



**2017** Master Catalog

**WIDIA** ™



For more than 90 years, WIDIA™ brand products and services have defined excellence in innovation, technology, and customer service.

From turning, indexable milling, solid end milling, holmaking, tapping, and tooling systems — WIDIA offers a broad range of solutions, all delivered from a single source. Match the most expansive portfolio of precision-engineered products and engineered solution services available today with a global, specialized network of Authorized Distributor partners, and you have the tools you need — and the power that only comes from WIDIA.



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

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**1926**

Tungsten carbide production begins

**1937**

WIDIA™ wins the Grand Prix at the world exposition in Paris

**1962**

First patent granted for coated carbide inserts

**1967**

WIDIA (India) begins producing carbide and tools

**1968**

Launch of first global coated grade

# A Powerful History of High Performance

For more than 90 years, WIDIA™ brand products and services have defined excellence in innovation, technology, and customer service. From the world's first patent for carbide indexable inserts to the development of the world's first coated grades, WIDIA delivers extreme results, no matter what the challenge.

From turning, indexable milling, solid end milling, holemaking, tapping, and tooling systems — WIDIA offers a broad range of solutions. Match the most expansive portfolio of precision-engineered products and engineered solution services available today with a global, specialized network of Authorized Distributor partners, and you have the tools you need — and the power that only comes from WIDIA.

**WIDIA** ™

**1982**

Launch of first PVD TiN coated taps (VTD)

**1987**

Launch of the Widaflex™ tooling system for turning, holemaking, and milling

**2000**

QS 9000 TES and VDA 6.4 certification for the WIDIA operations in Germany

**2009**

The WIDIA, Hanita, Greenfield Tap & Die, Circle, ClappDiCo, Manchester, Metal Removal, Metcut, and Rübigen brands combine to create the WIDIA Products Group

**2011**

Launch KM™ and ERICKSON™ Portfolio

**2013**

Launch of new VariTap™ series

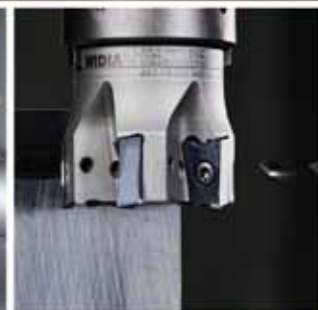
**2016**

WIDIA celebrates 90 years

CELEBRATING


90  
YEARS

1926 - 2016



# NOVO KNOWS

## ART TO PART TO PROFIT



Being as productive and profitable as possible is your fundamental goal. With the addition of NOVO™ to your team, your goal can be achieved. NOVO possesses powerful digital tools that link together process planning, inventory availability and purchase, cost-per-part management, and productivity improvements.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift.

[widia.com/novo](http://widia.com/novo)



**01**

THE DIGITAL SOURCE FOR DELIVERING  
SMART MACHINING SOLUTIONS

[widia.com/novo](http://widia.com/novo)

**NOVO**  <sup>TM</sup>

# WIDIA™ Metalworking Services

WIDIA™ provides an array of products and support services from onsite tool management and engineering personnel, to inventory control systems, to tool manufacturing, reconditioning, and recycling to support tools and their processes throughout their entire lifecycle. Our metalworking services are designed to save your business time, money, and inventory, and protect your cutting tool investment for the long term.

Let WIDIA help you extend the life of your tools and maintain their performance in delivering productivity. Contact your local authorized WIDIA distributor or visit [widia.com/services](http://widia.com/services) to learn more.



## NOVO™

NOVO™ possesses powerful digital tools that link together process planning, inventory availability and purchase, cost-per-part management, and productivity improvements.

**See pages B111, E153, O20–O21, and W115 to learn more.**



## ToolBOSS™ Vending Solution

ToolBOSS vending solutions help to reduce costs and improve efficiencies to give you a competitive edge.

**See pages D61, K127, and S15 to learn more.**



## Customer Application Support

WIDIA™ Customer Application Engineers assist customers and engineering groups throughout the world with expert tool selection and application recommendations for the entire range of WIDIA tooling.

**See pages J15, U81, and W183 to learn more.**





### **Toolholder Service and Repair**

When your WIDIA™ advanced tooling products need to be serviced, the WIDIA Service and Repair Department has the highly trained staff to provide expert assistance.

**See pages K73, N32, and U96 to learn more.**



### **Carbide Recycling**

The WIDIA Carbide Recycling Program can turn accumulated scrap carbide tooling in your shop into cash.

**See pages P21 and R87 to learn more.**

## **KNOWLEDGE CENTER**

### **Knowledge Center**

The Knowledge Center offers several ways to get trained. In-person classes include lecture, lab, and machining demonstrations.

**See pages F101 and J31 to learn more.**



### **WIDIA and the Machine Tool Industry (MTI)**

We have Machine Tool Industry (MTI) specialists in more than 60 countries around the world, so there's always someone near you: [W-MTI.Solutions@WIDIA.com](mailto:W-MTI.Solutions@WIDIA.com).

**See page M170–M171 to learn more.**



### **Tool Reconditioning**

WIDIA Reconditioning Services optimize the value of metalcutting tools throughout their entire lifecycle by giving like-new performance — with rapid turnaround time — so tools are always on hand and perform just like new.

**See pages L18–L19, R130–R131, T62–T63, and W157 to learn more.**

## Get fast and reliable answers to your toughest metalcutting problems.

Our Customer Application Support (CAS) Team is the metalworking industry's leading help desk resource for tooling application solutions and problem resolution.

# Customer Application Support (CAS)

- Easy access to proven metalworking expertise.
- Service level excellence.
- Best-in-class application support tools and technology.

### Easy access to proven metalworking expertise!

WIDIA™ Customer Application Engineers assist customers and engineering groups throughout the world with expert tool selection and application recommendations for the entire range of WIDIA tooling.

#### Service Level Excellence:

- Fast telephone response.
- Quick technical solutions.
- Efficient case management.

#### Services Provided:

- Tooling selection.
- Operating parameters.
- Troubleshooting.
- Process optimization.
- Hardware support.

#### Best-in-Class Support Tools and Technology:

- Tooling performance experts.
- Materials database.
- Application calculators.

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United Kingdom	English	+44 0800 028 2996	001 724 539 6830 *	na.techsupport@widia.com
Ukraine	Russian	+380 0800502665	0048 6166 56504*	eu.techsupport@widia.com
USA	English	888 539 5145	001 724 539 6830 *	na.techsupport@widia.com

\*Noted phone and fax numbers are not toll free.

# On the Web

## We are here to serve you.

Visit our homepage at [widia.com](http://widia.com) to:

- Find a Local WIDIA™ Authorized Distributor near you.
- Contact our Customer Application Support team for technical support and product recommendations.
- Log in to NOVO™ for instant access to inventory availability, application recommendations, CAD drawings, and 3D models.
- Purchase WIDIA-branded merchandise.
- Get social with us on Facebook, Twitter, Instagram, YouTube, and more!

## NOVO™

You can also use our NOVO app to guide you to the correct choice!

For more information, please visit [widia.com/novo](http://widia.com/novo).

**NOVO:** The Digital Source for Delivering Smart Machining Solutions



For more information, contact your local WIDIA Authorized Distributor or visit [widia.com/services](http://widia.com/services).



# WIDIA™



## Turning

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# Turning Product Highlights

## WIDIA™ Victory™ High-Temp Turning

With three geometries and three grades, WIDIA Victory has a complete portfolio for high-temp turning applications in nickel-based (INCONEL®, Udimet®, Rene), cobalt-based (Haynes®), and Fe-based (Airmet 100) materials, as well as difficult-to-machine stainless (460SS, duplex, high-alloy stainless), cobalt-chrome, and stainless-based powdered metals. These materials are commonly found in rings, housings, hubs, compressors, fans, rotors, and medical devices.

### -FS Geometry

The -FS Geometry is a ground, highly-positive design best used in finishing cuts where size control, finish, and minimization of part deflection are considerations.

- Excellent chip control versus similar competitive geometries. This chip control adds process stability and reduces machine stoppages to remove stringers.
- Increased cutting speed and/or feed rate for better chip control to reduce cycle time, gain productivity, and reduce machining cost.
- Reduced cutting forces provide longer tool life and/or better surface finish.
- Improved depth-of-cut (DOC) notching resistance for longer tool life.
- Advanced PVD grades provide more wear resistance and longer tool life.





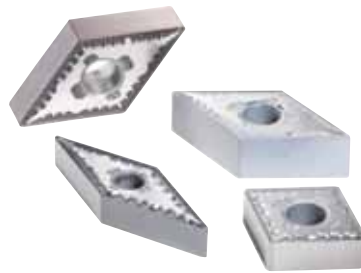
## -MS Geometry

-MS geometry is a molded geometry with increased edge toughness that is best used in medium machining.

- The -MS geometry offers excellent chip control versus similar competitive geometries. This chip control adds process stability and reduces machine stoppages to remove stringers.
- Available in two PVD grades, -MS is a high-performance geometry. Compete with confidence against any competitor. The -MS is also available in an uncoated grade.
- The WIDIA™ Victory™ grades offer better depth-of-cut (DOC) notching resistance and improved edge toughness. This offers customers an improved solution from other competitors.

## -UR Geometry

- -UR geometry offers a roughing solution for high-temp materials. Available in WS10PT™ and WS25PT™, the -UR geometry provides smooth chip forming and improved coolant flow for increased tool life. This positive geometry, with its unique chipbreaker without inflection points, reduces cutting forces and improves depth-of-cut (DOC) notching resistance.



# Turning Product Highlights

## WIDIA™ VariTurn™

Formerly known as WIDIA Value, the WIDIA VariTurn platform offers high-performance inserts with versatility. With eight grades and eight geometries, VariTurn covers 80% of all turning applications.

Every insert is gold, which exposes wear as the tool continues to be used. This makes it easy to detect when an insert is ready to be changed, maximizing the product's value and protecting the workpiece. Also, because WIDIA VariTurn inserts can be used in most applications, a single insert can take on any number of tasks, thus reducing inventory. WIDIA VariTurn products are reliable enough to cut steel, stainless steel, cast iron, and high-temperature alloys, enabling quick changes in workpiece materials without the need to swap inserts, saving time and money.

## WMT™ System

The WMT platform is the economical and reliable option for all grooving, face grooving, cut-off, turning, and profiling applications. The WMT system ensures precise insert positioning and provides only the most accurate machining, with exceptionally fast cycle times and superior performance.

### The WMT portfolio offers:

- Proven higher stability.
  - WMT insert design has the best clamping system for stability.
- Platform flexibility, with multiple geometries in single holder for multiple application types.
- Victory™ grades:
  - WU10HT™ — Uncoated
  - WU10PT, WU25PT — PVD
  - WP10CT, WP10CT — CVD
- Greater depth-of-cut (DOC) capability.

### Versatile and Well Constructed

- Specifically designed to increase speeds and feeds.
- Excellent geometry for even the most demanding deep grooving applications.
- The WMT system enables heavy stock removal in turning applications.
- Ensures finer surface finishes and a long, reliable tool life.







## WIDIA™ Tools for Small Hole Boring

When the application calls for boring at a D min of less than 1.38" (35mm), WIDIA offers comprehensive and easy solutions to choose from. Our portfolio of tools for small hole boring offer solutions in either indexable inserts or solid carbide inserts, and inserts are available for boring, profiling, threading, and grooving.

### I.D. Indexable Tooling

- Steel and solid carbide shanks with through coolant in inch and metric sizes.
- Ground-in and pressed-type chipbreaker inserts.
- Coated and uncoated carbide grades and cubic boron nitride/polycrystalline diamond-tipped inserts to support all machining applications.

### Quadralock™ System

- Versatile and engineered to give exceptional performance for I.D. machining applications. Quick, accurate insert indexing.
- Internal coolant can be used with all tool bodies. Cutting inserts have special slots that direct coolant to the cutting edge.
- Carbide grades for steels, stainless steels, non-ferrous materials, super alloys, titanium, and hard materials.

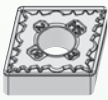
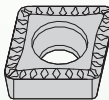
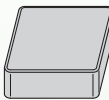
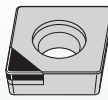
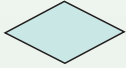





### A/B Series Tooling

- Inserts repeat within  $\pm .0005"$ , allowing quick and accurate setups.
- Elliptical, ground insert shanks allow for maximum strength and rigidity.
- Available in boring, grooving, threading, and profiling insert styles.
- Coated and uncoated carbide grades and cubic boron nitride/polycrystalline diamond-tipped inserts to support all machining applications.

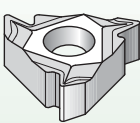
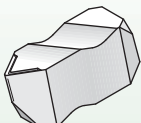
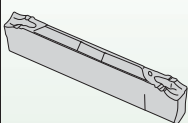
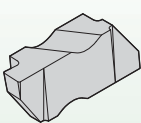
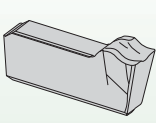
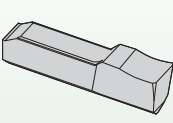


■ ANSI/ISO Turning Inserts

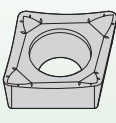
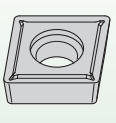
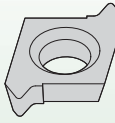
Step 1 • Select Insert Style

						
			Carbide Inserts, Negative	Carbide Inserts, Positive	Ceramic Inserts	PcBN/PCD Inserts
<b>C</b>	Rhomboid 80°		B35-B45	B30-B43 B45-B46	B179-B181	B197-B203
<b>D</b>	Rhomboid 55°		B51-B63	B47-B50 B63-B64	B182-B183	B206-B210
<b>R</b>	Round		B67	B65-B66	B184-B186	B210
<b>S</b>	Square 90°		B70-B77	B68-B70 B78-B80	B187-B192	B210-B212
<b>T</b>	Triangular 60°		B83-B91	B91-B93	B193-B195	B212-B215
<b>V</b>	Rhomboid 35°		B95-B99	B94-B95	B196	B216-B218
<b>W</b>	Trigon 80° with enlarged corner angles		B99-B105	B105	B196	B218

■ Threading, Grooving, and Cut-Off

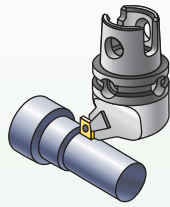
						
	LT	TopThread™	WMT™	TopGroove™	Separator™	Ranger™
inserts	F44-F71	F8-F22	E12-E27	E50-E76	E117-E128	E144-E148
toolholders	F72-F81	F23-F37	E28-E40	E77-E85	E129-E135	E141-E143, E149-E151

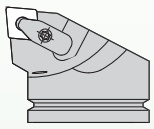
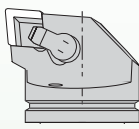
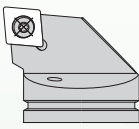
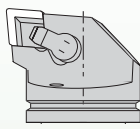
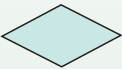






■ WIDIA™ Turning Solutions

			
	Inserts to Machine Aluminum	VariTurn™	Tools for Small Hole Boring
inserts	B150-B157	B106-B149	D1-D127

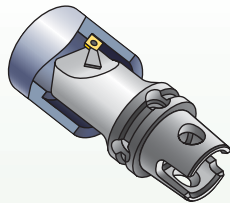
**Step 2 • Select Application and Clamping System**

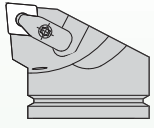
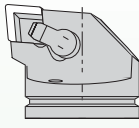
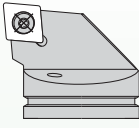
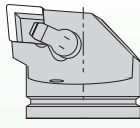
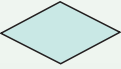






**External Machining**



							
				<b>D-Style Clamping</b>	<b>Negative C-Style Clamping</b>	<b>S-Style Clamping</b>	<b>Positive C-Style Clamping</b>
<b>C</b>	Rhomboid 80°		conventional	C8–C10	C19	C25–C26	–
<b>D</b>	Rhomboid 55°		conventional	C11–C12	–	C27	–
<b>R</b>	Round		conventional	C13	–	–	C23–C24
<b>S</b>	Square 90°		conventional	C13–C15	C19–C20	C27	C21
<b>T</b>	Triangular 60°		conventional	C15–C16	–	C28	C21–C23
<b>V</b>	Rhomboid 35°		conventional	C17–C18	–	C29	–
<b>W</b>	Trigon 80° with enlarged corner angles		conventional	C18	C20	–	–

**Internal Machining**



							
				<b>D-Style Clamping</b>	<b>Negative C-Style Clamping</b>	<b>S-Style Clamping</b>	<b>Positive C-Style Clamping</b>
<b>C</b>	Rhomboid 80°		conventional	C36–C37	–	C40–C44	–
<b>D</b>	Rhomboid 55°		conventional	C38	–	C45–C48	–
<b>R</b>	Round		conventional	–	–	–	–
<b>S</b>	Square 90°		conventional	C39	–	–	–
<b>T</b>	Triangular 60°		conventional	–	–	C49–C50	C39
<b>V</b>	Rhomboid 35°		conventional	–	–	C51	–
<b>W</b>	Trigon 80° with enlarged corner angles		conventional	–	–	–	–



## Turning ISO/ANSI Inserts

WIDIA Victory High-Performance Inserts .....	B2–B105
WIDIA VariTurn .....	B106–B149
Inserts for Machining Aluminum .....	B150–B157
Ceramic, PcBN, and PCD Inserts.....	B158–B218

# A Complete High-Performance Turning Portfolio • WIDIA™ Victory™

Specifically engineered multilayer coating provides high-speed capability for finishing to roughing operations. New geometries enhance chip control for better tool life and superior surface finishes.



## Victory

- Market-leading technology.
- Longer tool life.
- Higher productivity through increased speed capability.

### Steel and Stainless Steel Grades

- Reduced cycle times — high speed and feed capability.
- Long tool life — new multilayer coating provides better wear resistance.
- Proven seating — smooth and secure seating surface.
- Outer layer is bronze-colored for easier wear detection.

#### Post-coat treatment

- Improves edge toughness.
- Long, predictable tool life.
- Reduces depth-of-cut notching.
- Wide range of applications.

#### Improved edge toughness

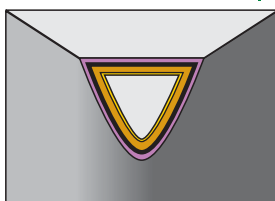
- Provides smooth outer surface to reduce forces, friction, and workpiece sticking.

#### Post-coat grinding

- Provides secure seating surface.

New geometry identification system.

MT-CVD/CVD-TiN-TiCN-  
Al<sub>2</sub>O<sub>3</sub>-ZrCN



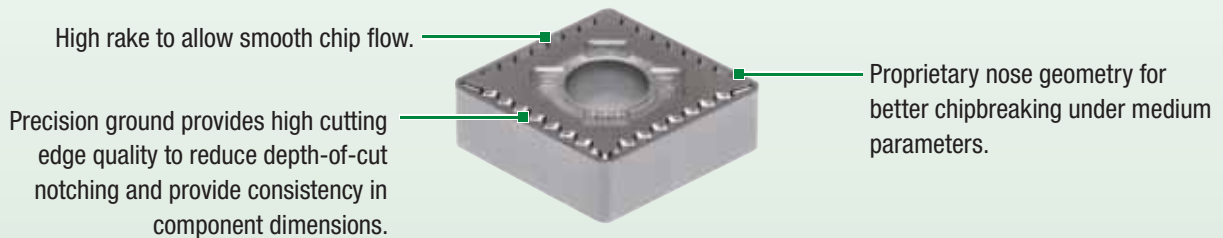
#### Alpha alumina layer

- Provides coating integrity at elevated speeds.
- Higher productivity and dependability at high cutting temperatures.

New WIDIA™ Victory™ grades and geometries are designed to offer better tool life and surface finishes.

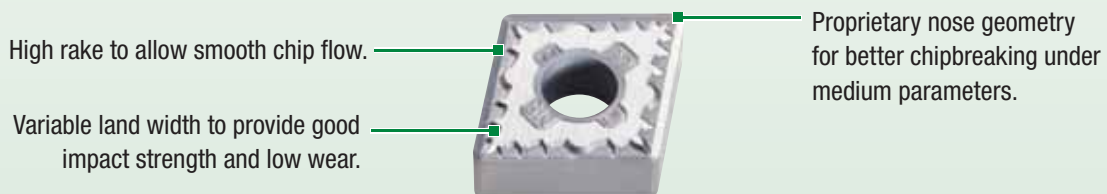
**..GG-FS Geometry**

- All ..GG-FS inserts are G tolerance inserts. This is a critical feature in some applications, especially the aerospace industry.
- Reduced cycle times — high speed and feed capability.
- Reduced cutting forces — improved dimensional control and reduced deflections.
- New chip forming elements — better chip control.
- Long tool life — new multilayer coating provides better wear resistance.
- Proven seating — smooth and secure seating surface.



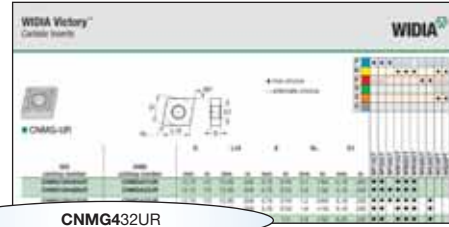
**..MG-MS Geometry**

- High positive rake angle delivers improved tool life by reducing cutting forces and built-up edge when machining high-temp alloys.
- Improved chip control and reduced crater wear due to proprietary chipbreakers with varying shapes and distances.
- Reduced thermal wear and cracking due to near sharp cutting edge with optimized edge treatment.
- Improved chipbreaking at various depths of cut due to variable land width, which improves impact strength.
- All MG-MS inserts are molded, which supports increased tool life due to the elimination of grinding stress.



## How Do Catalog Numbers Work?

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



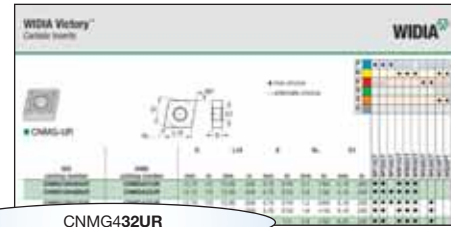
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Insert Shape		Insert Clearance Angle		Tolerance Class		Insert Features		Size																																																																																																																																																																																																																									
<b>H</b>	Hexagon 120°	<b>A</b>	3°	<p>Tolerances apply prior to edge prep and coating</p>	<b>N</b>		<p><b>Code for inch cutting edge length "L10"</b></p> <table border="1"> <thead> <tr> <th>inch</th> <th>"D"</th> <th>C</th> <th>D</th> <th>R</th> <th>S</th> <th>T</th> <th>V</th> <th>W</th> </tr> </thead> <tbody> <tr> <td>1.2 (5)</td> <td>5/32</td> <td>S4</td> <td>04</td> <td>03</td> <td>03</td> <td>06</td> <td>—</td> <td>—</td> </tr> <tr> <td>1.5 (6)</td> <td>3/16</td> <td>04</td> <td>05</td> <td>04</td> <td>04</td> <td>08</td> <td>08</td> <td>S3</td> </tr> <tr> <td>1.8 (7)</td> <td>7/32</td> <td>05</td> <td>06</td> <td>05</td> <td>05</td> <td>09</td> <td>09</td> <td>03</td> </tr> <tr> <td>—</td> <td>.236</td> <td>—</td> <td>—</td> <td>06</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>2</td> <td>1/4</td> <td>06</td> <td>07</td> <td>06</td> <td>06</td> <td>11</td> <td>11</td> <td>04</td> </tr> <tr> <td>2.5</td> <td>5/16</td> <td>08</td> <td>09</td> <td>07</td> <td>07</td> <td>13</td> <td>13</td> <td>05</td> </tr> <tr> <td>—</td> <td>.315</td> <td>—</td> <td>—</td> <td>08</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>3</td> <td>3/8</td> <td>09</td> <td>11</td> <td>09</td> <td>09</td> <td>16</td> <td>16</td> <td>06</td> </tr> <tr> <td>—</td> <td>.394</td> <td>—</td> <td>—</td> <td>10</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>3.5</td> <td>7/16</td> <td>11</td> <td>13</td> <td>11</td> <td>11</td> <td>19</td> <td>19</td> <td>07</td> </tr> <tr> <td>—</td> <td>.472</td> <td>—</td> <td>—</td> <td>12</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>4</td> <td>1/2</td> <td>12</td> <td>15</td> <td>12</td> <td>12</td> <td>22</td> <td>22</td> <td>08</td> </tr> <tr> <td>4.5</td> <td>9/16</td> <td>14</td> <td>17</td> <td>14</td> <td>14</td> <td>24</td> <td>24</td> <td>09</td> </tr> <tr> <td>5</td> <td>5/8</td> <td>16</td> <td>19</td> <td>15</td> <td>15</td> <td>27</td> <td>27</td> <td>10</td> </tr> <tr> <td>—</td> <td>.630</td> <td>—</td> <td>—</td> <td>16</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>5.5</td> <td>11/16</td> <td>17</td> <td>21</td> <td>17</td> <td>17</td> <td>30</td> <td>30</td> <td>11</td> </tr> <tr> <td>6</td> <td>3/4</td> <td>19</td> <td>23</td> <td>19</td> <td>19</td> <td>33</td> <td>33</td> <td>13</td> </tr> <tr> <td>—</td> <td>.787</td> <td>—</td> <td>—</td> <td>20</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>7</td> <td>7/8</td> <td>22</td> <td>27</td> <td>22</td> <td>22</td> <td>38</td> <td>38</td> <td>15</td> </tr> <tr> <td>—</td> <td>.984</td> <td>—</td> <td>—</td> <td>25</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>8</td> <td>1</td> <td>25</td> <td>31</td> <td>25</td> <td>25</td> <td>44</td> <td>44</td> <td>17</td> </tr> <tr> <td>10</td> <td>1-1/4</td> <td>32</td> <td>38</td> <td>31</td> <td>31</td> <td>54</td> <td>54</td> <td>21</td> </tr> <tr> <td>—</td> <td>1.260</td> <td>—</td> <td>—</td> <td>32</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> </tbody> </table>	inch	"D"	C	D	R	S	T	V	W	1.2 (5)	5/32	S4	04	03	03	06	—	—	1.5 (6)	3/16	04	05	04	04	08	08	S3	1.8 (7)	7/32	05	06	05	05	09	09	03	—	.236	—	—	06	—	—	—	—	2	1/4	06	07	06	06	11	11	04	2.5	5/16	08	09	07	07	13	13	05	—	.315	—	—	08	—	—	—	—	3	3/8	09	11	09	09	16	16	06	—	.394	—	—	10	—	—	—	—	3.5	7/16	11	13	11	11	19	19	07	—	.472	—	—	12	—	—	—	—	4	1/2	12	15	12	12	22	22	08	4.5	9/16	14	17	14	14	24	24	09	5	5/8	16	19	15	15	27	27	10	—	.630	—	—	16	—	—	—	—	5.5	11/16	17	21	17	17	30	30	11	6	3/4	19	23	19	19	33	33	13	—	.787	—	—	20	—	—	—	—	7	7/8	22	27	22	22	38	38	15	—	.984	—	—	25	—	—	—	—	8	1	25	31	25	25	44	44	17	10	1-1/4	32	38	31	31	54	54	21	—	1.260	—	—	32	—	—	—	—	<b>4</b>	
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<b>O</b>	Octagon 135°	<b>B</b>	5°	<p>D = Theoretical diameter of the insert inscribed circle S = Thickness B = See figures below</p>	<b>R</b>																																																																																																																																																																																																																												
<b>P</b>	Pentagon 108°	<b>C</b>	7°		<b>M</b>																																																																																																																																																																																																																												
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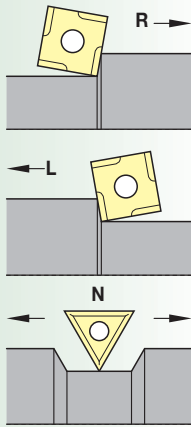
tolerance class	tolerance on "D"	tolerance on "B"	tolerance on "S"
C	±.0010"	±.0005"	±.001"
H	±.0005"	±.0005"	±.001"
E	±.0010"	±.0010"	±.001"
G	±.0010"	±.0010"	±.005"
M	See tables on next page		±.005"
U	See tables on next page		±.005"



By referencing this easy-to-use guide, you can identify the correct product to meet your needs.



CNMG432UR

<p><b>3</b></p> <p>Thickness S</p> <table border="1"> <thead> <tr> <th>symbol</th> <th>thickness</th> </tr> <tr> <th>inch</th> <th>inch</th> </tr> </thead> <tbody> <tr><td>.5 (1)</td><td>1/32</td></tr> <tr><td>.6</td><td>.040</td></tr> <tr><td>1 (2)</td><td>1/16</td></tr> <tr><td>1.2</td><td>5.64</td></tr> <tr><td>1.5</td><td>3/32</td></tr> <tr><td>2</td><td>1/8</td></tr> <tr><td>2.5</td><td>5/32</td></tr> <tr><td>3</td><td>3/16</td></tr> <tr><td>3.5</td><td>7/32</td></tr> <tr><td>4</td><td>1/4</td></tr> <tr><td>5</td><td>5/16</td></tr> <tr><td>6</td><td>3/8</td></tr> <tr><td>7</td><td>7/16</td></tr> <tr><td>18</td><td>1/2</td></tr> </tbody> </table>	symbol	thickness	inch	inch	.5 (1)	1/32	.6	.040	1 (2)	1/16	1.2	5.64	1.5	3/32	2	1/8	2.5	5/32	3	3/16	3.5	7/32	4	1/4	5	5/16	6	3/8	7	7/16	18	1/2	<p><b>2</b></p> <p>Corner Radius "Rε"</p> <table border="1"> <thead> <tr> <th>symbol</th> <th>corner radius</th> </tr> <tr> <th>inch</th> <th>inch</th> </tr> </thead> <tbody> <tr><td>X0</td><td>.0015</td></tr> <tr><td>0</td><td>.004</td></tr> <tr><td>.5</td><td>.008</td></tr> <tr><td>1</td><td>1/64</td></tr> <tr><td>2</td><td>1/32</td></tr> <tr><td>3</td><td>3/64</td></tr> <tr><td>4</td><td>1/16</td></tr> <tr><td>5</td><td>5/64</td></tr> <tr><td>6</td><td>3/32</td></tr> <tr><td>7</td><td>7/64</td></tr> <tr><td>8</td><td>1/8</td></tr> <tr><td>—</td><td rowspan="2">round insert</td></tr> <tr><td>—</td></tr> </tbody> </table>	symbol	corner radius	inch	inch	X0	.0015	0	.004	.5	.008	1	1/64	2	1/32	3	3/64	4	1/16	5	5/64	6	3/32	7	7/64	8	1/8	—	round insert	—	<p>Hand of Insert (optional)</p> <p>R = Right hand L = Left hand N = Neutral</p> 	<p>Cutting Edge (optional)</p> <table border="1"> <tbody> <tr><td>F</td><td>Sharp</td></tr> <tr><td>E</td><td>Rounded</td></tr> <tr><td>T</td><td>Chamfered</td></tr> <tr><td>S</td><td>Chamfered and Rounded</td></tr> <tr><td>K</td><td>Double-Chamfered</td></tr> <tr><td>P</td><td>Double-Chamfered and Rounded</td></tr> </tbody> </table>	F	Sharp	E	Rounded	T	Chamfered	S	Chamfered and Rounded	K	Double-Chamfered	P	Double-Chamfered and Rounded	<p><b>UR</b></p> <p>Chipbreaker (optional)</p> <table border="1"> <tbody> <tr><td>13</td><td>Railroad Light</td></tr> <tr><td>CT</td><td>Copy Turning</td></tr> <tr><td>FF</td><td>Fine Finishing</td></tr> <tr><td>FP</td><td>Finish Positive</td></tr> <tr><td>FW</td><td>Finish Wiper</td></tr> <tr><td>ML</td><td>Medium Light</td></tr> <tr><td>MR</td><td>Medium Roughing</td></tr> <tr><td>MW</td><td>Medium Wiper</td></tr> <tr><td>RH</td><td>Roughing Heavy</td></tr> <tr><td>T</td><td>Negative Land</td></tr> <tr><td>UF</td><td>Universal Finishing</td></tr> <tr><td>UM</td><td>Universal Medium</td></tr> <tr><td>UR</td><td>Universal Roughing</td></tr> <tr><td>.NMP</td><td>Sharp Medium</td></tr> <tr><td>MP</td><td>Medium Positive</td></tr> <tr><td>FS</td><td>Finishing High-Temp(S)</td></tr> <tr><td>MS</td><td>Medium High-Temp(S)</td></tr> <tr><td>MU</td><td>Medium Universal</td></tr> <tr><td>SR</td><td>Super Roughing</td></tr> <tr><td>65</td><td>Heavy Roughing</td></tr> </tbody> </table>	13	Railroad Light	CT	Copy Turning	FF	Fine Finishing	FP	Finish Positive	FW	Finish Wiper	ML	Medium Light	MR	Medium Roughing	MW	Medium Wiper	RH	Roughing Heavy	T	Negative Land	UF	Universal Finishing	UM	Universal Medium	UR	Universal Roughing	.NMP	Sharp Medium	MP	Medium Positive	FS	Finishing High-Temp(S)	MS	Medium High-Temp(S)	MU	Medium Universal	SR	Super Roughing	65	Heavy Roughing
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X0	.0015																																																																																																																				
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8	1/8																																																																																																																				
—	round insert																																																																																																																				
—																																																																																																																					
F	Sharp																																																																																																																				
E	Rounded																																																																																																																				
T	Chamfered																																																																																																																				
S	Chamfered and Rounded																																																																																																																				
K	Double-Chamfered																																																																																																																				
P	Double-Chamfered and Rounded																																																																																																																				
13	Railroad Light																																																																																																																				
CT	Copy Turning																																																																																																																				
FF	Fine Finishing																																																																																																																				
FP	Finish Positive																																																																																																																				
FW	Finish Wiper																																																																																																																				
ML	Medium Light																																																																																																																				
MR	Medium Roughing																																																																																																																				
MW	Medium Wiper																																																																																																																				
RH	Roughing Heavy																																																																																																																				
T	Negative Land																																																																																																																				
UF	Universal Finishing																																																																																																																				
UM	Universal Medium																																																																																																																				
UR	Universal Roughing																																																																																																																				
.NMP	Sharp Medium																																																																																																																				
MP	Medium Positive																																																																																																																				
FS	Finishing High-Temp(S)																																																																																																																				
MS	Medium High-Temp(S)																																																																																																																				
MU	Medium Universal																																																																																																																				
SR	Super Roughing																																																																																																																				
65	Heavy Roughing																																																																																																																				

"D"	± Tolerance on "D"				"D"	± Tolerance on "B"			
	Class M Tolerance			Class U Tolerance		Class M Tolerance			Class U Tolerance
	Shapes S, T, C, R, & W	Shape D	Shape V	Shapes S, T, & C		Shapes S, T, C, R, & W	Shape D	Shape V	Shapes S, T, & C
inch	inch	inch	inch	inch	inch	inch	inch	inch	
5/32	.002	—	—	—	5/32	.003	—	—	—
3/16	.002	—	—	.003	3/16	.003	—	—	.005
7/32	.002	.002	.002	.003	7/32	.003	.004	—	.005
1/4	.002	.002	.002	.003	1/4	.003	.004	—	.005
5/16	.002	.002	.002	.003	5/16	.003	.004	—	.005
3/8	.002	.002	.002	.003	3/8	.003	.004	.007	.005
7/16	.003	.003	.003	.005	7/16	.005	.006	—	—
1/2	.003	.003	.003	.005	1/2	.005	.006	.010	.008
9/16	.003	.003	.003	.005	9/16	.005	.006	—	—
5/8	.004	.004	.004	.007	5/8	.006	.007	—	.011
11/16	.004	.004	.004	.007	11/16	.006	.007	—	.011
3/4	.004	.004	.004	.007	3/4	.006	.007	—	.011
7/8	.005	—	—	.010	7/8	.006	—	—	.015
1	.005	—	—	.010	1	.007	—	—	.015
1 1/4	.006	—	—	.010	1 1/4	.008	—	—	.015

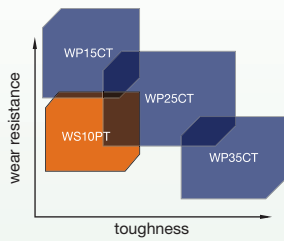
A system of grades, geometries, and application guidelines to provide optimal solutions for your metalcutting needs. It's easy to determine which WIDIA™ chip-control cutting tool will work best in your specific workpiece materials and applications!



W	P	15	C	T													
Brand	Primary Workpiece Material	Application Range*	Insert Material	Application													
<table border="1"> <tr><td>P</td><td>Steel</td></tr> <tr><td>M</td><td>Stainless Steel</td></tr> <tr><td>K</td><td>Cast Iron</td></tr> <tr><td>N</td><td>Non-Ferrous</td></tr> <tr><td>S</td><td>High-Temp Alloys</td></tr> <tr><td>H</td><td>Hardened Materials</td></tr> <tr><td>U</td><td>Universal Machining</td></tr> </table>	P	Steel	M	Stainless Steel	K	Cast Iron	N	Non-Ferrous	S	High-Temp Alloys	H	Hardened Materials	U	Universal Machining	<p>05 = fine finishing            10 = finishing            15 = }            20 = } medium to roughing            25 = }            30 = }            35 = } roughing            40 = }            45 = } heaviest roughing            50 = }</p> <p>*Samples shown are based on turning and will differ within applications.</p>	<p>H = Uncoated Carbide            C = Carbide + CVD            P = Carbide + PVD            T = Cermet            Y = Ceramics            D = Diamond            B = PcBN            S = HSS            E = HSS-E            M = HSS-E-PM</p>	<p>T = Turning            M = Milling            H = Holmaking            D = Solid Drills            E = Solid End Mills            G = Taps            R = Reamer            V = Thread Mills</p>
P	Steel																
M	Stainless Steel																
K	Cast Iron																
N	Non-Ferrous																
S	High-Temp Alloys																
H	Hardened Materials																
U	Universal Machining																

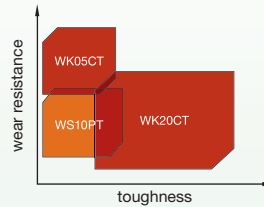


## Victory Toughness/Wear Resistance



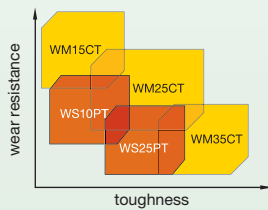
### WP Grades for Steel

- Three grades and seven primary geometries for use in roughing to finishing operations.
- Increase cutting speed and/or feed rate to gain productivity.



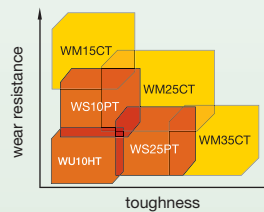
### WK Grades for Cast Iron

- Three grades across 12 geometries for use in roughing to finishing operations.
- Very good balance of wear resistance and toughness for long predictable tool life. Flat top geometry for machining cast iron. For finishing to roughing applications.



### WM Grades for Stainless Steel

- Two grades to cover all of your cast iron turning operations.
- Increase cutting speed and/or feed rate by up to 30% over similar competitive grades.



### WS Grades for High-Temp Alloys

- Two grades for use in roughing to finishing operations.
- Very good wear resistance for longer tool life.
- One uncoated grade for use in titanium.

## Positive and Negative Inserts

### Positive Inserts



- Screw-on inserts are the first choice for I.D. turning of all materials and O.D. turning on small to medium lathes.
- Suitable for all workpiece materials.

### Negative Inserts



- Negative style inserts are your first choice for general machining of all materials on medium to large lathes.
- Negative style inserts offer the best economy for high metal removal rates.
- Available in flat-top and chip-control geometries with both molded and ground peripheries.
- Suitable for all workpiece materials.

### Ceramic Inserts



- Ceramic inserts are a great choice for productive machining of high-temp alloys.
- Negative rake inserts are also recommended for the machining of hardened materials and cast irons.
- Available in flat-top geometries with molded and ground peripheries.

### PcBN and PCD Inserts



- PcBN can be used for machining steels with a hardness higher than 48 HRC.
- PcBN inserts can also be used for productivity improvements in machining cast irons and high-temp alloys.
- PCD inserts are used for machining non-ferrous materials.

## Insert Selection System

### How to Use

The WIDIA three-step insert selection system makes choosing and applying the most productive tool as easy as 1, 2, 3. Tool recommendations are based on six workpiece material groups, optimizing selection accuracy.

### Example:

#### Six workpiece material groups

##### ■ Step 1 • Select the insert geometry


Given: depths of cut = .040" (1mm)  
feed = .016 IPR (4mm)

**Unknown: insert geometry**

Solution: -RH



##### ■ Step 2 • Select the grade

Given: cutting conditions:  
lightly interrupted cut 



Geometry: -RH

**Unknown: grade**

Solution: WP25CT™



##### ■ Step 3 • Select the cutting speed

Given: grade WP35CT™   
cutting conditions   
material CK15

**Unknown: cutting speed**

Solution: 210 m/min

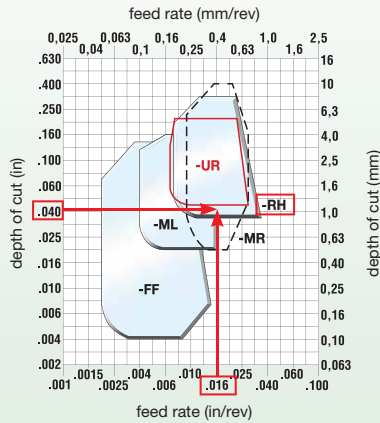
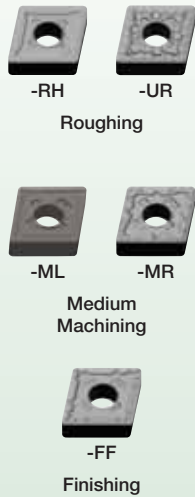
### Need help in selecting a product?

Additional information can be obtained by contacting  
the WIDIA Customer Application Support Team.

Go to [widia.com](http://widia.com) for your country's phone number.

**Step 1 • Select the insert geometry**

**Negative Inserts**



P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

**Step 2 • Select the grade**

cutting condition	Negative Insert Geometry					Positive Insert Geometry		
	-FF	-ML	-MR	-UR	-RH	-FP	-MU	-MP
heavily interrupted cut	WP15CT	WP25CT	WP35CT/ WP25CT	WP35CT	WP35CT	WP25CT/ WS25PT	WP35CT	WM35CT
lightly interrupted cut	WP15CT	WP25CT	WP25CT	WP35CT	WP35CT	WP25CT	WP25CT	WP25CT
varying depth of cut, casting, or forging skin	WP15CT	WP15CT	WP15CT	WP25CT	WP25CT	WP15CT	WP15CT	WP15CT
smooth cut, pre-turned surface	WP15CT	WP15CT	WP15CT	WP25CT	WP25CT	WP15CT	WP15CT	WP15CT

**Step 3 • Selecting the cutting speed**

Low-Carbon (<0.3% C) and Free-Machining Steel											Starting Conditions	
material group	grade	speed – m/min (SFM)									m/min	SFM
		135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)		
P0/P1	WP15CT										395	1320
	WP25CT										275	925
	WP35CT										210	700
	WS10PT										280	925

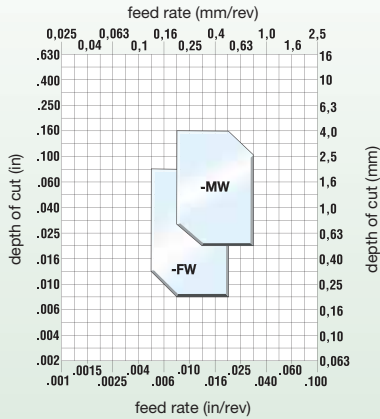
**WIDIA Material Group Selection Guide:**

To optimize speed recommendations, material subgroups have been added to each of the six workpiece material groups.

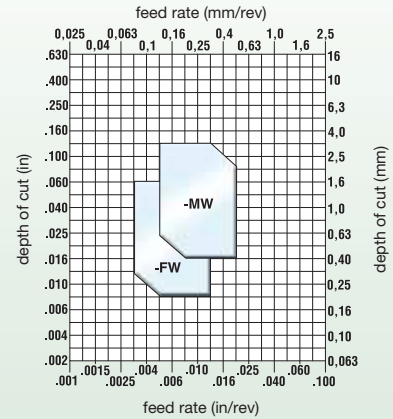
material	material group ISO code	number of material subgroups
steel	P	1-6
stainless steel	M	1-3
cast iron	K	1-3
non-ferrous materials	N	1-8
high-temp alloys	S	1-4
hardened materials	H	1

■ **Step 1 • Select the insert geometry**

**Negative Wiper Inserts**



**Positive Wiper Inserts**

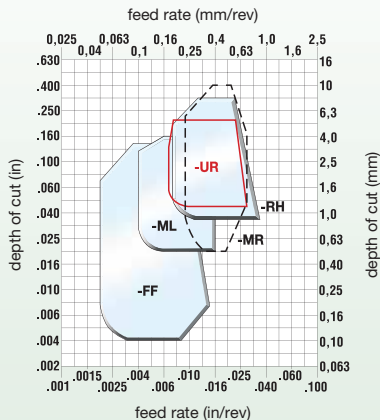
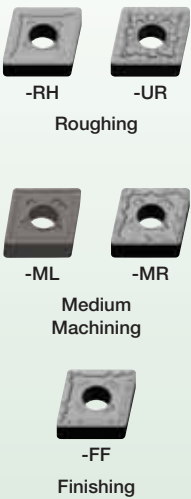


■ **Step 2 • Select the grade**

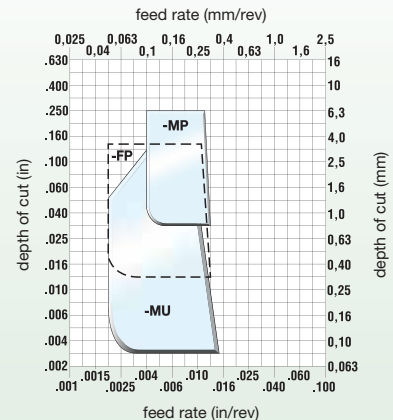
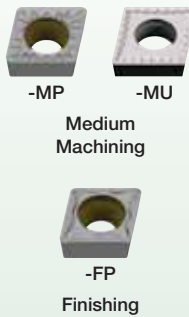
cutting condition	Negative Insert Geometry		Positive Insert Geometry	
	-FW	-MW	-FW	-MW
heavily interrupted cut	WP15CT	WP25CT	-	WP25CT
lightly interrupted cut	WP15CT	WP25CT	WP15CT	WP25CT
varying depth of cut, casting, or forging skin	WP15CT	WP15CT	WP15CT	WP15CT
smooth cut, pre-turned surface	WP15CT	WP15CT	WP15CT	WP15CT

■ **Step 1 • Select the insert geometry**

**Negative Inserts**



**Positive Inserts**



■ **Step 2 • Select the grade**

cutting condition	Negative Insert Geometry					Positive Insert Geometry		
	-FF	-ML	-MR	-UR	-RH	-FP	-MU	-MP
heavily interrupted cut	WP15CT	WP25CT	WP35CT/ WP25CT	WP35CT	WP35CT	WP25CT/ WS25PT	WP35CT	WM35CT
lightly interrupted cut	WP15CT	WP25CT	WP25CT	WP35CT	WP35CT	WP25CT	WP25CT	WP25CT
varying depth of cut, casting, or forging skin	WP15CT	WP15CT	WP15CT	WP25CT/ WP10CT	WP25CT	WP15CT	WP25CT/ WP10CT	WP15CT
smooth cut, pre-turned surface	WP15CT	WP15CT	WP15CT	WP25CT/ WP10CT	WP25CT	WP15CT	WP25CT/ WP10CT	WP15CT

(continued)

**Step 3 • Select the cutting speed** *(continued)*
**Low-Carbon (<0.3% C) and Free-Machining Steel**

speed – m/min (SFM)

Starting Conditions



material group	grade	135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM
P0/P1	WP15CT	◇									395	1320
	WP25CT	◇									275	925
	WP35CT	◇									210	700
	WS10PT	◇									280	925
	WM35CT	◇									180	600

**Medium- and High-Carbon Steels (>0.3% C)**

speed – m/min (SFM)

Starting Conditions



material group	grade	135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM
P2	WP15CT	◇									265	880
	WP25CT	◇									195	650
	WP35CT	◇									150	500
	WS10PT	◇									200	650
	WM35CT	◇									120	500

**Alloy Steels and Tool Steels (≤330 HB) (≤35 HRC)**

speed – m/min (SFM)

Starting Conditions



material group	grade	135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM
P3	WP15CT	◇									190	630
	WP25CT	◇									155	510
	WP35CT	◇									120	400
	WS10PT	◇									155	510
	WM35CT	◇									90	300

**Alloy Steels and Tool Steels (340–450 HB) (36–48 HRC)**

speed – m/min (SFM)

Starting Conditions



material group	grade	60 (200)	90 (300)	120 (400)	150 (500)	180 (600)	210 (700)	240 (800)	270 (900)	300 (1000)	m/min	SFM
P4	WP15CT	◇									145	480
	WP25CT	◇									105	360
	WP35CT	◇									95	325
	WS10PT	◇									110	360
	WM35CT	◇									65	225

**Ferritic, Martensitic, and PH Stainless Steels (≤330 HB) (≤35 HRC)**

speed – m/min (SFM)

Starting Conditions



material group	grade	120 (400)	150 (500)	180 (600)	210 (700)	240 (800)	270 (900)	300 (1000)	330 (1100)	360 (1200)	m/min	SFM
P5	WP15CT	◇									215	720
	WP25CT	◇									195	650
	WP35CT	◇									135	450
	WS10PT	◇									200	660

**Ferritic, Martensitic, and PH Stainless Steels (340–450 HB) (36–48 HRC)**

speed – m/min (SFM)

Starting Conditions

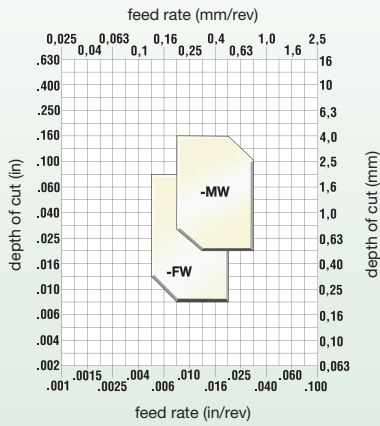


material group	grade	105 (350)	135 (450)	165 (550)	195 (650)	225 (750)	255 (850)	285 (950)	315 (1050)	345 (1150)	m/min	SFM
P6	WP15CT	◇									180	600
	WP25CT	◇									150	500
	WP35CT	◇									105	350
	WS10PT	◇									150	500

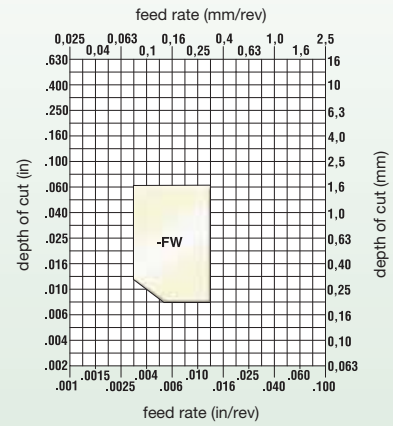
■ Step 1 • Select the insert geometry



**Negative Wiper Inserts**



**Positive Wiper Inserts**

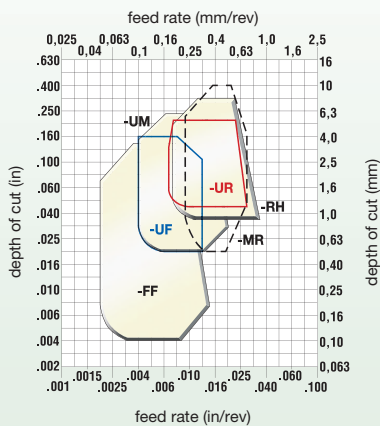
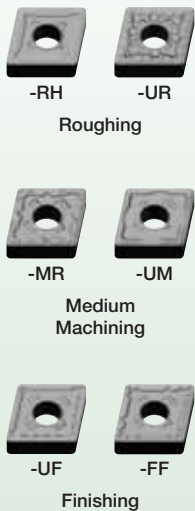


■ Step 2 • Select the grade

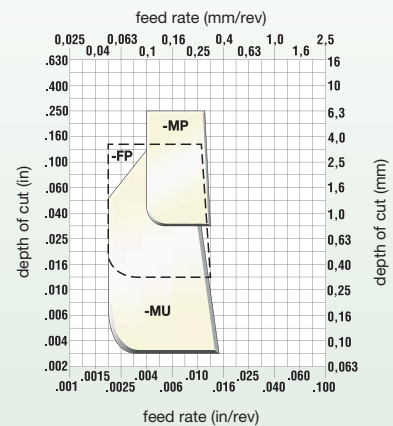
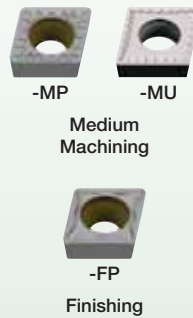
cutting condition	Negative Insert Geometry		Positive Insert Geometry
	-FW	-MW	-FW
heavily interrupted cut	WM15CT	WM15CT	WM15CT
lightly interrupted cut	WM15CT	WM25CT	WM15CT
varying depth of cut, casting, or forging skin	WM15CT	WM25CT	WM15CT
smooth cut, pre-turned surface	WM15CT	WM25CT	WM15CT

■ Step 1 • Select the insert geometry

**Negative Inserts**



**Positive Inserts**



(continued)



**Step 2 • Select the grade** *(continued)*

cutting condition	Negative Insert Geometry						
	-FF	-UF	-MR	-UM	-RH	-UR	
heavily interrupted cut		WS10PT	WM15CT	WM35CT	WM35CT	-	WM35CT
lightly interrupted cut		WS10PT	WM15CT	WM25CT	WM25CT	WM35CT	WM35CT/ WM25CT
varying depth of cut, casting, or forging skin		WM15CT	WM15CT/ WS10PT	WM15CT	WM15CT	WM35CT	WM25CT
smooth cut, pre-turned surface		WM15CT	WM15CT	WM15CT	WM15CT	-	WM15CT

cutting condition	Positive Insert Geometry			
	-FP	-MU	-MP	
heavily interrupted cut		WM25CT	WM35CT/ WS25PT	WM25CT
lightly interrupted cut		WM25CT	WM25CT/ WS10PT	WM25CT
varying depth of cut, casting, or forging skin		WM25CT/ WM15CT	WM25CT	WM25CT/ WM15CT
smooth cut, pre-turned surface		WM15CT	WM25CT	WM15CT

**Step 3 • Select the cutting speed**

**Austenitic Stainless Steel** speed – m/min (SFM) Starting Conditions

material group	grade	speed – m/min (SFM)										Starting Conditions	
		90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	200 (650)	360 (1200)	405 (1350)	450 (1500)	m/min	SFM
M1	WM15CT											180	600
	WM25CT											150	500
	WM35CT											120	400
	WS10PT											215	700
	WS25PT											180	550

**Austenitic Stainless Steel** speed – m/min (SFM) Starting Conditions

material group	grade	speed – m/min (SFM)										Starting Conditions	
		90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	200 (650)	360 (1200)	405 (1350)	450 (1500)	m/min	SFM
M2	WM15CT											165	550
	WM25CT											140	450
	WM35CT											105	350
	WS10PT											200	650
	WS25PT											165	500

**Austenitic Stainless Steel: Duplex (Ferritic and Austenitic Mixture)** speed – m/min (SFM) Starting Conditions

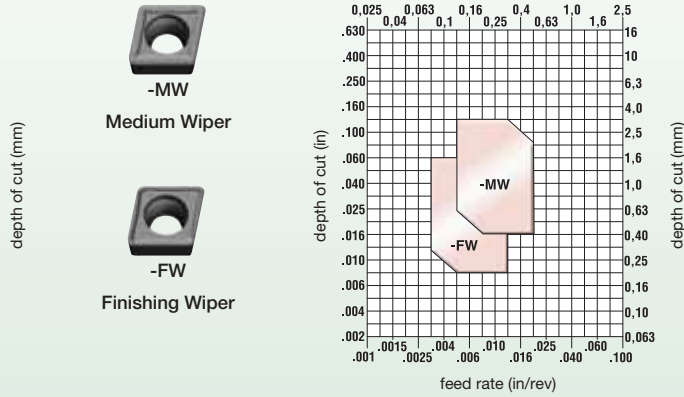
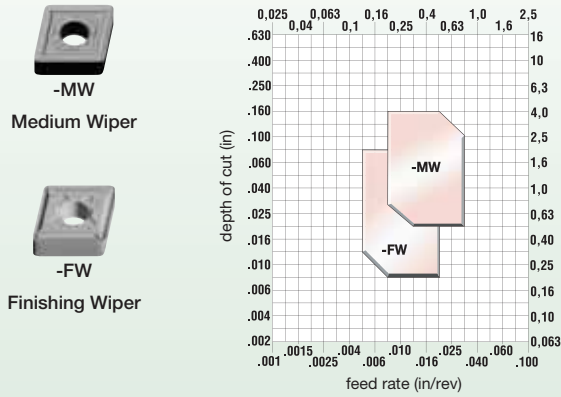
material group	grade	speed – m/min (SFM)										Starting Conditions	
		90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	200 (650)	360 (1200)	405 (1350)	450 (1500)	m/min	SFM
M3	WM15CT											150	500
	WM25CT											120	400
	WM35CT											90	300
	WS10PT											185	600
	WS25PT											150	450

■ Step 1 • Select the insert geometry



**Negative Wiper Inserts**

**Positive Wiper Inserts**



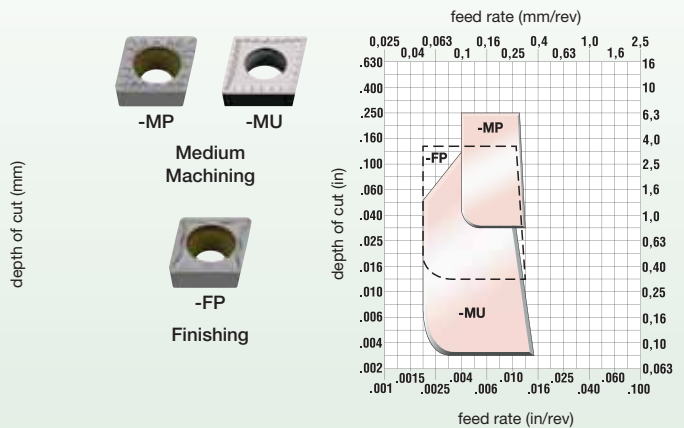
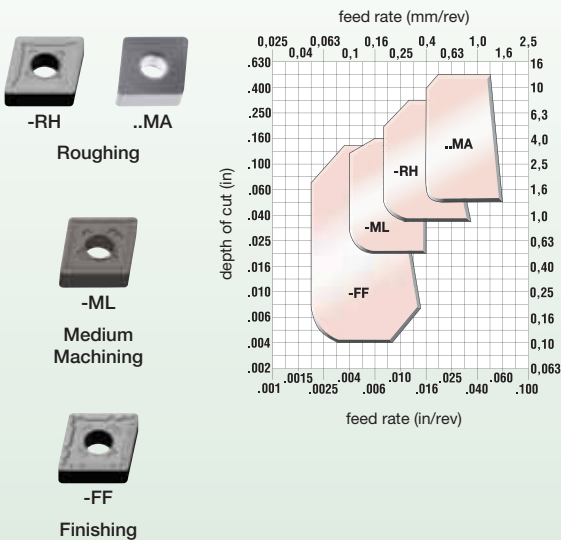
■ Step 2 • Select the grade

cutting condition		Negative Insert Geometry		Positive Insert Geometry	
		-FW	-MW	-FW	-MW
heavily interrupted cut		-	-	-	-
lightly interrupted cut		WK05CT	WK05CT	WK05CT	WK05CT
varying depth of cut, casting, or forging skin		WK05CT	WK05CT	WK05CT	WK05CT
smooth cut, pre-turned surface		WK05CT	WK05CT	WK05CT	WK05CT

■ Step 1 • Select the insert geometry

**Negative Inserts**

**Positive Inserts**



(continued)

**Step 2 • Select the grade** *(continued)*

cutting condition	Negative Insert Geometry				Positive Insert Geometry		
	-FF	-ML	-UR	..MA	-FP	-MU	-MP
heavily interrupted cut		WK20CT	WK20CT	WK20CT	WK20CT	WK20CT	WK20CT
lightly interrupted cut		WK20CT	WK20CT	WK20CT	WK20CT	WK20CT	WK20CT
varying depth of cut, casting, or forging skin		WK20CT	WK05CT	WK20CT	WK05CT	WK20CT	WK20CT
smooth cut, pre-turned surface		WK20CT	WK05CT	WS10PT	WK05CT	WK20CT	WK20CT/ WK05CT/ WS10PT

**Step 3 • Select the cutting speed**

**Gray Cast Iron** speed – m/min (SFM) Starting Conditions

material group	grade	60 (200)	180 (600)	305 (1000)	430 (1400)	550 (1800)	675 (2200)	800 (2600)	920 (3000)	1040 (3400)	1160 (3800)	m/min	SFM
<b>K1</b>	WK05CT											450	1500
	WK20CT											300	1000

**Ductile, Compacted Graphite, and Malleable Cast Irons (<600 MPa tensile strength)** speed – m/min (SFM) Starting Conditions

material group	grade	90 (300)	135 (450)	180 (600)	225 (750)	275 (900)	320 (1050)	360 (1200)	410 (1350)	460 (1500)	500 (1650)	m/min	SFM
<b>K2</b>	WS10PT											200	650
	WK05CT											360	1200
	WK20CT											240	800

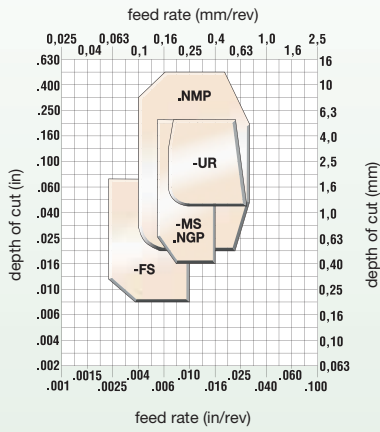
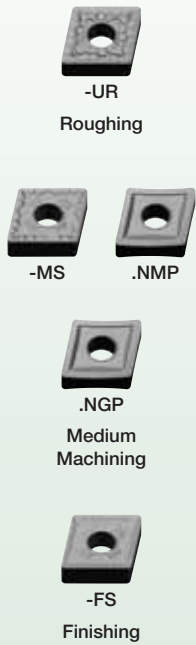
**Ductile, Malleable, and Austempered Cast Irons (>600 MPa tensile strength)** speed – m/min (SFM) Starting Conditions

material group	grade	90 (300)	135 (450)	180 (600)	225 (750)	275 (900)	320 (1050)	360 (1200)	410 (1350)	460 (1500)	500 (1650)	m/min	SFM
<b>K3</b>	WS10PT											150	500
	WK05CT											240	800
	WK20CT											210	700

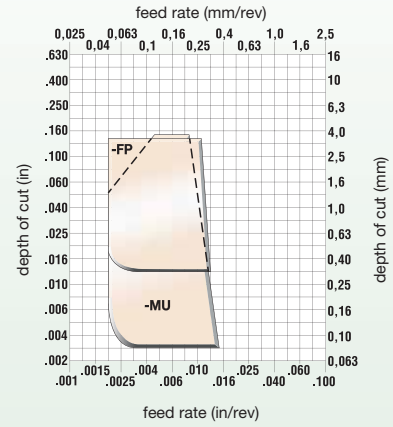
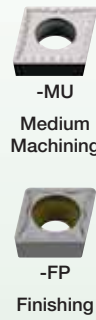
■ Step 1 • Select the insert geometry



Negative Inserts



Positive Inserts



■ Step 2 • Select the grade

cutting condition		Negative Insert Geometry			Positive Insert Geometry		
		-FS	.NGP/.NMP	-MS	-UR	-FP	-MU
heavily interrupted cut		WS25PT	WS25PT	WS25PT	WS25PT/ WM35CT	WS25PT/ WM15CT	WS25PT
lightly interrupted cut		WS10PT	WS10PT	WS25PT	WS25PT/ WM25CT	WS25PT	WS25PT
varying depth of cut, casting, or forging skin		WS10PT	WS10PT	WS10PT	WS25PT	WS10PT	WS10PT
smooth cut, pre-turned surface		WS10PT/ WU10HT	WS10PT/ WU10HT	WS10PT	WS10PT	WS10PT	WS10PT

(continued)

■ Step 3 • Select the cutting speed *(continued)*

**Iron-Based, Heat-Resistant Alloys (135–320 HB) (≤34 HRC)**

speed – m/min (SFM)

Starting Conditions



material group	grade	15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	290 (950)	310 (1050)	m/min	SFM
S1	WU10HT	◇										30	100
	WS10PT	◇										55	180
	WS25PT	◇										40	125
	WM15CT	◇										55	180
	WM25CT/WM35CT	◇										40	125

**Cobalt-Based, Heat-Resistant Alloys (150–425 HB) (≤45 HRC)**

speed – m/min (SFM)

Starting Conditions



material group	grade	15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	290 (950)	310 (1050)	m/min	SFM
S2	WU10HT	◇										35	110
	WS10PT	◇										60	195
	WS25PT	◇										30	100
	WM15CT	◇										60	195
	WM25CT/WM35CT	◇										30	100

**Nickel-Based, Heat-Resistant Alloys (140–475 HB) (≤48 HRC)**

speed – m/min (SFM)

Starting Conditions



material group	grade	15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	290 (950)	310 (1050)	m/min	SFM
S3	WU10HT	◇										40	125
	WS10PT	◇										70	225
	WS25PT	◇										40	125
	WM15CT	◇										70	225
	WM25CT/WM35CT	◇										40	125

**Titanium and Titanium Alloys (110–450 HB) (≤48 HRC)**

speed – m/min (SFM)

Starting Conditions



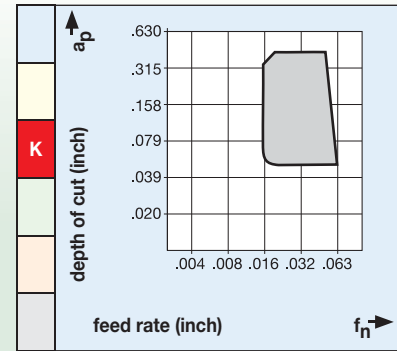
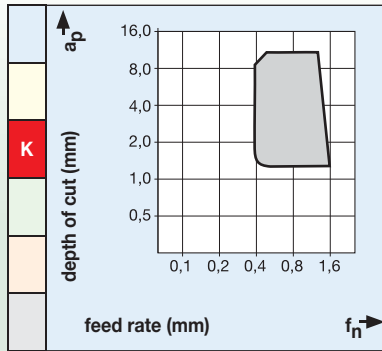
material group	grade	15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	290 (950)	310 (1050)	m/min	SFM
S4	WU10HT	◇										45	150
	WM15CT	◇										70	225
	WM25CT/WM35CT	◇										55	175

■ Negative Inserts

**..MA**



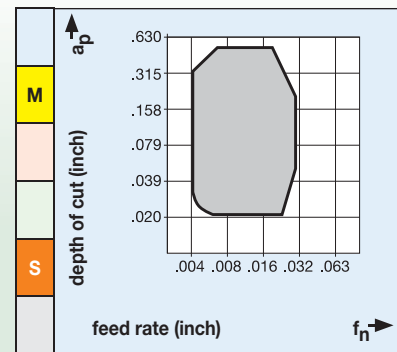
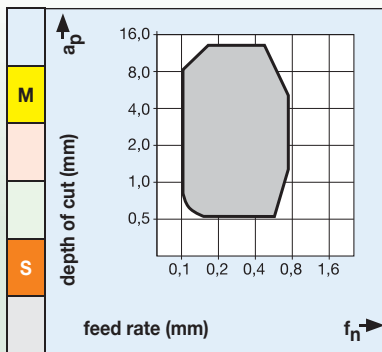
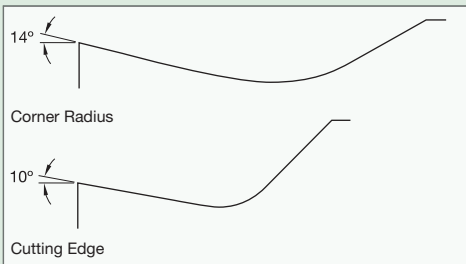
Flat top geometry for machining cast iron. For finishing to roughing applications.



**.NMP**



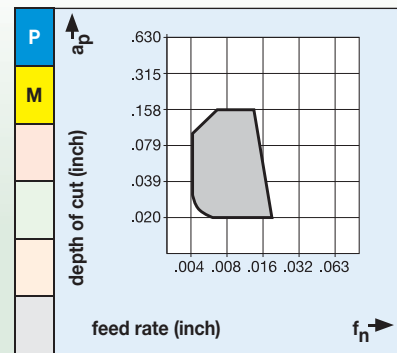
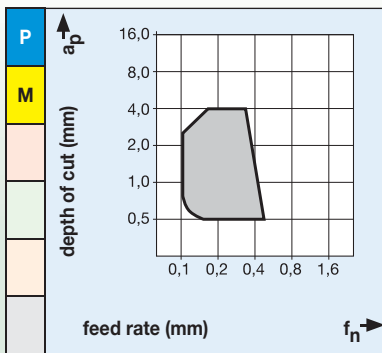
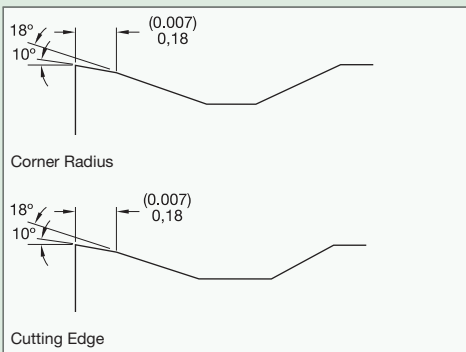
For medium-duty machining of tough work materials, such as chrome- and nickel-based alloys. Minimizes tendency for materials to adhere to insert.



**4**



Semi-finishing geometry for light- to medium-duty steel machining. Reduced back forces result from adjusted inclination angle. Well-suited for positive, vibration-prone parts.



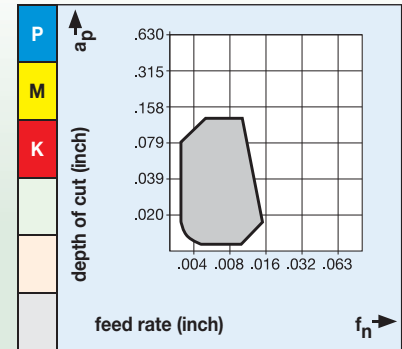
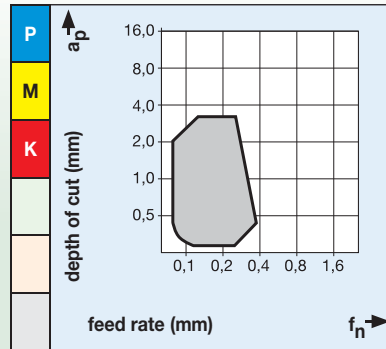
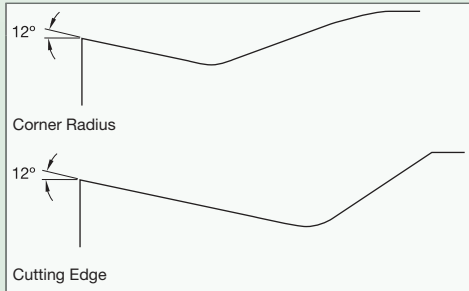
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■ **Negative Inserts** *(continued)*

**22**



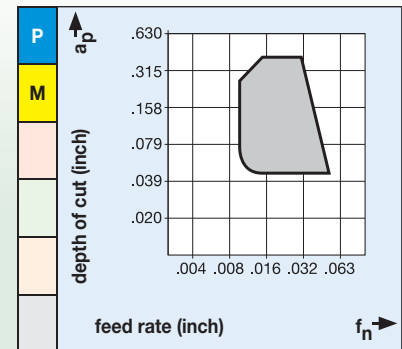
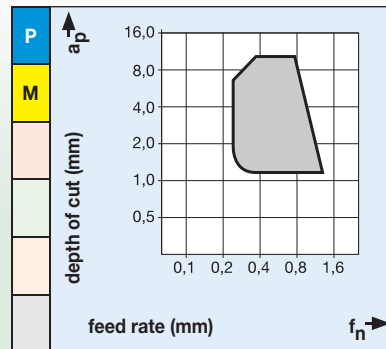
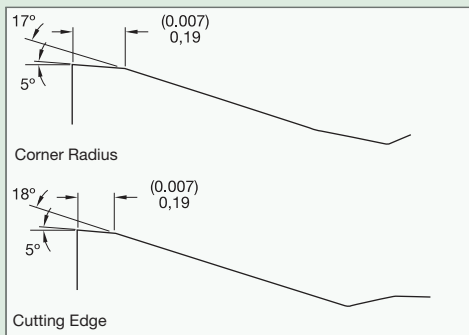
For finish turning, producing smooth, accurate surfaces. Very good chip control, especially at low depths of cut.



**65**



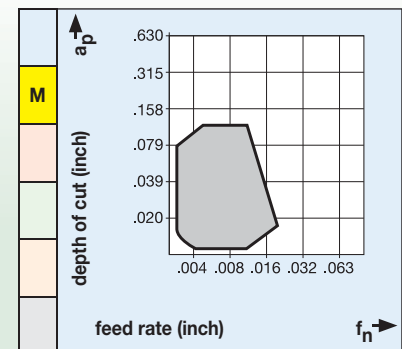
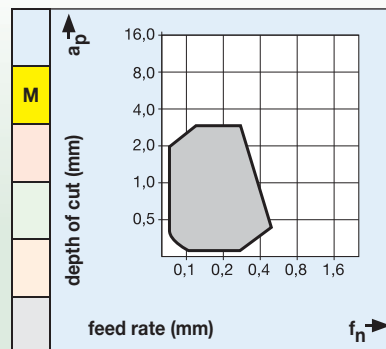
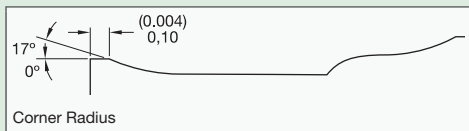
Rough-turning geometry with chip control extending to the medium-duty range. Positive rake angle lowers cutting forces, reducing power requirements. Used on low-tensile and stainless steels.



**CT**



Designed for outward copy turning. Where other geometries produce long chips, the unique distribution of the cut results in good chip control.



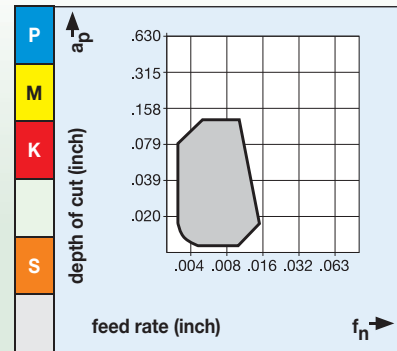
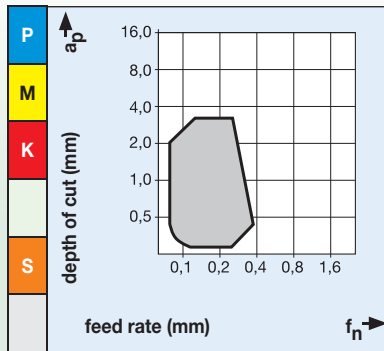
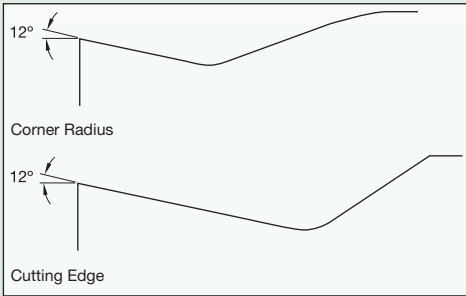
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■ Negative Inserts (continued)

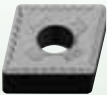
**FF**



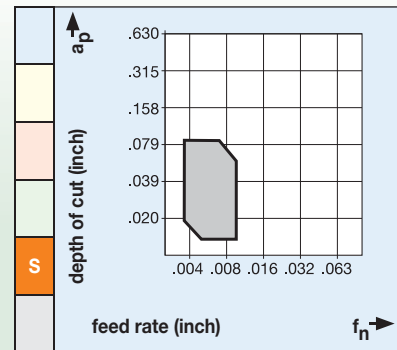
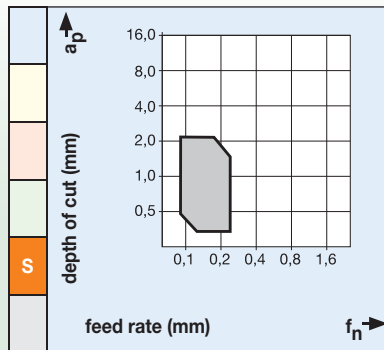
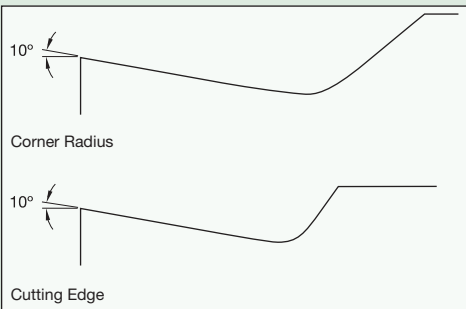
For finish turning, producing smooth, accurate surfaces. Very good chip control, especially at low depths of cut.



**FS**



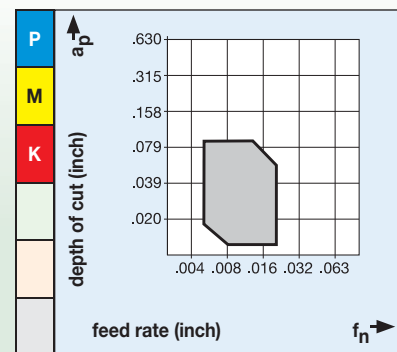
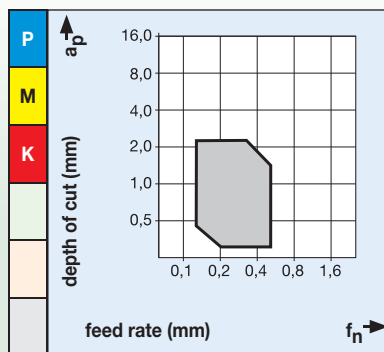
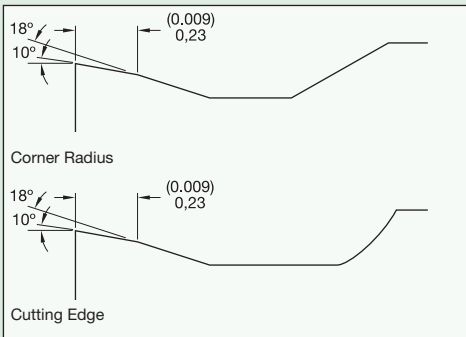
For finishing applications. Ground periphery with positive cutting edge ideally suited for high-temp alloys. Micro finished edge on the ground periphery adds just a slight hone for improved edge integrity and reliability.



**FW**



Wiper geometry for finishing when good surface finish is needed using high feed rates. First choice for high-performance finishing.

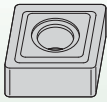


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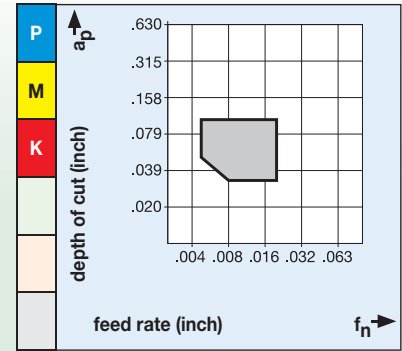
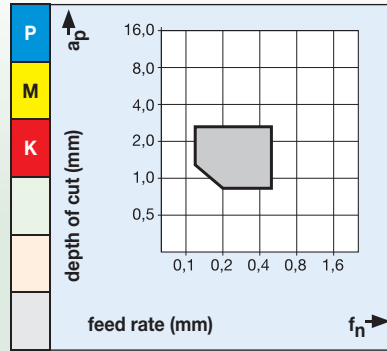
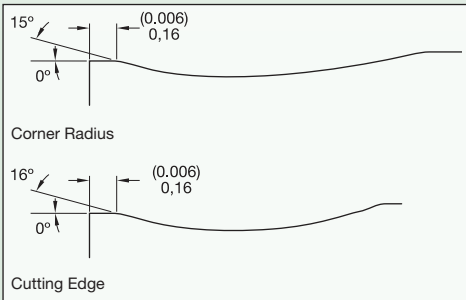


**■ Negative Inserts** (continued)

**MG**



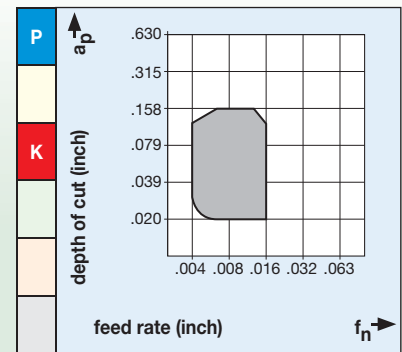
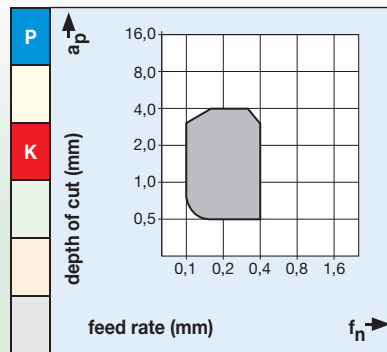
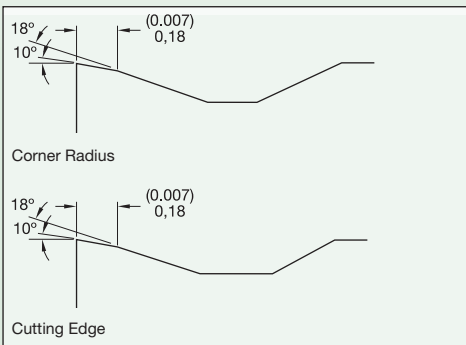
For light machining to light roughing.



**ML**



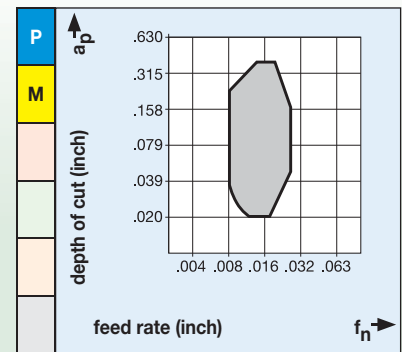
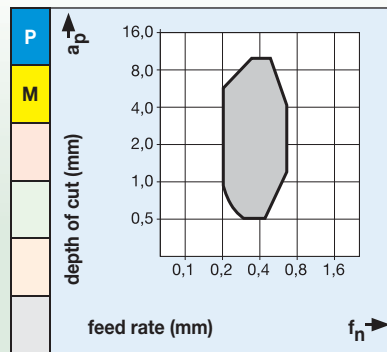
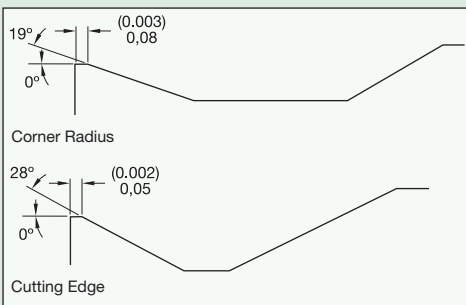
For finishing to medium machining with a negative, stable cutting edge.



**MR**



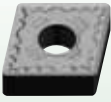
For medium to light roughing of steels, difficult-to-machine high-alloy titanium, and aluminum materials. High strength to deal with heavy chip deformation.



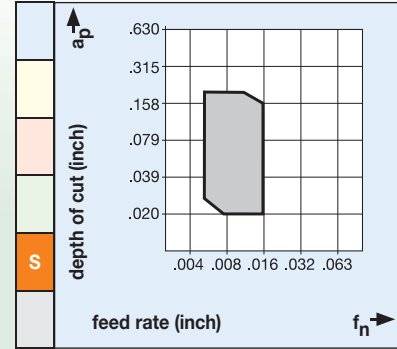
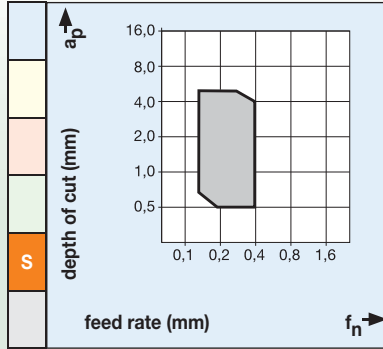
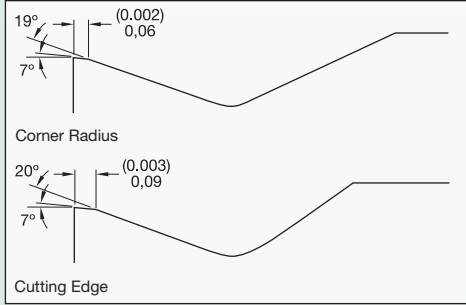
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**■ Negative Inserts** *(continued)*

**MS**



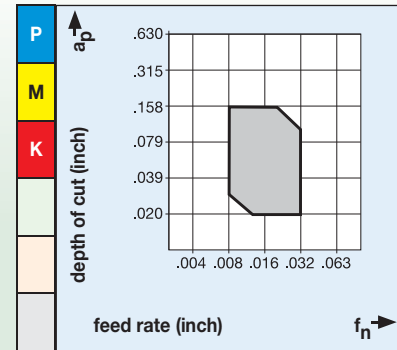
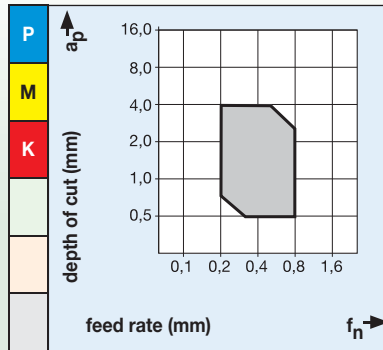
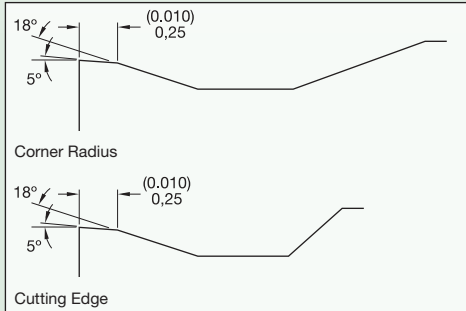
For medium machining in high-temp materials. Utilizes a micro-finished edge preparation to increase edge toughness.



**MW**



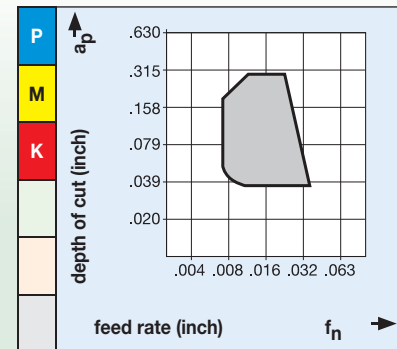
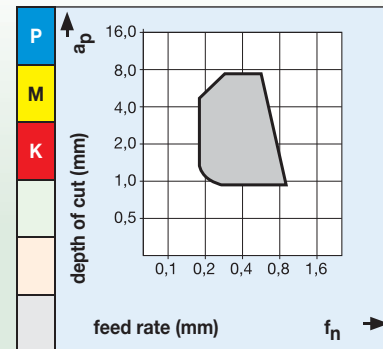
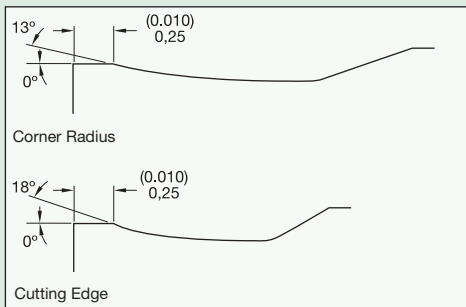
Wiper geometry for light to medium turning with high feed rates. Feed twice as high as with edges with full corner radii to produce same surface finish.



**RH**



For medium-duty to roughing. Outstanding chip control. High edge strength for interrupted cuts, forging skin, or scale. Preferred for all cast iron, such as gray, malleable, and nodular.



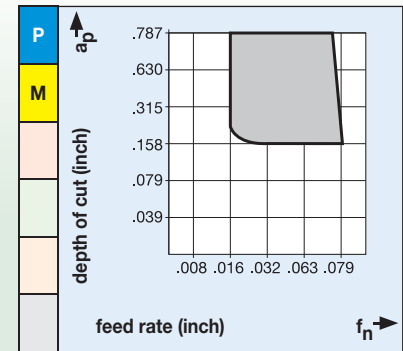
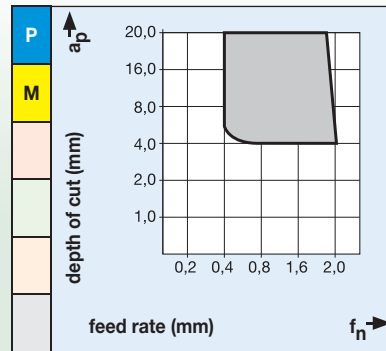
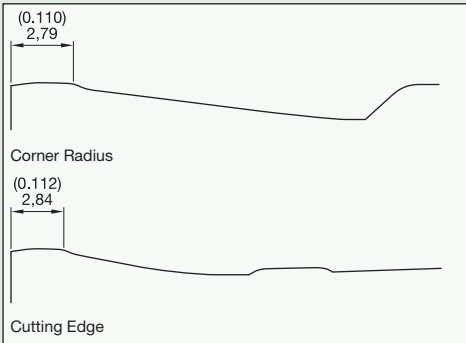
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■ **Negative Inserts** (continued)

**SR**



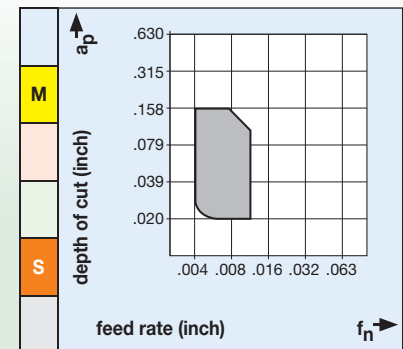
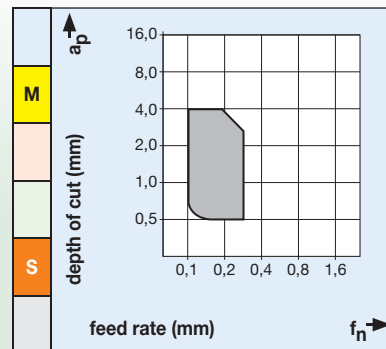
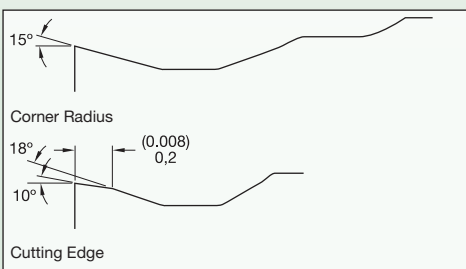
A super roughing geometry. The SR has a strong cutting edge to support high cutting loads in roughing applications. Can produce high metal removal rates.



**UF**



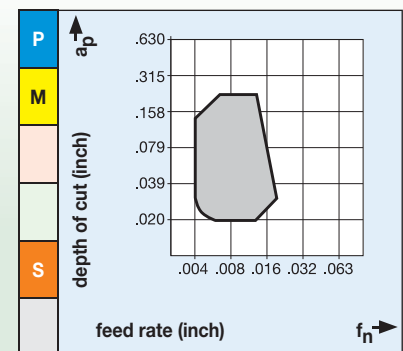
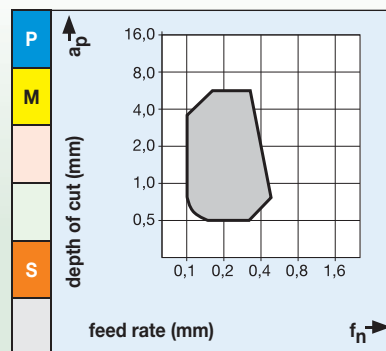
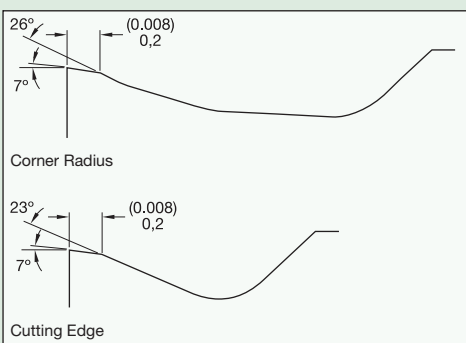
For finishing with a positive cutting edge for reduced cutting forces and superior surface quality.



**UM**



For medium-duty turning operations. Soft-cutting chipbreaker. Used in applications producing varying chip sections, such as profile or copy turning. Good dimensional accuracy. For soft steel materials and stainless steels.



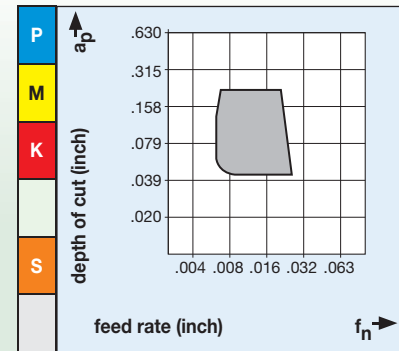
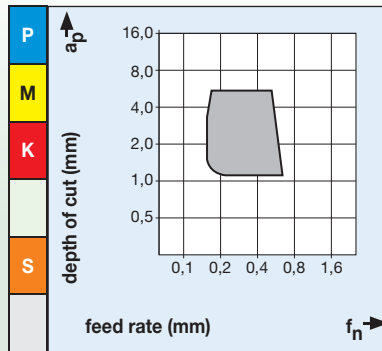
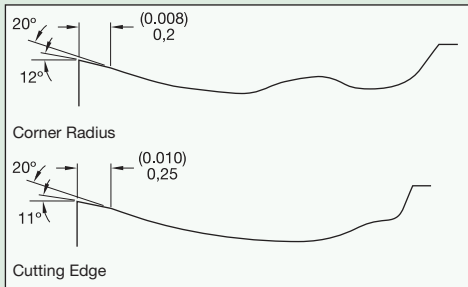
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■ Negative Inserts (continued)

UR

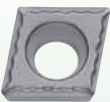


Roughing geometry with smooth chip forming and improved coolant flow for increased tool life. Positive geometry reduces cutting forces and improves depth-of-cut notching resistance. Ideally suitable for stainless steel applications and for smooth machining of steel.

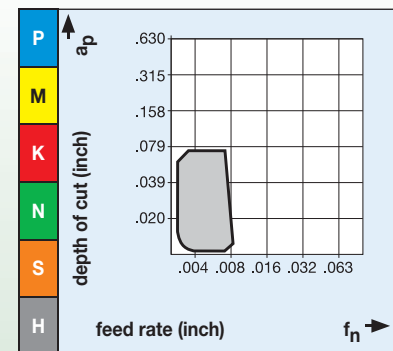
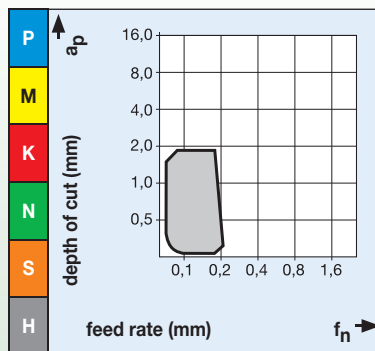
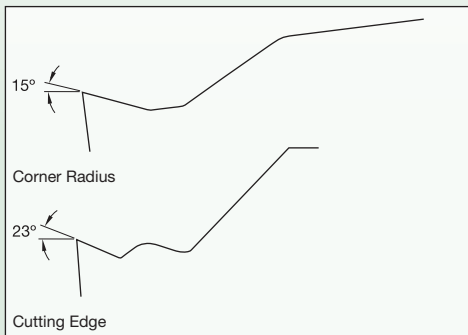


■ Positive Inserts

2



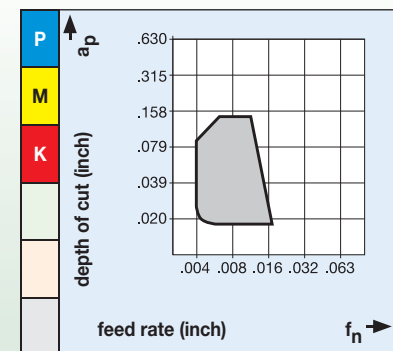
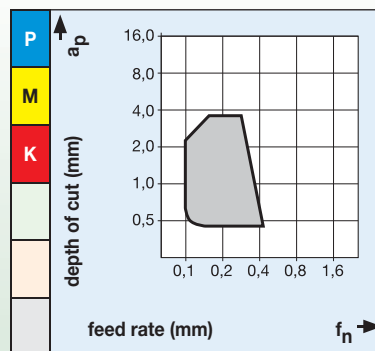
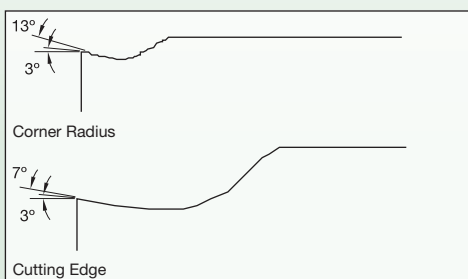
Sharp edge for finish machining. Good chip control with very small chip sections. High dimensional accuracy and smooth surface finishes. Inserts with .008" corner radius precision-ground on all sides.



41



Preferred for light- to medium-duty machining. Low cutting forces and reduced power requirements due to positive rake angle. Good chip control over a wide range. Also used on short-chipping cast iron.



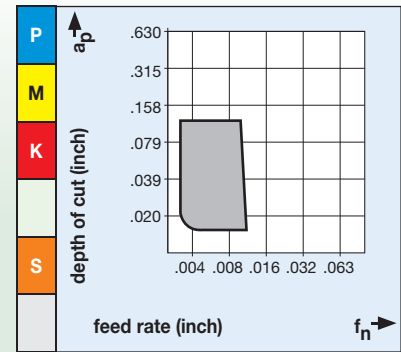
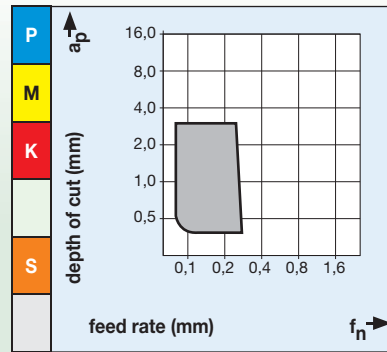
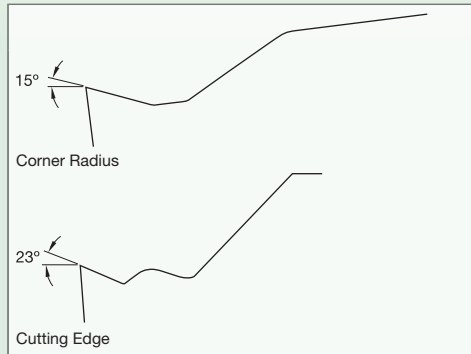
(continued)

**Positive Inserts** *(continued)*

**FP**



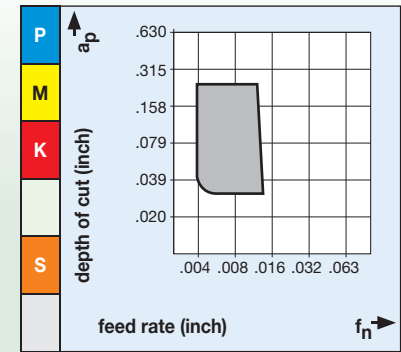
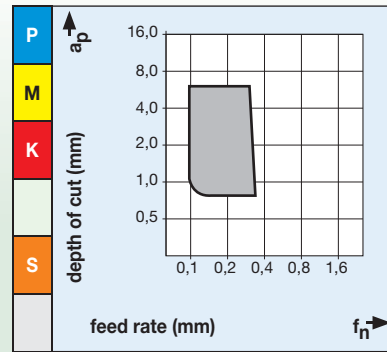
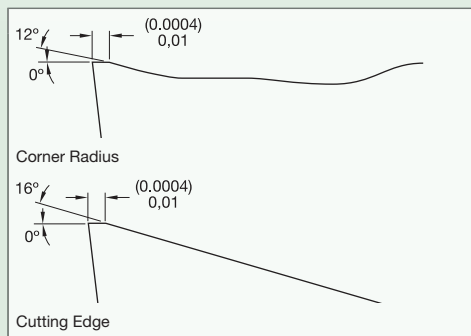
For finishing to medium turning operations with optimal chip control over a wide range of cutting conditions and workpiece materials.



**MP**



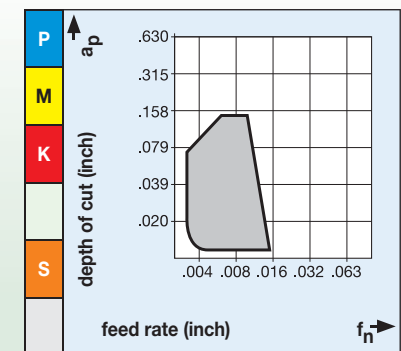
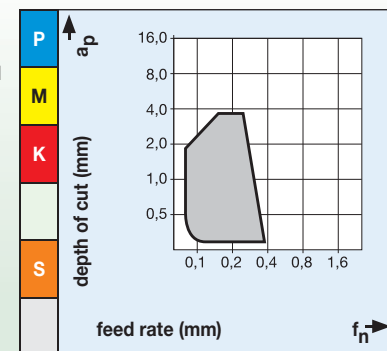
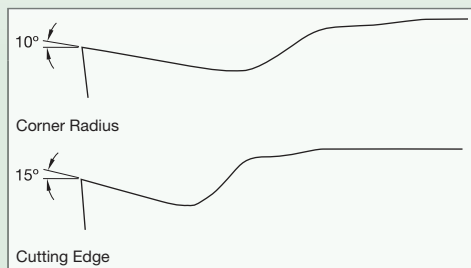
For medium to rough turning with reduced cutting forces and improved chip control for high feed rates. Suitable for high metal removal rates and spindling applications.

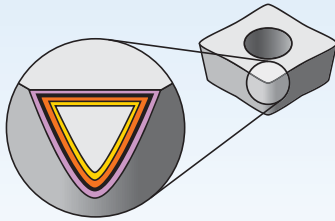


**MU**



A medium universal geometry with a soft cutting action due to its positive geometry. Has a versatile application range and is suited for turning unstable components and for boring applications.



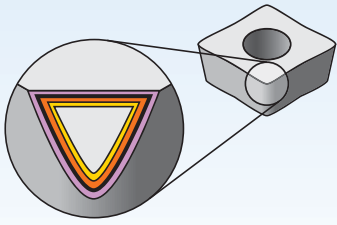


Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

Grade	Coating	Grade Description	wear resistance ↔ toughness																		
			05	10	15	20	25	30	35	40	45										
WP15CT		Coated carbide. MT-CVD/CVD – TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -ZrCN. Good balance of wear resistance and toughness properties. High productivity machining on smooth to lightly interrupted cuts. For steels.	P																		
	HC-P15																				
WP25CT		Coated carbide. MT-CVD/CVD – TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -ZrCN. Good toughness properties. Excellent first choice for steel machining, high productivity metal removal for all but the harshest interrupted cuts.	P																		
	HC-P25																				
WP35CT		Coated carbide. MT-CVD/CVD – TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -ZrCN. Proven on all roughing and heavy roughing operations, wet or dry, on interrupted and uninterrupted cuts.	P																		
	HC-P35																				
WM15CT		Coated carbide. MT-CVD/CVD – TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -ZrCN. High degree of wear resistance and good resistance to depth-of-cut notching for long tool life in finishing to medium turning applications.	P																		
	HC-M15																				
WM25CT		Coated carbide. MT-CVD/CVD – TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -ZrCN. Good balance of wear resistance and toughness properties. Light and medium machining. For austenitic stainless steel AISI series.	P																		
	HC-M25																				
WM35CT		Coated carbide. MT-CVD/CVD – TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -ZrCN. Good toughness and wear resistance balance. For medium to roughing operations with light and heavily interrupted cuts.	P																		
	HC-M35																				





Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

Grade	Coating	Grade Description	wear resistance ← → toughness																								
			05	10	15	20	25	30	35	40	45																
<b>THM</b>		Uncoated carbide. Extraordinarily good balance of hardness, wear resistance, edge stability, and toughness. Light and medium machining. For cast iron, all non-ferrous metals, and non-metals. Useful in unfavorable conditions.																									
			<b>K</b>																								
			<b>N</b>																								
			<b>S</b>																								
<b>TTM</b>		Uncoated carbide. Medium machining. For steel.																									
			<b>P</b>																								
			<b>M</b>																								
<b>TTR</b>		Uncoated carbide. Light and medium machining. For steel. To be used at low cutting speeds. Effective in unfavorable conditions.																									
			<b>P</b>																								
<b>TT15</b>		Cermets. Light machining. Extremely good wear resistance at higher cutting speeds. For steels and nodular cast iron. Recommended for high cutting speeds under favorable conditions.																									
			<b>P</b>																								
			<b>M</b>																								
			<b>K</b>																								





# Victory™ -UR Geometry



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

-UR geometry offers a roughing solution for high-temp materials.

Available in WS10PT™ and WS25PT™, the -UR geometry provides smooth chip forming and improved coolant flow for increased tool life. This positive geometry, with its unique chipbreaker without inflection points, reduces cutting forces and improves depth-of-cut (DOC) notching resistance, while still providing superior edge stability.

To learn more, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA™**  
**VICTORY**

























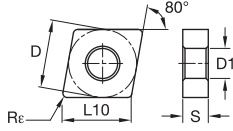
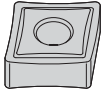












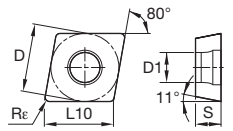
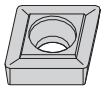
● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Inserts

**■ CNMP**

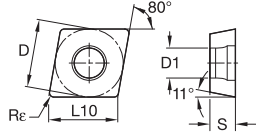
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		mm	in	mm	in	mm	in	mm	in	mm	in																
CNMP120404	CNMP431	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203				4171585	4173552	4173681			4172439							
CNMP120408	CNMP432	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203				4171586	4173653	4173682			4172440	4172614						
CNMP120412	CNMP433	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203				4171587	4173654	4173693			4172441	4172615						
CNMP160608	CNMP542	15,88	5/8	16,12	.635	6,35	1/4	0,8	1/32	6,35	.250				4171588	4173655	4173694										
CNMP160612	CNMP543	15,88	5/8	16,12	.635	6,35	1/4	1,2	3/64	6,35	.250				4171589	4173656	4173695			4172442							
CNMP190612	CNMP643	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313									4172483	4172442						
CNMP190616	CNMP644	19,05	3/4	19,34	.762	6,35	1/4	1,6	1/16	7,93	.313				4171590	4173657	4173696										



**■ CPGT-3**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP36CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in																
CPGT04T1043	CPGT151213	4,76	3/16	4,83	.190	1,98	5/64	0,4	.016	2,15	.085																2022082



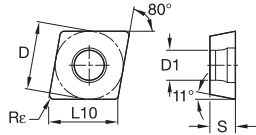


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H																				

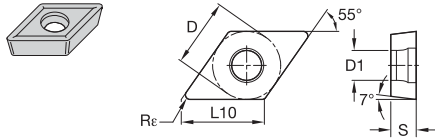
■ CPMT-FP

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in														
CPMT060202FP	CPMT21505FP	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	4170015	4170025	4170035	4168812	4168822	4168832	4168842	4170105	4170115	4170125	4170135	4170145	4170155	4170165	4170175	4170185
CPMT060204FP	CPMT2151FP	6,35	1/4	6,45	.254	2,38	3/32	0,4	1/64	2,80	.110	4170016	4170026	4170036	4168812	4168823	4168833	4168843	4170105	4170115	4170125	4170135	4170145	4170155	4170165	4170175	4170185
CPMT060208FP	CPMT2152FP	6,35	1/4	6,45	.254	2,38	3/32	0,8	1/32	2,80	.110	4170017	4170027	4170037	4168813	4168824	4168834	4168844	4170106	4170116	4170126	4170136	4170146	4170156	4170166	4170176	4170186
CPMT09T302FP	CPMT32505FP	9,53	3/8	9,67	.381	3,97	5/32	0,2	.008	4,40	.173	4170017	4170027	4170037	4168813	4168824	4168834	4168844	4170106	4170116	4170126	4170136	4170146	4170156	4170166	4170176	4170186
CPMT09T304FP	CPMT3251FP	9,53	3/8	9,67	.381	3,97	5/32	0,4	1/64	4,40	.173	4170018	4170028	4170038	4168814	4168826	4168836	4168846	4170107	4170117	4170127	4170137	4170147	4170157	4170167	4170177	4170187
CPMT09T308FP	CPMT3252FP	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	4170019	4170029	4170039	4168815	4168827	4168837	4168847	4170108	4170118	4170128	4170138	4170148	4170158	4170168	4170178	4170188



■ CPMT-MP

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in													
CPMT060208MP	CPMT2152MP	6,35	1/4	6,45	.254	2,38	3/32	0,8	1/32	2,80	.110	4170255	4170265	4170275	4168923	4168933	4168943	4170266	4170276	4170286	4170296	4170306	4170316	4170326	4170336	4170346
CPMT09T308MP	CPMT3252MP	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	4170256	4170266	4170276	4168923	4168933	4168943	4170266	4170276	4170286	4170296	4170306	4170316	4170326	4170336	4170346
CPMT09T312MP	CPMT3253MP	9,53	3/8	9,67	.381	3,97	5/32	1,2	3/64	4,40	.173	4170259	4170269	4170279	4168924	4168934	4168944	4170267	4170277	4170287	4170297	4170307	4170317	4170327	4170337	4170347



- first choice
- alternate choice

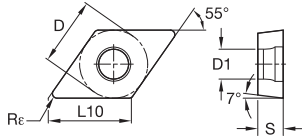
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K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

### ■ DCMT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT115	
		mm	in	mm	in	mm	in	mm	in	mm	in																
DCMT070204	DCMT2151	6,35	1/4	7,75	.305	2,38	3/32	0,4	1/64	2,80	.110	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DCMT11T304	DCMT3251	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	
DCMT11T308	DCMT3252	9,53	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,40	.173	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	
DCMT11T312	DCMT3253	9,53	3/8	11,63	.458	3,97	5/32	1,2	3/64	4,40	.173	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	
DCMT150404	DCMT431	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,50	.217	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	
DCMT150408	DCMT432	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,50	.217	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	
DCMT150412	DCMT433	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,50	.217	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	
DCMT150416	DCMT434	12,70	1/2	15,50	.610	4,76	3/16	1,6	.063	5,50	.217	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	







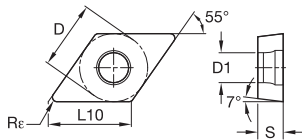
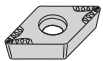
● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Inserts

### DCMT-MP

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT		WP25CT		WP35CT		WM15CT		WM25CT		WM35CT		WK05CT		WK20CT		WS10PT		WS25PT		WU10HT		THM		TTM		TTR		TTI15				
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in																															
DCMT11T304MP	DCMT3251MP	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173	4170201	4170202	-	-	-	-	-	-	-	-	-	-	-	4170242	4170243	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
DCMT11T308MP	DCMT3252MP	9,53	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,40	.173	4170202	4170224	-	-	4168898	4168898	-	-	-	-	-	-	-	4170243	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCMT11T312MP	DCMT3253MP	9,53	3/8	11,63	.458	3,97	5/32	1,2	3/64	4,40	.173	4170213	4170225	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

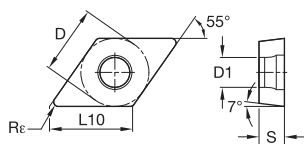
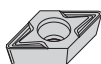


### DCMT-MU

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT		WP25CT		WP35CT		WM15CT		WM25CT		WM35CT		WK05CT		WK20CT		WS10PT		WS25PT		WU10HT		THM		TTM		TTR		TTI15						
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in																																	
DCMT11T304MU	DCMT3251MU	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173	5623585	5623586	-	-	-	-	-	-	-	-	-	-	-	5623586	5623587	5623582	5623584	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCMT11T308MU	DCMT3252MU	9,52	3/8	11,63	.458	3,97	.156	0,8	.0315	4,40	.173	5623600	5623608	-	-	-	-	-	-	-	-	-	-	-	5623602	5623607	5623601	5623603	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DCMT150408MU	DCMT432MU	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,50	.217	5623606	5623608	-	-	-	-	-	-	-	-	-	-	5623605	5623607	5623609	5623610	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DCMT150412MU	DCMT433MU	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,50	.217	-	-	-	-	-	-	-	-	-	-	-	-	5623611	5623612	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Inserts

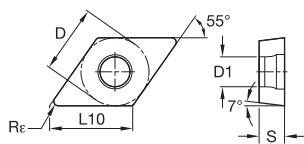
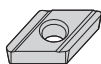


● first choice  
○ alternate choice

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M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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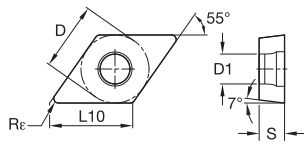
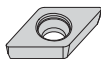
**■ DCMT-MW**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
DCMT11T304MW	DCMT3251MW	9,52	3/8	11,63	.458	3,97	5/32	0,2	.007	4,40	.173	5623488	5623489													
DCMT11T308MW	DCMT3252MW	9,53	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,40	.173	5623488	5623489													



**■ DCMX-18**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
DCMX11T302R18	DCMX3250R18	9,53	3/8	11,63	.458	3,97	5/32	0,2	.008	4,30	.169												2011507			



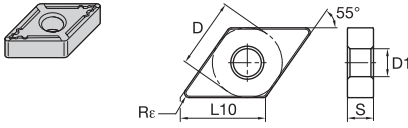
**■ DCMW**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
DCMW070204	DCMW2151	6,35	1/4	7,75	.305	2,38	3/32	0,4	1/64	2,80	.110															
DCMW11T304	DCMW3251	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173															
DCMW150408	DCMW432	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,50	.217															







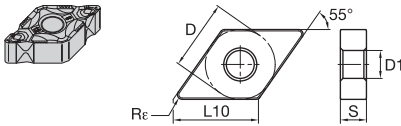


● first choice  
○ alternate choice

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K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

## ■ DNMG-22

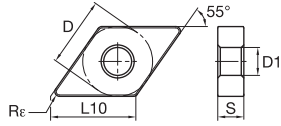
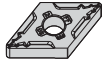
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
DNMG11040822	DNMG33222	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150															2022221



## ■ DNMG-CT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
DNMG150604CT	DNMG441CT	12,70	1/2	15,50	.610	6,35	1/4	0,3	.013	5,16	.203				4171742	4172699										
DNMG150608CT	DNMG442CT	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203				4171753	4172700										
DNMG150612CT	DNMG443CT	12,70	1/2	15,50	.610	6,35	1/4	1,1	.045	5,16	.203				4171754	4172701										



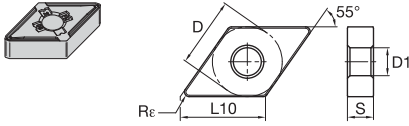


- first choice
- alternate choice

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S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

■ DNMG-FF

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15		
		mm	in	mm	in	mm	in	mm	in	mm	in																	
DNMG110404FF	DNMG331FF	9,53	3/8	11,63	.458	4,76	3/16	0,4	1/64	3,81	.150	4171028	4171028															
DNMG110408FF	DNMG332FF	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	4171029	4171029							5684273								
DNMG110412FF	DNMG333FF	9,53	3/8	11,63	.458	4,76	3/16	1,2	3/64	3,81	.150					4172350	4172350											
DNMG150404FF	DNMG431FF	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	4171030	4171030							5684274								
DNMG150408FF	DNMG432FF	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	4171031	4171031			4172352	4172352			4171373	4171373							
DNMG150412FF	DNMG433FF	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203								4171374	4171374	5684275							
DNMG150604FF	DNMG441FF	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	4171032	4171032			4172683	4172683			4171375	4171375	5684276						
DNMG150608FF	DNMG442FF	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	4171043	4171043						4171376	4171376								
DNMG150612FF	DNMG443FF	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	4171044	4171044			4172685	4172685			4171377	4171377							



● first choice  
○ alternate choice

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K		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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S		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

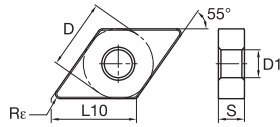
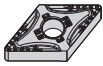
Inserts

■ DNMG-FW

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	TUM	TUM	TTR	TT115	
		mm	in	mm	in	mm	in	mm	in	mm	in																
DNMG110404FW	DNMG331FW	9,53	3/8	11,63	.458	4,76	3/16	0,4	1/64	3,81	.150																
DNMG110408FW	DNMG332FW	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150																
DNMG150404FW	DNMG431FW	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203																
DNMG150408FW	DNMG432FW	12,70	1/2	15,50	.610	4,76	3/16	0,4	.016	5,16	.203																
DNMG150604FW	DNMG441FW	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203																
DNMG150608FW	DNMG442FW	12,70	1/2	15,50	.610	6,35	1/4	0,4	.016	5,16	.203																







● first choice  
○ alternate choice

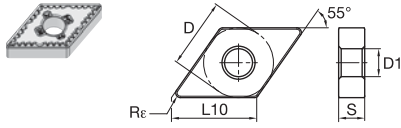
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### ■ DNMG-MR

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1																													
		mm	in	mm	in	mm	in	mm	in	mm	in	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT15													
DNMG110408MR	DNMG332MR	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	4171139	4171139	4170564	4170060																								
DNMG150404MR	DNMG431MR	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	4171140	4170565	4170051																									
DNMG150408MR	DNMG432MR	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	4171141	4170566	4170052																									
DNMG150412MR	DNMG433MR	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	4171142	4170567	4170053																									
DNMG150604MR	DNMG441MR	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	4171143	4170568	4170054																									
DNMG150608MR	DNMG442MR	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	4171144	4170569	4170055																									
DNMG150612MR	DNMG443MR	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	4171145	4170570	4170056																									
												4173024	4173023																										
												4173139	4173138																										



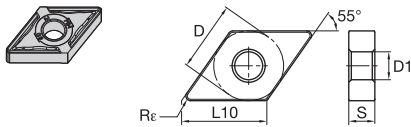


● first choice  
○ alternate choice

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K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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■ DNMG-MS

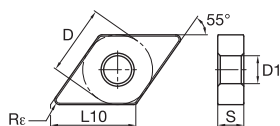
ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT115
		mm	in	mm	in	mm	in	mm	in	mm	in															
DNMG110408MS	DNMG332MS	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150									5908769	5908770	5908781				
DNMG150404MS	DNMG431MS	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203									5908782	5908783	5908784				
DNMG150408MS	DNMG432MS	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203									5908785	5908787	5908788				
DNMG150412MS	DNMG433MS	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203									5908789	5908790	5908791				
DNMG150604MS	DNMG441MS	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203									5908792	5908793	5908794				
DNMG150608MS	DNMG442MS	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203									5908795	5908796	5908797				
DNMG150612MS	DNMG443MS	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203									5908798	5908799	5908800				



■ DNMG-MW

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT115
		mm	in	mm	in	mm	in	mm	in	mm	in															
DNMG150408MW	DNMG432MW	12,70	1/2	15,50	.610	4,76	3/16	0,4	.016	5,16	.203	5623494	5623495													
DNMG150412MW	DNMG433MW	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203															
DNMG150608MW	DNMG442MW	12,70	1/2	15,50	.610	6,35	1/4	0,4	.016	5,16	.203	5623498	5623499													
DNMG150612MW	DNMG443MW	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203															





● first choice  
○ alternate choice

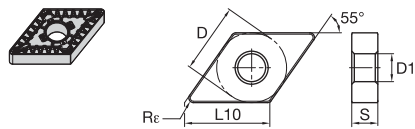
P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

**DNMG-UF**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TIM	TTR	TTI15		
		mm	in	mm	in	mm	in	mm	in	mm	in																	
DNMG110404UF	DNMG331UF	9,53	3/8	11,63	.458	4,76	3/16	0,4	1/64	3,81	.150	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DNMG110408UF	DNMG332UF	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DNMG150404UF	DNMG431UF	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DNMG150408UF	DNMG432UF	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	5645606	5645605	○	○	○	○	○	○	○	5645602	5645601	○	○	○	○	○	○
DNMG150412UF	DNMG433UF	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DNMG150604UF	DNMG441UF	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DNMG150608UF	DNMG442UF	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	○	5645609	○	○	○	○	○	○	○	○	5645607	○	○	○	○	○	○
DNMG150612UF	DNMG443UF	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○





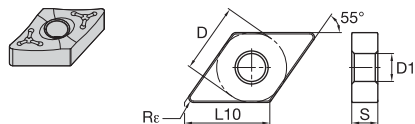


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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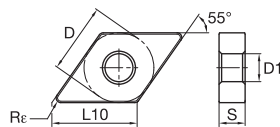
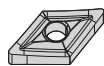
■ DNMG-UR

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT115		
		mm	in	mm	in	mm	in	mm	in	mm	in																	
DNMG110408UR	DNMG332UR	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150																	
DNMG110412UR	DNMG333UR	9,53	3/8	11,63	.458	4,76	3/16	1,2	3/64	3,81	.150	4171101	4171102	4170509	4169966	4169424	4169453	4169488	4171426									
DNMG150408UR	DNMG432UR	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	4171103	4171103	4170511	4169967	4169426	4169454	4169489	4171428									
DNMG150412UR	DNMG433UR	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	4171104	4170512	4170511	4169968		4169455	4169490	4169489	4171429	5579271							
DNMG150416UR	DNMG434UR	12,70	1/2	15,50	.610	4,76	3/16	1,6	1/16	5,16	.203						4169491	4169491	4171430	5680171								
DNMG150608UR	DNMG442UR	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	4171105	4170513	4169969	4169427	4169456	4169492	4169491	4171431	5579276								
DNMG150612UR	DNMG443UR	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	4171106	4171106	4170514	4169970	4169428	4169457	4169493	5680172	4171432								
DNMG150616UR	DNMG444UR	12,70	1/2	15,50	.610	6,35	1/4	1,6	1/16	5,16	.203	4171107	4170515	4169971			4169494	4169494	4171433									



■ DNMM-65

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT115
		mm	in	mm	in	mm	in	mm	in	mm	in															
DNMM15060865	DNMM44265	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	5698413	5698414	5698415												
DNMM15061265	DNMM44365	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	5698417														
DNMM15061665	DNMM44465	12,70	1/2	15,50	.610	6,35	1/4	1,6	1/16	5,16	.203	5698418	5698419													



● first choice  
○ alternate choice

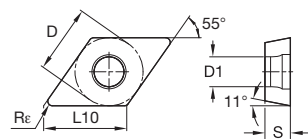
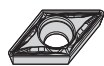
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Inserts

#### ■ DNMP

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT15
		mm	in	mm	in	mm	in	mm	in	mm	in															
DNMP150404	DNMP431	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DNMP150408	DNMP432	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DNMP150412	DNMP433	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DNMP150604	DNMP441	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DNMP150608	DNMP442	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DNMP150612	DNMP443	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

NOTE: DNMP-style inserts are single sided.

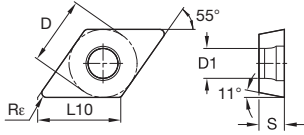
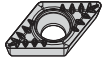


#### ■ DPMT-FP

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT15
		mm	in	mm	in	mm	in	mm	in	mm	in															
DPMT070204FP	DPMT2151FP	6,35	1/4	7,75	.305	2,38	3/32	0,4	1/64	2,80	.110	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DPMT11T304FP	DPMT3251FP	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
DPMT11T308FP	DPMT3252FP	9,53	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



Inserts

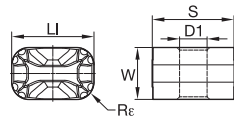
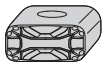


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

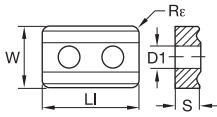
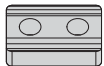
■ DPMT-MP

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
DPMT11T308MP	DPMT3252MP	9,53	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,40	.173	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



■ LNUX-13

ISO catalog number	ANSI catalog number	W		LI		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
LNUX19194013	LNUX19194013	10,00	.394	19,05	.750	19,05	3/4	4,0	.158	6,35	.250	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
LNUX30194013	LNUX30194013	12,00	.472	30,00	1.181	19,05	3/4	4,0	.158	6,35	.250	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

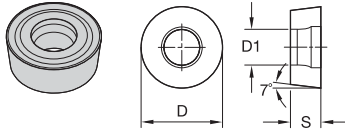


■ LNUX-EN95

ISO catalog number	ANSI catalog number	W		LI		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
LNUX400924EN95	LNUX400924EN95	25,40	1.000	40,00	1.575	9,53	3/8	2,4	.094	9,12	.359	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



Inserts

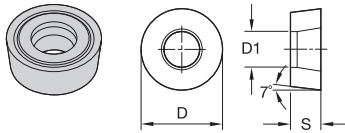


● first choice  
○ alternate choice

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M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

**RCMT-T**

ISO catalog number	ANSI catalog number	D		S		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in															
RCMT1606M0T	RCMT1606M0T	16,00	.630	6,35	1/4	5,50	.217	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○



**RCMX**

ISO catalog number	ANSI catalog number	D		S		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in															
RCMX2006M0T	RCMX2006M0T	20,00	.7874	6,35	1/4	6,50	.256	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
RCMX2507M0T	RCMX2507M0T	25,00	63/64	7,94	5/16	7,40	.291	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
RCMX3209M0T	RCMX3209M0T	32,00	1.2598	9,53	3/8	9,50	.374	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

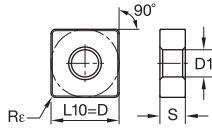
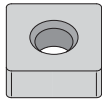












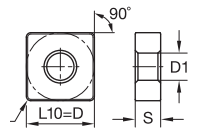
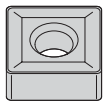
● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Inserts

### SNMA

ISO catalog number	ANSI catalog number	D		L10		S		R <sub>ε</sub>		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in																
SNMA120408	SNMA432	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SNMA120412	SNMA433	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SNMA120416	SNMA434	12,70	1/2	12,70	.500	4,76	3/16	1,6	1/16	5,16	.203	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SNMA150608	SNMA542	15,88	5/8	15,88	.625	6,35	1/4	0,8	1/32	6,35	.250	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SNMA150612	SNMA543	15,88	5/8	15,88	.625	6,35	1/4	1,2	3/64	6,35	.250	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SNMA150616	SNMA544	15,88	5/8	15,88	.625	6,35	1/4	1,6	1/16	6,35	.250	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SNMA190612	SNMA643	19,05	3/4	19,05	.750	6,35	1/4	1,2	3/64	7,93	.313	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SNMA190616	SNMA644	19,05	3/4	19,05	.750	6,35	1/4	1,6	1/16	7,93	.313	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

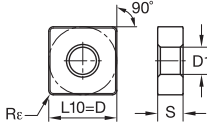
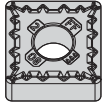


### SNMG

ISO catalog number	ANSI catalog number	D		L10		S		R <sub>ε</sub>		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in																
SNMG250924	SNMG866	25,40	1	25,40	1.000	9,53	3/8	2,4	3/32	9,12	.359	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•



Inserts

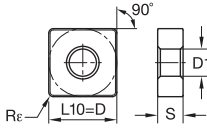


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

■ SNMG-FF

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
SNMG090304FF	SNMG321FF	9,53	3/8	9,53	.375	3,18	1/8	0,4	1/64	3,81	.150	4171045								4171378	5684279					
SNMG090308FF	SNMG322FF	9,53	3/8	9,53	.375	3,18	1/8	0,8	1/32	3,81	.150	4171046				4172686			4171379	5684277						
SNMG120404FF	SNMG431FF	12,70	1/2	12,70	.500	4,76	3/16	0,4	1/64	5,16	.203	4171047							4171380	5684330						
SNMG120408FF	SNMG432FF	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	4171048							4171381	5684278						
SNMG120412FF	SNMG433FF	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	4171049							4171382							
SNMG120416FF	SNMG434FF	12,70	1/2	12,70	.500	4,76	3/16	1,6	1/16	5,16	.203				4172690											



■ SNMG-ML

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
SNMG090304ML	SNMG321ML	9,53	3/8	9,53	.375	3,18	1/8	0,4	1/64	3,81	.150	4171071														
SNMG090308ML	SNMG322ML	9,53	3/8	9,53	.375	3,18	1/8	0,8	1/32	3,81	.150	4171072	4170488						4171668	4171402						
SNMG120404ML	SNMG431ML	12,70	1/2	12,70	.500	4,76	3/16	0,4	1/64	5,16	.203								4171403	4171403						
SNMG120408ML	SNMG432ML	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	4171073	4170489						4171669	4171404						
SNMG120412ML	SNMG433ML	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	4171074	4170490						4171670	4171405						
SNMG120416ML	SNMG434ML	12,70	1/2	12,70	.500	4,76	3/16	1,6	1/16	5,16	.203								4171406	4171406						





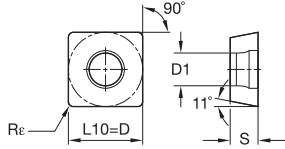
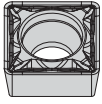












● first choice  
○ alternate choice

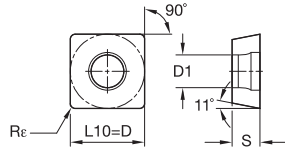
P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



Inserts

**SPMT-FP**

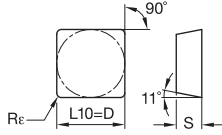
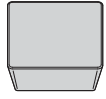
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in																
SPMT09T304FP	SPMT3251FP	9,53	3/8	9,53	.375	3,97	5/32	0,4	1/64	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
SPMT09T308FP	SPMT3252FP	9,53	3/8	9,53	.375	3,97	5/32	0,8	1/32	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○


**SPMT-MP**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in																
SPMT09T308MP	SPMT3252MP	9,53	3/8	9,53	.375	3,97	5/32	0,8	1/32	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
SPMT120408MP	SPMT432MP	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,50	.217	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



Inserts

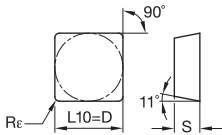
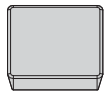


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

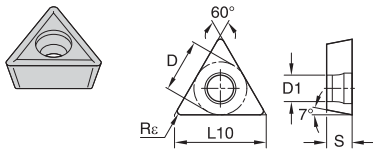
### SPUN/SPU

ISO catalog number	ANSI catalog number	D		L10		S		Rε		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT115
		mm	in	mm	in	mm	in	mm	in															
SPUN090308	SPU322	9,53	3/8	9,53	.375	3,18	1/8	0,8	1/32	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○
SPUN120304	SPU421	12,70	1/2	12,70	.500	3,18	1/8	0,4	1/64	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
SPUN120308	SPU422	12,70	1/2	12,70	.500	3,18	1/8	0,8	1/32	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
SPUN120312	SPU423	12,70	1/2	12,70	.500	3,18	1/8	1,2	3/64	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
SPUN120412	SPU433	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
SPUN190416	SPU634	19,05	3/4	19,05	.750	4,76	3/16	1,6	1/16	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
SPUN150412	SPUN533	15,88	5/8	15,88	.625	4,76	3/16	1,2	3/64	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
SPUN190412	SPUN633	19,05	3/4	19,05	.750	4,76	3/16	1,2	3/64	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



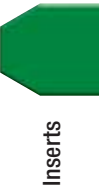
### SPUN-T/SPU-T

ISO catalog number	ANSI catalog number	D		L10		S		Rε		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT115
		mm	in	mm	in	mm	in	mm	in															
SPUN250620T	SPU845T	25,40	1	25,40	1.000	6,35	1/4	2,0	5/64	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



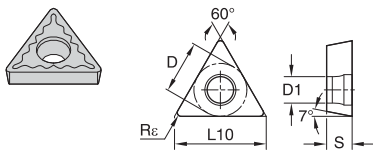
● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



■ **TCMT**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in																
TCMT110202	TCMT21505	6,35	1/4	11,00	.433	2,38	3/32	0,2	.008	2,80	.110	■	■	■	■	■	■	■	■	○	○	○	○	○	○	○	○
TCMT110204	TCMT2151	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110	■	■	■	■	■	■	■	■	○	○	○	○	○	○	○	
TCMT16T304	TCMT3251	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173	■	■	■	■	■	■	■	■	○	○	○	○	○	○	○	
TCMT16T308	TCMT3252	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173	■	■	■	■	■	■	■	■	○	○	○	○	○	○	○	
TCMT220408	TCMT432	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,50	.217	■	■	■	■	■	■	■	■	○	○	○	○	○	○	○	

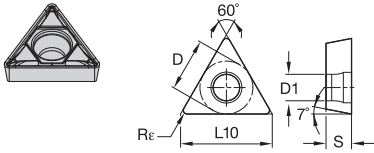


■ **TCMT-2**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in																
TCMT1102042	TCMT21512	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110	■	■	■	■	■	■	■	■	○	○	○	○	○	○	○	2014082



Inserts

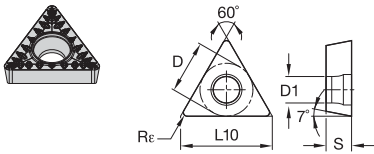


- first choice
- alternate choice

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M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

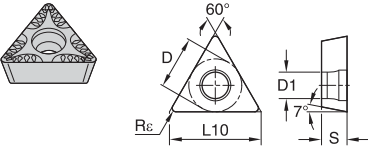
**TCMT-FP**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in																
TCMT110202FP	TCMT21505FP	6,35	1/4	11,00	.433	2,38	3/32	0,2	.008	2,90	.114																
TCMT110204FP	TCMT2151FP	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110	4170006	4170313		4168770	4168801	4168800			4170097							
TCMT110208FP	TCMT2152FP	6,35	1/4	11,00	.433	2,38	3/32	0,8	1/32	2,80	.110	4170007	4170014		4168771	4168802			4170098	4170099							
TCMT16T304FP	TCMT3251FP	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173	4170008	4170315		4168772	4168803			4170099								
TCMT16T308FP	TCMT3252FP	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173	4170009	4170316		4168773	4168804			4170100								
TCMT16T312FP	TCMT3253FP	9,53	3/8	16,50	.650	3,97	5/32	1,2	3/64	4,40	.173	4170010			4168805	4168804			4170101								
TCMT220408FP	TCMT432FP	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,50	.217	4170011	4170317			4168806			4170102								



**TCMT-MP**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15		
		mm	in	mm	in	mm	in	mm	in	mm	in																	
TCMT110208MP	TCMT2152MP	6,35	1/4	11,00	.433	2,38	3/32	0,8	1/32	2,80	.110		4170231						4170249									
TCMT16T304MP	TCMT3251MP	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173		4170232		4168904	4168918			4170250									
TCMT16T308MP	TCMT3252MP	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173	4170216	4170233		4168905	4168919			4170251									
TCMT16T312MP	TCMT3253MP	9,53	3/8	16,50	.650	3,97	5/32	1,2	3/64	4,40	.173	4170234			4168920			4170252	4170251									

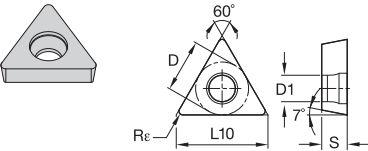


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

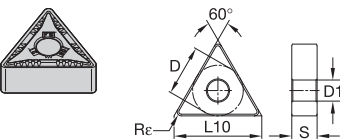
### TCMT-MU

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1																		
		mm	in	mm	in	mm	in	mm	in	mm	in	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15		
TCMT16T304MU	TCMT3251MU	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TCMT16T308MU	TCMT3252MU	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



### TCMW

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1																		
		mm	in	mm	in	mm	in	mm	in	mm	in	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15		
TCMW110204	TCMW2151	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TCMW16T304	TCMW3251	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

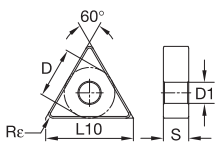
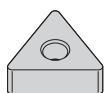


### TNGG-FS

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1																		
		mm	in	mm	in	mm	in	mm	in	mm	in	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15		
TNGG160404FS	TNGG331FS	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNGG220408FS	TNGG432FS	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



Inserts

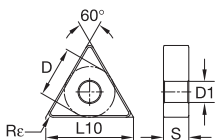


- first choice
- alternate choice

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K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

■ TNMA

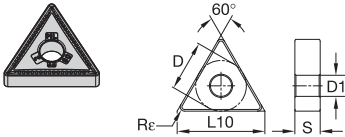
ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS28PT	WU10HT	THM	TTM	TTR	TT15		
		mm	in	mm	in	mm	in	mm	in	mm	in																	
TNMA160408	TNMA332	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMA160412	TNMA333	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMA160416	TNMA334	9,53	3/8	16,50	.650	4,76	3/16	1,6	1/16	3,81	.150	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMA220408	TNMA432	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMA220412	TNMA433	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMA220416	TNMA434	12,70	1/2	22,00	.866	4,76	3/16	1,6	1/16	5,16	.203	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMA270616	TNMA544	15,88	5/8	27,50	1.083	6,35	1/4	1,6	1/16	6,35	.250	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○



■ TNMG-FF

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS28PT	WU10HT	THM	TTM	TTR	TT15		
		mm	in	mm	in	mm	in	mm	in	mm	in																	
TNMG110304FF	TNMG221FF	6,35	1/4	11,00	.433	3,18	1/8	0,4	1/64	2,26	.089	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMG110308FF	TNMG222FF	6,35	1/4	11,00	.433	3,18	1/8	0,8	1/32	2,26	.089	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMG160404FF	TNMG331FF	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMG160408FF	TNMG332FF	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMG160412FF	TNMG333FF	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○





● first choice  
○ alternate choice

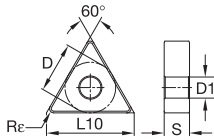
P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○


**■ TNMG-ML**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS29PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
TNMG110304ML	TNMG221ML	6,35	1/4	11,00	.433	3,18	1/8	0,4	1/64	2,26	.089	5684347							4171407							
TNMG110308ML	TNMG222ML	6,35	1/4	11,00	.433	3,18	1/8	0,8	1/32	2,26	.089								4171408	4171409						
TNMG160404ML	TNMG331ML	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	4171075	4171076	4170491					4171671	4171409						
TNMG160408ML	TNMG332ML	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	4171076	4170492	4170491					4171672	4171410						
TNMG160412ML	TNMG333ML	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	4171077	4171078	4170493					4171673	4171411						
TNMG220404ML	TNMG431ML	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203	5684348							4171412							
TNMG220408ML	TNMG432ML	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	4171078	4170494													



Inserts

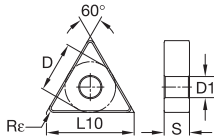


● first choice  
○ alternate choice

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M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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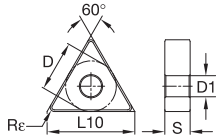
### ■ TNMG-MR

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
TNMG160404MR	TNMG331MR	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150															
TNMG160408MR	TNMG332MR	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150															
TNMG160412MR	TNMG333MR	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150															
TNMG220404MR	TNMG431MR	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203															
TNMG220408MR	TNMG432MR	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203															
TNMG220412MR	TNMG433MR	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203															
TNMG220416MR	TNMG434MR	12,70	1/2	22,00	.866	4,76	3/16	1,6	1/16	5,16	.203															



### ■ TNMG-MS

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
TNMG160404MS	TNMG331MS	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150															
TNMG160408MS	TNMG332MS	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150															
TNMG220404MS	TNMG431MS	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203															
TNMG220408MS	TNMG432MS	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203															
TNMG220412MS	TNMG433MS	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203															
TNMG270608MS	TNMG542MS	15,88	5/8	27,50	1.083	6,35	1/4	0,8	1/32	6,35	.250															



● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

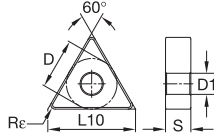
Inserts

**■ TNMG-RH**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WJ10HT	THM	TJM	TTR	TT115
		mm	in	mm	in	mm	in	mm	in	mm	in															
TNMG160408RH	TNMG332RH	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	4171007	4171542													
												4171008	4171543	4171724												
TNMG160412RH	TNMG333RH	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	4171009	4171544													
												4171010	4171545	4171726												
TNMG220408RH	TNMG432RH	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	4171011	4171546													
												4171012	4171547	4171727												
TNMG220412RH	TNMG433RH	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203	4171013	4171548													
												4171014	4171549	4171728												
TNMG220416RH	TNMG434RH	12,70	1/2	22,00	.866	4,76	3/16	1,6	1/16	5,16	.203	4171015	4171550													
												4171016	4171551	4171729												
TNMG270612RH	TNMG543RH	15,88	5/8	27,50	1.083	6,35	1/4	1,2	3/64	6,35	.250	4171017	4171552													
												4171018	4171553	4171730												
TNMG270616RH	TNMG544RH	15,88	5/8	27,50	1.083	6,35	1/4	1,6	1/16	6,35	.250	4171019	4171554													
												4171020	4171555	4171731												
TNMG330924RH	TNMG666RH	19,05	3/4	33,00	1.299	9,53	3/8	2,4	3/32	7,93	.313	4171021	4171556													
												4171022	4171557	4171732												



Inserts

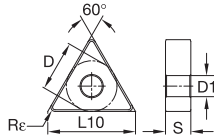


- first choice
- alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

**■ TNMG-UF**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT115	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in														
TNMG160404UF	TNMG331UF	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMG160408UF	TNMG332UF	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
TNMG160412UF	TNMG333UF	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
TNMG220404UF	TNMG431UF	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
TNMG220408UF	TNMG432UF	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

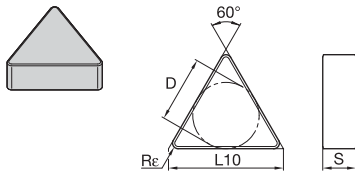


**■ TNMG-UM**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TT115
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in													
TNMG160404UM	TNMG331UM	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMG160408UM	TNMG332UM	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMG160412UM	TNMG333UM	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMG160416UM	TNMG334UM	9,53	3/8	16,50	.650	4,76	3/16	1,6	1/16	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMG220404UM	TNMG431UM	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMG220408UM	TNMG432UM	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TNMG220412UM	TNMG433UM	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○







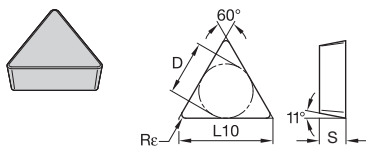
● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



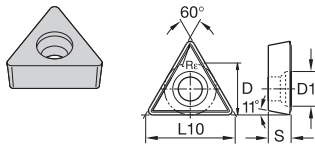
### ■ TNUN/TNU

ISO catalog number	ANSI catalog number	D		L10		S		Rε		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in																
TNUN160408	TNU332	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○



### ■ TPGN/TPG

ISO catalog number	ANSI catalog number	D		L10		S		Rε		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in																
TPGN110308	TPG222	6,35	1/4	11,00	.433	3,18	1/8	0,8	1/32	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TPGN160308	TPG322	9,53	3/8	16,50	.650	3,18	1/8	0,8	1/32	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

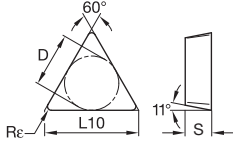
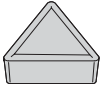


### ■ TPGA

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
TPGA110204	TPGA2151	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
TPGA110208	TPGA2152	6,35	1/4	11,00	.433	2,38	3/32	0,8	1/32	2,80	.110	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



Inserts

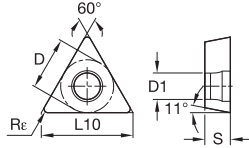
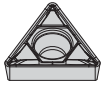


- first choice
- alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

TPMR

ISO catalog number	ANSI catalog number	D		L10		S		Rε		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in															
TPMR110304	TPMR221	6,35	1/4	11,00	.433	3,18	1/8	0,4	1/64	4170859														
TPMR110308	TPMR222	6,35	1/4	11,00	.433	3,18	1/8	0,8	1/32	4170860							4170954							
TPMR160304	TPMR321	9,53	3/8	16,50	.650	3,18	1/8	0,4	1/64	4170861							4170955							
TPMR160308	TPMR322	9,53	3/8	16,50	.650	3,18	1/8	0,8	1/32	4170862							4170956							
TPMR160312	TPMR323	9,53	3/8	16,50	.650	3,18	1/8	1,2	3/64	4170863							4170957							

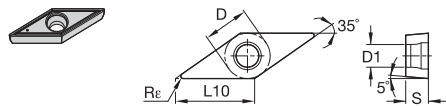


TPMT-FP

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in																
TPMT090208FP	TPMT18152FP	5,56	7/32	9,63	.379	2,38	3/32	0,8	1/32	2,50	.098	4170025	4170335														
TPMT110204FP	TPMT2151FP	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110	4170026	4170336														
TPMT110208FP	TPMT2152FP	6,35	1/4	11,00	.433	2,38	3/32	0,8	1/32	2,80	.110	4170027	4170337														
TPMT16T304FP	TPMT3251FP	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173	4170028	4170338														
TPMT16T308FP	TPMT3252FP	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173	4170029	4170339														
TPMT16T312FP	TPMT3253FP	9,53	3/8	16,50	.650	3,97	5/32	1,2	3/64	4,40	.173	4170030	4170340														
TPMT220408FP	TPMT432FP	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,50	.217	4170340															





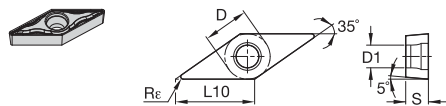


● first choice  
○ alternate choice

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M	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

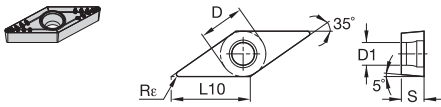
■ VBMT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS28PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
VBMT160404	VBMT331	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	4,40	.173															
VBMT160408	VBMT332	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	4,40	.173															
VBMT160412	VBMT333	9,53	3/8	16,61	.654	4,76	3/16	1,2	3/64	4,40	.173															



■ VBMT-FP

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS28PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
VBMT110302FP	VBMT2205FP	6,35	1/4	11,07	.436	3,18	1/8	0,2	.008	2,80	.110															
VBMT110304FP	VBMT221FP	6,35	1/4	11,07	.436	3,18	1/8	0,4	1/64	2,80	.110															
VBMT110308FP	VBMT222FP	6,35	1/4	11,07	.436	3,18	1/8	0,8	1/32	2,80	.110															
VBMT160402FP	VBMT3305FP	9,53	3/8	16,61	.654	4,76	3/16	0,2	.008	4,40	.173															
VBMT160404FP	VBMT331FP	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	4,40	.173															
VBMT160408FP	VBMT332FP	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	4,40	.173															
VBMT160412FP	VBMT333FP	9,53	3/8	16,61	.654	4,76	3/16	1,2	3/64	4,40	.173															

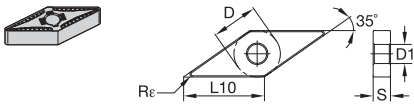


● first choice  
○ alternate choice

P	M	K	N	S	H	WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

**VBMT-MP**

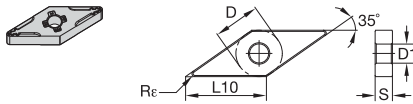
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in																
VBMT160404MP	VBMT331MP	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
VBMT160408MP	VBMT332MP	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	


**VNGG-FS**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
VNGG160402FS	VNGG3305FS	9,53	3/8	16,61	.654	4,76	3/16	0,2	.008	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
VNGG160401FS	VNGG330FS	9,53	3/8	16,61	.654	4,76	3/16	0,1	.004	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
VNGG160404FS	VNGG331FS	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
VNGG160408FS	VNGG332FS	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○







● first choice  
○ alternate choice

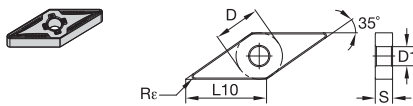
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M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



Inserts

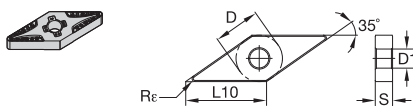
■ **VNMG-VF**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in														
VNMG160404VF	VNMG331VF	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	4171053															
VNMG160408VF	VNMG332VF	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	4171054				4172695					5684333						



■ **VNMG-ML**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in													
VNMG160404ML	VNMG331ML	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	4171079														
VNMG160408ML	VNMG332ML	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	4171080														

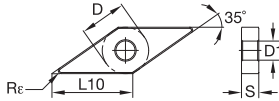


■ **VNMG-MR**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in													
VNMG160408MR	VNMG332MR	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	4171157														



Inserts

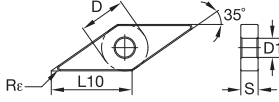


- first choice
- alternate choice

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M	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

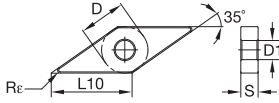
**VNMG-MS**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in																
VNMG160404MS	VNMG331MS	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150																
VNMG160408MS	VNMG332MS	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150										5908947	5908944	5908945	5908948	5908949		
VNMG220404MS	VNMG431MS	12,70	1/2	22,14	.872	4,76	3/16	0,4	1/64	5,16	.203										5908950	5908951					
VNMG220408MS	VNMG432MS	12,70	1/2	22,14	.872	4,76	3/16	0,8	1/32	5,16	.203										5908963	5908964	5908961	5908962			



**VNMG-RH**

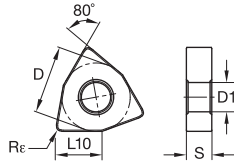
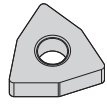
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15		
		mm	in	mm	in	mm	in	mm	in	mm	in																	
VNMG160408RH	VNMG332RH	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150		4171015	4171550	4171732													
VNMG220408RH	VNMG432RH	12,70	1/2	22,14	.872	4,76	3/16	0,8	1/32	5,16	.203		4171016	4171551	4171733													
VNMG220412RH	VNMG433RH	12,70	1/2	22,14	.872	4,76	3/16	1,2	3/64	5,16	.203		4171017	4171552	4171734													



**VNMG-UF**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15		
		mm	in	mm	in	mm	in	mm	in	mm	in																	
VNMG160404UF	VNMG331UF	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150																	
VNMG160408UF	VNMG332UF	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	5645618			4169372	4169398				5645616								



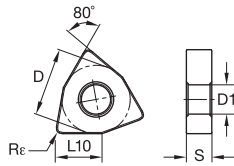


- first choice
- alternate choice

P	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

■ WNMA

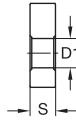
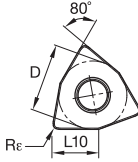
ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
WNMA060408	WNMA332	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○
WNMA060412	WNMA333	9,53	3/8	6,52	.257	4,76	3/16	1,2	3/64	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
WNMA080408	WNMA432	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
WNMA080412	WNMA433	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
WNMA080416	WNMA434	12,70	1/2	8,69	.342	4,76	3/16	1,6	1/16	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	



■ WNMG-FF

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
WNMG060404FF	WNMG331FF	9,53	3/8	6,52	.257	4,76	3/16	0,4	1/64	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
WNMG060408FF	WNMG332FF	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
WNMG080404FF	WNMG431FF	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
WNMG080408FF	WNMG432FF	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	





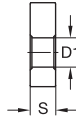
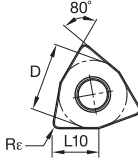
● first choice  
○ alternate choice

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S	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
H	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Inserts

### ■ WNMG-FW

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT		WP25CT		WP35CT		WM15CT		WM25CT		WM35CT		WK05CT		WK20CT		WS10PT		WS25PT		WU10HT		THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
WNMG060404FW	WNMG331FW	9,53	3/8	6,52	.257	4,76	3/16	0,4	1/64	3,81	.150	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
WNMG060408FW	WNMG332FW	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
WNMG080404FW	WNMG431FW	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
WNMG080408FW	WNMG432FW	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
WNMG080412FW	WNMG433FW	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

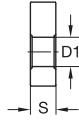
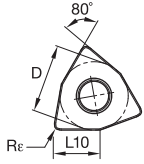
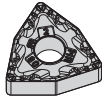


### ■ WNMG-ML

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT		WP25CT		WP35CT		WM15CT		WM25CT		WM35CT		WK05CT		WK20CT		WS10PT		WS25PT		WU10HT		THM	TTM	TTR	TTI15			
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					
WNMG060404ML	WNMG331ML	9,53	3/8	6,52	.257	4,76	3/16	0,4	1/64	3,81	.150	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
WNMG060408ML	WNMG332ML	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
WNMG080404ML	WNMG431ML	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
WNMG080408ML	WNMG432ML	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



Inserts

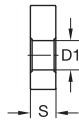
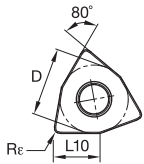
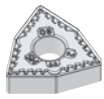


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

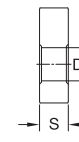
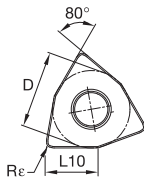
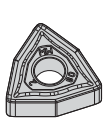
■ WNMG-MR

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15		
		mm	in	mm	in	mm	in	mm	in	mm	in																	
WNMG080408MR	WNMG432MR	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	4171158	4171159	4170581	4170067	4173033	4173148											
WNMG080412MR	WNMG433MR	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	4171159	4170582	4170068		4173034	4173149											
WNMG080416MR	WNMG434MR	12,70	1/2	8,69	.342	4,76	3/16	1,6	1/16	5,16	.203	4171160	4170583															



■ WNMG-MS

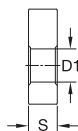
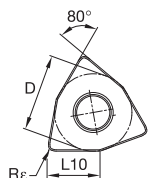
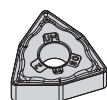
ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15		
		mm	in	mm	in	mm	in	mm	in	mm	in																	
WNMG060408MS	WNMG332MS	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150									5908966	5908967	5908968						
WNMG080404MS	WNMG431MS	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203									5908969	5908970	5908971						
WNMG080408MS	WNMG432MS	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203									5908972	5908973	5908974						



■ WNMG-MW

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15		
		mm	in	mm	in	mm	in	mm	in	mm	in																	
WNMG060408MW	WNMG332MW	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	5623512	5623513															
WNMG080408MW	WNMG432MW	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	5623517																
WNMG080412MW	WNMG433MW	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203				4173119													



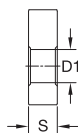
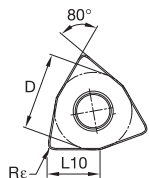
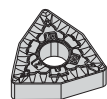


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

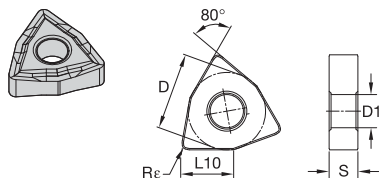
■ WNMG-UM

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
WNMG060404UM	WNMG331UM	9,53	3/8	6,52	.257	4,76	3/16	0,4	1/64	3,81	.150	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○
WNMG060408UM	WNMG332UM	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○
WNMG060412UM	WNMG333UM	9,53	3/8	6,52	.257	4,76	3/16	1,2	3/64	3,81	.150	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○
WNMG080404UM	WNMG431UM	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○
WNMG080408UM	WNMG432UM	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○
WNMG080412UM	WNMG433UM	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○
WNMG080416UM	WNMG434UM	12,70	1/2	8,69	.342	4,76	3/16	1,6	1/16	5,16	.203	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○



■ WNMG-UR

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in															
WNMG060408UR	WNMG332UR	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○
WNMG060412UR	WNMG333UR	9,53	3/8	6,52	.257	4,76	3/16	1,2	3/64	3,81	.150	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○
WNMG080408UR	WNMG432UR	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○
WNMG080412UR	WNMG433UR	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○
WNMG080416UR	WNMG434UR	12,70	1/2	8,69	.342	4,76	3/16	1,6	1/16	5,16	.203	■	■	■	○	○	○	○	○	○	○	○	○	○	○	○

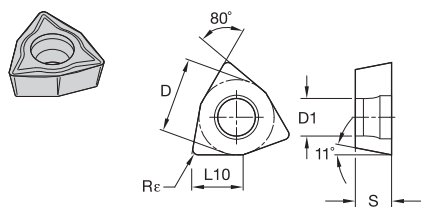


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

### WNMP

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in														
WNMP080408	WNMP432	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
WNMP080412	WNMP433	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	



### WPMT-FP

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT	THM	TTM	TTR	TTI15
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in													
WPMTS3T104FP	WPMT15121FP	4,76	3/16	3,25	.128	1,98	5/64	0,4	1/64	2,15	.085	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
WPMT040204FP	WPMT2151FP	6,35	1/4	4,34	.171	2,38	3/32	0,4	1/64	2,80	.110	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
WPMT06T304FP	WPMT3251FP	9,53	3/8	6,52	.257	3,97	5/32	0,4	1/64	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
WPMT06T308FP	WPMT3252FP	9,53	3/8	6,52	.257	3,97	5/32	0,8	1/32	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

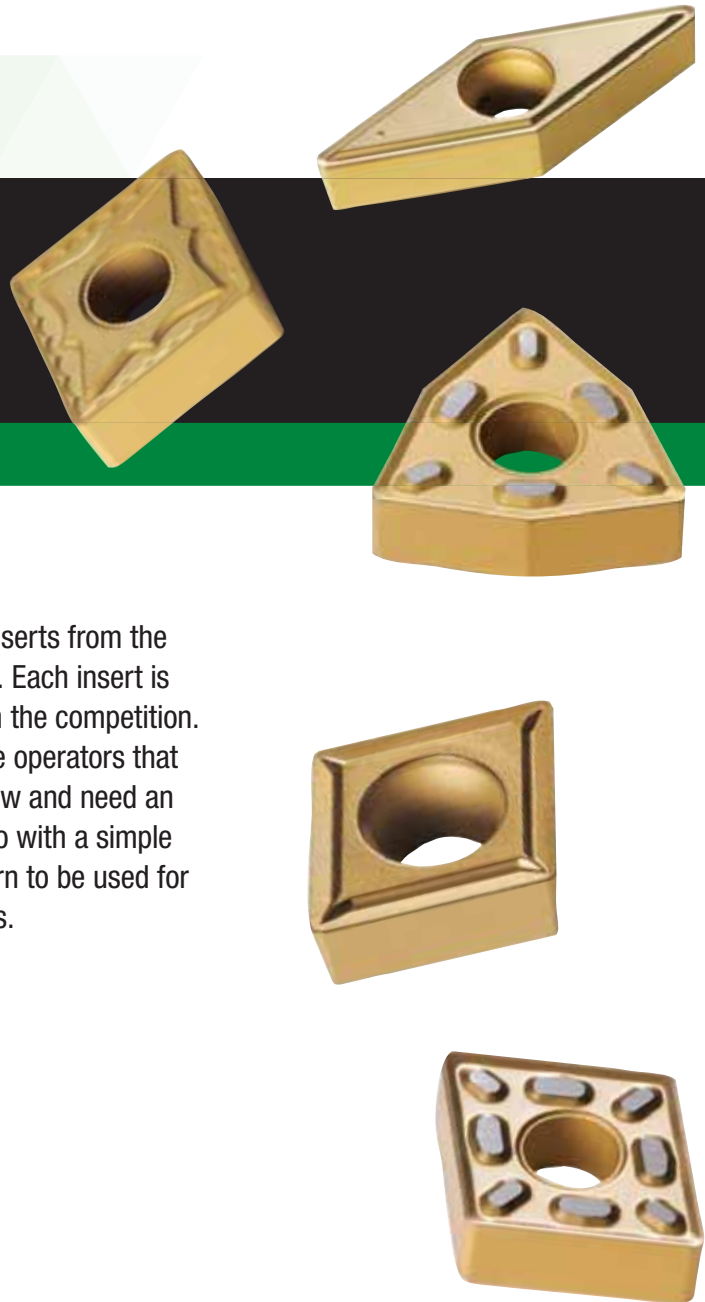


The Gold Standard for Value •  
**WIDIA™ VariTurn™**

# VariTurn

WIDIA VariTurn is the cost-effective line of inserts from the brand you already know and trust for quality. Each insert is 100% manufactured by WIDIA to outperform the competition. WIDIA VariTurn offers the versatility for those operators that are cutting steel today and cast iron tomorrow and need an insert to get the job done. A focused portfolio with a simple grade selection method allows WIDIA VariTurn to be used for approximately 80% of all turning applications.

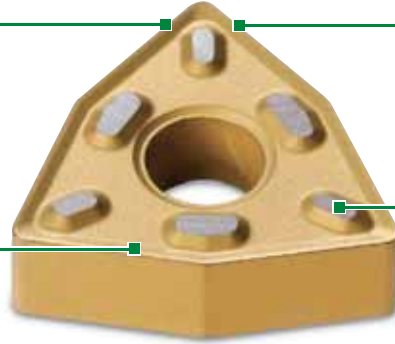
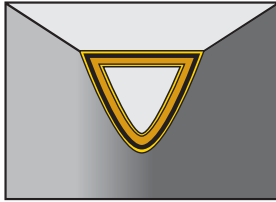
- Engineered to optimize performance.
- Gold coating on every insert.
- Proven grade technologies.



**Post-coat treatment**

- Improves edge toughness.
- Wide range of applications.

MT-CVD/CVD—  
TiN-TiCN-Al<sub>2</sub>O<sub>3</sub>-TiN



**Improved edge toughness**

- Provides smooth outer surface to reduce forces, friction, and workpiece sticking.

**Post-coat grinding**

- Provides secure seating surface.

## Getting the Most from Every Insert

WIDIA™ VariTurn™ products make it simple to get the most out of your inserts, and your money. Every insert is gold, which exposes wear as the tool continues to be used. This makes it easy to detect when an insert is ready to be changed — maximizing the product's value and protecting the workpiece. Also, because WIDIA VariTurn inserts can be used in most applications, a single insert can take on any number of tasks, thus reducing your inventory. WIDIA VariTurn products are also reliable enough to cut steel, stainless steel, cast iron, and high-temperature alloys, enabling quick changes in workpiece materials without the need to swap inserts, saving time and money.

## WIDIA VariTurn Options

This versatile line offers a simple geometry selection system, eight grades, and eight geometries, including negative rake and screw-on. With these options, WIDIA VariTurn inserts cover 80% of all general turning applications.

## How Do Catalog Numbers Work?

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



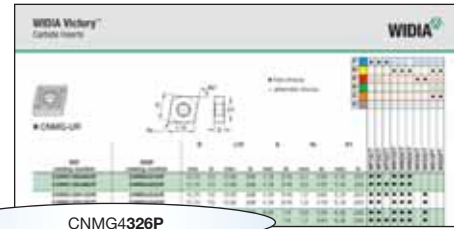
CNMG4326P

C		N		M		G		4																																																																																																																																																																																																																																																																					
Insert Shape		Insert Clearance Angle		Tolerance Class		Insert Features		Size																																																																																																																																																																																																																																																																					
H	Hexagon 120°	A	3°	Tolerances apply prior to edge prep and coating  		N		<table border="1"> <thead> <tr> <th colspan="2"></th> <th colspan="8">"Code for inch cutting edge length "L10"</th> </tr> <tr> <th colspan="2"></th> <th colspan="8">"D"</th> </tr> <tr> <th>inch</th> <th>inch</th> <th>C</th> <th>D</th> <th>R</th> <th>S</th> <th>T</th> <th>V</th> <th>W</th> <th></th> </tr> </thead> <tbody> <tr> <td>1.2 (5)</td> <td>5/32</td> <td>S4</td> <td>04</td> <td>03</td> <td>03</td> <td>06</td> <td>-</td> <td>-</td> <td></td> </tr> <tr> <td>1.5 (6)</td> <td>3/16</td> <td>04</td> <td>05</td> <td>04</td> <td>04</td> <td>08</td> <td>08</td> <td>S3</td> <td></td> </tr> <tr> <td>1.8 (7)</td> <td>7/32</td> <td>05</td> <td>06</td> <td>05</td> <td>05</td> <td>09</td> <td>09</td> <td>03</td> <td></td> </tr> <tr> <td>-</td> <td>.236</td> <td>-</td> <td>-</td> <td>06</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> </tr> <tr> <td>2</td> <td>1/4</td> <td>06</td> <td>07</td> <td>06</td> <td>06</td> <td>11</td> <td>11</td> <td>04</td> <td></td> </tr> <tr> <td>2.5</td> <td>5/16</td> <td>08</td> <td>09</td> <td>07</td> <td>07</td> <td>13</td> <td>13</td> <td>05</td> <td></td> </tr> <tr> <td>-</td> <td>.315</td> <td>-</td> <td>-</td> <td>08</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> </tr> <tr> <td>3</td> <td>3/8</td> <td>09</td> <td>11</td> <td>09</td> <td>09</td> <td>16</td> <td>16</td> <td>06</td> <td></td> </tr> <tr> <td>-</td> <td>.394</td> <td>-</td> <td>-</td> <td>10</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> </tr> <tr> <td>3.5</td> <td>7/16</td> <td>11</td> <td>13</td> <td>11</td> <td>11</td> <td>19</td> <td>19</td> <td>07</td> <td></td> </tr> <tr> <td>-</td> <td>.472</td> <td>-</td> <td>-</td> <td>12</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> </tr> <tr> <td>4</td> <td>1/2</td> <td>12</td> <td>15</td> <td>12</td> <td>12</td> <td>22</td> <td>22</td> <td>08</td> <td></td> </tr> <tr> <td>4.5</td> <td>9/16</td> <td>14</td> <td>17</td> <td>14</td> <td>14</td> <td>24</td> <td>24</td> <td>09</td> <td></td> </tr> <tr> <td>5</td> <td>5/8</td> <td>16</td> <td>19</td> <td>15</td> <td>15</td> <td>27</td> <td>27</td> <td>10</td> <td></td> </tr> <tr> <td>-</td> <td>.630</td> <td>-</td> <td>-</td> <td>16</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> </tr> <tr> <td>5.5</td> <td>11/16</td> <td>17</td> <td>21</td> <td>17</td> <td>17</td> <td>30</td> <td>30</td> <td>11</td> <td></td> </tr> <tr> <td>6</td> <td>3/4</td> <td>19</td> <td>23</td> <td>19</td> <td>19</td> <td>33</td> <td>33</td> <td>13</td> <td></td> </tr> <tr> <td>-</td> <td>.787</td> <td>-</td> <td>-</td> <td>20</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> </tr> <tr> <td>7</td> <td>7/8</td> <td>22</td> <td>27</td> <td>22</td> <td>22</td> <td>38</td> <td>38</td> <td>15</td> <td></td> </tr> <tr> <td>-</td> <td>.984</td> <td>-</td> <td>-</td> <td>25</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> </tr> <tr> <td>8</td> <td>1</td> <td>25</td> <td>31</td> <td>25</td> <td>25</td> <td>44</td> <td>44</td> <td>17</td> <td></td> </tr> <tr> <td>10</td> <td>1-1/4</td> <td>32</td> <td>38</td> <td>31</td> <td>31</td> <td>54</td> <td>54</td> <td>21</td> <td></td> </tr> <tr> <td>-</td> <td>1.260</td> <td>-</td> <td>-</td> <td>32</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td></td> </tr> </tbody> </table>				"Code for inch cutting edge length "L10"										"D"								inch	inch	C	D	R	S	T	V	W		1.2 (5)	5/32	S4	04	03	03	06	-	-		1.5 (6)	3/16	04	05	04	04	08	08	S3		1.8 (7)	7/32	05	06	05	05	09	09	03		-	.236	-	-	06	-	-	-	-		2	1/4	06	07	06	06	11	11	04		2.5	5/16	08	09	07	07	13	13	05		-	.315	-	-	08	-	-	-	-		3	3/8	09	11	09	09	16	16	06		-	.394	-	-	10	-	-	-	-		3.5	7/16	11	13	11	11	19	19	07		-	.472	-	-	12	-	-	-	-		4	1/2	12	15	12	12	22	22	08		4.5	9/16	14	17	14	14	24	24	09		5	5/8	16	19	15	15	27	27	10		-	.630	-	-	16	-	-	-	-		5.5	11/16	17	21	17	17	30	30	11		6	3/4	19	23	19	19	33	33	13		-	.787	-	-	20	-	-	-	-		7	7/8	22	27	22	22	38	38	15		-	.984	-	-	25	-	-	-	-		8	1	25	31	25	25	44	44	17		10	1-1/4	32	38	31	31	54	54	21		-	1.260	-	-	32	-	-	-	-	
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O	Octagon 135°	B	5°		G		<p>D = Theoretical diameter of the insert inscribed circle S = Thickness B = See figures below</p>																																																																																																																																																																																																																																																																						
P	Pentagon 108°	C	7°		H																																																																																																																																																																																																																																																																								
R	Round -	D	15°	X	Special Design																																																																																																																																																																																																																																																																								
S	Square 90°	E	20°	V																																																																																																																																																																																																																																																																									
T	Triangular 60°	F	25°																																																																																																																																																																																																																																																																										
C	Rhomboid 80°	G	30°																																																																																																																																																																																																																																																																										
D	85°	N	0°																																																																																																																																																																																																																																																																										
E	55°																																																																																																																																																																																																																																																																												
M	75°																																																																																																																																																																																																																																																																												
V	86°																																																																																																																																																																																																																																																																												
	35°																																																																																																																																																																																																																																																																												
W	Trigon 80° with enlarged corner angles	P	11°																																																																																																																																																																																																																																																																										
L	Rectangular 90°																																																																																																																																																																																																																																																																												
A	Parallelogram 85°																																																																																																																																																																																																																																																																												
B	82°																																																																																																																																																																																																																																																																												
N/K	55°																																																																																																																																																																																																																																																																												

tolerance class	tolerance on "D"	tolerance on "B"	tolerance on "S"
C	±.0010"	±.0005"	±.001"
H	±.0005"	±.0005"	±.001"
E	±.0010"	±.0010"	±.001"
G	±.0010"	±.0010"	±.005"
M	See tables on next page		±.005"
U	See tables on next page		±.005"



By referencing this easy-to-use guide, you can identify the correct product to meet your needs.



CNMG4326P

**3**

Thickness  
S

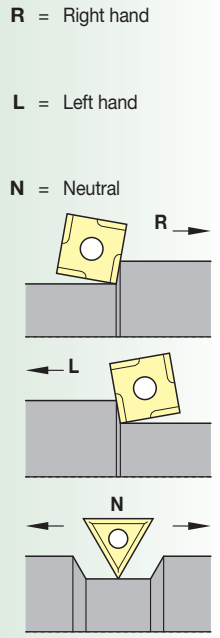
symbol	thickness
inch	inch
.5 (1)	1/32
.6	.040
1 (2)	1/16
1.2	5/64
1.5	3/32
2	1/8
2.5	5/32
3	3/16
3.5	7/32
4	1/4
5	5/16
6	3/8
7	7/16
18	1/2

**2**

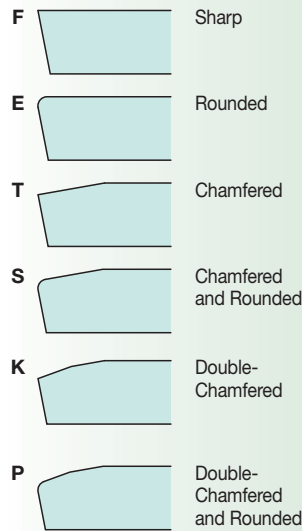
Corner  
Radius "Re"

symbol	corner radius
inch	inch
X0	.0015
0	.004
.5	.008
1	1/64
2	1/32
3	3/64
4	1/16
5	5/64
6	3/32
7	7/64
8	1/8
-	round insert
-	

Hand of Insert  
(optional)



Cutting Edge  
(optional)



**6P**

Chipbreaker  
(optional)

- 1P = Finishing
- 2P = Finishing
- ..GP = Medium Machining
- 4P = Medium Machining
- 6P = Medium Roughing
- ..MA = Roughing
- 7N = Heavy Roughing

"D"	± Tolerance on "D"				± Tolerance on "B"				
	Class M Tolerance			Class U Tolerance	Class M Tolerance			Class U Tolerance	
	Shapes S, T, C, R, & W	Shape D	Shape V	Shapes S, T, & C	"D"	Shapes S, T, C, R, & W	Shape D	Shape V	Shapes S, T, & C
inch	inch	inch	inch	inch	inch	inch	inch	inch	inch
5/32	.002	-	-	-	5/32	.003	-	-	-
3/16	.002	-	-	.003	3/16	.003	-	-	.005
7/32	.002	.002	.002	.003	7/32	.003	.004	-	.005
1/4	.002	.002	.002	.003	1/4	.003	.004	-	.005
5/16	.002	.002	.002	.003	5/16	.003	.004	-	.005
3/8	.002	.002	.002	.003	3/8	.003	.004	.007	.005
7/16	.003	.003	.003	.005	7/16	.005	.006	-	-
1/2	.003	.003	.003	.005	1/2	.005	.006	.010	.008
9/16	.003	.003	.003	.005	9/16	.005	.006	-	-
5/8	.004	.004	.004	.007	5/8	.006	.007	-	.011
11/16	.004	.004	.004	.007	11/16	.006	.007	-	.011
3/4	.004	.004	.004	.007	3/4	.006	.007	-	.011
7/8	.005	-	-	.010	7/8	.006	-	-	.015
1	.005	-	-	.010	1	.007	-	-	.015
1 1/4	.006	-	-	.010	1 1/4	.008	-	-	.015

A system of grades, geometries, and application guidelines to provide optimal solutions for your metalcutting needs. It's easy to determine which WIDIA™ chip-control cutting tool will work best in your specific workpiece materials and applications!

TN	15	M														
Brand	Relative Hardness (ISO 513)	Primary Workpiece Material (ISO 513)														
TN = WIDIA	<p>01 = Hardest</p> <p>10     ↑</p> <p>20      </p> <p>30     ↓</p> <p>40      </p> <p>50 = Toughest</p>	<table border="1"> <tr><td>P</td><td>Steel</td></tr> <tr><td>M</td><td>Stainless Steel</td></tr> <tr><td>K</td><td>Cast Iron</td></tr> <tr><td>N</td><td>Non-Ferrous</td></tr> <tr><td>S</td><td>High-Temp Alloys</td></tr> <tr><td>H</td><td>Hardened Materials</td></tr> <tr><td>U</td><td>Universal Machining</td></tr> </table>	P	Steel	M	Stainless Steel	K	Cast Iron	N	Non-Ferrous	S	High-Temp Alloys	H	Hardened Materials	U	Universal Machining
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M	Stainless Steel															
K	Cast Iron															
N	Non-Ferrous															
S	High-Temp Alloys															
H	Hardened Materials															
U	Universal Machining															



## NOVO KNOWS CAD/CAM

With the addition of NOVO™ to your team, your CAD/CAM capabilities become much more accurate, streamlined, and productive.

**Before NOVO:** The programmer would be in their CAD/CAM software, programming a part. Using the outdated method of finding a tool in a catalog, and then manually inputting the tooling information from the catalog into the CAD/CAM software.

The concern is that assumptions are made, and only partial tooling information is entered.

**With NOVO:** The powerful digital intelligence of NOVO not only helps the programmer find the right tool for the metalcutting job, but also automatically integrates all the tooling data into a complete CAD/CAM solution.

The integration of all the tooling data increases the viability of the part being programmed, and is delivered quickly — saving you time.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift. [widia.com/novo](http://widia.com/novo)



■ Step 1 • Select the insert geometry

Negative Inserts



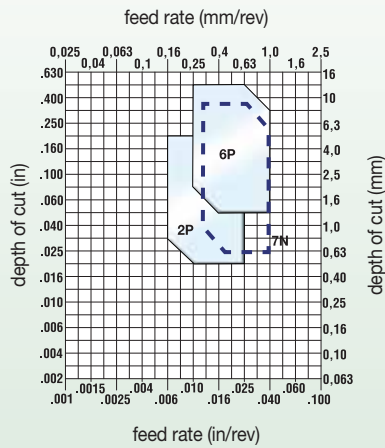
2P  
Finishing



6P  
Roughing



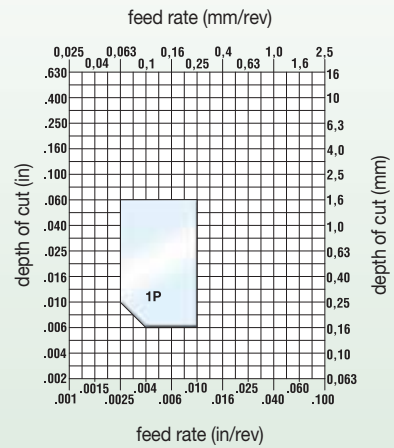
7N  
Heavy Roughing



Positive Inserts



1P  
Finishing



■ Step 2 • Select the grade

cutting condition	Negative Insert Geometry			Positive Insert Geometry
	2P	6P	7N	1P
heavily interrupted cut	TN30P	TN30P	TN30P	TN30P
lightly interrupted cut	TN20P/TN30P	TN20P/TN30P	TN20P/TN30P	TN20P
varying depth of cut, casting, or forging skin	TN20P/TN30P	TN20P/TN30P	TN20P/TN30P	TN10P
smooth cut, pre-turned surface	TN10P	TN10P	TN10P	TN10P

(continued)

**Step 3 • Selecting the cutting speed** *(continued)*
**Low-Carbon (<0.3% C) and Free-Machining Steel**

Material Group	grade	speed – m/min (SFM)										Starting Conditions	
		135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM	
P0/P1	TN10P	◊										316	1056
	TN20P	◊										248	833
	TN30P	◊										189	630

**Medium- and High-Carbon Steels (>0.3% C)**

Material Group	grade	speed – m/min (SFM)										Starting Conditions	
		135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM	
P2	TN10P	◊										212	704
	TN20P	◊										176	585
	TN30P	◊										135	450

**Alloy Steels and Tool Steels (≤330 HB) (≤35 HRC)**

Material Group	grade	speed – m/min (SFM)										Starting Conditions	
		135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM	
P3	TN10P	◊										152	504
	TN20P	◊										140	459
	TN30P	◊										108	360

**Alloy Steels and Tool Steels (340–450 HB) (36–48 HRC)**

Material Group	grade	speed – m/min (SFM)										Starting Conditions	
		60 (200)	90 (300)	120 (400)	150 (500)	180 (600)	210 (700)	240 (800)	270 (900)	300 (1000)	m/min	SFM	
P4	TN10P	◊										116	384
	TN20P	◊										95	324
	TN30P	◊										86	293

**Ferritic, Martensitic, and PH Stainless Steels (≤330 HB) (≤35 HRC)**

Material Group	grade	speed – m/min (SFM)										Starting Conditions	
		120 (400)	150 (500)	180 (600)	210 (700)	240 (800)	270 (900)	300 (1000)	330 (1100)	360 (1200)	m/min	SFM	
P5	TN10P	◊										172	576
	TN20P	◊										176	585
	TN30P	◊										122	405

**Ferritic, Martensitic, and PH Stainless Steels (340–450 HB) (36–48 HRC)**

Material Group	grade	speed – m/min (SFM)										Starting Conditions	
		105 (350)	135 (450)	165 (550)	195 (650)	225 (750)	255 (850)	285 (950)	315 (1050)	345 (1150)	m/min	SFM	
P6	TN10P	◊										144	480
	TN20P	◊										135	450
	TN30P	◊										95	315

■ Step 1 • Select the insert geometry

Negative Inserts



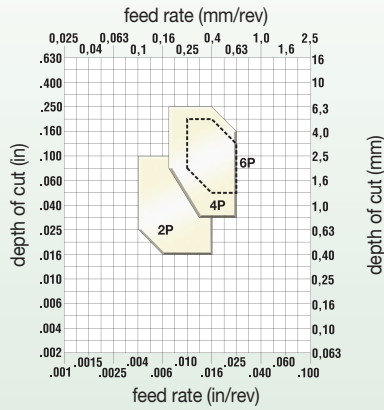
2P  
Finishing



4P  
Medium



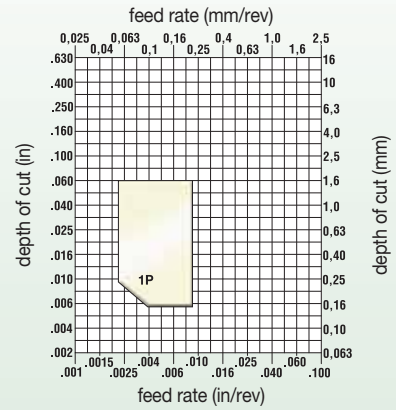
6P  
Roughing



Positive Inserts



1P  
Finishing



■ Step 2 • Select the grade

cutting condition	Negative Insert Geometry			Positive Insert Geometry
	2P	4P	6P	1P
heavily interrupted cut	TN15M/TN10	TN30M	TN30M	TN30M/TN10
lightly interrupted cut	TN15M/TN10	TN30M	TN30M	TN30M
varying depth of cut, casting, or forging skin	TN15M	TN15M/TN30M	TN15M/TN30M	TN15M/TN30M
smooth cut, pre-turned surface	TN15M	TN15M	TN15M	TN15M

■ Step 3 • Selecting the cutting speed

Austenitic Stainless Steel		speed – m/min (SFM)									Starting Conditions	
Material Group	grade	90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	360 (1200)	405 (1350)	450 (1500)	m/min	SFM
M1	TN15M	◊									162	540
	TN30M	◊									135	450
	TN10U	◊									194	630
	TN15U	◊									129	420

Austenitic Stainless Steel		speed – m/min (SFM)									Starting Conditions	
Material Group	grade	90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	360 (1200)	405 (1350)	450 (1500)	m/min	SFM
M2	TN15M	◊									149	495
	TN30M	◊									135	450
	TN10U	◊									180	585
	TN15U	◊									120	390

Austenitic Stainless Steel: Duplex (Ferritic and Austenitic Mixture)		speed – m/min (SFM)									Starting Conditions	
Material Group	grade	90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	360 (1200)	405 (1350)	450 (1500)	m/min	SFM
M3	TN15M	◊									135	450
	TN30M	◊									108	360
	TN10U	◊									167	540
	TN15U	◊									111	360

**Step 1 • Select the insert geometry**

**Negative Inserts**



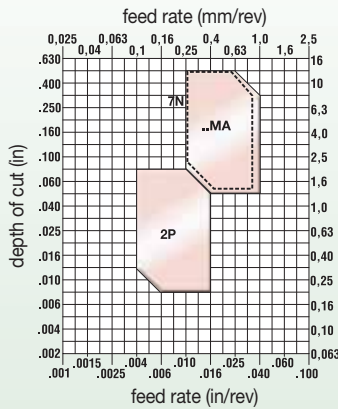
**2P**  
Finishing



**..MA**  
Heavy Roughing



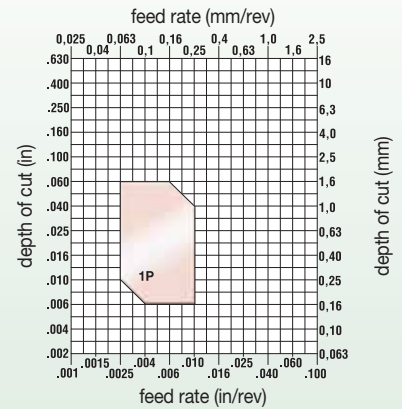
**7N**  
Heavy Roughing



**Positive Inserts**



**1P**  
Finishing



**Step 2 • Select the grade**

cutting condition	Negative Insert Geometry			Positive Insert Geometry
	2P	..MA	7N	1P
heavily interrupted cut	TN20K	TN20K	TN20K	TN20K
lightly interrupted cut	TN20K	TN20K	TN20K	TN20K
varying depth of cut, casting, or forging skin	TN20K	TN20K	TN20K	TN20K
smooth cut, pre-turned surface	TN20K	TN20K	TN20K	TN20K

**Step 3 • Selecting the cutting speed**

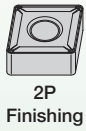
Gray Cast Iron		speed – m/min (SFM)										Starting Conditions	
Material Group	grade	60 (200)	150 (500)	240 (800)	330 (1100)	420 (1400)	510 (1700)	600 (2000)	690 (2300)	780 (2600)	m/min	SFM	
<b>K1</b>	TN20K										270	900	

Ductile, Compacted Graphite, and Malleable Cast Irons (<80 KSI tensile strength)		speed – m/min (SFM)										Starting Conditions	
Material Group	grade	60 (200)	150 (500)	240 (800)	330 (1100)	420 (1400)	510 (1700)	600 (2000)	690 (2300)	780 (2600)	m/min	SFM	
<b>K2</b>	TN20K										216	720	

Ductile, Compacted Graphite, and Malleable Cast Irons (>80 KSI tensile strength)		speed – m/min (SFM)										Starting Conditions	
Material Group	grade	60 (200)	150 (500)	240 (800)	330 (1100)	420 (1400)	510 (1700)	600 (2000)	690 (2300)	780 (2600)	m/min	SFM	
<b>K3</b>	TN20K										189	630	

■ Step 1 • Select the insert geometry

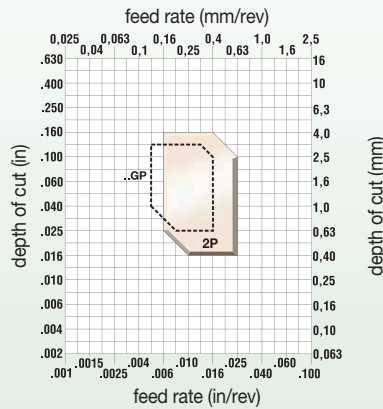
Negative Inserts



2P  
Finishing



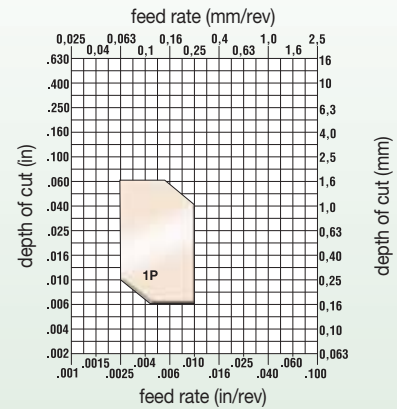
..GP  
Medium



Positive Inserts



1P  
Finishing



■ Step 2 • Select the grade

cutting condition	Negative Insert Geometry		Positive Insert Geometry
	2P	..GP	1P
heavily interrupted cut	TN15U	-	TN15U
lightly interrupted cut	TN10U	TN10U	TN15U
varying depth of cut, casting, or forging skin	TN10U	TN10U	TN10U
smooth cut, pre-turned surface	TN10U	TN10U	TN10U

■ Step 3 • Select the cutting speed

Iron-Based, Heat-Resistant Alloys (135–320 HB) (≤34 HRC)

Material Group	grade	speed – m/min (SFM)									Starting Conditions	
		15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	260 (850)	m/min	SFM
S1	TN10U		◊								50	162
	TN15U		◊								33	108

Cobalt-Based, Heat-Resistant Alloys (150–425 HB) (≤45 HRC)

Material Group	grade	speed – m/min (SFM)									Starting Conditions	
		15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	260 (850)	m/min	SFM
S2	TN10U		◊								54	176
	TN15U		◊								36	117

Nickel-Based, Heat-Resistant Alloys (140–475 HB) (≤48 HRC)

Material Group	grade	speed – m/min (SFM)									Starting Conditions	
		15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	260 (850)	m/min	SFM
S3	TN10U			◊							63	203
	TN15U			◊							42	135

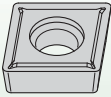
Titanium and Titanium Alloys (110–450 HB) (≤48 HRC)

Material Group	grade	speed – m/min (SFM)									Starting Conditions	
		15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	260 (850)	m/min	SFM
S4	TN10U			◊							63	203
	TN15U			◊							42	135

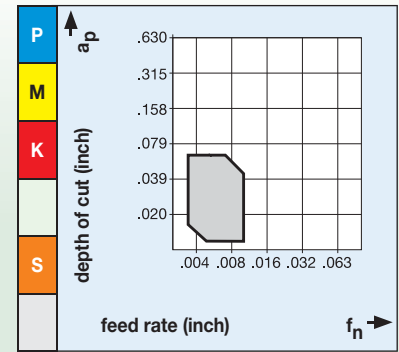
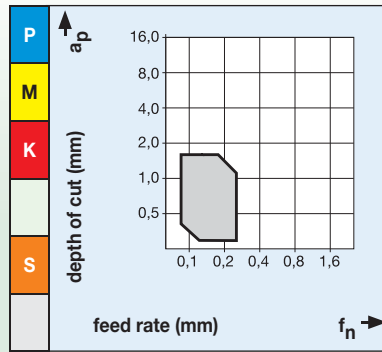
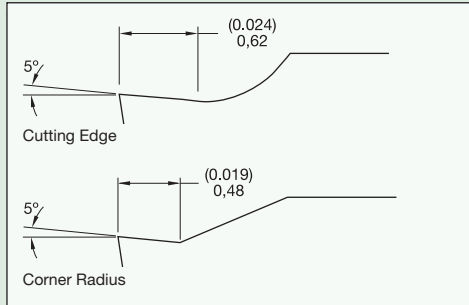


■ Positive and Negative Inserts

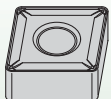
**1P**



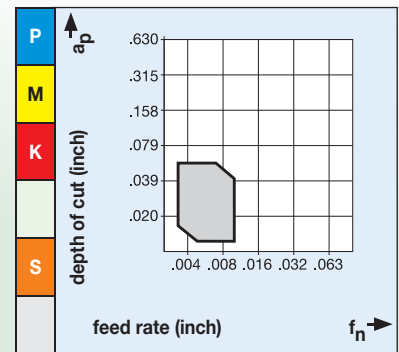
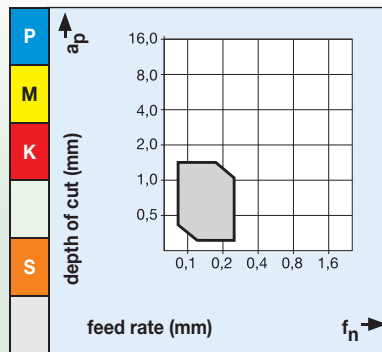
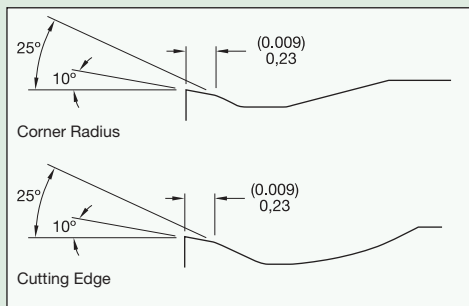
Preferred for light finishing. Low cutting forces and reduced power requirements due to positive rake angle. Good chip control over a wide range.



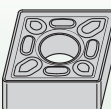
**2P**



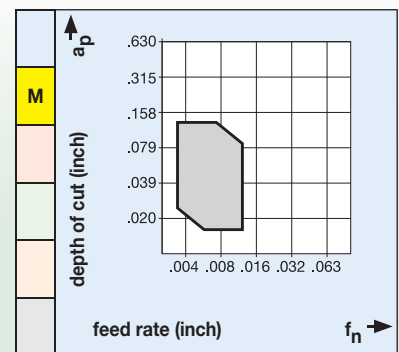
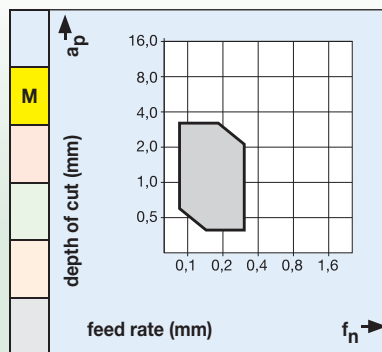
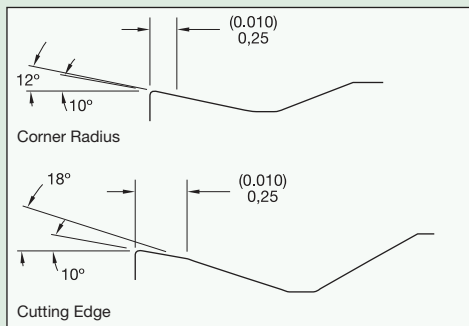
For finish turning, producing smooth, accurate surfaces. Very good chip control, especially at low depths of cut.



**4P**



For medium-duty turning operations. Soft-cutting chipbreaker. Used in applications producing varying chip sections, such as profile or copy turning. Good dimensional accuracy. For soft steel materials and stainless steels.



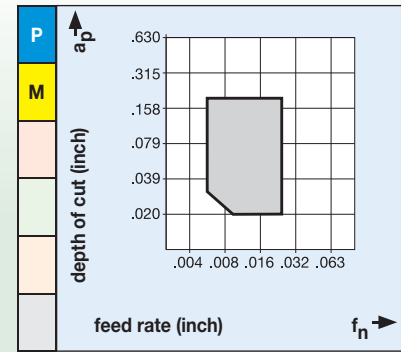
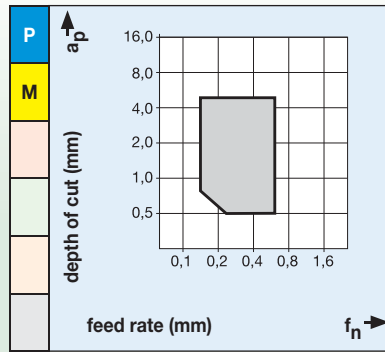
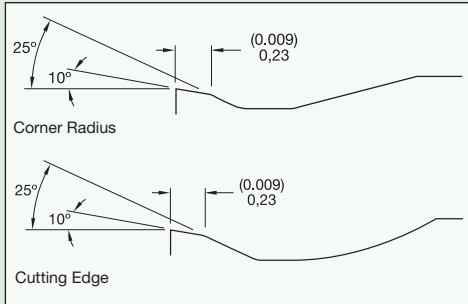
(continued)

■ Positive and Negative Inserts (continued)

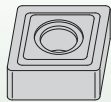
**6P**



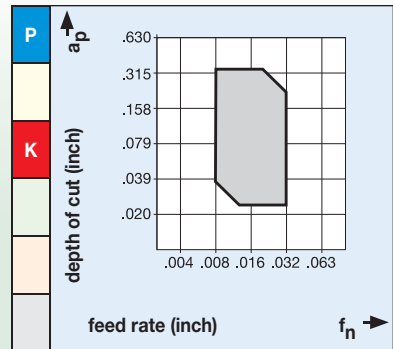
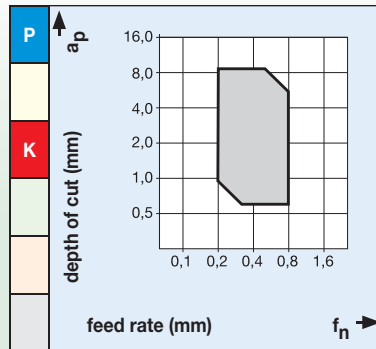
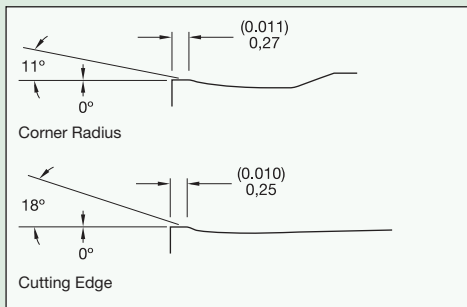
For medium to rough turning. Outstanding chip control due to specially configured chipbreaker element in corner area. Good chip forming with low depths of cut.



**7N**



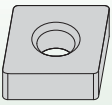
For medium-duty to roughing. Outstanding chip control. High edge strength for interrupted cuts, forging skin or scale. Preferred for all cast iron such as gray, malleable, and nodular.



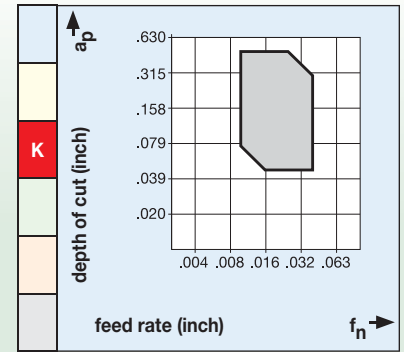
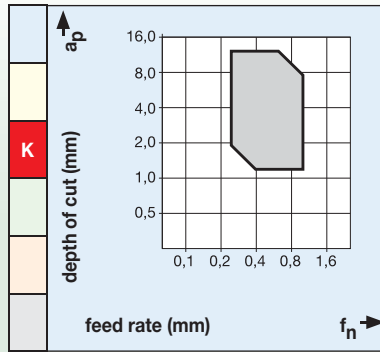
(continued)

■ Positive and Negative Inserts (continued)

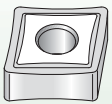
**..MA**



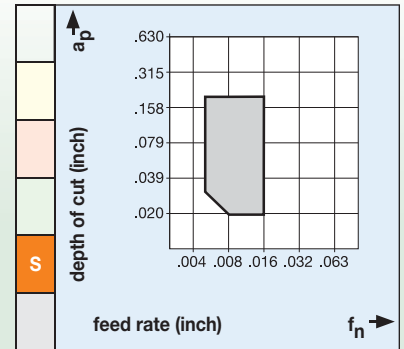
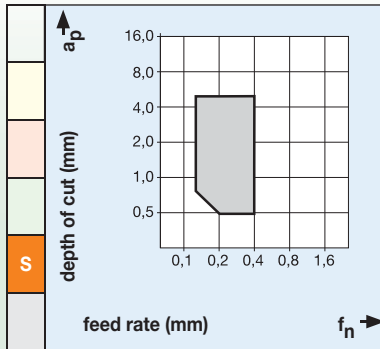
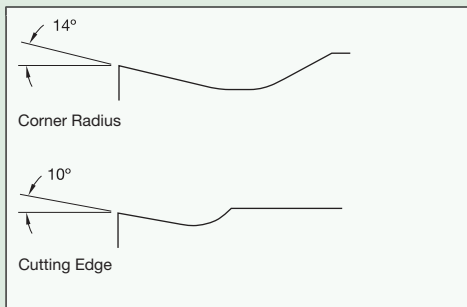
Flat top geometry for machining cast iron.  
For finishing to roughing applications.

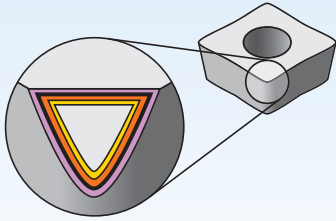


**..GP**



For light machining to light roughing.



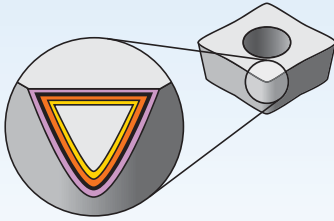


Coatings provide high-speed capability and are engineered for finishing to light roughing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness



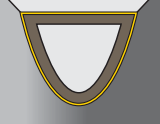
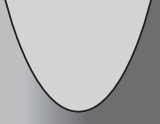
Grade	Coating	Grade Description	Performance Chart																				
				05	10	15	20	25	30	35	40	45											
TN10P		Coated carbide. MTCVD-TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN. Ideal for light finishing to medium machining applications. Superior wear resistance.	<b>P</b>																				
	<b>HC-P10</b>		<b>K</b>																				
TN20P		Coated carbide. MTCVD-TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN. Great general-purpose turning grade for steels. Ideal for semi-finishing to moderately heavy roughing.	<b>P</b>																				
	<b>HC-P20</b>		<b>K</b>																				
TN30P		Coated carbide. MTCVD-TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN. Tough carbide grade. Ideal for roughing and heavy roughing applications.	<b>P</b>																				
	<b>HC-P30</b>																						
TN15M		Coated carbide. MTCVD-TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN. Ideal for general-purpose machining of stainless steels.	<b>P</b>																				
			<b>M</b>																				
			<b>S</b>																				
	<b>HC-M15</b>																						



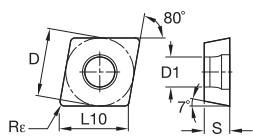
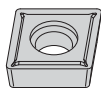
Coatings provide high-speed capability and are engineered for finishing to light roughing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Grade	Coating	Grade Description	Material Group																		
			P	M	K	N	S	H	05	10	15	20	25	30	35	40	45				
TN30M		Coated carbide. MTCVD-TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN. Ideal for general-purpose machining of stainless steels.	P																		
	HC-M30		M																		
TN20K		Coated carbide. MTCVD-TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN. Great when used for straight or lightly interrupted cut applications of ductile and cast irons.	P																		
	HC-K20		K																		
TN10U		Coated carbide. PVD-TiAlN-TiN. Ideal for finishing of difficult to machine alloys and stainless steels.	P																		
	HC-S10		M																		
TN15U		Uncoated carbide. Excellent abarasion resistance for machining cast irons, austentic stainless steels, and most high-temperature alloys.	P																		
	HW-P15		M																		

Inserts

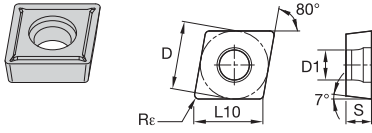


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

■ CCGT-1P

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
CCGT0602021P	CCGT215051P	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110							4163978	4163979	
CCGT0602041P	CCGT21511P	6,35	1/4	6,45	.254	2,38	3/32	0,4	1/64	2,80	.110							4163980	4163981	
CCGT0602081P	CCGT21521P	6,35	1/4	6,45	.254	2,38	3/32	0,8	1/32	2,80	.110							4163982	4163982	
CCGT09T3011P	CCGT32501P	9,53	3/8	9,67	.381	3,97	5/32	0,1	.004	4,40	.173							4164495	4164496	
CCGT09T3021P	CCGT325051P	9,53	3/8	9,67	.381	3,97	5/32	0,2	.008	4,40	.173							4164493	4164494	
CCGT09T3041P	CCGT32511P	9,53	3/8	9,67	.381	3,97	5/32	0,4	1/64	4,40	.173							4164497	4164498	
CCGT09T3081P	CCGT32521P	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173							4164499	4164500	



● first choice  
○ alternate choice

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K	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
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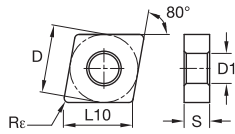
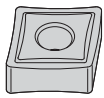
Inserts

■ **CCMT-1P**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P		TN20P		TN30P		TN15M		TN30M		TN20K		TN10U		TN15U		
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in															
CCMT0602021P	CCMT215051P	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	4166244	4166244	4166244	4166244	4166242	4166242	4166242	4166242	4166242	4166242	4166242	4166242	4166242	4166242	4166242	4166242	4166242
CCMT0602041P	CCMT21511P	6,35	1/4	6,45	.254	2,38	3/32	0,4	1/64	2,80	.110	4166326	4166326	4166326	4166326	4166326	4166326	4166326	4166326	4166326	4166326	4166326	4166326	4166326	4166326	4166326	4166326	4166326
CCMT0602081P	CCMT21521P	6,35	1/4	6,45	.254	2,38	3/32	0,8	1/32	2,80	.110	4166333	4166333	4166333	4166333	4166333	4166333	4166333	4166333	4166333	4166333	4166333	4166333	4166333	4166333	4166333	4166333	4166333
CCMT09T3021P	CCMT325051P	9,53	3/8	9,67	.381	3,97	5/32	0,2	.008	4,40	.173	4166339	4166339	4166339	4166339	4166339	4166339	4166339	4166339	4166339	4166339	4166339	4166339	4166339	4166339	4166339	4166339	4166339
CCMT09T3041P	CCMT32511P	9,53	3/8	9,67	.381	3,97	5/32	0,4	1/64	4,40	.173	4166341	4166341	4166341	4166341	4166341	4166341	4166341	4166341	4166341	4166341	4166341	4166341	4166341	4166341	4166341	4166341	4166341
CCMT09T3081P	CCMT32521P	9,53	3/8	9,67	.381	3,97	5/32	0,8	1/32	4,40	.173	4166348	4166348	4166348	4166348	4166348	4166348	4166348	4166348	4166348	4166348	4166348	4166348	4166348	4166348	4166348	4166348	4166348
CCMT1204041P	CCMT4311P	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,50	.217	4166355	4166355	4166355	4166355	4166355	4166355	4166355	4166355	4166355	4166355	4166355	4166355	4166355	4166355	4166355	4166355	4166355
CCMT1204081P	CCMT4321P	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,50	.217	4166559	4166559	4166559	4166559	4166559	4166559	4166559	4166559	4166559	4166559	4166559	4166559	4166559	4166559	4166559	4166559	4166559



Inserts



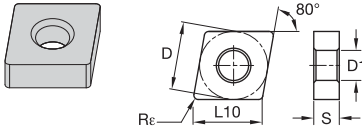
● first choice  
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M	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

■ CNGP

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
CNGP120401	CNGP430	12,70	1/2	12,90	.508	4,76	3/16	0,1	.004	5,16	.203									
CNGP120402	CNGP4305	12,70	1/2	12,90	.508	4,76	3/16	0,2	.008	5,16	.203									
CNGP120404	CNGP431	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203									
CNGP120408	CNGP432	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203									
CNGP120412	CNGP433	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203									





● first choice  
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K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

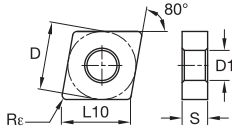
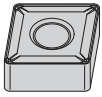


■ CNMA

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
CNMA120404	CNMA431	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	●	●	●	○	○	○	○	○	○
CNMA120408	CNMA432	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	●	●	●	○	○	○	○	○	○
CNMA120412	CNMA433	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	●	●	●	○	○	○	○	○	○
CNMA120416	CNMA434	12,70	1/2	12,90	.508	4,76	3/16	1,6	1/16	5,16	.203	●	●	●	○	○	○	○	○	○
CNMA160612	CNMA543	15,88	5/8	16,12	.635	6,35	1/4	1,2	3/64	6,35	.250	●	●	●	○	○	○	○	○	○
CNMA160616	CNMA544	15,88	5/8	16,12	.635	6,35	1/4	1,6	1/16	6,35	.250	●	●	●	○	○	○	○	○	○
CNMA190612	CNMA643	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313	●	●	●	○	○	○	○	○	○
CNMA190616	CNMA644	19,05	3/4	19,34	.762	6,35	1/4	1,6	1/16	7,93	.313	●	●	●	○	○	○	○	○	○



Inserts

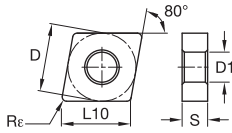


● first choice  
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P	●	●	●	○	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○

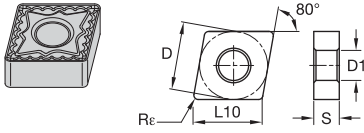
**■ CNMG-2P**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
CNMG1204042P	CNMG4312P	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	4166171	4166172	-	4166244	4166245	4166243	4166246	4166247	-
CNMG1204082P	CNMG4322P	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	4166248	4166249	-	4166252	4166250	4166253	4166248	4166254	-
CNMG1204122P	CNMG4332P	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	4166255	4166256	-	4166258	-	4166257	4166259	-	-



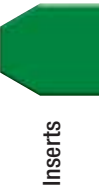
**■ CNMG-4P**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U
		mm	in	mm	in	mm	in	mm	in	mm	in								
CNMG1204044P	CNMG4314P	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	-	5359116	-	4165830	4165831	-	5359117	-
CNMG1204084P	CNMG4324P	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	5359118	-	4165832	4165853	-	5359119	-
CNMG1204124P	CNMG4334P	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	5359240	-	4165854	4165855	-	5359241	-
CNMG1606124P	CNMG5434P	15,88	5/8	16,12	.635	6,35	1/4	1,2	3/64	6,35	.250	-	-	-	4165856	4165857	-	-	-
CNMG1906124P	CNMG6434P	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313	-	-	-	4165858	4165859	-	-	-



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M	●	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○

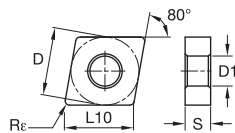
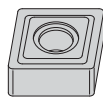


**■ CNMG-6P**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
CNMG0903086P	CNMG3226P	9,53	3/8	9,67	.381	3,18	1/8	0,8	1/32	3,81	.150	4165948	4165949	-	-	-	-	-	-	-
CNMG1204046P	CNMG4316P	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	4165952	4165963	-	-	-	-	-	-	-
CNMG1204086P	CNMG4326P	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	4165966	4165967	4165968	-	-	-	-	-	-
CNMG1204126P	CNMG4336P	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	4165971	4165972	4165973	4165969	4165970	-	-	-	-
CNMG1606126P	CNMG5436P	15,88	5/8	16,12	.635	6,35	1/4	1,2	3/64	6,35	.250	-	4165976	4165977	4165978	-	-	-	-	-
CNMG1906126P	CNMG6436P	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313	-	4165980	4165981	4165982	4165979	-	-	-	-



Inserts

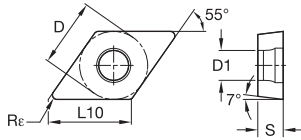


● first choice  
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M	●	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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■ CNMG-7N

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
CNMG1204047N	CNMG4317N	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	4166386	4166387	4166388	4166389	4166390	4166391	4166392	4166393	4166394
		12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	4166387	4166388	4166389	4166390	4166391	4166392	4166393	4166394	4166395
CNMG1204127N	CNMG4337N	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	4166433	4166434	4166435	4166436	4166437	4166438	4166439	4166440	4166441
		12,70	1/2	12,90	.508	4,76	3/16	1,6	1/16	5,16	.203	4166434	4166435	4166436	4166437	4166438	4166439	4166440	4166441	4166442
CNMG1204167N	CNMG4347N	12,70	1/2	12,90	.508	4,76	3/16	1,6	1/16	5,16	.203	4166437	4166438	4166439	4166440	4166441	4166442	4166443	4166444	4166445
		12,70	1/2	12,90	.508	4,76	3/16	1,6	1/16	5,16	.203	4166438	4166439	4166440	4166441	4166442	4166443	4166444	4166445	4166446
CNMG1606127N	CNMG5437N	15,88	5/8	16,12	.635	6,35	1/4	1,2	3/64	6,35	.250	4166440	4166441	4166442	4166443	4166444	4166445	4166446	4166447	4166448
		15,88	5/8	16,12	.635	6,35	1/4	1,6	1/16	6,35	.250	4166441	4166442	4166443	4166444	4166445	4166446	4166447	4166448	4166449
CNMG1606167N	CNMG5447N	15,88	5/8	16,12	.635	6,35	1/4	1,6	1/16	6,35	.250	4166444	4166445	4166446	4166447	4166448	4166449	4166450	4166451	4166452
		15,88	5/8	16,12	.635	6,35	1/4	1,6	1/16	6,35	.250	4166445	4166446	4166447	4166448	4166449	4166450	4166451	4166452	4166453
CNMG1906087N	CNMG6427N	19,05	3/4	19,34	.762	6,35	1/4	0,8	1/32	7,93	.313	4166447	4166448	4166449	4166450	4166451	4166452	4166453	4166454	4166455
		19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313	4166448	4166449	4166450	4166451	4166452	4166453	4166454	4166455	4166456
CNMG1906127N	CNMG6437N	19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313	4166449	4166450	4166451	4166452	4166453	4166454	4166455	4166456	4166457
		19,05	3/4	19,34	.762	6,35	1/4	1,2	3/64	7,93	.313	4166450	4166451	4166452	4166453	4166454	4166455	4166456	4166457	4166458
CNMG1906167N	CNMG6447N	19,05	3/4	19,34	.762	6,35	1/4	1,6	1/16	7,93	.313	4166453	4166454	4166455	4166456	4166457	4166458	4166459	4166460	4166461
		19,05	3/4	19,34	.762	6,35	1/4	1,6	1/16	7,93	.313	4166454	4166455	4166456	4166457	4166458	4166459	4166460	4166461	4166462
CNMG2509247N	CNMG8667N	25,40	1	25,79	1.015	9,53	3/8	2,4	3/32	9,12	.359	4166457	4166458	4166459	4166460	4166461	4166462	4166463	4166464	4166465
		25,40	1	25,79	1.015	9,53	3/8	2,4	3/32	9,12	.359	4166458	4166459	4166460	4166461	4166462	4166463	4166464	4166465	4166466



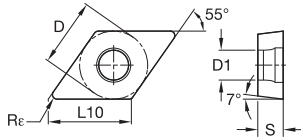
● first choice  
○ alternate choice

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M	●	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○

Inserts

### ■ DCGT-1P

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
DCGT0702011P	DCGT21501P	6,35	1/4	7,75	.305	2,38	3/32	0,1	.004	2,80	.110								4164501	4164502
DCGT11T3011P	DCGT32501P	9,53	3/8	11,63	.458	3,97	5/32	0,1	.004	4,40	.173								4164523	4164524
DCGT1504081P	DCGT4321P	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,50	.217								4164525	

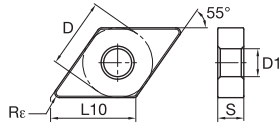
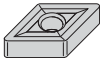


### ■ DCMT-1P

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
DCMT0702021P	DCMT215051P	6,35	1/4	7,75	.305	2,38	3/32	0,2	.008	2,80	.110									
DCMT0702041P	DCMT21511P	6,35	1/4	7,75	.305	2,38	3/32	0,4	1/64	2,80	.110	4166627	4166628		4166630	4166631	4166629	4166632	4166625	4166626
DCMT11T3021P	DCMT325051P	9,53	3/8	11,63	.458	3,97	5/32	0,2	.008	4,40	.173								4166634	4166635
DCMT11T3041P	DCMT32511P	9,53	3/8	11,63	.458	3,97	5/32	0,4	1/64	4,40	.173	4166636	4166637		4166639	4166640	4166638	4166641	4166642	4166643
DCMT11T3081P	DCMT32521P	9,53	3/8	11,63	.458	3,97	5/32	0,8	1/32	4,40	.173	4166643	4166644		4166646	4166647	4166645	4166648		
DCMT11T3121P	DCMT32531P	9,53	3/8	11,63	.458	3,97	5/32	1,2	3/64	4,40	.173	4166649			4166651	4166650	4166652	4166651		
DCMT1504041P	DCMT4311P	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,50	.217	4166653	4166654			4166655				
DCMT1504081P	DCMT4321P	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,50	.217	4166656	4166657			4166658				



Inserts

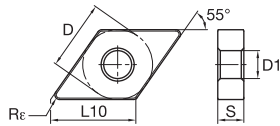
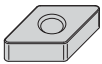


● first choice  
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K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

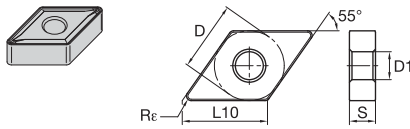
■ DNGP

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
DNGP150401	DNGP430	12,70	1/2	15,50	.610	4,76	3/16	0,1	.004	5,16	.203	■	■	■	■	■	■	■	■	■
DNGP150402	DNGP4305	12,70	1/2	15,50	.610	4,76	3/16	0,2	.008	5,16	.203	■	■	■	■	■	■	■	■	■
DNGP150404	DNGP431	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	■	■	■	■	■	■	■	■	■
DNGP150408	DNGP432	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	■	■	■	■	■	■	■	■	■



■ DNMA

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
DNMA150408	DNMA432	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	■	■	■	■	■	■	■	■	■
DNMA150608	DNMA442	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	■	■	■	■	■	■	■	■	■
DNMA150412	DNMA433	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	■	■	■	■	■	■	■	■	■
DNMA150612	DNMA443	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	■	■	■	■	■	■	■	■	■



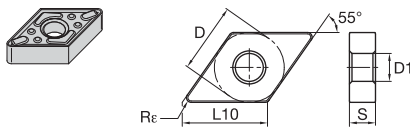
● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○



■ **DNMG-2P**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
DNMG150402P	DNMG4312P	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	4166260	4166261	-	4166263	4166264	4166262	4166265	4166266	
DNMG1506042P	DNMG4412P	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	4166825	4166826	-	4166828	-	4166827	4166829	4166830	
DNMG1504082P	DNMG4322P	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	4166267	4166269	-	4166273	4166275	4166271	4166277	4166279	
DNMG1506082P	DNMG4422P	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	4166831	4166832	-	4166844	-	4166843	4166845	4166846	
DNMG1506122P	DNMG4432P	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	4166847	4166848	-	4166850	4166851	4166849	4166852	-	

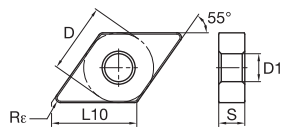
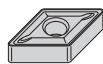


■ **DNMG-4P**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U
		mm	in	mm	in	mm	in	mm	in	mm	in								
DNMG1504044P	DNMG4314P	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	4165860	4165861	-	-	-
DNMG1506044P	DNMG4414P	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	-	5359244	-	4165864	4165865	-	-	-
DNMG1504084P	DNMG4324P	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	5359242	-	4165862	4165863	-	5359243	-
DNMG1506084P	DNMG4424P	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	5359245	-	4165866	4165867	-	-	-
DNMG1506124P	DNMG4434P	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	-	-	-	4165868	4165869	-	-	-



Inserts



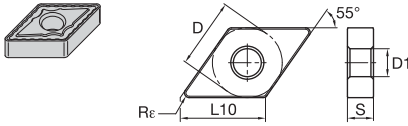
● first choice  
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K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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■ DNMG-6P

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
DNMG1104086P	DNMG3326P	9,53	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	4165984	4165985							
DNMG1504046P	DNMG4316P	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	4165987	4165988							
DNMG1506046P	DNMG4416P	12,70	1/2	15,50	.610	6,35	1/4	0,4	1/64	5,16	.203	4166767	4166768							
DNMG1504086P	DNMG4326P	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	4165991	4165992	4165993						
DNMG1506086P	DNMG4426P	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	4166771	4166772	4166793						
DNMG1504126P	DNMG4336P	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	4165996	4165997	4166765	4166794	4166795				
DNMG1506126P	DNMG4436P	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	4166796	4166797	4166798						
DNMG1906126P	DNMG5436P	15,88	5/8	19,38	.763	6,35	1/4	1,2	3/64	6,35	.250	4166801	4166799	4166799						





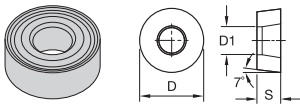
● first choice  
○ alternate choice

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M	●	●	●	●	●	●	●	●	●	●	●
K	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
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■ **DNMG-7N**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
DNMG1504047N	DNMG4317N	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	4166458	4166459	○	○	○	○	○	○	○
DNMG1504087N	DNMG4327N	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	4166460	4166461	4166462	○	○	○	○	○	○
DNMG1506087N	DNMG4427N	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	4166484	4166485	4166486	○	○	○	○	○	○
DNMG1504127N	DNMG4337N	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	4166464	4166465	4166432	○	○	○	○	○	○
DNMG1506127N	DNMG4437N	12,70	1/2	15,50	.610	6,35	1/4	1,2	3/64	5,16	.203	4166488	4166489	4166490	○	○	○	○	○	○
DNMG1906127N	DNMG5437N	15,88	5/8	19,38	.763	6,35	1/4	1,2	3/64	6,35	.250	4166492	4166493	○	○	○	○	○	○	○

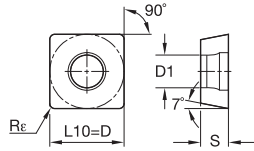
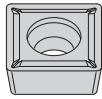


■ **RNMG-7N**

ISO catalog number	ANSI catalog number	D		S		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U
		mm	in	mm	in	mm	in								
RNMG12047N	RNMG437N	12,70	1/2	4,76	3/16	5,16	.203	○	4166494	○	○	○	4166495	○	○
RNMG19067N	RNMG647N	19,05	3/4	6,35	1/4	7,93	.313	4166496	4166497	○	○	○	○	○	○



Inserts

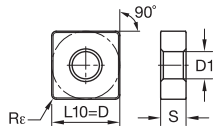
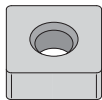


● first choice  
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K	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○

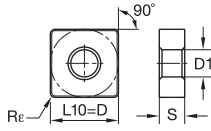
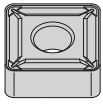
■ SCMT-1P

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
SCMT09T3041P	SCMT32511P	9,53	3/8	9,53	.375	3,97	5/32	0,4	1/64	4,40	.173	4166362	4166393	4166393	4166395	4166396	4166394	4166397	4166397	4166397
SCMT09T3081P	SCMT32521P	9,53	3/8	9,53	.375	3,97	5/32	0,8	1/32	4,40	.173	4166398	4166399	4166399	4166401	4166402	4166400	4166403	4166403	4166397
SCMT1204041P	SCMT4311P	12,70	1/2	12,70	.500	4,76	3/16	0,4	1/64	5,50	.217	4166405	4166406	4166406	4166408	4166409	4166407	4166410	4166404	4166404
SCMT1204081P	SCMT4321P	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,50	.217	4166405	4166406	4166406	4166408	4166409	4166407	4166410	4166404	4166404



■ SNMA

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U
		mm	in	mm	in	mm	in	mm	in	mm	in								
SNMA120408	SNMA432	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	4165842	4165843	4165843	4165844	4165842	4165844	4165845	4165845
SNMA120412	SNMA433	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	4165842	4165843	4165843	4165844	4165842	4165844	4165845	4165845
SNMA150612	SNMA543	15,88	5/8	15,88	.625	6,35	1/4	1,2	3/64	6,35	.250	4165842	4165843	4165843	4165844	4165842	4165844	4165845	4165845
SNMA190612	SNMA643	19,05	3/4	19,05	.750	6,35	1/4	1,2	3/64	7,93	.313	4165842	4165843	4165843	4165844	4165842	4165844	4165845	4165845



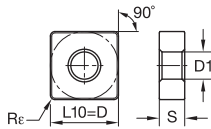
● first choice  
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M	●	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○
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■ **SNMG-2P**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U		
		mm	in	mm	in	mm	in	mm	in	mm	in										
SNMG0903082P	SNMG3222P	9,53	3/8	9,53	.375	3,18	1/8	0,8	1/32	3,81	.150	4166853	4166854				4166855	4166856			
SNMG1204082P	SNMG4322P	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	4166857	4166858		4166860		4166859	4166861	4166862		

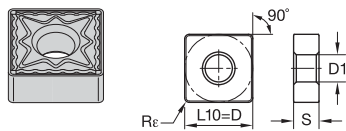


■ **SNMG-4P**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
SNMG1204084P	SNMG4324P	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203									
SNMG1204124P	SNMG4334P	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203				4165872	4165873				



Inserts

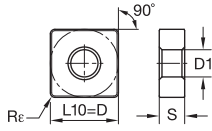
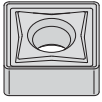


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■ SNMG-6P

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
SNMG0903086P	SNMG3226P	9,53	3/8	9,53	.375	3,18	1/8	0,8	1/32	3,81	.150	4166802	4166803							
SNMG1204046P	SNMG4316P	12,70	1/2	12,70	.500	4,76	3/16	0,4	1/64	5,16	.203	4166804	4166805			4166806	4166807			
SNMG1204086P	SNMG4326P	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	4166808	4166809	4166810	4166811					
SNMG1204126P	SNMG4336P	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	4166813	4166814	4166815	4166816	4166817				
SNMG1906166P	SNMG6446P	19,05	3/4	19,05	.750	6,35	1/4	1,6	1/16	7,92	.312			5308173						
SNMG1906126P	SNMG6436P	19,05	3/4	19,05	.750	6,35	1/4	1,2	3/64	7,93	.313	4166818	4166819	4166820	4166821					



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N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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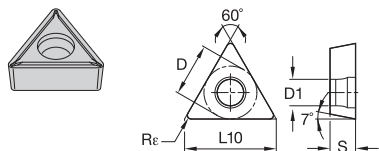
Inserts

■ **SNMG-7N**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U
		mm	in	mm	in	mm	in	mm	in	mm	in								
SNMG1204087N	SNMG4327N	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	4166498	4166499				4166500		
SNMG1204127N	SNMG4337N	12,70	1/2	12,70	.500	4,76	3/16	1,2	3/64	5,16	.203	4166501	4166502	4166503			4166504		
SNMG1204167N	SNMG4347N	12,70	1/2	12,70	.500	4,76	3/16	1,6	1/16	5,16	.203	4166505	4166506	4166507			4166508		
SNMG1506127N	SNMG5437N	15,88	5/8	15,88	.625	6,35	1/4	1,2	3/64	6,35	.250		4166509	4166510			4166511		
SNMG1506167N	SNMG5447N	15,88	5/8	15,88	.625	6,35	1/4	1,6	1/16	6,35	.250		4166512	4166513			4166514		
SNMG1906127N	SNMG6437N	19,05	3/4	19,05	.750	6,35	1/4	1,2	3/64	7,93	.313		4166515	4166516			4166517		
SNMG1906167N	SNMG6447N	19,05	3/4	19,05	.750	6,35	1/4	1,6	1/16	7,93	.313		4166518	4166519			4166520		



Inserts

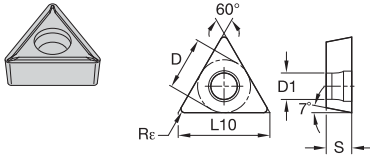


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■ TCGT-1P

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
TCGT1102011P	TCGT21501P	6,35	1/4	11,00	.433	2,38	3/32	0,1	.004	2,80	.110								4164526	4164527
TCGT1102041P	TCGT21511P	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110								4164528	4164529
TCGT16T3021P	TCGT325051P	9,53	3/8	16,50	.650	3,97	5/32	0,2	.008	4,40	.173								4164530	4164531
TCGT16T3041P	TCGT32511P	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173								4164531	4164532
TCGT16T3081P	TCGT32521P	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173								4164543	



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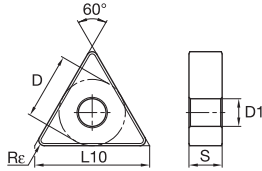


■ **TCMT-1P**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U
		mm	in	mm	in	mm	in	mm	in	mm	in								
TCMT1102041P	TCMT21511P	6,35	1/4	11,00	.433	2,38	3/32	0,4	1/64	2,80	.110	4166414	4166415	4166417	4166418	4166416	4166419		
TCMT1102081P	TCMT21521P	6,35	1/4	11,00	.433	2,38	3/32	0,8	1/32	2,80	.110	4166420	4166421			4166422	4166423		
TCMT1102021P	TCMT215051P	6,35	1/4	11,00	.433	2,38	3/32	0,2	.008	2,90	.114	4166411							
TCMT16T3021P	TCMT325051P	9,53	3/8	16,50	.650	3,97	5/32	0,2	.008	4,40	.173								
TCMT16T3041P	TCMT32511P	9,53	3/8	16,50	.650	3,97	5/32	0,4	1/64	4,40	.173	4166425	4166426						
TCMT16T3081P	TCMT32521P	9,53	3/8	16,50	.650	3,97	5/32	0,8	1/32	4,40	.173	4166469	4166471						
TCMT16T3121P	TCMT32531P	9,53	3/8	16,50	.650	3,97	5/32	1,2	3/64	4,40	.173								
TCMT2204081P	TCMT4321P	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,50	.217	4166567	4166568						



Inserts

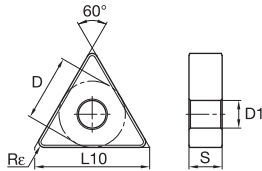
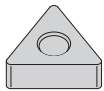


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S	○	○	○	○	○	○	○	○	○	○	○	○	○	○
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■ TNGP

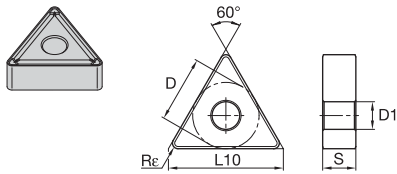
ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
TNGP160402	TNGP3305	9,53	3/8	16,50	.650	4,76	3/16	0,2	.008	3,81	.150							4164789	4164790	4164790
TNGP160404	TNGP331	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150							4164791	4164792	4164792
TNGP160408	TNGP332	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150							4164793		



■ TNMA

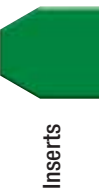
ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
TNMA160408	TNMA332	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150						4165846			
TNMA160412	TNMA333	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150						4165847			
TNMA220408	TNMA432	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203						4165848			





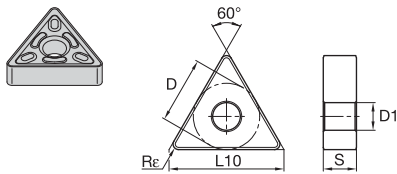
● first choice  
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■ **TNMG-2P**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
TNMG1604042P	TNMG3312P	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	4166863	4166864	-	4166866	4166867	4166865	4166872	4166868	4166869
TNMG1604082P	TNMG3322P	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	4166870	4166871	-	4166873	-	4166872	4166874	4166875	4166876
TNMG1604122P	TNMG3332P	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	4166876	4166877	-	4166879	-	4166878	4166881	-	-
TNMG2204082P	TNMG4322P	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	4166882	4166883	-	4166885	-	4166884	4166886	4166887	-

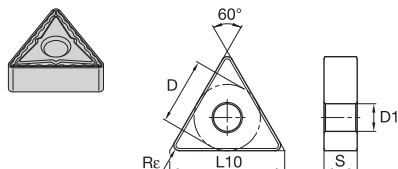


■ **TNMG-4P**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U
		mm	in	mm	in	mm	in	mm	in	mm	in								
TNMG1604044P	TNMG3314P	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	-	5359246	-	4165874	-	-	-	-
TNMG1604084P	TNMG3324P	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	-	5359247	-	4165876	4165877	-	-	-
TNMG1604124P	TNMG3334P	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	-	-	-	4165878	4165879	-	-	-
TNMG2204044P	TNMG4314P	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203	-	5359248	-	4165880	4165881	-	-	-
TNMG2204084P	TNMG4324P	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	-	5359249	-	4165882	4165883	-	-	-
TNMG2204124P	TNMG4334P	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203	-	5359250	-	-	-	-	-	-



Inserts

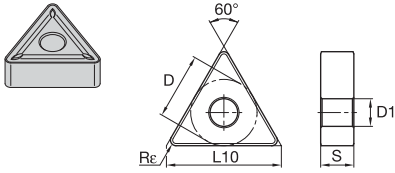


● first choice  
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■ TNMG-6P

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
TNMG1604046P	TNMG3316P	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	4166822	4166823	-	4166824	4167086	-	-	-	-
TNMG1604086P	TNMG3326P	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	4167087	4167088	4167089	-	4167091	4167086	-	-	-
TNMG1604126P	TNMG3336P	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	4167092	4167113	-	4167114	4167115	-	-	-	-
TNMG2204046P	TNMG4316P	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203	4167116	4167117	-	4167118	4167119	-	-	-	-
TNMG2204086P	TNMG4326P	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	4167120	4167121	4167122	4167123	4167124	-	-	-	-



● first choice  
○ alternate choice

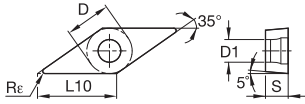
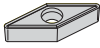
P	●	●	●	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○



■ **TNMG-7N**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
TNMG1604047N	TNMG3317N	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	●	○	○	○	○	○	○	○	○
TNMG1604087N	TNMG3327N	9,53	3/8	16,50	.650	4,76	3/16	0,8	1/32	3,81	.150	○	○	○	○	○	○	○	○	○
TNMG1604127N	TNMG3337N	9,53	3/8	16,50	.650	4,76	3/16	1,2	3/64	3,81	.150	○	○	○	○	○	○	○	○	○
TNMG2204047N	TNMG4317N	12,70	1/2	22,00	.866	4,76	3/16	0,4	1/64	5,16	.203	○	○	○	○	○	○	○	○	○
TNMG2204087N	TNMG4327N	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	○	○	○	○	○	○	○	○	○
TNMG2204127N	TNMG4337N	12,70	1/2	22,00	.866	4,76	3/16	1,2	3/64	5,16	.203	○	○	○	○	○	○	○	○	○
TNMG2706127N	TNMG5437N	15,88	5/8	27,50	1.083	6,35	1/4	1,2	3/64	6,35	.250	○	○	○	○	○	○	○	○	○
TNMG3309247N	TNMG6667N	19,05	3/4	33,00	1.299	9,53	3/8	2,4	3/32	7,93	.313	○	○	○	○	○	○	○	○	○



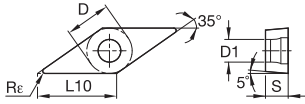
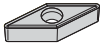


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○
M	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

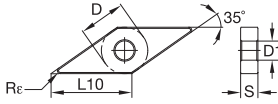
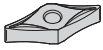
■ VBGT-1P

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
VBGT1103011P	VBGT2201P	6,35	1/4	11,07	.436	3,18	1/8	0,1	.004	2,80	.110	●	●	●	○	○	○	○	○	○
VBGT1103021P	VBGT22051P	6,35	1/4	11,07	.436	3,18	1/8	0,2	.008	2,80	.110	●	●	●	○	○	○	○	○	○
VBGT1103041P	VBGT2211P	6,35	1/4	11,07	.436	3,18	1/8	0,4	1/64	2,80	.110	●	●	●	○	○	○	○	○	○
VBGT1604011P	VBGT3301P	9,53	3/8	16,61	.654	4,76	3/16	0,1	.004	4,40	.173	●	●	●	○	○	○	○	○	○
VBGT1604021P	VBGT33051P	9,53	3/8	16,61	.654	4,76	3/16	0,2	.008	4,40	.173	●	●	●	○	○	○	○	○	○
VBGT1604041P	VBGT3311P	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	4,40	.173	●	●	●	○	○	○	○	○	○



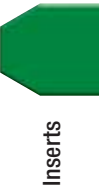
■ VBMT-1P

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
VBMT1103021P	VBMT22051P	6,35	1/4	11,07	.436	3,18	1/8	0,2	.008	2,80	.110	●	●	●	○	○	○	○	○	○
VBMT1103041P	VBMT2211P	6,35	1/4	11,07	.436	3,18	1/8	0,4	1/64	2,80	.110	●	●	●	○	○	○	○	○	○
VBMT1103081P	VBMT2221P	6,35	1/4	11,07	.436	3,18	1/8	0,8	1/32	2,80	.110	●	●	●	○	○	○	○	○	○
VBMT1604021P	VBMT33051P	9,53	3/8	16,61	.654	4,76	3/16	0,2	.008	4,40	.173	●	●	●	○	○	○	○	○	○
VBMT1604041P	VBMT3311P	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	4,40	.173	●	●	●	○	○	○	○	○	○
VBMT1604081P	VBMT3321P	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	4,40	.173	●	●	●	○	○	○	○	○	○



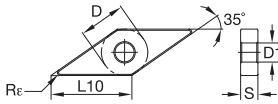
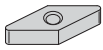
● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○
M	●	●	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○



■ VNGP

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
VNGP160401	VNGP330	9,53	3/8	16,61	.654	4,76	3/16	0,1	.004	3,81	.150	■	■	■	■	■	■	■	■	■
VNGP160402	VNGP3305	9,53	3/8	16,61	.654	4,76	3/16	0,2	.008	3,81	.150	■	■	■	■	■	■	■	■	■
VNGP220404	VNGP431	12,70	1/2	22,14	.872	4,76	3/16	0,4	1/64	5,16	.203	■	■	■	■	■	■	■	■	■
VNGP220408	VNGP432	12,70	1/2	22,14	.872	4,76	3/16	0,8	1/32	5,16	.203	■	■	■	■	■	■	■	■	■

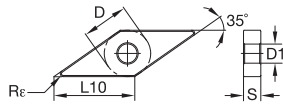
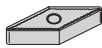


■ VNMA

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
VNMA160408	VNMA332	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	■	■	■	■	■	■	■	■	■



Inserts

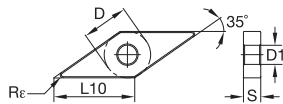
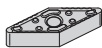


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○
M	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

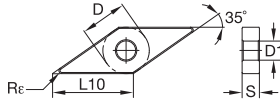
■ VNMG-2P

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
VNMG1604042P	VNMG3312P	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	4166281	4166282	-	-	-	-	-	-	-
VNMG1604082P	VNMG3322P	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	4166288	4166289	-	-	-	-	-	-	-



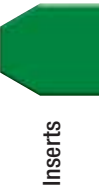
■ VNMG-4P

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U
		mm	in	mm	in	mm	in	mm	in	mm	in								
VNMG1604044P	VNMG3314P	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	-	5359251	-	-	-	-	-	-
VNMG1604084P	VNMG3324P	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	5359253	-	-	-	-	-	-



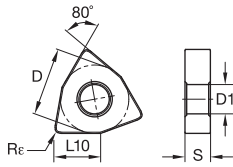
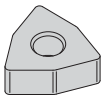
● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○
M	●	●	●	●	●	●	●	●	●	●	●	●	●
K	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○



■ **VNMG-6P**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
VNMG1604086P	VNMG3326P	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	4167125	4167126	4167127	4167128					

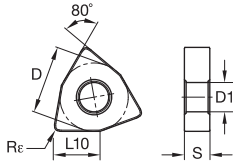
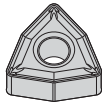


■ **WNMA**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
WNMA060408	WNMA332	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150						4165850			
WNMA080408	WNMA432	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203						4165851			
WNMA080412	WNMA433	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203						4165852			



Inserts

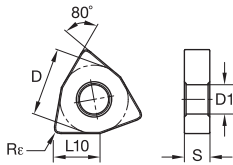
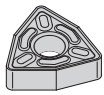


● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○
M	●	●	●	●	●	●	●	●	●	●	●	●	●
K	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○

■ WNMG-2P

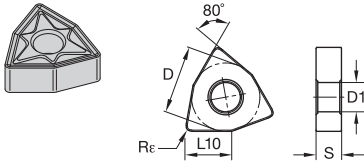
ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U
		mm	in	mm	in	mm	in	mm	in	mm	in								
WNMG0804042P	WNMG4312P	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	4166294	4166295	-	4166297	4166298	4166296	4166299	4166300
WNMG0804082P	WNMG4322P	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	4166301	4166302	-	4166304	4166303	4166305	4166306	4166300



■ WNMG-4P

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U
		mm	in	mm	in	mm	in	mm	in	mm	in								
WNMG0804044P	WNMG4314P	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	4165888	4165889	-	-	-
WNMG0804084P	WNMG4324P	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	5359255	-	-	4165890	4165891	-	5359256	-
WNMG0804124P	WNMG4334P	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	4165892	-	-	-	-





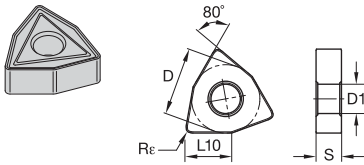
● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○
M	●	●	●	●	●	●	●	●	●	●	●	●	●	●
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○



■ **WNMG-6P**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U	
		mm	in	mm	in	mm	in	mm	in	mm	in									
WNMG0604086P	WNMG3326P	9,53	3/8	6,52	.257	4,76	3/16	0,8	1/32	3,81	.150	4167129	4167130	-	-	-	-	-	-	-
WNMG0804086P	WNMG4326P	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	4167133	4167134	4167135	4167136	4167137	-	-	-	-
WNMG0804126P	WNMG4336P	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	4167138	4167139	4167140	4167141	4167142	-	-	-	-



■ **WNMG-7N**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		TN10P	TN20P	TN30P	TN15M	TN30M	TN20K	TN10U	TN15U
		mm	in	mm	in	mm	in	mm	in	mm	in								
WNMG0804087N	WNMG4327N	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	4166547	4166548	4166549	-	-	-	-	-
WNMG0804127N	WNMG4337N	12,70	1/2	8,69	.342	4,76	3/16	1,2	3/64	5,16	.203	4166551	4166552	4166553	-	-	4166550	-	-
WNMG0804167N	WNMG4347N	12,70	1/2	8,69	.342	4,76	3/16	1,6	1/16	5,16	.203	-	4166555	4166556	-	-	4166554	-	-



## WIDIA™ Inserts for Machining Aluminum

WIDIA offers a series of inserts specifically designed for machining aluminum materials. These inserts are available in both an uncoated and a PVD grade for better performance and better tool life.

# Inserts for Aluminum

- Easy-to-choose platform — one geometry and two grades.
- Longer tool life.

High positive rake for smooth chip flow.

G tolerance inserts for better precision.



High polish inserts to prevent built-up edge and for longer tool life.

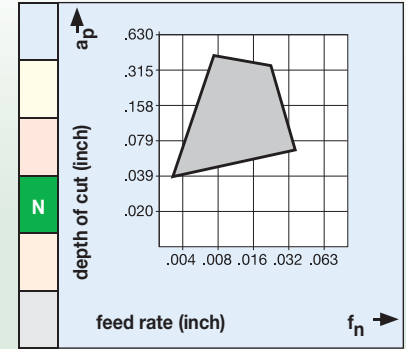
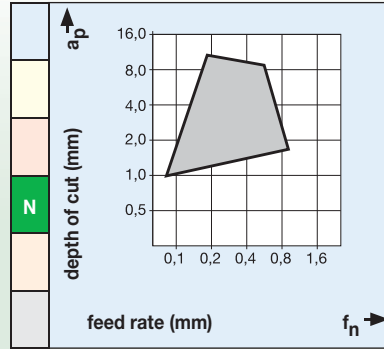


■ Negative Inserts

**AL1**



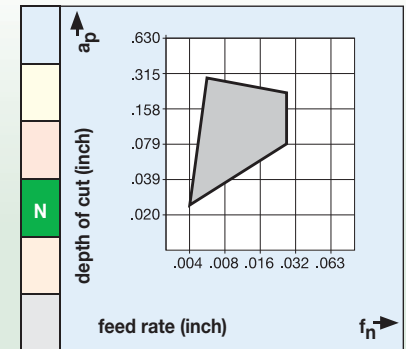
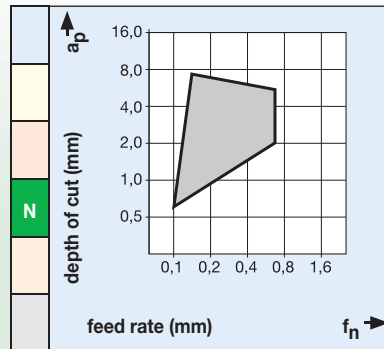
For turning cast aluminum, light alloys, non-ferrous metals, high-melting metals, plastics, glass fiber, reinforced plastics, laminated board, carbon, and fine ceramics.



**AL3**



For cost-effective machining of aluminum, non-ferrous metals, and plastics. Extremely sharp cutting edges result in optimum part finishes with low cutting forces and short chips. Finishing of steel, stainless steel, and gray iron is possible with the coated grade HCK10™.



■ Step 1 • Select the insert geometry

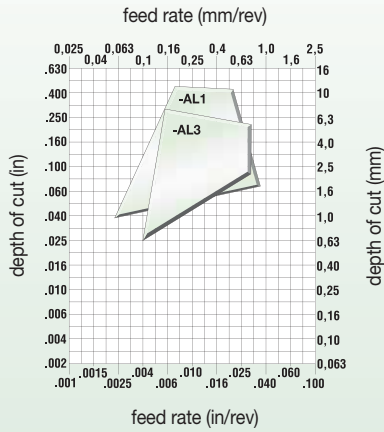
Positive Inserts



-AL1



-AL3



■ Step 2 • Select the grade

Positive Insert Geometry

cutting condition		-AL1	-AL3
heavily interrupted cut		HCK10/HWK10	HCK10/HWK15
lightly interrupted cut		HCK10/HWK10	HCK10/HWK15
varying depth of cut, casting, or forging skin		HCK10/HWK10	HCK10/HWK15
smooth cut, pre-turned surface		HCK10/HWK10	HCK10/HWK15

■ Step 3 • Selecting the cutting speed

Low-Silicon Aluminum Alloys  
(hypoeutectic <12.2% Si) and Magnesium Alloys

Material Group	grade	speed – m/min (SFM)										Starting Conditions	
		250 (800)	500 (1600)	750 (2400)	1000 (3200)	1250 (4000)	1500 (4800)	1750 (5600)	2000 (6400)	2250 (7200)	2500 (8000)	m/min	SFM
N2	HCK10	◊										550	1800

High-Silicon Aluminum Alloys  
(hypereutectic >12.2% Si) and Magnesium Alloys

Material Group	grade	speed – m/min (SFM)										Starting Conditions	
		250 (800)	500 (1600)	750 (2400)	1000 (3200)	1250 (4000)	1500 (4800)	1750 (5600)	2000 (6400)	2250 (7200)	2500 (8000)	m/min	SFM
N3	HCK10	◊										550	1800

■ Additional cutting speed recommendations for miscellaneous workpiece materials

Copper-, Brass-, Zinc-Based on a Machinability Index Range of 70–100

Material Group	grade	speed – m/min (SFM)				Starting Conditions	
		250 (800)	500 (1600)	750 (2400)	1000 (3200)	m/min	SFM
N4	HCK10	◇				275	900
	HWK10/HWK15	◇				260	850

Nylon, Plastics, Rubbers, Phenolics, Resins, Fiberglass, and Glass

Material Group	grade	speed – m/min (SFM)				Starting Conditions	
		250 (800)	500 (1600)	750 (2400)	1000 (3200)	m/min	SFM
N5	HCK10	◇				275	900

Carbon and Graphite Composites:  
 Brush Alloys, Kevlar, and Graphite (280–400 HB) (30–43 HRC)

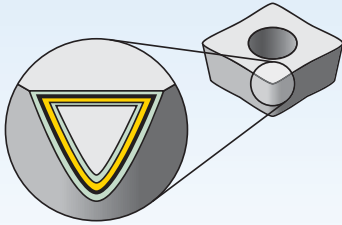
Material Group	grade	speed – m/min (SFM)				Starting Conditions	
		250 (800)	500 (1600)	750 (2400)	1000 (3200)	m/min	SFM
N6	HCK10	◇				200	650

MMCs (Aluminum-Based Metal Matrix Composites)

Material Group	grade	speed – m/min (SFM)				Starting Conditions	
		250 (800)	500 (1600)	750 (2400)	1000 (3200)	m/min	SFM
N7	HCK10	◇				170	550

Tin Alloys, Cast: ASTM 823, Alloys 1, 2, 3, 11

Material Group	grade	speed – m/min (SFM)				Starting Conditions	
		250 (800)	500 (1600)	750 (2400)	1000 (3200)	m/min	SFM
N8	HCK10	◇				215	700
	HWK10/HWK15	◇				180	600

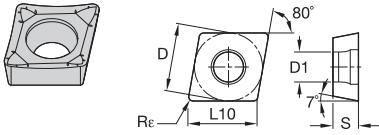


Coatings provide high-speed capability and are engineered for finishing to light roughing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45
<b>HCK10</b>		Coated carbide. PVD — TIALN-Al <sub>2</sub> O <sub>3</sub> on micro-grain carbide. Light and medium machining. For aluminum alloys.										
	<b>HC-N10</b>											
<b>HWK10</b>		Uncoated carbide. Micro-grain carbide with high cutting edge stability. Light machining. For non-ferrous metals and non-metals.										
	<b>HF-N10</b>											
<b>HWK15</b>		Uncoated carbide. Micro-grain carbide with high cutting edge stability. Light and medium machining. For non-ferrous metals and non-metals.										
	<b>HF-N15</b>											



● first choice  
○ alternate choice

P			
M			
K			
N	●	●	●
S			
H			

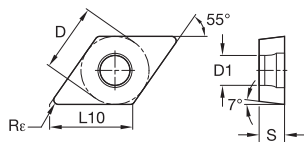
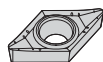


■ **CCGT-AL3**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		HCK10	HWK10	HWK15
		mm	in	mm	in	mm	in	mm	in	mm	in			
CCGT060202AL3	CCGT21505AL3	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	2022257	2022258	2022258
CCGT060204AL3	CCGT2151AL3	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	2022259	2022260	2022260
CCGT09T302AL3	CCGT32505AL3	9,53	3/8	9,67	.381	3,97	5/32	0,2	.008	4,40	.173	2022261	2022262	2022262
CCGT09T304AL3	CCGT3251AL3	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173	2022261	2022262	2022262
CCGT09T308AL3	CCGT3252AL3	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173	2022261	2022262	2022262
CCGT120402AL3	CCGT4305AL3	12,70	1/2	12,90	.508	4,76	3/16	0,2	.008	5,50	.217	2022263	2022264	2022264
CCGT120404AL3	CCGT431AL3	12,70	1/2	12,90	.508	4,76	3/16	0,4	.016	5,50	.217	2022263	2022264	2022264
CCGT120408AL3	CCGT432AL3	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,50	.217	2022263	2022264	2022264



Inserts

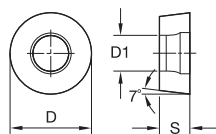
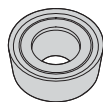


● first choice  
○ alternate choice

P			
M			
K			
N	●	●	●
S			
H			

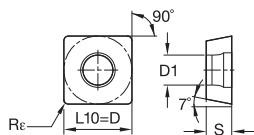
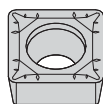
■ DCGT-AL3

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		HCK10	HWK10	HWK15
		mm	in	mm	in	mm	in	mm	in	mm	in			
DCGT070202AL3	DCGT21505AL3	6,35	1/4	7,75	.305	2,38	3/32	0,2	.008	2,80	.110	2022327	2022328	
DCGT070204AL3	DCGT2151AL3	6,35	1/4	7,75	.305	2,38	3/32	0,4	.016	2,80	.110	2022329	2022330	
DCGT11T302AL3	DCGT32505AL3	9,53	3/8	11,63	.458	3,97	5/32	0,2	.008	4,40	.173	2014890	2022361	
DCGT11T304AL3	DCGT3251AL3	9,53	3/8	11,63	.458	3,97	5/32	0,4	.016	4,40	.173	2022332	2022331	
DCGT11T308AL3	DCGT3252AL3	9,53	3/8	11,63	.458	3,97	5/32	0,8	.031	4,40	.173	2022332	2022463	



■ RCGT-AL1

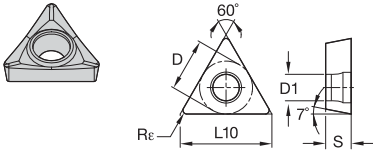
ISO catalog number	ANSI catalog number	D		S		D1	
		mm	in	mm	in	mm	in
RCGT0803M0AL1	RCGT0803M0AL1	8,00	.315	3,18	1/8	3,40	.134



■ SCGT-AL3

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		HCK10	HWK10	HWK15
		mm	in	mm	in	mm	in	mm	in	mm	in			
SCGT120408AL3	SCGT432AL3	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	5,50	.217	2023638		





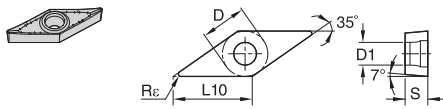
● first choice  
○ alternate choice

P			
M			
K			
N	●	●	●
S			
H			



■ TCGT-AL1

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		HCK10	HWK10	HWK15
		mm	in	mm	in	mm	in	mm	in	mm	in			
TCGT110204AL1	TCGT2151AL1	6,35	1/4	11,00	.433	2,38	3/32	0,4	.016	2,80	.110	○	○	○
TCGT16T308AL1	TCGT3252AL1	9,53	3/8	16,50	.650	3,97	5/32	0,8	.031	4,40	.173	○	○	○



■ VCGT-AL3

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		HCK10	HWK10	HWK15
		mm	in	mm	in	mm	in	mm	in	mm	in			
VCGT110302AL3	VCGT2205AL3	6,35	1/4	11,07	.436	3,18	1/8	0,2	.008	2,80	.110	○	○	○
VCGT110304AL3	VCGT221AL3	6,35	1/4	11,07	.436	3,18	1/8	0,4	.016	2,80	.110	○	○	○
VCGT160404AL3	VCGT331AL3	9,53	3/8	16,61	.654	4,76	3/16	0,4	.031	4,40	.173	○	○	○
VCGT160408AL3	VCGT332AL3	9,53	3/8	16,61	.654	4,76	3/16	0,8	.031	4,40	.173	○	○	○
VCGT160412AL3	VCGT333AL3	9,53	3/8	16,61	.654	4,76	3/16	1,2	.047	4,40	.173	○	○	○
VCGT220530AL3	VCGT4358AL3	12,70	1/2	22,14	.872	5,56	7/32	3,0	.118	5,50	.217	○	○	○



# Ceramic, PcBN, and PCD Inserts

## Advanced Material Inserts



Hard part turning, along with the machining of cast irons, high-temp alloys, and non-ferrous materials, can be accomplished through the use of inserts made from advanced materials. These advanced materials include ceramics, PcBN (polycrystalline cubic boron nitride), and PCD (polycrystalline diamond). WIDIA™ offers:

- Improved performance.
- Greater wear resistance.
- Focused grades portfolio to make choosing the right grade easy.

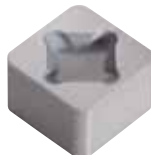
### Ceramic Inserts

- Silicon-nitride based ceramic for cast iron machining.
- Mixed ceramic for hard machining and finishing of cast iron.
- Whisker ceramic for high-temp alloy and hard machining.

**CW2015 —  
Mixed Ceramic**



**CW5025 —  
Silicon-Nitride  
Ceramic**

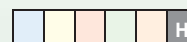


**PcBN**

**Solid Inserts**

- Inserts are made only from PcBN.
- No material joint.
- Best heat-absorption capacity.
- Can work at highest temperatures.

**WBH25P**



**Tipped Inserts**

- Require a carrier and a PcBN tip.
- The tips are brazed to a carrier.
- The substrate has to have a pocket that will accommodate and support the tip.

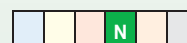
**WBH25P**



**PCD**

- Targeted machining of non-ferrous materials.
- Significant advantage in hardness over carbide tools.
- Increased productivity through higher speeds and longer tool life.
- Best used in processing materials that are un-machinable with conventional tooling.

**WDN25U**



## How Do Catalog Numbers Work?

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

WIDIA		Cubic Boron Nitride and Polycrystalline Diamond Inserts ISO/ANSI Inserts													
ISO catalog number	ANSI catalog number	D	L10	S	R <sub>ε</sub>	D1	Material								
CCGW21505EC	CCGW21505EC	6.35	1.4	6.45	254	2.38	0.2	008	2.80	110	CCGW-C				
CCGW21505EC	CCGW21505EC	6.35	1.4	6.45	254	2.38	0.2	008	2.80	110	CCGW-C				

CCGW21505EC

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Insert Shape	Insert Clearance Angle	Tolerance Class	Insert Features	Size																																																																																																																																																																																																																																	
<p><b>H</b> Hexagon 120°</p> <p><b>O</b> Octagon 135°</p> <p><b>P</b> Pentagon 108°</p> <p><b>R</b> Round</p> <p><b>S</b> Square 90°</p> <p><b>T</b> Triangular 60°</p> <p><b>C</b> Rhomboid 80°</p> <p><b>D</b> 55°</p> <p><b>E</b> 75°</p> <p><b>M</b> 86°</p> <p><b>V</b> 35°</p> <p><b>W</b> Trigon 80° with enlarged corner angles</p> <p><b>L</b> Rectangular 90°</p> <p><b>A</b> Parallelogram 85°</p> <p><b>B</b> 82°</p> <p><b>N/K</b> 55°</p>	<p><b>A</b> 3°</p> <p><b>B</b> 5°</p> <p><b>C</b> 7°</p> <p><b>D</b> 15°</p> <p><b>E</b> 20°</p> <p><b>F</b> 25°</p> <p><b>G</b> 30°</p> <p><b>N</b> 0°</p> <p><b>P</b> 11°</p> <p><b>O</b> For other clearance angles requiring descriptions.</p>	<p>Tolerances apply prior to edge prep and coating</p> <p><b>D</b> = Theoretical diameter of the insert inscribed circle <b>S</b> = Thickness <b>B</b> = See figures below</p>	<p><b>N</b></p> <p><b>R</b></p> <p><b>F</b></p> <p><b>A</b></p> <p><b>M</b></p> <p><b>G</b></p> <p><b>W</b></p> <p><b>T</b></p> <p><b>Q</b></p> <p><b>U</b></p> <p><b>B</b></p> <p><b>H</b></p> <p><b>C</b></p> <p><b>J</b></p> <p><b>X</b> Special Design</p> <p><b>V</b></p>	<p>Code for inch cutting edge length "L10"</p> <table border="1"> <thead> <tr> <th colspan="2">"D"</th> <th>C</th> <th>D</th> <th>R</th> <th>S</th> <th>T</th> <th>V</th> <th>W</th> </tr> <tr> <th>inch</th> <th>inch</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1.2 (5)</td> <td>5/32</td> <td>S4</td> <td>04</td> <td>03</td> <td>03</td> <td>06</td> <td>—</td> <td>—</td> </tr> <tr> <td>1.5 (6)</td> <td>3/16</td> <td>04</td> <td>05</td> <td>04</td> <td>04</td> <td>08</td> <td>08</td> <td>S3</td> </tr> <tr> <td>1.8 (7)</td> <td>7/32</td> <td>05</td> <td>06</td> <td>05</td> <td>05</td> <td>09</td> <td>09</td> <td>03</td> </tr> <tr> <td>—</td> <td>.236</td> <td>—</td> <td>—</td> <td>06</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>2</td> <td>1/4</td> <td>06</td> <td>07</td> <td>06</td> <td>06</td> <td>11</td> <td>11</td> <td>04</td> </tr> <tr> <td>2.5</td> <td>5/16</td> <td>08</td> <td>09</td> <td>07</td> <td>07</td> <td>13</td> <td>13</td> <td>05</td> </tr> <tr> <td>—</td> <td>.315</td> <td>—</td> <td>—</td> <td>08</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>3</td> <td>3/8</td> <td>09</td> <td>11</td> <td>09</td> <td>09</td> <td>16</td> <td>16</td> <td>06</td> </tr> <tr> <td>—</td> <td>.394</td> <td>—</td> <td>—</td> <td>10</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>3.5</td> <td>7/16</td> <td>11</td> <td>13</td> <td>11</td> <td>11</td> <td>19</td> <td>19</td> <td>07</td> </tr> <tr> <td>—</td> <td>.472</td> <td>—</td> <td>—</td> <td>12</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>4</td> <td>1/2</td> <td>12</td> <td>15</td> <td>12</td> <td>12</td> <td>22</td> <td>22</td> <td>08</td> </tr> <tr> <td>4.5</td> <td>9/16</td> <td>14</td> <td>17</td> <td>14</td> <td>14</td> <td>24</td> <td>24</td> <td>09</td> </tr> <tr> <td>5</td> <td>5/8</td> <td>16</td> <td>19</td> <td>15</td> <td>15</td> <td>27</td> <td>27</td> <td>10</td> </tr> <tr> <td>—</td> <td>.630</td> <td>—</td> <td>—</td> <td>16</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>5.5</td> <td>11/16</td> <td>17</td> <td>21</td> <td>17</td> <td>17</td> <td>30</td> <td>30</td> <td>11</td> </tr> <tr> <td>6</td> <td>3/4</td> <td>19</td> <td>23</td> <td>19</td> <td>19</td> <td>33</td> <td>33</td> <td>13</td> </tr> <tr> <td>—</td> <td>.787</td> <td>—</td> <td>—</td> <td>20</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>7</td> <td>7/8</td> <td>22</td> <td>27</td> <td>22</td> <td>22</td> <td>38</td> <td>38</td> <td>15</td> </tr> <tr> <td>—</td> <td>.984</td> <td>—</td> <td>—</td> <td>25</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> <tr> <td>8</td> <td>1</td> <td>25</td> <td>31</td> <td>25</td> <td>25</td> <td>44</td> <td>44</td> <td>17</td> </tr> <tr> <td>10</td> <td>1-1/4</td> <td>32</td> <td>38</td> <td>31</td> <td>31</td> <td>54</td> <td>54</td> <td>21</td> </tr> <tr> <td>—</td> <td>1.260</td> <td>—</td> <td>—</td> <td>32</td> <td>—</td> <td>—</td> <td>—</td> <td>—</td> </tr> </tbody> </table>	"D"		C	D	R	S	T	V	W	inch	inch								1.2 (5)	5/32	S4	04	03	03	06	—	—	1.5 (6)	3/16	04	05	04	04	08	08	S3	1.8 (7)	7/32	05	06	05	05	09	09	03	—	.236	—	—	06	—	—	—	—	2	1/4	06	07	06	06	11	11	04	2.5	5/16	08	09	07	07	13	13	05	—	.315	—	—	08	—	—	—	—	3	3/8	09	11	09	09	16	16	06	—	.394	—	—	10	—	—	—	—	3.5	7/16	11	13	11	11	19	19	07	—	.472	—	—	12	—	—	—	—	4	1/2	12	15	12	12	22	22	08	4.5	9/16	14	17	14	14	24	24	09	5	5/8	16	19	15	15	27	27	10	—	.630	—	—	16	—	—	—	—	5.5	11/16	17	21	17	17	30	30	11	6	3/4	19	23	19	19	33	33	13	—	.787	—	—	20	—	—	—	—	7	7/8	22	27	22	22	38	38	15	—	.984	—	—	25	—	—	—	—	8	1	25	31	25	25	44	44	17	10	1-1/4	32	38	31	31	54	54	21	—	1.260	—	—	32	—	—	—	—
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By referencing this easy-to-use guide, you can identify the correct product to meet your needs.

WIDIA Cubic Boron Nitride and Polycrystalline Diamond Inserts ISO/ANSI Inserts

**CCGW21505EC**

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inch	inch	inch	inch	inch	inch	inch	inch	inch	
5/32	.002	—	—	—	5/32	.003	—	—	—
3/16	.002	—	—	.003	3/16	.003	—	—	.005
7/32	.002	.002	.002	.003	7/32	.003	.004	—	.005
1/4	.002	.002	.002	.003	1/4	.003	.004	—	.005
5/16	.002	.002	.002	.003	5/16	.003	.004	—	.005
3/8	.002	.002	.002	.003	3/8	.003	.004	.007	.005
7/16	.003	.003	.003	.005	7/16	.005	.006	—	—
1/2	.003	.003	.003	.005	1/2	.005	.006	.010	.008
9/16	.003	.003	.003	.005	9/16	.005	.006	—	—
5/8	.004	.004	.004	.007	5/8	.006	.007	—	.011
11/16	.004	.004	.004	.007	11/16	.006	.007	—	.011
3/4	.004	.004	.004	.007	3/4	.006	.007	—	.011
7/8	.005	—	—	.010	7/8	.006	—	—	.015
1	.005	—	—	.010	1	.007	—	—	.015
1 1/4	.006	—	—	.010	1 1/4	.008	—	—	.015

## WBH25P for Enhanced Performance – Five Unique Features

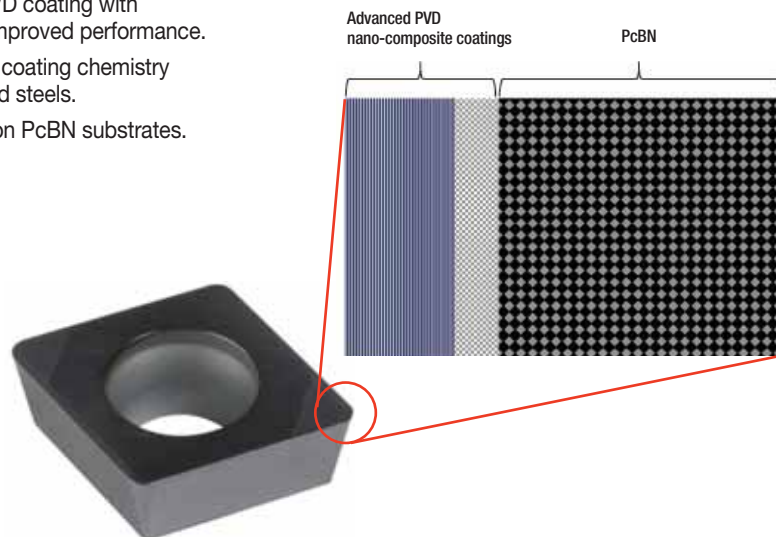
### 1 Newly developed substrate enables application in a wide variety of demanding situations.

The substrate contains superhard grains with a uniquely formulated size distribution and nano-structured binder phase. This unique combination provides an unparalleled balance of wear resistance and toughness. The net result is a robust hard turning tooling solution for a wide range of applications, including continuous to interrupted cutting.



### 2 Nano-composite coating that enhances speed capabilities and tool life.

- Specially developed, advanced PVD coating with nano-composite architecture for improved performance.
- Improved wear resistance by PVD coating chemistry technology for machining hardened steels.
- Enhanced PVD coating adhesion on PcBN substrates.



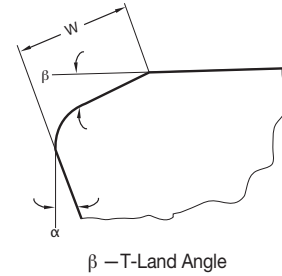
### 3 Improved edge preparation technology for longer tool life, reliable performance, better surface finish, and tighter workpiece tolerances.

A critical performance factor is the edge preparation itself. The grind direction, surface roughness, hone sizes, and tolerances have great impact on performance and process reliability. WIDIA™ has performed significant research work and optimized edge preparation to improve your overall machining effectiveness.

## 4 Large standard portfolio.

Standard edge preparation — the optimum combination of T-land angle, T-land width, and hone size — is paramount in achieving maximum performance. WIDIA™ has developed three standard edge configurations, including wiper inserts.

- |                                      |  |
|--------------------------------------|--|
| • Light machining edge prep E.       | E: Honed cutting edge  |
| • Medium machining edge prep S01015. | S01015: $W \times \beta = .004" \times 15^\circ$<br>(0,10mm x 15°) |
| • Heavy machining edge prep S01025.  | S01025: $W \times \beta = .004" \times 25^\circ$<br>(0,10mm x 25°) |



These edge preps are available in common styles, sizes, and nose radii in both positive and negative geometries.

## 5 CB1 chipbreaker in positive and negative geometries, solving chipbreaking and chip control issues.

Chipbreaker — when machining case-hardened steel with a hard outer skin and a tough and softer core, a chipbreaker provides a great advantage. The CB1 chipbreaker is a proven solution to effectively breaking chips. Long chips can form bird nests, causing machine malfunctions, increasing scrap-rates, and reducing the overall equipment effectiveness.



Available as a custom solution product.

**Insert without Chipbreaker**



- Long chips.
- Bird-nest formation.

**Insert with Chipbreaker**



- Chips are broken.

**Grade Numbering System – Ceramics**

<b>CW</b>	<b>2</b>	<b>0</b>	<b>15</b>
Brand	Cutting Material Group		Application Range
CW = WIDIA™	<p><b>2</b> = CM Mixed (black) ceramic</p> <p><b>3</b> = CR Whisker reinforced ceramic</p> <p><b>5</b> = CN Silicon nitride ceramic</p>	<p><b>0</b> = Stationary cutting edges (turning, parting, threading)</p> <p><b>1</b> = First successor</p> <p><b>2</b> = Semi-standard rotating cutting edges</p> <p><b>3</b> = Semi-standard general applications</p> <p><b>5</b> = Rotating cutting edges (milling, drilling, reaming)</p>	<p><b>05</b> = fine finishing</p> <p><b>10</b> = finishing</p> <p><b>15</b> = } medium to roughing</p> <p><b>20</b> = }</p> <p><b>25</b> = }</p> <p><b>30</b> = } roughing</p> <p><b>35</b> = }</p> <p><b>40</b> = }</p> <p><b>45</b> = } heaviest roughing</p> <p><b>50</b> = }</p>





Grade Numbering System – PcBN and PCD

<b>W</b>	<b>B</b>	<b>H</b>	<b>30</b>	<b>P</b>
Brand	Cutting Material Group	Material Range	Application Range	Coating
WIDIA™	<p><b>B</b> = CBN</p> <p><b>D</b> = PCD</p>		<p>05 = fine finishing</p> <p>10 = finishing</p> <p>15 = } medium to roughing</p> <p>20 = }</p> <p>25 = }</p> <p>30 = } roughing</p> <p>35 = }</p> <p>40 = }</p> <p>45 = } heaviest roughing</p> <p>50 = }</p>	<p><b>U</b> = Uncoated</p> <p><b>C</b> = CVD Coated</p> <p><b>P</b> = PVD Coated</p>

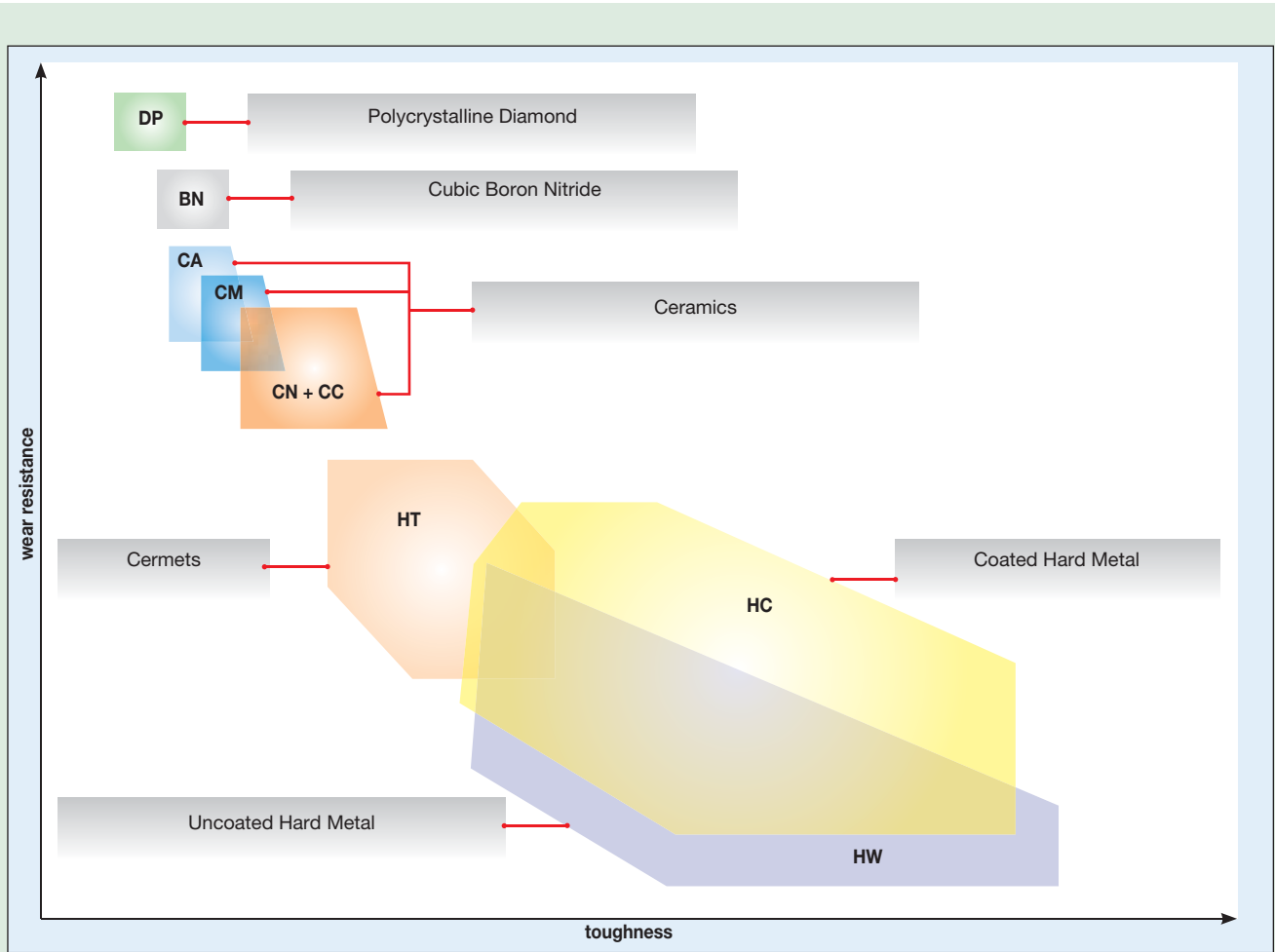
  

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials
<b>U</b>	Universal Machining



The cutting tool materials are classified by the combination of their hardness and wear resistance characteristics.

The extended standard DIN ISO 513 also includes ceramic cutting materials and the superhard polycrystalline materials, boron nitride and diamond, resulting in additional identification symbols for these cutting material groups.



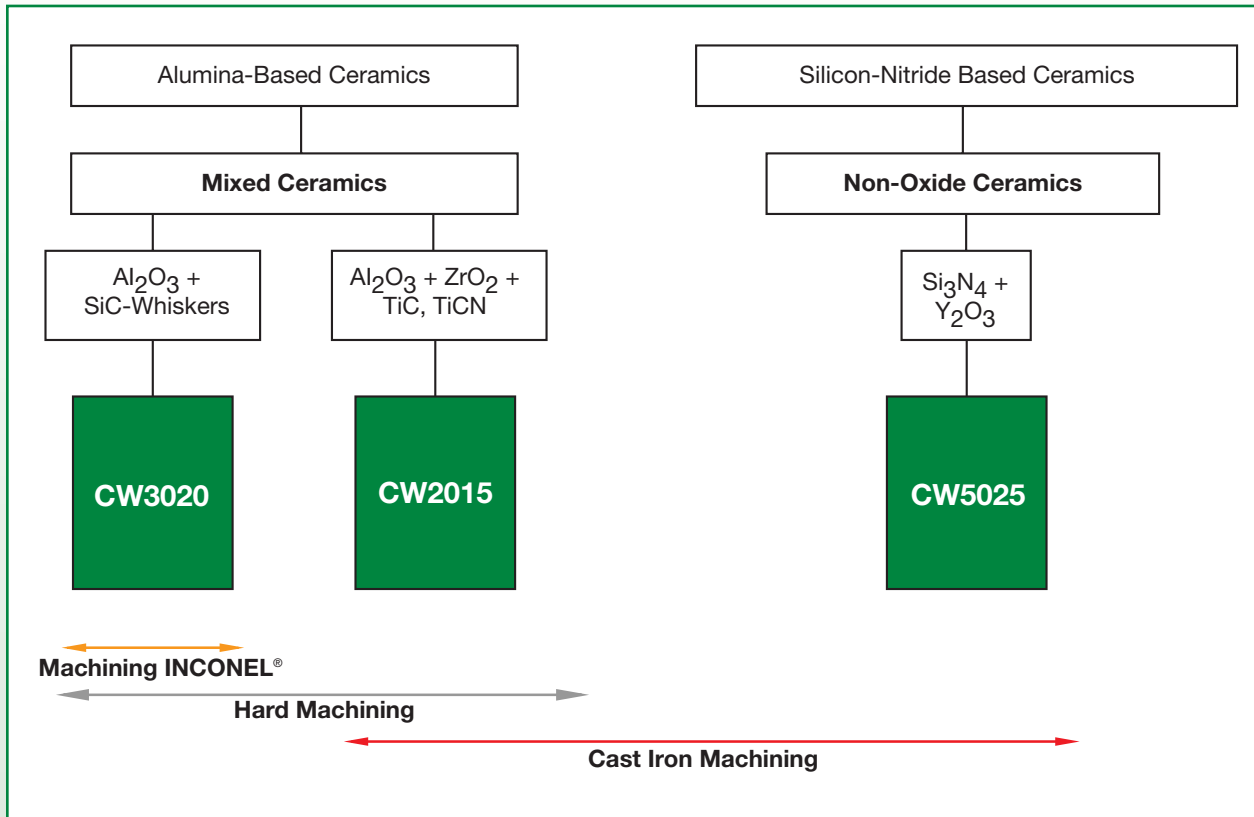
main group	sub-group (symbol)	feature
hard metal	HW	Uncoated WC-base hard metal
	HT	Uncoated TIC/TIN-base hard metal (cermets)
	HC	Coated hard metal
ceramics	CA	Al <sub>2</sub> O <sub>3</sub> -base oxide ceramics
	CM	Composite ceramics Al <sub>2</sub> O <sub>3</sub> + metal carbide
	CN	Si <sub>3</sub> N <sub>4</sub> -base nitride ceramics
	CC	Coated ceramics
cubic boron nitride	BL	Cubic boron nitride (CBN) with low CBN content
	BH	Cubic boron nitride (CBN) with high CBN content
diamond	DP	Polycrystalline diamond (PCD)

**Ceramic Inserts for Hard Turning, Turning in Cast Iron Materials, and Turning in High-Temp Alloys**



- Ceramics offer greater wear resistance and toughness.
- Ceramics can be used in high-speed, continuous, and lightly interrupted turning applications in cast iron materials.
- Ceramics can be used for high-speed applications in high-temp alloys.

**Ceramic Turning Grades**



**CW2015™**

- Alumina and titanium carbo-nitride.
- High hardness and wear resistance.
- TiCN increases strength and hardness.
- Black in color.

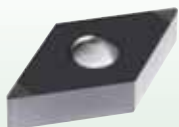
**CW3020™**

- Alumina + SiC whisker.
- High hardness and wear resistance.
- Whisker ceramic with elongated crystals and very high strength.
- Gray-green color.

**CW5025™**

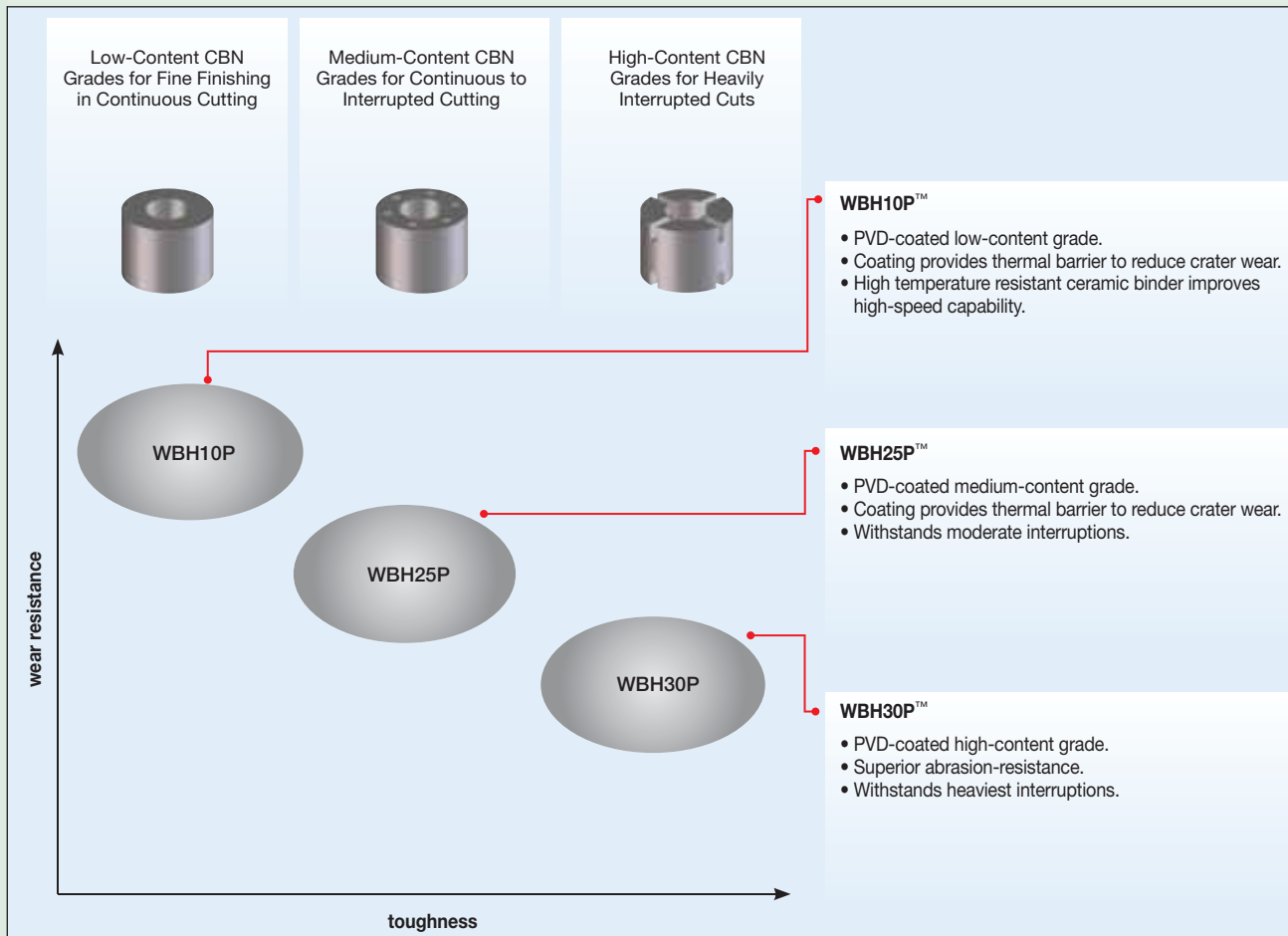
- Pure silicon-nitride composition.
- Used in high-speed turning applications.
- Designed for use in gray cast iron and lower tensile ductile irons.

### PcBN Grades for Hard Turning, Powder Metal, and Gray Cast Iron Machining

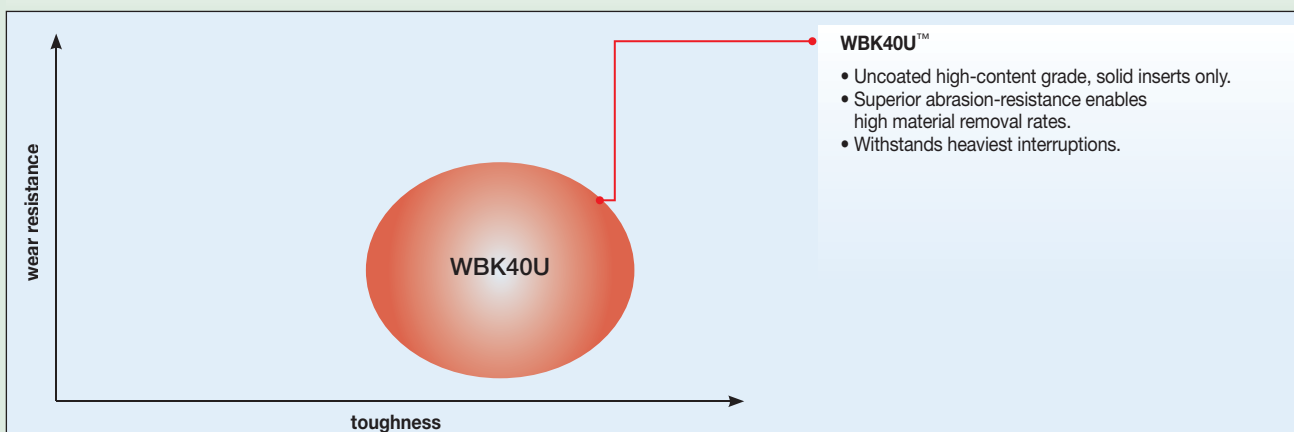


- PVD-coated grades available.
- Complete range of CBN grades for continuous to heavily interrupted turning.
- Industry-leading grades for gray cast iron machining.
- Full line of grades for hard turning.
- For best performance: solid, full-top, and tipped inserts are available.

#### Hard Turning Grades



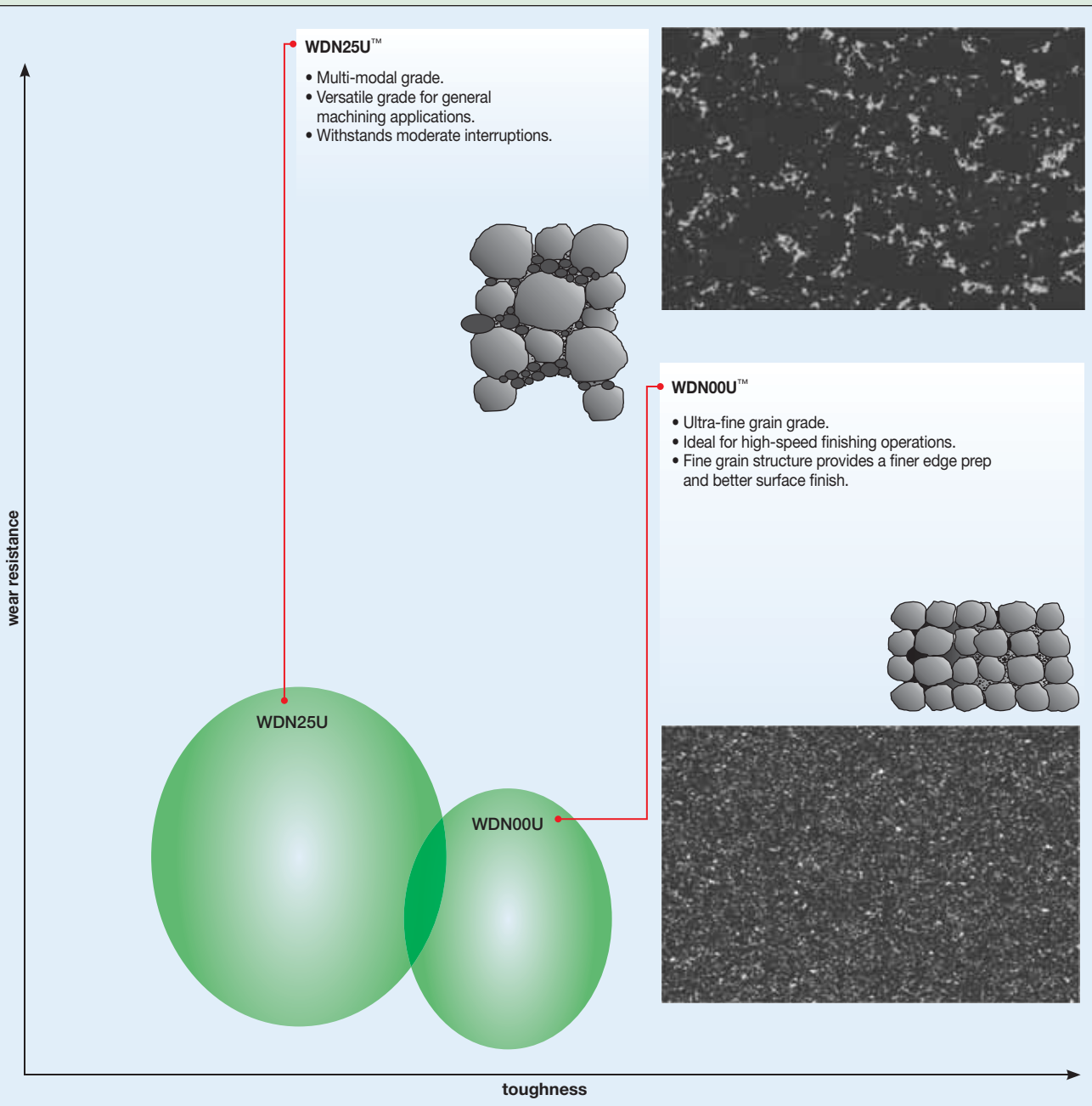
#### Gray Cast Iron Grade



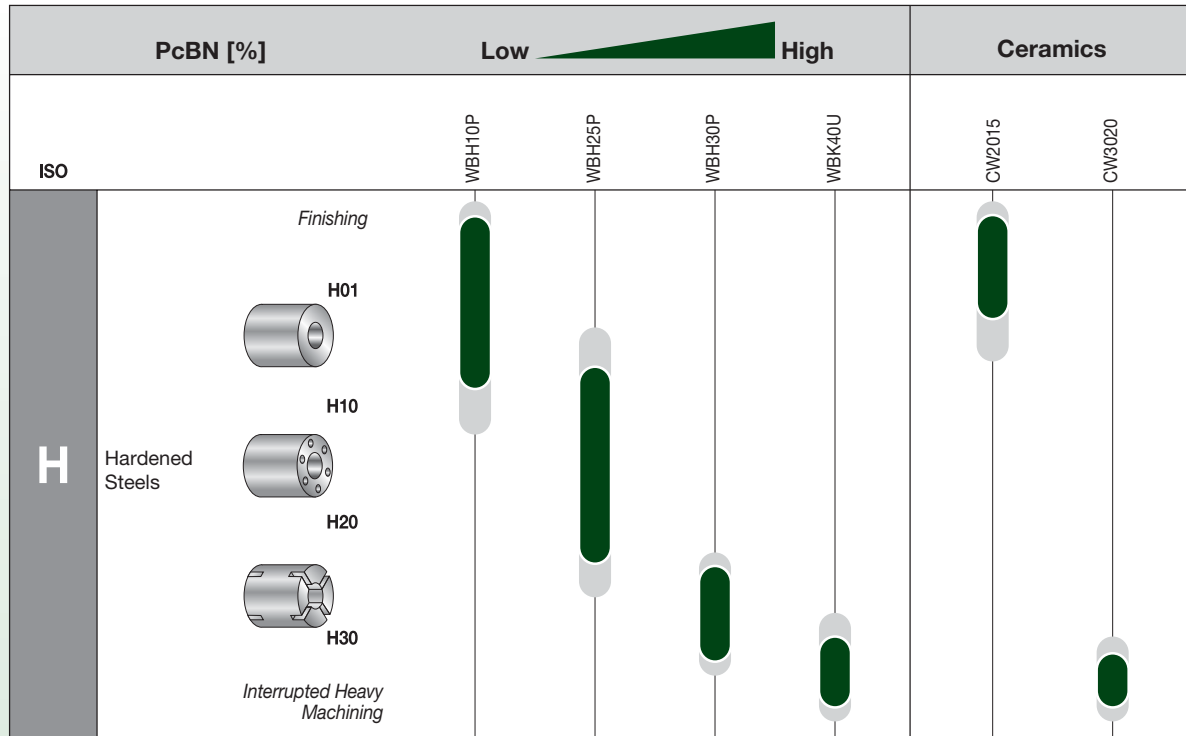
**PCD Grades for Turning Non-Ferrous Materials**



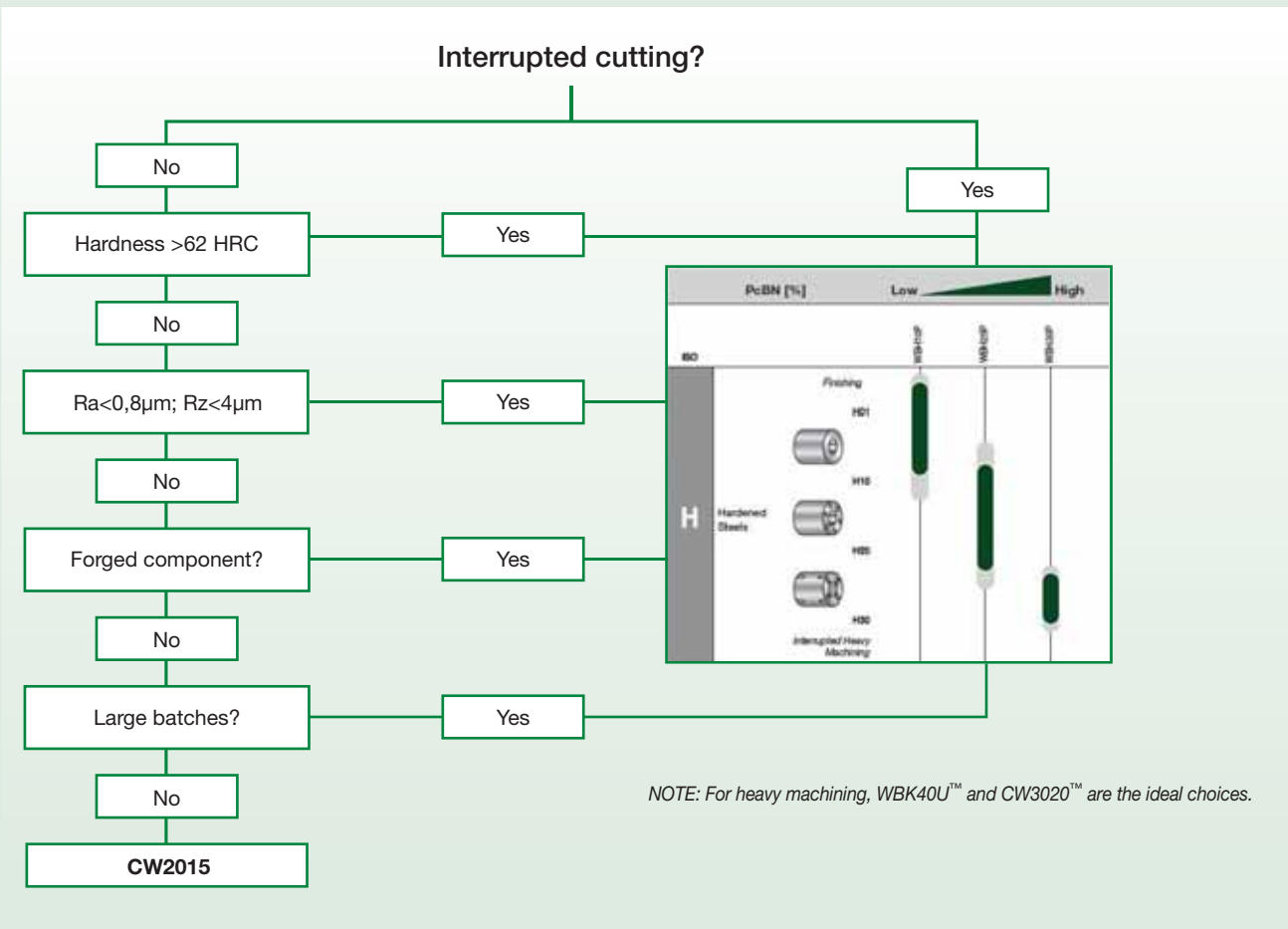
- Two PCD grades — WDN25U and WDN00U — cover a wide range of applications.
- New grades provide outstanding performance to increase productivity and cut manufacturing costs.
- High abrasion and chipping resistance.
- Used in machining aluminum alloys with low- and high-silicon content, copper alloys, ceramics, and plastics.
- Suitable for machining highly abrasive materials such as titanium and Metal Matrix Composites (MMC).



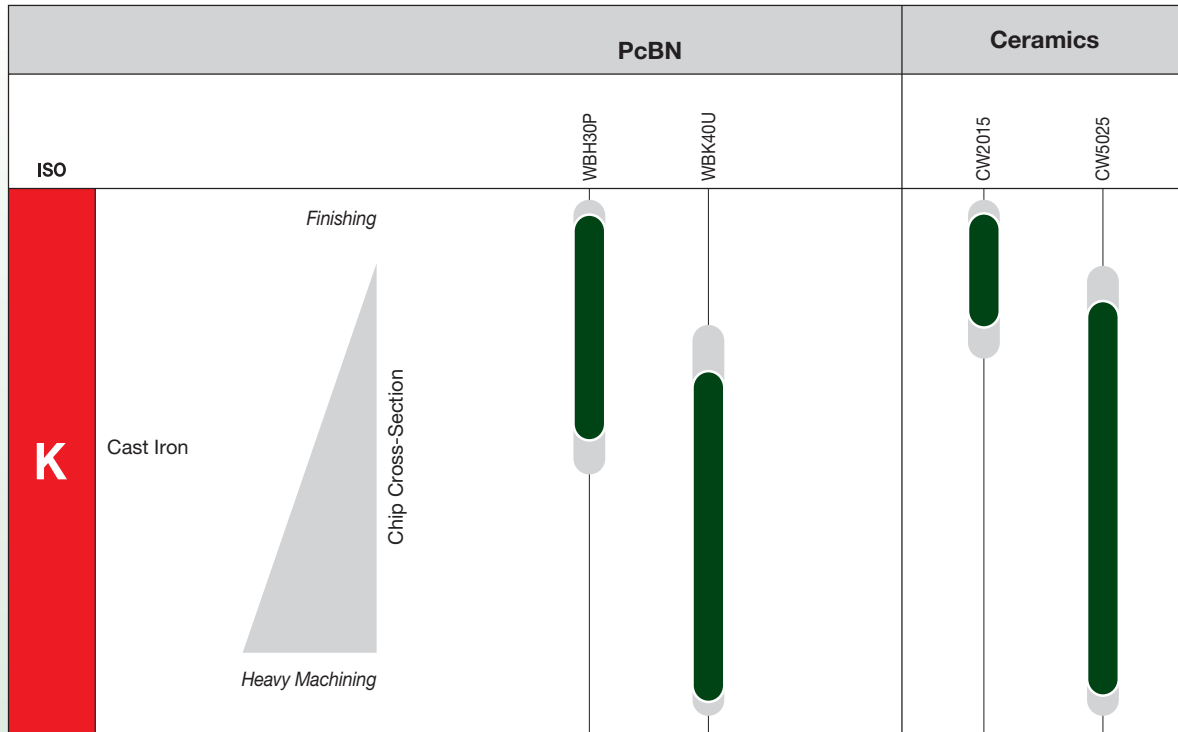
Advanced Materials for Hard Turning



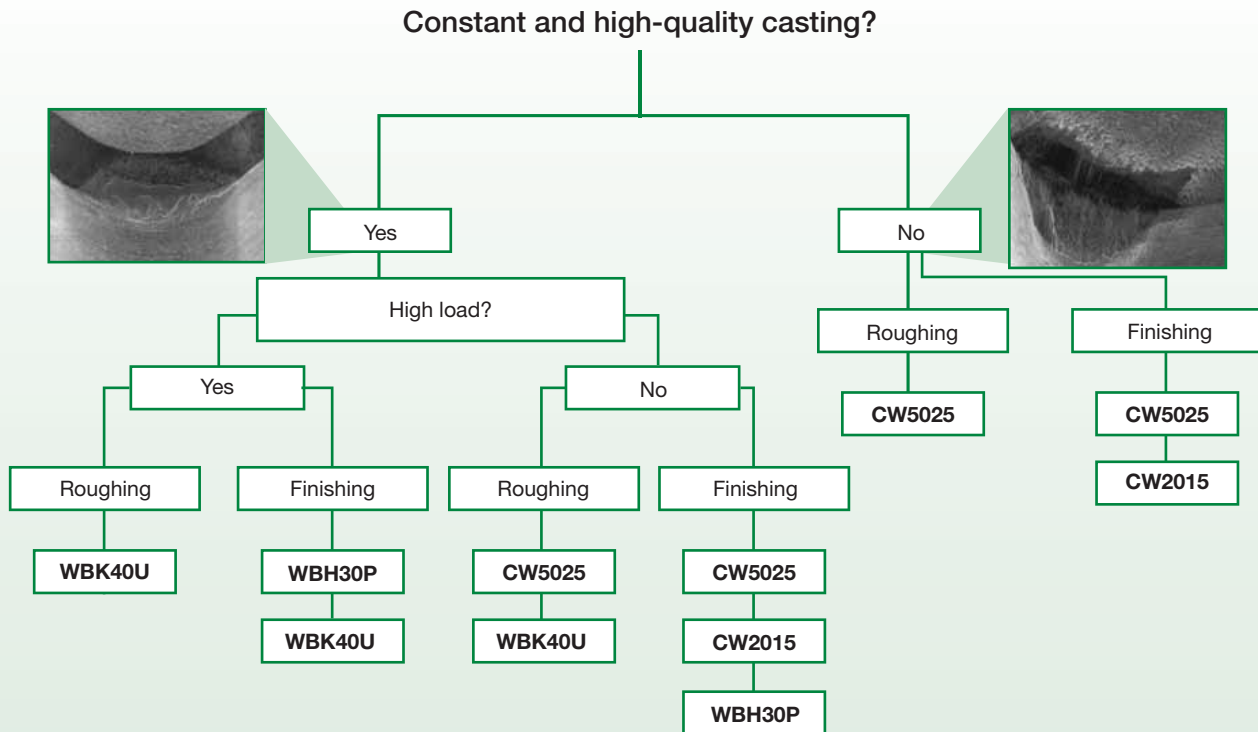
Hard Turning Grade Selection



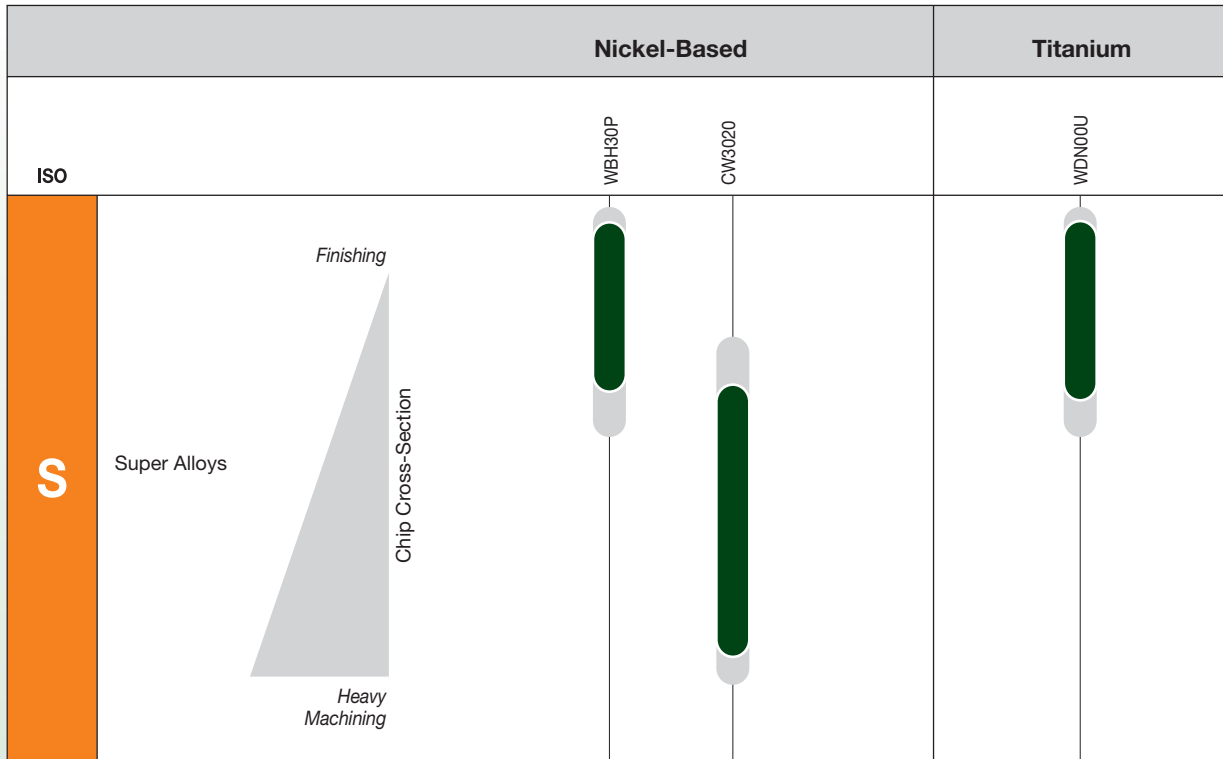
Advanced Materials for Cast Iron Machining



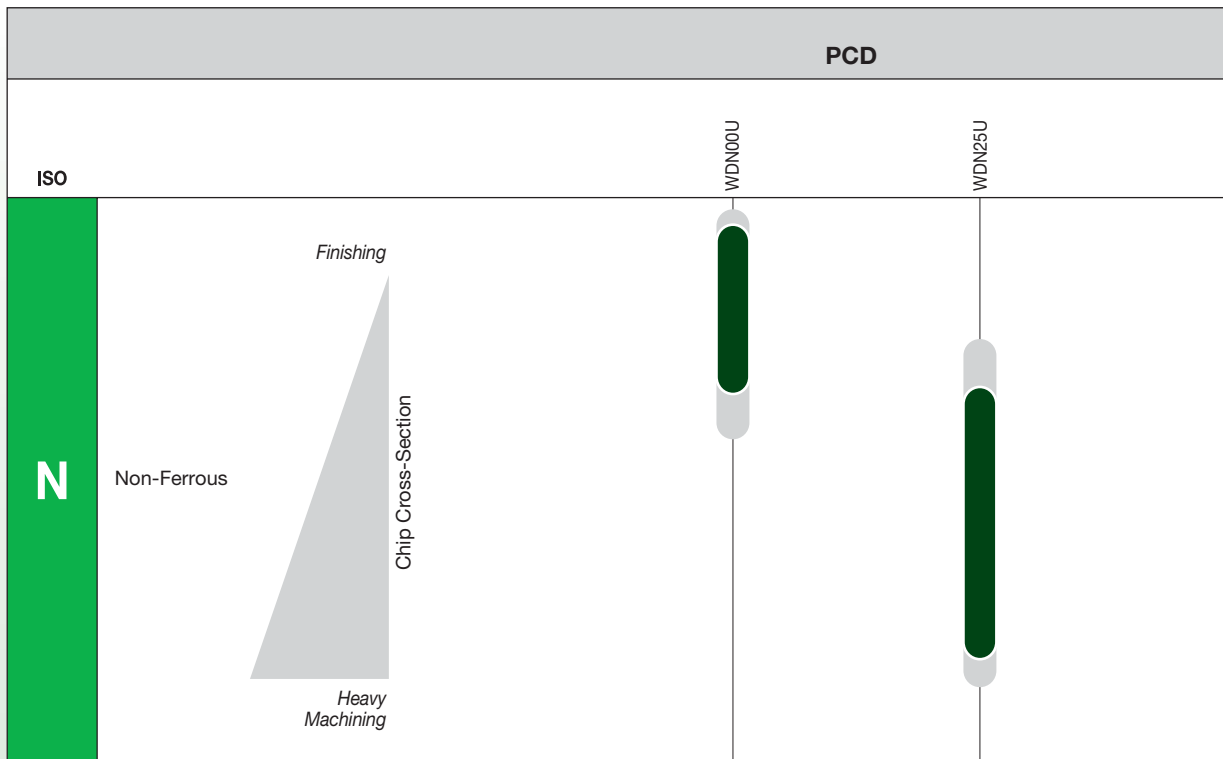
Cast Iron Machining Grade Selection



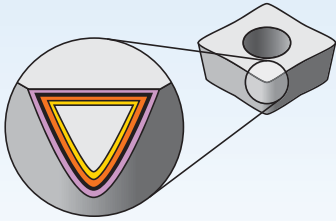
Advanced Materials for High-Temperature Machining



Advanced Materials for Non-Ferrous Machining



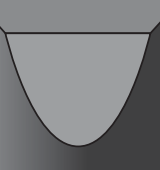
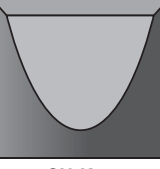
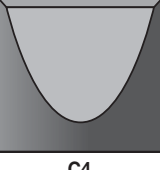
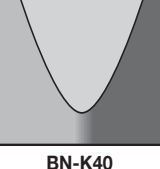
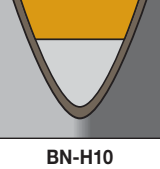


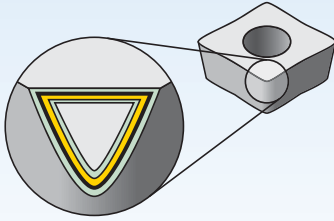


Reduce cycle times. High speed and feed capability. Long tool life. New multi-layer coating provides better wear resistance.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45
<b>CW2015</b>		Mixed (black) ceramic. Matrix Al <sub>2</sub> O <sub>3</sub> and TiCN. Good toughness properties combined with good wear resistance. Semi-finishing and finishing. For hardened iron base materials and gray cast iron (finishing).										
	<b>CM-H10</b>											
<b>CW5025</b>		Silicon-nitride ceramic. Extraordinary toughness properties. Roughing, also in heavily interrupted cuts. Capable of high-performance turning. To be used with or without coolant. For gray cast iron.										
	<b>CN-K15</b>											
<b>CW3020</b>		Whisker ceramic with a matrix of Al <sub>2</sub> O <sub>3</sub> + SiCw. The SiC whiskers embedded in the micro-structure give this ceramic excellent toughness for cutting high-temp alloys and cast materials with high Brinell hardness.										
	<b>C4</b>											
<b>WBK40U</b>		A high CBN content, solid CBN insert with multiple cutting edges. Applied in roughing to finishing of fully pearlitic gray cast iron, chilled irons, high-chrome alloyed steels, sintered powdered metals, and heavy cuts in hardened steels (>45 HRC). Use for finishing chilled and fully pearlitic cast iron. Solid inserts offer better security and shock-resistance than tipped inserts, while also enabling deeper depth-of-cut capability.										
	<b>BN-K40</b>											
<b>WBH10P</b>		A low content CBN grade with a PVD-TiAlN coating for added wear resistance. Designed for precision machining of hardened steels (>45 HRC); the harder the steel the better. PVD coating offers improved wear resistance and excellent surface finish capability. Effectively applied on bearing steels, hot and cold work tool steels, high-speed steels, die steels, case-hardened steels, carburized and nitrided irons, and some hard coatings.										
	<b>BN-H10</b>											



**Reduce cycle times. High speed and feed capability. Long tool life. New multi-layer coating provides better wear resistance.**

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Grade	Coating	Grade Description	Wear Resistance / Toughness																		
			05	10	15	20	25	30	35	40	45										
WBH25P		A PVD-TiAlN coating over a low content, CBN tip brazed onto a carbide insert. Designed for roughing to finishing of hardened steels (>45 HRC). Use on bearing steel, hot and cold work tool steels, high-speed steels, die steels, case-hardened steels, carburized and nitrided irons, and some hard coatings.																			
	<b>BN-H25</b>																				
WBH30P		A PVD-TiAlN coating over a low content, CBN tip brazed onto a carbide insert. Designed for roughing to finishing in interrupted cuts on hardened steels (>45 HRC). Applied on gray cast iron, chilled irons, high-chrome alloyed steels, high-temp alloys, and sintered powdered metals.																			
	<b>BN-H30</b>																				
WDN00U*		An ultra-fine grained polycrystalline diamond (PCD) tip brazed onto a carbide substrate. Designed for general purpose turning of primarily non-ferrous materials. Applied over a wide range of continuous to interrupted cuts where superior surface finish is needed. Use on low to medium silicon content aluminum alloys, non-metallics, copper, brass, and zinc-based alloys. The ultra-fine grained diamond particle size enables superior surface finishes while ensuring the best mechanical shock resistance of any PCD cutting tool.																			
	<b>DP-N10</b>																				
WDN25U		A multi-modal PCD grade with a range of grain sizes brazed onto a carbide substrate. Engineered for extreme abrasion resistance and good edge strength for demanding applications. An ideal choice for high-silicon aluminum alloys, bi-metallic (AL/GC) materials, MMC, carbon-fiber reinforced plastics, and other abrasive non-metallic materials.																			
	<b>DP-N25</b>																				

\*Grade available as Custom Solution only.

Material Group		Cutting Speed – vc m/min								
		CW2015			CW3020			CW5025		
		min	Start	max	min	Start	max	min	Start	max
ap [mm]		0,5		4,0	0,5		4,0	1,0		8,0
f [mm/rev]		0,2		0,4	0,1		5,0	0,2		0,6
<b>P</b>	0	-	-	-	-	-	-	-	-	-
	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-	-
<b>M</b>	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
<b>K</b>	1	250	<b>475</b>	725	-	-	-	250	<b>760</b>	1000
	2	300	<b>550</b>	800	-	-	-	275	<b>365</b>	490
	3	250	<b>400</b>	600	-	-	-	275	<b>335</b>	440
<b>N</b>	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-	-
	7	-	-	-	-	-	-	-	-	-
	8	-	-	-	-	-	-	-	-	-
<b>S</b>	1	-	-	-	170	<b>200</b>	375	-	-	-
	2	-	-	-	170	<b>200</b>	375	-	-	-
	3	-	-	-	190	<b>250</b>	375	-	-	-
	4	-	-	-	-	-	-	-	-	-
<b>H</b>	1	60	<b>100</b>	140	45	<b>85</b>	125	-	-	-
	2	60	<b>100</b>	140	45	<b>85</b>	125	-	-	-
	3	60	<b>100</b>	140	45	<b>85</b>	125	-	-	-
	4	60	<b>100</b>	140	45	<b>85</b>	125	-	-	-

Inserts

Inserts

Material Group		Cutting Speed – vc SFM								
		CW2015			CW3020			CW5025		
		min	Start	max	min	Start	max	min	Start	max
ap [inch]		0.0197		0.1575	0.0197		0.0394	0.0394		0.315
f [inch]		0.0079		0.0157	0.0039		0.1969	0.0047		0.0236
P	0	-	-	-	-	-	-	-	-	-
	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-	-
M	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
K	1	815	1555	2375	-	-	-	800	2500	3300
	2	980	1800	2600	-	-	-	900	1200	1600
	3	820	1310	1965	-	-	-	900	1100	1450
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-	-
	7	-	-	-	-	-	-	-	-	-
	8	-	-	-	-	-	-	-	-	-
S	1	-	-	-	550	650	1200	-	-	-
	2	-	-	-	550	720	1200	-	-	-
	3	-	-	-	600	820	1200	-	-	-
	4	-	-	-	-	-	-	-	-	-
H	1	200	325	450	150	275	400	-	-	-
	2	200	325	450	150	275	400	-	-	-
	3	200	325	450	150	275	400	-	-	-
	4	200	325	450	150	275	400	-	-	-

Material Group		Cutting Speed – vc m/min																	
		WBH10P			WBH25P			WBH30P			WBK40U			WDN00U			WDN25U		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
ap [mm]		0,10	0,50		0,10	0,50		0,08	0,40		0,10	1,50		0,20	2,00		0,20	2,00	
f [mm/rev]		0,06	0,25		0,05	0,20		0,05	0,20		0,08	0,20		0,10	0,30		0,10	0,25	
P	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	1	-	-	-	-	-	-	400	600	800	650	800	1200	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-	500	765	2500	500	765	2500
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	580	1000
	3	-	-	-	-	-	-	-	-	-	-	-	-	250	520	1000	250	520	1000
	4	-	-	-	-	-	-	-	-	-	-	-	-	250	400	750	250	400	750
	5	-	-	-	-	-	-	-	-	-	-	-	-	550	760	1000	550	760	1000
	6	-	-	-	-	-	-	-	-	-	-	-	-	400	460	850	400	365	750
	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	120	160	200	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	120	160	200	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	120	160	200	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-	100	180	320	-	-	-
H	1	80	170	260	80	160	230	60	120	220	60	120	220	-	-	-	-	-	-
	2	80	170	260	80	160	230	60	120	220	60	120	220	-	-	-	-	-	-
	3	80	170	260	80	160	230	60	120	220	60	120	220	-	-	-	-	-	-
	4	80	170	260	80	160	230	60	120	220	60	120	220	-	-	-	-	-	-

Inserts

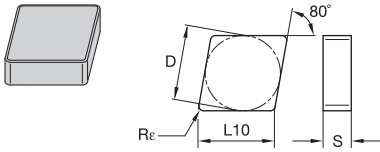
# Speed and Feed Chart

PcBN and PCD • Inch



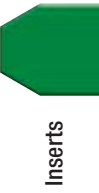
Inserts

Material Group		Cutting Speed – vc m/min																																			
		WBH10P			WBH25P			WBH30P			WBK40U			WDN00U			WDN25U																				
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max																		
ap [inch]		0.004			0.020			0.004			0.020			0.003			0.016			0.008			0.080			0.008			0.079			0.008			0.079		
f [inch]		0.002			0.010			0.002			0.008			0.002			0.008			0.003			0.010			0.004			0.010			0.004			0.010		
P	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
M	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
K	1	-	-	-	-	-	-	1310	1975	2625	2125	2625	3950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
N	1	-	-	-	-	-	-	-	-	-	-	-	-	1600	2500	8000	1600	2500	8000	-	-	-	-	-	-	-	-	-	-	-	-						
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	2000	3200	-	-	-	-	-	-	-	-	-	-	-	-						
	3	-	-	-	-	-	-	-	-	-	-	-	-	800	1700	3200	800	1700	3200	-	-	-	-	-	-	-	-	-	-	-	-						
	4	-	-	-	-	-	-	-	-	-	-	-	-	800	1300	2400	800	1300	2400	-	-	-	-	-	-	-	-	-	-	-	-						
	5	-	-	-	-	-	-	-	-	-	-	-	-	1700	2500	3200	1700	2500	3200	-	-	-	-	-	-	-	-	-	-	-	-						
	6	-	-	-	-	-	-	-	-	-	-	-	-	1000	1200	2400	1000	1500	2800	-	-	-	-	-	-	-	-	-	-	-	-						
	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
S	1	-	-	-	-	-	-	400	525	650	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	2	-	-	-	-	-	-	400	525	650	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	3	-	-	-	-	-	-	400	525	650	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	4	-	-	-	-	-	-	-	-	-	-	-	-	325	600	1050	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
H	1	275	550	850	275	525	755	200	400	725	200	400	725	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	2	275	550	850	275	525	755	200	400	725	200	400	725	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	3	275	550	850	275	525	755	200	400	725	200	400	725	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	4	275	550	850	275	525	755	200	400	725	200	400	725	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						



● first choice  
○ alternate choice

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H	●	○	○	○

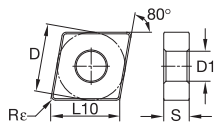
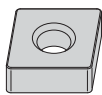


■ CNGN/CNG

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
CNGN120404T02020	CNG431T0820	12,70	1/2	12,90	.508	4,76	3/16	0,4	.016	—	—	2952551	—	—
CNGN120408T01020	CNG432T0420	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	—	—	—	3869578	—
CNGN120408T02020	CNG432T0820	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	—	—	2952552	—	2952082
CNGN120412T01020	CNG433T0420	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	—	—	—	3869579	—
CNGN120412T02020	CNG433T0820	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	—	—	2952603	—	2952113
CNGN120416T01020	CNG434T0420	12,70	1/2	12,90	.508	4,76	3/16	1,6	.063	—	—	—	3869580	—
CNGN120416T02020	CNG434T0820	12,70	1/2	12,90	.508	4,76	3/16	1,6	.063	—	—	2952604	—	2952114
CNGN120712T01020	CNG453T0420	12,70	1/2	12,90	.508	7,94	5/16	1,2	.047	—	—	—	3869581	—
CNGN120712T02020	CNG453T0820	12,70	1/2	12,90	.508	7,94	5/16	1,2	.047	—	—	2952605	—	2952115
CNGN120716T01020	CNG454T0420	12,70	1/2	12,90	.508	7,94	5/16	1,6	.063	—	—	—	3869582	—



Inserts

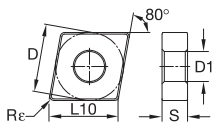
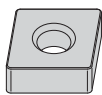


● first choice  
○ alternate choice

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H	●			

■ CNGA

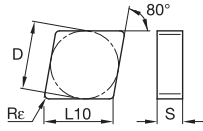
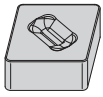
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
CNGA120404T02020	CNGA431T0820	12,70	1/2	12,90	.508	4,76	3/16	0,4	.016	5,16	.203	2952526	2952527	2952159
CNGA120408T02020	CNGA432T0820	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	2952527	2952159	2952159
CNGA120412T02020	CNGA433T0820	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	5,16	.203	2952528	2952161	2952161
CNGA120416T02020	CNGA434T0820	12,70	1/2	12,90	.508	4,76	3/16	1,6	.063	5,16	.203	2952173	2952173	2952173
CNGA160612T02020	CNGA543T0820	15,88	5/8	16,12	.635	6,35	1/4	1,2	.047	6,35	.250	2952529	2952174	2952174
CNGA160616T02020	CNGA544T0820	15,88	5/8	16,12	.635	6,35	1/4	1,6	.063	6,35	.250	2952175	2952175	2952175
CNGA190612T02020	CNGA643T0820	19,05	3/4	19,34	.762	6,35	1/4	1,2	.047	7,93	.313	2952530	2952176	2952176
CNGA190616T02020	CNGA644T0820	19,05	3/4	19,34	.762	6,35	1/4	1,6	.063	7,93	.313	2952531	2952176	2952176



■ CNGA-FW

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
CNGA120408T01020FW	CNGA432T0420FW	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	2952160	2952158	2952158
CNGA120412T01020FW	CNGA433T0420FW	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	5,16	.203	2952160	2952160	2952160
CNGA120416T01020FW	CNGA434T0420FW	12,70	1/2	12,90	.508	4,76	3/16	1,6	.063	5,16	.203	2952162	2952162	2952162





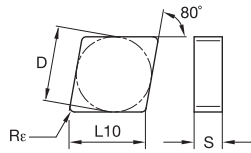
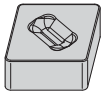
● first choice  
○ alternate choice

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■ **CNGX**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
CNGX120708T02020	CNGX452T0820	12,70	1/2	12,90	.508	7,94	5/16	0,8	.031	—	—	■	■	2952117
CNGX120712T02020	CNGX453T0820	12,70	1/2	12,90	.508	7,94	5/16	1,2	.047	—	—	■	■	2952119
CNGX160716T02020	CNGX554T0820	15,88	5/8	16,12	.635	7,94	5/16	1,6	.063	—	—	■	■	2952121

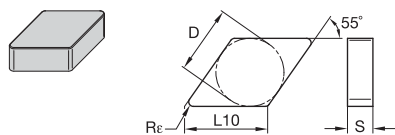


■ **CNGX-FW**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
CNGX120712T01020FW	CNGX453T0420FW	12,70	1/2	12,90	.508	7,94	5/16	1,2	.047	—	—	■	■	2952118



Inserts

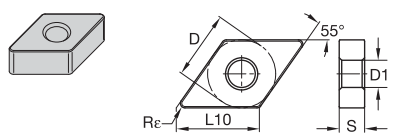


● first choice  
○ alternate choice

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H	●		

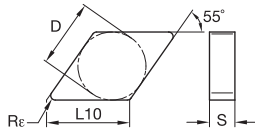
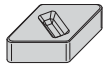
■ DNGN/DNG

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
DNGN150704T02020	DNG451T0820	12,70	1/2	15,50	.610	7,94	5/16	0,4	.016	—	—	2952607	3869743	—
DNGN150708T01020	DNG452T0420	12,70	1/2	15,50	.610	7,94	5/16	0,8	.031	—	—	—	3869743	—
DNGN150708T02020	DNG452T0820	12,70	1/2	15,50	.610	7,94	5/16	0,8	.031	—	—	2952608	—	—
DNGN150712T02020	DNG453T0820	12,70	1/2	15,50	.610	7,94	5/16	1,2	.047	—	—	2952609	—	—
DNGN150716T01020	DNG454T0420	12,70	1/2	15,50	.610	7,94	5/16	1,6	.063	—	—	—	3869745	—



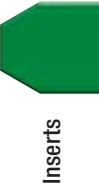
■ DNGA

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
DNGA150404T02020	DNGA431T0820	12,70	1/2	15,50	.610	4,76	3/16	0,4	.016	5,16	.203	2952532	—	—
DNGA150408T02020	DNGA432T0820	12,70	1/2	15,50	.610	4,76	3/16	0,8	.031	5,16	.203	2952533	—	—
DNGA150412T02020	DNGA433T0820	12,70	1/2	15,50	.610	4,76	3/16	1,2	.047	5,16	.203	2952534	—	2952184
DNGA150604T02020	DNGA441T0820	12,70	1/2	15,50	.610	6,35	1/4	0,4	.016	5,16	.203	2952535	—	—
DNGA150608T02020	DNGA442T0820	12,70	1/2	15,50	.610	6,35	1/4	0,8	.031	5,16	.203	2952536	—	—
DNGA150612T02020	DNGA443T0820	12,70	1/2	15,50	.610	6,35	1/4	1,2	.047	5,16	.203	2952537	—	2952185



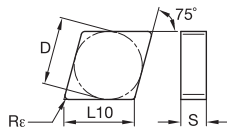
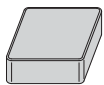
● first choice  
○ alternate choice

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S			●	
H	●			



■ **DNGX**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
DNGX120712T02020	DNGX120712T02020	10,00	.3937	12,21	.481	7,94	5/16	1,2	.047	—	—			2952124
DNGX120716T02020	DNGX120716T02020	10,00	.3937	12,21	.481	7,94	5/16	1,6	.063	—	—			2952125
DNGX150708T02020	DNGX452T0820	12,70	1/2	15,50	.610	7,94	5/16	0,8	.031	—	—			2952126
DNGX150712T02020	DNGX453T0820	12,70	1/2	15,50	.610	7,94	5/16	1,2	.047	—	—			2952127
DNGX150716T02020	DNGX454T0820	12,70	1/2	15,50	.610	7,94	5/16	1,6	.063	—	—			2952128

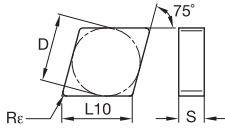
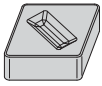


■ **ENGN/ENG**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
ENGN130704T02020	ENG451T0820	12,70	1/2	13,15	.518	7,94	5/16	0,4	.016	—	—	2952611		
ENGN130708T02020	ENG452T0820	12,70	1/2	13,15	.518	7,94	5/16	0,8	.031	—	—	2952612		
ENGN130712T02020	ENG453T0820	12,70	1/2	13,15	.518	7,94	5/16	1,2	.047	—	—	2952613		
ENGN130716T02020	ENG454T0820	12,70	1/2	13,15	.518	7,94	5/16	1,6	.063	—	—	2952614		



Inserts

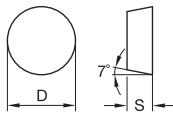
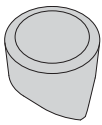


● first choice  
○ alternate choice

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H	●		

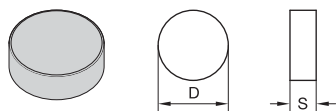
■ ENGX

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
ENGX130716T02020	ENGX454T0820	12,70	1/2	13,15	.518	7,94	5/16	1,6	.063	—	—			2952130



■ RCGX/RCGV

ISO catalog number	ANSI catalog number	D		S		CW2015	CW3020	CW5025
		mm	in	mm	in			
RCGX060400T01020	RCGV23T0420	6,35	1/4	4,76	3/16		3869746	
RCGX090700T02020	RCGV35T0820	9,53	3/8	7,92	5/16	2952694		
RCGX090700T07015	RCGV35T2815	9,53	3/8	7,92	5/16	2952695		
RCGX090700T01020	RCGV35T0420	9,53	3/8	7,94	5/16	2952693	3869747	
RCGX120700T01020	RCGV45T0420	12,70	1/2	7,92	5/16		3869748	
RCGX120700T02020	RCGV45T0820	12,70	1/2	7,92	5/16	2952697		
RCGX120700T20015	RCGV45T8015	12,70	1/2	7,92	5/16	2952698		



● first choice  
○ alternate choice

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H	●		

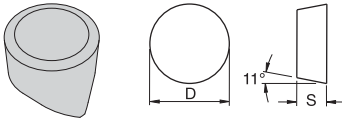


■ RNGN/RNG

ISO catalog number	ANSI catalog number	D		S		CW2015	CW3020	CW5025
		mm	in	mm	in			
RNGN090300T01020	RNG32T0420	9,53	3/8	3,18	1/8		3869749	
RNGN090400T02020	RNG33T0820	9,53	3/8	4,76	3/16	2952615		
RNGN120400T01020	RNG43T0420	12,70	1/2	4,76	3/16		3869750	
RNGN120400T02020	RNG43T0820	12,70	1/2	4,76	3/16	2952616		2952131
RNGN120700T01020	RNG45T0420	12,70	1/2	7,94	5/16		3869751	
RNGN120700T02020	RNG45T0820	12,70	1/2	7,94	5/16	2952617		
RNGN120700T10015	RNG45T4015	12,70	1/2	7,94	5/16	2952618		
RNGN120700T20015	RNG45T8015	12,70	1/2	7,94	5/16	2952619		
RNGN150700T02020	RNG55T0820	15,88	5/8	7,94	5/16	2952620		2952133



Inserts

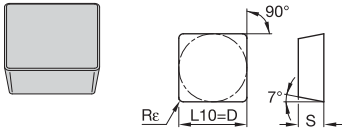


● first choice  
○ alternate choice

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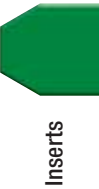
■ **RPGV**

ISO catalog number	ANSI catalog number	D		S		CW2015	CW3020	CW5025
		mm	in	mm	in			
RPGX060400T01020	RPGV23T0420	6,35	1/4	4,78	3/16		3869753	
RPGX090700T01020	RPGV35T0420	9,53	3/8	7,92	5/16		3869754	
RPGX120700T01020	RPGV45T0420	12,70	1/2	7,94	5/16		3869755	



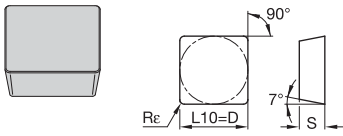
● first choice  
○ alternate choice

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■ SCGN/SCG

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
SCGN090412T00520	SCG333T0220	9,53	3/8	9,53	.375	4,76	3/16	1,2	.047	—	—			2952147

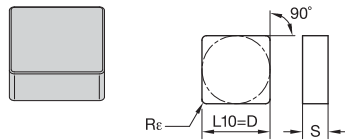


■ SCUN/SCU

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
SCUN120412T00520	SCU433T0220	12,70	1/2	12,70	.500	4,76	3/16	1,2	.047	—	—	2952699		



Inserts



● first choice  
○ alternate choice

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■ SNGN/SNG

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		CW/2015	CW/3020	CW/5025	
		mm	in	mm	in	mm	in	mm	in	mm	in				
SNGN090308T02020	SNG322T0820	9,53	3/8	9,53	.375	3,18	1/8	0,8	.031	—	—	2952748	2952748	—	—
SNGN090412T00515	SNG333T0215	9,53	3/8	9,53	.375	4,76	3/16	1,2	.047	—	—	2952749	2952749	—	—
SNGN120408T00520	SNG432T0220	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	—	—	2952750	2952750	—	—
SNGN120408T02020	SNG432T0820	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	—	—	2952751	2952751	2952135	—
SNGN120412T01020	SNG433T0420	12,70	1/2	12,70	.500	4,76	3/16	1,2	.047	—	—	—	3869756	—	—
SNGN120412T02020	SNG433T0820	12,70	1/2	12,70	.500	4,76	3/16	1,2	.047	—	—	2952752	2952752	2952136	—
SNGN120416T01020	SNG434T0420	12,70	1/2	12,70	.500	4,76	3/16	1,6	.063	—	—	—	3869757	—	—
SNGN120416T02020	SNG434T0820	12,70	1/2	12,70	.500	4,76	3/16	1,6	.063	—	—	—	—	2952137	—
SNGN120704T02020	SNG451T0820	12,70	1/2	12,70	.500	7,94	5/16	0,4	.016	—	—	2952824	2952824	—	—
SNGN120708T02020	SNG452T0820	12,70	1/2	12,70	.500	7,94	5/16	0,8	.031	—	—	2952825	2952825	—	—
SNGN120712T00520	SNG453T0220	12,70	1/2	12,70	.500	7,94	5/16	1,2	.047	—	—	2953339	2953339	—	—
SNGN120712T01020	SNG453T0420	12,70	1/2	12,70	.500	7,94	5/16	1,2	.047	—	—	—	3869758	—	—

(continued)



(SNGN/SNG – continued)

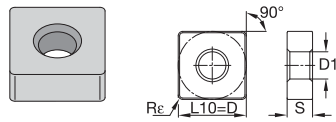
● first choice  
○ alternate choice

P	■	■	■	■
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ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
SNGN120712T02020	SNG453T0820	12,70	1/2	12,70	.500	7,94	5/16	1,2	.047	—	—	2952826	2952138	2952138
SNGN120716T00520	SNG454T0220	12,70	1/2	12,70	.500	7,94	5/16	1,6	.063	—	—	2953340	2952138	2952138
SNGN120716T01020	SNG454T0420	12,70	1/2	12,70	.500	7,94	5/16	1,6	.063	—	—	3869759	2952139	2952139
SNGN120716T02020	SNG454T0820	12,70	1/2	12,70	.500	7,94	5/16	1,6	.063	—	—	2952139	2952139	2952139
SNGN120720T02020	SNG455T0820	12,70	1/2	12,70	.500	7,94	5/16	2,0	.078	—	—	2952828	2952828	2952828
SNGN120720T10015	SNG455T4015	12,70	1/2	12,70	.500	7,94	5/16	2,0	.078	—	—	2952829	2952829	2952829
SNGN150712T02020	SNG553T0820	15,88	5/8	15,88	.625	7,94	5/16	1,2	.047	—	—	2952830	2952830	2952830
SNGN150716T02020	SNG554T0820	15,88	5/8	15,88	.625	7,94	5/16	1,6	.063	—	—	2952831	2952831	2952831
SNGN190720K20015	SNG655K8015	19,05	3/4	19,05	.750	7,94	5/16	2,0	.079	—	—	2952832	2952832	2952832
SNGN190720T20015	SNG655T8015	19,05	3/4	19,05	.750	7,94	5/16	2,0	.079	—	—	2952833	2952833	2952833



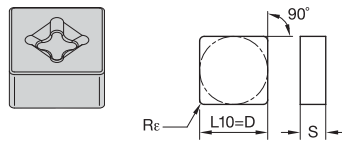


● first choice  
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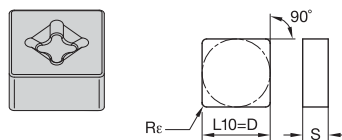
■ SNGA

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
SNGA120408T02020	SNGA432T0820	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	5,16	.203	2952538	2952538	2952187
SNGA120412T02020	SNGA433T0820	12,70	1/2	12,70	.500	4,76	3/16	1,2	.047	5,16	.203	2952539	2952539	2952188
SNGA120416T02020	SNGA434T0820	12,70	1/2	12,70	.500	4,76	3/16	1,6	.063	5,16	.203	2952540	2952540	2952189
SNGA150612T02020	SNGA543T0820	15,88	5/8	15,88	.625	6,35	1/4	1,2	.047	6,35	.250	2952190	2952190	2952191
SNGA150616T02020	SNGA544T0820	15,88	5/8	15,88	.625	6,35	1/4	1,6	.063	6,35	.250	2952191	2952191	2952191



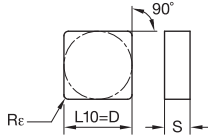
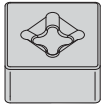
■ SNGX

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
SNGX120708T02020	SNGX452T0820	12,70	1/2	12,70	.500	7,94	5/16	0,8	.031	—	—	2952144	2952144	2952140
SNGX150716T02020	SNGX554T0820	15,88	5/8	15,88	.625	7,94	5/16	1,6	.063	—	—	2952144	2952144	2952141



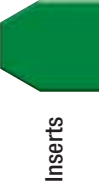
■ SNGX-FW

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
SNGX120712T01020FW	SNGX453T0420FW	12,70	1/2	12,70	.500	7,94	5/16	1,2	.047	—	—	2952141	2952141	2952141



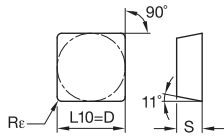
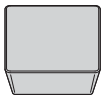
● first choice  
○ alternate choice

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■ **SNMX**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
SNMX120712T02020	SNMX453T0820	12,70	1/2	12,70	.500	7,94	5/16	1,2	.047	—	—			2952069
SNMX120716T02020	SNMX454T0820	12,70	1/2	12,70	.500	7,94	5/16	1,6	.063	—	—			2952070
SNMX150716T02020	SNMX554T0820	15,88	5/8	15,88	.625	7,94	5/16	1,6	.063	—	—			2952071

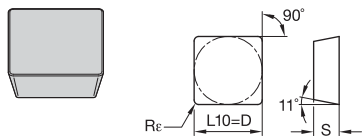


■ **SPGN-T/SPG-T**

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
SPGN090308T01020	SPG322T0420	9,53	3/8	9,53	.375	3,18	1/8	0,8	.031	—	—	2952700		
SPGN120304T01020	SPG421T0420	12,70	1/2	12,70	.500	3,18	1/8	0,4	.016	—	—	2952701		
SPGN120308T01020	SPG422T0420	12,70	1/2	12,70	.500	3,18	1/8	0,8	.031	—	—	2952702		



Inserts

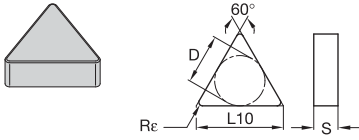


● first choice  
○ alternate choice

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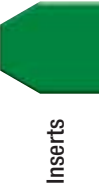
■ SPUN-T/SPU-T

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
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SPUN120304T00520	SPU421T0220	12,70	1/2	12,70	.500	3,18	1/8	0,4	.016	—	—	2952703		
SPUN120308T00520	SPU422T0220	12,70	1/2	12,70	.500	3,18	1/8	0,8	.031	—	—	2952704		
SPUN120312T00520	SPU423T0220	12,70	1/2	12,70	.500	3,18	1/8	1,2	.047	—	—	2952705		



● first choice  
○ alternate choice

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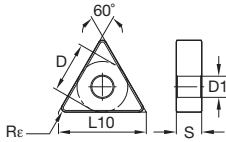
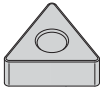


■ TNGN/TNG

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
TNGN160404T02020	TNG331T0820	9,53	3/8	16,50	.650	4,76	3/16	0,4	.016	—	—	2952835		
TNGN160408T01020	TNG332T0420	9,53	3/8	16,50	.650	4,76	3/16	0,8	.031	—	—	3869761		
TNGN160408T02020	TNG332T0820	9,53	3/8	16,50	.650	4,76	3/16	0,8	.031	—	—	2952836		2952072
TNGN160412T02020	TNG333T0820	9,53	3/8	16,50	.650	4,76	3/16	1,2	.047	—	—	2952837		2952153
TNGN160416T02020	TNG334T0820	9,53	3/8	16,50	.650	4,76	3/16	1,6	.063	—	—	2952838		
TNGN160708T02020	TNG352T0820	9,53	3/8	16,50	.650	7,94	5/16	0,8	.031	—	—	2952839		
TNGN160712T02020	TNG353T0820	9,53	3/8	16,50	.650	7,94	5/16	1,2	.047	—	—	2952840		
TNGN220408T02020	TNG432T0820	12,70	1/2	22,00	.866	4,76	3/16	0,8	.031	—	—	2952841		
TNGN220416T02020	TNG434T0820	12,70	1/2	22,00	.866	4,76	3/16	1,6	.063	—	—			2952154



Inserts

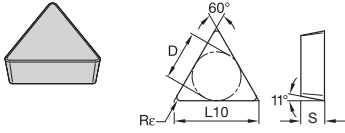


● first choice  
○ alternate choice

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■ TNGA

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
TNGA160408T02020	TNGA332T0820	9,53	3/8	16,50	.650	4,76	3/16	0,8	.031	3,81	.150	2952541	2952195	I
TNGA160412T02020	TNGA333T0820	9,53	3/8	16,50	.650	4,76	3/16	1,2	.047	3,81	.150	2952542	2952196	I
TNGA160416T02020	TNGA334T0820	9,53	3/8	16,50	.650	4,76	3/16	1,6	.063	3,81	.150	2952543	2952197	I
TNGA220408T02020	TNGA432T0820	12,70	1/2	22,00	.866	4,76	3/16	0,8	.031	5,16	.203	2952544		I



● first choice  
○ alternate choice

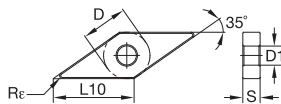
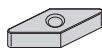
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■ TPG

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		CW2015	CW3020	CW5025	
		mm	in	mm	in	mm	in	mm	in	mm	in				
TPGN110304T01020	TPG221T0420	6,35	1/4	11,00	.433	3,18	1/8	0,4	.016	—	—	2952706	2952706	2952706	2952706
TPGN110308T01020	TPG222T0420	6,35	1/4	11,00	.433	3,18	1/8	0,8	.031	—	—	2952707	2952707	2952707	2952707
TPGN110312T01020	TPG223T0420	6,35	1/4	11,00	.433	3,18	1/8	1,2	.047	—	—	2952708	2952708	2952708	2952708
TPGN160304T00520	TPG321T0220	9,53	3/8	16,50	.650	3,18	1/8	0,4	.016	—	—	2952709	2952709	2952709	2952709
TPGN160304T01020	TPG321T0420	9,53	3/8	16,50	.650	3,18	1/8	0,4	.016	—	—	2952710	2952710	2952710	2952710
TPGN160308T00520	TPG322T0220	9,53	3/8	16,50	.650	3,18	1/8	0,8	.031	—	—	2952711	2952711	2952711	2952711
TPGN160308T01020	TPG322T0420	9,53	3/8	16,50	.650	3,18	1/8	0,8	.031	—	—	2952712	2952712	2952712	2952712
TPGN160308T02020	TPG322T0820	9,53	3/8	16,50	.650	3,18	1/8	0,8	.031	—	—	2952713	2952713	2952155	2952155
TPGN160312T01020	TPG323T0420	9,53	3/8	16,50	.650	3,18	1/8	1,2	.047	—	—	2952713	2952713	2952713	2952713
TPGN160312T02020	TPG323T0820	9,53	3/8	16,50	.650	3,18	1/8	1,2	.047	—	—	2952713	2952713	2952156	2952156



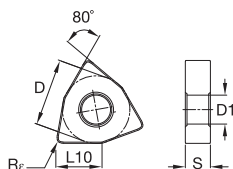
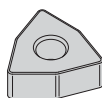


● first choice  
○ alternate choice

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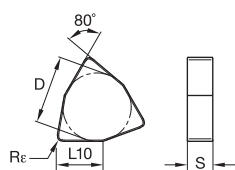
■ VNGA

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
VNGA160404T02020	VNGA331T0820	9,53	3/8	16,61	.654	4,76	3/16	0,4	.016	3,81	.150	2952545	2952545	●
VNGA160408T02020	VNGA332T0820	9,53	3/8	16,61	.654	4,76	3/16	0,8	.031	3,81	.150	2952546	2952198	○
VNGA160412T02020	VNGA333T0820	9,53	3/8	16,61	.654	4,76	3/16	1,2	.047	3,81	.150	2952547	2952547	●
VNGA220408T02020	VNGA432T0820	12,70	1/2	22,14	.872	4,76	3/16	0,8	.031	5,16	.203	2952548	2952199	○



■ WNGA

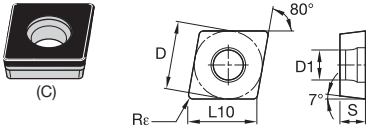
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
WNGA080408T02020	WNGA432T0820	12,70	1/2	8,69	.342	4,76	3/16	0,8	.031	5,16	.203	2952199	2952199	●
WNGA080412T02020	WNGA433T0820	12,70	1/2	8,69	.342	4,76	3/16	1,2	.047	5,16	.203	2952200	2952199	○
WNGA080416T02020	WNGA434T0820	12,70	1/2	8,69	.342	4,76	3/16	1,6	.063	5,16	.203	2952201	2952199	○



■ WNGX

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		CW2015	CW3020	CW5025
		mm	in	mm	in	mm	in	mm	in	mm	in			
WNGX080712T02020	WNGX453T0820	12,70	1/2	8,69	.342	7,94	5/16	1,2	.047	—	—	2952157	2952157	●





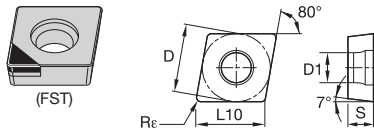
● first choice  
○ alternate choice

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Inserts

■ CCGW-C

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CCGW060202EC	CCGW21505EC	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	○	○	○	○	○	○	○
CCGW060202S01015C	CCGW21505S0415C	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	○	○	○	○	○	○	○
CCGW060204S01015C	CCGW2151S0415C	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	○
CCGW09T304S01015C	CCGW3251S0415C	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173	○	○	○	○	○	○	○
CCGW09T308S01015C	CCGW3252S0415C	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173	○	○	○	○	○	○	○

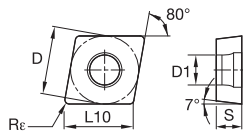


■ CCGW-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U
		mm	in	mm	in	mm	in	mm	in	mm	in						
CCGW060204FST	CCGW2151FST	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○
CCGW09T304FST	CCGW3251FST	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173	○	○	○	○	○	○
CCGW09T308FST	CCGW3252FST	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173	○	○	○	○	○	○



Inserts

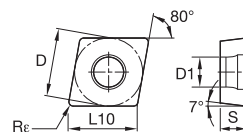


- first choice
- alternate choice

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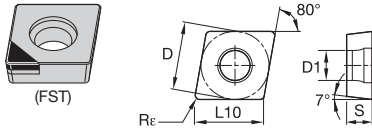
■ CCGW-FWC

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CCGW060202EFWC	CCGW21505EFWC	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	○	○	○	○	○	○	○
CCGW060204EFWC	CCGW2151EFWC	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	○
CCGW09T304EFWC	CCGW3251EFWC	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173	○	○	○	○	○	○	○
CCGW09T308EFWC	CCGW3252EFWC	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173	○	○	○	○	○	○	○



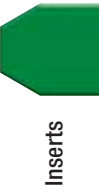
■ CCGW-MT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CCGW09T304S01015MT	CCGW3251S0415MT	9,52	3/8	9,67	.381	3,99	.157	0,4	.016	4,40	.173	○	○	○	○	○	○	○
CCGW09T308S01015MT	CCGW3252S0415MT	9,52	3/8	9,67	.381	3,99	.157	0,8	.031	4,40	.173	○	○	○	○	○	○	○



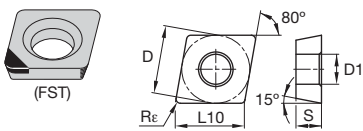
● first choice  
○ alternate choice

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**■ CCMW-FST**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CCMW060204FST	CCMW2151FST	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	3883135
CCMW060208FST	CCMW2152FST	6,35	1/4	6,45	.254	2,38	3/32	0,8	.032	2,80	.110	○	○	○	○	○	○	3883133
CCMW09T304FST	CCMW3251FST	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173	○	○	○	○	○	○	3883134
CCMW09T308FST	CCMW3252FST	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173	○	○	○	○	○	○	3883136

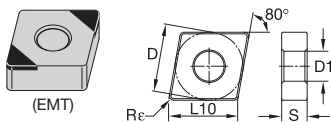


**■ CDHB-FST**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CDHBS4T002FST	CDHB120601FST	3,97	5/32	4,03	.159	1,02	.040	0,1	.002	2,13	.084	○	○	○	○	○	○	3898745
CDHBS4T004FST	CDHB120605FST	3,97	.1562	4,03	.159	1,02	.040	0,2	.007	2,13	.084	○	○	○	○	○	○	3898744



Inserts

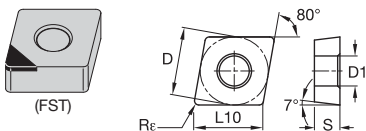


- first choice
- alternate choice

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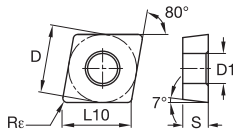
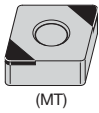
■ CNGA-EMT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P 3883363	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CNGA120408EMT	CNGA432EMT	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	○	○	○	○	○	○	○
CNGA120412EMT	CNGA433EMT	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	5,16	.203	○	○	○	○	○	○	○



■ CNGA-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CNGA120404FST	CNGA431FST	12,70	1/2	12,90	.508	4,76	3/16	0,4	.016	5,16	.203	○	○	○	○	○	○	○
CNGA120408FST	CNGA432FST	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	○	○	○	○	○	○	○



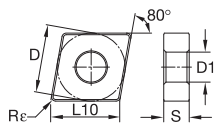
● first choice  
○ alternate choice

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H	■	●	●	●	●	●	●	●	●	●	●	●	●	●

Inserts

### ■ CNGA-FW/MW MT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CNGA120404EFWMT	CNGA431EFWMT	12,70	1/2	12,90	.508	4,76	3/16	0,4	.016	5,15	.203	○	○	○	○	○	○	○
CNGA120408EFWMT	CNGA432EFWMT	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	○	○	○	○	○	○	○
CNGA120408S01025FWMT	CNGA432S0425FWMT	12,70	1/2	12,90	.508	4,78	.1883	0,8	.031	5,16	.203	○	○	○	○	○	○	○

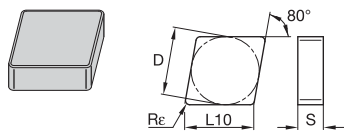


### ■ CNGA-MT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CNGA120404S01025MT	CNGA431S0425MT	12,70	1/2	12,90	.508	4,78	.1883	0,4	.016	5,16	.203	○	○	○	○	○	○	○
CNGA120408S01025MT	CNGA432S0425MT	12,70	1/2	12,90	.508	4,78	.1883	0,8	.031	5,16	.203	○	○	○	○	○	○	○
CNGA120412S01020MT	CNGA433S0420MT	12,70	1/2	12,90	.508	4,78	.1883	1,2	.047	5,16	.203	○	○	○	○	○	○	○
CNGA120412S01025MT	CNGA433S0425MT	12,70	1/2	12,90	.508	4,78	.1883	1,2	.047	5,16	.203	○	○	○	○	○	○	○



Inserts

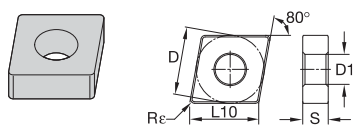


● first choice  
○ alternate choice

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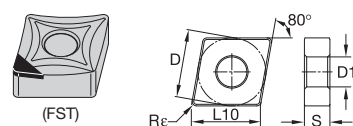
■ CNMN/CNM

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CNMN090312S02020	CNM323S0820	9,53	3/8	9,67	.381	3,18	1/8	1,2	.047	—	—	■	■	■				
CNMN120408S02020	CNM432S0820	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	—	—	■	■	■	3883278			
CNMN120412S02020	CNM433S0820	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	—	—	■	■	■	3883280			



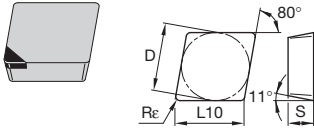
■ CNMA

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CNMA120408S02020	CNMA432S0820	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	■	■	■	3883281			
CNMA120412S02020	CNMA433S0820	12,70	1/2	12,90	.508	4,76	3/16	1,2	.047	5,16	.203	■	■	■	3883282			



■ CNMS-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CNMS120408FST	CNMS432FST	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,16	.203	■	■	■	■			3898729



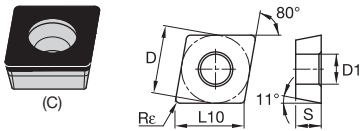
● first choice  
○ alternate choice

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N	■																		●	●
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### ■ CPGN/CPG

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CPGN120304F	CPG421F	12,70	1/2	12,90	.508	3,18	1/8	0,4	.016	—	—	○	○	○	○	○	○	○
CPGN120308F	CPG422F	12,70	1/2	12,90	.508	3,18	1/8	0,8	.031	—	—	○	○	○	○	○	○	○

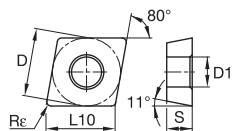


### ■ CPGW-C

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CPGW060202EC	CPGW21505EC	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	○	○	○	○	○	○	○
CPGW060202S01015C	CPGW21505S0415C	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	○	○	○	○	○	○	○
CPGW060204S01015C	CPGW2151S0415C	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	○
CPGW060208S01015C	CPGW2152S0415C	6,35	1/4	6,45	.254	2,38	3/32	0,8	.031	2,80	.110	○	○	○	○	○	○	○
CPGW09T304S01015C	CPGW3251S0415C	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173	○	○	○	○	○	○	○
CPGW09T308S01015C	CPGW3252S0415C	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173	○	○	○	○	○	○	○



Inserts

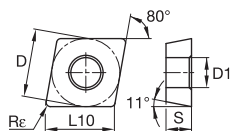


● first choice  
○ alternate choice

P	■																			
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K	■											●	●							
N	■																		●	●
S	■																		●	●
H	■											●	●	●	●					

■ CPGW-FST

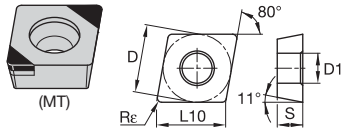
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CPGW060202FST	CPGW21505FST	6,35	1/4	6,45	.254	2,38	3/32	0,2	.008	2,80	.110	○	○	○	○	○	○	3898751
CPGW060204FST	CPGW2151FST	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	3898752
CPGW060208FST	CPGW2152FST	6,35	1/4	6,45	.254	2,38	3/32	0,8	.031	2,80	.110	○	○	○	○	○	○	3898753
CPGW09T304FST	CPGW3251FST	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173	○	○	○	○	○	○	3898754
CPGW09T308FST	CPGW3252FST	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173	○	○	○	○	○	○	3898755
CPGW120404FST	CPGW431FST	12,70	1/2	12,90	.508	4,76	3/16	0,4	.016	5,50	.217	○	○	○	○	○	○	3898756
CPGW120408FST	CPGW432FST	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,50	.217	○	○	○	○	○	○	3898757



■ CPGW-FWST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CPGW060204FWST	CPGW2151FWST	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	5885758
CPGW09T308FWST	CPGW3252FWST	9,53	3/8	9,67	.381	3,97	5/32	0,8	.031	4,40	.173	○	○	○	○	○	○	5885759
CPGW120408FWST	CPGW432FWST	12,70	1/2	12,90	.508	4,76	3/16	0,8	.031	5,50	.217	○	○	○	○	○	○	5885760
																		3898758





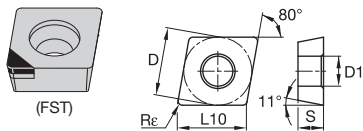
● first choice  
○ alternate choice

P	■										
M	■										
K	■			●	●						
N	■								●	●	
S	■								●	●	
H	■	●	●	●	●						

Inserts

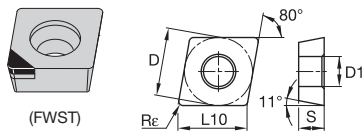
### ■ CPGW-MT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CPGW09T304S01015MT	CPGW3251S0415MT	9,53	3/8	9,67	.381	3,99	.157	0,4	.016	4,40	.173	3883526	○	○	○	○	○	○
CPGW09T308S01015MT	CPGW3252S0415MT	9,53	3/8	9,67	.381	3,99	.157	0,8	.031	4,40	.173	3883527	○	○	6018085	○	○	○



### ■ CPMW-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CPMW050204FST	CPMW7151FST	5,56	7/32	5,65	.222	2,38	3/32	0,4	.016	2,50	.098	○	○	○	○	○	○	3883139
CPMW060204FST	CPMW2151FST	6,35	1/4	6,45	.254	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	3883137

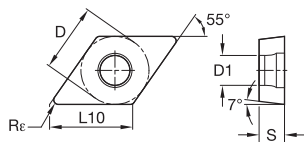
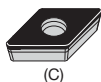


### ■ CPMW-FWST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
CPMW09T304FWST	CPMW3251FWST	9,53	3/8	9,67	.381	3,97	5/32	0,4	.016	4,40	.173	○	○	○	○	○	○	3883138



Inserts

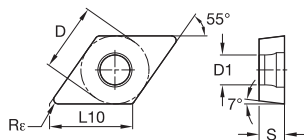


● first choice  
○ alternate choice

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S	■													●	●					
H	■	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

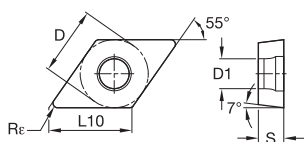
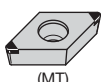
■ DCGW-C

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
DCGW070202EC	DCGW21505EC	6,35	1/4	7,75	.305	2,38	3/32	0,2	.008	2,80	.110	○	○	○	○	○	○	○
DCGW070202S01015C	DCGW21505S0415C	6,35	1/4	7,75	.305	2,38	3/32	0,2	.008	2,80	.110	●	●	●	●	●	●	●
DCGW070204S01015C	DCGW2151S0415C	6,35	1/4	7,75	.305	2,38	3/32	0,4	.016	2,80	.110	●	●	○	○	○	○	○



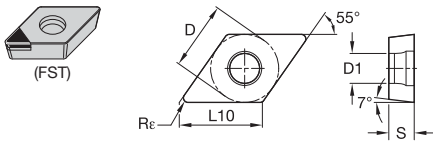
■ DCGW-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
DCGW070204FST	DCGW2151FST	6,35	1/4	7,75	.305	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	○
DCGW11T304FST	DCGW3251FST	9,53	3/8	11,63	.458	3,97	5/32	0,4	.016	4,40	.173	○	○	○	○	○	○	○



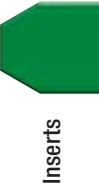
■ DCGW-MT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U
		mm	in	mm	in	mm	in	mm	in	mm	in						
DCGW11T304S01015MT	DCGW3251S0415MT	9,52	3/8	11,63	.458	3,99	.157	0,4	.016	4,40	.173	●	●	●	●	●	●
DCGW11T308S01015MT	DCGW3252S0415MT	9,52	3/8	11,63	.458	3,99	.157	0,8	.031	4,40	.173	●	●	●	●	●	●



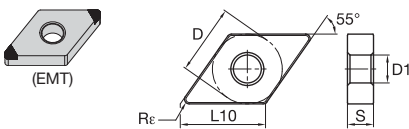
● first choice  
○ alternate choice

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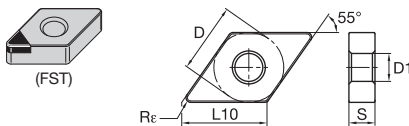
### DCMW-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U		
		mm	in	mm	in	mm	in	mm	in	mm	in								
DCMW070204FST	DCMW2151FST	6,35	1/4	7,75	.305	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	○	○
DCMW11T304FST	DCMW3251FST	9,53	3/8	11,63	.458	3,97	5/32	0,4	.016	4,40	.173	○	○	○	○	○	○	○	○
DCMW11T308FST	DCMW3252FST	9,53	3/8	11,63	.458	3,97	5/32	0,8	.031	4,40	.173	○	○	○	○	○	○	○	○



### DNGA-EMT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
DNGA150408EMT	DNGA432EMT	12,70	1/2	15,50	.610	4,76	3/16	0,8	.031	5,16	.203	○	○	○	○	○	○	○
DNGA150412EMT	DNGA433EMT	12,70	1/2	15,50	.610	4,76	3/16	1,2	.047	5,16	.203	○	○	○	○	○	○	○

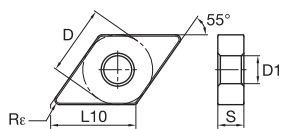
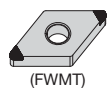


### DNGA-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U
		mm	in	mm	in	mm	in	mm	in	mm	in						
DNGA150404FST	DNGA431FST	12,70	1/2	15,50	.610	4,76	3/16	0,4	.016	5,16	.203	○	○	○	○	○	○
DNGA150408FST	DNGA432FST	12,70	1/2	15,50	.610	4,76	3/16	0,8	.031	5,16	.203	○	○	○	○	○	○



Inserts

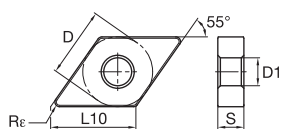
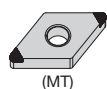


● first choice  
○ alternate choice

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S	■													●	●					
H	■	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

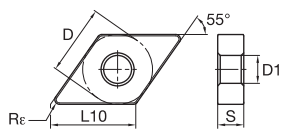
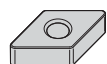
■ DNGA-FWMT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
DNGA150404EFWMT	DNGA431EFWMT	12,70	1/2	15,50	.610	4,76	3/16	0,4	.007	5,16	.203	○	○	○	○	○	○	○
DNGA150408EFWMT	DNGA432EFWMT	12,70	1/2	15,50	.610	4,76	3/16	0,8	.016	5,16	.203	○	○	○	○	○	○	○
DNGA150412EFWMT	DNGA433EFWMT	12,70	1/2	15,50	.610	4,76	3/16	1,2	.047	5,16	.203	○	○	○	○	○	○	○



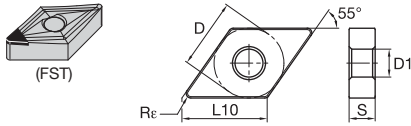
■ DNGA-MT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
DNGA150404S01025MT	DNGA431S0425MT	12,70	1/2	15,50	.610	4,78	.1883	0,4	.016	5,16	.203	○	○	○	○	○	○	○
DNGA150408S01025MT	DNGA432S0425MT	12,70	1/2	15,50	.610	4,78	.1883	0,8	.031	5,16	.203	○	○	○	○	○	○	○



■ DNMA

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U
		mm	in	mm	in	mm	in	mm	in	mm	in						
DNMA110408S02020	DNMA332S0820	9,53	3/8	11,63	.458	4,76	3/16	0,8	.031	3,81	.150	○	○	○	○	○	○



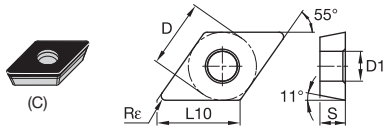
P	■																			
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K	■											●	●							
N	■																			
S	■																			
H	■																			

● first choice  
○ alternate choice

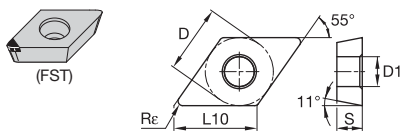
Inserts

**DNMS-FST**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
DNMS150404FST	DNMS431FST	12,70	1/2	15,50	.610	4,76	3/16	0,4	.016	5,16	.203	■	■	■	■	■	■	■
DNMS150408FST	DNMS432FST	12,70	1/2	15,50	.610	4,76	3/16	0,8	.031	5,16	.203	■	■	■	■	5885776	5885776	3898732
																5885777	3898733	


**DPGW-C**

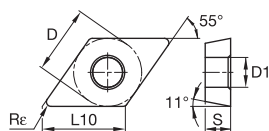
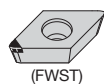
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
DPGW070202EC	DPGW21505EC	6,35	1/4	7,75	.305	2,38	3/32	0,2	.008	2,80	.110	■	■	■	■	■	■	■
DPGW070204S01015C	DPGW2151S0415C	6,35	1/4	7,75	.305	2,38	3/32	0,4	.016	2,80	.110	■	■	■	■	■	■	■
DPGW070208S01015C	DPGW2152S0415C	6,35	1/4	7,75	.305	2,38	3/32	0,8	.031	2,80	.110	■	■	■	■	■	■	■


**DPGW-FST**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U
		mm	in	mm	in	mm	in	mm	in	mm	in						
DPGW070202FST	DPGW21505FST	6,35	1/4	7,75	.305	2,38	3/32	0,2	.008	2,80	.110	■	■	■	■	■	■
DPGW070204FST	DPGW2151FST	6,35	1/4	7,75	.305	2,38	3/32	0,4	.016	2,80	.110	■	■	■	■	5885779	3898764
DPGW11T304FST	DPGW3251FST	9,53	3/8	11,63	.458	3,97	5/32	0,4	.016	4,40	.173	■	■	■	■	5885780	3898765



Inserts

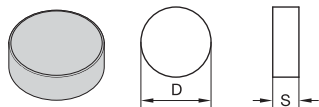


● first choice  
○ alternate choice

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K	■											●	●							
N	■																		●	●
S	■																		●	●
H	■											●	●	●	●					

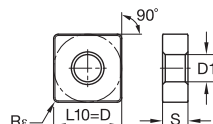
### DPGW-FWST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U		
		mm	in	mm	in	mm	in	mm	in	mm	in								
DPGW070204FWST	DPGW2151FWST	6,35	1/4	7,75	.305	2,38	3/32	0,2	.007	2,80	.110	○	○	○	○	○	○	○	○
DPGW11T304FWST	DPGW3251FWST	9,53	3/8	11,63	.458	3,97	5/32	0,2	.007	4,40	.173	○	○	○	○	○	○	○	○



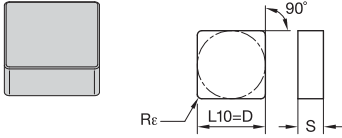
### RNM

ISO catalog number	ANSI catalog number	D		S		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U
		mm	in	mm	in						
RNMN090300S02020	RNM32S0820	9,53	3/8	3,18	1/8	○	○	○	○	○	○
RNMN120300S02020	RNM42S0820	12,70	1/2	3,18	1/8	○	○	○	○	○	○
RNMN120400S02020	RNM43S0820	12,70	1/2	4,76	3/16	○	○	○	○	○	○



### SNGA-MT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U
		mm	in	mm	in	mm	in	mm	in	mm	in						
SNGA120404S01025MT	SNGA431S0425MT	12,70	1/2	12,70	.500	4,78	.1883	0,4	.016	5,16	.203	○	○	○	○	○	○
SNGA120408S01025MT	SNGA432S0425MT	12,70	1/2	12,70	.500	4,78	.1883	0,8	.031	5,16	.203	○	○	○	○	○	○
SNGA120412S01025MT	SNGA433S0425MT	12,70	1/2	12,70	.500	4,78	.1883	1,2	.047	5,16	.203	○	○	○	○	○	○



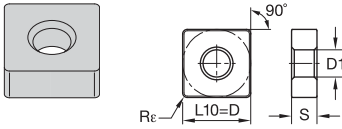
- first choice
- alternate choice

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M																
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S													●	●		
H												●	●	●	●	

Inserts

### ■ SNM

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
SNMN090316S02020	SNM324S0820	9,53	3/8	9,53	.375	3,18	1/8	1,6	.063	—	—	■	■	○	3883320	■	■	
SNMN120416T02020	SNM434S0820	12,70	1/2	12,70	.500	4,76	3/16	1,6	.063	—	—	■	■	○	3883324	■	■	

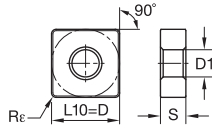


### ■ SNMA

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
SNMA120408S02020	SNMA432S0820	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	5,16	.203	■	■	○	3883325	■	■	
SNMA120412S02020	SNMA433S0820	12,70	1/2	12,70	.500	4,76	3/16	1,2	.047	5,16	.203	■	■	○	3883326	■	■	



Inserts

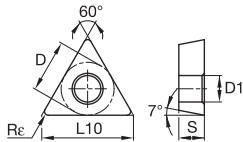
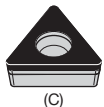


● first choice  
○ alternate choice

P	■																			
M	■																			
K	■											●	●							
N	■													●	●					
S	■													●	●					
H	■											●	●	●	●					

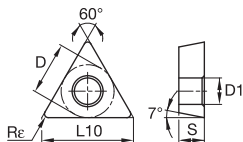
■ SNMS-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
SNMS120408FST	SNMS432FST	12,70	1/2	12,70	.500	4,76	3/16	0,8	.031	5,16	.203	○	○	○	○	○	○	○
SNMS120412FST	SNMS433FST	12,70	1/2	12,70	.500	4,76	3/16	1,2	.047	5,16	.203	○	○	○	○	○	○	○



■ TCGW-C

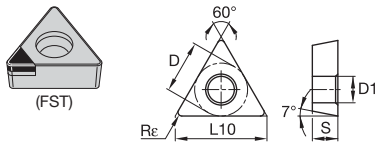
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
TCGW110202EC	TCGW21505EC	6,35	1/4	11,00	.433	2,38	3/32	0,2	.008	2,80	.110	○	○	○	○	○	○	○
TCGW110204S01015C	TCGW2151S0415C	6,35	1/4	11,00	.433	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	○



■ TCGW-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
TCGW110204FST	TCGW2151FST	6,35	1/4	11,00	.433	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	○
TCGW16T304FST	TCGW3251FST	9,53	3/8	16,50	.650	3,97	5/32	0,4	.016	4,40	.173	○	○	○	○	○	○	○



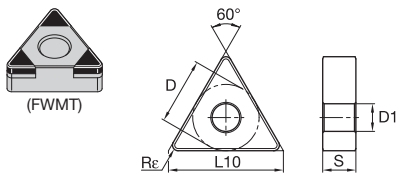


● first choice  
○ alternate choice

P	■	■	■	■	■	■	■
M	■	■	■	■	■	■	■
K	■	■	■	■	■	■	■
N	■	■	■	■	■	■	■
S	■	■	■	■	■	■	■
H	■	■	■	■	■	■	■

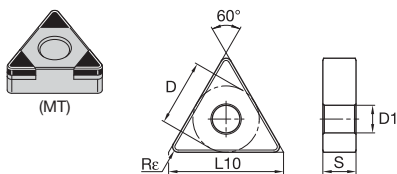
### TCMW-FST

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
TCMW110204FST	TCMW2151FST	6,35	1/4	11,00	.433	2,38	3/32	0,4	.016	2,80	.110	■	■	■	■	■	■	3883144



### TNGA-FWMT

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U
		mm	in	mm	in	mm	in	mm	in	mm	in						
TNGA160408EFWMT	TNGA332EFWMT	9,53	3/8	16,50	.650	4,76	3/16	0,8	.016	3,81	.150	■	3883361	■	■	■	■
TNGA160412EFWMT	TNGA333EFWMT	9,53	3/8	16,50	.650	4,76	3/16	1,2	.047	3,81	.150	■	3883362	■	■	■	■

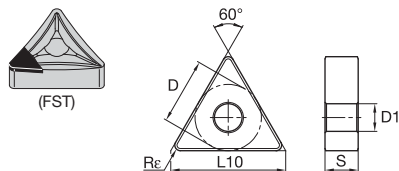


### TNGA-MT

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U
		mm	in	mm	in	mm	in	mm	in	mm	in						
TNGA160404S01025MT	TNGA331S0425MT	9,53	3/8	16,50	.650	4,78	.1883	0,4	.016	3,81	.150	■	3883329	■	■	■	■
TNGA160408S01025MT	TNGA332S0425MT	9,53	3/8	16,50	.650	4,78	.1883	0,8	.031	3,81	.150	■	3883892	■	■	■	■
TNGA160412S01025MT	TNGA333S0425MT	9,53	3/8	16,50	.650	4,78	.1883	1,2	.047	3,81	.150	■	3883893	■	■	■	■



Inserts

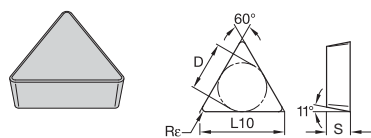


● first choice  
○ alternate choice

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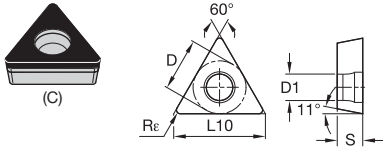
■ TNMS-FST

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
TNMS160404FST	TNMS331FST	9,53	3/8	16,50	.650	4,76	3/16	0,4	.016	3,81	.150	○	○	○	○	○	○	○
TNMS160408FST	TNMS332FST	9,53	3/8	16,50	.650	4,76	3/16	0,8	.031	3,81	.150	○	○	○	○	○	○	○



■ TPGN/TPG

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
TPGN110304F	TPG221F	6,35	1/4	11,00	.433	3,18	1/8	0,4	.016	—	—	○	○	○	○	○	○	○
TPGN110308F	TPG222F	6,35	1/4	11,00	.433	3,18	1/8	0,8	.031	—	—	○	○	○	○	○	○	○
TPGN160304F	TPG321F	9,53	3/8	16,50	.650	3,18	1/8	0,4	.016	—	—	○	○	○	○	○	○	○
TPGN160308F	TPG322F	9,53	3/8	16,50	.650	3,18	1/8	0,8	.031	—	—	○	○	○	○	○	○	○
TPGN220408F	TPG432F	12,70	1/2	22,00	.866	4,76	3/16	0,8	.031	—	—	○	○	○	○	○	○	○



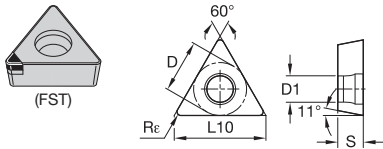
● first choice  
○ alternate choice

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Inserts

■ TPGW-C

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
TPGW110202EC	TPGW21505EC	6,35	1/4	11,00	.433	2,38	3/32	0,2	.008	2,80	.110	○	○	○	○	○	○	○
TPGW110204S01015C	TPGW2151S0415C	6,35	1/4	11,00	.433	2,38	3/32	0,4	.016	2,80	.110	●	○	○	○	○	○	○
TPGW110208S01015C	TPGW2152S0415C	6,35	1/4	11,00	.433	2,38	3/32	0,8	.031	2,80	.110	●	○	○	○	○	○	○

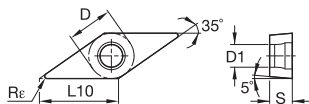
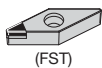


■ TPGW-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
TPGW110204FST	TPGW2151FST	6,35	1/4	11,00	.433	2,38	3/32	0,4	.016	2,80	.110	○	○	○	○	○	○	○
TPGW110208FST	TPGW2152FST	6,35	1/4	11,00	.433	2,38	3/32	0,8	.031	2,80	.110	○	○	○	○	○	○	○
TPGW16T304FST	TPGW3251FST	9,53	3/8	16,50	.650	3,97	5/32	0,4	.016	4,40	.173	○	○	○	○	○	○	○
TPGW16T308FST	TPGW3252FST	9,53	3/8	16,50	.650	3,97	5/32	0,8	.031	4,40	.173	○	○	○	○	○	○	○



Inserts

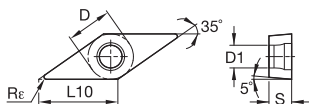
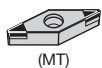


● first choice  
○ alternate choice

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K	■										●	●									
N	■																			●	●
S	■																			●	
H	■																				

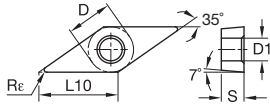
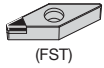
■ VBGW-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
VBGW110304FST	VBGW221FST	6,35	1/4	11,07	.436	3,18	1/8	0,4	.016	2,80	.110	○	○	○	○	○	○	3898774
VBGW160404FST	VBGW331FST	9,53	3/8	16,61	.654	4,76	3/16	0,4	.016	4,40	.173	○	○	○	○	○	○	3898775



■ VBGW-MT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
VBGW160408S01015MT	VBGW332S0415MT	9,52	3/8	16,61	.654	4,78	.1883	0,8	.031	4,40	.173	3883537	○	○	○	○	○	6018095
VBGW160404S01015MT	VBGW331S0415MT	9,53	3/8	16,61	.654	4,78	.1883	0,4	.016	4,40	.173	3883536	○	○	○	○	○	6018094



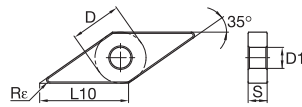
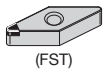
● first choice  
○ alternate choice

P	■																			
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### VCMW-FST

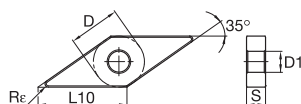
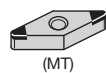
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
VCMW110304FST	VCMW221FST	6,35	1/4	11,07	.436	3,18	1/8	0,4	.016	2,80	.110	■	■	■	■	■	■	3888147



### VNGA-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
VNGA160404FST	VNGA331FST	9,53	3/8	16,61	.654	4,76	3/16	0,4	.016	3,81	.150	■	■	■	■	■	■	3898736
VNGA160408FST	VNGA332FST	9,53	3/8	16,61	.654	4,76	3/16	0,8	.031	3,81	.150	■	■	■	■	■	■	3898737



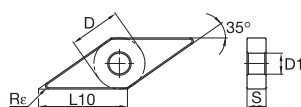
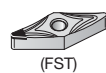


● first choice  
○ alternate choice

P	■																			
M	■																			
K	■										●	●								
N	■																		●	●
S	■																		●	●
H	■																			

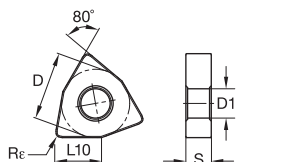
### VNGA-MT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
VNGA160404S01025MT	VNGA331S0425MT	9,53	3/8	16,61	.654	4,78	.1883	0,4	.016	3,81	.150	3883538	3883894	6018096	●	●	●	
VNGA160408S01025MT	VNGA332S0425MT	9,53	3/8	16,61	.654	4,78	.1883	0,8	.031	3,81	.150	3883539	3883896	6018097	●	●	●	



### VNMS-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
VNMS160404FST	VNMS331FST	9,53	3/8	16,61	.654	4,76	3/16	0,4	.016	3,81	.150	●	●	●	●	●	●	3898738
VNMS160408FST	VNMS332FST	9,53	3/8	16,61	.654	4,76	3/16	0,8	.031	3,81	.150	●	●	●	●	●	●	3898739



### WNGA-FST

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WBH10P	WBH25P	WBH30P	WBK40U	WDN00U	WDN25U	
		mm	in	mm	in	mm	in	mm	in	mm	in							
WNGA080404FST	WNGA431FST	12,70	1/2	8,69	.342	4,76	3/16	0,4	.016	5,16	.203	●	●	●	●	●	●	3898740
WNGA080408FST	WNGA432FST	12,70	1/2	8,69	.342	4,76	3/16	0,8	.031	5,16	.203	●	●	●	●	●	●	3898741

# Separator™ Toolholders and Inserts



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

Specifically engineered to deliver toolholder flexibility with integral, component, universal, and blade-style designs.

- Insert widths .079–.157" (2–4mm).
- Toolholder shank sizes .394–1.25" (10–31,75mm).
- Cut-off up to 2.99" (76mm) bar capacity.
- Quick, reliable insert indexing.
- Positive mechanical clamping.
- CNC square shank, screw machine, and PL blade-style toolholders.

To learn more, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA** 



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## Victory™ Turning

A Complete High-Performance Turning Portfolio

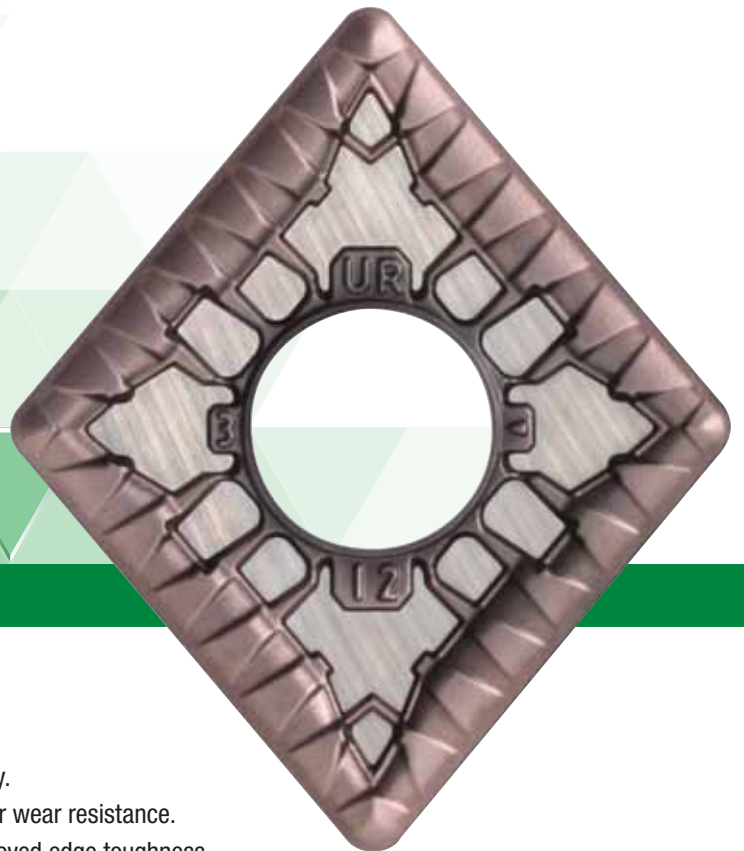
Specifically engineered multilayer coating provides high-speed capability for finishing to roughing operations. New geometries enhance chip control for better tool life and superior surface finishes.

- Market-leading technology.
- Longer tool life.
- Higher productivity through increased speed capability.

**WIDIA™**  
**VICTORY**



# Steel and Stainless Steel Grades



- Reduced cycle times — high speed and feed capability.
- Long tool life — new multilayer coating provides better wear resistance.
- ZrCN top layer with post-coat treatment provides improved edge toughness and wear detection.
- Outer layer is bronze-colored for easier wear detection.

To learn more, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA** ™



## Tools for External Turning and Internal Boring

Tools for External Turning .....	C2–C29
Tools for Internal Boring.....	C30–C51
Tunable Boring Bars.....	C52–C55
Cartridges .....	C56–C97

Modern machining operations performed on CNC machine tools and flexible production facilities require high-performance tools that provide straightforward design and application versatility. WIDIA™ offers an extensive range of toolholders for external turning to meet even the most exacting production demands across a broad spectrum of workpiece shapes and sizes.

# Tools for External Turning



Whatever your operation requirements — from light finishing cuts at very high cutting speeds to heavy roughing applications — there is a WIDIA solution to meet your needs. The complete program includes toolholders for pin-, screw-, or clamp-type holding.

## D-Style Clamping

- Used for negative style inserts.
- Clamp assembly contains clamp, screw, and retaining ring.
- Quick insert indexing.
- Ensures insert repeatability and seating.
- Reduced chatter and extended tool life.

## P-Style Clamping

- Lever-type clamping system for negative indexable inserts.
- No interference to chip flow.
- Fast insert changes.

*P-style available in metric sizes only.*



## S-Style Clamping

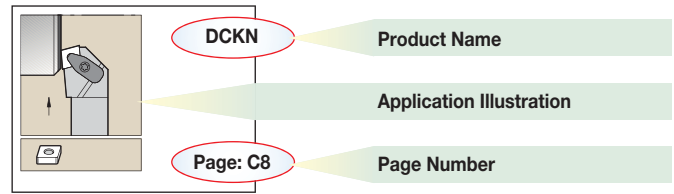
- Screw clamping system for positive indexable inserts.
- Compact design for high reliability and cost efficiency.
- Carbide shim for additional tool protection.

## C-Style Clamping

- Height-adjustable clamp permits use of additional chipbreakers.
- Universal clamping system for positive and negative flat top inserts.
- Robust engineering makes it easy to handle.
- Carbide shim for extra tool protection.

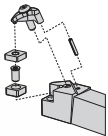


Each unique clamping system offers product options to fill your specific toolholder needs. Find the illustration that fits your application and navigate to the corresponding page to get the correct solution.



### D-Style Clamping

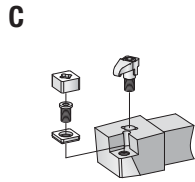
#### D



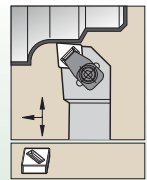
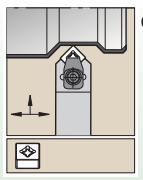
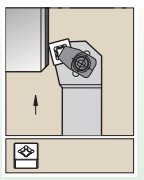
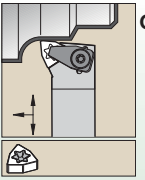
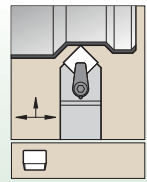
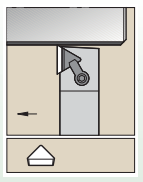
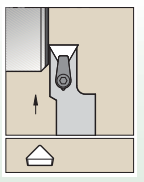
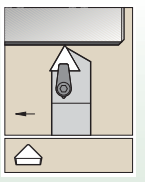
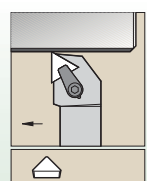
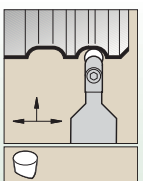
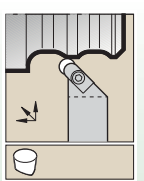
One-piece clamp assembly holder for use with negative style inserts. An extremely rigid clamping system. The tool is protected by a carbide shim.

	<b>DCKN</b> 15° Page: <b>C8</b>		<b>DCLN</b> -5° Page: <b>C9</b>		<b>DCRN</b> 15° Page: <b>C10</b>		<b>DDJN</b> -3° Page: <b>C11</b>
	<b>DDPN</b> 27.5° Page: <b>C12</b>		<b>DDQN</b> -17.5° Page: <b>C12</b>		<b>DRGN</b> Page: <b>C13</b>		<b>DSDN</b> 45° Page: <b>C13</b>
	<b>DSKN</b> 15° Page: <b>C14</b>		<b>DSRN</b> 15° Page: <b>C14</b>		<b>DSSN</b> 45° Page: <b>C15</b>		<b>DTFN</b> 0° Page: <b>C15</b>
	<b>DTGN</b> 0° Page: <b>C16</b>		<b>DTJN</b> -3° Page: <b>C16</b>		<b>DVJN</b> 3° Page: <b>C17</b>		<b>DVVN</b> 17.5° Page: <b>C18</b>
	<b>DWLN</b> -5° Page: <b>C18</b>						

**C-Style Clamping**

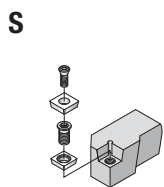


**C**  
Top clamping system for negative and positive indexable inserts to DIN 4968. This universal clamping system is robust and easy to handle. Some height-adjustable clamps enable the use of additional chipbreakers. A carbide shim provides additional tool protection. Toolholders with cutting edge heights upwards of .625" and insert iCs greater than .250".

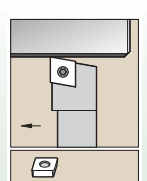
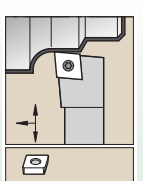
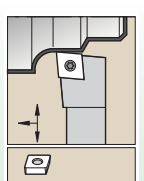
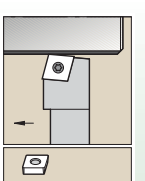
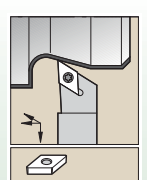
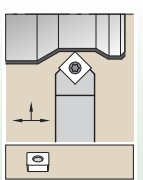
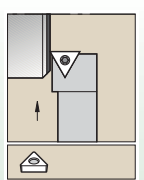
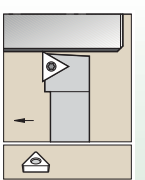
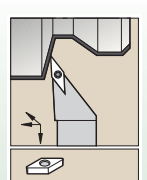
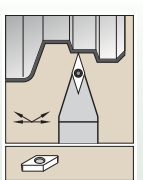
	<b>CCLN-MX</b> -5° Page: C19		<b>CSDN-MX</b> 45° Page: C19		<b>CSKN-MX</b> 15° Page: C20		<b>CWLN-MX</b> -5° Page: C20
	<b>CSDP</b> 45° Page: C21		<b>CTAP</b> 0° Page: C21		<b>CTCP</b> 0° Page: C22		<b>CTEP</b> 30° Page: C22
	<b>CTGP</b> 0° Page: C23		<b>CRDP*</b> 0° Page: C23		<b>CRGP*</b> 45° Page: C24		

\*Exact Clamping System not shown.

**S-Style Clamping**

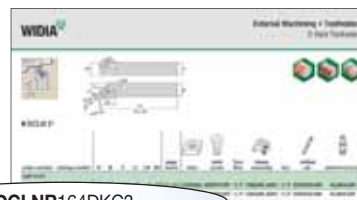


**S**  
Screw clamping system for positive indexable inserts with countersunk hole to DIN 4967. Compact design using a minimum of spare parts for high reliability and cost efficiency. A carbide shim provides additional tool protection. Toolholders with cutting edge heights upwards of .625" and insert iCs from .375" are secured by means of a threaded bushing.

	<b>SCGP</b> 0° Page: C25		<b>SCLC</b> -5° Page: C25		<b>SCLP</b> -5° Page: C26		<b>SCRIP</b> 15° Page: C26
	<b>SDJC</b> -3° Page: C27		<b>SSDC</b> 45° Page: C27		<b>STFP</b> 0° Page: C28		<b>STGP</b> 0° Page: C28
	<b>SVJB</b> -3° Page: C29		<b>SVVB</b> 17.5° Page: C29				

## How Do Catalog Numbers Work?

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

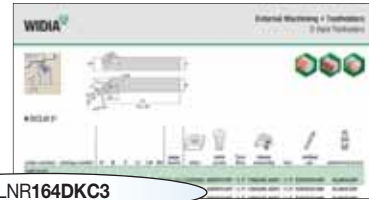


DCLNR164DKC3

D	C	L	N	R	
Insert Holding Method	Insert Shape	Tool Style or Lead Angle	Insert Clearance Angle	Hand of Tool	Additional Information
<p><b>D</b></p>	<p><b>A</b> 85°</p> <p><b>B</b> 82°</p> <p><b>C</b> 80°</p> <p><b>D</b> 55°</p> <p><b>E</b> 75°</p> <p><b>H</b> 120°</p> <p><b>K</b> 55°</p> <p><b>L</b> 90°</p> <p><b>M</b> 86°</p> <p><b>O</b> 135°</p> <p><b>P</b> 108°</p> <p><b>R</b> (Circle)</p> <p><b>S</b> 90°</p> <p><b>T</b> 60°</p> <p><b>V</b> 35°</p> <p><b>W</b> 80°</p>	<p><b>A</b> 0°    <b>L</b> 5°</p> <p><b>B</b> 15°    <b>P</b> 27.5°</p> <p><b>C</b> 0°    <b>Q</b> 27.5°</p> <p><b>D</b> 45°    <b>R</b> 15°</p> <p><b>E</b> 30°    <b>S</b> 45°</p> <p><b>F</b> 0°    <b>U</b> 3°</p> <p><b>G</b> 0°    <b>V</b> 17.5°</p> <p><b>Y</b> 5°</p>	<p><b>N</b> 0°</p> <p><b>B</b> 5°</p> <p><b>C</b> 7°</p> <p><b>P</b> 11°</p> <p><b>D</b> 15°</p> <p><b>E</b> 20°</p> <p><b>F</b> 25°</p>	<p><b>R</b> = Right hand</p> <p><b>L</b> = Left hand</p> <p><b>N</b> = Neutral</p>	<p><b>C</b> = Deep pocket for ceramic insert</p> <p><b>S</b> = Single pocket locating wall</p> <p><b>F</b> = Straight shank, no offset</p>
<p><b>C</b></p>					
<p><b>S</b></p>					



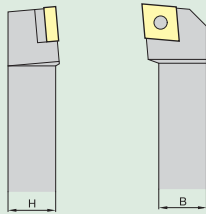
By referencing this easy-to-use guide, you can identify the correct product to meet your needs.



DCLNR164DKC3

**1**

Shank Dimensions



This two-digit number indicates the holder cross section.

- For shanks 5/8" square and larger, the number represents the number of sixteenths of width and height.
- For shanks under 5/8" square, the number of sixteenths of cross-section are preceded by zero.
- For rectangular holders, the first digit represents the number of eighths of width "B" and the second digit the number of quarters of height "H", except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.

**6**

**4**

Insert Size

**Insert iC**

Number of 1/8ths of "D"

**D**

Qualified Surface and Length

- A** = Qualified back and end, 4" long
- B** = Qualified back and end, 4.5" long
- C** = Qualified back and end, 5" long
- D** = Qualified back and end, 6" long
- E** = Qualified back and end, 7" long
- F** = Qualified back and end, 8" long
- G\*** = Qualified back and end, 5.5" long
- H\*** = Qualified back and end, 5.625" long
- I\*** = Qualified back and end, 3" long
- J\*** = Qualified back and end, 5.3" long
- K\*** = Qualified back and end, 14" long
- L\*** = Qualified back and end, 6.8" long
- M** = Qualified front and end, 4" long
- N** = Qualified front and end, 4.5" long
- P** = Qualified front and end, 5" long
- R** = Qualified front and end, 6" long
- S** = Qualified front and end, 7" long
- T** = Qualified front and end, 8" long
- U\*** = Qualified front and end, 5.5" long
- V\*** = Qualified back and end, 3.5" long
- W\*** = Qualified front and end, 3.5" long
- Y\*** = Qualified back and end, 3.75" long
- Z\*** = Qualified back and end, 3.250" long

\* WIDIA™ standard only.

**KC**

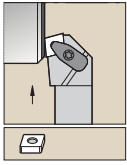
Additional Information

- R =**  
Radial clearance for 4" minimum bore
- S =**  
3.00 minimum bore
- KC =**  
D-Style Clamping

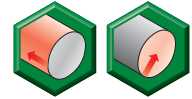
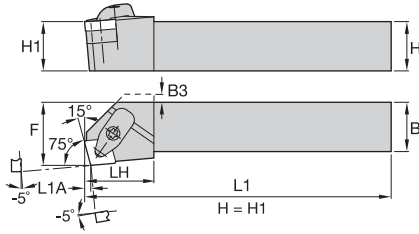
**3**

Insert Thickness (optional)

- 3 =** .188"
- 4 =** .250"



See pages B30–B46 for inserts.

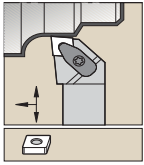


Tools for External Turning and Internal Boring

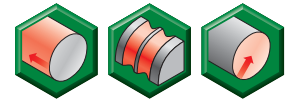
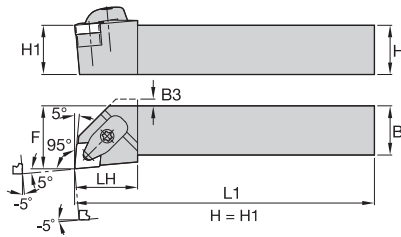
■ DCKN 15°

order number	catalog number	H	B	F	L1	LH	L1A	B3	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
<b>right hand</b>															
5696521	DCKNR124BK3	.75	.75	1.000	4.50	1.25	.122	.22	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5696522	DCKNR164DK3	1.00	1.00	1.250	6.00	1.25	.122	—	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5696523	DCKNR204DK3	1.25	1.25	1.500	6.00	1.25	.122	—	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5696524	DCKNR205DK4	1.25	1.25	1.500	6.00	1.25	.150	—	CN..543	ICSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5696525	DCKNR206DK4	1.25	1.25	1.500	6.00	1.50	.183	—	CN..643	ICSN643	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M
<b>left hand</b>															
5696308	DCKNL164DK3	1.00	1.00	1.250	6.00	1.25	.122	—	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5696309	DCKNL204DK3	1.25	1.25	1.500	6.00	1.25	.122	—	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5696520	DCKNL205DK4	1.25	1.25	1.500	6.00	1.25	.150	—	CN..543	ICSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M





See pages B30–B46 for inserts.

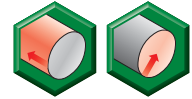
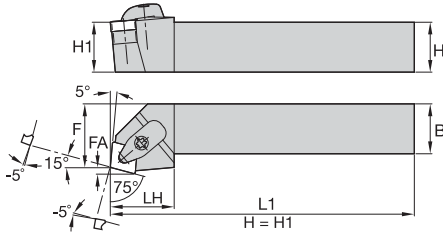


## ■ DCLN -5°

order number	catalog number	H	B	F	L1	LH	B3	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
<b>right hand</b>														
5564318	DCLNR123BK3	.75	.75	1.000	4.50	1.12	.06	CN..322	ICSN332	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564319	DCLNR124BK3	.75	.75	1.000	4.50	1.25	.15	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564320	DCLNR163DK3	1.00	1.00	1.250	6.00	1.12	—	CN..332	ICSN322	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564321	DCLNR164DK3	1.00	1.00	1.250	6.00	1.25	—	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5696526	DCLNR165CK4	1.00	1.00	1.250	5.00	1.38	—	CN..543	ICSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5564322	DCLNR165DK4	1.00	1.00	1.250	6.00	1.38	—	CN..543	ICSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5564323	DCLNR166DK4	1.00	1.00	1.250	6.00	1.38	—	CN..643	ICSN633	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M
5564324	DCLNR204DK3	1.25	1.25	1.500	6.00	1.25	—	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564325	DCLNR205DK4	1.25	1.25	1.500	6.00	1.38	—	CN..543	ICSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5564326	DCLNR206DK4	1.25	1.25	1.500	6.00	1.63	—	CN..643	ICSN643	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M
5564327	DCLNR244DK3	1.50	1.50	2.000	6.00	1.25	—	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564328	DCLNR245DK4	1.50	1.50	2.000	6.00	1.38	—	CN..543	ICSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5564329	DCLNR246DK4	1.50	1.50	2.000	6.00	1.63	—	CN..643	ICSN643	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M
5564330	DCLNR246EK4	1.50	1.50	2.000	7.00	1.63	—	CN..643	ICSN643	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M
<b>left hand</b>														
5564295	DCLNL123BK3	.75	.75	1.000	4.50	1.12	.06	CN..322	ICSN332	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564296	DCLNL124BK3	.75	.75	1.000	4.50	1.25	.15	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564297	DCLNL163DK3	1.00	1.00	1.250	6.00	1.12	—	CN..322	ICSN332	KMSP39IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564298	DCLNL164DK3	1.00	1.00	1.250	6.00	1.25	—	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564299	DCLNL165DK4	1.00	1.00	1.250	6.00	1.38	—	CN..543	ICSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5564310	DCLNL166DK4	1.00	1.00	1.250	6.00	1.63	—	CN..643	ICSN633	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M
5564311	DCLNL204DK3	1.25	1.25	1.500	6.00	1.25	—	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564312	DCLNL205DK4	1.25	1.25	1.500	6.00	1.38	—	CN..543	ICSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5564313	DCLNL206DK4	1.25	1.25	1.500	6.00	1.63	—	CN..643	ICSN643	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M
5564315	DCLNL244DK3	1.50	1.50	2.000	6.00	1.25	—	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564316	DCLNL245DK4	1.50	1.50	2.000	6.00	1.38	—	CN..543	ICSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5564317	DCLNL246DK4	1.50	1.50	2.000	6.00	1.63	—	CN..643	ICSN643	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M



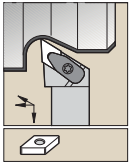
See pages B30–B46 for inserts.



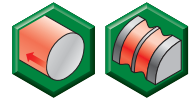
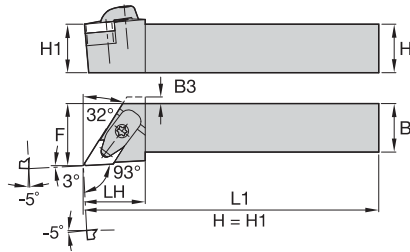
Tools for External Turning and Internal Boring

■ DCRN 15°

order number	catalog number	H	B	F	L1	LH	FA	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
<b>right hand</b>														
5696531	DCRNR124BKC3	.75	.75	.878	4.50	1.25	.12	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5696532	DCRNR164DKC3	1.00	1.00	1.128	6.00	1.25	.12	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5696533	DCRNR204DKC3	1.25	1.25	1.378	6.00	1.25	.12	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5696535	DCRNR245DKC4	1.50	1.50	1.851	6.00	1.38	.15	CN..543	ICSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5696534	DCRNR206DKC4	1.25	1.25	1.501	6.00	1.38	.18	CN..643	ICSN643	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M
<b>left hand</b>														
5696527	DCRNL164DKC3	1.00	1.00	1.128	6.00	1.25	.12	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5696528	DCRNL204DKC3	1.25	1.25	1.378	6.00	1.25	.12	CN..432	ICSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5696530	DCRNL245DKC4	1.50	1.50	1.851	6.00	1.38	.15	CN..543	ICSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5696529	DCRNL206DKC4	1.25	1.25	1.501	6.00	1.38	.18	CN..643	ICSN643	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M

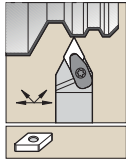


See pages B47-B64 for inserts.

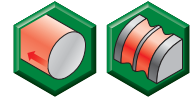
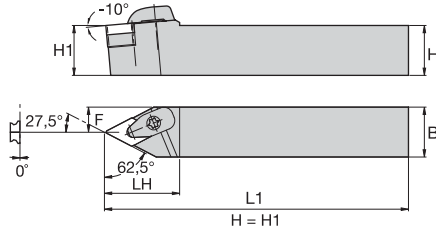


## ■ DDJN -3°

order number	catalog number	H	B	F	L1	LH	B3	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin	
<b>right hand</b>															
5696544	DDJNR123BKC3	.75	.75	1.000	4.50	1.25	.06	DN..332	IDSN322	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
5696545	DDJNR163DKC3	1.00	1.00	1.250	6.00	1.25	—	DN..332	IDSN322	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
5696548	DDJNR203DKC3	1.25	1.25	1.500	6.00	1.25	—	DN..332	IDSN322	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
5696546	DDJNR164DKC3	1.00	1.00	1.250	6.00	1.25	—	DN..432	IDSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
5696549	DDJNR204DKC3	1.25	1.25	1.500	6.00	1.25	—	DN..432	IDSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
5696547	DDJNR165DKC4	1.00	1.00	1.250	6.00	1.38	.15	DN..543	IDSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M	
5696550	DDJNR205DKC4	1.25	1.25	1.500	6.00	1.38	—	DN..543	IDSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M	
5696551	DDJNR245DKC4	1.50	1.50	2.000	6.00	1.38	—	DN..543	IDSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M	
<b>left hand</b>															
5696536	DDJNL123BKC3	.75	.75	1.000	4.50	1.25	.06	DN..332	IDSN322	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
5696537	DDJNL163DKC3	1.00	1.00	1.250	6.00	1.25	—	DN..332	IDSN322	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
5696540	DDJNL203DKC3	1.25	1.25	1.500	6.00	1.25	—	DN..332	IDSN322	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
5696538	DDJNL164DKC3	1.00	1.00	1.250	6.00	1.25	—	DN..432	IDSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
5696541	DDJNL204DKC3	1.25	1.25	1.500	6.00	1.25	—	DN..432	IDSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
5696539	DDJNL165DKC4	1.00	1.00	1.250	6.00	1.38	.15	DN..543	IDSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M	
5696542	DDJNL205DKC4	1.25	1.25	1.500	6.00	1.38	—	DN..543	IDSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M	
5696543	DDJNL245DKC4	1.50	1.50	2.000	6.00	1.38	—	DN..543	IDSN543	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M	



See pages B47–B64 for inserts.



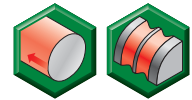
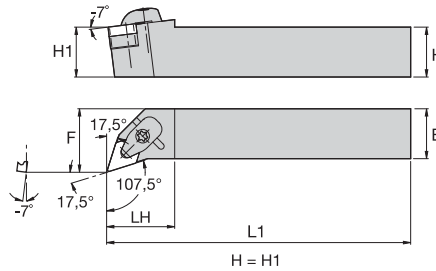
■ DDPN 27.5°

order number	catalog number	H	B	F	L1	LH	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
5696552	DDPNN164DKC3	1.00	1.00	.497	6.00	1.62	DN..432	IDSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M

Tools for External Turning and Internal Boring

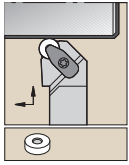


See pages B47–B64 for inserts.

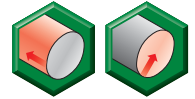
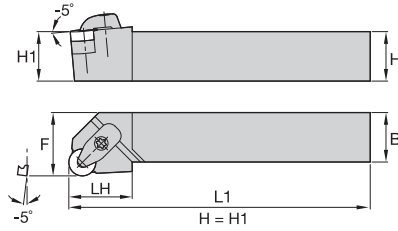


■ DDQN -17.5°

order number	catalog number	H	B	F	L1	LH	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
<b>right hand</b>													
5564339	DDQNR164CKC3	1.00	1.00	1.250	5.00	1.38	DN..432	IDSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564340	DDQNR204DKC3	1.25	1.25	1.500	6.00	1.38	DN..432	IDSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
<b>left hand</b>													
5564337	DDQNL164DKC3	1.00	1.00	1.250	6.00	1.38	DN..432	IDSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5564338	DDQNL204DKC3	1.25	1.25	1.500	6.00	1.38	DN..432	IDSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M

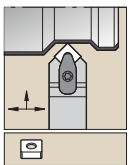


See pages B65–B67 for inserts.

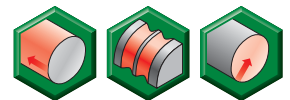
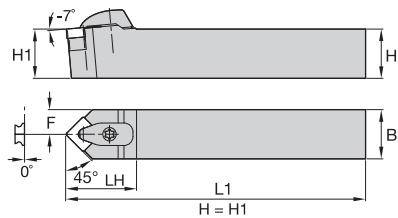


■ **DRGN**

order number	catalog number	H	B	F	L1	LH	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
<b>right hand</b>													
5697735	DRG NR124BKC3	.75	.75	1.000	4.50	1.25	RN..43	IRSN43	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697736	DRG NR164DKC3	1.00	1.00	1.250	6.00	1.25	RN..43	IRSN44	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697738	DRG NR204DKC3	1.25	1.25	1.500	6.00	1.25	RN..43	IRSN44	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697737	DRG NR165DKC4	1.00	1.00	1.250	6.00	1.25	RN..54	IRSN54	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5697739	DRG NR206DKC4	1.25	1.25	1.500	6.00	1.38	RN..64	IRSN64	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M
<b>left hand</b>													
5697730	DRG NL124BKC3	.75	.75	1.000	4.50	1.25	RN..43	IRSN43	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697731	DRG NL164DKC3	1.00	1.00	1.250	6.00	1.25	RN..43	IRSN44	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697733	DRG NL204DKC3	1.25	1.25	1.500	6.00	1.25	RN..43	IRSN44	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697732	DRG NL165DKC4	1.00	1.00	1.250	6.00	1.25	RN..54	IRSN54	KMSP515IP	15 IP	CM209R ASSY	15 IP	SSP025016M
5697734	DRG NL206DKC4	1.25	1.25	1.500	6.00	1.38	RN..64	IRSN64	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M

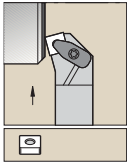


See pages B68–B80 for inserts.

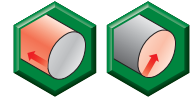
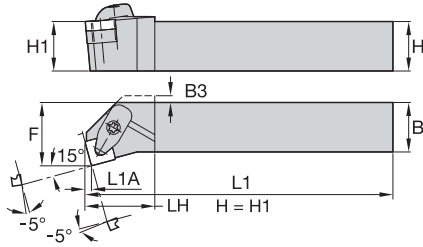


■ **DSDN 45°**

order number	catalog number	H	B	F	L1	LH	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
5697740	DSD NN124KC3	.75	.75	.375	4.50	1.44	SN..432	ISSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697741	DSD NN164KC3	1.00	1.00	.500	6.00	1.44	SN..432	ISSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697742	DSD NN204KC3	1.25	1.25	.625	6.00	1.44	SN..432	ISSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697743	DSD NN206KC4	1.25	1.25	.625	6.00	1.75	SN..643	ISSN643	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M

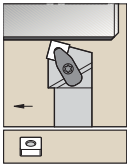


See pages B68–B80 for inserts.

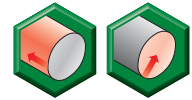
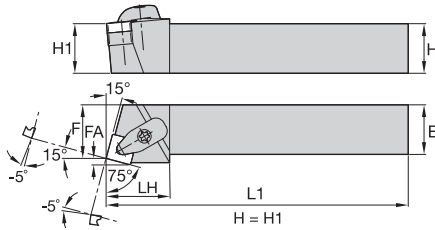


■ DSKN 15°

order number	catalog number	H	B	F	L1	LH	L1A	B3	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
<b>right hand</b>															
5697745	DSKNR164CKC3	1.00	1.00	1.250	5.00	1.25	.12	.12	SN..432	ISSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697746	DSKNR164DKC3	1.00	1.00	1.250	6.00	1.25	.12	.12	SN..432	ISSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
<b>left hand</b>															
5697744	DSKNL164DKC3	1.00	1.00	1.250	6.00	1.25	.12	.12	SN..432	ISSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M



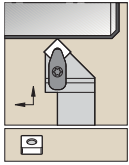
See pages B68–B80 for inserts.



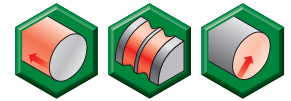
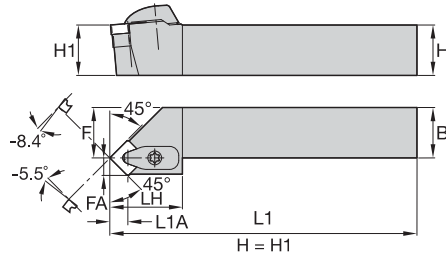
■ DSRN 15°

order number	catalog number	H	B	F	L1	LH	FA	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin	
<b>right hand</b>															
5564343	DSRNR164DKC3	1.00	1.00	1.130	6.00	1.25	.12	SN..432	ISSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
<b>left hand</b>															
5564341	DSRNL164DKC3	1.00	1.00	1.130	6.00	1.25	.12	SN..432	ISSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
5564342	DSRNL206DKC4	1.25	1.25	1.321	6.00	1.50	.18	SN..643	ISSN643	KMSP625IP	25 IP	CM210R ASSY	25 IP	SSP025016M	



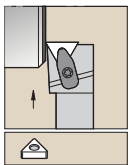


See pages B68–B80 for inserts.

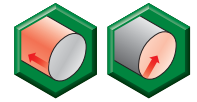
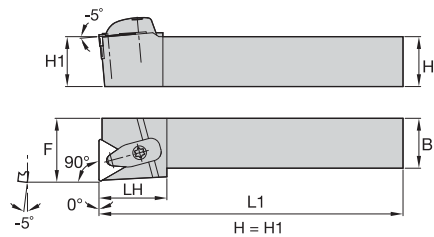


■ **DSSN 45°**

order number	catalog number	H	B	F	L1	LH	FA	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin	
<b>right hand</b>															
5697754	DSSNR164DKC3	1.00	1.00	.912	6.00	1.50	.34	SN..432	ISSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M	
<b>left hand</b>															
5697753	DSSNL164DKC3	1.00	1.00	.912	6.00	1.50	.34	SN..432	ISSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M	

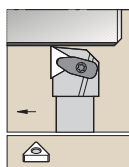


See pages B81–B93 for inserts.

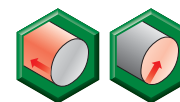
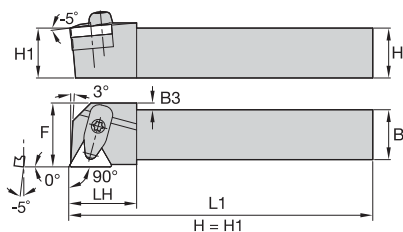


■ **DTFN 0°**

order number	catalog number	H	B	F	L1	LH	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
<b>right hand</b>													
5697758	DTFNR123BKC3	.75	.75	1.000	4.50	1.25	TN..332	ITSN323	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697759	DTFNR163DKC3	1.00	1.00	1.250	6.00	1.25	TN..332	ITSN323	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697760	DTFNR164DKC3	1.00	1.00	1.250	6.00	1.38	TN..432	ITSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
<b>left hand</b>													
5697755	DTFNL123BKC3	.75	.75	1.000	4.50	1.25	TN..332	ITSN323	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697756	DTFNL163DKC3	1.00	1.00	1.250	6.00	1.25	TN..332	ITSN323	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697757	DTFNL164DKC3	1.00	1.00	1.250	6.00	1.38	TN..432	ITSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M

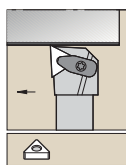


See pages B81–B93 for inserts.

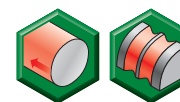
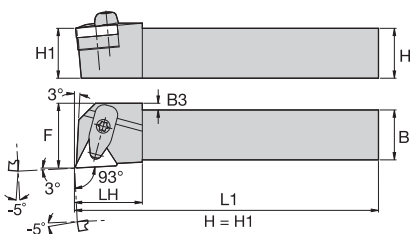


■ DTGN 0°

order number	catalog number	H	B	F	L1	LH	B3	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
<b>right hand</b>														
5697764	DTGNR123BKC3	.75	.75	1.000	4.50	1.12	.25	TN..332	ITSN323	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697765	DTGNR163DKC3	1.00	1.00	1.250	6.00	1.12	—	TN..332	ITSN323	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697766	DTGNR164DKC3	1.00	1.00	1.250	6.00	1.25	.09	TN..432	ITSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
<b>left hand</b>														
5697761	DTGNL123BKC3	.75	.75	1.000	4.50	1.12	.25	TN..332	ITSN323	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697762	DTGNL163DKC3	1.00	1.00	1.250	6.00	1.12	—	TN..332	ITSN323	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697763	DTGNL164DKC3	1.00	1.00	1.250	6.00	1.25	.09	TN..432	ITSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M

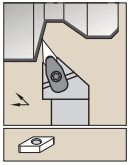


See pages B81–B93 for inserts.

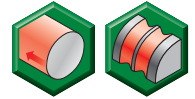
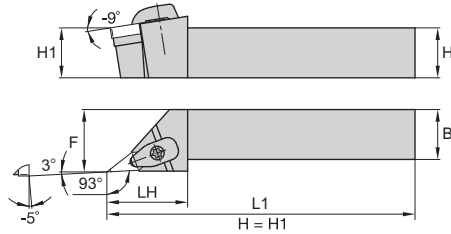


■ DTJN -3°

order number	catalog number	H	B	F	L1	LH	B3	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
<b>right hand</b>														
5697767	DTJNR164DKC3	1.00	1.00	1.250	6.00	1.25	.12	TN..432	ITSN443	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M

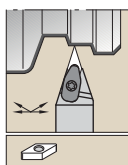


See pages B94–B99 for inserts.

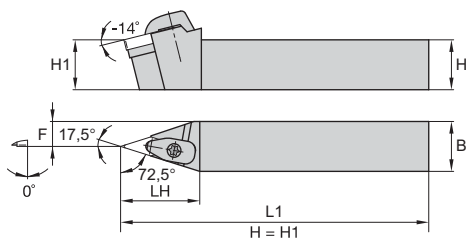


## ■ DVJN 3°

order number	catalog number	H	B	F	L1	LH	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
<b>right hand</b>													
5697781	DVJNR123CKC3	.75	.75	1.000	5.00	1.82	VN..332	IVSN322	KMSP315IP	15 IP	CM215R ASSY	15 IP	SSP025016M
5564346	DVJNR163DKC3	1.00	1.00	1.250	6.00	1.82	VN..332	IVSN322	KMSP315IP	15 IP	CM215R ASSY	15 IP	SSP025016M
5697782	DVJNR853DKC3	1.25	1.00	1.250	6.00	1.82	VN..332	IVSN322	KMSP315IP	15 IP	CM215R ASSY	15 IP	SSP025016M
5564347	DVJNR164DKC3	1.00	1.00	1.250	6.00	2.15	VN..432	IVSN432	KMSP415IP	15 IP	CM235R ASSY	15 IP	SSP025016M
5697783	DVJNR854DKC3	1.25	1.00	1.250	6.00	2.15	VN..432	IVSN432	KMSP415IP	15 IP	CM235R ASSY	15 IP	SSP025016M
<b>left hand</b>													
5697780	DVJNL854DKC3	1.25	1.00	1.250	6.00	2.15	VN..432	—	—	15 IP	—	15 IP	—
5697768	DVJNL123CKC3	.75	.75	1.000	5.00	1.82	VN..332	IVSN322	KMSP315IP	15 IP	CM215R ASSY	15 IP	SSP025016M
5564344	DVJNL163DKC3	1.00	1.00	1.250	6.00	1.82	VN..332	IVSN322	KMSP315IP	15 IP	CM215R ASSY	15 IP	SSP025016M
5697769	DVJNL853DKC3	1.25	1.00	1.250	6.00	1.82	VN..332	IVSN322	KMSP315IP	15 IP	CM215R ASSY	15 IP	SSP025016M
5564345	DVJNL164DKC3	1.00	1.00	1.250	6.00	2.15	VN..432	IVSN432	KMSP415IP	15 IP	CM235R ASSY	15 IP	SSP025016M



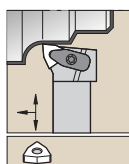
See pages B94–B99 for inserts.



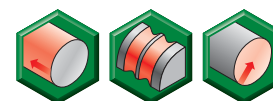
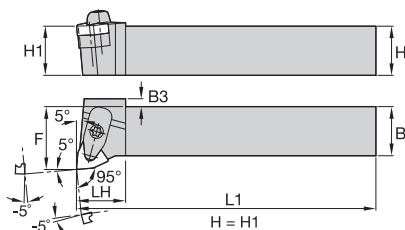
■ DVN 17.5°

order number	catalog number	H	B	F	L1	LH	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
5564348	DVNN163DKC3	1.00	1.00	.496	6.00	1.97	VN..332	IVSN322	KMSP315IP	15 IP	CM215R ASSY	15 IP	SSP025016M

Tools for External Turning and Internal Boring

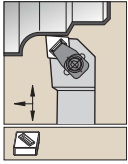


See pages B99–B105 for inserts.

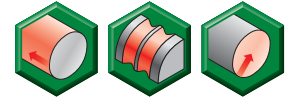
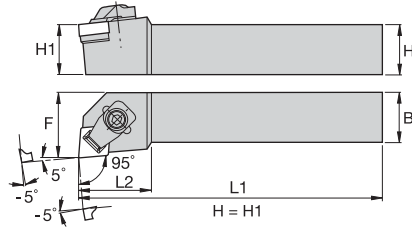


■ DWLN -5°

order number	catalog number	H	B	F	L1	LH	B3	gage insert	shim	shim screw	Torx Plus	clamp assembly	Torx Plus	slotted pin
<b>right hand</b>														
5697789	DWLN123BKC3	.75	.75	1.000	4.50	1.00	.28	WN..332	IWSN322	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697790	DWLN163DKC3	1.00	1.00	1.250	6.00	1.00	.06	WN..332	IWSN322	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697791	DWLN164CKC3	1.00	1.00	1.250	5.00	1.00	.15	WN..432	IWSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697792	DWLN164DKC3	1.00	1.00	1.250	6.00	1.00	.15	WN..432	IWSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697793	DWLN204DKC3	1.25	1.25	1.500	6.00	—	—	WN..432	IWSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
<b>left hand</b>														
5697784	DWLN123BKC3	.75	.75	1.000	4.50	1.00	.28	WN..332	IWSN322	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697785	DWLN163DKC3	1.00	1.00	1.250	6.00	1.00	.06	WN..332	IWSN322	KMSP315IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697786	DWLN164CKC3	1.00	1.00	1.250	5.00	1.00	.15	WN..432	IWSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697787	DWLN164DKC3	1.00	1.00	1.250	6.00	1.00	.15	WN..432	IWSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M
5697788	DWLN204DKC3	1.25	1.25	1.500	6.00	1.00	—	WN..432	IWSN433	KMSP415IP	15 IP	CM234R ASSY	15 IP	SSP025016M

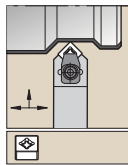


See pages B177–B179 and B197–B205 for inserts.

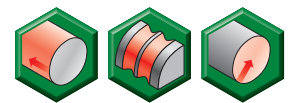
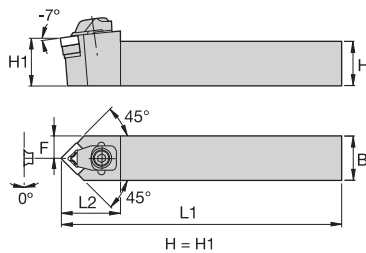


## ■ CCLN-MX -5°

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	Torx	clamp assembly	Torx
<b>right hand</b>												
3093607	CCLNR164DMX5	1.00	1.00	1.250	6.00	1.25	CN.X452	552.221	554.260	T20	551.326	T25
3093608	CCLNR165DMX5	1.00	1.00	1.250	6.00	1.38	CN.X553	552.223	554.261	T25	551.342	T25
<b>left hand</b>												
3093605	CCLNL164DMX5	1.00	1.00	1.250	6.00	1.25	CN.X452	552.221	554.260	T20	551.326	T25
3093606	CCLNL244DMX5	1.50	1.50	2.000	6.00	1.25	CN.X452	552.221	554.260	T20	551.326	T25

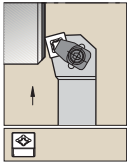


See pages B186–B191 and B211–B212 for inserts.

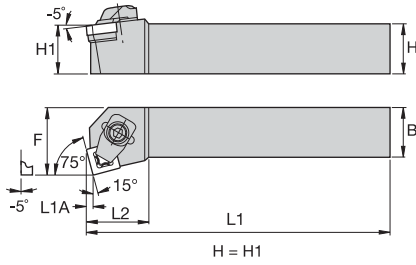


## ■ CSDN-MX 45°

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	Torx	clamp assembly	Torx
3093609	CSDNN164DMX5	1.00	1.00	.500	6.00	1.38	SN.X452	552.232	554.260	T20	551.326	T25

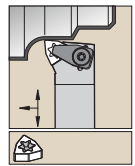


See pages B186–B191 and B211–B212 for inserts.

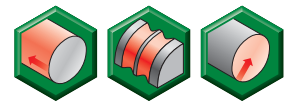
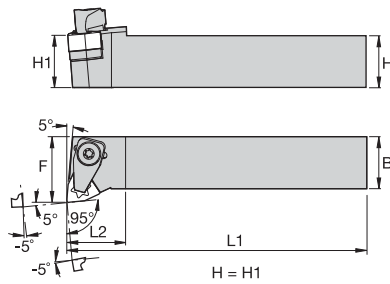


■ CSKN-MX 15°

order number	catalog number	H	B	F	L1	L2	L1A	gage insert	shim	shim screw	Torx	clamp assembly	Torx
<b>right hand</b>													
3093281	CSKNR164DMX5	1.00	1.00	1.250	6.00	1.06	.12	SN.X452	552.232	554.260	T20	551.326	T25
<b>left hand</b>													
3093282	CSKNL164DMX5	1.00	1.00	1.250	6.00	1.06	.12	SN.X452	552.232	554.260	T20	551.326	T25

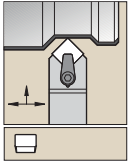


See pages B195–B198 and B218 for inserts.

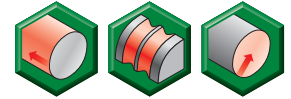
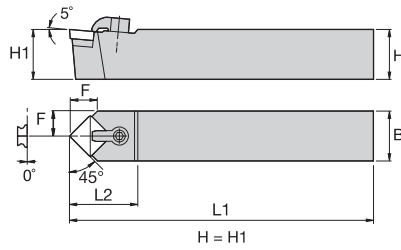


■ CWLN-MX -5°

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	Torx	clamp assembly	Torx
<b>right hand</b>												
3093603	CWLN164DMX5	1.00	1.00	1.250	6.00	1.12	WN.X452	552.210	554.260	T20	551.326	T25
<b>left hand</b>												
3093604	CWLN164DMX5	1.00	1.00	1.250	6.00	1.12	WN.X452	552.210	554.260	T20	551.326	T25

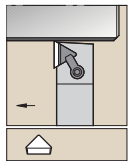


See pages B192–B194 and B212–B216 for inserts.

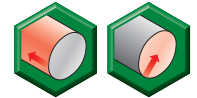
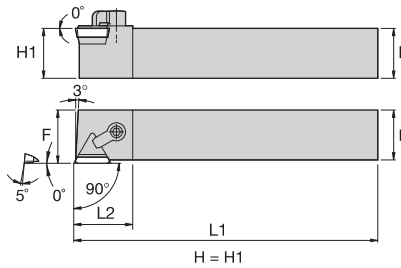


## ■ CSDP 45°

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	hex	clamp	clamp screw	hex
2951032	CSDPN103	.63	.63	.310	4.50	.94	SP.322	SM120	SL344	—	CK7	STC5	3/32
2951284	CSDPN124	.75	.75	.372	4.50	1.38	SP.422	SM40	S111	1/16	CK10	STC8	5/32
2951285	CSDPN164	1.00	1.00	.497	6.00	1.38	SP.422	SM40	S111	1/16	CK9	STC4	5/32

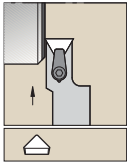


See pages B192–B194 and B212–B216 for inserts.

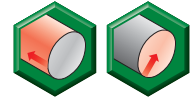
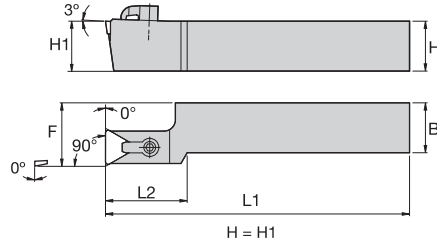


## ■ CTAP 0°

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	hex	clamp	clamp screw	hex
<b>right hand</b>													
2951286	CTAPR082B	.50	.50	.500	4.50	.75	TP.221	SM119	SL344	—	CK19	STC9	3/32
2951287	CTAPR123B	.75	.75	.750	4.50	1.06	TP.322	SM41	S111	1/16	CK10	STC8	5/32



See pages B192–B194 and B212–B216 for inserts.

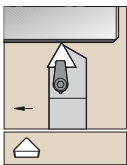


■ CTCP 0°

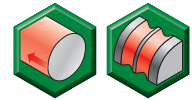
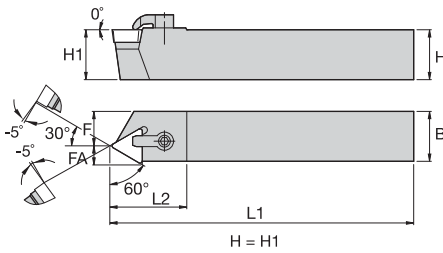
order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	hex	clamp	clamp screw	hex
<b>left hand</b>													
2951288	CTCPN443	1.00	.50	.542	8.00	1.19	TP.322	SM41	S111	1/16	CK23	STC11	1/8



Tools for External Turning and Internal Boring



See pages B192–B194 and B212–B216 for inserts.

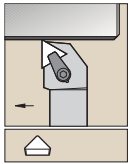


■ CTEP 30°

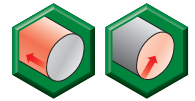
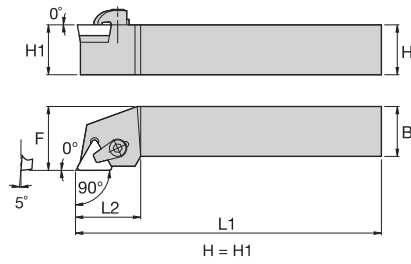
order number	catalog number	H	B	F	L1	L2	FA	gage insert	shim	shim screw	hex	clamp	clamp screw	hex
<b>right hand</b>														
2951289	CTEPR123B	.75	.75	.460	4.50	1.25	.28	TP.322	SM41	S111	1/16	CK10	STC8	5/32
2951290	CTEPR163D	1.00	1.00	.700	6.00	1.25	.28	TP.322	SM41	S111	1/16	CK9	STC4	5/32





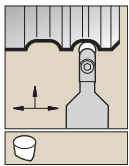


See pages B192–B194 and B212–B216 for inserts.

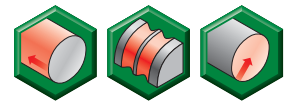
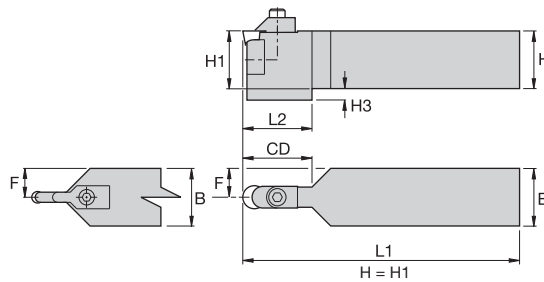


■ **CTGP 0°**

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	hex	clamp	clamp screw	hex
<b>right hand</b>													
2951292	CTGPR123B	.75	.75	1.000	4.50	1.13	TP.322	SM41	S111	1/16	CK10	STC8	5/32
<b>left hand</b>													
2951291	CTGPL123B	.75	.75	1.000	4.50	1.13	TP.322	SM41	S111	1/16	CK10	STC8	5/32

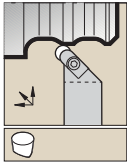


See pages B183–B185 and B210 for inserts.

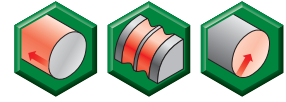
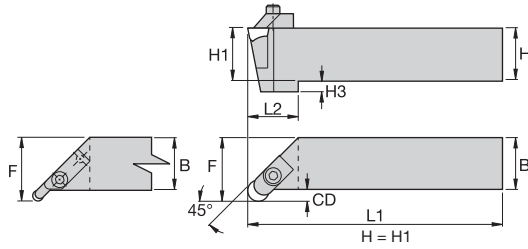


■ **CRDP 0°**

order number	catalog number	H	B	F	L1	L2	CD	H3	gage insert	nest	clamp	clamp screw	hex
3871495	CRDPN162DV	1.00	1.00	.496	6.00	—	.75	—	R..V23	NST1	CM214	MS1321	2.5 mm
3871496	CRDPN163DV	1.00	1.00	.496	6.00	—	1.13	—	R..V35	NST2	CM219	CS412	3.5 mm
3871497	CRDPN203DV	1.25	1.25	.621	6.00	—	1.13	—	R..V35	NST2	CM219	CS412	3.5 mm
3871498	CRDPN164DV	1.00	1.00	.496	6.00	1.50	1.50	.25	R..V45	NST3	CM216	CS412	3.5 mm
3871499	CRDPN204DV	1.25	1.25	.621	6.00	—	1.50	—	R..V45	NST3	CM216	CS412	3.5 mm



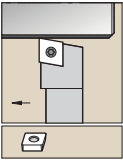
See pages B183-B185 and B210 for inserts.



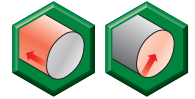
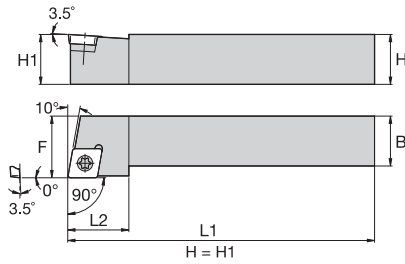
Tools for External Turning and Internal Boring

■ CRGP 45°

order number	catalog number	H	B	F	L1	L2	CD	H3	gage insert	nest	clamp	clamp screw	hex
<b>right hand</b>													
3871506	CRGPR164DV	1.00	1.00	1.250	6.00	1.19	.25	.25	R..V45	NST3	CM216	CS412	3.5 mm
3871504	CRGPR203DV	1.25	1.25	1.500	6.00	—	.25	—	R..V35	NST2	CM219	CS412	3.5 mm
3871508	CRGPR204DV	1.25	1.25	1.500	6.00	—	.25	—	R..V45	NST3	CM216	CS412	3.5 mm
<b>left hand</b>													
3871501	CRGPL162DV	1.00	1.00	1.250	6.00	—	.25	—	R..V23	NST1	CM214	MS1321	2.5 mm
3871507	CRGPL164DV	1.00	1.00	1.250	6.00	1.19	.25	.25	R..V45	NST3	CM216	CS412	3.5 mm
3871505	CRGPL203DV	1.25	1.25	1.500	6.00	—	.25	—	R..V35	NST2	CM219	CS412	3.5 mm
3871509	CRGPL204DV	1.25	1.25	1.500	6.00	—	.25	—	R..V45	NST3	CM216	CS412	3.5 mm

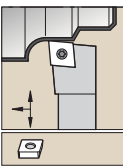


See pages B47–B64 for inserts.

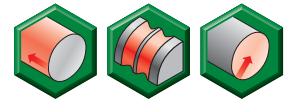
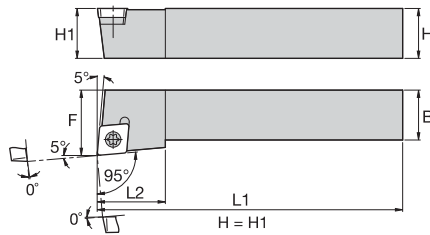


■ **SCGP 0°**

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	hex	insert screw	Torx
<b>right hand</b>												
5094166	SCGPR083V	.50	.50	.625	3.50	.62	CP..3252	—	—	—	MS1027	T9
5094167	SCGPR123B	.75	.75	1.000	4.50	.63	CP..3252	SM417	MS1028	3/32	MS1027	T9
<b>left hand</b>												
5094164	SCGPL083V	.50	.50	.625	3.50	.62	CP..3252	—	—	—	MS1027	T9
5094165	SCGPL123B	.75	.75	1.000	4.50	.63	CP..3252	SM417	MS1028	3/32	MS1027	T9

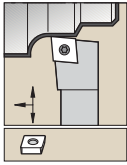


See pages B30–B46 for inserts.

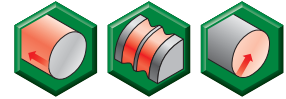
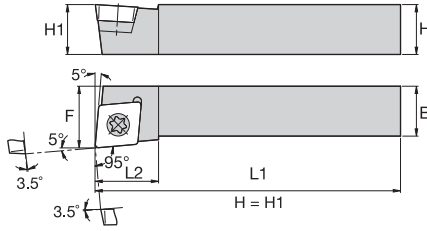


■ **SCLC -5°**

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	hex	insert screw	Torx
<b>right hand</b>												
2951352	SCLCR062	.38	.38	.500	2.50	.50	CC..2151	—	—	—	MS1153	T7
2951363	SCLCR083	.50	.50	.625	3.50	.63	CC..3252	—	—	—	MS1155	T15
2951364	SCLCR103	.63	.63	.750	4.00	.62	CC..3252	SKCP343	SRS3	3.5 mm	MS1156	T15
2951365	SCLCR123	.75	.75	1.000	4.50	.62	CC..3252	SKCP343	SRS3	3.5 mm	MS1156	T15
2951366	SCLCR164D	1.00	1.00	1.250	6.00	.75	CC..432	SKCP453	SRS4	4 mm	MS1158	T15
<b>left hand</b>												
2951350	SCLCL062	.38	.38	.500	2.50	.50	CC..2151	—	—	—	MS1153	T7
2951351	SCLCL083	.50	.50	.625	3.50	.63	CC..3252	—	—	—	MS1155	T15



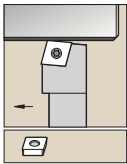
See pages B30–B46 for inserts.



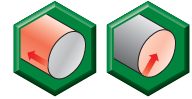
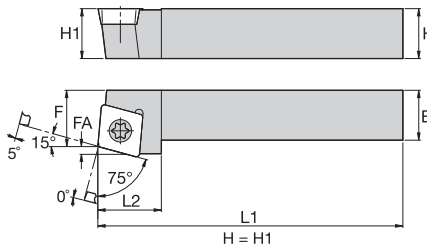
Tools for External Turning and Internal Boring

■ SCLP -5°

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	hex	insert screw	Torx
<b>right hand</b>												
5094214	SCLPR062	.38	.38	.500	2.50	.44	CP..2151	—	—	—	MS1153	T7
5094215	SCLPR083V	.50	.50	.625	3.50	.62	CP..3252	—	—	—	MS1027	T9
5094219	SCLPR123B	.75	.75	1.000	4.50	.62	CP..3252	SM417	MS1028	3/32	MS1027	T9
<b>left hand</b>												
5094168	SCLPL062	.38	.38	.500	2.50	.44	CP..2151	—	—	—	MS1153	T7
5094210	SCLPL083V	.50	.50	.625	3.50	.62	CP..3252	—	—	—	MS1027	T9
5094213	SCLPL123B	.75	.75	1.000	4.50	.62	CP..3252	SM417	MS1028	3/32	MS1027	T9

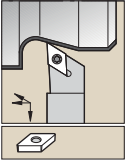


See pages B30–B46 for inserts.

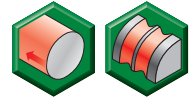
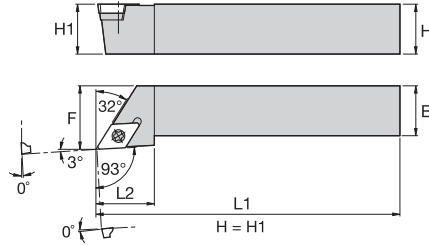


■ SCR 15°

order number	catalog number	H	B	F	L1	L2	FA	gage insert	insert screw	Torx
<b>right hand</b>										
5094252	SCRPR062	.38	.38	.439	2.50	.44	.06	CP..2151	MS1153	T7
5094253	SCRPR083V	.50	.50	.437	3.50	.62	.09	CP..3252	MS1027	T9
<b>left hand</b>										
5094250	SCRPL062	.38	.38	.439	2.50	.44	.06	CP..2151	MS1153	T7
5094251	SCRPL083V	.50	.50	.437	3.50	.62	.09	CP..3252	MS1027	T9

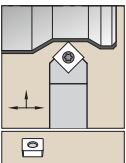


See pages B47–B64 for inserts.

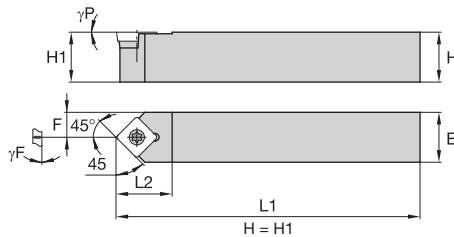


■ **SDJC -3°**

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	hex	insert screw	Torx
<b>right hand</b>												
2951369	SDJCR062	.38	.38	.500	2.50	.62	DC..2151	—	—	—	MS1153	T7
2951370	SDJCR123	.75	.75	1.000	4.50	.88	DC..3252	SKDP343	SRS3	3.5 mm	MS1156	T15
2951371	SDJCR163	1.00	1.00	1.250	6.00	.88	DC..3252	SKDP343	SRS3	3.5 mm	MS1156	T15
<b>left hand</b>												
2951367	SDJCL102	.63	.63	.750	4.00	.62	DC..2151	—	—	—	MS1153	T7
2951368	SDJCL163	1.00	1.00	1.250	6.00	.88	DC..3252	SKDP343	SRS3	3.5 mm	MS1156	T15

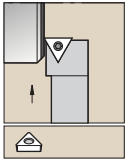


See pages B68–B80 for inserts.

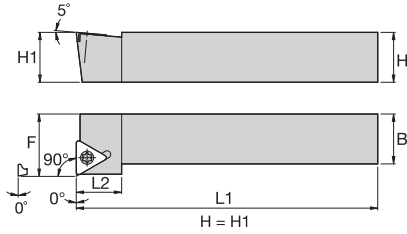


■ **SSDC 45°**

order number	catalog number	H	B	F	L1	L2	$\gamma_F^\circ$	$\gamma_P^\circ$	gage insert	insert screw	Torx
<b>left hand</b>											
2951372	SSDCN083	.50	.50	.250	3.50	.63	0.0	0.0	SC..3252	MS1155	T15




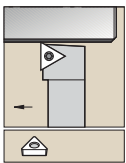
See pages B81–B93 for inserts.



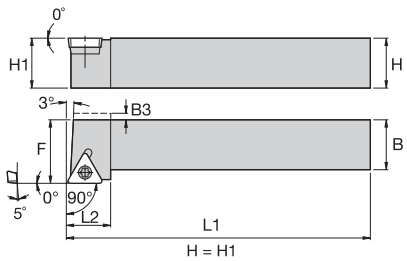
Tools for External Turning and Internal Boring

■ STFP 0°


order number	catalog number	H	B	F	L1	gage insert	insert screw	Torx	
									
<b>right hand</b>									
5094255	STFPR062	.38	.38	.500	2.50	TP..2151	MS1153	T7	
<b>left hand</b>									
5094254	STFPL062	.38	.38	.500	2.50	TP..2151	MS1153	T7	

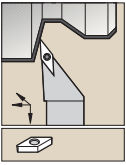


See pages B81–B93 for inserts.

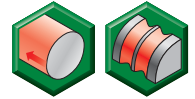
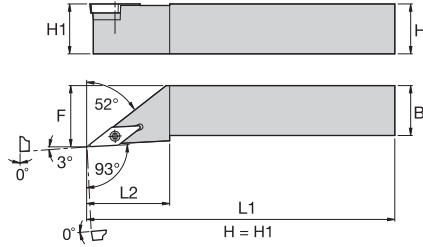


■ STGP 0°

order number	catalog number	H	B	F	L1	L2	gage insert	insert screw	Torx
									
<b>right hand</b>									
5094258	STGPR062	.38	.38	.500	2.50	.56	TP..2151	MS1153	T7
5094259	STGPR082V	.50	.50	.625	3.50	.56	TP..2151	MS1153	T7
<b>left hand</b>									
5094256	STGPL062	.38	.38	.500	2.50	.56	TP..2151	MS1153	T7
5094257	STGPL082V	.50	.50	.625	3.50	.56	TP..2151	MS1153	T7

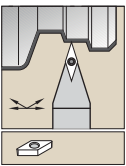


See pages B94–B99 for inserts.

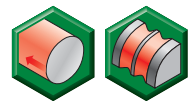
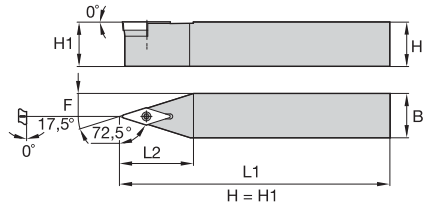


■ **SVJB -3°**

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	hex	insert screw	Torx
<b>right hand</b>												
2951375	SVJBR123	.75	.75	1.000	4.50	1.38	VB..332	SKVN343	SRS3	3.5 mm	MS1156	T15
2951376	SVJBR163	1.00	1.00	1.250	6.00	1.38	VB..332	SKVN343	SRS3	3.5 mm	MS1156	T15
<b>left hand</b>												
2951373	SVJBL123	.75	.75	1.000	4.50	1.38	VB..332	SKVN343	SRS3	3.5 mm	MS1156	T15
2951374	SVJBL163	1.00	1.00	1.250	6.00	1.38	VB..332	SKVN343	SRS3	3.5 mm	MS1156	T15



See pages B94–B99 for inserts.



■ **SWB 17.5°**

order number	catalog number	H	B	F	L1	L2	gage insert	shim	shim screw	hex	insert screw	Torx
<b>left hand</b>												
2951377	SVB163	1.00	1.00	.500	6.00	1.31	VB..332	SKVN343	SRS3	3.5 mm	MS1156	T15

Today's modern boring operations require the most reliable, high-performance tools. WIDIA™ offers an extensive range of toolholders for internal boring to meet even the most precise production demands across a broad spectrum of workpiece shapes and sizes.

# Tools for Internal Boring



WIDIA boring bars, available with both a conventional steel shank or a vibration-resistant carbide shank and coolant hole, guarantee consistent results and enhanced production reliability.

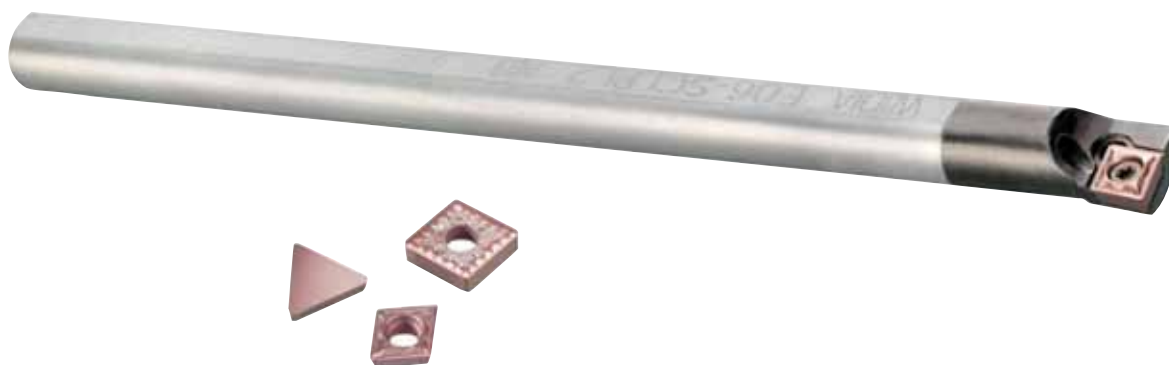
## D-Style Clamping

- Used for negative style inserts.
- Clamp assembly contains clamp, screw, and retaining ring.
- Quick insert indexing.
- Ensures insert repeatability and seating.
- Reduced chatter and extended tool life.

## P-Style Clamping

- Lever-type clamping system for negative indexable inserts.
- No interference to chip flow.
- Fast insert changes.

*P-style available in metric sizes only.*





## S-Style Clamping

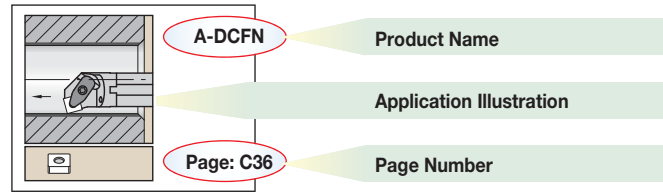
- Screw clamping system for positive indexable inserts.
- Compact design for high reliability and cost efficiency.
- Carbide shim for additional tool protection.

## C-Style Clamping

- Height-adjustable clamp permits use of additional chipbreakers.
- Universal clamping system for positive and negative flat top inserts.
- Robust engineering makes it easy to handle.
- Carbide shim for extra tool protection.

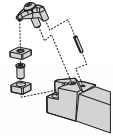


Each unique clamping system offers product options to fill your specific toolholder needs. Find the illustration that fits your application and navigate to the corresponding page to get the correct solution.

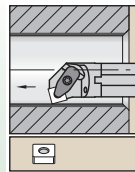


## D-Style Clamping

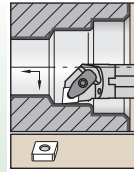
**D**



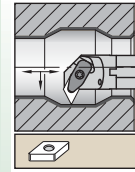
One-piece clamp assembly holder for use with negative style inserts. An extremely rigid clamping system. The tool is protected by a carbide shim.



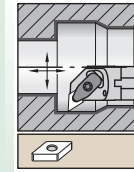
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Page:  
**C36**



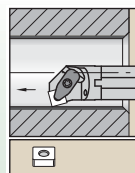
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**C37**



**A-DDPN**  
27.5°  
Page:  
**C38**



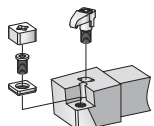
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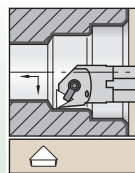
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15°  
Page:  
**C39**

## C-Style Clamping

**C**



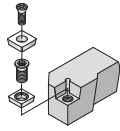
Top clamping system for negative and positive indexable inserts to DIN 4968. This universal clamping system is robust and easy to handle. Some height-adjustable clamps enable the use of additional chipbreakers. A carbide shim provides additional tool protection. Toolholders with cutting edge heights upwards of .625" and insert iCs greater than .250".



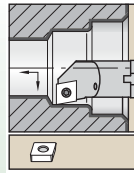
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Page:  
**C39**

**S-Style Clamping**

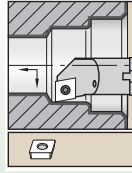
**S**



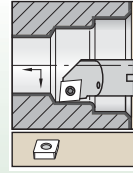
Screw clamping system for positive indexable inserts with countersunk hole to DIN 4967. Compact design using a minimum of spare parts for high reliability and cost efficiency. A carbide shim provides additional tool protection. Toolholders with cutting edge heights upwards of .625" and insert iCs from .375" are secured by means of a threaded bushing.



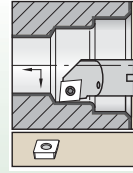
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**C40**



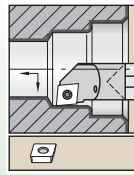
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Page:  
**C41**



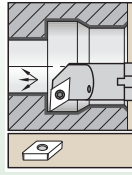
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Page:  
**C42**



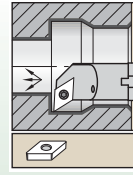
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Page:  
**C43**



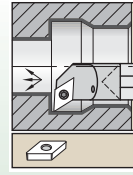
**E-SCLP**  
-5°  
Page:  
**C44**



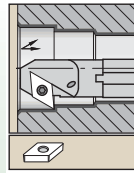
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Page:  
**C45**



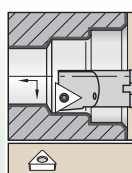
**A-SDUP**  
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Page:  
**C46**



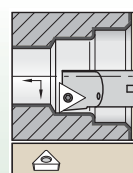
**E-SDUP**  
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Page:  
**C47**



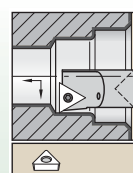
**A-SDXP**  
-5°  
Page:  
**C48**



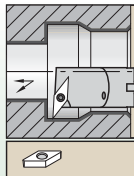
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Page:  
**C49**



**A-STFP**  
0°  
Page:  
**C49**



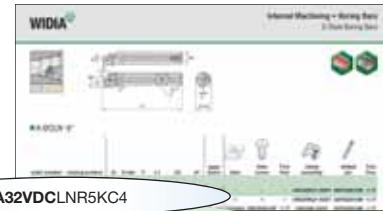
**E-STFP**  
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Page:  
**C50**



**A-SVUB**  
-3°  
Page:  
**C51**

## How Do Catalog Numbers Work?

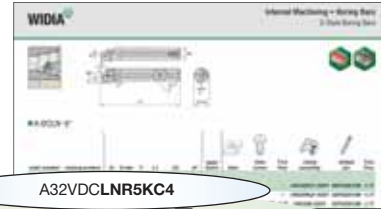
Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



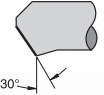
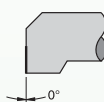
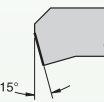
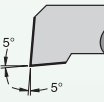
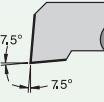
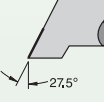
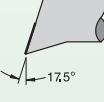
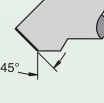
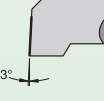
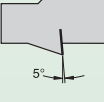
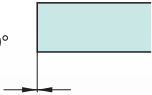

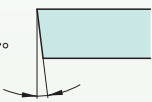
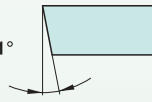
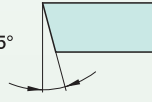

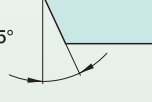
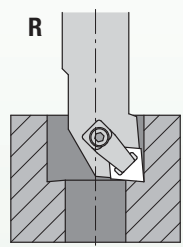
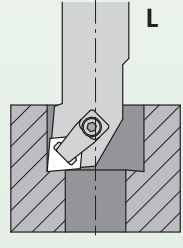
A32VDCLNR5KC4

A	32	V	D	C
Bar Type	Bar Diameter	Bar Length**	Insert Holding Method	Insert Shape
<p><b>A</b>  Steel bar with coolant</p> <p><b>S</b>  Steel bar without coolant</p> <p><b>C</b>  Carbide bar</p> <p><b>D</b>  DeVibrator bar with coolant</p> <p><b>D</b>  Tunable bar with coolant</p> <p><b>E</b>  Carbide bar with coolant</p> <p><b>B</b>  DeVibrator</p> <p><b>H</b>  Interchangeable head</p> <p><b>L</b>  Heavy metal bar with coolant</p>	<p> D</p> <p>Inch: A two-digit number indicates the bar diameter in 1/16" increments</p>	<p>3 = F</p> <p>3.5 = G</p> <p>4 = H</p> <p>4.5 = J</p> <p>5 = K</p> <p>5.5 = L</p> <p>6 = M</p> <p>6.5 = N</p> <p>7 = Q</p> <p>8 = R</p> <p>10 = S</p> <p>12 = T</p> <p>14 = U</p> <p>16 = V</p> <p>18 = W</p> <p>20 = Y</p> <p>**Used only when more than one length is available or a special length is required.</p>	<p><b>D</b> </p> <p><b>C</b> </p> <p><b>S</b> </p>	<p><b>A</b>  85°</p> <p><b>B</b>  82°</p> <p><b>C</b>  80°</p> <p><b>D</b>  55°</p> <p><b>E</b>  75°</p> <p><b>H</b>  120°</p> <p><b>K</b>  55°</p> <p><b>L</b>  90°</p> <p><b>M</b>  86°</p> <p><b>O</b>  135°</p> <p><b>P</b>  108°</p> <p><b>R</b> </p> <p><b>S</b>  90°</p> <p><b>T</b>  60°</p> <p><b>V</b>  35°</p> <p><b>W</b>  80°</p>

By referencing this easy-to-use guide, you can identify the correct product to meet your needs.

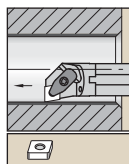


A32VDCLNR5KC4

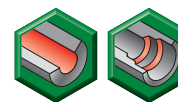
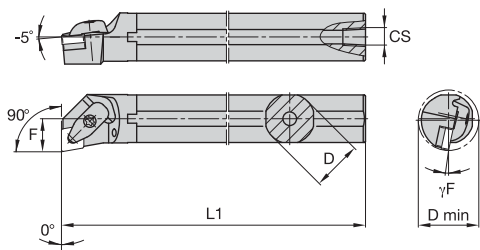
<b>L</b>	<b>N</b>	<b>R</b>	<b>5</b>	<b>KC4</b>
Bar Style or Lead Angle	Insert Clearance Angle	Hand of Tool	Insert Size	Additional Information
<p><b>E</b> </p> <p><b>F</b> </p> <p><b>K</b> </p> <p><b>L</b> </p> <p>(E-style inserts)</p> <p><b>L</b> </p> <p><b>P</b> </p> <p><b>Q</b> </p> <p><b>S</b> </p> <p><b>U</b> </p> <p><b>X</b> </p>	<p><b>N</b> 0° </p> <p><b>B</b> 5° </p> <p><b>C</b> 7° </p> <p><b>P</b> 11° </p> <p><b>D</b> 15° </p> <p><b>E</b> 20° </p> <p><b>F</b> 25° </p>	<p><b>R</b> = Right-hand boring bar</p> <p></p> <p><b>L</b> = Left-hand boring bar</p> <p></p>	<p>Insert <b>iC</b></p> <p>Number of 1/8ths of "D"</p>	<p><b>M...</b> = TNT/MTS clamping systems for ceramic and PcBN inserts</p> <p><b>D</b> = Dual pocket</p> <p><b>AP5</b> = Axil positive</p> <p><b>KC</b> = D-Style</p> <p><b>+</b> = Insert thickness</p>

# D-Style Clamping Boring Bars for Negative Inserts

Steel Shank with Through Coolant



Steel shank with through coolant.  
See pages B30-B46 for inserts.

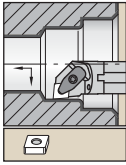


Tools for External Turning and Internal Boring

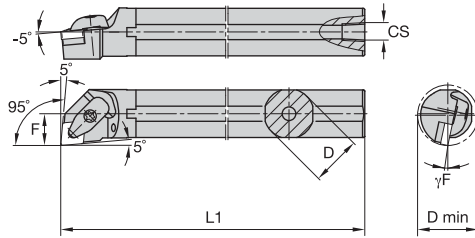
## ■ A-DCFN 0°



order number	catalog number	D	D min	F	L1	CS	γF°	gage insert	shim	shim screw	Torx Plus	clamp assembly	slotted pin	Torx Plus
<b>right hand</b>														
5696051	A16TDCFN4KC3	1.250	1.470	.765	14.00	1/4-18 NPT	-12.0	CN..432	—	—	15 IP	CM234RLP ASSY	SSP025016M	15 IP
5696052	A20UDCFNR4KC3	1.500	1.760	.890	14.00	1/4-18 NPT	-10.0	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696053	A24UDCFNR4KC3	1.500	1.760	.890	14.00	1/4-18 NPT	-10.0	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
<b>left hand</b>														
5695949	A16TDCFN4KC3	1.250	1.470	.765	14.00	1/4-18 NPT	-12.0	CN..432	—	—	15 IP	CM234RLP ASSY	SSP025016M	15 IP
5696050	A20UDCFNL4KC3	1.250	1.470	.765	14.00	1/4-18 NPT	-12.0	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP



Steel shank with through coolant.  
See pages B30–B46 for inserts.

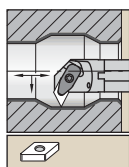


## ■ A-DCLN -5°

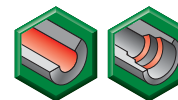
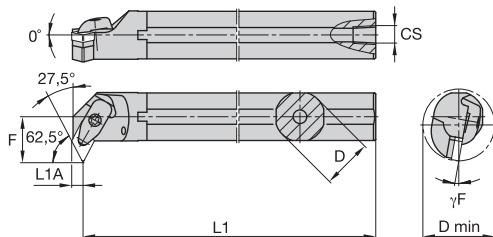
order number	catalog number	D	D min	F	L1	CS	$\gamma F^\circ$	gage insert	shim	shim screw	Torx Plus	clamp assembly	slotted pin	Torx Plus
<b>right hand</b>														
5696296	A16TDCLNR3KC2	1.000	1.200	.640	12.00	1/4-18 NPT	-10.0	CN..322	—	—	—	CM234RLP ASSY	SSP025016M	15 IP
5696297	A16TDCLNR4KC3	1.000	1.200	.640	12.00	1/4-18 NPT	-12.0	CN..432	—	—	—	CM234RLP ASSY	SSP025016M	15 IP
5696298	A20UDCLNR4KC3	1.250	1.470	.765	14.00	1/4-18 NPT	-12.0	CN..432	ICSN433	KMSP4S15IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696299	A24UDCLNR4KC3	1.500	1.760	.890	14.00	1/4-18 NPT	-12.0	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696300	A24UDCLNR5KC4	1.500	1.760	.890	14.00	1/4-18 NPT	-14.0	CN..543	ICSN533	KMSP5S15IP	15 IP	CM209R ASSY	SSP025018M	15 IP
5696301	A28UDCLNR4KC3	1.750	2.010	1.015	14.00	1/4-18 NPT	-12.0	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696302	A32VDCLNR4KC3	2.000	2.400	1.281	16.00	1/4-18 NPT	-12.0	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696303	A32VDCLNR5KC4	2.000	2.400	1.281	16.00	1/4-18 NPT	-12.0	CN..543	ICSN533	KMSP515IP	15 IP	CM209R ASSY	SSP025018M	15 IP
5696304	A32VDCLNR6KC4	2.000	2.400	1.281	16.00	1/4-18 NPT	-12.0	CN..643	ICSN633	KMSP625IP	25 IP	CM210R ASSY	SSP025018M	25 IP
5696305	A40VDCLNR4KC3	2.500	3.030	1.531	16.00	1/4-18 NPT	-8.0	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696306	A40VDCLNR6KC4	2.500	3.030	1.531	16.00	1/4-18 NPT	-10.0	CN..643	ICSN633	KMSP625IP	25 IP	CM210R ASSY	SSP025018M	25 IP
<b>left hand</b>														
5696285	A16TDCLNL3KC2	1.000	1.200	.640	12.00	1/4-18 NPT	-10.0	CN..322	—	—	—	CM234RLP ASSY	SSP025016M	15 IP
5696286	A16TDCLNL4KC3	1.000	1.200	.640	12.00	1/4-18 NPT	-12.0	CN..432	—	—	—	CM234RLP ASSY	SSP025016M	15 IP
5696287	A20UDCLNL4KC3	1.250	1.470	.765	14.00	1/4-18 NPT	-12.0	CN..432	ICSN433	KMSP4S15IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696288	A24UDCLNL4KC3	1.500	1.760	.890	14.00	1/4-18 NPT	-12.0	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696289	A24UDCLNL5KC4	1.500	1.760	.890	14.00	1/4-18 NPT	-14.0	CN..543	ICSN533	KMSP5S15IP	15 IP	CM209R ASSY	SSP025018M	15 IP
5696290	A28UDCLNL4KC3	1.750	2.010	1.015	14.00	1/4-18 NPT	-12.0	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696291	A32VDCLNL4KC3	2.000	2.400	1.281	16.00	1/4-18 NPT	-12.0	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696292	A32VDCLNL5KC4	2.000	2.400	1.281	16.00	1/4-18 NPT	-12.0	CN..543	ICSN533	KMSP515IP	15 IP	CM209R ASSY	SSP025018M	15 IP
5696293	A32VDCLNL6KC4	2.000	2.400	1.281	16.00	1/4-18 NPT	-12.0	CN..643	ICSN633	KMSP625IP	25 IP	CM210R ASSY	SSP025018M	25 IP
5696294	A40VDCLNL4KC3	2.500	3.030	1.531	16.00	1/4-18 NPT	-8.0	CN..432	ICSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696295	A40VDCLNL6KC4	2.500	3.030	1.531	16.00	1/4-18 NPT	-10.0	CN..643	ICSN633	KMSP625IP	25 IP	CM210R ASSY	SSP025018M	25 IP

# D-Style Clamping Boring Bars for Negative Inserts

Steel Shank with Through Coolant

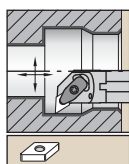


Steel shank with through coolant. See pages B47-B64 for inserts.

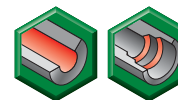
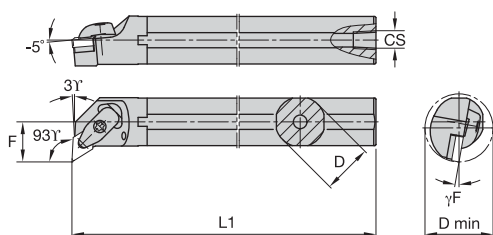


## A-DDPN 27.5°

order number	catalog number	D	D min	F	L1	L1A	CS	gage insert	shim	shim screw	Torx Plus	clamp assembly	slotted pin	Torx Plus
<b>right hand</b>														
5696054	A20UDDPNR4KC3	1.250	1.705	1.000	14.00	.26	1/4-18 NPT	DN.432	IDSN443	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696055	A24UDDPNR4KC3	1.500	2.000	1.125	14.00	.26	1/4-18 NPT	DN.432	IDSN443	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP



Steel shank with through coolant. See pages B47-B64 for inserts.

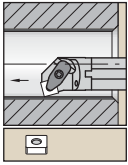


## A-DDUN -3°

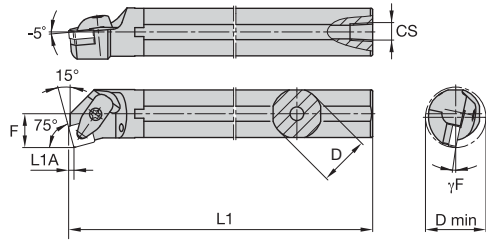
order number	catalog number	D	D min	F	L1	CS	γF°	gage insert	shim	shim screw	clamp assembly	slotted pin	Torx Plus
<b>left hand</b>													
5696056	A16TDDUNL3KC3	1.000	1.300	.750	12.00	1/4-18 NPT	-12.0	DN..332	K15IP	KLM33L9IP	CM234RLP ASSY	SSP025016M	15 IP

Tools for External Turning and Internal Boring



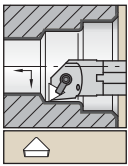


Steel shank with through coolant.  
See pages B68–B80 for inserts.

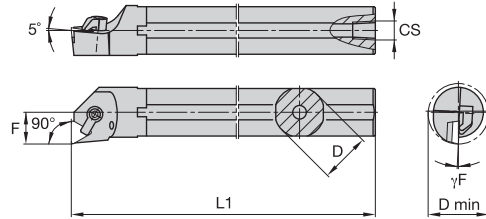


■ **A-DSKN 15°**

order number	catalog number	D	D min	F	L1	L1A	CS	γF°	gage insert	shim	shim screw	Torx Plus	clamp assembly	slotted pin	Torx Plus
<b>right hand</b>															
5696058	A20UDSKNR4KC3	1.500	1.760	.890	14.00	.12	1/4-18 NPT	-10.0	SN..432	ISSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP
5696059	A24UDSKNR4KC3	2.000	2.400	1.281	16.00	.18	1/4-18 NPT	-12.0	SN..643	ISSN433	KMSP415IP	25 IP	CM234R ASSY	SSP025016M	25 IP
5696070	A32VDSKNR6KC4	2.000	2.400	1.281	16.00	.18	1/4-18 NPT	-12.0	SN..643	ISSN633	KMSP625IP	25 IP	CM210R ASSY	SSP025018M	25 IP
<b>left hand</b>															
5696057	A24UDSKNL4KC3	1.500	1.760	.890	14.00	.12	1/4-18 NPT	-10.0	SN..432	ISSN433	KMSP415IP	15 IP	CM234R ASSY	SSP025016M	15 IP



Steel shank with through coolant.  
See pages B192–B194 and B212–B216 for inserts.

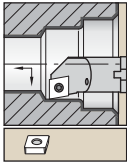


■ **A-CTFP 0°**

order number	catalog number	D	D min	F	L1	CS	γF°	gage insert	shim	shim screw	hex	clamp	clamp screw	hex	
<b>right hand</b>															
2951396	A16TCTFPR3	1.000	1.200	.640	12.00	1/4-18 NPT	.0	TP.322	—	—	—	CK20	STC11	1/8	
2951400	A20UCTFPR3	1.250	1.470	.765	14.00	1/4-18 NPT	-3.0	TP.322	SM41	S19	1/16	CK10	STC8	5/32	

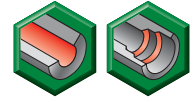
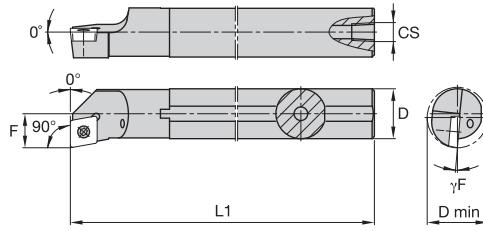
# S-Style Screw Clamp Boring Bars for Positive Inserts

Steel Shank with Through Coolant



Steel shank with through coolant.

See pages B30–B46 for inserts.

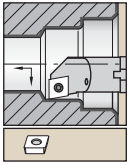


Tools for External Turning and Internal Boring

## ■ A-SCFC 0°

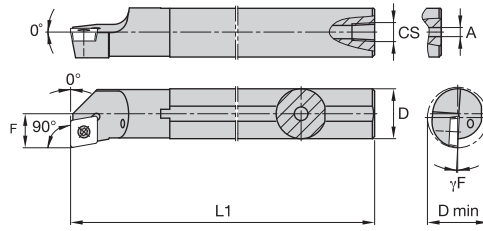


order number	catalog number	D	D min	F	L1	CS	γF°	gage insert	insert screw	Torx
<b>right hand</b>										
3883416	A08RSCFCR2	.500	.600	.312	8.00	1/16-27 NPT	-7.0	CC..2151	MS1153	T7
3883418	A10SSCFR2	.625	.770	.406	10.00	1/8-27 NPT	-5.0	CC..2151	MS1153	T7
3883421	A12SSCFR3	.750	.930	.500	10.00	1/8-27 NPT	-5.0	CC..3252	MS1155	T15
<b>left hand</b>										
3883415	A08RSCFCL2	.500	.600	.312	8.00	1/16-27 NPT	-7.0	CC..2151	MS1153	T7
3883417	A10SSCFCL2	.625	.770	.406	10.00	1/8-27 NPT	-5.0	CC..2151	MS1153	T7
3883419	A12SSCFCL3	.750	.930	.500	10.00	1/8-27 NPT	-5.0	CC..3252	MS1155	T15




Steel shank with through coolant.

See pages B30–B46 for inserts.

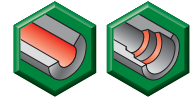
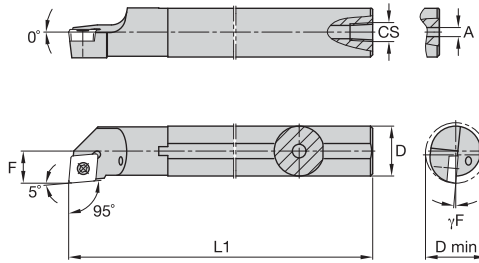
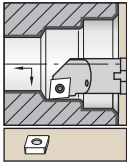


## ■ A-SCFP 0°

order number	catalog number	D	D min	F	L1	A	CS	γF°	gage insert	insert screw	Torx
											
<b>right hand</b>											
5077440	A06MSCFPR2	.375	.480	.250	6.00	.13	—	-4.0	CP..2151	<b>MS1153</b>	T7
5077445	A08RSCFPR2	.500	.600	.312	8.00	—	1/16 - 27 NPT	-2.0	CP..2151	<b>MS1153</b>	T7
5077495	A10SSCFPR2	.625	.770	.406	10.00	—	1/8 - 27 NPT	.0	CP..2151	<b>MS1153</b>	T7
5077499	A12SSCFPR3	.750	.930	.500	10.00	—	1/8 - 27 NPT	-2.0	CP..3252	<b>MS1155</b>	T15
5077555	A16TSCFPR3	1.000	1.200	.640	12.00	—	1/4 - 18 NPT	.0	CP..3252	<b>MS1155</b>	T15
<b>left hand</b>											
5077119	A06MSCFPL2	.375	.480	.250	6.00	.13	—	-4.0	CP..2151	<b>MS1153</b>	T7
5077444	A08RSCFPL2	.500	.600	.312	8.00	—	1/16 - 27 NPT	-2.0	CP..2151	<b>MS1153</b>	T7
5077493	A10SSCFPL2	.625	.770	.406	10.00	—	1/8 - 27 NPT	.0	CP..2151	<b>MS1153</b>	T7
5077498	A12SSCFPL3	.750	.930	.500	10.00	—	1/8 - 27 NPT	-2.0	CP..3252	<b>MS1155</b>	T15
5077554	A16TSCFPL3	1.000	1.200	.640	12.00	—	1/4 - 18 NPT	.0	CP..3252	<b>MS1155</b>	T15

# S-Style Screw Clamp Boring Bars for Positive Inserts

Steel Shank with Through Coolant



Steel shank with through coolant.

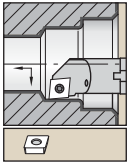
See pages B30-B46 for inserts.

## ■ A-SCLC -5°

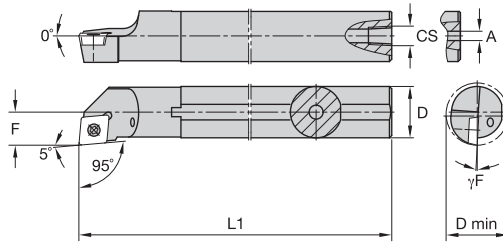


order number	catalog number	D	D min	F	L1	A	CS	γF°	gage insert	insert screw	Torx
<b>right hand</b>											
2951383	A06MSCLCR2	.375	.480	.250	6.00	.13	—	-8.0	CC..2151	MS1939	T7
2951386	A08RSCLCR2	.500	.600	.312	8.00	—	1/16-27 NPT	-7.0	CC..2151	MS1153	T7
2951388	A10SSCLCR2	.625	.770	.406	10.00	—	1/8-27 NPT	-5.0	CC..2151	MS1153	T7
2951392	A12SSCLCR3	.750	.930	.500	10.00	—	1/8-27 NPT	-5.0	CC..3252	MS1155	T15
2951399	A16TSCLCR3	1.000	1.200	.640	12.00	—	1/4-18 NPT	-4.0	CC..3252	MS1155	T15
2951408	A20USCLCR4	1.250	1.470	.765	14.00	—	1/4-18 NPT	-5.0	CC..432	MS1157	T15
2951418	A24USCLCR4	1.500	1.760	.890	14.00	—	1/4-18 NPT	-4.0	CC..432	MS1157	T15
<b>left hand</b>											
2951391	A12SSCLCL3	.750	.930	.500	10.00	—	1/8-27 NPT	-5.0	CC..3252	MS1155	T15

Tools for External Turning and Internal Boring



Steel shank with through coolant.  
See pages B30–B46 for inserts.



## ■ A-SCLP -5°

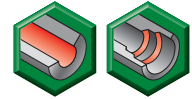
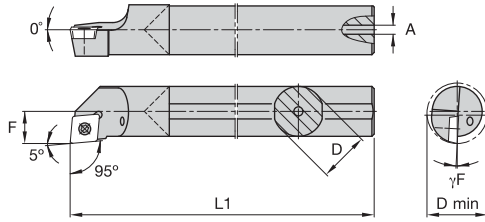
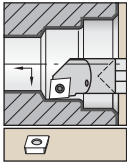
order number	catalog number	D	D min	F	L1	A	CS	γF°	gage insert	insert screw	Torx
<b>right hand</b>											
5077618	A06MSCLPR2	.375	.480	.250	6.00	.13	—	-6.0	CP..2151	MS1153	T7
5077643	A08RSCLPR2	.500	.600	.312	8.00	.16	1/16 - 27 NPT	-3.0	CP..2151	MS1153	T7
5077648	A10SSCLPR2	.625	.770	.406	10.00	—	1/8 - 27 NPT	-2.0	CP..2151	MS1153	T7
5077649	A10SSCLPR3	.625	.770	.406	10.00	.16	1/8 - 27 NPT	-2.0	CPMT3252	MS1155	T15
5077687	A12SSCLPR3D	.750	1.030	.500	10.00	—	1/8 - 27 NPT	-2.0	CP..3252	MS1155	T15
5077686	A12SSCLPR3	.750	.930	.500	10.00	—	1/8 - 27 NPT	-2.0	CP..3252	MS1155	T15
5077699	A16TSCLPR3	1.000	1.200	.640	12.00	—	1/4 - 18 NPT	.0	CP..3252	MS1155	T15
<b>left hand</b>											
5077616	A06MSCLPL2	.375	.480	.250	6.00	.13	—	-6.0	CP..2151	MS1153	T7
5077642	A08RSCLPL2	.500	.600	.312	8.00	—	1/16 - 27 NPT	-3.0	CP..2151	MS1153	T7
5077646	A10SSCLPL2	.625	.770	.406	10.00	—	1/8 - 27 NPT	-2.0	CP..2151	MS1153	T7
5077647	A10SSCLPL3	.625	.770	.406	10.00	.16	1/8 - 27 NPT	-2.0	CPMT3252	MS1155	T15
5077682	A12SSCLPL3	.750	.930	.500	10.00	—	1/8 - 27 NPT	-2.0	CP..3252	MS1155	T15
5077696	A16TSCLPL3	1.000	1.200	.640	12.00	—	1/4 - 18 NPT	.0	CP..3252	MS1155	T15



Tools for External Turning and Internal Boring

# S-Style Screw Clamp Boring Bars for Positive Inserts

Carbide Shank with Through Coolant



Carbide shank with through coolant.

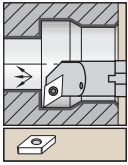
See pages B30-B46 for inserts.

## ■ E-SCLP -5°



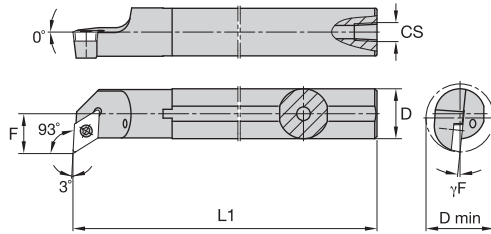
order number	catalog number	D	D min	F	L1	A	γF°	gage insert	insert screw	Torx
<b>right hand</b>										
5092925	E05KSCLPR18	.313	.415	.219	4.950	.093	-5.0	CP..18151	MS1933	T7
5093092	E06MSCLPR2	.375	.480	.250	5.950	.125	-6.0	CP..2151	MS1939	T7
5093096	E08RSCLPR2	.500	.600	.312	7.930	.187	-2.0	CP..2151	MS1153	T7
5093141	E10SSCLPR2	.625	.770	.406	9.905	.218	-2.0	CP..2151	MS1153	T7
5093142	E10SSCLPR3	.625	.770	.406	9.930	.218	-3.0	CP..3252	MS1155	T15
5093147	E12SSCLPR2	.750	.930	.500	9.905	.281	-2.0	CP..2151	MS1153	T7
5093148	E12SSCLPR3	.750	.930	.500	9.905	.281	-2.0	CP..3252	MS1155	T15
5093183	E16TSCLPR3	1.000	1.200	.640	11.905	.312	.0	CP..3252	MS1155	T15
<b>left hand</b>										
5092924	E05KSCLPL18	.313	.415	.219	4.950	.093	-5.0	CP..18151	MS1933	T7
5093091	E06MSCLPL2	.375	.480	.250	5.950	.125	-6.0	CP..2151	MS1939	T7
5093095	E08RSCLPL2	.500	.600	.312	7.930	.187	-2.0	CP..2151	MS1153	T7
5093099	E10SSCLPL2	.625	.770	.406	9.905	.218	-2.0	CP..2151	MS1153	T7
5093140	E10SSCLPL3	.625	.770	.406	9.930	.218	-3.0	CP..3252	MS1155	T15
5093145	E12SSCLPL2	.750	.930	.500	9.905	.281	-2.0	CP..2151	MS1153	T7
5093146	E12SSCLPL3	.750	.930	.500	9.905	.281	-2.0	CP..3252	MS1155	T15
5093182	E16TSCLPL3	1.000	1.200	.640	11.905	.312	.0	CP..3252	MS1155	T15

Tools for External Turning and Internal Boring



Steel shank with through coolant.

See pages B47–B64 for inserts.



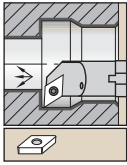
■ **A-SDUC -3°**

order number	catalog number	D	D min	F	L1	CS	$\gamma F^\circ$	gage insert	insert screw	hex
<b>right hand</b>										
2951394	A12SSDUCR3	.750	.980	.562	10.00	1/8-27 NPT	-5.0	DC..3252	MS1155	T15
<b>left hand</b>										
2951393	A12SSDUCL3	.750	.980	.562	10.00	1/8-27 NPT	-5.0	DC..3252	MS1155	T15

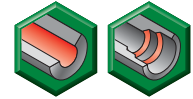
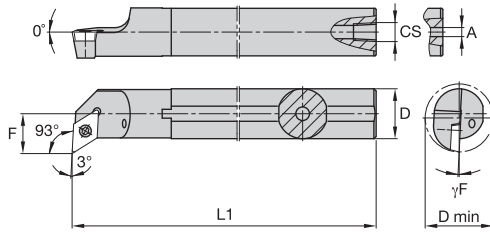


# S-Style Screw Clamp Boring Bars for Positive Inserts

Steel Shank with Through Coolant



Steel shank with through coolant.



See pages B47–B64 for inserts.

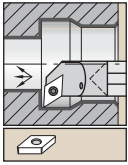
## ■ A-SDUP -3°



order number	catalog number	D	D min	F	L1	A	CS	γF°	gage insert	insert screw	Torx
<b>right hand</b>											
5078324	A06MSDUPR2	.375	.600	.375	6.000	.125	—	-3.0	DP..2151	MS1153	T7
5078326	A08RSDUPR2	.500	.730	.437	8.000	.156	1/16-27 NPT	.0	DP..2151	MS1153	T7
5078328	A10SSDUPR2	.625	.850	.500	10.000	.156	1/8-27 NPT	.0	DP..2151	MS1153	T7
5078362	A12SSDUPR3	.750	.980	.562	10.000	.156	1/8-27 NPT	.0	DP..3252	MS1155	T15
5078366	A16TSDUPR3	1.000	1.300	.750	12.000	.250	1/4-18 NPT	.0	DP..3252	MS1155	T15
<b>left hand</b>											
5078321	A06MSDUPL2	.375	.600	.375	6.000	.125	—	-3.0	DP..2151	MS1153	T7
5078325	A08RSDUPL2	.500	.730	.437	8.000	.156	1/16-27 NPT	.0	DP..2151	MS1153	T7
5078327	A10SSDUPL2	.625	.850	.500	10.000	.156	1/8-27 NPT	.0	DP..2151	MS1153	T7
5078361	A12SSDUPL3	.750	.980	.562	10.000	.156	1/8-27 NPT	.0	DP..3252	MS1155	T15
5078365	A16TSDUPL3	1.000	1.300	.750	12.000	.250	1/4-18 NPT	.0	DP..3252	MS1155	T15

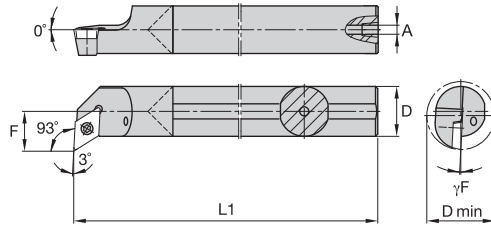
Tools for External Turning and Internal Boring






Carbide shank with through coolant.

See pages B47-B64 for inserts.

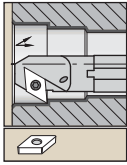


## ■ E-SDUP -3°

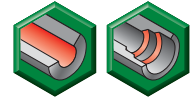
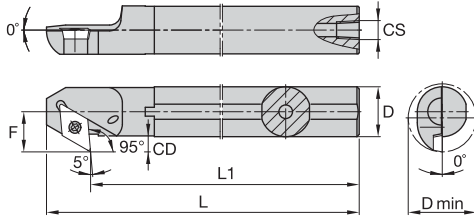
order number	catalog number	D	D min	F	L1	A	$\gamma F^\circ$	gage insert	insert screw	Torx
										
<b>right hand</b>										
5093422	E06MSDUPR2	.375	.600	.375	5.950	.125	-2.0	DP..2151	MS1153	T7
5093424	E08RSDUPR2	.500	.730	.437	7.930	.187	.0	DP..2151	MS1153	T7
5093427	E10SSDUPR2	.625	.850	.500	9.910	.218	.0	DP..2151	MS1153	T7
5093593	E12SSDUPR2	.750	.980	.562	9.905	.281	.0	DP..2151	MS1153	T7
5093632	E12SSDUPR3	.750	.980	.562	9.905	.281	.0	DP..3252	MS1155	T15
5093636	E16TSDUPR3	1.000	1.300	.750	11.900	.312	.0	DP..3252	MS1155	T15
<b>left hand</b>										
5093421	E06MSDUPL2	.375	.600	.375	5.950	.125	-2.0	DP..2151	MS1153	T7
5093423	E08RSDUPL2	.500	.730	.437	7.930	.187	.0	DP..2151	MS1153	T7
5093425	E10SSDUPL2	.625	.850	.500	9.910	.218	.0	DP..2151	MS1153	T7
5093592	E12SSDUPL2	.750	.980	.562	9.905	.281	.0	DP..2151	MS1153	T7
5093599	E12SSDUPL3	.750	.980	.562	9.905	.281	.0	DP..3252	MS1155	T15
5093635	E16TSDUPL3	1.000	1.300	.750	11.900	.312	.0	DP..3252	MS1155	T15

# S-Style Screw Clamp Boring Bars for Positive Inserts

Steel Shank with Through Coolant



Steel shank with through coolant.



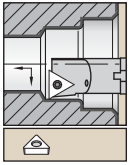
See pages B47–B64 for inserts.

## ■ A-SDXP -5°



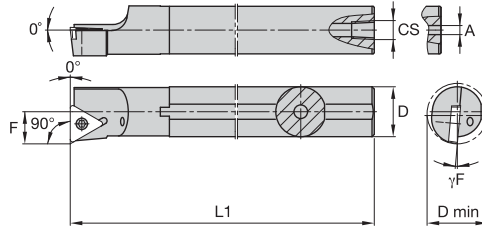
order number	catalog number	D	D min	F	L1	L	CD	CS	gage insert	insert screw	Torx
<b>right hand</b>											
5078377	A08RSDXPR2	.500	.730	.437	8.00	8.50	.187	1/16-27 NPT	DP..2151	<b>MS1153</b>	T7
5078379	A10SSDXPR2	.620	.850	.500	10.00	10.50	.187	1/8-27 NPT	DP..2151	<b>MS1153</b>	T7
5078403	A12SSDXPR3	.750	.980	.562	10.00	10.63	.187	1/8-27 NPT	DP..3252	<b>MS1155</b>	T15
5078408	A16TSDXPR3	1.000	1.300	.750	12.00	12.66	.250	1/4-18 NPT	DP..3252	<b>MS1155</b>	T15
<b>left hand</b>											
5078378	A10SSDXPL2	.620	.850	.500	10.00	10.50	.187	1/8-27 NPT	DP..2151	<b>MS1153</b>	T7
5078402	A12SSDXPL3	.750	.980	.562	10.00	10.63	.187	1/8-27 NPT	DP..3252	<b>MS1155</b>	T15
5078406	A16TSDXPL3	1.000	1.300	.750	12.00	12.66	.250	1/4-18 NPT	DP..3252	<b>MS1155</b>	T15

Tools for External Turning and Internal Boring



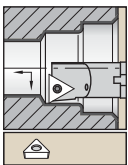
Steel shank with through coolant.

See pages B81–B93 for inserts.



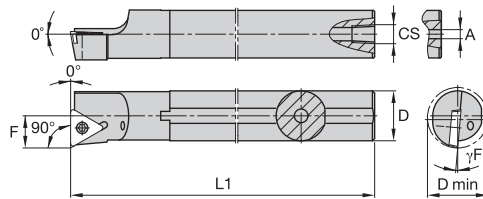
## ■ A-STFC 0°

order number	catalog number	D	D min	F	L1	A	CS	$\gamma F^\circ$	gage insert	insert screw	hex
<b>right hand</b>											
2951385	A06MSTFCR2	.375	.480	.250	6.00	.13	—	-8.0	TC..2151	MS1153	T7
2951387	A08RSTFCR2	.500	.600	.312	8.00	.16	1/16-27 NPT	-7.0	TC..2151	MS1153	T7
2951389	A10SSTFCR2	.625	.770	.406	10.00	.16	1/8-27 NPT	-5.0	TC..2151	MS1153	T7
2951395	A12SSTFCR2	.750	.930	.500	10.00	.16	1/8-27 NPT	-5.0	TC..2151	MS1153	T7



Steel shank with through coolant.

See pages B81–B93 for inserts.



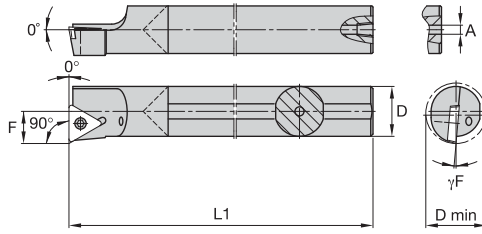
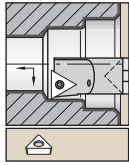
## ■ A-STFP 0°

order number	catalog number	D	D min	F	L1	A	CS	$\gamma F^\circ$	gage insert	insert screw	Torx
<b>right hand</b>											
5086723	A06MSTFPR2	.375	.480	.250	6.000	.125	—	-4.0	TP..2151	MS1153	T7
5086728	A08RSTFPR2	.500	.600	.312	8.000	.160	—	-2.0	TP..2151	MS1153	T7
5086729	A10SSTFPR2	.625	.770	.406	10.000	.156	1/8-27 NPT	.0	TP..2151	MS1153	T7
5086804	A12SSTFPR3	.750	.930	.500	10.000	.156	1/8-27 NPT	-2.0	TPMT3252	MS1155	T15
5086805	A16TSTFPR3	1.000	1.200	.640	12.000	.250	1/4 - 18 NPT	.0	TP..3252	MS1155	T15
<b>left hand</b>											
5086722	A06MSTFPL2	.375	.480	.250	6.000	.125	—	-4.0	TP..2151	MS1153	T7
5086727	A08RSTFPL2	.500	.600	.312	8.000	.160	1/16 - 27 NPT	-2.0	TP..2151	MS1153	T7
5086803	A12SSTFPL3	.750	.930	.500	10.000	.156	1/8-27 NPT	-2.0	TPMT3252	MS1155	T15



# S-Style Screw Clamp Boring Bars for Positive Inserts

Carbide Shank with Through Coolant



Carbide shank with through coolant.

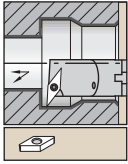
See pages B81–B93 for inserts.

## ■ E-STFP 0°



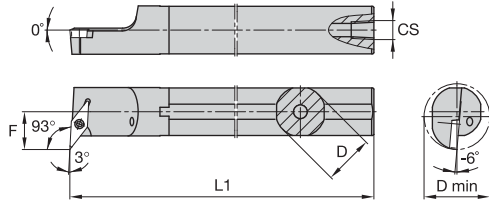
order number	catalog number	D	D min	F	L1	A	γF°	gage insert	insert screw	insert screw	Torx
<b>right hand</b>											
5093688	E05KSTFPR18	.313	.415	.219	5.000	.093	-5.0	TP..18151	MS1933	—	T7
5093689	E06DSTFPR2A	.375	.480	.250	5.879	.125	-7.0	TP41	—	S32	3/32
5093693	E06MSTFPR2	.375	.480	.250	6.000	.125	-4.0	TP..2151	MS1153	—	T7
5093698	E08RSTFPR2	.500	.600	.312	7.930	.187	-2.0	TP..2151	MS1153	—	T7
5093753	E10SSTFPR2	.625	.770	.406	10.000	.218	.0	TP..2151	MS1153	—	T7
5093757	E12SSTFPR3	.750	.930	.500	10.000	.281	-2.0	TP..3252	MS1155	—	T15
5093771	E16TSTFPR3	1.000	1.200	.640	12.000	.312	.0	TP..3252	MS1155	—	T15
<b>left hand</b>											
5093680	E05KSTFPL18	.313	.415	.219	5.000	.093	-5.0	TP..18151	MS1933	—	T7
5093690	E06MSTFPL2	.375	.480	.250	6.000	.125	-4.0	TP..2151	MS1153	—	T7
5093697	E08RSTFPL2	.500	.600	.312	7.930	.187	-2.0	TP..2151	MS1153	—	T7
5093752	E10SSTFPL2	.625	.770	.406	10.000	.218	.0	TP..2151	MS1153	—	T7
5093756	E12SSTFPL3	.750	.930	.500	10.000	.281	-2.0	TP..3252	MS1155	—	T15
5093770	E16TSTFPL3	1.000	1.200	.640	12.000	.312	.0	TP..3252	MS1155	—	T15

Tools for External Turning and Internal Boring




Steel shank with through coolant.

See pages B94-B99 for inserts.



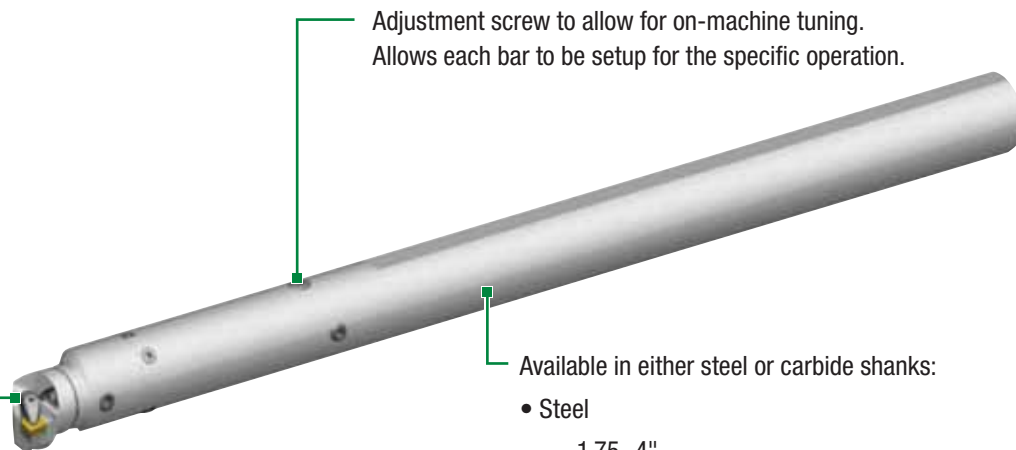
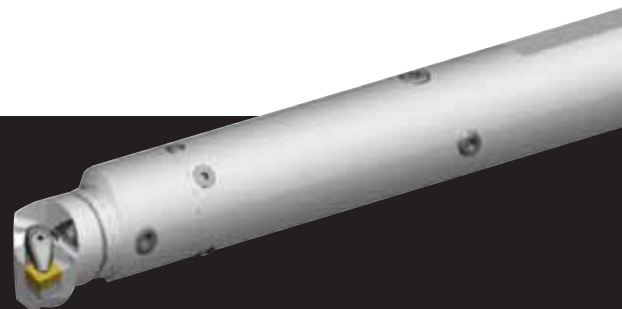
■ **A-SVUB -3°**

order number	catalog number	D	D min	F	L1	CS	gage insert	insert screw	Torx
									
<b>right hand</b>									
3883423	A12SSVUBR2	.750	.980	.562	10.00	1/8-27 NPT	VB..221	MS1153	T7
3883425	A16TSVUBR3	1.000	1.300	.750	12.00	1/4-18 NPT	VB..332	MS1155	T15
<b>left hand</b>									
3883422	A12SSVUBL2	.750	.980	.562	10.00	1/8-27 NPT	VB..221	MS1153	T7
3883424	A16TSVUBL3	1.000	1.300	.750	12.00	1/4-18 NPT	VB..332	MS1155	T15

## Tunable Boring Bars with Front End KM™ Quick Change Adapter

Reduce vibrations and enhance productivity in deep boring applications with KM Quick Change heads and tunable boring bars.

# Tunable Boring Bars



Adjustment screw to allow for on-machine tuning.  
Allows each bar to be setup for the specific operation.

Comprehensive offering of KM Quick Change cutting units. See WIDIA™ Tooling Systems Catalog (A-09-02122) for KM adapters.

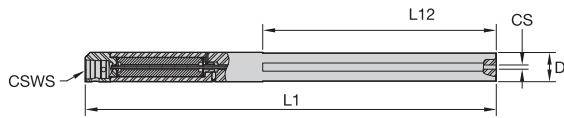
Available in either steel or carbide shanks:

- Steel
  - 1.75–4"
  - 40–100mm
- Carbide
  - 2–4"
  - 50–100mm

Features	Function	Benefit
Robust internal clamping package	<ul style="list-style-type: none"> <li>• Eliminates chatter and vibration.</li> <li>• Higher metal removal rate.</li> <li>• Larger depths of cut.</li> </ul>	<ul style="list-style-type: none"> <li>• High surface quality.</li> <li>• Low scrap rate.</li> <li>• Increased productivity.</li> <li>• Reduced noise exposure.</li> </ul>
Tunable clamping mechanism	Bar can be tuned on the machine with just turning a screw.	Optimized damping characteristics for all kinds of machining conditions.
KM™ Quick Change front end adapter	<ul style="list-style-type: none"> <li>• Ridged clamping system.</li> <li>• Wide selection of KM Quick Change cutting units.</li> </ul>	Flexible system reduces tooling inventory and setup times.

### ■ Tuning Procedure

1. Loosen the two locking screws on the bar.
2. Turn the adjusting screw in the positive direction until it becomes snug.  
The adjusting screw becomes snug when it locks the tuner mass.
3. Turn the screw one complete turn in the negative direction and take a test cut.
4. Repeat Step 3 until chatter is eliminated.
5. Once chatter is eliminated, note that chatter starts between the current screw setting and one turn in the positive direction. Make 1/4 turn adjustments within this range, taking test cuts for each setting, until you can identify the adjusting screw setting that causes chatter to start.
6. Once the adjusting screw setting that causes chatter is determined, back the adjusting screw off a 1/2 turn in the negative direction.
7. Tighten both clamping screws and take a test cut to confirm desired results.



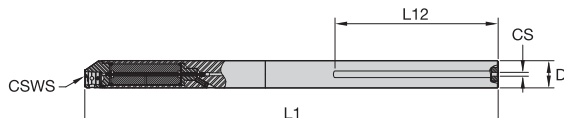
Tunable steel shank with through coolant and front end KM™ clamping unit.



■ D...TTB-KM • Inch

order number	catalog number	D	L1	CS	L12	L1 min	CSWS system size
3637915	D28TTB26KM40	1.750	24.44	1/4-18 NPT	15.75	13.50	KM40
3637916	D32TTB29KM40	2.000	27.44	1/4-18 NPT	18.50	13.38	KM40
3637917	D40TTB36KM40	2.500	34.45	1/4-18 NPT	24.75	16.00	KM40
3638033	D48TTB45KM63	3.000	42.23	1/4-18 NPT	24.00	21.70	KM63
3638034	D64TTB58KM63	4.000	56.24	3/8-18 NPT	20.00	27.62	KM63

NOTE: KM adapters can be found in the WIDIA™ Tooling Systems Catalog (A-09-02122EN).



Carbide tunable boring bar with KM™ Quick Change connection.

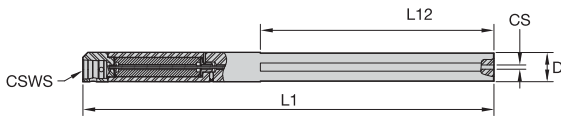


■ G-KM-TTB • Inch

order number	catalog number	D	L1	CS	L12	CSWS system size
3954294	G32TTB41KM40	2.000	39.45	3/8-18 NPT	12.00	KM40
3954295	G40TTB51KM40	2.500	49.45	3/8-18 NPT	15.00	KM40
3954296	G48TTB63KM63	3.000	58.56	3/8-18 NPT	18.00	KM63
3954297	G64TTB79KM63	4.000	76.56	3/8-18 NPT	24.00	KM63

NOTE: KM adapters can be found in the WIDIA™ Tooling Systems Catalog (A-09-02122EN).





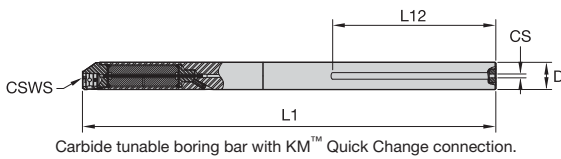
Tunable steel shank with through coolant and front end KM™ clamping unit.



■ D...TTB-KM • Metric

order number	catalog number	D	L1	CS	L12	L1 min	CSWS system size
3637636	D40MTTB560KM40	40	520	RP 3/8-19	305	330	KM40
3637637	D50MTTB737KM40	50	697	RP 3/8-19	470	337	KM40
3637638	D60MTTB1000KM40	60	976	RP 3/8-19	686	396	KM40
3642134	D80MTTB1120KM63	80	1060	RP 3/8-19	610	560	KM63
3642135	D100MTTB1330KM63	100	1384	RP 3/8-19	622	695	KM63

NOTE: KM adapters can be found in the WIDIA™ Tooling Systems Catalog (A-09-02122EN).



Carbide tunable boring bar with KM™ Quick Change connection.



■ G-KM-TTB • Metric

order number	catalog number	D	L1	CS	L12	CSWS system size
3954298	G50MTTB1026KM40	50	986	RP 3/8-19	300	KM40
3954299	G60MTTB1226KM40	60	1186	RP 3/8-19	381	KM40
3954300	G80MTTB1564KM63	80	1504	RP 3/8-19	480	KM63
3954301	G100MTTB2066KM63	100	1975	RP 3/8-19	600	KM63

NOTE: KM adapters can be found in the WIDIA™ Tooling Systems Catalog (A-09-02122EN).

Tools for External Turning and Internal Boring

Modern machining operations demand high-quality, high-performance toolholders that provide straightforward design and application versatility.

Standard WIDIA™ cartridges are ideal for turning tools with one, or several, cutting edges. A wide range of cartridge sizes and styles provide numerous combinations and application possibilities.

# Cartridges



## Clamping System M

- Combined pin/wedge clamp for negative inserts.
- An extremely sturdy clamping system, specially designed for interrupted cuts.
- The tool is protected by a carbide shim.

## Clamping System P

- Lever-type clamping system for negative indexable inserts with hole to DIN 4988 and positive round inserts more than 20mm in diameter.
- Inserts with one- and two-side chip control geometries have positive rakes from 6° to 18°.
- Advantages of this system are fast insert changes and no interference with chip flow.

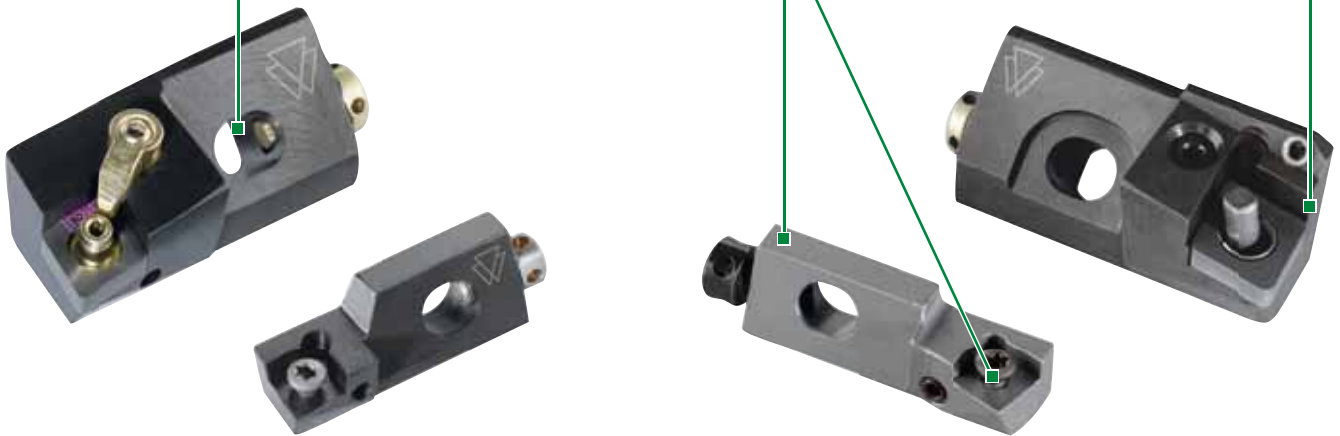
*P-style available in metric sizes only.*



Simple and secure mounting to the tool by a single cartridge clamping screw. High accuracy on "F" dimension ensures proper application to minimum bore dimensions.

Same clamping systems as standard turning toolholders. Overall sizes to DIN and ISO are ideal for single- and multi-tooth turning, boring, and spotting tools.

Precise axial and radial positioning by adjustment screws.



### Clamping System C

- Top clamping system for negative and positive indexable inserts to DIN 4968.
- This universal clamping system is robust and easy to handle.
- Some height-adjustable clamps enable the use of additional chipbreakers.
- A carbide shim provides additional tool protection.



### Clamping System S

- Screw clamping system for positive indexable inserts with countersunk hole to DIN 4967.
- Compact design using a minimum of spare parts for high reliability and cost efficiency.
- A carbide shim provides additional tool protection.
- Toolholders with cutting edge heights upwards of .625" (16mm) and insert iCs from .375" (9,52mm) are secured by means of a threaded bushing.

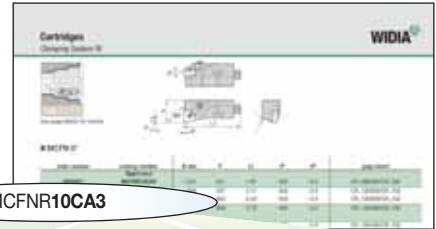
## How Do Catalog Numbers Work?

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

Cartridges		WIDIA	
<b>MCFNR10CA3</b>			
M	C	F	N

<b>M</b>	<b>C</b>	<b>F</b>	<b>N</b>	<b>R</b>
<p><b>Insert Clamping System</b></p>	<p><b>Insert Shape</b></p>	<p><b>Cartridge Style</b></p>	<p><b>Insert Clearance Angle</b></p>	<p><b>Hand of Tool</b></p>
<p><b>C</b></p> <p>Top clamping by clamping finger for inserts without hole.</p>	<p><b>C</b> </p> <p><b>D</b> </p> <p><b>R</b> </p> <p><b>S</b> </p> <p><b>T</b> </p> <p><b>W</b> </p>	<p><b>F</b> </p> <p><b>K</b> </p> <p><b>L</b> </p> <p><b>J</b> </p> <p><b>Q</b> </p> <p><b>R</b> </p> <p><b>S</b> </p> <p><b>G</b> </p>	<p><b>C</b> </p> <p><b>N</b> </p> <p><b>P</b> </p>	<p><b>Right-hand cartridge</b></p> <p><b>R</b> </p> <p><b>Left-hand cartridge</b></p> <p><b>L</b> </p>
<p><b>M</b></p> <p>Top and hole clamping for inserts with hole.</p>				
<p><b>S</b></p> <p>Center clamping by screw for inserts with hole.</p>				

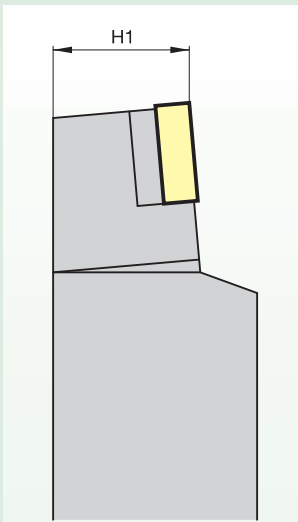
By referencing this easy-to-use guide, you can identify the correct product to meet your needs.



MCFNR10CA3

**10**

Cartridge Size



**H1** = Cutting edge height of cartridge, in inches

**C**

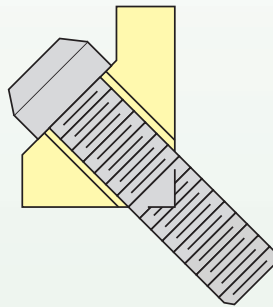
Identifying Code of Cartridge

**C** = Cartridge

**A**

Mounting Design of Cartridge

A-design conforming to ISO 5611



**3**

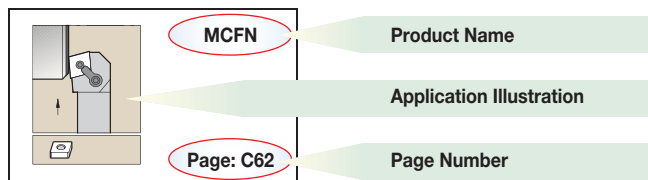
Insert Size



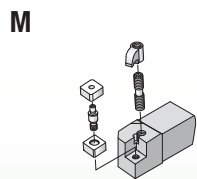
**Insert iC**  
Number of 1/8ths of "D"

Additional Information

Each unique clamping system offers product options to fill your specific toolholder needs. Find the illustration that fits your application and navigate to the corresponding page to get the correct solution.



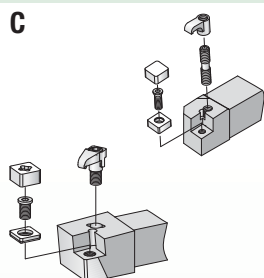
### Clamping System M



Combined pin/wedge clamp for negative inserts. An extremely sturdy clamping system, specially designed for interrupted cuts. The tool is protected by a carbide shim.

	<b>MCFN</b> 0° Page: C62		<b>MCKN</b> 15° Page: C63		<b>MCLN</b> -5° Page: C64		<b>MDJN</b> -3° Page: C65
	<b>MDQN</b> -17.5° Page: C66		<b>MSKN</b> 15° Page: C67		<b>MSRN</b> 15° Page: C68		<b>MSSN</b> 45° Page: C69
	<b>MSTN</b> 30° Page: C70		<b>MSYN</b> 5° Page: C71		<b>MTFN</b> 0° Page: C72		<b>MTGN</b> 0° Page: C73

### Clamping System C

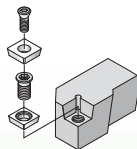


Top clamping system for negative and positive indexable inserts to DIN 4968. This universal clamping system is robust and easy to handle. Some height-adjustable clamps enable the use of additional chipbreakers. A carbide shim provides additional tool protection. Toolholders with cutting edge heights upwards of .625" and insert iCs greater than .250".

	<b>CSKP</b> 15° Page: C74		<b>CSRP</b> 15° Page: C75		<b>CSSP</b> 45° Page: C76		<b>CTFP</b> 0° Page: C77
--	---------------------------------	--	---------------------------------	--	---------------------------------	--	--------------------------------

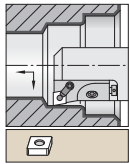
**Clamping System S**

**S**

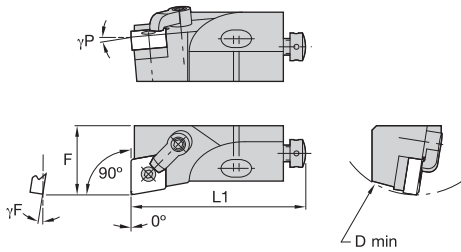


Combined pin/wedge clamp for negative inserts. An extremely sturdy clamping system, specially designed for interrupted cuts. The tool is protected by a carbide shim.

	<b>SCFP</b> 0° Page: <b>C78</b>		<b>SCGP</b> 0° Page: <b>C79</b>		<b>SCLC</b> -5° Page: <b>C80</b>		<b>SCLP</b> -5° Page: <b>C81</b>
	<b>SCRП</b> 15° Page: <b>C82</b>		<b>SCSP</b> 45° Page: <b>C83</b>		<b>SСTP</b> 30° Page: <b>C84</b>		<b>SCWP</b> 30° Page: <b>C85</b>
	<b>SDJP</b> -3° Page: <b>C86</b>		<b>SRGC</b>  Page: <b>C87</b>		<b>SSKC</b> 15° Page: <b>C88</b>		<b>SSKP</b> 15° Page: <b>C89</b>
	<b>SSRC</b> 15° Page: <b>C90</b>		<b>SSRP</b> 15° Page: <b>C91</b>		<b>SSSC</b> 45° Page: <b>C92</b>		<b>SSSP</b> 45° Page: <b>C93</b>
	<b>STFP</b> 0° Page: <b>C94</b>		<b>STGP</b> 0° Page: <b>C95</b>		<b>STTP</b> 30° Page: <b>C96</b>		<b>STWP</b> 30° Page: <b>C97</b>



See pages B30–B46 for inserts.

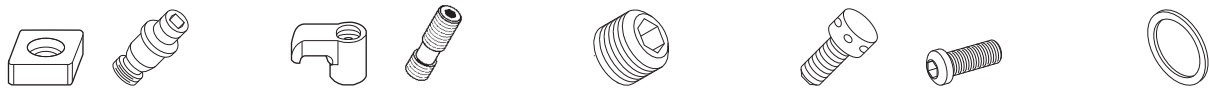


Tools for External Turning and Internal Boring

■ MCFN 0°

order number	catalog number	D min	F	L1	γF°	γP°	gage insert
<b>right hand</b>							
3870421	MCFNR10CA3	1.575	.551	1.97	-9.0	-9.0	CN..090308/CN..322
3870420	MCFNR12CA4	1.969	.787	2.17	-9.0	-5.0	CN..120408/CN..432
3870419	MCFNR16CA4	2.362	.984	2.48	-9.0	-5.0	CN..120408/CN..432
3870418	MCFNR20CA4	2.756	.984	2.76	-9.0	-5.0	CN..120408/CN..432
<b>left hand</b>							
3870423	MCFNL12CA4	1.969	.787	2.17	-9.0	-5.0	CN..120408/CN..432
3870422	MCFNL16CA4	2.362	.984	2.48	-9.0	-5.0	CN..120408/CN..432

■ Spare Parts

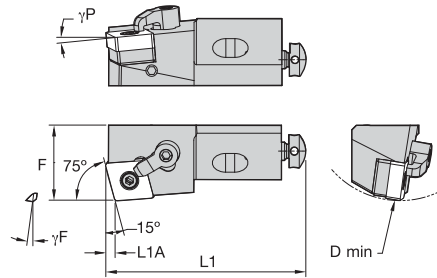


D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	—	KLM33	2 mm	CKM36	STCM38	2 mm	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	—	KLM43	2 mm	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	4 mm	CSWM 060 050
2.362	ICSN432	KLM46S	2.5 mm	CKM34	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050
2.756	ICSN432	KLM46	2.5 mm	CKM34	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050





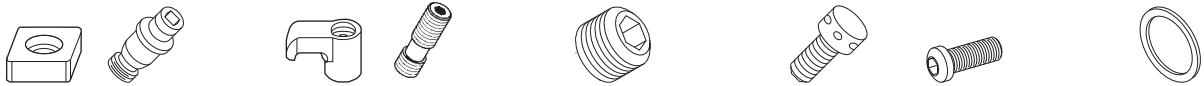
See pages B30–B46 for inserts.



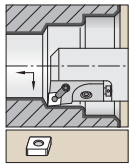
## ■ MCKN 15°

order number	catalog number	D min	F	L1	L1A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>								
3870416	MCKNR12CA4	1.969	.787	2.17	.12	-9.0	-5.0	CN..120408/CN..432
3870415	MCKNR16CA4	2.362	.984	2.48	.12	-9.0	-5.0	CN..120408/CN..432
<b>left hand</b>								
3870417	MCKNL12CA4	1.969	.787	2.17	.12	-9.0	-5.0	CN..120408/CN..432

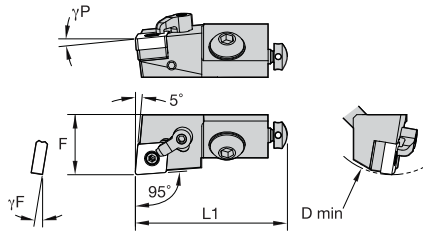
## ■ Spare Parts



D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.969	—	KLM43	2 mm	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	4 mm	CSWM 060 050
2.362	ICSN432	KLM46S	2.5 mm	CKM34	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050



See pages B30–B46 for inserts.



Tools for External Turning and Internal Boring

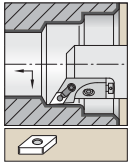
■ MCLN -5°

order number	catalog number	D min	F	L1	γF°	γP°	gage insert
<b>right hand</b>							
3870410	MCLNR12CA4	1.969	.787	2.17	-9.0	-5.0	CN..120408/CN..432
3870409	MCLNR16CA4	2.362	.984	2.48	-9.0	-5.0	CN..120408/CN..432
3870408	MCLNR20CA4	2.756	.984	2.76	-9.0	-5.0	CN..120408/CN..432
3870407	MCLNR25CA6	3.937	1.260	3.94	-9.0	-5.0	CN..190612/CN..643
<b>left hand</b>							
3870414	MCLNL12CA4	1.969	.787	2.17	-9.0	-5.0	CN..120408/CN..432
3870413	MCLNL16CA4	2.362	.984	2.48	-9.0	-5.0	CN..120408/CN..432
3870412	MCLNL20CA4	2.756	.984	2.76	-9.0	-5.0	CN..120408/CN..432
3870411	MCLNL25CA6	3.937	1.260	3.94	-9.0	-5.0	CN..190612/CN..643

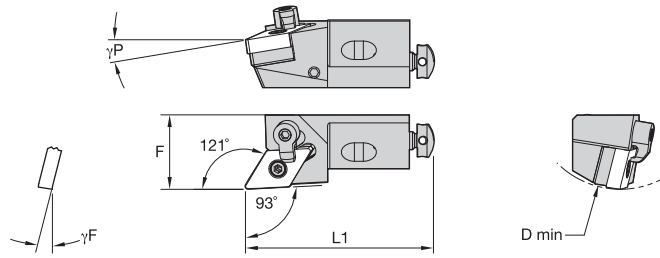
■ Spare Parts



D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	holding screw	hex	washer
1.969	—	KLM43	2 mm	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	—	4 mm	CSWM 060 050
2.362	ICSN432	KLM46S	2.5 mm	CKM34	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	—	5 mm	CSWM 080 050
2.756	ICSN432	KLM46	2.5 mm	CKM34	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	—	5 mm	CSWM 080 050
3.937	ICSN633	KLM68	4 mm	CKM35	STCM8	4 mm	KUAM27	4 mm	KUAM32	—	MS364	8 mm	CSWM 100 080



See pages B47–B64 for inserts.



## ■ MDJN -3°

order number	catalog number	D min	F	L1	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>							
3870405	MDJNR16CA4	2.362	.984	2.48	-9.0	-9.0	DN..150408/DN..3.532
3870404	MDJNR20CA4	2.756	.984	2.76	-8.5	-8.5	DN..150408/DN..3.532
<b>left hand</b>							
3870406	MDJNL16CA4	2.362	.984	2.48	-9.0	-9.0	DN..150408/DN..3.532

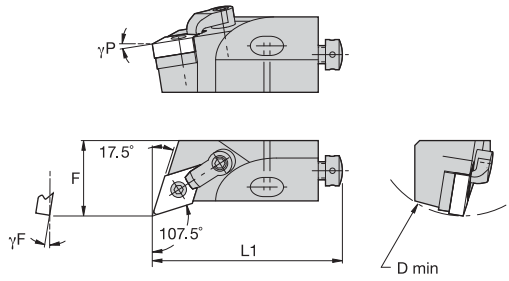
## ■ Spare Parts



D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
2.362	IDSN432	KLM46S	2.5 mm	CKM36	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050
2.756	IDSN432	KLM46	2.5 mm	CKM41	STCM40	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050



See pages B47–B64 for inserts.



Tools for External Turning and Internal Boring

■ MDQN -17.5°

order number	catalog number	D min	F	L1	γF°	γP°	gage insert
<b>right hand</b>							
3870361	MDQNR16CA4	2.362	.984	2.48	-9.0	-6.0	DN..150408/DN..3.532
3870360	MDQNR20CA4	2.756	.984	2.76	-9.0	-8.0	DN..150408/DN..3.532
<b>left hand</b>							
3870403	MDQNL16CA4	2.362	.984	2.48	-9.0	-6.0	DN..150408/DN..3.532
3870362	MDQNL20CA4	2.756	.984	2.76	-9.0	-8.0	DN..150408/DN..3.532

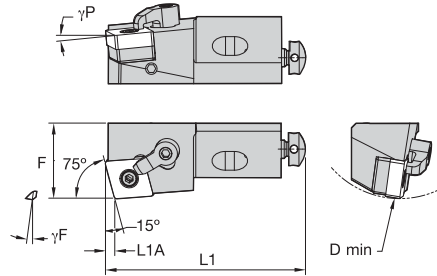
■ Spare Parts



D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
2.362	IDSN432	KLM46S	2.5 mm	CKM36	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050
2.756	IDSN432	KLM46	2.5 mm	CKM34	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050



See pages B68–B80 for inserts.



## ■ MSKN 15°

order number	catalog number	D min	F	L1	L1A	γF°	γP°	gage insert
<b>right hand</b>								
3870352	MSKNR10CA3	1.575	.551	1.97	.09	-9.0	-5.0	SN..090308/SN..322
3870351	MSKNR12CA4	1.969	.787	2.17	.12	-9.0	-5.0	SN..120408/SN..432
3870350	MSKNR16CA4	2.362	.984	2.48	.12	-9.0	-5.0	SN..120408/SN..432
3870349	MSKNR20CA5	2.756	.984	2.76	.15	-9.0	-5.0	SN..150612/SN..543
3870348	MSKNR25CA6	3.937	1.260	3.94	.18	-9.0	-5.0	SN..190612/SN..543
<b>left hand</b>								
3870356	MSKNL10CA3	1.575	.551	1.97	.09	-9.0	-5.0	SN..090308/SN..322
3870354	MSKNL16CA4	2.362	.984	2.48	.12	-9.0	-5.0	SN..120408/SN..432
3870353	MSKNL20CA5	2.756	.984	2.76	.15	-9.0	-5.0	SN..150612/SN..543

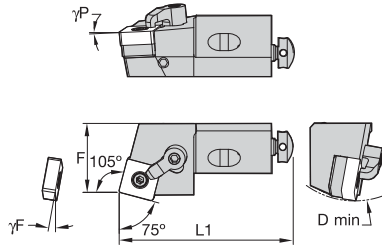
## ■ Spare Parts



D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	holding screw	hex	washer
1.575	—	KLM33	2 mm	CKM36	STCM38	2 mm	KUAM28	2 mm	KUAM30	191.405	—	4 mm	CSWM 060 050
1.969	—	KLM43	2 mm	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	—	4 mm	CSWM 060 050
2.362	ISSN432	KLM46S	2.5 mm	CKM34	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	—	5 mm	CSWM 080 050
2.756	SKSN566K	KLM54	2.5 mm	CKM37	STCM40	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	—	5 mm	CSWM 080 050
3.937	ISSN633	KLM68	4 mm	CKM35	STCM8	4 mm	KUAM27	4 mm	KUAM32	—	MS364	8 mm	CSWM 100 080



See pages B68–B80 for inserts.



Tools for External Turning and Internal Boring

■ MSRN 15°

order number	catalog number	D min	F	L1	FA	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>								
3870344	MSRNR10CA3	1.575	.551	1.97	.087	-9.0	-5.0	SN..090308/SN..322
3870343	MSRNR12CA4	1.969	.787	2.17	.119	-9.0	-5.0	SN..120408/SN..432
3870341	MSRNR20CA5	2.756	.984	2.76	.147	-9.0	-5.0	SN..150612/SN..543
<b>left hand</b>								
3870347	MSRNL12CA4	1.969	.787	2.17	.119	-9.0	-5.0	SN..120408/SN..432
3870346	MSRNL16CA4	2.362	.984	2.48	.119	-9.0	-5.0	SN..120408/SN..432
3870345	MSRNL20CA5	2.756	.984	2.76	.147	-9.0	-5.0	SN..150612/SN..543

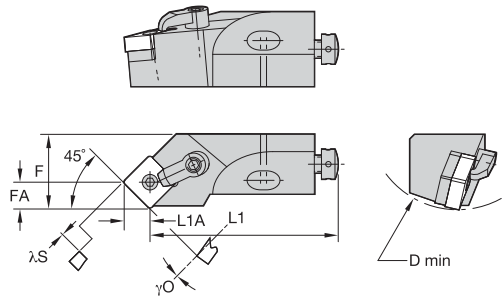
■ Spare Parts



D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	—	KLM33	2 mm	CKM36	STCM38	2 mm	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	—	KLM43	2 mm	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	4 mm	CSWM 060 050
2.362	ISSN432	KLM46S	2.5 mm	CKM34	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050
2.756	SKSN566K	KLM54	2.5 mm	CKM37	STCM40	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050



See pages B68-B80 for inserts.



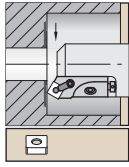
## ■ MSSN 45°

order number	catalog number	D min	F	L1	FA	L1A	λS°	γO°	gage insert
<b>right hand</b>									
3870336	MSSNR10CA3	1.575	.551	1.73	.252	.24	-13.0	.0	SN..090308/SN..322
3870335	MSSNR12CA4	1.969	.787	1.85	—	.33	-13.0	.0	SN..120408/SN..432
3870334	MSSNR16CA4	2.362	.984	2.09	.343	.33	-13.0	.0	SN..120408/SN..432
3870333	MSSNR20CA5	2.756	.984	2.36	.560	.40	-13.0	.0	SN..150612/SN..543
<b>left hand</b>									
3870340	MSSNL10CA3	1.575	.551	1.73	.252	.24	-13.0	.0	SN..090308/SN..322
3870339	MSSNL12CA4	1.969	.787	1.85	—	.33	-13.0	.0	SN..120408/SN..432
3870338	MSSNL16CA4	2.362	.984	2.09	.343	.33	-13.0	.0	SN..120408/SN..432

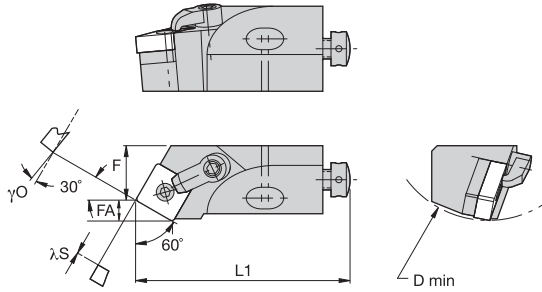
## ■ Spare Parts



D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	—	KLM33	2 mm	CKM36	STCM38	2 mm	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	—	KLM43	2 mm	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	4 mm	CSWM 060 050
2.362	ISSN432	KLM46S	2.5 mm	CKM36	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050
2.756	SKSN566K	KLM54	2.5 mm	CKM37	STCM40	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050



See pages B68–B80 for inserts.



■ MSTN 30°

order number	catalog number	D min	F	L1	FA	λS°	γO°	gage insert
<b>right hand</b>								
3870312	MSTNR10CA3	1.575	.354	1.97	.524	-11.0	.0	SN..090308/SN..322
3870311	MSTNR12CA4	1.969	.512	2.17	.231	-11.0	.0	SN..120408/SN..432
3870310	MSTNR16CA4	2.362	.591	2.48	.232	.0	-11.0	SN..120408/SN..432

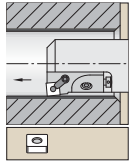
■ Spare Parts



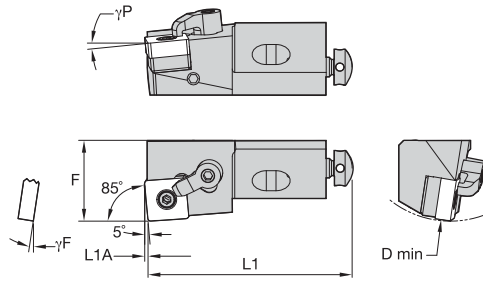
D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	—	KLM33	2 mm	CKM36	STCM38	2 mm	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	—	KLM43	2 mm	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	4 mm	CSWM 060 050
2.362	ISSN432	KLM46S	2.5 mm	CKM34	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050

Tools for External Turning and Internal Boring





See pages B68–B80 for inserts.



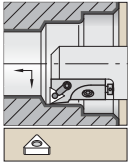
## MSYN 5°

order number	catalog number	D min	F	L1	L1A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>								
3870308	MSYNR10CA3	1.575	.551	1.97	.03	-9.0	-5.0	SN..090308/SN..322
3870307	MSYNR12CA4	1.969	.787	2.17	.04	-9.0	-5.0	SN..120408 / SN..432
3870306	MSYNR16CA4	2.362	.984	2.48	.04	-9.0	-5.0	SN..120408 / SN..432
3870305	MSYNR25CA6	3.937	1.260	3.94	.06	-9.0	-5.0	SN..190612/SN..643
<b>left hand</b>								
3870309	MSYNL10CA3	1.575	.551	1.97	.03	-9.0	-5.0	SN..090308/SN..322

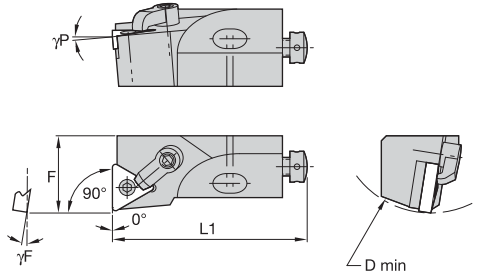
## Spare Parts



D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	holding screw	hex	washer
1.575	—	KLM33	2 mm	CKM36	STCM38	2 mm	KUAM28	2 mm	KUAM30	191.405	—	4 mm	CSWM 060 050
1.969	—	KLM43	2 mm	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	—	4 mm	CSWM 060 050
2.362	ISSN432	KLM46S	2.5 mm	CKM34	STCM9	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	—	5 mm	CSWM 080 050
3.937	ISSN633	KLM68	4 mm	CKM35	STCM8	4 mm	KUAM27	4 mm	KUAM33	—	MS364	8 mm	CSWM 100 080



See pages B81–B93 for inserts.



Tools for External Turning and Internal Boring

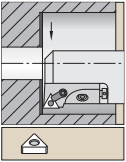
■ MTFN 0°

order number	catalog number	D min	F	L1	γF°	γP°	gage insert
<b>right hand</b>							
3871303	MTFNR12CA3	1.969	.787	2.17	-9.0	-5.0	TN..160408/TN..332
3871302	MTFNR16CA3	2.362	.984	2.48	-9.0	-5.0	TN..160408/TN..332
3871301	MTFNR20CA4	2.756	.984	2.76	-9.0	-5.0	TN..220408/TN..432
3871300	MTFNR25CA5	3.937	1.260	3.94	-9.0	-5.0	TN..270612/TN..443
<b>left hand</b>							
3871306	MTFNL12CA3	1.969	.787	2.17	-9.0	-5.0	TN..160408/TN..332
3871305	MTFNL16CA3	2.362	.984	2.48	-9.0	-5.0	TN..160408/TN..332

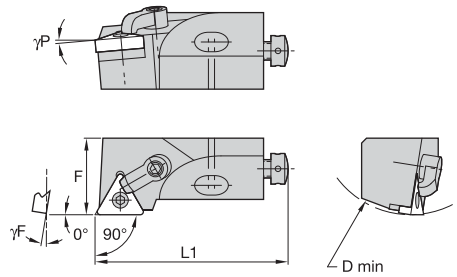
■ Spare Parts



D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	holding screw	hex	washer
1.969	—	KLM33L	2 mm	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	—	4 mm	CSWM 060 050
2.362	ITSN322	KLM34L	2 mm	CKM34	STCM9	2 mm	KUAM25	2 mm	KUAM32	191.407	—	5 mm	CSWM 080 050
2.756	ITSN433	KLM46	2.5 mm	CKM35	STCM37	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	—	5 mm	CSWM 080 050
3.937	ITSN534	KLM58	3 mm	CKM38	STCM39	3 mm	KUAM26	3 mm	KUAM32	—	MS364	8 mm	CSWM 100 080



See pages B81–B93 for inserts.



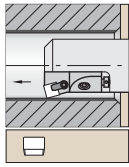
## ■ MTGN 0°

order number	catalog number	D min	F	L1	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>							
3871296	MTGNR12CA3	1.969	.787	2.17	-9.0	-5.0	TN..160408/TN..332
3871295	MTGNR16CA3	2.362	.984	2.48	-9.0	-5.0	TN..160408/TN..332
3871294	MTGNR20CA4	2.756	.984	2.76	-9.0	-5.0	TN..220408/TN..432
<b>left hand</b>							
3871299	MTGNL12CA3	1.969	.787	2.17	-9.0	-5.0	TN..160408/TN..332
3871298	MTGNL16CA3	2.362	.984	2.48	-9.0	-5.0	TN..160408/TN..332
3871297	MTGNL20CA4	2.756	.984	2.76	-9.0	-5.0	TN..220408/TN..432

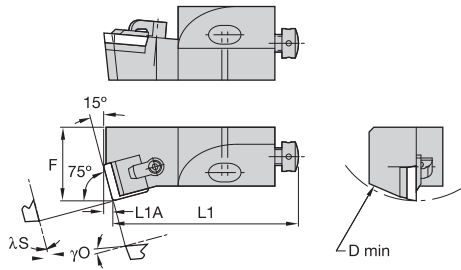
## ■ Spare Parts



D min	shim	lock pin	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.969	—	KLM33L	2 mm	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	4 mm	CSWM 060 050
2.362	ITSN322	KLM34L	2 mm	CKM34	STCM9	2 mm	KUAM25	2 mm	KUAM32	191.407	5 mm	CSWM 080 050
2.756	ITSN433	KLM46	2.5 mm	CKM35	STCM37	2.5 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050



See pages B186-B191 and B211-B212 for inserts.



Tools for External Turning and Internal Boring

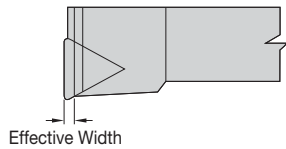
■ CSKP 15°

order number	catalog number	D min	F	L1	L1A	λS°	γO°	gage insert
<b>right hand</b>								
3870437	CSKPR10CA3	1.575	.551	1.97	.09	.0	5.0	SP..090308/SP..322
3870436	CSKPR12CA4	1.969	.787	2.17	.12	.0	5.0	SP..120308/SP..422

■ Spare Parts



D min	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	CKM34	STCM38	2 mm	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	4 mm	CSWM 060 050

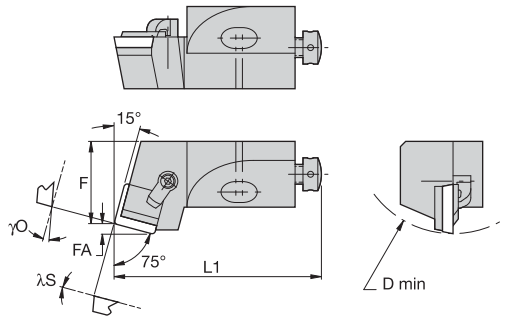


■ Chipbreakers for C-Style Cartridges

Chipbreakers			note
insert	chipbreaker	effective width	
SP..090308/SP..322	CBS-12	2.1	**For chipbreaking on both primary and secondary cutting edges
	CBS-12D**	2.1	
SP..120308/SP..422	CBS16	4.4	**For chipbreaking on both primary and secondary cutting edges
	CBS-16D**	2.8	
	CBS-16N	3.0	
	CBS16F	2.1	



See pages B186–B191 and B211–B212 for inserts.



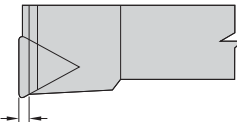
■ CSRP 15°

order number	catalog number	D min	F	L1	FA	λS°	γ0°	gage insert
<b>right hand</b>								
3870435	CSRPR10CA3	1.575	.551	1.97	.087	.0	.0	SP..090308/SP..322
3870434	CSRPR12CA4	1.969	.787	2.17	.119	3.0	.0	SP..120308/SP..422

■ Spare Parts



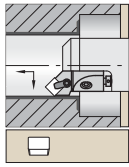
D min	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	CKM34	STCM38	2 mm	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	4 mm	CSWM 060 050



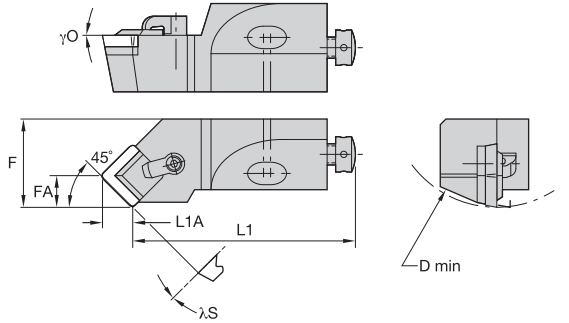
Effective Width

■ Chipbreakers for C-Style Cartridges

Chipbreakers			note
insert	chipbreaker	effective width	
SP..090308/SP..322	CBS-12	2.1	**For chipbreaking on both primary and secondary cutting edges
	CBS-12D**	2.1	
SP..120308/SP..422	CBS16	4.4	**For chipbreaking on both primary and secondary cutting edges
	CBS-16D**	2.8	
	CBS-16N	3.0	
	CBS16F	2.1	



See pages B186–B191 and B211–B212 for inserts.



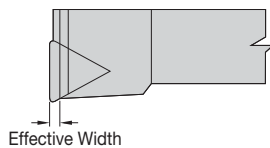
■ CSSP 45°

order number	catalog number	D min	F	L1	FA	L1A	λS°	γ0°	gage insert
<b>right hand</b>									
3870430	CSSPR10CA3	1.575	.551	1.73	.254	.24	.0	.0	SP..090308/SP..322
3870429	CSSPR12CA4	1.969	.787	1.85	.342	.33	.0	.0	SP..120308/SP..422
<b>left hand</b>									
3870433	CSSPL10CA3	1.575	.551	1.73	.254	.24	.0	.0	SP..090308/SP..322
3870432	CSSPL12CA4	1.969	.787	1.85	.342	.33	.0	.0	SP..120308/SP..422
3870431	CSSPL20CA4	2.756	.984	2.36	—	.33	.0	.0	SP..120308/SP..422

■ Spare Parts

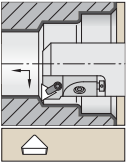


D min	shim	shim screw	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	—	—	—	CKM34	STCM38	2 mm	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	—	—	—	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	4 mm	CSWM 060 050
2.756	SM840	MS111	2 mm	CKM20	STCM11	3 mm	KUAM26	3 mm	KUAM32	191.407	5 mm	CSWM 080 050

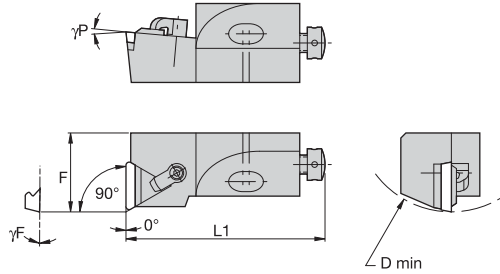


■ Chipbreakers for C-Style Cartridges

Chipbreakers			note
insert	chipbreaker	effective width	
SP..090308/SP..322	CBS-12	2.1	**For chipbreaking on both primary and secondary cutting edges
	CBS-12D**	2.1	
SP..120308/SP..422	CBS16	4.4	**For chipbreaking on both primary and secondary cutting edges
	CBS-16D**	2.8	
	CBS-16N	3.0	
	CBS16F	2.1	



See pages B192–B194 and B212–B216 for inserts.



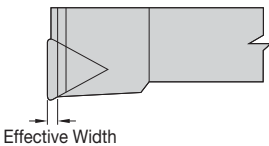
## CTFP 0°

order number	catalog number	D min	F	L1	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>							
3870427	CTFPR10CA2	1.575	.551	1.97	.0	5.0	TP..110304/TP..421
3870426	CTFPR12CA3	1.969	.787	2.17	.0	5.0	TP..160308/TP..322
3870424	CTFPR20CA4	2.756	.984	2.76	.0	5.0	TP..220408/TP..432
<b>left hand</b>							
3870428	CTFPL12CA3	1.969	.787	2.17	.0	5.0	TP..160308/TP..322

## Spare Parts



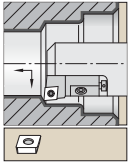
D min	shim	shim screw	hex	clamp	clamp screw	hex	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	—	—	—	CKM34	STCM38	2 mm	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	—	—	—	CKM34	STCM38	2 mm	KUAM22	2 mm	KUAM31	191.406	4 mm	CSWM 060 050
2.756	SM837	MS125	2.5 mm	CKM35	STCM8	4 mm	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050



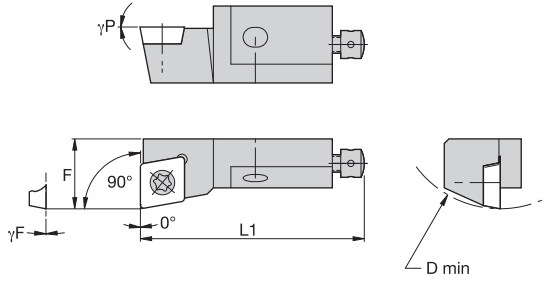
## Chipbreakers for C-Style Cartridges

Chipbreakers

insert	chipbreaker	effective width	note
TP..110304/TP..421	CBT-8	2.2	
TP..160308/TP..322	CBT-12*	4.0	*Use with CTC-style holder only
	CBT-12*	2.7	*Use with CTC-style holder only
	CBT-12*	2.2	*Use with CTC-style holder only
TP..220408/TP..432	CBT-16	5.5	
	CBT-16N	3.2	
	CBT-16F	2.1	



See pages B30–B46 for inserts.



■ SCFP 0°

order number	catalog number	D min	F	L1	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>							
3871284	SCFPR06CA05	.787	.315	.98	.0	.0	CP..050204/CP..18151
3871283	SCFPR08CA06	.984	.394	1.26	.0	.0	CP..060204/CP..2151
3871272	SCFPR10CA09	1.575	.551	1.97	.0	.0	CP..09T308/CP..3252
<b>left hand</b>							
3871285	SCFPL08CA06	.984	.394	1.26	.0	.0	CP..060204/CP..2151

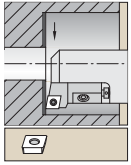
■ Spare Parts



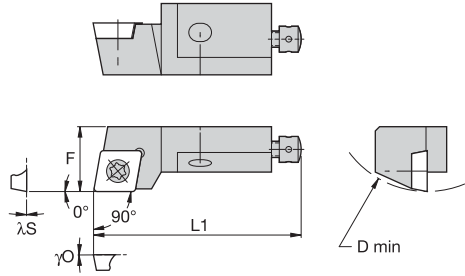
D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	holding screw	hex	washer
.787	MS1933	T7	KUAM34	1.5 mm	KUAM35	—	MS2173	2 mm	CSWM 035 040
.984	MS1153	T7	KUAM34	1.5 mm	KUAM20	—	MS2175	2.5 mm	CSWM 040 050
1.575	MS1155	T15	KUAM28	2 mm	KUAM30	191.405	—	4 mm	CSWM 060 050

Tools for External Turning and Internal Boring





See pages B47–B64 for inserts.



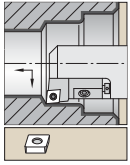
## ■ SCGP 0°

order number	catalog number	D min	F	L1	$\lambda S^\circ$	$\gamma 0^\circ$	gage insert
<b>right hand</b>							
3871270	SCGPR08CA06	.984	.394	1.26	.0	.0	CP..060204/CP..2151
<b>left hand</b>							
3871271	SCGPL08CA06	.984	.394	1.26	.0	.0	CP..060204/CP..2151

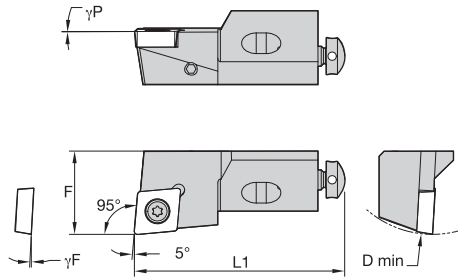
## ■ Spare Parts



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	holding screw	hex	washer
.984	MS1153	T7	KUAM34	1.5 mm	KUAM20	MS2175	2.5 mm	CSWM 040 050



See pages B30–B46 for inserts.



Tools for External Turning and Internal Boring

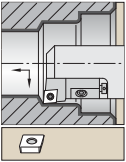
■ SCLC -5°

order number	catalog number	D min	F	L1	$\gamma^F$	$\gamma^P$	gage insert
<b>right hand</b>							
3871268	SCLCR10CA09	1.575	.551	1.97	-3.0	.0	CC..09T308/CC..3252
3871265	SCLCR12CA12	1.969	.787	2.17	-3.0	.0	CC..120408/CC..432
<b>left hand</b>							
3871267	SCLCL12CA12	1.969	.787	2.17	-3.0	.0	CC..120408/CC..432
3871266	SCLCL16CA12	2.362	.984	2.48	-3.0	.0	CC..120408/CC..432

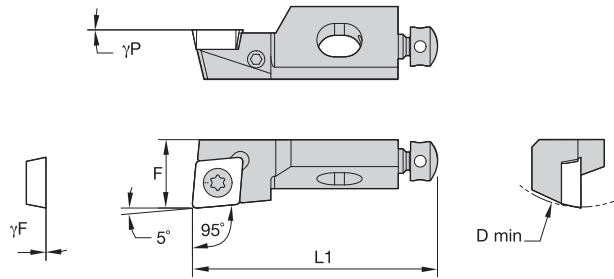
■ Spare Parts



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	MS1155	T15	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	MS1157	T15	KUAM23	2.5 mm	KUAM31	191.406	4 mm	CSWM 060 050
2.362	MS1157	T15	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050



See pages B47–B64 for inserts.



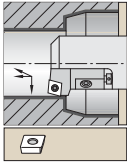
## ■ SCLP -5°

order number	catalog number	D min	F	L1	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>							
3871261	SCLPR06CA05	.787	.315	.98	.0	.0	CP..050204/CP..18151
3871260	SCLPR08CA06	.984	.394	1.26	.0	.0	CP..060204/CP..2151
3871259	SCLPR10CA09	1.575	.551	1.97	.0	.0	CP..09T308/CP..3252
<b>left hand</b>							
3871264	SCLPL06CA05	.787	.315	.98	.0	.0	CP..050204/CP..18151
3871263	SCLPL08CA06	.984	.394	1.26	.0	.0	CP..060204/CP..2151
3871262	SCLPL10CA09	1.575	.551	1.97	.0	.0	CP..09T308/CP..3252

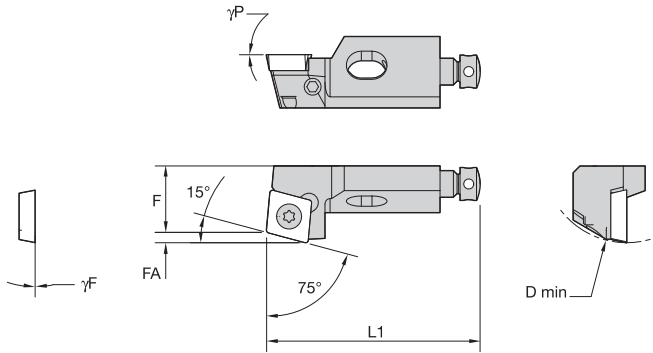
## ■ Spare Parts



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	holding screw	hex	washer
.787	MS1933	T7	KUAM34	1.5 mm	KUAM35	—	MS2173	2 mm	CSWM 035 040
.984	MS1153	T7	KUAM34	1.5 mm	KUAM20	—	MS2175	2.5 mm	CSWM 040 050
1.575	MS1155	T15	KUAM28	2 mm	KUAM30	191.405	—	4 mm	CSWM 060 050



See pages B30–B46 for inserts.



■ **SCRP 15°**

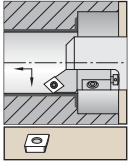
order number	catalog number	D min	F	L1	FA	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>								
3871257	SCRPR08CA06	.984	.394	1.26	.059	.0	.0	CP..060204/CP..2151
<b>left hand</b>								
3871258	SCRPL08CA06	.984	.394	1.26	.059	.0	.0	CP..060204/CP..2151

■ **Spare Parts**

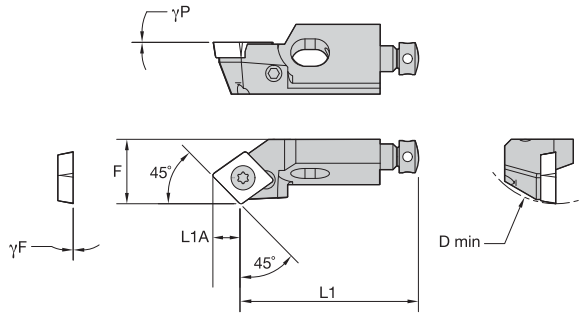


D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	holding screw	hex	washer
.984	MS1153	T7	KUAM34	1.5 mm	KUAM20	MS2175	2.5 mm	CSWM 040 050

Tools for External Turning and Internal Boring



See pages B47–B64 for inserts.



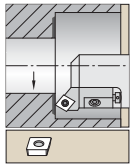
■ **SCSP 45°**

order number	catalog number	D min	F	L1	L1A	γF°	γP°	gage insert
<b>right hand</b>								
3871255	SCSPR06CA05	.787	.315	.83	.14	.0	.0	CP..050204/CP..18151
3871254	SCSPR08CA06	.984	.394	1.10	.17	.0	.0	CP..060204/CP..2151

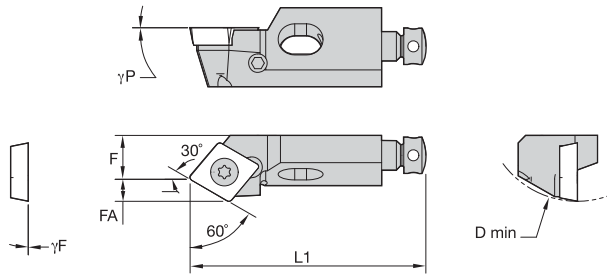
■ **Spare Parts**



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	holding screw	hex	washer
.787	MS1933	T7	—	—	KUAM35	MS2173	2 mm	CSWM 035 040
.984	MS1153	T7	KUAM34	1.5 mm	KUAM20	MS2175	2.5 mm	CSWM 040 050



See pages B30–B46 for inserts.



Tools for External Turning and Internal Boring

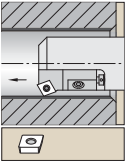
■ SCTP 30°

order number	catalog number	D min	F	L1	FA	γF°	γP°	gage insert
<b>right hand</b>								
3871252	SCTPR06CA05	.787	.217	.98	.102	.0	.0	CP..050204/CP..18151
3871251	SCTPR08CA06	.984	.236	1.26	.116	.0	.0	CP..060204/CP..2151
<b>left hand</b>								
3871253	SCTPL08CA06	.984	.236	1.26	.116	.0	.0	CP..060204/CP..2151

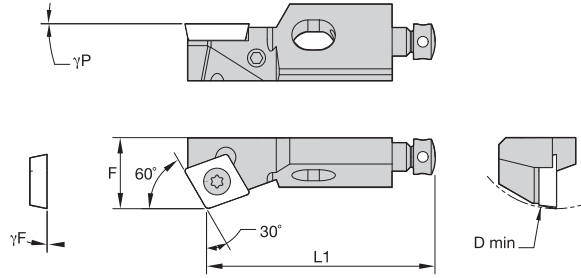
■ Spare Parts



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	holding screw	hex	washer
.787	MS1933	T7	—	—	KUAM35	MS2173	2 mm	CSWM 035 040
.984	MS1153	T7	KUAM34	1.5 mm	KUAM20	MS2175	2.5 mm	CSWM 040 050



See pages B47–B64 for inserts.



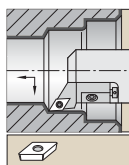
■ **SCWP 30°**

order number	catalog number	D min	F	L1	$\gamma_F^\circ$	$\gamma_P^\circ$	gage insert
<b>right hand</b>							
3871249	SCWPR08CA06	.984	.394	1.26	.0	.0	CP..060204/CP..2151
<b>left hand</b>							
3871250	SCWPL08CA06	.984	.394	1.26	.0	.0	CP..060204/CP..2151

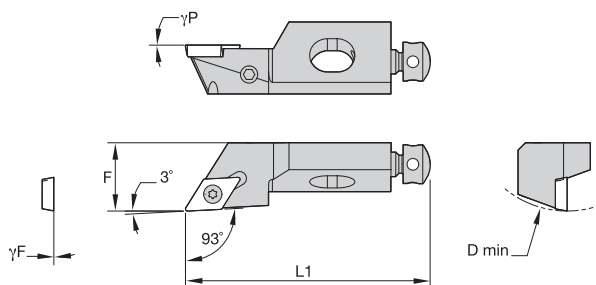
■ **Spare Parts**



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	holding screw	hex	washer
.984	MS1153	T7	KUAM34	1.5 mm	KUAM20	MS2175	2.5 mm	CSWM 040 050



See pages B47-B64 for inserts.



■ SDJP -3°

order number	catalog number	D min	F	L1	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>							
3871247	SDJPR10CA07	1.575	.551	1.97	.0	.0	DP..070204/DP..2151
<b>left hand</b>							
3871248	SDJPL10CA07	1.575	.551	1.97	.0	.0	DP..070204/DP..2151

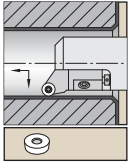
■ Spare Parts



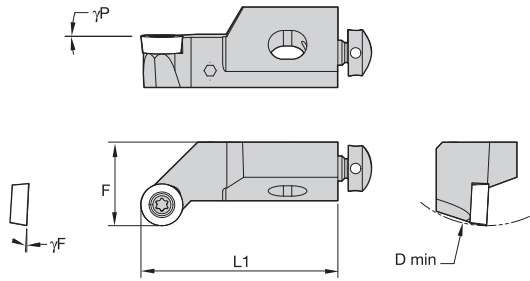
D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	MS1153	T7	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050

Tools for External Turning and Internal Boring





See pages B65–B67 for inserts.



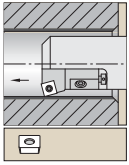
## SRGC

order number	catalog number	D min	F	L1	$\gamma^F$ °	$\gamma^P$ °	gage insert
<b>right hand</b>							
3871245	SRGCR08CA06	.984	.394	1.26	-4.0	.0	RC..0602M0/RC..215
3871244	SRGCR10CA08	1.575	.551	1.97	-3.0	.0	RC..0803M0/RC..0803M0
<b>left hand</b>							
3871246	SRGCL12CA10	1.969	.787	2.17	-3.0	.0	RC..10T3M0/RC..10T3M0

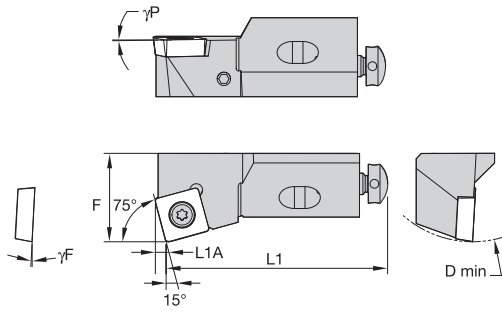
## Spare Parts



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	holding screw	hex	washer
.984	MS1153	T7	KUAM34	1.5 mm	KUAM20	—	MS2175	2.5 mm	CSWM 040 050
1.575	MS1154	T9	KUAM28	2 mm	KUAM30	191.405	—	4 mm	CSWM 060 050
1.969	MS1155	T15	KUAM23	2.5 mm	KUAM31	191.406	—	4 mm	CSWM 060 050



See pages B68–B80 for inserts.



■ SSKC 15°

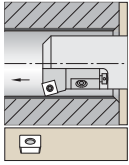
order number	catalog number	D min	F	L1	L1A	γF°	γP°	gage insert
<b>right hand</b>								
3871192	SSKCR10CA09	1.575	.551	1.97	.09	-4.3	-2.5	SC..09T308/SC..3252
3871191	SSKCR12CA12	1.969	.787	2.17	.12	-3.0	.0	SC..120408/SC..432
3871190	SSKCR16CA12	2.362	.984	2.48	.12	-3.0	.0	SC..120408/SC..432
<b>left hand</b>								
3871243	SSKCL12CA12	1.969	.787	2.17	.12	-3.0	.0	SC..120408/SC..432

■ Spare Parts

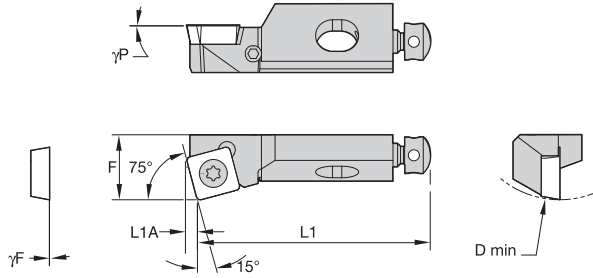


D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	MS1155	T15	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	MS1157	T15	KUAM23	2.5 mm	KUAM31	191.406	4 mm	CSWM 060 050
2.362	MS1157	T15	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050

Tools for External Turning and Internal Boring



See pages B68-B80 for inserts.



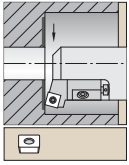
## SSKP 15°

order number	catalog number	D min	F	L1	L1A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>								
3870393	SSKPR10CA09	1.575	.551	1.97	.09	.0	.0	SP..09T308/SP..3252
3870392	SSKPR12CA09	1.969	.787	2.17	.09	.0	.0	SP..09T308/SP..3252
<b>left hand</b>								
3870394	SSKPL10CA09	1.575	.551	1.97	.09	.0	.0	SP..09T308/SP..3252

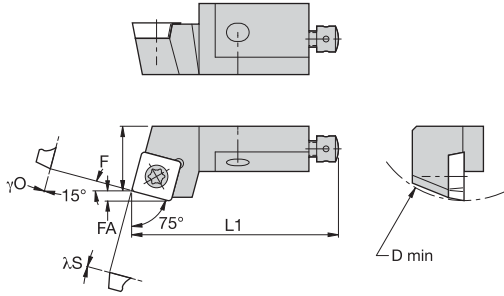
## Spare Parts



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	MS1155	T15	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	MS1155	T15	KUAM23	2.5 mm	KUAM31	191.406	4 mm	CSWM 060 050



See pages B68–B80 for inserts.



Tools for External Turning and Internal Boring

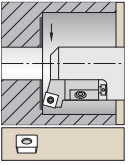
■ SSRC 15°

order number	catalog number	D min	F	L1	FA	λS°	γO°	gage insert
<b>right hand</b>								
3870390	SSRCR12CA12	1.969	.787	2.17	.121	-3.0	.0	SC..120408/SC..432
<b>left hand</b>								
3870391	SSRCL12CA12	1.969	.787	2.17	.121	-3.0	.0	SC..120408/SC..432

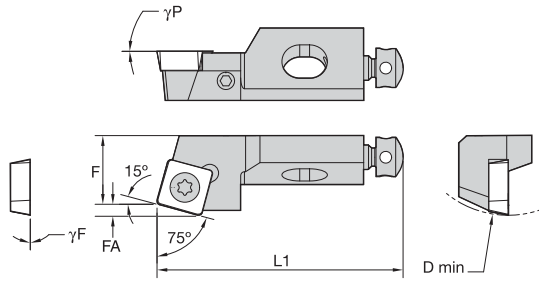
■ Spare Parts



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.969	MS1157	T15	KUAM23	2.5 mm	KUAM31	191.406	4 mm	CSWM 060 050



See pages B68–B80 for inserts.



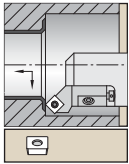
## ■ SSRP 15°

order number	catalog number	D min	F	L1	FA	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>								
3870388	SSRPR10CA09	1.575	.551	1.97	.088	.0	.0	SP..09T308/SP..3252
<b>left hand</b>								
3870389	SSRPL10CA09	1.575	.551	1.97	.087	.0	.0	SP..09T308/SP..3252

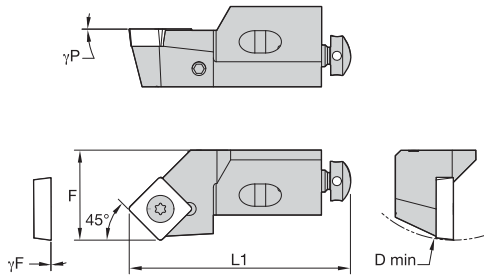
## ■ Spare Parts



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	MS1155	T15	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050



See pages B68–B80 for inserts.



■ SSSC 45°

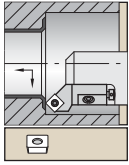
order number	catalog number	D min	F	L1	$\gamma_F^\circ$	$\gamma_P^\circ$	gage insert
<b>right hand</b>							
3870386	SSSCR10CA09	1.575	.551	1.73	-3.0	.0	SC..09T308/SC..3252
3870385	SSSCR12CA12	1.969	.787	1.85	-3.0	.0	SC..120408/SC..432
3870384	SSSCR16CA12	2.362	.984	2.09	.0	.0	SC..120408/SC..432
<b>left hand</b>							
3870387	SSSCL12CA12	1.969	.787	1.85	-3.0	.0	SC..120408/SC..432

■ Spare Parts

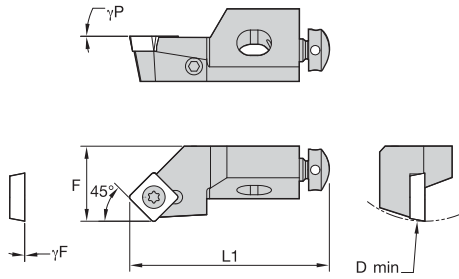


D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	MS1155	T15	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050
1.969	MS1157	T15	KUAM23	2.5 mm	KUAM31	191.406	4 mm	CSWM 060 050
2.362	MS1157	T15	KUAM25	2.5 mm	KUAM32	191.407	5 mm	CSWM 080 050

Tools for External Turning and Internal Boring



See pages B68–B80 for inserts.



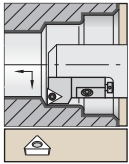
## ■ SSSP 45°

order number	catalog number	D min	F	L1	$\gamma^F$ °	$\gamma^P$ °	gage insert
<b>right hand</b>							
3870382	SSSPR10CA09	1.575	.551	1.73	.0	.0	SP..09T308/SP..3252
<b>left hand</b>							
3870383	SSSPL10CA09	1.575	.551	1.73	.0	.0	SP..09T308/SP..3252

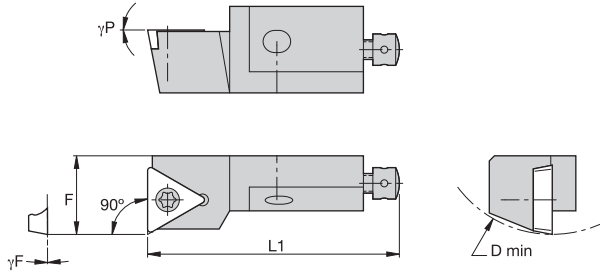
## ■ Spare Parts



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	hex	washer
1.575	MS1155	T15	KUAM28	2 mm	KUAM30	191.405	4 mm	CSWM 060 050



See pages B81–B93 for inserts.

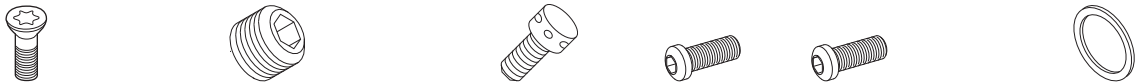


Tools for External Turning and Internal Boring

■ STFP 0°

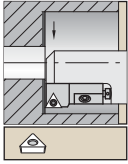
order number	catalog number	D min	F	L1	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>							
3870378	STFPR08CA09	.984	.394	1.26	.0	.0	TP..090204/TP..18151
3870377	STFPR10CA11	1.575	.551	1.97	.0	.0	TP..110204/TP..2151
3870376	STFPR12CA16	1.969	.787	2.17	.0	.0	TP..16T308/TP..3252
<b>left hand</b>							
3870381	STFPL08CA09	.984	.394	1.26	.0	.0	TP..090204/TP..18151
3870380	STFPL10CA11	1.575	.551	1.97	.0	.0	TP..110204/TP..2151
3870379	STFPL12CA16	1.969	.787	2.17	.0	.0	TP..16T308/TP..3252

■ Spare Parts

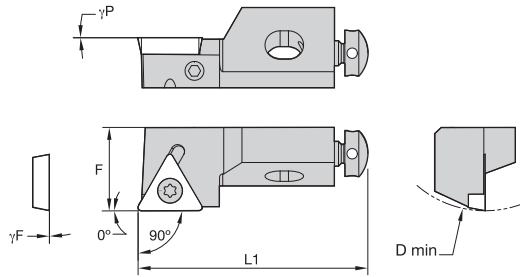


D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	holding screw	hex	washer
.984	MS1152	T7	KUAM34	1.5 mm	KUAM20	—	MS2175	2.5 mm	CSWM 040 050
1.575	MS1153	T7	KUAM28	2 mm	KUAM30	191.405	—	4 mm	CSWM 060 050
1.969	MS1155	T15	KUAM23	2.5 mm	KUAM31	191.406	—	4 mm	CSWM 060 050





See pages B81–B93 for inserts.



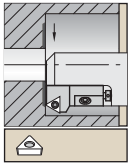
## ■ STGP 0°

order number	catalog number	D min	F	L1	$\gamma^F$	$\gamma^P$	gage insert
<b>right hand</b>							
3870372	STGPR08CA09	.984	.394	1.26	.0	.0	TP..090204/TP..18151
3870371	STGPR10CA11	1.575	.551	1.97	.0	.0	TP..110204/TP..2151
3870370	STGPR12CA16	1.969	.787	2.17	.0	.0	TP..16T308/TP..3252
<b>left hand</b>							
3870374	STGPL08CA09	.984	.394	1.26	.0	.0	TP..090204/TP..18151
3870373	STGPL10CA11	1.575	.551	1.97	.0	.0	TP..110204/TP..2151

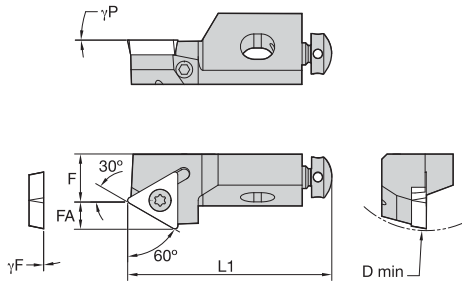
## ■ Spare Parts



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	holding screw	hex	washer
.984	MS1152	T7	KUAM34	1.5 mm	KUAM20	—	MS2175	2.5 mm	CSWM 040 050
1.575	MS1153	T7	KUAM28	2 mm	KUAM30	191.405	—	4 mm	CSWM 060 050
1.969	MS1155	T15	KUAM23	2.5 mm	KUAM31	191.406	—	4 mm	CSWM 060 050



See pages B81–B93 for inserts.



■ STTP 30°

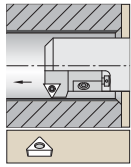
order number	catalog number	D min	F	L1	FA	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>								
3870369	STTPR08CA09	.984	.236	1.26	.167	.0	.0	TP..090204/TP..18151
3870368	STTPR10CA11	1.575	.354	1.97	.195	.0	.0	TP..110204/TP..2151
3870367	STTPR12CA16	1.969	.512	2.17	.282	.0	.0	TP..16T308/TP..3252

■ Spare Parts

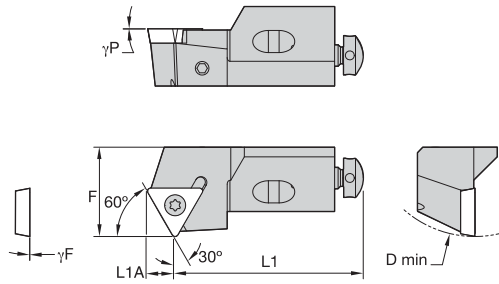


D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	holding screw	hex	washer
.984	MS1152	T7	KUAM34	1.5 mm	KUAM20	—	MS2175	2.5 mm	CSWM 040 050
1.575	MS1153	T7	KUAM28	2 mm	KUAM30	191.405	—	4 mm	CSWM 060 050
1.969	MS1155	T15	KUAM23	2.5 mm	KUAM31	191.406	—	4 mm	CSWM 060 050

Tools for External Turning and Internal Boring



See pages B99–B105 for inserts.



## STWP 30°

order number	catalog number	D min	F	L1	L1A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert
<b>right hand</b>								
3870364	STWPR08CA09	.984	.394	1.10	.17	.0	.0	TP..090204/TP..18151
3870363	STWPR10CA11	1.575	.551	1.73	.20	.0	.0	TP..110204/TP..2151
3870252	STWPR12CA16	1.969	.787	1.85	.28	.0	.0	TP..16T308/TP..3252
<b>left hand</b>								
3870366	STWPL10CA11	1.575	.551	1.73	.20	.0	.0	TP..110204/TP..2151
3870365	STWPL12CA16	1.969	.787	1.85	.28	.0	.0	TP..16T308/TP..3252


## Spare Parts



D min	insert screw	Torx	radial adjusting screw	hex	axial adjusting screw	mounting screw	holding screw	hex	washer
.984	MS1152	T7	KUAM34	1.5 mm	KUAM20	—	MS2175	2.5 mm	CSWM 040 050
1.575	MS1153	T7	KUAM28	2 mm	KUAM30	191.405	—	4 mm	CSWM 060 050
1.969	MS1155	T15	KUAM23	2.5 mm	KUAM31	191.406	—	4 mm	CSWM 060 050

# NOVO KNOWS

## ART TO PART TO PROFIT



Being as productive and profitable as possible is your fundamental goal. With the addition of NOVO™ to your team, your goal can be achieved. NOVO possesses powerful digital tools that link together process planning, inventory availability and purchase, cost-per-part management, and productivity improvements.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift.

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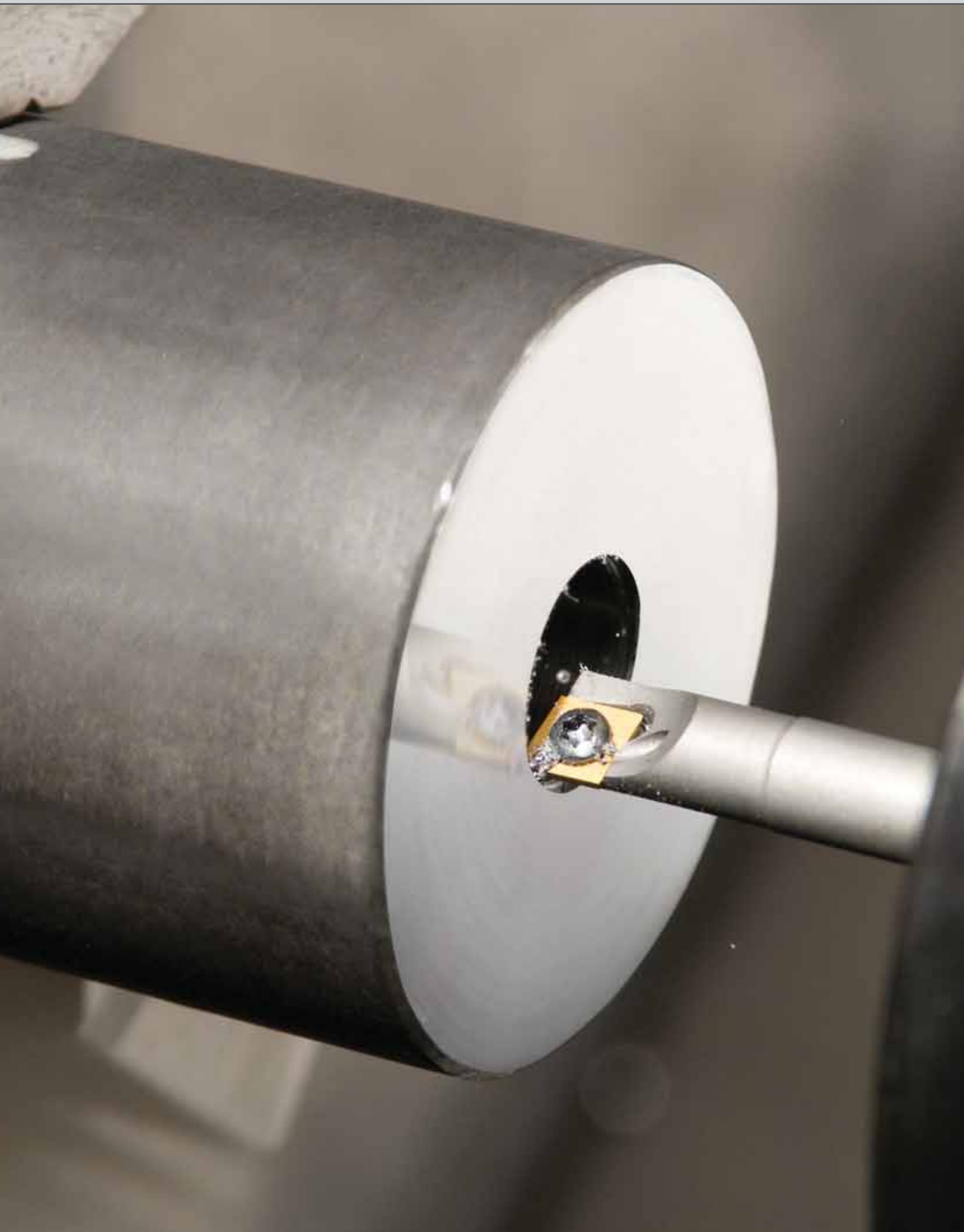


**01**

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## Tools for Small Hole Boring

Small Hole Boring I.D. Indexable Insert Tooling.....	D2–D91
A/B Series .....	D92–D106
Quadralock.....	D108–D121
Technical Information .....	D122–D125
Custom Solution Worksheet .....	D126–D127

The WIDIA™ line of micro boring bars provides accurate holmaking tooling in diameters as small as .062" (1,57mm). These economical, indexable inserts are available in both steel and carbide shanks and are stocked in both metric and inch sizes. Ideal for a wide range of applications, including precision micro boring.



## Small Hole Boring • I.D. Indexable Insert Tooling

### 80° Diamond Insert Boring Bars

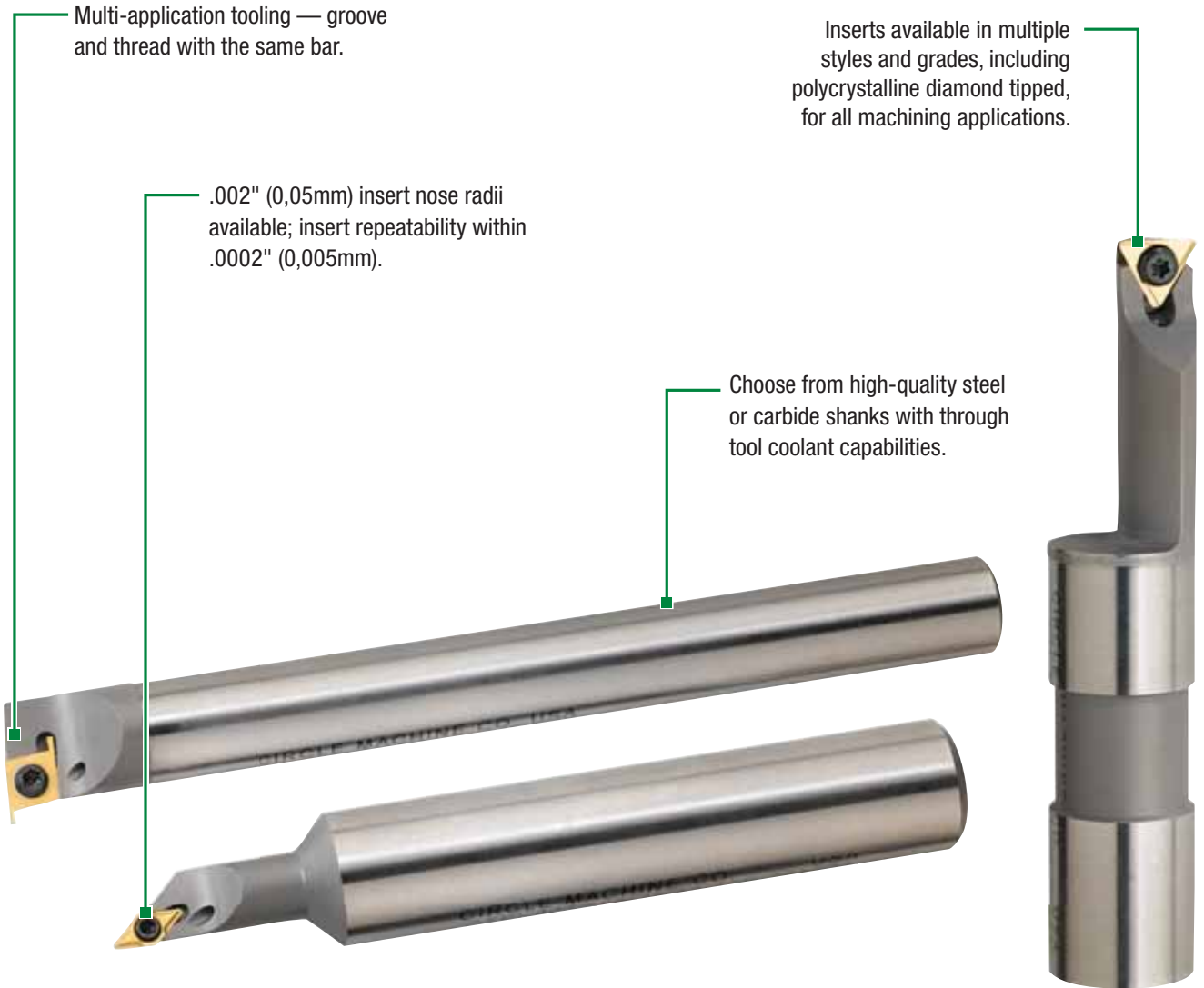
- Available in shanks as small as .157" (4mm) to bore >.180" (4,57mm) diameter.
- Positive rake geometry for free cutting action and better surface finishes.
- Superior, unobstructed chip evacuation.
- Stocked in multiple grades to bore a wide range of materials.

### Threading and Grooving Boring Bars

- Easy insert changes for threading and grooving.
- Thread down to a 48 TP, 1,3mm TP (pitch).
- Thread and groove capabilities to an inside bore diameter of .272" (6,91mm).







Multi-application tooling — groove and thread with the same bar.

.002" (0,05mm) insert nose radii available; insert repeatability within .0002" (0,005mm).

Inserts available in multiple styles and grades, including polycrystalline diamond tipped, for all machining applications.

Choose from high-quality steel or carbide shanks with through tool coolant capabilities.

## Triangle Insert Boring Bars

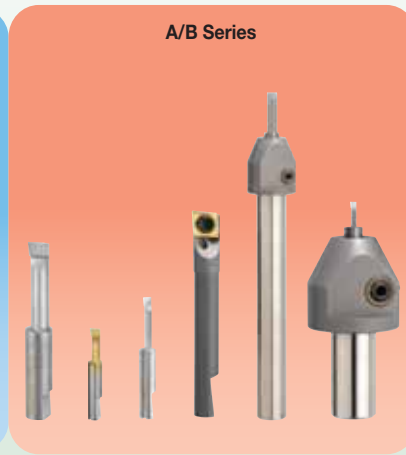
- Designed for less obstruction and greater chip evacuation.
- Positive rake geometry to bore holes  $>.275"$  (6,98mm) diameter.
- Stocked in all grades, including diamond-tipped and borazon-tipped styles.
- Stocked in shanks as small as  $.24"$  (6mm) for  $.28"$  (7,06mm) minimum bore diameter.



**The World's Most Comprehensive Boring Solutions**

Trust the WIDIA™ full line of boring tools to meet all of your demanding job requirements. Whatever the work at hand, you are sure to find the most appropriate solution in this comprehensive, easy-to-use guide.

We engineer only the BEST boring tools, designed to reduce your machining time, provide superior results, and outperform the competition.



**Select the Correct Small Hole Boring Product Platform for Your Application**

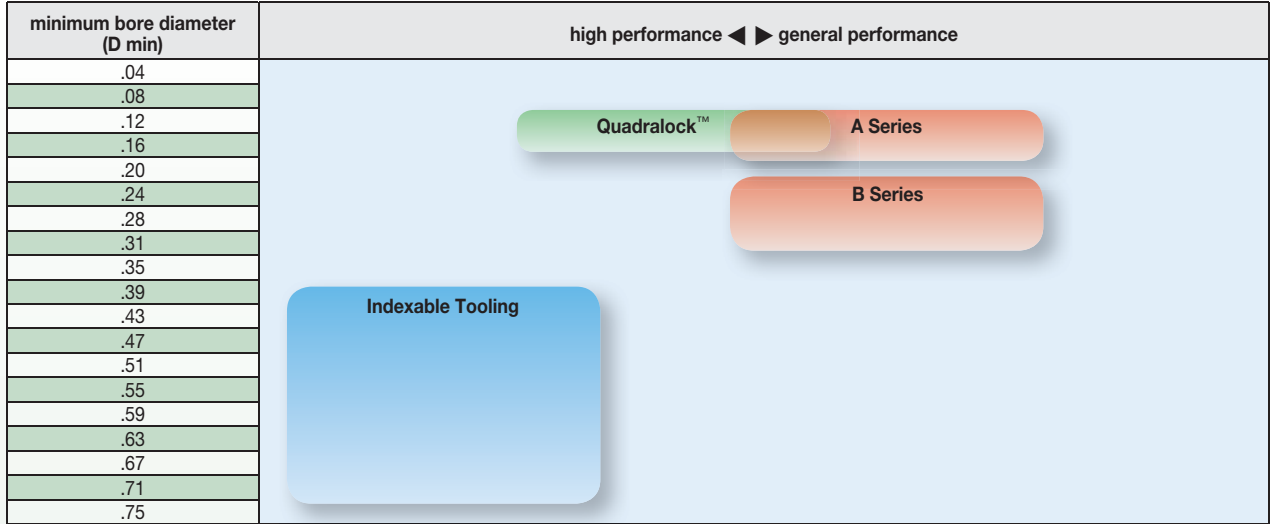
**1 Determine tooling system to be used based on hole size to be bored (D min).**

*NOTE: Proper bar selection will have largest minimum bore dimension under hole size to be bored.*

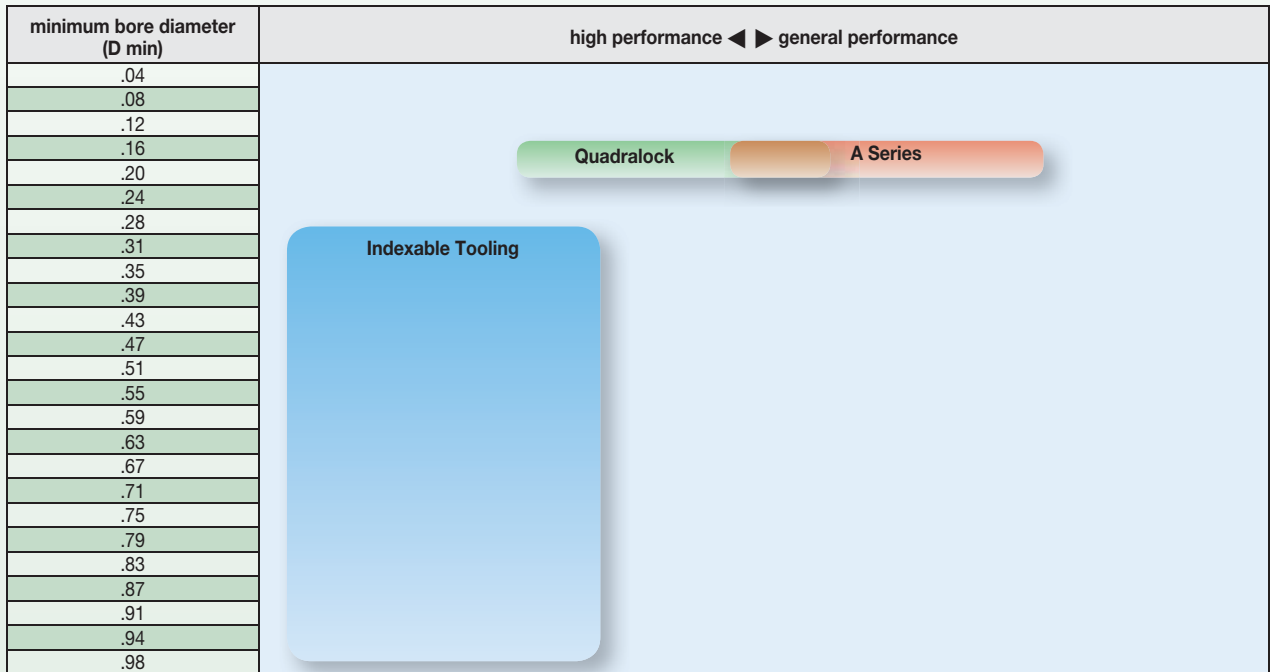
- Indexable Tooling
- A/B Series
- Quadralock

Boring	high performance ◀ ▶ general performance
minimum bore diameter (D min)	
.04	
.08	
.12	
.16	
.20	
.24	
.28	
.31	
.35	
.39	
.43	
.47	
.51	
.55	
.59	
.63	
.67	
.71	
.75	
.79	
.83	
.87	
.91	
.94	
.98	
1.02	
1.06	
1.10	
1.14	
1.18	
1.22	
1.26	
1.30	
1.34	
1.38	

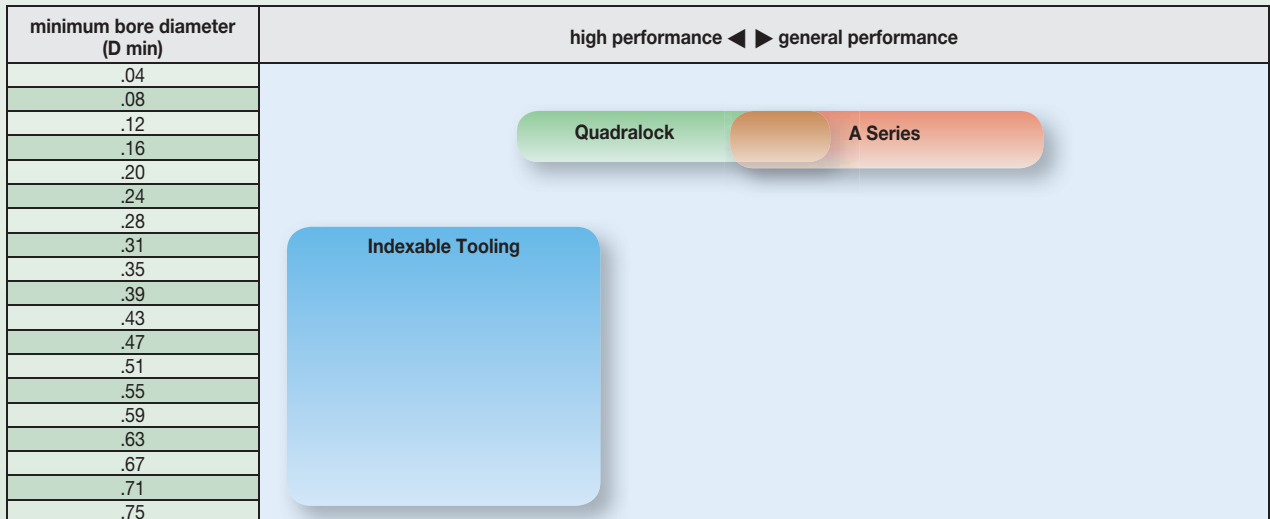
**Profiling**



**Threading**



**Grooving**



NOTE: Proper bar selection will have largest minimum bore dimension under hole size to be bored.

**2 Determine boring bar (D).**

**A Select shank size (D) based on your machine's requirements.**

**B Determine bore depth (how far the boring bar extends from the holder).** Multiply bar diameter by 4. If bore depth is less, use a steel bar. If bore depth exceeds 4:1 ratio, use a carbide bar. Use L1 or L4 depending on bar selected. (See recommended maximum overhang chart on page D122.) For indexable tooling, go to **step 3**. For all other tooling systems, go directly to **step 4**.

**C Determine lead angle (KRA).** Zero degree lead angle is used when maximum stability is required. Lead angle may vary based on changing conditions, such as boring in a blind hole.

**Small Hole Boring Bars For Turning**  
Clamping System S • Carbide

order number	catalog number	KRA	D	D min	F	L1	A	γ°	γ°	gage insert	insert screw	Tors	
right hand	2831949	CCBI19519607R	7	154	180	095	4.000	040	0.0°	0.0°	CD-129X05	CC08	T8

**3 Determine which chipbreaker is best for the material to be machined.**

Consult the Small Hole Boring Chipbreaker Geometry charts on pages D66–D69.

**Small Hole Boring**  
Chipbreaker Geometries

**Single-Sided, Positive Inserts**

**..HB**  
Flat inserts. Peripheral ground for best surface quality and reduced cutting pressure. Very stable cutting edge offers maximum rigidity.

**4 Determine which grade is best for the material to be machined.**

Consult the Grades and Grade Descriptions charts on pages D70–D71.

**Grades and Grade Descriptions**  
Small Hole Boring Inserts

Coatings provide high-speed capability and are engineered for finishing to light roughing.

Coating	Grade Description	wear resistance ← toughness									
		05	10	15	20	25	30	35	40	45	
CMI	Uncoated carbide. A very tough, ultra-fine grain unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, iron, and non-ferrous materials. Performs best at low speeds and will handle interruptions and high feed rates. Use when C2, C3, or C25 fail due to chipping or breaking.	M									
		K									
		N									
		O									
C2	Uncoated carbide. A hard, low binder content, unalloyed WC/Co fine-grained grade. General purpose grade for non-ferrous materials. Has excellent abrasion resistance for machining cast iron, austenitic stainless steels, non-ferrous metals, non-metals.	M									
		K									
		N									
		O									

5 Select the appropriate insert based on style, grade, and geometry.

### Small Hole Boring Positive Inserts

● first choice  
○ alternate choice

ISO catalog number		ANSI catalog number	D		L10		L		Rr		D1		max		CG5	CG5	CG5	CG5	CG5	CG5	CG5	CG5	CG5	CG5	CG5
			mm	in	mm	in	mm	in	mm	in	mm	in	mm	in											
CDHB4T08B	CDHB1206XB	3.97	5/32	4.03	.158	1.02	.040	0.05	.002	2.13	.084	—	—												
CDHB4T0X0M	CDHB1206X0M	3.97	5/32	4.03	.158	1.02	.040	0.05	.002	2.13	.084	1.30	.075												
CDHB4T002	CDHB120605	3.97	5/32	4.03	.158	1.02	.040	0.18	.007	2.13	.084	—	—												
CDHB4T002M	CDHB120605M	3.97	5/32	4.03	.158	1.02	.040	0.18	.007	2.13	.084	0.98	.038												
CDHB4T004M	CDHB12061M	3.97	5/32	4.03	.158	1.02	.040	0.38	.015	2.13	.084	0.96	.038												
CDHB4T004	CDHB12061	3.97	5/32	4.03	.158	1.02	.040	0.38	.015	2.13	.084	—	—												

NOTE: Max DOC only applies to lipend inserts, which are designated with an "M" at the end of the catalog number.

6 Determine the Speed and Feed Chart with the appropriate cutting data.

- A Based on grade and edge geometry, identify starting speed (vc) and feed (fz). The first choice starting feed is in bold.
- B Use the corresponding speed located in the same column below the feed information.

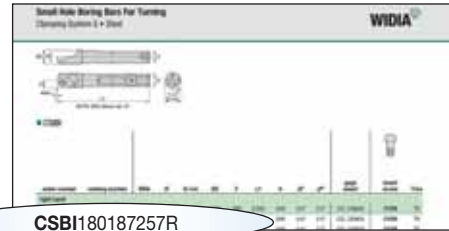
### Speed and Feed Chart

Positive Inserts • Inch

Material Group	ap [inch]	f [inch]	Cutting Speed — vc SFM																								
			C2			C25			C3			CG5															
			min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max										
P	0/1		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	2	<b>A</b>	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
	3		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	4		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	5		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	6		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
M	1		.002	—	.012	.002	—	.012	.002	—	.012	.002	—	.012	.002	—	.012	.002	—	.012	.002	—	.012	.002	—	.012	
	2		180	<b>225</b>	270	205	<b>255</b>	310	205	<b>255</b>	310	240	<b>300</b>	360	265	240	<b>270</b>	325	240	160	<b>200</b>	245	180	170	210	140	<b>170</b>
	3		120	<b>150</b>	185	140	<b>170</b>	210	140	<b>170</b>	210	160	<b>200</b>	245	180	170	210	140	<b>170</b>	210	140	<b>170</b>	210	140	<b>170</b>	210	140
K	1		.002	—	.012	.002	—	.012	.002	—	.012	.002	—	.012	.002	—	.012	.002	—	.012	.002	—	.012	.002	—	.012	
	2		170	<b>213</b>	255	190	<b>235</b>	285	190	<b>235</b>	285	195	<b>240</b>	295	220	220	<b>270</b>	325	240	160	<b>200</b>	245	180	170	210	140	<b>170</b>
	3		220	<b>270</b>	330	240	<b>300</b>	360	240	<b>300</b>	360	250	<b>310</b>	375	275	270	330	400	270	210	<b>265</b>	330	400	270	210	<b>265</b>	
	1		.002	—	.020	.002	—	.020	.002	—	.020	.002	—	.020	.002	—	.020	.002	—	.020	.002	—	.020	.002	—	.020	
	2		1320	<b>1650</b>	1980	1320	<b>1650</b>	1980	1320	<b>1650</b>	1980	1320	<b>1650</b>	1980	1320	<b>1650</b>	1980	1320	<b>1650</b>	1980	1320	<b>1650</b>	1980	1320	<b>1650</b>	1980	
	3		970	<b>1210</b>	1450	970	<b>1215</b>	1460	970	<b>1215</b>	1460	970	<b>1215</b>	1460	970	<b>1215</b>	1460	970	<b>1215</b>	1460	970	<b>1215</b>	1460	970	<b>1215</b>	1460	

## How Do Catalog Numbers Work?

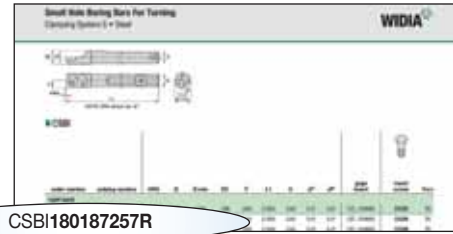
Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



CSBI180187257R

<b>C</b>	<b>S</b>	<b>B</b>		<b>I</b>	
Series Type	Bar Type	Bar Style Designation		Units	Insert Shape (optional)
<p><b>C</b> </p> <p><b>F</b> </p> <p><b>G</b> </p> <p><b>L</b> </p> <p><b>Q</b> </p> <p><b>S</b> </p>	<p> <b>S</b> = Steel (with coolant)</p> <p> <b>C</b> = Carbide (with coolant)</p>			<p><b>I</b> = Inch</p> <p><b>M</b> = Metric</p>	<p><b>C</b> </p> <p><b>W</b> </p>
<p><b>B</b> Boring Bar </p>		<p><b>O</b> Offset Boring Bar </p>			
<p><b>C</b> External Chamfering Bar </p>		<p><b>P</b> Profiling Bar </p>			
<p><b>I</b> Internal Threading Bar </p>		<p><b>R</b> Reverse Chamfer or Back Chamfer Bar </p>			
<p><b>M</b> Offset Internal Grooving Bar </p>					

By referencing this easy-to-use guide, you can identify the correct product to meet your needs.



CSBI180187257R

**180**

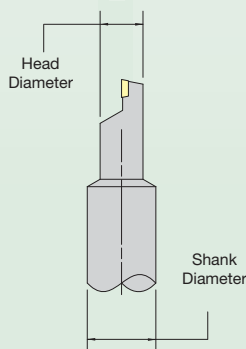
Head Diameter shown as "D2"

**Inch**

- 165 = .166"
- 180 = .180"/.189"
- 203 = .203"/.207"/.210"
- 250 = .260"/.258"
- 312 = .313"/.321"/.322"/.323"
- 322 = .322"
- 375 = .375"/.385"/.390"
- 500 = .510"

**Metric**

- 7 = 6,60mm
- 8 = 8,18mm/8,20mm
- 10 = 9,78mm
- 13 = 12,70mm/12,95mm
- 45 = 4,57mm
- 48 = 4,80mm
- 52 = 5,16mm
- 53 = 5,30mm
- 64 = 6,60mm
- 66 = 6,55mm/6,60mm
- 82 = 8,15mm
- 95 = 9,50mm
- 99 = 9,91mm
- 159 = 15,88mm



NOTE: Only shown on stepped-style bars.

**187**

Shank Diameter shown as "D"

**Inch**

- 156 = .156"
- 187 = .187"/.188"
- 250 = .250"
- 312 = .312"/.313"
- 375 = .375"
- 500 = .500"
- 625 = .625"
- 750 = .750"
- 875 = .875"
- 1000 = 1.000"
- 1250 = 1.250"

**Metric**

- 4 = 4,00mm
- 5 = 5,00mm
- 6 = 6,00mm
- 8 = 8,00mm
- 10 = 10,00mm
- 12 = 12,00mm
- 16 = 16,00mm

**25**

Length/Depth shown as "L1/L4"

Bore Length for Step Bars  
Thread Depth for Threading Bars  
Overall Length for Straight Shank Bars

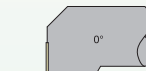
Inch	Metric
1 = 1.000"	12 = 12,70mm
1125 = 1.125"	19 = 19,05mm
125 = 1.250"	22 = 22,23mm
15 = 1.500"	25 = 25,40mm
1875 = 1.875"	32 = 31,75mm
2 = 2.000"	38 = 38,10mm
25 = 2.500"	48 = 47,63mm
3125 = 3.125"	51 = 50,80mm
35 = 3.500"	63 = 63,50mm
4 = 4.000"	64 = 64,00mm
45 = 4.500"	76 = 76,00mm
5 = .500"/5.000"	79 = 79,38mm
6 = 6.000"	100 = 100,58mm/101,50mm/101,60mm
7 = 7.000"/7.085"	102 = 101,60mm
75 = .750"	127 = 127,00mm
8 = 8.000"	152 = 152,00mm/152,40mm
90 = .900"	
10 = 10.000"	178 = 177,80mm/179,90mm
12 = 12.000"	
	203 = 203,20mm
	254 = 254,00mm

**7**

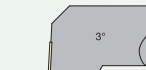
Lead Angle\*

0 = 0°  
Used for Threading/  
Grooving Bars

- 3 = 3°
- 5 = 5°
- 7 = 7°
- 225 = 22.5°
- 30 = 30°
- 45 = 45°
- 60 = 60°



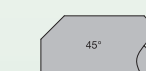
0°



3°



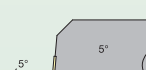
22.5°



45°



7°



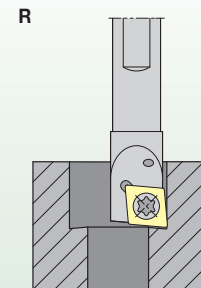
5°

**R**

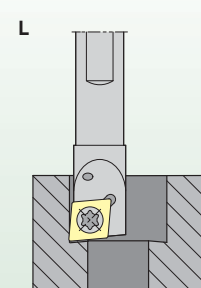
Hand of Tool

R = Right hand  
L = Left hand

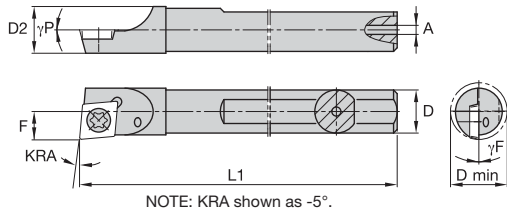
Right-hand boring bar



Left-hand boring bar



\*NOTE: Shown as "KRI" for metric bars and "KRA" for inch bars.



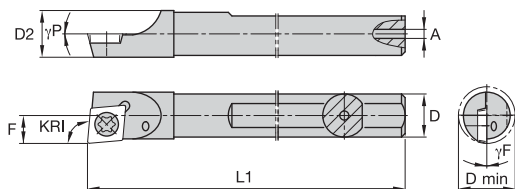
Tools for Small Hole Boring

■ CSBI



order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
2832371	CSBI16518757R	-7	.188	.180	.166	.095	2.500	.040	0.0°	0.0°	CD..120605	CC09	T6
2832617	CSBI180187255R	-5	.188	.204	.180	.104	2.500	.040	0.0°	5.0°	CD..120605	CC09	T6
2832553	CSBI187255R	-5	.188	.228	.203	.228	2.500	.040	0.0°	5.0°	CD..120605	CC09	T6
2832442	CSBI25035R	-5	.250	.285	.260	.145	3.000	.040	0.0°	5.0°	CD..120605	CC11	T6
2832566	CSBI187250R	0	.188	.244	.203	.122	2.500	.040	0.0°	5.0°	CD..120605	CC11	T6
2832454	CSBI25030R	0	.250	.292	.260	.152	3.000	.040	0.0°	5.0°	CD..120605	CC11	T6
<b>left hand</b>													
2832365	CSBI16518757L	-7	.188	.180	.166	.095	2.500	.040	0.0°	0.0°	CD..120605	CC09	T6
2832623	CSBI180187255L	-5	.188	.204	.180	.104	2.500	.040	0.0°	5.0°	CD..120605	CC09	T6
2832559	CSBI187255L	-5	.188	.228	.203	.116	2.500	.040	0.0°	5.0°	CD..120605	CC11	T6
2832448	CSBI25035L	-5	.250	.285	.260	.145	3.000	.040	0.0°	5.0°	CD..120605	CC11	T6
3896203	CSBI25030L	0	.250	.292	.260	.152	3.000	.040	0.0°	5.0°	CD..120605	CC11	T6

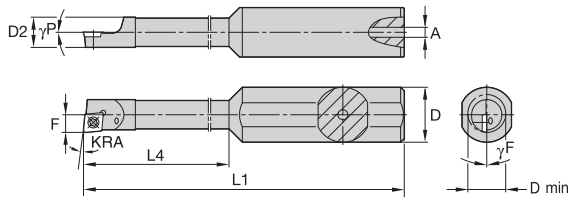




■ CSBM



order number	catalog number	KRI	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
3896205	CSBM5650R	90	5,00	5,94	5,16	3,10	63,50	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
2831676	CSBM6650R	90	6,00	7,09	6,20	3,73	63,50	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831441	CSBM5655R	95	5,00	5,79	5,16	2,95	63,50	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
2831687	CSBM6655R	95	6,00	7,09	6,21	3,73	63,50	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831666	CSBM8765R	95	8,00	9,04	8,18	4,70	76,20	1,52	0.0°	5.0°	CD..S4T002	CC11	T6
2831701	CSBM4657R	97	4,00	4,57	4,22	2,41	63,50	1,02	0.0°	0.0°	CD..S4T002	CC09	T6
<b>left hand</b>													
3896204	CSBM5650L	90	5,00	5,94	5,16	3,10	63,50	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
3896207	CSBM6650L	90	6,00	7,09	6,20	3,73	63,50	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
3896209	CSBM8760L	90	8,00	9,05	8,18	4,70	76,00	2,40	0.0°	5.0°	CD..S4T002	CC11	T6
3896206	CSBM5655L	95	5,00	5,78	5,16	2,95	63,50	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
3896208	CSBM6655L	95	6,00	7,09	6,20	3,73	63,50	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
3517652	CSBM8765L	95	8,00	9,04	8,18	9,04	76,20	1,52	0.0°	5.0°	CD..S4T002	CC11	T6
2831695	CSBM4657L	97	4,00	4,57	4,22	2,41	63,50	1,02	0.0°	0.0°	CD..S4T002	CC09	T6



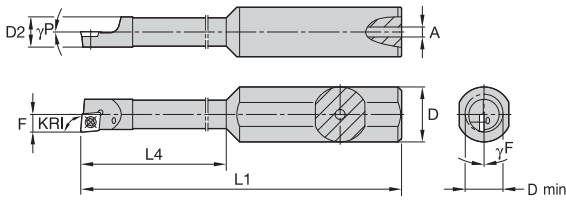
NOTE: KRA shown as -5°.

Tools for Small Hole Boring

■ CSBI • STEPPED



order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
2832607	CSBI18037515R	-5	.375	.204	.180	.104	2.500	.040	0.0°	5.0°	CD..120605	CC09	T6
2832596	CSBI18037555R	-5	.375	.204	.180	.104	2.500	.040	0.0°	5.0°	CD..120605	CC09	T6
2832535	CSBI20337515R	-5	.375	.228	.203	.116	2.500	.040	0.0°	5.0°	CD..120605	CC11	T6
2832518	CSBI20337555R	-5	.375	.230	.203	.116	2.500	.040	0.0°	5.0°	CD..120605	CC11	T6
2832429	CSBI2503751255R	-5	.375	.285	.260	.145	2.500	.040	0.0°	5.0°	CD..120605	CC11	T6
2832414	CSBI250375755R	-5	.375	.285	.260	.145	2.500	.040	0.0°	5.0°	CD..120605	CC11	T6
2832589	CSBI18050015R	-5	.500	.204	.180	.104	2.750	.040	0.0°	5.0°	CD..120605	CC09	T6
2832577	CSBI18050055R	-5	.500	.204	.180	.104	2.750	.040	0.0°	5.0°	CD..120605	CC09	T6
2832488	CSBI20350015R	-5	.500	.228	.203	.116	2.750	.040	0.0°	5.0°	CD..120605	CC09	T6
2832467	CSBI20350055R	-5	.500	.228	.203	.116	2.750	.040	0.0°	5.0°	CD..120605	CC09	T6
2832398	CSBI2505001255R	-5	.500	.285	.260	.145	2.750	.040	0.0°	5.0°	CD..120605	CC11	T6
2832374	CSBI250500755R	-5	.500	.285	.260	.145	2.750	.040	0.0°	5.0°	CD..120605	CC11	T6
2832547	CSBI20337510R	0	.375	.234	.203	.122	2.500	.040	0.0°	5.0°	CD..120605	CC09	T6
2832529	CSBI20337550R	0	.375	.234	.203	.122	2.500	.040	0.0°	5.0°	CD..120605	CC11	T6
2832503	CSBI20350010R	0	.500	.234	.203	.122	2.750	.040	0.0°	5.0°	CD..120605	CC11	T6
2832409	CSBI2505001250R	0	.500	.292	.260	.152	2.750	.040	0.0°	5.0°	CD..120605	CC11	T6
2832385	CSBI250500750R	0	.500	.292	.260	.152	2.750	.040	0.0°	5.0°	CD..120605	CC11	T6
<b>left hand</b>													
2832602	CSBI18037555L	-5	.375	.204	.180	.104	2.500	.040	0.0°	5.0°	CD..120605	CC09	T6
2832419	CSBI250375755L	-5	.375	.285	.260	.145	2.500	.040	0.0°	5.0°	CD..120605	CC11	T6
2832583	CSBI18050055L	-5	.500	.204	.180	.104	2.750	.040	0.0°	5.0°	CD..120605	CC09	T6
2832494	CSBI20350015L	-5	.500	.228	.203	.116	2.750	.040	0.0°	5.0°	CD..120605	CC11	T6
2832472	CSBI20350055L	-5	.500	.228	.203	.116	2.750	.040	0.0°	5.0°	CD..120605	CC11	T6
2832404	CSBI2505001255L	-5	.500	.285	.260	.145	2.750	.040	0.0°	5.0°	CD..120605	CC11	T6
2832380	CSBI250500755L	-5	.500	.285	.260	.145	2.750	.040	0.0°	5.0°	CD..120605	CC11	T6

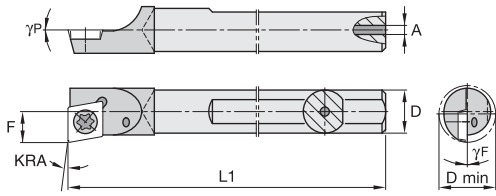


■ **CSBM • STEPPED**

order number	catalog number	KRI	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>														
2831606	CSBM5210250R	90	10,00	5,94	5,16	3,10	70,00	25,72	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831499	CSBM5212250R	90	12,00	5,94	5,16	3,10	70,00	25,40	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831477	CSBM6412190R	90	12,00	7,42	6,60	3,86	70,00	19,05	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831462	CSBM6412320R	90	12,00	7,42	6,60	3,86	70,00	31,75	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831661	CSBM4510125R	95	10,00	5,18	4,57	5,18	69,85	12,70	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
2831639	CSBM5210125R	95	10,00	5,78	5,16	2,95	70,00	12,30	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
2831615	CSBM5210255R	95	10,00	5,78	5,16	5,78	69,85	24,96	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831595	CSBM6410195R	95	10,00	7,24	6,60	3,68	70,00	19,05	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831548	CSBM4512125R	95	12,00	5,18	4,57	2,64	69,85	12,70	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
2831512	CSBM5212255R	95	12,00	5,78	5,16	2,95	70,00	25,40	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
2831490	CSBM6412195R	95	12,00	7,24	6,60	3,68	70,00	19,05	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831468	CSBM6412325R	95	12,00	7,24	6,60	3,68	70,00	31,75	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
<b>left hand</b>														
2831656	CSBM4510125L	95	10,00	5,18	4,57	2,64	70,00	12,70	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
2831588	CSBM6410195L	95	10,00	7,24	6,60	3,68	70,00	19,05	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
3890853	CSBM4512125L	95	12,00	5,18	4,57	2,64	69,85	12,70	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
3890854	CSBM4512255L	95	12,00	5,18	4,57	2,64	69,85	25,40	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
2831528	CSBM5212125L	95	12,00	5,78	5,16	2,95	70,00	12,70	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831483	CSBM6412195L	95	12,00	7,24	6,60	3,68	70,00	19,05	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
3890855	CSBM6412325L	95	12,00	7,24	6,60	3,68	70,00	31,75	1,02	0.0°	5.0°	CD..S4T002	CC11	T6



Tools for Small Hole Boring

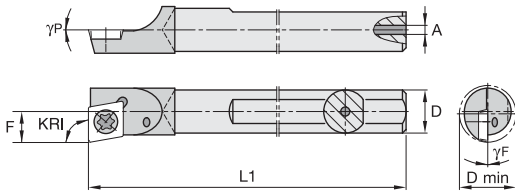


Tools for Small Hole Boring

■ CCBI

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
2831949	CCBI16515667R	-7	.156	.180	.095	6.000	.040	0.0°	0.0°	CD..120605	CC09	T6
2832281	CCBI18018745R	-5	.188	.208	.104	4.000	.040	0.0°	5.0°	CD..120605	CC09	T6
2832276	CCBI18018765R	-5	.188	.208	.104	6.000	.040	0.0°	5.0°	CD..120605	CC09	T6
2832183	CCBI18745R	-5	.188	.218	.111	4.000	.040	0.0°	5.0°	CD..120605	CC09	T6
2832164	CCBI18765R	-5	.188	.218	.111	6.000	.040	0.0°	5.0°	CD..120605	CC09	T6
2832049	CCBI25045R	-5	.250	.285	.145	4.000	.047	0.0°	5.0°	CD..120605	CC11	T6
2832029	CCBI25065R	-5	.250	.285	.145	6.000	.047	0.0°	5.0°	CD..120605	CC11	T6
2832270	CCBI31265R	-5	.312	.356	.185	6.000	.093	0.0°	5.0°	CD..120605	CC11	T6
2832195	CCBI18740R	0	.187	.224	.117	4.000	.040	0.0°	5.0°	CD..120605	CC09	T6
2832177	CCBI18760R	0	.188	.224	.117	6.000	.040	0.0°	5.0°	CD..120605	CC09	T6
2832062	CCBI25040R	0	.250	.292	.152	4.000	.047	0.0°	5.0°	CD..120605	CC11	T6
2832039	CCBI25060R	0	.250	.292	.152	6.000	.047	0.0°	5.0°	CD..120605	CC11	T6
2832234	CCBI31260R	0	.313	.356	.185	6.000	.093	0.0°	5.0°	CD..120605	CC09	T6
<b>left hand</b>												
2831945	CCBI16515667L	-7	.156	.180	.095	6.000	.040	0.0°	0.0°	CD..120605	CC09	T6
2832287	CCBI18018745L	-5	.188	.208	.104	4.000	.040	0.0°	5.0°	CD..120605	CC09	T6
2832190	CCBI18745L	-5	.188	.218	.111	4.000	.040	0.0°	5.0°	CD..120605	CC09	T6
2832172	CCBI18765L	-5	.188	.218	.111	6.000	.040	0.0°	5.0°	CD..120605	CC09	T6
2832057	CCBI25045L	-5	.250	.285	.145	4.000	.047	0.0°	5.0°	CD..120605	CC11	T6
2832033	CCBI25065L	-5	.250	.285	.145	6.000	.047	0.0°	5.0°	CD..120605	CC11	T6
2832265	CCBI31265L	-5	.313	.356	.185	6.000	.093	0.0°	5.0°	CD..120605	CC11	T6
2832200	CCBI18740L	0	.188	.224	.117	4.000	.040	0.0°	5.0°	CD..120605	CC09	T6
2832067	CCBI25040L	0	.250	.292	.152	4.000	.047	0.0°	5.0°	CD..120605	CC11	T6
2832043	CCBI25060L	0	.250	.292	.152	6.000	.047	0.0°	5.0°	CD..120605	CC11	T6
2832229	CCBI31260L	0	.312	.356	.185	6.000	.093	0.0°	5.0°	CD..120605	CC11	T6



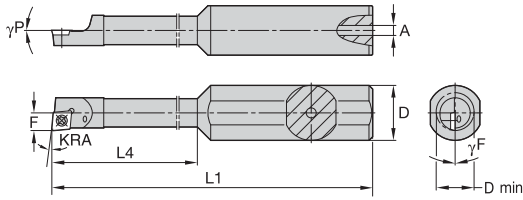


■ **CCBM**



order number	catalog number	KRI	D	D min	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
2831801	CCBM51000R	90	5,00	5,94	3,18	100,58	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
3896025	CCBM61000R	90	6,00	7,08	3,73	100,33	1,19	0.0°	5.0°	CD..S4T002	CC11	T6
2831277	CCBM81520R	90	8,00	9,04	4,70	152,15	2,36	0.0°	5.0°	CD..S4T002	CC11	T6
2831826	CCBM51005R	95	5,00	5,94	3,02	100,58	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831311	CCBM61525R	95	6,00	7,08	3,73	152,15	1,19	0.0°	5.0°	CD..S4T002	CC11	T6
2831821	CCBM61005R	95	6,00	7,09	3,73	100,33	1,19	0.0°	5.0°	CD..S4T002	CC11	T6
2831289	CCBM81525R	95	8,00	9,04	4,70	152,15	2,36	0.0°	5.0°	CD..S4T002	CC11	T6
2831832	CCBM41007R	97	3,96	4,57	2,41	100,33	1,02	0.0°	0.0°	CD..S4T002	CC09	T6
2831324	CCBM41527R	97	4,00	4,57	2,41	152,40	1,02	0.0°	0.0°	CD..S4T002	CC09	T6
<b>left hand</b>												
3896023	CCBM51000L	90	5,00	5,94	3,18	100,58	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
3896024	CCBM61000L	90	6,00	7,08	3,73	100,33	1,19	0.0°	5.0°	CD..S4T002	CC11	T6
3896026	CCBM61520L	90	6,00	7,09	3,73	152,15	1,19	0.0°	5.0°	CD..S4T002	CC11	T6
3896028	CCBM81520L	90	8,00	9,04	4,70	152,15	2,36	0.0°	5.0°	CD..S4T002	CC11	T6
2831807	CCBM51005L	95	5,00	5,94	3,02	100,58	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831025	CCBM51525L	95	5,00	5,94	3,02	152,40	1,02	0.0°	5.0°	CD..S4T002	CC09	T6
2831307	CCBM61525L	95	6,00	7,08	3,73	152,15	1,19	0.0°	5.0°	CD..S4T002	CC11	T6
2831791	CCBM61005L	95	6,00	7,09	3,73	100,33	1,19	0.0°	5.0°	CD..S4T002	CC11	T6
3896027	CCBM81005L	95	8,00	9,04	4,70	101,60	2,36	0.0°	5.0°	CD..S4T002	CC11	T6
2831283	CCBM81525L	95	8,00	9,04	4,70	152,40	2,36	0.0°	5.0°	CD..S4T002	CC11	T6
2831813	CCBM41007L	97	3,96	4,57	2,41	100,33	1,02	0.0°	0.0°	CD..S4T002	CC09	T6
3896002	CCBM41527L	97	4,00	4,57	2,41	152,40	1,02	0.0°	0.0°	CD..S4T002	CC09	T6

Tools for Small Hole Boring



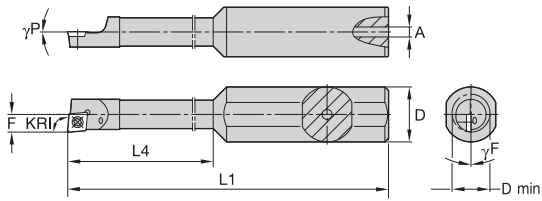
NOTE: KRA shown as -5°.

■ CCBI • STEPPED

Tools for Small Hole Boring



order number	catalog number	KRA	D	D min	F	L1	L4	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>													
2832254	CCBI18050018755R	-5	.500	.208	.104	3.375	1.875	.125	0.0°	5.0°	CD..120605	CC09	T6
2832241	CCBI1805008755R	-5	.500	.208	.104	2.375	.875	.040	0.0°	5.0°	CD..120605	CC09	T6
2832141	CCBI20350015R	-5	.500	.234	.119	2.500	1.000	.040	0.0°	5.0°	CD..S4T002	CC11	T6
2832120	CCBI20350025R	-5	.500	.234	.119	3.500	2.000	.125	0.0°	5.0°	CD..120605	CC11	T6
2832006	CCBI2505001255R	-5	.500	.285	.145	2.750	1.250	.125	0.0°	5.0°	CD..120605	CC11	T6
2831989	CCBI250500255R	-5	.500	.285	.145	4.000	2.500	.125	0.0°	5.0°	CD..120605	CC11	T6
2832219	CCBI18062518755R	-5	.625	.208	.104	4.375	1.875	.125	0.0°	5.0°	CD..120605	CC09	T6
2832205	CCBI1806258755R	-5	.625	.208	.104	3.375	.875	.125	0.0°	5.0°	CD..120605	CC09	T6
2832101	CCBI20362515R	-5	.625	.234	.119	3.500	1.000	.125	0.0°	5.0°	CD..S4T002	CC11	T6
2832076	CCBI20362525R	-5	.625	.234	.119	4.500	2.000	.125	0.0°	5.0°	CD..120605	CC11	T6
2831976	CCBI2506251255R	-5	.625	.285	.145	3.750	1.250	.125	0.0°	5.0°	CD..120605	CC11	T6
2832152	CCBI20350010R	0	.500	.234	.125	2.500	1.000	.125	0.0°	5.0°	CD..S4T002	CC11	T6
2832135	CCBI20350020R	0	.500	.240	.125	3.500	2.000	.125	0.0°	5.0°	CD..120605	CC11	T6
3337598	CCBI2505001250R	0	.500	.292	.152	2.750	1.250	.125	0.0°	5.0°	CD..120605	CC11	T6
2831999	CCBI250500250R	0	.500	.292	.152	4.000	2.500	.125	0.0°	5.0°	CD..120605	CC11	T6
3789922	CCBI20362520R	0	.625	.240	.125	4.500	2.000	.125	0.0°	5.0°	CD..120605	CC11	T6
2831987	CCBI2506251250R	0	.625	.292	.152	3.750	1.250	.125	0.0°	5.0°	CD..120605	CC11	T6
<b>left hand</b>													
2832247	CCBI1805008755L	-5	.500	.208	.104	2.375	.875	.125	0.0°	5.0°	CD..120605	CC09	T6
2832147	CCBI20350015L	-5	.500	.234	.119	2.500	1.000	.125	0.0°	5.0°	CD..S4T002	CC11	T6
2832012	CCBI2505001255L	-5	.500	.285	.145	2.750	1.250	.125	0.0°	5.0°	CD..120605	CC11	T6
2831995	CCBI250500255L	-5	.500	.285	.145	4.000	2.500	.125	0.0°	5.0°	CD..120605	CC11	T6
2832211	CCBI1806258755L	-5	.625	.208	.104	3.375	.875	.125	0.0°	5.0°	CD..120605	CC09	T6



■ **CCBM • STEPPED**

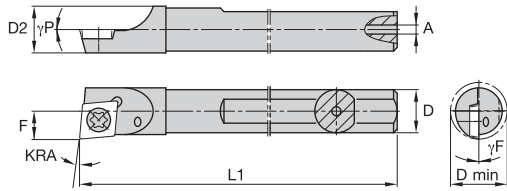


order number	catalog number	KRI	D	D min	F	L1	L4	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
2831211	CCBM5312510R	90	12,00	5,94	3,18	88,90	50,80	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
2831188	CCBM6612320R	90	12,00	7,42	3,85	69,85	31,75	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
2831175	CCBM6612630R	90	12,00	7,42	3,86	101,60	63,50	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
2831127	CCBM5316510R	90	16,00	6,10	3,18	114,30	50,80	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
2831110	CCBM6516320R	90	16,00	7,42	3,86	95,25	31,75	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
2831265	CCBM4812225R	95	12,00	5,28	2,64	60,32	22,22	3,18	0.0°	5.0°	CD..S4T002	CC09	T6
2831255	CCBM4812485R	95	12,00	5,28	2,64	85,73	47,63	3,18	0.0°	5.0°	CD..S4T002	CC09	T6
2831244	CCBM5312255R	95	12,00	5,94	3,02	63,50	25,40	1,02	0.0°	5.0°	CD..S4T002	CC11	T6
2831201	CCBM6612325R	95	12,00	7,24	3,68	69,85	31,75	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
3896019	CCBM6612635R	95	12,00	7,24	3,68	101,60	63,50	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
3896015	CCBM4816225R	95	16,00	5,28	2,64	85,72	22,23	3,18	0.0°	5.0°	CD..S4T002	CC09	T6
3896017	CCBM4816485R	95	16,00	5,28	2,64	111,12	47,62	3,18	0.0°	5.0°	CD..S4T002	CC09	T6
2831162	CCBM5316255R	95	16,00	5,94	3,02	88,90	25,40	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
2831139	CCBM5316515R	95	16,00	5,94	3,02	114,30	50,80	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
3896018	CCBM6516325R	95	16,00	7,24	3,68	95,25	31,75	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
<b>left hand</b>													
2831194	CCBM6612325L	95	12,00	7,24	3,68	69,85	31,75	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
3896093	CCBM6612635L	95	12,00	7,24	3,68	101,60	63,50	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
2831157	CCBM5316255L	95	16,00	5,94	3,02	88,90	25,40	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
2831132	CCBM5316515L	95	16,00	5,94	3,02	114,30	50,80	3,18	0.0°	5.0°	CD..S4T002	CC11	T6
2831117	CCBM6516325L	95	16,00	7,24	3,68	95,25	31,75	3,18	0.0°	5.0°	CD..S4T002	CC11	T6

Tools for Small Hole Boring

# Small Hole Boring Bars for Turning

Clamping System S • Steel



NOTE: KRA shown as -5°.

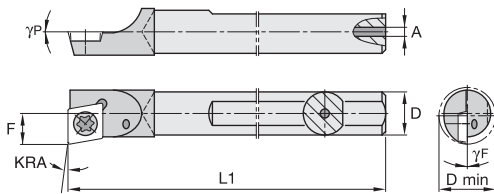
## QSMI

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
2825464	QSMI37545R	-5	.375	.481	.385	.278	4.000	.125	0.0°	0.0°	CP..2....	QC15	T8
2825455	QSMI50055R	-5	.500	.545	.510	.280	5.000	.156	0.0°	0.0°	CP..2....	QC15	T8
2825394	QSMI62565R	-5	.625	.670	.635	.343	6.000	.156	0.0°	0.0°	CP..2....	QC15	T8
<b>left hand</b>													
2825457	QSMI37545L	-5	.375	.420	.385	.218	4.000	.125	0.0°	0.0°	CP..2....	QC15	T8
2825449	QSMI50055L	-5	.500	.545	.510	.280	5.000	.156	0.0°	0.0°	CP..2....	QC15	T8



NOTE: D min and F calculated using the CPG grooving-style insert.

## Clamping System S • Carbide



NOTE: KRA shown as -5°.

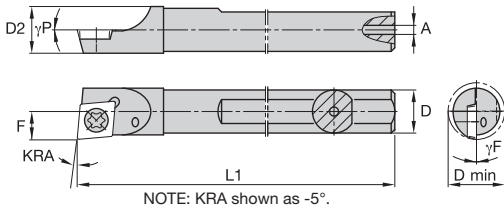
## QCMi

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
2825117	QCMi37565R	-5	.375	.481	.278	6.000	.125	0.0°	0.0°	CP..2....	QC15	T8
2825105	QCMi50085R	-5	.500	.545	.280	8.000	.188	0.0°	0.0°	CP..21205	QC15	T8
2825089	QCMi625105R	-5	.625	.670	.343	10.000	.218	0.0°	0.0°	CP..2....	QC15	T8
<b>left hand</b>												
2825112	QCMi37565L	-5	.375	.420	.218	6.000	.125	0.0°	0.0°	CP..2..	QC15	T8
2825094	QCMi50085L	-5	.500	.545	.280	8.000	.188	0.0°	0.0°	CP..2....	QC15	T8



NOTE: F calculated using the CPG-style insert.





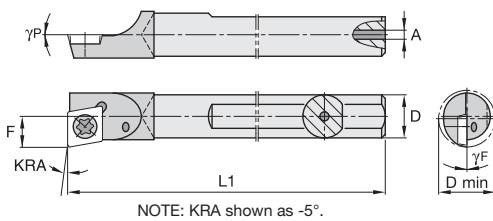
■ SSBIC

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
2822637	SSBIC62575R	-5	.625	.680	.635	.353	7.000	.156	0.0°	0.0°	CP..3252	STM31	T15
2822626	SSBIC75085R	-5	.750	.805	.760	.415	8.000	.156	0.0°	0.0°	CP..3252	STM31	T15
<b>left hand</b>													
2822643	SSBIC62575L	-5	.625	.680	.635	.353	7.000	.156	0.0°	0.0°	CP..3252	STM31	T15
2822631	SSBIC75085L	-5	.750	.805	.760	.415	8.000	.156	0.0°	0.0°	CPMT3252	STM31	T15



Tools for Small Hole Boring

Clamping System S • Carbide



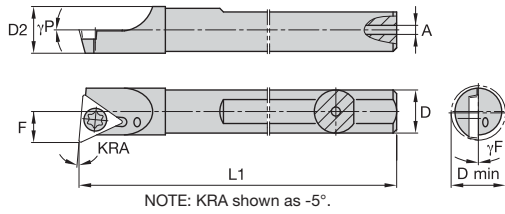
■ SDBIC

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
2822301	SDBIC62565R	-5	.625	.680	.353	6.000	.218	-5.0°	0.0°	CPMT3252	STM31	T15
2822289	SDBIC625105R	-5	.625	.680	.353	10.000	.218	-5.0°	0.0°	CPMT3252	STM31	T15
2822277	SDBIC75065R	-5	.750	.805	.415	6.000	.281	0.0°	0.0°	CP..3252	STM31	T15
2822265	SDBIC750105R	-5	.750	.805	.415	10.000	.281	0.0°	0.0°	CP..3205	STM31	T15
<b>left hand</b>												
2822306	SDBIC62565L	-5	.625	.680	.353	6.000	.218	0.0°	0.0°	CP..3252	STM31	T15
3896009	SDBIC625105L	-5	.625	.680	.353	10.000	.218	-5.0°	0.0°	CP..3252	STM31	T15
2822283	SDBIC75065L	-5	.750	.805	.415	6.000	.281	0.0°	0.0°	CPMT3252	STM31	T15
2822272	SDBIC750105L	-5	.750	.805	.415	10.000	.281	0.0°	0.0°	CP..3205	STM31	T15




# Small Hole Boring Bars for Turning

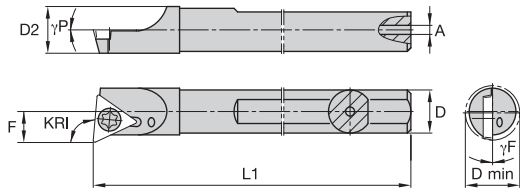
Clamping System S • Steel



Tools for Small Hole Boring

## ■ FSBI

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
													
<b>right hand</b>													
2830455	FSBI187355R	-5	.188	.275	.197	.123	3.500	.040	0.0°	5.0°	TD..130805	<b>FC11</b>	T7
2830358	FSBI25045R	-5	.250	.296	.260	.156	4.000	.040	0.0°	5.0°	TD..130805	<b>FC14</b>	T7
2830260	FSBI31245R	-5	.313	.358	.322	.187	4.000	.060	0.0°	5.0°	TD..130805	<b>FC14</b>	T7
2830466	FSBI187350R	0	.188	.275	.197	.123	3.500	.040	0.0°	5.0°	TD..130805	<b>FC11</b>	T7
2830369	FSBI25040R	0	.250	.296	.260	.156	4.000	.040	0.0°	5.0°	TD..130805	<b>FC14</b>	T7
2830272	FSBI31240R	0	.313	.358	.322	.187	4.000	.060	0.0°	5.0°	TD..130805	<b>FC14</b>	T7
<b>left hand</b>													
3783152	FSBI187355L	-5	.187	.275	.197	.123	3.500	.040	0.0°	5.0°	TD..130805	<b>FC11</b>	T7
2830364	FSBI25045L	-5	.250	.296	.260	.156	4.000	.040	0.0°	5.0°	TD..130805	<b>FC14</b>	T7
2830270	FSBI31245L	-5	.313	.358	.322	.187	4.000	.060	0.0°	5.0°	TD..130805	<b>FC14</b>	T7
3896210	FSBI25040L	0	.250	.296	.260	.156	4.000	.040	0.0°	5.0°	TD..130805	<b>FC14</b>	T7

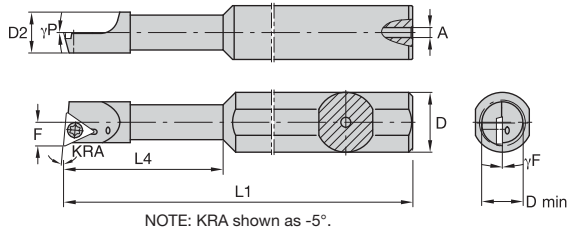


■ **FSBM**

order number	catalog number	KRI	D	D min	D2	F	L1	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>													
2829554	FSBM61000R	90	6,00	7,06	6,20	3,71	101,60	1,02	0.0°	5.0°	TD..07S102	FC11	T7
2829566	FSBM61005R	95	6,00	7,06	6,20	3,71	101,60	1,02	0.0°	5.0°	TD..07S102	FC11	T7
<b>left hand</b>													
3896211	FSBM61000L	90	6,00	7,06	6,20	3,71	101,60	1,02	0.0°	5.0°	TD..07S102	FC11	T7
3896213	FSBM81000L	90	8,00	9,14	8,20	4,80	101,60	1,52	0.0°	5.0°	TD..07S102	FC11	T7
2829545	FSBM81005L	95	8,00	9,14	8,20	4,80	101,60	1,52	0.0°	5.0°	TD..07S102	FC11	T7



Tools for Small Hole Boring

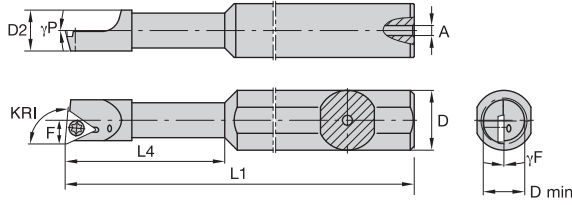


Tools for Small Hole Boring

**FSBI • STEPPED**

order number	catalog number	KRA	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>														
2830430	FSBI20350015R	-5	.500	.275	.203	.126	3.000	1.000	.040	0.0°	5.0°	TD..130805	FC11	T7
2830405	FSBI20350055R	-5	.500	.275	.203	.126	3.000	.500	.040	0.0°	5.0°	TD..130805	FC11	T7
2830335	FSBI2505001255R	-5	.500	.296	.259	.156	3.000	1.250	.040	0.0°	5.0°	TD..130805	FC14	T7
2830312	FSBI250500755R	-5	.500	.296	.259	.156	3.000	.750	.040	0.0°	5.0°	TD..130805	FC14	T7
2830245	FSBI312500155R	-5	.500	.358	.321	.187	3.000	1.500	.060	0.0°	5.0°	TD..130805	FC14	T7
2830212	FSBI31250015R	-5	.500	.358	.321	.187	3.000	1.000	.060	0.0°	5.0°	TD..130805	FC14	T7
2830380	FSBI20362555R	-5	.625	.275	.203	.126	4.000	.500	.040	0.0°	5.0°	TD..130805	FC11	T7
2830296	FSBI2506251255R	-5	.625	.296	.259	.156	4.000	1.250	.040	0.0°	5.0°	TD..130805	FC11	T7
2830284	FSBI250625755R	-5	.625	.296	.259	.156	4.000	.750	.040	0.0°	5.0°	TD..130805	FC11	T7
2830189	FSBI312625155R	-5	.625	.358	.321	.187	4.000	1.500	.060	0.0°	5.0°	TD..130805	FC11	T7
2830185	FSBI31262515R	-5	.625	.358	.321	.187	4.000	1.000	.060	0.0°	5.0°	TD..130805	FC11	T7
2830417	FSBI20350050R	0	.500	.275	.203	.134	3.000	.500	.040	0.0°	5.0°	TD..130805	FC11	T7
2830347	FSBI2505001250R	0	.500	.296	.259	.156	3.000	1.250	.040	0.0°	5.0°	TD..130805	FC14	T7
2830329	FSBI250500750R	0	.500	.296	.259	.156	3.000	.750	.040	0.0°	5.0°	TD..130805	FC14	T7
2830227	FSBI31250010R	0	.500	.358	.321	.187	3.000	1.000	.060	0.0°	5.0°	TD..130805	FC14	T7
<b>left hand</b>														
2830324	FSBI250500755L	-5	.500	.296	.259	.156	3.000	.750	.040	0.0°	5.0°	TD..130805	FC14	T7
2830222	FSBI31250015L	-5	.500	.358	.321	.187	3.000	1.000	.060	0.0°	5.0°	TD..130805	FC14	T7
2830320	FSBI250625755L	-5	.625	.296	.259	.156	4.000	.750	.040	0.0°	5.0°	TD..130805	FC14	T7
3383045	FSBI2506251250L	0	.625	.296	.259	.156	4.000	1.250	.040	0.0°	5.0°	TD..130805	FC14	T7
3327103	FSBI250625750L	0	.625	.296	.259	.156	4.000	.750	.040	0.0°	5.0°	TD..130805	FC14	T7



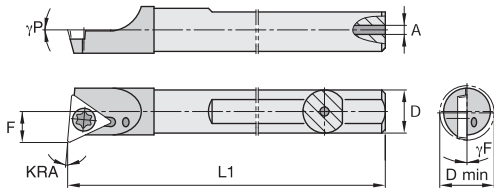


■ **FSBM • STEPPED**

order number	catalog number	KRI	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>														
3890858	FSBM6612320R	90	12,00	7,52	6,58	3,96	76,20	31,75	1,02	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
2829472	FSBM8212250R	90	12,00	9,09	8,15	4,75	76,00	25,40	1,52	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
2829448	FSBM8212380R	90	12,00	9,09	8,15	4,75	76,20	38,10	1,52	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
3890860	FSBM6616190R	90	16,00	7,52	6,58	3,96	101,60	19,05	1,02	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
2829533	FSBM5212125R	95	12,00	6,99	5,16	3,20	76,20	12,70	1,02	0.0°	5.0°	TD..07S102	<b>FC11</b>	T7
3890857	FSBM5212255R	95	12,00	6,99	5,16	3,20	76,20	25,40	1,02	0.0°	5.0°	TD..07S102	<b>FC11</b>	T7
2829508	FSBM6612195R	95	12,00	7,52	6,58	3,96	76,00	19,05	1,02	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
2829459	FSBM8212385R	95	12,00	9,09	8,15	4,75	76,00	38,10	1,52	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
3897011	FSBM5216125R	95	16,00	6,99	5,16	3,20	101,60	12,70	1,02	0.0°	5.0°	TD..07S102	<b>FC11</b>	T7
3890862	FSBM6616325R	95	16,00	7,52	6,58	3,96	101,60	31,75	1,02	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
2829429	FSBM6616195R	95	16,00	7,52	6,60	3,96	102,00	19,05	1,02	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
<b>left hand</b>														
2829442	FSBM8212380L	90	12,00	9,09	8,15	4,75	76,00	38,10	1,52	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
3890861	FSBM6616320L	90	16,00	7,52	6,58	3,96	101,60	31,75	1,02	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
3890856	FSBM5212125L	95	12,00	6,99	5,16	3,20	76,20	12,70	1,02	0.0°	5.0°	TD..07S102	<b>FC11</b>	T7



Tools for Small Hole Boring

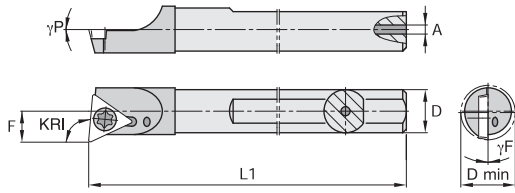


Tools for Small Hole Boring

■ FCBI



order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
2830020	FCBI18745R	-5	.188	.275	.126	4.000	.040	0.0°	5.0°	TD..130805	FC11	T7
2829995	FCBI18765R	-5	.188	.275	.126	6.000	.040	0.0°	5.0°	TD..130805	FC11	T7
2829897	FCBI25045R	-5	.250	.296	.156	4.000	.047	0.0°	5.0°	TD..130805	FC11	T7
2829764	FCBI31265R	-5	.312	.358	.187	6.000	.093	0.0°	5.0°	TD..130805	FC14	T7
2829881	FCBI25065R	-5	.250	.296	.156	6.000	.047	0.0°	5.0°	TDHB130805	FC14	T7
2829787	FCBI31245R	-5	.312	.358	.187	4.000	.093	0.0°	5.0°	TDHB130805	FC14	T7
2830007	FCBI18760R	0	.187	.275	.134	6.000	.040	0.0°	5.0°	TD..130805	FC11	T7
2830032	FCBI18740R	0	.188	.275	.134	4.000	.040	0.0°	5.0°	TD..130805	FC11	T7
2829908	FCBI25040R	0	.250	.296	.156	4.000	.047	0.0°	5.0°	TD..130805	FC14	T7
2829892	FCBI25060R	0	.250	.296	.156	6.000	.047	0.0°	5.0°	TD..130805	FC11	T7
2829799	FCBI31240R	0	.313	.358	.187	4.000	.093	0.0°	5.0°	TD..130805	FC14	T7
2829777	FCBI31260R	0	.313	.358	.187	6.000	.093	0.0°	5.0°	TD..130805	FC14	T7
<b>left hand</b>												
2830027	FCBI18745L	-5	.187	.275	.126	4.000	.040	0.0°	5.0°	TD..130805	FC11	T7
2829903	FCBI25045L	-5	.250	.296	.156	4.000	.047	0.0°	5.0°	TD..130805	FC14	T7
2829885	FCBI25065L	-5	.250	.296	.156	6.000	.047	0.0°	5.0°	TD..130805	FC14	T7
2829793	FCBI31245L	-5	.312	.358	.187	4.000	.093	0.0°	5.0°	TD..130805	FC14	T7
2829770	FCBI31265L	-5	.312	.358	.187	6.000	.093	0.0°	5.0°	TD..130805	FC14	T7
3896029	FCBI25040L	0	.250	.296	.156	4.000	.047	0.0°	5.0°	TD..130805	FC14	T7

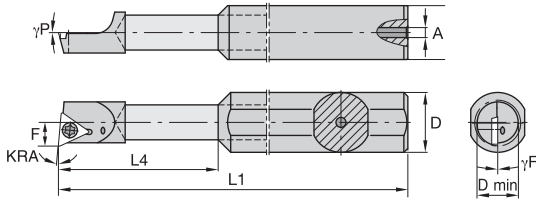


■ **FCBM**

order number	catalog number	KRI	D	D min	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
3896036	FCBM51000R	90	5,00	6,98	3,40	100,58	1,02	0.0°	5.0°	TD..07S102	<b>FC11</b>	T7
3896031	FCBM61520R	90	6,00	7,06	3,70	152,40	1,19	0.0°	5.0°	TD..07S102	<b>FC11</b>	T7
2829356	FCBM81520R	90	8,00	9,16	4,80	152,40	2,36	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
2829390	FCBM61525R	95	6,00	7,06	3,71	152,40	1,19	0.0°	5.0°	TD..07S102	<b>FC11</b>	T7
2829368	FCBM81525R	95	8,00	9,16	4,80	152,40	2,36	0.0°	5.0°	TD..07S102	<b>FC14</b>	T7
<b>left hand</b>												
3896035	FCBM51000L	90	5,00	6,98	3,40	100,58	1,02	0.0°	5.0°	TD..07S102	<b>FC11</b>	T7
3896030	FCBM61520L	90	6,00	7,06	3,71	152,40	1,19	0.0°	5.0°	TD..130805	<b>FC11</b>	T7
3896032	FCBM81520L	90	8,00	9,16	4,80	152,40	2,36	0.0°	5.0°	TD..130805	<b>FC11</b>	T7
3896037	FCBM51005L	95	5,00	6,98	3,20	100,58	1,02	0.0°	5.0°	TD..07S102	<b>FC11</b>	T7
2829385	FCBM61525L	95	6,00	7,06	3,71	152,40	1,19	0.0°	5.0°	TD..07S102	<b>FC11</b>	T7



Tools for Small Hole Boring

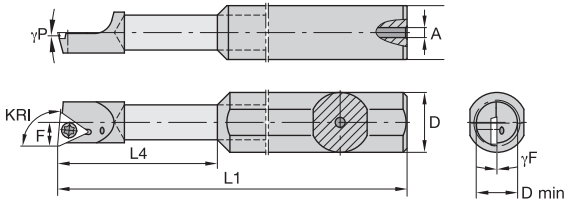


■ FCBI • STEPPED



order number	catalog number	KRA	D	D min	F	L1	L4	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>													
2829979	FCBI20350015R	-5	.500	.275	.126	2.500	1.000	.125	0.0°	5.0°	TD..130805	FC11	T7
2829962	FCBI20350025R	-5	.500	.275	.126	3.500	2.000	.125	0.0°	5.0°	TD..130805	FC11	T7
2829857	FCBI2505001255R	-5	.500	.296	.156	2.750	1.250	.250	0.0°	5.0°	TD..130805	FC11	T7
2829847	FCBI250500255R	-5	.500	.296	.156	4.000	2.500	.125	0.0°	5.0°	TD..130805	FC11	T7
2829740	FCBI312500155R	-5	.500	.358	.187	3.000	1.500	.125	0.0°	5.0°	TD..130805	FC14	T7
2829722	FCBI31250031255R	-5	.500	.358	.187	4.625	3.125	.125	0.0°	5.0°	TD..130805	FC14	T7
2829942	FCBI20362515R	-5	.625	.275	.126	3.500	1.000	.125	0.0°	5.0°	TD..130805	FC11	T7
2829920	FCBI20362525R	-5	.625	.275	.126	4.500	2.000	.125	0.0°	5.0°	TD..130805	FC14	T7
2829828	FCBI2506251255R	-5	.625	.296	.156	3.750	1.250	.250	0.0°	5.0°	TD..130805	FC11	T7
2829811	FCBI250625255R	-5	.625	.296	.156	5.000	2.500	.125	0.0°	5.0°	TD..130805	FC14	T7
2829704	FCBI312625155R	-5	.625	.358	.187	4.000	1.500	.125	0.0°	5.0°	TD..130805	FC14	T7
2829686	FCBI31262531255R	-5	.625	.358	.187	5.625	3.125	.125	0.0°	5.0°	TD..130805	FC14	T7
2829990	FCBI20350010R	0	.500	.275	.134	2.500	1.000	.125	0.0°	5.0°	TD..130805	FC11	T7
2829967	FCBI20350020R	0	.500	.275	.134	3.500	2.000	.125	0.0°	5.0°	TD..130805	FC11	T7
2829869	FCBI2505001250R	0	.500	.296	.156	2.750	1.250	.125	0.0°	5.0°	TD..130805	FC14	T7
2829851	FCBI250500250R	0	.500	.296	.156	4.000	2.500	.125	0.0°	5.0°	TD..130805	FC14	T7
2829751	FCBI312500150R	0	.500	.358	.187	3.000	1.500	.125	0.0°	5.0°	TD..130805	FC14	T7
2829736	FCBI31250031250R	0	.500	.358	.187	4.625	3.125	.125	0.0°	5.0°	TD..130805	FC14	T7
3896065	FCBI20362510R	0	.625	.275	.134	3.500	1.000	.125	0.0°	5.0°	TD..130805	FC11	T7
2829930	FCBI20362520R	0	.625	.275	.134	4.500	2.000	.125	0.0°	5.0°	TD..130805	FC11	T7
2829841	FCBI2506251250R	0	.625	.296	.156	3.750	1.250	.125	0.0°	5.0°	TD..130805	FC14	T7
2829817	FCBI250625250R	0	.625	.296	.156	5.000	2.500	.125	0.0°	5.0°	TD..130805	FC14	T7
2829716	FCBI312625150R	0	.625	.358	.187	4.000	1.500	.125	0.0°	5.0°	TD..130805	FC14	T7
2829698	FCBI31262531250R	0	.625	.358	.187	5.625	3.125	.125	0.0°	5.0°	TD..130805	FC14	T7
<b>left hand</b>													
2829985	FCBI20350015L	-5	.500	.275	.126	2.500	1.000	.125	0.0°	5.0°	TDHB130805	FC14	T7
2829863	FCBI2505001255L	-5	.500	.296	.156	2.750	1.250	.125	0.0°	5.0°	TD..130805	FC14	T7
2829745	FCBI312500155L	-5	.500	.358	.187	3.000	1.500	.125	0.0°	5.0°	TD..130805	FC14	T7
2829835	FCBI2506251255L	-5	.625	.296	.156	3.750	1.250	.125	0.0°	5.0°	TD..130805	FC14	T7
2829709	FCBI312625155L	-5	.625	.358	.187	4.000	1.500	.125	0.0°	5.0°	TD..130805	FC14	T7



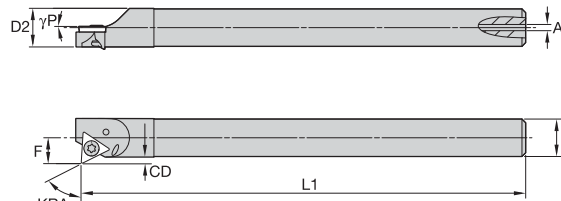
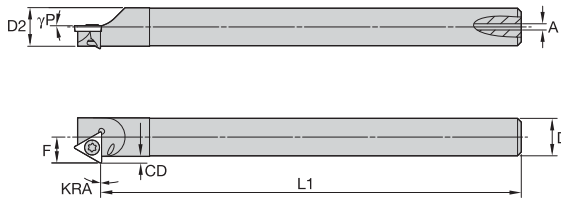


FCBM • STEPPED



order number	catalog number	KRI	D	D min	F	L1	L4	A	$\gamma^{\circ}$	$\gamma^{\circ}$	gage insert	insert screw	Torx
<b>right hand</b>													
3896072	FCBM6612630R	90	12,00	7,52	3,96	101,60	63,50	1,19	0.0°	5.0°	TD..07S102	FC14	T7
2829268	FCBM8212790R	90	12,00	9,09	4,75	117,48	79,38	3,18	0.0°	5.0°	TD..07S102	FC14	T7
3896069	FCBM5316250R	90	16,00	6,98	3,40	88,90	25,40	3,18	0.0°	5.0°	TD..07S102	FC11	T7
3896084	FCBM6616320R	90	16,00	7,52	3,96	95,25	31,75	3,18	0.0°	5.0°	TD..07S102	FC11	T7
3896086	FCBM8216380R	90	16,00	9,09	4,75	101,60	38,10	3,18	0.0°	5.0°	TD..07S102	FC14	T7
3896095	FCBM8216790R	90	16,00	9,09	4,75	142,87	79,37	3,18	0.0°	5.0°	TD..07S102	FC14	T7
2829350	FCBM5312255R	95	12,00	6,98	3,20	63,50	25,40	3,18	0.0°	5.0°	TD..07S102	FC11	T7
2829323	FCBM6612325R	95	12,00	7,52	3,96	69,85	31,75	3,18	0.0°	5.0°	TD..07S102	FC14	T7
3896083	FCBM6612635R	95	12,00	7,52	3,96	101,60	63,50	3,18	0.0°	5.0°	TD..07S102	FC11	T7
2829301	FCBM8212385R	95	12,00	9,09	4,75	76,20	38,10	3,18	0.0°	5.0°	TD..07S102	FC14	T7
2829279	FCBM8212795R	95	12,00	9,09	4,75	117,48	79,38	3,18	0.0°	5.0°	TD..07S102	FC14	T7
3897085	FCBM5316255R	95	16,00	6,98	3,20	88,90	25,40	3,18	0.0°	5.0°	TD..07S102	FC11	T7
3790247	FCBM6616325R	95	16,00	7,52	3,96	95,25	31,75	3,18	0.0°	5.0°	TD..07S102	FC14	T7
3786518	FCBM6616635R	95	16,00	7,52	3,96	127,00	63,50	3,18	0.0°	5.0°	TD..07S102	FC14	T7
3786519	FCBM8216795R	95	16,00	9,09	4,75	117,48	79,38	3,18	0.0°	5.0°	TD..07S102	FC14	T7
<b>left hand</b>													
3896067	FCBM5312510L	90	12,00	6,98	3,40	88,90	50,80	3,18	0.0°	5.0°	TD..07S102	FC11	T7
2829344	FCBM5312255L	95	12,00	6,98	3,20	63,50	25,40	3,18	0.0°	5.0°	TD..07S102	FC11	T7
3896068	FCBM5312515L	95	12,00	6,98	3,20	88,90	50,80	3,18	0.0°	5.0°	TD..07S102	FC11	T7
2829319	FCBM6612325L	95	12,00	7,52	3,96	69,85	31,75	3,18	0.0°	5.0°	TD..07S102	FC14	T7
2829295	FCBM8212385L	95	12,00	9,09	4,75	76,20	38,10	3,18	0.0°	5.0°	TD..07S102	FC14	T7
3896070	FCBM5316255L	95	16,00	6,98	3,20	88,90	25,40	3,18	0.0°	5.0°	TD..07S102	FC11	T7
3896085	FCBM6616325L	95	16,00	7,52	3,96	95,25	31,75	3,18	0.0°	5.0°	TD..07S102	FC11	T7
3896087	FCBM8216385L	95	16,00	9,09	4,75	101,60	38,10	3,18	0.0°	5.0°	TD..07S102	FC14	T7

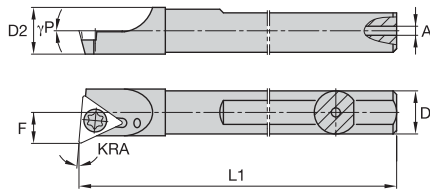
Tools for Small Hole Boring



Tools for Small Hole Boring

### ■ FSRI

order number	catalog number	KRA	D	D min	D2	F	L1	CD	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>														
2830138	FSRI312350R	0	.313	.394	.322	.223	3.500	.062	.040	0.0°	0.0°	TD..130805	FC14	T7
2830120	FSRI3123560R	30	.313	.407	.322	.236	3.500	.075	.040	0.0°	0.0°	TD..130805	FC14	T7

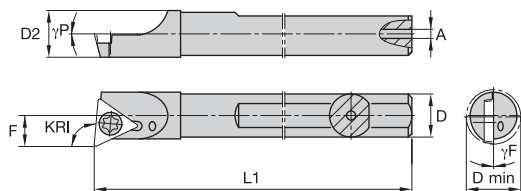


NOTE: KRA shown as -5°.

### ■ QSBI

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx	
<b>right hand</b>														
2825910	QSBI37555R	-5	.375	.438	.385	.221	5.000	.125	0.0°	5.0°	TP..21505	QC21	T9	
2825774	QSBI50065R	-5	.500	.563	.510	.296	6.000	.156	0.0°	5.0°	TP..21505	QC26	T9	
2825923	QSBI37550R	0	.375	.438	.385	.221	5.000	.125	0.0°	5.0°	TP..21505	QC21	T9	
2825788	QSBI50060R	0	.500	.563	.510	.296	6.000	.156	0.0°	5.0°	TP..21505	QC26	T9	
<b>left hand</b>														
2825917	QSBI37555L	-5	.375	.438	.385	.221	5.000	.125	0.0°	5.0°	TP..21505	QC21	T9	
2825781	QSBI50065L	-5	.500	.563	.510	.296	6.000	.156	0.0°	5.0°	TP..21505	QC26	T9	



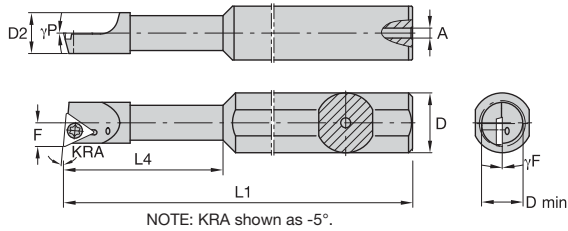


■ **QSBM**



order number	catalog number	KRI	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
3886552	QSBM101275R	95	10,00	11,15	10,21	5,79	127,00	3,20	0.0°	5.0°	TP..110202	QC21	T9
<b>left hand</b>													
3886550	QSBM101270L	90	10,00	11,15	10,21	5,79	127,00	3,20	0.0°	5.0°	TP..110202	QC21	T9
3886943	QSBM121520L	90	12,00	13,16	12,19	6,81	152,40	4,00	0.0°	5.0°	TP..110202	QC26	T9
3886551	QSBM101275L	95	10,00	11,15	10,21	5,79	127,00	3,20	0.0°	5.0°	TP..110202	QC21	T9

Tools for Small Hole Boring

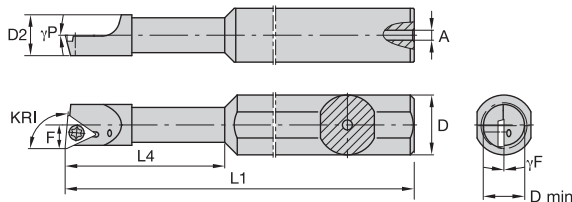


Tools for Small Hole Boring

■ QSBI • STEPPED

order number	catalog number	KRA	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>														
2825884	QSBI37550011255R	-5	.500	.438	.390	.221	3.750	1.125	.080	0.0°	5.0°	TP..21505	QC21	T9
2825854	QSBI37550018755R	-5	.500	.438	.390	.221	3.750	1.875	.080	0.0°	5.0°	TP..21505	QC21	T9
2825832	QSBI37562511255R	-5	.625	.438	.390	.221	4.250	1.125	.080	0.0°	5.0°	TP..21505	QC21	T9
2825816	QSBI37562518755R	-5	.625	.438	.390	.221	4.250	1.875	.080	0.0°	5.0°	TP..21505	QC21	T9
2825753	QSBI500625155R	-5	.625	.563	.510	.296	4.250	1.500	.156	0.0°	5.0°	TP..21505	QC26	T9
2825730	QSBI500625255R	-5	.625	.563	.510	.296	4.250	2.500	.156	0.0°	5.0°	TP..21505	QC26	T9
2825801	QSBI375750155R	-5	.750	.438	.390	.221	4.000	1.500	.080	0.0°	5.0°	TP..21505	QC21	T9
2825720	QSBI625750255R	-5	.750	.688	.625	.353	4.500	2.500	.098	0.0°	5.0°	TP..21505	QC26	T9
2825897	QSBI37550011250R	0	.500	.438	.390	.221	3.750	1.125	.080	0.0°	5.0°	TP..21505	QC21	T9
2825870	QSBI37550018750R	0	.500	.438	.390	.221	3.750	1.875	.080	0.0°	5.0°	TP..21505	QC21	T9
2825819	QSBI37562518750R	0	.625	.438	.390	.221	4.250	1.875	.080	0.0°	5.0°	TP..21505	QC21	T9
2825747	QSBI500625250R	0	.625	.563	.510	.296	4.250	2.500	.156	0.0°	5.0°	TP..21505	QC26	T9
2825727	QSBI625750250R	0	.750	.688	.625	.353	4.500	2.500	.098	0.0°	5.0°	TP..21505	QC26	T9
<b>left hand</b>														
2825864	QSBI37550018755L	-5	.500	.438	.390	.221	3.750	1.875	.080	0.0°	5.0°	TP..21505	QC21	T9
2825838	QSBI37562511255L	-5	.625	.438	.390	.221	4.250	1.125	.080	0.0°	5.0°	TP..21505	QC21	T9
2825760	QSBI500625155L	-5	.625	.563	.510	.296	4.250	1.500	.156	0.0°	5.0°	TP..21505	QC26	T9
3783153	QSBI500625255L	-5	.625	.563	.510	.296	4.250	2.500	.156	0.0°	5.0°	TP..21505	QC26	T9
2825522	QSBI375750155L	-5	.750	.438	.390	.221	4.000	1.500	.080	0.0°	5.0°	TP..21505	QC21	T9
2954362	QSBI500625150L	0	.625	.563	.510	.296	4.250	1.500	.080	0.0°	5.0°	TP..21505	QC26	T9

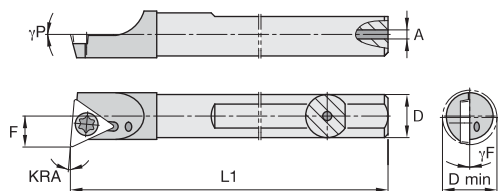




■ QSBM • STEPPED

order number	catalog number	KRI	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>														
2825013	QSBM9912480R	90	12,00	11,12	9,91	5,61	95,25	47,63	2,03	0.0°	5.0°	TP..110202	QC21	T9
3890865	QSBM9916480R	90	16,00	11,12	9,91	5,61	107,95	47,63	2,03	0.0°	5.0°	TP..110202	QC21	T9
3886949	QSBM15920630R	90	20,00	17,47	15,88	8,97	114,30	63,50	2,49	0.0°	5.0°	TP..110202	QC26	T9
2825052	QSBM9912295R	95	12,00	11,12	9,91	5,61	95,25	28,58	2,03	0.0°	5.0°	TP..110202	QC21	T9
2825024	QSBM9912485R	95	12,00	11,12	9,91	5,61	95,25	47,63	2,03	0.0°	5.0°	TP..110202	QC21	T9
3890864	QSBM9916295R	95	16,00	11,12	9,91	5,61	107,95	28,58	2,03	0.0°	5.0°	TP..110202	QC21	T9
2824993	QSBM9916485R	95	16,00	11,12	9,91	5,61	107,95	47,63	2,03	0.0°	5.0°	TP..110202	QC21	T9
3886945	QSBM1316385R	95	16,00	14,30	12,95	7,52	107,95	38,10	2,03	0.0°	5.0°	TP..110202	QC26	T9
3886948	QSBM1316635R	95	16,00	14,30	12,95	7,52	107,95	63,50	2,03	0.0°	5.0°	TP..110202	QC26	T9
2824950	QSBM9920385R	95	20,00	11,12	9,91	5,61	101,60	38,10	2,03	0.0°	5.0°	TP..110202	QC21	T9
3886950	QSBM15920635R	95	20,00	17,47	15,88	8,97	114,30	63,50	2,49	0.0°	5.0°	TP..110202	QC26	T9
<b>left hand</b>														
2825019	QSBM9912485L	95	12,00	11,12	9,91	5,61	95,25	47,63	2,03	0.0°	5.0°	TP..110202	QC21	T9
3896089	QSBM9916295L	95	16,00	11,12	9,91	5,61	107,95	28,58	2,03	0.0°	5.0°	TP..110202	QC21	T9
3886944	QSBM1316385L	95	16,00	14,30	12,95	7,52	107,95	38,10	2,03	0.0°	5.0°	TP..110202	QC26	T9
3886947	QSBM1316635L	95	16,00	14,30	12,95	7,52	107,95	63,50	2,03	0.0°	5.0°	TP..110202	QC26	T9
2824945	QSBM9920385L	95	20,00	11,12	9,91	5,61	101,60	38,10	2,03	0.0°	5.0°	TP..110202	QC21	T9




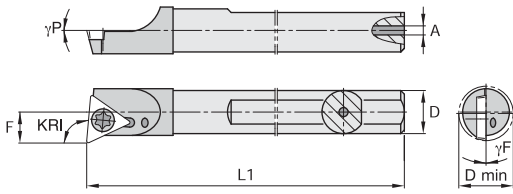


NOTE: KRA shown as -5°.

Tools for Small Hole Boring

### ■ QCBI

order number	catalog number	KRA	D	D min	F	L1	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
												
<b>right hand</b>												
2825290	QCBI37565R	-5	.375	.438	.228	6.000	.125	0.0°	5.0°	TP..21505	<b>QC21</b>	T9
2825265	QCBI375105R	-5	.375	.438	.228	10.000	.125	0.0°	5.0°	TP..21505	<b>QC21</b>	T9
2825272	QCBI50085R	-5	.500	.563	.296	8.000	.188	0.0°	5.0°	TP..21505	<b>QC21</b>	T9
2825232	QCBI500105R	-5	.500	.563	.296	10.000	.188	0.0°	5.0°	TP..21505	<b>QC21</b>	T9
2825304	QCBI37560R	0	.375	.438	.228	6.000	.125	0.0°	5.0°	TP..21505	<b>QC21</b>	T9
3837881	QCBI375100R	0	.375	.438	.228	10.000	.125	0.0°	5.0°	TP..21505	<b>QC21</b>	T9
2825285	QCBI50080R	0	.500	.563	.296	8.000	.188	0.0°	5.0°	TP..21505	<b>QC21</b>	T9
2825238	QCBI500100R	0	.500	.563	.296	10.000	.188	0.0°	5.0°	TP..21505	<b>QC26</b>	T9
<b>left hand</b>												
2825297	QCBI37565L	-5	.375	.438	.228	6.000	.125	0.0°	5.0°	TP..21505	<b>QC21</b>	T9
2825278	QCBI50085L	-5	.500	.563	.296	8.000	.188	0.0°	5.0°	TP..21505	<b>QC21</b>	T9
3896041	QCBI375100L	0	.375	.438	.228	10.000	.125	0.0°	5.0°	TP..21505	<b>QC21</b>	T9
2979612	QCBI50080L	0	.500	.563	.296	8.000	.188	0.0°	5.0°	TP..21505	<b>QC21</b>	T9



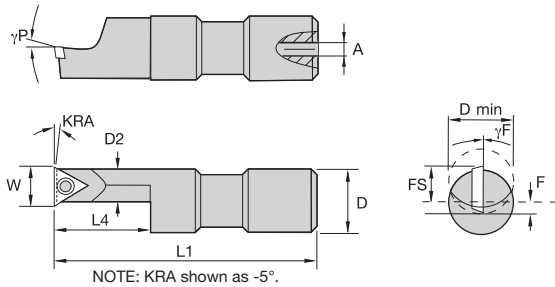
■ **QCBM**

order number	catalog number	KRI	D	D min	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
3854445	QCBM102540R	90	10,00	11,15	5,79	254,00	3,20	0.0°	5.0°	TP..110202	QC21	T9
2824776	QCBM102545R	95	10,00	11,15	5,79	254,00	3,20	0.0°	5.0°	TP..110202	QC21	T9
2824747	QCBM122545R	95	12,00	13,16	6,81	254,00	4,70	0.0°	5.0°	TP..110202	QC21	T9
<b>left hand</b>												
3896043	QCBM122540L	90	12,00	13,16	6,81	254,00	4,70	0.0°	5.0°	TP..110202	QC26	T9
3896044	QCBM122545L	95	12,00	13,16	6,81	254,00	4,70	0.0°	5.0°	TP..110202	QC26	T9



Tools for Small Hole Boring

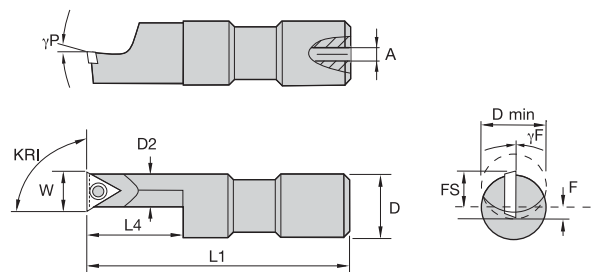
Clamping System S • Steel



■ **QSOI**

order number	catalog number	KRA	D	D min	D2	F	L1	L4	FS	W	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>																
2825654	QSOI3126251255R	-5	.625	.606	.313	.055	3.125	1.250	.366	.421	.060	0.0°	5.0°	TP..21505	QC26	T9
2825640	QSOI375750155R	-5	.750	.750	.375	.023	3.750	1.500	—	—	.080	0.0°	5.0°	TP..21505	QC26	T9
2825660	QSOI3126251250R	0	.625	.606	.312	.055	3.125	1.250	.156	.422	.060	0.0°	5.0°	TP..21505	QC26	T9
2825647	QSOI375750150R	0	.750	.750	.375	.024	3.750	1.500	.188	.423	.080	0.0°	5.0°	TP..21505	QC26	T9



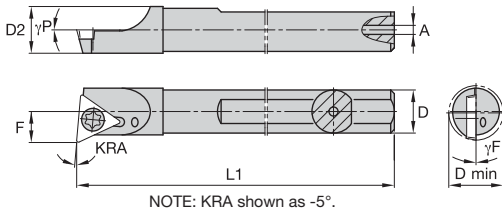


### ■ QSOM

order number	catalog number	KRI	D	D min	D2	F	L1	L4	FS	W	A	$\gamma_F^\circ$	$\gamma_P^\circ$	gage insert	insert screw	Torx
right hand																
2824819	QSOM9516385R	95	16,00	16,51	9,50	0,64	95,25	38,10	10,63	10,70	2,03	0.0°	5.0°	TP..110202	QC26	T9





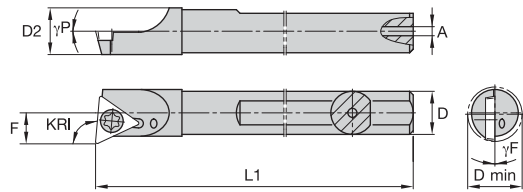


■ SSBI




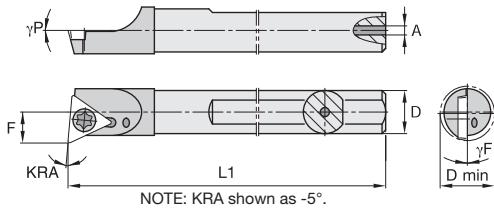
order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
2823053	SSBI500255R	-5	.500	.668	.572	.339	2.500	.156	0.0°	5.0°	TP..3205	SC30	T10
2823025	SSBI50065R	-5	.500	.668	.572	.339	6.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2822980	SSBI62545R	-5	.625	.720	.635	.393	4.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2822947	SSBI62575R	-5	.625	.720	.635	.393	7.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2822921	SSBI75045R	-5	.750	.850	.760	.460	4.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2822898	SSBI75085R	-5	.750	.850	.760	.460	8.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2823121	SSBI1000105R	-5	1.000	1.100	1.010	.585	10.000	.250	0.0°	5.0°	TP..3205	SC30	T10
2823096	SSBI100055R	-5	1.000	1.100	1.010	.585	5.000	.250	0.0°	5.0°	TP..3205	SC30	T10
2823073	SSBI1250125R	-5	1.250	1.350	1.260	.710	12.000	.250	0.0°	5.0°	TP..3205	SC30	T10
2823067	SSBI500250R	0	.500	.668	.572	.339	2.500	.156	0.0°	5.0°	TP..3205	SC30	T10
2823039	SSBI50060R	0	.500	.668	.572	.339	6.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2823009	SSBI62540R	0	.625	.720	.635	.393	4.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2822959	SSBI62570R	0	.625	.720	.635	.393	7.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2822935	SSBI75040R	0	.750	.850	.760	.460	4.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2822907	SSBI75080R	0	.750	.850	.760	.460	8.000	.156	0.0°	5.0°	TP..3205	SC30	T10
<b>left hand</b>													
2823032	SSBI50065L	-5	.500	.668	.572	.339	6.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2822987	SSBI62545L	-5	.625	.720	.635	.393	4.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2822954	SSBI62575L	-5	.625	.720	.635	.393	7.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2822928	SSBI75045L	-5	.750	.850	.760	.460	4.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2822901	SSBI75085L	-5	.750	.850	.760	.460	8.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2823128	SSBI1000105L	-5	1.000	1.100	1.010	.585	10.000	.250	0.0°	5.0°	TP..3205	SC30	T10
2823081	SSBI1250125L	-5	1.250	1.350	1.260	.710	12.000	.375	0.0°	5.0°	TP..3205	SC30	T10
2822966	SSBI62570L	0	.625	.720	.635	.393	7.000	.156	0.0°	5.0°	TP..3205	SC30	T10
3792877	SSBI75080L	0	.750	.850	.760	.460	8.000	.156	0.0°	5.0°	TP..3205	SC30	T10
2823142	SSBI1000100L	0	1.000	1.100	1.010	.585	10.000	.312	0.0°	5.0°	TP..3205	SC30	T10
3837307	SSBI100050L	0	1.000	1.100	1.010	.585	5.000	.312	0.0°	5.0°	TP..3205	SC30	T10

Tools for Small Hole Boring



■ **SSBM**

order number	catalog number	KRI	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
3886968	SSBM202030R	90	20,00	21,23	20,19	10,90	203,20	4,00	0.0°	5.0°	TP..160302		SC30 T10
<b>left hand</b>													
3886967	SSBM202030L	90	20,00	21,23	20,19	10,90	203,20	4,00	0.0°	5.0°	TP..160302	SC30	T10
3886969	SSBM202035L	95	20,00	21,23	20,19	10,90	203,20	4,00	0.0°	5.0°	TP..160302	SC30	T10

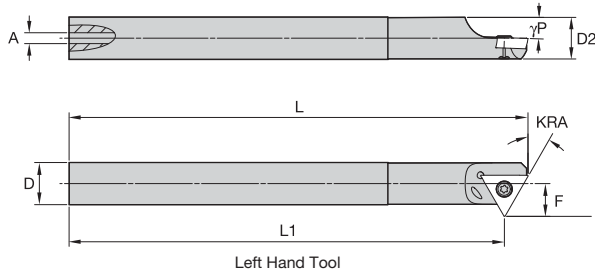


■ SCBI



order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
2822500	SCBI62565R	-5	.625	.720	.393	6.000	.218	0.0°	5.0°	TP..3205	SC30	T10
2822515	SCBI625105R	-5	.625	.720	.393	10.000	.218	0.0°	5.0°	TP..3205	SC30	T10
2822454	SCBI75065R	-5	.750	.850	.460	6.000	.281	0.0°	5.0°	TP..3205	SC30	T10
2822479	SCBI750105R	-5	.750	.850	.460	10.000	.281	0.0°	5.0°	TP..3205	SC30	T10
2822327	SCBI875125R	-5	.875	.953	.500	12.000	.281	0.0°	5.0°	TP..3205	SC30	T10
2822540	SCBI100065R	-5	1.000	1.100	.585	6.000	.312	0.0°	5.0°	TP..3205	SC30	T10
2822561	SCBI1000125R	-5	1.000	1.100	.585	12.000	.312	0.0°	5.0°	TP..3205	SC30	T10
2822510	SCBI62560R	0	.625	.720	.393	6.000	.218	0.0°	5.0°	TP..3205	SC30	T10
2822527	SCBI625100R	0	.625	.720	.393	10.000	.218	0.0°	5.0°	TP..3205	SC30	T10
2822467	SCBI75060R	0	.750	.850	.460	6.000	.281	0.0°	5.0°	TP..3205	SC30	T10
2822492	SCBI750100R	0	.750	.850	.460	10.000	.281	0.0°	5.0°	TP..3205	SC30	T10
2822574	SCBI1000120R	0	1.000	1.100	.585	12.000	.312	0.0°	5.0°	TP..3205	SC30	T10
<b>left hand</b>												
2822503	SCBI62565L	-5	.625	.720	.393	6.000	.218	0.0°	5.0°	TP..3205	SC30	T10
2822522	SCBI625105L	-5	.625	.720	.393	10.000	.218	0.0°	5.0°	TP..3205	SC30	T10
2822460	SCBI75065L	-5	.750	.850	.460	6.000	.281	0.0°	5.0°	TP..3205	SC30	T10
3784482	SCBI100060L	0	1.000	1.100	.585	6.000	.312	0.0°	5.0°	TP..3205	SC30	T10
2822576	SCBI1000120L	0	1.000	1.100	.585	12.000	.312	0.0°	5.0°	TP..3205	SC30	T10

Tools for Small Hole Boring



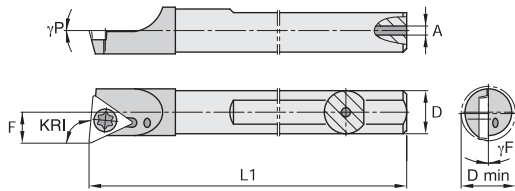
Tools for Small Hole Boring

■ SSCI

order number	catalog number	KRA	D	D min	D2	F	L1	L	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
left hand														
2822888	SSCI625430L	30	.625	.730	.635	.402	3.530	4.086	.156	0.0°	0.0°	TP..3205	SC30	T10



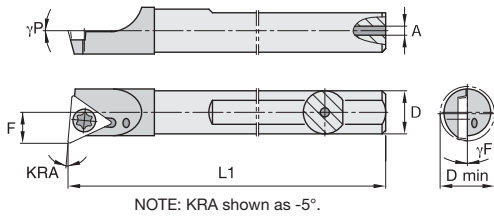
Clamping System S • Carbide



■ SCBM

order number	catalog number	KRI	D	D min	F	L1	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
right hand												
3895892	SCBM162540R	90	16,00	17,25	8,89	254,00	5,51	0.0°	5.0°	TP..160302	SC30	T10
3896004	SCBM162545R	95	16,00	17,25	8,89	254,00	5,51	0.0°	5.0°	TP..160302	SC30	T10
3896006	SCBM202545R	95	20,00	21,25	10,90	254,00	7,11	0.0°	5.0°	TP..160302	SC30	T10
left hand												
3895891	SCBM162540L	90	16,00	17,25	8,89	254,00	5,51	0.0°	5.0°	TP..160302	SC30	T10
3896005	SCBM202540L	90	20,00	21,25	10,90	254,00	7,11	0.0°	5.0°	TP..160302	SC30	T10
3896003	SCBM162545L	95	16,00	17,25	8,89	254,00	5,51	0.0°	5.0°	TP..160302	SC30	T10
3896091	SCBM202545L	95	20,00	21,25	10,90	254,00	7,11	0.0°	5.0°	TP..160302	SC30	T10



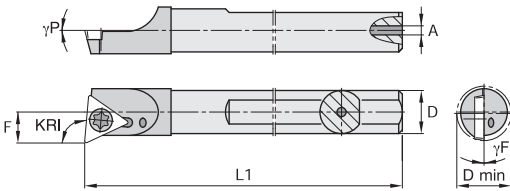


■ SDBI

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
3896007	SDBI1000125R	-5	1.000	1.100	—	.585	12.000	.312	0.0°	5.0°	TP..3205	SC30	T10
3896008	SDBI625100R	0	.625	.731	—	.393	10.000	.218	0.0°	5.0°	TP..3205	SC30	T10
<b>left hand</b>													
2822433	SDBI62560L	0	.625	.731	.635	.393	6.000	.218	0.0°	5.0°	TP..3205	SC30	T10



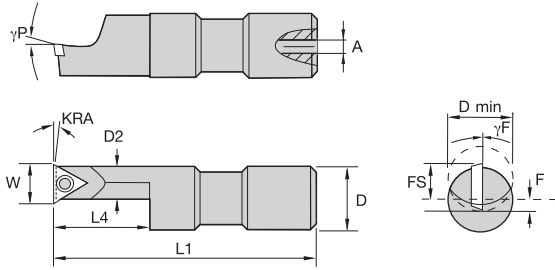
Tools for Small Hole Boring



■ SDBM

order number	catalog number	KRI	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
3896011	SDBM162540R	90	16,00	17,25	—	8,89	254,00	5,51	0.0°	5.0°	TP..160302	SC30	T10
3896014	SDBM202540R	90	20,00	21,25	—	10,90	254,00	7,11	0.0°	5.0°	TP..160302	SC30	T10
2822085	SDBM162545R	95	16,00	17,25	16,13	8,89	254,00	5,54	0.0°	5.0°	TP..160302	SC30	T10
3896092	SDBM202545R	95	20,00	21,25	—	10,90	254,00	7,11	0.0°	5.0°	TP..160302	SC30	T10
<b>left hand</b>													
3896010	SDBM162540L	90	16,00	17,25	—	8,89	254,00	5,51	0.0°	5.0°	TP..160302	SC30	T10
3896013	SDBM202540L	90	20,00	21,25	—	10,90	254,00	7,11	0.0°	5.0°	TP..160302	SC30	T10
3896012	SDBM162545L	95	16,00	17,25	—	8,89	254,00	5,51	0.0°	5.0°	TP..160302	SC30	T10
3897084	SDBM202545L	95	20,00	21,25	—	10,90	254,00	7,11	0.0°	5.0°	TP..160302	SC30	T10



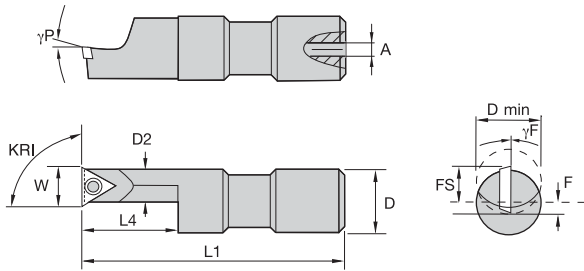


NOTE: KRA shown as -5°.

Tools for Small Hole Boring

■ SSOI

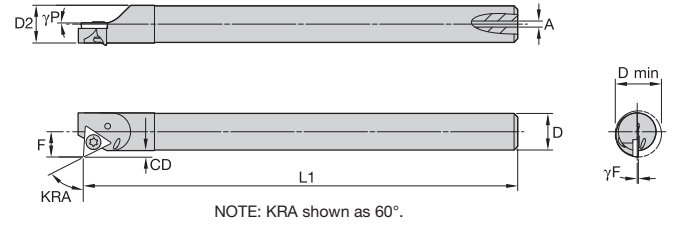
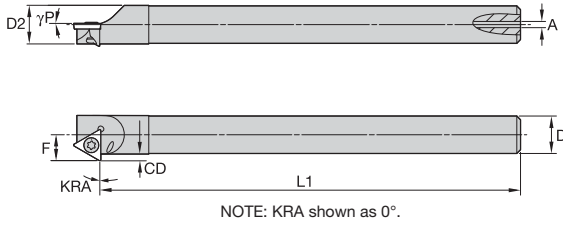
order number	catalog number	KRA	D	D min	D2	F	L1	L4	FS	W	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>																
2822843	SSOI5001000255R	-5	1.000	.969	.500	.070	4.750	2.500	—	—	.118	0.0°	5.0°	TP..3205	SC30	T10
2822857	SSOI5001000150R	0	1.000	.969	.500	.070	3.750	1.500	.250	.640	.118	0.0°	5.0°	TP..3205	SC30	T10
2822850	SSOI5001000250R	0	1.000	.969	.500	.070	4.750	2.500	.250	.640	.118	0.0°	5.0°	TP..3205	SC30	T10



■ SSOM

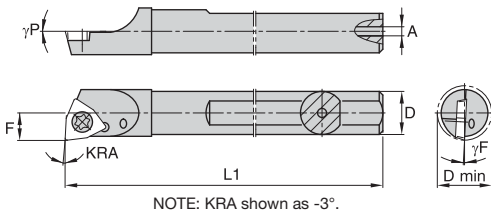
order number	catalog number	KRI	D	D min	D2	F	L1	L4	FS	W	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>																
3896090	SSOM1325380R	90	24,99	24,61	12,70	1,78	95,25	38,10	14,46	16,24	3,00	0.0°	5.0°	TPHB160302	SC30	T10
3890867	SSOM1325630R	90	24,99	24,61	12,70	1,78	120,65	63,50	14,46	16,24	3,00	0.0°	5.0°	TPHB160302	SC30	T10
3890866	SSOM1325385R	95	24,99	24,61	12,70	1,78	95,25	38,10	14,40	16,18	3,00	0.0°	5.0°	TPHB160302	SC30	T10
3890868	SSOM1325635R	95	24,99	24,61	12,70	1,78	120,65	63,50	14,40	16,18	3,00	0.0°	5.0°	TPHB160302	SC30	T10





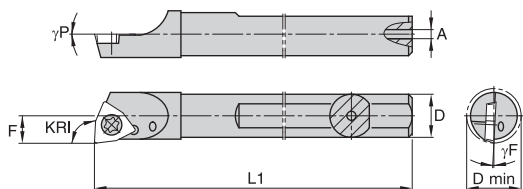
■ QSRI

order number	catalog number	KRA	D	D min	D2	F	L1	CD	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>														
2825633	QSRI375450R	0	.375	.492	.370	.287	4.500	.102	.125	0.0°	0.0°	TP..21505	QC21	T9
2825605	QSRI50050R	0	.500	.645	.510	.380	5.000	.125	.156	0.0°	0.0°	TP..21505	QC21	T9
2825614	QSRI375560R	30	.375	.525	.390	.320	5.000	.125	.125	0.0°	0.0°	TP..21505	QC21	T9
2825587	QSRI500660R	30	.500	.645	.510	.380	6.000	.125	.156	0.0°	0.0°	TP..21505	QC21	T9
2825621	QSRI375545R	45	.375	.525	.390	.320	5.000	.125	.125	0.0°	0.0°	TP..21505	QC21	T9
2825594	QSRI500645R	45	.500	.645	.510	.380	6.000	.125	.156	0.0°	0.0°	TP..21505	QC21	T9
3896088	QSRI375530R	60	.375	.525	.390	.320	5.000	.125	.125	0.0°	0.0°	TP..21505	QC21	T9



■ GSBIW

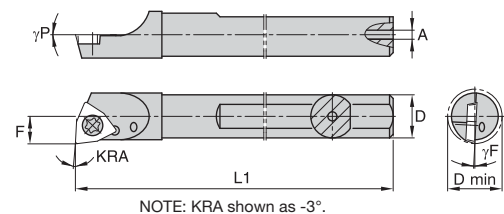
order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx	
<b>right hand</b>														
2828170	GSBIW18743R	-3	.188	.260	.228	.126	4.000	.040	-3.0°	0.0°	WP..1511	CT11	T6	
2828161	GSBIW25043R	-3	.250	.285	.260	.142	4.000	.040	-3.0°	0.0°	WP..1511	CT11	T6	
2828145	GSBIW31243R	-3	.313	.347	.322	.174	4.000	.040	-3.0°	0.0°	WP..1511	CT15	T6	
<b>left hand</b>														
2828167	GSBIW18743L	-3	.187	.260	.228	.126	4.000	.040	-3.0°	0.0°	WP..1511	CT11	T6	
2828151	GSBIW25043L	-3	.250	.285	.260	.142	4.000	.040	-3.0°	0.0°	WP..1511	CT11	T6	
2828139	GSBIW31243L	-3	.313	.347	.322	.174	4.000	.040	-3.0°	0.0°	WP..1511	CT15	T6	



### GSBMW

order number	catalog number	KRI	D	D min	D2	F	L1	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>													
2828122	GSBMW61003R	93	6,00	6,78	6,21	3,43	101,60	1,02	-3.0°	0.0°	WP..S30104	CT11	T6
3886549	GSBMW81003R	93	8,00	8,10	8,18	4,42	101,60	2,40	-3.0°	0.0°	WP..S30104	CT11	T6
<b>left hand</b>													
2828116	GSBMW61003L	93	6,00	6,78	6,21	3,43	101,60	1,02	-3.0°	0.0°	WP..S30104	CT11	T6
3886548	GSBMW81003L	93	8,00	8,10	8,18	4,42	101,60	2,40	-3.0°	0.0°	WP..S30104	CT11	T6

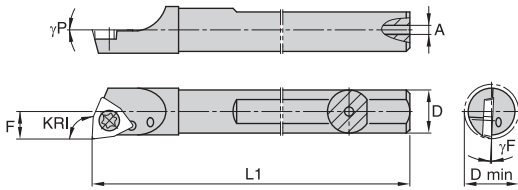
## Clamping System S • Carbide



### GCBIW

order number	catalog number	KRA	D	D min	F	L1	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>												
2827756	GCBIW18763R	-3	.188	.260	.126	6.000	.040	-3.0°	0.0°	WP..1511	CT11	T6
2827743	GCBIW25063R	-3	.250	.285	.143	6.000	.047	-3.0°	0.0°	WP..1511	—	T6
2827734	GCBIW31263R	-3	.312	.347	.174	6.000	.093	-3.0°	0.0°	WP..1511	CT15	T6
<b>left hand</b>												
2827749	GCBIW18763L	-3	.188	.260	.126	6.000	.040	-3.0°	0.0°	WP..1511	CT11	T6
2827740	GCBIW25063L	-3	.250	.285	.143	6.000	.047	-3.0°	0.0°	WP..1511	CT11	T6
2827727	GCBIW31263L	-3	.312	.347	.174	6.000	.093	-3.0°	0.0°	WP..1511	CT15	T6





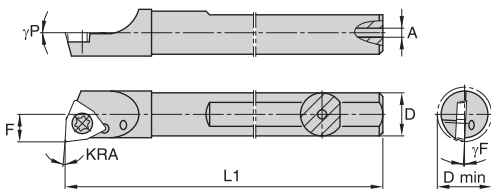
■ GCBMW

order number	catalog number	KRI	D	D min	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
3896040	GCBMW51523R	93	5,00	6,60	3,20	152,40	1,02	-3.0°	0.0°	WP..S30104	CT11	T6
2827711	GCBMW61523R	93	6,00	6,78	3,43	152,40	1,19	-3.0°	0.0°	WP..S30104	CT11	T6
<b>left hand</b>												
3896039	GCBMW51523L	93	5,00	6,60	3,20	152,40	1,02	-3.0°	0.0°	WP..S30104	CT11	T6
2827705	GCBMW61523L	93	6,00	6,78	3,43	152,40	1,19	-3.0°	0.0°	WP..S30104	CT11	T6
3897012	GCBMW81523L	93	8,00	8,80	4,42	152,40	2,36	-3.0°	0.0°	WP..S30104	CT11	T6



Tools for Small Hole Boring

Clamping System S • Steel

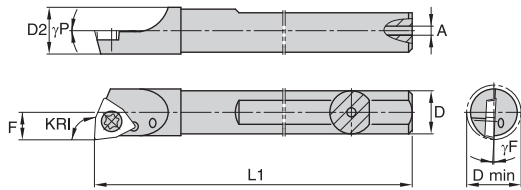


NOTE: KRA shown as -3°.

■ QSBIW

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
2825364	QSBIW37553R	-3	.375	.413	.385	.211	5.000	.093	-3.0°	0.0°	WP..2151	QTM20	T7
2825351	QSBIW50063R	-3	.500	.538	.510	.272	6.000	.156	-3.0°	0.0°	WP..2151	QTM20	T7
<b>left hand</b>													
2825357	QSBIW37553L	-3	.375	.413	.385	.211	5.000	.093	-3.0°	0.0°	WP..2151	QTM20	T7
2825345	QSBIW50063L	-3	.500	.538	.510	.273	6.000	.156	-3.0°	0.0°	WP..2151	QTM20	T7





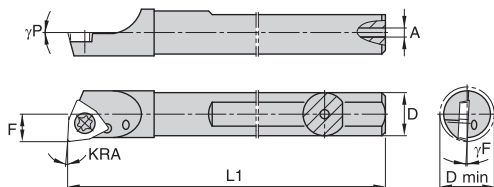
Tools for Small Hole Boring

### ■ QSBMW

order number	catalog number	KRI	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
3393828	QSBMW121523R	93	12,00	12,90	12,19	6,55	152,40	4,00	-3.0°	0.0°	WP..040204	QTM20	T7
<b>left hand</b>													
3886952	QSBMW101273L	93	10,00	10,94	10,70	5,59	127,00	3,20	-3.0°	0.0°	WP..040204	QTM20	T7



## Clamping System S • Carbide

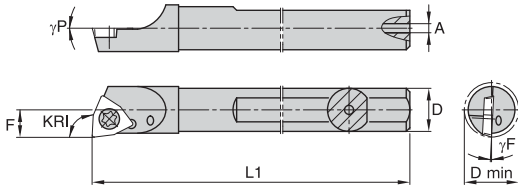


NOTE: KRA shown as -3°.

### ■ QCBIW

order number	catalog number	KRA	D	D min	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
2825335	QCBIW37563R	-3	.375	.413	.211	6.000	.125	-3.0°	0.0°	WP..2151	QTM20	T7
2825324	QCBIW50083R	-3	.500	.538	.273	8.000	.188	0.0°	0.0°	WP..2151	QTM20	T7
<b>left hand</b>												
2825327	QCBIW37563L	-3	.375	.413	.211	6.000	.125	-3.0°	0.0°	WP..2151	QTM20	T7
2825318	QCBIW50083L	-3	.500	.538	.273	8.000	.188	0.0°	0.0°	WP..2151	QTM20	T7





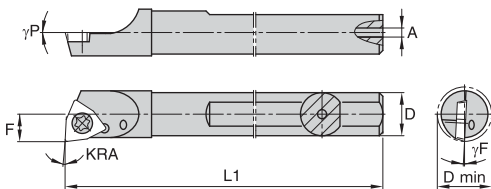
■ **QCBMW**

order number	catalog number	KRI	D	D min	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
3782378	QCBMW102543R	93	10,00	10,95	5,59	254,00	3,20	-3.0°	0.0°	WP..040204	QTM20	T7
<b>left hand</b>												
3896045	QCBMW102543L	93	10,00	10,95	5,59	254,00	3,20	-3.0°	0.0°	WP..040204	QTM20	T7
3896046	QCBMW122543L	93	12,00	12,90	6,55	254,00	4,70	-3.0°	0.0°	WP..040204	QTM20	T7



Tools for Small Hole Boring

Clamping System S • Steel

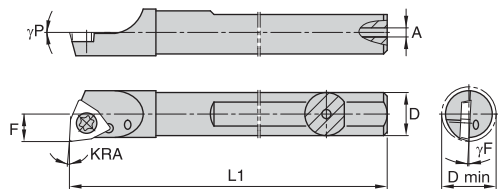


NOTE: KRA shown as -3°.

■ **SSBIW**

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
2823167	SSBIW62573R	-3	.625	.673	.635	.345	7.000	.156	-3.0°	0.0°	WP..3251	STM31	T15
2823155	SSBIW75083R	-3	.750	.797	.760	.407	8.000	.156	-3.0°	0.0°	WP..321	STM31	T15
<b>left hand</b>													
2823161	SSBIW62573L	-3	.625	.673	.635	.345	7.000	.156	-3.0°	0.0°	WP..3251	STM31	T15
2823149	SSBIW75083L	-3	.750	.797	.760	.407	8.000	.156	-3.0°	0.0°	WP..3251	STM31	T15



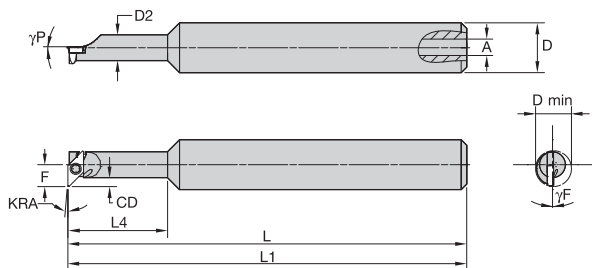


NOTE: KRA shown as -3°.

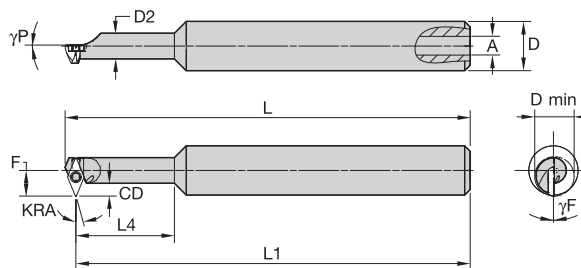
Tools for Small Hole Boring

■ SCBIW

order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx	
<b>right hand</b>														
2822603	SCBIW625103R	-3	.625	.673	—	.345	10.000	.218	-3.0°	0.0°	WP..3251	STM31	T15	
2822591	SCBIW750103R	-3	.750	.797	—	.407	10.000	.281	-3.0°	0.0°	WP..321	STM31	T15	
<b>left hand</b>														
2822595	SCBIW625103L	-3	.625	.673	.635	.345	10.000	.218	-3.0°	0.0°	WP..321	STM31	T15	



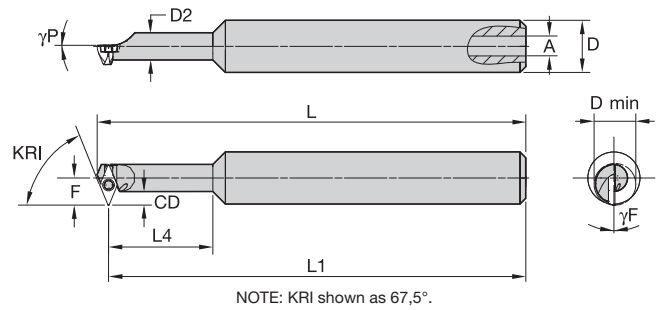
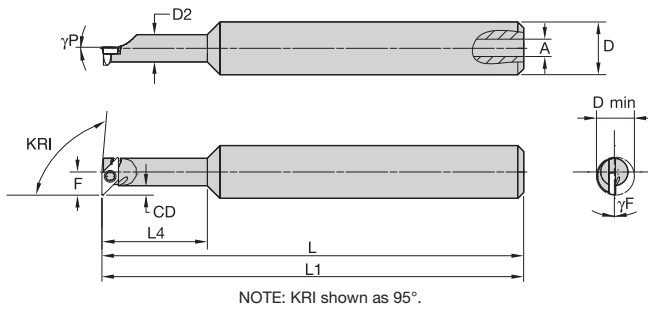
NOTE: KRA shown as -5°.



NOTE: KRA shown as 22.5°.

■ CSPI

order number	catalog number	KRA	D	D min	D2	F	CD	L	L1	L4	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>																
2832344	CSPI25050015R	-5.0	.500	.360	.260	.220	.090	4.000	4.000	1.000	.040	0.0°	0.0°	GP..12105	CT15	T6
2832334	CSPI3125001255R	-5.0	.500	.423	.323	.251	.090	4.000	4.000	1.250	.040	0.0°	0.0°	GP..12105	CT15	T6
2832297	CSPI25050010R	.0	.500	.360	.260	.220	.090	4.000	4.000	1.000	.040	0.0°	0.0°	GPHW12105	CT15	T6
2832291	CSPI3125001250R	.0	.500	.423	.323	.251	.090	4.000	4.000	1.250	.040	0.0°	0.0°	GP..12105	CT15	T6
2832319	CSPI2505001225R	22.5	.500	.400	.260	.260	.130	4.080	4.000	1.000	.040	0.0°	0.0°	GP..12105	CT15	T6
<b>left hand</b>																
2832337	CSPI25050015L	-5.0	.500	.360	.260	.220	.090	4.000	4.000	1.000	.040	0.0°	0.0°	GP..12105	CT15	T6
2832326	CSPI3125001255L	-5.0	.500	.423	.323	.251	.090	4.000	4.000	1.250	.040	0.0°	0.0°	GP..12105	CT15	T6

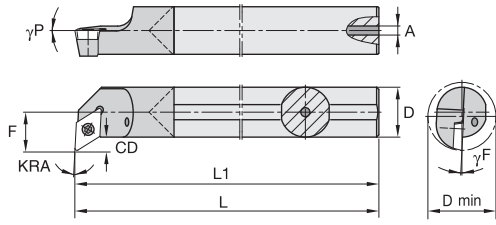


■ **CSPM**

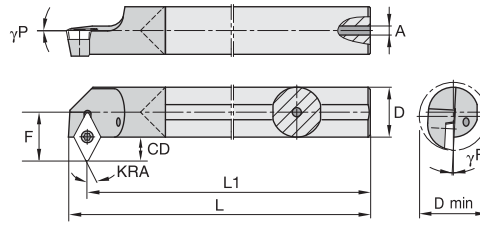
order number	catalog number	KRI	D	D min	D2	F	CD	L	L1	L4	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>																
2831399	CSPM71225225R	67.5	12,00	10,16	6,60	6,60	3,30	104,00	101,60	25,40	1,02	0.0°	0.0°	GC..050102	CT15	T6
3758942	CSPM81232225R	67.5	12,00	11,37	8,18	7,01	2,92	105,16	101,60	31,75	1,02	0.0°	0.0°	GC..050102	CT15	T6
2831411	CSPM712255R	95.0	12,00	9,14	6,60	5,59	2,29	101,60	101,60	25,40	1,02	0.0°	0.0°	GC..050102	CT15	T6
<b>left hand</b>																
2831394	CSPM71225225L	67.5	12,00	10,16	6,60	6,60	3,30	104,00	101,60	25,40	1,02	0.0°	0.0°	GPHW050102	CT15	T6
2831378	CSPM81232225L	67.5	12,00	11,38	8,18	7,01	2,92	104,10	101,60	31,75	1,02	0.0°	0.0°	GC..050102	CT15	T6
2831405	CSPM712255L	95.0	12,00	9,14	6,60	5,59	2,29	101,60	101,60	25,40	1,02	0.0°	0.0°	GP..050102	CT15	T6
2831383	CSPM812325L	95.0	12,00	10,74	8,20	6,38	2,27	101,60	101,60	31,75	1,02	0.0°	0.0°	GP..050102	CT15	T6



Tools for Small Hole Boring



NOTE: KRA shown as -5°.



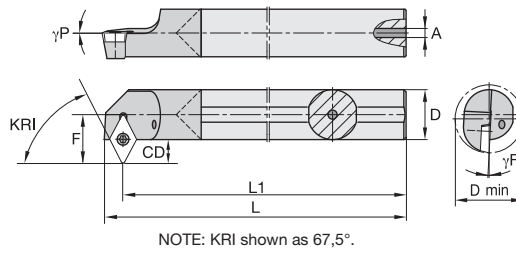
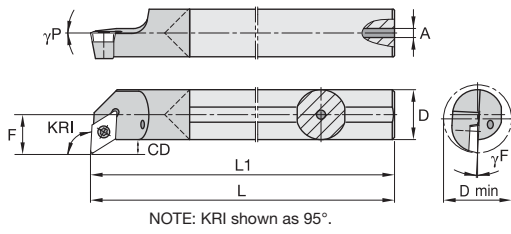
NOTE: KRA shown as 22.5°.

Tools for Small Hole Boring

■ CCPI



order number	catalog number	KRA	D	D min	F	CD	L	L1	A	$\gamma^F$	$\gamma^P$	gage insert	insert screw	Torx
<b>right hand</b>														
2831774	CCPI25065R	-5.0	.250	.360	.220	.091	6.000	6.000	.047	0.0°	0.0°	GP..12105	CT15	T6
2831762	CCPI31265R	-5.0	.313	.423	.251	.091	6.000	6.000	.093	0.0°	0.0°	GP..12105	CT15	T6
2831727	CCPI25060R	.0	.250	.360	.220	.091	6.000	6.000	.047	0.0°	0.0°	GP..12105	CT15	T6
2831714	CCPI31260R	.0	.313	.423	.251	.091	6.000	6.000	.093	0.0°	0.0°	GP..12105	CT15	T6
2831751	CCPI2506225R	22.5	.250	.400	.260	.131	6.095	6.000	.047	0.0°	0.0°	GP..12105	CT15	T6
2831739	CCPI3126225R	22.5	.313	.448	.276	.116	6.101	6.000	.093	0.0°	0.0°	GP..12105	CT15	T6
<b>left hand</b>														
2831767	CCPI25065L	-5.0	.250	.360	.220	.091	6.000	6.000	.047	0.0°	0.0°	GP..12105	CT15	T6
2831755	CCPI31265L	-5.0	.313	.423	.251	.091	6.000	6.000	.093	0.0°	0.0°	GP..12105	CT15	T6
2831721	CCPI25060L	.0	.250	.360	.220	.091	6.000	6.000	.047	0.0°	0.0°	GP..12105	CT15	T6
3849913	CCPI31260L	.0	.313	.423	.251	.091	6.000	6.000	.093	0.0°	0.0°	GP..12105	CT15	T6
3897898	CCPI2506225L	22.5	.250	.400	.260	.131	6.096	6.000	.047	0.0°	0.0°	GP..12105	CT15	T6

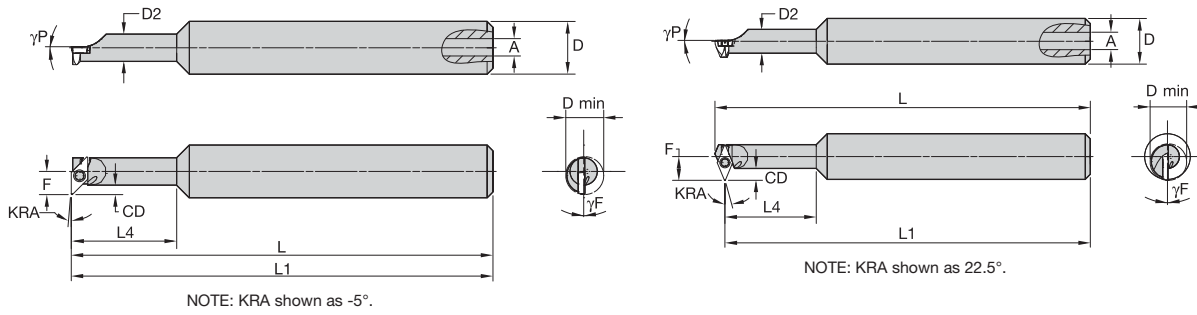


■ CCPM

order number	catalog number	KRI	D	D min	F	CD	L	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>														
2831010	CCPM6152225R	67.5	6,00	10,16	6,60	3,51	154,61	152,40	1,19	0.0°	0.0°	GP..050102	CT15	T6
2831020	CCPM61525R	95.0	6,00	9,14	5,59	2,49	152,40	152,40	1,19	0.0°	0.0°	GP..050102	CT15	T6
<b>left hand</b>														
2831004	CCPM6152225L	67.5	6,00	10,15	6,60	3,51	152,61	152,40	1,19	0.0°	0.0°	GP..050102	CT15	T6
2830980	CCPM8152225L	67.5	8,00	11,38	7,01	2,92	155,96	152,40	2,36	0.0°	0.0°	GP..050102	CT15	T6
3897899	CCPM61525L	95.0	6,00	9,14	5,59	2,49	152,40	152,40	1,19	0.0°	0.0°	GP..050102	CT15	T6
3896022	CCPM81525L	95.0	8,00	10,74	6,38	2,28	152,40	152,40	2,23	0.0°	0.0°	GP..050102	CT15	T6



Tools for Small Hole Boring



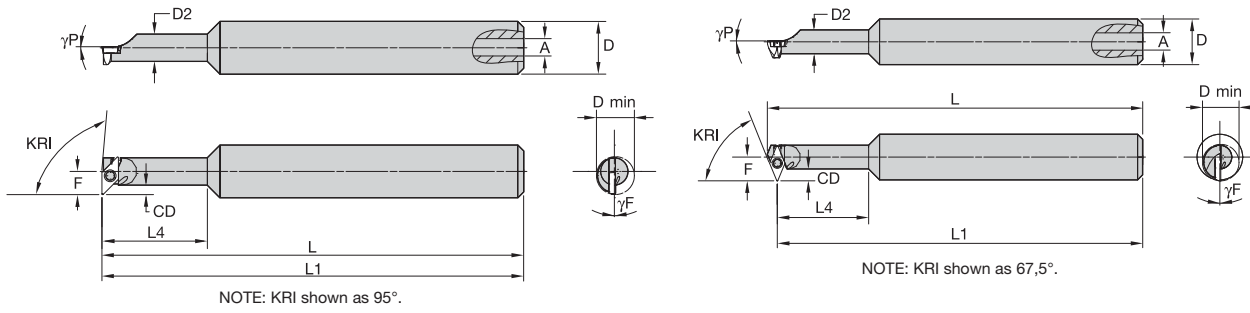
Tools for Small Hole Boring

■ GSPI



order number	catalog number	KRA	D	D min	D2	F	CD	L	L1	L4	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>																
2828281	GSPI375625155R	-5.0	.625	.515	.385	.312	.120	4.500	4.500	1.500	.098	0.0°	0.0°	GC..151505	GT21	T7
2828269	GSPI50075025R	-5.0	.750	.630	.510	.374	.119	5.000	5.000	2.000	.098	0.0°	0.0°	GC..151505	GT21	T7
2828196	GSPI375625150R	.0	.625	.515	.385	.312	.120	4.500	4.500	1.500	.098	0.0°	0.0°	GC..151505	GT21	T7
2828203	GSPI50075020R	.0	.750	.630	.510	.374	.119	5.000	5.000	2.000	.098	0.0°	0.0°	GC..151505	GT21	T7
2828310	GSPI37562515225R	22.5	.625	.540	.385	.338	.146	4.134	4.000	1.500	.098	0.0°	0.0°	GC..151505	GT21	T7
2828295	GSPI5007502225R	22.5	.750	.665	.510	.400	.145	5.158	5.000	2.000	.098	0.0°	0.0°	GC..151505	GT21	T7
<b>left hand</b>																
2828275	GSPI375625155L	-5.0	.625	.515	.385	.312	.120	4.500	4.500	1.500	.098	0.0°	0.0°	GC..151505	GT21	T7



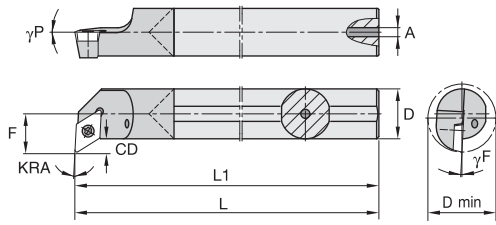


**GSPM**

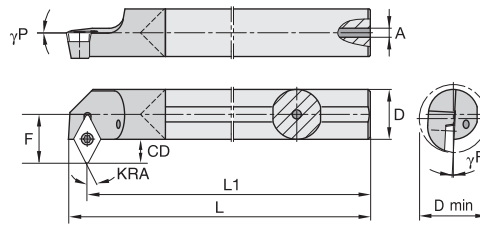
order number	catalog number	KRI	D	D min	D2	F	CD	L	L1	L4	A	$\gamma_F^\circ$	$\gamma_P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>																
3518694	GSPM1316515R	95.0	16,00	16,00	12,95	9,50	3,02	127,00	127,00	50,80	2,49	0.0°	0.0°	GC..060202	GT21	T7
<b>left hand</b>																
3897894	GSPM101638225L	67.5	16,00	13,72	9,78	8,59	3,70	105,01	101,60	38,10	2,49	0.0°	0.0°	GC..060202	GT21	T7
3897896	GSPM131651225L	67.5	16,00	16,89	12,95	10,16	3,68	130,90	127,00	50,80	2,49	0.0°	0.0°	GC..060202	GT21	T7
3897895	GSPM1016385L	95.0	16,00	13,08	9,78	7,93	3,04	114,30	114,30	38,10	2,49	0.0°	0.0°	GC..060202	GT21	T7
3896052	GSPM1316515L	95.0	16,00	16,00	12,95	9,50	3,02	127,00	127,00	50,80	2,49	0.0°	0.0°	GC..060202	GT21	T7



Tools for Small Hole Boring



NOTE: KRA shown as -5°.



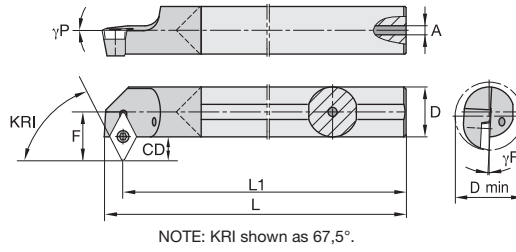
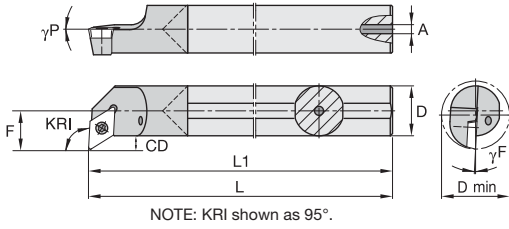
NOTE: KRA shown as 22.5°.

Tools for Small Hole Boring

■ GCPI



order number	catalog number	KRA	D	D min	F	CD	L	L1	A	$\gamma_F^\circ$	$\gamma_P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>														
2827811	GCPI50085R	-5.0	.500	.640	.374	.120	8.000	8.000	.188	0.0°	0.0°	GC..151505	GT21	T7
2827800	GCPI625105R	-5.0	.625	.765	.437	.121	10.000	10.000	.218	0.0°	0.0°	GC..151505	GT21	T7
2827775	GCPI37560R	.0	.375	.515	.312	.121	6.000	6.000	.125	0.0°	0.0°	GC..151505	GT21	T7
2827767	GCPI50080R	.0	.500	.640	.374	.120	8.000	8.000	.188	0.0°	0.0°	GC..151505	GT21	T7
3897902	GCPI625100R	.0	.625	.765	.437	.121	10.000	10.000	.218	0.0°	0.0°	GC..151505	GT21	T7
2827825	GCPI37565R	.0	.375	.515	.312	.121	6.000	6.000	.125	0.0°	0.0°	GC..151505	GT21	T7
2827845	GCPI3756225R	22.5	.375	5.400	.338	.147	6.134	6.000	.125	0.0°	0.0°	GC..151505	GT21	T7
2827833	GCPI5008225R	22.5	.500	.665	.400	.145	8.158	8.000	.187	0.0°	0.0°	GC..151505	GT21	T7
<b>left hand</b>														
2827819	GCPI37565L	-5.0	.375	.515	.312	.121	6.000	6.000	.125	0.0°	0.0°	GC..151505	GT21	T7
3897901	GCPI50085L	-5.0	.500	.640	.374	.120	8.000	8.000	.188	0.0°	0.0°	GC..151505	GT21	T7
2827794	GCPI625105L	-5.0	.625	.765	.437	.120	10.000	10.000	.218	0.0°	0.0°	GC..151505	GT21	T7
3897900	GCPI50080L	.0	.500	.640	.374	.120	8.000	8.000	.188	0.0°	0.0°	GC..151505	GT21	T7
2827839	GCPI3756225L	22.5	.375	.540	.338	.147	6.176	6.000	.125	0.0°	0.0°	GC..151505	GT21	T7
2827829	GCPI5008225L	22.5	.500	.665	.400	.146	8.157	8.000	.188	0.0°	0.0°	GC..151505	GT21	T7
3838856	GCPI62510225L	22.5	.625	.791	.463	.146	10.158	10.000	.218	0.0°	0.0°	GC..151505	GT21	T7

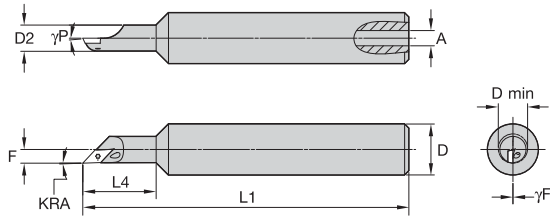


**GCPM**

order number	catalog number	KRI	D	D min	F	CD	L	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>														
2827656	GCPM10254225R	67.5	10,00	14,20	8,81	3,68	258,47	254,00	3,20	0.0°	0.0°	GC..060202	GT21	T7
3897906	GCPM12254225R	67.5	12,00	16,18	9,80	3,71	257,86	254,00	4,70	0.0°	0.0°	GC..060202	GT21	T7
3896073	GCPM16254225R	67.5	16,00	20,09	11,76	3,67	258,01	254,00	5,51	0.0°	0.0°	GC..060202	GT21	T7
3897904	GCPM102545R	95.0	10,00	13,54	8,15	3,06	254,00	254,00	3,20	0.0°	0.0°	GC..060202	GT21	T7
3759184	GCPM122545R	95.0	12,00	15,52	9,14	3,05	254,00	254,00	4,70	0.0°	0.0°	GC..060202	GT21	T7
3897909	GCPM162545R	95.0	16,00	19,43	11,10	3,01	254,00	254,00	5,51	0.0°	0.0°	GC..060202	GT21	T7
<b>left hand</b>														
3897903	GCPM10254225L	67.5	10,00	14,20	8,81	3,72	257,49	254,00	3,20	0.0°	0.0°	GC..060202	GT21	T7
3897905	GCPM12254225L	67.5	12,00	16,18	9,80	3,71	257,86	254,00	4,70	0.0°	0.0°	GC..060202	GT21	T7
3897908	GCPM16254225L	67.5	16,00	20,07	11,76	3,67	258,02	254,00	5,51	0.0°	0.0°	GC..060202	GT21	T7
3782377	GCPM102545L	95.0	10,00	13,54	8,15	3,02	254,00	254,00	3,20	0.0°	0.0°	GC..060202	GT21	T7
3897907	GCPM122545L	95.0	12,00	15,52	9,14	3,05	254,00	254,00	4,70	0.0°	0.0°	GC..060202	GT21	T7
2827644	GCPM162545L	95.0	16,00	19,43	11,10	3,01	254,00	254,00	5,51	0.0°	0.0°	GC..060202	GT21	T7



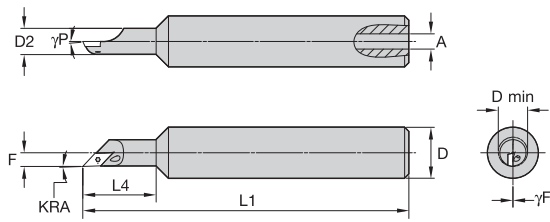
Tools for Small Hole Boring



Tools for Small Hole Boring

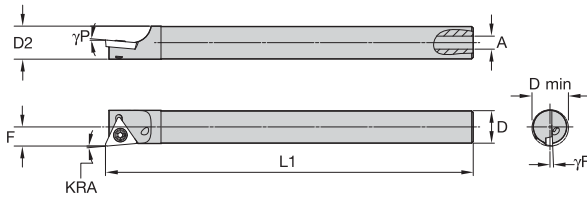
■ CTPI

order number	catalog number	KRA	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert	insert screw	Torx
right hand														
2828101	CTPI32262590647R	-2.0	.625	.339	.322	.168	4.000	.900	.187	0.0°	0.0°	GP..12105	CT11	T6



■ GTPI

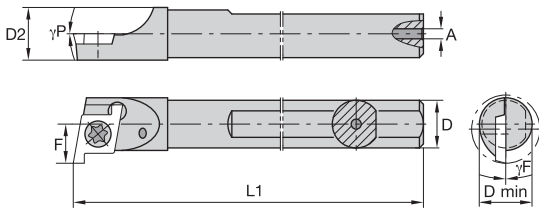
order number	catalog number	KRA	D	D min	D2	F	L1	L4	A	γF°	γP°	gage insert	insert screw	Torx
right hand														
2828184	GTPI37562590647R	-2.0	.625	.625	.375	.236	4.000	.900	.187	0.0°	-3.0°	GC..151505	GT21	T7



■ **SSPI**



order number	catalog number	KRA	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>													
2822826	SSPI62575R	-5.0	.625	.700	.635	.372	7.000	.156	0.0°	5.0°	TP..3205	SC30	T10

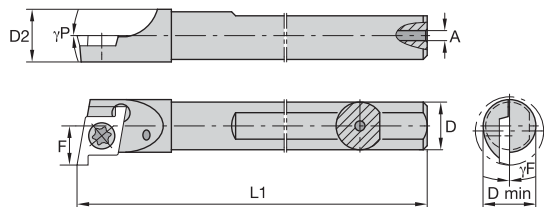


■ **CSMI**



order number	catalog number	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
<b>right hand</b>												
2832353	CSMI187250R	.188	.272	.219	.154	2.500	.040	0.0°	0.0°	CD.5..	CC11	T6
2832348	CSMI25030R	.250	.312	.260	.175	3.000	.040	0.0°	0.0°	CD.5..	CC11	T6

NOTE: Refer to insert design for cutting depth, cutting width, and blind hole limitations.

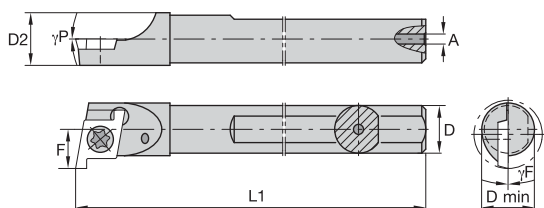


Tools for Small Hole Boring

### CSMM

order number	catalog number	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
right hand												
2831048	CSMM6760R	6,00	7,92	6,60	4,44	76,20	1,02	0.0°	0.0°	CD.50302R	CC11	T6

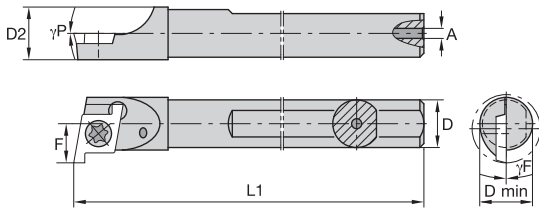
NOTE: Refer to insert design for cutting depth, cutting width, and blind hole limitations.



### CCMI

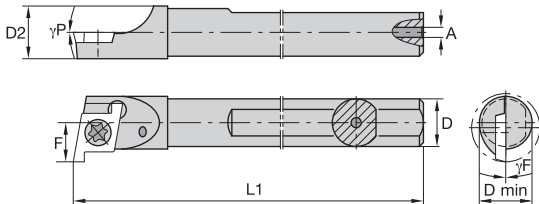
order number	catalog number	D	D min	D2	F	L1	A	γF°	γP°	gage insert	insert screw	Torx
right hand												
2831841	CCMI18740R	.187	.272	.208	.154	4.000	.040	0.0°	0.0°	CD.5..	CC11	T6
2831838	CCMI25040R	.250	.312	.258	.175	4.000	.047	0.0°	0.0°	CD.5..	CC11	T6

NOTE: Refer to insert design for cutting depth, cutting width, and blind hole limitations.


**QSMI**

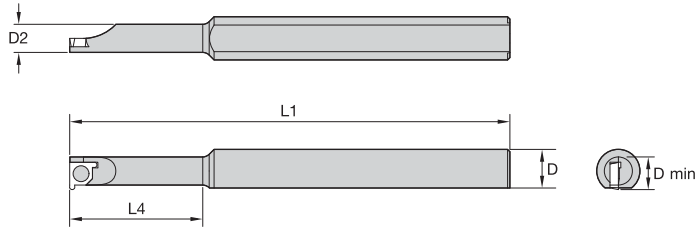
order number	catalog number	D	D min	D2	F	L1	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>												
2825464	QSMI37545R	.375	.481	.385	.278	4.000	.125	0.0°	0.0°	CP..2....	QC15	T8
2825455	QSMI50055R	.500	.545	.510	.280	5.000	.156	0.0°	0.0°	CP..2....	QC15	T8
2825394	QSMI62565R	.625	.670	.635	.343	6.000	.156	0.0°	0.0°	CP..2....	QC15	T8
<b>left hand</b>												
2825457	QSMI37545L	.375	.420	.385	.218	4.000	.125	0.0°	0.0°	CP..2....	QC15	T8
2825449	QSMI50055L	.500	.545	.510	.280	5.000	.156	0.0°	0.0°	CP..2....	QC15	T8

NOTE: D min and F calculated using the CPG grooving-style insert.  
Refer to insert design for cutting depth, cutting width, and blind hole limitations.


**QCMi**


order number	catalog number	D	D min	F	L1	A	$\gamma F^\circ$	$\gamma P^\circ$	gage insert	insert screw	Torx
<b>right hand</b>											
2825117	QCMi37565R	.375	.481	.278	6.000	.125	0.0°	0.0°	CP..2....	QC15	T8
2825105	QCMi50085R	.500	.545	.280	8.000	.188	0.0°	0.0°	CP..21205	QC15	T8
2825089	QCMi625105R	.625	.670	.343	10.000	.218	0.0°	0.0°	CP..2....	QC15	T8
<b>left hand</b>											
2825112	QCMi37565L	.375	.420	.218	6.000	.125	0.0°	0.0°	CP..2..	QC15	T8
2825094	QCMi50085L	.500	.545	.280	8.000	.188	0.0°	0.0°	CP..2....	QC15	T8

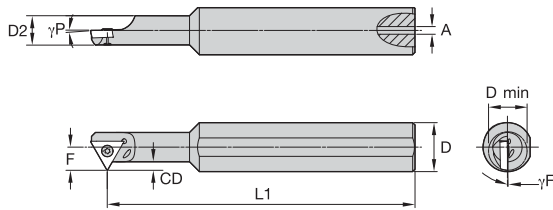
NOTE: F calculated using the CPG-style insert.  
Refer to insert design for cutting depth, cutting width, and blind hole limitations.




Tools for Small Hole Boring

■ LSMI

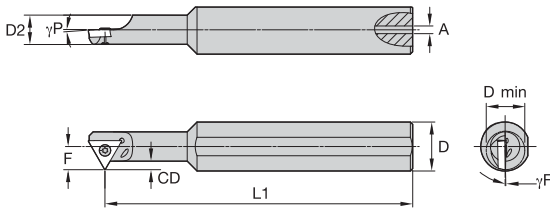
order number	catalog number	D	D min	D2	L1	L4	gage insert	insert screw	Torx
									
<b>right hand</b>									
2820948	LSMI24437511870R	.375	.315	.244	3.819	1.187	FN..1.5..	LTM16	T5
2820954	LSMI2443758280R	.375	.315	.244	3.425	.828	FN..1.5..	LTM16	T5
2820937	LSMI24450011870R	.500	.315	.244	3.819	1.187	FN..1.5..	LTM16	T5
2820944	LSMI2445008280R	.500	.315	.244	3.425	.828	FN..1.5..	LTM16	T5



■ FSII

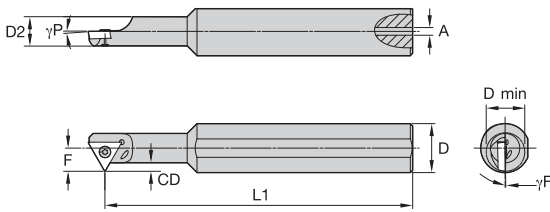
order number	catalog number	D	D min	D2	F	L1	CD	A	γF°	γP°	gage insert	insert screw	Torx
													
<b>right hand</b>													
2830177	FSII25062512560R	.625	.322	.250	.155	4.000	.060	.040	0.0°	-2.0°	TB..1308X0	FC11	T7
2830171	FSII2506257560R	.625	.322	.250	.155	4.000	.060	.040	0.0°	-2.0°	TB..1308X0	FC11	T7
2830161	FSII3126251560R	.625	.382	.372	.186	4.000	.060	.040	0.0°	-2.0°	TB..1308X0	FC11	T7
2830155	FSII31262593760R	.625	.382	.372	.186	4.000	.060	.040	0.0°	-2.0°	TB..1308X0	FC11	T7
2830143	FSII625460R	.625	.700	.635	.377	4.000	.060	.156	0.0°	-2.0°	TB..1308X0	FC14	T7





■ **QSII**

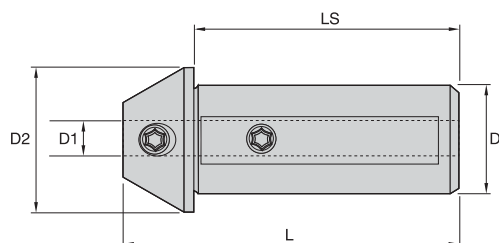
order number	catalog number	D	D min	D2	F	L1	CD	A	γF°	γP°	gage insert	insert screw	Torx
right hand													
2825707	QSII375625187560R	.625	.468	.375	.234	4.000	.093	.098	0.0°	-2.0°	TB..2150	QC21	T9
2825693	QSII375625112560R	.625	.478	.375	.234	4.000	.093	.098	0.0°	-2.0°	TB..2150	QC21	T9
2825679	QSII5006251560R	.625	.603	.501	.297	4.000	.093	.098	0.0°	-2.0°	TB..2150	QC21	T9
2825670	QSII625460R	.625	.738	.635	.410	4.000	.092	.156	0.0°	-2.0°	TB..2150	QC26	T9



■ **SSII**

order number	catalog number	D	D min	D2	F	L1	CD	A	γF°	γP°	gage insert	insert screw	Torx
right hand													
2822864	SSII750860R	.750	.935	.760	.548	8.000	.168	.156	0.0°	-2.0°	TP..3205	SC30	T10

Tools for Small Hole Boring



Tools for Small Hole Boring

■ CSI

order number	catalog number	D1	D	D2	LS	L
2832905	CSI750156	.156	.750	1.100	2.000	2.500
2832801	CSI1000156	.156	1.000	1.100	2.000	2.500
2832868	CSI625156	.157	.625	1.100	2.000	2.500
2832898	CSI750187	.188	.750	1.100	2.000	2.500
2832795	CSI1000187	.188	1.000	1.100	2.000	2.500
3493266	CSI625187	.188	.625	1.100	2.000	2.500
2832856	CSI625250	.250	.625	1.100	2.000	2.500
2832893	CSI750250	.250	.750	1.100	2.000	2.500
2832790	CSI1000250	.250	1.000	1.100	2.000	2.500
2832851	CSI625312	.312	.625	1.100	2.000	2.500
2832885	CSI750312	.313	.750	1.100	2.000	2.500
2832785	CSI1000312	.313	1.000	1.100	2.000	2.500
2832844	CSI625375	.375	.625	1.100	2.000	2.500
2832879	CSI750375	.375	.750	1.100	2.000	2.500
2832780	CSI1000375	.375	1.000	1.100	2.000	2.500
2832932	CSI1250375	.375	1.250	1.725	3.000	3.875
2832874	CSI750500	.500	.750	1.100	2.000	2.500
2832775	CSI1000500	.500	1.000	1.100	2.000	2.500
2832920	CSI1250625	.625	1.250	1.725	3.000	3.625
2832947	CSI1500625	.625	1.500	1.725	3.000	3.875
2832914	CSI1250750	.750	1.250	1.725	3.000	3.625
2832941	CSI1500750	.750	1.500	1.725	3.000	3.875
2832935	CSI15001000	1.000	1.500	1.725	3.000	3.875

■ CSM

order number	catalog number	D1	D	D2	LS	L
2832838	CSM22156	3,96	22,00	27,94	50,80	63,50
2832832	CSM22187	4,75	22,00	27,94	50,80	63,50
2832827	CSM22250	6,36	22,00	27,94	50,80	63,50
2832820	CSM22312	7,93	22,00	27,94	50,80	63,50
2832813	CSM22375	9,53	22,00	27,94	50,80	63,50
2832809	CSM22500	12,70	22,00	27,94	50,80	63,50

# ToolBOSS™

## ToolBOSS Vending Solutions

ToolBOSS vending solutions help to reduce costs and improve efficiencies to give you a competitive edge.

- Cut tooling inventory by 50% or more.
- Decrease spending on tooling by up to 30%.
- Reduce administrative costs by as much as 90%.

## Customer Offering

### Shared Rewards

Free use of ToolBOSS vending machine combined with a comprehensive maintenance and service package based on agreed sales targets for specified contract terms.

### Direct Purchase of Equipment

ToolBOSS vending machines are available for purchase. Maintenance and service packages available with annual agreements.

For more information, please contact us at:

Tel: 888 281 8080

[na-help.desk@toolboss.com](mailto:na-help.desk@toolboss.com)

[toolboss.com](http://toolboss.com)



You can also use our NOVO app to guide you to the correct choice!

For more information, please visit [widia.com/novo](http://widia.com/novo).

**NOVO:** The Digital Source for Delivering Smart Machining Solutions

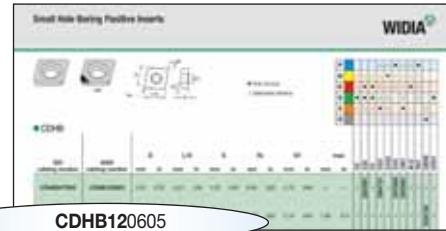


For more information, contact your local WIDIA Authorized Distributor or visit [widia.com/services](http://widia.com/services).



## How Do Catalog Numbers Work?

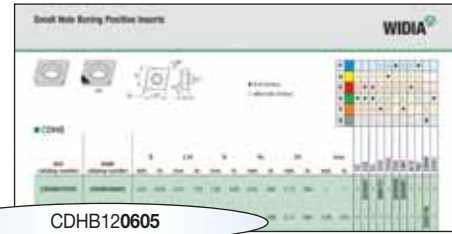
Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



CDHB120605

<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"><b>C</b></div> <p style="text-align: center;">Insert Shape</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="display: flex; align-items: center;"> <span style="margin-right: 10px;">T</span> <span style="margin-right: 10px;">60°</span> </div> <div style="display: flex; align-items: center;"> <span style="margin-right: 10px;">C</span> <span style="margin-right: 10px;">80°</span> </div> <div style="display: flex; align-items: center;"> <span style="margin-right: 10px;">G</span> <span style="margin-right: 10px;">45°</span> </div> <div style="display: flex; align-items: center;"> <span style="margin-right: 10px;">W</span> <span style="margin-right: 10px;">80°</span> </div> </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"><b>D</b></div> <p style="text-align: center;">Insert Clearance Angle</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="display: flex; align-items: center;"> <span style="margin-right: 10px;">B</span> <span style="margin-right: 10px;">5°</span> </div> <div style="display: flex; align-items: center;"> <span style="margin-right: 10px;">C</span> <span style="margin-right: 10px;">7°</span> </div> <div style="display: flex; align-items: center;"> <span style="margin-right: 10px;">D</span> <span style="margin-right: 10px;">15°</span> </div> <div style="display: flex; align-items: center;"> <span style="margin-right: 10px;">P</span> <span style="margin-right: 10px;">11°</span> </div> </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"><b>H</b></div> <p style="text-align: center;">Tolerance Class</p> <p style="text-align: center;">Tolerances apply prior to edge prep and coating.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> </div> <div style="display: flex; justify-content: center; align-items: center; margin-top: 10px;"> </div> <p style="font-size: small; margin-top: 10px;"> <b>D</b> = Theoretical diameter of the insert inscribed circle  <b>S</b> = Thickness  <b>B</b> = See figures below         </p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"><b>B</b></div> <p style="text-align: center;">Insert Features</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="display: flex; align-items: center;"> <div style="width: 60%; font-size: x-small;">                 Partly cylindrical hole, 40–60° countersink, single-sided             </div> <div style="width: 35%;"> <p style="text-align: center; font-size: x-small;"><b>W</b> without chipbreaker</p> <p style="text-align: center; font-size: x-small;"><b>T</b> with chipbreaker</p> </div> </div> <div style="display: flex; align-items: center;"> <div style="width: 60%; font-size: x-small;">                 Partly cylindrical hole, 70–90° countersink, single-sided             </div> <div style="width: 35%;"> <p style="text-align: center; font-size: x-small;"><b>B</b> without chipbreaker</p> <p style="text-align: center; font-size: x-small;"><b>H</b> with chipbreaker</p> </div> </div> </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"><b>12</b></div> <p style="text-align: center;">Size</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th style="text-align: left;">“D” inch</th> <th colspan="4" style="text-align: center;">Code for inch cutting edge length “L10”</th> </tr> <tr> <th></th> <th style="text-align: center;">C</th> <th style="text-align: center;">G</th> <th style="text-align: center;">T</th> <th style="text-align: center;">W</th> </tr> </thead> <tbody> <tr> <td>5/32</td> <td style="text-align: center;">12</td> <td style="text-align: center;">12</td> <td style="text-align: center;">–</td> <td style="text-align: center;">–</td> </tr> <tr> <td>.160</td> <td style="text-align: center;">–</td> <td style="text-align: center;">–</td> <td style="text-align: center;">13</td> <td style="text-align: center;">–</td> </tr> <tr> <td>3/16</td> <td style="text-align: center;">–</td> <td style="text-align: center;">15</td> <td style="text-align: center;">–</td> <td style="text-align: center;">15</td> </tr> <tr> <td>1/4</td> <td style="text-align: center;">2</td> <td style="text-align: center;">–</td> <td style="text-align: center;">2</td> <td style="text-align: center;">2</td> </tr> <tr> <td>3/8</td> <td style="text-align: center;">3</td> <td style="text-align: center;">–</td> <td style="text-align: center;">3</td> <td style="text-align: center;">3</td> </tr> <tr> <td>.386</td> <td style="text-align: center;">–</td> <td style="text-align: center;">–</td> <td style="text-align: center;">31</td> <td style="text-align: center;">–</td> </tr> </tbody> </table>	“D” inch	Code for inch cutting edge length “L10”					C	G	T	W	5/32	12	12	–	–	.160	–	–	13	–	3/16	–	15	–	15	1/4	2	–	2	2	3/8	3	–	3	3	.386	–	–	31	–
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By referencing this easy-to-use guide, you can identify the correct product to meet your needs.



CDHB120605

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	Shapes S, T, C, R, & W inch	Shape D inch	Shape V inch	Shapes S, T, & C inch		Shapes S, T, C, R, & W inch	Shape D inch	Shape V inch	Shapes S, T, & C inch
5/32	.002	-	-	-	5/32	.003	-	-	-
3/16	.002	-	-	.003	3/16	.003	-	-	.005
7/32	.002	.002	.002	.003	7/32	.003	.004	-	.005
1/4	.002	.002	.002	.003	1/4	.003	.004	-	.005
5/16	.002	.002	.002	.003	5/16	.003	.004	-	.005
3/8	.002	.002	.002	.003	3/8	.003	.004	.007	.005
7/16	.003	.003	.003	.005	7/16	.005	.006	-	-
1/2	.003	.003	.003	.005	1/2	.005	.006	.010	.008
9/16	.003	.003	.003	.005	9/16	.005	.006	-	-
5/8	.004	.004	.004	.007	5/8	.006	.007	-	.011
11/16	.004	.004	.004	.007	11/16	.006	.007	-	.011
3/4	.004	.004	.004	.007	3/4	.006	.007	-	.011
7/8	.005	-	-	.010	7/8	.006	-	-	.015
1	.005	-	-	.010	1	.007	-	-	.015
1 1/4	.006	-	-	.010	1 1/4	.008	-	-	.015

The WIDIA™ three-step insert selection system makes choosing and applying the most productive tool easy. Tool recommendations are based on six workpiece material groups.

**1 Select the Insert Geometry:**

Based on the needed depth of cut and feed rate, choose the geometry that best matches your needs.

**2 Select the Grade:**

Determine your cutting conditions, and choose the proper grade.

**TN7–CM1 for Steel**

ISO 513	P				
	01	10	20	30	40
Hard Metal Coated					
		TN7			
		ALO			
		CG6			
		CG55			
			CG5		
			CM1		

wear resistance = harder

- TN7** — High edge strength and wear-resistant cermet. Finishing to semi-finishing of carbon, alloy, and stainless steels at medium to high speeds.
- ALO** — Can withstand light interruptions. Alumina coating enables higher cutting speeds.
- CG6** — High-speed, general-purpose grade for all kinds of steel and cast iron.
- CG55** — High edge strength and wear resistance. Reduces problems with built-up edge. Superior thermal deformation resistance and depth-of-cut notch resistance.
- CG5** — Best at low speeds. Will handle interruptions and high feed rates.
- CM1** — For heavy turning and heavily interrupted cuts.

toughness = softer

**ALO–CM1 for Stainless Steel**

ISO 513	M				
	01	10	20	30	40
Hard Metal Coated					
		ALO			
		C3 and C25			
		C2			
		CG6			
		CG55			
			CG5		
		CM1			

wear resistance = harder

- ALO** — Can withstand light interruptions. Alumina coating enables higher cutting speeds.
- C3 and C25** — Good wear resistance with some toughness.
- C2** — Excellent abrasion resistance for machining cast irons, austenitic stainless steels, non-ferrous metals, non-metals, and most high-temperature alloys.
- CG6** — High-speed, general-purpose grade for all kinds of steel and cast iron.
- CG55** — High edge strength and wear resistance. Reduces problems with built-up edge. Superior thermal deformation resistance and depth-of-cut notch resistance.
- CG5** — Best at low speeds. Will handle interruptions and high feed rates.
- CM1** — For heavy turning and heavily interrupted cuts.

toughness = softer

**3 Select the Cutting Speed:**

In the foldout speed and feed chart, establish your cutting speed and obtain your optimal starting conditions and range.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

**TN7–CM1 for Cast Iron**

ISO 513	K				
	01	10	20	30	40
Hard Metal Coated	TN7				
	ALO				
	CG6				
	CG55				
	C3 and C25				
	C2				
			CG5		
			CM1		

wear resistance = harder

- TN7** – High edge strength and wear-resistant cermet.
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- C3 and C25** – Good wear resistance with some toughness.
- C2** – Excellent abrasion resistance for machining cast irons, austenitic stainless steels, non-ferrous metals, non-metals, and most high-temperature alloys.
- CG5** – Best at low speeds. Will handle interruptions and high feed rates.
- CM1** – For heavy turning and heavily interrupted cuts.

toughness = softer

**C3–CM1 for High-Temperature Alloys**

ISO 513	S				
	01	10	20	30	40
Hard Metal Coated	C3 and C25				
	C2				
			CG5		
			CM1		

wear resistance = harder

- C3 and C25** – Good wear resistance with some toughness.
- C2** – Excellent abrasion resistance for machining cast irons, austenitic stainless steels, non-ferrous metals, non-metals, and most high-temperature alloys.
- CG5** – Best at low speeds. Will handle interruptions and high feed rates.
- CM1** – For heavy turning and heavily interrupted cuts.

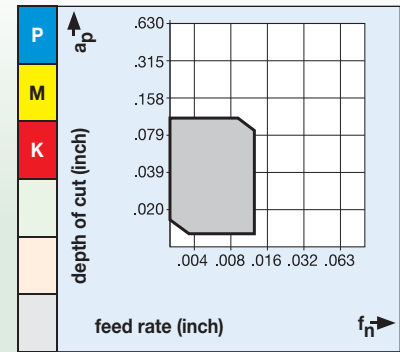
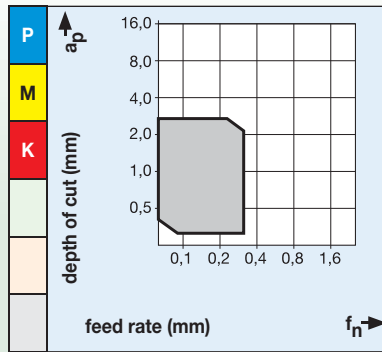
toughness = softer

■ Single-Sided, Positive Inserts

..HB



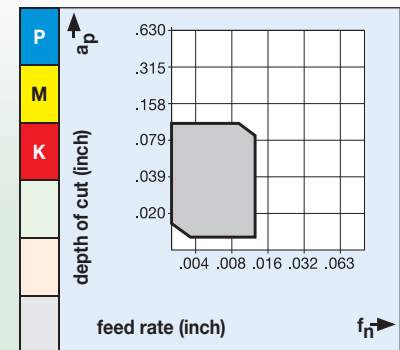
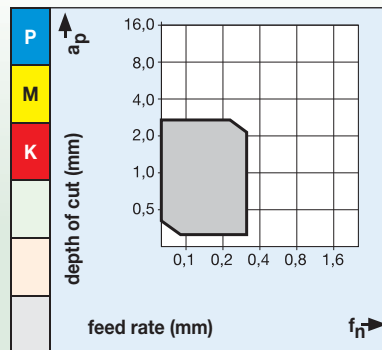
Flat inserts. Peripheral ground for best surface quality and reduced cutting pressure. Very stable cutting edge offers maximum rigidity.



..HT



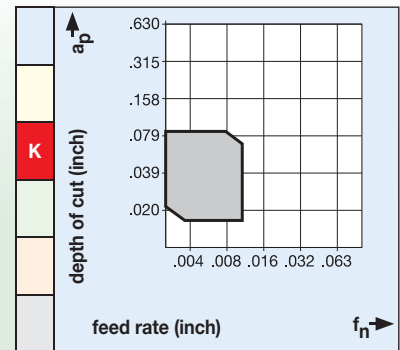
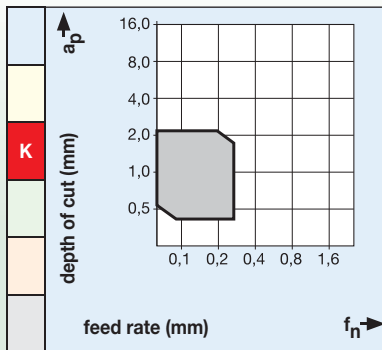
Peripheral ground insert chipbreaker. Good chip control. Geometry for general-purpose applications.



..HB-M



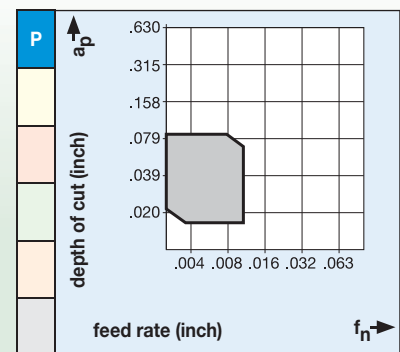
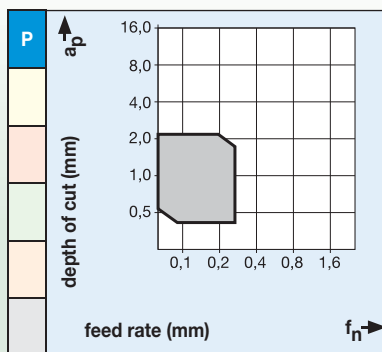
Cubic Boron Nitride (CBN) or Polycrystalline Diamond (PCD) tip for high-temp alloys and non-ferrous machining. Very stable cutting edge offers maximum rigidity.



..LF



Geometry for general-purpose applications. Very good chip control. Recommended for general finish machining.





**Geometry Selection Criteria**

**Flat Top-Type Inserts**

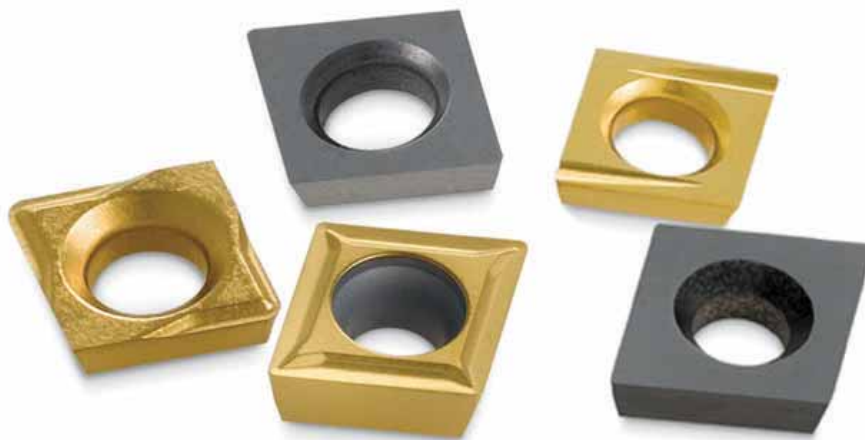
Chipbreaker Geometry ..HB, ..HB-M, ..HW

- Suitable for interrupted cuts.
- Use when chip control is not critical.

**Pressed Chipbreaker-Type Inserts**

Chipbreaker Geometry ..LF

- Suitable for moderate interruption of cuts.
- Use when chip control is a concern.

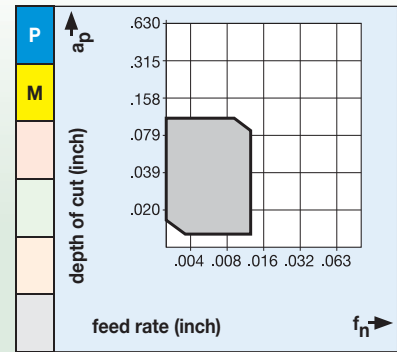
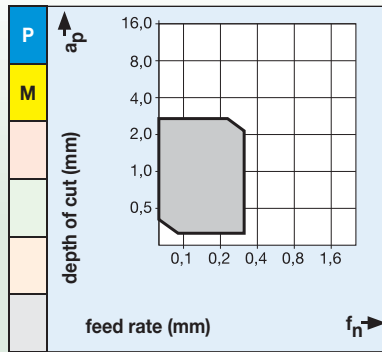


■ Single-Sided, Positive Inserts

..HH



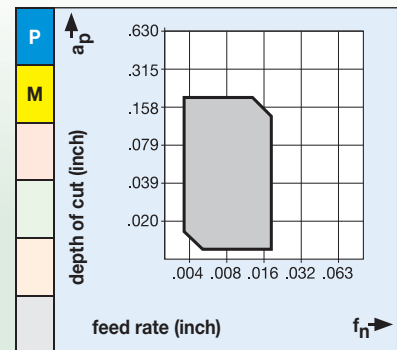
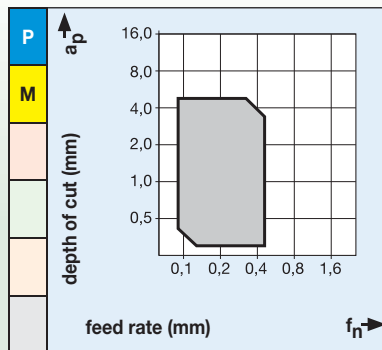
Peripheral ground for best surface quality and reduced cutting pressure. For fine to medium finishes.



HP



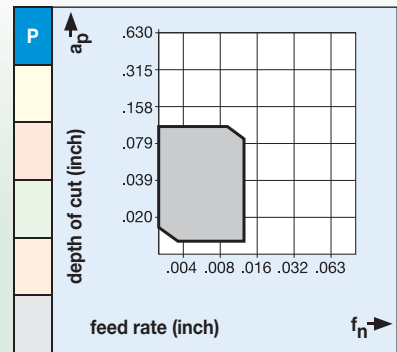
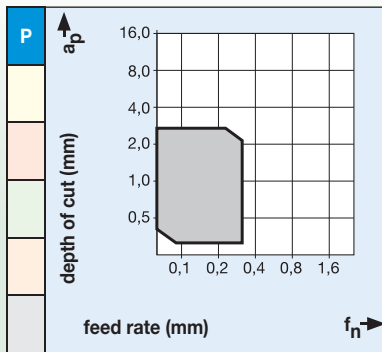
High positive-type chipbreaker. Peripheral ground for best surface quality and reduced cutting pressure. Recommended for high-temp alloys and non-ferrous machining.



..HH-R/L



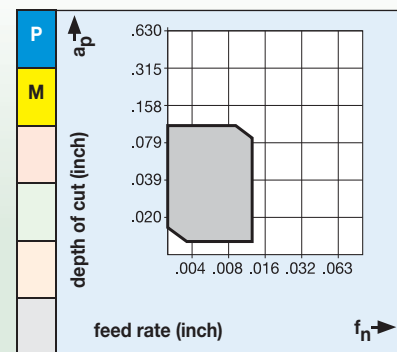
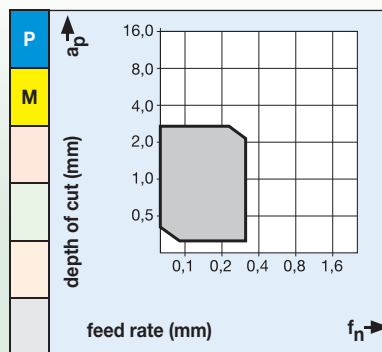
Ground-in chipbreaker. Peripheral ground for best surface quality and reduced cutting pressure.  
\*Right-hand inserts used in left-hand bars ONLY. Left-hand inserts used in right-hand bars ONLY.



..HW



Flat insert for profiling. Very stable cutting edge offers maximum rigidity.



**Geometry Selection Criteria**

**Pressed Chipbreaker-Type Inserts with Ground Periphery**

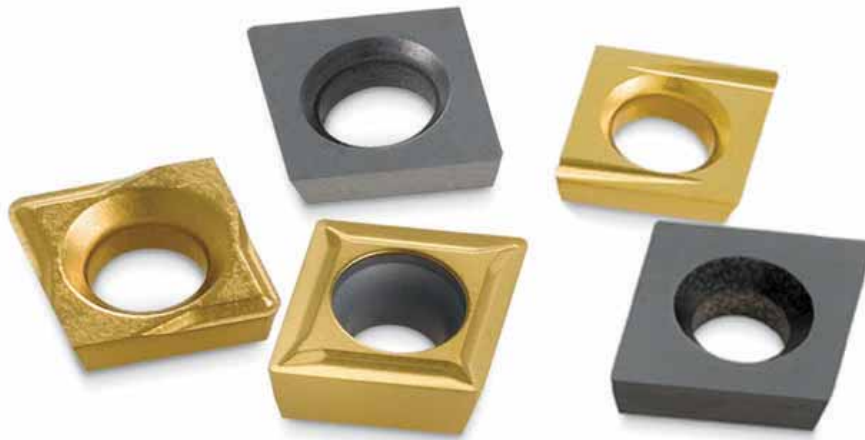
Chipbreaker Geometry ..HH, ..HT, HP

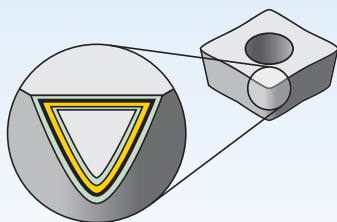
- Suitable for light to moderate interruption of cuts.
- Use when chip control is a concern.
- Superior surface finish and closer tolerance on workpiece.

**Ground-In Chipbreaker-Type Inserts**

Chipbreaker Geometry ..HH-R/L

- Suitable for smooth cuts.
- Use when chip control is a concern.
- Superior surface finish and closer tolerance on workpiece.

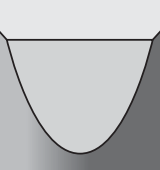
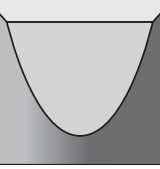
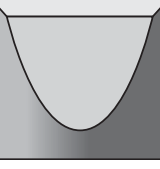
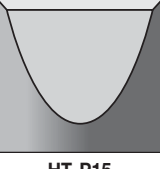





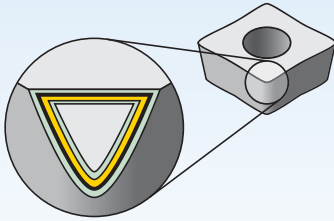
Coatings provide high-speed capability and are engineered for finishing to light roughing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45		
CM1	 HW-S25	Uncoated carbide. A very tough, ultra-fine grain unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Performs best at low speeds and will handle interruptions and high feed rates. Use when C2, C3, or C25 fail due to chipping or breaking.	P											
			M											
			K											
			N											
			S											
C2	 HW-N15	Uncoated carbide. A hard, low binder content, unalloyed WC/Co fine-grained grade. General-purpose grade for non-ferrous materials. Has excellent abrasion resistance for machining cast irons, austenitic stainless steels, non-ferrous metals, non-metals, and most high-temperature alloys.	M											
			K											
			N											
			S											
C3 and C25	 HW-K15	Uncoated carbide. Has excellent abrasion resistance for machining cast irons, aluminum, and non-ferrous metals. Good wear resistance with some toughness. Harder than C2, resulting in greater edge wear resistance. Suitable for finishing operations.	M											
			K											
			N											
			S											
TN7	 HT-P15	A highly wear-resistant (TiC/TiN-based) cermet grade. High edge strength and wear-resistant cermet offers improved tool life over uncoated/coated carbides and resists material build-up on cutting edge. Finishing to semi-finishing of carbon, alloy, and stainless steels at medium to high speeds. Can also be used on non-ferrous materials.	P											
			K											
ALO	 HC-K15	Coated carbide. CVD – TiCN-TiC-Al <sub>2</sub> O <sub>3</sub> . A thin alumina coating over a hard, deformation-resistant substrate. High-speed finishing of gray cast irons and medium-speed finishing of alloy steels that are in a hardness range of 35–50 HRC. Can withstand light interruptions. Alumina coating enables higher cutting speeds.	P											
			M											
			K											



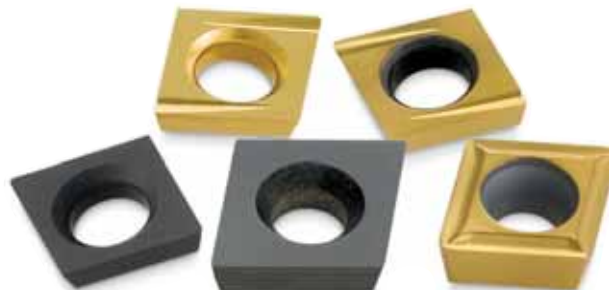


Coatings provide high-speed capability and are engineered for finishing to light roughing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45
CG6		Coated carbide. CVD — TiC-TiCN-TiN. Tri-phase coating on a hard, low binder content, fine-grained grade. High-speed, general-purpose grade for all kinds of steel. Gold in color.	<b>P</b>									
	<b>HC-P10</b>		<b>M</b>									
CG5		A PVD-TiN-coated grade. Straight 9.5% Co substrate. Submicron grain. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Performs best at low speeds and will handle interruptions and high feed rates.	<b>P</b>									
	<b>HC-S25</b>		<b>M</b>									
	<b>K</b>											
	<b>N</b>											
	<b>S</b>											
CG55		A PVD-TiN coating over a very wear-resistant, unalloyed carbide substrate. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Grade provides combination of high edge strength and wear resistance. Coating increases wear resistance and reduces problems with built-up edge. The substrate offers superior thermal deformation resistance and depth-of-cut notch resistance.	<b>P</b>									
	<b>HC-M20</b>		<b>M</b>									
	<b>K</b>											
	<b>S</b>											
CBN6		PcBN tip brazed onto a carbide insert. Recommended for machining hardened steel (45–65 HRC). Use on bearing steel, hot and cold work tool steels, high-speed steels, die steels, case-hardened steels, carburized and nitrided irons, and some hard coatings. Can be run both dry and wet.	<b>P</b>									
	<b>BN-H25</b>		<b>H</b>									
CPD1		Polycrystalline diamond (PCD) compact grade provides exceptional hardness and abrasion resistance. CPD1 is a superior finish boring grade that will significantly improve workpiece tolerances, surface finishes, and insert tool life in high-silicon aluminum, copper, aluminum carbon graphite, hard rubber, plastics, and/or wood.	<b>N</b>									
	<b>DP-N10</b>											



Material Group		Cutting Speed – vc SFM																	
		C2			C25			C3			CG5			CG55			CG6		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	ap [inch]	-	-	-	-	-	-	-	-	-	.002	-	.012	.002	-	.012	.002	-	.012
	f [inch]	-	-	-	-	-	-	-	-	-	.012	-	.001	.012	-	.001	.012	-	.001
	0/1	-	-	-	-	-	-	-	-	-	305	<b>380</b>	460	340	<b>420</b>	505	415	<b>515</b>	620
	2	-	-	-	-	-	-	-	-	-	200	<b>250</b>	300	220	<b>275</b>	330	270	<b>335</b>	405
	3	-	-	-	-	-	-	-	-	-	200	<b>250</b>	300	220	<b>275</b>	330	270	<b>335</b>	405
	4	-	-	-	-	-	-	-	-	-	155	<b>195</b>	235	170	<b>215</b>	260	210	<b>260</b>	315
	5	-	-	-	-	-	-	-	-	-	200	<b>250</b>	300	220	<b>275</b>	330	270	<b>335</b>	405
6	-	-	-	-	-	-	-	-	-	135	<b>165</b>	200	150	<b>185</b>	225	180	<b>220</b>	265	
M	ap [inch]	.002	-	.012	.002	-	.012	.002	-	.012	.002	-	.012	.002	-	.012	.002	-	.012
	f [inch]	.001	-	.012	.001	-	.012	.001	-	.012	.001	-	.012	.001	-	.012	.001	-	.012
	1	180	<b>225</b>	270	205	<b>255</b>	310	205	<b>255</b>	310	240	<b>300</b>	360	265	<b>330</b>	400	305	<b>380</b>	460
	2	165	<b>205</b>	250	185	<b>230</b>	280	185	<b>230</b>	280	220	<b>270</b>	325	240	<b>300</b>	360	280	<b>345</b>	415
3	120	<b>150</b>	185	140	<b>170</b>	210	140	<b>170</b>	210	160	<b>200</b>	245	180	<b>220</b>	270	205	<b>255</b>	310	
K	ap [inch]	.002	-	.012	.002	-	.012	.002	-	.012	.002	-	.012	.002	-	.012	.002	-	.012
	f [inch]	.001	-	.012	.001	-	.012	.001	-	.012	.001	-	.012	.001	-	.012	.001	-	.012
	1	170	<b>213</b>	255	190	<b>235</b>	285	190	<b>235</b>	285	195	<b>240</b>	295	220	<b>270</b>	325	240	<b>300</b>	360
	2	220	<b>270</b>	330	240	<b>300</b>	360	240	<b>300</b>	360	250	<b>310</b>	375	275	<b>345</b>	415	305	<b>380</b>	460
3	160	<b>200</b>	240	180	<b>220</b>	265	180	<b>220</b>	265	180	<b>225</b>	270	200	<b>250</b>	300	220	<b>275</b>	330	
N	ap [inch]	.002	-	.020	.002	-	.020	.002	-	.020	.002	-	.020	.002	-	.020	-	-	-
	f [inch]	.001	-	.012	.001	-	.012	.001	-	.012	.001	-	.012	.001	-	.012	-	-	-
	1	1320	<b>1650</b>	1980	1320	<b>1650</b>	1980	1320	<b>1650</b>	1980	1320	<b>1650</b>	1980	1455	<b>1815</b>	2180	-	-	-
	2	970	<b>1210</b>	1450	970	<b>1215</b>	1460	970	<b>1215</b>	1460	970	<b>1215</b>	1460	1070	<b>1335</b>	1600	-	-	-
	3	225	<b>280</b>	340	225	<b>280</b>	340	225	<b>280</b>	340	275	<b>340</b>	410	300	<b>375</b>	450	-	-	-
	4	1015	<b>1250</b>	1520	1010	<b>1270</b>	1520	1010	<b>1270</b>	1520	455	<b>570</b>	690	505	<b>630</b>	760	-	-	-
	5	480	<b>600</b>	720	480	<b>600</b>	720	480	<b>600</b>	720	580	<b>720</b>	865	640	<b>795</b>	955	-	-	-
	6	460	<b>575</b>	690	460	<b>575</b>	690	460	<b>575</b>	690	555	<b>690</b>	830	610	<b>765</b>	920	-	-	-
7	780	<b>975</b>	1170	780	<b>980</b>	1175	780	<b>980</b>	1175	800	<b>1000</b>	1200	875	<b>1100</b>	1320	-	-	-	
S	ap [inch]	.001	-	.008	.001	-	.008	.001	-	.008	.001	-	.008	.001	-	.008	-	-	-
	f [inch]	.001	-	.005	.001	-	.005	.001	-	.005	.001	-	.005	.001	-	.005	-	-	-
	1	95	<b>120</b>	145	95	<b>120</b>	145	95	<b>120</b>	145	95	<b>120</b>	145	108	<b>133</b>	163	-	-	-
	2	75	<b>95</b>	115	75	<b>95</b>	120	75	<b>95</b>	120	75	<b>95</b>	120	87	<b>107</b>	130	-	-	-
	3	75	<b>95</b>	115	75	<b>95</b>	120	75	<b>95</b>	120	105	<b>130</b>	160	120	<b>145</b>	175	-	-	-
4	80	<b>100</b>	120	80	<b>100</b>	120	80	<b>100</b>	120	-	-	-	-	-	-	-	-	-	
H	ap [inch]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	f [inch]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.

Material Group		Cutting Speed – vc SFM														
		CM1			ALO			TN7			CBN6			CPD1		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	ap [inch]	.002	–	.012	.002	–	.012	.002	–	.012	–	–	–	–	–	–
	f [inch]	.012	–	.001	.012	–	.001	.012	–	.001	–	–	–	–	–	–
	0/1	180	<b>220</b>	265	540	<b>675</b>	810	650	<b>810</b>	975	–	–	–	–	–	–
	2	115	<b>140</b>	175	350	<b>440</b>	530	420	<b>525</b>	630	–	–	–	–	–	–
	3	115	<b>140</b>	175	350	<b>440</b>	530	420	<b>525</b>	630	–	–	–	–	–	–
	4	90	<b>110</b>	135	275	<b>340</b>	410	330	<b>410</b>	495	–	–	–	–	–	–
	5	115	<b>140</b>	175	350	<b>440</b>	525	420	<b>520</b>	628	–	–	–	–	–	–
6	80	<b>95</b>	115	235	<b>290</b>	350	280	<b>350</b>	420	–	–	–	–	–	–	
M	ap [inch]	.002	–	.012	.002	–	.012	.002	–	.012	–	–	–	–	–	–
	f [inch]	.001	–	.012	.001	–	.012	.001	–	.012	–	–	–	–	–	–
	1	180	<b>220</b>	265	345	<b>430</b>	520	340	<b>420</b>	505	–	–	–	–	–	–
	2	160	<b>200</b>	240	315	<b>390</b>	470	305	<b>380</b>	460	–	–	–	–	–	–
3	120	<b>150</b>	180	235	<b>295</b>	355	225	<b>280</b>	340	–	–	–	–	–	–	
K	ap [inch]	.002	–	.012	.002	–	.012	.002	–	.012	–	–	–	–	–	–
	f [inch]	.001	–	.012	.001	–	.012	.001	–	.012	–	–	–	–	–	–
	1	150	<b>190</b>	230	410	<b>510</b>	615	270	<b>340</b>	410	–	–	–	–	–	–
	2	190	<b>240</b>	290	520	<b>650</b>	780	345	<b>430</b>	520	–	–	–	–	–	–
3	140	<b>175</b>	210	380	<b>470</b>	565	255	<b>315</b>	380	–	–	–	–	–	–	
N	ap [inch]	.002	–	.020	–	–	–	.002	–	.020	–	–	–	.002	–	.020
	f [inch]	.001	–	.012	–	–	–	.001	–	.012	–	–	–	.001	–	.012
	1	1320	<b>1650</b>	1980	–	–	–	1320	<b>1650</b>	1980	–	–	–	2800	<b>3500</b>	4200
	2	970	<b>1215</b>	1460	–	–	–	970	<b>1210</b>	1455	–	–	–	2130	<b>2665</b>	3200
	3	225	<b>280</b>	340	–	–	–	265	<b>330</b>	400	–	–	–	1200	<b>1500</b>	1800
	4	330	<b>410</b>	490	–	–	–	635	<b>790</b>	955	–	–	–	1065	<b>1330</b>	1600
	5	480	<b>600</b>	720	–	–	–	640	<b>800</b>	960	–	–	–	1120	<b>1400</b>	1680
	6	460	<b>575</b>	690	–	–	–	580	<b>725</b>	870	–	–	–	1100	<b>1375</b>	1650
7	780	<b>975</b>	1175	–	–	–	795	<b>990</b>	1195	–	–	–	1730	<b>2170</b>	2600	
S	ap [inch]	.001	–	.008	–	–	–	–	–	–	.001	–	.008	–	–	–
	f [inch]	.001	–	.005	–	–	–	–	–	–	.001	–	.005	–	–	–
	1	85	<b>105</b>	130	–	–	–	–	–	–	290	<b>360</b>	435	–	–	–
	2	65	<b>80</b>	100	–	–	–	–	–	–	230	<b>280</b>	340	–	–	–
	3	90	<b>110</b>	135	–	–	–	–	–	–	320	<b>400</b>	480	–	–	–
4	75	<b>90</b>	110	–	–	–	–	–	–	–	–	–	–	–	–	
H	ap [inch]	–	–	–	–	–	–	–	–	–	.001	–	.008	–	–	–
	f [inch]	–	–	–	–	–	–	–	–	–	.001	–	.005	–	–	–
	1	–	–	–	–	–	–	–	–	–	360	<b>450</b>	540	–	–	–
	2	–	–	–	–	–	–	–	–	–	340	<b>420</b>	505	–	–	–
	3	–	–	–	–	–	–	–	–	–	320	<b>400</b>	480	–	–	–
4	–	–	–	–	–	–	–	–	–	290	<b>360</b>	435	–	–	–	

NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.

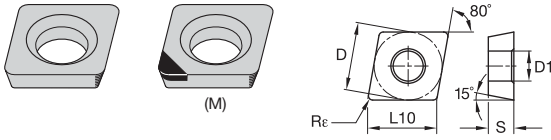
Material Group		Cutting Speed – vc m/min																	
		C2			C25			C3			CG5			CG55			CG6		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	ap [mm]	-	-	-	-	-	-	-	-	-	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300
	f [mm/rev]	-	-	-	-	-	-	-	-	-	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300
	0/1	-	-	-	-	-	-	-	-	-	95	<b>115</b>	140	105	<b>130</b>	155	125	<b>155</b>	190
	2	-	-	-	-	-	-	-	-	-	60	<b>75</b>	90	65	<b>85</b>	100	80	<b>100</b>	125
	3	-	-	-	-	-	-	-	-	-	60	<b>75</b>	90	65	<b>85</b>	100	80	<b>100</b>	125
	4	-	-	-	-	-	-	-	-	-	45	<b>60</b>	70	50	<b>65</b>	80	65	<b>80</b>	95
	5	-	-	-	-	-	-	-	-	-	60	<b>75</b>	90	65	<b>85</b>	100	80	<b>100</b>	125
6	-	-	-	-	-	-	-	-	-	40	<b>50</b>	60	45	<b>55</b>	70	55	<b>65</b>	80	
M	ap [mm]	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300
	f [mm/rev]	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300
	1	55	<b>70</b>	80	60	<b>80</b>	95	60	<b>80</b>	95	75	<b>90</b>	110	80	<b>100</b>	120	95	<b>115</b>	140
	2	50	<b>60</b>	75	55	<b>70</b>	85	55	<b>70</b>	85	65	<b>80</b>	100	75	<b>90</b>	110	85	<b>105</b>	125
3	35	<b>45</b>	55	45	<b>50</b>	65	45	<b>50</b>	65	50	<b>60</b>	75	55	<b>65</b>	80	60	<b>80</b>	95	
K	ap [mm]	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300
	f [mm/rev]	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300
	1	50	<b>65</b>	80	60	<b>70</b>	85	60	<b>70</b>	85	60	<b>75</b>	90	65	<b>80</b>	100	75	<b>90</b>	110
	2	65	<b>80</b>	100	75	<b>90</b>	110	75	<b>90</b>	110	75	<b>95</b>	115	85	<b>105</b>	125	95	<b>115</b>	140
3	50	<b>60</b>	75	55	<b>65</b>	80	55	<b>65</b>	80	55	<b>70</b>	80	60	<b>75</b>	90	65	<b>85</b>	100	
N	ap [mm]	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300	0,051	-	0,300	-	-	-
	f [mm/rev]	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300	0,025	-	0,300	-	-	-
	1	400	<b>505</b>	605	400	<b>505</b>	605	400	<b>505</b>	605	400	<b>505</b>	605	445	<b>555</b>	665	-	-	-
	2	295	<b>370</b>	440	295	<b>370</b>	445	295	<b>370</b>	445	295	<b>370</b>	445	325	<b>405</b>	490	-	-	-
	3	70	<b>85</b>	105	70	<b>85</b>	105	70	<b>85</b>	105	85	<b>105</b>	125	90	<b>115</b>	135	-	-	-
	4	310	<b>380</b>	465	310	<b>385</b>	465	310	<b>385</b>	465	140	<b>175</b>	210	155	<b>190</b>	230	-	-	-
	5	145	<b>185</b>	220	145	<b>185</b>	220	145	<b>185</b>	220	175	<b>220</b>	265	195	<b>240</b>	290	-	-	-
6	140	<b>175</b>	210	140	<b>175</b>	210	140	<b>175</b>	210	170	<b>210</b>	255	185	<b>235</b>	280	-	-	-	
7	240	<b>295</b>	355	240	<b>300</b>	360	240	<b>300</b>	360	245	<b>305</b>	365	265	<b>335</b>	400	-	-	-	
S	ap [mm]	0,025	-	0,200	0,025	-	0,200	0,025	-	0,200	0,025	-	0,200	0,025	-	0,200	-	-	-
	f [mm/rev]	0,025	-	0,127	0,025	-	0,127	0,025	-	0,127	0,025	-	0,127	0,025	-	0,127	-	-	-
	1	30	<b>35</b>	45	30	<b>35</b>	45	30	<b>35</b>	45	30	<b>35</b>	45	35	<b>40</b>	50	-	-	-
	2	25	<b>30</b>	35	25	<b>30</b>	35	25	<b>30</b>	35	25	<b>30</b>	35	25	<b>35</b>	40	-	-	-
	3	25	<b>30</b>	35	25	<b>30</b>	35	25	<b>30</b>	35	30	<b>40</b>	50	35	<b>45</b>	55	-	-	-
4	25	<b>30</b>	35	25	<b>30</b>	35	25	<b>30</b>	35	-	-	-	-	-	-	-	-	-	
H	ap [mm]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	f [mm/rev]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.



Material Group		Cutting Speed – vc m/min														
		CM1			ALO			TN7			CBN6			CPD1		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	ap [mm]	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	–	–	–	–	–	–
	f [mm/rev]	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	–	–	–	–	–	–
	0/1	55	<b>65</b>	80	165	<b>205</b>	245	200	<b>245</b>	295	–	–	–	–	–	–
	2	35	<b>45</b>	55	105	<b>135</b>	160	130	<b>160</b>	190	–	–	–	–	–	–
	3	35	<b>45</b>	55	105	<b>135</b>	160	130	<b>160</b>	190	–	–	–	–	–	–
	4	25	<b>35</b>	40	85	<b>105</b>	125	100	<b>125</b>	150	–	–	–	–	–	–
	5	35	<b>45</b>	55	105	<b>135</b>	160	130	<b>160</b>	190	–	–	–	–	–	–
6	25	<b>30</b>	35	70	<b>90</b>	105	85	<b>105</b>	130	–	–	–	–	–	–	
M	ap [mm]	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	–	–	–	–	–	–
	f [mm/rev]	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	–	–	–	–	–	–
	1	55	<b>65</b>	80	105	<b>130</b>	160	105	<b>130</b>	155	–	–	–	–	–	–
	2	50	<b>60</b>	75	95	<b>120</b>	145	95	<b>115</b>	140	–	–	–	–	–	–
3	35	<b>45</b>	55	70	<b>90</b>	110	70	<b>85</b>	105	–	–	–	–	–	–	
K	ap [mm]	0,051	–	0,300	0,051	–	0,300	0,051	–	0,300	–	–	–	–	–	–
	f [mm/rev]	0,025	–	0,300	0,025	–	0,300	0,025	–	0,300	–	–	–	–	–	–
	1	45	<b>60</b>	70	125	<b>155</b>	185	80	<b>105</b>	125	–	–	–	–	–	–
	2	60	<b>75</b>	90	160	<b>200</b>	240	105	<b>130</b>	160	–	–	–	–	–	–
3	45	<b>55</b>	65	115	<b>145</b>	170	80	<b>95</b>	115	–	–	–	–	–	–	
N	ap [mm]	0,051	–	0,300	–	–	–	0,051	–	0,300	–	–	–	0,051	–	0,300
	f [mm/rev]	0,025	–	0,300	–	–	–	0,025	–	0,300	–	–	–	0,025	–	0,300
	1	400	<b>505</b>	605	–	–	–	400	<b>505</b>	605	–	–	–	855	<b>1065</b>	1280
	2	295	<b>370</b>	445	–	–	–	295	<b>370</b>	445	–	–	–	650	<b>810</b>	975
	3	70	<b>85</b>	105	–	–	–	80	<b>100</b>	120	–	–	–	365	<b>455</b>	550
	4	100	<b>125</b>	150	–	–	–	195	<b>240</b>	290	–	–	–	325	<b>405</b>	490
	5	145	<b>185</b>	220	–	–	–	195	<b>245</b>	295	–	–	–	340	<b>425</b>	510
	6	140	<b>175</b>	210	–	–	–	175	<b>220</b>	265	–	–	–	335	<b>420</b>	505
7	240	<b>295</b>	360	–	–	–	240	<b>300</b>	365	–	–	–	525	<b>660</b>	790	
S	ap [mm]	0,025	–	0,200	–	–	–	–	–	–	0,025	–	0,200	–	–	–
	f [mm/rev]	0,025	–	0,127	–	–	–	–	–	–	0,025	–	0,127	–	–	–
	1	25	<b>30</b>	40	–	–	–	–	–	–	90	<b>110</b>	135	–	–	–
	2	20	<b>25</b>	30	–	–	–	–	–	–	70	<b>85</b>	105	–	–	–
	3	25	<b>35</b>	40	–	–	–	–	–	–	100	<b>120</b>	145	–	–	–
4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
H	ap [mm]	–	–	–	–	–	–	–	–	–	0,025	–	0,200	–	–	–
	f [mm/rev]	–	–	–	–	–	–	–	–	–	0,025	–	0,127	–	–	–
	1	–	–	–	–	–	–	–	–	–	110	<b>135</b>	165	–	–	–
	2	–	–	–	–	–	–	–	–	–	105	<b>130</b>	155	–	–	–
	3	–	–	–	–	–	–	–	–	–	100	<b>120</b>	145	–	–	–
4	–	–	–	–	–	–	–	–	–	90	<b>110</b>	135	–	–	–	

NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.



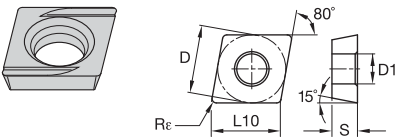
● first choice  
○ alternate choice

P	■					●	○																						
M	■	○	○	○		●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	■	○	○	○	○	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	■	●	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	■	○	○	○	○	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	■																												

■ CDHB

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		max		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1		
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in													
CDHBS4T0X0	CDHB1206X0	3,97	5/32	4,03	.159	1,02	.040	0,05	.002	2,13	.084	—	—	■	2830897	■	■	■	■	2830888	2830881	■	■	■	■	■
CDHBS4T0X0M	CDHB1206X0M	3,97	5/32	4,03	.159	1,02	.040	0,05	.002	2,13	.084	1,90	.075	■	■	■	■	■	■	■	■	■	■	■	■	■
CDHBS4T002	CDHB120605	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084	—	—	■	2830864	■	■	■	■	2830853	2830848	■	■	■	■	■
CDHBS4T002M	CDHB120605M	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084	0,96	.038	■	■	■	■	■	■	■	■	■	■	■	■	■
CDHBS4T004M	CDHB12061M	3,97	5/32	4,03	.159	1,02	.040	0,38	.015	2,13	.084	0,96	.038	■	■	■	■	■	■	■	■	■	■	■	■	■
CDHBS4T004	CDHB12061	3,97	5/32	4,03	.159	1,02	.040	0,38	.015	2,13	.084	—	—	■	2830830	■	■	■	■	2830817	2830813	■	■	■	■	■

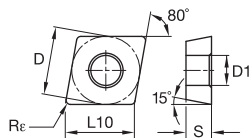
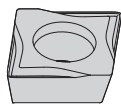
NOTE: Max DOC only applies to tipped inserts, which are designated with an "M" at the end of the catalog number.



■ CDHH-R/L

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1				
		mm	in	mm	in	mm	in	mm	in	mm	in															
right hand																										
CDHHS4T002R	CDHH120605R	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084	■	■	■	■	■	■	■	■	2830706	■	■	■	■	■	
CDHHS4T004R	CDHH12061R	3,97	5/32	4,03	.159	1,02	.040	0,38	.015	2,13	.084	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
left hand																										
CDHHS4T002L	CDHH120605L	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084	■	■	■	■	■	■	■	■	2830712	2830700	■	■	■	■	■
CDHHS4T004L	CDHH12061L	3,97	5/32	4,03	.159	1,02	.040	0,38	.015	2,13	.084	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

NOTE: Right-hand inserts used in left-hand bars only.

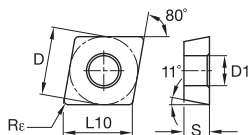
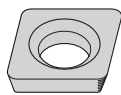


● first choice  
○ alternate choice

P					●	○	○	○	○	○								
M			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K			●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S			○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H																		○

**■ CDHH**

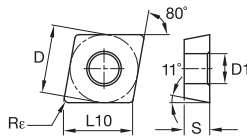
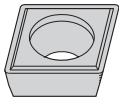
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in												
CDHHS4T002	CDHH120605	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084												
CDHHS4T002L	CDHH120605L	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084				2830724	2830632							
																	2830712						
CDHHS4T002R	CDHH120605R	3,97	5/32	4,03	.159	1,02	.040	0,18	.007	2,13	.084				2830731								
CDHHS4T004L	CDHH12061L	3,97	5/32	4,03	.159	1,02	.040	0,38	.015	2,13	.084				2830678								
CDHHS4T004R	CDHH12061R	3,97	5/32	4,03	.159	1,02	.040	0,38	.015	2,13	.084				2830682								
CDHHS4T004	CDHH12061	3,97	5/32	4,10	.161	1,02	.040	0,38	.015	2,13	.084				2830619								



**■ CPHB**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in												
CPHB06T102	CPHB21205	6,35	1/4	6,45	.254	1,91	.075	0,18	.007	2,80	.110												
CPHB06T104	CPHB2121	6,35	1/4	6,45	.254	1,91	.075	0,38	.015	2,80	.110				2824562	2824563							

Tools for Small Hole Boring



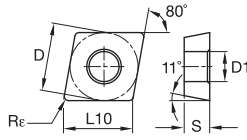
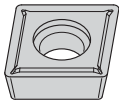
● first choice  
○ alternate choice

P	●				●		○											
M		○	○	○			●	●		○	○							
K				●	●	○	○		○	○	○			●	○			
N		●	●	●	●	○	○				○							●
S		○	○	○								○						
H															●			

Tools for Small Hole Boring

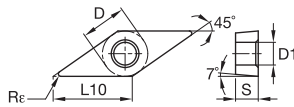
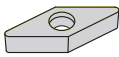
**CPHH**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1		
		mm	in	mm	in	mm	in	mm	in	mm	in													
CPHH06T102	CPHH21205	6,35	1/4	6,45	.254	1,91	.075	0,18	.007	2,79	.110	○	○			2824461	2824461							
CPHH06T104	CPHH2121	6,35	1/4	6,45	.254	1,91	.075	0,38	.015	2,80	.110	○	○			2824441								



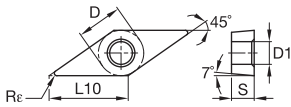
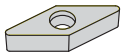
**CPMT-LF**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1		
		mm	in	mm	in	mm	in	mm	in	mm	in													
CPMT09T302LF	CPMT32505LF	9,53	3/8	9,67	.381	3,97	.156	0,20	.008	4,40	.173	○	○			2821519								
CPMT09T304LF	CPMT3251LF	9,53	3/8	9,67	.381	3,97	.156	0,40	.016	4,40	.173	○	○			2821499								
CPMT09T308LF	CPMT3252LF	9,52	3/8	9,67	.381	3,97	.156	0,79	.031	4,40	.173	○	○			2821484								



**GCHW**

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1		
		mm	in	mm	in	mm	in	mm	in	mm	in													
GCHW060202	GCHW151505	4,76	3/16	6,73	.265	2,36	.093	0,18	.007	2,39	.094	○	○			2827596								
GCHW060204	GCHW15151	4,76	3/16	6,73	.265	2,36	.093	0,38	.015	2,39	.094	○	○			2827577	2827596							

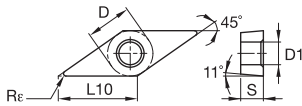
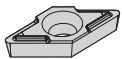


● first choice  
○ alternate choice

P	■	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	■	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	■	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	■	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	■	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	■	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

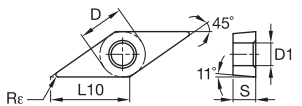
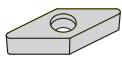
■ GCHT

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in												
GCHT060202	GCHT151505	4,83	.1902	6,83	.269	2,36	.093	0,18	.007	2,39	.094	○	○	○	●	○	○	○	○	○	○	○	○
GCHT060204	GCHT15151	4,76	3/16	6,83	.269	2,36	.093	0,38	.015	2,39	.094	○	○	○	●	○	○	○	○	○	○	○	○



■ GPHW

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in												
GPHW050102	GPHW12105	3,97	5/32	5,61	.221	1,59	.062	0,18	.007	2,13	.084	○	○	○	●	○	○	○	○	○	○	○	○
GPHW050104	GPHW1211	3,97	5/32	5,61	.221	1,59	.062	0,38	.015	2,13	.084	○	○	○	●	○	○	○	○	○	○	○	○



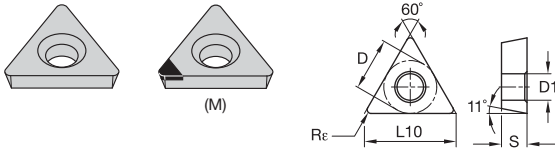
■ GPHT

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in												
GPHT050102	GPHT12105	3,97	5/32	5,76	.227	1,57	.062	0,18	.007	2,13	.084	○	○	○	●	○	○	○	○	○	○	○	○
GPHT050104	GPHT1211	4,08	.1605	5,76	.227	1,57	.062	0,38	.015	2,13	.084	○	○	○	●	○	○	○	○	○	○	○	○

Tools for Small Hole Boring







● first choice  
○ alternate choice

P	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

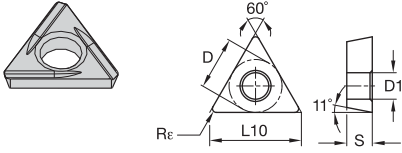
Tools for Small Hole Boring

TPHB

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		max		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in											
TPHB1102X0	TPHB215X0	6,35	1/4	11,00	.433	2,38	.094	0,05	.002	3,30	.130	—	—				2824236	2824251		2824220				
TPHB1102X0M	TPHB215X0M	6,35	1/4	11,00	.433	2,38	.094	0,05	.002	3,30	.130	1,62	.064										2823954	
TPHB110202	TPHB21505	6,35	1/4	11,00	.433	2,38	.094	0,18	.007	3,30	.130	—	—			2824191	2824200		2824195	2824168		2824148		
TPHB110202M	TPHB21505M	6,35	1/4	11,00	.433	2,38	.094	0,18	.007	3,30	.130	1,62	.064										2823949	2824022
TPHB110204	TPHB2151	6,35	1/4	11,00	.433	2,38	.094	0,38	.015	3,30	.130	—	—			2824122	2824136		2824129	2824104		2824090		
TPHB110204M	TPHB2151M	6,35	1/4	11,00	.433	2,38	.094	0,40	.015	3,30	.130	1,62	.064										2823942	2824015
TPHB110208	TPHB2152	6,35	1/4	11,00	.433	2,38	.094	0,79	.031	3,30	.130	—	—				2824077		2824044			2824037		
TPHB1603X0	TPHB32X0	9,53	3/8	16,50	.650	3,18	.125	0,05	.002	3,30	.130	—	—				2821402		2821844					
TPHB160302	TPHB3205	9,53	3/8	16,50	.650	3,18	.125	0,18	.007	3,30	.130	—	—	2821834			2821397		2821816					
TPHB160304	TPHB321	9,53	3/8	16,50	.650	3,18	.125	0,38	.015	3,30	.130	—	—	2821799			2821392		2821778					
TPHB160308	TPHB322	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	3,30	.130	—	—	2821371			2821381		2821377					
TPCB160302	TD6P05	9,53	3/8	—	—	3,23	.127	0,18	.007	3,30	.130	—	—						2821349					

NOTE: Max DOC only applies to tipped inserts, which are designated with an "M" at the end of the catalog number.





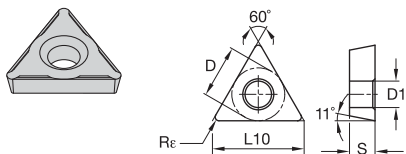
● first choice  
○ alternate choice

P	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

■ TPHH-R/L

ISO catalog number	ANSI catalog number	D		L10		S		Re		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1	
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in												
<b>right hand</b>																							
TPHH110202R	TPHH21505R	6,35	1/4	11,00	.433	2,38	.094	0,18	.007	3,33	.131				2823812								
TPHH160302R	TPHH3205R	9,53	3/8	16,50	.650	3,18	.125	0,18	.007	3,33	.131				2821213								
TPHH160304R	TPHH321R	9,53	3/8	16,50	.650	3,18	.125	0,38	.015	3,33	.131				2821168								
TPHH160308R	TPHH322R	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	3,33	.131				2821121								
<b>left hand</b>																							
TPHH110202L	TPHH21505L	6,35	1/4	11,00	.433	2,38	.094	0,18	.007	3,33	.131				2823805						2823767		
TPHH110204L	TPHH2151L	6,35	1/4	11,00	.433	2,38	.094	0,38	.015	3,33	.131				2823753		2823739						
TPHH160302L	TPHH3205L	9,53	3/8	16,50	.650	3,18	.125	0,18	.007	3,33	.131				2821208								
TPHH160304L	TPHH321L	9,53	3/8	16,50	.650	3,18	.125	0,38	.015	3,33	.131				2821162		2821150						
TPHH160308L	TPHH322L	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	3,33	.131				2821115								

NOTE: Right-hand inserts used in left-hand bars only.

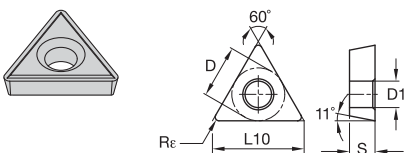


● first choice  
○ alternate choice

P					●	○	○	○	○	○	○	○		
M		○	○	○	○	○	○	○	○	○	○	○		
K		○	○	○	○	○	○	○	○	○	○	○		
N		○	○	○	○	○	○	○	○	○	○	○		
S		○	○	○	○	○	○	○	○	○	○	○		
H													○	

TPHH

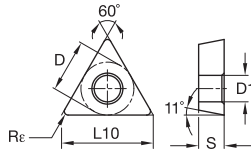
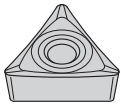
ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in												
TPHH110202	TPHH21505	6,35	1/4	11,00	.433	2,38	.094	0,18	.007	3,30	.130	○	○	○	○	○	○	○	○	○	○	○	○
TPHH110204	TPHH2151	6,35	1/4	11,00	.433	2,38	.094	0,38	.015	3,30	.130	○	○	○	○	○	○	○	○	○	○	○	○
TPCH110204	TPCH221	6,50	.256	11,26	.443	2,38	.094	0,38	.015	3,30	.130	○	○	○	○	○	○	○	○	○	○	○	○



TPHH-LF

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in												
TPHH160304	TPHH321	9,53	3/8	16,50	.650	3,18	.125	0,40	.016	3,33	.131	○	○	○	○	○	○	○	○	○	○	○	○
TPHH160304LF	TPHH321LF	9,53	3/8	16,50	.650	3,18	.125	0,40	.016	3,33	.131	○	○	○	○	○	○	○	○	○	○	○	○
TPHH160308	TPHH322	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	3,33	.131	○	○	○	○	○	○	○	○	○	○	○	○
TPHH160308	TPHH322LF	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	3,33	.131	○	○	○	○	○	○	○	○	○	○	○	○
TPHH17T309LF	TPHH312524LF	9,80	.386	16,98	.669	3,97	.156	0,94	.037	3,33	.131	○	○	○	○	○	○	○	○	○	○	○	○

Tools for Small Hole Boring

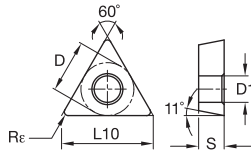
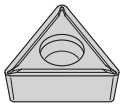


● first choice  
○ alternate choice

P					●	○																
M										●	●	○	○	○	○	○						
K										○	○	○	○	○	○	○	○	○	○			
N										○	○	○	○	○	○	○	○	○	○	○		●
S										○	○	○	○	○	○	○	○	○	○	○	○	○
H																						●

■ TPGT-HP

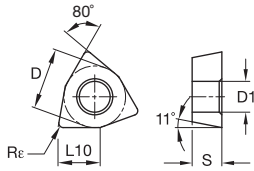
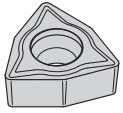
ISO catalog number	ANSI catalog number	D		L10		S		R <sub>e</sub>		D1		C2	C25	C3	CG5	CG55	CG6	GM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in												
TPGT110202HP	TPGT21505HP	6,35	1/4	11,00	.433	2,38	.094	0,20	.008	2,90	.114	○	○	○	●	○	○	○	○	○	○	○	○
TPGT110204HP	TPGT2151HP	6,35	1/4	11,00	.433	2,38	.094	0,40	.016	2,90	.114	○	○	○	○	○	○	○	○	○	○	○	○
TPGT16T304HP	TPGT3251HP	9,53	3/8	16,50	.650	3,97	.156	0,40	.016	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○



■ TPMT-LF

ISO catalog number	ANSI catalog number	D		L10		S		R <sub>e</sub>		D1		C2	C25	C3	CG5	CG55	CG6	GM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in												
TPMT110202LF	TPMT21505LF	6,35	1/4	11,00	.433	2,38	.094	0,20	.008	2,80	.110	○	○	○	○	○	○	○	○	○	○	○	○
TPMT110204LF	TPMT2151LF	6,35	1/4	11,00	.433	2,38	.094	0,40	.016	2,80	.110	○	○	○	○	○	○	○	○	○	○	○	○
TPMT160304LF	TPMT321LF	9,53	3/8	16,50	.650	3,18	.125	0,40	.016	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○
TPMT160308LF	TPMT322LF	9,53	3/8	16,50	.650	3,18	.125	0,79	.031	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○

Tools for Small Hole Boring



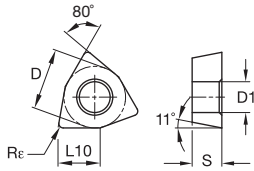
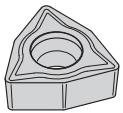
● first choice  
○ alternate choice

P	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Tools for Small Hole Boring

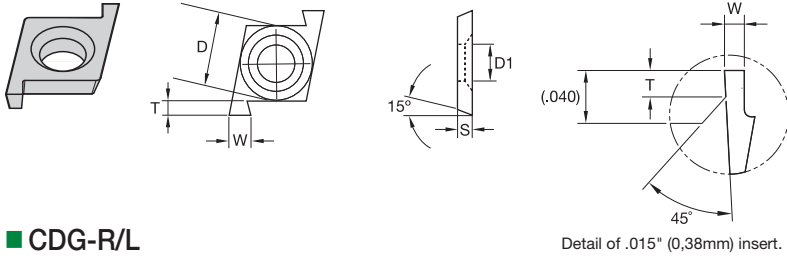
## WPHT

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in												
WPHTS30101	WPHT1510	4,76	3/16	3,26	.128	1,59	.062	0,10	.004	2,16	.085	○	○	○	○	○	○	○	○	○	○	○	○
WPHTS30102	WPHT15105	4,76	3/16	3,26	.128	1,59	.062	0,20	.008	2,16	.085	○	○	○	○	○	○	○	○	○	○	○	○
WPHTS30104	WPHT1511	4,76	3/16	3,26	.128	1,59	.062	0,40	.016	2,16	.085	○	○	○	○	○	○	○	○	○	○	○	○
WPGT040202UF	WPGT21505UF	6,35	1/4	4,34	.171	2,38	.094	0,20	.008	2,79	.110	○	○	○	○	○	○	○	○	○	○	○	○
WPHT040201	WPHT2150	6,35	1/4	4,34	.171	2,38	.094	0,10	.004	2,80	.110	○	○	○	○	○	○	○	○	○	○	○	○
WPHT040204	WPHT2151	6,35	1/4	4,34	.171	2,38	.094	0,40	.016	2,80	.110	○	○	○	○	○	○	○	○	○	○	○	○



## WPMT-LF

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in												
WPMTS3T104LF	WPMT15121LF	4,76	3/16	3,25	.128	1,98	.078	0,40	.016	2,15	.085	○	○	○	○	○	○	○	○	○	○	○	○
WPMT040204LF	WPMT2151LF	6,35	1/4	4,34	.171	2,38	.094	0,40	.016	2,90	.114	○	○	○	○	○	○	○	○	○	○	○	○
WPMT06T304LF	WPMT3251LF	9,53	3/8	6,52	.257	3,97	.156	0,40	.016	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○
WPMT06T308LF	WPMT3252LF	9,53	3/8	6,52	.257	3,97	.156	0,80	.031	4,40	.173	○	○	○	○	○	○	○	○	○	○	○	○

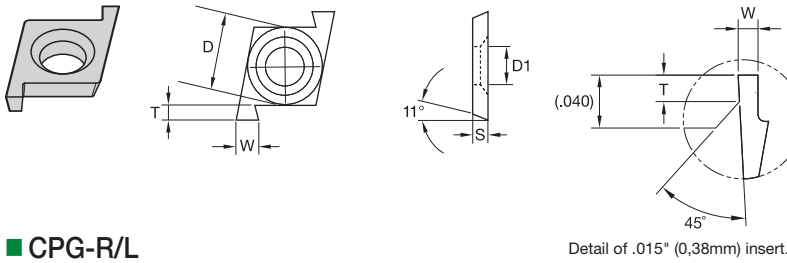


● first choice  
○ alternate choice

P	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

### ■ CDG-R/L

ISO catalog number	ANSI catalog number	D		S		T		W		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
		mm	in	mm	in	mm	in	mm	in	mm	in											
right hand																						
CDG50252R	CDG50252R	3,97	5/32	1,27	.050	1,02	.040	0,64	.025	2,13	.084	●	○	○	2830541	○	○	○	○	○	○	○
CDG50302R	CDG50302R	3,97	5/32	1,27	.050	1,02	.040	0,76	.030	2,13	.084	○	○	○	2830529	○	○	2830535	○	○	○	○

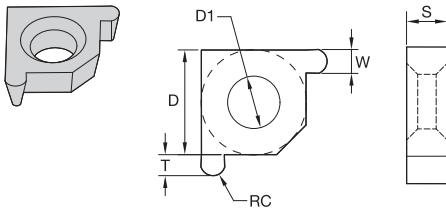


### ■ CPG-R/L

ISO catalog number	ANSI catalog number	D		S		T		W		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
		mm	in	mm	in	mm	in	mm	in	mm	in											
right hand																						
CPG2032R	CPG2032R	6,35	1/4	1,91	.075	1,65	.065	0,76	.030	2,79	.110	○	○	○	2824546	○	○	○	○	○	○	○
CPG2062R	CPG2062R	6,35	1/4	1,91	.075	1,65	.065	1,52	.060	2,79	.110	○	○	○	2824531	○	○	○	○	○	○	○

Tools for Small Hole Boring

Tools for Small Hole Boring

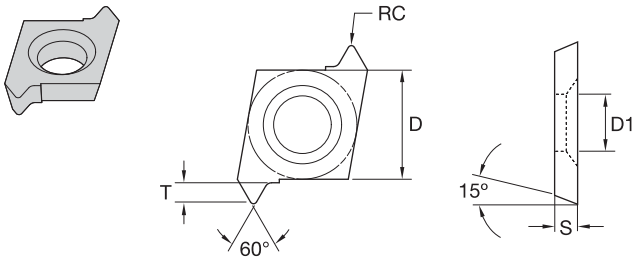


● first choice  
○ alternate choice

P	●												
M	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○

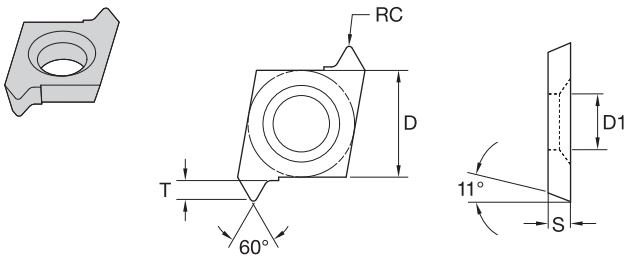
**FNR-R/L**

ISO catalog number	ANSI catalog number	D		S		T		W		RC		D1		C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in												mm
right hand																									
FNR150472R	FNR150472R	5,00	.1969	1,85	.073	1,00	.039	1,20	.047	0,60	.024	2,50	.098												



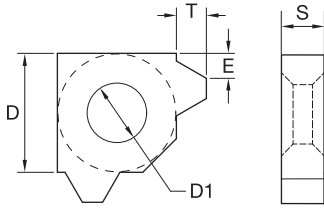
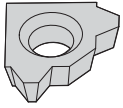
**CDT-R/L**

ISO catalog number	ANSI catalog number	D		S		T		RC		D1		TPI min	TPI max	TP min	TP max	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
		mm	in	mm	in	mm	in	mm	in	mm	in															
right hand																										
CDT50022R	CDT50022R	3,97	5/32	1,27	.050	0,76	.030	0,05	.002	2,11	.083	24	48	0,5	1,0											



**CPT-R/L**

ISO catalog number	ANSI catalog number	D		S		T		RC		D1		TPI min	TPI max	TP min	TP max	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
		mm	in	mm	in	mm	in	mm	in	mm	in															
right hand																										
CPT20052R	CPT20052R	6,35	1/4	1,91	.075	1,65	.065	0,13	.005	2,79	.110	10	24	1,0	2,5											

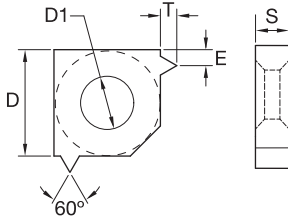
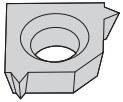


● first choice  
○ alternate choice

P	●																				
M	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H																					

**FNT-ACME-R/L**

ISO catalog number	ANSI catalog number	D		S		T		E		D1		TPI min	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
		mm	in	mm	in	mm	in	mm	in	mm	in												
right hand																							
FNT1512ACME2R	FNT1512ACME2R	5,00	.197	2,35	.093	1,26	.049	1,05	.041	2,50	.098	12				2820829							



**FNT-UN-R/L**

ISO catalog number	ANSI catalog number	D		S		T		E		D1		TPI min	C2	C25	C3	CG5	CG55	CG6	CM1	ALO	TN7	CBN6	CPD1
		mm	in	mm	in	mm	in	mm	in	mm	in												
right hand																							
FNT1528UN2R	FNT1528UN2R	5,00	.197	1,85	.073	0,61	.024	0,65	.026	2,50	.098	28				2820865							

Tools for Small Hole Boring

WIDIA-CIRCLE™ catalog number	New ISO/ANSI catalog number
CDCD	CDHB
CDCG	CDHH
CDCT	CDHH
CPCA	CPHB
CPCM	CPHH
GCCD	GCHW
GCCT	GCHT
GPCD	GPHW
GPCT	GPHT
TD6P	TPHB
TDAB	TDHB
TDAT	TDHH
TDCG	TDHH
TPCB	TPHB
TPCG	TPHH
TPCH	TPHH
TPGH	TPHH
TPMT	TPMT
WPGT	WPHT





**■ Insert Screws**

order number	ISO catalog number	ANSI catalog number	Torx/hex	internal thread
2840098	MSM46	MSM46	2 mm	M4X0.7
2840186	AS832/AS-8-32	AS832/AS-8-32	5/64	#8-32
2892513	BS832	BS832	5/64	—
2820981	LTM16	LTM16	T5	M2X0.4
2832647	CC11	CC11	T6	#1-72
2832635	CT11	CT11	T6	#1-72
2830477	FC11	FC11	T7	—
2828337	GT21	GT21	T7	#2-56
2825941	QTM20	QTM20	T7	M2.5X0.45
2825948	QTM26	QTM26	T7	M2.5X0.45
2826005	QC15	QC15	T8	#3-48
2826038	QC21	QC21	T9	#4-40
2823227	SC30	SC30	T10	#4-40
2823203	STM31	STM31	T15	M3.5 X 0.6
2832641	CT15	CT15	T16	#1-72

**■ Wrenches**

order number	ISO catalog number	ANSI catalog number	Torx/hex
2840094	MKEY	MKEY	2.0 mm
2840174	AKEY	AKEY	5/64
2828318	GTKEY	GTKEY	T5
2832628	CKEY	CKEY	T6
2830492	FKEY	FKEY	T7
2825973	Q8KEY	Q8KEY	T8
2825982	QKEY	QKEY	T9
2823182	SKEY	SKEY	T10

**■ Drive Bits**

order number	ISO catalog number	ANSI catalog number	Torx/hex
2840089	MBIT	MBIT	2 mm
2832661	CBIT	CBIT	T6
2830497	FBIT	FBIT	T7
2825963	QTBIT	QTBIT	T7
2825964	Q8BIT	Q8BIT	T8
2826045	QBIT	QBIT	T9
2823236	SBIT	SBIT	T10
2823196	STBIT	STBIT	T15

**■ Wedges**

order number	ISO catalog number	ANSI catalog number
2840192	AW250/AW-250	AW250/AW-250
2836024	BW312	BW312

## A/B Series Small Hole Tooling

Available in steel and carbide shanks, the WIDIA™ line of micro boring bars is an excellent, economical choice for a wide range of applications — from creating small holes in small parts to precision micro boring typically found in large workpieces — manufactured in the aerospace, heavy equipment, and automotive industries.

# A/B Series



## A/B Series Micro Boring Bar

### Features

- .062–.156" (1,56–3,96mm) diameter boring range.
- Unique locking system enables quick, accurate insert changes.
- Insert repeatability guaranteed within  $\pm .0005"$  ( $\pm 0,013\text{mm}$ ).

### Benefits

- Quick, accurate insert setups.
- Available in multiple styles for machining a wide range of materials.
- Elliptical, ground insert shanks for maximum strength and rigidity.

### ABD Type

Replaceable boring insert with coolant slot.



### ABD Type

Replaceable boring insert available in coated and uncoated carbide, CBN, and PCD tip. A series has a coolant slot.



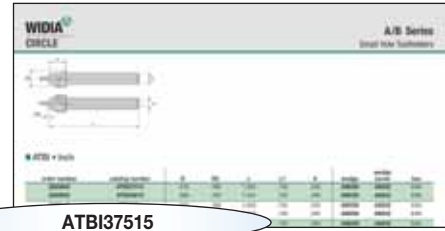
### BB Type

Replaceable boring insert.



### A/B Series Boring Bar Identification System

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



**ATBI37515**

**AT**

Series Style and Bar Type  
*Construction Features of the Boring Bar*

>.187" (4,75mm) Bore Diameter

**AT** = Through Coolant  
**BS** = No Coolant

**B**

Boring Bar

**I**

Type

**I** = Inch

**M** = Metric

**375**

Shank Diameter  
*shown as "D"*

**Inch**

**375** = .375"  
**500** = .500"  
**625** = .625"  
**750** = .750"  
**1000** = 1.000"

**Metric**

**8** = 8,00mm  
**10** = 10,00mm  
**12** = 12,00mm  
**16** = 16,00mm  
**20** = 20,00mm

**15**

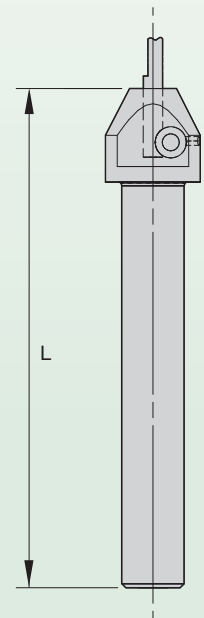
Length  
*shown as "L"*

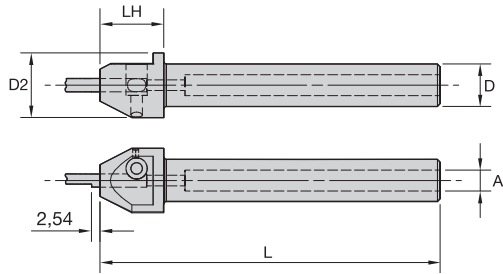
**Inch**

**15** = 1.50"  
**4** = 4.00"  
**6** = 6.00"

**Metric**

**38** = 38,0mm  
**100** = 100,0mm  
**102** = 102,0mm  
**152** = 152,0mm

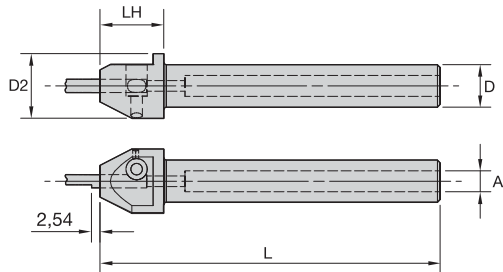




**ATBI**

order number	catalog number	D	D2	L	LH	A	wedge	wedge screw	hex
2839848	ATBI37515	.375	.760	1.500	.750	.250	AW250/AW-250	AS832/AS-8-32	5/64
2839842	ATBI50015	.500	.760	1.500	.750	.250	AW250/AW-250	AS832/AS-8-32	5/64
3896119	ATBI5004	.500	.760	4.000	.750	.250	AW250/AW-250	AS832/AS-8-32	5/64
2839830	ATBI6254	.625	.760	4.000	.750	.250	AW250/AW-250	AS832/AS-8-32	5/64
2839826	ATBI7504	.750	.760	4.000	.750	.250	AW250/AW-250	AS832/AS-8-32	5/64
2839821	ATBI10004	1.000	.760	4.000	.750	.250	AW250/AW-250	AS832/AS-8-32	5/64

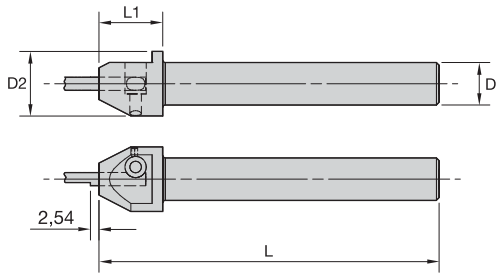
NOTE: These tools will accept any A-Series solid carbide insert (ABD, ABD-M, AGD, APD, and ATD).



**ATBM**

order number	catalog number	D	D2	L	LH	A	wedge	hex
3896121	ATBM12100	12,00	19,30	102	19	6,35	AW250/AW-250	5/64
2839192	ATBM1638	16,00	19,30	38	19	6,35	AW250/AW-250	5/64
3896193	ATBM16100	16,00	19,30	102	19	6,35	AW250/AW-250	5/64
3896194	ATBM20102	20,00	19,30	102	19	6,35	AW250/AW-250	5/64
3896195	ATBM25102	25,00	19,30	102	19	6,35	AW250/AW-250	5/64

NOTE: These tools will accept any A-Series solid carbide insert (ABD, ABD-M, AGD, APD, and ATD).

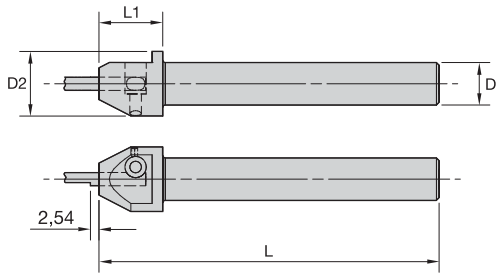


■ **BSBI**



order number	catalog number	D	D2	L	L1	wedge	wedge screw	hex
2832989	BSBI5006	.500	1.010	6.000	1.150	BW312	BS832	5/64
2832984	BSBI6256	.625	1.010	6.000	1.150	BW312	BS832	5/64
2832980	BSBI7506	.750	1.010	6.000	1.150	BW312	BS832	5/64
2832974	BSBI10006	1.000	1.010	6.000	1.150	BW312	BS832	5/64

NOTE: These tools will accept any B-Series solid carbide insert (BB and BP).



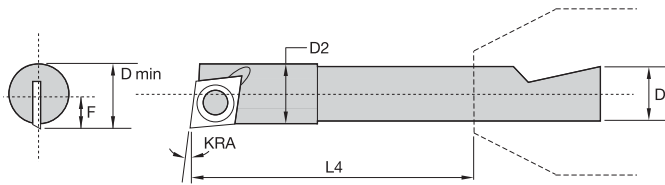
■ **BSBM**



order number	catalog number	D	D2	L	L1	wedge	wedge screw	hex
3896196	BSBM20152	20,00	25,65	152	29	BW312	BS832	5/64

NOTE: These tools will accept any B-Series solid carbide insert (BB and BP).

Tools for Small Hole Boring

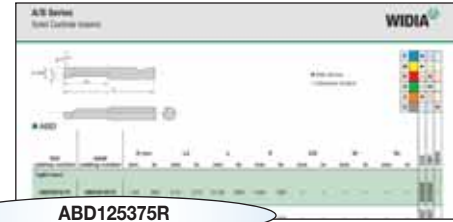


■ ABC

order number	catalog number	KRA	D		D min		D2		F		L4		gage insert	insert screw	Torx
			mm	in	mm	in	mm	in	mm	in	mm	in			
right hand															
2836656	ABC1000R	-7	3,96	.156	4,57	.180	4,16	.164	2,41	.095	25,40	1.000	CD..120605	CC09	T6
2836651	ABC1250R	-7	3,96	.156	4,57	.180	4,16	.164	2,41	.095	31,75	1.250	CD..120605	CC09	T6
2836645	ABC1500R	-7	3,96	.156	4,57	.180	4,16	.164	2,41	.095	38,10	1.500	CD..120605	CC09	T6
2836667	ABC500R	-7	3,96	.156	4,57	.180	4,16	.164	2,41	.095	12,70	.500	CD..120605	CC09	T6
2836660	ABC750R	-7	3,96	.156	4,57	.180	4,16	.164	2,41	.095	19,05	.750	CD..120605	CC09	T6



## A/B Series Boring Bar Identification System



ABD125375R

### ABD

Insert Style

**A Series = Through Coolant**

**ABC** = Indexable Boring  
**ABD** = Boring  
**AGD** = Grooving  
**APD** = Profiling  
**ATD** = Threading

**B Series = Without coolant**

**BB** = Boring  
**BP** = Profiling

### 125

Minimum Bore  
*shown as "D min"*

**Inch**

**A Series**

**06** = .062"  
**09** = .094"  
**125** = .125"  
**156** = .156"

**(AGD style only)**

**095** = .110"  
**125** = .140"  
**156** = .175"

**(ATD style only)**

**095** = .100"  
**125** = .130"  
**156** = .160"

**B Series**

**187** = .187"  
**250** = .250"  
**312** = .312"

**Metric**

**A Series**

**06** = 1,58mm  
**09** = 2,39mm  
**125** = 3,18mm  
**156** = 3,96mm

**(AGD style only)**

**095** = 2,79mm  
**125** = 3,56mm  
**156** = 4,45mm

**(ATD style only)**

**095** = 2,79mm  
**125** = 3,56mm  
**156** = 4,45mm

**B Series**

**187** = 4,75mm  
**250** = 6,35mm  
**312** = 7,93mm

### 375

Bore Depth, Groove Width,  
Flat on Thread  
*shown as "L4, W"*

**Inch**

**Bore Depth**

**187** = .187"  
**281** = .281"  
**312** = .312"  
**375** = .375"  
**500** = .500"  
**600** = .600"  
**625** = .625"  
**750** = .750"  
**825** = .825"  
**875** = .875"  
**1000** = 1.000"  
**1250** = 1.250"  
**1500** = 1.500"  
**1750** = 1.750"  
**2125** = 2.125"

**Metric**

**Bore Depth**

**187** = 4,75mm  
**281** = 7,14mm  
**312** = 7,93mm  
**375** = 9,53mm  
**500** = 12,70mm  
**600** = 15,24mm  
**625** = 15,88mm  
**750** = 19,05mm  
**825** = 20,96mm  
**875** = 22,23mm  
**1000** = 25,40mm  
**1250** = 31,75mm  
**1500** = 38,10mm  
**1750** = 44,45mm  
**2125** = 53,98mm

**Inch**

**A Series**

**Groove Width  
(AGD style only)**

**03** = .030"  
**04** = .040"  
**05** = .050"

**Thread  
(ATD style only)**

**F2** = .002"  
Flat on thread

**Metric**

**A Series**

**Groove Width  
(AGD style only)**

**03** = 0,76mm  
**04** = 1,02mm  
**05** = 1,27mm

**Thread  
(ATD style only)**

**F2** = 0,05mm  
Flat on thread

### R

Hand  
of Tool

**R** =  
Right hand

**L** =  
Left hand

Tip Style  
*(optional)*

**Symbol**  
M

**Usage**  
Mini tip

# Victory™ Turning



## EXTREME **CHALLENGES.** EXTREME **RESULTS.**

Specifically engineered multilayer coating provides high-speed capability for finishing to roughing operations. New geometries enhance chip control for better tool life and superior surface finishes.

### **A Complete High-Performance Turning Portfolio**

- Market-leading technology.
- Longer tool life.
- Higher productivity through increased speed capability.

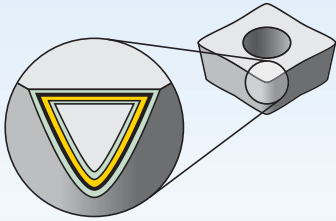
### **Steel and Stainless Steel Grades**

- Reduce cycle times — high speed and feed capability.
- Long tool life — new multilayer coating provides better wear resistance.
- ZrCN top layer with post-coat treatment provides improved edge toughness and wear detection.
- Outer layer is bronze-colored for easier wear detection.

To learn more, contact your local Authorized  
Distributor or visit [widia.com](http://widia.com).

**WIDIA™**  
**VICTORY**

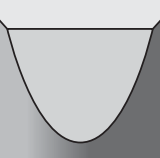






Coatings provide high-speed capability and are engineered for finishing to light roughing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45		
<b>CM1</b>		Uncoated carbide. A very tough, ultra-fine grain unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Performs best at low speeds and will handle interruptions and high feed rates. Use when C2, C3, or C25 fail due to chipping or breaking.	<b>P</b>				■	■	■					
			<b>M</b>				■	■	■					
			<b>K</b>				■	■	■					
			<b>N</b>				■	■	■					
			<b>S</b>						■	■	■			
<b>CG5</b>		A PVD-TiN-coated grade. Straight 9.5% Co substrate. Submicron grain. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Performs best at low speeds and will handle interruptions and high feed rates.	<b>P</b>				■	■	■					
			<b>M</b>				■	■	■					
			<b>K</b>				■	■	■					
			<b>N</b>				■	■	■					
			<b>S</b>						■	■	■			
<b>CBN6</b>		PcBN tip brazed onto a carbide insert. Recommended for machining hardened steel (45–65 HRC). Use on bearing steel, hot and cold work tool steels, high-speed steels, die steels, case-hardened steels, carburized and nitrided irons, and some hard coatings. Can be run both dry and wet.												
			<b>H</b>											

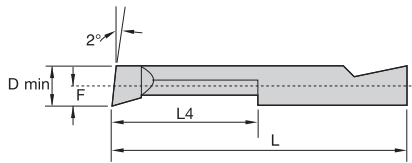


Material Group		Cutting Speed – vc SFM								
		CG5			CM1			CBN6		
		min	Start	max	min	Start	max	min	Start	max
P	ap [inch]	0.001	-	0.008	0.001	-	0.008	-	-	-
	f [inch]	0.0005	-	0.007	0.0005	-	0.007	-	-	-
	0/1	305	<b>380</b>	460	180	<b>220</b>	265	-	-	-
	2	200	<b>245</b>	300	115	<b>140</b>	170	-	-	-
	3	200	<b>245</b>	300	115	<b>140</b>	170	-	-	-
	4	155	<b>195</b>	235	90	<b>110</b>	135	-	-	-
	5	200	<b>250</b>	300	115	<b>145</b>	175	-	-	-
	6	135	<b>165</b>	200	80	<b>95</b>	115	-	-	-
M	ap [inch]	0.001	-	0.008	0.001	-	0.008	-	-	-
	f [inch]	0.0005	-	0.007	0.0005	-	0.007	-	-	-
	1	240	<b>300</b>	360	180	<b>220</b>	265	-	-	-
	2	220	<b>270</b>	325	160	<b>200</b>	240	-	-	-
	3	165	<b>200</b>	245	120	<b>150</b>	180	-	-	-
K	ap [inch]	0.001	-	0.010	0.001	-	0.010	-	-	-
	f [inch]	0.0005	-	0.007	0.0005	-	0.007	-	-	-
	1	195	<b>245</b>	295	155	<b>190</b>	230	-	-	-
	2	250	<b>310</b>	375	190	<b>240</b>	290	-	-	-
	3	180	<b>225</b>	270	140	<b>175</b>	210	-	-	-
N	ap [inch]	0.001	-	0.025	0.001	-	0.025	-	-	-
	f [inch]	0.0005	-	0.007	0.0005	-	0.007	-	-	-
	1	1320	<b>1650</b>	1980	1320	<b>1650</b>	1980	-	-	-
	2	970	<b>1215</b>	1455	970	<b>1215</b>	1455	-	-	-
	3	240	<b>300</b>	360	225	<b>280</b>	340	-	-	-
	4	455	<b>570</b>	685	325	<b>405</b>	490	-	-	-
	5	320	<b>400</b>	480	260	<b>320</b>	385	-	-	-
	6	320	<b>400</b>	480	260	<b>320</b>	385	-	-	-
	7	785	<b>985</b>	1180	780	<b>975</b>	1175	-	-	-
S	ap [inch]	0.001	-	0.008	0.001	-	0.008	-	-	-
	f [inch]	0.001	-	0.007	0.001	-	0.007	-	-	-
	1	90	<b>105</b>	130	175	<b>215</b>	260	-	-	-
	2	65	<b>80</b>	100	135	<b>170</b>	205	-	-	-
	3	105	<b>130</b>	160	90	<b>110</b>	135	-	-	-
	4	-	-	-	-	-	-	-	-	
H	ap [inch]	-	-	-	-	-	-	0.0005	-	0.003
	f [inch]	-	-	-	-	-	-	0.0005	-	0.004
	1	-	-	-	-	-	-	360	<b>450</b>	540
	2	-	-	-	-	-	-	340	<b>420</b>	505
	3	-	-	-	-	-	-	320	<b>400</b>	480
	4	-	-	-	-	-	320	<b>400</b>	480	

NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.

Material Group		Cutting Speed – vc m/min								
		CG5			CM1			CBN6		
		min	Start	max	min	Start	max	min	Start	max
P	ap [mm]	0,025	-	0,200	0,025	-	0,203	-	-	-
	f [mm/rev]	0,013	-	0,178	0,013	-	0,178	-	-	-
	0/1	95	<b>120</b>	145	55	<b>70</b>	85	-	-	-
	2	65	<b>80</b>	90	40	<b>45</b>	55	-	-	-
	3	65	<b>80</b>	90	40	<b>45</b>	55	-	-	-
	4	50	<b>60</b>	75	30	<b>35</b>	45	-	-	-
	5	65	<b>80</b>	95	40	<b>45</b>	55	-	-	-
6	45	<b>55</b>	65	25	<b>30</b>	40	-	-	-	
M	ap [mm]	0,025	-	0,200	0,025	-	0,200	-	-	-
	f [mm/rev]	0,013	-	0,178	0,013	-	0,178	-	-	-
	1	75	<b>95</b>	110	55	<b>70</b>	85	-	-	-
	2	70	<b>85</b>	100	50	<b>65</b>	75	-	-	-
3	55	<b>65</b>	80	40	<b>50</b>	55	-	-	-	
K	ap [mm]	0,001	-	0,010	0,001	-	0,010	-	-	-
	f [mm/rev]	0,0005	-	0,007	0,0005	-	0,007	-	-	-
	1	65	<b>80</b>	95	50	<b>60</b>	75	-	-	-
	2	80	<b>95</b>	115	60	<b>75</b>	90	-	-	-
3	55	<b>70</b>	85	45	<b>55</b>	65	-	-	-	
N	ap [mm]	0,025	-	0,640	0,025	-	0,640	-	-	-
	f [mm/rev]	0,013	-	0,178	0,013	-	0,178	-	-	-
	1	405	<b>505</b>	605	405	<b>505</b>	605	-	-	-
	2	300	<b>370</b>	445	300	<b>370</b>	445	-	-	-
	3	75	<b>95</b>	110	70	<b>90</b>	105	-	-	-
	4	140	<b>175</b>	210	105	<b>125</b>	155	-	-	-
	5	100	<b>125</b>	150	80	<b>100</b>	120	-	-	-
	6	100	<b>125</b>	150	80	<b>100</b>	120	-	-	-
7	240	<b>300</b>	360	240	<b>300</b>	360	-	-	-	
S	ap [mm]	0,025	-	0,200	0,025	-	0,200	-	-	-
	f [mm/rev]	0,013	-	0,178	0,013	-	0,178	-	-	-
	1	30	<b>35</b>	40	55	<b>70</b>	85	-	-	-
	2	20	<b>30</b>	35	45	<b>55</b>	65	-	-	-
	3	35	<b>40</b>	50	30	<b>35</b>	45	-	-	-
4	-	-	-	-	-	-	-	-	-	
H	ap [mm]	-	-	-	-	-	-	0,025	-	0,200
	f [mm/rev]	-	-	-	-	-	-	0,0005	-	0,004
	1	-	-	-	-	-	-	110	<b>140</b>	165
	2	-	-	-	-	-	-	105	<b>130</b>	155
	3	-	-	-	-	-	-	100	<b>125</b>	150
4	-	-	-	-	-	-	100	<b>125</b>	150	

NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.

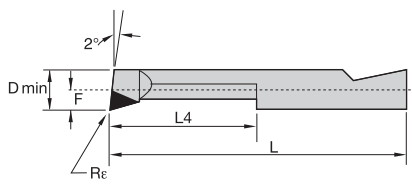


● first choice  
○ alternate choice

P	●	○	
M	●	○	
K	○	●	
N	○	●	
S	●	○	
H			●

■ ABD

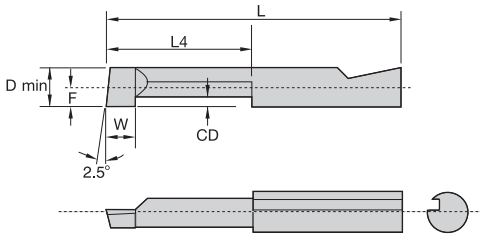
ISO catalog number	ANSI catalog number	D min		L4		L		F		CG5	CM1	CBN6
		mm	in	mm	in	mm	in	mm	in			
right hand												
ABD06187R	ABD06187R	1,58	.062	5,41	.213	21,92	.863	0,66	.026	2836639	2836632	
ABD06312R	ABD06312R	1,58	.062	7,93	.312	24,44	.962	0,66	.026	2836627	2836621	
ABD09281R	ABD09281R	2,39	.094	7,14	.281	23,65	.931	1,04	.041	2836614	2836608	
ABD09500R	ABD09500R	2,39	.094	12,70	.500	29,21	1.150	1,04	.041	2836604	2836599	
ABD125375R	ABD125375R	3,18	.125	9,53	.375	26,04	1.025	1,45	.057	2836593	2836588	
ABD125625R	ABD125625R	3,18	.125	15,88	.625	32,39	1.275	1,45	.057	2836582	2836579	
ABD156500R	ABD156500R	3,96	.156	12,70	.500	29,21	1.150	1,85	.073	2836573		
ABD156875R	ABD156875R	3,96	.156	22,23	.875	38,74	1.525	1,85	.073	2836561		



■ ABD-M

ISO catalog number	ANSI catalog number	D min		L4		L		F		Rε		CG5	CM1	CBN6
		mm	in	mm	in	mm	in	mm	in	mm	in			
right hand														
ABD156875RM	ABD156875RM	3,96	.156	22,23	.875	38,74	1.525	1,85	.073	0,18	.007			2836679

Tools for Small Hole Boring

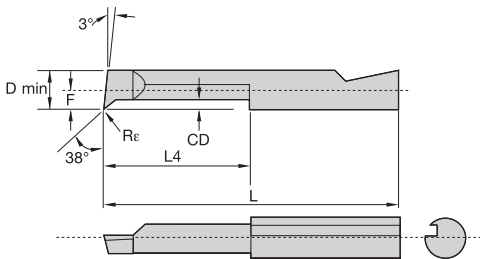


● first choice  
○ alternate choice

P	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

■ AGD

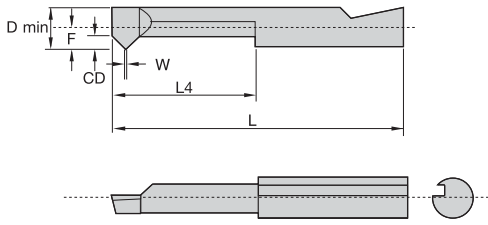
ISO catalog number	ANSI catalog number	D min		L4		L		F		CD		W		CG5	CM1	CBN6	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in				
right hand																	
AGD09503	AGD09503	2,79	.110	7,93	.312	24,44	.962	1,17	.046	0,76	.030	0,76	.030	2836550	2836545		
AGD12504	AGD12504	3,56	.140	9,53	.375	26,04	1.025	1,55	.061	0,89	.035	1,02	.040	2836537	2836545		
AGD15605	AGD15605	4,45	.175	12,70	.500	29,21	1.150	1,93	.076	1,27	.050	1,27	.050	2836524	2836545		



■ APD

ISO catalog number	ANSI catalog number	D min		L4		L		F		CD		Re		CG5	CM1	CBN6	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in				
right hand																	
APD06187R	APD06187R	1,58	.062	4,75	.187	21,26	.837	0,66	.026	0,43	.017	0,18	.007	2836511	2836495		
APD09281R	APD09281R	2,39	.094	7,14	.281	23,65	.931	1,07	.042	0,71	.028	0,18	.007	2836489	2836495		
APD125375R	APD125375R	3,18	.125	9,53	.375	26,04	1.025	1,45	.057	1,02	.040	0,18	.007	2836489	2836495		
APD156500R	APD156500R	3,96	.156	12,70	.500	29,21	1.150	1,85	.073	1,27	.050	0,18	.007	2836473	2836495		

Tools for Small Hole Boring



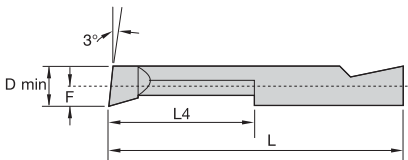
● first choice  
○ alternate choice

P	●	○
M	●	○
K	○	●
N	○	●
S	●	○
H	●	○

Tools for Small Hole Boring

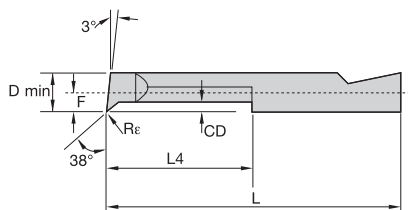
**ATD**

ISO catalog number	ANSI catalog number	D min		L4		L		F		CD		W		TP min	TP max	TPI min	TPI max	CG5	CM1	CBN6
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in							
right hand																				
ATD12560F2	ATD12560F2	3,56	.140	9,53	.375	26,04	1.025	1,55	.061	0,69	.027	0,05	.002	1,06	0,53	24	48			
ATD15660F2	ATD15660F2	4,45	.175	12,70	.500	29,21	1.150	1,93	.076	0,81	.032	0,05	.002	1,27	0,53	20	48	2836443	2836436	2836450



**BB**

ISO catalog number	ANSI catalog number	D min		L4		L		F		CG5	CM1	CBN6
		mm	in	mm	in	mm	in	mm	in			
right hand												
BB187750R	BB187750R	4,75	.187	19,05	.750	45,72	1.800	2,24	.088	2832769		
BB1871250R	BB1871250R	4,75	.187	31,75	1.250	58,42	2.300	2,24	.088	2832758		
BB2501000R	BB2501000R	6,35	.250	25,40	1.000	52,07	2.050	3,05	.120	2832747	2832742	
BB3121250R	BB3121250R	7,93	.312	53,98	2.125	80,65	3.175	3,84	.151	2832724	2832719	



● first choice  
○ alternate choice

P	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
N	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

■ BP

ISO catalog number	ANSI catalog number	D min		L4		L		F		CD		Rε		CG5	CM1	CBN6
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in			
right hand																
BP187600R	BP187600R	4,75	.187	15,24	.600	41,91	1.650	2,24	.088	1,58	.062	0,18	.007	2832702		
BP250825R	BP250825R	6,35	.250	20,96	.825	47,63	1.875	3,05	.120	1,98	.078	0,18	.007	2832689		



Tools for Small Hole Boring

■ Insert Screws

order number	ISO catalog number	ANSI catalog number	Torx/hex	internal thread
2840098	MSM46	MSM46	2 mm	M4X0.7
2840186	AS832/AS-8-32	AS832/AS-8-32	5/64	#8-32
2892513	BS832	BS832	5/64	—
2820981	LTM16	LTM16	T5	M2X0.4
2832647	CC11	CC11	T6	#1-72
2832635	CT11	CT11	T6	#1-72
2830477	FC11	FC11	T7	—
2828337	GT21	GT21	T7	#2-56
2825941	QTM20	QTM20	T7	M2.5X0.45
2825948	QTM26	QTM26	T7	M2.5X0.45
2826005	QC15	QC15	T8	#3-48
2826038	QC21	QC21	T9	#4-40
2823227	SC30	SC30	T10	#4-40
2823203	STM31	STM31	T15	M3.5 X 0.6
2832641	CT15	CT15	T16	#1-72

■ Wrenches

order number	ISO catalog number	ANSI catalog number	Torx/hex
2840094	MKEY	MKEY	2.0 mm
2840174	AKEY	AKEY	5/64
2828318	GTKEY	GTKEY	T5
2832628	CKEY	CKEY	T6
2830492	FKEY	FKEY	T7
2825973	Q8KEY	Q8KEY	T8
2825982	QKEY	QKEY	T9
2823182	SKEY	SKEY	T10

■ Drive Bits

order number	ISO catalog number	ANSI catalog number	Torx/hex
2840089	MBIT	MBIT	2 mm
2832661	CBIT	CBIT	T6
2830497	FBIT	FBIT	T7
2825963	QTBIT	QTBIT	T7
2825964	Q8BIT	Q8BIT	T8
2826045	QBIT	QBIT	T9
2823236	SBIT	SBIT	T10
2823196	STBIT	STBIT	T15

■ Wedges

order number	ISO catalog number	ANSI catalog number
2840192	AW250/AW-250	AW250/AW-250
2836024	BW312	BW312

Tools for Small Hole Boring



# The best solution for demanding threading applications



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

The WIDIA™ TopThread™ system is the best solution for demanding threading applications. With unmatched tooling technology, you can trust WIDIA TopThread tools for all of your threading and grooving needs.

- Large selection of insert geometries and grades.
- Rigid insert clamping design ensures the best tool life, surface finish, and workpiece quality.
- Ensures accurate, high-quality threads. Excellent for internal threading operations.

To learn more, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA** 

## Quadralock™ •

### High-Precision Products for I.D. Applications

Easy access, quick-change toolholders and inserts perform multiple I.D. applications for maximum productivity with one toolholder.

The unique cutting tip of the Quadralock I.D. Quick-Change Tooling System can be locked in four different positions, enabling operation in both Swiss-style and conventional machines. Four quick, easy setup steps and guaranteed insert repeatability within  $\pm 0.0005"$  ( $\pm 0,013\text{mm}$ ) ensures superior performance.



# Quadralock

## Quadralock Ultra-Precision Tooling

### Features

- Fixed-limit stop for precise and repeatable cutting edge positioning.
- Tight insert seat pocket ensures secure hold.
- V-slots and limit-stop bolts for increased indexability.

### Benefits

- Internal coolant supply directly lubricates cutting edge.
- Ability to rotate tool at 90° increments.
- For all boring, grooving, profiling, and threading applications.

### Boring

Bore holes as small as .010" (0,25mm).



### Grooving

Groove in a .110" (2,79mm) diameter hole.



### Profiling

Profile in diameters as small as .062" (1,57mm).

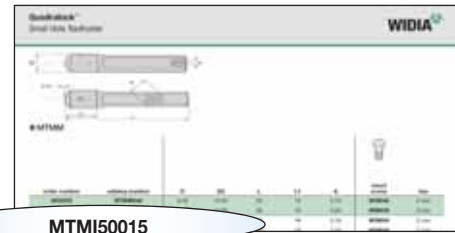


### Threading

Thread down to a No. 5; .100" (2,54mm).



## Quadralock Boring Bar Identification System



MTMI50015

### MTM

Quadralock Boring System

### I

Type

**I** = Inch  
**M** = Metric

### 500

Shank Diameter  
*shown as "D"*

**Inch**

375 = .375"  
500 = .500"  
625 = .625"  
750 = .750"  
1000 = 1.000"

**Metric**

8 = 8,00mm  
10 = 10,00mm  
12 = 12,00mm  
16 = 16,00mm  
22 = 22,00mm

### 15

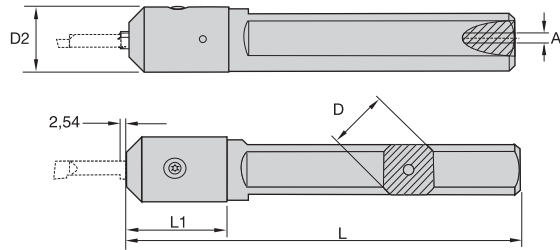
Length  
*shown as "L"*

**Inch**

15 = 1.50"  
4 = 4.00"  
5 = 5.00"

**Metric**

40 = 38,10mm  
100 = 101,60mm  
127 = 127,00mm

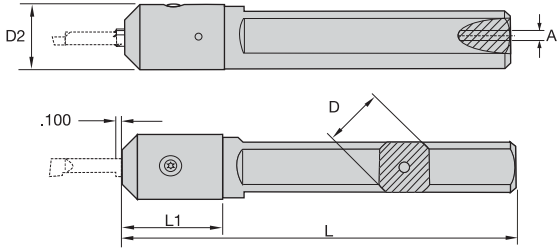


Tools for Small Hole Boring


■ **MTMM**



order number	catalog number	D	D2	L	L1	A	insert screw	hex
3896202	MTMM840	8,00	12,95	38	19	3,18	MSM46	2 mm
3896198	MTMM1040	10,00	12,95	38	19	3,00	MSM46	2 mm
3896200	MTMM1240	12,00	12,95	38	19	3,18	MSM46	2 mm
3896199	MTMM12100	12,00	12,95	102	19	3,00	MSM46	2 mm
3896201	MTMM22127	22,00	12,95	127	19	3,00	MSM46	2 mm

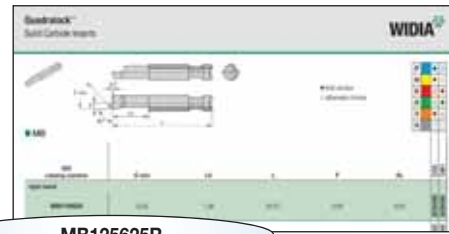


■ **MTMI**

order number	catalog number	D	D2	L	L1	A	insert screw	hex
2839815	MTMI37515	.375	.510	1.500	.750	.118		2 mm
2839803	MTMI50015	.500	.510	1.500	.750	.125	<b>MSM46</b>	2 mm
2839792	MTMI62515	.625	.510	1.500	.760	.125	<b>MSM46</b>	2 mm
2839785	MTMI6254	.625	.510	4.000	.760	.125	<b>MSM46</b>	2 mm
2839779	MTMI75015	.750	.510	1.500	.760	.125	<b>MSM46</b>	2 mm
2839774	MTMI7504	.750	.510	4.000	.760	.125	<b>MSM46</b>	2 mm
3896197	MTMI10005	1.000	.510	5.000	.760	.125	<b>MSM46</b>	2 mm

Tools for Small Hole Boring

# Quadralock Boring Bar Insert Identification System

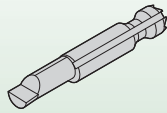


MB125625R

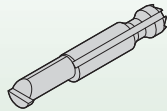
## MB

Insert Style

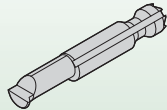
MB = Boring



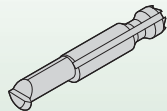
MG = Grooving



MP = Profiling



MT = Threading



## 125

Minimum Bore  
shown as "D min"

Inch

- 010 = .010"
- 030 = .030"
- 062 = .062"
- 094 = .094"
- 125 = .125"
- 156 = .156"

(for MG and MT style only)

- 095 = .110"
- 125 = .140"
- 156 = .175"

Metric

- 010 = 0,25mm
- 030 = 0,76mm
- 062 = 1,58mm
- 094 = 2,39mm
- 125 = 3,18mm
- 156 = 3,96mm

(for MG and MT style only)

- 095 = 2,79mm
- 125 = 3,56mm
- 156 = 4,45mm

## 625

Bore Depth, Groove Width,  
Flat on Thread  
shown as "L4, W"

Inch

Bore Depth

- 062 = .062"
- 187 = .187"
- 281 = .281"
- 312 = .312"
- 375 = .375"
- 500 = .500"
- 625 = .625"
- 875 = .875"

Groove Width  
(for MG style only)

- 030 = .030"
- 040 = .040"
- 050 = .050"

Thread  
(for MT style only)

- 60F2 = .002"
- Flat on 60° thread

Metric

Bore Depth

- 062 = 1,58mm
- 187 = 4,75mm
- 281 = 7,14mm
- 312 = 7,93mm
- 375 = 9,53mm
- 500 = 12,70mm
- 625 = 15,88mm
- 875 = 22,23mm

Groove Width  
(for MG style only)

- 030 = 0,76mm
- 040 = 1,02mm
- 050 = 1,27mm

Thread  
(for MT style only)

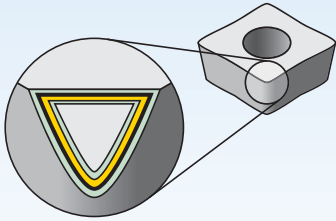
- 60F2 = 0,05mm
- Flat on 60° thread

## R

Hand  
of Tool

R =  
Right hand

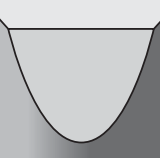
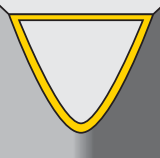
L =  
Left hand



Coatings provide high-speed capability and are engineered for finishing to light roughing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45		
Grade	 <b>CM1</b> <b>HW-S25</b>	Uncoated carbide. A very tough, ultra-fine grain unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Performs best at low speeds and will handle interruptions and high feed rates. Use when C2, C3, or C25 fail due to chipping or breaking.	<b>P</b>											
			<b>M</b>											
			<b>K</b>											
			<b>N</b>											
			<b>S</b>											
			<b>H</b>											
Grade	 <b>CG5</b> <b>HC-S25</b>	A PVD-TIN-coated grade. Straight 9.5% Co substrate. Submicron grain. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Performs best at low speeds and will handle interruptions and high feed rates.	<b>P</b>											
			<b>M</b>											
			<b>K</b>											
			<b>N</b>											
			<b>S</b>											
			<b>H</b>											



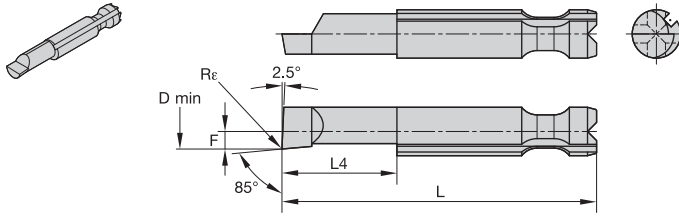
Material Group		Cutting Speed – vc SFM					
		CG5			CM1		
		min	Start	max	min	Start	max
P	ap [inch]	0.0008	-	0.008	0.0008	-	0.008
	f [inch]	0.0008	-	0.0028	0.0008	-	0.0028
	0/1	340	420	505	210	260	315
	2	230	280	340	145	175	215
	3	230	280	340	145	175	215
	4	175	220	265	115	140	170
	5	225	280	340	145	175	215
	6	150	185	225	100	120	145
M	ap [inch]	0.0008	-	0.008	0.0008	-	0.008
	f [inch]	0.0008	-	0.0028	0.0008	-	0.0028
	1	240	300	360	180	220	265
	2	220	270	325	160	200	240
	3	165	200	245	120	150	180
K	ap [inch]	0.0008	-	0.008	0.0008	-	0.008
	f [inch]	0.0008	-	0.0028	0.0008	-	0.0028
	1	195	245	295	155	190	230
	2	250	310	375	190	240	290
	3	180	225	270	140	175	210
N	ap [inch]	0.0008	-	0.020	0.0008	-	0.020
	f [inch]	0.0004	-	0.0035	0.0004	-	0.0035
	1	1320	1650	1980	1320	1650	1980
	2	970	1215	1455	970	1215	1455
	3	240	300	360	225	280	340
	4	455	570	685	325	405	490
	5	320	400	480	260	320	385
	6	320	400	480	260	320	385
	7	785	985	1180	780	975	1175
S	ap [inch]	0.0008	-	0.008	0.0008	-	0.008
	f [inch]	0.0008	-	0.0024	0.0008	-	0.0024
	1	90	105	130	175	215	260
	2	65	80	100	135	170	205
	3	105	130	160	90	110	135
	4	-	-	-	-	-	
H	ap [inch]	-	-	-	-	-	-
	f [inch]	-	-	-	-	-	-
	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
	4	-	-	-	-	-	

NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.



Material Group		Cutting Speed – vc m/min					
		CG5			CM1		
		min	Start	max	min	Start	max
P	ap [mm]	.001	-	.008	.001	-	.008
	f [mm/rev]	.0005	-	.007	.0005	-	.007
	0/1	105	130	155	65	80	100
	2	70	90	105	45	55	65
	3	70	90	105	45	55	65
	4	55	70	85	40	45	55
	5	70	90	105	45	55	70
M	6	50	60	70	35	40	45
	ap [mm]	.001	-	.008	.001	-	.008
	f [mm/rev]	.0005	-	.007	.0005	-	.007
	1	75	95	110	55	70	85
K	2	70	85	100	50	65	75
	3	55	65	80	40	50	55
	ap [mm]	.001	-	.010	.001	-	.010
	f [mm/rev]	.0005	-	.007	.0005	-	.007
N	1	65	80	95	50	60	75
	2	80	95	115	60	75	90
	3	55	70	85	45	55	65
	ap [mm]	.001	-	.025	.001	-	.025
	f [mm/rev]	.0005	-	.007	.0005	-	.007
	1	405	505	605	405	505	605
	2	300	370	445	300	370	445
	3	75	95	110	70	90	105
S	4	140	175	210	105	125	155
	5	100	125	150	80	100	120
	6	100	125	150	80	100	120
	7	240	300	360	240	300	360
	ap [mm]	.001	-	.008	.001	-	.008
H	f [mm/rev]	.001	-	.007	.001	-	.007
	1	30	35	40	55	70	85
	2	20	30	35	45	55	65
	3	35	40	50	30	35	45
	4	-	-	-	-	-	-
H	ap [mm]	-	-	-	-	-	-
	f [mm/rev]	-	-	-	-	-	-
	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
4	-	-	-	-	-	-	

NOTE: Speed and feed rates and depth of cut may vary depending on materials and machining conditions including, but not limited to, tool overhang, tool size, and finished surface requirements.



● first choice  
○ alternate choice

P	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
N	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

■ MB

Tools for Small Hole Boring

ISO catalog number	ANSI catalog number	D min		L4		L		F		Re		CG5	CM1
		mm	in	mm	in	mm	in	mm	in	mm	in		
right hand													
MB010062R	MB010062R	0,25	.010	1,58	.062	20,57	.810	0,09	.004	0,03	.001	2836098	2836095
MB062187R	MB062187R	1,58	.062	5,41	.213	21,92	.863	0,66	.026	0,05	.002	2836423	3885985
MB062312R	MB062312R	1,58	.062	7,93	.312	24,44	.962	0,66	.026	0,05	.002	2836418	2836263
MB094281R	MB094281R	2,39	.094	7,14	.281	23,65	.931	1,04	.041	0,05	.002	2836405	3857732
MB094500R	MB094500R	2,39	.094	12,70	.500	29,21	1.150	1,04	.041	0,05	.002	2836251	2836240
MB125625R	MB125625R	3,18	.125	15,88	.625	32,39	1.275	1,45	.057	0,10	.004	2836388	2836240
MB156500R	MB156500R	3,96	.156	12,70	.500	29,21	1.150	1,85	.073	0,10	.004	3885997	2836229
MB156875R	MB156875R	3,96	.156	22,23	.875	38,74	1.525	1,85	.073	0,10	.004	2836229	

(continued)

(MB – continued)

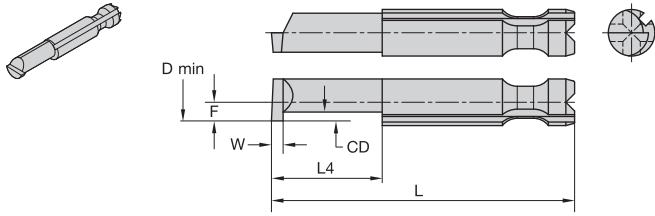
● first choice  
○ alternate choice

P	●	○
M	●	○
K	○	●
N	○	●
S	●	○
H		

ISO catalog number	ANSI catalog number	D min		L4		L		F		Rε		CG5	CM1
		mm	in	mm	in	mm	in	mm	in	mm	in		
left hand													
MB010062L	MB010062L	0,25	.010	1,58	.062	20,57	.810	0,09	.004	0,03	.001	3885960	3885959
MB030187L	MB030187L	0,76	.030	4,75	.187	21,26	.837	0,34	.014	0,03	.001	3885961	3885962
MB062187L	MB062187L	1,58	.062	5,41	.213	21,92	.863	0,66	.026	0,05	.002	3885983	3885984
MB062312L	MB062312L	1,58	.062	7,93	.312	24,44	.962	0,66	.026	0,05	.002	3885986	3885987
MB094281L	MB094281L	2,39	.094	7,14	.281	23,65	.931	1,04	.041	0,05	.002	3885989	3885991
MB094500L	MB094500L	2,39	.094	12,70	.500	29,21	1.150	1,04	.041	0,05	.002	3885990	3885991
MB125375L	MB125375L	3,18	.125	9,53	.375	26,04	1.025	1,45	.057	0,10	.004	3885992	3885993
MB125625L	MB125625L	3,18	.125	15,88	.625	32,39	1.275	1,45	.057	0,10	.004	3885994	3885995
MB156500L	MB156500L	3,96	.156	12,70	.500	29,21	1.150	1,85	.073	0,10	.004	3027643	3885996
MB156875L	MB156875L	3,96	.156	22,23	.875	38,74	1.525	1,85	.073	0,10	.004	3885998	3885999

NOTE: Actual bore depth for MB062187R and MB062187L equals 5,41mm.  
ANSI Catalog Number MB062187R and ANSI Catalog Number MB062187L have an actual bore depth of .213".

Tools for Small Hole Boring



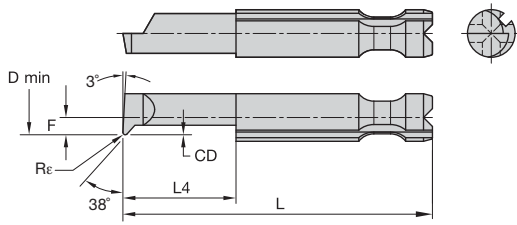
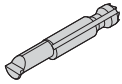
● first choice  
○ alternate choice

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M	<input checked="" type="checkbox"/>	<input type="checkbox"/>
K	<input type="checkbox"/>	<input checked="" type="checkbox"/>
N	<input type="checkbox"/>	<input checked="" type="checkbox"/>
S	<input checked="" type="checkbox"/>	<input type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>

■ MG

Tools for Small Hole Boring

ISO catalog number	ANSI catalog number	D min		L4		L		F		CD		W		CG5	CM1
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		
<b>right hand</b>															
MG095030R	MG095030R	2,79	.110	7,93	.312	24,44	.962	1,17	.046	0,76	.030	0,76	.030	I	2836223
MG125040R	MG125040R	3,56	.140	9,53	.375	26,04	1.025	1,55	.061	0,89	.035	1,02	.040	I	3897442
MG156050R	MG156050R	4,45	.175	12,70	.500	29,21	1.150	1,93	.076	1,27	.050	1,27	.050	I	2836210
<b>left hand</b>															
MG095030L	MG095030L	2,79	.110	7,93	.312	24,44	.962	1,17	.046	0,76	.030	0,76	.030	I	3886000
MG125040L	MG125040L	3,56	.140	9,53	.375	26,04	1.025	1,55	.061	0,89	.035	1,02	.040	I	3886002
MG156050L	MG156050L	4,45	.175	12,70	.500	29,21	1.150	1,93	.076	1,27	.050	1,27	.050	I	3886003
														I	3897483
														I	3897484



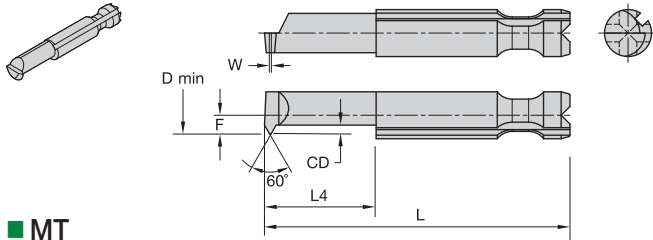
● first choice  
○ alternate choice

P	●	○
M	●	○
K	○	●
N	○	●
S	●	○
H	○	○

**MP**

ISO catalog number	ANSI catalog number	D min		L4		L		F		CD		Re		CG5	CM1
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		
<b>right hand</b>															
MP062187R	MP062187R	1,58	.062	4,75	.187	21,26	.837	0,66	.026	0,43	.017	0,10	.004	2836357	-
MP094281R	MP094281R	2,39	.094	7,14	.281	23,65	.931	1,07	.042	0,71	.028	0,10	.004	2836351 2836357	3897488
MP125375R	MP125375R	3,18	.125	9,53	.375	26,04	1.025	1,45	.057	1,02	.040	0,20	.008	2836345 2836357	2836190 2836184
MP156500R	MP156500R	3,96	.156	12,70	.500	29,21	1.150	1,85	.073	1,27	.050	0,20	.008	2836339	2836184
<b>left hand</b>															
MP062187L	MP062187L	1,58	.062	4,75	.187	21,26	.837	0,66	.026	0,43	.017	0,10	.004	-	3897486
MP094281L	MP094281L	2,39	.094	7,14	.281	23,65	.931	1,07	.042	0,71	.028	0,10	.004	3644074	3897487 3897486
MP125375L	MP125375L	3,18	.125	9,53	.375	26,04	1.025	1,45	.057	1,02	.040	0,20	.008	-	3897490
MP156500L	MP156500L	3,96	.156	12,70	.500	29,21	1.150	1,85	.073	1,27	.050	0,20	.008	3897491	3897492 3897490

Tools for Small Hole Boring



● first choice  
○ alternate choice

P	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

■ MT

Tools for Small Hole Boring

ISO catalog number	ANSI catalog number	D min		L4		L		F		CD		W		CG5	CM1
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		
<b>right hand</b>															
MT09560F2R	MT09560F2R	2,79	.110	7,93	.312	24,44	.962	1,17	.046	0,56	.022	0,05	.002	1	2836180
MT12560F2R	MT12560F2R	3,56	.140	9,53	.375	26,04	1.025	1,55	.061	0,69	.027	0,05	.002	2836328	3897497
MT15660F2R	MT15660F2R	4,45	.175	12,70	.500	29,21	1.150	1,93	.076	0,81	.032	0,05	.002	1	2836168
<b>left hand</b>															
MT09560F2L	MT09560F2L	2,79	.110	7,93	.312	24,44	.962	1,17	.046	0,56	.022	0,05	.002	3897493	3897494
MT12560F2L	MT12560F2L	3,56	.140	9,53	.375	26,04	1.025	1,55	.061	0,69	.027	0,05	.002	3897496	3897495
MT15660F2L	MT15660F2L	4,45	.175	12,70	.500	29,21	1.150	1,93	.076	0,81	.032	0,05	.002	3897498	3897499

**■ Insert Screws**

order number	ISO catalog number	ANSI catalog number	Torx/hex	internal thread
2840098	MSM46	MSM46	2 mm	M4X0.7
2840186	AS832/AS-8-32	AS832/AS-8-32	5/64	#8-32
2892513	BS832	BS832	5/64	—
2820981	LTM16	LTM16	T5	M2X0.4
2832647	CC11	CC11	T6	#1-72
2832635	CT11	CT11	T6	#1-72
2830477	FC11	FC11	T7	—
2828337	GT21	GT21	T7	#2-56
2825941	QTM20	QTM20	T7	M2.5X0.45
2825948	QTM26	QTM26	T7	M2.5X0.45
2826005	QC15	QC15	T8	#3-48
2826038	QC21	QC21	T9	#4-40
2823227	SC30	SC30	T10	#4-40
2823203	STM31	STM31	T15	M3.5 X 0.6
2832641	CT15	CT15	T16	#1-72

Tools for Small Hole Boring

**■ Wrenches**

order number	ISO catalog number	ANSI catalog number	Torx/hex
2840094	MKEY	MKEY	2.0 mm
2840174	AKEY	AKEY	5/64
2828318	GTKEY	GTKEY	T5
2832628	CKEY	CKEY	T6
2830492	FKEY	FKEY	T7
2825973	Q8KEY	Q8KEY	T8
2825982	QKEY	QKEY	T9
2823182	SKEY	SKEY	T10

**■ Drive Bits**

order number	ISO catalog number	ANSI catalog number	Torx/hex
2840089	MBIT	MBIT	2 mm
2832661	CBIT	CBIT	T6
2830497	FBIT	FBIT	T7
2825963	QTBIT	QTBIT	T7
2825964	Q8BIT	Q8BIT	T8
2826045	QBIT	QBIT	T9
2823236	SBIT	SBIT	T10
2823196	STBIT	STBIT	T15

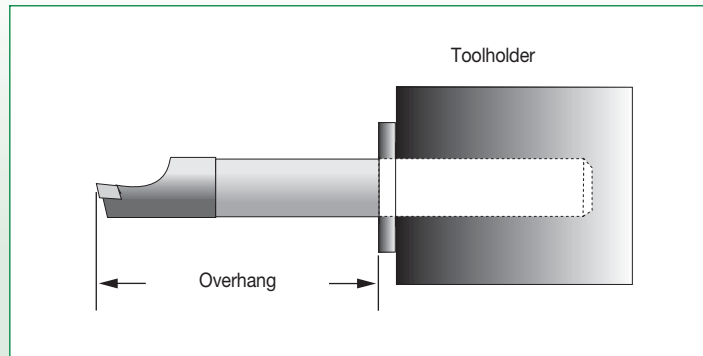
**■ Wedges**

order number	ISO catalog number	ANSI catalog number
2840192	AW250/AW-250	AW250/AW-250
2836024	BW312	BW312

### Setup Recommendations for Bar Overhang

WIDIA-CIRCLE™ cutting tools are the finest quality boring, grooving, profiling, and threading tools available. For more than 50 years, WIDIA-CIRCLE has been the industry leader in solving small-diameter hole machining problems in major manufacturing plants worldwide.

A common problem associated with any cutting tool is extending the tool beyond its support point. This condition of excessive overhang can cause chatter, poor finishes, or inadequate tool life.



We recommend a 4:1 ratio (4 times bar diameter) overhang when using steel shank bars and up to a 10:1 (10 times bar diameter) overhang when using carbide shank bars. The overhang ratios are affected by many factors:

- Type(s) of material(s) being machined.
- Depth of cut(s).
- Feed rate(s).

Recommended conditions may still be unsatisfactory because of chatter. Chatter can be induced by non-rigid setups or harmonics from the machine or machining conditions. In many cases, changing the RPM of the machine can reduce chatter.

shank diameter (inch)	steel shank ratio 4:1 (inch)	carbide shank ratio 10:1 (inch)
0.156"	0.625"	1.560"
0.187"	0.748"	1.187"
0.250"	1.000"	2.500"
0.375"	1.500"	3.750"
0.500"	2.000"	5.000"
0.625"	2.500"	6.250"
0.750"	3.000"	7.500"
0.875"	3.500"	8.750"
1.000"	4.000"	10.000"
1.250"	5.000"	12.500"

shank diameter (mm)	steel shank ratio 4:1 (mm)	carbide shank ratio 10:1 (mm)
4,00mm	16,00mm	40,00mm
5,00mm	20,00mm	50,00mm
6,00mm	24,00mm	60,00mm
8,00mm	32,00mm	80,00mm
10,00mm	40,00mm	100,00mm
12,00mm	48,00mm	120,00mm
16,00mm	64,00mm	160,00mm
20,00mm	80,00mm	200,00mm
25,00mm	100,00mm	250,00mm
32,00mm	128,00mm	320,00mm



### Setup Information and Recommendations

**Tool "D" (above centerline)**

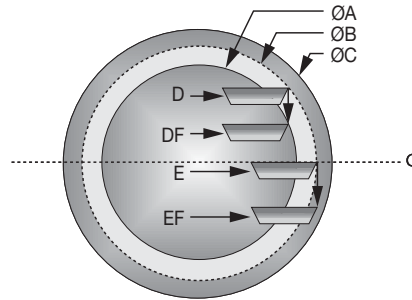
Set  $\varnothing B$  is deflected to position "DF," relieving the load by deflecting to a smaller bore,  $\varnothing A$ . Tool "D" cannot "dig in" because the cut (load) becomes lighter as it deflects.

**Tool "E" (on centerline or below)**

Set  $\varnothing B$  "digs in" and is deflected toward position "EF" and bore  $\varnothing C$ . The larger the load, the larger the deflection.

**Tip of the Insert**

This enables the end user to hold closer tolerances, produce a better finish, and avoid chatter.

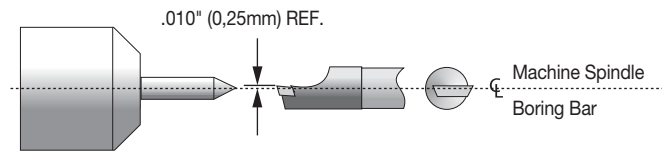


Built-in geometries of WIDIA-CIRCLE™ precision boring bars are based on the concept that the boring bar shank will always be positioned on the machine spindle centerline. The cutting point will be slightly high (against direction of rotation) except when facing centerline or cutting on outside diameters.

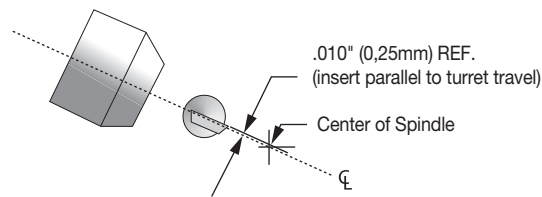
Use WIDIA-CIRCLE precision setup level or:

1. Use center height gage and position insert as shown in illustration.
2. If center point is unavailable, mark the center of the bar stock with a centering punch or square. Position the insert as shown in illustration.
3. Lay a straight edge on the insert to help position the insert parallel to the travel or centerline.

*NOTE: In some cases, to help reduce chatter or taper, the insert may need to be rotated less than .010" (0,25mm) but more than .002" (0,05mm) above center.*

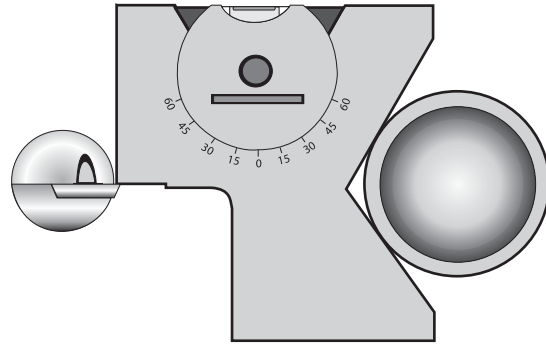


Slant Bed Machines

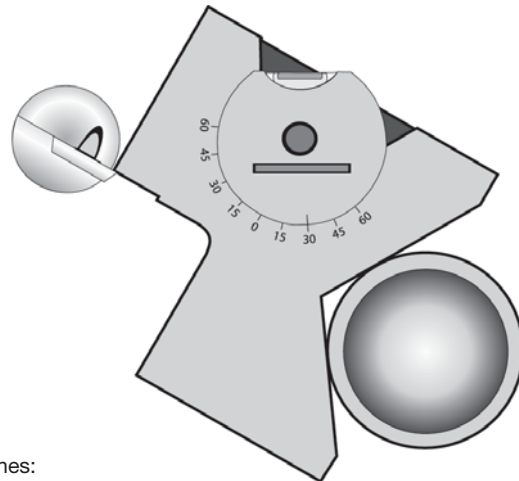




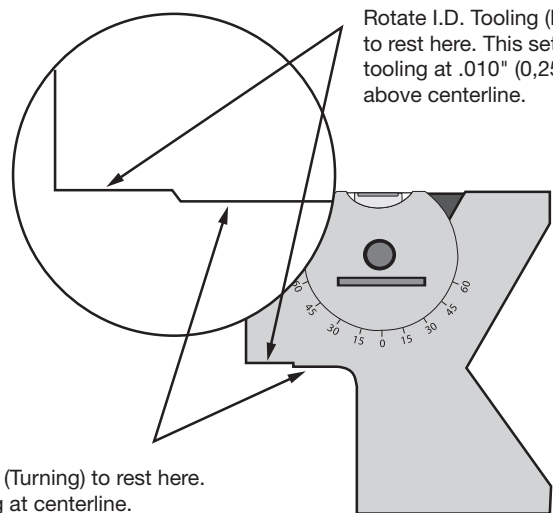
Uni-Level Precision Setup Level



For most machines:  
Set the dial to the 0° mark.



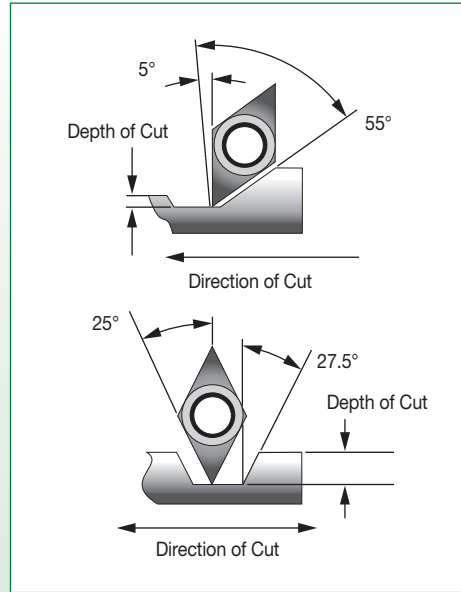
For slant bed-type machines:  
Set the dial to the degree of the bed.



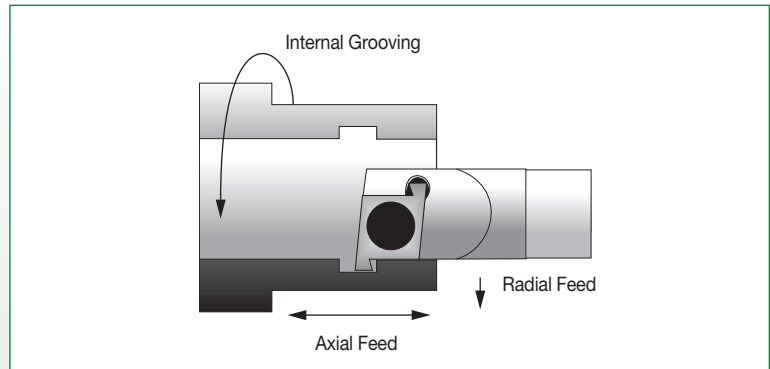
Rotate I.D. Tooling (Boring)  
to rest here. This sets the  
tooling at .010" (0,25mm)  
above centerline.

Rotate O.D. Tooling (Turning)  
to rest here.  
This sets the tooling at centerline.

**Setup Information and Recommendations for Boring and Profiling**



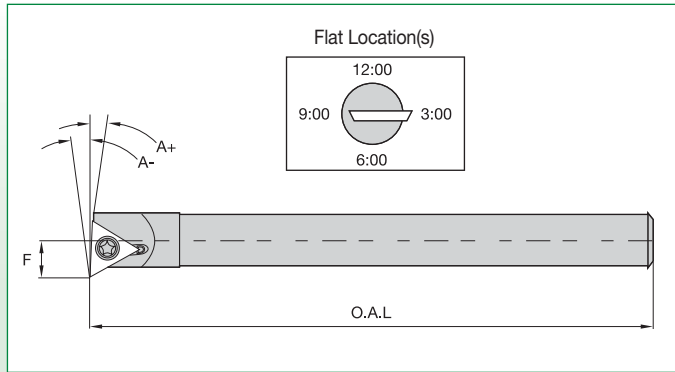
**Setup Information and Recommendations for Grooving**



■ **CDG Indexable-Type Grooving Inserts**

safe overhang conditions:	steel ratio 4:1 (inch)	carbide ratio 10:1 (inch)
surface footage(s):	see pages D72–D75	
radial feeds:	C-Series = .0003–.001" Q-Series = .0003–.002"	
axial feeds:	C-Series = .0005–.002" Q-Series = .0005–.005"	

For more than 50 years, WIDIA-CIRCLE™ has offered the most reliable, highest-quality small hole boring bars available. Although our extensive product line covers most machining applications, we understand that a custom solution tool may be required.



### Straight Shank-Type Boring Bars

Steel or Carbide

Date

#### Customer-Specified Dimensions

- = **O.A.L. (Overall Length)** From 3x bar diameter to catalog length.
- = **"F" Dimension** ±.010" (0,254mm) from basic dimension shown in catalog triangle insert bars only.
- = **"A" Dimension** +10° to -10° triangle insert bars only.
- = **Flat Location(s)** 1 Flat — no charge (see illustration above).

**Special Instructions**  
(please make any necessary notes or sketches in the box at right)

**Closest Catalog Standard**

**Customer**

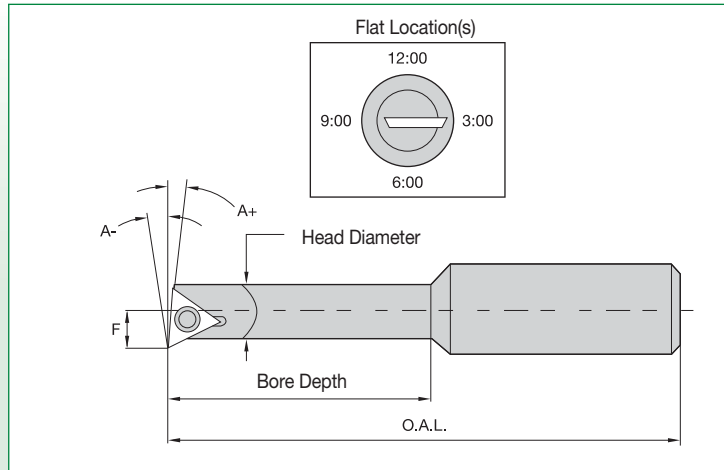
**Distributor**

**Shipping Requirements**

Ground       Next Day Air       2nd Day Air       3rd Day Air

*Attention Distributors: Use this worksheet to collect information for your customer.*

Use this worksheet to modify any of our existing products to meet your own specifications. If your special requirements do not fit any of these categories, contact us directly.



### Step-Down Shank-Type Boring Bars

Steel or Carbide

Date

#### Customer-Specified Dimensions

- = **Bore Depth** .750" (19,05mm) to 6x diameter steel; .750" (19,05mm) to 10x diameter carbide.
- = **O.A.L. (Overall Length)** Steel; smaller than O.A.L. listed in catalog carbide, bore depth, and standard sleeve length.
- = **"F" Dimension** ±.010" (0,254mm) from basic dimension shown in catalog triangle insert bars only.
- = **"A" Dimension** +10° to -10° triangle insert bars only.
- = **Flat Location(s)** 1 Flat — no charge (see illustration above).

**Special Instructions**  
(please make any necessary notes or sketches in the box at right)

**Closest Catalog Standard**

**Customer**

**Distributor**

**Shipping Requirements**

Ground       Next Day Air       2nd Day Air       3rd Day Air

*Attention Distributors: Use this worksheet to collect information for your customer.*



# WIDIA™ Victory™ High-Temp Turning

The new -FS and -MS geometries from WIDIA are specifically designed for use in high-temperature alloys, nickel-based (INCONEL®, Udimet®, Rene) materials, cobalt-based (Haynes®), Fe-based (Airmet 100) materials, titanium and titanium alloys, as well as difficult-to-machine stainless (460SS, duplex, high-alloy stainless), cobalt-chrome, and stainless-based powdered metals.

## ..GG-FS Geometry

- All ..GG-FS inserts are periphery ground to provide a G tolerance. This is a critical in some applications, especially in the aerospace industry.
- Precision grinding provides a high quality cutting edge which reduces depth-of-cut notching and delivers consistent surface quality in finishing applications.
- Be more productive by utilizing the higher speed capability provided by the latest in PVD coating technology and optimized post-coat treatment.
- Achieve better tool life through the high positive rake angle which reduces cutting forces and built-up edge.



# WIDIA™ Victory™ High-Temp Turning



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## ..MG-MS Geometry

- High positive rake angle delivers improved tool life by reducing cutting forces and built-up edge when machining high-temp alloys.
- Improved chip control and reduced crater wear due to proprietary chipbreakers with varying shapes and distances.
- Reduced thermal wear and cracking due to near sharp cutting edge with optimized edge treatment.
- Improved chipbreaking at various depths of cut due to variable land width, which improves impact strength.
- All MG-MS inserts are molded, which supports increased tool life due to the elimination of grinding stress.

To learn more, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA** 

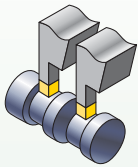




## Grooving and Cut-Off

Grooving and Cut-Off Platforms .....	E2-E3
WMT Grooving, Face Grooving, Cut-Off, and Profiling.....	E4-E40
TopGroove Shallow Grooving and Face Grooving .....	E42-E97
ProGroove Grooving and Cut-Off .....	E98-E112
Separator for Cut-Off .....	E113-E139
Ranger Face Grooving System .....	E140-E152

**Grooving**



**WMT™**

- Insert cutting widths: .079-.315" (2-8mm).
- O.D. cutting depths: .65-1" (16,5-25,4mm).
- I.D. boring bar minimum bore diameter: 2.25" (57,15mm).
- Screw-clamping integral shank/cartridge toolholders available.
- Geometry for deep grooving.

Pages:  
E4-E40



**TopGroove™**

- Insert cutting widths: .02-.25" (0,5-6,35mm).
- Insert cutting depths: .025-.50" (0,64-12,7mm).
- I.D. boring bar minimum bore diameter: .440" (11,2mm).
- Integral shank toolholders available.

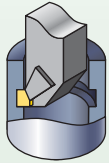
Pages:  
E42-E97



**ProGroove™**

- Insert cutting depths: .394-1.58" (10-40mm).
- Inserts enable precision sintered execution, good tolerances, and repeatability.
- Screw-clamping integral shank toolholders available.
- Grooving and O.D. turning.

Pages:  
E98-E109



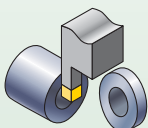
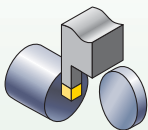
**LG**

- Insert cutting widths: .315-.630" (8-16mm).
- O.D. cutting depths: .787-1.26" (20-32mm).
- Wedge-clamping integral shank tooling available.

Pages:  
E110-E112



**Cut-Off**



**WMT**

- Cut-off widths: .059-.157" (1,5-4mm).
- Maximum cutting depth: .857" (22,2mm).
- Screw-clamping integral shank/cartridge toolholders available.
- Economical double-sided inserts for rigidity and dimensional accuracy.
- Right-/left-hand styles: 5° and 12° lead angles.

Pages:  
E4-E40



**Separator™**

- Cut-off widths: .079-.157" (2-4mm).
- Positive mechanical, self-clamping blades.
- Right-/left-hand style toolholders available.
- Single-edge inserts for maximum depth capacity.

Pages:  
E113-E139



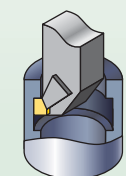
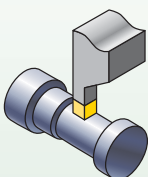
**ProGroove**

- Cut-off widths: .079-.315" (2-8mm).
- Single-edge inserts for maximum depth capacity.
- Right-/left-hand styles with 6° lead angles.
- Self-clamping blades/screw-clamping integral shank toolholders available.

Pages:  
E98-E109



**Plunge and Turn**



**WMT**

**Heavy Stock Removal in Turning Applications**

- Double-sided inserts, cutting widths: .079-.315" (2-8mm).
- O.D. cutting depths: .650-1" (16,5-25,4mm).
- I.D. boring bar minimum bore diameter: 2.25" (57,15mm).
- Screw-clamping integral shank/cartridge toolholders available.

Pages:  
E4-E40



**ProGroove**

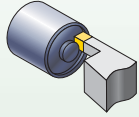
**For Light-Cutting Inserts**

- Cutting widths: .079-.315" (2-8mm).
- O.D. cutting depths: .394-1.58" (10-40mm).
- Single-edge inserts for maximum depth capacity.
- Screw-clamping integral shank toolholders available.

Pages:  
E98-E109



**Face Grooving**



**WMT™**

- Cutting widths: .118-.250" (3-6,35mm).
- Cutting depths: .5-1" (13-25,4mm).
- Minimum face groove diameter: 1.5-8" (38-205mm).

Pages:  
E4-E40



**TopGroove™**

- NF/NFD face groove insert range: .94-2.25" (24-57mm).
- Cutting width range for standard inserts: .079-.156" (0,8-9,5mm).
- Cutting depth range for standard inserts: .070-.500" (1,27-12,70mm).
- Cutting width range for NF/NFD face grooving inserts: .079-.25" (2-6,35mm).
- Standard insert minimum face groove diameter range: 2.125-13" (54,0-330mm).
- Cutting depth range for NF/NFD face grooving inserts: .060-.500" (1,52-12,70mm).
- Cutting depth range for NF: .060-.150" (1,52-3,81mm).
- Cutting depth range for NFD: .250-.500" (6,35-12,7mm).

Pages:  
E42-E97



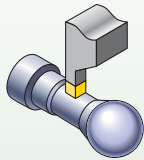
**Ranger™**

- Cutting widths: .126-.25" (3,18-6,35mm).
- Cutting depths: .75-1" (19-25,4mm).
- Minimum face groove O.D. diameter: 2.25-16" (57-400mm).
- Square right-angle shank and round shank toolholders available.
- Screw-clamping, adjustable cartridge toolholders with different widths and spindle rotations.

Pages:  
E140-E152



**Profiling**



**WMT**

**For Heavy Stock Removal**

- Full radius insert cutting widths: .118-.315" (3-8mm).
- O.D. cutting depths: .650-1" (16,5-25,4mm).
- Screw-clamping integral shank/cartridge toolholders available.

Pages:  
E4-E40



**TopGroove**

**Moderate/Heavy Stock Removal at Shallow Profile Depths**

- Full-radius insert cutting widths: .062-.250" (1,57-6,35mm).
- Insert cutting depths: .094-.250" (2,39-6,35mm).
- Integral shank toolholders and ERICKSON™ heads available.

Pages:  
E42-E97



**ProGroove™**

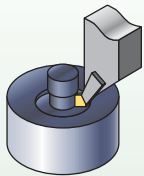
**For Light Cutting**

- Full-radius insert cutting widths: .118-.236" (3-6mm).
- O.D. cutting depths: .394-1.26" (10-32mm).
- Screw-clamping integral shank/cartridge toolholders available.

Pages:  
E98-E109



**Undercutting**



**TopGroove**

- Undercutting insert widths: .094-.157" (2,4-4mm).
- Economical double-ended inserts.

Pages:  
E42-E97



## WMT™ System •

One Platform for Grooving,  
Face Grooving, Cut-Off, and Profiling

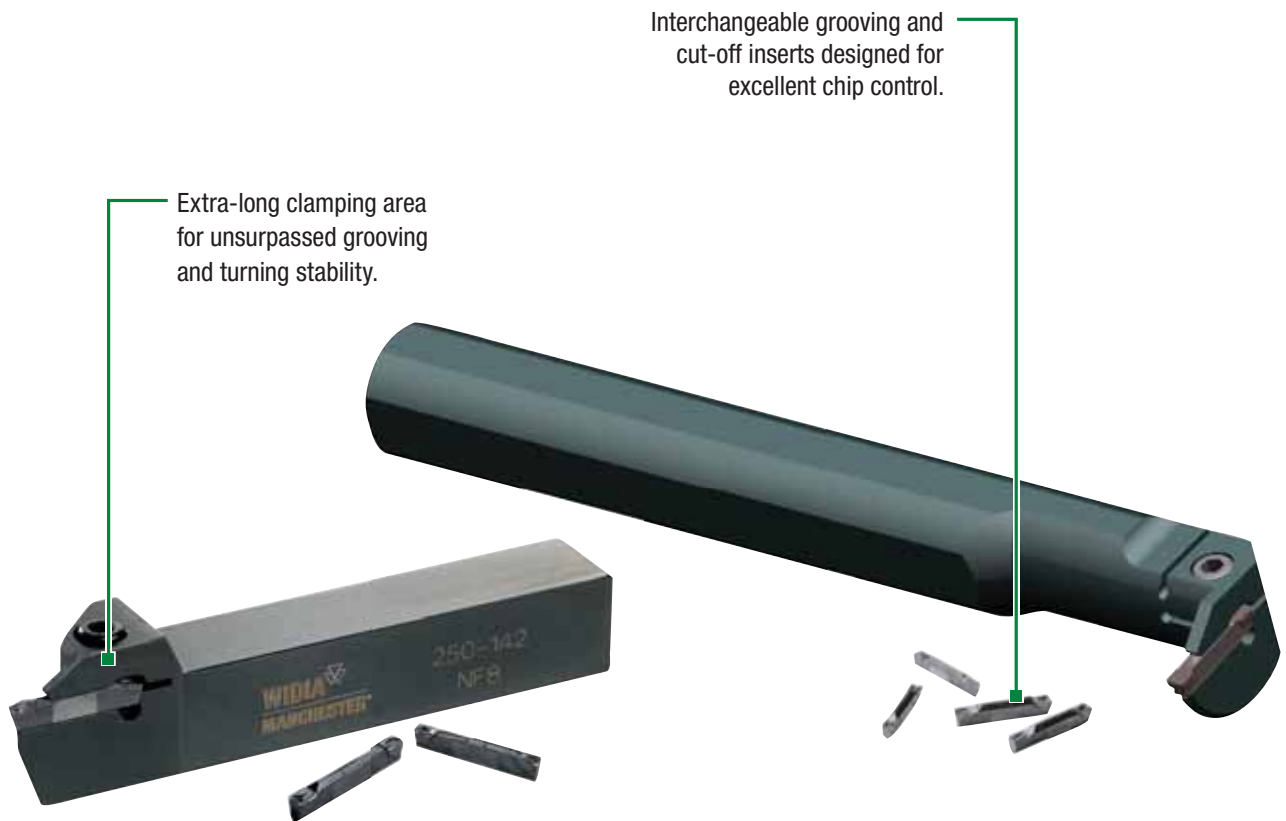
# WMT



The WMT platform is the economical and reliable option for all your grooving, cut-off, turning, and profiling applications. Trust the WMT system to ensure precise insert positioning and provide only the most accurate machining with exceptionally fast cycle times and superior performance.

### Versatile and Well-Constructed

- Specifically designed to increase speeds and feeds.
- Excellent geometry for even your most demanding deep grooving applications.
- The WMT system enables heavy stock removal in turning applications.
- Ensures finer surface finishes and a long, reliable tool life.



## WMT™ Toolholders

- Outstanding system rigidity and clamping capabilities.
- Guarantees fast cycle times and limited turret indexes.
- Precise insert positioning for accurate machining.
- Double-V shape means operator-friendly insert indexing and optimum insert positioning.
- Choice of integral or modular holders.



## The Most Advanced Turning Solutions in the Industry

For unsurpassed quality, value, and performance, look no further than the WIDIA™ comprehensive line of specially engineered and dependable grooving and cut-off solutions. All the tools you need from the reliable name you can trust!

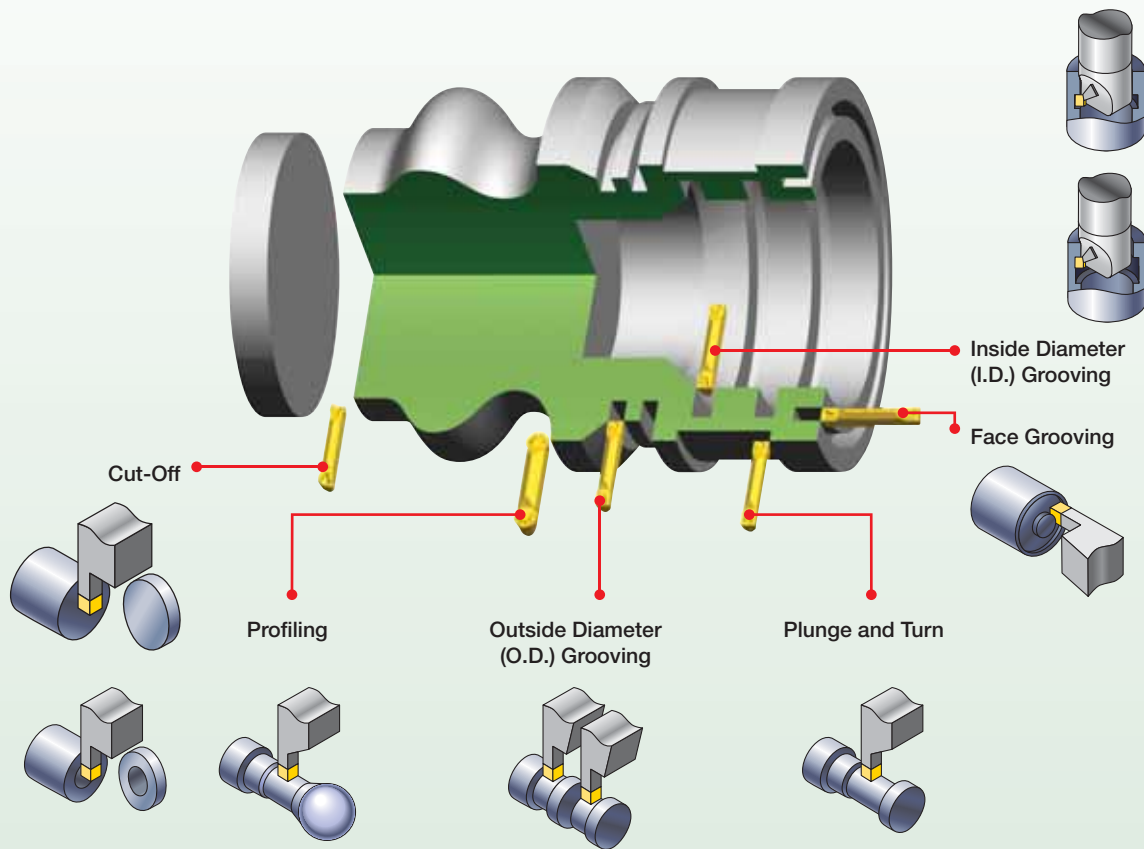
The WMT system, with its extra-long clamping area and precise insert positioning, ensures exceptionally fast and accurate machining, all-in-one tool, for your most demanding grooving, cut-off, turning, and profiling applications.

It is perfect for all general-purpose operations, including both shallow and deep grooving.

Utilize this handy, easy-to-use guide to identify and select the appropriate grooving and cut-off tools for your specific needs.

### 1 Choose the application to be performed:

Groove depth, width, and profile.



### 2 Identify the material to be machined:

Each tool has a material grid marked with a letter indicating the materials that can be machined.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

**3 Select your toolholder based on the application:**

- A** Choose the appropriate width "W" required for the application.
- B** Choose the shortest cutting depth "CD" dimension for increased tool rigidity.
- C** Select the largest toolholder shank "H" and "B" dimensions for maximum rigidity.

**WMT™ Turning, Grooving, and Cut-Off**  
Integral Toolholders

**■ O.D. Grooving and Cut-Off**

order number	catalog number	seat size	A	H	C	B	CD	D max	F	HG	L1	L2	clamp screw	clamp screw
right hand														
3059127	WMTSR181805	1	309	1,000	1,000	401	—	391	—	6,000	4,679		W0296	—
3059436	WMTCR62063	2	479	375	368	—	1,062	375	125	4,500	3,410		W0249	—
3059440	WMTCR62062	2	479	300	494	—	1,126	300	188	4,000	3,410		W0249	—
3059942	WMTSR102066	2	679	625	603	640	—	625	250	5,000	3,690		W0249	—
3059944	WMTSR122066	2	679	750	718	650	—	750	—	5,000	3,690		W0249	—
3059946	WMTSR102064	2	679	1,000	989	686	—	1,000	—	5,000	4,686		W0249	—
3055288	WMTCR62063	2S	384	375	365	—	1,062	375	125	4,500	3,410		W0249	—
3055292	WMTCR62062	2S	384	300	490	—	1,250	300	180	4,000	3,230		W0249	—
3055294	WMTSR102067S	2S	384	625	603	750	—	625	250	5,000	3,330		—	W1006
3055298	WMTSR122067S	2S	384	750	718	750	—	750	250	5,000	3,480		—	W1006
3059324	WMTSR122062	2S	694	750	718	625	—	750	—	5,000	3,690		—	W1006
3059328	WMTSR102067S	2S	694	1,000	989	750	—	1,000	—	5,000	4,330		—	W1006
3059330	WMTSR102044	2	125	625	603	440	—	625	—	5,000	3,690		—	W1006
3059300	WMTSR103067	3	125	625	603	675	—	625	250	5,000	3,350		—	W1006
3059306	WMTSR123067	3	125	750	718	675	—	750	250	5,000	3,350		—	W1006
3059316	WMTSR103044	3	125	1,000	989	440	—	1,000	—	4,000	4,690		—	W1006
3059318	WMTSR103067	3	125	1,000	989	675	—	1,000	—	5,000	4,375		—	W1006
3059320	WMTSR104067	4	138	1,000	989	675	—	1,000	—	5,000	4,375		—	W1006
3059326	WMTSR104044	4	138	625	603	440	—	625	—	5,000	3,690		—	W1006
3059332	WMTSR124044	4	138	750	718	440	—	750	—	5,000	3,690		—	W1006

	application	conventional toolholders	modular blades
	O.D. Grooving and Cut-Off	pages E30–E33	page E39
	Face Grooving	pages E34–E35	page E40
	I.D. Grooving	page E36	—
	Plunge and Turn	pages E30–E33	page E39

**4 Select chipbreaker style for the application:**

- CM** Cut-Off Medium
- CM-W** Cut-Off Medium with Wiper
- PT** Groove, Plunge, and Turn
- PC** Plunge and Contour
- PH** Groove, Plunge, and Turn

NOTE: Chart shows recommended starting feed rates.

**WMT™ Turning, Grooving, Cut-off, and Profiling**  
 Feed Values for Grooving Inserts

**CM Cut-Off Medium**

- Double-ended, V-bottom and top, mechanically clamped.
- Neutral, right-, and left-hand lead angles up to 12°.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.
- Ideal for 300 Series stainless steel, tool steel, titanium, INCONEL®, and other nickel-based alloys at moderate speeds and feeds.

**CM Cut-Off Medium with Wiper**

- Wiper flats where surface finish is critical.
- Double-ended, V-bottom, and top, mechanically clamped.
- Neutral, right-, and left-hand lead angles up to 12°.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.

**PT Grooving Inserts**

- High positive rake geometry for low cutting force, especially in soft materials.
- Deep grooving tool for plunge and turn O.D. and face grooving operations.
- Delivers chip control over full range of DOC when turning.
- Cuts in both axial and radial directions.

**PC Grooving and Profiling Inserts**

- Superior chip control.
- Full nose radius geometry for plunge and contour operations.
- Effective cutting edge geometry exceeds 180° for increased versatility.

**PH Plunging and Turning Inserts**

- Excellent performance in greater than 35 HRC.
- Deep grooving tool for plunge and turn O.D. and face grooving operations.
- Delivers chip control over full range of DOC when turning.
- Delivers superior chip control in interrupted cuts.

width of cut (in mm)	Feed Rate (mm/rev)
.062 (1.5 and 2.0)	0.007
.094 (2.3)	0.008
.125 (3.2)	0.010
.157 (4.0)	0.012

turn/profile lead (mm/rev)	Size 2	Size 3	Size 4	Size 5	Size 6	Size 7	Size 8
0.04	0.02	0.03	0.04	0.05	0.06	0.07	0.08
0.06	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.10	0.04	0.05	0.06	0.07	0.08	0.09	0.10
0.16	0.05	0.06	0.07	0.08	0.09	0.10	0.11

turn/profile lead (mm/rev)	Size 2	Size 3	Size 4	Size 5	Size 6
0.04	0.02	0.03	0.04	0.05	0.06
0.06	0.03	0.04	0.05	0.06	0.07
0.10	0.04	0.05	0.06	0.07	0.08
0.16	0.05	0.06	0.07	0.08	0.09

- A** Choose the appropriate insert width “W” for your specific application.
- B** Select the required corner radius value “RR”.

**WIDIA™**

**WMT™ Turning, Grooving, and Cut-Off**  
 Cut-Off Inserts

RR = RL on neutral inserts

catalog number	seat size	A W		B RR		LI	hand	WMT0CT	WMT25CT	WMT19PT	WMT25PT	WMT19PT
		mm	in	mm	in							
WMT015N00CM08	1	1.50	.059	0.08	.003	18.30	.760	N - Neutral	+	+	+	+
WMT020N00CM08	2	2.00	.079	0.08	.003	18.21	.756	N - Neutral	+	+	+	+
WMT024N00CM13	25	2.39	.094	0.13	.005	22.32	.879	N - Neutral	+	+	+	+
WMT030N00CM17	3	3.00	.118	0.17	.007	25.38	.999	N - Neutral	+	+	+	+

Legend: P (blue), M (yellow), K (red), N (green), S (orange), H (grey). Symbols: ● (first choice), ○ (alternate choice).



5 Select grade:

Grooving cutting condition		Recommended Grades					
		steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
heavily interrupted cut		WU25PT	WU25PT	WU25PT	WU25PT	WU25PT	-
lightly interrupted cut		WP25CT/ WU25PT	WU25PT	WP25CT/ WU25PT	WU25PT	WU25PT	-
varying depth of cut, casting, or forging skin		WU10PT	WU10PT	WP10CT/ WU10PT	WU10PT	WU10HT/ WU10PT	WU10PT
smooth cut, pre-turned surface		WP10CT/ WU10PT	WU10PT	WP10CT/ WU10PT	WU10PT	WU10HT/ WU10PT	WU10PT

Cut-Off cutting condition		Recommended Grades					
		steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
heavily interrupted cut		WU25PT	WU25PT	WU25PT	WU25PT	WU25PT	-
lightly interrupted cut		WU25PT	WU25PT	WU25PT	WU25PT	WU25PT	-
varying depth of cut, casting, or forging skin		WU25PT	WU25PT	WU25PT	WU25PT	WU25PT	WU25PT
smooth cut, pre-turned surface		WU25PT	WU25PT	WU25PT	WU25PT	WU25PT	WU25PT

NOTE: See page E11 for Grades and Grade Descriptions.

6 Determine cutting data:

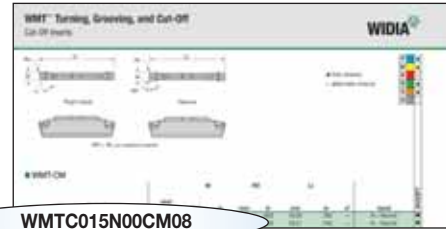
- A Based on material group and grade, identify starting speed (vc).
- B First choice starting speed is in **bold**.

NOTE: See pages E13-E14 for cutting data.

Material Group		Cutting Speed – vc m/min																	
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT					
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max			
P	0/1	100	100	110	190	200	210	170	<b>175</b>	180	210	225	240	170	175	180			
	2	95	95	105	180	185	190	150	160	170	210	220	230	185	195	205			
	3	95	95	105	180	185	190	150	160	170	210	220	230	185	195	205			
	4	70	70	75	165	170	175	130	145	155	140	145	155	125	125	130			
	5	85	90	95	170	175	180	140	150	160	180	190	195	155	165	170			
	6	50	50	50	140	150	160	120	125	130	70	75	80	70	75	80			
M	1	70	75	80	120	125	130	120	125	130	-	-	-	-	-				
	2	50	50	50	100	100	110	70	75	80	-	-	-	-	-				
K	1	85	90	95	190	200	210	155	165	170	215	225	235	180	190	195			
	2	75	75	80	185	190	200	155	165	175	205	215	225	175	185	195			
	3	70	75	80	170	175	180	140	150	160	210	225	240	190	200	210			
N	1	70	75	80	140	150	160	110	120	130	-	-	-	-	-				
	2	70	75	80	140	150	160	110	120	130	-	-	-	-	-				
	3	70	75	80	140	150	160	110	120	130	-	-	-	-	-				
	4	70	75	80	140	150	160	110	120	130	-	-	-	-	-				
	5	70	75	80	140	150	160	110	120	130	-	-	-	-	-				
	6	70	75	80	140	150	160	110	120	130	-	-	-	-	-				
	7	70	75	80	140	150	160	110	120	130	-	-	-	-	-				
S	1	20	25	30	70	75	80	50	55	60	-	-	-	-	-				
	2	20	25	30	65	65	70	50	50	50	-	-	-	-	-				
	3	50	50	50	100	100	110	70	75	80	-	-	-	-	-				
	4	-	-	-	70	75	80	50	50	50	-	-	-	-	-				

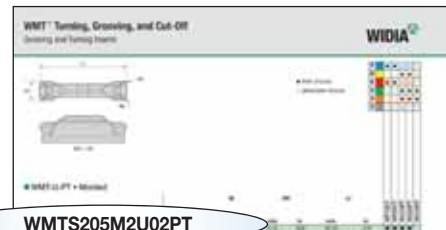
## WMT Identification System

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



WMT C015 N00 CM08

Cut-Off						
<b>WMT</b>	<b>C</b>	<b>015</b>	<b>N</b>	<b>00</b>	<b>CM</b>	<b>08</b>
Tooling System	Cut-Off	W in mm* 10 inch* 1000	Hand of Insert	Main Cutting Edge Lead Angle	Chipbreaker Geometry <b>CM</b> = Cut-Off Medium <b>CM-W</b> = Cut-Off Medium with Wiper	Corner Radius in mm* 10



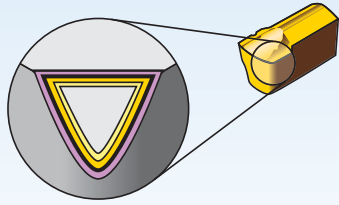
WMT S205 M2U02 PT

Groove, Plunge, Turn, and Contour Inserts							
<b>WMT</b>	<b>S</b>	<b>205</b>	<b>M</b>	<b>2</b>	<b>U</b>	<b>02</b>	<b>PT</b>
Tooling System	Square	mm* 10 inch* 1000	Unit of Measurement for Width <b>M</b> = mm <b>I</b> = inch	Seat Size	Insert Tolerance	Corner Radius in mm* 10	Chipbreaker Geometry <b>PT</b> = Groove, Plunge, and Turn <b>PH</b> = Groove Plunge, and Turn <b>PC</b> = Plunge and Contour

**P** = Precision ground grooving  
width tolerance:  
± .001" (0,025mm)

**U** = Utility molded grooving  
width tolerance:

3,05–4,05:	$\frac{+.006"}{-0}$	$\frac{(+0,15mm)}{-0}$
5,05–10,05:	$\frac{+.010"}{-0}$	$\frac{(+0,25mm)}{-0}$



Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45	
WU10PT		An advanced PVD-TiAlN coating over a very deformation-resistant unalloyed carbide substrate. The WU10PT™ grade's new and improved coating enables speeds to be increased by 50–100%. The WU10PT grade is ideal for finishing to general machining of most workpiece materials at higher speeds. Excellent for machining most steels, stainless steels, cast irons, non-ferrous materials, and super alloys under stable conditions. It also performs well machining hardened and short chipping materials.	<b>P</b>										
	<b>HC-P15</b>		<b>M</b>										
			<b>K</b>										
			<b>N</b>										
			<b>S</b>										
			<b>H</b>										
WU25PT		An advanced PVD-TiAlN-coated grade with a tough, ultra-fine-grain, unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temperature alloys, titanium, irons, and non-ferrous materials. Speeds may vary from low to medium and will handle interruptions and high feed rates.	<b>P</b>										
	<b>HC-P30</b>		<b>M</b>										
			<b>K</b>										
			<b>N</b>										
			<b>S</b>										
			<b>H</b>										
WU10HT		A hard, low binder content, unalloyed WC/Co fine-grained uncoated grade. Exceptional edge wear resistance combined with very high strength for machining titanium, cast irons, austenitic stainless steels, non-ferrous metals, non-metals, and most high-temperature alloys. Superior thermal deformation and depth-of-cut notch resistance. The grain structure is well controlled for minimal pits and flaws, which contributes to long, reliable service.	<b>M</b>										
	<b>HW-K15</b>		<b>K</b>										
			<b>N</b>										
			<b>S</b>										
			<b>H</b>										
WP10CT		A specially engineered, proprietary, cobalt-enriched carbide grade with thick K-MTCVD-TiCN coating layer, an Al <sub>2</sub> O <sub>3</sub> layer of controlled grain size, and outer layers of TiCN and TiN for maximum wear resistance. An excellent finishing to medium machining grade for a variety of workpiece materials including most steels, ferritic and martensitic stainless steels, and cast irons. The specially engineered cobalt-enriched substrate offers a balanced combination of deformation resistance and edge toughness, while the thick coating layers offer outstanding abrasion resistance and crater wear resistance for high-speed machining. The smooth coating provides good resistance to edge build-up and microchipping and produces excellent surface finishes.	<b>P</b>										
	<b>HC-P10</b>		<b>M</b>										
			<b>K</b>										
			<b>N</b>										
			<b>S</b>										
WP25CT		A tough cobalt-enriched carbide grade with a newly designed multilayer K-MTCVD TiCN-Al <sub>2</sub> O <sub>3</sub> -TiCN/TiN coating with superior interlayer adhesion. This is the industry's best general-purpose turning grade for most steels and ferritic and martensitic stainless steels. The substrate design, with cobalt-enrichment, ensures adequate deformation resistance along with excellent bulk toughness and insert edge strength. The coating layers offer good wear resistance over a wide range of machining conditions. The smoothness of the coating leads to reduced frictional heat, minimizes microchipping, and improves workpiece surface finishes.	<b>P</b>										
	<b>HC-P25</b>		<b>M</b>										
			<b>K</b>										
			<b>N</b>										
			<b>S</b>										

**CM Cut-Off Medium**

- Double-ended, V-bottom and top, mechanically clamped.
- Neutral, right-, and left-hand lead angles up to 12°.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.
- Ideal for 300 Series stainless steel, tool steel, titanium, INCONEL®, and other nickel-based alloys at moderate speeds and feeds.



**CM-W Cut-Off Medium with Wiper**

- Wiper flats where surface finish is critical.
- Double-ended, V-bottom, and top, mechanically clamped.
- Neutral, right-, and left-hand lead angles up to 12°.
- Designed to increase speed and feed.
- Chip geometry designed for excellent chip control and minimized cutting pressure on various materials.



**PT Plunge, Groove, and Turn Inserts**

- High positive rake geometry for low cutting force, especially in soft materials.
- Deep grooving tool for plunge and turn O.D. and face grooving operations.
- Delivers chip control over full range of DOC when turning.
- Cuts in both axial and radial directions.



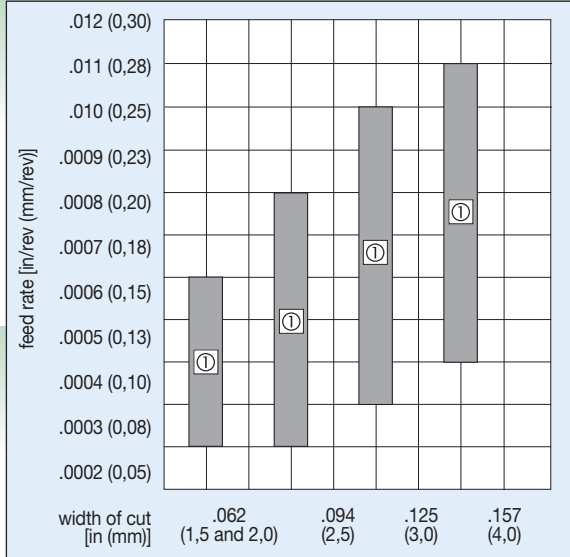
**PC Grooving and Profiling Inserts**

- Superior chip control.
- Full nose radius geometry for plunge and contour operations.
- Effective cutting edge geometry exceeds 180° for increased versatility.

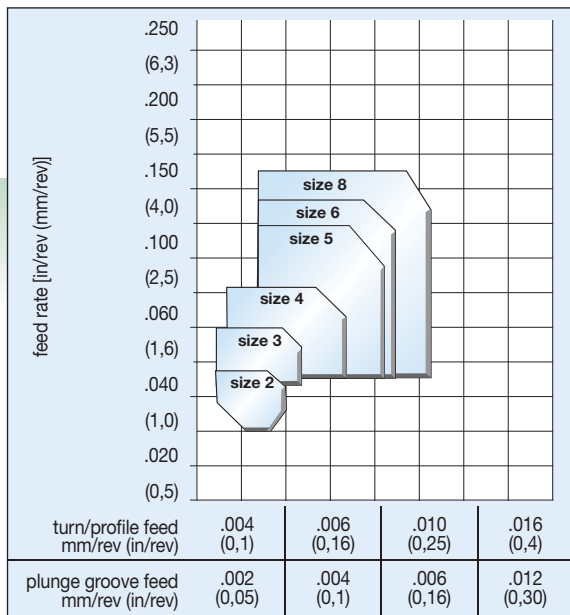
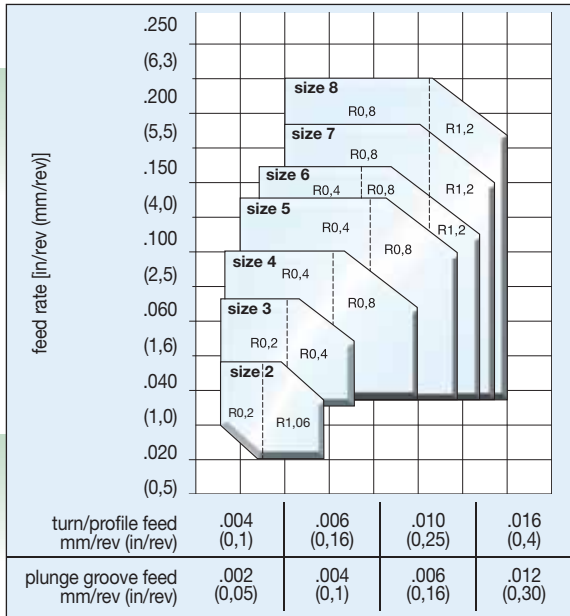


**PH Plunge, Groove, and Turn Inserts**

- Excellent performance in greater than 35 HRC.
- Deep grooving tool for plunge and turn O.D. and face grooving operations.
- Delivers chip control over full range of DOC when turning.
- Delivers superior chip control in interrupted cuts.



① Recommended Starting Feed



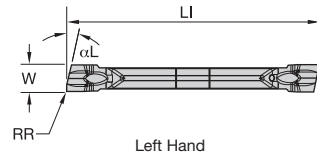
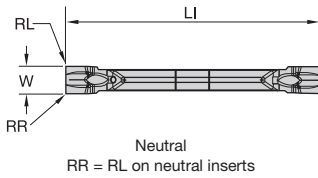
Material Group		Cutting Speed – vc m/min														
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	0/1	100	<b>100</b>	110	190	<b>200</b>	210	170	<b>175</b>	180	210	<b>225</b>	240	170	<b>175</b>	180
	2	95	<b>95</b>	105	180	<b>185</b>	190	150	<b>160</b>	170	210	<b>220</b>	230	185	<b>195</b>	205
	3	95	<b>95</b>	105	180	<b>185</b>	190	150	<b>160</b>	170	210	<b>220</b>	230	185	<b>195</b>	205
	4	70	<b>70</b>	75	165	<b>170</b>	175	135	<b>145</b>	155	140	<b>145</b>	155	125	<b>125</b>	135
	5	85	<b>90</b>	95	170	<b>175</b>	180	140	<b>150</b>	160	180	<b>190</b>	195	155	<b>165</b>	170
	6	50	<b>50</b>	50	140	<b>150</b>	160	120	<b>125</b>	130	70	<b>75</b>	80	70	<b>75</b>	80
M	1	70	<b>75</b>	80	120	<b>125</b>	130	120	<b>125</b>	130	-	-	-	-	-	-
	2	50	<b>50</b>	50	100	<b>100</b>	110	70	<b>75</b>	80	-	-	-	-	-	-
	3	50	<b>50</b>	50	95	<b>100</b>	105	85	<b>90</b>	95	-	-	-	-	-	-
K	1	85	<b>90</b>	95	190	<b>200</b>	210	155	<b>165</b>	170	215	<b>225</b>	235	180	<b>190</b>	195
	2	75	<b>75</b>	80	185	<b>190</b>	200	155	<b>165</b>	175	205	<b>215</b>	225	175	<b>185</b>	195
	3	70	<b>75</b>	80	170	<b>175</b>	180	140	<b>150</b>	160	210	<b>225</b>	240	190	<b>200</b>	210
N	1	70	<b>75</b>	80	140	<b>150</b>	160	110	<b>120</b>	130	-	-	-	-	-	-
	2	70	<b>75</b>	80	140	<b>150</b>	80	110	<b>120</b>	80	-	-	-	-	-	-
	3	70	<b>75</b>	80	140	<b>150</b>	80	110	<b>120</b>	80	-	-	-	-	-	-
	4	70	<b>75</b>	80	140	<b>150</b>	80	110	<b>120</b>	80	-	-	-	-	-	-
	5	70	<b>75</b>	80	140	<b>150</b>	80	110	<b>120</b>	80	-	-	-	-	-	-
	6	70	<b>75</b>	80	140	<b>150</b>	80	110	<b>120</b>	80	-	-	-	-	-	-
	7	70	<b>75</b>	80	140	<b>150</b>	120	110	<b>120</b>	105	-	-	-	-	-	-
S	1	20	<b>25</b>	30	70	<b>75</b>	80	60	<b>65</b>	65	-	-	-	-	-	-
	2	20	<b>25</b>	30	65	<b>65</b>	70	50	<b>50</b>	50	-	-	-	-	-	-
	3	50	<b>50</b>	50	100	<b>100</b>	110	70	<b>75</b>	80	-	-	-	-	-	-
	4	-	-	-	70	<b>75</b>	80	50	<b>50</b>	50	-	-	-	-	-	-
H	1	-	-	-	15	<b>30</b>	60	15	<b>30</b>	60	-	-	-	-	-	-
	2	-	-	-	15	<b>30</b>	60	15	<b>30</b>	60	-	-	-	-	-	-
	3	-	-	-	15	<b>30</b>	60	15	<b>30</b>	60	-	-	-	-	-	-
	4	-	-	-	15	<b>30</b>	60	15	<b>30</b>	60	-	-	-	-	-	-



Grooving and Cut-Off

Grooving and Cut-Off

Material Group		Cutting Speed – vc SFM														
		WU10HT			WU10PT			WU25PT			WP10CT			WP25CT		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
<b>P</b>	0/1	290	<b>300</b>	320	620	<b>650</b>	680	520	<b>550</b>	580	670	<b>700</b>	740	590	<b>625</b>	660
	2	310	<b>325</b>	345	570	<b>600</b>	630	520	<b>545</b>	575	680	<b>720</b>	760	595	<b>625</b>	655
	3	310	<b>325</b>	345	570	<b>600</b>	630	520	<b>545</b>	575	680	<b>720</b>	760	595	<b>625</b>	655
	4	195	<b>205</b>	220	520	<b>545</b>	575	475	<b>495</b>	520	445	<b>470</b>	495	385	<b>405</b>	430
	5	265	<b>275</b>	290	520	<b>550</b>	580	480	<b>500</b>	530	580	<b>615</b>	645	510	<b>540</b>	565
	6	120	<b>125</b>	130	480	<b>500</b>	530	430	<b>450</b>	470	260	<b>275</b>	290	240	<b>250</b>	260
<b>M</b>	1	240	<b>250</b>	260	430	<b>450</b>	470	400	<b>425</b>	450	-	-	-	-	-	-
	2	140	<b>150</b>	160	310	<b>325</b>	340	290	<b>300</b>	320	-	-	-	-	-	-
	3	155	<b>165</b>	170	310	<b>325</b>	340	285	<b>300</b>	315	-	-	-	-	-	-
<b>K</b>	1	240	<b>250</b>	265	595	<b>625</b>	660	550	<b>575</b>	605	690	<b>725</b>	760	595	<b>625</b>	655
	2	225	<b>235</b>	245	610	<b>640</b>	675	555	<b>585</b>	615	665	<b>700</b>	735	570	<b>600</b>	630
	3	240	<b>250</b>	260	520	<b>550</b>	580	480	<b>500</b>	530	710	<b>750</b>	790	620	<b>650</b>	680
<b>N</b>	1	240	<b>250</b>	260	480	<b>500</b>	530	380	<b>400</b>	420	-	-	-	-	-	-
	2	240	<b>250</b>	260	480	<b>500</b>	530	380	<b>400</b>	420	-	-	-	-	-	-
	3	240	<b>250</b>	260	480	<b>500</b>	530	380	<b>400</b>	420	-	-	-	-	-	-
	4	240	<b>250</b>	260	480	<b>500</b>	530	380	<b>400</b>	420	-	-	-	-	-	-
	5	240	<b>250</b>	260	480	<b>500</b>	530	380	<b>400</b>	420	-	-	-	-	-	-
	6	240	<b>250</b>	260	480	<b>500</b>	530	380	<b>400</b>	420	-	-	-	-	-	-
	7	240	<b>250</b>	260	480	<b>500</b>	530	380	<b>400</b>	420	-	-	-	-	-	-
<b>S</b>	1	110	<b>115</b>	120	235	<b>250</b>	265	215	<b>225</b>	235	-	-	-	-	-	-
	2	55	<b>60</b>	60	195	<b>210</b>	220	195	<b>210</b>	220	-	-	-	-	-	-
	3	190	<b>200</b>	210	310	<b>325</b>	340	290	<b>300</b>	320	-	-	-	-	-	-
	4	100	<b>100</b>	110	-	-	-	-	-	-	-	-	-	-	-	-
<b>H</b>	1	-	-	-	60	<b>100</b>	200	60	<b>100</b>	200	-	-	-	-	-	-
	2	-	-	-	60	<b>100</b>	200	60	<b>100</b>	200	-	-	-	-	-	-
	3	-	-	-	60	<b>100</b>	200	60	<b>100</b>	200	-	-	-	-	-	-
	4	-	-	-	60	<b>100</b>	200	60	<b>100</b>	200	-	-	-	-	-	-



● first choice  
○ alternate choice

P	●	●	○	○	
M	●	●	○	○	
K	●	●	○	○	
N	●	●	○	○	
S	●	●	○	○	
H	○	○	○	○	

**WMT-CM**

catalog number	seat size	W		RR		LI		hand	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in						
WMTC015N00CM08	1	1,50	.059	0,08	.003	19,30	.760	N - Neutral	●	●	○	○	○
WMTC020N00CM08	2	2,00	.079	0,08	.003	19,21	.756	N - Neutral	●	●	○	○	○
WMTC094N00CM13	2B	2,39	.094	0,13	.005	22,32	.879	N - Neutral	●	●	○	○	○
WMTC030N00CM17	3	3,00	.118	0,17	.007	25,40	1.000	N - Neutral	●	●	○	○	○
WMTC125N00CM17	3	3,17	.125	0,17	.007	25,41	1.000	N - Neutral	●	●	○	○	○
WMTC040N00CM17	4	4,00	.157	0,17	.007	25,40	1.000	N - Neutral	●	●	○	○	○

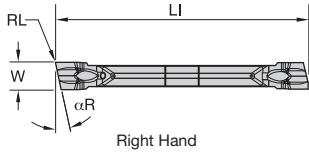
  

catalog number	seat size	W		RR		LI		αL	hand	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in							
WMTC015L05CM08	1	1,50	.059	0,08	.003	19,31	.760	5	L - Left	●	●	○	○	○
WMTC020L05CM08	2	1,99	.079	0,08	.003	19,21	.756	5	L - Left	●	●	○	○	○
WMTC020L12CM08	2	2,00	.079	0,08	.003	19,25	.758	12	L - Left	●	●	○	○	○
WMTC030L12CM17	3	3,00	.118	0,17	.007	25,40	1.000	12	L - Left	●	●	○	○	○
WMTC030L05CM17	3	3,00	.118	0,17	.007	25,40	1.000	5	L - Left	●	●	○	○	○
WMTC040L12CM17	4	4,00	.157	0,17	.007	25,40	1.000	12	L - Left	●	●	○	○	○
WMTC040L05CM17	4	4,00	.157	0,17	.007	25,40	1.000	5	L - Left	●	●	○	○	○

(continued)

Grooving and Cut-Off

(WMT-CM – continued)



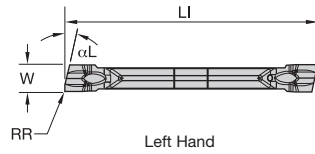
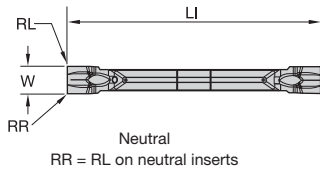
● first choice  
○ alternate choice

P	●	●	○	○
M	●	●	○	○
K	●	●	○	○
N	●	●	○	○
S	●	●	○	○
H	○	○	○	○

Grooving and Cut-Off

catalog number	seat size	W		RL		LI		αR	hand	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in							
WMTC015R12CM08	1	1,50	.059	0,08	.003	19,28	.759	12	R - Right	■	■	■	4169672	4169672
WMTC015R05CM08	1	1,50	.059	0,08	.003	19,31	.760	5	R - Right	■	■	■	4169670	4169670
WMTC020R05CM08	2	2,00	.079	0,08	.003	19,26	.758	5	R - Right	■	■	■	4169675	4169675
WMTC020R12CM08	2	2,00	.079	0,08	.003	19,26	.758	12	R - Right	■	■	■	4169678	4169678
WMTC094R12CM13	2B	2,39	.094	0,13	.005	22,28	.877	12	R - Right	■	■	■	4169580	4169580
WMTC094R05CM13	2B	2,39	.094	0,13	.005	22,32	.879	5	R - Right	■	■	■	4169578	4169578
WMTC030R05CM17	3	3,00	.118	0,17	.007	25,40	1.000	5	R - Right	■	■	■	4169684	4169684
WMTC030R12CM17	3	3,00	.118	0,17	.007	25,40	1.000	12	R - Right	■	■	■	4169688	4169688
WMTC125R05CM17	3	3,17	.125	0,17	.007	25,40	1.000	5	R - Right	■	■	■	4169664	4169664
WMTC125R12CM17	3	3,18	.125	0,17	.007	25,40	1.000	12	R - Right	■	■	■	4169666	4169666
WMTC040R12CM17	4	4,00	.157	0,17	.007	25,40	1.000	12	R - Right	■	■	■	4169696	4169696
WMTC040R05CM17	4	4,00	.157	0,17	.007	25,40	1.000	5	R - Right	■	■	■	4169694	4169694





● first choice  
○ alternate choice

P	●	●	○	○
M	●	●	○	○
K	●	●	○	○
N	●	●	●	●
S	●	●	●	●
H	○	○	○	○

■ **WMT-CM-W**

catalog number	seat size	W		RR		LI		hand	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in						
WMTC015N00CMW08	1	1,50	.059	0,08	.003	19,30	.760	N - Neutral	✓	✓	✓	4169669	✓
WMTC020N00CMW08	2	2,00	.079	0,08	.003	19,21	.756	N - Neutral	✓	✓	✓	4169674	✓
WMTC094N00CMW13	2B	2,39	.094	0,13	.005	22,32	.879	N - Neutral	✓	✓	✓	4169577	✓
WMTC030N00CMW17	3	3,00	.118	0,17	.007	25,40	1.000	N - Neutral	✓	✓	✓	4169683	✓
WMTC125N00CMW17	3	3,18	.125	0,17	.007	25,41	1.000	N - Neutral	✓	✓	✓	4169663	✓
WMTC040N00CMW17	4	4,00	.157	0,17	.007	25,40	1.000	N - Neutral	✓	✓	✓	4169693	✓

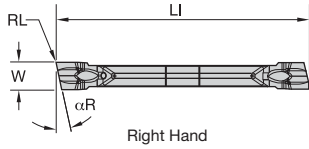
catalog number	seat size	W		RR		LI		alpha L	hand	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in							
WMTC020L12CMW08	2	2,00	.079	0,08	.003	19,27	.758	12	L - Left	✓	✓	✓	4169681	✓
WMTC030L12CMW17	3	3,00	.118	0,17	.007	25,40	1.000	12	L - Left	✓	✓	✓	4169691	✓
WMTC030L05CMW17	3	3,00	.118	0,17	.007	25,40	1.000	5	L - Left	✓	✓	✓	4169687	✓

(continued)



Grooving and Cut-Off

(WMT-CM-W – continued)

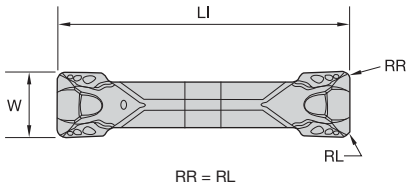


● first choice  
○ alternate choice

P	●	●	○	○
M	●	●	○	○
K	●	●	○	○
N	●	●	○	○
S	●	●	○	○
H	○	○	○	○

Grooving and Cut-Off

catalog number	seat size	W		RL		LI		αR	hand	WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in							
WMTC020R05CMW08	2	2,00	.079	0,08	.003	19,20	.756	5	R - Right				4169676	
WMTC020R12CMW08	2	2,00	.079	0,08	.003	19,27	.758	12	R - Right				4169679	
WMTC094R12CMW13	2B	2,39	.094	0,13	.005	22,29	.877	12	R - Right				4169581	
WMTC094R05CMW13	2B	2,39	.094	0,13	.005	22,32	.879	5	R - Right				4169579	
WMTC030R05CMW17	3	3,00	.118	0,17	.007	25,40	1.000	5	R - Right				4169685	
WMTC030R12CMW17	3	3,00	.118	0,17	.007	25,40	1.000	12	R - Right				4169689	
WMTC125R05CMW17	3	3,17	.125	0,17	.007	25,41	1.000	5	R - Right				4169665	
WMTC125R12CMW17	3	3,17	.125	0,17	.007	25,41	1.000	12	R - Right				4169667	



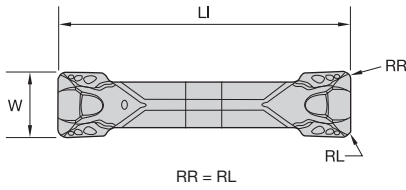
● first choice  
○ alternate choice

P	●	●	○	○	○
M	●	○	○	○	○
K	●	○	○	○	○
N	●	○	○	○	○
S	○	○	○	○	○
H	○	○	○	○	○

■ **WMT-U-PT • Molded**

catalog number	seat size	W		RR		LI		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT	
		mm	in	mm	in	mm	in						
WMTS205M2U02PT	2	2,05	.081	0,15	.006	19,23	.757	4169554	4169555	4116131	4116132	4113569	4116132
WMTS305M3U03PT	3	3,05	.120	0,31	.012	25,81	1.016	4169556	4169557	4113568	4113569	4113569	4116132
WMTS305M3U06PT	3	3,05	.120	0,61	.024	25,78	1.015	4169558	4169559	4113570	4113571	4113571	4113571
WMTS405M4U03PT	4	4,05	.159	0,31	.012	25,53	1.005	4169560	4169561	4113577	4113578	4113578	4113578
WMTS405M4U06PT	4	4,05	.159	0,61	.024	25,53	1.005	4169562	4169563	4113579	4113580	4113580	4113580
WMTS505M5U03PT	5	5,05	.199	0,30	.012	28,76	1.320	4169564	4169565	4116148	4116149	4116149	4116151
WMTS505M5U06PT	5	5,05	.199	0,61	.024	28,76	1.320	4169566	4169567	4116150	4116151	4116151	4116151
WMTS605M6U03PT	6	6,05	.238	0,30	.012	28,76	1.320	4169568	4169569	4117253	4117254	4117254	4117254
WMTS605M6U06PT	6	6,05	.238	0,59	.023	28,76	1.320	4169570	4169571	4117255	4117256	4117256	4117256
WMTS805M8U06PT	8	8,05	.317	0,61	.024	28,70	1.130	4169572	4169573	4117261	4117262	4117262	4117262
WMTS805M8U15PT	8	8,05	.317	1,50	.059	28,71	1.130	4169574	4169575	4117263	4117264	4117264	4117264

Grooving and Cut-Off



● first choice  
○ alternate choice

P	●	●	○	○
M	●	●	○	○
K	●	●	○	○
N	●	●	○	○
S	●	●	○	○
H	○	○	○	○

■ WMT-P-PT • Precision

catalog number	seat size	W		RR		LI		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in					
WMTS200M2P02PT	2	2,00	.079	0,15	.006	19,10	.752	■	■	■	■	■
WMTS094I2BP02PT	2B	2,38	.094	0,15	.006	22,15	.872	■	■	■	■	■
WMTS094I2BP04PT	2B	2,38	.094	0,38	.015	22,14	.872	■	■	■	■	■
WMTS300M3P03PH	3	3,00	.118	0,30	.012	25,65	1.010	■	■	■	■	■
WMTS300M3P03PT	3	3,00	.118	0,31	.012	25,65	1.010	■	■	■	■	■
WMTS300M3P06PH	3	3,00	.118	0,60	.024	25,65	1.010	■	■	■	■	■
WMTS300M3P06PT	3	3,00	.118	0,61	.024	25,65	1.010	■	■	■	■	■
WMTS125I3P03PT	3	3,17	.125	0,23	.009	25,40	1.000	■	■	■	■	■
WMTS125I3P08PT	3	3,17	.125	0,76	.030	25,40	1.000	■	■	■	■	■
WMTS125I3P03PH	3	3,18	.125	0,25	.010	25,40	1.000	■	■	■	■	■
WMTS125I3P08PH	3	3,18	.125	0,75	.030	25,40	1.000	■	■	■	■	■
WMTS156I4P03PH	4	3,95	.156	0,30	.012	25,40	1.000	■	■	■	■	■
WMTS156I4P08PH	4	3,96	.156	0,75	.030	25,40	1.000	■	■	■	■	■
WMTS400M4P03PH	4	4,00	.157	0,30	.012	25,40	1.000	■	■	■	■	■
WMTS400M4P03PT	4	4,00	.157	0,31	.012	25,40	1.000	■	■	■	■	■
WMTS400M4P06PH	4	4,00	.157	0,60	.024	25,40	1.000	■	■	■	■	■

(continued)

Grooving and Cut-Off

(WMT-P-PT • Precision — continued)

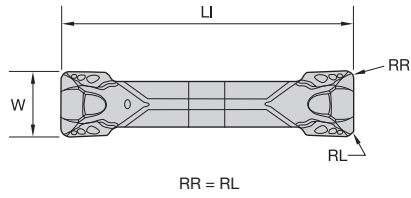
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M	●	●	●	○
K	●	●	○	○
N	●	●	●	●
S	●	●	●	●
H	○	○	○	○

● first choice  
○ alternate choice

catalog number	seat size	W		RR		LI		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in					
WMTS400M4P06PT	4	4,00	.157	0,60	.024	25,40	1.000	●	●	○	○	○
WMTS188I5P03PT	5	4,76	.188	0,26	.010	28,63	1.127	●	●	○	○	○
WMTS188I5P03PH	5	4,77	.188	0,25	.010	28,63	1.127	●	●	○	○	○
WMTS188I5P08PH	5	4,77	.188	0,75	.030	28,63	1.127	●	●	○	○	○
WMTS188I5P08PT	5	4,77	.188	0,76	.030	28,63	1.127	●	●	○	○	○
WMTS500M5P03PH	5	5,00	.197	0,30	.012	28,63	1.127	●	●	○	○	○
WMTS500M5P03PT	5	5,00	.197	0,30	.012	28,63	1.127	●	●	○	○	○
WMTS500M5P06PH	5	5,00	.197	0,60	.024	28,63	1.127	●	●	○	○	○
WMTS500M5P06PT	5	5,00	.197	0,61	.024	28,63	1.127	●	●	○	○	○
WMTS600M6P03PH	6	6,00	.236	0,30	.012	28,63	1.127	●	●	○	○	○
WMTS600M6P03PT	6	6,00	.236	0,30	.012	28,63	1.127	●	●	○	○	○
WMTS600M6P06PT	6	6,00	.236	0,58	.022	28,63	1.127	●	●	○	○	○
WMTS600M6P06PH	6	6,00	.236	0,60	.024	28,63	1.127	●	●	○	○	○
WMTS250I6P08PH	6	6,32	.249	0,75	.030	28,63	1.127	●	●	○	○	○
WMTS250I6P08PT	6	6,34	.250	0,76	.030	28,63	1.127	●	●	○	○	○
WMTS250I6P03PH	6	6,35	.250	0,25	.010	28,63	1.127	●	●	○	○	○



(WMT-P-PT • Precision — continued)

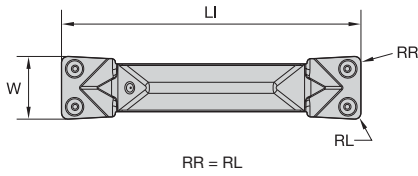


● first choice  
○ alternate choice

P	●	●	○	○
M	●	●	○	○
K	●	●	○	○
N	●	●	○	○
S	●	●	○	○
H	○	○	○	○

Grooving and Cut-Off

catalog number	seat size	W		RR		LI		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in					
WMTS250I6P03PT	6	6,35	.250	0,25	.010	28,63	1.127			4118593	4118594	
WMTS312I8P03PH	8	7,92	.312	0,25	.010	28,57	1.125			5345985	5345986	
WMTS312I8P08PH	8	7,92	.312	0,75	.030	28,57	1.125			5345987	5345988	
WMTS800M8P03PH	8	8,00	.315	0,30	.012	28,57	1.125			5346436	5346437	
WMTS800M8P06PH	8	8,00	.315	0,60	.024	28,57	1.125			5346434	5346435	
WMTS800M8P06PT	8	8,00	.315	0,61	.024	28,57	1.125			4117257	4117258	
WMTS800M8P15PT	8	8,00	.315	1,50	.059	28,57	1.125			4117259	4117260	



● first choice  
○ alternate choice

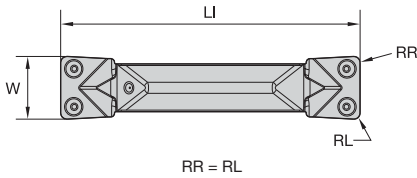
P	●	●	○	○
M	●	●	○	○
K	●	●	○	○
N	●	●	○	○
S	●	●	○	○
H	○	○	○	○

■ **WMT-U-PH • Molded**

catalog number	seat size	W		RR		LI		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in					
WMTS305M3U03PH	3	3,05	.120	0,30	.012	25,81	1.016			5346392	5346393	
WMTS305M3U06PH	3	3,05	.120	0,60	.024	25,81	1.016			5346394	5346395	
WMTS405M4U03PH	4	4,05	.159	0,30	.012	25,53	1.005			5346396	5346397	
WMTS405M4U06PH	4	4,05	.159	0,60	.024	25,53	1.005			5346398	5346399	
WMTS505M5U03PH	5	5,05	.199	0,30	.012	28,76	1.320			5346400	5346401	
WMTS505M5U06PH	5	5,05	.199	0,60	.024	28,76	1.320			5346402	5346403	
WMTS605M6U03PH	6	6,05	.238	0,30	.012	28,76	1.320			5346404	5346405	
WMTS605M6U06PH	6	6,05	.238	0,60	.024	28,76	1.320			5346406	5346407	
WMTS805M8U03PH	8	8,05	.317	0,30	.012	28,70	1.130			5346410	5346411	
WMTS805M8U06PH	8	8,05	.317	0,60	.024	28,70	1.130			5346408	5346409	



Grooving and Cut-Off



● first choice  
○ alternate choice

P	●	●	○	○
M	●	●	○	○
K	●	●	○	○
N	●	●	○	○
S	●	●	○	○
H	○	○	○	○

■ **WMT-P-PH • Precision**

catalog number	seat size	W		RR		LI		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in					
WMTS300M3P03PH	3	3,00	.118	0,30	.012	25,65	1.010	●	●	○	○	○
WMTS300M3P06PH	3	3,00	.118	0,60	.024	25,65	1.010	●	●	○	○	○
WMTS125I3P03PH	3	3,18	.125	0,25	.010	25,40	1.000	●	●	○	○	○
WMTS125I3P08PH	3	3,18	.125	0,75	.030	25,40	1.000	●	●	○	○	○
WMTS156I4P03PH	4	3,95	.156	0,30	.012	25,40	1.000	●	●	○	○	○
WMTS156I4P08PH	4	3,96	.156	0,75	.030	25,40	1.000	●	●	○	○	○
WMTS400M4P03PH	4	4,00	.157	0,30	.012	25,40	1.000	●	●	○	○	○
WMTS400M4P06PH	4	4,00	.157	0,60	.024	25,40	1.000	●	●	○	○	○
WMTS188I5P03PH	5	4,77	.188	0,25	.010	28,63	1.127	●	●	○	○	○
WMTS188I5P08PH	5	4,77	.188	0,75	.030	28,63	1.127	●	●	○	○	○
WMTS500M5P03PH	5	5,00	.197	0,30	.012	28,63	1.127	●	●	○	○	○
WMTS500M5P06PH	5	5,00	.197	0,60	.024	28,63	1.127	●	●	○	○	○

(continued)

Grooving and Cut-Off



(WMT-P-PH • Precision – continued)

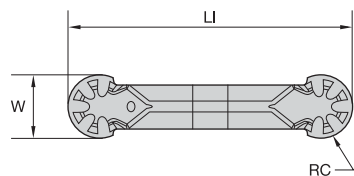
● first choice  
○ alternate choice

P	●	●	○	○
M	●	●	●	○
K	●	●	○	○
N	●	●	●	●
S	●	●	●	●
H	○	○	○	○

catalog number	seat size	W		RR		LI		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in					
WMTS600M6P03PH	6	6,00	.236	0,30	.012	28,63	1.127	●	●	○	○	○
WMTS600M6P06PH	6	6,00	.236	0,60	.024	28,63	1.127	●	●	○	○	○
WMTS250I6P08PH	6	6,32	.249	0,75	.030	28,63	1.127	●	●	○	○	○
WMTS250I6P03PH	6	6,35	.250	0,25	.010	28,63	1.127	●	●	○	○	○
WMTS312I8P03PH	8	7,92	.312	0,25	.010	28,57	1.125	●	●	○	○	○
WMTS312I8P08PH	8	7,92	.312	0,75	.030	28,57	1.125	●	●	○	○	○
WMTS800M8P03PH	8	8,00	.315	0,30	.012	28,57	1.125	●	●	○	○	○
WMTS800M8P06PH	8	8,00	.315	0,60	.024	28,57	1.125	●	●	○	○	○



Grooving and Cut-Off



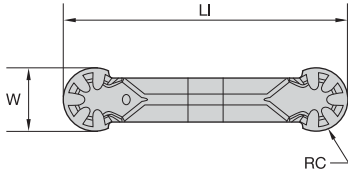
● first choice  
○ alternate choice

P	●	●	○	○
M	●	●	○	○
K	●	●	○	○
N	●	●	○	○
S	●	●	○	○
H	○	○	○	○

■ **WMT-U-PC • Molded**

catalog number	seat size	W		RC		LI		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in					
WMTR305M3UPC	3	3,05	.120	1,53	.060	25,53	1.005	4170174	-	4170172	-	-
WMTR405M4UPC	4	4,05	.163	2,03	.080	25,58	1.007	4170179	-	4170177	-	-
WMTR505M5UPC	5	5,05	.202	2,53	.099	29,01	1.142	4170184	-	4170182	-	-
WMTR605M6UPC	6	6,05	.238	3,03	.119	28,77	1.133	4170189	-	4170187	-	-
WMTR805M8UPC	8	8,05	.317	4,03	.159	29,22	1.150	4170194	-	4170192	-	-

Grooving and Cut-Off



● first choice  
○ alternate choice

P	●	●	○	○
M	●	●	○	○
K	●	●	○	○
N	●	●	●	●
S	●	●	●	●
H	○	○	○	○

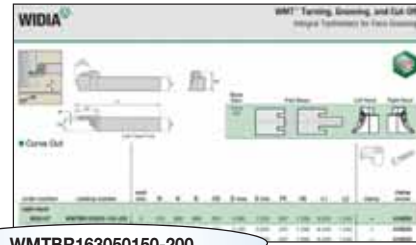
■ **WMT-P-PC • Precision**

catalog number	seat size	W		RC		LI		WP10CT	WP25CT	WU10PT	WU25PT	WU10HT
		mm	in	mm	in	mm	in					
WMTR300M3PPC	3	3,00	.118	1,50	.059	25,40	1.000			4170170	4170170	4170195
WMTR400M4PPC	4	4,00	.158	2,00	.079	25,45	1.002			4170175	4170176	4170196
WMTR188I5PPC	5	4,78	.188	2,39	.094	28,65	1.128			4170119	4170120	
WMTR500M5PPC	5	5,00	.197	2,50	.098	28,88	1.137			4170180	4170181	
WMTR600M6PPC	6	6,00	.236	3,00	.118	28,65	1.128			4170185	4170186	
WMTR250I6PPC	6	6,36	.250	3,18	.125	29,01	1.142			4170121	4170122	
WMTR312I8PPC	8	7,94	.312	3,96	.156	29,00	1.142			4170163	4170164	
WMTR800M8PPC	8	8,00	.315	4,00	.158	29,08	1.145			4170190	4170191	



## WMT System

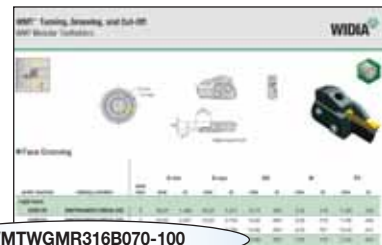
Our WMT toolholders now have a smart new naming system. Here are some examples of the improved nomenclature for our WMT Toolholders.



WMTBR163050150-200

### Integral Toolholders

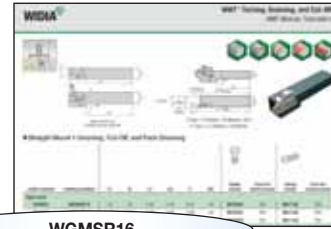
<b>WMT</b> Tooling System	<b>B</b> Tool Style	<b>R</b> Hand	<b>16</b> Shank Size	<b>3</b> Seat Size	<b>050</b> Max Grooving Depth	<b>—</b>	<b>150-200</b> Face Grooving Diameter
<b>WMT</b> = Groove and Turn (WMT Insert)	<b>S</b> = Straight <b>C</b> = Straight with circular support <b>E</b> = End mount <b>A</b> = Straight, face grooving, curve in <b>B</b> = Straight, face grooving, curve out	<b>R</b> = Right hand <b>L</b> = Left hand	For square shanks, the number indicates the height and width in 1/16" increments. For rectangular shanks, the first digit indicates the number of eighths of width "B" and the second digit indicates the number of quarters of height "H".	<b>1</b> <b>2</b> <b>2B</b> <b>3</b> <b>4</b> <b>5</b> <b>6</b> <b>8</b>	CD max in 1/100" NOTE: Values <1.00" use a preceding zero (e.g., 075 = .75" max groove depth)		Diameters are min and max for outer face groove diameter 999 = unlimited D max  D min – D max in 1/100" e.g., 275-400 = 2.75" D min 4.00" D max



WMTWGMR316B070-100

### Modular Blades

<b>WMT</b> Tooling System	<b>WGM</b> Connection Type	<b>R</b> Hand	<b>3</b> Seat Size	<b>16</b> Max Grooving Depth	<b>B</b> Tool Style	<b>070-100</b> Face Grooving Diameter
		<b>R</b> = Right hand <b>L</b> = Left hand			<b>A</b> = Curve In <b>B</b> = Curve Out	



**WGMSR16**

**Modular Toolholders**

**WGM**

Tooling System

**MDG** = Modular Deep Grooving

**WGM** = Modular Serrated Locking System

**S**

Tool Style

**S** = Straight  
**E** = End mount

**R**

Hand

**R** = Right hand  
**L** = Left hand

**16**

Shank Size

For square shanks, the number indicates the height and width in 1/16" increments. For rectangular shanks, the first digit indicates the number of eighths of width "B" and the second digit indicates the number of quarters of height "H".

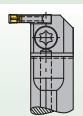


**A16RWMTER0316N**

**Integral Boring Bars**

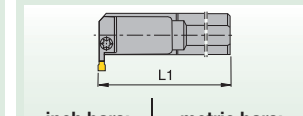
**A**

Steel Bar with Coolant



**16**

Bar Diameter



inch bars:	metric bars:
R = 8"	R = 200mm
S = 10"	S = 150mm
T = 12"	T = 300mm

**R**

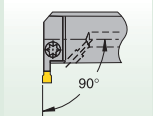
Bar Length

**WMT**

WMT™ Groove and Turn System

**E**

Tool Style



**E** = End mounted (90°)

**R**

Hand

**R** = Right hand  
**L** = Left hand

**03**

Seat Size

pocket seat size	cutting width (mm)
02	2,00–2,62
2B	2,39–2,62
03	3,0–3,05
04	4,0–4,05
05	5,0–5,05
06	6,0–6,05
08	8,0–8,05
10	10,0–10,05

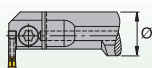
**16**

Max Grooving Depth

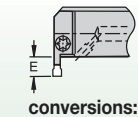
**N**

Tool Units

**N** = Inch  
**M** = Metric

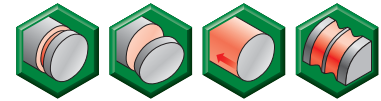
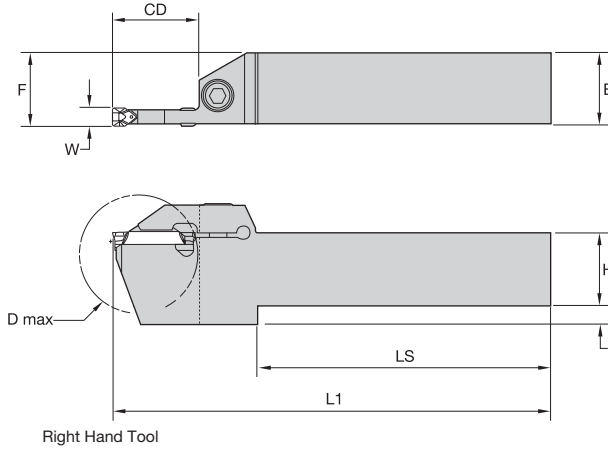
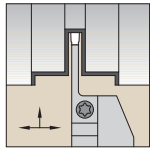


inch bars:	metric bars:
A two-digit number which indicates the bar diameter in 1/16" increments.	
Bar diameter in millimeters	



**conversions:**

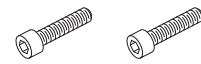
mm	inch
7mm	.28"
10mm	.39"
12mm	.47"
16mm	.63"



Right Hand Tool

Grooving and Cut-Off

■ O.D. Grooving and Cut-Off



order number	catalog number	seat size	W	H	B	CD	D max	F	H3	L1	LS	clamp screw	clamp screw
<b>right hand</b>													
3656137	WMTSR161065	1	.059	1.000	1.000	.650	—	.991	—	6.000	4.679	606266	—
3655938	WMTCR62053	2	.079	.375	.375	—	1.062	.375	.125	4.500	3.410	606249	—
3655940	WMTCR82062	2	.079	.500	.500	—	1.125	.500	.188	4.500	3.410	606249	—
3655942	WMTSR102065	2	.079	.625	.625	.650	—	.625	.250	5.000	3.680	606249	—
3655944	WMTSR122065	2	.079	.750	.750	.650	—	.750	—	5.000	3.680	606249	—
3655946	WMTSR162065	2	.079	1.000	1.000	.650	—	1.000	—	6.000	4.680	606249	—
3655888	WMTCR62B053	2B	.094	.375	.375	—	1.062	.375	.125	4.500	3.410	606249	—
3655892	WMTCR82B062	2B	.094	.500	.500	—	1.250	.500	.190	4.500	3.290	606249	—
3655894	WMTSR102B075	2B	.094	.625	.625	.750	—	.625	.250	5.000	3.500	—	619205
3655896	WMTSR122B075	2B	.094	.750	.750	.750	—	.750	.250	5.000	3.480	—	619205
3655934	WMTSR122B042	2B	.094	.750	.750	.420	—	.750	—	5.000	3.695	—	619205
3539156	WMTSR162B042	2B	.094	1.000	1.000	.420	—	1.000	—	6.000	4.700	—	619205
3655936	WMTSR162B075	2B	.094	1.000	1.000	.750	—	1.000	—	6.000	4.500	—	619205
3655900	WMTSR103087	3	.125	.625	.625	.875	—	.625	.250	5.000	3.355	—	619205
3539113	WMTSR123044	3	.125	.750	.750	.440	—	.750	—	5.000	3.695	—	—
3655908	WMTSR123087	3	.125	.750	.750	.875	—	.750	.250	5.000	3.355	—	619205
3655916	WMTSR163044	3	.125	1.000	1.000	.440	—	1.000	—	6.000	4.695	—	619205
3655918	WMTSR163087	3	.125	1.000	1.000	.875	—	1.000	—	6.000	4.375	—	619205
3655920	WMTSR164087	4	.156	1.000	1.000	.875	—	1.000	—	6.000	4.375	—	619205
3655930	WMTSR104044	4	.156	.625	.625	.440	—	.625	—	5.000	3.695	—	619205
3655932	WMTSR124044	4	.156	.750	.750	.440	—	.750	—	5.000	3.695	—	619205
3655902	WMTSR105056	5	.188	.625	.625	.560	—	.629	—	5.000	3.562	—	619168
3655904	WMTSR105100	5	.188	.625	.625	1.000	—	.629	.250	5.500	3.655	—	619168
3655910	WMTSR125056	5	.188	.750	.750	.560	—	.750	—	5.000	3.562	—	619168
3655912	WMTSR125100	5	.188	.750	.750	1.000	—	.750	.250	5.500	3.655	—	619168
3655922	WMTSR165056	5	.188	1.000	1.000	.560	—	1.000	—	6.000	4.562	—	619168
3655924	WMTSR165100	5	.188	1.000	1.000	1.000	—	1.000	—	6.000	4.175	—	619168
3655914	WMTSR126056	6	.250	.750	.750	.560	—	.754	—	5.000	3.562	—	619168
3655926	WMTSR166056	6	.250	1.000	1.000	.560	—	1.004	—	6.000	4.562	—	619168
3655928	WMTSR166100	6	.250	1.000	1.000	1.000	—	1.002	—	6.000	4.174	—	619168
3539139	WMTSR168056	8	.312	1.000	1.000	.560	—	1.000	—	6.000	4.553	—	—

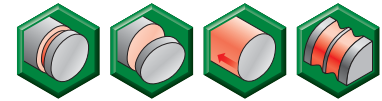
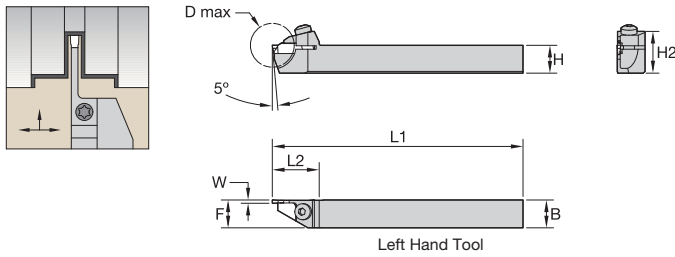
(continued)

(O.D. Grooving and Cut-Off — continued)



order number	catalog number	seat size	W	H	B	CD	D max	F	H3	L1	LS	clamp screw	clamp screw
3539141	WMTSR168100	8	.312	1.000	1.000	1.000	—	1.000	—	6.000	4.174	—	MS1575
3539143	WMTSR208056	8	.312	1.250	1.250	.560	—	1.250	—	6.000	4.553	—	619168
3539145	WMTSR208100	8	.312	1.250	1.250	1.000	—	1.250	—	6.000	4.174	—	619168
<b>left hand</b>													
3656138	WMTSL161065	1	.059	1.000	1.000	.650	—	.991	—	6.000	4.679	606249	—
3655939	WMTCL62053	2	.079	.375	.375	—	1.062	.375	.125	4.500	3.410	606249	—
3655941	WMTCL82062	2	.079	.500	.500	—	1.125	.500	.188	4.500	3.410	606249	—
3655943	WMTSL102065	2	.079	.625	.625	.650	—	.625	.250	5.000	3.680	606249	—
3655945	WMTSL122065	2	.079	.750	.750	.650	—	.750	—	5.000	3.680	606249	—
3655947	WMTSL162065	2	.079	1.000	1.000	.650	—	1.000	—	6.000	4.680	606249	—
3655893	WMTCL82B062	2B	.094	.500	.500	—	1.250	.500	.190	4.500	3.290	606249	—
3655895	WMTSL102B075	2B	.094	.625	.625	.750	—	.625	.250	5.000	3.480	—	619205
3655897	WMTSL122B075	2B	.094	.750	.750	.750	—	.750	.250	5.000	3.480	—	619205
3655935	WMTSL122B042	2B	.094	.750	.750	.420	—	.750	—	5.000	3.700	—	619205
3655937	WMTSL162B075	2B	.094	1.000	1.000	.750	—	1.000	—	6.000	4.500	—	619205
3655899	WMTSL103044	3	.125	.625	.625	.440	—	.625	—	5.000	3.695	—	619205
3655901	WMTSL103087	3	.125	.625	.625	.875	—	.625	.250	5.000	3.355	—	619205
3655907	WMTSL123044	3	.125	.750	.750	.440	—	.750	—	5.000	3.695	—	619205
3655909	WMTSL123087	3	.125	.750	.750	.875	—	.750	.250	5.000	3.355	—	619205
3655917	WMTSL163044	3	.125	1.000	1.000	.440	—	1.000	—	6.000	4.695	—	619205
3655919	WMTSL163087	3	.125	1.000	1.000	.875	—	1.000	—	6.000	4.375	—	619205
3655921	WMTSL164087	4	.156	1.000	1.000	.875	—	1.000	—	6.000	4.375	—	619205
3655931	WMTSL104044	4	.156	.625	.625	.440	—	.625	—	5.000	3.695	—	619205
3655933	WMTSL124044	4	.156	.750	.750	.440	—	.750	—	5.000	3.697	—	619205
3655905	WMTSL105100	5	.188	.625	.625	1.000	—	.629	.250	5.500	3.655	—	619168
3655911	WMTSL125056	5	.188	.750	.750	.560	—	.750	—	5.000	3.562	—	619168
3655913	WMTSL125100	5	.188	.750	.750	1.000	—	.750	.250	5.500	3.655	—	619168
3655925	WMTSL165100	5	.188	1.000	1.000	1.000	—	1.000	—	6.000	4.175	—	619168
3655915	WMTSL126056	6	.250	.750	.750	.560	—	.754	—	5.000	3.562	—	619168
3655927	WMTSL166056	6	.250	1.000	1.000	.560	—	1.004	—	6.000	4.562	—	619168
3655929	WMTSL166100	6	.250	1.000	1.000	1.000	—	1.004	—	6.000	4.174	—	619168
3539140	WMTSL168056	8	.312	1.000	1.000	.560	—	.998	—	6.000	4.553	—	MS1575
3539142	WMTSL168100	8	.312	1.000	1.000	1.000	—	—	—	6.000	4.174	—	MS1575
3539144	WMTSL208056	8	.312	1.250	1.250	.560	—	1.250	—	6.000	4.553	—	619168
3539146	WMTSL208100	8	.312	1.250	1.207	1.000	—	1.250	—	6.000	4.174	—	619168

Grooving and Cut-Off



■ **Swiss Grooving and Cut-Off • Inch**

Grooving and Cut-Off

order number	catalog number	seat size	W	H	B	D max	F	H2	L1	L2	clamp screw
<b>right hand</b>											
3655948	WMTCR061039	1	.059	.375	.375	.787	.375	.625	4.500	.842	606249
3655949	WMTCR081039	1	.059	.500	.500	.787	.500	.750	4.500	.842	606249
3656135	WMTCR121051	1	.059	.750	.750	1.024	.750	1.050	5.000	.952	606266
3656133	WMTCR101051	1	.059	.625	.625	1.024	.626	.925	5.000	.952	606266
3656141	WMTCR082039	2	.079	.500	.500	.787	.500	.750	4.500	.843	606249
3656143	WMTCR102051	2	.079	.625	.625	1.024	.625	.925	5.000	.953	606266
3656139	WMTCR062039	2	.079	.375	.375	.787	.375	.625	4.500	.843	606249
3656145	WMTCR122051	2	.079	.750	.750	1.024	.750	1.050	5.000	.953	606266
<b>left hand</b>											
3656186	WMTCL061039	1	.059	.375	.375	.787	.375	.625	4.500	.842	606249
3656101	WMTCL081039	1	.059	.500	.500	.787	.500	.750	4.500	.842	606249
3656134	WMTCL101051	1	.059	.625	.625	1.024	.626	.925	5.000	.952	606266
3656136	WMTCL121051	1	.059	.750	.750	1.024	.750	1.050	5.000	.952	606266
3656140	WMTCL062039	2	.079	.375	.375	.787	.375	.625	4.500	.843	606249
3656142	WMTCL082039	2	.079	.500	.500	.787	.500	.750	4.500	.843	606249
3656144	WMTCL102051	2	.079	.625	.625	1.024	.625	.925	5.000	.953	606266
3656146	WMTCL122051	2	.079	.750	.750	1.024	.750	1.050	5.000	.953	606266

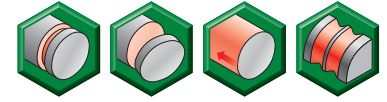
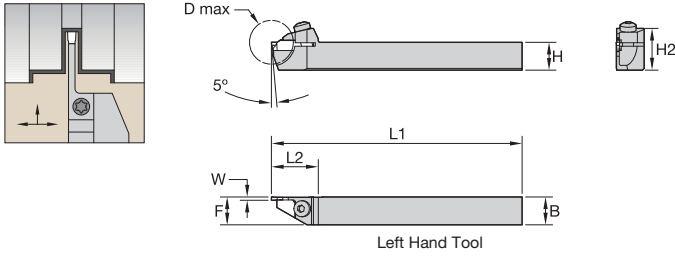


NOTE: Insert exterior edge in line with toolholder edge for .375" and .500" shank toolholders.

Update to our latest style cut-off inserts for use in the above style toolholders.  
These holders can be used in many machines including Stars, Citizens, Tsugami, and Tonos/DECO.

Insert Width	Lead Angle	Old Manchester Catalog Number	Old Manchester Grade	WMT Cut-Off Insert	WMT Insert Grade	WIDIA™ Order Number
1.5 mm	Neutral	583-165	M443B	WMTC015N00CM08	WU25PT	4169668
1.5 mm	Right - 5°	583-166	M443B	WMTC015R05CM08	WU25PT	4169670
1.5 mm	Right - 12°	583-168	M443B	WMTC015R12CM08	WU25PT	4169672
1.5 mm	Left - 5°	583-167	M443B	WMTC015L05CM08	WU25PT	4169671
2.0 mm	Neutral	583-170	M443B	WMTC020N00CM08	WU25PT	4169673
2.0 mm	Right - 5°	583-170	M443B	WMTC020R05CM08	WU25PT	4169675
2.0 mm	Right - 12°	583-173	M443B	WMTC020R12CM08	WU25PT	4169678
2.0 mm	Left - 5°	583-172	M443B	WMTC020L05CM08	WU25PT	4169677
2.0 mm	Left - 12°	583-174	M443B	WMTC020L12CM08	WU25PT	4169680
2.0 mm	Neutral - Groove	583-129	M45 / M43	WMTC200M2P02PT	WU25PT	4116130
2.0 mm	Neutral	583-125	M45 / M43	WMTC020N00CMW08	WU25PT	4169674
2.0 mm	Right - 5°	583-126	M45 / M43	WMTC020R05CMW08	WU25PT	4169676
2.0 mm	Right - 12°	583-128	M45 / M43	WMTC020R12CMW08	WU25PT	4169679
2.0 mm	Left - 12°	583-129	M45 / M43	WMTC020L12CMW08	WU25PT	4169681



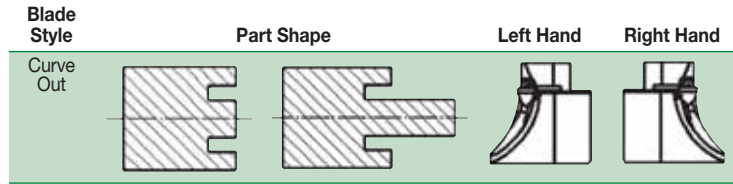
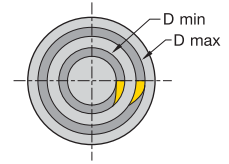
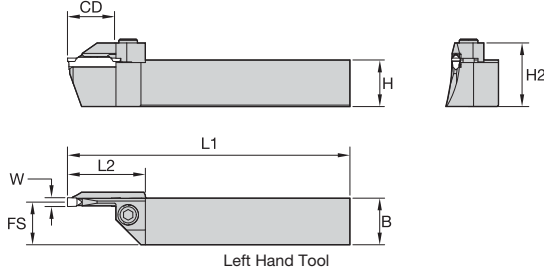
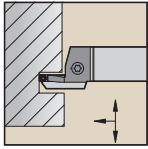


■ **Swiss Grooving and Cut-Off • Metric**

order number	catalog number	seat size	W	H	B	F	D max	H2	H3	L1	L2	clamp screw
<b>right hand</b>												
3650508	WMTCR1010H110	1	1,50	10,0	10,0	10,0	20	16	—	100	21	606249
3650510	WMTCR1212H110	1	1,50	12,0	12,0	12,0	20	18	—	100	21	606249
3650512	WMTCR1616K113	1	1,50	16,0	15,9	16,0	26	24	—	125	24	606266
3650514	WMTCR2020K113	1	1,50	20,0	19,9	20,0	26	28	—	125	24	606266
3653413	WMTCR1010H210	2	2,00	10,0	10,0	10,0	20	16	—	100	21	606249
3653415	WMTCR1212H210	2	2,00	12,0	12,0	12,0	20	18	—	100	21	606249
3653417	WMTCR1616K213	2	2,00	16,0	15,8	16,0	26	24	—	125	24	606266
3653419	WMTCR2020K213	2	2,00	20,0	19,8	20,0	26	28	—	125	24	606266
<b>left hand</b>												
3650509	WMTCL1010H110	1	1,50	10,0	10,0	10,0	20	16	—	100	21	606249
3650511	WMTCL1212H110	1	1,50	12,0	12,0	12,0	20	18	—	100	21	606249
3650513	WMTCL1616K113	1	1,50	16,0	15,9	16,0	26	24	—	125	24	606266
3650515	WMTCL2020K113	1	1,50	20,0	19,9	20,0	26	28	—	125	24	606266
3653414	WMTCL1010H210	2	2,00	10,0	10,0	10,0	20	16	—	100	21	606249
3653416	WMTCL1212H210	2	2,00	12,0	12,0	12,0	20	18	—	100	21	606249
3653418	WMTCL1616K213	2	2,00	16,0	15,8	16,0	26	24	—	125	24	606266
3653420	WMTCL2020K213	2	2,00	20,0	19,8	20,0	26	28	—	125	24	606266
3539171	WMTCL1212H2B16	2B	2,38	12,0	11,7	11,9	32	23	5	100	30	606249



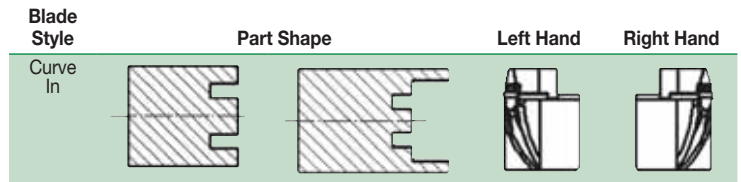
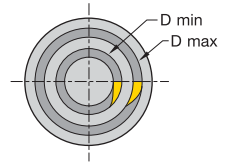
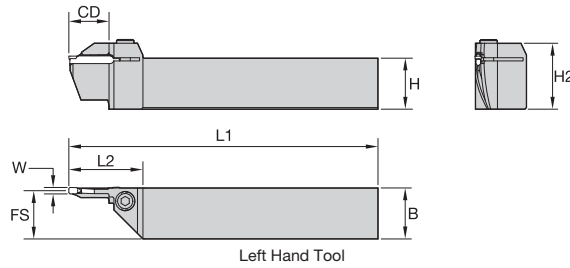
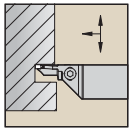
Grooving and Cut-Off



■ Curve Out

order number	catalog number	seat size	W	H	B	CD	D max	D min	FS	H2	L1	L2	clamp	clamp screw
<b>right hand</b>														
3656147	WMTBR163050-150-200	3	.125	.990	.990	.500	2.000	1.500	.937	1.280	6.000	1.343	—	619205
3656149	WMTBR163063-200-275	3	.125	.990	.990	.625	2.750	2.000	.937	1.280	6.000	1.343	—	619205
3656151	WMTBR163063-275-400	3	.125	.990	.990	.625	4.000	2.750	.937	1.280	6.000	1.343	—	619205
3656153	WMTBR163075-400-800	3	.125	.990	.990	.750	8.000	4.000	.937	1.280	6.000	1.438	—	619205
3656155	WMTBR165063-150-200	5	.188	.990	.990	.625	2.000	1.500	.906	1.355	6.000	1.500	446102	619168
3656157	WMTBR165075-200-275	5	.188	.990	.990	.750	2.750	2.000	.906	1.352	6.000	1.500	446102	619168
3656159	WMTBR165075-275-400	5	.188	.990	.990	.750	4.000	2.750	.906	1.352	6.000	1.655	446104	619168
3656165	WMTBR166075-200-275	6	.250	.990	.990	.750	2.750	2.000	.875	1.372	6.000	1.500	446102	619168
3656168	WMTBR166100-400-800	6	.250	.990	.990	1.000	8.000	4.000	.875	1.372	6.000	1.655	446104	619168
3656187	WMTBR166075-275-400	6	.251	.990	.990	.750	4.000	2.750	.875	1.372	6.000	1.655	446104	619168
<b>left hand</b>														
3656152	WMTBL163063-275-400	3	.125	.990	.990	.625	4.000	2.750	.937	1.280	6.000	1.343	—	619205
3656154	WMTBL163075-400-800	3	.125	.990	.990	.750	8.000	4.000	.937	1.280	6.000	1.438	—	619205
3656156	WMTBL165063-150-200	5	.188	.990	.990	.625	2.000	1.500	.906	1.355	6.000	1.500	446101	619168
3656158	WMTBL165075-200-275	5	.188	.990	.990	.750	2.750	2.000	.906	1.352	6.000	1.500	446101	619168
3656164	WMTBL166063-150-200	6	.250	.990	.990	.625	2.000	1.500	.875	1.377	6.000	1.500	446101	619168
3656166	WMTBL166075-200-275	6	.250	.990	.990	.750	2.750	2.000	.875	1.372	6.000	1.500	446101	619168
3656167	WMTBL166075-275-400	6	.250	.990	.990	.750	4.000	2.750	.875	1.372	6.000	1.655	446103	619168
3656169	WMTBL166100-400-800	6	.250	.990	.990	1.000	8.000	4.000	.875	1.372	6.000	1.655	446103	619168

NOTE: Initial cut of tool must be between D min and D max. Due to the insert being positioned .030" above center, minimum diameter after initial cut is .850".  
Tool Holders that accept .125" width inserts have an integral clamp.  
Tool Holders that accept .187" and .250" width inserts are supplied with a detachable clamp.

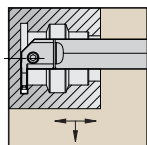


■ Curve In

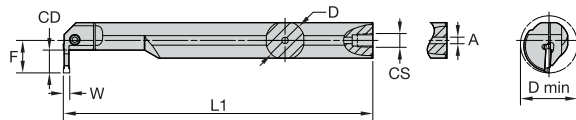
order number	catalog number	seat size	W	H	B	CD	D max	D min	FS	H2	L1	L2	clamp	clamp screw
<b>right hand</b>														
3539321	WMTAR163063-275-400	3	.125	.990	.990	.625	4.000	2.750	.937	1.280	6.000	1.343	—	MS326
3539323	WMTAR163075-400-800	3	.125	.990	.990	.750	8.000	4.000	.937	1.280	6.000	1.438	—	MS326
3539325	WMTAR165075-275-400	5	.187	.990	.990	.750	4.000	2.750	.906	1.336	6.000	1.655	446104	619168
3539327	WMTAR165100-400-800	5	.187	.990	.990	1.000	8.000	4.000	.906	1.336	6.000	1.655	446104	619168
3539329	WMTAR166075-275-400	6	.250	.990	.990	.765	4.000	2.750	.875	1.336	6.000	1.655	446104	619168
3539331	WMTAR166100-400-800	6	.250	.990	.990	1.000	8.000	4.000	.875	1.336	6.000	1.655	446104	619168
<b>left hand</b>														
3539322	WMTAL163063-275-400	3	.125	.990	.990	.625	4.000	2.750	.937	1.280	6.000	1.343	—	MS326
3539324	WMTAL163075-400-800	3	.125	.990	.990	.750	8.000	4.000	.937	1.280	6.000	1.438	—	MS326
3539326	WMTAL165075-275-400	5	.187	.990	.990	.750	4.000	2.750	.906	1.336	6.000	1.655	446103	619168
3539328	WMTAL165100-400-800	5	.187	.990	.990	1.000	8.000	4.000	.906	1.336	6.000	1.655	446103	619168
3539330	WMTAL166075-275-400	6	.250	.990	.990	.765	4.000	2.750	.875	1.336	6.000	1.655	446103	619168
3539332	WMTAL166100-400-800	6	.250	.990	.990	1.000	8.000	4.000	.875	1.336	6.000	1.655	446103	619168

NOTE: Initial cut of tool must be between D min and D max. Due to the insert being positioned .030" above center, minimum diameter after initial cut is .850".  
Tool Holders that accept .125" width inserts have an integral clamp.  
Tool Holders that accept .187" and .250" width inserts are supplied with a detachable clamp.

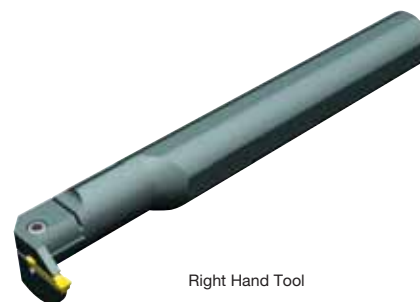
Grooving and Cut-Off



Steel shank with through coolant.



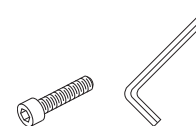
Right Hand Tool



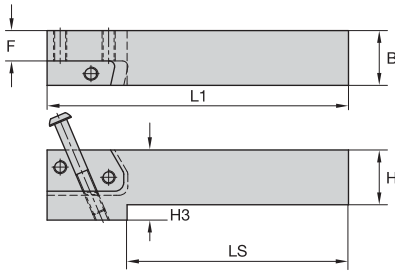
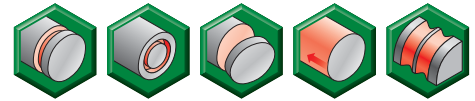
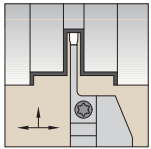
Right Hand Tool

Grooving and Cut-Off

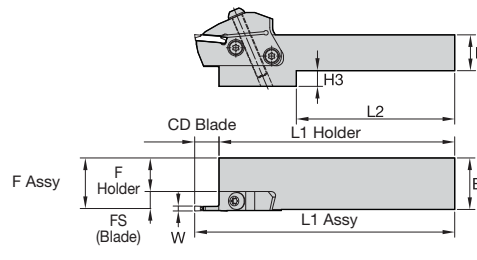
■ I.D. Boring Bars



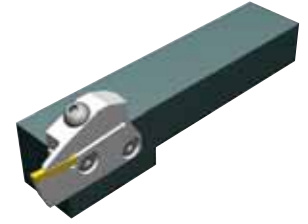
order number	catalog number	seat size	W	CD	D min	D	L1	F	A	clamp screw	hex
<b>right hand</b>											
5423448	A16RWMTER0316N	3	.125	.630	1.59	1.00	8.00	1.024	.25	619168	5 mm
5423840	A16RWMTER0416N	4	.156	.630	1.59	1.00	8.00	1.024	.25	619168	5 mm
5423449	A20SWMTER0319N	3	.125	.748	1.85	1.25	10.00	1.142	.25	619168	5 mm
5423841	A20SWMTER0419N	4	.156	.748	1.85	1.25	10.00	1.142	.25	619168	5 mm
5423842	A20SWMTER0519N	5	.188	.748	1.85	1.25	10.00	1.142	.25	619168	5 mm
5423844	A20SWMTER0619N	6	.250	.748	1.85	1.25	10.00	1.142	.25	619168	5 mm
5423843	A24TWMTER0522N	5	.188	.866	2.13	1.50	12.00	1.260	.25	619168	5 mm
5423845	A24TWMTER0622N	6	.250	.866	2.13	1.50	12.00	1.260	.25	619168	5 mm
<b>left hand</b>											
5423846	A16RWMTEL0316N	3	.125	.630	1.59	1.00	8.00	1.024	.25	619168	5 mm
5423848	A16RWMTEL0416N	4	.156	.630	1.59	1.00	8.00	1.024	.25	619168	5 mm
5423847	A20SWMTEL0319N	3	.125	.748	1.85	1.25	10.00	1.142	.25	619168	5 mm
5423849	A20SWMTEL0419N	4	.156	.748	1.85	1.25	10.00	1.142	.25	619168	5 mm
5423870	A20SWMTEL0519N	5	.188	.748	1.85	1.25	10.00	1.142	.25	619168	5 mm
5423872	A20SWMTEL0619N	6	.250	.748	1.85	1.25	10.00	1.142	.25	619168	5 mm
5423871	A24TWMTEL0522N	5	.188	.866	2.13	1.50	12.00	1.260	.25	619168	5 mm
5423873	A24TWMTEL0622N	6	.250	.866	2.13	1.50	12.00	1.260	.25	619168	5 mm



Right Hand Tool  
2 blade screws required



F Assy = F (Holder) + FS (Blade) + W/2  
L1 Assy = L1 (Holder) + CD (Blade)



■ Straight Mount • Grooving, Cut-Off, and Face Grooving

order number	catalog number	H	B	L1	LS	F	H3	blade screw	Torx for blade screw	clamp screw	Torx for clamp screw
<b>right hand</b>											
5349621	WGMSR12	.75	.75	4.30	2.75	0.31	.49	MS2002	T25	MS1162	T25
5349622	WGMSR16	1.00	1.00	5.05	3.86	0.56	.24	MS2002	T25	MS1162	T25
5349624	WGMSR20	1.25	1.25	5.05	—	0.81	—	MS2002	T25	MS1162	T25
<b>left hand</b>											
5349609	WGMSL12	.75	.75	4.30	2.75	0.31	.49	MS2002	T25	MS1162	T25
5349620	WGMSL16	1.00	1.00	5.05	3.86	0.56	.24	MS2002	T25	MS1162	T25
5349623	WGMSL20	1.25	1.25	5.05	—	0.81	—	MS2002	T25	MS1162	T25

NOTE: Use the larger seat size toolholder for optimal performance.  
Blade screws and clamp screw included with holder.

Toolholder Style	Hand of Holder	Hand of Blade
WGMS – Straight Mount	Right	Right
	Left	Left
WGME – End Mount	Right	Left
	Left	Right

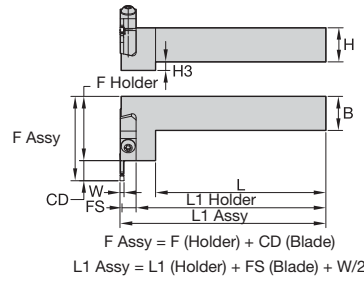
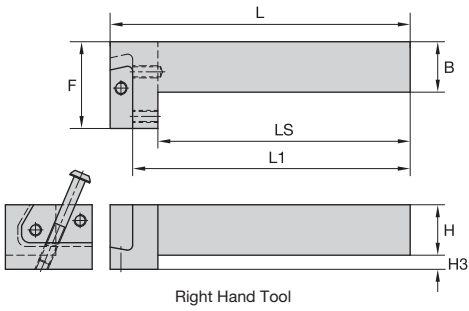
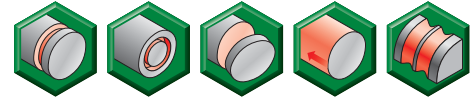


Grooving and Cut-Off Blade  
found on page E39.



Face Grooving Blades found on  
page E40.

Grooving and Cut-Off



Grooving and Cut-Off

■ End Mount • Grooving, Cut-Off, and Face Grooving

order number	catalog number	H	B	L	L1	LS	F	H3
<b>right hand</b>								
5514977	WGMR16	1.00	1.00	5.96	5.53	4.96	1.70	.24
5515022	WGMR2050	1.25	1.25	5.96	5.53	4.96	1.70	—
<b>left hand</b>								
5514976	WGML16	1.00	1.00	5.96	5.53	4.96	1.70	.24
5515023	WGML2050	1.25	1.25	5.96	5.53	4.96	1.70	—

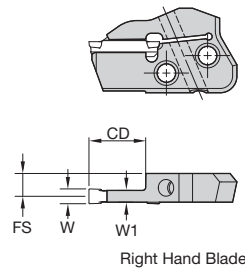
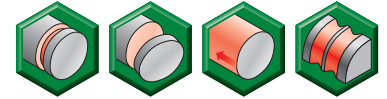
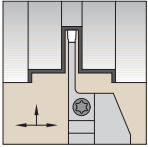
Toolholder Style	Hand of Holder	Hand of Blade
WGMS – Straight Mount	Right	Right
	Left	Left
WGME – End Mount	Right	Left
	Left	Right



Grooving and Cut-Off Blades found on page E39.



Face Grooving Blades found on page E40.



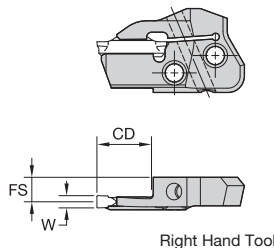
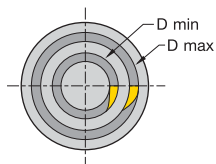
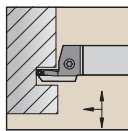
■ Grooving and Cut-Off

order number	catalog number	seat size	CD		W		FS		W1	
			mm	in	mm	in	mm	in	mm	in
<b>right hand</b>										
5359127	WMTWGMR114S	1	14,00	.551	1,50	.059	11,04	.435	1,22	.048
5359128	WMTWGMR213S	2	13,00	.512	2,00	.079	10,81	.426	1,68	.066
5359129	WMTWGMR2B16S	2B	16,50	.650	2,39	.094	10,71	.422	1,88	.074
5359130	WMTWGMR319S	3	19,00	.748	3,00	.118	10,38	.409	2,54	.100
5359131	WMTWGMR419S	4	19,00	.748	4,00	.157	10,00	.394	3,30	.130
5359132	WMTWGMR522S	5	22,00	.866	5,00	.197	9,82	.387	3,66	.144
5359133	WMTWGMR622S	6	22,00	.866	6,00	.236	9,26	.365	4,78	.188
<b>left hand</b>										
5359120	WMTWGML114S	1	14,00	.551	1,50	.059	11,04	.435	1,22	.048
5359121	WMTWGML213S	2	13,00	.512	2,00	.079	10,81	.426	1,68	.066
5359122	WMTWGML2B16S	2B	16,50	.650	2,39	.094	10,71	.422	1,88	.074
5359123	WMTWGML319S	3	19,00	.748	3,00	.118	10,38	.409	2,54	.100
5359124	WMTWGML419S	4	19,00	.748	4,00	.157	10,00	.394	3,30	.130
5359125	WMTWGML522S	5	22,00	.866	5,00	.197	9,82	.387	3,66	.144
5359126	WMTWGML622S	6	22,00	.866	6,00	.236	9,26	.365	4,78	.188

NOTE: Blade and clamp screw torque equals 71–88 in. lbs. (8–10 Nm).

Toolholder Style	Hand of Holder	Hand of Blade
WGMS – Straight Mount	Right	Right
	Left	Left
WGME – End Mount	Right	Left
	Left	Right

Grooving and Cut-Off



Grooving and Cut-Off

■ Face Grooving

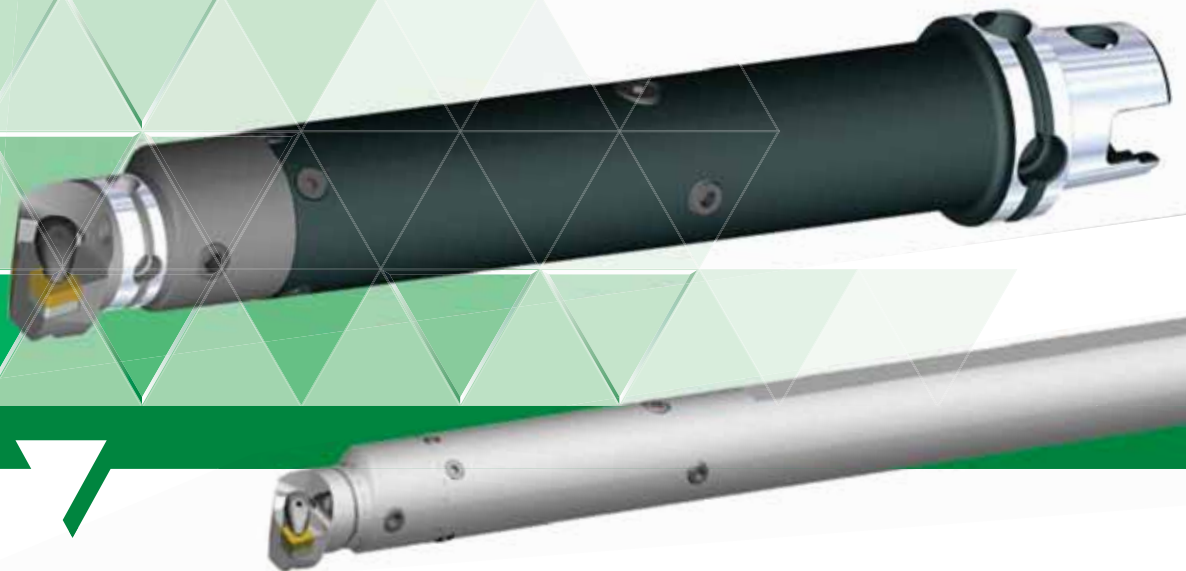
order number	catalog number	seat size	D min		D max		CD		W		FS	
			mm	in	mm	in	mm	in	mm	in	mm	in
<b>right hand</b>												
5359150	WMTWGMR313B038-052	3	38,00	1.496	52,00	2.047	12,70	.500	3,00	.118	11,00	.433
5359151	WMTWGMR316B052-070	3	52,00	2.047	70,00	2.756	15,88	.625	3,00	.118	11,00	.433
5359154	WMTWGMR416B052-070	4	52,00	2.047	70,00	2.756	15,88	.625	4,00	.157	10,50	.413
5359152	WMTWGMR316B070-100	3	70,00	2.756	100,00	3.937	15,88	.625	3,00	.118	11,00	.433
5359155	WMTWGMR416B070-100	4	70,00	2.756	100,00	3.937	15,88	.625	4,00	.157	10,50	.413
5359153	WMTWGMR319B100-205	3	100,00	3.937	205,00	8.071	19,05	.750	3,00	.118	11,00	.433
5359156	WMTWGMR419B100-205	4	100,00	3.937	205,00	8.071	19,05	.750	4,00	.157	10,50	.413
5359157	WMTWGMR522B100-205	5	100,00	3.937	205,00	8.071	22,00	.866	5,00	.197	10,00	.394
5359158	WMTWGMR622B100-205	6	100,00	3.937	205,00	8.071	22,00	.866	6,00	.236	10,00	.394
<b>left hand</b>												
5359146	WMTWGML616B030-052	6	30,00	1.181	52,00	2.047	15,88	.625	6,00	.236	10,00	.394
5359134	WMTWGML313B038-052	3	38,00	1.496	52,00	2.047	12,70	.500	3,00	.118	11,00	.433
5359138	WMTWGML413B038-052	4	38,00	1.496	52,00	2.047	12,70	.500	4,00	.157	10,50	.413
5359142	WMTWGML516B038-052	5	38,00	1.496	52,00	2.047	15,88	.625	5,00	.197	10,00	.394
5359135	WMTWGML316B052-070	3	52,00	2.047	70,00	2.756	15,88	.625	3,00	.118	11,00	.433
5359139	WMTWGML416B052-070	4	52,00	2.047	70,00	2.756	15,88	.625	4,00	.157	10,50	.413
5359143	WMTWGML519B052-070	5	52,00	2.047	70,00	2.756	19,05	.750	5,00	.197	10,00	.394
5359147	WMTWGML619B052-070	6	52,00	2.047	70,00	2.756	19,05	.750	6,00	.236	10,00	.394
5359136	WMTWGML316B070-100	3	70,00	2.756	100,00	3.937	15,88	.625	3,00	.118	11,00	.433
5359140	WMTWGML416B070-100	4	70,00	2.756	100,00	3.937	15,88	.625	4,00	.157	10,50	.413
5359144	WMTWGML519B070-100	5	70,00	2.756	100,00	3.937	19,05	.750	5,00	.197	10,00	.394
5359148	WMTWGML619B070-100	6	70,00	2.756	100,00	3.937	19,05	.750	6,00	.236	10,00	.394
5359137	WMTWGML319100-205	3	100,00	3.937	205,00	8.071	19,05	.750	3,00	.118	11,00	.433
5359141	WMTWGML419B100-205	4	100,00	3.937	205,00	8.071	19,05	.750	4,00	.157	10,50	.413
5359145	WMTWGML522B100-205	5	100,00	3.937	205,00	8.071	22,00	.866	5,00	.197	10,00	.394
5359149	WMTWGML622B100-205	6	100,00	3.937	205,00	8.071	22,00	.866	6,00	.236	10,00	.394

NOTE: Blade and clamp screw torque equals 71–88 in. lbs. (8–10 Nm).

Toolholder Style	Hand of Holder	Hand of Blade
WGMS – Straight Mount	Right	Right
	Left	Left
WGME – End Mount	Right	Left
	Left	Right



# WIDIA™ Tunable Tooling



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

Internal dampening package eliminates chatter, vibration, and harmonics in all your deep-hole boring applications!

- Proprietary features provide superior surface finish and increased productivity.
- Wide product offering — from boring bars, extensions, and holders to rotating adapters and modular sections.
- Reduce setup time with KM™ Quick Change tooling — now an ISO standard!
- Customize WIDIA pre-tuned boring bars — after they're on the machine — to optimize performance in your specific machining operations.

For tighter tolerances, reduced scrap rates, and improved tool life, you can rely on WIDIA Tunable Tooling!

To learn more, contact your local Authorized Distributor or visit [widia.com](http://widia.com)

**WIDIA** 

## WIDIA™ TopGroove™ for Shallow Grooving and Face Grooving

# TopGroove

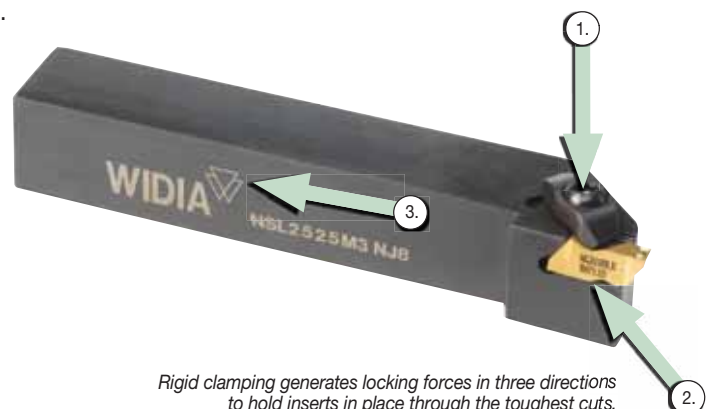


WIDIA has set the industry standard for threading and grooving productivity with the TopGroove clamping design. The TopGroove design provides consistent tool performance, accurate indexing, and superior clamping to provide excellent surface finish and outstanding tool life.

Let us help you select the correct insert for your application needs or upgrade your current TopGroove tooling inventory to include chip control geometries and the high productivity grades available from WIDIA.

### Rigidity, Versatility, and Chip Control

- TopGroove clamping design features a rugged bridge clamp, which locates in a groove molded into the insert to provide superior resistance to side and radial cutting forces.
- TopGroove inserts are available for shallow grooving, deep grooving, light turning, profiling, shallow and deep face grooving, back turning, undercutting, and Poly-Vee grooving.
- The proprietary WIDIA chip control design works in multi-directional turning as well as radial feed applications to provide excellent chip evacuation in deep grooving applications.



*Rigid clamping generates locking forces in three directions to hold inserts in place through the toughest cuts.*

TopGroove inserts employ a unique top rake chip control geometry that efficiently evacuates chips and produces better quality parts faster.

The WIDIA™ TopGroove™ clamping system offers a complete line of grooving geometries and an extensive grade selection.



## Carbide Grades and Proven Solutions for High Productivity

- The TopGroove system has a carbide grade to match your application needs that include uncoated grades, PVD-coated grades, CVD-coated grades, and advanced material grades, including cermets, ceramics, PcBNs, and PCDs (as custom solutions).
- PVD TiAlN-coated grades are designed to cut a variety of workpiece materials.
- Versatile design enables one system to handle O.D. and I.D. grooving, face grooving, back turning, undercutting, and even threading operations.

## The Most Advanced Turning Solutions in the Industry

Perfect for shallow grooving operations, the WIDIA™ TopGroove clamping system provides a complete line of grooving geometries and an extensive grade selection to meet even the most demanding application requirements. For increased rigidity, versatility, chip control, and carbide grade options, the TopGroove clamping system is the proven solution.

With maximum clamping rigidity and superior versatility, TopGroove inserts employ a unique top rake chip control geometry that efficiently evacuates chips and produces better quality parts, faster than ever before.

Utilize this comprehensive, easy-to-use guide for the information necessary to identify, choose, and select the appropriate cutting tools for your specific needs.

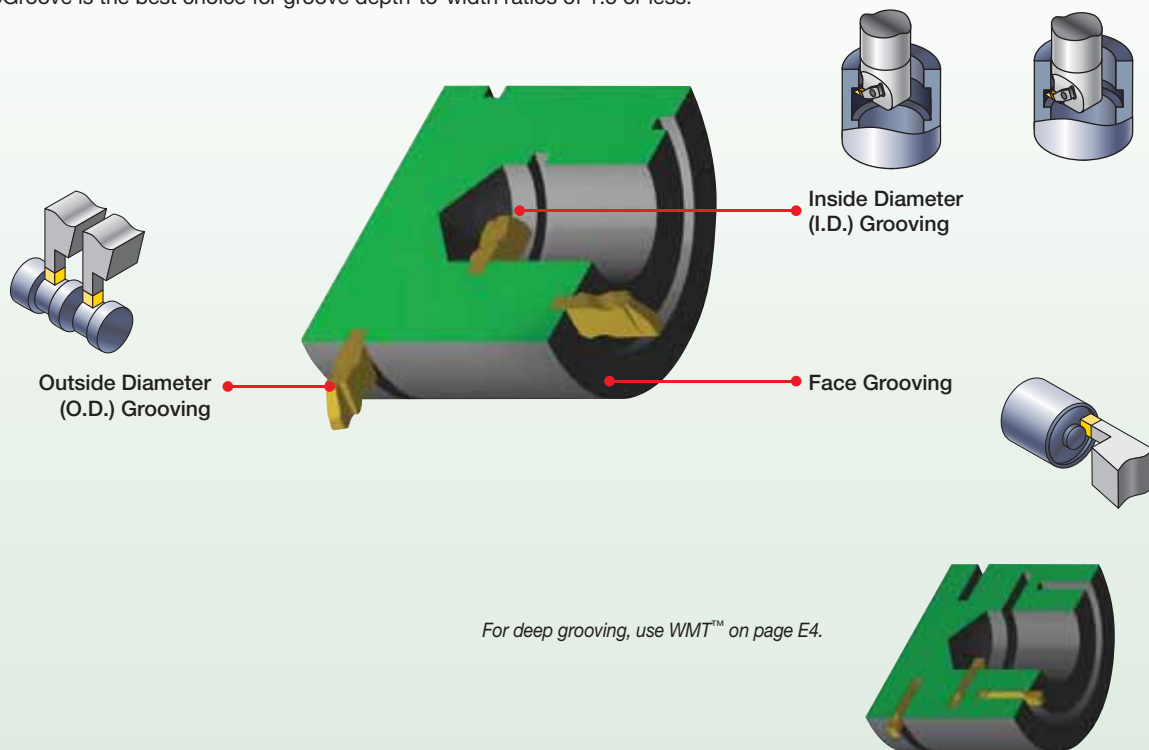
### What you need to know:

- Material being machined.
- Groove depth, width, and profile.
- Application to be performed (face, O.D., or I.D. grooving).
- Toolholder requirements (e.g. KM™, ERICKSON™, square shank, right/left).

### 1 Choose the application to be performed:

Groove depth, width, and profile.

TopGroove is the best choice for groove depth-to-width ratios of 1.5 or less.



### TopGroove™ for Internal, External, and Face Grooving Applications

system capabilities			minimum	maximum
	O.D./I.D. Grooving	width	.020" (0,50mm)	.375" (9,53mm)
		depth	—	.500" (12,7mm)
	Face Grooving	width	.125" (3,2mm)	.250" (6,35mm)
		depth	—	.500" (12,7mm)
	Internal Grooving	diameter	.440" (11,2mm)	—
	Face Grooving Diameter	standard	.940" (23,9mm)	—
		deep	—	—
	Deep O.D./I.D. Grooving	width	.059" (1,50mm)	.250" (6,35mm)
		depth	—	.500" (12,7mm)
	Deep Face Grooving	width	.125" (3,18mm)	.250" (6,35mm)
		depth	—	.500" (12,7mm)

**2 Identify the material to be machined:**

Each tool has a material grid marked with a letter indicating the materials that can be machined.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

**3 Select your toolholder based on the application:**

- A** Choose the appropriate gage insert (width) required for the application.
- B** Choose the shortest cutting depth "CD" dimension for increased tool rigidity.
- C** Select the largest toolholder shank "H" and "B" dimensions for maximum rigidity.

**TopGroove™**  
Toolholders

■ NS

order number	catalog number	C		F	L1	L2	B4	CD	gage insert	clamp	clamp screw	clamp screw	hex/Torx Plus
		H	B										
<b>right hand</b>													
3632147	NSR062	.375	.375	.562	2.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639035	NSR082V	.500	.500	.750	3.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639044	NSR102B	.625	.625	.875	4.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639026	NSR122B	.750	.750	1.000	4.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639027	NSR123A	.750	.750	1.000	4.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3639023	NSR123B	.750	.750	1.000	4.50	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3639025	NSR162C	1.000	1.000	1.250	5.00	.75	.35	.138	N.2R	CM74	S310	—	7/64
3638592	NSR163C	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3638591	NSR163D	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3639028	NSR203D	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3637509	NSR205D	1.250	1.250	1.500	6.00	2.00	.61	.415	N.5R	CM80	S352	—	1/4
3637506	NSR243D	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3637535	NSR243E	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3637540	NSR245D	1.500	1.500	2.000	6.00	2.00	.61	.415	N.5R	CM80	S352	—	1/4
3637496	NSR853D	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
<b>left hand</b>													
3632161	NSL062	.375	.375	.562	2.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3637485	NSL082V	.500	.500	.750	3.50	.75	.35	.138	N.2L	CM75	S310	—	7/64

		application	conventional toolholders	modular blades
		O.D. Grooving and Plunge and Turn	pages E78–E82	—
		I.D. Grooving	pages E84–E85	—

**4 Select chipbreaker style for the application:**

See application guide on page E50 for a complete list of insert styles.

NOTE: Chart shows recommended starting feed rates.

See page E51.

WIDIA
TopGroove™  
Feed Values for Grooving Inserts

**TopGroove • NG-K, NG-1L, and NG**

- Chip control enables true optimization and productivity.
- For general-purpose, O-ring, and circlip grooving applications.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.

**TopGroove • NGP and NGD-K**

- Positive rake angles.
- For deep, O-ring, circlip, and general-purpose grooving applications.
- Chip geometry for excellent chip control.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.

**TopGroove • NR and NR-K**

- For full radius grooving and turning profiling applications.

- A Choose the appropriate insert width “W” for your specific application.
- B Select the required corner radius value “RR”.





TopGroove™  
Grooving Inserts
WIDIA

Right-hand insert shown; left-hand insert is mirror image.

■ NG • Grooving Inserts

catalog number	insert size	A		B		T		P	M	K	N	S	H
		mm	in	mm	in	mm	in						
NG2041R	2	0.79	.031	0.28	.011	1.27	.050	•	•	•	•	•	•
NG2041R	2	1.08	.041	0.28	.011	1.27	.050	•	•	•	•	•	•
NG3047R	3	1.19	.047	0.19	.008	1.01	.075	•	•	•	•	•	•
NG2059R	2	1.47	.058	0.19	.008	1.27	.050	•	•	•	•	•	•
NG3062R	3	1.58	.062	0.19	.008	2.30	.094	•	•	•	•	•	•
NG3062R	2	1.58	.062	0.19	.008	2.79	.110	•	•	•	•	•	•

**5 Select grade:**

		Recommended Grades					
cutting condition		steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
smooth cut, pre-turned surface		TN7110	TN6010	TN7110	TN6010/THM	TN6010	TN6010
varying depth of cut, casting, or forging skin		TN6010	TN6010	TN6010	TN6010/THM	TN6010	TN6010
lightly interrupted cut		TN6025	TN6025	TN6025	TN6010/THM	TN6025	TN6025
heavily interrupted cut		TN6025	TN6025	TN6025	TN6010/THM	TN6025	TN6025

See page E49 for Grades and Grade Descriptions.

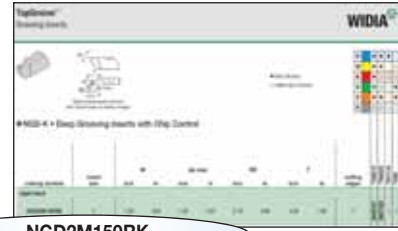
**6 Determine cutting data:**

- A Based on material group and grade, identify starting speed (vc).
- B First choice starting speed is in **bold**.

See page E52–E53 for cutting data.

		TopGroove™ Recommended Cutting Speeds • Metric											
		Cutting Speed – vc m/min											
Material Group		TN6010			TN6025			TN7110			THM		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	0 / 1	140	<b>175</b>	210	130	<b>140</b>	150	200	<b>215</b>	230	90	<b>95</b>	100
	2	115	145	175	110	140	175	170	<b>220</b>	270	75	100	125
	3	115	145	175	110	140	175	170	<b>220</b>	270	75	100	125
	4	75	<b>130</b>	120	75	<b>95</b>	115	115	<b>148</b>	175	55	85	80
	5	105	<b>140</b>	170	100	120	145	155	<b>190</b>	220	70	85	100
	6	45	60	75	40	55	65	65	<b>95</b>	100	30	40	45
M	1	90	115	140	80	75	90	–	–	–	60	75	90
	2	55	70	90	40	50	55	–	–	–	50	60	75
	3	60	80	95	40	50	60	–	–	–	40	50	55
K	1	120	150	180	80	80	90	175	<b>220</b>	275	70	90	100
	2	120	150	180	80	75	85	160	<b>215</b>	265	50	65	80
	3	110	<b>140</b>	170	85	75	90	180	<b>230</b>	280	60	70	80
N	1	600	750	900	600	750	900	–	–	–	600	750	900
	2	535	665	835	535	665	835	–	–	–	500	660	800
	3	290	<b>395</b>	370	230	<b>300</b>	370	–	–	–	600	750	900
	4	135	180	225	135	180	225	–	–	–	500	650	800
	5	70	90	110	70	90	110	–	–	–	230	300	370
	6	445	565	690	445	565	690	–	–	–	150	200	250
	7	550	700	850	550	700	850	–	–	–	150	200	250
S	1	35	40	50	25	35	40	–	–	–	25	35	45
	2	20	20	30	15	20	20	–	–	–	20	30	35
	3	60	70	90	40	60	70	–	–	–	15	25	30
	4	30	<b>35</b>	45	20	<b>30</b>	35	–	–	–	10	15	20
H	1	–	–	–	15	30	60	15	30	60	–	–	–
	2	–	–	–	15	30	60	15	30	60	–	–	–
	3	–	–	–	15	30	60	15	30	60	–	–	–
	4	–	–	–	15	30	60	15	30	60	–	–	–

# TopGroove Insert Identification System



NGD2M150RK

N	G	D	2	M	150	R		K																								
Type of Insert	Insert Style	Additional Information	Insert Size	Size Identification	Groove Size**	Hand of Insert	Cutting Depth	Chipbreaker Design	Definition of Inserts																							
<p><b>N</b> – TopGroove</p>	<p><b>B</b> – Blank (for special forms)</p> <p><b>F</b> – Face grooving</p> <p><b>G</b> – Grooving</p> <p><b>P</b> – Back turning</p> <p><b>R</b> – Full radius</p> <p><b>U</b> – Undercutting (or relieving)</p> <p><b>V</b> – Poly-Vee</p>	<p><b>D</b> – Deep grooving</p> <p><b>P</b> – Positive</p> <p><b>C</b> – Groove and chamfer</p>	<p><b>2</b> – Grooving inserts with Chip Control</p>	<p><b>M</b> – Metric insert groove width</p> <p><b>C</b> – Circlip groove insert width is nominal circlip size</p> <p><b>Blank</b> – Indicates inch width insert</p> <table border="1"> <thead> <tr> <th rowspan="2">insert number</th> <th colspan="2">W1</th> </tr> <tr> <th>mm</th> <th>inch</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2,54</td> <td>.100</td> </tr> <tr> <td>2</td> <td>3,81</td> <td>.150</td> </tr> <tr> <td>3</td> <td>4,95</td> <td>.195</td> </tr> <tr> <td>4</td> <td>6,98</td> <td>.255</td> </tr> <tr> <td>5</td> <td>9,65</td> <td>.380</td> </tr> <tr> <td>6</td> <td>9,73</td> <td>.383</td> </tr> </tbody> </table>	insert number	W1		mm	inch	1	2,54	.100	2	3,81	.150	3	4,95	.195	4	6,98	.255	5	9,65	.380	6	9,73	.383	<p><b>150</b> – Groove Size**</p>	<p><b>L</b> – Left hand</p> <p><b>R</b> – Right hand</p>	<p>Shown for groove and chamfer inserts in .0004" increments.</p>	<p><b>K</b> – Standard chip control</p> <p><b>E</b> – Hone only</p>	<p><b>Groove size</b></p> <p><b>J</b> or <b>L</b> – Poly-Vee inserts</p> <p><b>I</b> – Internal face grooving</p>
insert number	W1																															
	mm	inch																														
1	2,54	.100																														
2	3,81	.150																														
3	4,95	.195																														
4	6,98	.255																														
5	9,65	.380																														
6	9,73	.383																														

Position pertains to groove width for F-, G-, and U-style inserts, radii for R-style grooving inserts, and circlip size for groove and chamfer inserts. Dimension in .001" or 0,01mm.  
**Inch example:** 1/32" width groove or radius equals "031" catalog position number.  
**Metric example:** 3,25mm width groove or radius equals "325" catalog position number.  
 Width Tolerance: ±.001" (±0,025mm) unless otherwise specified.

\*\*Omit position for TopGroove NB-style blanks.

### TopGroove/TopThread Threading and Grooving Insert Dimensions

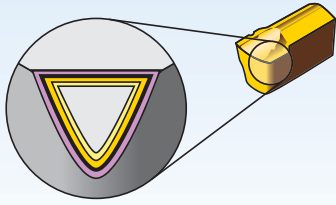
insert size	S		W1	
	mm	inch	mm	Inch
1	2,54	.100	2,54	.100
2	5,56	.219	3,81	.150
3	8,74	.344	4,95	.195
4	11,51	.453	6,48	.255
5	17,48	.688	9,65	.380
6	11,51	.453	9,73	.383
8	7,93	.312	11,13	.438

### TopGroove/TopThread Holder Design

**NOTE:** Holders are designed to locate insert inclined to 3° to provide back clearance down open side.

WIDIA™ TopGroove, and TopThread™ tooling technology combine to bring you the very best threading and grooving system available in the world today.





Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

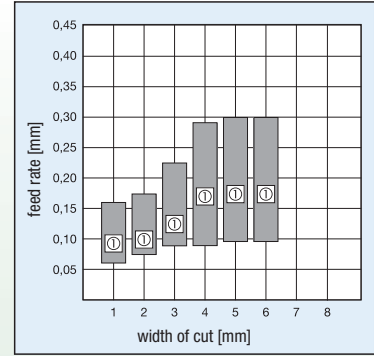
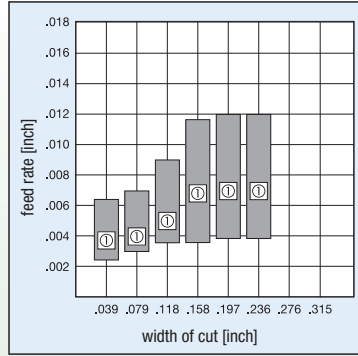
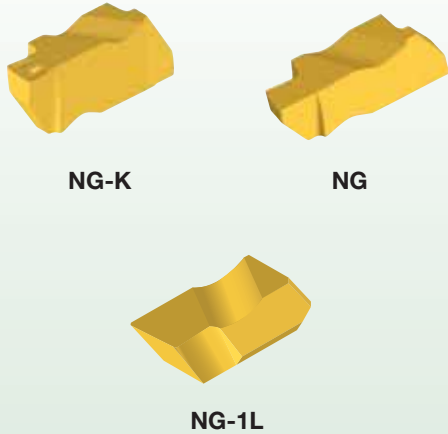
Grade	Coating	Grade Description		Performance																	
				05	10	15	20	25	30	35	40	45									
TN6010	HC-S10	An advanced PVD TiAlN coating over a very deformation-resistant unalloyed carbide substrate. TN6010 is ideal for finishing to general machining of most workpiece materials at higher speeds. Excellent for machining most steels, stainless steels, cast irons, non-ferrous materials, and super alloys under stable conditions. It also performs well machining hardened and short chipping materials.	P																		
			M																		
			K																		
			N																		
			S																		
			H																		
TN6025	HC-S25	An advanced PVD TiAlN-coated grade with a tough, ultra-fine-grain unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temp alloys, titanium, irons, and non-ferrous materials. Speeds may vary from low to medium and will handle interruptions and high feed rates.	P																		
			M																		
			K																		
			N																		
			S																		
			H																		
TN7110	HC-P10	Coated carbide. MTCVD/CVD — TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN. Very wear resistant. Light and medium machining. For steels and nodular cast iron.	P																		
			M																		
			K																		
THM	HW-K15	Uncoated carbide. Extraordinarily good balance of hardness, wear resistance, edge stability, and toughness. Light and medium machining. For cast iron and all non-ferrous metals and non-metals. Useful in unfavorable conditions.	P																		
			M																		
			K																		
			N																		
			S																		
			H																		



insert style	application	rake angle	page(s)	insert style	application	rake angle	page(s)
<b>NG</b> 	<ul style="list-style-type: none"> <li>• General-purpose grooving.</li> <li>• O-ring grooving.</li> <li>• Circlip grooving.</li> </ul>	neutral	<b>E54–E56</b>	<b>NFD-KI*</b> 	<ul style="list-style-type: none"> <li>• Internal deep face grooving with chip control.</li> <li>• For use in boring bars for internal face grooves.</li> </ul>	10° positive	—
<b>NG-K</b> 	<ul style="list-style-type: none"> <li>• Chip control geometry.</li> <li>• General-purpose grooving.</li> <li>• O-ring grooving.</li> <li>• Circlip grooving.</li> <li>• Light turning.</li> </ul>	10° positive	<b>E57–E63</b>	<b>NP-K</b> 	<ul style="list-style-type: none"> <li>• Turning.</li> <li>• Back turning positive.</li> <li>• Profiling with chip control.</li> </ul>	10° positive	<b>E70</b>
<b>NGC-K*</b> 	<ul style="list-style-type: none"> <li>• Combined groove and chamfered edge break in one positive plunge with chip control.</li> <li>• Designed for DIN 471/472 standard circlip grooves.</li> </ul>	10° positive	—	<b>NR</b> 	<ul style="list-style-type: none"> <li>• Full radius grooving.</li> <li>• Turning and profiling.</li> </ul>	neutral	<b>E71–E73</b>
<b>NGD*</b> 	<ul style="list-style-type: none"> <li>• Deep grooving.</li> </ul>	neutral	—	<b>NR-K</b> 	<ul style="list-style-type: none"> <li>• Chip control geometry.</li> <li>• Full radius grooving, turning, and profiling.</li> </ul>	10° positive	<b>E74</b>
<b>NGD-K</b> 	<ul style="list-style-type: none"> <li>• Chip control geometry.</li> <li>• Deep grooving.</li> <li>• Light turning.</li> </ul>	10° positive	<b>E64–E66</b>	<b>NRD</b> 	<ul style="list-style-type: none"> <li>• Deep grooving.</li> <li>• Full radius end-form.</li> </ul>	neutral	<b>E75</b>
<b>NGP</b> 	<ul style="list-style-type: none"> <li>• General-purpose grooving.</li> <li>• O-ring grooving.</li> <li>• Circlip grooving.</li> </ul>	5° positive	<b>E67–E68</b>	<b>NRP*</b> 	<ul style="list-style-type: none"> <li>• Full radius grooving.</li> <li>• Light-turning profiling.</li> </ul>	5° positive	—
<b>NF*</b> 	<ul style="list-style-type: none"> <li>• Face grooving.</li> <li>• Additional side clearance.</li> </ul>	neutral	—	<b>NU*</b> 	<ul style="list-style-type: none"> <li>• Undercutting.</li> </ul>	neutral	—
<b>NF-K</b> 	<ul style="list-style-type: none"> <li>• Face grooving with chip control.</li> <li>• Additional side clearance.</li> </ul>	10° positive	<b>E69</b>	<b>NV*</b> 	<ul style="list-style-type: none"> <li>• Poly-Vee grooving.</li> </ul>	neutral	—
<b>NFD-K</b> 	<ul style="list-style-type: none"> <li>• Deep face grooving with chip control.</li> <li>• Additional side clearance.</li> </ul>	10° positive	<b>E70</b>	<b>NB/NBD</b> 	<ul style="list-style-type: none"> <li>• Blanks.</li> <li>• Blanks for deep grooving.</li> <li>• Available in uncoated grades only.</li> </ul>	—	<b>E76</b>

\*Inserts are available as custom solutions.

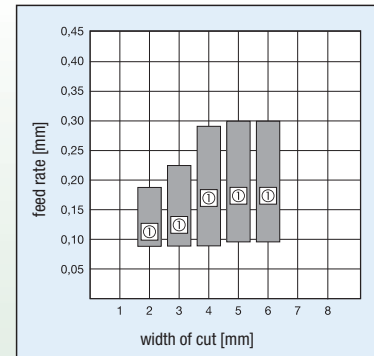
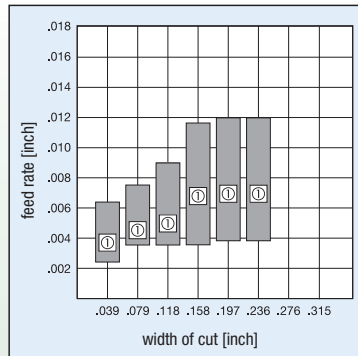
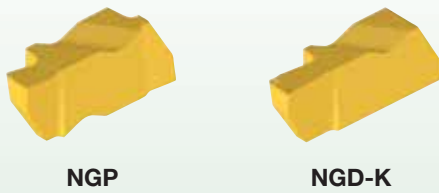
**TopGroove • NG-K, NG-1L, and NG**



① Recommended Starting Feed

- Chip control enables true optimization and productivity.
- For general-purpose, O-ring, and circlip grooving applications.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.

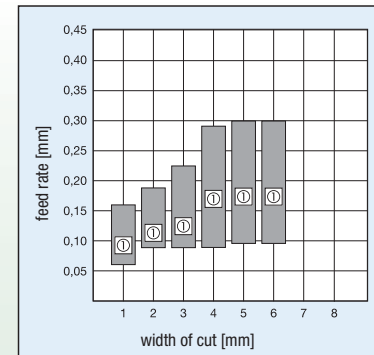
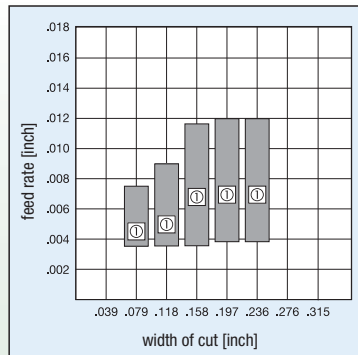
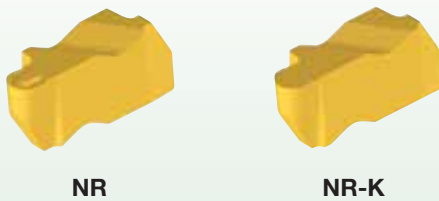
**TopGroove • NGP and NGD-K**



① Recommended Starting Feed

- Positive rake angles.
- For deep, O-ring, circlip, and general-purpose grooving applications.
- Chip geometry for excellent chip control.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.

**TopGroove • NR and NR-K**



① Recommended Starting Feed

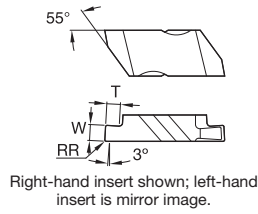
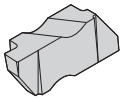
- For full radius grooving and turning profiling applications.
- Chip geometry for excellent chip control.
- Precision ground for accurate edge location.
- Can be used in both toolholders and boring bars.

Grooving and Cut-Off

Material Group		Cutting Speed – vc m/min											
		TN6010			TN6025			TN7110			THM		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	0/1	140	175	210	130	140	150	200	215	230	90	95	100
	2	115	145	175	110	145	175	170	220	270	75	100	125
	3	115	145	175	110	145	175	170	220	270	75	100	125
	4	75	100	120	75	95	115	115	145	175	55	65	80
	5	105	140	170	100	125	145	155	190	220	70	85	100
	6	45	60	75	40	55	65	65	85	100	30	40	45
M	1	90	115	140	60	75	90	-	-	-	60	75	90
	2	55	70	90	40	50	55	-	-	-	50	60	75
	3	60	80	95	40	50	60	-	-	-	40	50	55
K	1	120	150	180	60	80	90	175	220	275	70	90	100
	2	120	150	180	60	75	85	165	215	265	50	65	80
	3	110	140	170	60	75	90	180	230	280	60	70	80
N	1	600	750	900	600	750	900	-	-	-	600	750	900
	2	535	685	835	535	685	835	-	-	-	500	650	800
	3	230	300	370	230	300	370	-	-	-	600	750	900
	4	135	180	225	135	180	225	-	-	-	500	650	800
	5	70	90	110	70	90	110	-	-	-	230	300	370
	6	445	565	690	445	565	690	-	-	-	150	200	250
	7	550	700	850	550	700	850	-	-	-	150	200	250
S	1	35	40	50	25	35	40	-	-	-	25	35	45
	2	20	20	30	15	20	20	-	-	-	20	30	35
	3	60	70	80	40	60	70	-	-	-	15	25	30
	4	30	35	45	20	30	35	-	-	-	10	15	20
H	1	15	30	60	15	30	60	-	-	-	10	20	35
	2	15	30	60	15	30	60	-	-	-	10	20	35
	3	15	30	60	15	30	60	-	-	-	10	20	35
	4	15	30	60	15	30	60	-	-	-	10	20	35

Material Group		Cutting Speed – vc SFM											
		TN6010			TN6025			TN7110			THM		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
<b>P</b>	0/1	455	<b>570</b>	685	425	<b>455</b>	490	655	<b>705</b>	750	295	<b>310</b>	325
	2	380	<b>475</b>	575	360	<b>465</b>	575	555	<b>720</b>	885	245	<b>320</b>	405
	3	380	<b>475</b>	575	360	<b>465</b>	575	555	<b>720</b>	885	245	<b>320</b>	405
	4	245	<b>320</b>	390	235	<b>300</b>	365	370	<b>470</b>	570	170	<b>210</b>	260
	5	345	<b>450</b>	555	325	<b>400</b>	475	510	<b>615</b>	720	230	<b>280</b>	330
	6	145	<b>195</b>	245	130	<b>180</b>	210	210	<b>275</b>	325	95	<b>130</b>	145
<b>M</b>	1	295	<b>390</b>	490	195	<b>245</b>	295	–	–	–	180	<b>220</b>	270
	2	180	<b>245</b>	310	130	<b>160</b>	180	–	–	–	115	<b>145</b>	165
	3	195	<b>260</b>	320	130	<b>165</b>	195	–	–	–	225	<b>295</b>	325
<b>K</b>	1	390	<b>490</b>	590	195	<b>255</b>	295	570	<b>720</b>	900	195	<b>255</b>	295
	2	390	<b>490</b>	590	195	<b>240</b>	280	535	<b>700</b>	875	195	<b>240</b>	280
	3	360	<b>455</b>	555	195	<b>245</b>	295	590	<b>750</b>	920	195	<b>245</b>	295
<b>N</b>	1	1965	<b>2460</b>	2950	1965	<b>2460</b>	2950	–	–	–	1805	<b>2295</b>	2785
	2	1750	<b>2240</b>	2730	1750	<b>2240</b>	2730	–	–	–	1805	<b>2295</b>	2785
	3	750	<b>980</b>	1210	750	<b>980</b>	1210	–	–	–	1805	<b>2295</b>	2785
	4	445	<b>590</b>	730	445	<b>590</b>	730	–	–	–	1195	<b>1555</b>	1915
	5	230	<b>295</b>	360	230	<b>295</b>	360	–	–	–	620	<b>820</b>	1015
	6	1450	<b>1855</b>	2260	1450	<b>1855</b>	2260	–	–	–	490	<b>655</b>	820
	7	1805	<b>2295</b>	2785	1805	<b>2295</b>	2785	–	–	–	425	<b>555</b>	690
<b>S</b>	1	110	<b>130</b>	165	75	<b>110</b>	130	–	–	–	75	<b>110</b>	130
	2	55	<b>65</b>	90	40	<b>55</b>	65	–	–	–	60	<b>85</b>	105
	3	195	<b>235</b>	260	135	<b>195</b>	235	–	–	–	45	<b>60</b>	75
	4	–	–	–	–	–	–	–	–	–	35	<b>50</b>	55
<b>H</b>	1	60	<b>100</b>	200	60	<b>100</b>	200	–	–	–	35	<b>70</b>	115
	2	60	<b>100</b>	200	60	<b>100</b>	200	–	–	–	35	<b>70</b>	115
	3	60	<b>100</b>	200	60	<b>100</b>	200	–	–	–	35	<b>70</b>	115
	4	60	<b>100</b>	200	60	<b>100</b>	200	–	–	–	35	<b>70</b>	115

Grooving and Cut-Off



● first choice  
○ alternate choice

P		●	●	●	○
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○	○	○

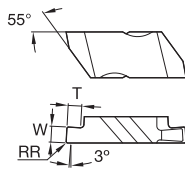
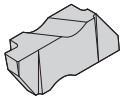
■ NG • Grooving Inserts

Grooving and Cut-Off

catalog number	insert size	W		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in				
right hand											
NG2031R	2	0,79	.031	0,09	.004	1,27	.050	3607153	3607495		3607030
NG2041R	2	1,04	.041	0,09	.004	1,27	.050		3607330		
NG3047R	3	1,19	.047	0,19	.008	1,91	.075	3607157	3607416		
NG2058R	2	1,47	.058	0,19	.008	1,27	.050		3607450		
NG2062R	2	1,58	.062	0,19	.008	2,79	.110	3607167	3607453		3607027
NG3062R	3	1,58	.062	0,19	.008	2,39	.094	3607109	3607403		3607014
NG3094R	3	2,39	.094	0,19	.008	3,81	.150	3607137	3607406		3607018
NG3125R	3	3,18	.125	0,19	.008	3,81	.150	3607110	3607375		3607020
NG4250R	4	6,35	.250	0,57	.023	6,35	.250	3607143	3607382		

(continued)

(NG • Grooving Inserts — continued)



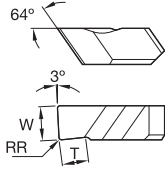
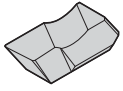
Right-hand insert shown; left-hand insert is mirror image.

● first choice  
○ alternate choice

P		●	●	●	○
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○	○	○

catalog number	insert size	W		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in				
<b>left hand</b>											
NG2031L	2	0,79	.031	0,09	.004	1,27	.050	3607482	3607482		
NG3047L	3	1,19	.047	0,19	.008	1,91	.075	3607179	3607501		3607036
NG2058L	2	1,47	.058	0,19	.008	1,27	.050	3607498	3607498		
NG2062L	2	1,58	.062	0,19	.008	2,79	.110	3607481	3607481		
NG3062L	3	1,58	.062	0,19	.008	2,39	.094	3607158	3607459		
NG3094L	3	2,39	.094	0,19	.008	3,81	.150	3607160	3607323		
NG3125L	3	3,18	.125	0,19	.008	3,81	.150	3607152	3607445		3607022
NG5M500L	5	5,00	.197	0,32	.013	9,52	.375	3636572	3636572		
NG4250L	4	6,35	.250	0,57	.023	6,35	.250	3607175	3607513		





● first choice  
○ alternate choice

P		●	●	●	○
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○	○	○

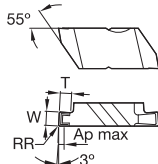
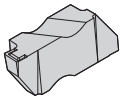
■ NG-1L • Grooving Inserts

catalog number	insert size	W		RR		T		cutting edges	TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in					
left hand												
NG1047L	1	1,19	.047	0,19	.008	1,91	.075	1		3636571		
NG1062L	1	1,58	.062	0,19	.008	1,91	.075	1		3636569		
NG1094L	1	2,39	.094	0,19	.008	1,91	.075	1		3636570		

NOTE: Width tolerance is +/- .003" (+/- 0,076mm) on NG-1L inserts.

Grooving and Cut-Off





Right-hand insert shown; left-hand insert is mirror image.

● first choice  
○ alternate choice

P	●	●	●	●
M	●	●	○	○
K	●	○	○	○
N	●	○	○	●
S	●	●	○	●
H	○	○	○	○

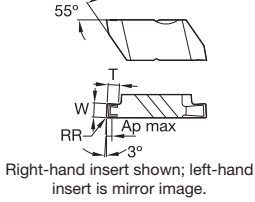
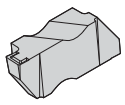
■ **NG-K • Grooving Inserts with Chip Control**

catalog number	insert size	W		Ap max		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in				
right hand													
NG2M050RK	2	0,50	.020	0,64	.025	0,09	.004	0,64	.025	3606991	3607394		
NG2031RK	2	0,79	.031	0,76	.030	0,09	.004	1,27	.050	3607090	3607313		
NG2M080RK	2	0,80	.032	0,76	.030	0,09	.004	1,27	.050	3606903	3607291		
NG2M100RK	2	1,00	.039	0,76	.030	0,09	.004	1,27	.050	3607129	3607218		
NG3M100RK	3	1,00	.039	0,76	.030	0,19	.008	1,91	.075	3607219	3607218		
NG2047RK	2	1,19	.047	0,76	.030	0,09	.004	1,27	.050	3607123	3607404		
NG3047RK	3	1,19	.047	0,76	.030	0,19	.008	1,91	.075	3607084	3607238		
NG2M120RK	2	1,20	.047	0,76	.030	0,09	.004	1,27	.050	3606679	3607299		
NG3M120RK	3	1,20	.047	0,76	.030	0,19	.008	1,91	.075	3606915	3607412		
NG2M140RK	2	1,40	.055	0,76	.030	0,09	.004	1,27	.050	3607151	3607318		
NG2M150RK	2	1,50	.059	1,09	.043	0,19	.008	2,79	.110	3607234	3607234		
NG3M150RK	3	1,50	.059	1,02	.040	0,19	.008	2,39	.094	3607221	3607221	3607668	
NG2062RK	2	1,58	.062	1,09	.043	0,19	.008	2,79	.110	3607089	3607215		
NG3062RK	3	1,58	.062	1,02	.040	0,19	.008	2,39	.094	3607055	3607070	3607628	
NG2M170RK	2	1,70	.067	1,09	.043	0,19	.008	2,79	.110	3606673	3607242		



(continued)

(NG-K • Grooving Inserts with Chip Control — continued)



● first choice  
○ alternate choice

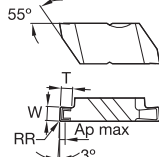
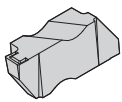
P		●	●	●	
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○		

Grooving and Cut-Off

catalog number	insert size	W		Ap max		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in				
NG2M175RK	2	1,75	.069	1,09	.043	0,19	.008	2,79	.110	●	●	●	●
NG3M175RK	3	1,75	.069	1,02	.040	0,19	.008	2,39	.094	○	○	○	○
NG3072RK	3	1,83	.072	1,02	.040	0,19	.008	2,39	.094	●	●	●	●
NG2M195RK	2	1,95	.077	1,09	.043	0,19	.008	2,79	.110	○	○	○	○
NG3078RK	3	1,98	.078	1,02	.040	0,19	.008	2,39	.094	●	●	●	●
NG2M200RK	2	2,00	.079	1,09	.043	0,19	.008	2,79	.110	○	○	○	○
NG3M200RK	3	2,00	.079	1,02	.040	0,19	.008	2,39	.094	●	●	●	●
NG2M220RK	2	2,20	.087	1,09	.043	0,19	.008	2,79	.110	○	○	○	○
NG3M220RK	3	2,20	.087	1,02	.040	0,19	.008	2,39	.094	●	●	●	●
NG3M225RK	3	2,24	.088	1,02	.040	0,19	.008	2,39	.094	○	○	○	○
NG2M225RK	2	2,25	.088	1,09	.043	0,19	.008	2,79	.110	●	●	●	●
NG2094RK	2	2,39	.094	1,09	.043	0,19	.008	2,79	.110	○	○	○	○
NG3094RK	3	2,39	.094	1,02	.040	0,19	.008	3,81	.150	●	●	●	●
NG2M250RK	2	2,50	.098	1,09	.043	0,19	.008	2,79	.110	○	○	○	○
NG3M250RK	3	2,50	.098	1,02	.040	0,19	.008	3,81	.150	●	●	●	●
NG2M275RK	2	2,75	.108	1,09	.043	0,19	.008	2,79	.110	○	○	○	○

(continued)

(NG-K • Grooving Inserts with Chip Control — continued)



Right-hand insert shown; left-hand insert is mirror image.

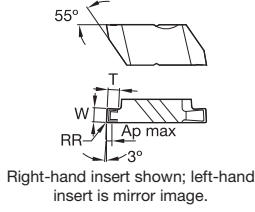
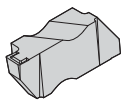
● first choice  
○ alternate choice

P	●	●	●	●
M	●	●	○	○
K	●	○	○	○
N	●	○	○	●
S	●	●	○	●
H	○	○	○	○

catalog number	insert size	W		Ap max		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in				
NG3M275RK	3	2,75	.108	1,02	.040	0,19	.008	3,81	.150	3606677	3607337		
NG2M300RK	2	3,00	.118	1,09	.043	0,19	.008	2,79	.110	3606676	3607340		
NG3M300RK	3	3,00	.118	1,02	.040	0,19	.008	3,81	.150	3607138	3607072		
NG4M300RK	4	3,00	.118	1,02	.040	0,19	.008	3,81	.150	3607388			
NG2125RK	2	3,18	.125	1,09	.043	0,19	.008	2,79	.110	3607155	3607381		
NG3125RK	3	3,18	.125	1,02	.040	0,19	.008	3,81	.150	3607057	3607068		
NG4125RK	4	3,18	.125	1,06	.040	0,19	.008	3,81	.150	3607163	3607449		
NG3M320RK	3	3,20	.126	1,02	.040	0,19	.008	3,81	.150	3607365			
NG2M325RK	2	3,25	.128	1,09	.043	0,19	.008	2,79	.110	3607533	3607533		
NG3M325RK	3	3,25	.128	1,02	.040	0,19	.008	3,81	.150	3607515	3607302		
NG3M350RK	3	3,50	.138	2,92	.115	0,32	.013	3,81	.150	3607302	3607302		
NG4M350RK	4	3,50	.138	2,92	.115	0,57	.023	6,35	.250	3607370			
NG3156RK	3	3,96	.156	2,92	.115	0,19	.008	3,81	.150	3607127	3607456		
NG3M400RK	3	3,99	.157	2,92	.115	0,32	.013	3,81	.150	3606678	3607235		
NG4M400RK	4	4,00	.158	2,92	.115	0,57	.023	6,35	.250	3606908	3607364		
NG3M425RK	3	4,24	.167	2,92	.115	0,32	.013	3,81	.150	3607517			



(NG-K • Grooving Inserts with Chip Control — continued)



● first choice  
○ alternate choice

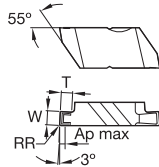
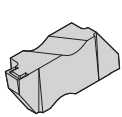
P		●	●	●	
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○		

Grooving and Cut-Off

catalog number	insert size	W		Ap max		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in				
NG3M450RK	3	4,50	.177	2,92	.115	0,32	.013	3,81	.150	●	●	●	●
NG4M450RK	4	4,50	.177	2,92	.115	0,57	.023	6,35	.250	●	●	●	●
NG3189RK	3	4,80	.189	2,92	.115	0,57	.023	3,81	.150	●	●	●	●
NG4189RK	4	4,80	.189	2,92	.115	0,57	.023	6,35	.250	●	●	●	●
NG4M500RK	4	5,00	.197	2,92	.115	0,32	.013	6,35	.250	●	●	●	●
NG4M550RK	4	5,50	.217	3,81	.150	0,57	.023	6,35	.250	●	●	●	●
NG4M600RK	4	6,00	.236	3,81	.150	0,57	.023	6,35	.250	●	●	●	●
NG4250RK	4	6,35	.250	3,81	.150	0,57	.023	6,35	.250	●	●	●	●
left hand													
NG2M050LK	2	0,50	.020	0,64	.025	0,09	.004	0,64	.025	●	●	●	●
NG2031LK	2	0,79	.031	0,76	.030	0,09	.004	1,27	.050	●	●	●	●
NG2M080LK	2	0,80	.032	0,76	.030	0,09	.004	1,27	.050	●	●	●	●
NG2M100LK	2	1,00	.039	0,76	.030	0,09	.004	1,27	.050	●	●	●	●
NG3M100LK	3	1,00	.039	0,76	.030	0,19	.008	1,91	.075	●	●	●	●
NG2047LK	2	1,19	.047	0,76	.030	0,09	.004	1,27	.050	●	●	●	●
NG3047LK	3	1,19	.047	0,76	.030	0,19	.008	1,91	.075	●	●	●	●

(continued)

(NG-K • Grooving Inserts with Chip Control — continued)



Right-hand insert shown; left-hand insert is mirror image.

● first choice  
○ alternate choice

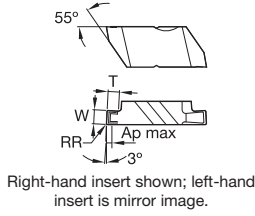
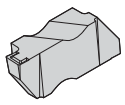
P	●	●	●	●	●
M	●	●	○	○	○
K	●	○	○	○	○
N	●	○	○	○	○
S	●	●	○	○	○
H	○	○	○	○	○

catalog number	insert size	W		Ap max		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in				
NG2M120LK	2	1,20	.047	0,76	.030	0,09	.004	1,27	.050	3606827	3607334		
NG3M120LK	3	1,20	.047	0,76	.030	0,19	.008	1,91	.075	3606917	3607384		
NG2M140LK	2	1,40	.055	0,76	.030	0,09	.004	1,27	.050	3606904	3607338		
NG2M150LK	2	1,50	.059	1,09	.043	0,19	.008	2,79	.110	3607294	3607294		
NG3M150LK	3	1,50	.059	1,02	.040	0,19	.008	2,39	.094	3607308	3607308	3607663	
NG2062LK	2	1,58	.062	1,09	.043	0,19	.008	2,79	.110	3607126	3607307		
NG3062LK	3	1,58	.062	1,02	.040	0,19	.008	2,39	.094	3607092	3607213	3607631	
NG2M170LK	2	1,70	.067	1,09	.043	0,19	.008	2,79	.110	3606905	3607327		
NG2M175LK	2	1,75	.069	1,09	.043	0,19	.008	2,79	.110	3607421	3607421		
NG3M175LK	3	1,75	.069	1,02	.040	0,19	.008	2,39	.094	3607331	3607331		
NG3072LK	3	1,83	.072	1,02	.040	0,19	.008	2,39	.094	3607184	3607454		
NG2M195LK	2	1,95	.077	1,09	.043	0,19	.008	2,79	.110	3606910	3607420		
NG3078LK	3	1,98	.078	1,02	.040	0,19	.008	2,39	.094	3607106	3607460		
NG2M200LK	2	2,00	.079	1,09	.043	0,19	.008	2,79	.110	3607144	3607207		
NG3M200LK	3	2,00	.079	1,02	.040	0,19	.008	2,39	.094	3607211	3607211	3607666	
NG2M220LK	2	2,20	.087	1,09	.043	0,19	.008	2,79	.110	3607367			



Grooving and Cut-Off

(NG-K • Grooving Inserts with Chip Control — continued)



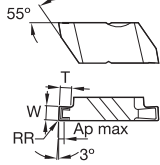
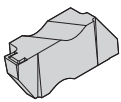
● first choice  
○ alternate choice

P		●	●	●	●
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○	○	○

Grooving and Cut-Off

catalog number	insert size	W		Ap max		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in				
NG3M220LK	3	2,20	.087	1,02	.040	0,19	.008	2,39	.094	—	—	—	—
NG3M225LK	3	2,24	.088	1,02	.040	0,19	.008	2,39	.094	3606909	3607329	3607516	—
NG2M225LK	2	2,25	.088	1,09	.043	0,19	.008	2,79	.110	3606907	3607413	—	—
NG2094LK	2	2,39	.094	1,09	.043	0,19	.008	2,79	.110	3607149	3607380	—	—
NG3094LK	3	2,39	.094	1,02	.040	0,19	.008	3,81	.150	3607058	3607204	—	—
NG2M250LK	2	2,50	.098	1,09	.043	0,19	.008	2,79	.110	—	3607518	—	—
NG3M250LK	3	2,50	.098	1,02	.040	0,19	.008	3,81	.150	—	3607300	—	—
NG2M275LK	2	2,75	.108	1,09	.043	0,19	.008	2,79	.110	3606913	3607292	—	—
NG3M275LK	3	2,75	.108	1,02	.040	0,19	.008	3,81	.150	3606831	3607297	—	—
NG2M300LK	2	3,00	.118	1,09	.043	0,19	.008	2,79	.110	3606680	3607326	—	—
NG3M300LK	3	3,00	.118	1,02	.040	0,19	.008	3,81	.150	3606522	3607212	—	—
NG4M300LK	4	3,00	.118	1,02	.040	0,19	.008	3,81	.150	—	3607386	—	—
NG2125LK	2	3,18	.125	1,09	.043	0,19	.008	2,79	.110	3607165	3607444	—	—
NG3125LK	3	3,18	.125	1,02	.040	0,19	.008	3,81	.150	3607061	3607203	—	—
NG4125LK	4	3,18	.125	1,06	.400	0,19	.008	3,81	.150	3607183	3607448	—	—
NG3M320LK	3	3,20	.126	1,02	.040	0,19	.008	3,81	.150	—	3607372	—	—

(NG-K • Grooving Inserts with Chip Control — continued)



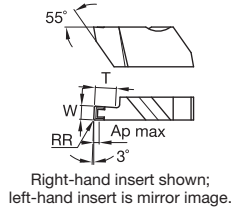
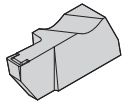
Right-hand insert shown; left-hand insert is mirror image.

● first choice  
○ alternate choice

P	●	●	●	●	●
M	●	●	●	○	○
K	●	○	○	○	○
N	●	○	○	○	○
S	●	●	○	○	○
H	○	○	○	○	○

catalog number	insert size	W		Ap max		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in				
NG2M325LK	2	3,25	.128	1,09	.043	0,19	.008	2,79	.110	●	●	●	●
NG3M325LK	3	3,25	.128	1,02	.040	0,19	.008	3,81	.150	●	●	●	●
NG3M350LK	3	3,50	.138	2,92	.115	0,32	.013	3,81	.150	●	●	●	●
NG4M350LK	4	3,50	.138	2,92	.115	0,57	.023	6,35	.250	●	●	●	●
NG3156LK	3	3,96	.156	2,92	.115	0,19	.008	3,81	.150	●	●	●	●
NG3M400LK	3	3,99	.157	2,92	.115	0,32	.013	3,81	.150	●	●	●	●
NG4M400LK	4	4,00	.158	2,92	.115	0,57	.023	6,35	.250	●	●	●	●
NG3M425LK	3	4,24	.167	2,92	.115	0,32	.013	3,81	.150	●	●	●	●
NG3M450LK	3	4,50	.177	2,92	.115	0,32	.013	3,81	.150	●	●	●	●
NG4M450LK	4	4,50	.177	2,92	.115	0,57	.023	6,35	.250	●	●	●	●
NG3189LK	3	4,80	.189	2,92	.115	0,57	.023	3,81	.150	●	●	●	●
NG4189LK	4	4,80	.189	2,92	.115	0,57	.023	6,35	.250	●	●	●	●
NG4M500LK	4	5,00	.197	2,92	.115	0,32	.013	6,34	.250	●	●	●	●
NG4M550LK	4	5,50	.217	3,81	.150	0,57	.023	6,35	.250	●	●	●	●
NG4M600LK	4	6,00	.236	3,81	.150	0,57	.023	6,35	.250	●	●	●	●
NG4250LK	4	6,35	.250	3,81	.150	0,57	.023	6,35	.250	●	●	●	●





● first choice  
○ alternate choice

P		●	●	●	●
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○	○	○

■ NGD-K • Deep Grooving Inserts with Chip Control

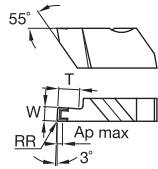
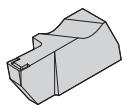
Grooving and Cut-Off

catalog number	insert size	W		Ap max		RR		T		cutting edges	TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in					
right hand														
NGD2M150RK	2	1,50	.059	1,09	.043	0,19	.008	4,06	.160	1	3606937	3607503		
NGD3062RK	3	1,58	.062	1,02	.040	0,19	.008	3,18	.125	2	3607104	3607233		
NGD2M200RK	2	2,00	.079	1,09	.043	0,19	.008	5,08	.200	1	3606938	3607485		
NGD3M200RK	3	2,00	.079	1,02	.040	0,19	.008	4,06	.160	1	3606945	3607505		
NGD3094RK	3	2,39	.094	1,02	.040	0,19	.008	6,35	.250	1	3607083	3607205		3607029
NGD2M250RK	2	2,50	.098	1,09	.043	0,19	.008	5,08	.200	1	3606939	3607504		
NGD3M250RK	3	2,50	.098	1,02	.040	0,19	.008	6,35	.250	1	3606946	3607425		
NGD3M300RK	3	3,00	.118	1,02	.040	0,19	.008	6,35	.250	1	3606922	3607426		
NGD3125RK	3	3,18	.125	1,02	.040	0,19	.008	6,35	.250	1	3607088	3607210		
NGD4125RK	4	3,18	.125	1,02	.040	0,19	.008	6,35	.250	2	3607133	3607312		
NGD3M350RK	3	3,50	.138	2,92	.115	0,32	.013	6,35	.250	1		3607506		
NGD3M400RK	3	4,00	.157	2,92	.115	0,32	.013	6,35	.250	1	3606940	3607427		
NGD4M400RK	4	4,00	.157	2,92	.115	0,57	.023	9,53	.375	1	3606986	3607507		
NGD4M450RK	4	4,50	.177	2,92	.115	0,57	.023	12,70	.500	1		3607508		
NGD3189RK	3	4,80	.189	2,92	.115	0,57	.023	6,35	.250	1	3607170	3607373		

(continued)



(NGD-K • Deep Grooving Inserts with Chip Control — continued)



Right-hand insert shown;  
left-hand insert is mirror image.

● first choice  
○ alternate choice

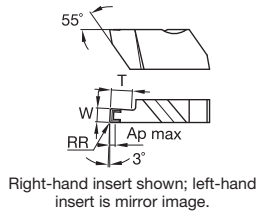
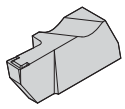
P	●	●	●	●	●
M	●	●	○	○	○
K	●	○	○	○	○
N	●	○	○	○	○
S	●	●	○	○	○
H	○	○	○	○	○

catalog number	insert size	W		Ap max		RR		T		cutting edges	TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in					
NGD4189RK	4	4,80	.189	2,92	.115	0,57	.023	9,53	.375	1	3607161	3607921		
NGD4M500RK	4	5,00	.197	2,92	.115	0,57	.023	12,70	.500	1	3606988	3607509		
NGD4M550RK	4	5,50	.217	3,81	.150	0,57	.023	12,70	.500	1	3606989			
NGD4250RK	4	6,35	.250	3,81	.150	0,57	.023	12,70	.500	1	3607134	3607414		
left hand														
NGD2M150LK	2	1,50	.059	1,09	.043	0,19	.008	4,06	.160	1	3606935	3607402		
NGD3062LK	3	1,58	.062	1,02	.040	0,19	.008	3,18	.125	2	3607098	3607451		
NGD2M200LK	2	2,00	.079	1,09	.043	0,19	.008	5,08	.200	1	3606936	3607399		
NGD3M200LK	3	2,00	.079	1,02	.040	0,19	.008	4,06	.160	1	3606941	3607487		
NGD3094LK	3	2,39	.094	1,02	.040	0,19	.008	6,34	.250	1	3607096	3607240		3607035
NGD2M250LK	2	2,50	.098	1,09	.043	0,19	.008	5,08	.200	1	3606992	3607391		
NGD3M250LK	3	2,50	.098	1,02	.040	0,19	.008	6,35	.250	1	3606942	3607423		

(continued)



(NGD-K • Deep Grooving Inserts with Chip Control — continued)

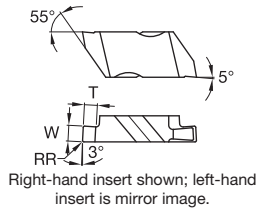
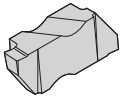


● first choice  
○ alternate choice

P	●	●	●	●
M	●	●	○	○
K	●	○	○	○
N	●	○	○	●
S	●	●	○	●
H	○	○	○	○

Grooving and Cut-Off

catalog number	insert size	W		Ap max		RR		T		cutting edges	TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in					
NGD3M300LK	3	3,00	.118	1,02	.040	0,19	.008	6,35	.250	1	3606943	3607400	•	•
NGD3125LK	3	3,18	.125	1,02	.040	0,19	.008	6,35	.250	1	3607097	3607209	•	•
NGD4125LK	4	3,18	.125	1,02	.040	0,19	.008	6,35	.250	2	3607132	3607316	•	•
NGD3M350LK	3	3,50	.138	2,92	.115	0,32	.013	6,35	.250	1	•	3607488	•	•
NGD3M400LK	3	4,00	.157	2,92	.115	0,32	.013	6,35	.250	1	3606921	3607424	•	•
NGD4M400LK	4	4,00	.157	2,92	.115	0,57	.023	9,53	.375	1	3606923	3607489	•	•
NGD4M450LK	4	4,50	.177	2,92	.115	0,57	.023	12,70	.500	1	•	3607490	•	•
NGD3189LK	3	4,80	.189	2,92	.115	0,57	.023	6,35	.250	1	3607148	3607410	•	•
NGD4189LK	4	4,80	.189	2,92	.115	0,57	.023	9,53	.375	1	3607147	3607314	•	•
NGD4M500LK	4	5,00	.197	2,92	.115	0,57	.023	12,70	.500	1	•	3607491	•	•
NGD4M550LK	4	5,50	.217	3,81	.150	0,57	.023	12,70	.500	1	•	3607492	•	•
NGD4250LK	4	6,35	.250	3,80	.150	0,57	.023	12,70	.500	1	3607178	3607422	•	•



● first choice  
○ alternate choice

P	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
M	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
K	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
S	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

■ **NGP • Grooving Positive Rake Inserts**

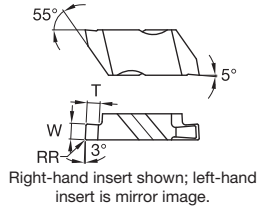
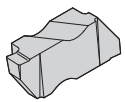
catalog number	insert size	W		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in				
<b>right hand</b>											
NGP2M150R	2	1,50	.059	0,19	.008	2,79	.110	3606975			3607045
NGP3M150R	3	1,50	.059	0,19	.008	1,90	.075	3606979			3607049
NGP2062R	2	1,58	.062	0,19	.008	2,79	.110	3607128			
NGP2M200R	2	2,00	.079	0,19	.008	2,79	.110	3606976			3607046
NGP3M200R	3	2,00	.079	0,19	.008	2,79	.110	3606980			3607050
NGP2M250R	2	2,50	.098	0,19	.008	2,79	.110	3606977			3607047
NGP3M250R	3	2,50	.098	0,19	.008	3,81	.150	3606981			3607051
NGP2M300R	2	3,00	.118	0,19	.008	2,79	.110	3606978			3607048
NGP3M300R	3	3,00	.118	0,19	.008	3,81	.150				3607052

(continued)



Grooving and Cut-Off

(NGP • Grooving Positive Rake Inserts — continued)

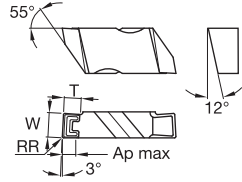
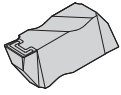


● first choice  
○ alternate choice

P		●	●	●	
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○		

Grooving and Cut-Off

catalog number	insert size	W		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in				
<b>left hand</b>											
NGP2M150L	2	1,50	.059	0,19	.008	2,79	.110	3606967			3607037
NGP3M150L	3	1,50	.059	0,19	.008	1,90	.075	3606971			3607041
NGP2062L	2	1,57	.062	0,19	.008	2,79	.110	3607182			
NGP2M200L	2	2,00	.079	0,19	.008	2,79	.110	3606968			3607038
NGP3M200L	3	2,00	.079	0,19	.008	2,79	.110	3606972			3607042
NGP2M250L	2	2,50	.098	0,19	.008	2,79	.110	3606969			3607039
NGP3M250L	3	2,50	.098	0,19	.008	3,81	.150	3606973			3607043
NGP2M300L	2	3,00	.118	0,19	.008	2,79	.110				3607040
NGP3M300L	3	3,00	.118	0,19	.008	3,81	.150	3606974			3607044



Right-hand insert shown; left-hand insert is mirror image.

● first choice  
○ alternate choice

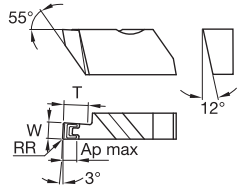
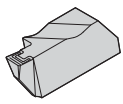
P		●	●	●	○
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○	○	○

■ **NF-K • Face Grooving Positive Rake Inserts**

catalog number	insert size	W		Ap max		RR		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in				
<b>right hand</b>													
NF3M200RK	3	2,00	.079	1,02	.040	0,19	.008	1,78	.070	●	○	○	○
NF3M300RK	3	3,00	.118	1,02	.040	0,19	.008	3,81	.150	○	●	○	○
NF3125RK	3	3,18	.125	1,02	.040	0,19	.008	3,81	.150	○	○	○	○
<b>left hand</b>													
NF3M200LK	3	2,00	.079	1,02	.040	0,19	.008	1,78	.070	○	○	○	○
NF3M300LK	3	3,00	.118	1,02	.040	0,19	.008	3,81	.150	○	○	○	○
NF3125LK	3	3,18	.125	1,02	.040	0,19	.008	3,81	.150	○	○	○	○
NF3156LK	3	3,96	.156	2,92	.115	0,19	.008	3,81	.150	○	○	○	○



Grooving and Cut-Off



Right-hand insert shown; left-hand insert is mirror image.

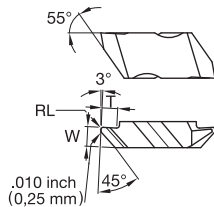
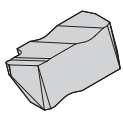
● first choice  
○ alternate choice

P	●	●	●	●
M	●	●	○	○
K	●	○	○	○
N	●	○	○	○
S	●	●	○	○
H	○	○	○	○

■ **NFD-K • Face Grooving Deep-Grooving Inserts**

catalog number	insert size	W		Ap max		RR		T		cutting edges	TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in					
<b>right hand</b>														
NFD3M300RK	3	3,00	.118	1,02	.040	0,19	.008	6,35	.250	1	●	○	○	○
NFD3125RK	3	3,18	.125	1,02	.040	0,19	.008	6,35	.250	1	●	○	○	○
NFD4189RK	4	4,80	.189	2,92	.115	0,57	.023	9,53	.375	1	●	○	○	○
NFD4250RK	4	6,35	.250	3,81	.150	0,57	.023	12,70	.500	1	●	○	○	○
<b>left hand</b>														
NFD3M300LK	3	3,00	.118	1,02	.040	0,19	.008	6,35	.250	1	○	●	○	○
NFD3125LK	3	3,18	.125	1,02	.040	0,19	.008	6,35	.250	1	○	●	○	○
NFD4189LK	4	4,80	.189	2,92	.115	0,57	.023	9,53	.375	1	○	●	○	○

Grooving and Cut-Off

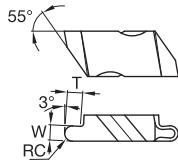
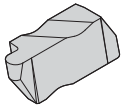


Right-hand insert shown; left-hand insert is mirror image.

■ **NP-K • Profiling Inserts**

catalog number	insert size	W		RL		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in				
<b>right hand</b>											
NP2002RK	2	3,68	.145	0,25	.010	2,79	.110	○	○	○	○
NP3002RK	3	4,83	.190	0,25	.010	5,08	.200	○	○	○	○
NP3012RK	3	4,83	.190	0,25	.010	5,08	.200	○	○	○	○

NOTE: Width tolerance is +/- .005" (+/- 0,13mm).



Right-hand insert shown; left-hand insert is mirror image.

● first choice  
○ alternate choice

P	●	●	●	●
M	●	●	○	○
K	●	○	○	○
N	●	○	○	●
S	●	●	○	●
H	○	○	○	○

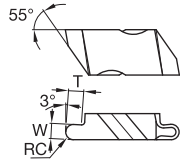
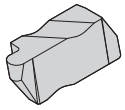
■ NR • Full Radius Inserts

catalog number	insert size	W		RC		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in				
right hand											
NR2M050R	2	1,00	.039	0,50	.020	1,27	.050	3606957	3607393		
NR2M075R	2	1,50	.059	0,75	.030	2,79	.110	3606929	3607469		
NR2031R	2	1,58	.062	0,79	.031	2,79	.110	3607174	3607301		
NR3031R	3	1,58	.062	0,79	.031	2,39	.094	3607125	3607475		3607015
NR2M100R	2	2,00	.079	1,00	.039	2,79	.110	3606930	3607470		
NR3M100R	3	2,00	.079	1,00	.039	2,39	.094	3606958	3607397		
NR2047R	2	2,39	.094	1,19	.047	2,79	.110		3607494		
NR3047R	3	2,39	.094	1,19	.047	3,81	.150	3607093	3607502		3607031
NR2M125R	2	2,50	.098	1,25	.049	2,79	.110	3606931	3607471		
NR3M125R	3	2,50	.098	1,25	.049	3,81	.150	3606959	3607439		
NR2M150R	2	3,00	.118	1,50	.059	2,79	.110	3606932	3607472		
NR3M150R	3	3,00	.118	1,50	.059	3,81	.150	3606960	3607440		
NR3062R	3	3,18	.125	1,59	.063	3,81	.150	3607131	3607473		3607026
NR2M175R	2	3,50	.138	1,75	.069	2,79	.110	3606933	3607483		
NR3M175R	3	3,50	.138	1,75	.069	3,81	.150	3606961	3607441		



(continued)

(NR • Full Radius Inserts – continued)



Right-hand insert shown; left-hand insert is mirror image.

● first choice  
○ alternate choice

P	●	●	●	●
M	●	●	○	○
K	●	○	○	○
N	●	○	○	●
S	●	●	○	●
H	○	○	○	○

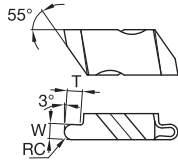
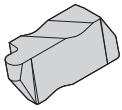
Grooving and Cut-Off

catalog number	insert size	W		RC		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in				
NR3M200R	3	4,00	.157	2,00	.079	3,81	.150	3606962	3607398	●	●
NR4M200R	4	4,00	.157	2,00	.079	6,35	.250	3606964	3607484	●	●
NR3M225R	3	4,50	.177	2,25	.089	3,81	.150	3606963	3607442	●	●
NR4M225R	4	4,50	.177	2,25	.089	6,35	.250	3606965	3607485	●	●
NR3094R	3	4,78	.188	2,39	.094	3,81	.150	3607180	3607476	●	●
NR4M250R	4	5,00	.197	2,50	.098	6,35	.250	3606966	3607486	●	●
NR4125R	4	6,35	.250	3,18	.125	6,35	.250	3607130	3607500	●	●
left hand											
NR2M050L	2	1,00	.039	0,50	.020	1,27	.050	3606948	3607401	3607672	●
NR2M075L	2	1,50	.059	0,75	.030	2,79	.110	3606924	3607430	●	●
NR2031L	2	1,58	.062	0,79	.031	2,79	.110	3607176	3607319	●	●
NR3031L	3	1,58	.062	0,79	.031	2,39	.094	3607139	3607478	●	3607034
NR2M100L	2	2,00	.079	1,00	.039	2,79	.110	3606925	3607431	3607684	●
NR3M100L	3	2,00	.079	1,00	.039	2,39	.094	3606949	3607395	●	●
NR2047L	2	2,39	.094	1,19	.047	2,79	.110	●	3607446	●	●
NR3047L	3	2,39	.094	1,19	.047	3,81	.150	3607135	3607479	●	3607028

(continued)



(NR • Full Radius Inserts – continued)



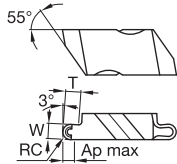
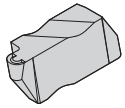
Right-hand insert shown; left-hand insert is mirror image.

● first choice  
○ alternate choice

P		●	●	●	○
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○	○	○

catalog number	insert size	W		RC		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in				
NR2M125L	2	2,50	.098	1,25	.049	2,79	.110	3606926	3607432	○	○
NR3M125L	3	2,50	.098	1,25	.049	3,81	.150	3606950	3607435	○	○
								3607433	3607689	○	○
NR2M150L	2	3,00	.118	1,50	.059	2,79	.110	3606927	3607433	○	○
NR3M150L	3	3,00	.118	1,50	.059	3,81	.150	3606951	3607436	○	○
NR3062L	3	3,18	.125	1,59	.063	3,81	.150	3607171	3607497	○	○
								3606928	3607434	○	○
NR2M175L	2	3,50	.138	1,75	.069	2,79	.110	3606928	3607434	○	○
NR3M175L	3	3,50	.138	1,75	.069	3,81	.150	3606952	3607437	○	○
								3607396	3607691	○	○
NR3M200L	3	4,00	.157	2,00	.079	3,81	.150	3606953	3607396	○	○
NR4M200L	4	4,00	.157	2,00	.079	6,35	.250	3606954	3607466	○	○
NR3M225L	3	4,50	.177	2,25	.089	3,81	.150	3606934	3607438	○	○
NR4M225L	4	4,50	.177	2,25	.089	6,35	.250	3606955	3607467	○	○
NR3094L	3	4,78	.188	2,39	.094	3,81	.150	3607169	3607339	○	○
NR4M250L	4	5,00	.197	2,50	.098	6,35	.250	3606956	3607468	○	○
NR4125L	4	6,35	.250	3,18	.125	6,35	.250	3607181	3607514	○	○





Right-hand insert shown; left-hand insert is mirror image.

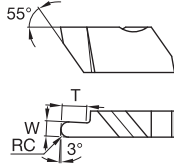
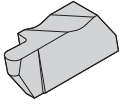
● first choice  
○ alternate choice

P	●	●	●	●
M	●	●	○	○
K	●	○	○	○
N	●	○	○	●
S	●	●	○	●
H	○	○	○	○

■ NR-K • Full Radius Inserts with Chip Control

Grooving and Cut-Off

catalog number	insert size	W		Ap max		RC		T		TN6010	TN6025	TN7110	THM
		mm	in	mm	in	mm	in	mm	in				
<b>right hand</b>													
NR3031RK	3	1,57	.062	1,97	.078	0,79	.031	2,39	.094	3607062	3607206		
NR3047RK	3	2,39	.094	1,91	.075	1,19	.047	3,81	.150	3607086	3607214		
NR3062RK	3	3,18	.125	2,92	.115	1,59	.063	3,81	.150	3607056	3607236		
NR3078RK	3	3,96	.156	2,54	.100	1,98	.078	3,81	.150	3607094	3607407		
NR4062RK	4	3,18	.125	2,92	.115	1,59	.063	3,81	.150	3607461	3607407		
NR4094RK	4	4,78	.188	3,81	.150	2,39	.094	6,35	.250	3607101	3607480		
NR4125RK	4	6,35	.250	3,81	.150	3,18	.125	6,35	.250	3607141	3607303		
<b>left hand</b>													
NR3031LK	3	1,58	.062	1,98	.078	0,79	.031	2,39	.094	3607095	3607222		
NR3047LK	3	2,39	.094	1,91	.075	1,19	.047	3,81	.150	3607102	3607408		
NR3062LK	3	3,18	.125	2,92	.115	1,59	.063	3,81	.150	3607091	3607216		
NR3078LK	3	3,96	.156	2,54	.100	1,98	.078	3,81	.150	3607172	3607306		
NR4062LK	4	3,18	.125	2,92	.115	1,59	.063	3,81	.150	3607156	3607405		
NR4094LK	4	4,78	.188	3,81	.150	2,39	.094	6,35	.250	3607150	3607452		
NR4125LK	4	6,35	.250	3,81	.150	3,18	.125	6,35	.250	3607166	3607458		



NOTE: Right-hand insert shown; left-hand insert is mirror image.

● first choice  
○ alternate choice

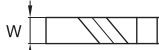
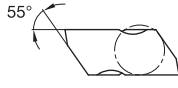
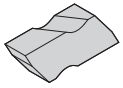
P		●	●	●	○
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○	○	○

■ **NRD • Full Radius Deep-Grooving Inserts**

catalog number	insert size	W		T		cutting edges	TN6010	TN6025	TN7110	THM
		mm	in	mm	in					
<b>right hand</b>										
NRD3031R	3	1,58	.062	3,18	.125	2	3607087	3607457		
NRD3062R	3	3,18	.125	6,35	.250	1	3607099	3607474		
NRD4062R	4	3,18	.125	6,35	.250	2	3607173	3607499		
NRD4125R	4	6,35	.250	12,70	.500	1	3607185	3607496		
<b>left hand</b>										
NRD3031L	3	1,58	.062	3,18	.125	2	3607085	3607455		
NRD3062L	3	3,18	.125	6,35	.250	1	3607124	3607462		
NRD4062L	4	3,18	.125	6,35	.250	2	3607162	3607295		
NRD4125L	4	6,35	.250	12,70	.500	1	3607186	3607298		



Grooving and Cut-Off



Right-hand insert shown; left-hand insert is mirror image.

● first choice  
○ alternate choice

P		●	●	●	
M		●	●	○	○
K		●	○	○	○
N		●	○	○	●
S		●	●	○	●
H		○	○		

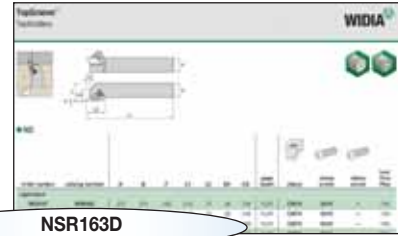
■ NB • Blanks

catalog number	insert size	W		TN6010	TN6025	TN7110	THM
		mm	in				
<b>right hand</b>							
NB2R	2	3,81	.150				3607064
NB3R	3	4,95	.195				3607019
<b>left hand</b>							
NB2L	2	3,81	.150				3607016
NB3L	3	4,95	.195				3607017

NOTE: NB blanks are designed to allow modification of the W dimension and end form.  
W dimension is provided to indicate maximum possible width.  
Available in uncoated grades only.

Grooving and Cut-Off

**TopGroove™**  
**Holder Identification System**

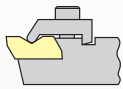


NSR163D

**N**

Insert Holding Method

**N** – TopGroove\*

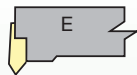


\*Proprietary standard only.

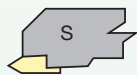
**S**

Insert Mounting Location

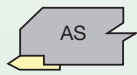
End mount



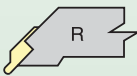
Side mount Offset



Side mount No offset for swiss machining



NRR undercut

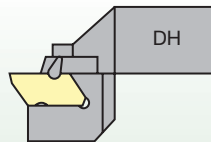


**R**

Hand of Tool

**Drop Head**

Drop Head



**16**

Shank Size

**Inch:**

For shanks 5/8" square and larger, the number represents the number of sixteenths of width and height. For shanks under 5/8" square, the number of sixteenths of cross section is preceded by a zero. For rectangular holders, the first digit represents the number of eighths of width and the second digit the number of quarters of height, except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.

**3**

Insert Size



insert size	W1
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"

**D**

Qualified Surface and Length

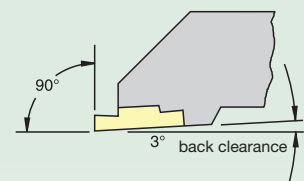
**A** – Qualified back and end, 4" long

**B** – Qualified back and end, 4.5" long

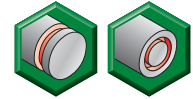
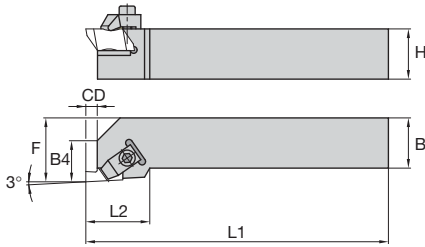
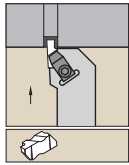
**C** – Qualified back and end, 5" long

**D** – Qualified back and end, 6" long

**E** – Qualified back and end, 7" long

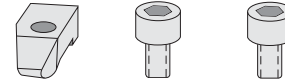


NOTE: Holders are designed to locate insert inclined to 3° to provide back clearance down open side.



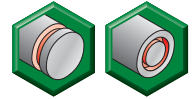
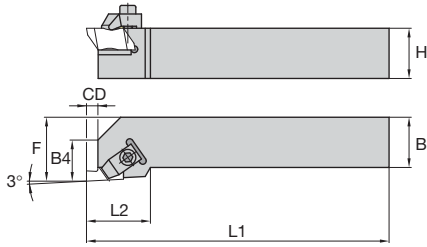
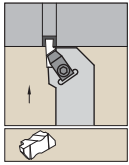
■ NS

Grooving and Cut-Off



order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	clamp screw	hex/ Torx Plus
<b>right hand</b>													
3632147	NSR062	.375	.375	.562	2.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639035	NSR082V	.500	.500	.750	3.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639044	NSR102B	.625	.625	.875	4.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639026	NSR122B	.750	.750	1.000	4.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639027	NSR123A	.750	.750	1.000	4.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3639023	NSR123B	.750	.750	1.000	4.50	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3639025	NSR162C	1.000	1.000	1.250	5.00	.75	.35	.138	N.2R	CM74	S310	—	7/64
3638592	NSR163C	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3638591	NSR163D	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3639028	NSR203D	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3637509	NSR205D	1.250	1.250	1.500	6.00	2.00	.61	.415	N.5R	CM80	S352	—	1/4
3637506	NSR243D	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3637535	NSR243E	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3637540	NSR245D	1.500	1.500	2.000	6.00	2.00	.61	.415	N.5R	CM80	S352	—	1/4
3637496	NSR853D	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
<b>left hand</b>													
3632161	NSL062	.375	.375	.562	2.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3637485	NSL082V	.500	.500	.750	3.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3637510	NSL102B	.625	.625	.875	4.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3632145	NSL122B	.750	.750	1.000	4.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3632152	NSL123A	.750	.750	1.000	4.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3639032	NSL123B	.750	.750	1.000	4.50	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3632138	NSL162C	1.000	1.000	1.250	5.00	.75	.35	.138	N.2L	CM75	S310	—	7/64
3639029	NSL163C	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3639024	NSL163D	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3639037	NSL203D	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3637536	NSL205D	1.250	1.250	1.500	6.00	2.00	.61	.415	N.5L	CM81	S352	—	1/4
3637515	NSL243D	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3637548	NSL243E	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3637508	NSL853D	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP

NOTE: F dimension measured over sharp point of insert.



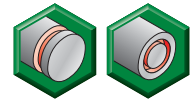
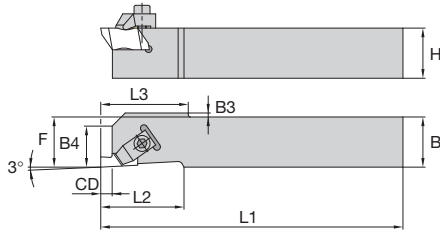
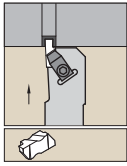
■ NS (With Shim)

order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	clamp screw	hex/ Torx Plus	shim	shim screw	shim screw I.D. drive size
<b>right hand</b>																
3639031	NSR164C	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4R	CM72LP	—	S2112	25 IP	SM420	SL344	—
3639033	NSR164D	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4R	CM72LP	—	S2112	25 IP	SM420	SL344	—
3632153	NSR166D	1.000	1.000	1.250	6.00	1.38	.67	.334	N.6R	CM120	S412	—	5/32	SM416	S111	1/16
3637539	NSR168D	1.000	1.000	1.250	6.00	1.25	.72	.225	N.8R	CM144	S422	—	3/16	SM419	S112	1/16
3637529	NSR204C	1.250	1.250	1.500	5.00	1.38	.54	.294	N.4R	CM72LP	—	S2112	25 IP	SM420	SL344	—
3637472	NSR206D	1.250	1.250	1.500	6.00	1.38	.67	.334	N.6R	CM120	S412	—	5/32	SM416	S111	1/16
3637501	NSR244E	1.500	1.500	2.000	7.00	1.50	.54	.294	N.4R	CM72LP	—	S2112	25 IP	SM420	SL344	—
3637520	NSR246D	1.500	1.500	2.000	6.00	1.50	.67	.334	N.6R	CM120	S412	—	5/32	SM416	S111	1/16
3637526	NSR854D	1.250	1.000	1.250	6.00	1.38	.54	.294	N.4R	CM72LP	—	S2112	25 IP	SM420	SL344	—
3637534	NSR864E	1.500	1.000	1.250	7.00	1.38	.54	.294	N.4R	CM72LP	—	S2112	25 IP	SM420	SL344	—
<b>left hand</b>																
3632151	NSL164C	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP	SM420	SL344	—
3639040	NSL164D	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP	SM420	SL344	—
3641699	NSL204C	1.250	1.250	1.500	5.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP	SM420	SL344	—
3639036	NSL204D	1.250	1.250	1.500	6.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP	SM420	SL344	—
3637507	NSL206D	1.250	1.250	1.500	6.00	1.38	.67	.334	N.6L	CM121	S412	—	5/32	SM416	S111	1/16
3637505	NSL244D	1.500	1.500	2.000	6.00	1.50	.54	.294	N.4L	CM73LP	—	S2112	25 IP	SM420	SL344	—
3637533	NSL244E	1.500	1.500	2.000	7.00	1.50	.54	.294	N.4L	CM73LP	—	S2112	25 IP	SM420	SL344	—
3637546	NSL246D	1.500	1.500	2.000	6.00	1.50	.67	.334	N.6L	CM121	S412	—	5/32	SM416	S111	1/16
3637541	NSL854D	1.250	1.000	1.250	6.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP	SM420	SL344	—
3641700	NSL864E	1.500	1.000	1.250	7.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP	SM420	SL344	—

NOTE: F dimension measured over sharp point of insert.






Grooving and Cut-Off



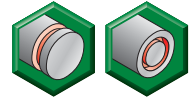
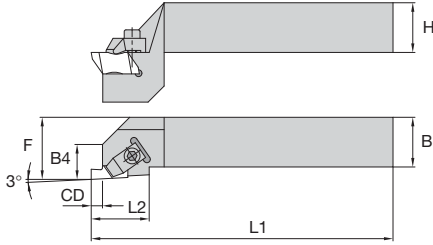
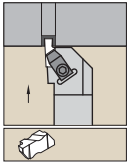
■ NAS (For Swiss Machines)

Grooving and Cut-Off







order number	catalog number	H	B	F	L1	L2	B4	CD	B3	L3	gage insert	 clamp	 clamp screw	 clamp screw	hex/ Torx Plus
<b>right hand</b>															
3632140	NASR062D	.375	.375	.375	6.00	.75	.35	.138	.07	.88	N.2R	CM182	S310	—	7/64
3636529	NASR082D	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2R	CM182	S310	—	7/64
3639042	NASR083D	.500	.500	.500	6.00	1.25	.50	.210	.13	1.32	N.3R	CM184LP	—	S2112	25 IP
3639039	NASR102B	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2R	CM74	S310	—	7/64
3636532	NASR103B	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3R	CM184LP	—	S2112	25 IP
<b>left hand</b>															
3637531	NASL062D	.375	.375	.375	6.00	.75	.35	.138	.07	.88	N.2L	CM183	S310	—	7/64
3636534	NASL082D	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2L	CM183	S310	—	7/64
3637497	NASL083D	.500	.500	.500	6.00	1.25	.50	.210	.13	1.32	N.3L	CM185	S412	—	25 IP
3637489	NASL102B	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2L	CM75	S310	—	7/64
3636524	NASL103B	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3L	CM185LP	—	S2112	25 IP

NOTE: F dimension measured over sharp point of insert.  
Insert exterior edge in line with toolholder edge.





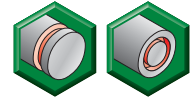
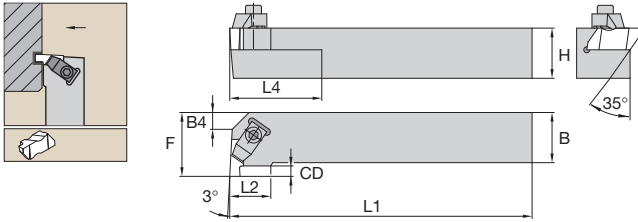
■ **NS -DH**

order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	clamp screw	hex/Torx Plus
<b>right hand</b>													
3637547	NSRDH122B	.750	.750	1.000	4.50	.75	.40	.138	N.2R			—	7/64
3637528	NSRDH163D	1.000	1.000	1.250	6.00	1.25	.58	.210	N.3R		—	S2112	25 IP
3637511	NSRDH203D	1.250	1.250	1.500	6.00	1.25	.62	.210	N.3R		—	S2112	25 IP
3637530	NSRDH204D	1.250	1.250	1.500	6.00	1.38	.62	.294	N.4R		—	S2112	25 IP
<b>left hand</b>													
3637518	NSLDH203D	1.250	1.250	1.500	6.00	1.25	.62	.210	N.3L		—	S2112	25 IP

NOTE: F dimension measured over sharp point of insert.



Grooving and Cut-Off



NE

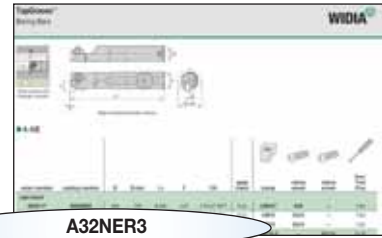
Grooving and Cut-Off



order number	catalog number	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	clamp screw	hex/Torx Plus
<b>right hand</b>													
3637521	NER062	.375	.375	.750	2.50	.50	—	.138	N.2L	CM75	S310	—	7/64
3637517	NER102B	.625	.625	.750	4.50	—	—	.138	N.2L	CM75	S310	—	7/64
3632156	NER122B	.750	.750	1.000	4.50	.50	.29	.138	N.2L	CM75	S310	—	7/64
3632133	NER123B	.750	.750	1.125	4.50	.75	—	.210	N.3L	CM73LP	—	S2112	25 IP
3637486	NER162C	1.000	1.000	1.250	5.00	.50	.41	.138	N.2L	CM75	S310	—	7/64
3639038	NER163C	1.000	1.000	1.250	5.00	.75	—	.210	N.3L	CM73LP	—	S2112	25 IP
3639030	NER163D	1.000	1.000	1.250	6.00	.75	—	.210	N.3L	CM73LP	—	S2112	25 IP
3637492	NER164C	1.000	1.000	1.375	5.00	.75	—	.294	N.4L	CM73LP	—	S2112	25 IP
3639043	NER164D	1.000	1.000	1.375	6.00	.75	—	.294	N.4L	CM73LP	—	S2112	25 IP
3632157	NER204D	1.250	1.250	1.625	6.00	.75	.27	.294	N.4L	CM73LP	—	S2112	25 IP
3637542	NER205D	1.250	1.250	2.000	6.00	1.44	—	.415	N.5L	CM81	S352	—	1/4
3637544	NER206D	1.250	1.250	1.625	6.00	.75	.27	.300	N.6L	CM121	S412	—	5/32
3637524	NER243D	1.500	1.500	2.000	6.00	.75	.76	.210	N.3L	CM73LP	—	S2112	25 IP
3637522	NER244D	1.500	1.500	2.000	6.00	.75	.65	.294	N.4L	CM73LP	—	S2112	25 IP
3637523	NER853D	1.250	1.000	1.250	6.00	.75	—	.210	N.3L	CM73LP	—	S2112	25 IP
<b>left hand</b>													
3637525	NEL062	.375	.375	.750	2.50	.50	—	.138	N.2R	CM74	S310	—	7/64
3637503	NEL122B	.750	.750	1.000	4.50	.50	.29	.138	N.2R	CM74	S310	—	7/64
3632144	NEL123B	.750	.750	1.125	4.50	.75	—	.210	N.3R	CM72LP	—	S2112	25 IP
3637500	NEL162C	1.000	1.000	1.250	5.00	.50	.41	.138	N.2R	CM74	S310	—	7/64
3632155	NEL163C	1.000	1.000	1.250	5.00	.75	—	.210	N.3R	CM72LP	—	S2112	25 IP
3639041	NEL163D	1.000	1.000	1.250	6.00	.75	—	.210	N.3R	CM72LP	—	S2112	25 IP
3637493	NEL164C	1.000	1.000	1.375	5.00	.75	—	.294	N.4R	CM72LP	—	S2112	25 IP
3632162	NEL164D	1.000	1.000	1.375	6.00	.75	—	.294	N.4R	CM72LP	—	S2112	25 IP
3632154	NEL203D	1.250	1.250	1.500	6.00	.75	.26	.210	N.3R	CM72LP	—	S2112	25 IP
3632159	NEL204D	1.250	1.250	1.625	6.00	.75	.27	.294	N.4R	CM72LP	—	S2112	25 IP
3637549	NEL205D	1.250	1.250	2.000	6.00	1.44	—	.415	N.5R	CM80	S352	—	1/4
3641697	NEL206D	1.250	1.250	1.625	6.00	.75	.27	.300	N.6R	CM120	S412	—	5/32
3637537	NEL243D	1.500	1.500	2.000	6.00	.75	.76	.210	N.3R	CM72LP	—	S2112	25 IP
3637538	NEL853D	1.250	1.000	1.250	6.00	.75	—	.210	N.3R	CM72LP	—	S2112	25 IP

NOTE: F dimension measured over sharp point of insert.

# TopGroove Boring Bar Identification System

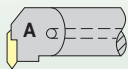


A32NER3

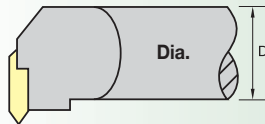
**A**

Bar Type

Steel with coolant



A two-digit number that indicates the bar diameter in 1/16" increments.



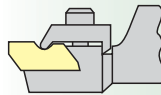
**32**

Bar Diameter

**N**

Insert Holding Method

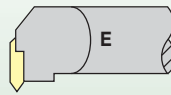
N – TopGroove



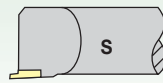
**E**

Insert Location

End mount



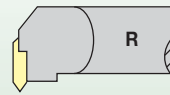
Side mount



**R**

Hand of Tool

Right hand

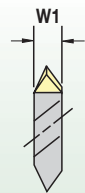


Left hand

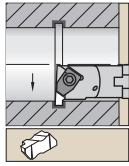


**3**

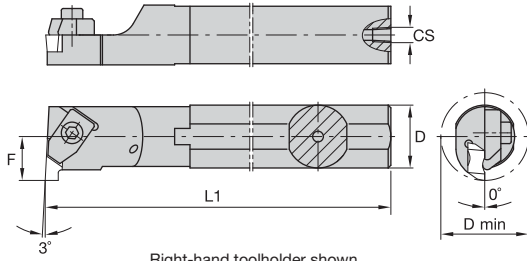
Insert Size



insert size	W1
1	.100"
2	.150"
3	.195"
4	.255"
5	.380"
6	.383"
8	.438"



Steel shank with through coolant.

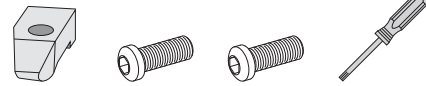


Right-hand toolholder shown.



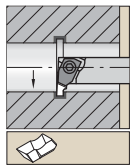
**A-NE**

Grooving and Cut-Off

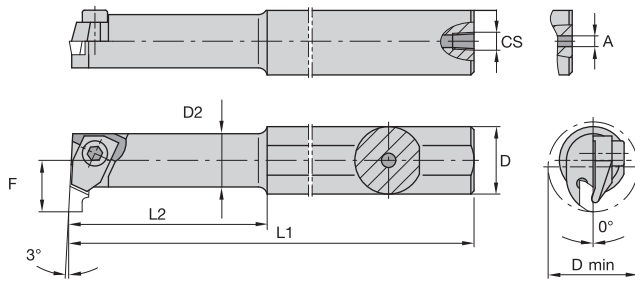


order number	catalog number	D	D min	L1	F	CS	gage insert	clamp	clamp screw	clamp screw	hex/Torx Plus
<b>right hand</b>											
3632117	A08NER2	.500	.730	8.000	.437	1/16-27 NPT	N.2L	CM147	S39	—	7/64
3632114	A10NER2	.625	1.000	10.000	.500	1/8-27 NPT	N.2L	CM75	S310	—	7/64
3632118	A12NER2	.750	1.125	10.000	.562	1/8-27 NPT	N.2L	CM75	S310	—	7/64
3632113	A16NER3	1.000	1.375	12.000	.688	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632130	A16TNER2	1.000	1.375	12.000	.688	1/4-18 NPT	N.2L	CM75	S310	—	7/64
3632116	A20NER3	1.250	1.750	14.000	.875	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632115	A24NER3	1.500	2.000	14.000	1.000	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632132	A28NER3	1.750	2.250	14.000	1.125	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632123	A28NER4	1.750	2.500	14.000	1.250	1/4-18 NPT	N.4L	CM73LP	—	S2112	25 IP
3632122	A32NER3	2.000	2.500	16.000	1.250	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632125	A32NER4	2.000	2.750	16.000	1.375	1/4-18 NPT	N.4L	CM73LP	—	S2112	25 IP
3637514	A32NER5	2.000	2.812	16.000	1.406	1/4-18 NPT	N.5L	CM81	S352	—	1/4
3632143	A32NER6	2.000	2.750	16.000	1.375	1/4-18 NPT	N.6L	CM121	S412	—	5/32
3632146	A40NER3	2.500	3.000	16.000	1.500	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632136	A40NER4	2.500	3.250	16.000	1.625	1/4-18 NPT	N.4L	CM73LP	—	S2112	25 IP
3637498	A40NER6	2.500	3.250	16.000	1.625	1/4-18 NPT	N.6L	CM121	S412	—	5/32
<b>left hand</b>											
3632131	A08NEL2	.500	.730	8.000	.437	1/16-27 NPT	N.2R	CM146	S39	—	7/64
3632127	A10NEL2	.625	1.000	10.000	.500	1/8-27 NPT	N.2R	CM74	S310	—	7/64
3632126	A12NEL2	.750	1.125	10.000	.562	1/8-27 NPT	N.2R	CM74	S310	—	7/64
3632142	A16NEL2	1.000	1.375	12.000	.688	1/4-18 NPT	N.2R	CM74	S310	—	7/64
3632120	A16NEL3	1.000	1.375	12.000	.688	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3632124	A20NEL3	1.250	1.750	14.000	.875	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3632128	A24NEL3	1.500	2.000	14.000	1.000	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3637490	A28NEL3	1.750	2.250	14.000	1.125	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3632141	A28NEL4	1.750	2.500	14.000	1.250	1/4-18 NPT	N.4R	CM72LP	—	S2112	25 IP
3632139	A32NEL3	2.000	2.500	16.000	1.250	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3632149	A32NEL4	2.000	2.750	16.000	1.375	1/4-18 NPT	N.4R	CM72LP	—	S2112	25 IP
3637527	A32NEL5	2.000	2.812	16.000	1.406	1/4-18 NPT	N.5R	CM80	S352	—	1/4
3637512	A32NEL6	2.000	2.750	16.000	1.375	1/4-18 NPT	N.6R	CM120	S412	—	5/32
3637504	A40NEL3	2.500	3.000	16.000	1.500	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3637491	A40NEL4	2.500	3.250	16.000	1.625	1/4-18 NPT	N.4R	CM72LP	—	S2112	25 IP

NOTE: Minimum bore capability varies with depth of groove. See page E92 for details.  
F dimension measured over sharp point of insert.



Necked steel shank with through coolant.



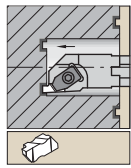
Right-hand toolholder shown.



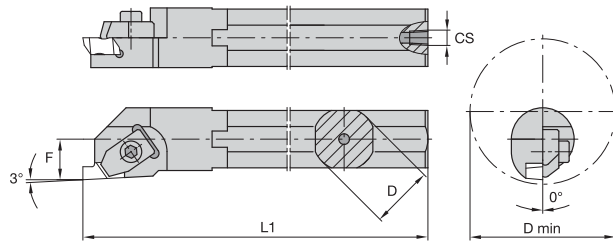
**A-NE-1**

order number	catalog number	D	D min	D2	L1	L2	F	A	CS	gage insert	clamp	socket-head cap screw	wrench size clamp screw
<b>right hand</b>													
3632121	A06NER1	.375	.440	.312	6	1.250	.258	.125	—	N.1L	CM109	S304	5/64
3632119	A08NER1	.500	.440	.310	8	1.290	.258	.094	1/16-27 NPT	N.1L	CM109	S304	5/64
3632148	A10NER1	.625	.800	—	10	—	.406	—	1/8-27 NPT	N.1L	CM109	S304	5/64

NOTE: Minimum bore capability varies with depth of groove. See page E92 for details.  
F dimension measured over sharp point of insert.



Steel shank with through coolant.



Right-hand tool holder shown.



**A-NS**

order number	catalog number	D	D min	L1	F	CS	gage insert	clamp	clamp screw	hex/Torx Plus
<b>right hand</b>										
3632129	A16TNSR3	1.000	2.250	12.000	.640	1/4-18 NPT	N.3R	CM72LP	S2112	25 IP
3632135	A20UNSR3	1.250	2.250	14.000	.765	1/4-18 NPT	N.3R	CM72LP	S2112	25 IP
3632134	A24UNSR3	1.500	2.250	14.000	.890	1/4-18 NPT	N.3R	CM72LP	S2112	25 IP
3637516	A28UNSR3	1.750	2.250	14.000	1.015	1/4-18 NPT	N.3R	CM72LP	S2112	25 IP
3632160	A32VNSR3	2.000	2.375	16.000	1.281	1/4-18 NPT	N.3R	CM72LP	S2112	25 IP
3637513	A40VNSR3	2.500	2.875	16.000	1.531	1/4-18 NPT	N.3R	CM72LP	S2112	25 IP
<b>left hand</b>										
3632137	A16TNSL3	1.000	2.250	12.000	.640	1/4-18 NPT	N.3L	CM73LP	S2112	25 IP
3637495	A20UNSL3	1.250	2.250	14.000	.765	1/4-18 NPT	N.3L	CM73LP	S2112	25 IP
3637488	A24UNSL3	1.500	2.250	14.000	.890	1/4-18 NPT	N.3L	CM73LP	S2112	25 IP
3637502	A32VNSL3	2.000	2.375	16.000	1.281	1/4-18 NPT	N.3L	CM73LP	S2112	25 IP

NOTE: Minimum bore capability varies with depth of groove. See page E92 for details.  
F dimension measured over sharp point of insert.

## TopGroove™ Inserts: The Best Platform for Customization

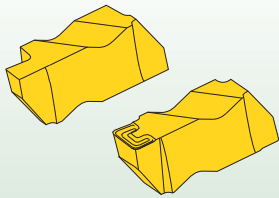
All TopGroove custom order inserts benefit from the superior rigidity of our TopGroove toolholder and clamping system. For added productivity, most custom orders can be incorporated into the double-ended inserts.

Custom orders start with proven WIDIA™ carbide grade technology as the basis for optimizing tool performance. Positive top rake angles are also available in most inserts.

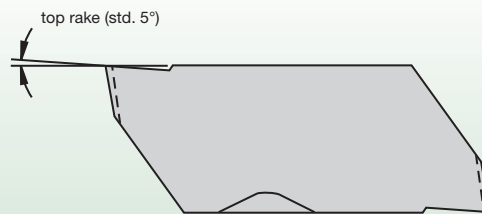
State-of-the-art CAD enables rapid development of your custom insert design. For convenience, a concept drawing is always available to facilitate engineering development of an insert.

There are limitless variations of the flat-top TopGroove design. Additionally, chip control in the most common styles enables true optimization and productivity. WIDIA offers NB- and NBD-style insert blanks as well. These blanks can be end-form ground in your own shop.

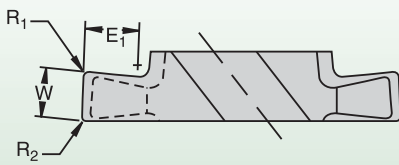
Whatever your special grooving requirements may be, WIDIA can provide an effective solution. We have the technical expertise, resources, and commitment to help you develop insert designs that satisfy your metalcutting application demands.



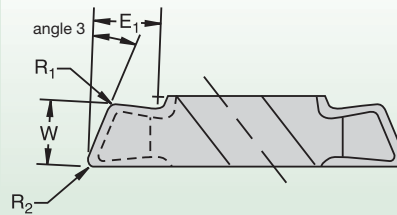
**top rake**



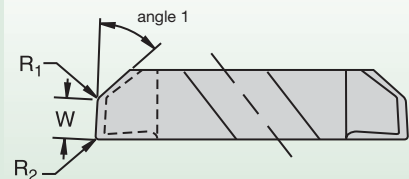
**style A**



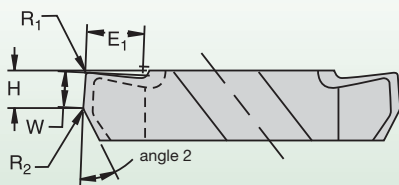
**style B1**



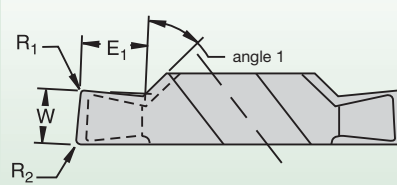
**style B2**



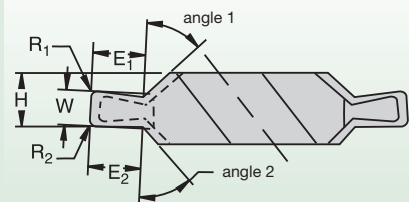
**style B3**



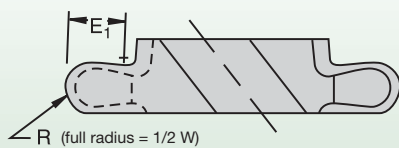
**style B4**



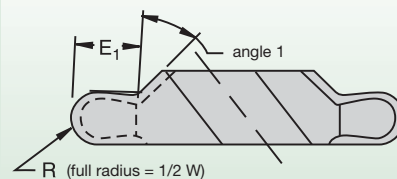
**style C1**



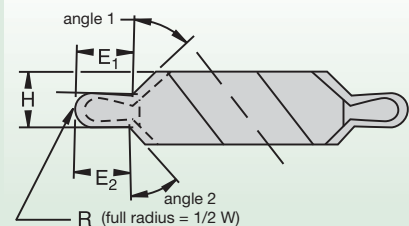
**style D**



**style F**



**style G**



NOTE: Common styles are shown here in right-hand versions. Left-hand versions are also available.

### TopGroove Grooving Systems

Use this Custom Order Worksheet to modify an existing product to meet your specifications. If your custom requirements do not fall into these categories, simply contact your WIDIA™ Distributor.

Trust our experienced distributors and WIDIA engineering team to design the best solution for you.

Date

#### Customer-Specified Dimensions

Style (circle one)

A    B1    B2    B3    B4    C1    D    F    G

Orientation (circle one)

left hand

right hand

Top Rake

Total Width (T)

Cutting Width (W)

Angle 1

Corner Radius 1 (R<sub>1</sub>)

Angle 2

Corner Radius 2 (R<sub>2</sub>)

Offset (H)

Cutting Depth (E<sub>1</sub>)

Other (please specify)

#### Special Instructions

*(please make any necessary notes or sketches in the box at right)*

Closest Catalog Standard

Customer

Distributor

#### Shipping Requirements

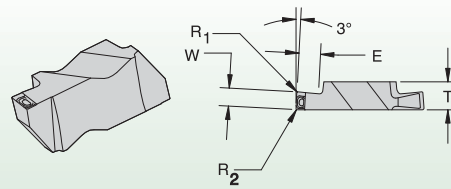
*Attention Distributors: Use this worksheet to collect information for your customer.*

Ground                     
  Next Day Air                     
  2nd Day Air                     
  3rd Day Air

**■ A-SK Specials**

10° positive cutting action

- Grooving
- Face grooving



insert catalog number		width range W	corner radii range R <sub>1</sub> and R <sub>2</sub>	E	T	grades
right hand	left hand					
<b>NG2-R-SK</b> or <b>NF2-R-SK</b>	<b>NG2-L-SK</b> or <b>NF2-L-SK</b>	.026-.056 .057-.135	.000-.007 .003-.013	.050 .110	.150	Carbide grades quoted upon request. <b>See page E49.</b>
<b>NG3-R-SK</b> or <b>NF3-R-SK</b>	<b>NG3-L-SK</b> or <b>NF3-L-SK</b>	.042-.067	.003-.013	.094	.195	
		.068-.076	.005-.020	.094		
		.077-.094	.005-.030	.150		
		.095-.105	.005-.020	.150		
		.106-.125	.005-.030	.150		
		.126-.134	.005-.020	.150		
<b>NG4-R-SK</b> or <b>NF4-R-SK</b>	<b>NG4-L-SK</b> or <b>NF4-L-SK</b>	.135-.156	.005-.030	.150		
		.157-.174	.008-.018	.150		
		.184-.196	.018-.028	.150		
		.100-.110	.005-.020	.150	.255	
		.111-.125	.005-.030	.150		
		.126-.131	.005-.020	.150		
.132-.156	.005-.030	.150				
.157-.162	.005-.020	.150				
.163-.189	.005-.030	.250				
.190-.191	.018-.028	.250				
.192-.204	.008-.018	.250				
.245-.257	.018-.025	.250				

NG-SK, NF-SK, NGD-SK, and NFD-SK inserts may be specially ordered within the specifications listed in the above charts.

Order example: NF3R-SK W = .090,  
R<sub>1</sub> = .010, R<sub>2</sub> = .010, grade TN6010™.

Unless otherwise specified, a standard tolerance of ±.001" on width (W) will be applied, and a standard tolerance of ±.0025" on radii (R<sub>1</sub> and R<sub>2</sub>) will be applied.

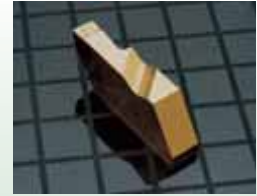
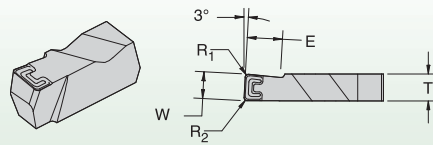
If deeper cutting depth (E) is required, please specify. Refer to the application drawing and charts for maximum face groove depths and minimum face groove diameters.

In addition to the guidelines above, full radius face groove inserts may be quoted. Under certain conditions, chip control performance may vary from standard insert styles.



**■ A-SK Specials**

- 10° positive cutting action
- Deep grooving
  - Deep face grooving



insert catalog number		width range W	corner radii range R <sub>1</sub> and R <sub>2</sub>	E	T	grades
right hand	left hand					
<b>NGD3-R-SK</b>	<b>NGD3-L-SK</b>	.057-.069	.003-.013	.125	.195	Carbide grades quoted upon request. <b>See page E49.</b>
or	or	.089-.101*	.003-.013	.250		
<b>NFD3-R-SK</b>	<b>NFD3-L-SK</b>	.120-.132*	.003-.013	.250		
		.184-.196*	.018-.028	.250		
<b>NGD4-R-SK</b>	<b>NG4-L-SK</b>	.120-.132*	.003-.013	.250	.255	
or	or	.180-.196*	.018-.028	.375		
<b>NFD4-R-SK</b>	<b>NF4-L-SK</b>	.245-.257*	.018-.028	.500		

\*One cutting edge.

NG-SK, NF-SK, NGD-SK, and NFD-SK inserts may be specially ordered within the specifications listed in the above charts.

Order example: NF3R-SK W = .090, R<sub>1</sub> = .010, R<sub>2</sub> = .010, grade TN6010™.

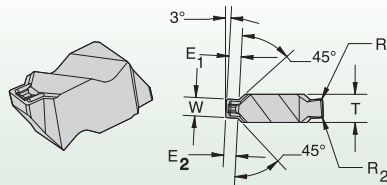
Unless otherwise specified, a standard tolerance of ±.001" on width (W) will be applied, and a standard tolerance of ±.0025" on radii (R<sub>1</sub> and R<sub>2</sub>) will be applied.

If deeper cutting depth (E) is required, please specify. Refer to the application drawing and charts for maximum face groove depths and minimum face groove diameters.

In addition to the guidelines above, full radius face groove inserts may be quoted. Under certain conditions, chip control performance may vary from standard insert styles.

**■ C1-SK Specials**

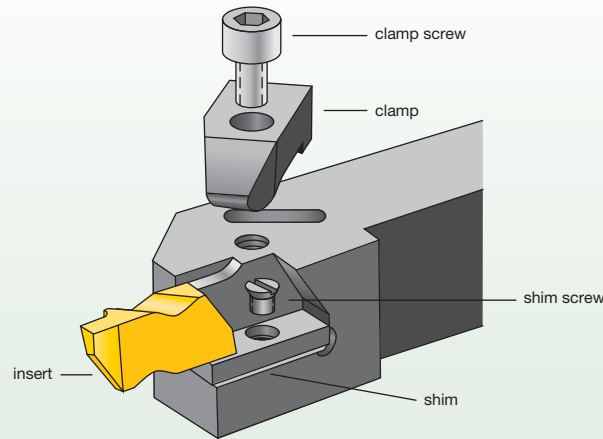
- Groove and chamfer













insert catalog number		width range W	corner radii range R <sub>1</sub> and R <sub>2</sub>	E	T	grades
right hand	left hand					
<b>NB2-R-K</b>	<b>NB2-L-K</b>	.047-.125	.005-.015	.100	.150	Carbide grades quoted upon request.
<b>NB3-R-K</b>	<b>NB3-L-K</b>	.094-.170	.005-.025	.150	.195	<b>See page E49.</b>

NOTE: The above insert style is for simultaneous groove and chamfer operations with chip control.

### TopGroove Toolholders and Boring Bars



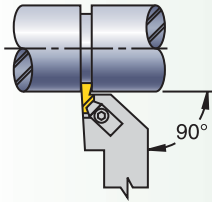
insert size and style	 clamp	 clamp screw	 shim	 shim screw
NG-1L 	CM-109	S-304	–	–
NG-2R	CM-182	S-310	–	–
NG-2L	CM-183	S-310	–	–
NG-2R 	CM-74	S-310	–	–
NG-2L	CM-75	S-310	–	–
NG-3R	CM-184	S-412	–	–
NG-3L	CM-185	S-412	–	–
NG-3R	CM-72	S-412	–	–
NG-3L 	CM-73	S-412	–	–
NG-3R*	CM-78	S-412	–	–
NG-3L*	CM-70	S-412	–	–
NG-4R	CM-72	S-412	SM-420	SL-344
NG-4L 	CM-73	S-412	SM-420	SL-344
NG-5R	CM-80	S-352	–	–
NG-5L 	CM-81	S-352	–	–
NG-6R	CM-120	S-412	SM-416	S-111
NG-6L 	CM-121	S-412	SM-416	S-111
<b>TopGroove relief grooving</b>				
NU-3125R	CM-72	S-412	–	–
NU-3125L	CM-73	S-412	–	–
NU-3125R**	CM-72	S-618	–	–
NU-3125L**	CM-73	S-618	–	–
<b>Utility threading</b>				
NTU-4R	CM-72	S-412	–	–
NTU-4L	CM-73	S-412	–	–

\*1" diameter boring head.  
\*\*Boring head.

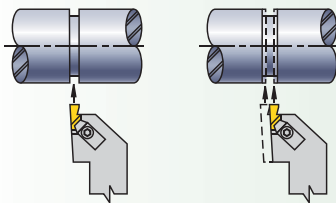
## Grooving Tool Failure and Solution Guide

### Practical Solutions to Common Grooving Problems

#### Holder Position for Grooving Operation

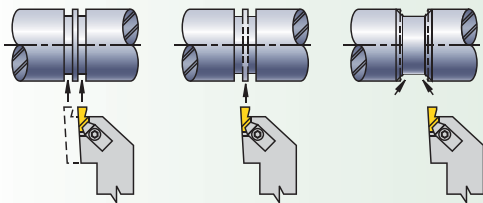


#### How to Cut a Groove Slightly Wider than the Groove Tool



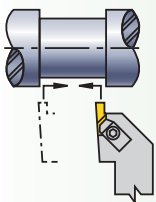
1. Plunge the center of the groove.
2. Plunge each side of the groove to get the specified width. Use a slower feed rate when cutting groove sides.

#### How to Cut Wider Grooves



1. Plunge out both sides of groove width.
2. Plunge center area to remove web of material remaining.
3. Plunge both sides of groove at the required angle, using approximately one-half the width of the grooving tool for maximum width of cut.

#### Finish Turning the Groove



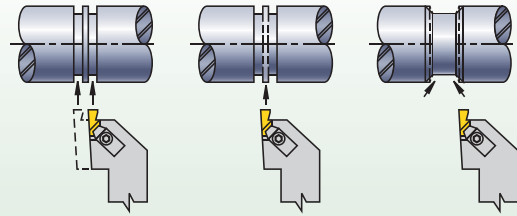
1. Follow recommendations explained above.
2. To avoid insert chipping and to achieve groove wall perpendicularity, follow the tool path outlined here.
3. Use the lightest depth of cut that still enables good chip surface finishing.

problem	solution
bur	<ol style="list-style-type: none"> <li>1. Ensure tool center height.</li> <li>2. Use sharp tool (index more often).</li> <li>3. Use positive rake PVD-coated insert.</li> <li>4. Use correct grade for workpiece material.</li> <li>5. Use correct geometry (e.g., positive rake for work-hardening material).</li> <li>6. Chamfer before grooving.</li> <li>7. Change tool path.</li> </ol>
poor surface finish	<ol style="list-style-type: none"> <li>1. Increase speed.</li> <li>2. Use sharp tool (index more often).</li> <li>3. Dwell tool in bottom 1–3 revolutions (max).</li> <li>4. Use proper chip control geometry.</li> <li>5. Increase coolant flow/concentration.</li> <li>6. Ensure proper setup (overhang, shank size).</li> <li>7. Use correct geometry (e.g., positive rake for work-hardening material).</li> </ol>
groove bottom that is not flat	<ol style="list-style-type: none"> <li>1. Use sharp tool (index more often).</li> <li>2. Dwell tool in bottom 1–3 revolutions (max).</li> <li>3. Reduce tool overhang (increase rigidity).</li> <li>4. Ensure correct tool alignment.</li> <li>5. Reduce feed rate at groove bottom.</li> <li>6. Use a wider insert.</li> <li>7. Ensure tool center height.</li> </ol>
poor chip control	<ol style="list-style-type: none"> <li>1. Use “K” chip control geometry insert.</li> <li>2. Use sharp tool (index more often).</li> <li>3. Increase coolant concentration.</li> <li>4. Adjust feed rate (usually increase first).</li> </ol>
chatter	<ol style="list-style-type: none"> <li>1. Reduce tool and workpiece overhang.</li> <li>2. Adjust speed and feed (usually increase first).</li> <li>3. Ensure center height.</li> </ol>
insert chipping	<ol style="list-style-type: none"> <li>1. Use correct grade for workpiece material.</li> <li>2. Increase speed.</li> <li>3. Reduce feed.</li> <li>4. Use a stronger grade.</li> <li>5. Increase tool and setup rigidity.</li> </ol>
side walls not straight	<ol style="list-style-type: none"> <li>1. Check tool alignment for square.</li> <li>2. Use correct insert hand.</li> <li>3. Reduce workpiece and tool overhang.</li> <li>4. Use sharp insert (index more often).</li> </ol>

### Machining Guidelines for Chip Control • Grooving

When the proper cutter diameter is not available, proper cutter positioning will provide positive results.

- Center height of insert should be positioned at the center of the workpiece or up to .005" (0,13mm) above.
- Dwell time in the bottom of the groove (more than three revolutions) is not recommended.
- Chip control is feed-rate related and should be adjusted to fit the particular situation. Recommended feed range is .003–.012 IPR (0,08–0,3 mm/rev).

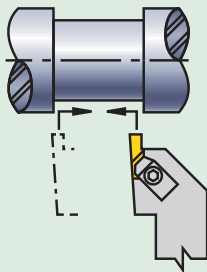


### Machining Guidelines for Chip Control • Turning/Profiling

Maximum depth of cut for side cutting (turning/profiling) depends on the material being cut and the width of the tool.

- .031–.062" (0,79–1,6mm) wide insert can cut up to .025" (0,6mm) deep.
- .067–.128" (1,7–3,3mm) wide insert can cut up to .040" (1mm) deep.
- .138–.189" (3,5–4,8mm) wide insert can cut up to .080" (2mm) deep.
- .197–.250" (5–6,35mm) wide insert can cut up to .120" (3mm) deep.

#### Finish Turning the Groove



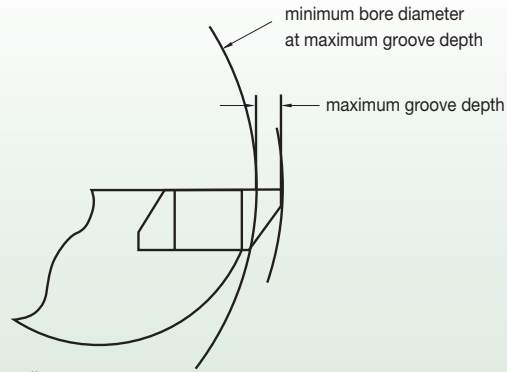
1. Plunge both sides of groove width.
2. Plunge center area to remove web of material remaining.
3. To avoid insert chipping and to achieve groove wall perpendicularity, follow the tool path outlined.
4. Use the lightest depth of cut that still allows good chipbreaking, tool life, and surface finish.

insert catalog number	Groove Limits			
	maximum internal groove depth		minimum bore diameter	
	inch	mm	inch	mm
NG-1094L	.075	1,91	.800	20,32
—	.040	1,02	.440	11,18
NG-2031R/L	.050	1,27	.730	18,54
NG-2041R/L	—	—	—	—
NG-2047R/L	—	—	—	—
NG-2058R/L	—	—	—	—
—	.110	2,79	2.500	63,50
NG-2062R/L	.102	2,59	1.750	44,45
NG-2094R/L	.098	2,49	1.500	38,10
NG-2125R/L	.080	2,03	1.000	25,40
—	.055	1,40	.730	18,54
NG-3047R/L	—	—	—	—
NG-3062R/L	.094	2,39	1.750	44,45
NG-3072R/L	.090	2,29	1.625	41,28
NG-3078R/L	.075	1,91	1.375	34,93
NG-3088R/L	—	—	—	—
NG-3094R/L	—	—	—	—
NG-3097R/L	.150	3,81	2.375	60,33
NG-3105R/L	—	—	—	—
NG-3110R/L	.145	3,68	2.125	53,98
NG-3122R/L	—	—	—	—
NG-3125R/L	.138	3,51	1.875	47,63
NG-3142R/L	—	—	—	—
NG-3156R/L	.125	3,18	1.625	41,28
NG-3178R/L	—	—	—	—
NG-3185R/L	.110	2,79	1.375	34,93
NG-3189R/L	—	—	—	—
NG-4125R/L	.150	3,81	2.750	69,85
—	.250	6,35	5.750	146,05
NG-4189R/L	.245	6,22	5.000	127,00
NG-4213R/L	.240	6,10	4.500	114,30
NG-4219R/L	.218	5,54	3.250	82,55
NG-4250R/L	.200	5,08	2.500	63,50

NOTE: The same maximum groove depth and minimum bore diameter values also apply to metric, NG-K (chip control), and NR (full radius) inserts of similar size.

The same internal grooving depth limits are a function of bar clearance versus bore diameters.

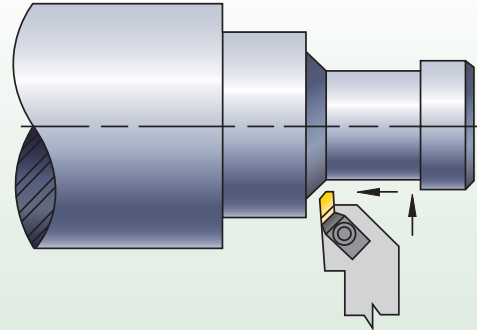
### Internal Groove Depth versus Bar Interference



NOTE: Internal grooving depth limits are a function of bar clearance versus bore diameters.

### Machining Guidelines for Back Turning/Turning/Profiling

The NP-K-style TopGroove inserts were engineered specifically for back turning on small automatic lathes, but they also find applications for other light turning and profiling operations. For general applications, maximum depth of cut should not exceed .108" (2,74mm) for size 2 inserts or .151" (3,84mm) for size 3 inserts.



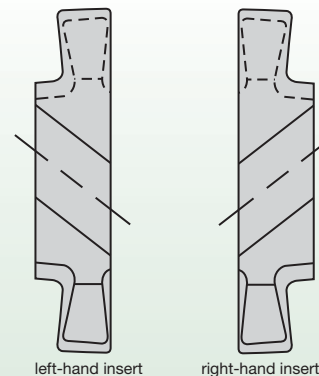
### Machining Guidelines for Using TopGroove Deep Grooving Inserts (NGD)

Typically, those NGD- and NRD-style inserts with two cutting edges require no machine offset changes. However, those inserts with only one cutting edge do require offset changes. Refer to the chart here to ensure proper offset adjustments.

insert catalog number	add to C dimension		add to F dimension	
	inch	mm	inch	mm
NGD-3062	.000	0,00	.000	0,00
NGD-3094	.100	2,54	.100	2,54
NGD-3125	.100	2,54	.100	2,54
NGD-3189	.100	2,54	.100	2,54
NGD-4125	.000	0,00	.000	0,00
NGD-4189	.125	3,18	.125	3,18
NGD-4250	.250	6,35	.250	6,35
NRD-3031	.000	0,00	.000	0,00
NRD-3062	.100	2,54	.100	2,54
NRD-4062	.000	0,00	.000	0,00
NRD-4094	.250	6,35	.250	6,35
NRD-4125	.250	6,35	.250	6,35

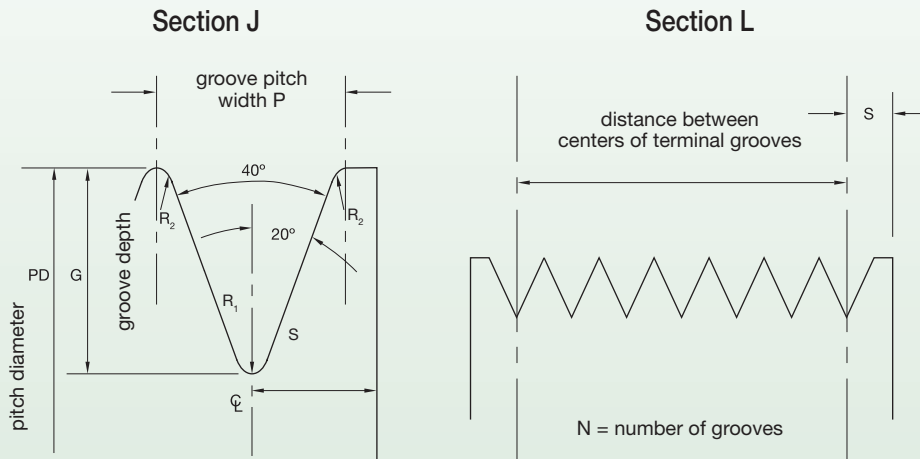
### TopGroove Insert Selection Guide

- All TopGroove inserts are precision ground to provide accurate edge location and secure locking of the insert in the toolholder pocket.
- TopGroove inserts can be used in either toolholders or boring bars.
- Right-hand TopGroove toolholders use right-hand inserts. Left-hand TopGroove toolholders use left-hand inserts.
- Right-hand TopGroove boring bars use left-hand inserts. Left-hand TopGroove boring bars use right-hand inserts.



**Machining Guidelines for Poly-Vee Grooving with Custom Solution and TopGroove NV Inserts (NV3-J and NV4-L)**

- To machine cross section “J”, use insert NV3-J.
- To machine cross section “L”, use insert NV4-L.

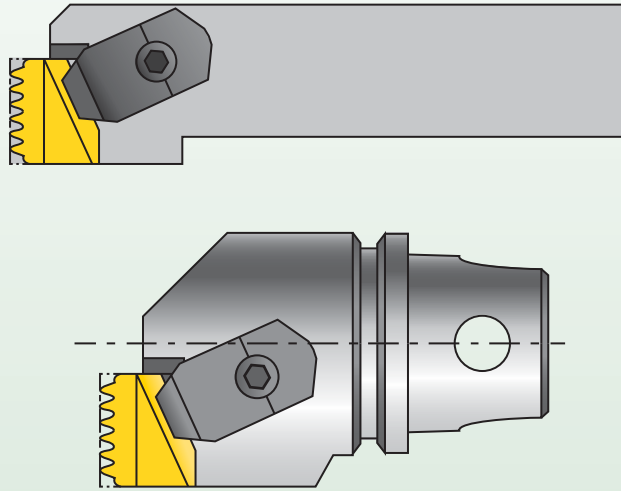


**Groove Dimensions and Tolerances for Sheaves**

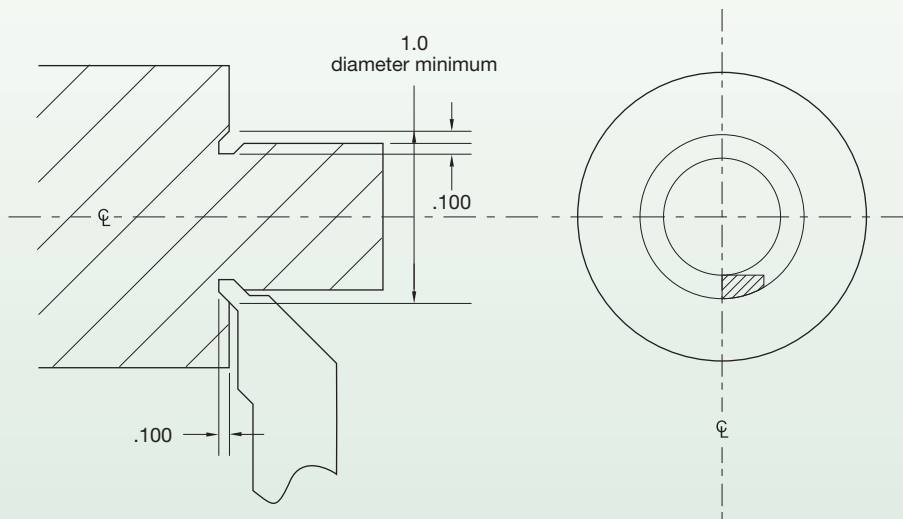
groove cross section	pitch width (P)	groove depth (G)	minimum radius (R2)	radius (R1)	terminal distance	distance between centers of terminal grooves and maximum accumulated tolerance
J	.092 ±.001	.087 ±.005	.008	.0125 ±.0025	1/8	(N-1).092 ±.010
L	.185 ±.002	.201 ±.005	.015	.0125 ±.0025	3/8	(N-1).185 ±.010

### Multiple Tooth Poly-Vee Grooving

Let WIDIA™ quote your multiple tooth poly-vee grooving applications. Semi-standard inserts and holders are available. The strong TopGroove design holds the insert rigid and outperforms any other tooling method for this application.

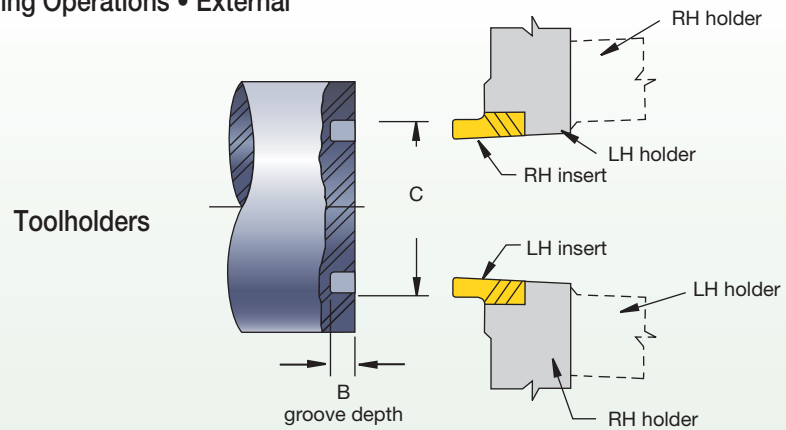


### Machining Guidelines for Undercutting Operations Performed with Custom Solution and TopGroove NU Inserts (NU3094, NU3125, and NU3156)



NOTE: Items shown are non-standard items.

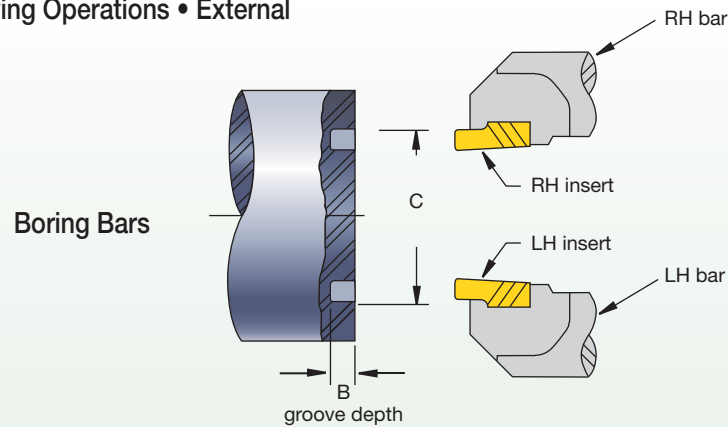
Machining Guidelines for Face Grooving Operations • External



Standard NF/NDF Inserts

insert family	maximum groove depth B		minimum groove diameter C	
	inch	mm	inch	mm
NF-3	.060	1,52	.94	23,9
NF-3	.094	2,39	1.20	30,5
NF-3	.125	3,18	1.42	36,1
NF-3	.150	3,81	1.63	41,3
NFD-3	.250	6,35	1.88	47,6
NFD-4	.375	9,53	2.25	57,2
NFD-4	.500	12,70	2.25	57,2

Machining Guidelines for Face Grooving Operations • External

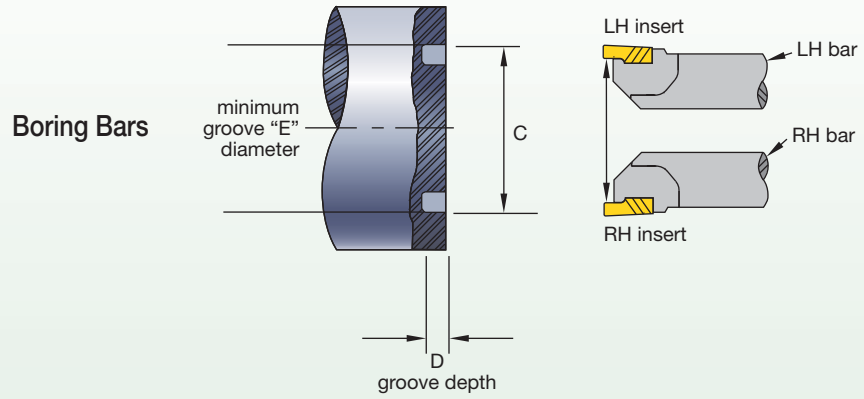


Standard NG/NGD Inserts

insert family	maximum groove depth B		minimum groove diameter C	
	inch	mm	inch	mm
NG-2	.050	1,27	2.13	54,0
NG-2	.110	2,79	3.50	88,9
NG-3	.094	2,39	4.00	101,6
NG-3	.125	3,18	5.00	127,0
NG-3	.150	3,81	5.50	139,7
NGD-3	.250	6,35	6.88	174,6
NG-4	.150	3,81	6.00	152,4
NG-4	.250	6,35	8.25	209,6
NGD-4	.375	9,53	8.75	222,3
NGD-4	.500	12,70	8.75	222,3



Machining Guidelines for Face Grooving Operations • Internal



Standard NG/NGD Inserts

insert family	maximum groove depth B		minimum groove diameter C	
	inch	mm	inch	mm
NFD-3-KI	.250	6,35	2.250	63,5

*NOTE: Also check minimum bore diameter of boring bar. See page E84.*

## ProGroove™ • Grooving and Cut-Off

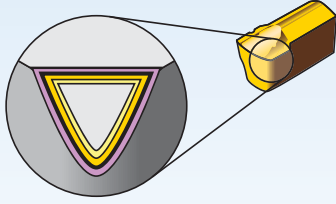
# ProGroove



With easy-to-change inserts available in multiple high-performance carbide grades, the ProGroove system ensures accurate, reliable, and reproducible cutting edge performance.

- Single-end grooving and cut-off inserts.
- Offered with integral toolholders and blades.
- Shallow, deep grooving, and cut-off capabilities.
- Available in four different geometries.



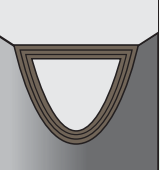
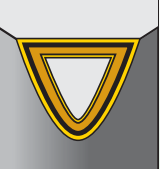
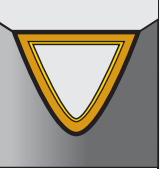
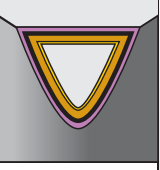
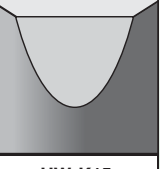
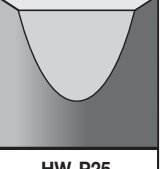


Coatings provide high-speed capability and are engineered for finishing to light roughing.

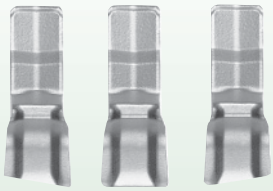
- Reduce cycle times — high speed and feed capability.
- Longer tool life — new multilayer coating provides better wear resistance.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

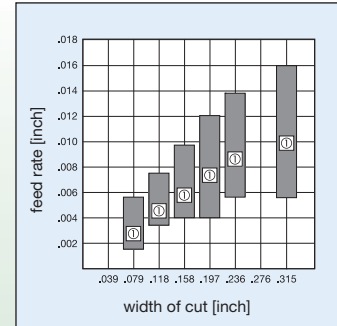
Grade	Coating	Grade Description		Performance Matrix												
				05	10	15	20	25	30	35	40	45				
TN6030		PVD-TiAlN Nanolayer coated carbide. Medium and heavy machining for steels and nodular cast irons. Recommended at medium cutting speeds when good toughness properties are required.	<b>P</b>													
	<b>M</b>															
TN7525		MT-CVD/CVD — TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN coated carbide. Light and medium machining for steels and nodular cast irons.	<b>P</b>													
	<b>K</b>															
TN7535		MT-CVD/CVD — TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> coated carbide. Medium and heavy machining for steels and nodular cast iron.	<b>P</b>													
	<b>K</b>															
TN8025		MT-CVD/CVD-TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -ZrCN coated carbide. Light and medium machining for all stainless steels. Can be used both with or without coolant.	<b>M</b>													
THM		Uncoated carbide for light and medium machining. For cast iron and all non-ferrous metals and non-metals. Also capable of machining hardened materials at low cutting speeds.	<b>K</b>													
	<b>N</b>															
TTM		Uncoated carbide with good toughness and wear properties. Medium machining for steels.	<b>P</b>													
	<b>M</b>															
	<b>HW-K15</b>		<b>H</b>													
	<b>HW-P25</b>		<b>P</b>													

**PGU**



left-hand    neutral    right-hand

For grooving and parting operations, universal use. Positive chipbreaker groove for light cutting action. Right-hand and left-hand styles with 6° front angle.

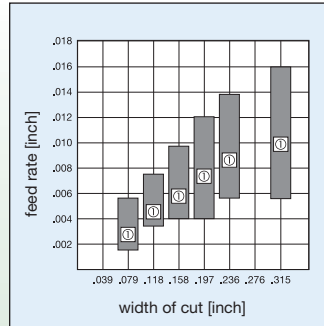


① Recommended Starting Feed

**PGM**



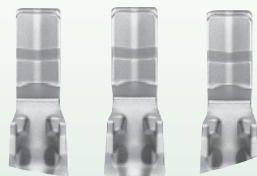
neutral



① Recommended Starting Feed

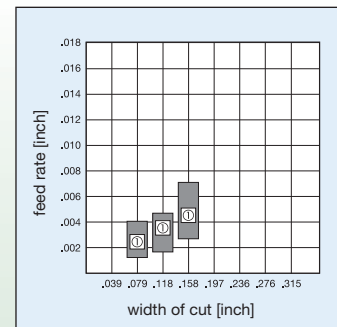
For grooving and parting, also capable of copy and straight turning as well as chamfering. With additional chip forming element for good chip control with varying depths of cut.

**PGS**



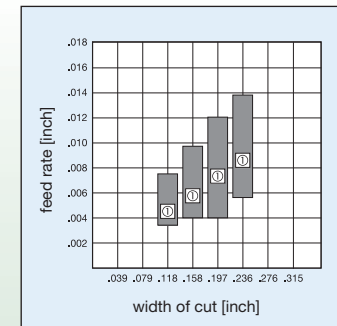
left-hand    neutral    right-hand

For low-bur parting with straight flanks and smooth surface finishes. All inserts are recommended for parting and grooving slender workpieces, part diameter <1.25", and thin-wall tubes.



① Recommended Starting Feed

**PGR**



① Recommended Starting Feed

Full round inserts for profiling, grooving, and copy turning. Very good chip control for broad general use. Accurate, reproducible cutting edge positioning.

**LG System • 0 and 1**

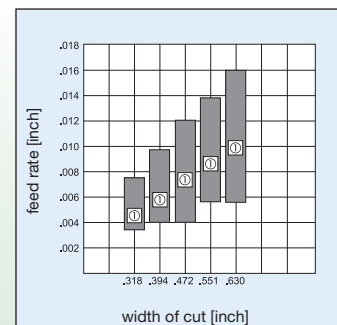


0

1

...0  
Inserts with wide range of applications in grooving and deep grooving. With additional chip control element for good chip control, even with varying widths of cut.

...1  
Inserts with wide range of uses in grooving and deep grooving of short chipping materials.

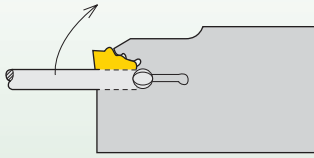


① Recommended Starting Feed

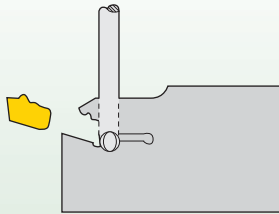
Material Group		Cutting Speed – vc m/min																	
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	0 / 1	130	140	150	200	215	230	140	175	210	-	-	-	-	-	-	90	95	100
	2	110	145	175	170	220	270	115	145	175	-	-	-	-	-	-	75	100	125
	3	110	145	175	170	220	270	115	145	175	-	-	-	-	-	-	75	100	125
	4	75	95	115	115	145	175	75	100	120	-	-	-	-	-	-	55	65	80
	5	100	125	145	155	190	220	105	140	170	-	-	-	-	-	-	70	85	100
	6	40	55	65	65	85	100	45	60	75	-	-	-	-	-	-	30	40	45
M	1	90	110	140	-	-	-	-	-	-	90	120	150	-	-	-	60	75	90
	2	55	70	90	-	-	-	-	-	-	55	75	95	-	-	-	40	50	55
	3	60	75	95	-	-	-	-	-	-	60	80	100	-	-	-	40	50	60
K	1	60	80	90	120	150	180	-	-	-	-	-	-	60	80	90	-	-	-
	2	60	75	85	120	150	180	-	-	-	-	-	-	60	75	85	-	-	-
	3	60	75	90	110	140	170	-	-	-	-	-	-	60	75	90	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-	600	750	900	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	535	685	835	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	230	300	370	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-	135	180	225	-	-	-
	5	-	-	-	-	-	-	-	-	-	-	-	-	70	90	110	-	-	-
	6	-	-	-	-	-	-	-	-	-	-	-	-	445	565	690	-	-	-
	7	-	-	-	-	-	-	-	-	-	-	-	-	550	700	850	-	-	-
S	1	-	-	-	-	-	-	-	-	-	-	-	-	25	35	40	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	15	20	20	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	40	60	70	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-	20	30	35	-	-	-
H	1	-	-	-	-	-	-	-	-	-	-	-	-	10	20	35	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	10	20	35	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	10	20	35	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-	10	20	35	-	-	-

Material Group		Cutting Speed – vc SFM																	
		TN6030			TN7525			TN7535			TN8025			THM			TTM		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	0 / 1	425	455	490	655	705	750	455	570	685	-	-	-	-	-	-	295	310	325
	2	360	465	575	555	720	885	380	475	575	-	-	-	-	-	-	245	320	405
	3	360	465	575	555	720	885	380	475	575	-	-	-	-	-	-	245	320	405
	4	235	300	365	370	470	570	245	320	390	-	-	-	-	-	-	170	210	260
	5	325	400	475	510	615	720	345	450	555	-	-	-	-	-	-	230	280	330
	6	130	180	210	210	275	325	145	195	245	-	-	-	-	-	-	95	130	145
M	1	295	390	490	-	-	-	-	-	-	295	390	490	-	-	-	195	245	295
	2	180	245	310	-	-	-	-	-	-	180	245	310	-	-	-	130	160	180
	3	195	260	320	-	-	-	-	-	-	195	260	320	-	-	-	130	165	195
K	1	195	255	295	390	490	590	-	-	-	-	-	-	195	255	295	-	-	-
	2	195	240	280	390	490	590	-	-	-	-	-	-	195	240	280	-	-	-
	3	195	245	295	360	455	555	-	-	-	-	-	-	195	245	295	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-	1965	2460	2950	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	1750	2240	2730	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	750	980	1210	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-	445	590	730	-	-	-
	5	-	-	-	-	-	-	-	-	-	-	-	-	230	295	360	-	-	-
	6	-	-	-	-	-	-	-	-	-	-	-	-	1450	1855	2260	-	-	-
	7	-	-	-	-	-	-	-	-	-	-	-	-	1805	2295	2785	-	-	-
S	1	-	-	-	-	-	-	-	-	-	-	-	-	75	110	130	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	40	55	65	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	135	195	235	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-	65	95	115	-	-	-
H	1	-	-	-	-	-	-	-	-	-	-	-	-	35	70	115	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	35	70	115	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	35	70	115	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-	35	70	115	-	-	-

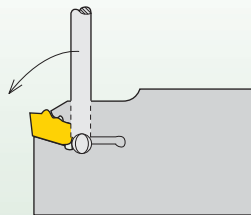
**ProGroove System**



To change the cutting insert, place the wrench into the blade recess. The blade mouth is opened by turning through 90°.

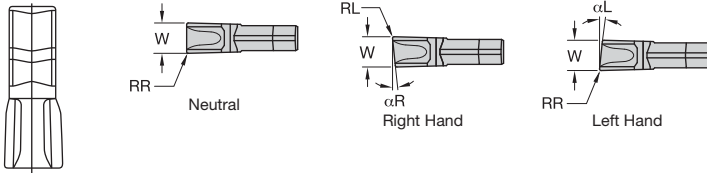


In this position, the wrench is self-locking, leaving both hands free for changing the cutting insert.



The cutting insert is pressed against the rear seat in the blade mouth, releasing the wrench. The insert is accurately positioned and securely clamped.





● first choice  
○ alternate choice

P	●	●	●	●	○	○	○	○
M	●	○	○	○	○	○	○	○
K	●	●	●	●	○	○	○	○
N	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○

PGU

catalog number	insert size	W		RR		hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
		mm	in	mm	in							
123567320	2	2,10	.083	0,20	.008	N - Neutral	2953289	2498725	2498713	2021804	2008876	—
123567330	3	3,10	.122	0,30	.012	N - Neutral	2953284	—	2498714	2017822	2008931	—
123567340	4	4,10	.161	0,30	.012	N - Neutral	2953286	2498727	2498715	—	2009080	—
123567350	5	5,10	.201	0,30	.012	N - Neutral	2953673	2498728	2498716	—	2021873	—
123567360	6	6,10	.240	0,40	.016	N - Neutral	2953674	2952333	2952350	—	2009385	—
123567380	8	8,15	.321	0,60	.024	N - Neutral	2953666	—	2952351	2009482	2009504	—

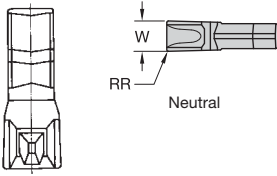
catalog number	insert size	W		RR		alphaL	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
		mm	in	mm	in								
123567231	3	3,10	.122	0,25	.010	6	L - Left	2953672	2498730	2498718	—	—	—
123567241	4	4,10	.161	0,25	.010	6	L - Left	2953676	—	—	—	—	—

catalog number	insert size	W		RL		alphaR	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
		mm	in	mm	in								
123567230	3	3,10	.122	0,25	.010	6	R - Right	2953291	2498729	2498717	—	—	—
123567240	4	4,10	.161	0,25	.010	6	R - Right	2953667	2498731	2498719	—	—	—

NOTE: W tolerance on all = ±.002" (±0,05mm).

Grooving and Cut-Off





● first choice  
○ alternate choice

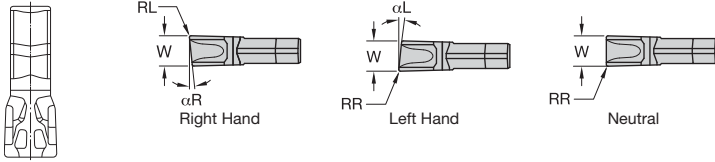
P	●	●	●	○	●
M	●	○	○	●	●
K	●	●	●	●	●
N	○	○	○	●	○
S	○	○	○	●	○
H	○	○	○	●	○

■ PGM

catalog number	insert size	W		RR		hand	TN6030	TN7525	TN7535	TN8025	THM	TTM	
		mm	in	mm	in								
123567420	2	2,10	.083	0,20	.008	N - Neutral	2953679	2953679	2498733	2498721			
123567430	3	3,10	.122	0,30	.012	N - Neutral	2953678	2498734	2498722				
123567440	4	4,10	.161	0,30	.012	N - Neutral	2953663	2498735	2498723				
123567450	5	5,10	.201	0,30	.012	N - Neutral	2953671	2498736	2498724				
123567460	6	6,10	.240	0,40	.016	N - Neutral	2953677	2952335	2952352				
123567480	8	8,15	.321	0,60	.024	N - Neutral	2953675	2952336	2952353				

NOTE: W tolerance on all = ±.002" (±0,05mm).





● first choice  
○ alternate choice

P	●	●	●	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○
K	●	●	●	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○

PGS

catalog number	insert size	W		RR		hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
		mm	in	mm	in							
123567702	2	2,25	.089	0,20	.008	N - Neutral	●	●	○	○	○	○
123567703	3	3,25	.128	0,20	.008	N - Neutral	●	●	○	○	○	○
123567704	4	4,25	.167	0,20	.008	N - Neutral	●	●	○	○	○	○

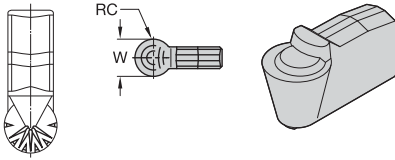
catalog number	insert size	W		RR		alphaL	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
		mm	in	mm	in								
123567721	2	2,25	.089	0,20	.008	6	L - Left	●	●	○	○	○	○
123567731	3	3,25	.128	0,20	.008	6	L - Left	●	●	○	○	○	○

catalog number	insert size	W		RL		alphaR	hand	TN6030	TN7525	TN7535	TN8025	THM	TTM
		mm	in	mm	in								
123567720	2	2,25	.089	0,20	.008	6	R - Right	●	●	○	○	○	○
123567730	3	3,25	.128	0,20	.008	6	R - Right	●	●	○	○	○	○
123567740	4	4,25	.167	0,20	.008	6	R - Right	●	●	○	○	○	○

NOTE: W tolerance on all = ±.002" (±0,05mm).

Grooving and Cut-Off



● first choice  
○ alternate choice

P	●	●	●	○	●
M	●	○	○	●	●
K	●	●	●	●	●
N	○	○	○	○	○
S	○	○	○	○	○
H	○	○	○	○	○

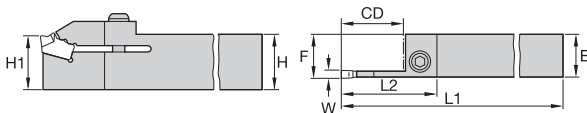
**PGR**

catalog number	insert size	W		RC		TN6090	TN7525	TN7535	TN8025	THM	TTM
		mm	in	mm	in						
123567803	3	3,00	.118	1,50	.059	●	○	○	○	○	○
123567804	4	4,00	.158	2,00	.079	●	○	○	○	○	○
123567805	5	5,00	.197	2,50	.098	●	○	○	○	○	○
123567806	6	6,00	.236	3,00	.118	●	○	○	○	○	○

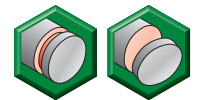
NOTE: W tolerance on all = ±.003" (±0,07mm).

Grooving and Cut-Off

**Integral Toolholders**

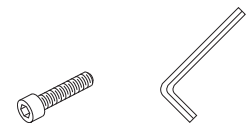


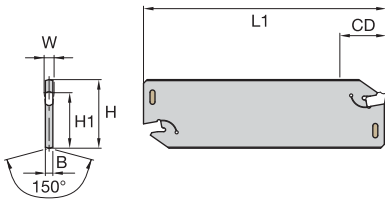
Right Hand Tool Shown



**Grooving and Cut-Off**

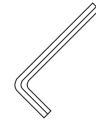
order number	catalog number	seat size	W	CD	H	B	F	L1	L2	H1	cap screw	wrench
<b>right hand</b>												
2962743	12250023000	3	.122	.787	.750	.750	.764	5.00	1.26	.750	12148596200	12148041200
2962745	12250023200	3	.122	.984	1.000	1.000	1.012	6.00	1.57	1.000	12148596200	12148041200
2962751	12250025200	5	.201	1.260	1.000	1.000	1.016	6.00	2.09	1.000	12148596200	12148041200
<b>left hand</b>												
2962744	12250023100	3	.122	.787	.750	.750	.764	5.00	1.26	.750	12148596200	12148041200





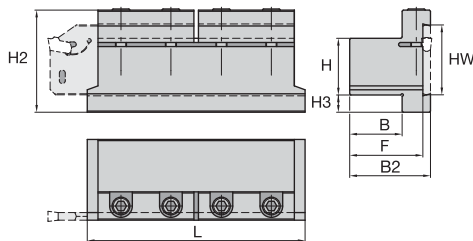
### Cut-Off Blades

Grooving and Cut-Off

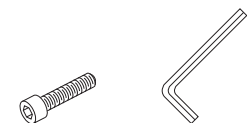


order number	catalog number	seat size	W		H		H1		L1		B		CD		wrench
			mm	in	mm	in	mm	in	mm	in	mm	in			
2021629	12251332000	2	2,1	.083	19,0	.748	15,7	.618	90	3.543	1,7	.067	20	.787	12146003800
2021639	12251342000	2	2,1	.083	26,0	1.024	21,4	.843	110	4.331	1,7	.067	25	.984	12146003800
2008113	12251352000	2	2,1	.083	32,0	1.260	25,0	.984	150	5.906	1,7	.067	25	.984	12146003800
2021640	12251343000	3	3,1	.122	26,0	1.024	21,4	.843	110	4.331	2,4	.095	40	1.575	12146003800
2008116	12251353000	3	3,1	.122	32,0	1.260	25,0	.984	150	5.906	2,4	.095	50	1.969	12146003800
2021641	12251344000	4	4,1	.161	26,0	1.024	21,4	.843	110	4.331	3,2	.126	40	1.575	12146003800
2008119	12251354000	4	4,1	.161	32,0	1.260	25,0	.984	150	5.906	3,2	.126	50	1.969	12146003800
2008122	12251355000	5	5,1	.201	32,0	1.260	25,0	.984	150	5.906	4,2	.165	60	2.362	12146003800
2008135	12251356000	6	6,1	.240	32,0	1.260	25,0	.984	150	5.906	5,0	.197	60	2.362	12146009500
2008138	12251358000	8	8,1	.319	32,0	1.260	25,0	.984	150	5.906	6,8	.268	60	2.362	12146009500
2021743	12251368000	8	8,1	.319	52,5	2.067	45,0	1.772	250	9.843	6,8	.268	100	3.937	12146009500

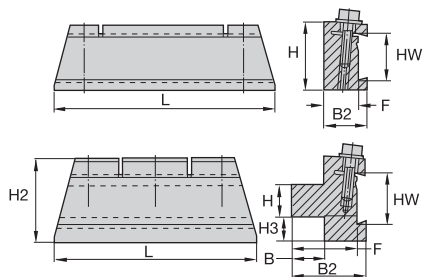
NOTE: Order wrench separately.



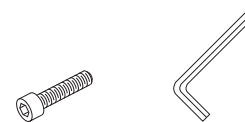
### Cut-Off Blade Holders



order number	catalog number	HW	H	B	F	H2	B2	H3	L	cap screw	wrench
2968845	32251221200	1.024	.750	.750	1.161	1.57	1.34	.32	3.39	125.625	12148041300
2968846	32251221600	1.260	1.000	1.000	1.417	1.89	1.63	.30	4.33	125.630	12148041300
2968847	32251222000	1.260	1.250	1.250	1.673	1.97	1.89	.13	4.33	125.630	12148041300

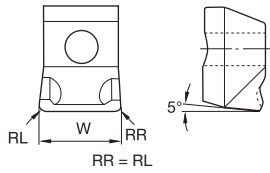


■ **Cut-Off Blade Holders**



order number	catalog number	HW	H	B	F	H2	B2	H3	L	cap screw	wrench
2021625	12251221900	19	16,0	16,0	28,3	30	30	4	100	12148036000	12148041300
2021634	12251212500	19	25,0	19,0	17,3	25	19	—	100	12148036000	12148041300
2021626	12251221600	26	16,0	16,0	31,0	40	36	12	100	12148036000	12148041300
2007826	12251222000	26	20,0	18,0	33,0	40	38	8	100	12148036000	12148041300
2008141	12251213200	26	32,0	20,0	15,0	32	20	—	125	12148036000	12148041300
2021635	12251222500	32	25,0	20,0	35,0	50	40	10	125	12148036000	12148041300
2008156	12251223200	32	32,0	25,0	40,0	50	45	3	125	12148036000	12148041300
2008159	12251233200	53	32,0	25,0	50,0	82	57	30	160	12146013400	12148041400
2021723	12251234000	53	40,0	40,0	58,0	82	65	22	160	12146013400	12148041400

Grooving and Cut-Off



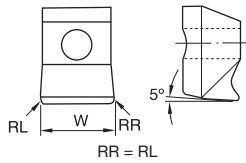
● first choice  
○ alternate choice

P	●	●	●	○	●	●
M	●	○	○	○	●	●
K	●	●	●	●	●	●
N	○	○	○	○	○	○
S	○	○	○	○	○	○
H	○	○	○	○	○	○

**■ LGN0**

catalog number	W		RR		TN6030	TN7525	TN7535	TN8025	THM	TTM
	mm	in	mm	in						
123568080	8,15	.321	0,80	.032	●	●	○	○	○	○
123568100	10,15	.400	0,80	.032	●	●	○	○	○	○
123568120	12,20	.480	0,80	.032	●	●	○	○	○	○
123568140	14,20	.559	0,80	.032	●	●	○	○	○	○
123568160	16,20	.638	0,80	.032	●	●	○	○	○	○

NOTE: W tolerance on all = ±.002" (±0,05mm).

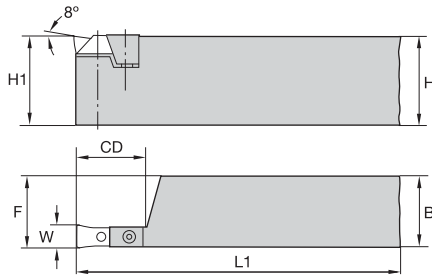


**■ LGN1**

catalog number	W		RR		TN6030	TN7525	TN7535	TN8025	THM	TTM
	mm	in	mm	in						
123568081	8,15	.321	0,80	.032	●	●	○	○	○	○
123568121	12,20	.480	0,80	.032	●	●	○	○	○	○
123568141	14,20	.559	0,80	.032	●	●	○	○	○	○
123568161	16,20	.638	0,80	.032	●	●	○	○	○	○

NOTE: W tolerance on all = ±.002" (±0,05mm).

Grooving and Cut-Off



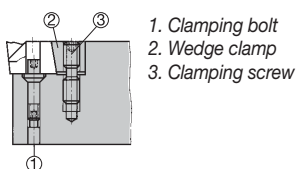
**Grooving**

order number	catalog number	seat size	W	CD	H	H1	B	L1	F
<b>right hand</b>									
2983280	32250110100	8	.321	.866	1.250	1.250	1.000	6.02	1.021
2983282	32250110500	12	.480	1.181	1.500	1.500	1.250	7.02	1.272
2983973	32250110700	14	.559	1.181	1.500	1.500	1.250	7.02	1.272
2983974	32250110900	16	.638	1.339	1.500	1.500	1.250	7.02	1.272
<b>left hand</b>									
2983975	32250110200	8	.321	.866	1.250	1.250	1.000	6.02	1.021
2983977	32250110600	12	.480	1.181	1.500	1.500	1.250	7.02	1.272
2983978	32250110800	14	.559	1.181	1.500	1.500	1.250	7.02	1.272
2983979	32250111000	16	.638	1.339	1.500	1.500	1.250	7.02	1.272

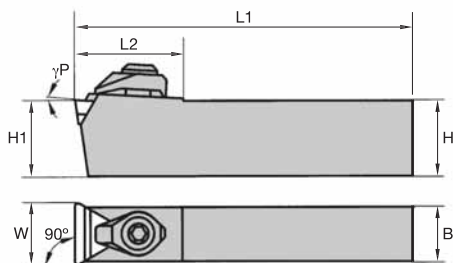
**Spare Parts**



catalog number	clamping bolt	wedge clamp	clamping screw	wrench for clamp screw	wrench for clamp screw	wrench for clamping bolt
<b>right hand</b>						
32250110100	12148060600	12148094300	12148574100	12148041000	—	12148046000
32250110500	12148060700	12148094500	12148574900	—	12148041100	12148040900
32250110700	12148060700	12148094600	12148574000	—	12148041200	12148040900
32250110900	12148060800	12148094700	12148574000	12148041000	12148041200	—
<b>left hand</b>						
32250110200	12148060600	12148094300	12148574100	12148041000	—	12148046000
32250110600	12148060700	12148094500	12148574900	—	12148041100	12148040900
32250110800	12148060700	12148094600	12148574000	—	12148041200	12148040900
32250111000	12148060800	12148094700	12148574000	12148041000	12148041200	—



Grooving and Cut-Off



■ Grooving

order number	catalog number	W	H	H1	B	L1	L2	γP°	gage insert
<b>left hand</b>									
2022921	12191061900	.409	.787	.787	.374	4.92	.827	3	TP..1103../TP..22..
2007414	12191062086	.602	.787	.787	.512	5.91	1.063	3	TP..1603../TP..32..
2022922	12191062586	.602	.984	.984	.512	5.91	1.063	3	TP..1603../TP..32..
2058066	12191062686	.795	.984	.984	.709	5.91	1.378	3	TP..2204../TP..43..
2022923	12191063286	.795	1.260	1.260	.709	7.09	1.378	3	TP..2204../TP..43..

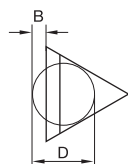
NOTE: Gage Inserts listed are ISO/ANSI style inserts.  
 Holders KS are supplied without chipbreaker. For chipbreaker order numbers, see below.

■ For Grooving without Chipbreaker

catalog number	clamp	button-head cap screw	screw	shim	shim screw	shim screw	washer	wrench
12191061900	12148589200	—	12148589800	12148032586	—	12148021900	—	12148041100
12191062086	12148586800	12148586000	—	12148031686	12148024100	—	12148024200	—
12191062586	12148586800	12148586000	—	12148031686	12148024100	—	12148024200	—
12191062686	12148586900	12148021100	—	12148032086	12148024500	—	12148024800	—
12191063286	12148586900	12148021100	—	12148032086	12148024500	—	12148024800	—

■ For Grooving with Chipbreaker (Order Additional Clamp and Chipbreaker)

insert	clamp with chipbreaker	D	chipbreakers					
			B – edge width					
			.016	.047	.071	.098	.126	.158
TP...22...	12148589200	.250	12148591011	12148588211	12148588311	12148588411	—	—
TP...32...	12148589300	.375	12148591111	12148586611	12148587011	12148587111	12148580011	—
TP...43...	12148586900	.500	—	—	12148580411	12148580511	12148580611	12148582511





## Separator™ for Cut-Off

Specifically engineered to deliver toolholder flexibility with integral, component, universal, and blade-style designs.

# Separator



### Features

- Insert widths .063–.157" (2–4mm).
- Toolholder shank sizes .375–1.250" (10–31,75mm).
- Cut-off up to 3" (76mm) bar capacity.

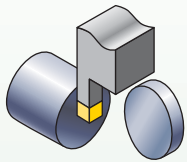
### Benefits

- Quick, reliable insert indexing.
- Positive mechanical clamping.
- CNC square shank, screw machine, and PL blade-style toolholders.

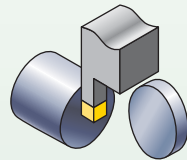
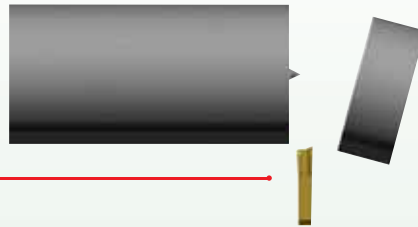


**1 Choose the application to be performed:**

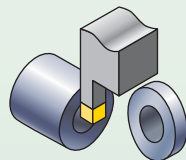
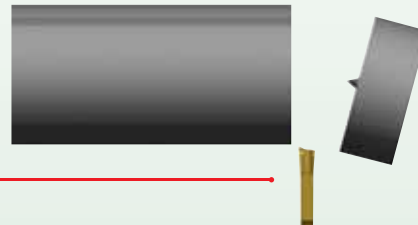
Choose lead angle of insert for application.



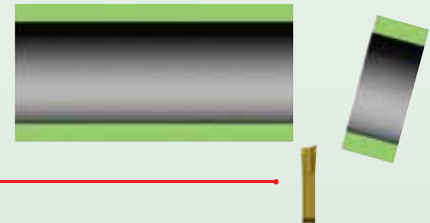
R.H. Lead Angle



L.H. Lead Angle



R.H. Lead Angle



**2 Identify the material to be machined:**

Each tool has a material grid marked with a letter indicating the materials that can be machined.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

**3 Select your toolholder based on the application:**

- A Choose the appropriate width of insert required for the application.
- B Choose the shortest cutting depth "CD" dimension for increased tool rigidity.
- C Select the largest toolholder shank "H" and "B" dimensions for maximum rigidity.

Separator™ Toolholders WIDIA

Extended Capacity Left Hand Tool Shown

Extended Capacity Right Hand Tool Shown

■ Square Shank • Extended Capacity

order number	catalog number	A	B	C	FS	H	L2	L1	clamp	clamp screw
right hand										
3038744	206420	125	1,000	360	307	1,000	1,667	6,000	430180	819164
3038746	206421	180	1,000	370	308	1,000	1,667	6,000	430180	819164
left hand										
3038746	206422	125	1,000	360	307	1,000	1,667	6,000	430181	819164

**4 Select chipbreaker style for the application:**

See the application guide on page E117 for a complete list of insert styles.

insert type	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
first choice	X <sup>2</sup> -Ultra (X <sup>2</sup> has wipers)	X <sup>2</sup> -Ultra	X <sup>2</sup> -Ultra	X <sup>2</sup> -Ultra	X <sup>2</sup> -Ultra	–
second choice	S <sup>2</sup> -Ultra	S <sup>2</sup> -Ultra	Classic	S <sup>2</sup> -Ultra	S <sup>2</sup> -Ultra	X <sup>2</sup>

**5 Select grade:**

machining condition	Recommended Grades					
	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys	hardened materials
<b>high performance</b> for optimal conditions (clean cuts, good machine condition, higher speed capability)	M93	M433B	M93	M93	M433B	–
	–	M93	–	–	M93	–
<b>general purpose</b> (1st choice for general machining)	M43	M43	M43	M43	M43	M93
<b>unfavorable conditions</b> (interrupted cuts, low speeds, etc.)	M45	M45	M45	M45	M45	–
	M40	M40	M40	M40	M40	–

See page E116 for Grades and Grade Descriptions.

**6 Determine cutting data:**

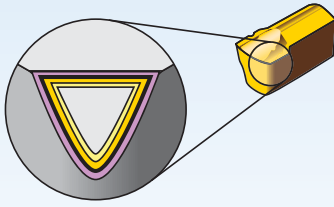
- A Based on material group and grade, identify starting speed (vc).
- B First choice starting speed is in **bold**.

See pages E118–E119 for cutting data.

Separator™  
Recommended Cutting Speeds • Metric

**WIDIA**

Material Group	Cutting Speed – vc – m/min															
	M40			M43			M433B			M45			M93			
	min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
P	0 / 1	40	80	115	110	180	210	–	–	–	45	85	125	150	200	245
	2	30	60	85	75	120	105	–	–	–	40	85	95	115	150	185
	3	30	60	85	75	120	165	–	–	–	40	65	95	115	150	185
	4	25	45	60	55	90	125	30	75	115	25	45	70	80	110	145
	5	25	40	55	55	110	140	35	115	145	40	<b>85</b>	95	105	140	170
6	15	30	40	35	50	65	35	50	70	20	30	45	45	60	75	
M	1	30	45	60	50	75	100	55	90	130	35	60	65	90	120	150
	2	20	30	40	35	50	65	35	60	90	25	50	55	75	95	
	3	20	30	40	35	50	65	35	60	85	25	40	50	60	80	100
K	1	65	95	125	90	135	175	200	260	320	75	110	145	170	225	325
	2	65	95	125	90	135	175	210	270	330	75	110	140	135	170	225
	3	55	90	120	80	125	170	215	275	335	65	<b>100</b>	145	110	140	215
N	1	210	370	520	275	440	610	–	–	–	245	400	560	305	490	670
	2	170	325	480	230	400	570	–	–	–	200	355	510	265	450	630
	3	135	265	375	190	300	435	–	–	–	150	230	305	210	305	400
	4	80	125	185	135	190	260	–	–	–	85	135	175	130	190	255
	5	45	75	100	60	85	115	–	–	–	50	80	110	70	100	135
	6	165	290	420	220	360	500	–	–	–	190	320	450	255	410	560
	7	180	340	490	245	410	560	–	–	–	215	370	520	275	460	640
8	25	35	40	25	40	50	30	45	50	30	35	45	35	45	60	



Coatings provide high-speed capability and are engineered for finishing to light roughing.

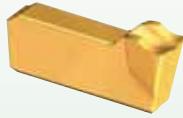
- Reduce cycle times — high speed and feed capability.
- Longer tool life — new multilayer coating provides better wear resistance.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

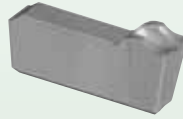
wear resistance ← → toughness

Grade	Coating	Grade Description		Performance Matrix																			
				05	10	15	20	25	30	35	40	45											
M40	HC-P35	A premium, single-phase PVD TiN coating over a tough, specially formulated substrate that performs well under extremely low to moderate speed conditions found on screw machines. Ideal for carbon steels, alloy steels, most stainless steels, and many high-temperature alloys.	P																				
			M																				
			K																				
			N																				
			S																				
M43	HC-P25	PVD-TiAlN multilayer coating over a tough, shock-resistant, fine-grained carbide substrate with increased oxidation resistance. Recommended on low to medium cutting speeds when good toughness properties are required.	P																				
			M																				
			K																				
			N																				
			S																				
M433B	HC-M30	PVD-TiAlN single-layer coating over a superiorly tough, fine-grained carbide substrate. Outstanding temperature properties with excellent resistance to avoid built-up edges. Medium to high speeds and feeds. For stainless steels and high-temperature alloys.	P																				
			M																				
			K																				
			N																				
			S																				
M45	HC-P30	A premium PVD-TiCN coated, shock-resistant carbide designed for low to moderate speeds. Excellent resistance to welding and BUE, along with improved abrasion resistance make this an ideal grade for austenitic stainless steel, low carbon steel, and high-temperature alloys.	P																				
			M																				
			K																				
			N																				
			S																				
M93	HC-P20	PVD-TiAlN multilayer coating over a tough, fine-grained carbide substrate with increased resistance to heat. Recommended for medium to higher cutting speeds under moderate conditions.	P																				
			M																				
			K																				
			N																				
			S																				

**Separator • X<sup>2</sup> and X<sup>2</sup>-Ultra**



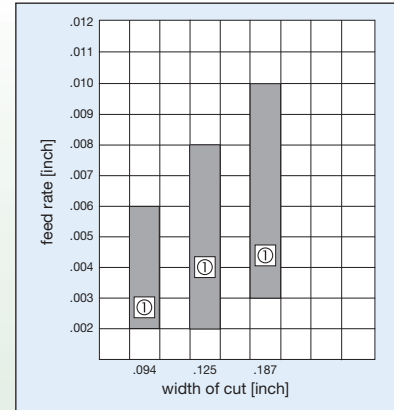
X<sup>2</sup>



X<sup>2</sup>-Ultra

This insert has the same geometry as the WMT-SX™. Chip control geometry offers the widest range of speed and feed capabilities and provides excellent flatness and finish. This chipbreaker cuts with the least amount of tool pressure, extending tool life. The geometry also includes wipers and a corner radius. This geometry works well on a variety of materials.

This insert has the same geometry as the WMT-SX-Ultra. The X<sup>2</sup>-Ultra is an enhanced version of the X<sup>2</sup> and is ideal for stainless steels, nickel-based alloys, tool steel, INCONEL®, and titanium.



① Recommended Starting Feed

**Separator • S<sup>2</sup> and S<sup>2</sup>-Ultra**



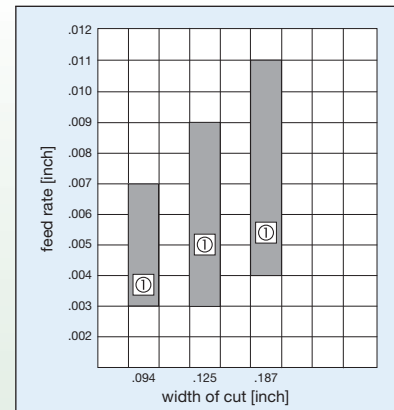
S<sup>2</sup>



S<sup>2</sup>-Ultra

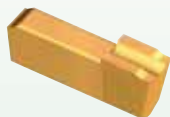
High positive rake with a more open chipbreaker enables increased speeds and feeds for moderate- to high-speed applications. The geometry includes wipers and a corner radius that provides superior flatness and finish. This insert is also available with sharp corners. Its greatest strengths can be seen on stainless steels and soft gummy steels.

The S<sup>2</sup>-Ultra is an enhanced version of the S<sup>2</sup> and is ideal for 300 series stainless steels, nickel-based alloys, tool steel, INCONEL, and titanium at moderate to high speeds and feeds.



① Recommended Starting Feed

**Separator • Classic and F<sup>2</sup>**



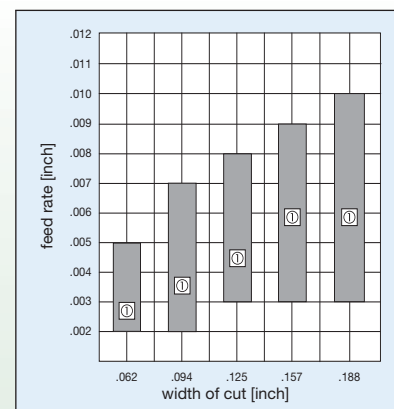
Classic



F<sup>2</sup>

A good general-purpose insert for carbon steels, alloy steels, and most stainless steels. The Separator Classic chipbreaker is designed to perform well at moderate to slow speeds and feeds. The Classic provides standard high lead angles and sharp corners, making it the first choice when choosing an insert for nib-free cut-off.

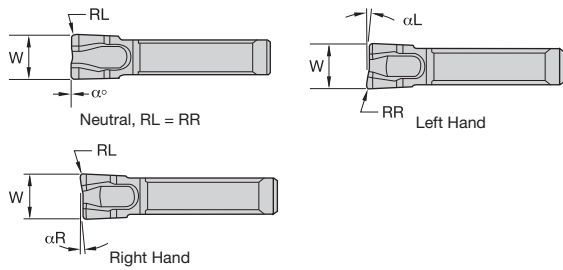
This insert provides superior flatness and finish on a wide variety of materials. Ideal for thick wall parts or cutting off larger diameter parts to center. The Separator F<sup>2</sup> performs well at slow to moderate speeds and feeds.



① Recommended Starting Feed

Material Group		Cutting Speed – vc m/min														
		M40			M43			M433B			M45			M93		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	0/1	40	80	115	110	160	210	-	-	-	45	85	125	150	200	245
	2	30	60	85	75	120	165	-	-	-	40	65	95	115	150	185
	3	30	60	85	75	120	165	-	-	-	40	65	95	115	150	185
	4	25	45	60	55	90	125	30	70	115	25	45	70	80	110	140
	5	35	60	85	85	110	140	85	115	145	40	65	95	105	140	170
	6	15	30	40	35	50	65	35	50	70	20	30	45	45	60	75
M	1	30	45	60	50	75	100	55	90	130	35	50	65	90	120	150
	2	20	30	40	35	50	65	35	60	80	25	35	50	55	75	95
	3	20	35	40	35	50	65	35	60	85	25	40	50	60	80	100
K	1	65	95	125	90	135	175	200	260	320	75	110	145	130	175	225
	2	65	95	125	90	135	175	210	270	330	75	110	140	135	170	225
	3	55	90	120	80	125	170	215	275	335	65	105	145	110	140	215
N	1	210	370	520	275	440	610	-	-	-	245	400	550	305	490	670
	2	170	325	480	230	400	570	-	-	-	200	355	510	265	450	630
	3	135	205	275	180	260	335	-	-	-	150	230	305	210	305	400
	4	80	120	165	105	150	190	-	-	-	95	135	175	130	180	225
	5	45	75	100	60	85	115	-	-	-	50	80	110	70	105	135
	6	165	290	420	220	360	500	-	-	-	190	320	450	255	410	560
	7	180	340	490	245	410	580	-	-	-	215	370	520	275	460	640
S	1	25	35	40	25	40	50	30	45	50	30	35	45	35	45	60
	2	10	15	20	15	20	25	15	20	25	10	15	20	20	25	30
	3	35	45	60	35	50	65	40	55	70	35	50	65	55	65	80
	4	15	25	30	25	30	35	25	30	40	20	25	35	30	35	45
H	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Group		Cutting Speed – vc SFM														
		M40			M43			M433B			M45			M93		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max	min	Start	max
<b>P</b>	0/1	125	<b>260</b>	370	350	<b>525</b>	700	–	–	–	150	<b>275</b>	400	500	<b>650</b>	800
	2	95	<b>185</b>	275	250	<b>395</b>	540	–	–	–	125	<b>215</b>	300	385	<b>490</b>	600
	3	95	<b>185</b>	275	250	<b>395</b>	540	–	–	–	125	<b>215</b>	300	385	<b>490</b>	600
	4	70	<b>135</b>	205	170	<b>285</b>	405	100	<b>235</b>	370	85	<b>155</b>	220	255	<b>360</b>	460
	5	110	<b>190</b>	275	270	<b>365</b>	455	270	<b>375</b>	475	120	<b>215</b>	305	345	<b>450</b>	555
	6	55	<b>90</b>	125	110	<b>160</b>	210	110	<b>170</b>	230	65	<b>100</b>	140	150	<b>200</b>	250
<b>M</b>	1	100	<b>145</b>	190	170	<b>250</b>	330	180	<b>300</b>	420	110	<b>165</b>	220	295	<b>390</b>	490
	2	70	<b>95</b>	120	110	<b>160</b>	210	120	<b>195</b>	270	85	<b>120</b>	155	180	<b>245</b>	310
	3	70	<b>105</b>	135	115	<b>165</b>	220	120	<b>200</b>	275	85	<b>125</b>	165	195	<b>260</b>	320
<b>K</b>	1	210	<b>310</b>	405	300	<b>440</b>	575	650	<b>850</b>	1050	250	<b>365</b>	475	425	<b>575</b>	725
	2	210	<b>310</b>	410	300	<b>435</b>	575	685	<b>885</b>	1085	240	<b>350</b>	460	440	<b>555</b>	740
	3	180	<b>290</b>	400	270	<b>410</b>	550	700	<b>900</b>	1100	210	<b>340</b>	470	360	<b>460</b>	700
<b>N</b>	1	700	<b>1200</b>	1700	900	<b>1450</b>	2000	–	–	–	800	<b>1300</b>	1800	1000	<b>1600</b>	2200
	2	565	<b>1065</b>	1565	765	<b>1315</b>	1865	–	–	–	665	<b>1165</b>	1665	865	<b>1465</b>	2065
	3	450	<b>675</b>	900	600	<b>850</b>	1100	–	–	–	500	<b>750</b>	1000	700	<b>1000</b>	1300
	4	265	<b>400</b>	535	350	<b>485</b>	615	–	–	–	310	<b>440</b>	575	435	<b>585</b>	735
	5	150	<b>240</b>	325	190	<b>285</b>	375	–	–	–	165	<b>260</b>	350	225	<b>350</b>	450
	6	550	<b>960</b>	1365	735	<b>1185</b>	1635	–	–	–	635	<b>1050</b>	1465	835	<b>1335</b>	1835
	7	600	<b>1100</b>	1600	800	<b>1350</b>	1900	–	–	–	700	<b>1200</b>	1700	900	<b>1500</b>	2100
<b>S</b>	1	80	<b>105</b>	130	90	<b>120</b>	150	95	<b>130</b>	165	90	<b>115</b>	140	110	<b>145</b>	185
	2	40	<b>55</b>	65	45	<b>60</b>	75	55	<b>70</b>	85	45	<b>60</b>	75	65	<b>80</b>	100
	3	110	<b>155</b>	200	120	<b>170</b>	220	130	<b>180</b>	230	120	<b>165</b>	210	180	<b>220</b>	260
	4	60	<b>80</b>	100	75	<b>95</b>	115	80	<b>105</b>	130	75	<b>90</b>	110	95	<b>115</b>	145
<b>H</b>	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–



● first choice  
○ alternate choice

P	●	●	●	●	●
M	●	●	●	●	●
K	○	○	○	○	○
N	●	●	●	●	●
S	○	○	○	○	○
H	○	○	○	○	○

**X<sup>2</sup>**

Grooving and Cut-Off

catalog number	insert size	W		RR		hand	M40	M43	M433B	M45	M93
		mm	in	mm	in						
507305	2	2,39	.094	0,14	.006	N - Neutral	●	●	●	●	●
507308	3	3,20	.126	0,17	.007	N - Neutral	●	●	●	●	●

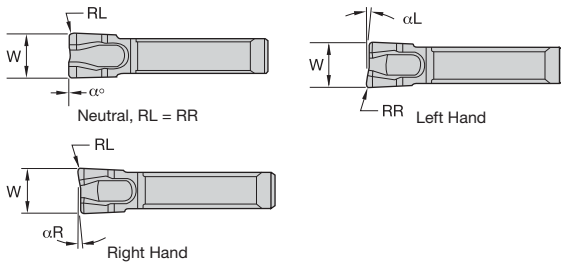
  

catalog number	insert size	W		RR		αL	hand	M40	M43	M433B	M45	M93
		mm	in	mm	in							
507307	2	2,39	.094	0,14	.006	5	L - Left	●	●	●	●	●
507310	3	3,20	.126	0,17	.007	5	L - Left	●	●	●	●	●

catalog number	insert size	W		RL		αR	hand	M40	M43	M433B	M45	M93
		mm	in	mm	in							
507306	2	2,39	.094	0,14	.006	5	R - Right	●	●	●	●	●
507309	3	3,20	.126	0,17	.007	5	R - Right	●	●	●	●	●





● first choice  
○ alternate choice

P	●	●	●	●	●
M	●	●	●	●	●
K	○	○	○	○	○
N	●	●	●	●	●
S	○	○	○	○	○
H	○	○	○	○	○

■ X<sup>2</sup> Ultra

catalog number	insert size	W		RR		hand	M40	M43	M433B	M45	M93
		mm	in	mm	in						
507354	2	2,39	.094	0,15	.006	N - Neutral	●	●	●	●	●
507357	3	3,20	.126	0,15	.006	N - Neutral	●	●	●	●	●

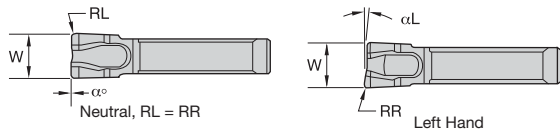
  

catalog number	insert size	W		RR		alpha L	hand	M40	M43	M433B	M45	M93
		mm	in	mm	in							
507356	2	2,39	.094	0,13	.005	5	L - Left	●	●	●	●	●
507359	3	3,20	.126	0,15	.006	5	L - Left	●	●	●	●	●

catalog number	insert size	W		RL		alpha R	hand	M40	M43	M433B	M45	M93
		mm	in	mm	in							
507355	2	2,39	.094	0,13	.005	5	R - Right	●	●	●	●	●
507358	3	3,20	.126	0,15	.006	5	R - Right	●	●	●	●	●





● first choice  
○ alternate choice

P	●	●	●	●	●	●
M	●	●	●	●	●	●
K	○	○	○	○	○	○
N	●	●	●	●	●	●
S	○	○	○	○	○	○
H	○	○	○	○	○	○

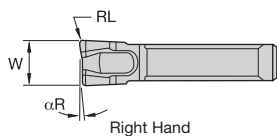
■ S²

Grooving and Cut-Off

catalog number	insert size	W		RR		hand	M40	M43	M433B	M45	M93
		mm	in	mm	in						
507275	2	2,39	.094	0,20	.008	N - Neutral	3540807	3540803		3540805	3540806
507295	3	3,00	.118	0,25	.010	N - Neutral		3540857		3540858	3540859
507278	3	3,20	.126	0,25	.010	N - Neutral	3540822	3540818		3540820	3540821
507378	4	4,00	.158	0,25	.010	N - Neutral		3540951		3540952	3540953
507281	5	4,78	.188	0,25	.010	N - Neutral		3540833		3540835	3540836
catalog number	insert size	W		RR		hand	M40	M43	M433B	M45	M93
		mm	in	mm	in						
507277	2	2,39	.094	0,20	.008	5				3540815	3540816
507297	3	3,00	.118	0,20	.008	5		3540863			3540865
507280	3	3,20	.126	0,20	.008	5				3540830	
507283	5	4,78	.188	0,20	.008	5					3540846

(continued)

(S<sup>2</sup> – continued)

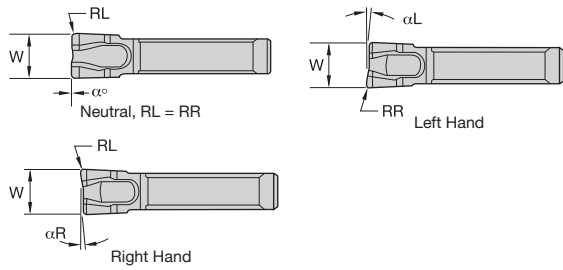


● first choice  
○ alternate choice

P	●	●	●	●	●	●
M	●	●	●	●	●	●
K	○	○	○	○	○	○
N	●	●	●	●	●	●
S	○	●	●	●	○	○
H	○	○	○	○	○	○

catalog number	insert size	W		RL		αR	hand							
		mm	in	mm	in			M40	M43	M433B	M45	M93		
507276	2	2,39	.094	0,20	.008	5	R - Right	3540812	3540808	3540810	3540811			
507301	2	2,39	.094	—	—	5	R - Right	—	—	3540870	—	—	—	—
507296	3	3,00	.118	0,20	.008	5	R - Right	—	3540860	—	—	—	—	—
507279	3	3,20	.126	0,20	.008	5	R - Right	3540827	3540823	—	—	—	—	—
507298	3	3,20	.126	—	—	5	R - Right	—	3540866	—	—	—	—	—
507379	4	4,00	.158	0,25	.010	5	R - Right	—	3540954	—	—	—	—	—
507282	5	4,78	.188	0,20	.008	5	R - Right	—	3540838	—	—	—	—	—
								—	—	3540867	—	—	—	—
								—	—	3540840	—	—	—	—
								—	—	—	3540841	—	—	—





● first choice  
○ alternate choice

P	●	●	●	●	●
M	●	●	●	●	●
K	○	○	○	○	○
N	●	●	○	○	○
S	○	○	○	○	○
H	○	○	○	○	○

■ S² Ultra

Grooving and Cut-Off

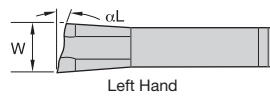
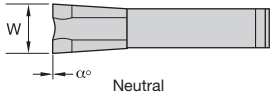
catalog number	insert size	W		RR		hand	M40	M43	M433B	M45	M93
		mm	in	mm	in						
507329	2	2,39	.094	0,15	.006	N - Neutral	■	■	3540907	■	■
507332	3	3,18	.125	0,15	.006	N - Neutral	■	■	3540910	■	■

catalog number	insert size	W		RR		αL	hand	M40	M43	M433B	M45	M93
		mm	in	mm	in							
507331	2	2,39	.094	0,15	.006	5	L - Left	■	■	3540909	■	■
507334	3	3,18	.125	0,15	.006	5	L - Left	■	■	3540912	■	■

catalog number	insert size	W		RL		αR	hand	M40	M43	M433B	M45	M93
		mm	in	mm	in							
507330	2	2,39	.094	0,15	.006	5	R - Right	■	■	3540908	■	■
507333	3	3,18	.125	0,15	.006	5	R - Right	■	■	3540911	■	■



● first choice  
○ alternate choice

P	●	●	●	●	●	●
M	●	●	●	●	●	●
K	○	○	○	○	○	○
N	●	●	●	●	●	●
S	○	○	○	○	○	○
H	○	○	○	○	○	○

■ Classic

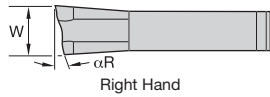
catalog number	insert size	W		hand	M40	M43	M433B	M45	M93	
		mm	in							
507196	2	1,60	.063	N - Neutral	3540664	3540664	3540663	3540663	3540529	
507140	2	2,39	.094	N - Neutral	3540530	3540528	3540528	3540529	3540529	
507117	3	3,20	.126	N - Neutral	3540461	3540459	3540460	3540460	3540460	
507116	5	4,78	.188	N - Neutral	3540449	3540447	3540447	3540447	3540447	
catalog number	insert size	W		alphaL	hand	M40	M43	M433B	M45	M93
		mm	in							
507152	2	2,36	.093	12	L - Left	3540594	3540594	3540594	3540594	3540594
507144	2	2,39	.094	4	L - Left	3540554	3540553	3540553	3540553	3540553
507154	3	3,15	.124	12	L - Left	3540598	3540597	3540597	3540597	3540597
507129	3	3,20	.126	4	L - Left	3540510	3540509	3540509	3540509	3540509
507125	5	4,78	.188	4	L - Left	3540487	3540487	3540487	3540487	3540487

(continued)



Grooving and Cut-Off

(Classic – continued)



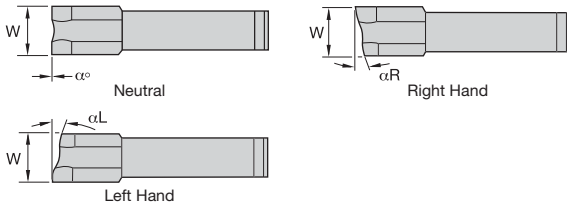
● first choice  
○ alternate choice

P	●	●	●	●	●
M	●	●	●	●	●
K	○	○	○	○	○
N	●	●	●	●	●
S	○	○	○	○	○
H	○	○	○	○	○

Grooving and Cut-Off

catalog number	insert size	W		$\alpha R$	hand								
		mm	in			M40	M43	M433B	M45	M83			
507197	2	1,60	.063	4	R - Right	3540666	3540666						
507214	2	1,60	.063	12	R - Right	3540692					3540691		
507207	2	2,31	.091	4	R - Right						3540685	3540685	
507151	2	2,36	.093	12	R - Right	3540589	3540589				3540587		
507143	2	2,39	.094	4	R - Right	3540544	3540544				3540542		3540543
507161	2	2,39	.094	18	R - Right	3540613					3540612		
507171	3	3,12	.123	6	R - Right	3540628	3540628						
507146	3	3,15	.124	12	R - Right	3540562					3540560		
507155	3	3,15	.124	18	R - Right	3540603	3540603				3540602		
507128	3	3,20	.126	4	R - Right	3540498					3540496	3540497	
507224	3	3,20	.126	4	R - Right	3540700	3540700				3540698		
507176	5	4,72	.186	12	R - Right	3540634					3540633		
507124	5	4,78	.188	4	R - Right	3540479					3540477		3540478

NOTE: No RR on classic inserts. Inserts are sharp.  
507207 and 507224 have a modified aggressive chip control design.



● first choice  
○ alternate choice

P	●	●	●	●	●
M	●	●	●	●	●
K	○	○	○	○	○
N	●	●	○	○	○
S	○	○	○	○	○
H	○	○	○	○	○

**F<sup>2</sup>**

catalog number	insert size	W		hand	M40	M43	M433B	M45	M93
		mm	in						
507240	2	2,39	.094	N - Neutral	3540744	3540744	3540744	3540743	3540743
507244	3	3,20	.126	N - Neutral	3540756	3540756	3540755	3540743	3540743

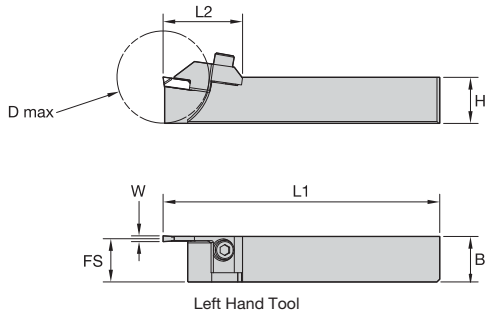
catalog number	insert size	W		αL	hand	M40	M43	M433B	M45	M93
		mm	in							
507255	2	2,39	.094	12	L - Left	3540781	3540781	3540781	3540784	3540784
507257	3	3,18	.125	4	L - Left	3540784	3540784	3540784	3540784	3540784

catalog number	insert size	W		αR	hand	M40	M43	M433B	M45	M93
		mm	in							
507241	2	2,39	.094	4	R - Right	3540747	3540747	3540746	3540746	3540746
507242	2	2,39	.094	12	R - Right	3540750	3540750	3540749	3540746	3540746
507243	2	2,39	.094	18	R - Right	3540753	3540753	3540752	3540752	3540752
507245	3	3,18	.125	4	R - Right	3540759	3540759	3540758	3540752	3540752
507246	3	3,18	.125	12	R - Right	3540762	3540762	3540761	3540761	3540761
507247	3	3,18	.125	18	R - Right	3540764	3540764	3540763	3540761	3540761
507252	5	4,75	.187	4	R - Right	3540774	3540774	3540773	3540773	3540773
507253	5	4,78	.188	12	R - Right	3540777	3540777	3540776	3540773	3540773



Grooving and Cut-Off



Grooving and Cut-Off

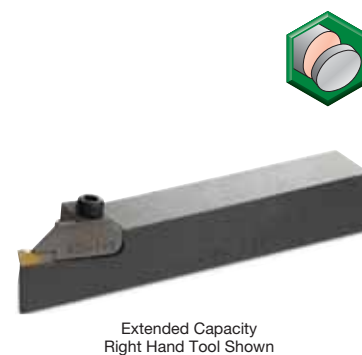
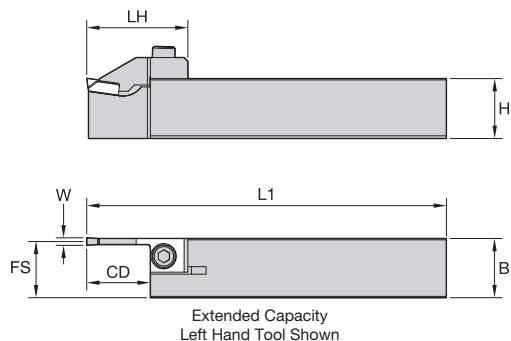
■ Square Shank



order number	catalog number	W	D max	B	FS	H	L2	L1	clamp	clamp screw
<b>right hand</b>										
3538685	206173	.094	1.063	.365	.328	.375	.987	2.630	435152	619122
3538687	206175	.094	1.063	.490	.453	.500	.978	6.000	435152	619122
3538679	206167	.094	1.500	.615	.578	.625	1.293	4.500	435140	619123
3538683	206171	.094	1.500	.740	.703	.750	1.293	4.500	435140	619120
3538672	206145	.125	1.000	.488	.437	.500	.928	6.000	435130	619122
3563787	206139	.125	1.500	.738	.687	.750	1.293	4.500	435126	619120
3538681	206169	.125	1.500	.613	.562	.625	1.293	4.500	435126	619123
<b>left hand</b>										
3538686	206174	.094	1.063	.365	.328	.375	.987	2.630	435153	619122
3538688	206176	.094	1.063	.490	.453	.500	.978	6.000	435153	619122
3538680	206168	.094	1.500	.615	.578	.625	1.293	4.500	435141	619123
3538684	206172	.094	1.500	.740	.703	.750	1.293	4.500	435141	619120
3538673	206146	.125	1.000	.488	.437	.500	.928	6.000	435131	619122
3563800	206140	.125	1.500	.738	.687	.750	1.293	4.500	435127	619120
3538682	206170	.125	1.500	.613	.562	.625	1.293	4.500	435127	619123

NOTE: Above toolholders are supplied with clamp and clamp screw.





■ Square Shank • Extended Capacity

order number	catalog number	W	CD	B	FS	H	LH	L1	clamp	clamp screw
<b>right hand</b>										
3538744	206420	.125	1.000	.988	.937	1.000	1.687	6.000	435180	619164
3538745	206421	.188	1.000	.978	.906	1.000	1.691	6.000	435180	619164
<b>left hand</b>										
3538746	206422	.125	1.000	.988	.937	1.000	1.687	6.000	435181	619164
3538747	206423	.188	1.000	.978	.906	1.000	1.687	6.000	435181	619164

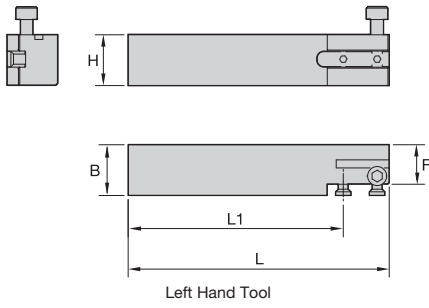
NOTE: Above toolholders are supplied with clamp and clamp screw.

■ Square Shank • Max Capacity

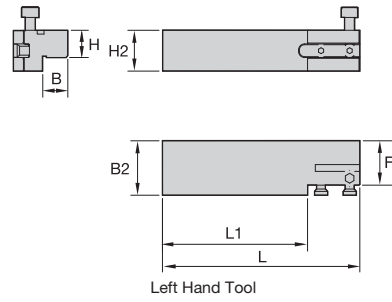
order number	catalog number	W	CD	B	FS	H	LH	L1	clamp screw
<b>right hand</b>									
3583634	206473	.188	1.260	1.000	1.156	1.000	2.219	6.000	MS337
3614343	206475	.188	1.260	1.250	1.406	1.250	2.219	6.000	MS337
<b>left hand</b>									
3582583	206474	.188	1.260	1.000	1.156	1.000	2.219	6.000	MS337
3538759	206476	.188	1.260	1.250	1.406	1.250	2.219	6.000	MS337

NOTE: Above toolholders are supplied with clamp and clamp screw.

Grooving and Cut-Off



Left Hand Tool



Left Hand Tool



Right Hand Tool

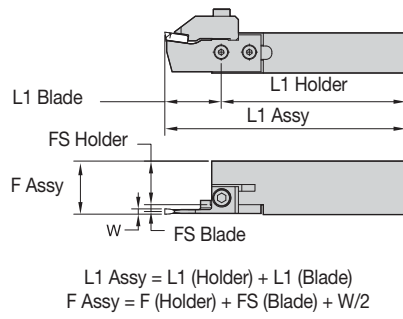
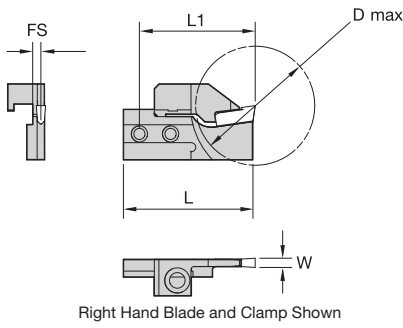
■ 1/2" and 3/4" Shank Toolholders

Grooving and Cut-Off



order number	catalog number	H	B	B2	L	L1	H2	F	support blade screw	clamp screw
<b>right hand</b>										
3563801	206179	.500	.460	1.000	3.625	2.913	.750	.815	606167	619124
<b>left hand</b>										
3538689	206178	.745	.750	—	3.625	2.913	—	.575	606167	619124

NOTE: 206178 can use right or left hand blade and clamp.



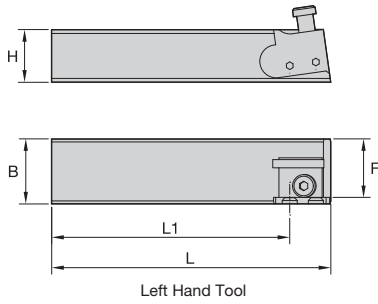
■ 1/2" and 3/4" Shank Blades



order number	catalog number	W	D max	FS	L	L1	clamp
<b>right hand</b>							
3539522	333111	.079	1.625	.134	1.767	1.580	435194
3539515	333101	.094	1.625	.128	1.767	1.580	435154
3539516	333102	.125	1.625	.112	1.767	1.580	435155
<b>left hand</b>							
3539517	333103	.094	1.625	.128	1.767	1.580	435156
3539518	333104	.125	1.625	.112	1.767	1.580	435157

NOTE: Clamps do not ship with blades. Order clamps separately.

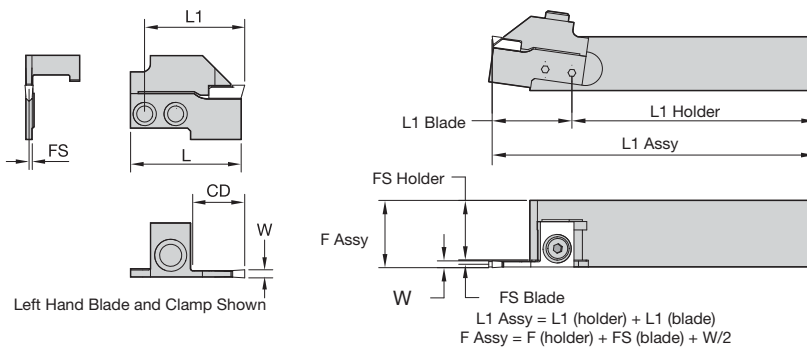
Grooving and Cut-Off



■ 1" and 1-1/4" Shank Toolholders

Grooving and Cut-Off

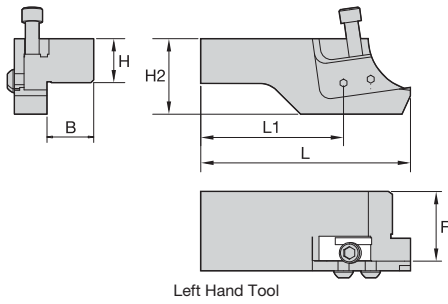
order number	catalog number	H	B	L	L1	F	support blade screw	clamp screw
<b>right hand</b>								
3538669	206141	1.000	1.234	5.291	4.510	1.109	606164	619121
3538670	206143	1.250	1.484	5.291	4.510	1.359	606164	619121
<b>left hand</b>								
3563786	206142	1.000	1.234	5.291	4.510	1.109	606164	619121



■ 1" and 1-1/4" Shank Blades

order number	catalog number	W	FS	L	L1	clamp
<b>right hand</b>						
3563591	331117	.094	.094	1.419	1.165	435142
3539504	331101	.125	.078	1.724	1.482	435128
3539508	331109	.158	.078	1.724	1.482	435128
3539506	331103	.188	.078	1.724	1.482	435128
<b>left hand</b>						
3539505	331102	.125	.078	1.724	1.482	435129
3539509	331110	.158	.078	1.724	1.482	435129
3539507	331104	.188	.078	1.724	1.482	435129

NOTE: Clamps do not ship with blades. Order clamps separately.



Left Hand Tool



Right Hand Tool

■ Universal Style Toolholder • 2-1/4" Bar Capacity

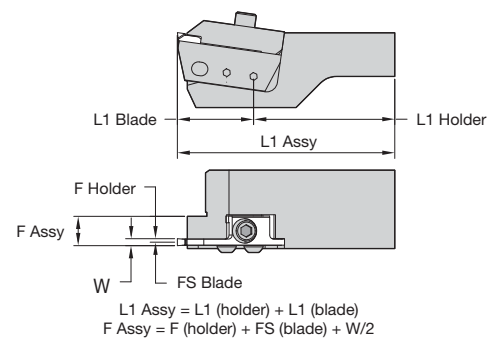
order number	catalog number	B	H	H2	F	L1	L	support blade screw	clamp screw
<b>right hand</b>									
3538667	206128	.812	.750	1.719	1.334	2.747	4.270	606171	619112
3538659	206114	.912	1.000	1.719	1.434	3.867	5.390	606171	619112
3538658	206113	1.062	1.000	1.719	1.584	4.247	5.770	606171	S352
3538665	206123	1.062	1.000	1.719	1.584	3.247	4.770	606171	S352
<b>left hand</b>									
3538662	206118	.812	.750	1.719	1.334	2.747	4.270	606171	619112
3563798	206108	1.062	1.000	1.719	1.584	3.867	5.390	606171	619112
3538668	206136	1.062	1.000	1.719	1.584	3.247	4.770	606171	619112

NOTE: Ships with blade and clamp screws.  
Support blade requires two screws.  
.750" shank holders 206118 and 206128 use different clamps.

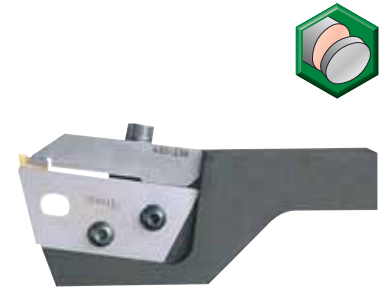
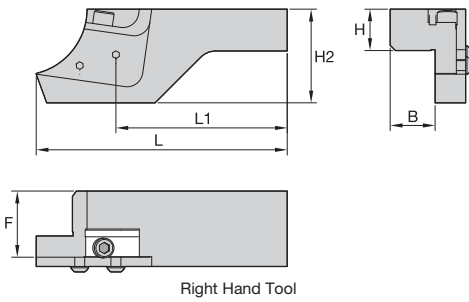
■ Components

W	L1	FS	left hand clamp	clamp for toolholder 206118 only	support blade	clamp for toolholder 206128 only	right hand clamp
.094	1.752	.036	435149	435151	310109	435150	435148
.125	1.752	.050	435104	435110	310102	435116	435101
.188	1.752	.072	435105	435109	310108	435117	435102

NOTE: All components ship separately.



Grooving and Cut-Off



■ Universal Style Toolholder • 3" Bar Capacity

Grooving and Cut-Off



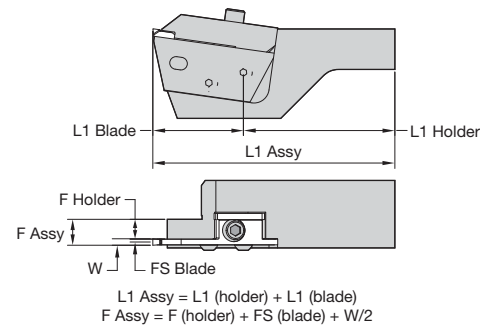
order number	catalog number	B	H	H2	F	L1	L	support blade screw	clamp screw
<b>right hand</b>									
3538660	206115	.964	1.000	2.219	1.454	3.754	5.640	606171	S352
3538661	206116	1.064	1.000	2.219	1.554	3.754	5.640	606171	619112
3587587	206121	1.194	1.250	2.219	1.684	4.004	5.890	606171	619112
<b>left hand</b>									
3563799	206110	1.074	1.000	2.219	1.564	3.304	5.190	606171	619112
3538663	206119	1.104	1.000	2.219	1.594	3.754	5.640	606171	619112

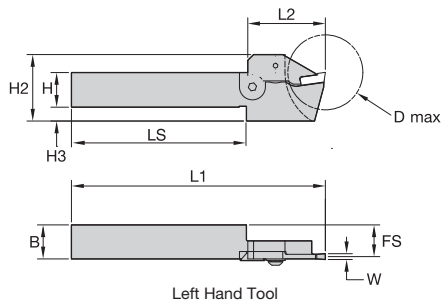
NOTE: Ships with blade and clamp screws.  
Support blade requires two screws.

■ Components

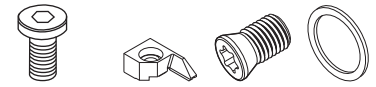
W	L1	FS	left hand clamp	support blade	right hand clamp
.125	2.246	.050	435137	309111	435136
.188	2.246	.072	435106	309105	435103
.250	2.246	.094	435107	309106	435108

NOTE: All components ship separately.





■ Sub-Spindle



order number	catalog number	W	D max	B	FS	H	H2	H3	L1	LS	L2	button-head cap screw	clamp	flat-head cap screw	washer
<b>right hand</b>															
3538762	206502	.094	1.630	.740	.703	.750	1.444	.300	5.500	3.790	1.680	619174	409184	619177	613139
3538760	206500	.126	2.630	.987	.937	1.000	1.754	.375	6.000	3.600	2.375	619174	409182	619175	613139
3538761	206501	.126	2.630	.987	.937	1.000	1.754	.375	6.000	3.600	2.375	619174	409183	619175	613139
<b>left hand</b>															
3538764	206504	.126	1.630	.737	.687	.750	1.439	.300	5.500	3.790	1.681	619174	409186	619176	613139
3538765	206505	.126	1.630	.737	.687	.750	1.439	.300	5.500	3.790	1.681	619174	409187	619176	613139

Grooving and Cut-Off

**Definitions and Guidelines**

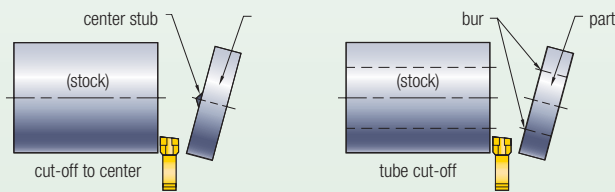
1. Width of cut (W) = width of the insert.
2. Lead angle = 0° (neutral); 4°, 5°, 12°, 18° (RH or LH).

**Reduce bur of cut-off faces:**

- Use lead angle-type inserts (Figures 1 and 2). Lead angle on a cut-off insert reduces the bur that remains on the part but decreases tool life and increases tool side deflection and possibly cycle time.

**Figure 1**

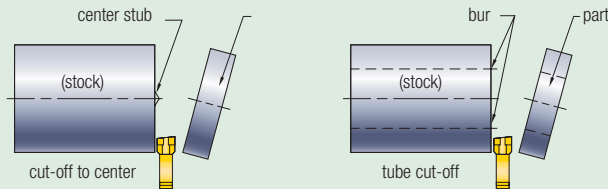
Insert selection **left-hand lead**



Left-hand lead insert leaves center stub or bur on part and produces clean stock surface.

**Figure 2**

Insert selection **right-hand lead**

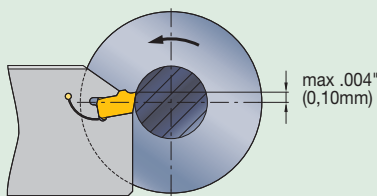


Right-hand lead insert leaves center stub or bur on stock and produces clean part surface.

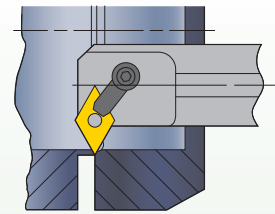
- Check total height and maintain on center with part diameter.
- The cutting edge height should be within ±.004" (0,1mm) to the center; recommended cutting position is .002" (0,05mm) above center.

**Figure 3**

Above center



- If 0° lead angle is mandatory, use the narrowest possible cut-off insert and blade. This will minimize the center stub or cut-off bur length. Decrease the feed rate to maximum .002" (0,05mm) or less at the point where diameter equals insert width.
- On tubing-type parts that require a chamfer on the I.D., align I.D. chamfer tool with cut-off surface. This will enable the chamfering operation to actually separate the part from the bar (see Figure 4). Note the part may drop onto the chamfering bar, which, in this case, will act like a catcher for the part.

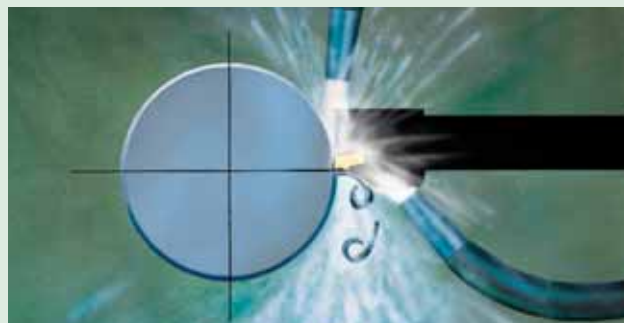


**Figure 4**

Internal chamfer line up

**Improve surface finish of cut-off faces:**

- Use insert with 0° lead angle.
- Increase coolant flow or improve application technique, as shown in Figure 5.
- Decrease the feed rate near the break-through point of the cut.
- Check that the grooving tool is set at the correct angle.
- Use blades with the greatest possible face height and smallest possible cutting width.
- Increase the speed.



**Figure 5**

Preferred method for applying coolant

- Mount cut-off tool upside down. This enables gravity to remove chips and avoid cutting the chips twice. Another benefit of mounting the tool upside down is preventing chips from wedging between the tool insert and the groove side walls, which galls the side wall surfaces.



**Improve chip control:**

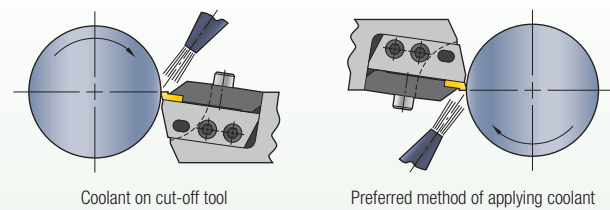
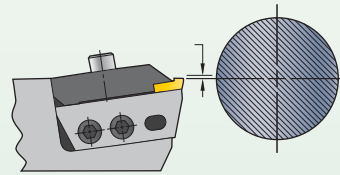
- Adjust feed rate up or down to accommodate chip formation.
- Use a 0° or smallest lead available.
- Use ample amounts of well-directed coolant (see Figure A).
- Maintain sharp cutting edge and corners.

**Improve flatness of cut-off surfaces:**

- Maintain 90° position (perpendicular alignment) between cut-off tool and workpiece.
- For low to moderate speed (sfpm), use Separator F<sup>2</sup>.
- For moderate to high speed (sfpm), use Separator S<sup>2</sup> or X<sup>2</sup>.
- Use strongest toolholder system possible.
- Use 0° lead angle inserts when possible. If lead angle inserts are needed, reduce the feed rate.
- Check for minimum overhang of holder and blade.
- Set up for minimum workpiece overhang (distance out of chuck).
- Reduce feed rate.
- Maintain sharp edge and corners on cut-off insert.
- Increase speed (RPM).
- Use ample amounts of well-directed coolant (see Figure A).
- Maintain proper tool center height .000–.005" (0–0,1mm) above center (see Figure B).

**Improve surface finish:**

- For low to moderate speed (sfpm), use Separator F<sup>2</sup>.
- For moderate to high speed (sfpm), use Separator S<sup>2</sup> or X<sup>2</sup>.
- Avoid overly aggressive chip control.
- Increase speed.
- Reduce lead angle and feed rate.
- Determine if corner radius is too large or small.
- Use a coated grade.
- Use coolant (see Figure A).

**Figure A**

**Figure B**

**Minimize edge chipping:**

- Check to see if tool is significantly above or below center.
- Reduce feed prior to part drop-off.
- Use Separator S<sup>2</sup> or X<sup>2</sup>.
- Choose the proper speed associated with the insert grade used.
- Call Technical Support to see if a larger hone size is needed.
- Eliminate chatter.
- Avoid chip re-cutting.
- Check for these part and machine problems:
  - Slide is loose.
  - Slide travel is irregular.
  - Bar/tube I.D. and/or O.D. is out of round.
  - Bar/tube is bent.
  - Thin wall collapses (deforms) in the cut.
  - Part is unstable.
  - Cut-off through unturned stock.
  - Excessive tool overhang.
  - Bent or partly attached flash ring.

(continued)

*(continued)***Eliminate chatter:**

- Minimize tool blade and holder overhang.
- Minimize part overhang.
- Use strongest toolholder system.
- Use a more narrow width of insert.
- Chipbreaker might be too aggressive. (Call Technical Support.)
- Adjust speed and feed rate up or down.
- Hold workpiece rigidly.
- With a longer part, support with steady rest or live center.
- Avoid machine dwell.
- Use S<sup>2</sup> or X<sup>2</sup> to reduce cutting forces.

**Reduce cut-off nib on solid bar or I.D. bur on tubing:**

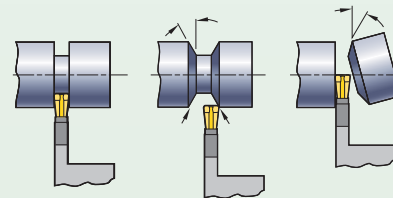
- Check tool height. Insert cutting edge should be on center to .002" (0,05mm) above centerline of workpiece.
- To reduce nib on part, use a high lead angle-type insert. Lead angle on a cut-off insert reduces the nib, which remains on the workpiece. CAUTION: the higher the lead, the more tool-side deflection.
- Use the narrowest possible cut-off insert to minimize the cut-off bur length.
- Reduce feed rate at the end of a cut.
- On most tubing-type parts, a 4° or 5° lead angle will be sufficient.
- Add support to a long slender-type part.
- Maintain proper sub-spindle alignment.
- If nib or bur persists, call Technical Support about reducing hone size.
- Use small- or no-corner radius.

**Eliminate built-up edge:**

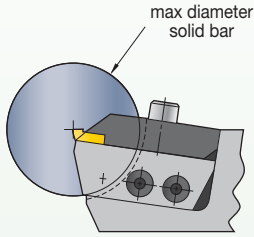
- Select proper grade for insert.
- Increase speed (RPM).
- Increase the feed rate.
- Use ample amounts of well-directed coolant (see Figure A on page E137).

**Chamfer and cut-off operations:**

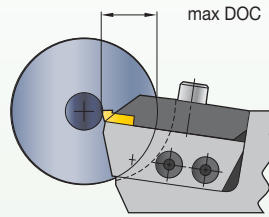
- Use Separator S<sup>2</sup> or X<sup>2</sup>.
- Groove or breakdown workpiece surface being machined.
- Machine the chamfer.
- For jobs requiring a chamfer on both ends of the part, begin by plunging to a depth just beyond the depth of the chamfers. Then, return to the part O.D. and profile each chamfer individually. Finish the cut-off after completion of the second chamfer.
- Cut off the workpiece (see Figure C).

**Figure C**

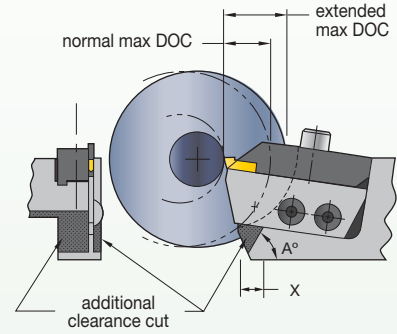
**Modifications for Increased Depth of Cut**



**Figure 1**  
Standard bar capacity shown



**Figure 2**  
Larger bar diameter shown



**Figure 3**  
Modified toolholder with larger bar diameter shown

Capacity Chart for 2-1/4" Diameter Bar Capacity Tooling								
bar diameter	2.5"	3.0"	3.5"	4.0"	4.5"	5.0"	6.0"	NOTE
max DOC	0.94"	0.75"	0.62"	0.56"	0.50"	0.47"	0.44"	with no modification on toolholder
	1.12"	1.03"	0.97"	0.91"	0.87"	0.84"	0.78"	with no modification on toolholder X = .40" A = 50"

Capacity Chart for 3" Diameter Bar Capacity Tooling						
bar diameter	3.5"	4.0"	4.5"	5.0"	6.0"	NOTE
max DOC	1.12"	1.00"	0.88"	0.78"	0.69"	with no modification on toolholder
	1.44"	1.37"	1.31"	1.25"	1.12"	with no modification on toolholder X = .40" A = 50"

## WIDIA™ Ranger™ Adjustable Face Grooving System

Ranger is the industry's only fully adjustable face grooving platform. The system can produce face groove diameters from 2.25–16" (57,2–406mm).

# Ranger



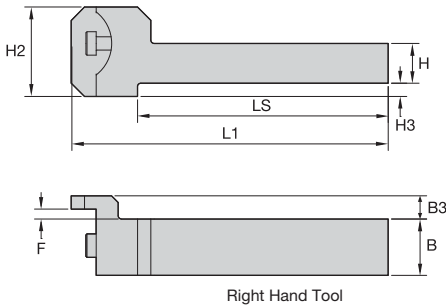
### Square Shank Toolholders

- Compact, right angle design with full 1" depth of cut capability when using .188" and .250" wide inserts.
- Versatile selection of curve-out cartridges, featuring .125", .188", and .250" widths.
- Universal insert geometry for steels, stainless steels, non-ferrous materials, and cast iron.

### Round Shank Bars

- Available in 1", 1.25", and 1.50" round shanks with added flexibility to use both right-hand and left-hand cartridges in the same shank.
- Versatile selection of both curve-in and curve-out cartridges to produce external and internal (through the bore) face groove styles.
- Insert widths of .125", .188", and .250" with choice of square front inserts for plunge and groove, or full nose radii for plunge, groove, and profile.





Left-hand holder with right-hand cartridge shown



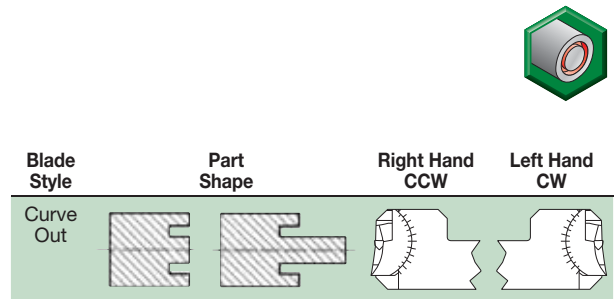
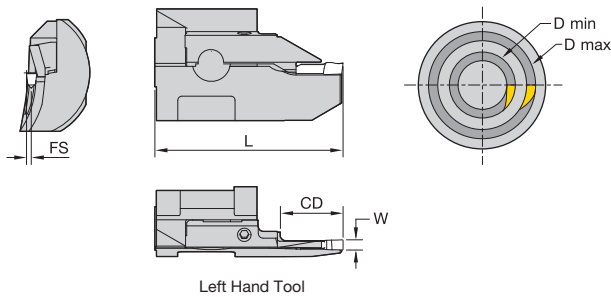
Right-hand holder with left-hand cartridge shown

■ Square Shank • Inch • Use Curve-Out Cartridges Only

order number	catalog number	B	B3	F	H	H2	H3	L1	LS	support blade screw	nut
<b>right hand</b>											
3538796	235103	1.06	.44	-.19	.75	1.69	.25	5.963	4.475	606218	613137
3538797	235104	1.06	.44	-.19	1.00	1.69	—	5.975	4.475	606218	613137
3538798	235105	1.06	.44	-.19	1.25	1.94	—	5.963	4.475	606218	613137
<b>left hand</b>											
3538800	235107	1.06	.44	-.19	1.00	1.69	—	5.963	4.475	606218	613137
3538801	235108	1.06	.44	-.19	1.25	1.94	—	5.963	4.475	606218	613137

NOTE: The toolholder shank is supplied with the support blade mounting screw, 606218, and nut, 61317. Order the insert and cartridge separately. Select left-hand cartridge for right-hand toolholder. Select right-hand cartridge for left-hand toolholder.

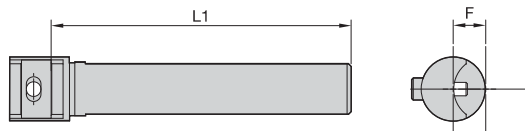
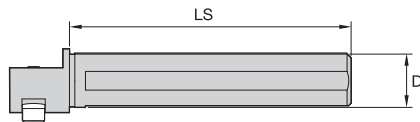
Cartridge Assembly



■ Curve-Out Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
<b>left hand</b>										
3539539	338125	3CCW	.125	.75	2.25	16	-.058	2.30	440205	606219
3539540	338126	5	.188	1.00	2.25	16	-.094	2.30	440206	606219
3539541	338127	6	.250	1.00	2.25	16	-.125	2.30	440207	606219
<b>right hand</b>										
3539542	338128	3CW	.125	.75	2.25	16	-.058	2.30	440208	606219
3539543	338129	5	.188	1.00	2.25	16	-.094	2.30	440209	606219
3539544	338130	6	.250	1.00	2.25	16	-.125	2.30	440210M	606219

NOTE: Curve-out cartridges can be used with both square shank holders and round shank bars. Clamp and clamp screw ships with cartridge. Select .125" (3,18mm), .188" (4,78mm), or .250" (6,35mm) inserts from page E145.



Round shank bar shown with left-hand curve-out cartridge (left-hand assembly)



Round shank bar shown with right-hand curve-in cartridge (right-hand assembly)

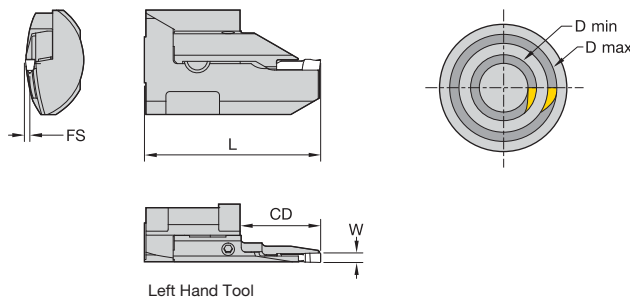
■ Round Shank • Inch • Universal Shank for RH and LH Assemblies

Grooving and Cut-Off

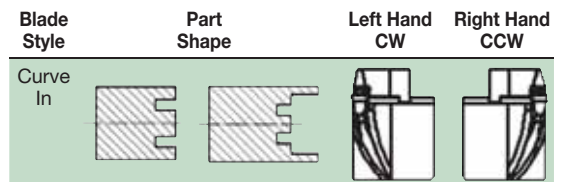
order number	catalog number	D	L1	LS	F	support blade screw	washer
3538803	235110	1.000	6.750	6.600	.763	619155	613135
3538802	235109	1.250	6.750	6.600	.763	619155	613135
3538794	235101	1.500	6.750	6.500	.763	619155	613135

NOTE: Select right-hand cartridge for right-hand assembly. Select left-hand cartridge for left-hand assembly. Round shank bars are supplied with the support blade mounting screw, 619155, and washer, 613135. Order the insert and cartridge separately.

Cartridge Assembly



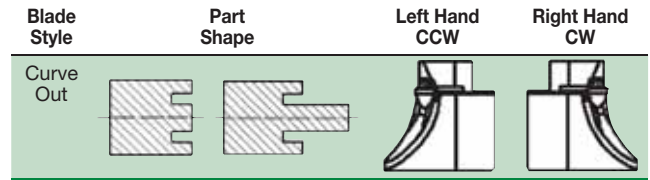
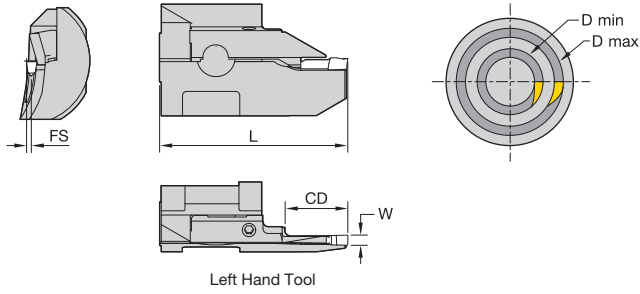
Left Hand Tool



■ Curve-In Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
<b>left hand</b>										
3539537	338123	3CW	.125	.75	2.25	16	-.071	2.30	440203	606219
3539538	338124	5	.188	1.00	2.25	16	-.094	2.30	440204	606219
3539546	338132	6	.250	1.00	2.25	16	-.125	2.30	440212	606219
<b>right hand</b>										
3539535	338121	3CCW	.125	.75	2.25	16	-.071	2.30	440201M	606219
3539536	338122	5	.188	1.00	2.25	16	-.094	2.30	440202	606219
3539545	338131	6	.250	1.00	2.25	16	-.125	2.30	440211	606219

NOTE: Curve-in cartridges used with round shank bars only. Clamp and clamp screw ships with cartridge. Select .125" (3,18mm), .188" (4,78mm), or .250" (6,35mm) inserts from page E145.



■ Curve-Out Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
<b>left hand</b>										
3539539	338125	3CCW	.125	.75	2.25	16	-.058	2.30	440205	606219
3539540	338126	5	.188	1.00	2.25	16	-.094	2.30	440206	606219
3539541	338127	6	.250	1.00	2.25	16	-.125	2.30	440207	606219
<b>right hand</b>										
3539542	338128	3CW	.125	.75	2.25	16	-.058	2.30	440208	606219
3539543	338129	5	.188	1.00	2.25	16	-.094	2.30	440209	606219
3539544	338130	6	.250	1.00	2.25	16	-.125	2.30	440210M	606219

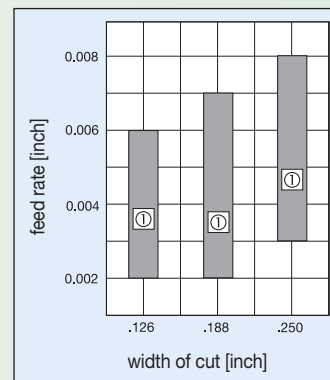


Grooving and Cut-Off

### Ranger Insert Selection



- Inserts available for plunge and groove and full-nose radii.
- Geometry designed to provide clearance while deep grooving.
- Superior chip control.



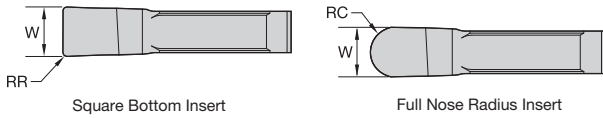
① Recommended Starting Feed

Square Bottom Inserts								
catalog number	seat size	W mm	W inch	RR mm	RR inch	max doc when side cutting	spindle rotation	
							CW	CCW
506101	3CCW	3,18	.125	0,25	.010	.050		●
506102	3CW	3,18	.125	0,25	.010	.050	●	
506103	5	4,78	.188	0,25	.010	.080	●	●
506107	6	6,35	.250	0,25	.010	.080	●	●

Full Nose Radius								
catalog number	seat size	W mm	W inch	RC mm	RC inch	max doc when side cutting	spindle rotation	
							CW	CCW
506104	3CCW	3,18	.125	1,59	.063	.050		●
506105	3CW	3,18	.125	1,59	.063	.050	●	
506106	5	4,78	.188	2,39	.094	.080	●	●
506108	6	6,35	.250	3,18	.125	.080	●	●

- The .125" (3,18mm) wide inserts and support blade assemblies will cut grooves up to .750" (19mm) deep. These inserts are spindle rotation specific because the V on the bottom of the insert is slightly offset to provide additional support in the cartridge.
- The .188" (4,78mm) and .250" (6,35mm) wide inserts and support blade assemblies will cut grooves up to 1" (25,4mm) deep. These inserts can be used for either clockwise or counterclockwise spindle rotation.





● first choice  
○ alternate choice

P					
M					
K					
N					
S					
H					

■ Face Grooving • Use with .125" (3,18mm) Cartridges • Clockwise Spindle Rotation

catalog number	seat size	W		RR		RC		C2	GC	M40	M43
		mm	in	mm	in	mm	in				
506102	3CW	3,18	.125	0,25	.010	—	—	3540407	3540408	3540409	—
506105	3CW	3,18	.125	—	—	1,59	.063	3540429	—	3540430	—

NOTE: Inserts showing RC values are full nose radius inserts.

■ Face Grooving • Use with .125" (3,18mm) Cartridges • Counterclockwise Spindle Rotation

catalog number	seat size	W		RR		RC		C2	GC	M40	M43
		mm	in	mm	in	mm	in				
506101	3CCW	3,18	.125	0,25	.010	—	—	3540398	3540399	3540400	—
506104	3CCW	3,18	.125	—	—	1,59	.063	—	—	3540423	—

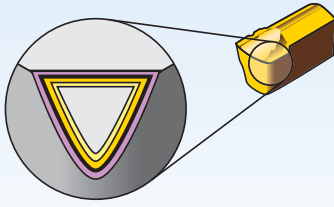
NOTE: Inserts showing RC values are full nose radius inserts.

■ Face Grooving • Not Spindle Rotation Specific

catalog number	seat size	W		RR		RC		C2	GC	M40	M43
		mm	in	mm	in	mm	in				
506103	5	4,78	.188	0,25	.010	—	—	3540414	3540415	3614667	—
506106	5	4,78	.188	—	—	2,39	.094	—	—	3540435	—
506107	6	6,35	.250	0,25	.010	—	—	—	—	3540440	—
506108	6	6,35	.250	—	—	3,18	.125	—	—	3540444	—

NOTE: Inserts showing RC values are full nose radius inserts.





Coatings provide high-speed capability and are engineered for finishing to light roughing.

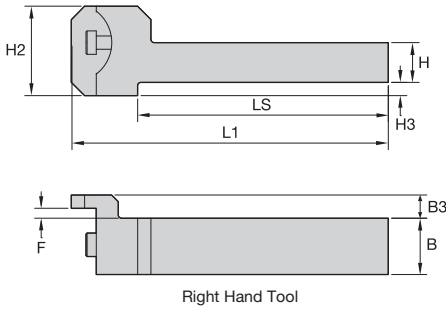
P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Grade	Coating	Grade Description	Performance Matrix																			
			05	10	15	20	25	30	35	40	45											
C2		A general-purpose tungsten carbide for use on cast irons, non-ferrous alloys, and many high-temperature alloys.	M																			
	HW-K15		K																			
GC		Coated carbide. CVD — TiC-TiCN-TiN. Tri-phase coating on a hard, low binder content, fine-grained grade. High-speed, general-purpose grade for all kinds of steel. Gold in color.	P																			
	HC-P15		M																			
M40		A premium, single-phase PVD TiN coating over a tough, specially formulated substrate that performs well under extremely low to moderate speed conditions found on screw machines. Ideal for carbon steels, alloy steels, most stainless steels, and many high-temperature alloys.	P																			
	HC-P35		M																			
M43		PVD-TiAlN multilayer coating over a tough, shock-resistant, fine-grained carbide substrate with increased oxidation resistance. Recommended on low to medium cutting speeds when good toughness properties are required.	P																			
	HC-P30		M																			

Material Group		Cutting Speed – vc SFM											
		C2			GC			M40			M43		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
<b>P</b>	0/1	–	–	–	570	<b>645</b>	720	125	<b>260</b>	370	350	<b>525</b>	700
	2	–	–	–	440	<b>495</b>	545	95	<b>185</b>	275	250	<b>395</b>	540
	3	–	–	–	440	<b>495</b>	545	95	<b>185</b>	275	250	<b>395</b>	540
	4	–	–	–	290	<b>355</b>	415	70	<b>135</b>	205	170	<b>285</b>	405
	5	–	–	–	395	<b>450</b>	505	110	<b>190</b>	275	270	<b>365</b>	455
	6	–	–	–	170	<b>200</b>	230	55	<b>90</b>	125	110	<b>160</b>	210
<b>M</b>	1	160	<b>190</b>	220	–	–	–	100	<b>145</b>	190	170	<b>250</b>	330
	2	125	<b>140</b>	155	–	–	–	70	<b>95</b>	120	110	<b>160</b>	210
	3	120	<b>140</b>	165	–	–	–	70	<b>105</b>	135	115	<b>165</b>	220
<b>K</b>	1	415	<b>495</b>	575	–	–	–	210	<b>310</b>	405	300	<b>440</b>	575
	2	410	<b>490</b>	575	–	–	–	210	<b>310</b>	410	300	<b>435</b>	575
	3	400	<b>475</b>	550	–	–	–	180	<b>290</b>	400	270	<b>410</b>	550
<b>N</b>	1	1000	<b>1350</b>	1700	–	–	–	700	<b>1200</b>	1700	900	<b>1450</b>	2000
	2	865	<b>1215</b>	1565	–	–	–	565	<b>1065</b>	1565	765	<b>1315</b>	1865
	3	700	<b>800</b>	900	–	–	–	450	<b>675</b>	900	600	<b>850</b>	1100
	4	435	<b>485</b>	535	–	–	–	265	<b>400</b>	535	350	<b>485</b>	615
	5	225	<b>275</b>	325	–	–	–	150	<b>240</b>	325	190	<b>285</b>	375
	6	835	<b>1100</b>	1365	–	–	–	550	<b>960</b>	1365	735	<b>1185</b>	1635
	7	900	<b>1250</b>	1600	–	–	–	600	<b>1100</b>	1600	800	<b>1350</b>	1900
<b>S</b>	1	105	<b>125</b>	140	–	–	–	80	<b>105</b>	130	90	<b>120</b>	150
	2	65	<b>70</b>	75	–	–	–	40	<b>55</b>	65	45	<b>60</b>	75
	3	180	<b>195</b>	210	–	–	–	110	<b>155</b>	200	120	<b>170</b>	220
	4	90	<b>100</b>	110	–	–	–	60	<b>80</b>	100	75	<b>95</b>	115
<b>H</b>	1	–	–	–	–	–	–	–	–	–	–	–	–
	2	–	–	–	–	–	–	–	–	–	–	–	–
	3	–	–	–	–	–	–	–	–	–	–	–	–
	4	–	–	–	–	–	–	–	–	–	–	–	–

Material Group		Cutting Speed – vc SFM											
		C2			GC			M40			M43		
		min	Start	max	min	Start	max	min	Start	max	min	Start	max
P	0/1	-	-	-	175	200	220	40	80	115	110	160	210
	2	-	-	-	135	150	165	30	60	85	75	120	165
	3	-	-	-	135	150	165	30	60	85	75	120	165
	4	-	-	-	90	110	130	25	45	60	55	90	125
	5	-	-	-	120	140	155	35	60	85	85	110	140
	6	-	-	-	50	60	70	15	30	40	35	50	65
M	1	50	60	70	-	-	-	30	45	60	50	75	100
	2	40	45	50	-	-	-	20	30	40	35	50	65
	3	35	45	55	-	-	-	20	35	40	35	50	65
K	1	125	155	175	-	-	-	65	95	125	90	135	175
	2	125	150	175	-	-	-	65	95	125	90	135	175
	3	120	145	170	-	-	-	55	90	120	80	125	170
N	1	305	410	520	-	-	-	210	370	520	275	440	610
	2	265	370	480	-	-	-	170	325	480	230	400	570
	3	210	245	275	-	-	-	135	205	275	180	260	335
	4	130	150	165	-	-	-	80	120	165	105	150	190
	5	70	85	100	-	-	-	45	75	100	60	85	115
	6	255	335	420	-	-	-	165	290	420	220	360	500
	7	275	380	490	-	-	-	180	340	490	245	410	580
S	1	30	40	45	-	-	-	25	35	40	25	40	50
	2	15	20	25	-	-	-	10	15	20	15	20	25
	3	55	60	65	-	-	-	35	45	60	35	50	65
	4	25	30	35	-	-	-	15	25	30	25	30	35
H	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-



Left-hand holder with right-hand cartridge shown



Right-hand holder with left-hand cartridge shown

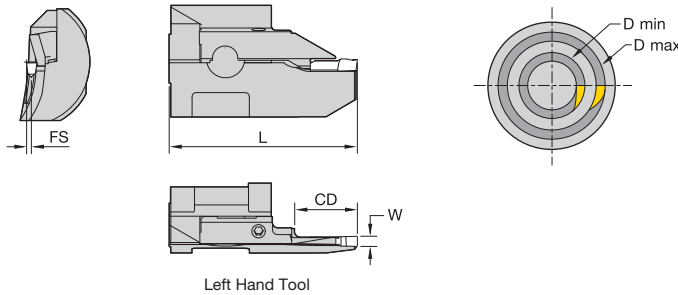
■ Square Shank • Metric • Use Curve-Out Cartridges Only

order number	catalog number	B	B3	H	H2	H3	F	L1	LS	support blade screw	nut
<b>right hand</b>											
3538809	235206	27	11	32	49	—	-5	151,460	113,665	606218	613137
3538807	235204	27	11	20	43	5	-5	151,460	113,665	606218	613137
3538808	235205	27	11	25	43	—	-5	151,460	113,665	606218	613137
<b>left hand</b>											
3538810	235207	27	11	20	43	5	-5	151,460	113,665	606218	613137
3538811	235208	27	11	25	43	—	-5	151,460	113,665	606218	613137

NOTE: The toolholder shank is supplied with the support blade mounting screw, 606218, and nut, 61317. Order the insert and cartridge separately. Select left-hand cartridge for right-hand toolholder. Select right-hand cartridge for left-hand toolholder.

Grooving and Cut-Off

Cartridge Assembly

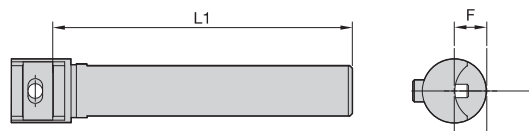
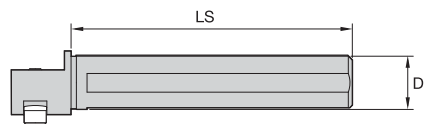


Blade Style	Part Shape	Right Hand CCW	Left Hand CW
Curve Out			

■ Curve-Out Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
<b>right hand</b>										
3539566	338228	3CW	3,18	19	57	400	-1,47	58	440208	606219
3539568	338230	6	6,35	25	57	400	-3,18	58	440210M	606219
<b>left hand</b>										
3539563	338225	3CCW	3,18	19	57	400	-1,47	58	440205	606219
3539564	338226	5	4,76	25	57	400	-2,39	58	440206	606219

NOTE: Curve-out cartridges can be used with both square shank holders and round shank bars. Clamp and clamp screw ships with cartridge. Select .125" (3,18mm), .188" (4,78mm), or .250" (6,35mm) inserts from page E145.



Round shank bar shown with left-hand curve-out cartridge (left-hand assembly)



Round shank bar shown with right-hand curve-in cartridge (right-hand assembly)

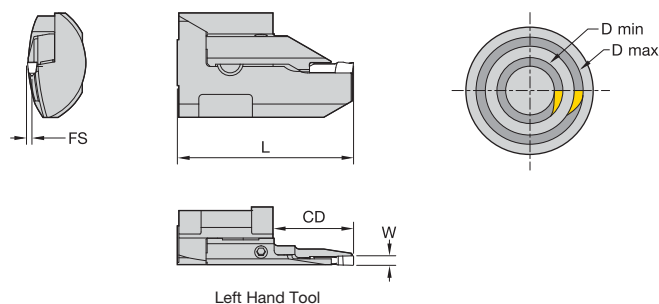
■ Round Shank • Metric • Universal Shank for RH and LH Assemblies

Grooving and Cut-Off

order number	catalog number	D	L1	LS	F	support blade screw	washer
3538804	235201	25	143,51	139,70	19	619155	613135
3538805	235202	30	143,51	139,70	19	619155	613135
3538806	235203	32	143,51	139,70	19	619155	613135

NOTE: Select right-hand cartridge for right-hand assembly. Select left-hand cartridge for left-hand assembly. Round shank bars are supplied with the support blade mounting screw, 619155, and washer, 613135. Order the insert and cartridge separately.

Cartridge Assembly

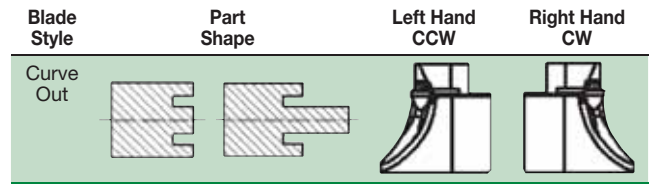
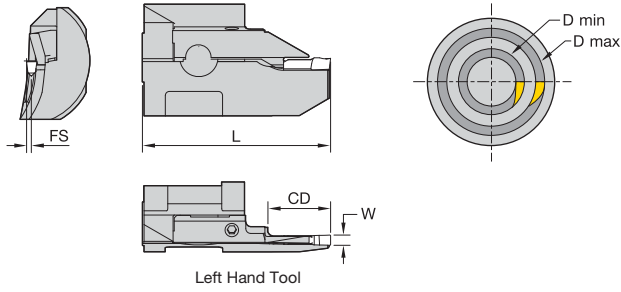


Blade Style	Part Shape	Left Hand CW	Right Hand CCW
Curve In			

■ Curve-In Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
<b>right hand</b>										
3539559	338221	3CCW	3,17	19	57	400	-1,80	58	440201M	606219
3539560	338222	5	4,76	25	57	400	-2,39	58	440202	606219
3539569	338231	6	6,35	25	57	400	-3,18	58	440211	606219
<b>left hand</b>										
3539561	338223	3CW	3,18	19	57	400	-1,80	58	440203	606219
3539562	338224	5	4,76	25	57	400	-2,39	58	440204	606219
3539570	338232	6	6,35	25	57	400	-3,18	58	440212	606219

NOTE: Curve-in cartridges used with round shank bars only. Clamp and clamp screw ships with cartridge. Select .125" (3,18mm), .188" (4,78mm), or .250" (6,35mm) inserts from page E145.



■ Curve-Out Cartridge • Complete with Top Clamp and Clamp Screw

order number	catalog number	seat size	W	CD	D min	D max	FS	L	clamp	clamp screw
<b>right hand</b>										
3539566	338228	3CW	3,18	19	57	400	-1,47	58	440208	606219
3539568	338230	6	6,35	25	57	400	-3,18	58	440210M	606219
<b>left hand</b>										
3539563	338225	3CCW	3,18	19	57	400	-1,47	58	440205	606219
3539564	338226	5	4,76	25	57	400	-2,39	58	440206	606219

NOTE: Curve-out cartridges can be used with both square shank holders and round shank bars. Clamp and clamp screw ships with cartridge.  
Select .125" (3,18mm), .188" (4,78mm), or .250" (6,35mm) inserts from page E145.



Grooving and Cut-Off

## Technical Recommendations • Ranger Tool Systems

### Application Information:

- When changing inserts, be sure the new insert locates against the positive stop on the clamp.
- Never tighten the insert clamping screw without an insert in the pocket. Permanent damage to the clamp could occur.
- Toolholder projection length out of the tool block should be as short as possible to maintain rigidity.
- Slower speeds and feeds are recommended compared to O.D. grooving.

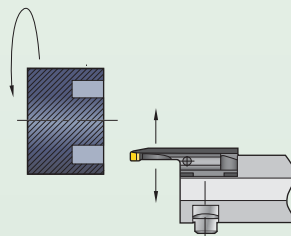
Face Grooving Ranges per Setting		
given diameter setting	plunge range at diameter setting	
	smallest O.D.	largest O.D.
2-1/4	2-1/4	2-3/8
2-1/2	2-3/8	2-5/8
2-3/4	2-9/16	2-15/16
3.0	2-5/8	3-3/8
3-1/2	3-1/16	3-15/16
4.0	3-1/2	4-1/2
5.0	4-1/4	5-3/4
6.0	5	7
8.0	6-1/2	9-1/2
10.0	8	11
11-16	9	16

**NOTE:** This chart is a general guide for face groove entry at outside diameters both smaller and larger than each given O.D. setting on the tool.

**Example:** If the tool is adjusted for 4" O.D., plunge cuts from 3-1/2" O.D. to 4-1/2" O.D. can be made without changing the 4" O.D. setting.

### Widening a Face Groove

Additional clearance is generated on the workpiece after the first groove cut. Without further adjustment, the tool may then be used to widen the groove toward the center or the O.D. of the workpiece.

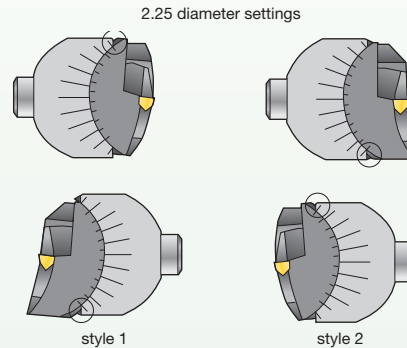


### Adjusting Information for Ranger Tooling

The following instructions are for style 1 Ranger tools. Instructions for style 2 tools are in [brackets].

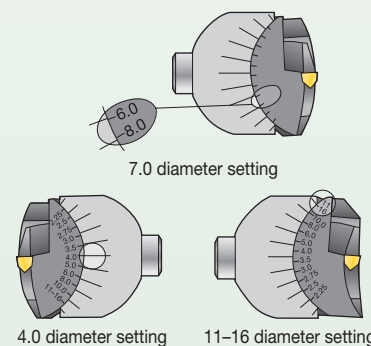
- Appropriate diameter range setting can be accomplished as follows:

**Step 1** Loosen the support blade locking screw and rotate the support blade so that the 2.25 mark is above the top line on the toolholder. [Below the line on toolholder for style 2.]



**Step 2** Slowly rotate the support blade down until the 2.25 mark is aligned with the top line of the toolholder. [Rotate the support blade up until the 2.25 mark is aligned with the bottom line on the toolholder for style 2.] At this point, the support blade assembly is properly aligned to cut face grooves at 2.25" O.D.

For diameters larger than 2.25" O.D., continue to rotate the support blade in the same direction until the desired diameter range has been aligned.



**Example:** The 7.0 diameter setting falls between the 6.0 and 8.0 diameter settings.

**Step 3** Tighten the support blade screw. Inspect the scale to ensure that the desired diameter range is aligned.

**NOTE:** It is important that these instructions are followed. Failure to do so may result in damage to the tool and the workpiece.



## NOVO KNOWS SEARCH

Searching for a tool by using the outdated method of a catalog has been replaced with the Advise and Select functions from NOVO™ — saving you time and money.

---

### ADVISE

Uses a rules-based approach to provide cutting tool recommendations:

- Define Machining Feature (face milling, slotting, blind hole, etc.)
- Apply Constraint Requirements (geometric, material, tolerance, etc.)
- Set Machining Sequence (single or multi-step operations, rough then finish, etc.)
- Receive Ranked Results

---

### SELECT

A method of selecting cutting tools from a tree structure via a hierarchy or parametric search:

- If you know which product you are looking for, a quick search can be performed by just the catalog number or product description.
- Smart filters significantly reduce the amount of potential tooling solutions.
- After the tool is selected, NOVO also provides cutting and adaptive item options that fit with your solution.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift. [widia.com/novo](http://widia.com/novo)



# Threading

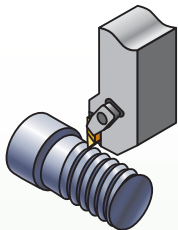
Threading Application Guide..... F2–F3

TopThread..... F4–F39

Laydown Threading..... F40–F82

Technical Information..... F83–F105

**TopThread  
External Threading**



**Square Shank Toolholder Sizes:**

- Inch — .375–1.5"
- Metric — 10–32mm

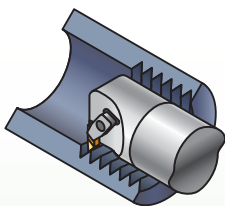
**Cresting (Full Profile):**

- UN TPI of 32–7
- ISO 1,5–3,0mm pitch

**60° Partial Profile — Flat Top**

- (NTF and NTK):**
- UN 44–4,5 TPI
- ISO 0,6–5,5mm pitch

**TopThread  
Internal Threading**



**Boring Bar Diameters:**

- Inch — .312–2.5"
- Metric — 10–50mm
- Minimum bore — .440" (11,5mm)
- Steel

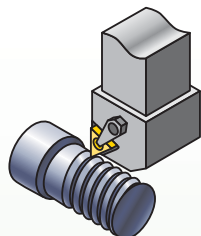
**Cresting (Full Profile):**

- UN 16–8 TPI
- ISO 1,5–3,0mm pitch

**60° Partial Profile — Flat Top**

- (NT-1L, NTF, and NTK):**
- UN 24–4,5 TPI
- ISO 1,0–5,5mm pitch

**Laydown  
External Threading**



**Square Shank Toolholder Sizes:**

- Inch — .500–1.25"
- Metric — 8–40mm

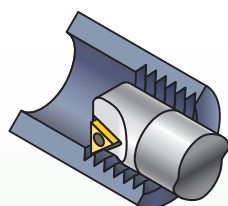
**Cresting (Full Profile):**

- UN 48–8 TPI
- ISO 0,5–5,0mm pitch

**60° Partial Profile:**

- UN 48–4 TPI
- ISO 0,5–6,0mm pitch

**Laydown  
Internal Threading**



**Boring Bar Diameters:**

- Inch — .375–1.25"
- Metric — 12–50mm
- Minimum bore — .500" (13mm)
- Steel and carbide

**Cresting (Full Profile)**

- and Partial Profile:**
- UN 48–8 TPI
  - ISO 0,5–5,0mm pitch

**60° Partial Profile:**

- UN 48–4 TPI
- ISO 0,5–6,0mm pitch

**55° Partial Profile:**

- UN 48–5 TPI
- ISO 0,5–5,0mm pitch

WIDIA™ TopThread™

# TopThread



High heat and high edge line load concentrated to a small nose radius, combined with high feed rates, places high demands on carbide threading inserts. The WIDIA TopThread system is the best solution for these problems.

The WIDIA TopThread system is the superior choice for high-demand applications like machining Acme, Buttress, and API threads.

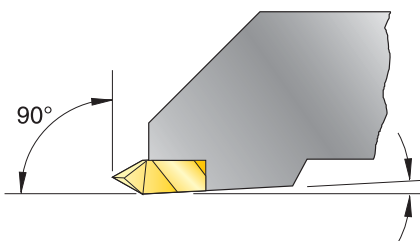
## TopThread Insert Technology

TopThread insert technology brings superior chip control to your threading operations. Unlike competitors' designs, the WIDIA recessed chip groove, when used according to our recommendations, will control the chip in most applications, bringing you better tool life and lower cutting pressures.

- Reduced inconsistencies and better workpiece finish.
- Superior chip control reduces the danger to operators.
- Increased productivity in all of your threading operations.
- Excellent choice for special thread forms and toolholder designs.

TopThread™ inserts are available in TN6010™ and TN6025™ grades to withstand the demands placed on the cutting edge of the threading insert.

The versatility of the TopThread steel enables you to use both threading and grooving inserts in the same toolholder.



*NOTE: Holders are designed to locate inserts inclined to 3° to provide back clearance down open side.*

## The Simple Solution

With the WIDIA™ TopThread solution, there is no need to worry about costly setup mistakes. TopThread insert selection is easy, quick, and enables accurate indexing to keep your machine spindle turning.

- Rigid design for increased insert stability during threading applications.
- Good quality threads, improved tool life, and improved surface finishes.
- Locking forces in three directions for superior resistance to tangential force.
- Unique 3° insert relief angle for back clearance.
- Available in partial profile inserts for 60° thread forms.

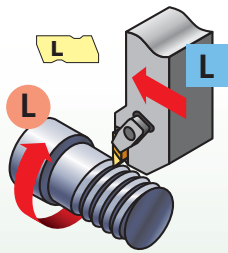
**Step 1 • Select Threading Method and Hand of Tooling**

**Required Information:**

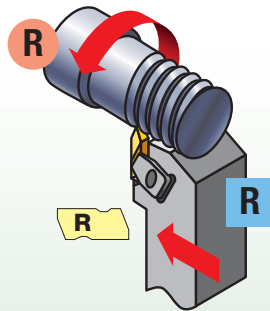
- External/internal operation.
- Spindle rotation/hand of thread.
- Feed direction.



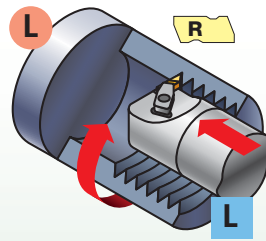
**Feed direction toward the chuck • RECOMMENDED**



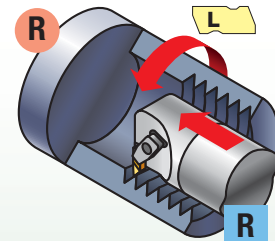
external left-hand thread



external right-hand thread

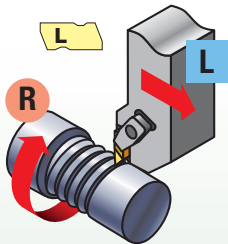


internal left-hand thread

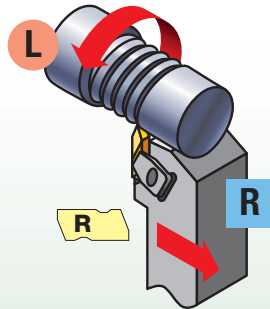


internal right-hand thread

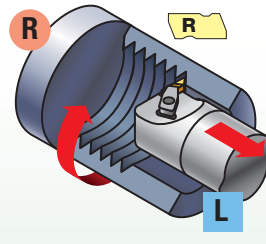
**Feed direction away from the chuck**



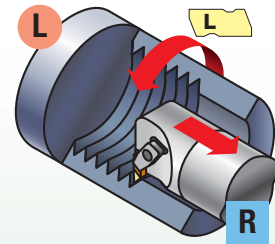
external right-hand thread



external left-hand thread



internal right-hand thread



internal left-hand thread

**Step 2 • Select Holder from Catalog Page**

The insert size must match the gage insert size of your toolholder selection:

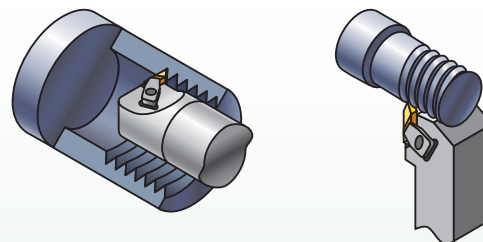
**Required Information:**

- External/internal operation.
- Minimum bore diameter (for internal operations).
- Hand of tool.
- Insert size (gage insert).

catalog number	gage insert
NSR-163D	N.3R
NSR-164D	N.4R

*NOTE: TopThread toolholders and boring bars are listed with a gage insert to indicate the size and hand required. They are compatible with both grooving and threading inserts of the same size.*

Select the appropriate holder for the insert size and hand:



*NOTE: Optimize your threading operation by using the proper infeed method and the recommended infeed values.*

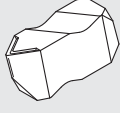
See the Technical section on pages F83–F105 of this catalog.

For internal threading, minimum bore varies depending on thread type. See page F96 for details.








**Step 3 • Choose Insert for Application**

- See threading insert overview on page F8.
- Select cresting inserts for fully controlled thread form including diameter control. Cresting inserts eliminate the need for deburring.
- Non-cresting partial profile inserts can cut a variety of thread pitches.
- Note insert size for toolholder selection.

	insert size	catalog number	TN6025	TN6010
	2	NT-2RK	•	•
	3	NT-3RK	•	•
	4	NT-4RK	•	•

**Step 4 • Select Grade and Speed**

Recommendations for Grade and Speed Selection — m/min (SFM)

workpiece material	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys
insert style	chip control or neutral 	chip control or positive 	neutral 	positive 	positive 
optimum cutting conditions	<b>TN6010</b> 50–230n (160–750)	<b>TN6010</b> 50–185 (160–600)	<b>TN6010</b> 70–210 (230–700)	—	<b>TN6010</b> 20–120 (65–400)
first choice	<b>TN6025</b> 40–200 (130–650)	<b>TN6025</b> 40–135 (130–450)	<b>TN6025</b> 60–145 (200–475)	<b>TN6025</b> 50–360 (160–1150)	<b>TN6025</b> 10–100 (35–330)

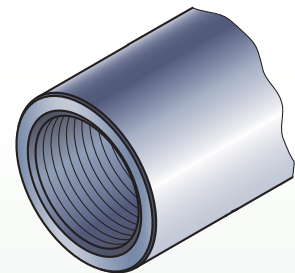
**Examples:**

- Chip Control:** NT-K or NT-CK (partial profile only)
- Neutral:** NT, NT-C, NTF, NTC, NJ, NJF, NDC-V, NA, NDC, NTB-A/B
- Positive:** NTP, NTK, NJP, NJK

**TopThread Threading Example:**

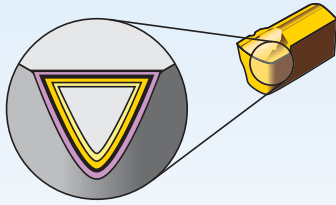
**application:** 8 TPI Acme internal right-hand thread  
**material:** alloy steel  
**workpiece diameter:** 4.5" (114,3mm)  
good cutting conditions  
feed towards the chuck

**Recommendation:**  
**insert:** NA3L8  
**grade:** TN6010  
**insert size:** 3  
**boring bar:** A40NER3  
**gage insert:** N.3L  
**speed:** 500 SFM (150 m/min)  
**infeed passes\*:** 12 passes



\* Infeed recommendations provided in technical data section on pages F90–F95.

chip control — K		style			thread profile	standard	tolerance class	cresting	application	page(s)	
		neutral	positive								
NT-K		NT		NTP		Partial Profile 60°	-	-	N	General use for 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	F13-F15
NT-CK						Partial Profile 60° — coarse pitch	-	-	N	Coarse pitch 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	F15
		NTF		NTK		Partial Profile 60° — fine pitch	-	-	N	Fine pitch 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches — able to thread close to shoulders.	F16
		NTC				American UN	ANSI B1.1:74	2A/2B	Y	Widely used inch-based 60° V-form for all industries.	F17
				NJP		UNJ	SAEA588791	3A/3B	N	Controlled root radius on external threads for military and aerospace industries.	F18
				NJK		UNJ — fine pitch	SAEA588790	3A/3B	N	Controlled root radius on external threads for military and aerospace industries — able to thread close to shoulders.	F18
		NDC-V				NPT	ANSI/ACME B1.201:1983	Standard NPT	Y	National Pipe Thread standard forms for pipe fittings.	F18
		NDC-V-M				NPT — multi-tooth	ANSI/ACME B1.201:1983	Standard NPT	Y	High-productivity multi-tooth threading inserts for NPT threads.	F19
		NWC-E				Whitworth, BSW, BSP	BS 84:1956, ISO 228/1:1982, DIN 259	Medium Class A	Y	Widely used 55° form for gas and water connections.	F19
		NDC-RD				API Round	API STD. 5B:1979	Standard API RD	Y	60° V-form with large radius for casing, tubing, and line pipe in the oil and gas industry, including 8 and 10 round forms.	F20
		NA				Acme	ANSI B1.5:1988	3G	N	29° truncated thread form for motion applications in a wide variety of industries.	F21
		NAS				Stub Acme	ANSI B1.8:1988	2G	N	Shallow depth 29° truncated thread form for motion applications in a wide variety of industries.	F22
		NTB-B				American Buttress — 45° clearance flank leading (Pull)	ANSI B1.9:1973	Class 2	N	Sawtooth form for axial load bearing applications in a variety of industries — use the “B” style when the 45° clearance flank is the leading flank.	F22



**Coatings provide high-speed capability and are engineered for finishing to light roughing.**

- Reduce cycle times — high speed capability.
- Longer tool life — new multilayer coating provides better wear resistance.

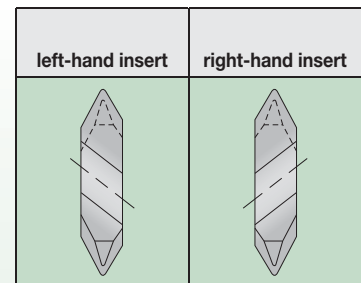
<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

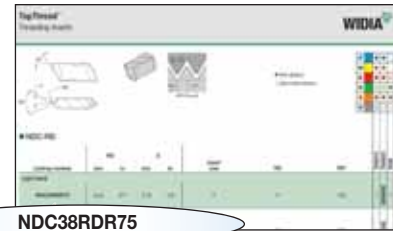
Grade	Coating	Grade Description																						
				05	10	15	20	25	30	35	40	45												
TN6010	HC-P10	An advanced PVD TiAlN coating over a very deformation-resistant unalloyed carbide substrate. TN6010 is ideal for finishing to general machining of most workpiece materials at higher speeds. Excellent for machining most steels, stainless steels, cast irons, non-ferrous materials, and super alloys under stable conditions. It also performs well machining hardened and short chipping materials.	P																					
			M																					
			K																					
			N																					
			S																					
			H																					
TN6025	HC-P25	An advanced PVD TiAlN-coated grade with a tough, ultra-fine-grain unalloyed substrate. For general-purpose machining of most steels, stainless steels, high-temp alloys, titanium, irons, and non-ferrous materials. Speeds may vary from low to medium and will handle interruptions and high feed rates.	P																					
			M																					
			K																					
			N																					
			S																					
			H																					
THM	HW-K15	Uncoated carbide for light and medium machining. For cast iron, all non-ferrous metals, and non-metals. Also capable of machining hardened materials at low cutting speeds.	P																					
			M																					
			K																					
			N																					
			S																					
			H																					

- All TopThread inserts are precision-ground to provide accurate edge location and secure locking of the insert in the toolholder pocket.
- TopThread inserts can be used in either toolholders or boring bars.
- All non-cresting-type threading inserts can be used for either external or internal applications. All cresting-type inserts are designated specifically for external or internal use.

- Right-hand TopThread toolholders use right-hand inserts. Left-hand TopThread toolholders use left-hand inserts.
- Right-hand TopThread boring bars use left-hand inserts. Left-hand Top Thread boring bars use right-hand inserts.
- See this page for carbide grade selection and more technical information.



# TopThread™ Insert Identification System

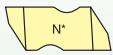


NDC38RDR75

**N**

Type of Insert

N – TopThread™



**D**

Insert

**C**

Additional Information

- B – Buttress
- F – Fine pitch
- S – Stub Acme
- C – Cresting
- P – Positive rake
- K – Fine pitch, positive

**3**

Insert Size

**8RD**

Industry Thread Identification

Indicates API or drilling industry form designation (e.g., 10RD, 8RD, .038) or controlled root radius threading inserts indicate the root radius in .001" increments (NJ, NJF, NJP, NJK) or M indicates metric ISO thread

**R**

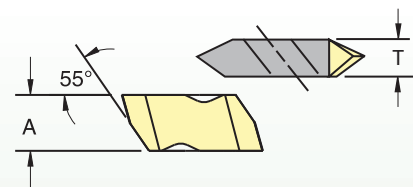
Hand of Insert

- R – Right hand
- L – Left hand

**75**

Definition of Insert

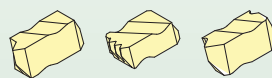
Additional Information



TopThread insert dimensions

insert size	A		T	
	inch	mm	inch	mm
1	.100	2,54	.100	2,54
2	.219	5,56	.150	3,81
3	.344	8,74	.195	4,95
4	.453	11,51	.255	6,48
5	.688	17,48	.380	9,65
6	.453	11,51	.383	9,73
8	.312	7,93	.438	11,13

NJF NDC-V-M NTC



NA NT NT-K



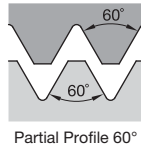
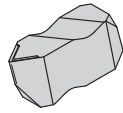
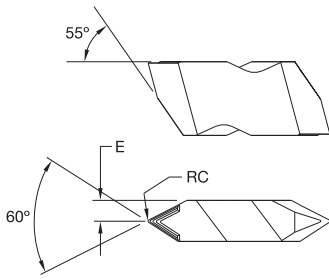
- Threads per inch or pitch (for metric)
- "A" or "B" type Buttress insert
- Taper per foot – API threads

- A – Acme
- D – API or NPT
- J – UNJ thread
- T – 60° V thread
- W – 55° V Whitworth

- I – Internal thread
- E – External thread (used only if internal and external thread forms are different)
- M – Multiple tooth
- K – Standard chip control
- C – Coarse pitch
- D – Dryseal

Material Group		Cutting Speed – vc m/min								
		TN6010			TN6025			THM		
		min	Start	max	min	Start	max	min	Start	max
<b>P</b>	0/1	140	<b>175</b>	210	130	<b>140</b>	150	90	<b>95</b>	100
	2	115	<b>145</b>	175	110	<b>145</b>	175	75	<b>100</b>	125
	3	115	<b>145</b>	175	110	<b>145</b>	175	75	<b>100</b>	125
	4	75	<b>100</b>	120	75	<b>95</b>	115	55	<b>65</b>	80
	5	105	<b>140</b>	170	100	<b>125</b>	145	70	<b>85</b>	100
	6	45	<b>60</b>	75	40	<b>55</b>	65	30	<b>40</b>	45
<b>M</b>	1	90	<b>115</b>	140	60	<b>75</b>	90	60	<b>75</b>	90
	2	55	<b>70</b>	90	40	<b>50</b>	55	50	<b>60</b>	75
	3	60	<b>80</b>	95	40	<b>50</b>	60	40	<b>50</b>	55
<b>K</b>	1	120	<b>150</b>	180	60	<b>80</b>	90	70	<b>90</b>	100
	2	120	<b>150</b>	180	60	<b>75</b>	85	50	<b>65</b>	80
	3	110	<b>140</b>	170	60	<b>75</b>	90	60	<b>70</b>	80
<b>N</b>	1	600	<b>750</b>	900	600	<b>750</b>	900	600	<b>750</b>	900
	2	535	<b>685</b>	835	535	<b>685</b>	835	500	<b>650</b>	800
	3	230	<b>300</b>	370	230	<b>300</b>	370	600	<b>750</b>	900
	4	135	<b>180</b>	225	135	<b>180</b>	225	500	<b>650</b>	800
	5	70	<b>90</b>	110	70	<b>90</b>	110	230	<b>300</b>	370
	6	445	<b>565</b>	690	445	<b>565</b>	690	150	<b>200</b>	250
	7	550	<b>700</b>	850	550	<b>700</b>	850	150	<b>200</b>	250
<b>S</b>	1	35	<b>40</b>	50	25	<b>35</b>	40	25	<b>35</b>	45
	2	20	<b>20</b>	30	15	<b>20</b>	20	20	<b>30</b>	35
	3	60	<b>70</b>	80	40	<b>60</b>	70	15	<b>25</b>	30
	4	30	<b>35</b>	45	20	<b>30</b>	35	10	<b>15</b>	20
<b>H</b>	1	15	<b>30</b>	60	-	-	-	-	-	-
	2	15	<b>30</b>	60	-	-	-	-	-	-
	3	15	<b>30</b>	60	-	-	-	-	-	-
	4	15	<b>30</b>	60	-	-	-	-	-	-

Material Group		Cutting Speed – vc SFM								
		TN6010			TN6025			THM		
		min	Start	max	min	Start	max	min	Start	max
P	0/1	455	<b>570</b>	685	425	<b>455</b>	490	295	<b>310</b>	325
	2	380	<b>475</b>	575	360	<b>465</b>	575	245	<b>320</b>	405
	3	380	<b>475</b>	575	360	<b>465</b>	575	245	<b>320</b>	405
	4	245	<b>320</b>	390	235	<b>300</b>	365	170	<b>210</b>	260
	5	345	<b>450</b>	555	325	<b>400</b>	475	230	<b>280</b>	330
	6	145	<b>195</b>	245	130	<b>180</b>	210	95	<b>130</b>	145
M	1	295	<b>390</b>	490	195	<b>245</b>	295	180	<b>220</b>	270
	2	180	<b>245</b>	310	130	<b>160</b>	180	115	<b>145</b>	165
	3	195	<b>260</b>	320	130	<b>165</b>	195	225	<b>295</b>	325
K	1	390	<b>490</b>	590	195	<b>255</b>	295	195	<b>255</b>	295
	2	390	<b>490</b>	590	195	<b>240</b>	280	195	<b>240</b>	280
	3	360	<b>455</b>	555	195	<b>245</b>	295	195	<b>245</b>	295
N	1	1965	<b>2460</b>	2950	1965	<b>2460</b>	2950	1805	<b>2295</b>	2785
	2	1750	<b>2240</b>	2730	1750	<b>2240</b>	2730	1805	<b>2295</b>	2785
	3	750	<b>980</b>	1210	750	<b>980</b>	1210	1805	<b>2295</b>	2785
	4	445	<b>590</b>	730	445	<b>590</b>	730	1195	<b>1555</b>	1915
	5	230	<b>295</b>	360	230	<b>295</b>	360	620	<b>820</b>	1015
	6	1450	<b>1855</b>	2260	1450	<b>1855</b>	2260	490	<b>655</b>	820
	7	1805	<b>2295</b>	2785	1805	<b>2295</b>	2785	425	<b>555</b>	690
S	1	110	<b>130</b>	165	75	<b>110</b>	130	75	<b>110</b>	130
	2	55	<b>65</b>	90	40	<b>55</b>	65	60	<b>85</b>	105
	3	195	<b>235</b>	260	135	<b>195</b>	235	45	<b>60</b>	75
	4	95	<b>115</b>	145	65	<b>95</b>	115	35	<b>50</b>	55
H	1	60	<b>100</b>	200	-	-	-	-	-	-
	2	60	<b>100</b>	200	-	-	-	-	-	-
	3	60	<b>100</b>	200	-	-	-	-	-	-
	4	60	<b>100</b>	200	-	-	-	-	-	-

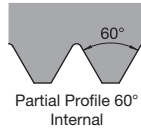
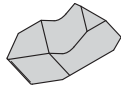
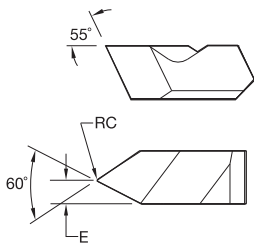


● first choice  
○ alternate choice

P	●	●	●	●
M	●	●	●	●
K	●	●	○	○
N	○	○	○	○
S	●	●	●	●
H	○	○	○	○

■ **NT-K**

catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in						TN6010	TN6025	THM
<b>right hand</b>												
NT2RK	0,10	.004	1,91	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607651	3607837	3607837
NT3RK	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607643	3607824	3607837
NT4RK	0,17	.007	3,25	.128	4	1,25-6,25	2,0-6,25	4-20	4-12	3607946	3607833	3607833
<b>left hand</b>												
NT2LK	0,10	.004	1,91	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607674	3607833	3607833
NT3LK	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607645	3607828	3607833

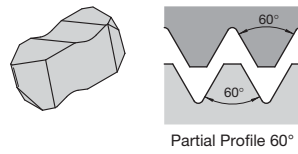
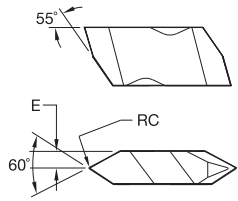


■ **NT-1L**

catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in						TN6010	TN6025	THM
<b>left hand</b>												
NT1L	0,08	.003	1,09	.043	1	—	1,0-2,0	—	12-24	3636551	3636555	3636555



Threading



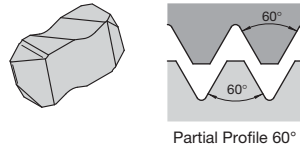
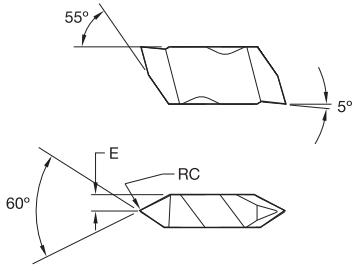
● first choice  
○ alternate choice

P	●	●	
M	●	●	○
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

■ NT	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in								
<b>right hand</b>												
NT2R	0,10	.004	1,90	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607647	3607843	—
NT3R	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607530	3607825	—
NT4R	0,17	.007	3,25	.128	4	1,25-6,25	2,0-6,25	4-20	4-12	3607676	3607834	—
<b>left hand</b>												
NT2L	0,10	.004	1,90	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607675	3607835	—
NT3L	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607532	3607826	—
NT4L	0,17	.007	3,25	.128	4	1,25-6,25	2,0-6,25	4-20	4-12	3607849	—	—

Threading



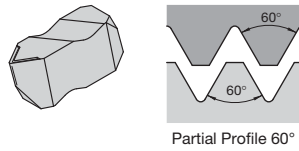
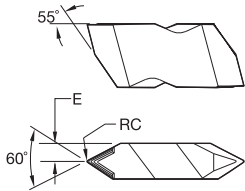


● first choice  
○ alternate choice

P	●	●	●
M	●	●	●
K	●	●	○
N	○	○	●
S	●	●	●
H	○	○	○

■ **NTP**

catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in						TN6010	TN6025	THM
<b>right hand</b>												
NTP2R	0,10	.004	1,91	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607677	3607841	3607841
NTP3R	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607644	3607823	3607823
NTP4R	0,17	.007	3,25	.128	4	1,25-6,25	2,0-6,25	4-20	4-12	3607839	3607839	3607839
<b>left hand</b>												
NTP2L	0,10	.004	1,91	.075	2	0,70-3,0	1,25-3,5	8-36	7-20	3607678	3607840	3607840
NTP3L	0,17	.007	2,49	.098	3	1,25-4,0	2,0-5,0	6-20	5-12	3607650	3607831	3607831

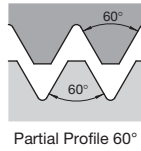
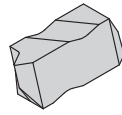
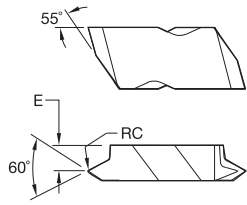


■ **NT-CK**

catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in						TN6010	TN6025	THM
<b>right hand</b>												
NT3RCK	0,34	.014	2,46	.097	3	2,5-4,0	4,0	6-11	6	3607649	3607838	3607838



Threading

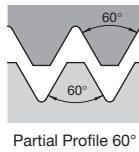
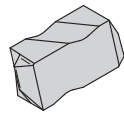
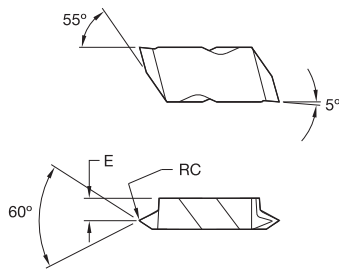


● first choice  
○ alternate choice

P	●	●	
M	●	●	○
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

■ **NTF**

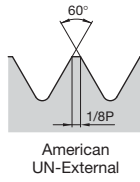
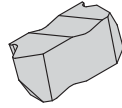
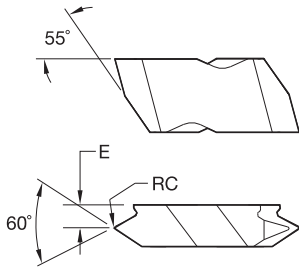
catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in								
<b>right hand</b>												
NTF2R	0,08	.003	2,79	.110	2	0,60-1,75	1,0-2,0	14-44	12-24	3607673	3607852	—
NTF3R	0,08	.003	3,58	.141	3	0,60-2,5	1,0-2,5	10-44	9-24	3607531	3607830	—
<b>left hand</b>												
NTF3L	0,08	.003	3,58	.141	3	0,60-2,5	1,0-2,5	10-44	9-24	3607652	3607832	—



■ **NTK**

catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in								
<b>right hand</b>												
NTK2R	0,08	.003	2,79	.110	2	0,60-1,75	1,0-2,0	14-44	12-24	3607646	3607836	—
NTK3R	0,08	.003	3,58	.141	3	0,60-2,50	1,0-2,5	10-44	9-24	3607528	3607827	—
<b>left hand</b>												
NTK3L	0,08	.003	3,58	.141	3	0,60-2,50	1,0-2,5	10-44	9-24	3607853	—	—

Threading

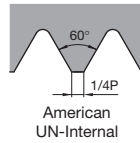
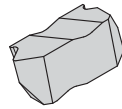
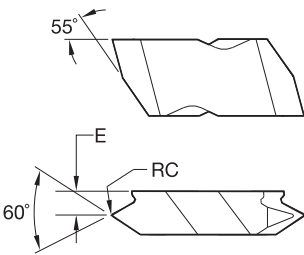


● first choice  
○ alternate choice

P	●	●	●
M	●	●	●
K	●	●	○
N	○	○	●
S	●	●	●
H	○	○	○

■ **NTC-E**

catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in						3636553	3636554	3636557
<b>right hand</b>												
NTC3R16E	0,19	.008	3,76	.148	3	—	—	16	—	3636553	3636557	—
NTC3R14E	0,22	.009	3,76	.148	3	—	—	14	—	3636554	—	—
NTC3R12E	0,25	.010	3,76	.148	3	—	—	12	—	3636549	3636562	—

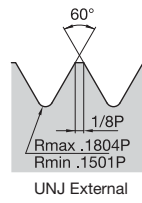
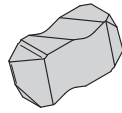
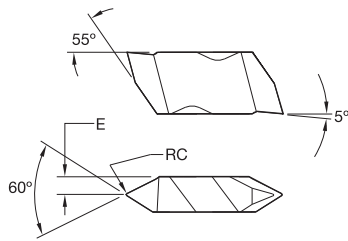


■ **NTC-I**

catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in						3636556		
<b>left hand</b>												
NTC3L12I	0,10	.004	3,76	.148	3	—	—	—	12	—	3636556	—



Threading

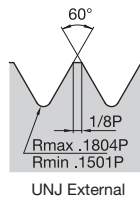
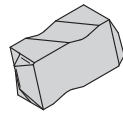
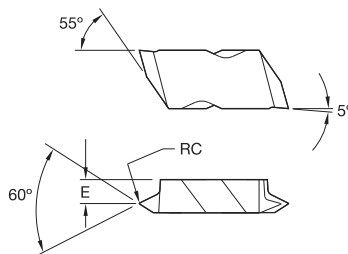


● first choice  
○ alternate choice

P	●	●	
M	●	●	○
K	●	●	○
N	○	○	●
S	●	●	●
H	○		

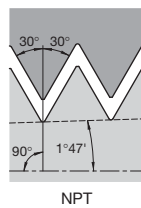
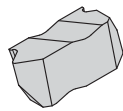
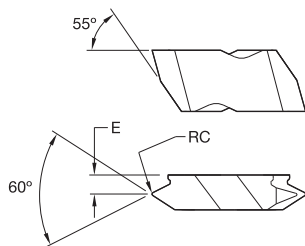
■ NJP

catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in								
right hand												
NJP3014R12	0,33	.013	2,49	.098	3	—	—	12	—	—	3607850	—



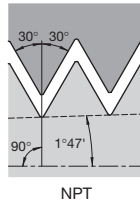
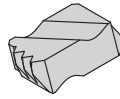
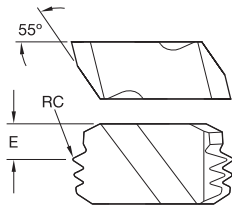
■ NJK

catalog number	RC		E		insert size	external thread pitch mm	internal thread pitch mm	external TPI	internal TPI	TN6010	TN6025	THM
	mm	in	mm	in								
right hand												
NJK3008R20	0,20	.008	3,58	.141	3	—	—	20	—	3607648	—	—



■ NDC-V

catalog number	RC		E		insert size	TPI	TPF	TN6010	TN6025	THM
	mm	in	mm	in						
right hand										
NDC3115VR75	0,10	.004	3,66	.144	3	11.5	.750	3636550	—	—

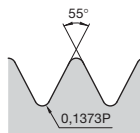
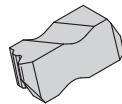
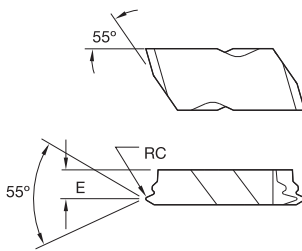


● first choice  
○ alternate choice

P	●	●	●
M	●	●	●
K	●	●	○
N	○	○	●
S	●	●	●
H	○	○	○

■ **NDC-V-M**

catalog number	RC		E		insert size	TPI	TPF	TN6010	TN6025	THM	
	mm	in	mm	in							
<b>right hand</b>											
NDC8115VR75M	0,10	.004	2,59	.102	8	11.5	.750	3636552			
NDC88VR75M	0,13	.005	2,41	.095	8	8	.750	3636548			



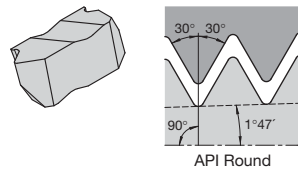
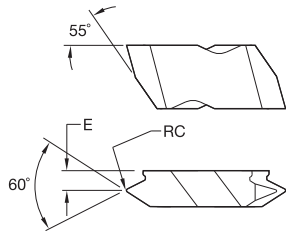
Whitworth BSW,  
BSP-External

■ **NWC-E**

catalog number	RC		E		insert size	TPI	TPF	TN6010	TN6025	THM	
	mm	in	mm	in							
<b>right hand</b>											
NWC3R14E	0,24	.009	3,43	.135	3	14	—		3811638		
NWC3R11E	0,30	.012	3,43	.135	3	11	—		3811639		



Threading



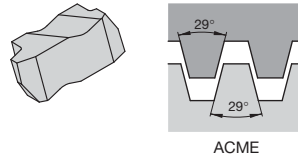
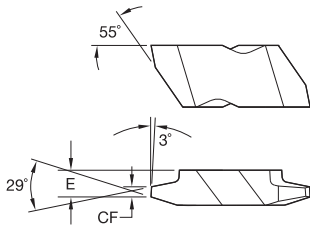
● first choice  
○ alternate choice

P	●	●		
M	●	●		
K	●	●	○	
N	○	○	●	
S	●	●	●	
H	○			

■ **NDC-RD**

Threading

catalog number	RC		E		insert size	TPI	TPF	TN6010	TN6025	THM
	mm	in	mm	in						
<b>right hand</b>										
NDC38RDR75	0,43	.017	3,18	.125	3	8	.750		3636558	
<b>left hand</b>										
NDC310RDL75	0,36	.014	3,18	.125	3	10	.750		3636565	
NDC38RDL75	0,43	.017	3,18	.125	3	8	.750		3636559	



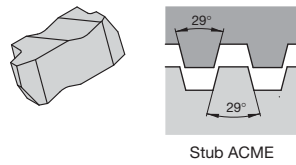
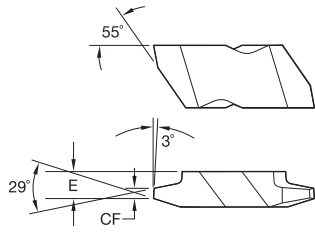
● first choice  
○ alternate choice

P	●	●	●
M	●	●	●
K	●	●	○
N	○	○	●
S	●	●	●
H	○	○	○

■ NA

catalog number	CF		E		insert size	TPI	TN6010	TN6025	THM
	mm	in	mm	in					
<b>right hand</b>									
NA3R8	1,04	.041	3,79	.149	3	8		3607854	
NA3R6	1,44	.057	3,79	.149	3	6		3607851	
NA3R4	2,22	.088	3,38	.133	3	4		3607848	
NA4R4	2,22	.088	5,13	.202	4	4		3636566	
NA6R3	3,01	.118	7,19	.283	6	3		3636564	
NA6R2	4,58	.180	7,19	.283	6	2		3636567	
<b>left hand</b>									
NA3L8	1,04	.041	3,79	.149	3	8		3607855	
NA3L6	1,44	.057	3,79	.149	3	6		3607847	
NA3L4	2,22	.088	3,38	.133	3	4		3607842	
NA4L4	2,22	.088	5,13	.202	4	4		3636560	
NA6L3	3,01	.118	7,19	.283	6	3		3636561	
NA6L2	4,58	.180	7,19	.283	6	2		3636568	



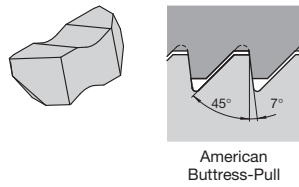
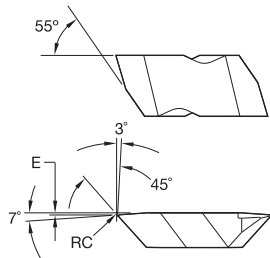


● first choice  
○ alternate choice

P	●	●		
M	●	●	○	
K	●	●	○	
N	○	○	●	
S	●	●	●	
H	○			

■ NAS

catalog number	CF		E		insert size	TPI	TN6010	TN6025	THM
	mm	in	mm	in					
<b>right hand</b>									
NAS3R8	1,21	.048	3,79	.149	3	8		3607856	
<b>left hand</b>									
NAS3L12	0,83	.033	3,79	.149	3	12		3607844	
NAS3L8	1,21	.048	3,79	.149	3	8		3607845	
NAS3L6	1,66	.065	3,79	.149	3	6		3607829	



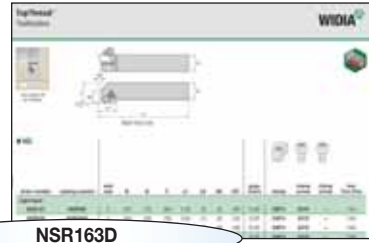
■ NTB-B

catalog number	RC		E		insert size	TPI	TPF	TN6010	TN6025	THM
	mm	in	mm	in						
<b>left hand</b>										
NTB3LB	0,17	.007	0,31	.012	3	8-16	—		3636563	

Threading

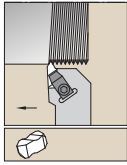


**TopThread  
Holder Identification System**

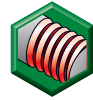
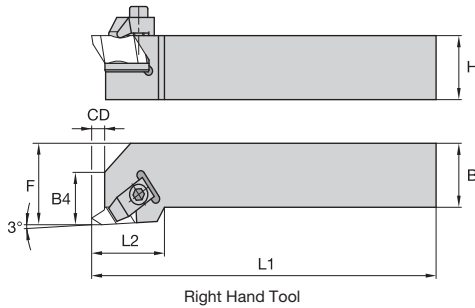


NSR163D

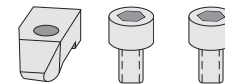
<b>N</b>	<b>S</b>	<b>R</b>	<b>16</b>	<b>3</b>	<b>D</b>															
Insert Holding Method	Insert Mounting Location	Hand of Tool	Drop Head	Shank Size	Qualified Surface and Length															
<p><b>N</b> – TopThread</p>	<p>End mount</p> <p>Side mount Offset</p> <p>Side mount No offset for swiss machining</p> <p>NRR undercut</p>	<p>Hand of Tool</p>	<p>Drop Head</p>	<p><b>16</b></p> <p>Inch: For shanks 5/8" square and larger, the number represents the number of sixteenths of width and height. For shanks under 5/8" square, the number of sixteenths of cross section is preceded by a zero. For rectangular holders, the first digit represents the number of eighths of width and the second digit the number of quarters of height, except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.</p>	<p><b>3</b></p> <p>Insert Size</p> <table border="1"> <thead> <tr> <th>insert size</th> <th>W1</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>.150"</td> </tr> <tr> <td>3</td> <td>.195"</td> </tr> <tr> <td>4</td> <td>.255"</td> </tr> <tr> <td>5</td> <td>.380"</td> </tr> <tr> <td>6</td> <td>.383"</td> </tr> <tr> <td>8</td> <td>.438"</td> </tr> </tbody> </table>	insert size	W1	2	.150"	3	.195"	4	.255"	5	.380"	6	.383"	8	.438"	<p><b>D</b></p> <p>Qualified Surface and Length</p> <ul style="list-style-type: none"> <li><b>A</b> – Qualified back and end, 4" long</li> <li><b>B</b> – Qualified back and end, 4.5" long</li> <li><b>C</b> – Qualified back and end, 5" long</li> <li><b>D</b> – Qualified back and end, 6" long</li> <li><b>E</b> – Qualified back and end, 7" long</li> </ul> <p>NOTE: Holders are designed to locate insert inclined to 3° to provide back clearance down open side.</p>
insert size	W1																			
2	.150"																			
3	.195"																			
4	.255"																			
5	.380"																			
6	.383"																			
8	.438"																			
			<p>End mount</p> <p>Side mount</p>																	



See page F8  
for inserts.



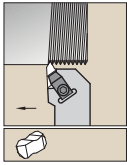
■ NS



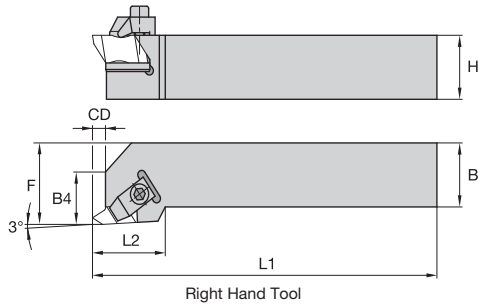
Threading

order number	catalog number	seat size	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	clamp screw	hex/ Torx Plus
<b>right hand</b>														
3632147	NSR062	2	.375	.375	.562	2.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639035	NSR082V	2	.500	.500	.750	3.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639044	NSR102B	2	.625	.625	.875	4.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639026	NSR122B	2	.750	.750	1.000	4.50	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639025	NSR162C	2	1.000	1.000	1.250	5.00	.75	.35	.138	N.2R	CM74	S310	—	7/64
3639027	NSR123A	3	.750	.750	1.000	4.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3639023	NSR123B	3	.750	.750	1.000	4.50	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3638592	NSR163C	3	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3638591	NSR163D	3	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3637496	NSR853D	3	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3639028	NSR203D	3	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3637506	NSR243D	3	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3637535	NSR243E	3	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3R	CM72LP	—	S2112	25 IP
3637509	NSR205D	5	1.250	1.250	1.500	6.00	2.00	.61	.415	N.5R	CM80	S352	—	1/4
3637540	NSR245D	5	1.500	1.500	2.000	6.00	2.00	.61	.415	N.5R	CM80	S352	—	1/4
<b>left hand</b>														
3632161	NSL062	2	.375	.375	.562	2.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3637485	NSL082V	2	.500	.500	.750	3.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3637510	NSL102B	2	.625	.625	.875	4.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3632145	NSL122B	2	.750	.750	1.000	4.50	.75	.35	.138	N.2L	CM75	S310	—	7/64
3632138	NSL162C	2	1.000	1.000	1.250	5.00	.75	.35	.138	N.2L	CM75	S310	—	7/64
3632152	NSL123A	3	.750	.750	1.000	4.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3639032	NSL123B	3	.750	.750	1.000	4.50	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3639029	NSL163C	3	1.000	1.000	1.250	5.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3639024	NSL163D	3	1.000	1.000	1.250	6.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3637508	NSL853D	3	1.250	1.000	1.250	6.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3639037	NSL203D	3	1.250	1.250	1.500	6.00	1.25	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3637515	NSL243D	3	1.500	1.500	2.000	6.00	1.38	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3637548	NSL243E	3	1.500	1.500	2.000	7.00	1.38	.50	.210	N.3L	CM73LP	—	S2112	25 IP
3637536	NSL205D	5	1.250	1.250	1.500	6.00	2.00	.61	.415	N.5L	CM81	S352	—	1/4

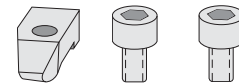
NOTE: F dimension measured over sharp point of insert.



See page F8 for inserts.



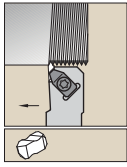
■ **NS (With Shim)**



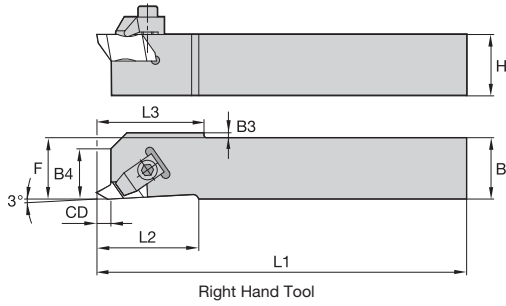
order number	catalog number	seat size	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	clamp screw	hex/Torx Plus
<b>right hand</b>														
3639031	NSR164C	2	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4R	CM72LP	—	S2112	25 IP
3639033	NSR164D	2	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4R	CM72LP	—	S2112	25 IP
3637526	NSR854D	4	1.250	1.000	1.250	6.00	1.38	.54	.294	N.4R	CM72LP	—	S2112	25 IP
3637529	NSR204C	4	1.250	1.250	1.500	5.00	1.38	.54	.294	N.4R	CM72LP	—	S2112	25 IP
3637534	NSR864E	2	1.500	1.000	1.250	7.00	1.38	.54	.294	N.4R	CM72LP	—	S2112	25 IP
3637501	NSR244E	4	1.500	1.500	2.000	7.00	1.50	.54	.294	N.4R	CM72LP	—	S2112	25 IP
3632153	NSR166D	3	1.000	1.000	1.250	6.00	1.38	.67	.334	N.6R	CM120	S412	—	5/32
3637472	NSR206D	3	1.250	1.250	1.500	6.00	1.38	.67	.334	N.6R	CM120	S412	—	5/32
3637520	NSR246D	4	1.500	1.500	2.000	6.00	1.50	.67	.334	N.6R	CM120	S412	—	5/32
3637539	NSR168D	4	1.000	1.000	1.250	6.00	1.25	.72	.225	N.8R	CM144	S422	—	3/16
<b>left hand</b>														
3632151	NSL164C	2	1.000	1.000	1.250	5.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP
3639040	NSL164D	6	1.000	1.000	1.250	6.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP
3637541	NSL854D	3	1.250	1.000	1.250	6.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP
3641699	NSL204C	2	1.250	1.250	1.500	5.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP
3639036	NSL204D	1	1.250	1.250	1.500	6.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP
3641700	NSL864E	1	1.500	1.000	1.250	7.00	1.38	.54	.294	N.4L	CM73LP	—	S2112	25 IP
3637505	NSL244D	2	1.500	1.500	2.000	6.00	1.50	.54	.294	N.4L	CM73LP	—	S2112	25 IP
3637533	NSL244E	4	1.500	1.500	2.000	7.00	1.50	.54	.294	N.4L	CM73LP	—	S2112	25 IP
3637507	NSL206D	2	1.250	1.250	1.500	6.00	1.38	.67	.334	N.6L	CM121	S412	—	5/32
3637546	NSL246D	2	1.500	1.500	2.000	6.00	1.50	.67	.334	N.6L	CM121	S412	—	5/32

NOTE: F dimension measured over sharp point of insert.

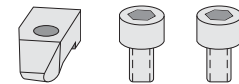
Threading



See page F8  
for inserts.



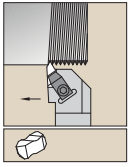
■ NAS



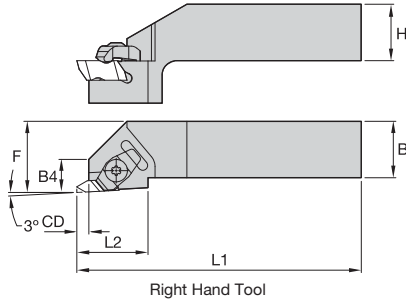
Threading

order number	catalog number	seat size	H	B	F	L1	L2	B4	CD	B3	L3	gage insert	clamp	clamp screw	clamp screw	hex/ Torx Plus
<b>right hand</b>																
3632140	NASR062D	2	.375	.375	.375	6.00	.75	.35	.138	.070	.88	N.2R	CM182	S310	—	7/64
3636529	NASR082D	2	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2R	CM182	S310	—	7/64
3639039	NASR102B	2	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2R	CM74	S310	—	7/64
3639042	NASR083D	3	.500	.500	.500	6.00	1.25	.50	.210	.125	1.32	N.3R	CM184LP	—	S2112	25 IP
3636532	NASR103B	3	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3R	CM184LP	—	S2112	25 IP
<b>left hand</b>																
3637531	NASL062D	2	.375	.375	.375	6.00	.75	.35	.138	.070	.88	N.2L	CM183	S310	—	7/64
3636534	NASL082D	2	.500	.500	.500	6.00	.75	.35	.138	—	—	N.2L	CM183	S310	—	7/64
3637489	NASL102B	2	.625	.625	.625	4.50	.75	.35	.138	—	—	N.2L	CM75	S310	—	7/64
3637497	NASL083D	3	.500	.500	.500	6.00	1.25	.50	.210	.125	1.32	N.3L	CM185	S412	—	25 IP
3636524	NASL103B	3	.625	.625	.625	4.50	1.25	—	.210	—	—	N.3L	CM185LP	—	S2112	25 IP

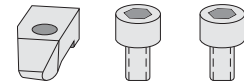
NOTE: F dimension measured over sharp point of insert.



See page F8 for inserts.



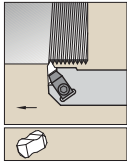
■ **NS-DH**



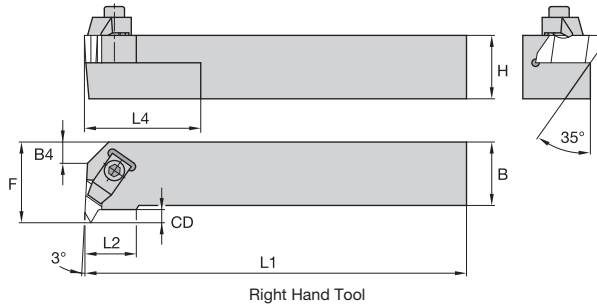
order number	catalog number	seat size	H	B	F	L1	L2	B4	CD	gage insert	clamp	clamp screw	clamp screw	hex/Torx Plus
<b>right hand</b>														
3637547	NSRDH122B	2	.750	.750	1.000	4.50	.75	.40	.138	N.2R	CM74	S310	—	7/64
3637528	NSRDH163D	3	1.000	1.000	1.250	6.00	1.25	.58	.210	N.3R	CM72LP	—	S2112	25 IP
3637511	NSRDH203D	3	1.250	1.250	1.500	6.00	1.25	.62	.210	N.3R	CM72LP	—	S2112	25 IP
3637530	NSRDH204D	4	1.250	1.250	1.500	6.00	1.38	.62	.294	N.4R	CM72LP	—	S2112	25 IP
<b>left hand</b>														
3637518	NSLDH203D	3	1.250	1.250	1.500	6.00	1.25	.62	.210	N.3L	CM73LP	—	S2112	25 IP

NOTE: F dimension measured over sharp point of insert.

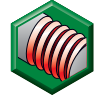
Threading



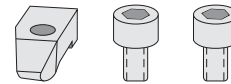
See page F8  
for inserts.



Right Hand Tool



■ NE



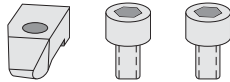
Threading

order number	catalog number	seat size	H	B	F	L1	L2	L4	B4	CD	gage insert	clamp	clamp screw	clamp screw	hex/ Torx Plus
right hand															
3637521	NER062	2	.375	.375	.750	2.50	.50	.50	—	.138	N.2L	CM75	S310	—	7/64
3637494	NER082V	2	.500	.500	.750	3.50	.50	1.00	—	.138	N.2L	CM75	S310	—	7/64
3637517	NER102B	2	.625	.625	.750	4.50	—	1.00	—	.138	N.2L	CM75	S310	—	7/64
3632156	NER122B	2	.750	.750	1.000	4.50	.50	1.00	.29	.138	N.2L	CM75	S310	—	7/64
3637486	NER162C	2	1.000	1.000	1.250	5.00	.50	1.00	.41	.138	N.2L	CM75	S310	—	7/64
3632133	NER123B	3	.750	.750	1.125	4.50	.75	2.00	—	.210	N.3L	CM73LP	—	S2112	25 IP
3639038	NER163C	3	1.000	1.000	1.250	5.00	.75	2.00	—	.210	N.3L	CM73LP	—	S2112	25 IP
3639030	NER163D	3	1.000	1.000	1.250	6.00	.75	2.00	—	.210	N.3L	CM73LP	—	S2112	25 IP
3637523	NER853D	3	1.250	1.000	1.250	6.00	.75	2.00	—	.210	N.3L	CM73LP	—	S2112	25 IP
3632150	NER203D	3	1.250	1.250	1.500	6.00	.75	2.00	.26	.210	N.3L	CM73LP	—	S2112	25 IP
3637524	NER243D	3	1.500	1.500	2.000	6.00	.75	2.00	.76	.210	N.3L	CM73LP	—	S2112	25 IP
3637492	NER164C	4	1.000	1.000	1.375	5.00	.75	2.00	—	.294	N.4L	CM73LP	—	S2112	25 IP
3639043	NER164D	4	1.000	1.000	1.375	6.00	.75	2.00	—	.294	N.4L	CM73LP	—	S2112	25 IP
3632157	NER204D	4	1.250	1.250	1.625	6.00	.75	2.00	.27	.294	N.4L	CM73LP	—	S2112	25 IP
3637522	NER244D	4	1.500	1.500	2.000	6.00	.75	2.00	.65	.294	N.4L	CM73LP	—	S2112	25 IP
3637542	NER205D	5	1.250	1.250	2.000	6.00	1.44	2.00	—	.415	N.5L	CM81	S352	—	1/4
3637544	NER206D	6	1.250	1.250	1.625	6.00	.75	2.00	.27	.300	N.6L	CM121	S412	—	5/32

NOTE: F dimension measured over sharp point of insert.

(continued)

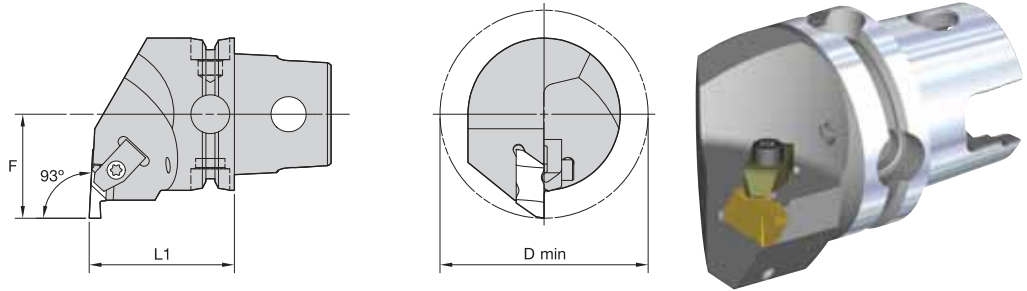
(NE – continued)

order number	catalog number	seat size	H	B	F	L1	L2	L4	B4	CD	gage insert				hex/ Torx Plus
												clamp	clamp screw	clamp screw	
<b>left hand</b>															
3637525	NEL062	2	.375	.375	.750	2.50	.50	.50	—	.138	N.2R	CM74	S310	—	7/64
3632158	NEL082V	2	.500	.500	.750	3.50	.50	1.00	—	.138	N.2R	CM74	S310	—	7/64
3637532	NEL102B	2	.625	.625	.750	4.50	—	1.00	—	.138	N.2R	CM74	S310	—	7/64
3637503	NEL122B	2	.750	.750	1.000	4.50	.50	1.00	.29	.138	N.2R	CM74	S310	—	7/64
3637500	NEL162C	2	1.000	1.000	1.250	5.00	.50	1.00	.41	.138	N.2R	CM74	S310	—	7/64
3632144	NEL123B	3	.750	.750	1.125	4.50	.75	2.00	—	.210	N.3R	CM72LP	—	S2112	25 IP
3632155	NEL163C	3	1.000	1.000	1.250	5.00	.75	2.00	—	.210	N.3R	CM72LP	—	S2112	25 IP
3639041	NEL163D	3	1.000	1.000	1.250	6.00	.75	2.00	—	.210	N.3R	CM72LP	—	S2112	25 IP
3637538	NEL853D	3	1.250	1.000	1.250	6.00	.75	2.00	—	.210	N.3R	CM72LP	—	S2112	25 IP
3632154	NEL203D	3	1.250	1.250	1.500	6.00	.75	2.00	.26	.210	N.3R	CM72LP	—	S2112	25 IP
3637537	NEL243D	3	1.500	1.500	2.000	6.00	.75	2.00	.76	.210	N.3R	CM72LP	—	S2112	25 IP
3637493	NEL164C	4	1.000	1.000	1.375	5.00	.75	2.00	—	.294	N.4R	CM72LP	—	S2112	25 IP
3632162	NEL164D	4	1.000	1.000	1.375	6.00	.75	2.00	—	.294	N.4R	CM72LP	—	S2112	25 IP
3632159	NEL204D	4	1.250	1.250	1.625	6.00	.75	2.00	.27	.294	N.4R	CM72LP	—	S2112	25 IP
3637543	NEL244D	4	1.500	1.500	2.000	6.00	.75	2.00	.65	.294	N.4R	CM72LP	—	S2112	25 IP
3637549	NEL205D	5	1.250	1.250	2.000	6.00	1.44	2.00	—	.415	N.5R	CM80	S352	—	1/4
3641697	NEL206D	6	1.250	1.250	1.625	6.00	.75	2.00	.27	.300	N.6R	CM120	S412	—	5/32

NOTE: F dimension measured over sharp point of insert.

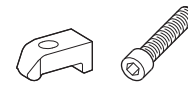


Threading



■ NE 93°

Threading

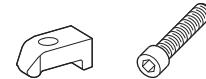
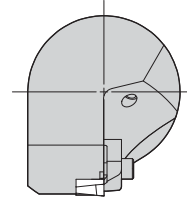
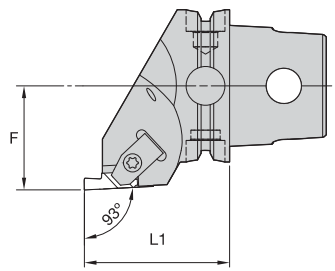


order number	catalog number	L1		F		D min		gage insert	clamp	clamp screw	kg	lbs
		mm	in	mm	in	mm	in					
<b>right hand</b>												
3902285	KM40TSNER2	40	1.575	27	1.063	54	2.126	NG2L	CM75	MS1488	0,30	.66
3902286	KM40TSNER3	40	1.575	27	1.063	54	2.126	NG3L	CM73	MS1489	0,30	.67
3902287	KM40TSNER4	40	1.575	27	1.063	54	2.126	NG4L	CM73	MS1489	0,30	.65
<b>left hand</b>												
3902132	KM40TSNEL2	40	1.575	27	1.063	54	2.126	NG2R	CM74	MS1488	0,30	.66
3902283	KM40TSNEL3	40	1.575	27	1.063	54	2.126	NG3R	CM-72	MS1489	0,30	.67
3902284	KM40TSNEL4	40	1.575	27	1.063	54	2.126	NG4R	CM-72	MS1489	0,30	.65





■ NS 93°

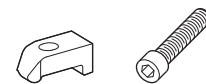
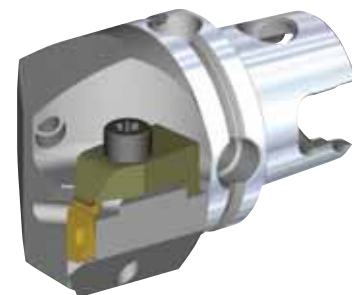
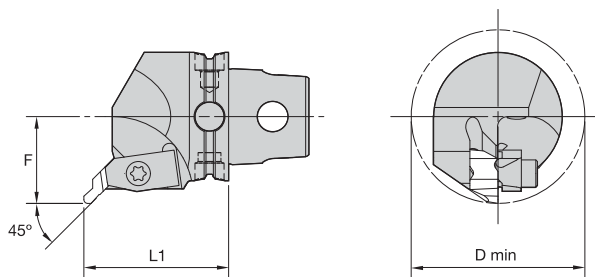


order number	catalog number	L1		F		gage insert	clamp	clamp screw	kg	lbs
		mm	in	mm	in					
<b>right hand</b>										
3902293	KM40TSNSR2	40	1.575	27	1.063	NG2R	CM74	MS1488	0,32	.70
3902294	KM40TSNSR3	47	1.850	27	1.063	NG3R	CM-72	MS1489	0,32	.71
3902295	KM40TSNSR4	47	1.850	27	1.063	NG4R	CM-72	MS1489	0,30	.66
<b>left hand</b>										
3902290	KM40TSNSL2	40	1.575	27	1.063	NG2L	CM75	MS1488	0,32	.70
3902291	KM40TSNSL3	47	1.850	27	1.063	NG3L	CM73	MS1489	0,33	.72
3902292	KM40TSNSL4	47	1.850	27	1.063	NG4L	CM73	MS1489	0,30	.66

Threading

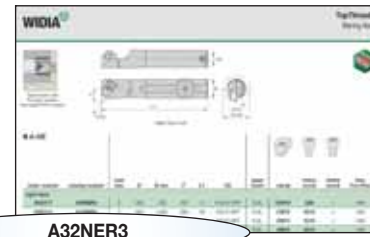


■ NR 45°

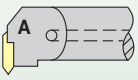
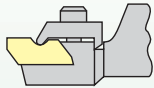


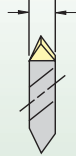
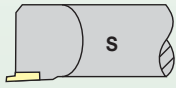
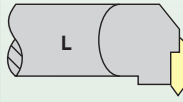
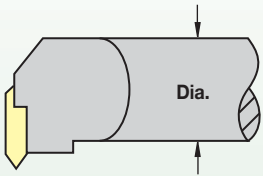


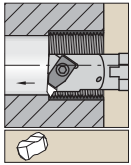
order number	catalog number	L1		F		D min		gage insert	clamp	clamp screw	kg	lbs
		mm	in	mm	in	mm	in					
<b>right hand</b>												
3902289	KM40TSNRR3045M	45	1.772	27	1.063	54	2.126	NU3L	CM73	MS1489	0,34	.75
<b>left hand</b>												
3902288	KM40TSNRL3045M	45	1.772	27	1.063	54	2.126	NU3R	CM-72	MS1489	0,33	.74

TopThread  
Boring Bar Identification System

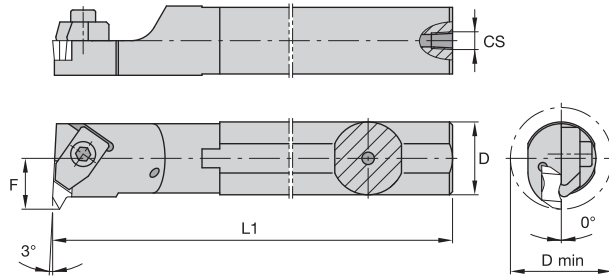


A32NER3

A	32	N	E	R	3																
Bar Type	Bar Diameter	Insert Holding Method	Insert Location	Hand of Tool	Insert Size																
Steel with coolant		N – TopThread*	End mount	Right hand	W1																
																					
			Side mount	Left hand																	
		*Proprietary standard only.																			
A two-digit number that indicates the bar diameter in 1/16" increments.					<table border="1"> <thead> <tr> <th>insert size</th> <th>W1</th> </tr> </thead> <tbody> <tr><td>1</td><td>.100"</td></tr> <tr><td>2</td><td>.150"</td></tr> <tr><td>3</td><td>.195"</td></tr> <tr><td>4</td><td>.255"</td></tr> <tr><td>5</td><td>.380"</td></tr> <tr><td>6</td><td>.383"</td></tr> <tr><td>8</td><td>.438"</td></tr> </tbody> </table>	insert size	W1	1	.100"	2	.150"	3	.195"	4	.255"	5	.380"	6	.383"	8	.438"
insert size	W1																				
1	.100"																				
2	.150"																				
3	.195"																				
4	.255"																				
5	.380"																				
6	.383"																				
8	.438"																				
																					



Steel shank with through coolant. See page F8 for inserts.



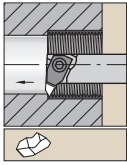
Right Hand Tool



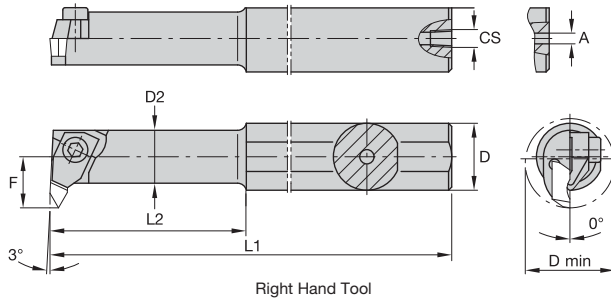
**A-NE**

order number	catalog number	seat size	D	D min	F	L1	CS	gage insert	clamp	clamp screw	clamp screw	hex/Torx Plus
<b>right hand</b>												
3632117	A08NER2	2	.500	.730	.437	8	1/16-27 NPT	N.2L	CM147	S39	—	7/64
3632114	A10NER2	2	.625	1.000	.500	10	1/8-27 NPT	N.2L	CM75	S310	—	7/64
3632118	A12NER2	2	.750	1.125	.562	10	1/8-27 NPT	N.2L	CM75	S310	—	7/64
3632130	A16TNER2	2	1.000	1.375	.688	12	1/4-18 NPT	N.2L	CM75	S310	—	7/64
3632113	A16NER3	3	1.000	1.375	.688	12	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632116	A20NER3	3	1.250	1.750	.875	14	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632115	A24NER3	3	1.500	2.000	1.000	14	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632132	A28NER3	3	1.750	2.250	1.125	14	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632122	A32NER3	3	2.000	2.500	1.250	16	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632146	A40NER3	3	2.500	3.000	1.500	16	1/4-18 NPT	N.3L	CM73LP	—	S2112	25 IP
3632123	A28NER4	4	1.750	2.500	1.250	14	1/4-18 NPT	N.4L	CM73LP	—	S2112	25 IP
3632125	A32NER4	4	2.000	2.750	1.375	16	1/4-18 NPT	N.4L	CM73LP	—	S2112	25 IP
3632136	A40NER4	4	2.500	3.250	1.625	16	1/4-18 NPT	N.4L	CM73LP	—	S2112	25 IP
3637514	A32NER5	5	2.000	2.812	1.406	16	1/4-18 NPT	N.5L	CM81	S352	—	1/4
3632143	A32NER6	6	2.000	2.750	1.375	16	1/4-18 NPT	N.6L	CM121	S412	—	5/32
3637498	A40NER6	6	2.500	3.250	1.625	16	1/4-18 NPT	N.6L	CM121	S412	—	5/32
<b>left hand</b>												
3632131	A08NEL2	2	.500	.730	.437	8	1/16-27 NPT	N.2R	CM146	S39	—	7/64
3632127	A10NEL2	2	.625	1.000	.500	10	1/8-27 NPT	N.2R	CM74	S310	—	7/64
3632126	A12NEL2	2	.750	1.125	.562	10	1/8-27 NPT	N.2R	CM74	S310	—	7/64
3632142	A16NEL2	2	1.000	1.375	.688	12	1/4-18 NPT	N.2R	CM74	S310	—	7/64
3632120	A16NEL3	3	1.000	1.375	.688	12	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3632124	A20NEL3	3	1.250	1.750	.875	14	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3632128	A24NEL3	3	1.500	2.000	1.000	14	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3637490	A28NEL3	3	1.750	2.250	1.125	14	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3632139	A32NEL3	3	2.000	2.500	1.250	16	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3637504	A40NEL3	3	2.500	3.000	1.500	16	1/4-18 NPT	N.3R	CM72LP	—	S2112	25 IP
3632141	A28NEL4	4	1.750	2.500	1.250	14	1/4-18 NPT	N.4R	CM72LP	—	S2112	25 IP
3632149	A32NEL4	4	2.000	2.750	1.375	16	1/4-18 NPT	N.4R	CM72LP	—	S2112	25 IP
3637491	A40NEL4	4	2.500	3.250	1.625	16	1/4-18 NPT	N.4R	CM72LP	—	S2112	25 IP
3637527	A32NEL5	5	2.000	2.812	1.406	16	1/4-18 NPT	N.5R	CM80	S352	—	1/4
3637512	A32NEL6	6	2.000	2.750	1.375	16	1/4-18 NPT	N.6R	CM120	S412	—	5/32

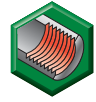
NOTE: F dimension measured over sharp point of insert.



Necked steel shank with through coolant. See page F8 for inserts.

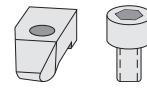


Right Hand Tool



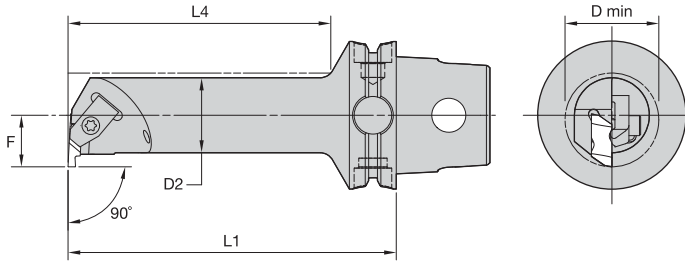
■ A-NE-1

Threading



order number	catalog number	seat size	D	D min	D2	L1	L2	F	A	CS	gage insert	clamp	clamp screw	hex/Torx Plus
<b>right hand</b>														
3632121	A06NER1	1	.375	.440	.312	6	1	.258	.125	—	N.1L	CM109	S304	5/64
3632119	A08NER1	1	.500	.440	.310	8	1	.258	.094	1/16-27 NPT	N.1L	CM109	S304	5/64
3632148	A10NER1	1	.625	.800	—	10	—	.406	—	1/8-27 NPT	N.1L	CM109	S304	5/64

NOTE: F dimension measured over sharp point of insert.



■ NE 90° • Steel



order number	catalog number	D2		D min		F		L4		L1		gage insert	kg	lbs
		mm	in	mm	in	mm	in	mm	in	mm	in			
<b>right hand</b>														
3955481	KM40TSS12ENER2	12	.472	19	.73	11	.433	42	1.655	70	2.756	NG2L	0,27	.58
3955483	KM40TSS16FNER2	16	.630	20	.79	11	.433	56	2.209	80	3.150	NG2L	0,28	.62
3955485	KM40TSS20GNER2	20	.787	25	.98	13	.512	70	2.757	90	3.543	NG2L	0,35	.76
3955487	KM40TSS25ENER2	25	.984	32	1.26	17	.669	55	2.169	70	2.756	NG2L	0,34	.75
3955491	KM40TSS25ENER3	25	.984	34	1.34	17	.669	55	2.169	70	2.756	NG3L	0,35	.77
3955489	KM40TSS25HNER2	25	.984	32	1.26	17	.669	75	2.954	100	3.937	NG2L	0,49	1.08
3955493	KM40TSS25HNER3	25	.984	34	1.34	17	.669	75	2.954	100	3.937	NG3L	0,49	1.09
3955497	KM40TSS32GNER3	32	1.260	40	1.57	22	.866	76	2.993	90	3.543	NG3L	0,55	1.21
3955495	KM40TSS32JNER3	32	1.260	40	1.57	22	.866	96	3.780	110	4.331	NG3L	0,67	1.48
<b>left hand</b>														
3955480	KM40TSS12ENEL2	12	.472	19	.73	11	.433	42	1.655	70	2.756	NG2R	0,27	.59
3955482	KM40TSS16FNEL2	16	.630	20	.79	11	.433	56	2.209	80	3.150	NG2R	0,28	.62
3955484	KM40TSS20GNEL2	20	.787	25	.98	13	.512	70	2.757	90	3.543	NG2R	0,35	.76
3955486	KM40TSS25ENEL2	25	.984	32	1.26	17	.669	55	2.169	70	2.756	NG2R	0,34	.75
3955490	KM40TSS25ENEL3	25	.984	34	1.34	17	.669	55	2.169	70	2.756	NG3R	0,35	.77
3955488	KM40TSS25HNEL2	25	.984	32	1.26	17	.669	75	2.954	100	3.937	NG2R	0,49	1.08
3955492	KM40TSS25HNEL3	25	.984	34	1.34	17	.669	75	2.954	100	3.937	NG3R	0,49	1.09
3955496	KM40TSS32GNEL3	32	1.260	40	1.57	22	.866	76	2.993	90	3.543	NG3R	0,55	1.21
3955494	KM40TSS32JNEL3	32	1.260	40	1.57	22	.866	96	3.780	110	4.331	NG3R	0,67	1.48

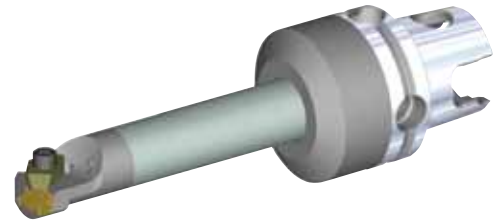
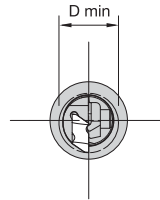
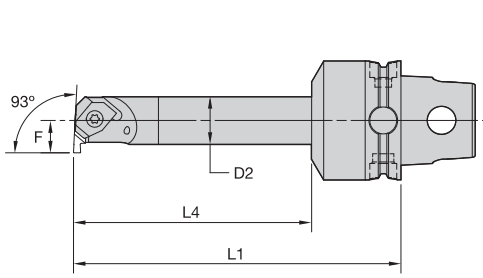
(continued)

Threading

(NE 90° • Steel — continued)

■ Spare Parts

	catalog number	 clamp	 clamp screw
Threading	right hand		
	KM40TSS12ENER2	CM147	MS1488
	KM40TSS16FNER2	CM147	MS1488
	KM40TSS20GNER2	CM75	MS1488
	KM40TSS25ENER2	CM75	MS1488
	KM40TSS25ENER3	CM73	MS1489
	KM40TSS25HNER2	CM75	MS1488
	KM40TSS25HNER3	CM73	MS1489
	KM40TSS32GNER3	CM73	MS1489
	KM40TSS32JNER3	CM73	MS1489
	left hand		
	KM40TSS12ENEL2	CM146	MS1488
	KM40TSS16FNEL2	CM146	MS1488
	KM40TSS20GNEL2	CM74	MS1488
KM40TSS25ENEL2	CM74	MS1488	
KM40TSS25ENEL3	CM-72	MS1489	
KM40TSS25HNEL2	CM74	MS1488	
KM40TSS25HNEL3	CM-72	MS1489	
KM40TSS32GNEL3	CM-72	MS1489	
KM40TSS32JNEL3	CM-72	MS1489	





■ NE 90° • Carbide

order number	catalog number	D2		D min		F		L4		L1		gage insert	kg	lbs
		mm	in	mm	in	mm	in	mm	in	mm	in			
<b>right hand</b>														
3951836	KM40TSE16JNER2	16	.630	20	.79	11	.433	80	3.15	110	4.331	NG2L	0,41	.90
<b>left hand</b>														
3951835	KM40TSE16JNEL2	16	.630	20	.79	11	.433	80	3.15	110	4.331	NG2R	0,41	.90



Threading

■ Spare Parts

catalog number	 clamp	 clamp screw
<b>right hand</b>		
KM40TSE16JNER2	CM146	MS1488
<b>left hand</b>		
KM40TSE16JNEL2	CM147	MS1488

The WIDIA™ high-performance carbide grades, coupled with our rigid TopThread clamping design, offer the metalworking industry optimum threading productivity.

When the large inventory of WIDIA standard products does not completely satisfy your productivity requirements, consider having TopThread inserts custom ground to meet your unique application needs.

The large variety of TopThread blank sizes allows maximum flexibility in threading endform design, especially for extra wide or oil field applications.

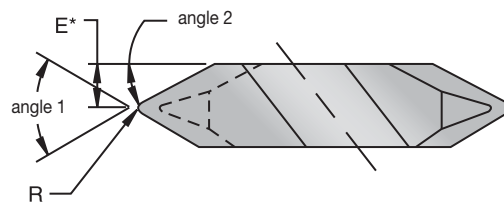
Common examples of special forms are shown here. Please contact your local WIDIA representative for recommendations on satisfying your special threading needs.

**Features and Benefits:**

- Quotes are handled quickly and efficiently using state-of-the-art CAD design software and electronic database software.
- Our Carbide Custom Solutions Design Team is your link to one of the industry's largest electronic databases. They can solve your most challenging design problems.
- Where necessary or required, concept drawings are available to facilitate your engineering development.
- A large number of high-performance carbide grades are available to optimize your productivity. The option of producing standard insert styles in non-standard carbide grades allows you to optimize tool life performance.

**style C2**

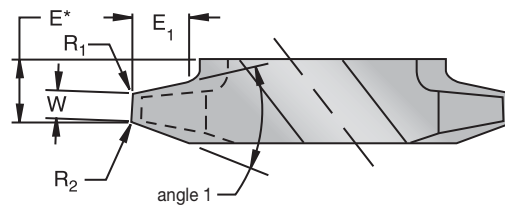
RH shown



\*to theoretical sharp point

**style C3**

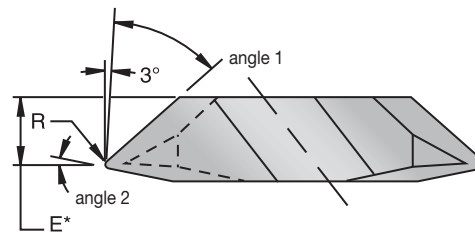
RH shown



\*to theoretical sharp point

**style C4 (NTB-A)**

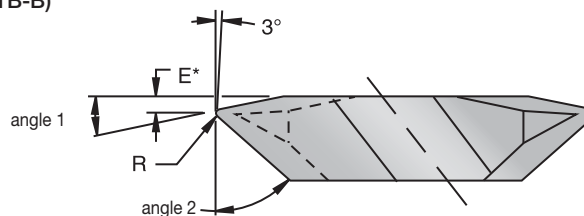
RH shown



\*to theoretical sharp point

**style C5 (NTB-B)**

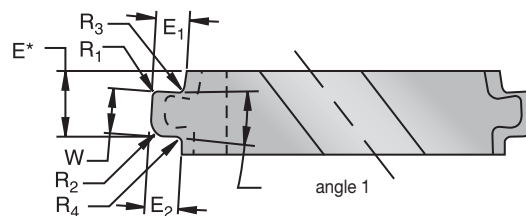
RH shown



\*to theoretical sharp point

**style C6**

RH shown

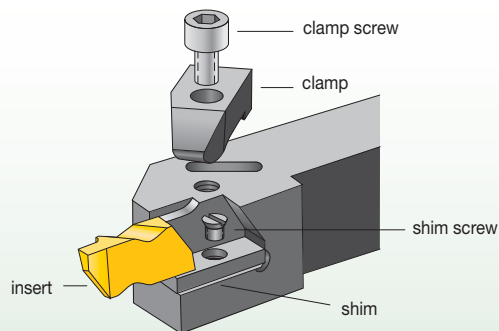













\*to theoretical sharp point

NOTE: Right-hand inserts shown; left-hand inserts are also available.



**TopThread and TopGroove  
Toolholders and Boring Bars**



insert size and style	 clamp	 clamp screw	 shim	 shim screw
NG-1L 	CM-109	S-304	-	-
NG-2R	CM-182	S-310	-	-
NG-2L	CM-183	S-310	-	-
NG-2R 	CM-74	S-310	-	-
NG-2L	CM-75	S-310	-	-
NG-3R	CM-184	S-412	-	-
NG-3L	CM-185	S-412	-	-
NG-3R	CM-72	S-412	-	-
NG-3L 	CM-73	S-412	-	-
NG-3R*	CM-78	S-412	-	-
NG-3L*	CM-70	S-412	-	-
NG-4R	CM-72	S-412	SM-420	SL-344
NG-4L 	CM-73	S-412	SM-420	SL-344
NG-5R	CM-80	S-352	-	-
NG-5L 	CM-81	S-352	-	-
NG-6R	CM-120	S-412	SM-416	S-111
NG-6L 	CM-121	S-412	SM-416	S-111
NG-8R	CM-144	S-422	SM-419	S-112
NG-8L	CM-145	S-422	SM-419	S-112
NG-8R** 	CM-144	S-422	SM-427	S-111
NG-8L**	CM-145	S-422	SM-427	S-111
TopGroove relief grooving				
NU-3125R	CM-72	S-412	-	-
NU-3125L	CM-73	S-412	-	-
NU-3125R**	CM-72	S-618	-	-
NU-3125L**	CM-73	S-618	-	-

\*25mm diameter boring head.  
\*\*Boring head.

## WIDIA™ Laydown Threading

For increased reliability and productivity, look no further than the WIDIA Laydown Threading System for all of your I.D. and O.D. threading applications. The Laydown Threading System maximizes tool life and thread quality.

# Laydown



This specially engineered system meets all modern production standards. With an extensive range of inserts and toolholders available, the Laydown Threading platform is ideal for all of your threading requirements.

## Laydown Insert Technology

Laydown insert technology, with its wide range of available tools and inserts, guarantees increased tool life, minimized built-up edges, and precise cuts of most common materials.

- TN6025™ premium PVD TiAlN-coated grade outperforms conventional PVD grades.
- Enables superior chip control and reduced cutting forces.
- Partial and full profile insert options available for all common thread forms.

## The Laydown Threading Solution

With the WIDIA™ Laydown Threading System, you experience reliable countersunk screw locking for unhindered chip flow and precise insert positioning accuracy.

- Industry-leading thread quality.
- Four insert sizes available to cover a wide range of thread-making operations.
- Ideal for high-helix/multi-start threads and single-point threading in small-diameter bores.
- Maximized tool life and low-profile design for unhindered chip flow and superior performance.

Reliable TopClamp™ locking guarantees precise insert positioning accuracy.

Choose from both steel and carbide boring bars to satisfy all machining application needs.

Get more parts per insert with the economy of the Laydown Threading insert's three cutting edges.



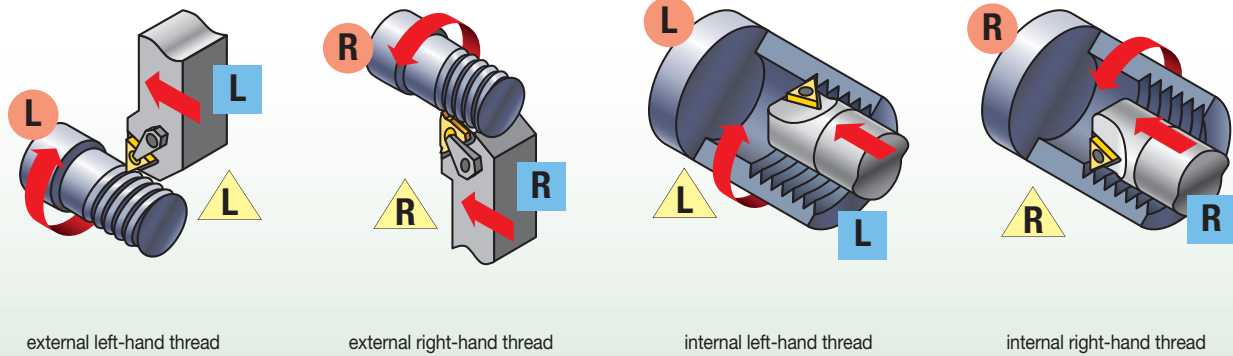
**Step 1 • Select Threading Method and Hand of Tooling**

**Required Information:**

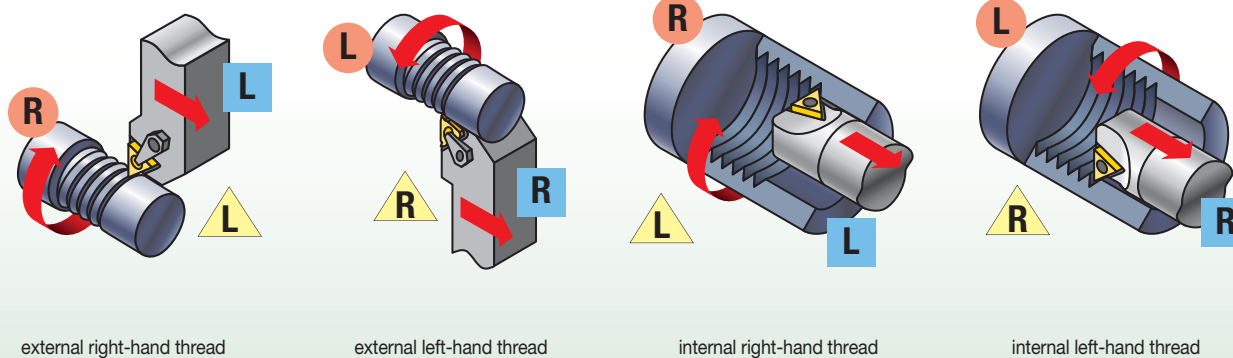
- External/internal operation.
- Spindle rotation/hand of thread.
- Feed direction.



**Feed direction toward the chuck • standard helix • RECOMMENDED**



**Feed direction away from the chuck • reverse helix\***



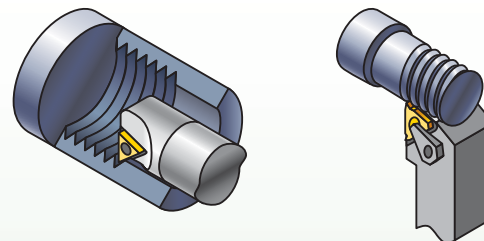
\*Negative shim required

**Step 2 • Select Holder from Catalog Page**

**Required Information:**

- External/internal operation.
- Minimum bore diameter (for internal operations).
- Hand of tool.
- Insert size (gage insert).

Select the appropriate holder for the insert size and hand:

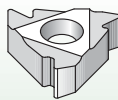


The insert size must match the gage insert size of your toolholder selection:

catalog number	gage insert	minimum bore diameter	shim
S0812LSER2	2IRA60	.650"	—
S2020LSER3	3IR...	1.45"	SM-Y13

### Step 3 • Choose Insert for Application

- Select cresting inserts for fully controlled thread form including diameter.
- Cresting inserts eliminate the need for deburring and are optimized for the best tool life at that pitch.
- Non-cresting partial profile inserts offer the flexibility to cut a variety of thread pitches with one insert.
- Note insert size for toolholder selection.



insert size	catalog number	TN6025
11	2IRA60	•
16	3IRAG60	•

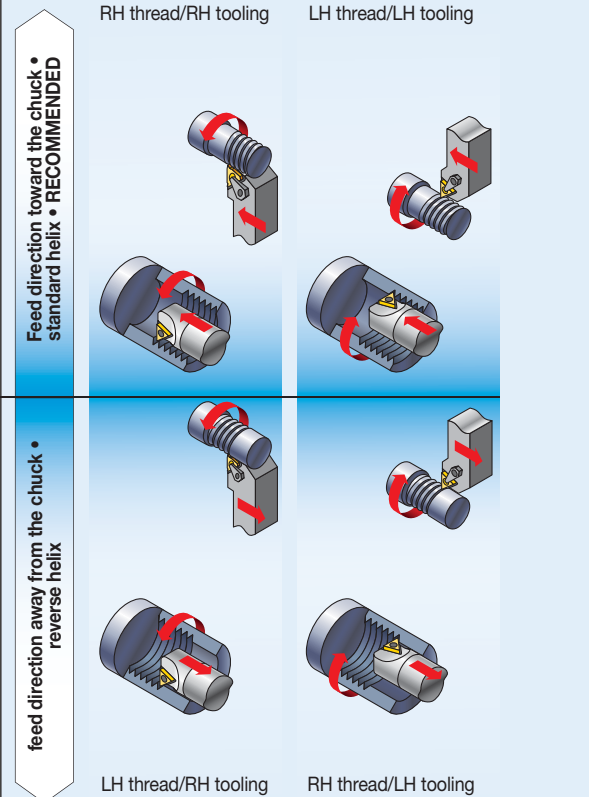
See *threading insert overview* on page F44.

### Step 4 • Select Appropriate Shim

#### Required Information:

- Thread form (TPI or pitch).
- Pitch diameter.
- Helix method (hand of tool, feed direction, hand of thread).
- Number of starts.

Select the proper shim: SMYE... for external RH or internal LH  
SMYI... for internal RH or external LH




insert size	pitch (TPI)				pitch diameter (inch)			
	external	internal	external	internal	external	internal	external	internal
72	...	...	...	...	...	...	...	...
80	...	...	...	...	...	...	...	...
90	...	...	...	...	...	...	...	...
100	...	...	...	...	...	...	...	...
110	...	...	...	...	...	...	...	...
120	...	...	...	...	...	...	...	...
130	...	...	...	...	...	...	...	...
140	...	...	...	...	...	...	...	...
150	...	...	...	...	...	...	...	...
160	...	...	...	...	...	...	...	...
170	...	...	...	...	...	...	...	...
180	...	...	...	...	...	...	...	...
190	...	...	...	...	...	...	...	...
200	...	...	...	...	...	...	...	...
220	...	...	...	...	...	...	...	...
240	...	...	...	...	...	...	...	...
260	...	...	...	...	...	...	...	...
280	...	...	...	...	...	...	...	...
300	...	...	...	...	...	...	...	...
320	...	...	...	...	...	...	...	...
340	...	...	...	...	...	...	...	...
360	...	...	...	...	...	...	...	...
380	...	...	...	...	...	...	...	...
400	...	...	...	...	...	...	...	...
420	...	...	...	...	...	...	...	...
440	...	...	...	...	...	...	...	...
460	...	...	...	...	...	...	...	...
480	...	...	...	...	...	...	...	...
500	...	...	...	...	...	...	...	...
520	...	...	...	...	...	...	...	...
540	...	...	...	...	...	...	...	...
560	...	...	...	...	...	...	...	...
580	...	...	...	...	...	...	...	...
600	...	...	...	...	...	...	...	...
620	...	...	...	...	...	...	...	...
640	...	...	...	...	...	...	...	...
660	...	...	...	...	...	...	...	...
680	...	...	...	...	...	...	...	...
700	...	...	...	...	...	...	...	...
720	...	...	...	...	...	...	...	...
740	...	...	...	...	...	...	...	...
760	...	...	...	...	...	...	...	...
780	...	...	...	...	...	...	...	...
800	...	...	...	...	...	...	...	...
820	...	...	...	...	...	...	...	...
840	...	...	...	...	...	...	...	...
860	...	...	...	...	...	...	...	...
880	...	...	...	...	...	...	...	...
900	...	...	...	...	...	...	...	...
920	...	...	...	...	...	...	...	...
940	...	...	...	...	...	...	...	...
960	...	...	...	...	...	...	...	...
980	...	...	...	...	...	...	...	...
1000	...	...	...	...	...	...	...	...

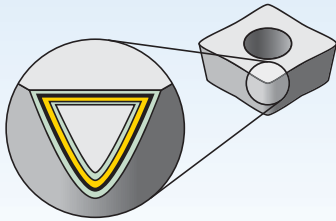
If recommended shim is different from shim supplied with toolholder, order shim separately.  
NOTE: Optimize your threading operation by using the proper infeed angle and the recommended infeed values. See the Technical Section on pages F83–F105. Also see detailed shim selection information on pages F104–F105.

### Step 5 • Select Grade and Speed

Recommendations for Grade and Speed Selection — m/min (SFM)

workpiece material	steel	stainless steel	cast iron	non-ferrous metals	high-temp alloys
insert style	 precision ground				
first choice	TN6025 40–200 (130–650)	TN6025 40–135 (130–450)	TN6025 60–145 (200–475)	TN6025 50–360 (160–1150)	TN6025 10–100 (35–330)

style		thread profile	standard	tolerance class	cresting	application	page(s)
	flat top						
	60	Partial profile 60°	—	—	N	General use for 60° thread forms, such as ISO and UN, where non-cresting inserts are desired to cut a variety of pitches.	F49–F50
	ISO	Metric ISO	ISO R262, DIN 13	6g/6H	Y	Widely used metric 60° V-form for all industries.	F51–F56
	UN	American UN	ANSI B1.1:74	2A/2B	Y	Widely used inch-based 60° V-form for all industries.	F57–F60
	NPT	NPT	ANSI/ASME B1.20.1S1983	Standard NPT	N	National Pipe Thread standard 60° thread form for pipe fittings.	F61–F62
	55	Partial profile 55°	—	—	N	General use for 55° thread forms such as Whitworth, BSW, and BSP where non-cresting inserts are desired to cut a variety of pitches.	F63–F64
	W	Whitworth, BSW, BSF, BSP	BS 84:1956, ISO 228/1:1982, DIN 259	Medium Class A	Y	Widely used 55° form for gas and water connections.	F65–F66
	API-RD	API round	API STD. 5B:1979	Standard API RD	Y	60° V-form with large radius for casing, tubing, and line pipe in the oil and gas industry, including 8 and 10 round forms.	F67
	PG	PG	DIN 404B0		Y	80° steel conduit thread.	F67
	RD	Round	DIN 405	7e/7H	Y	Round thread form for tube fittings in the chemical and food industries.	F68–F69
	TR	Trapez	DIN 103	7e/7H	N	30° truncated metric thread form for motion applications.	F70–F71

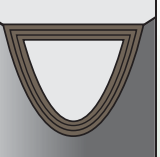


**Coatings provide high-speed capability and are engineered for finishing to heavy roughing.**

- Reduce cycle times — high speed capability.
- Longer tool life — new multilayer coating provides better wear resistance.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

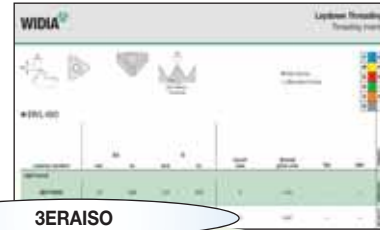
wear resistance ← → toughness

Grade	Coating	Grade Description	Performance Matrix																	
				05	10	15	20	25	30	35	40	45								
TN6025		PVD-TiAlN Nano-multilayer coated carbide. General-purpose machining for steels, stainless steels, cast irons, non-ferrous materials, and difficult-to-machine materials. Recommended at low to medium cutting speeds when higher toughness is required.	<b>P</b>																	
			<b>M</b>																	
			<b>K</b>																	
			<b>N</b>																	
			<b>S</b>																	
			<b>H</b>																	
	<b>HC-P25</b>																			

**Laydown Threading Thread Form Guide**

- All Laydown Threading inserts are precision ground to provide accurate thread forms and indexing.
- Both cresting and non-cresting partial profile inserts are specifically designed for either external or internal threading operations.
- Cresting inserts provide a fully controlled thread form, including major, minor, root, and crest for a given pitch. The need for deburring is eliminated and the inserts are optimized for the best tool life at that pitch.
- Non-cresting partial profile inserts offer the flexibility to cut a variety of thread pitches with one insert.
- Right-hand Laydown Threading toolholders use right-hand inserts. Left-hand Laydown Threading toolholders use left-hand inserts.
- Right-hand Laydown Threading boring bars use right-hand inserts. Left-hand Laydown Threading boring bars use left-hand inserts.

# Laydown Threading Insert Identification System



3ERAISO

**3**

Insert  
Size

**E**

Insert Type

**E** –  
External thread

**I** –  
Internal thread

**R**

Hand  
of Insert

**R** –  
Right-hand  
thread

**L** –  
Left-hand  
thread

**A**

Thread  
Pitch

**ISO**

Thread  
Profile

Number of Teeth

Single tooth profile –  
No symbol

Multi-tooth profile –  
Number of teeth  
(cutting edge and symbol)

Multi-tooth profile with  
two teeth – 2M

**55** Partial Profile 55°

**60** Partial Profile 60°

**ISO** ISO Metric 60°

**TR** ISO Metric 60°

**UN** ISO Inch/American UN 60°

**W** Whitworth 55°

**NPT** American National Pipe Thread 60°

**RD** Round

**PG** Steel Conduit

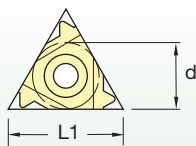
**APIRD** API Round

Partial profile inserts

symbol	mm
A	0,5–1,5
AG	0,5–3,0
G	1,7–3,0
N	3,5–5,0
Q	5,5–6,0

Full profile inserts

symbol	mm
Actual TPI	0,5–0,4

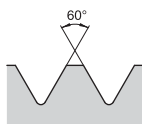
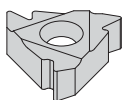
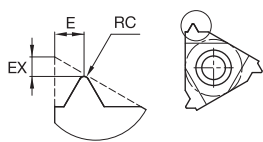


symbol	d	L1
2	0.250	11
3	0.375	16
4	0.500	22
5	0.625	27



Material Group		Cutting Speed – vc m/min		
		TN6025		
		min	Start	max
<b>P</b>	0/1	130	140	150
	2	110	145	175
	3	110	145	175
	4	75	95	115
	5	100	125	145
	6	40	55	65
<b>M</b>	1	60	75	90
	2	40	50	55
	3	40	50	60
<b>K</b>	1	60	80	90
	2	60	75	85
	3	60	75	90
<b>N</b>	1	600	750	900
	2	535	685	835
	3	230	300	370
	4	135	180	225
	5	70	90	110
	6	445	565	690
	7	550	700	850
<b>S</b>	1	25	35	40
	2	15	20	20
	3	40	60	70
	4	20	30	35

Material Group		Cutting Speed – vc SFM		
		TN6025		
		min	Start	max
P	0/1	425	455	490
	2	360	465	575
	3	360	465	575
	4	235	300	365
	5	325	400	475
	6	130	180	210
M	1	195	245	295
	2	130	160	180
	3	130	165	195
K	1	195	255	295
	2	195	240	280
	3	195	245	295
N	1	1965	2460	2950
	2	1750	2240	2730
	3	750	980	1210
	4	445	590	730
	5	230	295	360
	6	1450	1855	2260
	7	1805	2295	2785
S	1	75	110	130
	2	40	55	65
	3	135	195	235
	4	65	95	115



Partial Profile  
60° External

- first choice
- alternate choice

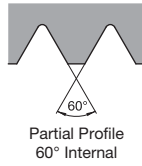
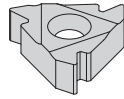
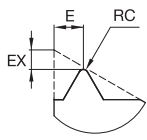
P	●
M	●
K	●
N	○
S	●
H	●

■ ER/L-60

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in	mm	in					
<b>right hand</b>											
2ERA60	0,05	.002	0,9	.035	0,8	.032	2	0,50-1,5	48-16	—	2007404
3ERA60	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	—	2018214
3ERAG60	0,08	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	2018246
3ERG60	0,28	.011	1,2	.047	1,7	.067	3	1,75-3,0	14-8	—	2018222
4ERN60	0,53	.021	1,7	.067	2,5	.098	4	3,5-5,0	7-5	—	2018252
5ERQ60	0,64	.025	2,1	.083	3,1	.122	5	5,5-6,0	4,5-4	—	2018256
<b>left hand</b>											
3ELAG60	0,08	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	2018236
3ELG60	0,28	.011	1,2	.047	1,7	.067	3	1,75-3,0	14-8	—	2071904



Threading



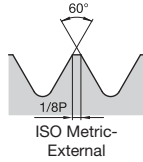
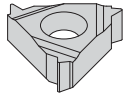
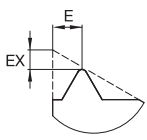
● first choice  
○ alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ IR/L-60

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in	mm	in					
<b>right hand</b>											
2IRA60	0,05	.002	0,8	.031	0,9	.035	2	0,50-1,5	48-16	—	2018262
3IRA60	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	—	2018272
3IRAG60	0,05	.002	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	2018284
3IRG60	0,15	.006	1,2	.047	1,7	.067	3	1,75-3,0	14-8	—	2018278
4IRN60	0,31	.012	1,7	.067	2,5	.098	4	3,5-5,0	7-5	—	2018290
5IRQ60	0,30	.012	1,8	.071	2,7	.106	5	5,5-6,0	4,5-4	—	2018295
<b>left hand</b>											
2ILA60	0,05	.002	0,8	.031	0,9	.035	2	0,50-1,5	48-16	—	2021656
3ILAG60	0,05	.002	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	2008275
3ILG60	0,15	.006	1,2	.047	1,7	.067	3	1,75-3,0	14-8	—	2007419
4ILN60	0,31	.012	1,7	.067	2,5	.098	4	3,5-5,0	7-5	—	2100489

Threading



- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ ER/L-ISO

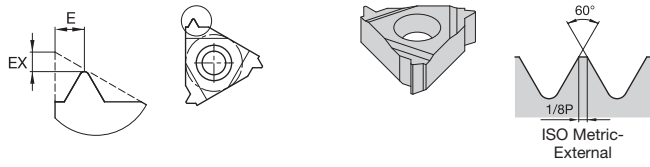
catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
<b>right hand</b>									
2ER15ISO	1,0	.039	0,8	.032	2	1,50	—	—	2007542
3ER05ISO	0,6	.024	0,4	.016	3	0,50	—	—	2018377
3ER07ISO	0,6	.024	0,6	.024	3	0,70	—	—	2018389
3ER075ISO	0,6	.024	0,6	.024	3	0,75	—	—	2018395
3ER08ISO	0,6	.024	0,6	.024	3	0,80	—	—	2018403
3ER10ISO	0,7	.027	0,7	.027	3	1,00	—	—	2018411
3ER125ISO	0,8	.031	0,9	.035	3	1,25	—	—	2018421
3ER15ISO	0,8	.031	1,0	.039	3	1,50	—	—	2018429
3ER175ISO	0,9	.035	1,2	.047	3	1,75	—	—	2018445
3ER20ISO	1,0	.039	1,3	.051	3	2,00	—	—	2018460
3ER25ISO	1,1	.043	1,5	.059	3	2,50	—	—	2018472
3ER30ISO	1,2	.047	1,6	.063	3	3,00	—	—	2008256
4ER40ISO	1,6	.063	2,3	.090	4	4,00	—	—	2018501
4ER35ISO	1,6	.063	2,3	.090	4	4,50	—	—	2018495
4ER45ISO	1,7	.067	2,4	.094	4	4,50	—	—	2018508



Threading

(continued)

(ER/L-ISO – continued)



● first choice  
○ alternate choice

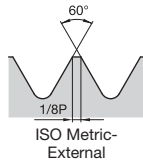
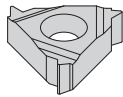
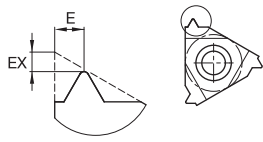
P	●
M	●
K	●
N	○
S	●
H	●

Threading

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
4ER50ISO	1,7	.067	2,5	.098	4	5,00	—	—	2018517
5ER55ISO	2,7	.106	1,9	.075	5	5,50	—	—	2018522
5ER60ISO	2,9	.114	2,0	.079	5	6,00	—	—	2018528
left hand									
2EL05ISO	0,6	.024	0,4	.016	2	0,50	—	—	3118234
2EL06ISO	0,6	.024	0,6	.024	2	0,60	—	—	3118236
2EL07ISO	0,6	.024	0,6	.024	2	0,70	—	—	3118240
2EL075ISO	0,6	.024	0,6	.024	2	0,75	—	—	3118238
2EL08ISO	0,6	.024	0,6	.024	2	0,80	—	—	3118242
2EL10ISO	0,7	.028	0,7	.028	2	1,00	—	—	3118374
2EL125ISO	0,8	.031	0,9	.035	2	1,25	—	—	3118376
2EL15ISO	0,8	.031	1,0	.039	2	1,50	—	—	3118378
2EL175ISO	0,8	.031	1,1	.043	2	1,75	—	—	3118380
3EL035ISO	0,8	.031	0,4	.016	3	0,35	—	—	3122015
3EL04ISO	0,7	.028	0,4	.016	3	0,40	—	—	3122018
3EL045ISO	0,7	.028	0,4	.016	3	0,45	—	—	3122017

(continued)

(ER/L-ISO – continued)



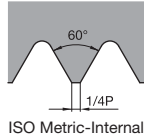
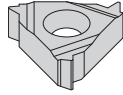
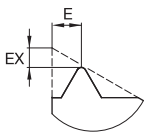
- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
<b>3EL06ISO</b>	0,6	.024	0,6	.024	3	0,60	—	—	3122021
<b>3EL10ISO</b>	0,7	.027	0,7	.027	3	1,00	—	—	2008187
<b>3EL15ISO</b>	0,8	.031	1,0	.039	3	1,50	—	—	2018435
<b>3EL175ISO</b>	0,9	.035	1,2	.047	3	1,75	—	—	2018447
<b>3EL20ISO</b>	1,3	.051	1,0	.039	3	2,00	—	—	2018466
<b>3EL30ISO</b>	1,2	.047	1,6	.063	3	3,00	—	—	2018489
<b>4EL40ISO</b>	1,6	.063	2,3	.090	4	4,00	—	—	2101539
<b>4EL50ISO</b>	1,7	.067	2,5	.098	4	5,00	—	—	2101597



Threading



● first choice  
○ alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

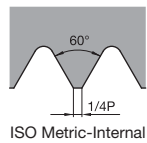
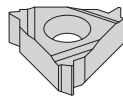
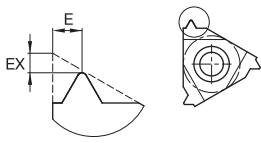
■ IR/L-ISO

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
right hand									
2IR075ISO	0,6	.024	0,3	.012	2	0,75	—	—	2007585
2IR10ISO	0,6	.024	0,7	.028	2	1,00	—	—	2007613
2IR125ISO	0,6	.024	0,7	.028	2	1,25	—	—	2007622
2IR15ISO	0,8	.032	1,0	.039	2	1,50	—	—	2018550
2IR175ISO	0,9	.032	1,1	.043	2	1,75	—	—	2018564
3IR05ISO	0,6	.024	0,6	.024	3	0,50	—	—	2018582
3IR075ISO	0,6	.024	0,6	.024	3	0,75	—	—	2018596
3IR10ISO	0,6	.024	0,7	.028	3	1,00	—	—	2018612
3IR125ISO	0,8	.032	0,9	.035	3	1,25	—	—	2018626
3IR15ISO	0,8	.032	1,0	.039	3	1,50	—	—	2018636
3IR175ISO	0,9	.035	1,2	.047	3	1,75	—	—	2018652
3IR20ISO	1,0	.039	1,3	.051	3	2,00	—	—	2018663
3IR25ISO	1,1	.043	1,5	.059	3	2,50	—	—	2018674
3IR30ISO	1,1	.043	1,5	.059	3	3,00	—	—	2018684
4IR35ISO	1,6	.063	2,3	.091	4	3,50	—	—	2018695

(continued)



(I/R/L-ISO – continued)



- first choice
- alternate choice

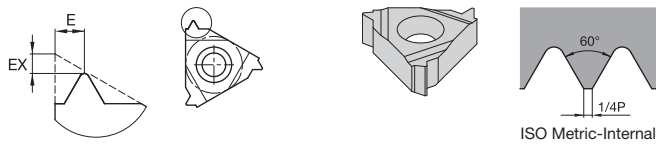
P	●
M	●
K	●
N	○
S	●
H	●

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
4IR40ISO	1,6	.063	2,3	.091	4	4,00	—	—	2018702
4IR45ISO	1,6	.063	2,4	.095	4	4,50	—	—	2018708
4IR50ISO	1,6	.063	2,3	.091	4	5,00	—	—	2018714
5IR55ISO	1,6	.063	2,3	.091	5	5,50	—	—	2021597
5IR60ISO	1,8	.071	2,5	.098	5	6,00	—	—	2018720
<b>left hand</b>									
2IL035ISO	0,8	.031	0,4	.016	2	0,35	—	—	3118382
2IL04ISO	0,7	.028	0,4	.016	2	0,40	—	—	3118384
2IL05ISO	0,6	.024	0,4	.016	2	0,50	—	—	3118386
2IL06ISO	0,6	.024	0,6	.024	2	0,60	—	—	3118387
2IL07ISO	0,6	.024	0,6	.024	2	0,70	—	—	3118390
2IL075ISO	0,6	.024	0,6	.024	2	0,75	—	—	3118389
2IL08ISO	0,6	.024	0,6	.024	2	0,80	—	—	3118392
2IL125ISO	0,8	.031	0,9	.035	2	1,25	—	—	3123198
2IL15ISO	0,8	.032	1,0	.039	2	1,50	—	—	2018557
2IL20ISO	0,9	.035	1,1	.043	2	2,00	—	—	2071923



(continued)

(R/L-ISO – continued)

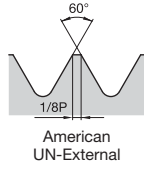
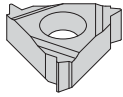
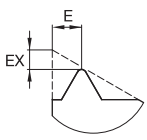


● first choice  
○ alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

Threading

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
3IL035ISO	0,8	.031	0,3	.012	3	0,35	—	—	3124269
3IL04ISO	0,8	.031	0,4	.016	3	0,40	—	—	3124271
3IL05ISO	0,6	.024	0,4	.016	3	0,50	—	—	3124272
3IL06ISO	0,6	.024	0,6	.024	3	0,60	—	—	3124274
3IL07ISO	0,6	.024	0,6	.024	3	0,70	—	—	3124276
3IL075ISO	0,6	.024	0,6	.024	3	0,75	—	—	2018598
3IL15ISO	0,8	.032	1,0	.039	3	1,50	—	—	2018642
3IL20ISO	1,0	.039	1,3	.051	3	2,00	—	—	2018667
3IL25ISO	1,1	.043	1,5	.059	3	2,50	—	—	2018678
3IL30ISO	1,1	.043	1,5	.059	3	3,00	—	—	2018688
4IL40ISO	1,6	.063	2,3	.090	4	4,00	—	—	2102322
4IL45ISO	1,6	.063	2,4	.094	4	4,50	—	—	2102347
4IL50ISO	1,6	.063	2,3	.090	4	5,00	—	—	2076776
5IL55ISO	1,6	.063	2,3	.091	5	5,50	—	—	2642318
5IL60ISO	1,8	.071	2,5	.098	5	6,00	—	—	2642319



● first choice  
○ alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ ER/L-UN

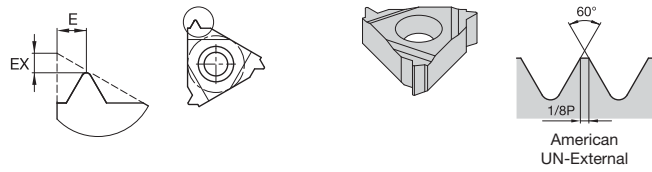
catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in					
<b>right hand</b>									
3ER48UN	0,6	.024	0,6	.024	3	—	48	—	2018736
3ER40UN	0,6	.024	0,6	.024	3	—	40	—	2018744
3ER36UN	0,6	.024	0,6	.024	3	—	36	—	2018748
3ER32UN	0,6	.024	0,6	.024	3	—	32	—	2018752
3ER28UN	0,6	.024	0,7	.028	3	—	28	—	2018756
3ER27UN	0,8	.032	0,7	.028	3	—	27	—	2018760
3ER24UN	0,7	.028	0,8	.032	3	—	24	—	2018766
3ER20UN	0,8	.032	0,9	.035	3	—	20	—	2018772
3ER18UN	0,8	.032	1,0	.039	3	—	18	—	2018778
3ER16UN	0,9	.035	1,1	.043	3	—	16	—	2018782
3ER14UN	1,0	.039	1,2	.047	3	—	14	—	2018790

(continued)



Threading

(ER/L-UN – continued)

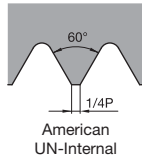
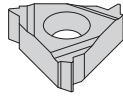
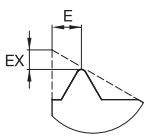


● first choice  
○ alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

Threading

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025 2018796 2018802 2018808 2018814 2018824 3122039 2192607 3122032 3122028
	mm	in	mm	in					
3ER13UN	1,3	.051	1,0	.039	3	—	13	—	
3ER12UN	1,1	.043	1,4	.055	3	—	12	—	
3ER11UN	1,1	.043	1,5	.059	3	—	11	—	
3ER10UN	1,1	.043	1,5	.059	3	—	10	—	
3ER8UN	1,2	.047	1,6	.063	3	—	8	—	
<b>left hand</b>									
3EL13UN	1,0	.039	1,3	.051	3	—	13	—	
3EL12UN	1,1	.043	1,4	.055	3	—	12	—	
3EL11UN	1,1	.043	1,5	.059	3	—	11	—	
3EL10UN	1,1	.043	1,5	.059	3	—	10	—	



- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ IR/L-UN

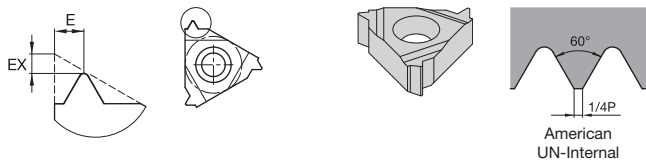
catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
<b>right hand</b>									
2IR32UN	0,6	.024	0,6	.024	2	—	32	—	2018860
3IR32UN	0,6	.024	0,6	.024	3	—	32	—	2018918
3IR28UN	0,6	.024	0,7	.027	3	—	28	—	2018922
3IR24UN	0,7	.028	0,8	.032	3	—	24	—	2018932
3IR20UN	0,8	.032	0,9	.035	3	—	20	—	2018938
2IR20UN	0,8	.032	0,9	.035	2	—	20	—	2018876
3IR18UN	0,8	.032	1,0	.039	3	—	18	—	2018944
2IR18UN	0,8	.031	1,0	.039	2	—	18	—	2018882
3IR16UN	0,9	.035	1,1	.043	3	—	16	—	2018950
2IR16UN	0,9	.035	1,1	.043	2	—	16	—	2018886
3IR14UN	0,9	.035	1,2	.047	3	—	14	—	2018955



Threading

(continued)

(IR/L-UN – continued)

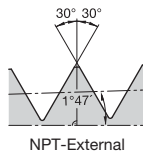
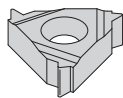
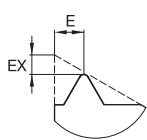


● first choice  
○ alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

Threading

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TNG025
	mm	in	mm	in					
3IR12UN	1,1	.043	1,4	.055	3	—	12	—	2018966
3IR10UN	1,1	.043	1,5	.059	3	—	10	—	2018979
3IR8UN	1,1	.043	1,5	.059	3	—	8	—	2018990
left hand									
3IL64UN	0,8	.031	0,4	.016	3	—	64	—	3122416
3IL56UN	0,7	.028	0,4	.016	3	—	56	—	3122414
2IL32UN	0,6	.024	0,6	.024	2	—	32	—	2102653
3IL12UN	1,1	.043	1,4	.055	3	—	12	—	2102749
3IL9UN	1,2	.047	1,7	.067	3	—	9	—	3122446
3IL8UN	1,1	.043	1,5	.059	3	—	8	—	3122444



● first choice  
○ alternate choice

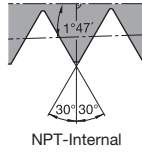
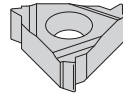
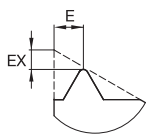
P	●
M	●
K	●
N	○
S	●
H	●

■ ER/L-NPT

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
<b>right hand</b>									
3ER115NPT	1,1	.043	1,5	.059	3	—	11.5	.7500	2019298
3ER14NPT	0,9	.035	1,2	.047	3	—	14	.7500	2019288
3ER18NPT	0,8	.032	1,0	.039	3	—	18	.7500	2019278
3ER8NPT	1,3	.051	1,8	.071	3	—	8	.7500	2019305



Threading



- first choice
- alternate choice

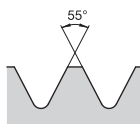
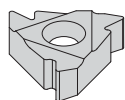
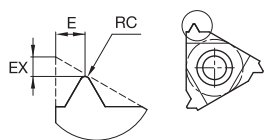
P	●
M	●
K	●
N	○
S	●
H	●

■ IR/L-NPT

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
right hand									
3IR115NPT	1,1	.043	1,5	.059	3	—	11.5	.7500	2019335
3IR14NPT	0,9	.035	1,2	.047	3	—	14	.7500	2019329
3IR18NPT	0,8	.031	1,0	.039	3	—	18	.7500	2019323
3IR8NPT	1,3	.051	1,8	.071	3	—	8	.7500	2019339

Threading





Partial Profile  
55° External

- first choice
- alternate choice

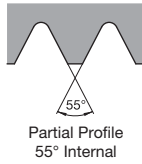
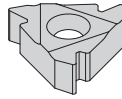
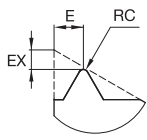
P	●
M	●
K	●
N	○
S	●
H	●

■ ER/L-55

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in	mm	in					
<b>right hand</b>											
3ERA55	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	—	2018301
3ERAG55	0,08	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	2018314
3ERG55	0,20	.008	1,2	.047	1,7	.067	3	1,75-3,0	14-8	—	2018308
4ERN55	0,43	.017	1,7	.067	2,5	.098	4	3,5-5,0	7-5	—	2018320
<b>left hand</b>											
3ELG55	0,20	.008	1,2	.047	1,7	.067	3	1,75-3,0	14-8	—	2008190



Threading



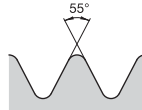
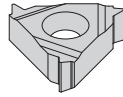
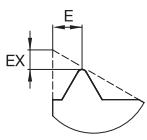
- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ IR/L-55

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in	mm	in					
<b>right hand</b>											
2IRA55	0,05	.002	0,8	.031	0,9	.035	2	0,50-1,5	48-16	—	2018328
3IRA55	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	—	2018334
3IRAG55	0,07	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	2018346
3IRG55	0,21	.008	1,2	.047	1,7	.067	3	1,75-3,0	14-8	—	2018340
4IRN55	0,43	.017	1,7	.067	2,5	.098	4	3,5-5,0	7-5	—	2018354
<b>left hand</b>											
3ILA55	0,05	.002	0,8	.031	0,9	.035	3	0,50-1,5	48-16	—	3122449
3ILAG55	0,07	.003	1,2	.047	1,7	.067	3	0,50-3,0	48-8	—	2018348

Threading



Whitworth BSW,  
BSF, BSP-External

- first choice
- alternate choice

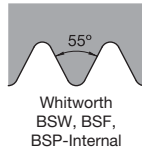
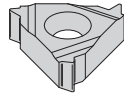
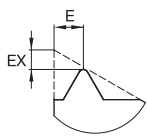
P	●
M	●
K	●
N	○
S	●
H	●

■ ER/L-W

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
<b>right hand</b>									
3ER32W	0,6	.024	0,6	.024	3	—	32	—	2019023
3ER28W	0,6	.024	0,7	.028	3	—	28	—	2019029
3ER19W	0,8	.032	1,0	.039	3	—	19	—	2019055
3ER18W	0,8	.031	1,0	.039	3	—	18	—	2021677
3ER16W	0,9	.035	1,1	.043	3	—	16	—	2019061
3ER14W	1,0	.039	1,2	.047	3	—	14	—	2019071
3ER12W	1,1	.043	1,4	.055	3	—	12	—	2019077
3ER11W	1,1	.043	1,5	.059	3	—	11	—	2019063
3ER10W	1,1	.043	1,5	.059	3	—	10	—	2019089
3ER8W	1,2	.047	1,5	.059	3	—	8	—	2019101
4ER6W	1,6	.063	2,3	.091	4	—	6	—	2021725
<b>left hand</b>									
3EL11W	1,1	.043	1,5	.059	3	—	11	—	2065289
3EL8W	1,2	.047	1,5	.059	3	—	8	—	2103046



Threading



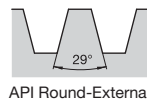
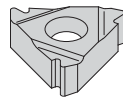
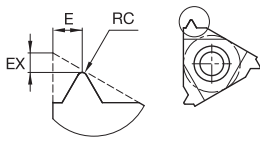
● first choice  
○ alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ IR/L-W

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
right hand									
2IR19W	0,8	.032	1,0	.039	2	—	19	—	2019121
2IR14W	0,9	.035	1,1	.043	2	—	14	—	2019136
3IR19W	0,8	.032	0,9	.035	3	—	19	—	2019172
3IR16W	0,9	.035	1,1	.043	3	—	16	—	2019178
3IR14W	1,0	.039	1,2	.047	3	—	14	—	2019189
3IR12W	1,1	.043	1,4	.055	3	—	12	—	2019195
3IR11W	1,1	.043	1,5	.059	3	—	11	—	2019205
3IR8W	1,2	.047	1,5	.059	3	—	8	—	2019224
4IR6W	1,6	.063	2,3	.090	4	—	6	—	2019234

Threading

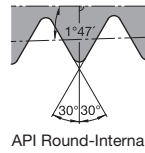
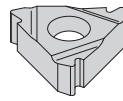
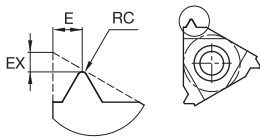


● first choice  
○ alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

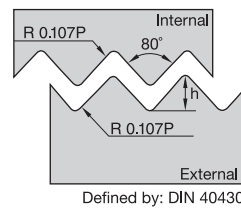
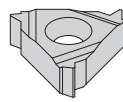
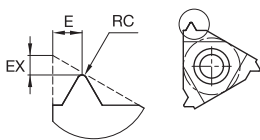
**ER-APIRD**

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in	mm	in					
right hand											
3ER10APIRD	0,34	.013	1,2	.047	1,4	.055	3	—	10	.750	2019608



**IR-APIRD**

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in	mm	in					
right hand											
3IR10APIRD	0,34	.013	1,2	.047	1,4	.055	3	—	10	.750	2019618
3IR8APIRD	0,40	.016	1,3	.051	1,5	.059	3	—	8	.750	2019622

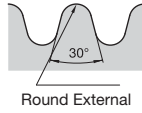
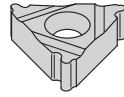
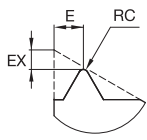


**IR-PG**

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in	mm	in					
right hand											
3IR16PG	0,11	.004	1,1	.043	0,8	.032	3	—	16	—	2019441



Threading



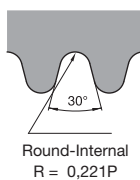
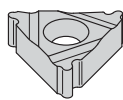
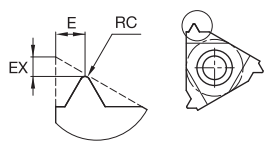
- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ ER/L-RD

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in	mm	in					
right hand											
3ER8RD	0,76	.030	1,4	.055	1,3	.051	3	—	8	—	2019347
4ER6RD	1,01	.040	1,5	.059	1,7	.067	4	—	6	—	2019359
left hand											
3EL8RD	0,76	.030	1,4	.055	1,3	.051	3	—	8	—	2071943

Threading



- first choice
- alternate choice

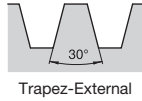
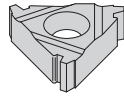
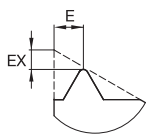
P	●
M	●
K	●
N	○
S	●
H	●

■ IR/L-RD

catalog number	RC		EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in	mm	in					
<b>right hand</b>											
3IR10RD	0,70	.028	1,1	.043	1,2	.047	3	—	10	—	2019375
3IR8RD	0,70	.028	1,4	.055	1,4	.055	3	—	8	—	2019381
4IR6RD	0,93	.037	1,5	.059	1,7	.067	4	—	6	—	2019394
4IR4RD	1,40	.055	2,3	.091	2,2	.087	4	—	4	—	2019400
<b>left hand</b>											
3IL8RD	0,06	.022	1,4	.055	1,4	.055	3	—	8	—	3122422



Threading



- first choice
- alternate choice

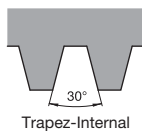
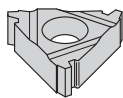
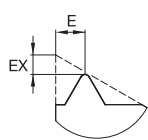
P	●
M	●
K	●
N	○
S	●
H	●

■ ER/L-TR

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
right hand									
3ER2TR	1,1	.043	1,3	.051	3	2,00	—	—	2019453
3ER3TR	1,3	.051	1,5	.059	3	3,00	—	—	2019461
4ER4TR	1,7	.067	1,9	.075	4	4,00	—	—	2019469
4ER5TR	2,1	.083	2,5	.098	4	5,00	—	—	2019479
5ER6TR	2,3	.091	2,7	.106	5	6,00	—	—	2019487
left hand									
3EL3TR	1,3	.051	1,5	.059	3	3,00	—	—	2019463
4EL4TR	1,7	.067	1,9	.075	4	4,00	—	—	2019471

Threading





- first choice
- alternate choice

P	●
M	●
K	●
N	○
S	●
H	●

■ IR/L-TR

catalog number	EX		E		insert size	thread pitch mm	TPI	TPF	TN6025
	mm	in	mm	in					
right hand									
3IR3TR	1,3	.051	1,5	.059	3	3,00	—	—	2019511
4IR4TR	1,7	.067	1,9	.075	4	4,00	—	—	2019520
4IR5TR	2,1	.083	2,5	.098	4	5,00	—	—	2019528
5IR6TR	2,3	.091	2,7	.106	5	6,00	—	—	2019534



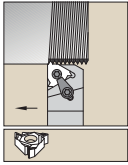
Threading

Laydown Threading  
Toolholder Identification System

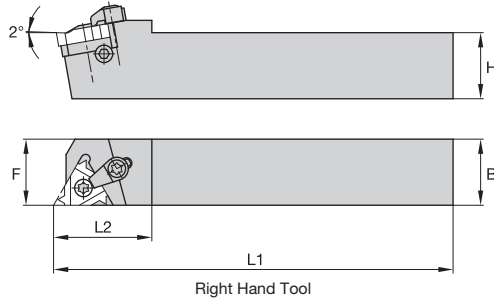


LSASR163

<b>L</b>	<b>S</b>	<b>AS</b>	<b>R</b>		<b>16</b>	<b>3</b>																					
Insert Style	Insert Holding Method	Tool Style	Hand of Tool	Drop Head	Shank Size	Insert Size	Qualified Surface and Length																				
<p>L – Laydown triangle</p>	<p>S – Insert screw or clamp only</p>	<p>Straight shank</p> <p>AS</p> <p>Offset shank</p> <p>S</p>	<p>Left hand</p> <p>L</p> <p>Right hand</p> <p>R</p>	<p>DH</p>	<p><b>Inch:</b> This shows a two-digit number that indicates the holder cross section. For shanks 5/8" square and over, the number will represent the number of sixteenths of width and height. For shanks under 5/8" square, the number of sixteenths of cross section will be preceded by a zero. For rectangular holders, the first digit represents the number of eighths of width, and the second digit the number of quarters of height, except for a toolholder 1-1/4" x 1-1/2", which is given the number 91.</p>	<p>C – qualified back and end, 5" long</p> <p>D – qualified back and end, 6" long</p> <p>E – qualified back and end, 7" long</p> <p>T – qualified back and end, 3.25" long</p> <p>Q – qualified metric holder</p>																					
				<p>Size equals number of 1/8" increments of iC.</p>																							
				<table border="1"> <thead> <tr> <th>inch insert size</th> <th>metric insert size</th> <th>d1 inch</th> <th>L1 mm</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>11</td> <td>1/4</td> <td>11,0</td> </tr> <tr> <td>3</td> <td>16</td> <td>3/8</td> <td>16,5</td> </tr> <tr> <td>4</td> <td>22</td> <td>1/2</td> <td>22,0</td> </tr> <tr> <td>5</td> <td>27</td> <td>5/8</td> <td>27,0</td> </tr> </tbody> </table>				inch insert size	metric insert size	d1 inch	L1 mm	2	11	1/4	11,0	3	16	3/8	16,5	4	22	1/2	22,0	5	27	5/8	27,0
inch insert size	metric insert size	d1 inch	L1 mm																								
2	11	1/4	11,0																								
3	16	3/8	16,5																								
4	22	1/2	22,0																								
5	27	5/8	27,0																								



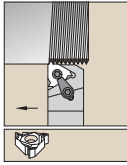
See page F44  
for inserts.



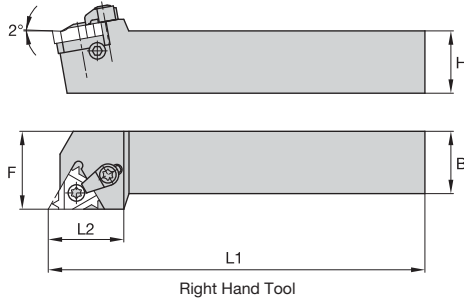
■ **LSAS**

order number	catalog number	seat size	H	B	F	L1	L2	gage insert	shim		clamp assembly		insert screw		
									shim screw	Torx	Torx	Torx	Torx	Torx	
<b>right hand</b>															
2968567	LSASR83	3	.500	.500	.500	3.25	.87	LT16ER	SMYE3	SSY3T	T10	—	—	SSA3T	T10
2968583	LSASR103	3	.625	.625	.630	5.00	1.20	LT16ER	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968584	LSASR123	3	.750	.750	.750	5.00	1.20	LT16ER	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968585	LSASR163	3	1.000	1.000	1.000	6.00	1.20	LT16ER	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968587	LSASR203	3	1.250	1.250	1.250	7.00	1.18	LT16ER	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968586	LSASR164	4	1.000	1.000	1.000	6.00	1.42	LT22ER	SMYE4	SSY4T	T20	CKC4	T20	SSA4T	T20
<b>left hand</b>															
2968572	LSASL83	3	.500	.500	.500	3.25	.87	LT16EL	SMYI3	SSY3T	T10	—	—	SSA3T	T10
2968568	LSASL103	3	.625	.625	.630	5.00	1.20	LT16EL	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968569	LSASL123	3	.750	.750	.750	5.00	1.20	LT16EL	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968570	LSASL163	3	1.000	1.000	1.000	6.00	1.20	LT16EL	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968571	LSASL164	4	1.000	1.000	1.000	6.00	1.42	LT22EL	SMYI4	SSY4T	T20	CKC4	T20	SSA4T	T20

Threading



See page F44 for inserts.

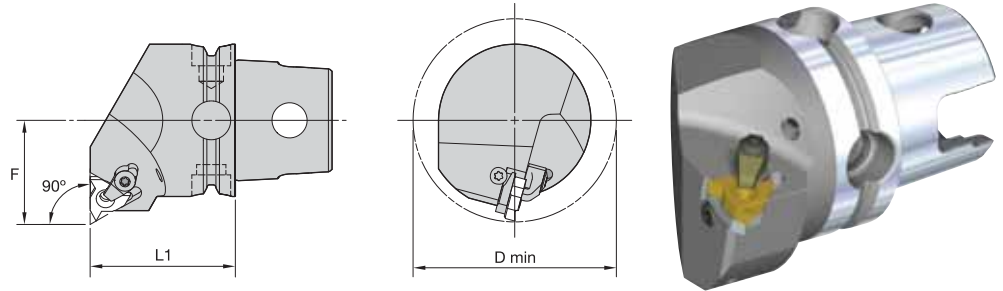


■ LSS

Threading



order number	catalog number	seat size	H	B	F	L1	L2	gage insert	shim	shim screw	Torx	clamp assembly	Torx	insert screw	Torx
<b>right hand</b>															
2968591	LSSR123D	3	.750	.750	1.000	6.00	1.00	LT16ER	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968592	LSSR163D	3	1.000	1.000	1.250	6.00	1.00	LT16ER	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968594	LSSR203D	3	1.250	1.250	1.500	6.00	1.00	LT16ER	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968593	LSSR164D	4	1.000	1.000	1.250	6.00	1.20	LT22ER	SMYE4	SSY4T	T20	CKC4	T20	SSA4T	T20
<b>left hand</b>															
2968588	LSSL123D	3	.750	.750	1.000	6.00	1.00	LT16EL	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968589	LSSL163D	3	1.000	1.000	1.250	6.00	1.00	LT16EL	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968590	LSSL164D	4	1.000	1.000	1.250	6.00	1.20	LT22EL	SMYI4	SSY4T	T20	CKC4	T20	SSA4T	T20

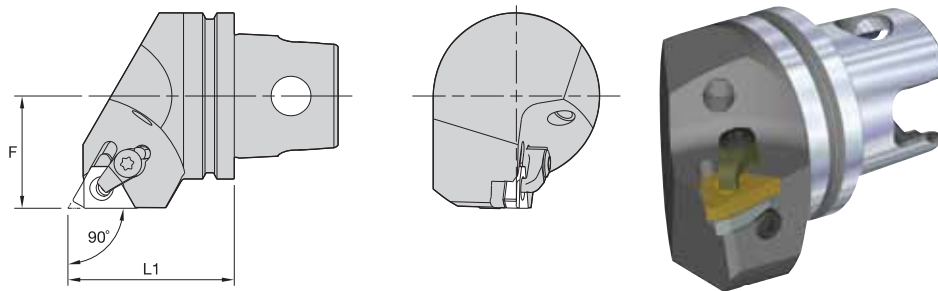


■ LSE-N 90° • Internal Only

order number	catalog number	L1		F		D min		gage insert	insert screw	shim	shim screw	clamp assembly	kg	lbs
		mm	in	mm	in	mm	in							
<b>right hand</b>														
3950832	KM40TSLSER16N	40	1.575	27	1.063	54	2.126	LT16NR	SSA3T	SMYI3	SSY3T	CKC3	0,35	.77
3950854	KM40TSLSER22N	40	1.575	27	1.063	54	2.126	LT22NR	SSA4T	SMYI4	SSY4T	CKC4	0,35	.77
3959399	KM40TSLSER27N	45	1.772	27	1.063	54	2.126	LT27NR	SSA5T	SMYI5	SSY5T	CKC5	0,39	.86
<b>left hand</b>														
3950831	KM40TSLSEL16N	40	1.575	27	1.063	54	2.126	LT16NL	SSA3T	SMYE3	SSY3T	CKC3	0,35	.77
3950853	KM40TSLSEL22N	40	1.575	27	1.063	54	2.126	LT22NL	SSA4T	SMYE4	SSY4T	CKC4	0,35	.77
3959398	KM40TSLSEL27N	45	1.772	27	1.063	54	2.126	LT27NL	SSA5T	SMYE5	SSY5T	CKC5	0,39	.86

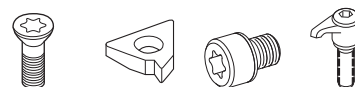
NOTE: Cutting units are supplied with insert screw and clamp assembly. However, tools are designed to use either the insert screw or the clamp assembly, not both.

Threading



■ LSS 90°

Threading



order number	catalog number	L1		F		gage insert	insert screw	shim	shim screw	clamp assembly	kg	lbs
		mm	in	mm	in							
<b>right hand</b>												
3950857	KM40TSLSSR16	40	1.575	27	1.063	LT16ER	SSA3T	SMYE3	SSY3T	CKC3	0,31	.68
3950858	KM40TSLSSR22	40	1.575	27	1.063	LT22ER	SSA4T	SMYE4	SSY4T	CKC4	0,30	.66
3959401	KM40TSLSSR27	45	1.772	27	1.063	LT27ER	SSA5T	SMYE5	SSY5T	CKC5	0,37	.82
<b>left hand</b>												
3950855	KM40TSLSSL16	40	1.575	27	1.063	LT16EL	SSA3T	SMYI3	SSY3T	CKC3	0,32	.70
3950856	KM40TSLSSL22	40	1.575	27	1.063	LT22EL	SSA4T	SMYI4	SSY4T	CKC4	0,31	.68
3959400	KM40TSLSSL27	45	1.772	27	1.063	LT27EL	SSA5T	SMYI5	SSY5T	CKC5	0,37	.82

NOTE: Cutting units are supplied with insert screw and clamp assembly. However, tools are designed to use either the insert screw or the clamp assembly, not both.

**Laydown Threading**  
**Boring Bar Identification System**



S1012LSER3

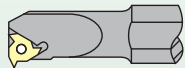
**S**

Bar Type

**E** – Carbide with coolant



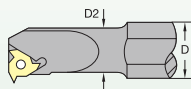
**S** – Steel shank without coolant



**10**

Primary Necked Shank Bar Diameter

Indicates the primary bar diameter in 1/16" increments.

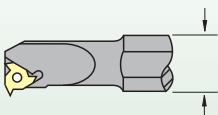


**NOTE:** Boring bars with primary bar diameters larger than 5/8" are supplied with clamp and insert screw. Secure the insert with either the clamp or insert screw. **Do not use both.**

**12**

Secondary (mounting) Bar Diameter

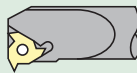
Indicates the secondary bar diameter in 1/16" increments.



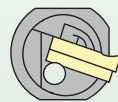
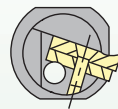
**L**

Insert Style

**L** – Laydown triangle



**S** – Insert screw or clamp only



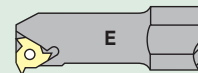
**S**

Insert Holding Method

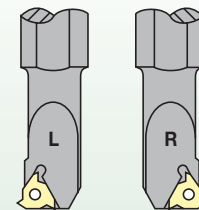
**E**

Bar Style

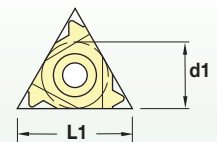
End cutting edge mount



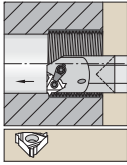
Left Hand Right Hand



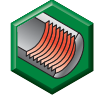
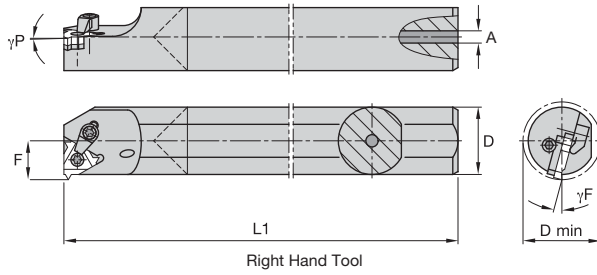
Size equals number of 1/8" increments of iC.



inch insert size	metric insert size	d1 inch	L1 mm
2	11	1/4	11,0
3	16	3/8	16,5
4	22	1/2	22,0



Carbide shank with through coolant. See page F44 for inserts.



■ E-LSE

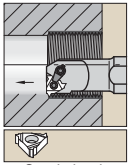
Threading



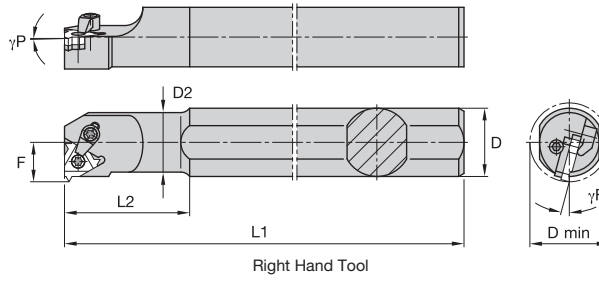
order number	catalog number	seat size	D	D min	F	L1	A	$\gamma_F^\circ$	$\gamma_P^\circ$	gage insert	shim	shim screw	Torx	clamp assembly	Torx	insert screw	Torx
<b>right hand</b>																	
2892518	E06LSER2	2	.375	.500	.280	6.00	.13	-15.0	-1.50	LT11NR	—	—	—	—	—	SSN2T	T8
2892520	E08LSER2	2	.500	.650	.350	8.00	.19	-15.0	-1.50	LT11NR	—	—	—	—	—	SSN2T	T8
<b>left hand</b>																	
2892519	E06LSEL2	2	.375	.500	.280	6.00	.13	-15.0	-1.50	LT11NL	—	—	—	—	—	SSN2T	T8
2892521	E08LSEL2	2	.500	.650	.350	8.00	.19	-15.0	-1.50	LT11NL	—	—	—	—	—	SSN2T	T8
2892553	E10LSEL3	3	.625	.800	.460	10.00	.22	-15.0	-1.50	LT16NL	—	—	—	—	—	SN3TPKG	T10
2892555	E12LSEL3	3	.750	.900	.510	10.00	.22	-15.0	-1.50	LT16NL	SMYE3	SSY3T	T10	CKC3	T15	SSA3T	T10

NOTE: Items listed without a shim are designed for a 1.5° inclination angle.





Steel shank without coolant. See page F44 for inserts.



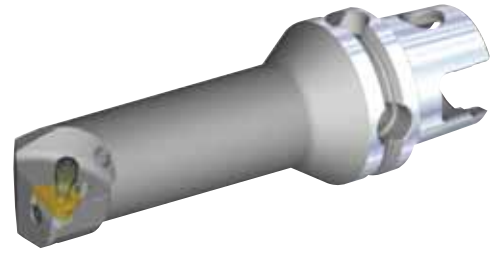
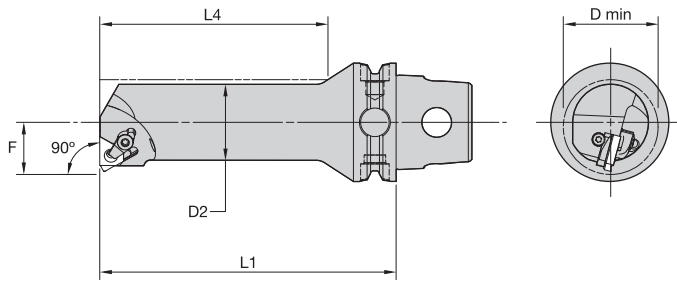
■ S-LSE

order number	catalog number	seat size	D	D min	D2	F	L1	L2	γF°	γP°	gage insert	shim		clamp assembly		insert screw		
												shim screw	Torx	Torx	Torx	insert screw	Torx	
<b>right hand</b>																		
2968597	S0612LSER2	2	.750	.500	.375	.280	7.00	1.00	-15.0	-1.50	LT11NR	—	—	—	—	—	SSN2T	T8
2968601	S1012LSER3	3	.750	.800	.625	.460	7.00	1.50	-15.0	-1.50	LT16NR	—	—	—	—	—	SN3TPKG	T10
2968763	S1212LSER3	3	.750	.900	—	.510	7.00	1.57	-15.0	-1.50	LT16NR	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10
2968765	S1620LSER3	3	1.250	1.200	1.000	.650	10.00	2.50	-15.0	-1.50	LT16NR	SMYI3	SSY3T	T10	CKC3	T15	SSA3T	T10

NOTE: Items listed without a shim are designed for a 1.5° inclination angle.



Threading



■ LSE 90°





Threading

order number	catalog number	D min		D2		F		L4		L1		gage insert	kg	lbs
		mm	in	mm	in	mm	in	mm	in	mm	in			
<b>right hand</b>														
3955464	KM40TSS10DLSER11	13	.51	10	.39	7	.276	35	1.38	60	2.362	LT11NR	0,22	.49
3955466	KM40TSS12ELSER11	16	.63	12	.47	9	.354	42	1.66	70	2.756	LT11NR	0,25	.56
3955468	KM40TSS16FLSER16	20	.79	16	.63	11	.433	56	2.21	80	3.150	LT16NR	0,28	.61
3955470	KM40TSS20GLSER16	25	.98	20	.79	13	.512	70	2.76	90	3.543	LT16NR	0,34	.75
3955472	KM40TSS25HLSER16	32	1.26	25	.98	17	.669	75	2.95	100	3.937	LT16NR	0,50	1.11
3955474	KM40TSS32JLSER16	40	1.57	32	1.26	22	.866	96	3.78	110	4.331	LT16NR	0,72	1.58
3955476	KM40TSS32JLSER22	40	1.57	32	1.26	22	.866	96	3.78	110	4.331	LT22NR	0,71	1.56
<b>left hand</b>														
3955463	KM40TSS10DLSEL11	13	.51	10	.39	7	.276	35	1.38	60	2.362	LT11NL	0,22	.49
3955465	KM40TSS12ELSEL11	16	.63	12	.47	9	.354	42	1.65	70	2.756	LT11NL	0,25	.55
3955467	KM40TSS16FLSEL16	20	.79	16	.63	11	.433	56	2.21	80	3.150	LT16NL	0,28	.61
3955469	KM40TSS20GLSEL16	25	.98	20	.79	13	.512	70	2.76	90	3.543	LT16NL	0,34	.75
3955471	KM40TSS25HLSSEL16	32	1.26	25	.98	17	.669	75	2.95	100	3.937	LT16NL	0,50	1.11
3955473	KM40TSS32JLSEL16	40	1.57	32	1.26	22	.866	96	3.78	110	4.331	LT16NL	0,72	1.58
3955475	KM40TSS32JLSEL22	40	1.57	32	1.26	22	.866	96	3.78	110	4.331	LT22NL	0,71	1.56

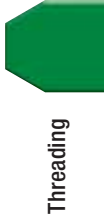
(continued)

(LSE 90° – continued)

■ Spare Parts

				
catalog number	insert screw	shim	shim screw	clamp assembly
<b>right hand</b>				
KM40TSS10DLSER11	SSN2T	–	–	–
KM40TSS12ELSER11	SSN2T	–	–	–
KM40TSS16FLSER16	SN3TPKG	–	–	–
KM40TSS20GLSER16	SSA3T	SMYI3	SSY3T	CKC3
KM40TSS25HLSER16	SSA3T	SMYI3	SSY3T	CKC3
KM40TSS32JLSER16	SSA3T	SMYI3	SSY3T	CKC3
KM40TSS32JLSER22	SSA4T	SMYI4	SSY4T	CKC4
<b>left hand</b>				
KM40TSS10DLSEL11	SSN2T	–	–	–
KM40TSS12ELSEL11	SSN2T	–	–	–
KM40TSS16FLSEL16	SN3TPKG	–	–	–
KM40TSS20GLSEL16	SSA3T	SMYE3	SSY3T	CKC3
KM40TSS25HLSSEL16	SSA3T	SMYE3	SSY3T	CKC3
KM40TSS32JLSEL16	SSA3T	SMYE3	SSY3T	CKC3
KM40TSS32JLSEL22	SSA4T	SMYE4	SSY4T	CKC4

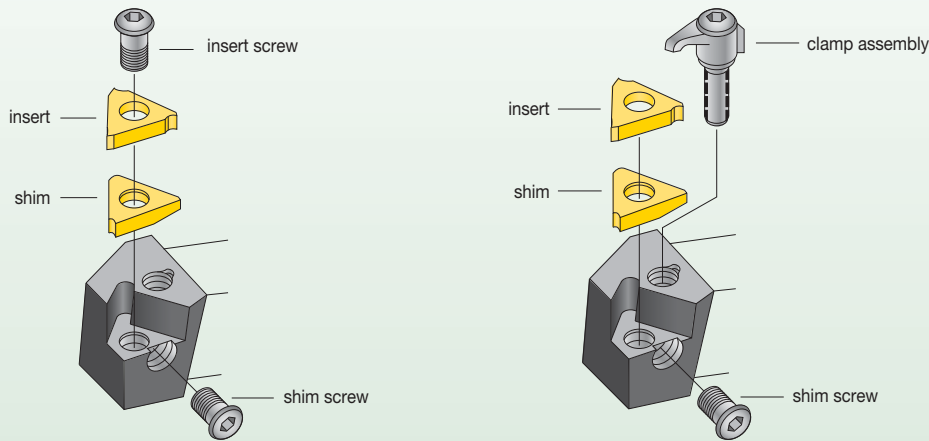
NOTE: Items listed without a shim are designed for a 1,5° inclination angle. Cutting units are supplied with insert screw and clamp assembly. However, tools are designed to use either the insert screw or the clamp assembly, not both.



### Laydown Threading Toolholders

In all cases, the proper shim selection is important.

WIDIA™ toolholders are supplied with a shim for a 1.5° lead angle. Change the shim if your thread is more than 1° different. For more details on proper shim selections, see pages F104–F105.



insert size and screw		insert screw	shim	shim screw and washer	clamp assembly
3ER		S-SA3T	SM-YIE3	S-SY3T	CK-C3
3EL		S-SA3T	SM-YI3	S-SY3T	CK-C3
4ER		S-SA4T	SM-YIE4	S-SY4T	CK-C4
4EL		S-SA4T	SM-YI4	S-SY4T	CK-C4
Laydown Threading boring bars					
2IR		S-SN2T	—	—	—
2IL		S-SN2T	—	—	—
3IR		S-SA3T	SM-YI3	S-SY3T	CK-C3
3IL		S-SA3T	SM-YIE3	S-SY3T	CK-C3
4IR		S-SA4T	SM-YI4	S-SY4T	CK-C4
4IL		S-SA4T	SM-YIE4	S-SY4T	CK-C4

**SM**

Shim

—

**Y**

Y-shim for Laydown standard inserts

**E**

**E** — External  
**I** — Internal

**3**

iC — 1/8"

—

**2N**

Shim Angle

2P	2° positive
1P	1° positive
—	0°
1N	1° negative
2N	2° negative
3N	3° negative

resultant angle		3.5°	2.5°	1.5°	0.5°	-0.5°	-1.5°
insert size (iC)	toolholder	shim ordering code					
3/8"	ex. RH/in. LH ex. LH/in. RH	SM-YE3-2P SM-Y13-2P	SM-YE3-1P SM-Y13-1P	SM-YE3 SM-Y13	SM-YE3-1N SM-Y13-1N	SM-YE3-2N SM-Y13-2N	SM-YE3-3N SM-Y13-3N
1/2"	ex. RH/in. LH ex. LH/in. RH	SM-YE4-2P SM-Y14-2P	SM-YE4-1P SM-Y14-1P	SM-YE4 SM-Y14	SM-YE4-1N SM-Y14-1N	SM-YE4-2N SM-Y14-2N	SM-YE4-3N SM-Y14-3N

### Slanted Shim Kit

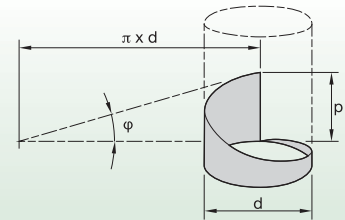
Because you might occasionally need different shims than those supplied with our standard toolholders, we strongly recommend that shim kits be readily available in every tool shop.

insert size	shim size (D)	ordering code	contains slanted shims
3x	3/8"	ABY3	SM-YE3-2P, 1P, 1N, 2N, 3N SM-Y13-2P, 1P, 1N, 2N, 3N
4x	1/2"	ABY4	SM-YE4-2P, 1P, 1N, 2N, 3N SM-Y14-2P, 1P, 1N, 2N, 3N

### The Helix Angle

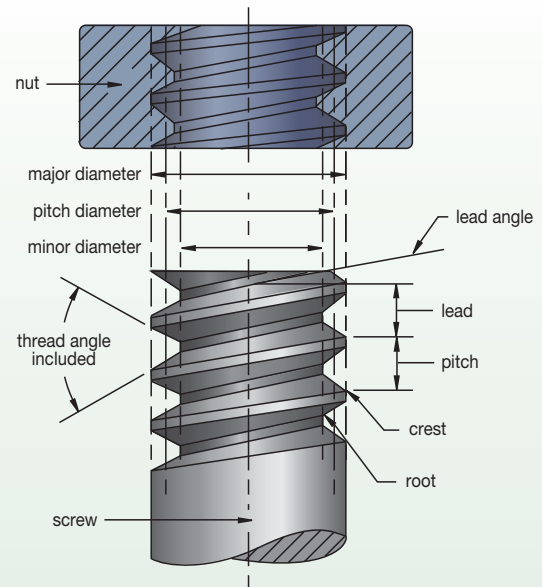
Example:  
 $d = 1.892''$  (48,06mm)       $\phi$  = Helix angle  
 $p = .125''$  (3,175mm)         $p$  = pitch  
 $d$  = pitch diameter

$$\phi = \arctan \left( \frac{p * \text{starts}}{\pi * \phi} \right) = 1.13^\circ$$



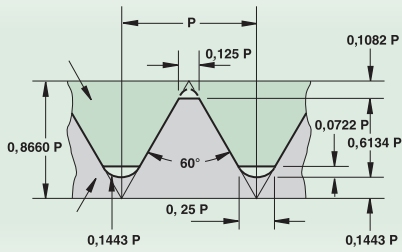
### Screw Thread Definitions

1. Major diameter — The largest diameter of a straight screw thread. This applies to both internal and external threads.
2. Pitch diameter — On a straight thread, it is the diameter which passes through the thread profiles at such points which make the thread width of the groove equal to one-half of the basic pitch. On a "perfect thread," this occurs at the point where the widths of the thread and groove are equal.
3. Thread angle (included) — The included angle between the individual flanks of the thread form.
4. Minor diameter — The smallest diameter of a straight screw thread. This applies to both internal and external threads.
5. Lead angle — On a straight thread, the lead angle is the angle created by the helix of the thread at the pitch diameter with a plane perpendicular to the axis.
6. Lead — The distance a screw thread advances axially in one revolution. On a single start, the pitch and lead are identical. The lead is equal to the pitch times the number of starts.
7. Pitch — The distance from a point on a screw thread to a corresponding point on the next thread measured parallel to the thread axis.
8. Crest — The outer most surface of the thread form which joins the flanks.
9. Root — The inner most surface of the thread form which joins the flanks.



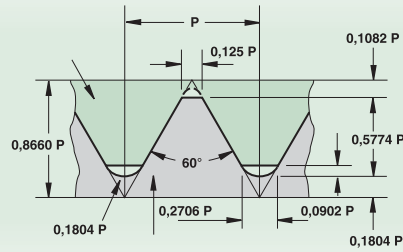
NOTE: Threads per inch (TPI) not shown:  
 The number of threads per inch measured axially.  
 The terms pitch and TPI are often used interchangeably.  $TPI = 1/pitch$

**ISO M (Metric) and UN (Unified National)**



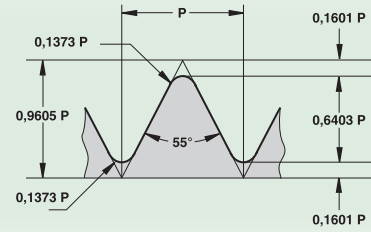
Use: All branches of mechanical industry.

**UNJ (controlled root radius)**



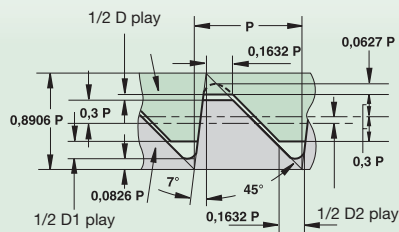
Use: Aircraft and space industry.

**Whitworth (BSW)**



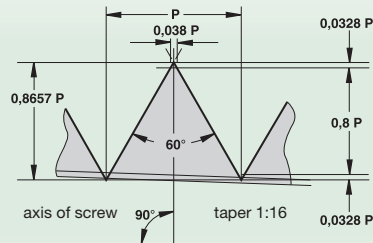
Use: Fittings and pipe couplings for gas, water, and sewer lines (replaced by ISO).

**American Buttress**



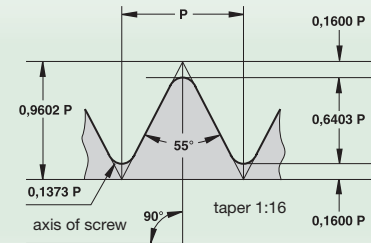
Use: Fittings and pipe couplings.

**NPT (American National Pipe Thread)**



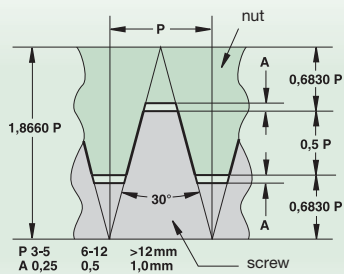
Use: Fittings and pipe couplings.

**BSPT (British Standard Pipe Thread)**



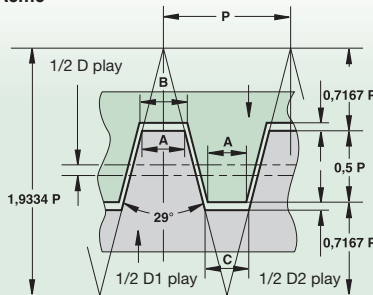
Use: Pipe thread for steam, gas, and water lines.

**TR DIN 103**



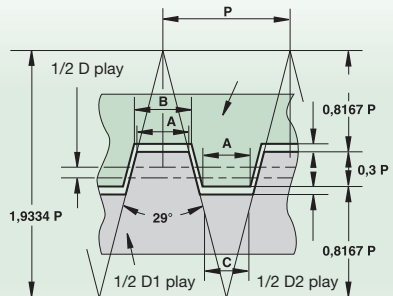
Use: Mechanical industry for motion transmission screws.

**Acme**



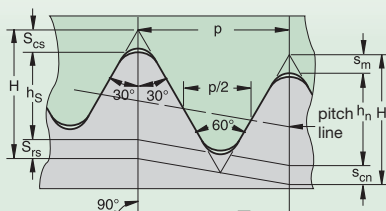
A = 0,0307 P  
B = 0,3707 P - x D play  
C = 0,3707 P - (D1 play - D2 play)  
Use: Acme-General is used in mechanical industry for motion transmission screws.

**Acme, truncated (Stub)**



A = 0,4224 P  
B = 0,4224 P - x D play  
C = 0,4224 P - (D1 play - D2 play)  
Use: Where normal Acme is too deep.

**API Casing and Tubing Round Thread Form**



taper = 3/4" per foot (62,5mm per meter) on diameter




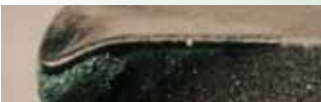



NOTE: Taper shown exaggerated.

**Suggested Grades and Speeds for Threading  
 Various Workpiece Materials**

workpiece group	workpiece material	recommended surface speed – SFM		
		uncoated	PVD coated	
		THM	TN6010	TN6025
free-machining carbon steel	10L18, 10L45, 1213, 12L13, 12L14, 1140, 1141, 11L44, 1151, 10L50	–	300–650	150–650
plain carbon steel	10063, 1008, 1010, 1015, 1018, 1020, 1025, 1026, 1108, 1117	–	250–650	150–575
alloy steels/tool steels 150–325 HB (up to 35 HRC)	1042, 1045, 1070, 1080, 1085, 1090, 1095, 1541, 1561, 1572, 5140, 8620, W1, O1, S1, P20, H13, D2, A6, H13, L6	–	250–650	125–550
alloy steels/tool steels 330–450 HB (36–47 HRC)		–	200–525	–
martensitic/ferritic stainless/precipitation hardening	416, 420F, 440F, 405, 409, 429, 430, 434, 436, 442, PH	–	150–525	100–400
austenitic stainless steel	201, 202, 301, 302, 303, 304, 304, 305, 321, 347, 348, 310, 314, 316, 316L, 330	200–350	200–650	150–450
gray cast iron 135–270 HB	class 20, 30, 35, 45	200–300	200–775	150–400
gray cast iron 275–450 HB	class 50, 55, 60	150–250	150–575	50–250
alloy/ductile iron	A536, J434C, 60-40-18, 80-55-06, 100-70-03	150–250	150–650	100–525
free-machining aluminum alloys	2024-T4, 2014-T6, 6061-T6, 2011-T3, 3003-H18, A2, Alcan, Alcoa 510, Duralumin	400–800	400–1200	–
high-silicon aluminum alloys	A380, A390, A380-1, A390-1, A380-2	–	–	–
copper/zinc/brass		250–600	250–1000	150–775
non-metallics	Graphite, Nylon, Plastics, Rubbers, Phenolics, Carbon	400–1500	400–1300	150–1000
high-temperature alloys 125–269 HB (up to 27 HRC)	Nickel 200, Monel, R405, Monel K500, INCONEL 600, INCONEL® 625/901x750/718, Waspaloy, Hastelloy C	80–120	80–400	40–250
high-temperature alloys 260–450 HB (26–47 HRC)	Rene 95, Waspaloy A286, Incoloy 800, Haynes 188, Stellite F, Haynes 25	80–100	100–250	20–200
titanium alloys	Ti-6Al-4V, Ti-5Al-2.5Sn	110–180	110–325	–

NOTE: When workpiece hardness levels are at the top of a range, starting SFM should be at the lower end. Regularly inspect insert clamps for worn flats.

Edge preparation: Uncoated – sharp  
 PVD coated – light hone except positive top rake, top rake-sharp

problem	cause	possible solution
<p>thread with torn finish</p> 	<ul style="list-style-type: none"> <li>• Burs.</li> <li>• Torn finish.</li> <li>• Steps.</li> <li>• Improper shim.</li> <li>• Improper infeed.</li> </ul>	<ul style="list-style-type: none"> <li>• Use modified flank infeed.</li> <li>• Use full profile insert.</li> <li>• Increase coolant concentration.</li> <li>• Increases SFM.</li> <li>• Check machine "Z" travel axis.</li> <li>• Check insert form.</li> <li>• Check for correct shim in LT system.</li> <li>• Calculate flank clearance.</li> </ul>
<p>chatter</p> 	<ul style="list-style-type: none"> <li>• Poor rigidity.</li> <li>• Insert movement.</li> <li>• Improper infeed.</li> <li>• Off centerline.</li> </ul>	<ul style="list-style-type: none"> <li>• Use modified flank infeed.</li> <li>• Minimize tool overhang.</li> <li>• Check for workpiece deflection.</li> <li>• Check insert and clamp.</li> <li>• Verify that tool cutting position is at workpiece centerline.</li> <li>• Adjust number of passes. Fewer passes reduce chatter.</li> </ul>
<p>built-up edge</p> 	<ul style="list-style-type: none"> <li>• Speed too low.</li> <li>• Insufficient coolant.</li> <li>• Chip load.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase SFM.</li> <li>• Increase coolant concentration and/or flow.</li> <li>• Adjust infeed angle.</li> <li>• Increase depth of cut per pass.</li> </ul>
<p>deformation</p> 	<ul style="list-style-type: none"> <li>• Wrong grade.</li> <li>• Speed too high.</li> <li>• Improper infeed angle.</li> <li>• Insufficient coolant.</li> </ul>	<ul style="list-style-type: none"> <li>• Use modified flank infeed.</li> <li>• Use a more wear-resistant grade (e.g., TN6010™).</li> <li>• Reduce SFM.</li> <li>• Increase coolant flow.</li> </ul>
<p>chipping</p> 	<ul style="list-style-type: none"> <li>• Improper infeed.</li> <li>• Chip load.</li> <li>• Wrong grade.</li> <li>• Incorrect speed.</li> <li>• Poor rigidity.</li> </ul>	<ul style="list-style-type: none"> <li>• Use modified flank infeed.</li> <li>• Increase or decrease number of passes.</li> <li>• Eliminate spring passes.</li> <li>• Use tougher grade (e.g., TN6025™).</li> <li>• Increase SFM if chipping on trailing edge.</li> <li>• Decrease SFM if chipping on leading edge.</li> <li>• Minimize tool overhang.</li> <li>• Check for insert movement/check clamp. Torque screw or clamp to correct value.</li> <li>• Check for possible part deflection.</li> <li>• Calculate flank clearance.</li> <li>• Ensure correct shim.</li> </ul>
<p>broken nose</p> 	<ul style="list-style-type: none"> <li>• Heavy chip load.</li> <li>• Small nose radius.</li> <li>• Wrong grade.</li> <li>• Improper infeed.</li> </ul>	<ul style="list-style-type: none"> <li>• Use modified flank infeed.</li> <li>• Decrease chip load.</li> <li>• Use large nose radius if possible.</li> <li>• Use tougher grade (e.g., TN6025).</li> </ul>
<p>flank wear</p> 	<ul style="list-style-type: none"> <li>• Improper shim.</li> <li>• Wrong grade.</li> <li>• Insufficient coolant.</li> <li>• Off centerline.</li> <li>• Insufficient flank clearance.</li> <li>• Improper infeed angle.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure correct shim.</li> <li>• Use a more wear-resistant grade (e.g., TN6025).</li> <li>• Increase coolant flow.</li> <li>• Check the centerline height of the tool. (The smaller the diameter, the more critical the need for centerline accuracy.)</li> <li>• Calculate flank clearance and change shim to increase clearance on worn flank.</li> <li>• If wear is on trailing flank, increase infeed angle clearance.</li> </ul>



problem	possible solution																	
	increase SFM	reduce SFM	increase chip load	decrease chip load where failure occurs	use tougher carbide grade	use harder carbide grade	apply coolant	use coated carbide	use topping insert	change infeed angle	check for insert movement and reseat	reduce tool overhang	reselect shim	apply chipbreaker style	reduce DOC	adjust center height	begin cutting threads .472" before workpiece	change infeed method
chatter	•			•							•	•				•		•
bur on crest	•								•									•
short tool life		•	•	•		•		•										•
chipped leading edge			•	•	•													
chipped trailing edge					•					•								
broken nose (first pass)	•														•	•		
broken nose (after first pass)				•	•					•			•					•
built-up on cutting edge	•		•				•	•										•
premature topping													•					
splitting threads																	•	
poor chip evacuation														•				•

WIDIA™ insert technology brings chip control to your threading operations with the TopThread™ platform. The proprietary WIDIA recessed chip groove, when used according to our recommendations, controls the chip in most applications. Our positive rake design lowers cutting pressures, which in turn lowers damaging heat generation thus providing better tool life. Long, stringy chips no longer mar the workpiece surface finish. The danger to operators when removing long chips from the workpiece and chuck is eliminated. All of these benefits combine to improve the productivity of your threading operations.

### The Last Pass

Some CNC controls require the last pass to be at a 0° infeed angle because the chip will not break on the last pass. On most carbon and alloy steels, the last pass can remain at .005" (0,127mm) depth of cut and produce an acceptable finish. For some materials, a .001" (0,025mm) to .003" (0,076mm) (spring) pass may be used to improve surface finish, however, chipbreaking action may be compromised.

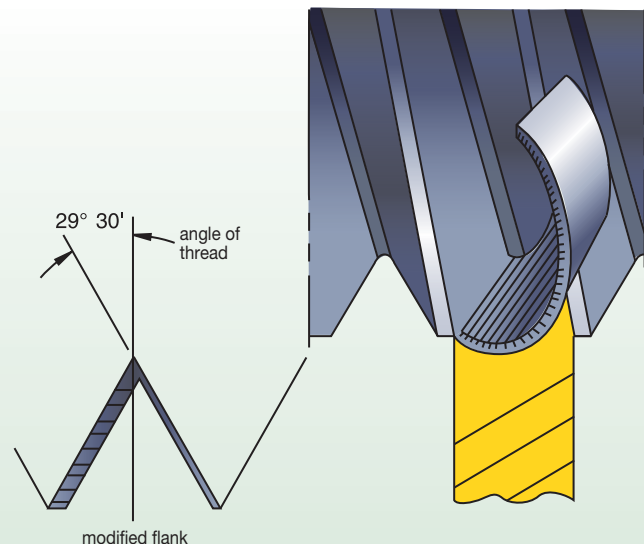


### Machine Programming

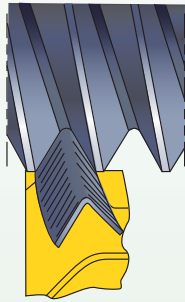
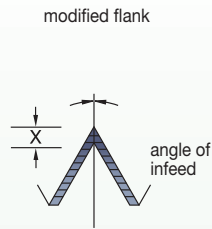
Modern CNC controls allow the programmer to easily adjust infeed angle, the number of passes, and depth of cut for each pass. The chip control threading insert performs best at an infeed angle of 29° 30', although 15° to 30° is acceptable. Also, it is important to maintain a minimum of .005" (0,127mm) depth of cut on every pass. In most applications, use of CNC canned cycles produce only marginally successful results. Custom written programs are better and are recommended.

### Infeed Angle

In order to effectively and consistently break the chip, it is important to use an infeed angle between 28° and 29° 30'. Do not apply chip control inserts at infeed angles less than 15°.



**Radial**



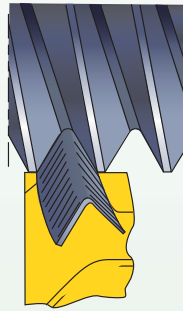
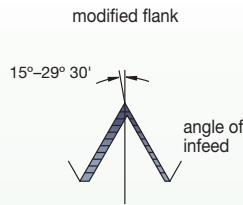
**Advantage –**

- Cutting on both sides of the thread form places all of the cutting edge in the cut and protects edge from chipping.
- Even wear on the insert.

**Disadvantage –**

- Tool develops a channel chip that may be difficult to handle.
- Tip chipping occurs when cutting high-tensile materials.
- Bur condition is increased.
- Entire cutting edge is engaged at finish of thread, causing increased tendency to chatter.

**Modified flank**



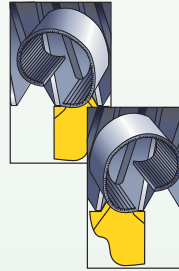
**Advantage –**

- Tool cuts both sides of thread form, so it is protected from chipping similar to 0° infeed. Channel-type chip develops, but uneven chip thickness helps remove the chip similar to flank infeed.
- This is the preferred method, especially when used with a chip control insert.
- Combined radial and/or alternating flank infeed.
- Results in good tool life, with wear evenly distributed over both flanks.

**Disadvantage –**

- Similar disadvantages as with 0° infeed, although reduced somewhat in magnitude as cutting forces are better equalized and chip flow is much less of a problem.

**Alternating flank**



**Advantage –**

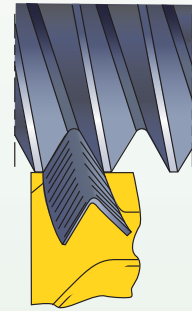
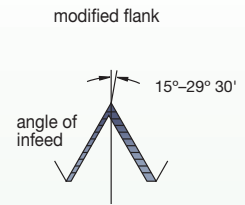
- Increased tool life because both edges are used equally.

*NOTE: Some machine tools may require special programming techniques to achieve this method of infeed.*

**Disadvantage –**

- Difficult to cut on conventional machinery.

**Reversed modified flank**



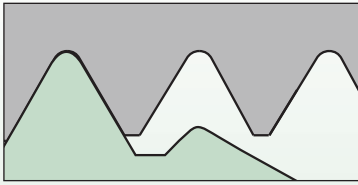
**Advantage –**

- Tool cuts both sides of thread form, so it is protected from chipping similar to 0° infeed. Channel-type chip develops, but uneven chip thickness helps remove the chip similar to flank infeed.
- This is the preferred method, especially when used with a chip control insert.
- Combined radial and/or alternating flank infeed.
- Results in good tool life, with wear evenly distributed over both flanks.
- As chip flow is the reversed feed direction, it is an excellent choice for internal threading.

**Disadvantage –**

- Programming needs to be done line by line.

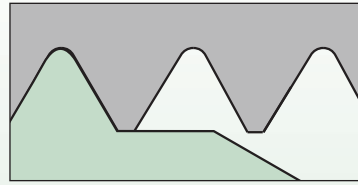
**Partial Profile**



**Tooth profile with universal profile shape:**

- Reduced inventory.
- For various pitches in a limited range.
- Major/minor diameters must be accurately pre-turned.

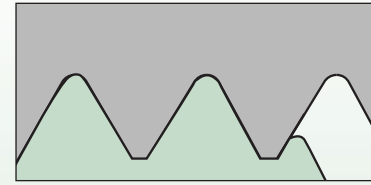
**Full Profile**



**Tooth profile with full profile shape including tooth height:**

- For bur-free, precise threads in the specified pitch.
- General application.
- Machining allowance for outside/core diameter around .004-.006".

**Multi-Tooth Profile**



**Multi-tooth full profile generally with 2-3 teeth:**

- Highly productive threading with fewer passes and longer tool life.
- Requires a rigid setup and long thread pass through.

**Formulas**

Inch Formula		
to find	given	formula
SFM	D (inch) RPM	$SFM = \frac{\pi \times D}{12"} \times RPM$
RPM	D (inch) SFM	$RPM = \frac{SFM \times 12"}{D \times \pi}$

**Legend**

- IPM = inch per minute
- SFM = surface feet per minute
- m/min = meters per minute
- RPM = revolutions per minute
- D = part diameter
- $\pi$  = 3.1416

Metric Formula		
to find	given	formula
m/min	D (mm) RPM	$m/min = \frac{\pi \times D}{1000} \times RPM$
RPM	D (mm) m/min	$RPM = \frac{m/min \times 1000}{D \times \pi}$

**Maximum Cutting Speeds**

On older machines cutting speed is often limited by the maximum travel speed (IPM or mm/min) of the tool allowed by the machine. Check your maximum speed with the following formulas:

inch formula: maximum cutting speed (SFM) =  

$$\frac{\text{part diameter (inch)} \times 3.14 \times \text{TPI} \times \text{max IPM}}{12"}$$

metric formula: maximum cutting speed (m/min) =  

$$\frac{\text{part diameter (mm)} \times 3.14 \times (1/\text{pitch}) \times \text{max mm/min}}{1000\text{mm}}$$

**Flank clearance**

- $\gamma$  =  $\arctan(\sin(\beta/2) * \tan(\alpha))$
- $\gamma$  = side (flank) clearance
- $\beta$  = included angle of thread form
- $\alpha$  = radial inclination angle

Thread	Angle	External	Internal
UN & ISO	60	5.3	8
BSW	55	4.8	7.3
TR	30	2.6	4
ACME	29	2.6	3.9
AMBUT	7	.6	.9
AMBUT	45	4	6

### Recommendation for Threading Infeed Passes

TPI	48-32	28-24	20-16	14-12	11.5-9	8-6	5-4	3-2
metric pitch (mm)	0,50-0,75	0,80-1	1,25-1,5	1,75-2	2,5-3	3,5-4	4,5-6	8
<b>Thread Type</b>	<b>recommended number of passes</b>							
Common V-thread forms ISO, UN, UNJ, NPT, Whitworth, BSPT, API Rotary Shoulder	4-5	5-6	6-8	8-10	9-12	12-15	14-16	15-25
Acme, Trapez, Round, API Round	—	—	5-6	7-8	10-11	12-13	13-15	18-20
Stub Acme, API Buttress	—	—	5	5-6	7-8	8-10	10-12	14-16
American Buttress	—	—	7-8	9-10	11-12	13-15	17-19	22-24

Maintain minimum .002" (0,05mm) infeed on last passes to avoid work hardening and excessive abrasion of the threading tool.

### Constant Volume Infeed Values for Threading Operations

In most applications, use of CNC canned cycles produces only marginally successful results. For example, an 8-pitch external thread has a depth of .0789" (2mm).

#### Formula for constant chip load infeed

- $\Delta a_p$  = radial infeed
- x = actual pass (from 1 to the nap)
- nap = number of passes
- $\phi$  = 1st pass, 0.3  
2nd pass, 1  
3rd pass and up, x-1

$$\Delta a_{p_x} = \frac{a_p}{\sqrt{\text{nap}-1}} * \sqrt{\phi}$$

#### Using Radial Infeed

Bending stress on the cutting edge caused by V-shaped chips from long-chipping steel workpiece materials.

High cutting forces with small cutting thicknesses require sharp edges with high strength.

#### Using Flank Infeed

Lower bending stress and stabilized cutting edges produce more favorable chip shapes and larger cutting thicknesses.

Carbides with high hardness, good wear resistance, and temperature stability are advantageous.

### Guidelines for Infeeds – How to Determine the Number and the Size of Passes

The number of passes "s" per thread is decisive for successful threading and crest turning. The following tables give standard values for the application condition when machining steel. The proper number of passes must be determined empirically.

If insert breakage occurs, the number of passes must be increased. With increased wear, we recommend decreasing the number of passes. The chip thickness should not be less than .0019" (0,05mm). The allowance at the diameter should not exceed .0078" (0,2mm).

### Metric ISO, External Thread Cutting

thread pitch P (mm)	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,50	3,00	3,50	4,00	4,50	5,00
T Ap (in)	.012	.018	.024	.030	.036	.042	.048	.060	.072	.085	.097	.109	.121
N Ap	4	4	5	6	6	8	8	10	12	14	15	15	16
values for flank infeed (X/Z)													
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0038	0.0057	0.0066	0.0073	0.0088	0.0087	0.0099	0.0110	0.0119	0.0129	0.0142	0.0160	0.0171
2	0.0031	0.0047	0.0054	0.0061	0.0073	0.0072	0.0082	0.0090	0.0098	0.0107	0.0117	0.0132	0.0141
3	0.0029	0.0043	0.0050	0.0056	0.0067	0.0066	0.0075	0.0083	0.0090	0.0098	0.0107	0.0121	0.0129
4	0.0022	0.0033	0.0038	0.0043	0.0051	0.0050	0.0058	0.0064	0.0069	0.0075	0.0082	0.0093	0.0099
5			0.0032	0.0036	0.0043	0.0043	0.0049	0.0054	0.0058	0.0063	0.0069	0.0078	0.0084
6				0.0032	0.0038	0.0037	0.0043	0.0047	0.0051	0.0056	0.0061	0.0069	0.0074
7						0.0034	0.0039	0.0043	0.0046	0.0050	0.0055	0.0062	0.0067
8						0.0031	0.0036	0.0039	0.0043	0.0046	0.0051	0.0057	0.0061
9								0.0037	0.0040	0.0043	0.0047	0.0053	0.0057
10								0.0034	0.0037	0.0040	0.0044	0.0050	0.0054
11									0.0035	0.0038	0.0042	0.0047	0.0051
12									0.0034	0.0036	0.0040	0.0045	0.0048
13										0.0035	0.0038	0.0043	0.0046
14										0.0033	0.0037	0.0041	0.0044
15											0.0035	0.0040	0.0043
16													0.0041
T Ap (in)	0.012	0.018	0.024	0.030	0.036	0.042	0.048	0.060	0.072	0.085	0.097	0.109	0.121

NOTE: Always allow .003-.005" extra stock for full profile inserts.

### Metric ISO, Internal Thread Cutting

thread pitch P (mm)	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,50	3,00	3,50	4,00	4,50	5,00
T Ap	0.011	0.016	0.021	0.027	0.032	0.037	0.043	0.053	0.064	0.075	0.085	0.096	0.107
N Ap	4	4	5	6	6	8	8	10	11	12	14	15	16
values for flank infeed (X/Z)													
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0035	0.0051	0.0058	0.0066	0.0078	0.0077	0.0089	0.0097	0.0111	0.0124	0.0129	0.0141	0.0151
2	0.0029	0.0042	0.0047	0.0055	0.0065	0.0063	0.0074	0.0080	0.0092	0.0102	0.0107	0.0116	0.0125
3	0.0026	0.0038	0.0043	0.0050	0.0059	0.0058	0.0067	0.0073	0.0084	0.0094	0.0098	0.0106	0.0114
4	0.0020	0.0029	0.0033	0.0038	0.0045	0.0044	0.0052	0.0056	0.0064	0.0072	0.0075	0.0082	0.0088
5			0.0028	0.0032	0.0038	0.0037	0.0044	0.0047	0.0054	0.0061	0.0063	0.0069	0.0074
6				0.0029	0.0034	0.0033	0.0038	0.0042	0.0048	0.0053	0.0056	0.0061	0.0065
7						0.0030	0.0035	0.0038	0.0043	0.0048	0.0050	0.0055	0.0059
8						0.0027	0.0032	0.0035	0.0040	0.0044	0.0046	0.0050	0.0054
9								0.0032	0.0037	0.0041	0.0043	0.0047	0.0050
10								0.0030	0.0035	0.0039	0.0040	0.0044	0.0047
11									0.0033	0.0037	0.0038	0.0042	0.0045
12										0.0035	0.0036	0.0040	0.0043
13											0.0035	0.0038	0.0041
14											0.0033	0.0036	0.0039
15												0.0035	0.0038
16													0.0036
T Ap	0.011	0.016	0.021	0.027	0.032	0.037	0.043	0.053	0.064	0.075	0.085	0.096	0.107

NOTE: Always allow .003-.005" extra stock for full profile inserts.

**UN Thread, External Thread Cutting**

TPI	24	20	18	16	14	12	11	10	9	8	7	6	5
<b>T Ap (in)</b>	0.026	0.031	0.034	0.038	0.036	0.042	0.048	0.060	0.072	0.085	0.097	0.109	0.121
<b>N Ap</b>	5	6	6	7	9	9	10	11	12	13	14	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0071	0.0076	0.0083	0.0085	0.0070	0.0081	0.0088	0.0104	0.0119	0.0134	0.0147	0.0160	0.0171
2	0.0059	0.0063	0.0069	0.0070	0.0058	0.0067	0.0072	0.0086	0.0098	0.0111	0.0122	0.0132	0.0141
3	0.0054	0.0057	0.0063	0.0064	0.0053	0.0062	0.0066	0.0079	0.0090	0.0102	0.0111	0.0121	0.0129
4	0.0041	0.0044	0.0048	0.0049	0.0040	0.0047	0.0051	0.0060	0.0069	0.0078	0.0086	0.0093	0.0099
5	0.0035	0.0037	0.0041	0.0042	0.0034	0.0040	0.0043	0.0051	0.0058	0.0066	0.0072	0.0078	0.0084
6		0.0033	0.0036	0.0037	0.0030	0.0035	0.0038	0.0045	0.0051	0.0058	0.0064	0.0069	0.0074
7				0.0033	0.0027	0.0032	0.0034	0.0040	0.0046	0.0052	0.0057	0.0062	0.0067
8					0.0025	0.0029	0.0031	0.0037	0.0043	0.0048	0.0053	0.0057	0.0061
9					0.0023	0.0027	0.0029	0.0035	0.0040	0.0045	0.0049	0.0053	0.0057
10							0.0027	0.0033	0.0037	0.0042	0.0046	0.0050	0.0054
11								0.0031	0.0035	0.0040	0.0044	0.0047	0.0051
12									0.0034	0.0038	0.0042	0.0045	0.0048
13										0.0036	0.0040	0.0043	0.0046
14											0.0038	0.0041	0.0044
15												0.0040	0.0043
16													0.0041
<b>T Ap (in)</b>	0.026	0.031	0.034	0.038	0.036	0.042	0.048	0.060	0.072	0.085	0.097	0.109	0.121

NOTE: Always allow .003-.005" extra stock for full profile inserts.

**UN Thread, Internal Thread Cutting**

TPI	24	20	18	16	14	12	11	10	9	8	7	6	5
<b>T Ap</b>	.023	.027	.030	.034	.039	.045	.049	.054	.060	.068	.077	.090	.108
<b>N Ap</b>	5	6	6	7	8	9	9	10	11	12	13	14	15
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0063	0.0066	0.0073	0.0076	0.0081	0.0087	0.0095	0.0099	0.0104	0.0112	0.0122	0.0137	0.0158
2	0.0052	0.0055	0.0061	0.0063	0.0067	0.0072	0.0078	0.0081	0.0086	0.0093	0.0101	0.0113	0.0131
3	0.0048	0.0050	0.0056	0.0057	0.0061	0.0066	0.0072	0.0075	0.0079	0.0085	0.0092	0.0103	0.0120
4	0.0037	0.0038	0.0043	0.0044	0.0047	0.0051	0.0055	0.0057	0.0060	0.0065	0.0071	0.0079	0.0092
5	0.0031	0.0032	0.0036	0.0037	0.0039	0.0043	0.0046	0.0048	0.0051	0.0055	0.0060	0.0067	0.0077
6		0.0029	0.0032	0.0033	0.0035	0.0038	0.0041	0.0042	0.0045	0.0048	0.0052	0.0059	0.0068
7				0.0030	0.0031	0.0034	0.0037	0.0038	0.0040	0.0044	0.0047	0.0053	0.0062
8					0.0029	0.0031	0.0034	0.0035	0.0037	0.0040	0.0044	0.0049	0.0057
9						0.0029	0.0032	0.0033	0.0035	0.0037	0.0041	0.0046	0.0053
10								0.0031	0.0033	0.0035	0.0038	0.0043	0.0050
11									0.0031	0.0033	0.0036	0.0041	0.0047
12										0.0032	0.0034	0.0039	0.0045
13											0.0033	0.0037	0.0043
14												0.0031	0.0035
15													0.0039
16													
<b>T Ap</b>	0.023	0.027	0.030	0.034	0.039	0.045	0.049	0.054	0.060	0.068	0.080	0.090	0.108

NOTE: Always allow .003-.005" extra stock for full profile inserts.

**NPT Thread, External, and Internal Machining**

TPI	27	18	14	11.5	8
<b>T Ap</b>	0.030	0.044	0.056	0.068	0.098
<b>N Ap</b>	6	8	10	12	14
values for flank infeed (X/Z)					
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0073	0.0091	0.0102	0.0112	0.0149
2	0.0061	0.0075	0.0084	0.0093	0.0123
3	0.0056	0.0069	0.0077	0.0085	0.0113
4	0.0043	0.0053	0.0059	0.0065	0.0086
5	0.0036	0.0045	0.0050	0.0055	0.0073
6	0.0032	0.0039	0.0044	0.0048	0.0064
7		0.0035	0.0040	0.0044	0.0058
8		0.0033	0.0037	0.0040	0.0053
9			0.0034	0.0037	0.0050
10			0.0032	0.0035	0.0047
11				0.0033	0.0044
12				0.0032	0.0042
13					0.0040
14					0.0038
15					
16					
<b>T Ap</b>	0.030	0.044	0.056	0.068	0.098

**BSPT Thread, External, and Internal Machining**

TPI	28	19	14	11
<b>T Ap</b>	0.023	0.034	0.046	0.057
<b>N Ap</b>	5	8	10	12
values for flank infeed (X/Z)				
order of passes	X/Z	X/Z	X/Z	X/Z
1	0.0063	0.0070	0.0084	0.0094
2	0.0052	0.0058	0.0069	0.0078
3	0.0048	0.0053	0.0064	0.0071
4	0.0037	0.0041	0.0049	0.0055
5	0.0031	0.0034	0.0041	0.0046
6		0.0030	0.0036	0.0041
7		0.0027	0.0033	0.0037
8		0.0025	0.0030	0.0034
9			0.0028	0.0031
10			0.0026	0.0029
11				0.0028
12				0.0027
13				
14				
15				
16				
<b>T Ap</b>	0.023	0.034	0.046	0.057

NOTE: Always allow .003-.005" extra stock for full profile inserts.

**Trapezoid Thread to DIN 103, External, and Internal Machining**

pitch	1.50	2.00	3.00	4.00	5.00
<b>T Ap</b>	0.040	0.049	0.069	0.089	0.108
<b>N Ap</b>	6	8	10	12	14
values for flank infeed (X/Z)					
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0098	0.0101	0.0126	0.0147	0.0164
2	0.0081	0.0084	0.0104	0.0121	0.0135
3	0.0074	0.0077	0.0095	0.0111	0.0124
4	0.0057	0.0059	0.0073	0.0085	0.0095
5	0.0048	0.0050	0.0062	0.0072	0.0080
6	0.0042	0.0044	0.0054	0.0063	0.0071
7		0.0040	0.0049	0.0057	0.0064
8		0.0036	0.0045	0.0053	0.0059
9			0.0042	0.0049	0.0055
10			0.0039	0.0046	0.0051
11				0.0044	0.0049
12				0.0041	0.0046
13					0.0044
14					0.0042
15					
16					
<b>T Ap</b>	0.040	0.049	0.069	0.089	0.108

**Round Thread to DIN 405, External, and Internal Machining**

pitch	10	8	6
<b>T Ap</b>	0.052	0.064	0.085
<b>N Ap</b>	8	10	12
values for flank infeed (X/Z)			
order of passes	X/Z	X/Z	X/Z
1	0.0108	0.0117	0.0140
2	0.0089	0.0096	0.0116
3	0.0081	0.0088	0.0106
4	0.0062	0.0068	0.0081
5	0.0053	0.0057	0.0069
6	0.0046	0.0050	0.0061
7	0.0042	0.0046	0.0055
8	0.0039	0.0042	0.0050
9		0.0039	0.0047
10		0.0037	0.0044
11			0.0042
12			0.0040
13			
14			
15			
16			
<b>T Ap</b>	0.052	0.064	0.085

NOTE: Always allow .003-.005" extra stock for full profile inserts.

NOTE: Always allow .003-.005" extra stock for full profile inserts.



### Whitworth, External, and Internal Thread Cutting

TPI	28	20	19	16	14	12	11	10	9	8	7	6	5
<b>T Ap</b>	0.023	0.032	0.032	0.034	0.040	0.053	0.058	0.064	0.071	0.080	0.091	0.107	0.128
<b>N Ap</b>	5	6	6	8	8	9	9	10	11	12	14	15	16
	values for flank infeed (X/Z)												
order of passes	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z	X/Z
1	0.0063	0.0078	0.0078	0.0070	0.0083	0.0103	0.0112	0.0117	0.0123	0.0132	0.0138	0.0157	0.0181
2	0.0052	0.0065	0.0065	0.0058	0.0068	0.0085	0.0093	0.0096	0.0102	0.0109	0.0114	0.0129	0.0149
3	0.0048	0.0059	0.0059	0.0053	0.0063	0.0078	0.0085	0.0088	0.0093	0.0100	0.0105	0.0118	0.0137
4	0.0037	0.0045	0.0045	0.0041	0.0048	0.0060	0.0065	0.0068	0.0071	0.0077	0.0080	0.0091	0.0105
5	0.0031	0.0038	0.0038	0.0034	0.0041	0.0050	0.0055	0.0057	0.0060	0.0065	0.0068	0.0077	0.0089
6		0.0034	0.0034	0.0030	0.0036	0.0044	0.0048	0.0050	0.0053	0.0057	0.0060	0.0068	0.0078
7				0.0027	0.0032	0.0040	0.0044	0.0046	0.0048	0.0051	0.0054	0.0061	0.0071
8				0.0025	0.0030	0.0037	0.0040	0.0042	0.0044	0.0047	0.0050	0.0056	0.0065
9						0.0034	0.0037	0.0039	0.0041	0.0044	0.0046	0.0052	0.0060
10								0.0037	0.0039	0.0041	0.0043	0.0049	0.0057
11									0.0036	0.0039	0.0041	0.0046	0.0054
12										0.0037	0.0039	0.0044	0.0051
13											0.0037	0.0042	0.0049
14											0.0036	0.0040	0.0047
15												0.0039	0.0045
16													0.0043
<b>T Ap</b>	0.023	0.032	0.032	0.034	0.040	0.053	0.058	0.064	0.071	0.080	0.091	0.107	0.128

NOTE: Always allow .003-.005" extra stock for full profile inserts.

### Multi-Tooth Threads, Internal

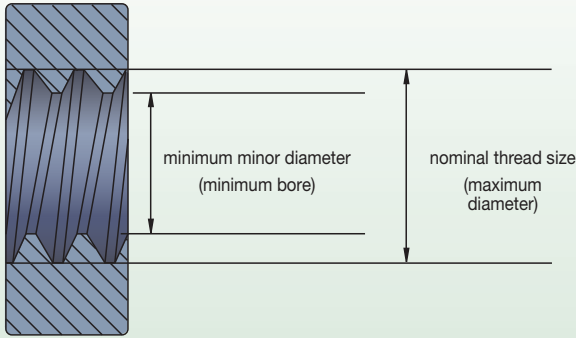
type	ISO metric						ISO UN					Whitworth	NPT		
	3M	2M	3M	2M	3M	2M	2M	3M	2M	3M	2M	2M	2M	3M	2M
pitch (mm)	1.0	1.5	1.5	2.0	2.0	3.0	—	—	—	—	—	—	—	—	—
TPI	—	—	—	—	—	—	16	16	12	12	8	11	11.5	11.5	8
total depth	.024	.033	.033	.460	.460	.070	.037	.037	.490	.490	.740	.620	.690	.690	.100
1	.013	.015	.020	.020	.028	.022	.017	.022	.022	.030	.023	.029	.023	.032	.035
2	.011	.010	.013	.015	.018	.019	.012	.015	.016	.019	.020	.019	.020	.022	.025
3	—	.008	—	.011	—	.017	.008	—	.011	—	.017	.014	.014	.015	.022
4	—	—	—	—	—	.012	—	—	—	—	.014	—	.012	—	.018

### Recommendations for Steel Workpieces (<300 BHN)

catalog number	insert size	TPI profile	total depth — on radius		
			1st pass	2nd pass	3rd pass
NTC-8R/L8EM	8	8 UN	.048	.064	.079
NTC-8R/L8IM	8	8 UN	.047	.061	.074
NTC-8R/L10EM	8	10 UN	.036	.050	.063
NTC-8R/L10IM	8	10 UN	.035	.048	.060
NTC-8R/L12EM	8	12 UN	.030	.041	.052
NTC-8R/L12IM	8	12 UN	.030	.037	.047
NTC-8R/L14EM	8	14 UN	.027	.037	.044
NTC-8R/L14IM	8	14 UN	.024	.031	.041
NTC-8R/L16EM 8	8	16 UN	.023	.032	.038
NTC-8R/L16IM	8	16 UN	.020	.027	.037
NTC-8R/L18EM	8	18 UN	.019	.026	.034
NTC-8R/L18IM	8	18 UN	.019	.024	.033
NDC-68RDR/L-75M	8	8 round	.058	.065	.073
NDC-61RDR/L-75M	8	10 round	.044	.051	.057
NDC-88RDRD/L-75M	8	8 round	.051	.069	.073
NDC-88VR/L-75M	8	8 NPT	.040	.068	.096
NDC-8115VR/L-75M	8	11.5 NPT	.038	.054	.067
NDN-814VR/L-75M	8	14 NPT	.038	.054	.054

NOTE: Always allow .003-.005" extra stock for full profile inserts.

The following charts list the largest thread pitch that can be applied on internal applications using TopThread threading inserts for 60° V-threading and Acme threading.



**Inch-Sized 60° V-Threading Limits**  
internal threading limitations  
NT-1, NT-2 V-threading inserts

TPI	nominal thread size		minimum minor diameter (inch)	
	NT-1	NT-2	NT-1	NT-2
6	1-7/8	—	1.695	—
7	1-3/4	—	1.595	—
8	1-5/8	—	1.490	—
9	1-9/16	—	1.442	—
10	1-1/2	15/16	1.392	.830
11	1-7/16	15/16	1.339	.830
11-1/2	1-3/8	15/16	1.281	.830
12	1-3/8	9/16	1.285	.472
13	1-5/16	9/16	1.229	.472
14	1-1/4	9/16	1.173	.472
16	1-1/4	9/16	1.182	.472
18	1-1/8	9/16	1.065	.472
20	1-1/8	1/2	1.071	.440
24*	1-1/16	1/2	1.017	.440

\*Twenty-four threads per inch and finer can be cut with an NT-2 insert provided the minor diameter is 1.000" or larger (.440" or larger with NT-1).

**internal threading limitations**  
NT-3 and- 4 V-threading inserts

TPI	nominal thread size	minimum minor diameter (inch)
4**	3	2.729
4-1/2**	2-7/8	2.634
5	2-3/4	2.534
6	2-1/2	2.320
7	2-1/4	2.095
8	2	1.865
9	1-15/16	1.817
10	1-7/8	1.767
11	1-13/16	1.714
11-1/12	1-3/4	1.656
12	1-3/4	1.660
13	1-5/8	1.542
14	1-9/16	1.485
16*	1-7/16	1.370

\*Sixteen threads per inch and finer can be cut provided minor diameter is 1.370" or larger.

\*\*NT-4 insert only.

**Metric-sized 60° V-Threading Limits**  
internal threading limitations  
NT-1, NT-2 60° V-threading inserts

TPI	nominal thread size		minimum thread diameter (inch)	
	NT-1	NT-2	NT-1	NT-2
4,00	M48 x 4.00	—	43,67	—
3,00	M42 x 3.00	—	38,75	—
2,50	M39 x 2.50	M24 x 2,50	36,29	21,29
2,00	M33 x 2.00	M15 x 2,00	30,84	12,84
1,75	M32 x 1.75	M15 x 1,75	30,11	13,11
1,50	M32 x 1.50	M15 x 1,50	30,38	13,38
1,25	M29 x 1.29	M14 x 1,25	27,65	12,65
1,00*	M27 x 1.00	M14 x 1,00	25,92	12,92
0,75	M22 x 0.75	M12 x 0,75	21,19	11,19

\*Thread pitch of 1mm and less can be cut with an NT-2 insert provided the core thread diameter is 25mm or larger (11mm or larger with NT-1).

**internal threading limitations**  
NT-3 and NT-4 60° V-threading inserts

TPI	nominal thread size	minimum thread diameter (inch)
6,00**	M76 x 6.00	69,50
5,50**	M73 x 5.50	67,05
5,00	M70 x 5.00	64,59
4,00	M64 x 4.00	59,67
3,00	M52 x 3.00	48,75
2,50	M48 x 2.50	45,29
2,00	M42 x 2.00	39,84
1,75	M40 x 1.75	38,11
1,50*	M38 x 1.50	36,38

\*Thread pitch of 1,5mm and less can be cut provided core thread diameter is 35mm or larger.

\*\*NT-4-insert only.

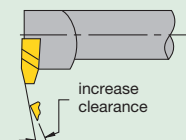
**Acme Threading Limits**

**internal threading limitations**  
NA and NAS-2, -3, -4, and -6 Acme threading inserts

TPI	nominal thread size	minimum thread diameter (inch)	
	NT-1	NT-1	NT-2
2**	5	4.500	114.3
2-1/2**	4-1/2	4.100	104.1
3**	4	3.665	93.1
4	3-1/2	3.250	82.6
5	3	2.800	71.1
6	2-1/2	2.333	59.3
8	2-1/4	2.125	54.0
10	2	1.900	48.3
12	1-3/4	1.667	42.4
14	1-5/8	1.554	39.5
16*	1-1/2	1.438	36.5

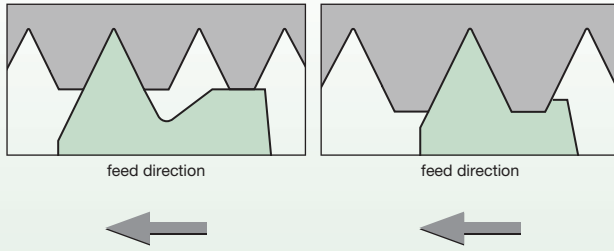
\*Sixteen threads per inch and finer can be cut provided minor diameter is 1.438" (36,5mm) or larger.

\*\*NA-6 insert only.



Additional secondary clearance can be ground on leading edge of insert to provide sufficient helical clearance for machining coarser threads and multiple start threads. Modified standard inserts may be furnished for machining threads outside of the limits shown.

### 60° V-Thread Crest Turning Application Data



NTC crest turning insert for 12 threads per inch and finer ( $P \leq 2\text{mm}$ )

NTC crest turning insert for 11 threads per inch and coarser ( $P \geq 3\text{mm}$ )

*NOTE: NTC inserts automatically control root to crest dimensions. Therefore, in setting up threading operations with NTC inserts, check the O.D. or I.D. at the thread crest for correct dimensions.*

### 60° V-Thread Crest Turning Application Data

insert catalog number	nose radius on insert (inch)	thread radius per MIL-S-8879A (inch)
NJ-3014R/L12	.0125/.0135	.0125/.0150
NJK-3008R/L20	.0075/.0085	.0075/.0090

#### “J” thread note for catalog

The controlled root radius thread form (SAE8879C) is defined for the external thread only. To machine the corresponding internal thread, choose any insert that will cut a unified class 2B thread, then bore the minor diameter to size. Refer to SAE8879C and MIL-S-8879C and SAEAS8879D for the correct “J” thread minor diameter values.

### 60° V-Thread Application Data

insert description	insert	D** (inch)	E** (inch)	recommended TPI*		recommended TP*	
				external	internal	external	internal
 NT-NTP-	NT-1	.075	.044	-	24-12	-	1,00-2,00
	NT-2	.113	.075	36-8	20-7	0,70-3,00	1,25-3,50
	NT-2-K	.113	.075	36-8	20-7	0,70-3,00	1,25-3,50
	NTF-2	.062	.040	44-14	24-12	0,60-1,75	1,00-2,00
	NTK-2	.062	.040	44-14	24-12	0,60-1,75	1,00-2,00
	NTP-2	.113	.075	36-8	20-7	0,70-3,00	1,25-3,50
	NT-3	.148	.097	20-6	12-5	1,25-4,00	2,00-5,00
	NT-3-K	.148	.097	20-6	12-5	1,25-4,00	2,00-5,00
	NT-3-C	.148	.097	11-6	6 (only)	2,50-4,00	4,00 (only)
	NT-3-CK	.148	.097	11-6	6 (only)	2,50-4,00	4,00 (only)
 NTF-NTK-	NTF-3	.083	.054	44-10	24-9	0,60-2,50	1,00-2,50
	NTK-3	.083	.054	44-10	24-9	0,60-2,50	1,00-2,50
	NTP-3	.148	.097	20-6	12-5	1,25-4,00	2,00-5,00
	NT-4	.196	.127	20-4	12-4	1,25-6,25	2,00-6,25
	NT-4-K	.196	.127	20-4	12-4	1,25-6,25	2,00-6,25
	NTP-4	.196	.127	20-4	12-4	1,25-6,25	2,00-6,25

\*Based on maximum insert radius size and class 2A and 2B thread specifications.

\*\*For metric D and E dimensions, multiply by 25,4.

API Thread Forms • Insert Applications Chart for API Rotary Shouldered Connections

thread form	WIDIA™ insert		tool joint application	minimum box size*
	cresting	non-cresting		
V-.038R 2" TPF 4 TPI	NDC-4038R/L2 4-E/IR4API382	ND-3038R/L	2-3/8 API internal flush 2-7/8 API internal flush 3-1/2 API internal flush 4 API internal flush 4-1/2 API internal flush 5-1/2 API internal flush 6-5/8 API internal flush 4 API full hole API #23, API #26, API #31, API #35, API #38, API #40, API #44, API #46, API #50	API #31 2-7/8 IF
V-.038R 3" TPF 4 TPI	NDC-4038R/L3 4-E/IR4API383	ND-3038R/L	API #56 API #61 API #70 API #77	API #56
V-.050 2" TPF 4 TPI	NDC-4050R/L2 4-E/IR4API502	ND-4050R/L	5-1/2 API full hole 6-5/8 API regular 6-5/8 API full hole	5-1/2 API full hole
V-.050 3" TPF 4 TPI	NDC-4050R/L3 4-E/IR4API503	ND-4050R/L	5-1/2 API regular 7-5/8 API regular 8-5/8 API regular	5-1/2 API regular
V-.040 3" TPF 5 TPI	NDC-3040R/L3 NDC-4040R/L3 4-E/IR5API403	ND-3040R/L ND-4040R/L	2-3/8 API regular 2-7/8 API regular 3-1/2 API regular 4-1/2 API regular	3-1/2 API regular

\*Minimum box size that can be threaded with a standard TopThread insert due to minimum bore equipment.

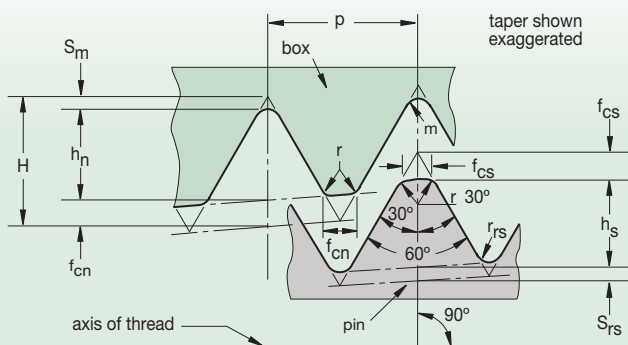
API Thread Forms

Product Thread Dimensions • Rotary Shouldered Connections (Inch)

threadform	taper inch per ft.	thread height, not truncated H	thread height, truncated h <sub>n</sub> =h <sub>s</sub>	root truncation S <sub>m</sub> =S <sub>rs</sub> f <sub>m</sub> =f <sub>rs</sub>	crest truncation f <sub>cn</sub> =f <sub>cs</sub>	width of flat		root radius r <sub>m</sub> =r <sub>rs</sub>	radius at thread corners r	pitch p
						crest f <sub>cn</sub> =f <sub>cs</sub>	crest f <sub>m</sub> =f <sub>rs</sub>			
V-.038R	2	.216005	.121844	.038000	.056161	.065	—	.038	.015	.250
V-.038R	3	.215379	.121381	.038000	.055998	.065	—	.038	.015	
V-.040	3	.172303	.117842	.020000	.034461	.040	—	.020	.015	.250
V-.050	3	.215379	.147303	.025000	.043076	.050	—	.025	.015	
V-.050	2	.216005	.147804	.025000	.043201	.050	—	.025	.015	.250

NOTE: All dimensions in inches.

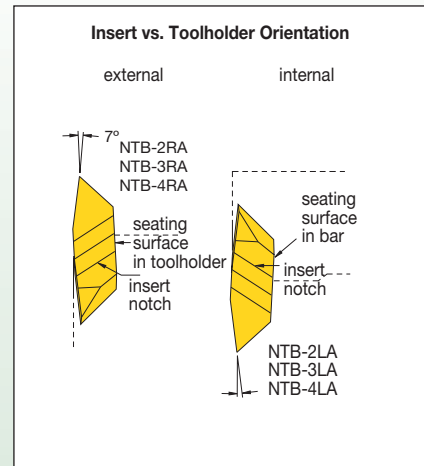
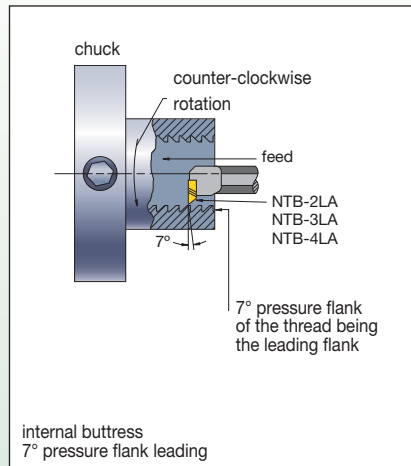
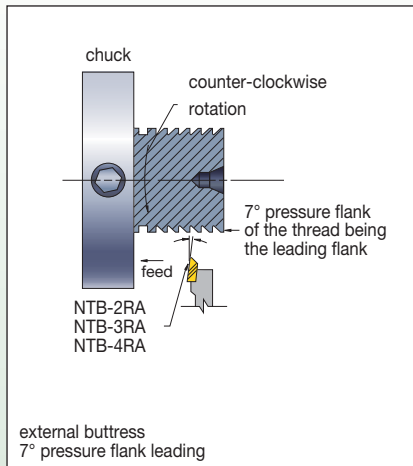
V-.040 and V-.050 Product Thread Form



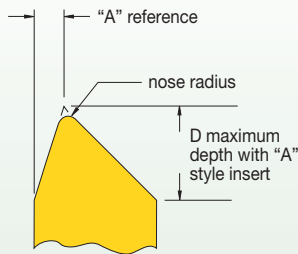
Casing and Tubing Round Thread (Height Dimensions)

thread element	10 TPI p=.1000	8 TPI p=.1250	
H	= .866p	.08660	.10825
H <sub>s</sub> = h <sub>n</sub>	= .626p - .007	.05560	.07125
S <sub>rs</sub> = S <sub>m</sub>	= .120p + .002	.01400	.01700
S <sub>cs</sub> = S <sub>cn</sub>	= .120p + .005	.01700	.02000

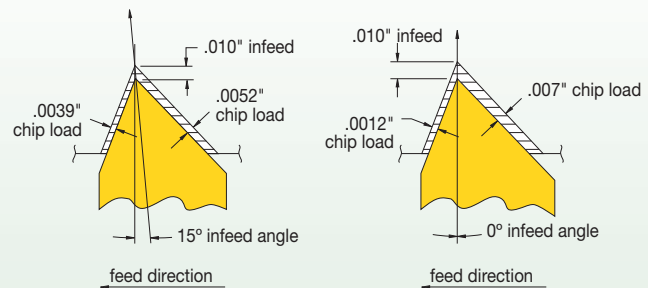
**American Buttress (7° Pressure Flank Leading) NTB-A Inserts • Push Type**



**Reference Dimensions**



**Infeed Angle vs. Chip Load: 7° Pressure Flank Leading**



insert	D (inch)	"A" ref. (inch)	nose radius (inch)	pitch based on maximum radius
NTB-2A	.133	.024	.002-.004	16-20 TPI
NTB-3A	.171	.031	.005-.008	8-16 TPI
NTB-4A	.218	.049	.008-.012	4-6 TPI

NTB-A insert

NOTE: For balanced chip load, 15° infeed angle is suggested.

**Internal Threading Limitations**

**internal threading limitations  
NTB-2A Buttress threading inserts**

TPI	nominal thread size	minimum minor diameter (inch)
8	1-3/4	1.600
10	1-5/8	1.505
12	1-1/2	1.400
16	1-1/4	1.175
20	1-1/16	1.002

**internal threading limitations  
NTB-3 and NTB-4A Buttress threading inserts**

TPI	nominal thread size	minimum minor diameter (inch)
4*	2-1/2	2.200
5	2-1/4	2.010
6	2	1.800
8	1-3/4	1.600
10	1-5/8	1.505
12**	1-1/2	1.400

\*NTB-4A insert only.

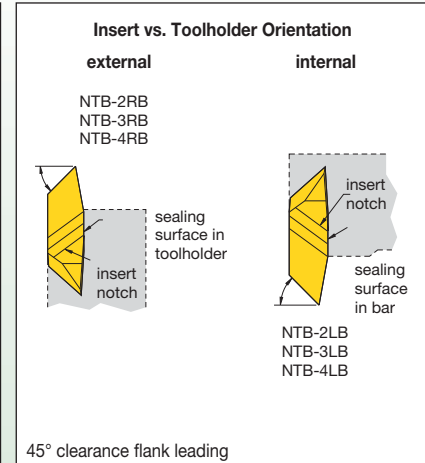
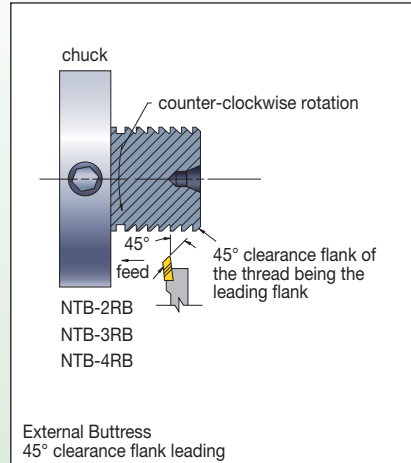
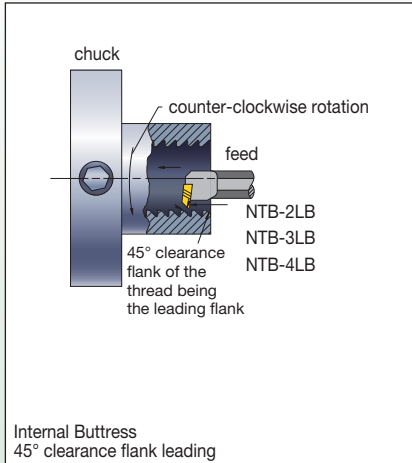
\*\*Can cut 16 or 20 threads per inch provided minor diameter is 1.375" or larger.

**Threads per Inch vs. Maximum Root Radius Chart (Inch)**

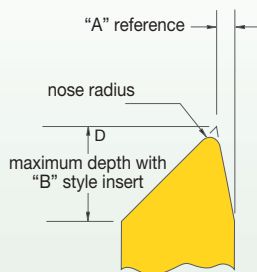
TPI	20	16	12	10	8	6	5	4	3	2-1/2	2	1-1/2	1-1/4	1
maximum root radius	.0036	.0045	.0059	.0071	.0089	.0119	.0143	.0179	.0238	.0268	.0375	.0476	.0572	.0714

NOTE: Special Buttress forms are available upon request.

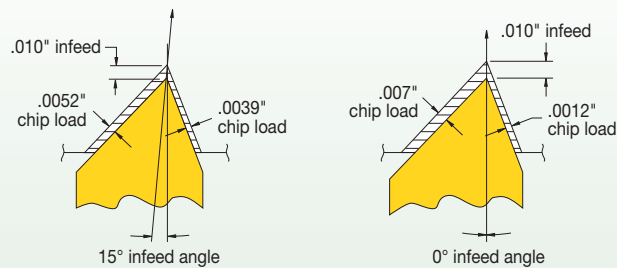
American Buttress (45° Clearance Flank Leading): NTB-B Inserts • PULL-type



Reference Dimensions



Infeed Angle vs. Chip Load: 45° Clearance Flank Leading



NTB-B insert

insert	D (inch)	"A" reference (inch)	nose radius (inch)	pitch based on maximum radius
NTB-3B	.171	.031	.005-.004	8-16 TPI

NOTE: For balanced chip load, a reverse 15° infeed angle is suggested.

Internal Threading Limitations

internal threading limitations NTB-2B Buttress threading inserts		
TPI	nominal thread size	minimum minor diameter (inch)
8	1-3/4	1.600
10	1-5/8	1.505
12	1-1/2	1.400
16	1-1/4	1.175
20	1-1/16	1.002

internal threading limitations NTB-3 and NTB-4B Buttress threading inserts		
TPI	nominal thread size	minimum minor diameter (inch)
4*	2-7/8	2.575
5	2-3/4	2.510
6	2-3/8	2.175
8	2-1/8	1.975
10	1-7/8	1.755
12	1-5/8	1.525
16	1-1/2	1.407
20	1-7/16	1.378

\*NTB-4B insert only.



# WIDIA™ Knowledge Center



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**WIDIA** 

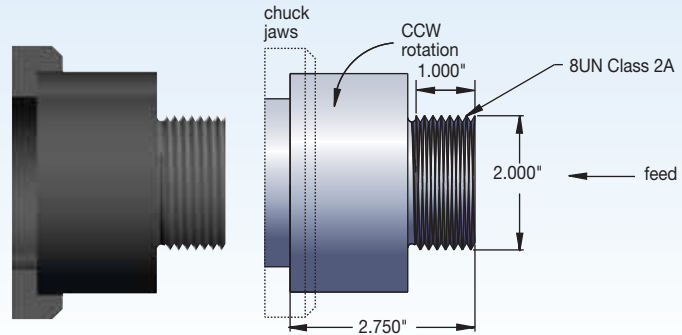
### Required Information

**From Part Drawing:**

- material: 316SS, 200 HB
- thread form: 8UN
- tolerance: class 2A
- operation: external threading
- pitch diameter: 2.00" x 1.00" deep

**From Machine Setup Data:**

- tooling: .750" x .750"
- spindle rotation: counter-clockwise
- feed: toward chuck

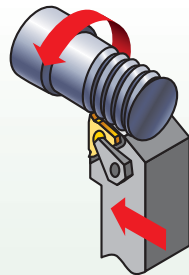


### Steps for a Successful Threading Operation

**Step 1 • Determine Threading Method**

**Need to Know:**

- Operation (external).
- Spindle rotation (CCW).  
*Counter-clockwise rotation.*
- Feed direction (toward chuck).
- Right-hand toolholder.
- Right-hand insert (ER).
- Standard helix method.



**Step 2 • Select Insert**



**Need to Know:**

- Thread form (8 UN Class 2A).
- Hand of insert (right hand – ER).

**Choose the High-Performance Solution**

catalog number	insert size	TN6025
3ER8UN	3"	•

**High-Performance Selection**

*NOTE: Use insert with largest iC available.*

- insert: 3ER8UN
- grade: TN6025
- speed: 500 SFM

**Step 3 • Select the Grade and Speed**

**Need to Know:**

- Workpiece material (316SS-200HB).
- Operation (external).

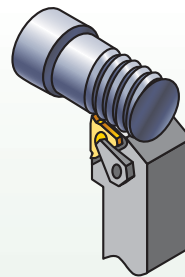
Options: Grade and Speed Selection Guidelines

threading operation	stainless steel
external	general purpose and high performance
	TN6025
	150–450 SFM

**Step 4 • Select Toolholder**

**Need to Know:**

- External or internal operation (external).
- Pitch diameter to determine minimum bore diameter (N/A).
- Type of tooling – toolholder, boring bar (toolholder).
- Hand of tool (right hand).
- Insert size (3/8").



Options:

catalog number	insert size	shim
LSASR-123	3"	SM-YE3

**First choice: LSASR-123 holder**

**Step 5 • Select Shim**

**Need to Know:**

- Thread form – TPI or pitch (8 TPI).
- Pitch diameter (2").
- Helix method (standard).  
See Laydown Threading (LT) shim selection chart.

Select SM-YE3 shim

*NOTE: The SM-YE3 shim is supplied with the selected toolholder.*



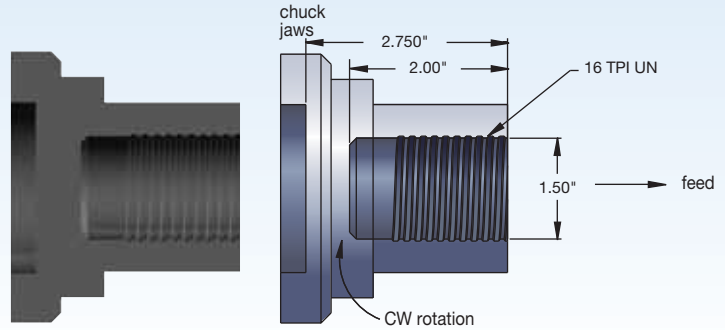
**Required Information**

**From Part Drawing:**

- material: 4140 steel
- thread form: 16 TPI UN
- tolerance: class 2B
- operation: internal threading
- pitch diameter: 1.5" x 2" deep

**From Machine Setup Data:**

- tooling: .075" boring bar
- spindle rotation: clockwise
- feed: away from chuck



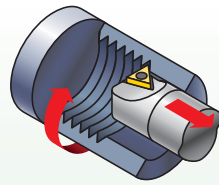
**Steps for a Successful Threading Operation**

**Step 1 •**

**Determine Threading Method**

**Need to Know:**

- Operation (internal).
- Spindle rotation (CW).  
*Clockwise rotation.*
- Feed direction (away from chuck).
- Left-hand toolholder.
- Left-hand insert (NL).
- Reverse helix method.



**Step 2 •**

**Select Insert**



**Need to Know:**

- Thread form (16UN Class 2B).
- Hand of insert (left hand – NL).

**Choose the High-Performance Solution**

catalog number	insert size	TN6025
2ILA60	2"	•
3ILA60	3"	•

**High-Performance Selection**

*NOTE: Use insert with largest possible iC to go into the bore.*

insert: 3ILA60  
grade: TN6025  
speed: 450 SFM

**Step 3 •**

**Select the Grade and Speed**

**Need to Know:**

- Workpiece material (4010 steel).
- Operation (internal).

Options: Grade and Speed  
Selection Guidelines

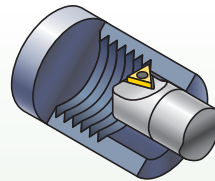
threading operation	steel
internal	general purpose and high performance
	TN6025
	100–550 SFM

**Step 4 •**

**Select Toolholder**

**Need to Know:**

- External or internal operation (internal).
- Pitch diameter to determine minimum bore diameter for internal operations (1.5").
- Type of tooling – toolholder, boring bar (boring bar).
- Hand of tool (left hand).
- Insert size (3/8").



Options:

catalog number	insert size	minimum bore diameter	shim
S1212-LSEL3	3"	.90	SM-YE3
S0812-LSEL2	2"	.65	–

**First choice: S1212-LSEL3 bar**

**Step 5 •**

**Select Shim**

**Need to Know:**

- Thread form – TPI or pitch (16 TPI).
- Pitch diameter (1.5").
- Helix method (reverse).  
See Laydown Threading (LT) shim selection chart.

Select SM-YE3-2N shim

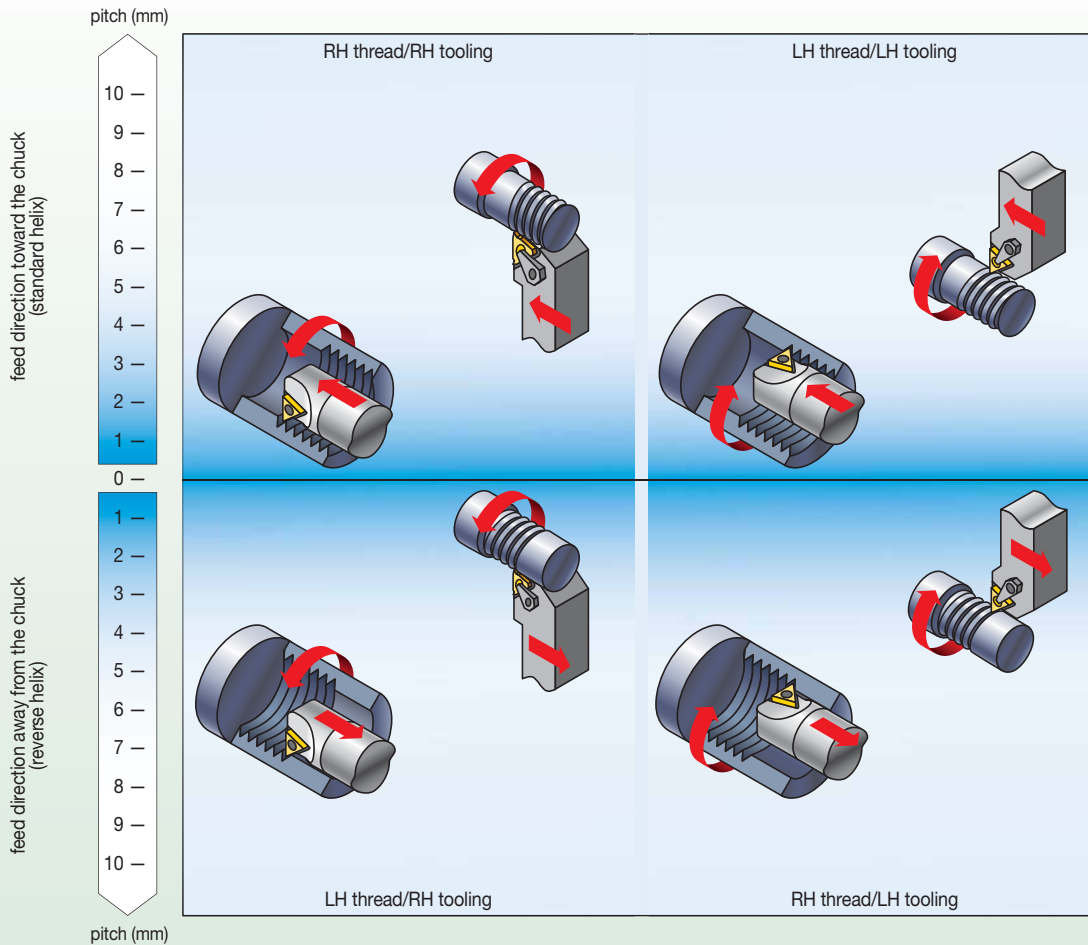
*NOTE: For this application, the standard shim supplied should be replaced with the recommended shim, SM-YE3-2N.*

### Laydown Threading Shim Selection Guidelines

It is essential to select the correct shim to ensure thread quality and maximum tool life. These parameters are needed:

- Pitch
- Pitch diameter
- Number of starts
- Feed direction

### Laydown Selection Chart



NOTE: For multi-start threads, use the lead value instead of the pitch.

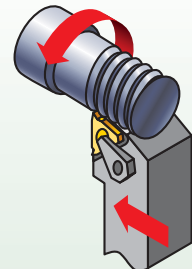
### Diagram of Thread Lead Angles

To calculate the lead angle of a given thread, use this formula:

$$\beta = \text{Arctan} \frac{P \cdot S}{\pi D_e}$$

$\beta$  = thread lead angle  
 $D_e$  = effective pitch diameter of thread wear  
 $P = 1/\text{TPI}$   
 $\text{TPI}$  = threads per inch  
 $S$  = number of starts  
 single-start, lead = pitch  
 multiple-start, lead = pitch (x) number of starts

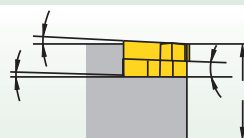
All toolholders are designed with an inclination angle = 1.5°. When turning standard threads with a lead angle of 1–2°, this guarantees adequate clearance at the flanks of the insert's thread tooth. The thread lead angle and the required inclination angle of the insert are given by  $\beta$ . Cutting edge height is constant at every shim and insert combination. All toolholders are supplied with 1-1/2° lead angle.



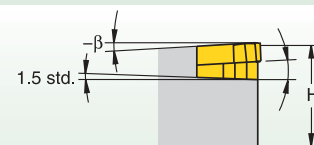
Laydown Threading Shim Selection Table • Inch

insert size	toolholder		shim ordering code (inch)							
	external	internal			standard					
3 (3/8")	RH	LH	SM-YE3-3P	SM-YE3-2P	SM-YE3-1P	SM-YE3	SM-YE3-1N	SM-YE3-1.5N	SM-YE3-2N	SM-YE3-3N
3 (3/8")	LH	RH	SM-YI3-3P	SM-YI3-2P	SM-YI3-1P	SM-YI3	SM-YI3-1N	SM-YI3-1.5N	SM-YI3-2N	SM-YI3-3N
4 (1/2")	RH	LH	SM-YE4-3P	SM-YE4-2P	SM-YE4-1P	SM-YE4	SM-YE4-1N	SM-YE4-1.5N	SM-YE4-2N	SM-YE4-3N
4 (1/2")	LH	RH	SM-YI4-3P	SM-YI4-2P	SM-YI4-1P	SM-YI4	SM-YI4-1N	SM-YI4-1.5N	SM-YI4-2N	SM-YI4-3N
TPI	pitch (mm)		pitch diameter (inch)							
72	-	-	-	-	-	0.12-0.31	0.32-0.84	>0.84	0.84-0.32	0.31-0.12
-	0,35	-	-	-	-	0.12-0.3	0.31-0.84	>0.84	0.84-0.31	0.3-0.12
64	-	-	-	-	-	0.14-0.35	0.36-0.95	>0.95	0.95-0.36	0.35-0.14
-	0,40	-	-	-	-	0.14-0.35	0.36-0.96	>0.96	0.96-0.36	0.35-0.14
56	-	0,45	-	-	-	0.16-0.4	0.41-1.09	>1.09	1.09-0.41	0.4-0.16
-	0,50	-	-	-	0.11-0.16	0.17-0.44	0.45-1.2	>1.20	1.2-0.45	0.44-0.17
48	-	-	-	-	0.12-0.17	0.18-0.46	0.47-1.27	>1.27	1.27-0.47	0.46-0.18
44	-	-	-	-	0.13-0.19	0.2-0.51	0.52-1.38	>1.38	1.38-0.52	0.51-0.2
-	0,60	-	0.1-0.12	0.13-0.2	0.21-0.53	0.54-1.44	>1.44	1.44-0.54	0.53-0.21	
40	-	-	0.11-0.13	0.14-0.21	0.22-0.56	0.57-1.52	>1.52	1.52-0.57	0.56-0.22	
-	0,70	-	0.12-0.15	0.16-0.23	0.24-0.62	0.63-1.68	>1.68	1.68-0.63	0.62-0.24	
36	-	-	0.12-0.15	0.16-0.23	0.24-0.62	0.63-1.69	>1.69	1.69-0.63	0.62-0.24	
-	0,75	0.11-0.12	0.13-0.16	0.17-0.25	0.26-0.66	0.67-1.8	>1.80	1.8-0.67	0.66-0.26	
32	-	0.12-0.13	0.14-0.17	0.18-0.26	0.27-0.7	0.71-1.9	>1.90	1.9-0.71	0.7-0.27	
-	0,80	0.12-0.13	0.14-0.17	0.18-0.26	0.27-0.71	0.72-1.91	>1.91	1.91-0.72	0.71-0.27	
28	-	0.14-0.14	0.15-0.19	0.2-0.3	0.31-0.8	0.81-2.17	>2.17	2.17-0.81	0.8-0.31	
27	-	0.14-0.15	0.16-0.2	0.21-0.31	0.32-0.83	0.84-2.25	>2.25	2.25-0.84	0.83-0.32	
-	1,00	0.15-0.16	0.17-0.21	0.22-0.33	0.34-0.89	0.9-2.39	>2.39	2.39-0.9	0.89-0.34	
24	-	0.16-0.17	0.18-0.23	0.24-0.35	0.36-0.94	0.95-2.53	>2.53	2.53-0.95	0.94-0.36	
-	1,25	0.19-0.2	0.21-0.27	0.28-0.42	0.43-1.11	1.12-2.99	>2.99	2.99-1.12	1.11-0.43	
20	-	0.19-0.21	0.22-0.27	0.28-0.42	0.43-1.13	1.14-3.04	>3.04	3.04-1.14	1.13-0.43	
18	-	0.21-0.23	0.24-0.31	0.32-0.47	0.48-1.26	1.277-3.38	>3.38	3.38-1.27	1.26-0.48	
-	1,50	0.22-0.25	0.26-0.33	0.34-0.5	0.51-1.34	1.35-3.59	>3.59	3.59-1.35	1.34-0.51	
16	-	0.24-0.26	0.27-0.35	0.36-0.53	0.54-1.41	1.42-3.8	>3.80	3.8-1.42	1.41-0.54	
-	1,75	0.26-0.29	0.3-0.38	0.39-0.59	0.6-1.56	1.57-4.19	>4.19	4.19-1.57	1.56-0.6	
14	-	0.27-0.3	0.31-0.4	0.41-0.61	0.62-1.62	1.63-4.34	>4.34	4.34-1.63	1.62-0.62	
13	-	0.29-0.32	0.33-0.43	0.44-0.66	0.67-1.74	1.75-4.68	>4.68	4.68-1.75	1.74-0.67	
-	2,00	0.3-0.33	0.34-0.44	0.45-0.67	0.68-1.78	1.79-4.79	>4.79	4.79-1.79	1.78-0.68	
12	-	0.32-0.35	0.36-0.46	0.47-0.71	0.72-1.89	1.9-5.07	>5.07	5.07-1.9	1.89-0.72	
11.5	-	0.33-0.37	0.38-0.49	0.5-0.74	0.75-1.97	1.98-5.29	>5.29	5.29-1.98	1.97-0.75	
11	-	0.34-0.38	0.39-0.51	0.52-0.78	0.79-2.06	2.07-5.53	>5.53	5.53-2.07	2.06-0.79	
-	2,50	0.37-0.42	0.43-0.55	0.56-0.84	0.85-2.23	2.24-5.98	>5.98	5.98-2.24	2.23-0.85	
10	-	0.38-0.42	0.43-0.56	0.57-0.86	0.87-2.27	2.28-6.08	>6.08	6.08-2.28	2.27-0.87	
9	-	0.42-0.47	0.48-0.62	0.63-0.95	0.96-2.52	2.53-6.75	>6.75	6.75-2.53	2.52-0.96	
-	3,00	0.45-0.5	0.51-0.66	0.67-1.02	1.03-2.68	2.69-7.18	>7.18	7.18-2.69	2.68-1.03	
8	-	0.47-0.53	0.54-0.7	0.71-1.08	1.09-2.84	2.85-7.6	>7.60	7.6-2.85	2.84-1.09	
-	3,50	0.52-0.59	0.6-0.77	0.78-1.19	1.2-3.13	3.14-8.38	>8.38	8.38-3.14	3.13-1.2	
7	-	0.524-0.61	0.62-0.8	0.81-1.23	1.24-3.25	3.26-8.68	>8.68	8.68-3.26	3.25-1.24	
-	4,00	0.6-0.67	0.68-0.89	0.9-1.36	1.37-3.58	3.59-9.57	>9.57	9.57-3.59	3.58-1.37	
6	-	0.63-0.71	0.72-0.94	0.95-1.44	1.45-3.79	3.8-10.13	>10.13	10.13-3.8	3.79-1.45	
-	5,00	0.75-0.84	0.85-1.11	1.12-1.7	1.71-4.48	4.49-11.97	>11.97	11.97-4.49	4.48-1.71	
5	-	0.76-0.86	0.87-1.13	1.14-1.73	1.74-4.55	4.56-12.16	>12.16	12.16-4.56	4.55-1.74	
4.5	-	0.84-0.95	0.96-1.26	1.27-1.92	1.93-5.06	5.07-13.51	>13.51	13.51-5.07	5.06-1.93	
-	6,00	0.9-1.01	1.02-1.33	1.34-2.04	2.05-5.37	5.38-14.36	>14.36	14.36-5.38	5.37-2.05	
4	-	0.95-1.07	1.08-1.41	1.42-2.16	2.17-5.69	5.7-15.2	>15.20	15.2-5.7	5.69-2.17	
inclination angle			4.5	3.5	2.5	1.5	0.5	0.0	-0.5	-1.5
			standard helix (feed toward the chuck)				reverse helix (feed away from the chuck)			

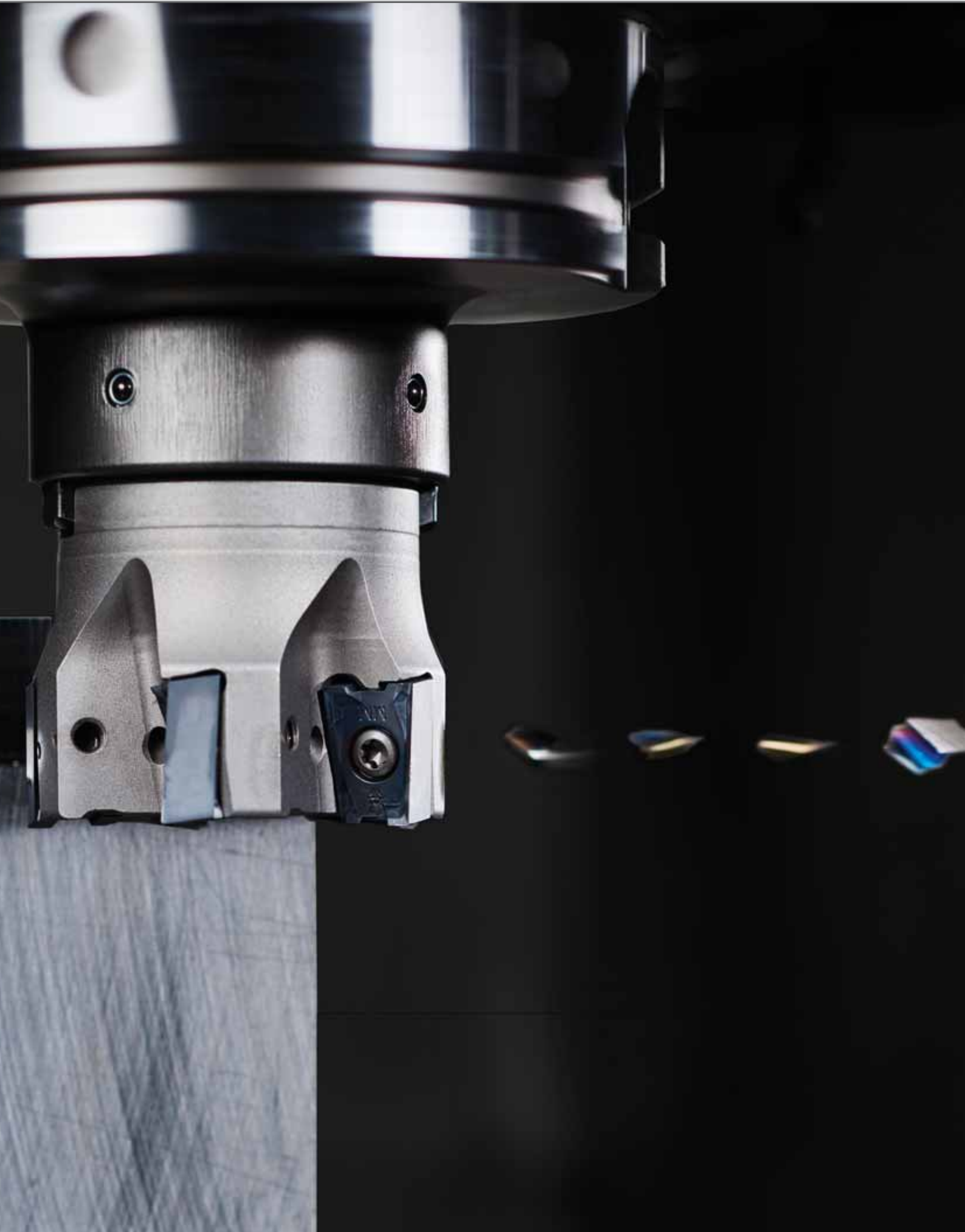
1. Select TPI or pitch from the left-hand columns.
2. Follow row to specified pitch diameter and the correct feed direction.
3. Follow the column to the top for the required shim based on the toolholder and insert size.



**standard helix method:**  
Used when RH thread is cut with RH tool or LH thread with LH tool.



**reverse helix method:**  
Used when RH thread is cut with LH tool or when LH thread is cut with RH tool.



## Indexable Milling

Indexable Milling Introduction.....G2-G19

Face Mills .....H1-H68

0° Shoulder Mills.....I1-I51

Slotting Mills .....J1-J33

Copy Mills.....K1-K126





# NEW PRODUCTS

Our latest metalcutting innovations are designed to deliver higher productivity, longer tool life, and increased application versatility.

For more information about the latest products and services from WIDIA™, please contact your WIDIA Representative or Authorized WIDIA Distributor, or visit [widia.com](http://widia.com).

## Victory™ Milling Grades

- WP40PM™ — New best-in-class Victory milling grade for machining steel materials in ISO material group P40 in rough milling applications.
- WK15CM™ — New milling grade for cast irons for higher tool life and increased productivity.
- WS30PM™ — A new high-performance milling grade for machining titanium and stainless steels.

## VSM11™

- Step down capabilities.
- Effective internal coolant supply for screw-on, end mill, and shell mill cutters.
- The max ramp angle for VSM11 is 10°.





## VSM490™

- Four cutting edges on a double-sided strong insert.
- Lower cutting forces; high-positive geometry.
- Excellent wall and surface finish capabilities.
- When using multiple steps, this is a “stepless” solution.



## VSM17™

- Depth-of-cut capabilities up to .642" (16,3mm).
- Step down capabilities.
- Effective internal coolant supply for screw-on, end mill, and shell mill cutters.



## SuperFeed™

- Protective cutter body.
- Increased flexibility with five PCD cartridge options.
- User-friendly axial adjustment.
- Reconditioning options reduce overall cost.



## The Most Advanced Milling Solutions in the Industry

For unsurpassed quality, value, and performance, you can trust WIDIA™ to provide the most comprehensive line of reliable metalcutting tools. Whatever your indexable milling product requirements, be assured that you will find the appropriate solution in this all-inclusive, easy-to-use guide.

For every milling application, workpiece, or equipment need, we offer the best tools on the market, designed to reduce your machining time, provide superior surface finishes, and outperform the competition.



You can also use our NOVO app to guide you to the correct choice!

For more information, please visit [widia.com/novo](http://widia.com/novo).

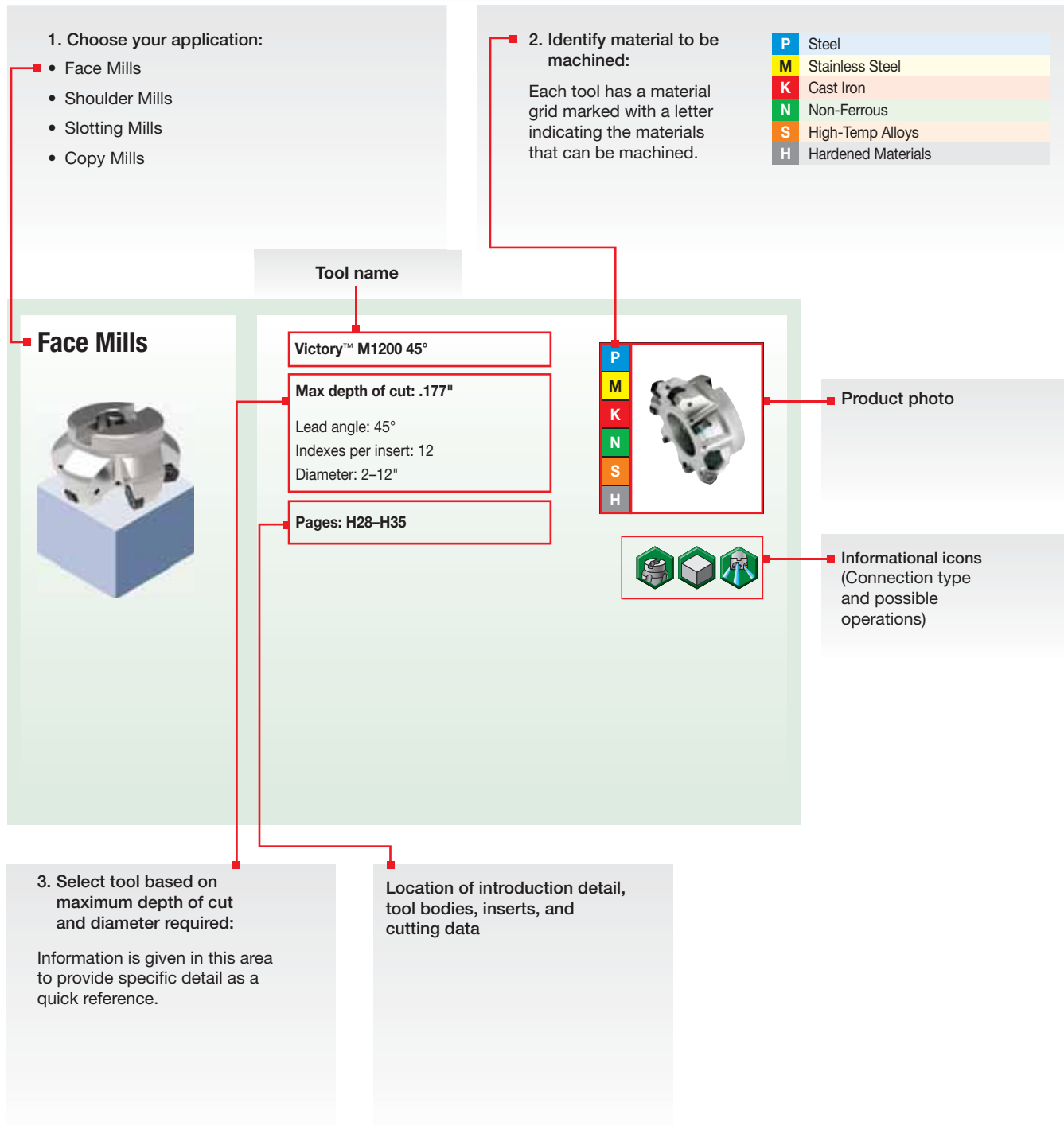
### 1. Choose your application:

- Face Mills
- Shoulder Mills
- Slotting Mills
- Copy Mills

### 2. Identify material to be machined:

Each tool has a material grid marked with a letter indicating the materials that can be machined.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials



### 3. Select tool based on maximum depth of cut and diameter required:

Information is given in this area to provide specific detail as a quick reference.

Location of introduction detail, tool bodies, inserts, and cutting data



### Selecting Tool Body, Insert, and Cutting Data

#### 4. Choose the tool body:

Choose diameter (D1) and pitch (Z) of tool body.

NOTE: Make sure you select the correct shank style for your toolholder. For toolholders, visit [widia.com](http://widia.com).

**Face Mills • Victory™ M1200 Series**  
Victory M1200 HF • Shell Mills

**WIDIA**

- Twelve cutting edges.
- High feed rates for rough face milling.
- Use standard M1200 inserts.

■ Shell Mills

order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
3854510	M1200HF200Z045075H909	2.000	2.704	.750	1.503	1.575	.087	4	11300	Yes	1.13

#### 5. Choose the inserts with the WIDIA™ insert selection guide:

- A Determine light machining, general purpose, or heavy machining according to workpiece material. See the Material Overview at the end of the catalog for material descriptions.
- B Select the grade given in the insert selection guide. Use the six digit order number to easily place your order.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..LD	WP40PM	<b>.S..GD</b>	<b>WP40PM</b>	.S..HD	WP40PM
P3-P4	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
P5-P6	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM

● first choice  
○ alternate choice

	P	M	K	N	S	H
WP40PM	●	○	○	○	○	○
WP35CM	○	○	○	○	○	○
WP25PM	○	○	○	○	○	○
WP35CM	○	○	○	○	○	○
WP40PM	○	○	○	○	○	○

■ HNGJ-GD

catalog number	cutting edges	D	L10	S	BS	Re	hm
HNGJ535ANSNGD	12	.625	.338	.219	.071	.047	.004

#### 6. Determine cutting data — with the WIDIA Recommended Speeds and Feeds tables:

- A Choose the recommended speed value according to the workpiece material and grade.
- B Choose the recommended starting feed rate according to the insert geometry and % of radial engagement ae.

Starting values are given in **bold**.

■ Recommended Starting Speeds [SFM]

Material Group		WS30PM	WP35CM	<b>WP40PM</b>	WK25YM	TN6501	THM-U											
		P	1	1790	1555	1460	1165	<b>1025</b>	965	—	—	—	—	—	—			
	2	1105	1000	905	985	<b>845</b>	710	—	—	—	—	—	—					
	3	1000	905	805	905	<b>770</b>	630	—	—	—	—	—	—					
	4	750	690	630	805	<b>670</b>	535	—	—	—	—	—	—					
	5	1025	905	830	670	<b>610</b>	535	—	—	—	—	—	—					
	6	630	535	430	590	<b>450</b>	355	—	—	—	—	—	—					
M	1	890	<b>785</b>	725	805	<b>725</b>	610	770	670	610	—	—	—					
	2	805	<b>710</b>	570	725	<b>630</b>	550	690	590	490	—	—	—					
	3	610	<b>535</b>	415	570	<b>510</b>	450	510	450	355	—	—	—					
K	1	—	—	—	1165	<b>1045</b>	940	—	—	—	3170	<b>2880</b>	2560	—	—	750	<b>670</b>	590
	2	—	—	—	925	<b>830</b>	750	—	—	—	2510	<b>2240</b>	2090	—	—	—	—	
	3	—	—	—	770	<b>690</b>	630	—	—	—	2110	<b>1870</b>	1720	—	—	—	—	

■ Recommended Starting Feeds [IPT]

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)														Insert Geometry	
	5%			10%			<b>20%</b>			30%			40-100%			
.F..LDJ	.019	<b>.035</b>	.072	.014	<b>.025</b>	.051	.010	<b>.019</b>	.038	.009	<b>.016</b>	.033	.008	.015	.030	.F..LDJ
.E..LD	.019	<b>.055</b>	.112	.014	<b>.039</b>	.079	.010	<b>.029</b>	.058	.009	<b>.025</b>	.051	.008	<b>.023</b>	.046	.E..LD
<b>.S..GD</b>	.036	<b>.093</b>	.153	.026	<b>.066</b>	.106	.019	<b>.049</b>	.078	.017	<b>.042</b>	.068	.015	<b>.039</b>	.062	.S..GD
.S..HD	.036	<b>.093</b>	.153	.026	<b>.066</b>	.106	.019	<b>.049</b>	.078	.017	<b>.042</b>	.068	.015	<b>.039</b>	.062	.S..HD

NOTE: Use "Light Machining" value as starting feed rate.

**Face Mills**

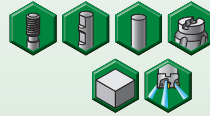


**Victory™ M1200 Mini HF 75°**

**Max depth of cut: .068"**

Lead angle: 75°  
Indexes per insert: 12  
Diameter: 1–3"

**Pages: H5–H9**

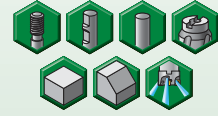
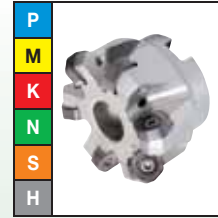


**Victory™ M1200 Mini 45°**

**Max depth of cut: .138"**

Lead angle: 45°  
Indexes per insert: 12  
Diameter: 1–5"

**Pages: H10–H17**

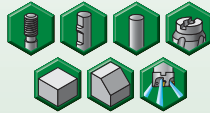


**Victory™ M1200 Mini HD 31°**

**Max depth of cut: .185"**

Lead angle: 31°  
Indexes per insert: 12  
Diameter: 1.5–5"

**Pages: H18–H21**

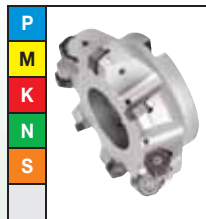


**Victory™ M1200 HF 75°**

**Max depth of cut: .087"**

Lead angle: 75°  
Indexes per insert: 12  
Diameter: 2–6"

**Pages: H24–H27**

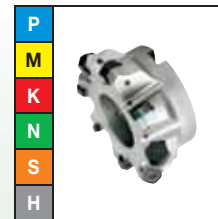


**Victory™ M1200 45°**

**Max depth of cut: .177"**

Lead angle: 45°  
Indexes per insert: 12  
Diameter: 2–12"

**Pages: H28–H35**



**Victory™ M1200 HD 31°**

**Max depth of cut: .236"**

Lead angle: 31°  
Indexes per insert: 12  
Diameter: 2–6"

**Pages: H36–H39**



(continued)

**Face Mills**

*(continued)*

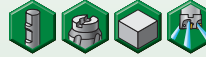


**M640**

**Max depth of cut: .180"**

Lead angle: 32°  
Indexes per insert: 6  
Diameter: 1.25–4"

**Pages: H42–H47**



**M660 SN1205..**

**Max depth of cut: 250"**

Lead angle: 45°  
Indexes per insert: 4  
Diameter: 1–6"

**Pages: H50–H55**

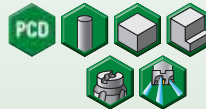
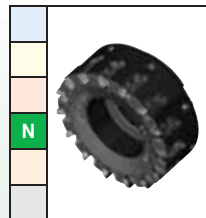


**SuperFeed™**

**Max depth of cut: .250"**  
(can be less depending on the cartridge)

Lead angle: 0°  
Indexes per insert: 1  
edge per PCD cartridge  
Diameter: Standard Platform  
2.5–8"

**Pages: H58–H62**

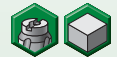


**M4000 Cartridge Milling System**

All front line insert styles available.

Diameter: 6–12"

**Pages: H66–H68**



**0° Shoulder Mills**

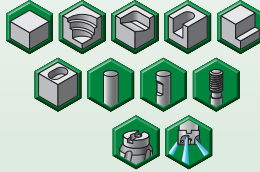
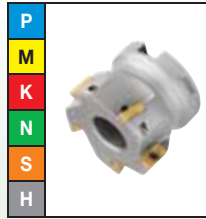


**VSM11™**

Max depth of cut: .461"

Lead angle: 0°  
Indexes per insert: 2  
Diameter: .5–4"

Pages: I4–I16

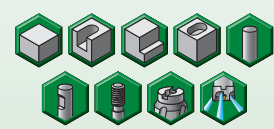
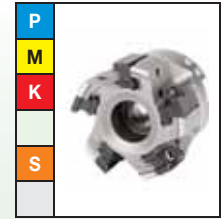


**VSM490™-15**

Max depth of cut: .590"

Lead angle: 0°  
Indexes per insert: 4  
Diameter: 1–6"

Pages: I32–I39

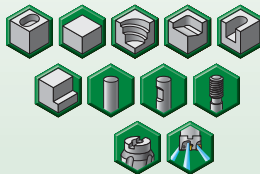
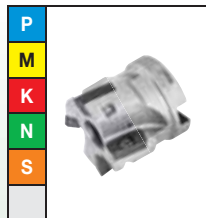


**VSM17™**

Max depth of cut: .642"

Lead angle: 0°  
Indexes per insert: 2  
Diameter: 1–6"

Pages: I20–I29

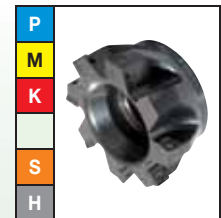


**M690 SD1204..**

Max depth of cut: .400"

Lead angle: 0°  
Indexes per insert: 4  
Diameter: 1.50–6"

Pages: I42–I47



**M690 SD1506..**

Max depth of cut: .500"

Lead angle: 0°  
Indexes per insert: 4  
Diameter: 2–10"

Pages: I48–I51



**Slotting Mills**

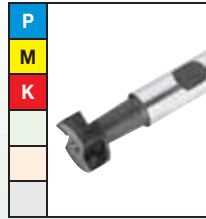


**M16**

**Slot Width Range:**  
11–21,9mm

Indexes per insert: 2  
Diameter: 25–50mm

Pages: J4–J7



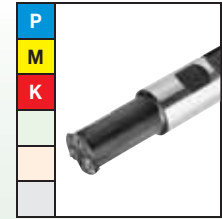
*These products are available for metric only.*

**M94**

**Slot Width Range:**  
1,93–5,23mm

Indexes per insert: 3  
Diameter: 25–80mm

Pages: J10–J14



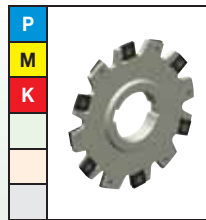
*These products are available for metric only.*

**M95**

**Slot Width Range:**  
4–10mm

Indexes per insert: 4  
Diameter: 100–200mm

Pages: J18–J21



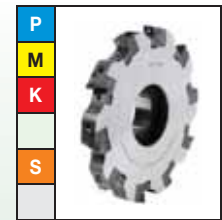
*These products are available for metric only.*

**M900™**

**Slot Width Range:**  
12–22mm

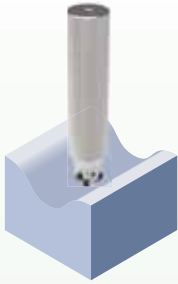
Indexes per insert: 2  
Diameter: 100–315mm

Pages: J24–J30



*These products are available for metric only.*

**Copy Mills**

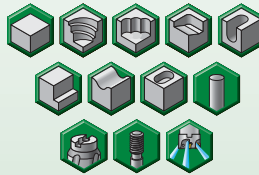


**M370™**

Max depth of cut: .078"

Indexes per insert: 6  
Diameter: 1–5"

Pages: K4–K18

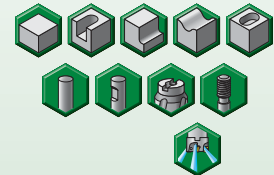
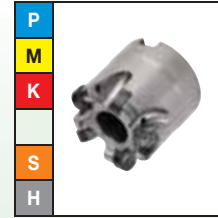


**M200™**

Max depth of cut: .200"

Indexes per insert up to: 12  
Diameter: 1–4"

Pages: K22–K41

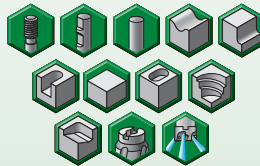
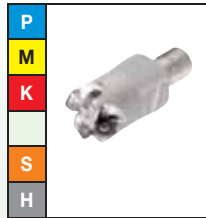


**M170™**

Max depth of cut: 8mm

Indexes per insert: 6  
Diameter: 12–125mm

Pages: K44–K72

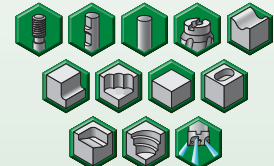
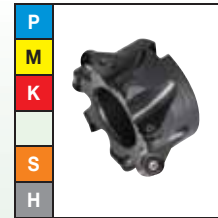


**M100™**

Max depth of cut: .236"

Diameter: 1–8"

Pages: K76–K101



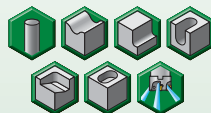
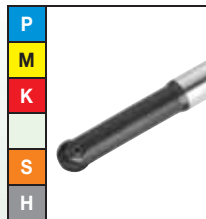
*These products are available for metric only.*

**M270™ Ball Nose**

Max depth of cut: .188–.500"

Diameter: .375–1"

Pages: K104–K115

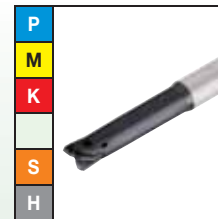


**M270 Toroidal**

Max depth of cut: .031–.126"

Diameter: .375–.750"

Pages: K116–K119

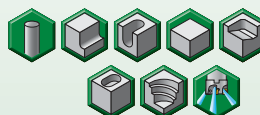
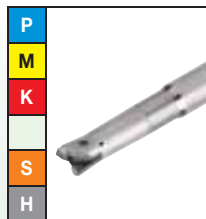


**M270 High-Feed**

Max depth of cut: .024–.043"

Diameter: .375–.750"

Pages: K120–K126



## NOVO KNOWS SEARCH

Searching for a tool by using the outdated method of a catalog has been replaced with the Advise and Select functions from NOVO™ — saving you time and money.

---

### ADVISE

Uses a rules-based approach to provide cutting tool recommendations:

- Define Machining Feature (face milling, slotting, blind hole, etc.)
- Apply Constraint Requirements (geometric, material, tolerance, etc.)
- Set Machining Sequence (single or multi-step operations, rough then finish, etc.)
- Receive Ranked Results

---

### SELECT

A method of selecting cutting tools from a tree structure via a hierarchy or parametric search:

- If you know which product you are looking for, a quick search can be performed by just the catalog number or product description.
- Smart filters significantly reduce the amount of potential tooling solutions.
- After the tool is selected, NOVO also provides cutting and adaptive item options that fit with your solution.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift. [widia.com/novo](http://widia.com/novo)

## How Do Catalog Numbers Work?

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

### H

Insert Shape

- A
- B
- C
- E
- H
- L
- O
- R
- S
- T
- W
- X

### N

Insert Clearance Angle

- A 3°
- B 5°
- C 7°
- D 15°
- E 20°
- F 25°
- G 30°
- N 0°
- P 11°

### P

Tolerance Class

### J

Geometry and Clamping Type

symbol	hole	shape of hole	chipbreaker	shape of insert's section
N	without		without	
R			single-sided	
F			double-sided	
A	with	cylindrical hole	without	
M			single-sided	
G			double-sided	
W	with	partly cylindrical hole, 40-60° countersink	without	
T			single-sided	
Q	with	partly cylindrical hole, 40-60° double countersink	without	
U			double-sided	
B	with	partly cylindrical hole, 70-90° countersink	without	
H			single-sided	
C	with	partly cylindrical hole, 70-90° double countersink	without	
J			double-sided	
X	special design			

indexable inserts with facets/wipers

indexable inserts with corner radii

insert thickness

iC	tolerances on "iC"		tolerances on "M"	
	classes J, K, L, M, N (+/-)	class U (+/-)	classes M & N (+/-)	class U (+/-)
4,76-10,00	0,051	0,076	0,076	0,127
11,11-14,29	0,076	0,127	0,127	0,203
15,00-20,64	0,102	0,178	0,152	0,279
22,00-31,16	0,127	0,254	0,178	0,381
31,75-35,00	0,152	0,254	0,2	0,381

	iC (+/-)	M (+/-)	T (+/-)		iC (+/-)	M (+/-)	T (+/-)
A	0,025	0,005	0,025	J	0,05-0,15*	0,005	0,025
B	0,025	0,005	0,013	K	0,05-0,15*	0,013	0,025
C	0,025	0,013	0,025	L	0,05-0,15*	0,025	0,025
D	0,025	0,013	0,013	M	0,05-0,15*	0,08-0,20*	0,013
E	0,025	0,025	0,025	N	0,05-0,15*	0,08-0,20*	0,025
F	0,013	0,005	0,025	P**	0,038	0,038	0,038
G	0,025	0,025	0,013	U	0,08-0,25*	0,13-0,30*	0,013
H	0,013	0,013	0,025				

\*See table above for tolerances according to insert size and class.  
\*\*WIDIA standard only.



By referencing this easy-to-use guide, you can identify the correct product to meet your needs.

Face Mills • Victory™ M1200 Mini Series									
Inserts									
Face Mill		HNPJ-GD		HNPJ-GD		HNPJ-GD		HNPJ-GD	
cutting number		cutting edges		D	L10	S	BS	Rg	hm
HNPJ0704ANSNGD		12		.500	269	.175	.050	.047	.004

HNPJ0704ANSNGD

**07**

Size  
(Cutting Edge Length)

**04**

Insert Thickness

symbol	thickness
T1	1,98
02	2,38
03	3,18
T3	3,97
04	4,76
05	5,56
06	6,35
07	7,94

**AN**

Corner Configuration

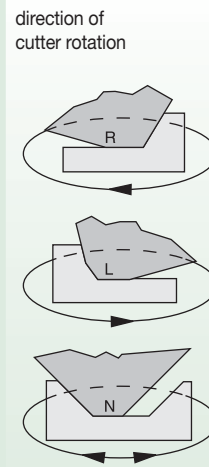
**S**

Cutting Edge Form

- F sharp
- E honed
- T T-land
- S honed + T-land

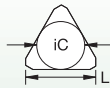
**N**

Insert Hand



**GD**

Edge Geometry

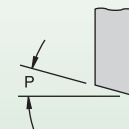
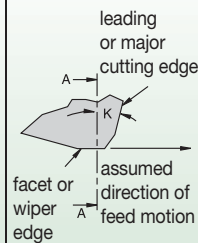


inscribed circle "iC" versus cutting edge length "L"

For shapes A, L, and X, see position #1; use length of leading cutting edge.

iC	"L" for shapes						
	S	T	R	O	C	H	E
6,00	-	-	06	-	-	-	-
6,35	06	11	06	02	06	03	06
8,00	-	-	08	-	-	-	-
9,52	09	16	09	04	09	05	09
10,00	-	-	10	-	-	-	-
12,00	-	-	12	-	-	-	-
12,70	12	22	12	05	12	07	13
15,88	15	27	15	06	16	09	16
16,00	-	-	16	-	-	-	-
19,05	19	33	19	07	19	11	19
20,00	-	-	20	-	-	-	-
25,00	-	-	25	-	-	-	-
25,40	25	4					

radius



MO	round insert	lead angle K		wiper edge clearance P	
01	0,1mm	If letter is replaced by number(s), refer to table for radius "r."		A	3°
02	0,2mm			B	5°
04	0,4mm			C	7°
05	0,5mm			D	15°
08	0,8mm			E	20°
10	1,0mm			A	45°
12	1,2mm			D	60°
15	1,5mm			E	75°
16	1,6mm			N	0°
24	2,4mm			P	90°
32	3,2mm	P	11°		

## How Do Catalog Numbers Work?

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

• Twoflute cutting edges.  
 • First choice for low depth-of-cut face milling.  
 • Maximum number of teeth per diameter.

■ Cylindrical Shanks

order number	catalog number	D1	D1 max	D	L	LEX	Aq1 max	Z	max RPM	coolant supply	iso
3934887	M1200D100Z03C100HN07L800	1,000	1,340	700	4,400	1,250	138	2	13800	Yes	J21
3934886	M1200D100Z03C100HN07L400	1,000	1,340	350	4,400	1,250	138	3	13800	Yes	J22
				4,500	1,000	138	3	17700	Yes	1,20	

**M1200D100Z03C100HN07L800**

### Indexable Milling Tool Bodies

**M1200**

Series

**D**

Cutting Diameter

**100**

**Z**

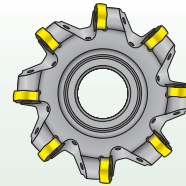
Number of Flutes

**03**

**C**

Shank Form

Z = Number of effective flutes



- C** = Cylindrical
- W** = Weldon®
- M** = Modular
- S** = Shell Mill

By referencing this easy-to-use guide, you can identify the correct product to meet your needs.

• Twelve cutting edges.  
 • First choice for low depth-of-cut face milling.  
 • Maximum number of teeth per diameter.

■ Cylindrical Shanks

order number	catalog number	D1	D1 max	D	L	LXX	Ap1 max	Z	max RPM	coolant supply	kit
392887	M1200D100Z03C100HN07L800	1,000	1,245	750	4,800	1,250	138	2	1,800	Yes	50
392888	M1200D100Z03C100HN07L400	1,000	1,343	750	4,800	1,250	138	3	1,800	Yes	50
392889	M1200D100Z03C100HN07L200	1,250	1,603	1,000	5,200	1,500	158	3	1,700	Yes	1,22

M1200D100Z03C100HN07L800

**Indexable Milling Tool Bodies**

**100**

Shank/Pilot Diameter

**H**

Insert Shape

**N**

Insert Clearance Angle

**07**

Insert Size (Cutting Edge Length)

**L**

Overall Length of Tool  
Used for all cylindrical shank and long version Weldon® if required (standard Weldon without)

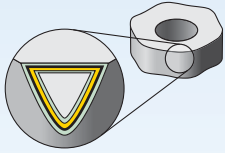
**800**

<b>A</b>		<b>M</b>	
<b>B</b>		<b>O</b>	
<b>C</b>		<b>P</b>	
<b>D</b>		<b>R</b>	
<b>E</b>		<b>S</b>	
<b>H</b>		<b>T</b>	
<b>K</b>		<b>V</b>	
<b>L</b>		<b>W</b>	
		<b>X</b>	Special Design

<b>C</b>	7°	
<b>D</b>	15°	
<b>E</b>	20°	
<b>F</b>	25°	
<b>G</b>	30°	
<b>N</b>	0°	
<b>P</b>	11°	

Optional uses as required

<b>LH</b>	Left Hand
<b>C</b>	Carbide Shank
<b>HM</b>	Heavy Metal Shank
<b>J</b>	JIS Standard



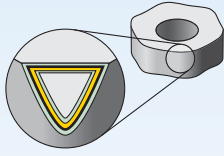
Modern coating technologies provide higher speed capabilities, greater productivity, and longer tool life.

Each insert has a material grid indicating primary and alternate uses for that tool, as well as whether it can be operated dry or with coolant.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

primary use		alternate use	
▽▽▽	Light (finishing)	▽▽▽	Light (finishing)
▽▽	Medium	▽▽	Medium
▽	Heavy (roughing)	▽	Heavy (roughing)

Grade		P	M	K	N	S	H	dry	with coolant
<b>TN2505</b>		▽▽▽		▽▽▽			▽▽▽	•	
HC-H05 • PVD-TiAlN									
<b>TN2510</b>		▽▽		▽▽			▽▽	•	
HC-H10 • MT-CVD/CVD-TiN-TiCN-(ZrO <sub>2</sub> -Al <sub>2</sub> O <sub>3</sub> -TiOx)									
<b>TN2525</b>		▽▽		▽▽			▽▽	•	
HC-H20 • PVD-TiAlN									
<b>TN6501</b>					▽▽▽			•	•
HC-N03 • PVD-TiB <sub>2</sub>									
<b>TN6510</b>				▽▽				•	
HC-K10 • PVD-TiAlN Nanolayer									
<b>TN6520</b>				▽▽				•	•
HC-K20 • PVD-TiAlN Nanolayer									



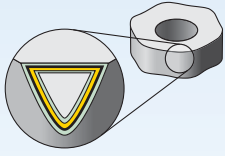
Modern coating technologies provide higher speed capabilities, greater productivity, and longer tool life.

Each insert has a material grid indicating primary and alternate uses for that tool, as well as whether it can be operated dry or with coolant.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

primary use		alternate use	
▼▼▼	Light (finishing)	▽▽▽	Light (finishing)
▼▼	Medium	▽▽	Medium
▼	Heavy (roughing)	▽	Heavy (roughing)

Grade		P	M	K	N	S	H	dry	with coolant
<b>TN6525</b>		▼▼	▽▽	▽▽				•	
HC-P25 • PVD-TiAlN Nanolayer									
<b>TN6540</b>		▼	▼	▽		▼▼		•	•
HC-P40 • PVD-TiAlN Nanolayer									
<b>TN7525</b>		▼▼	▽▽					•	
HC-P25 • MT-CVD/CVD-TiN-TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN									
<b>TN7535</b>		▼	▽	▽				•	
HC-P35 • MT-CVD/CVD-TiN-TiCN-Al <sub>2</sub> O <sub>3</sub>									
<b>TTI25</b>		▼▼▼	▽▽▽					•	•
HT-P15 • Cermet									
<b>THM</b>				▽	▼	▽		•	•
HW-K15 • Uncoated									



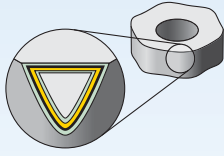
Modern coating technologies provide higher speed capabilities, greater productivity, and longer tool life.

Each insert has a material grid indicating primary and alternate uses for that tool, as well as whether it can be operated dry or with coolant.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

primary use		alternate use	
▽▽▽	Light (finishing)	▽▽▽	Light (finishing)
▽▽	Medium	▽▽	Medium
▽	Heavy (roughing)	▽	Heavy (roughing)

Grade		P	M	K	N	S	H	dry	with coolant
<b>THM-U</b>					▽▽▽			•	•
HF-N05 • Uncoated									
<b>TTM/TTM08</b>		▽▽	▽▽	▽▽				•	•
HW-P25 • Uncoated									
<b>WK15PM</b>				▽▽				•	•
PVD-TiAlN Nanolayer									
<b>WK15CM™</b>				▽▽				•	
MT-CVD/TiN-TiCN-Al <sub>2</sub> O <sub>3</sub>									
<b>WP20CM</b>		▽▽		▽▽					
MT-CVD/TiN-TiCN-Al <sub>2</sub> O <sub>3</sub>									
<b>WP25PM</b>		▽▽	▽▽	▽▽		▽▽	▽▽	•	•
PVD-AlTiN Multilayer									



Modern coating technologies provide higher speed capabilities, greater productivity, and longer tool life.

Each insert has a material grid indicating primary and alternate uses for that tool, as well as whether it can be operated dry or with coolant.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

primary use		alternate use	
▽▽▽	Light (finishing)	▽▽▽	Light (finishing)
▽▽	Medium	▽▽	Medium
▽	Heavy (roughing)	▽	Heavy (roughing)

Grade		P	M	K	N	S	H	dry	with coolant
<b>WS30PM™</b>		▽▽	▽▽			▽▽		•	•
PVD-AITiN Multilayer									
<b>WU35PM</b>		▽	▽			▽		•	•
PVD-AITiN Multilayer									
<b>WP35CM</b>		▽	▽	▽				•	
MT-CVD/TiN-TiCN-Al <sub>2</sub> O <sub>3</sub>									
<b>WP40PM™</b>		▽	▽			▽		•	•
PVD TiAlN-AlCrN Multilayer									
<b>WK25YM</b>				▽▽				•	
Silicon Nitride									
<b>WDN00U™</b>					▽▽▽ ▽▽▽ ▽				•
Ultra-fine grain PCD									





## Indexable Milling • Face Mills

M1200 Mini • First Choice for Taper 40 Spindle Machines .....	H2–H21
M1200 • First Choice for Taper 50 Spindle Machines.....	H22–H39
M640 • High Positive Geometries for Low-Power Machines.....	H40–H47
M660 • Heavy-Duty Applications .....	H48–H55
SuperFeed • PCD Face Milling & End Milling Platform.....	H56–H62
M4000 • Flexible Cartridge Milling System .....	H64–H68



One Series Meets Every Face Milling Need •

## WIDIA™ Victory™ M1200 Mini

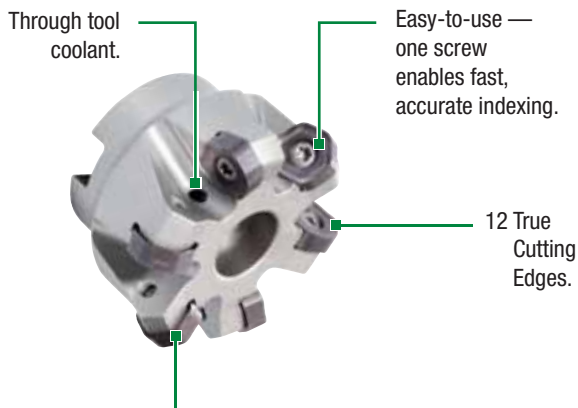
For consistent performance, look no further than the WIDIA Victory™ M1200 Mini. This easy-to-use product ensures great tool life, reduced machining time, and maximum productivity.

# M1200 Mini



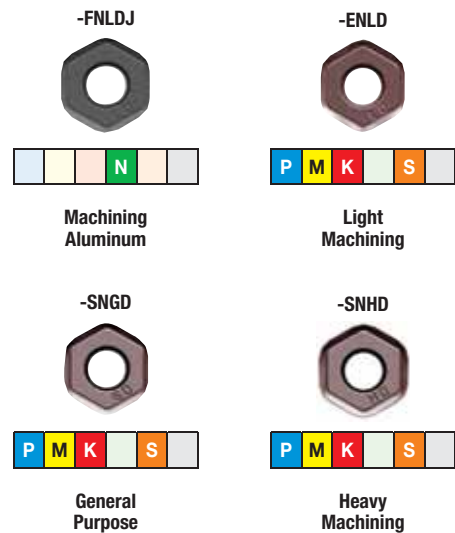
- Low cost per edge and high productivity.
- Reduced cutting forces due to soft cutting action.
- Significantly increased Metal Removal Rates (MRR).
- Victory™ M1200 Mini available in 75°, 45°, and 31° lead.
- WIDIA premium milling grades.
- Excellent tool life in light to heavy machining.
- Shorter machining cycle times.

Best-in-class face milling platform to boost productivity on taper 40 spindle milling machines and driven tools.



Comprehensive standard offering for coarse, medium, and fine pitch cutter bodies to match all shop floor needs.

Latest soft cutting edge insert design for all material groups



**Face Mills**

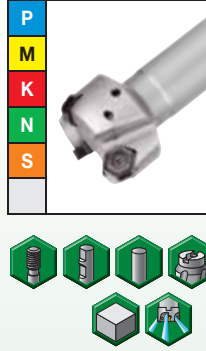


**Victory™ M1200 Mini HF 75°**

**Max depth of cut: .068"**

Lead angle: 75°  
Indexes per insert: 12  
Diameter: 1–3"

**Pages: H5–H9**

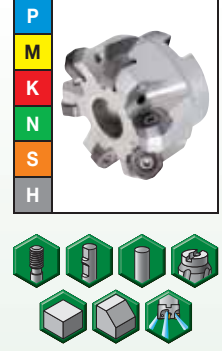


**Victory™ M1200 Mini 45°**

**Max depth of cut: .138"**

Lead angle: 45°  
Indexes per insert: 12  
Diameter: 1–5"

**Pages: H10–H17**



**Victory™ M1200 Mini HD 31°**

**Max depth of cut: .185"**

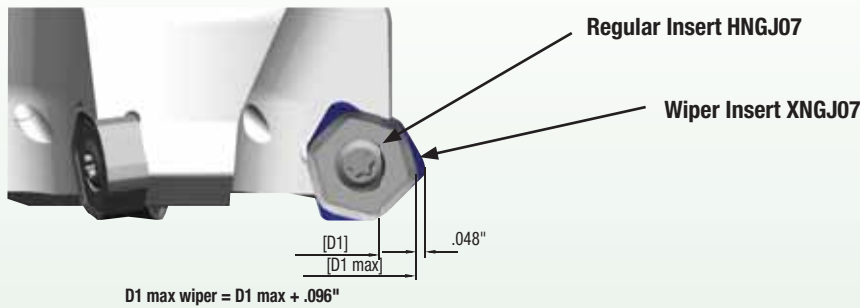
Lead angle: 31°  
Indexes per insert: 12  
Diameter: 1.5–5"

**Pages: H18–H21**

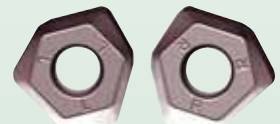


■ **Easy-to-use wiper insert setup to achieve excellent surface floor finish**

**Wiper insert overlapping vs. regular insert**



- Wiper inserts only applied with 45° lead angle cutter bodies.
- Easy to use. Regular and wiper inserts are loaded into fixed pockets. No adjustment required.
- Please have D1 max wiper in mind in case of limited working area.
- Use wiper inserts only in combination with periphery ground regular inserts HNGJ07.
- Up to cutting diameter D1=4" load one wiper insert.
- For cutting diameter D1=5" and above load two wiper inserts.
- Each wiper insert XNGJ07 can be applied with three right hand R and three left hand L cutting edges.



**Victory™ M1200 Mini Series**
**Victory™ M1200 Mini HF High-Feed 75°**

**12** True  
Cutting  
Edges



**Insert HNGJ0704  
HNPJ0704**

**Ap1 max = .068"**

M1200 Mini HF can be loaded with all M1200 Mini standard inserts, except wiper inserts.

**Victory™ M1200 Mini HF High-Feed**

First choice for long reach face milling applications or light fixtures.

The 75° lead angle thins the chip and allows higher feed rates and MRR.

Up to 40% shorter machining cycle time.


**Victory™ M1200 Mini 45°**

**12** True  
Cutting  
Edges



**Insert HNGJ0704  
HNPJ0704**

**Ap1 max = .138"**

Best-in-class leader in face milling up to Ap1 max = .138". Excellent choice for near net shape strategies and driven tools.

**Victory™ M1200 Mini HD 31°**

**12** True  
Cutting  
Edges



**Insert HNGJ0704  
HNPJ0704**

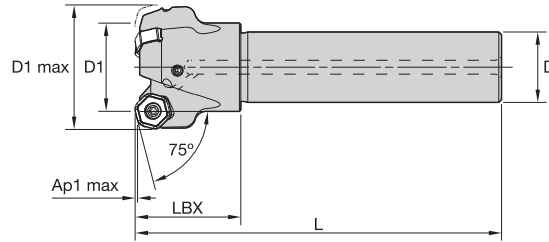
**Ap1 max = .185"**

Achieve a higher axial depth-of-cut capability up to Ap1 = .185" with standard M1200 Mini inserts.

- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- High-feed capability.



Face Mills



### ■ Cylindrical Shanks

order number	catalog number	D1	D1 max	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
4136453	M1200HF100Z02C075HN07L480	1.000	1.556	.750	4.800	1.250	.068	2	19800	Yes	.73
4136454	M1200HF100Z03C075HN07L480	1.000	1.556	.750	4.800	1.250	.068	3	19800	Yes	.69
4136455	M1200HF125Z03C100HN07L520	1.250	1.807	1.000	5.200	1.500	.068	3	17700	Yes	1.28
4136456	M1200HF125Z04C100HN07L520	1.250	1.807	1.000	5.200	1.500	.068	4	17700	Yes	1.29

### ■ Spare Parts



insert screw



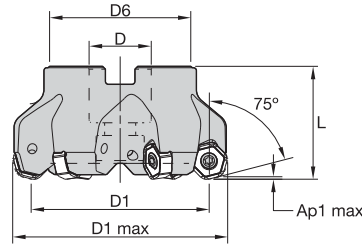
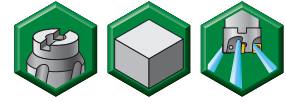
in. lbs.



Torx driver

D1	insert screw	in. lbs.	Torx driver
1.000	12146034500	31	12148082400
1.250	12146034500	31	12148082400

- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- High-feed capability.



■ Shell Mills

order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4136457	M1200HF150Z05S050HN07	1.500	2.057	.750	1.440	1.575	.068	5	15800	Yes	.57
4136458	M1200HF200Z05S075HN07	2.000	2.557	.750	1.750	1.575	.068	5	12500	Yes	1.12
4136459	M1200HF250Z06S075HN07	2.500	3.056	.750	1.750	1.575	.068	6	10000	Yes	1.48
4136460	M1200HF300Z08S100HN07	3.000	3.556	1.000	2.189	1.750	.068	8	8300	Yes	2.32

■ Spare Parts



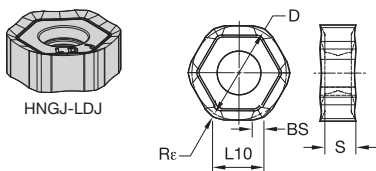
D1	insert screw	in. lbs.	Torx driver	socket-head cap screw	socket-head cap screw with coolant groove
1.500	12146034500	31	12148082400	S445	12146102400
2.000	12146034500	31	12148082400	S445	12146102400
2.500	12146034500	31	12148082400	S445	12146102400
3.000	12146034500	31	12148082400	S458	12146102800

NOTE: Socket-head cap screw with coolant groove must be ordered separately.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..LD	WP40PM	.S..GD	WP40PM	.S..HD	WP40PM
P3-P4	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
P5-P6	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
M1-M2	.E..LD	WP25PM	.S..GD	WP25PM	.S..HD	WP25PM
M3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
K1-K2	.E..LD	TN6510	.S..GD	WK15CM	.S..HD	WK15CM
K3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
N1-N2	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
N3	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
S1-S2	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP25PM
S3	.E..LD	WS30PM	.S..GD	WS30PM	.S..GD	WS30PM
S4	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP40PM
H1	-	-	-	-	-	-

Face Mills

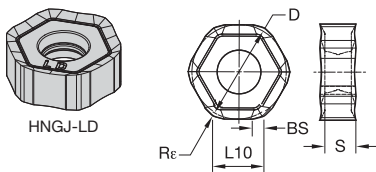


● first choice  
○ alternate choice

P	●			
M	●			
K	●			
N	●	●	●	
S	●			
H	●			

■ HNGJ-LDJ

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6501	THM-U
HNGJ0704ANFNLDJ	12	.500	.268	.176	.064	.047	.003	3954414	3954332

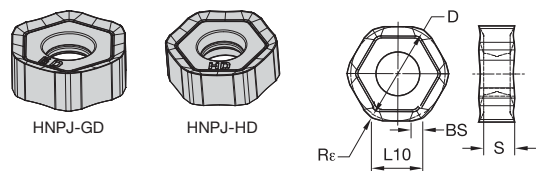


● first choice  
○ alternate choice

P	●								
M	●								
K	●								
N	●								
S	●								
H	●								

■ HNGJ-LD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WS30PM	WP40PM
HNGJ0704ANENLD	12	.500	.268	.176	.064	.047	.003	3954419	3954420	3954421	3954422	—	—	5895291	5895292	5528975	5550905
HNGJ070432ANENLD	12	.500	.268	.176	—	.126	.003	3954428	—	3954429	3954430	—	—	—	—	—	—



● first choice  
○ alternate choice

P	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

### HNPJ-GD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WS30PM	WP40PM
HNPJ0704ANSNGD	12	.500	.269	.175	.050	.047	.004	3954432	3954473	-	3954474	3954475	5427374	5895293	5895294	5528976	5550906

### HNPJ-HD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WS30PM	WP40PM	
HNPJ0704ANSNHD	12	.500	.269	.174	.049	.047	.006	3954481	3954477	3954482	3954478	-	3954479	3954480	5427375	5895295	5895296	5550907
HNPJ070432ANSNHD	12	.500	.269	.174	-	.126	.006	-	-	-	-	-	-	-	-	-	5895297	

## Recommended Starting Speeds

### Recommended Starting Speeds [SFM]

Material Group		TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM
P	1	- - -	- - -	1340 1045 925	1180 925 785	1790 1555 1460	- - -
	2	- - -	- - -	1045 830 710	830 630 550	1105 1000 905	- - -
	3	- - -	- - -	925 710 610	710 550 450	1000 905 805	- - -
	4	- - -	- - -	770 550 475	590 430 355	750 690 630	- - -
	5	- - -	- - -	1025 770 650	785 590 490	1025 905 830	- - -
	6	- - -	- - -	670 535 430	535 395 335	630 535 430	- - -
M	1	- - -	- - -	630 395 260	430 260 200	805 725 610	- - -
	2	- - -	- - -	395 260 155	260 155 140	725 630 550	- - -
	3	- - -	- - -	415 260 180	275 155 140	570 510 450	- - -
K	1	1570 1140 845	1475 1045 750	905 805 725	725 670 590	1165 1045 940	1655 1520 1340
	2	1380 925 670	1280 830 630	710 630 590	570 510 450	925 830 750	1320 1165 1080
	3	1105 845 650	985 750 535	590 535 475	510 475 415	770 690 630	1105 985 905
N	1	- - -	- - -	- - -	- - -	- - -	- - -
	2	- - -	- - -	- - -	- - -	- - -	- - -
	3	- - -	- - -	- - -	- - -	- - -	- - -
S	1	- - -	- - -	- - -	155 120 95	- - -	- - -
	2	- - -	- - -	- - -	80 60 40	- - -	- - -
	3	- - -	- - -	- - -	235 140 95	- - -	- - -
	4	- - -	- - -	- - -	200 95 80	- - -	- - -
H	1	475 360 230	- - -	- - -	- - -	- - -	- - -
	2	475 360 230	- - -	- - -	- - -	- - -	- - -
	3	380 260 150	- - -	- - -	- - -	- - -	- - -

(continued)



(Recommended Starting Speeds [SFM] — continued)

Material Group		WP25PM			WP35CM			WS30PM			WP40PM			TN6501			THM-U		
P	1	1295	<b>1120</b>	1060	1790	<b>1555</b>	1460	-	-	-	1165	<b>1025</b>	965	-	-	-	-	-	-
	2	1080	<b>940</b>	785	1105	<b>1000</b>	905	-	-	-	985	<b>845</b>	710	-	-	-	-	-	-
	3	1000	<b>845</b>	690	1000	<b>905</b>	805	-	-	-	905	<b>770</b>	630	-	-	-	-	-	-
	4	890	<b>725</b>	590	750	<b>690</b>	630	-	-	-	805	<b>670</b>	535	-	-	-	-	-	-
	5	725	<b>670</b>	590	1025	<b>905</b>	830	-	-	-	670	<b>610</b>	535	-	-	-	-	-	-
	6	650	<b>490</b>	395	630	<b>535</b>	430	-	-	-	590	<b>450</b>	355	-	-	-	-	-	-
M	1	805	<b>710</b>	650	805	<b>725</b>	610	890	<b>785</b>	725	770	<b>670</b>	610	-	-	-	-	-	-
	2	725	<b>630</b>	510	725	<b>630</b>	550	805	<b>710</b>	570	690	<b>590</b>	490	-	-	-	-	-	-
	3	550	<b>475</b>	370	570	<b>510</b>	450	610	<b>535</b>	415	510	<b>450</b>	355	-	-	-	-	-	-
K	1	905	<b>805</b>	725	1165	<b>1045</b>	940	-	-	-	-	-	-	-	-	-	-	-	-
	2	710	<b>630</b>	590	925	<b>830</b>	750	-	-	-	-	-	-	-	-	-	-	-	-
	3	590	<b>535</b>	475	770	<b>690</b>	630	-	-	-	-	-	-	-	-	-	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-	7870	<b>4720</b>	3935	7870	<b>4720</b>	3935
	2	-	-	-	-	-	-	-	-	-	-	-	-	5370	<b>3210</b>	2615	5370	<b>3210</b>	2615
	3	-	-	-	-	-	-	-	-	-	-	-	-	3150	<b>1970</b>	1570	3150	<b>1970</b>	1570
S	1	155	<b>140</b>	95	-	-	-	180	<b>155</b>	120	155	<b>140</b>	120	-	-	-	-	-	-
	2	155	<b>140</b>	95	-	-	-	180	<b>155</b>	120	155	<b>140</b>	120	-	-	-	-	-	-
	3	200	<b>155</b>	95	-	-	-	215	<b>180</b>	120	200	<b>155</b>	120	-	-	-	-	-	-
	4	275	<b>200</b>	140	260	<b>200</b>	130	335	<b>235</b>	155	260	<b>200</b>	140	-	-	-	-	-	-
H	1	475	<b>355</b>	275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

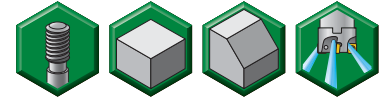
■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

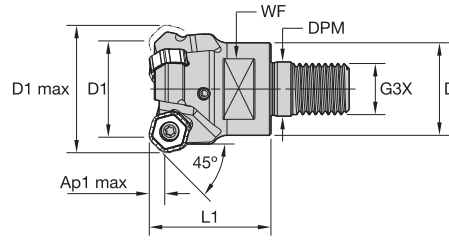
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
.F.LDJ	.019	<b>.035</b>	.072	.014	<b>.025</b>	.051	.010	<b>.019</b>	.038	.009	<b>.016</b>	.033	.008	<b>.015</b>	.030	.F.LDJ
.E..LD	.019	<b>.055</b>	.112	.014	<b>.039</b>	.079	.010	<b>.029</b>	.058	.009	<b>.025</b>	.051	.008	<b>.023</b>	.046	.E..LD
.S..GD	.036	<b>.093</b>	.153	.026	<b>.066</b>	.106	.019	<b>.049</b>	.078	.017	<b>.042</b>	.068	.015	<b>.039</b>	.062	.S..GD
.S..HD	.036	<b>.093</b>	.153	.026	<b>.066</b>	.106	.019	<b>.049</b>	.078	.017	<b>.042</b>	.068	.015	<b>.039</b>	.062	.S..HD

NOTE: Use "Light Machining" value as starting feed rate.

- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- Maximum number of teeth per diameter.



Face Mills



■ Screw-On End Mills

order number	catalog number	D1	D1 max	D	DPM	G3X	L1	WF	Ap1 max	Z	max RPM	coolant supply	lbs
3953681	M1200D100Z02M16HN07	1.000	1.343	1.142	.669	M16	1.250	.864	.138	2	19800	Yes	.30
3953682	M1200D100Z03M16HN07	1.000	1.343	1.142	.669	M16	1.250	.864	.138	3	19800	Yes	.28
3953903	M1200D125Z03M16HN07	1.250	1.593	1.142	.669	M16	1.500	.864	.138	3	17600	Yes	.44
3953904	M1200D125Z04M16HN07	1.250	1.593	1.142	.669	M16	1.500	.864	.138	4	17600	Yes	.41
3953905	M1200D150Z04M16HN07	1.500	1.843	1.142	.669	M16	1.500	.864	.138	4	15800	Yes	.49
3953906	M1200D150Z05M16HN07	1.500	1.843	1.142	.669	M16	1.500	.864	.138	5	15800	Yes	.48

■ Spare Parts



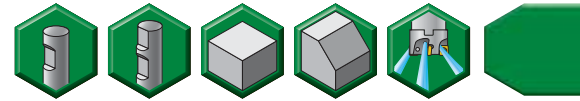
insert screw



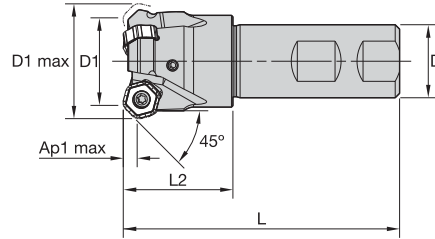
Torx driver

D1	insert screw	in. lbs.	Torx driver
1.000	12146034500	31	12148082400
1.250	12146034500	31	12148082400
1.500	12146034500	31	12148082400

- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- Maximum number of teeth per diameter.



Face Mills



### Weldon Shanks

order number	catalog number	D1	D1 max	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
3953893	M1200D100Z02W075HN07	1.000	1.343	.750	3.280	1.250	.138	2	19800	Yes	.46
3953894	M1200D100Z03W075HN07	1.000	1.343	.750	3.280	1.250	.138	3	19800	Yes	.44
3953895	M1200D125Z03W100HN07	1.250	1.593	1.000	3.783	1.500	.138	3	17700	Yes	.91
3953896	M1200D125Z04W100HN07	1.250	1.593	1.000	3.783	1.500	.138	4	17700	Yes	.88

### Spare Parts


 insert  
screw


in. lbs.


 Torx  
driver

D1	insert screw	in. lbs.	Torx driver
1.000	12146034500	31	12148082400
1.250	12146034500	31	12148082400

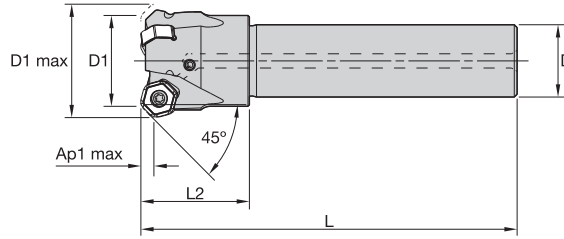
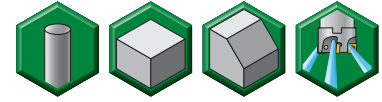
# Face Mills • Victory™ M1200 Mini Series

Victory M1200 Mini • Cylindrical Shanks



Face Mills

- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- Maximum number of teeth per diameter.



## ■ Cylindrical Shanks

order number	catalog number	D1	D1 max	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
3953897	M1200D100Z02C075HN07L480	1.000	1.343	.750	4.800	1.250	.138	2	19800	Yes	.64
3953898	M1200D100Z03C075HN07L480	1.000	1.343	.750	4.800	1.250	.138	3	19800	Yes	.62
3953899	M1200D125Z03C100HN07L520	1.250	1.593	1.000	5.200	1.500	.138	3	17700	Yes	1.22
3953901	M1200D100Z02C100HN07L800	1.000	1.343	1.000	8.000	1.250	.138	2	19800	Yes	1.66
3953902	M1200D100Z03C100HN07L800	1.000	1.343	1.000	8.000	1.250	.138	3	19800	Yes	1.64

## ■ Spare Parts



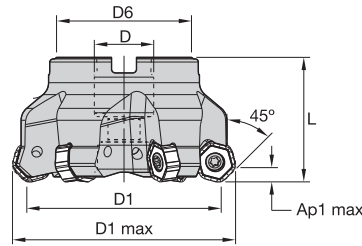
D1	insert screw	in. lbs.	Torx driver
1.000	12146034500	31	12148082400
1.250	12146034500	31	12148082400



- Twelve cutting edges.
- First choice for low depth-of-cut face milling.
- Maximum number of teeth per diameter.



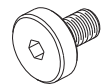
Face Mills



### ■ Shell Mills

order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4136461	M1200D150Z04S050HN07	1.500	1.813	.500	1.440	1.575	.136	4	15800	Yes	.55
4136462	M1200D150Z05S050HN07	1.500	1.813	.500	1.440	1.575	.136	5	15800	Yes	.55
3954485	M1200D200Z04S075HN07	2.000	2.343	.750	1.750	1.575	.138	4	12500	Yes	1.00
3954486	M1200D200Z05S075HN07	2.000	2.343	.750	1.750	1.575	.138	5	12500	Yes	1.02
3954487	M1200D200Z06S075HN07	2.000	2.343	.750	1.750	1.575	.138	6	12500	Yes	1.00
3954488	M1200D250Z04S075HN07	2.500	2.843	.750	1.750	1.575	.138	4	10000	Yes	1.27
3954489	M1200D250Z06S075HN07	2.500	2.843	.750	1.750	1.575	.138	6	10000	Yes	1.40
3954490	M1200D250Z08S075HN07	2.500	2.843	.750	1.750	1.575	.138	8	10000	Yes	1.36
3954491	M1200D300Z05S100HN07	3.000	3.343	1.000	2.189	1.750	.138	5	8300	Yes	2.00
3954492	M1200D300Z08S100HN07	3.000	3.343	1.000	2.189	1.750	.138	8	8300	Yes	2.25
3954503	M1200D300Z10S100HN07	3.000	3.343	1.000	2.189	1.750	.138	10	8300	Yes	2.12
3954504	M1200D400Z06S150HN07	4.000	4.342	1.500	3.661	1.750	.138	6	6300	Yes	3.74
3954505	M1200D400Z09S150HN07	4.000	4.342	1.500	3.661	1.750	.138	9	6300	Yes	3.68
3954506	M1200D400Z12S150HN07	4.000	4.342	1.500	3.661	1.750	.138	12	6300	Yes	3.65
4130534	M1200D500Z08S150HN07	5.000	5.343	1.500	3.652	2.380	.138	8	5000	Yes	6.31
4130535	M1200D500Z12S150HN07	5.000	5.343	1.500	3.652	2.380	.138	12	5000	Yes	6.52
4130536	M1200D500Z16S150HN07	5.000	5.343	1.500	3.652	2.380	.138	16	5000	Yes	6.63

### ■ Spare Parts

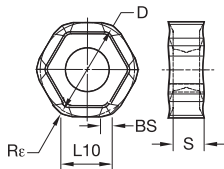
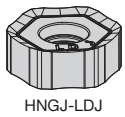


D1	insert screw	in. lbs.	Torx driver	socket-head cap screw	socket-head cap screw with coolant groove	coolant screw assembly
1.500	12146034500	31	12148082400	S424	—	—
2.000	12146034500	31	12148082400	S445	12146102400	—
2.500	12146034500	31	12148082400	S445	12146102400	—
3.000	12146034500	31	12148082400	S458	12146102800	—
4.000	12146034500	31	12148082400	—	—	S2165C
5.000	12146034500	31	12148082400	—	—	S2165C

NOTE: Socket-head cap screw with coolant groove must be ordered separately.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..LD	WP40PM	.S..GD	WP40PM	.S..HD	WP40PM
P3-P4	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
P5-P6	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
M1-M2	.E..LD	WP25PM	.S..GD	WP25PM	.S..HD	WP25PM
M3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
K1-K2	.E..LD	TN6510	.S..GD	WK15CM	.S..HD	WK15CM
K3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
N1-N2	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
N3	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
S1-S2	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP25PM
S3	.E..LD	WS30PM	.S..GD	WS30PM	.S..GD	WS30PM
S4	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP40PM
H1	-	-	-	-	-	-

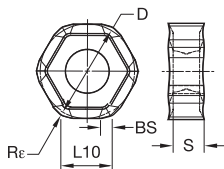
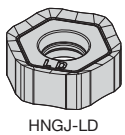


● first choice  
○ alternate choice

P	●			
M	●			
K	●			
N	●	●	●	
S	●			
H	●			

■ HNGJ-LDJ

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6501	THM-U
HNGJ0704ANFNLDJ	12	.500	.268	.176	.064	.047	.003	3954414	3954332

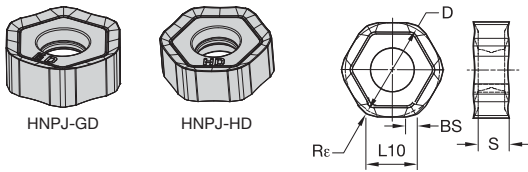


● first choice  
○ alternate choice

P	●		●	●	●	●	●	●	●
M	●		○	●	○	●	●	○	●
K	●	●	○	○	○	●	○		
N	●								
S	●			●			●	●	○
H	●						○		

■ HNGJ-LD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WS30PM	WP40PM
HNGJ0704ANENLD	12	.500	.268	.176	.064	.047	.003	3954419	3954420	3954421	3954422	—	—	5895291	5895292	5528975	5550905
HNGJ070432ANENLD	12	.500	.268	.176	—	.126	.003	3954428	—	3954429	3954430	—	—	—	—	—	—



● first choice  
○ alternate choice

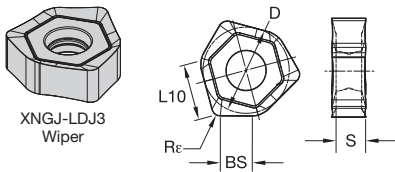
P	●	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○

■ HNPJ-GD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WS30PM	WP40PM
HNPJ0704ANSNGD	12	.500	.269	.175	.050	.047	.004	3954432	3954473	-	3954474	3954475	5427374	5895293	5895294	5528976	5550906

■ HNPJ-HD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WS30PM	WP40PM
HNPJ0704ANSNHD	12	.500	.269	.174	.049	.047	.006	3954481	3954477	3954478	-	3954479	3954480	5427375	5895295	5895296	5550907
HNPJ070432ANSNHD	12	.500	.269	.174	-	.126	.006	3954482	-	-	3954483	3954484	-	-	-	-	5895297



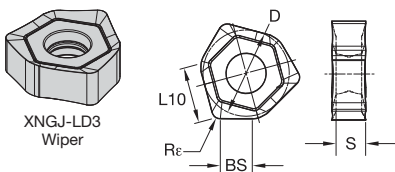
● first choice  
○ alternate choice

P	●	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○

■ XNGJ-LDJ3 Wiper

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6501	THM-U
XNGJ0704ANFNLDJ3W	3	.500	.267	.176	.267	.051	.003	3954416	3954433

NOTE: Inserts have 3 right-hand and 3 left-hand cutting edges.



● first choice  
○ alternate choice

P	●	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○

■ XNGJ-LD3 Wiper

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WS30PM	WP40PM
XNGJ0704ANENLD3W	3	.500	.267	.176	.267	.051	.003	3954424	3954425	3954426	3954427	-	5427373	5895298	-	-	5895299

NOTE: Inserts have 3 right-hand and 3 left-hand cutting edges.

■ Recommended Starting Speeds [SFM]

Face Mills

Material Group		TN6510			TN6520			TN6525			TN6540			TN7535			WK15CM		
P	1	-	-	-	-	-	-	1340	<b>1045</b>	925	1180	<b>925</b>	785	1790	<b>1555</b>	1460	-	-	-
	2	-	-	-	-	-	-	1045	<b>830</b>	710	830	<b>630</b>	550	1105	<b>1000</b>	905	-	-	-
	3	-	-	-	-	-	-	925	<b>710</b>	610	710	<b>550</b>	450	1000	<b>905</b>	805	-	-	-
	4	-	-	-	-	-	-	770	<b>550</b>	475	590	<b>430</b>	355	750	<b>690</b>	630	-	-	-
	5	-	-	-	-	-	-	1025	<b>770</b>	650	785	<b>590</b>	490	1025	<b>905</b>	830	-	-	-
	6	-	-	-	-	-	-	670	<b>535</b>	430	535	<b>395</b>	335	630	<b>535</b>	430	-	-	-
M	1	-	-	-	-	-	-	630	<b>395</b>	260	430	<b>260</b>	200	805	<b>725</b>	610	-	-	-
	2	-	-	-	-	-	-	395	<b>260</b>	155	260	<b>155</b>	140	725	<b>630</b>	550	-	-	-
	3	-	-	-	-	-	-	415	<b>260</b>	180	275	<b>155</b>	140	570	<b>510</b>	450	-	-	-
K	1	1570	<b>1140</b>	845	1475	<b>1045</b>	750	905	<b>805</b>	725	725	<b>670</b>	590	1165	<b>1045</b>	940	1655	<b>1520</b>	1340
	2	1380	<b>925</b>	670	1280	<b>830</b>	630	710	<b>630</b>	590	570	<b>510</b>	450	925	<b>830</b>	750	1320	<b>1165</b>	1080
	3	1105	<b>845</b>	650	985	<b>750</b>	535	590	<b>535</b>	475	510	<b>475</b>	415	770	<b>690</b>	630	1105	<b>985</b>	905
N	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	-	-	-	155	<b>120</b>	95	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	80	<b>60</b>	40	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	235	<b>140</b>	95	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-	200	<b>95</b>	80	-	-	-	-	-	-
H	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(continued)



(Recommended Starting Speeds [SFM] — continued)

Material Group		WP25PM	WP35CM	WS30PM	WP40PM	TN6501	THM-U
P	1	1295 <b>1120</b> 1060	1790 <b>1555</b> 1460	- - -	1165 <b>1025</b> 965	- - -	- - -
	2	1080 <b>940</b> 785	1105 <b>1000</b> 905	- - -	985 <b>845</b> 710	- - -	- - -
	3	1000 <b>845</b> 690	1000 <b>905</b> 805	- - -	905 <b>770</b> 630	- - -	- - -
	4	890 <b>725</b> 590	750 <b>690</b> 630	- - -	805 <b>670</b> 535	- - -	- - -
	5	725 <b>670</b> 590	1025 <b>905</b> 830	- - -	670 <b>610</b> 535	- - -	- - -
	6	650 <b>490</b> 395	630 <b>535</b> 430	- - -	590 <b>450</b> 355	- - -	- - -
M	1	805 <b>710</b> 650	805 <b>725</b> 610	890 <b>785</b> 725	770 <b>670</b> 610	- - -	- - -
	2	725 <b>630</b> 510	725 <b>630</b> 550	805 <b>710</b> 570	690 <b>590</b> 490	- - -	- - -
	3	550 <b>475</b> 370	570 <b>510</b> 450	610 <b>535</b> 415	510 <b>450</b> 355	- - -	- - -
K	1	905 <b>805</b> 725	1165 <b>1045</b> 940	- - -	- - -	- - -	- - -
	2	710 <b>630</b> 590	925 <b>830</b> 750	- - -	- - -	- - -	- - -
	3	590 <b>535</b> 475	770 <b>690</b> 630	- - -	- - -	- - -	- - -
N	1	- - -	- - -	- - -	- - -	7870 <b>4720</b> 3935	7870 <b>4720</b> 3935
	2	- - -	- - -	- - -	- - -	5370 <b>3210</b> 2615	5370 <b>3210</b> 2615
	3	- - -	- - -	- - -	- - -	3150 <b>1970</b> 1570	3150 <b>1970</b> 1570
S	1	155 <b>140</b> 95	- - -	180 <b>155</b> 120	155 <b>140</b> 120	- - -	- - -
	2	155 <b>140</b> 95	- - -	180 <b>155</b> 120	155 <b>140</b> 120	- - -	- - -
	3	200 <b>155</b> 95	- - -	215 <b>180</b> 120	200 <b>155</b> 120	- - -	- - -
	4	275 <b>200</b> 140	260 <b>200</b> 130	335 <b>235</b> 155	260 <b>200</b> 140	- - -	- - -
H	1	475 <b>355</b> 275	- - -	- - -	- - -	- - -	- - -
	2	- - -	- - -	- - -	- - -	- - -	- - -
	3	- - -	- - -	- - -	- - -	- - -	- - -

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Face Mills

Recommended Starting Feeds

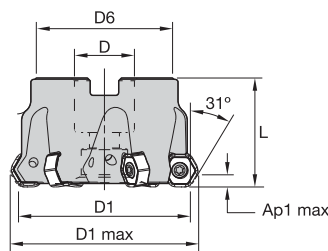
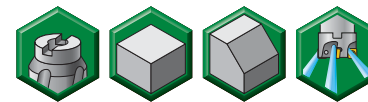
■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
.F..LDJ	.007	<b>.013</b>	.026	.005	<b>.009</b>	.018	.004	<b>.007</b>	.014	.003	<b>.006</b>	.012	.003	<b>.006</b>	.011	.F..LDJ
.E..LD	.007	<b>.020</b>	.040	.005	<b>.014</b>	.029	.004	<b>.011</b>	.021	.003	<b>.009</b>	.019	.003	<b>.008</b>	.017	.E..LD
.S..GD	.013	<b>.033</b>	.053	.009	<b>.024</b>	.038	.007	<b>.018</b>	.028	.006	<b>.015</b>	.025	.006	<b>.014</b>	.023	.S..GD
.S..HD	.013	<b>.033</b>	.053	.009	<b>.024</b>	.038	.007	<b>.018</b>	.028	.006	<b>.015</b>	.025	.006	<b>.014</b>	.023	.S..HD

NOTE: Use "Light Machining" value as starting feed rate.

- Twelve cutting edges.
- Higher Ap1 max with standard insert.



■ Shell Mills

order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4136415	M1200HD150Z04S050HN07	1.500	1.768	.500	1.440	1.575	.186	4	15800	Yes	.49
4136416	M1200HD150Z05S050HN07	1.500	1.768	.500	1.440	1.575	.186	5	15800	Yes	.50
4136417	M1200HD200Z04S075HN07	2.000	2.266	.750	1.750	1.575	.186	4	12500	Yes	.89
4136418	M1200HD200Z05S075HN07	2.000	2.266	.750	1.750	1.575	.186	5	12500	Yes	.90
4136419	M1200HD250Z04S075HN07	2.500	2.766	.750	1.750	1.575	.186	4	10000	Yes	1.19
4136420	M1200HD250Z06S075HN07	2.500	2.766	.750	1.750	1.575	.186	6	10000	Yes	1.23
4136421	M1200HD300Z05S100HN07	3.000	3.266	1.000	2.188	1.750	.186	5	8300	Yes	1.92
4136422	M1200HD300Z08S100HN07	3.000	3.266	1.000	2.188	1.750	.186	8	8300	Yes	2.01
4136433	M1200HD400Z06S150HN07	4.000	4.266	1.500	3.661	1.750	.185	6	6300	Yes	3.30
4136434	M1200HD400Z09S150HN07	4.000	4.266	1.500	3.661	1.750	.185	9	6300	Yes	3.44
4136435	M1200HD500Z08S150HN07	5.000	5.265	1.500	3.661	2.380	.185	8	5000	Yes	6.24
4136436	M1200HD500Z12S150HN07	5.000	5.265	1.500	3.661	2.380	.185	12	5000	Yes	6.45

■ Spare Parts



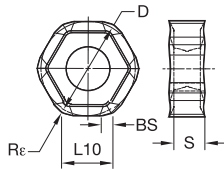
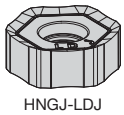
D1	insert screw	in. lbs.	Torx driver	socket-head cap screw	socket-head cap screw with coolant groove	coolant screw assembly
1.500	12146034500	31	12148082400	S424	—	—
2.000	12146034500	31	12148082400	S445	12146102400	—
2.500	12146034500	31	12148082400	S445	12146102400	—
3.000	12146034500	31	12148082400	S458	12146102800	—
4.000	12146034500	31	12148082400	—	—	S2165C
5.000	12146034500	31	12148082400	—	—	S2165C

NOTE: Socket-head cap screw with coolant groove must be ordered separately.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..LD	WP40PM	.S..GD	WP40PM	.S..HD	WP40PM
P3-P4	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
P5-P6	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
M1-M2	.E..LD	WP25PM	.S..GD	WP25PM	.S..HD	WP25PM
M3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
K1-K2	.E..LD	TN6510	.S..GD	WK15CM	.S..HD	WK15CM
K3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
N1-N2	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
N3	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
S1-S2	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP25PM
S3	.E..LD	WS30PM	.S..GD	WS30PM	.S..GD	WS30PM
S4	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP40PM
H1	-	-	-	-	-	-

Face Mills

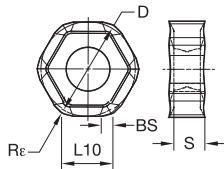
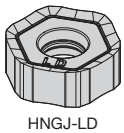


● first choice  
○ alternate choice

P	●						
M	●						
K	●						
N	●	●	●				
S	●						
H	●						

■ HNGJ-LDJ

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6501	THM-U
HNGJ0704ANFNLDJ	12	.500	.268	.176	.064	.047	.003	3954414	3954332



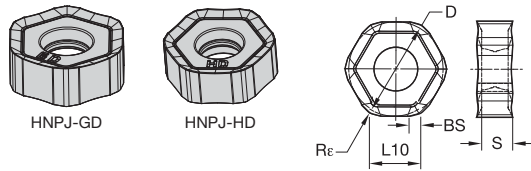
● first choice  
○ alternate choice

P	●								
M	●								
K	●								
N	●								
S	●								
H	●								

■ HNGJ-LD

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6510	WK15CM	WP25PM	WP35CM	WS30PM	WP40PM
HNGJ0704ANENLD	12	.500	.268	.176	.064	.047	.003	3954419	5895291	5895292	5528975	5550905	
HNGJ070432ANENLD	12	.500	.268	.176	-	.126	.003	3954428					

Face Mills



● first choice  
○ alternate choice

P	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○

■ HNPJ-GD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WS30PM	WP40PM
HNPJ0704ANSNGD	12	.500	.269	.175	.050	.047	.004	3954432	3954473	-	3954474	3954475	5427374	5895293	5895294	5528976	5550906

■ HNPJ-HD

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WP35CM	WS30PM	WP40PM
HNPJ0704ANSNHD	12	.500	.269	.174	.049	.047	.006	3954481	3954477	-	3954479	3954480	5427374	5895295	5895296	-	5550907
HNPJ070432ANSNHD	12	.500	.269	.174	-	.126	.006	3954482	3954478	-	3954483	3954484	-	-	-	-	5895297

Recommended Starting Speeds

■ Recommended Starting Speeds [SFM]

Material Group		TN6510	TN6520	TN6525	TN6540	TN7535	WK15CM
P	1	-	-	1340 1045 925	1180 925 785	1790 1555 1460	-
	2	-	-	1045 830 710	830 630 550	1105 1000 905	-
	3	-	-	925 710 610	710 550 450	1000 905 805	-
	4	-	-	770 550 475	590 430 355	750 690 630	-
	5	-	-	1025 770 650	785 590 490	1025 905 830	-
	6	-	-	670 535 430	535 395 335	630 535 430	-
M	1	-	-	630 395 260	430 260 200	805 725 610	-
	2	-	-	395 260 155	260 155 140	725 630 550	-
	3	-	-	415 260 180	275 155 140	570 510 450	-
K	1	1570 1140 845	1475 1045 750	905 805 725	725 670 590	1165 1045 940	1655 1520 1340
	2	1380 925 670	1280 830 630	710 630 590	570 510 450	925 830 750	1320 1165 1080
	3	1105 845 650	985 750 535	590 535 475	510 475 415	770 690 630	1105 985 905
N	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
S	1	-	-	-	155 120 95	-	-
	2	-	-	-	80 60 40	-	-
	3	-	-	-	235 140 95	-	-
	4	-	-	-	200 95 80	-	-
H	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-

(continued)

(Recommended Starting Speeds [SFM] — continued)

Material Group		WP25PM			WP35CM			WS30PM			WP40PM			TN6501			THM-U		
P	1	1295	<b>1120</b>	1060	1790	<b>1555</b>	1460	-	-	-	1165	<b>1025</b>	965	-	-	-	-	-	-
	2	1080	<b>940</b>	785	1105	<b>1000</b>	905	-	-	-	985	<b>845</b>	710	-	-	-	-	-	-
	3	1000	<b>845</b>	690	1000	<b>905</b>	805	-	-	-	905	<b>770</b>	630	-	-	-	-	-	-
	4	890	<b>725</b>	590	750	<b>690</b>	630	-	-	-	805	<b>670</b>	535	-	-	-	-	-	-
	5	725	<b>670</b>	590	1025	<b>905</b>	830	-	-	-	670	<b>610</b>	535	-	-	-	-	-	-
	6	650	<b>490</b>	395	630	<b>535</b>	430	-	-	-	590	<b>450</b>	355	-	-	-	-	-	-
M	1	805	<b>710</b>	650	805	<b>725</b>	610	890	<b>785</b>	725	770	<b>670</b>	610	-	-	-	-	-	-
	2	725	<b>630</b>	510	725	<b>630</b>	550	805	<b>710</b>	570	690	<b>590</b>	490	-	-	-	-	-	-
	3	550	<b>475</b>	370	570	<b>510</b>	450	610	<b>535</b>	415	510	<b>450</b>	355	-	-	-	-	-	-
K	1	905	<b>805</b>	725	1165	<b>1045</b>	940	-	-	-	-	-	-	-	-	-	-	-	-
	2	710	<b>630</b>	590	925	<b>830</b>	750	-	-	-	-	-	-	-	-	-	-	-	-
	3	590	<b>535</b>	475	770	<b>690</b>	630	-	-	-	-	-	-	-	-	-	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-	7870	<b>4720</b>	3935	7870	<b>4720</b>	3935
	2	-	-	-	-	-	-	-	-	-	-	-	-	5370	<b>3210</b>	2615	5370	<b>3210</b>	2615
	3	-	-	-	-	-	-	-	-	-	-	-	-	3150	<b>1970</b>	1570	3150	<b>1970</b>	1570
S	1	155	<b>140</b>	95	-	-	-	180	<b>155</b>	120	155	<b>140</b>	120	-	-	-	-	-	-
	2	155	<b>140</b>	95	-	-	-	180	<b>155</b>	120	155	<b>140</b>	120	-	-	-	-	-	-
	3	200	<b>155</b>	95	-	-	-	215	<b>180</b>	120	200	<b>155</b>	120	-	-	-	-	-	-
	4	275	<b>200</b>	140	260	<b>200</b>	130	335	<b>235</b>	155	260	<b>200</b>	140	-	-	-	-	-	-
H	1	475	<b>355</b>	275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Face Mills

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
.F..LDJ	.005	<b>.011</b>	.021	.004	<b>.008</b>	.015	.003	<b>.006</b>	.012	.003	<b>.005</b>	.010	.002	<b>.005</b>	.009	.F..LDJ
.E..LD	.005	<b>.016</b>	.032	.004	<b>.012</b>	.023	.003	<b>.009</b>	.017	.003	<b>.008</b>	.015	.002	<b>.007</b>	.014	.E..LD
.S..GD	.008	<b>.027</b>	.043	.006	<b>.019</b>	.031	.005	<b>.014</b>	.023	.004	<b>.013</b>	.020	.004	<b>.012</b>	.018	.S..GD
.S..HD	.011	<b>.027</b>	.043	.008	<b>.019</b>	.031	.006	<b>.014</b>	.023	.005	<b>.013</b>	.020	.005	<b>.012</b>	.018	.S..HD

NOTE: Use "Light Machining" value as starting feed rate.

One Series Meets Every Face Milling Need •

## WIDIA™ Victory™ M1200 Series

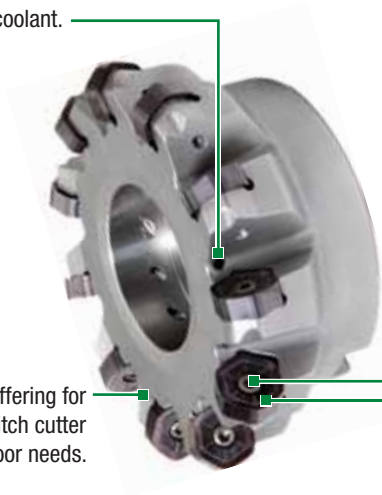
# M1200



- Low cost per edge, high productivity solution.
- 75°, 45°, and 31° lead angles.
- One series meets every face milling need.
- Available in WIDIA premium milling grades.
- Better tool life in light to heavy machining.

Best-in-class face milling platform to boost productivity on taper 50 spindle milling machines.

Through tool coolant.



Easy-to-use — one screw enables fast, accurate indexing.

Comprehensive standard offering for coarse, medium, and fine pitch cutter bodies to match all shop floor needs.

The latest technology with 12 true cutting edges and high-precision PSTS inserts.

**Face Mills**

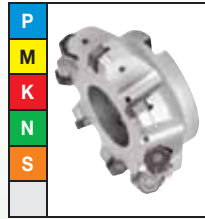


**Victory™ M1200 HF 75°**

Max depth of cut: .087"

Lead angle: 75°  
Indexes per insert: 12  
Diameter: 2–6"

Pages: H24–H27

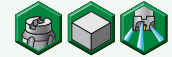
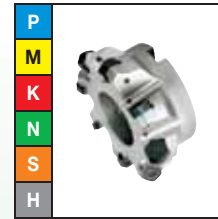


**Victory™ M1200 45°**

Max depth of cut: .177"

Lead angle: 45°  
Indexes per insert: 12  
Diameter: 2–12"

Pages: H28–H35



**Victory™ M1200 HD 31°**

Max depth of cut: .236"

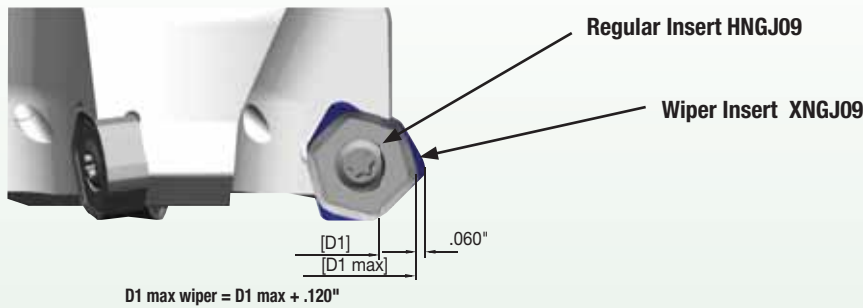
Lead angle: 31°  
Indexes per insert: 12  
Diameter: 2–6"

Pages: H36–H39

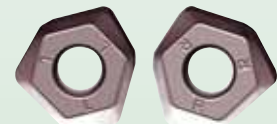


■ Easy-to-use wiper insert setup to achieve excellent surface floor finish

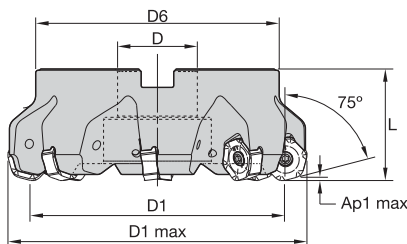
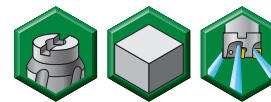
**Wiper insert overlapping vs. regular insert**



- Wiper inserts only applied with 45° lead angle cutter bodies.
- Easy to use. Regular and wiper inserts are loaded into fixed pockets. No adjustment required.
- Please have D1 max wiper in mind in case of limited working area.
- Use wiper inserts only in combination with periphery ground regular inserts HNGJ09.
- Up to cutting diameter D1=4" load one wiper insert.
- For cutting diameter D1=5" and above load two wiper inserts.
- Each wiper insert XNGJ09 can be applied with three right hand R and three left hand L cutting edges.



- Twelve cutting edges.
- High feed rates for rough face milling.
- Use standard M1200 inserts.
- Do not load wiper inserts.



■ Shell Mills

order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
3954510	M1200HF200Z04S075HN09	2.000	2.704	.750	1.593	1.575	.087	4	11300	Yes	1.13
3954511	M1200HF250Z05S075HN09	2.500	3.204	.750	1.986	1.575	.087	5	8900	Yes	1.60
3954512	M1200HF300Z06S100HN09	3.000	3.704	1.000	2.189	1.750	.087	6	7400	Yes	2.23
3954563	M1200HF400Z08S150HN09	4.000	4.703	1.500	3.661	1.750	.086	8	5800	Yes	3.96
3954564	M1200HF500Z09S150HN09	5.000	5.704	1.500	3.652	2.380	.087	9	4700	Yes	6.87
3954565	M1200HF600Z12S200HN09	6.000	6.706	2.000	4.722	2.380	.087	12	4000	Yes	10.51

■ Spare Parts

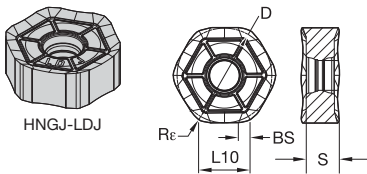
D1	insert screw	in. lbs.	Torx driver	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw assembly	coolant lock screw	coolant cap
2.00	12146034500	31	12148082400	S445	12146102400	—	—	—
2.50	12146034500	31	12148082400	S445	12146102400	—	—	—
3.00	12146034500	31	12148082400	S458	12146102800	—	—	—
4.00	12146034500	31	12148082400	—	—	S2165C	—	—
5.00	12146034500	31	12148082400	—	—	—	12146110500	12146111800
6.00	12146034500	31	12148082400	—	—	—	12146110600	12146111900

NOTE: Socket-head cap screw with coolant groove, coolant lock screw assembly, coolant lock screw, and coolant cap must be ordered separately.



■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..LD	WP40PM	.S..GD	WP40PM	.S..HD	WP40PM
P3-P4	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
P5-P6	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
M1-M2	.E..LD	WP25PM	.S..GD	WP25PM	.S..HD	WP25PM
M3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
K1-K2	.E..LD	TN6520	.S..GD	WK15CM	.S..HD	WK15CM
K3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
N1-N2	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
N3	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
S1-S2	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP25PM
S3	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP40PM
S4	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP40PM
H1	-	-	-	-	-	-

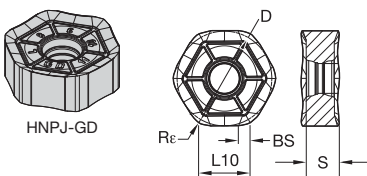


● first choice  
○ alternate choice

P	●			
M	●			
K	●			
N	●	●		
S	●			
H				

■ HNGJ-LDJ

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6501	THM-U
HNGJ535ANFNLDJ	12	.625	.338	.219	.071	.047	.001	3865373	3606383



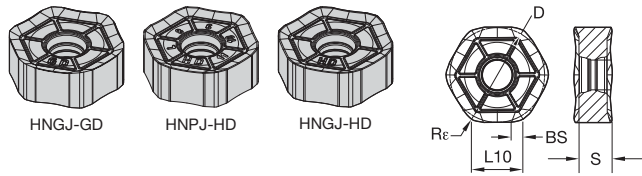
● first choice  
○ alternate choice

P	●		●	●	●	●	●	●	●
M	●	○	●	○	●	○	●	○	●
K	●	○	○	○	●	○	○	○	○
N	●								
S	●		●		●	●	●	○	
H							○		

■ HNPJ-GD

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HNPJ535ANSNGD	12	.625	.338	.219	.071	.047	.004	3761185	-	3761187	3761188	5427372	5895374	-	5895375	5550908

Face Mills



● first choice  
○ alternate choice

P	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○

■ HNGJ-GD

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HNGJ535ANSNGD	12	.625	.338	.219	.071	.047	.004	●	○	○	○	○	○	○	○	○

■ HNPJ-HD

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HNPJ53511ANSNHD	12	.625	.334	.214	—	.171	.005	●	○	○	○	○	○	○	○	○
HNPJ535ANSNHD	12	.625	.338	.215	.065	.047	.007	○	○	○	○	○	○	○	○	○

■ HNGJ-HD

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HNGJ53511ANSNHD	12	.625	.334	.214	—	.171	.008	○	○	○	○	○	○	○	○	○
HNGJ535ANSNHD	12	.625	.338	.215	.065	.047	.007	○	○	○	○	○	○	○	○	○

■ Recommended Starting Speeds [SFM]

Material Group		TN6520			TN6525			TN6540			TN7535			WK15CM			WP25PM		
P	1	-	-	-	1340	<b>1045</b>	925	1180	<b>925</b>	785	1790	<b>1555</b>	1460	-	-	-	1295	<b>1120</b>	1060
	2	-	-	-	1045	<b>830</b>	710	830	<b>630</b>	550	1105	<b>1000</b>	905	-	-	-	1080	<b>940</b>	785
	3	-	-	-	925	<b>710</b>	610	710	<b>550</b>	450	1000	<b>905</b>	805	-	-	-	1000	<b>845</b>	690
	4	-	-	-	770	<b>550</b>	475	590	<b>430</b>	355	750	<b>690</b>	630	-	-	-	890	<b>725</b>	590
	5	-	-	-	1025	<b>770</b>	650	785	<b>590</b>	490	1025	<b>905</b>	830	-	-	-	725	<b>670</b>	590
	6	-	-	-	670	<b>535</b>	430	535	<b>395</b>	335	630	<b>535</b>	430	-	-	-	650	<b>490</b>	395
M	1	-	-	-	630	<b>395</b>	260	430	<b>260</b>	200	805	<b>725</b>	610	-	-	-	805	<b>710</b>	650
	2	-	-	-	395	<b>260</b>	155	260	<b>155</b>	140	725	<b>630</b>	550	-	-	-	725	<b>630</b>	510
	3	-	-	-	415	<b>260</b>	180	275	<b>155</b>	140	570	<b>510</b>	450	-	-	-	550	<b>475</b>	370
K	1	1475	<b>1045</b>	750	905	<b>805</b>	725	725	<b>670</b>	590	1165	<b>1045</b>	940	1655	<b>1520</b>	1340	905	<b>805</b>	725
	2	1280	<b>830</b>	630	710	<b>630</b>	590	570	<b>510</b>	450	925	<b>830</b>	750	1320	<b>1165</b>	1080	710	<b>630</b>	590
	3	985	<b>750</b>	535	590	<b>535</b>	475	510	<b>475</b>	415	770	<b>690</b>	630	1105	<b>985</b>	905	590	<b>535</b>	475
N	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	155	<b>120</b>	95	-	-	-	-	-	-	155	<b>140</b>	95
	2	-	-	-	-	-	-	80	<b>60</b>	40	-	-	-	-	-	-	155	<b>140</b>	95
	3	-	-	-	-	-	-	235	<b>140</b>	95	-	-	-	-	-	-	200	<b>155</b>	95
	4	-	-	-	-	-	-	200	<b>95</b>	80	-	-	-	-	-	-	275	<b>200</b>	140
H	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	475	<b>355</b>	275
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Face Mills

Material Group		WS30PM			WP35CM			WP40PM			TN6501			THM-U		
P	1	-	-	-	1790	<b>1555</b>	1460	1165	<b>1025</b>	965	-	-	-	-	-	-
	2	-	-	-	1105	<b>1000</b>	905	985	<b>845</b>	710	-	-	-	-	-	-
	3	-	-	-	1000	<b>905</b>	805	905	<b>770</b>	630	-	-	-	-	-	-
	4	-	-	-	750	<b>690</b>	630	805	<b>670</b>	535	-	-	-	-	-	-
	5	-	-	-	1025	<b>905</b>	830	670	<b>610</b>	535	-	-	-	-	-	-
	6	-	-	-	630	<b>535</b>	430	590	<b>450</b>	355	-	-	-	-	-	-
M	1	890	<b>785</b>	725	805	<b>725</b>	610	770	<b>670</b>	610	-	-	-	-	-	-
	2	805	<b>710</b>	570	725	<b>630</b>	550	690	<b>590</b>	490	-	-	-	-	-	-
	3	610	<b>535</b>	415	570	<b>510</b>	450	510	<b>450</b>	355	-	-	-	-	-	-
K	1	-	-	-	1165	<b>1045</b>	940	-	-	-	-	-	-	-	-	-
	2	-	-	-	925	<b>830</b>	750	-	-	-	-	-	-	-	-	-
	3	-	-	-	770	<b>690</b>	630	-	-	-	-	-	-	-	-	-
N	1	-	-	-	-	-	-	-	-	-	7870	<b>4720</b>	3935	7870	<b>4720</b>	3935
	2	-	-	-	-	-	-	-	-	-	5370	<b>3210</b>	2615	5370	<b>3210</b>	2615
	3	-	-	-	-	-	-	-	-	-	3150	<b>1970</b>	1570	3150	<b>1970</b>	1570
S	1	180	<b>155</b>	120	-	-	-	155	<b>140</b>	120	-	-	-	-	-	-
	2	180	<b>155</b>	120	-	-	-	155	<b>140</b>	120	-	-	-	-	-	-
	3	215	<b>180</b>	120	-	-	-	200	<b>155</b>	120	-	-	-	-	-	-
	4	335	<b>235</b>	155	260	<b>200</b>	130	260	<b>200</b>	140	-	-	-	-	-	-
H	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

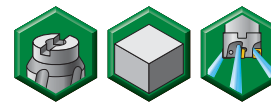
■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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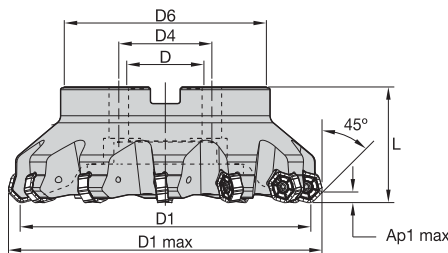
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
.F..LDJ	.018	<b>.036</b>	.073	.013	<b>.026</b>	.052	.010	<b>.019</b>	.039	.008	<b>.017</b>	.034	.008	<b>.015</b>	.031	.F..LDJ
.E..LD	.018	<b>.055</b>	.112	.013	<b>.039</b>	.079	.010	<b>.029</b>	.058	.008	<b>.025</b>	.051	.008	<b>.023</b>	.046	.E..LD
.S..GD	.028	<b>.093</b>	.153	.020	<b>.066</b>	.106	.015	<b>.049</b>	.078	.013	<b>.042</b>	.068	.012	<b>.039</b>	.062	.S..GD
.S..HD	.036	<b>.093</b>	.153	.026	<b>.066</b>	.106	.019	<b>.049</b>	.078	.017	<b>.042</b>	.068	.015	<b>.039</b>	.062	.S..HD

NOTE: Use "Light Machining" value as starting feed rate.

- Twelve cutting edges.
- First choice for general face milling.
- Low cutting forces for maximum productivity.



Face Mills










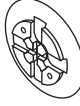
■ Shell Mills

order number	catalog number	D1	D1 max	D	D4	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
3323871	M1200D200Z04S075HN09	2.000	2.434	.750	—	1.750	1.570	.177	4	12500	Yes	.81
3323872	M1200D200Z05S075HN09	2.000	2.434	.750	—	1.750	1.570	.177	5	12500	Yes	.82
3650539	M1200D250Z04S075HN09	2.500	2.933	.750	—	2.144	1.570	.177	4	10000	Yes	1.35
3323873	M1200D250Z06S075HN09	2.500	2.933	.750	—	2.144	1.570	.177	6	10000	Yes	1.32
3323874	M1200D250Z07S075HN09	2.500	2.933	.750	—	2.144	1.570	.177	7	10000	Yes	1.34
3650540	M1200D300Z05S100HN09	3.000	3.433	1.000	—	2.189	1.750	.177	5	8300	Yes	1.86
3323875	M1200D300Z06S100HN09	3.000	3.433	1.000	—	2.189	1.750	.177	6	8300	Yes	1.79
3323876	M1200D300Z09S100HN09	3.000	3.433	1.000	—	2.189	1.750	.177	9	8300	Yes	1.97
3650541	M1200D400Z06S125HN09	4.000	4.432	1.250	—	2.722	1.750	.177	6	6300	Yes	3.17
3323877	M1200D400Z08S125HN09	4.000	4.432	1.250	—	2.880	1.750	.177	8	6300	Yes	2.93
3323878	M1200D400Z11S125HN09	4.000	4.432	1.250	—	2.880	1.750	.177	11	6300	Yes	3.14
3958019	M1200D400Z06S150HN09	4.000	4.432	1.500	—	3.661	1.750	.177	6	6300	Yes	4.17
3958020	M1200D400Z08S150HN09	4.000	4.432	1.500	—	3.661	1.750	.177	8	6300	Yes	4.13
3958021	M1200D400Z11S150HN09	4.000	4.432	1.500	—	3.661	1.750	.177	11	6300	Yes	4.16
3650542	M1200D500Z08S150HN09	5.000	5.431	1.500	—	3.652	2.380	.177	8	5000	Yes	6.20
3323879	M1200D500Z10S150HN09	5.000	5.431	1.500	—	3.810	2.380	.177	10	5000	Yes	5.94
3323880	M1200D500Z14S150HN09	5.000	5.431	1.500	—	3.810	2.380	.177	14	5000	Yes	6.21
4086796	M1200D600Z09S200HN09	6.000	6.430	2.000	—	4.722	2.380	.177	9	4100	Yes	9.04
3323881	M1200D600Z12S200HN09	6.000	6.432	2.000	—	4.879	2.380	.177	12	4100	Yes	9.10
3323882	M1200D600Z16S200HN09	6.000	6.432	2.000	—	4.879	2.380	.177	16	4100	Yes	9.36
3954507	M1200D800Z16S250HN09	8.000	8.432	2.500	4.000	5.118	2.380	.177	16	3130	Yes	13.14
4086797	M1200D800Z10S250HN09	8.000	8.433	2.500	4.000	5.118	2.380	.177	10	3130	Yes	13.01
4086798	M1200D1000Z12S250HN09	10.000	10.433	2.500	4.000	7.120	2.380	.177	12	2510	Yes	24.22
3954508	M1200D1000Z20S250HN09	10.000	10.433	2.500	4.000	7.120	2.380	.177	20	2510	Yes	24.52
4086799	M1200D1200Z14S250HN09	12.000	12.433	2.500	4.000	9.016	3.150	.177	14	2090	Yes	41.50
3954509	M1200D1200Z24S250HN09	12.000	12.433	2.500	4.000	9.016	3.150	.177	24	2090	Yes	42.66

(continued)

(Shell Mills — continued)

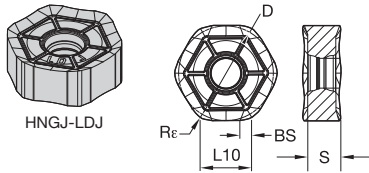
**■ Spare Parts**

								
D1	insert screw	in. lbs.	Torx driver	socket-head cap screw	socket-head cap screw with coolant groove	coolant screw assembly	coolant lock screw	coolant cap
2.000	12146034500	31	12148082400	S445	12146102400	—	—	—
2.500	12146034500	31	12148082400	S445	12146102400	—	—	—
3.000	12146034500	31	12148082400	S458	12146102800	—	—	—
4.000	12146034500	31	12148082400	—	—	12146109500	—	—
4.000	12146034500	31	12148082400	—	—	S2165C	—	—
5.000	12146034500	31	12148082400	—	—	—	12146110500	1214611800
6.000	12146034500	31	12148082400	—	—	—	12146110600	1214611900
8.000	12146034500	31	12148082400	—	—	—	—	12146112000
10.000	12146034500	31	12148082400	—	—	—	—	12146112100
12.000	12146034500	31	12148082400	—	—	—	—	12146112200

NOTE: Socket-head cap screw with coolant groove, coolant lock screw assembly, coolant lock screw, and coolant cap must be ordered separately.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..LD	WP40PM	.S..GD	WP40PM	.S..HD	WP40PM
P3-P4	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
P5-P6	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
M1-M2	.E..LD	WP25PM	.S..GD	WP25PM	.S..HD	WP25PM
M3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
K1-K2	.E..LD	TN6520	.S..GD	WK15CM	.S..HD	WK15CM
K3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
N1-N2	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
N3	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
S1-S2	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP25PM
S3	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP40PM
S4	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP40PM
H1	-	-	-	-	-	-

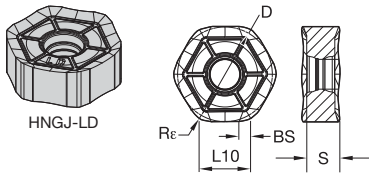


● first choice  
○ alternate choice

P	●			
M	●			
K	●			
N	●	●	●	
S	●			
H	●			

■ HNGJ-LDJ

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6501	THM-U
HNGJ535ANFNLDJ	12	.625	.338	.219	.071	.047	.001	3865373	3606383

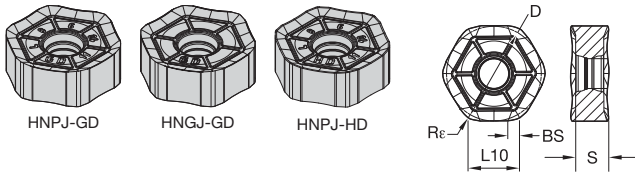


● first choice  
○ alternate choice

P	●								
M	●	○	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○	○
N	●								
S	●								○
H	●								

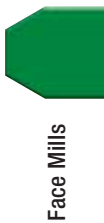
■ HNGJ-LD

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HNGJ535ANENLD	12	.625	.338	.219	.071	.047	.002	3093559	3330950	3030034	3030017	5895346	5528973	5895347	5895348	



● first choice  
○ alternate choice

P	●	●	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○



Face Mills

■ HNPJ-GD

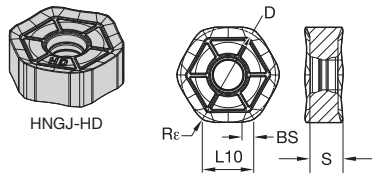
catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HNPJ535ANSNGD	12	.625	.338	.219	.071	.047	.004	3761185	-	3761187	3761188	5427372	5895374	-	5895375	5550908

■ HNGJ-GD

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HNGJ535ANSNGD	12	.625	.338	.219	.071	.047	.004	3119541	3614650	3037596	3093721	5427370	-	5528974	5895349	5895350

■ HNPJ-HD

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HNPJ53511ANSNHD	12	.625	.334	.214	-	.171	.005	3670864	3670866	-	-	-	5895378	-	5895379	5895380
HNPJ535ANSNHD	12	.625	.338	.215	.065	.047	.007	-	-	3670842	3670865	5427371	5895376	-	5895377	5550909

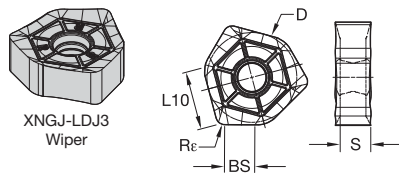


P	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○
N	●	○	○	○	○	○	○
S	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○

● first choice  
○ alternate choice

■ HNGJ-HD

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HNGJ53511ANSNHD	12	.625	.334	.214	—	.171	.008	3564083	3564084	3563902	—	—	—	—	—	—
HNGJ535ANSNHD	12	.625	.338	.215	.065	.047	.007	3563900	3563901	—	—	5895371	—	5895372	5895373	—



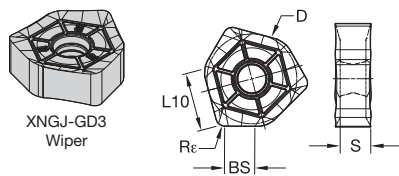
P	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○
N	●	○	○	○	○	○	○
S	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○

● first choice  
○ alternate choice

■ XNGJ-LDJ3 Wiper

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6501	THM-U
XNGJ535ANFLDJ3W	3	.625	.377	.217	.230	.063	.001	3865375	3865368

NOTE: Inserts have 3 right-hand and 3 left-hand cutting edges.



P	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○
N	●	○	○	○	○	○	○
S	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○

● first choice  
○ alternate choice

■ XNGJ-GD3 Wiper

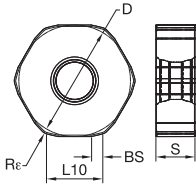
catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6520	TN6525	TN6540	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
XNGJ535ANSNGD3W	3	.625	.377	.217	.230	.063	.004	3524707	3523620	3066479	—	5622622	5895381	—	5895382	—

NOTE: Inserts have 3 right-hand and 3 left-hand cutting edges.





HNEC535ANSN  
Ceramic



- first choice
- alternate choice

P	Blue	
M	Yellow	
K	Red	●
N	Green	
S	Orange	
H	Grey	



■ HNEC535ANSN Ceramic

catalog number	cutting edges	D	L10	S	BS	Rε	hm	WK25YM
HNEC535ANSN	12	.625	.361	.219	.077	.047	.008	5910033

■ Recommended Starting Speeds [SFM]

Face Mills

Material Group		TN6520			TN6525			TN6540			TN7535			WK15CM			WP25PM		
P	1	-	-	-	1340	1045	925	1180	925	785	1790	1555	1460	-	-	-	1295	1120	1060
	2	-	-	-	1045	830	710	830	630	550	1105	1000	905	-	-	-	1080	940	785
	3	-	-	-	925	710	610	710	550	450	1000	905	805	-	-	-	1000	845	690
	4	-	-	-	770	550	475	590	430	355	750	690	630	-	-	-	890	725	590
	5	-	-	-	1025	770	650	785	590	490	1025	905	830	-	-	-	725	670	590
	6	-	-	-	670	535	430	535	395	335	630	535	430	-	-	-	650	490	395
M	1	-	-	-	630	395	260	430	260	200	805	725	610	-	-	-	805	710	650
	2	-	-	-	395	260	155	260	155	140	725	630	550	-	-	-	725	630	510
	3	-	-	-	415	260	180	275	155	140	570	510	450	-	-	-	550	475	370
K	1	1475	1045	750	905	805	725	725	670	590	1165	1045	940	1655	1520	1340	905	805	725
	2	1280	830	630	710	630	590	570	510	450	925	830	750	1320	1165	1080	710	630	590
	3	985	750	535	590	535	475	510	475	415	770	690	630	1105	985	905	590	535	475
N	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	155	120	95	-	-	-	-	-	-	155	140	95
	2	-	-	-	-	-	-	80	60	40	-	-	-	-	-	-	155	140	95
	3	-	-	-	-	-	-	235	140	95	-	-	-	-	-	-	200	155	95
	4	-	-	-	-	-	-	200	95	80	-	-	-	-	-	-	275	200	140
H	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	475	355	275
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

(Recommended Starting Speeds [SFM] — continued)

Material Group		WS30PM	WP35CM	WP40PM	WK25YM	TN6501	THM-U
P	1	- - -	1790 <b>1555</b> 1460	1165 <b>1025</b> 965	- - -	- - -	- - -
	2	- - -	1105 <b>1000</b> 905	985 <b>845</b> 710	- - -	- - -	- - -
	3	- - -	1000 <b>905</b> 805	905 <b>770</b> 630	- - -	- - -	- - -
	4	- - -	750 <b>690</b> 630	805 <b>670</b> 535	- - -	- - -	- - -
	5	- - -	1025 <b>905</b> 830	670 <b>610</b> 535	- - -	- - -	- - -
	6	- - -	630 <b>535</b> 430	590 <b>450</b> 355	- - -	- - -	- - -
M	1	890 <b>785</b> 725	805 <b>725</b> 610	770 <b>670</b> 610	- - -	- - -	- - -
	2	805 <b>710</b> 570	725 <b>630</b> 550	690 <b>590</b> 490	- - -	- - -	- - -
	3	610 <b>535</b> 415	570 <b>510</b> 450	510 <b>450</b> 355	- - -	- - -	- - -
K	1	- - -	1165 <b>1045</b> 940	- - -	3170 <b>2880</b> 2560	- - -	750 <b>670</b> 590
	2	- - -	925 <b>830</b> 750	- - -	2510 <b>2240</b> 2090	- - -	- - -
	3	- - -	770 <b>690</b> 630	- - -	2110 <b>1870</b> 1720	- - -	- - -
N	1	- - -	- - -	- - -	- - -	7870 <b>4720</b> 3935	7870 <b>4720</b> 3935
	2	- - -	- - -	- - -	- - -	5370 <b>3210</b> 2615	5370 <b>3210</b> 2615
	3	- - -	- - -	- - -	- - -	3150 <b>1970</b> 1570	3150 <b>1970</b> 1570
S	1	180 <b>155</b> 120	- - -	155 <b>140</b> 120	- - -	- - -	- - -
	2	180 <b>155</b> 120	- - -	155 <b>140</b> 120	- - -	- - -	- - -
	3	215 <b>180</b> 120	- - -	200 <b>155</b> 120	- - -	- - -	- - -
	4	335 <b>235</b> 155	260 <b>200</b> 130	260 <b>200</b> 140	- - -	- - -	- - -
H	1	- - -	- - -	- - -	- - -	- - -	- - -
	2	- - -	- - -	- - -	- - -	- - -	- - -
	3	- - -	- - -	- - -	- - -	- - -	- - -

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

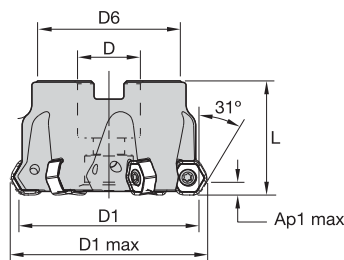
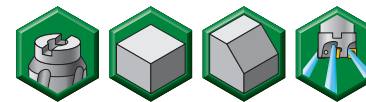
■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
.F..LDJ	.007	<b>.013</b>	.026	.005	<b>.009</b>	.019	.004	<b>.007</b>	.014	.003	<b>.006</b>	.012	.003	<b>.006</b>	.011	.F..LDJ
.E..LD	.007	<b>.020</b>	.040	.005	<b>.014</b>	.029	.004	<b>.011</b>	.021	.003	<b>.009</b>	.019	.003	<b>.008</b>	.017	.E..LD
.S..GD	.010	<b>.033</b>	.053	.007	<b>.024</b>	.038	.006	<b>.018</b>	.028	.005	<b>.015</b>	.025	.004	<b>.014</b>	.023	.S..GD
.S..HD	.013	<b>.033</b>	.053	.009	<b>.024</b>	.038	.007	<b>.018</b>	.028	.006	<b>.015</b>	.025	.006	<b>.014</b>	.023	.S..HD
.S..Ceramic	.007	<b>.013</b>	.020	.005	<b>.009</b>	.014	.004	<b>.007</b>	.011	.003	<b>.006</b>	.009	.003	<b>.006</b>	.008	.S..Ceramic

NOTE: Use "Light Machining" value as starting feed rate.

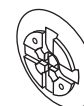
- Twelve cutting edges.
- Higher  $A_{p1}$  max with standard insert.
- Low cutting forces for maximum productivity.



■ Shell Mills

order number	catalog number	D1	D1 max	D	D6	L	$A_{p1}$ max	Z	max RPM	coolant supply	lbs
4147876	M1200HD200Z04S075HN09	2.000	2.337	.750	1.593	1.575	.236	4	12500	Yes	.75
4147877	M1200HD200Z05S075HN09	2.000	2.337	.750	1.593	1.575	.236	5	12500	Yes	.73
4147878	M1200HD250Z04S075HN09	2.500	2.836	.750	1.986	1.575	.236	4	10000	Yes	1.28
4147879	M1200HD250Z06S075HN09	2.500	2.836	.750	1.986	1.575	.236	6	10000	Yes	1.28
4147880	M1200HD300Z05S100HN09	3.000	3.336	1.000	2.189	1.750	.236	5	8300	Yes	1.86
4147881	M1200HD300Z08S100HN09	3.000	3.336	1.000	2.189	1.750	.236	8	8300	Yes	1.86
4147882	M1200HD400Z06S150HN09	4.000	4.335	1.500	3.661	1.750	.236	6	6300	Yes	3.19
4147883	M1200HD400Z08S150HN09	4.000	4.335	1.500	3.661	1.750	.236	8	6300	Yes	3.21
4147884	M1200HD500Z08S150HN09	5.000	5.335	1.500	3.652	2.380	.236	8	5000	Yes	6.28
4147885	M1200HD500Z10S150HN09	5.000	5.335	1.500	3.652	2.380	.236	10	5000	Yes	6.26
4147886	M1200HD600Z09S200HN09	6.000	6.335	2.000	4.722	2.380	.236	9	4100	Yes	9.26
4147887	M1200HD600Z12S200HN09	6.000	6.335	2.000	4.722	2.380	.236	12	4100	Yes	9.23

■ Spare Parts

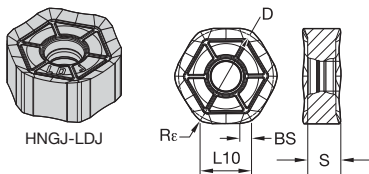


D1	insert screw	in. lbs.	Torx driver	socket-head cap screw	socket-head cap screw with coolant groove	coolant screw assembly	coolant lock screw	coolant cap
2.000	12146034500	31	12148082400	S445	12146102400	—	—	—
2.500	12146034500	31	12148082400	S445	12146102400	—	—	—
3.000	12146034500	31	12148082400	S458	12146102800	—	—	—
4.000	12146034500	31	12148082400	—	—	S2165C	—	—
5.000	12146034500	31	12148082400	—	—	S2165C	—	—
6.000	12146034500	31	12148082400	—	—	—	12146110600	12146111900

NOTE: Socket-head cap screw with coolant groove, coolant screw assembly, coolant lock screw, and coolant cap must be ordered separately.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..LD	WP40PM	.S..GD	WP40PM	.S..HD	WP40PM
P3-P4	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
P5-P6	.E..LD	WP25PM	.S..GD	WP35CM	.S..HD	WP35CM
M1-M2	.E..LD	WP25PM	.S..GD	WP25PM	.S..HD	WP25PM
M3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
K1-K2	.E..LD	TN6520	.S..GD	WK15CM	.S..HD	WK15CM
K3	.E..LD	WP35CM	.S..GD	WP35CM	.S..HD	WP35CM
N1-N2	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
N3	.F..LDJ	TN6501	.F..LDJ	TN6501	.F..LDJ	TN6501
S1-S2	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP25PM
S3	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP40PM
S4	.E..LD	WS30PM	.S..GD	WS30PM	.S..HD	WP40PM
H1	-	-	-	-	-	-

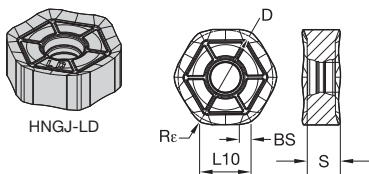


● first choice  
○ alternate choice

P	●			
M	●			
K	●			
N	●	●	●	
S	●			
H	●			

■ HNGJ-LDJ

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6501	THM-U
HNGJ535ANFNLDJ	12	.625	.338	.219	.071	.047	.001	3865373	3606383



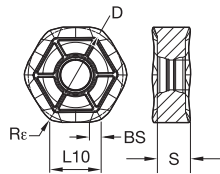
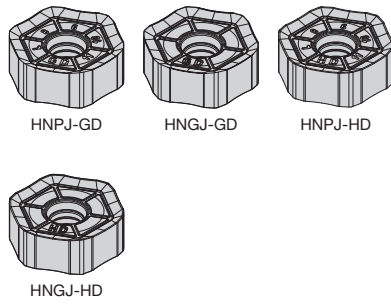
● first choice  
○ alternate choice

P	●								
M	●	○	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○	○
N	●								
S	●								○
H	●								

■ HNGJ-LD

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN6520	TN6525	TN6540	TN7535	WP25PM	WK15CM	WS30PM	WP35CM	WP40PM
HNGJ535ANENLD	12	.625	.338	.219	.071	.047	.002	3093559	3330950	3030034	3030017	5895346	5528973	5895347	5895348	

Face Mills



● first choice  
○ alternate choice

P	●	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○

**■ HNPJ-GD**

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6520	TN6525	TN6540	TN7535	WP25PM	WK15CM	WS30PM	WP35CM	WP40PM
HNPJ535ANSNGD	12	.625	.338	.219	.071	.047	.004	3761185	-	3761187	3761188	5895374	5427372	-	5895375	5550908

**■ HNGJ-GD**

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6520	TN6525	TN6540	TN7535	WP25PM	WK15CM	WS30PM	WP35CM	WP40PM
HNGJ535ANSNGD	12	.625	.338	.219	.071	.047	.004	3119541	3614650	3037596	3093721	-	5427370	5528974	5895349	5895350

**■ HNPJ-HD**

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6520	TN6525	TN6540	TN7535	WP25PM	WK15CM	WS30PM	WP35CM	WP40PM
HNPJ53511ANSNHD	12	.625	.334	.214	-	.171	.005	3670866	-	3670865	-	5895378	-	-	5895379	5895380
HNPJ535ANSNHD	12	.625	.338	.215	.065	.047	.007	3670864	-	3670842	-	5895376	5427371	-	5895377	5550909

**■ HNGJ-HD**

catalog number	cutting edges	D	L10	S	BS	Rε	hm	TN6520	TN6525	TN6540	TN7535	WP25PM	WK15CM	WS30PM	WP35CM	WP40PM
HNGJ53511ANSNHD	12	.625	.334	.214	-	.171	.008	3563900	3564084	3564085	-	-	-	-	-	-
HNGJ535ANSNHD	12	.625	.338	.215	.065	.047	.007	3563901	-	-	-	5895371	-	-	5895372	5895373

■ Recommended Starting Speeds [SFM]

Material Group		TN6501	TN6520	TN6525	TN6540	TN7535	WP25PM
P	1	- - -	- - -	1340 1045 925	1180 925 785	1790 1555 1460	1295 1120 1060
	2	- - -	- - -	1045 830 710	830 630 550	1105 1000 905	1080 940 785
	3	- - -	- - -	925 710 610	710 550 450	1000 905 805	1000 845 690
	4	- - -	- - -	770 550 475	590 430 355	750 690 630	890 725 590
	5	- - -	- - -	1025 770 650	785 590 490	1025 905 830	725 670 590
	6	- - -	- - -	670 535 430	535 395 335	630 535 430	650 490 395
M	1	- - -	- - -	630 395 260	430 260 200	805 725 610	805 710 650
	2	- - -	- - -	395 260 155	260 155 140	725 630 550	725 630 510
	3	- - -	- - -	415 260 180	275 155 140	570 510 450	550 475 370
K	1	- - -	1475 1045 750	905 805 725	725 670 590	1165 1045 940	905 805 725
	2	- - -	1280 830 630	710 630 590	570 510 450	925 830 750	710 630 590
	3	- - -	985 750 535	590 535 475	510 475 415	770 690 630	590 535 475
N	1	7870 4720 3935	- - -	- - -	- - -	- - -	- - -
	2	5370 3210 2615	- - -	- - -	- - -	- - -	- - -
	3	3150 1970 1570	- - -	- - -	- - -	- - -	- - -
S	1	- - -	- - -	- - -	155 120 95	- - -	155 140 95
	2	- - -	- - -	- - -	80 60 40	- - -	155 140 95
	3	- - -	- - -	- - -	235 140 95	- - -	200 155 95
	4	- - -	- - -	- - -	200 95 80	- - -	275 200 140
H	1	- - -	- - -	- - -	- - -	- - -	475 355 275
	2	- - -	- - -	- - -	- - -	- - -	- - -
	3	- - -	- - -	- - -	- - -	- - -	- - -

Material Group		WK15CM	WS30PM	WP35CM	WP40PM	TN6501	THM-U
P	1	- - -	- - -	1790 1555 1460	1165 1025 965	- - -	- - -
	2	- - -	- - -	1105 1000 905	985 845 710	- - -	- - -
	3	- - -	- - -	1000 905 805	905 770 630	- - -	- - -
	4	- - -	- - -	750 690 630	805 670 535	- - -	- - -
	5	- - -	- - -	1025 905 830	670 610 535	- - -	- - -
	6	- - -	- - -	630 535 430	590 450 355	- - -	- - -
M	1	- - -	890 785 725	805 725 610	770 670 610	- - -	- - -
	2	- - -	805 710 570	725 630 550	690 590 490	- - -	- - -
	3	- - -	610 535 415	570 510 450	510 450 355	- - -	- - -
K	1	1655 1520 1340	- - -	1165 1045 940	- - -	- - -	- - -
	2	1320 1165 1080	- - -	925 830 750	- - -	- - -	- - -
	3	1105 985 905	- - -	770 690 630	- - -	- - -	- - -
N	1	- - -	- - -	- - -	- - -	7870 4720 3935	7870 4720 3935
	2	- - -	- - -	- - -	- - -	5370 3210 2615	5370 3210 2615
	3	- - -	- - -	- - -	- - -	3150 1970 1570	3150 1970 1570
S	1	- - -	180 155 120	- - -	155 140 120	- - -	- - -
	2	- - -	180 155 120	- - -	155 140 120	- - -	- - -
	3	- - -	215 180 120	- - -	200 155 120	- - -	- - -
	4	- - -	335 235 155	260 200 130	260 200 140	- - -	- - -
H	1	- - -	- - -	- - -	- - -	- - -	- - -
	2	- - -	- - -	- - -	- - -	- - -	- - -
	3	- - -	- - -	- - -	- - -	- - -	- - -

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
.F..LDJ	.005	<b>.011</b>	.021	.004	<b>.008</b>	.015	.003	<b>.006</b>	.012	.003	<b>.005</b>	.010	.002	<b>.005</b>	.009	.F..LDJ
.E..LD	.005	<b>.016</b>	.032	.004	<b>.012</b>	.023	.003	<b>.009</b>	.017	.003	<b>.008</b>	.015	.002	<b>.007</b>	.014	.E..LD
.S..GD	.008	<b>.027</b>	.043	.006	<b>.019</b>	.031	.005	<b>.014</b>	.023	.004	<b>.013</b>	.020	.004	<b>.012</b>	.018	.S..GD
.S..HD	.011	<b>.027</b>	.043	.008	<b>.019</b>	.031	.006	<b>.014</b>	.023	.005	<b>.013</b>	.020	.005	<b>.012</b>	.018	.S..HD

NOTE: Use "Light Machining" value as starting feed rate.

When Low Cutting Forces Are Required •

## M640 Series

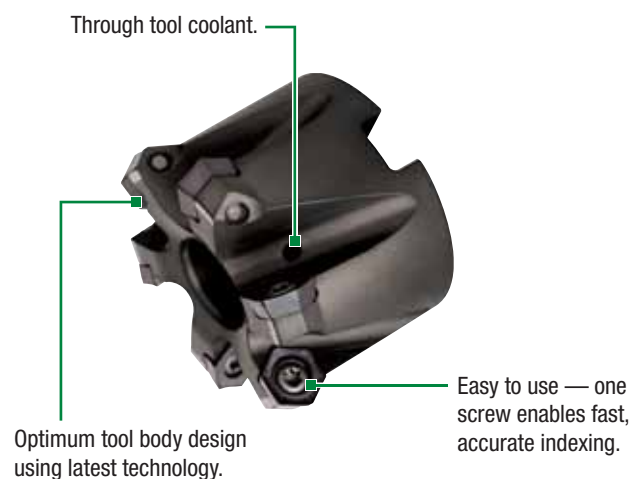
# M640



The M640 platform is the first choice when high productivity, superior finish operations, and soft cutting performance are a priority. With six effective cutting edges and a streamlined body design, this easy-to-use tool is ideal, even for low-power machines.

- Highly positive rake angle means extremely low cutting forces.
- Available in geometries and grades for all applications.
- Easy-to-use for fast, accurate indexing.

All pockets are machined into preheated material for excellent runout and pocket strength.





**Face Mills**

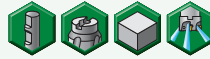


**M640**

**Max depth of cut: .180"**

Lead angle: 32°  
 Indexes per insert: 6  
 Diameter: 1.25–4"

**Pages: H42–H47**



**■ Insert Offering**



Low cutting force wiper inserts: Special wiper design for very soft cutting in finishing operations with high productivity.



Six effective cutting edges.

Highly positive rake:

- Extremely low cutting forces.
- For low-power machines, driven units, and light fixtures.
- Chipbreaker and grades for all applications.
- Through tool coolant up to 80mm diameter.

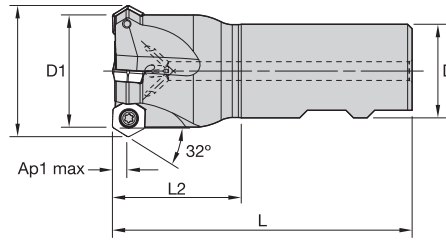
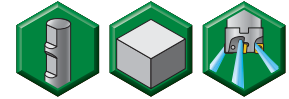
# Face Mills • M640 Series

Weldon® Shanks



Face Mills

- Six cutting edges.
- Highly positive rake for low-power machines or light fixtures.
- Geometries and grades for all applications.



## Weldon Shanks

order number	catalog number	D1	D1 max	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
2961908	M640D125Z03W125HP06	1.250	1.500	1.250	4.000	1.719	.189	3	13500	Yes	1.30
2961909	M640D150Z04W125HP06	1.500	1.750	1.250	4.000	1.719	.189	4	12000	Yes	1.30

## Spare Parts



insert screw



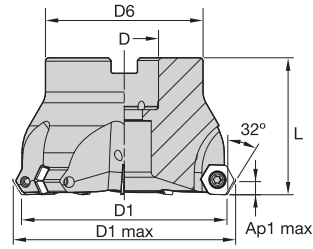
in. lbs.



Torx driver

D1	insert screw	in. lbs.	Torx driver
1.250	12148038800	36	12148000600
1.500	12148038800	36	12148000600

- Six cutting edges.
- Highly positive rake for low-power machines or light fixtures.
- Geometries and grades for all applications.



Face Mills

■ **Shell Mills**

order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
2961910	M640D200Z05S075HP06	2.000	2.250	.750	1.700	1.500	.189	5	11500	Yes	1.10
2961911	M640D250Z06S100HP06	2.500	2.750	1.000	2.200	1.750	.189	6	10100	Yes	1.98
2961912	M640D300Z07S100HP06	3.000	3.250	1.000	2.300	2.000	.189	7	7900	Yes	2.65
2961913	M640D400Z09S125HP06	4.000	4.250	1.250	2.800	2.000	.189	9	6300	Yes	3.53

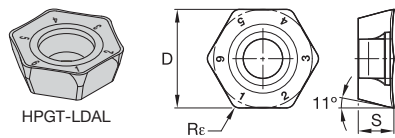
■ **Spare Parts**



D1	insert screw	in. lbs.	Torx driver
2.000	12148038800	36	12148000600
2.500	12148038800	36	12148000600
3.000	12148038800	36	12148000600
4.000	12148038800	36	12148000600

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..LD	WP40PM	.E..GD	WP40PM	.E..GD	WP40PM
P3-P4	.E..LD	WP25PM	.E..GD	WP35CM	.E..GD	WP35CM
P5-P6	.E..LD	WP25PM	.E..GD	WP35CM	.E..GD	WP35CM
M1-M2	.E..LD	WP25PM	.E..GD	WP25PM	.E..GD	WP25PM
M3	.E..LD	WP40PM	.E..GD	WP35CM	.E..GD	WP35CM
K1-K2	.E..LD	TN6510	.E..GD	WK15CM	.E..GD	WK15CM
K3	.E..LD	TN6520	.E..GD	WP35CM	.E..GD	WP35CM
N1-N2	.F..LDAL	TN6501	.F..LDAL	TN6501	.F..LDAL	TN6501
N3	.F..LDAL	TN6501	.F..LDAL	TN6501	.F..LDAL	TN6501
S1-S2	.E..LD	WP25PM	.E..GD	WP25PM	.E..GD	WP25PM
S3	.E..GD	WS30PM	.E..GD	WS30PM	.E..GD	WP40PM
S4	.E..GD	WS30PM	.E..GD	WS30PM	.E..GD	WP40PM
H1	.E..LD	TN2510	.E..GD	TN2510	-	-



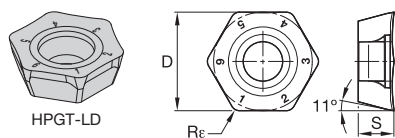
● first choice  
○ alternate choice

P	●				
M	●				
K	●			○	
N	●	●	●		
S	●			○	
H	●				

■ HPGT-LDAL

catalog number	cutting edges	D	S	Rε	hm	TN6501	THM-U	THM
HPGT225DZFRDLAL	6	.433	.158	.035	.003	2957548	2288107	2288106

NOTE: Depth of cut  $A_{p1} \max = .118''$  with this geometry.



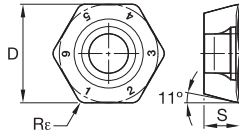
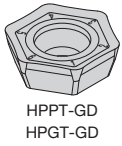
● first choice  
○ alternate choice

P	○			●	●	●	●	●	●	●
M	○			○	●	○	○	○	○	○
K	○	●	●	○	○	○	○	○	○	○
N										
S				●		●	●	●	○	
H	●					○				

■ HPGT-LD

catalog number	cutting edges	D	S	Rε	hm	TN2510	TN6510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HPGT225DZERLD	6	.429	.157	.039	.003	2288072	-	2957585	2957547	2957587	2288070	-	-	5895784	-	-	5895785

NOTE: Depth of cut  $A_{p1} \max = .118''$  with this geometry.



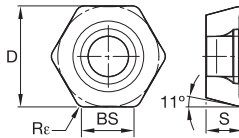
● first choice  
○ alternate choice

■ HPPT-GD

catalog number	cutting edges	D	S	Rε	hm	TN2510	TN6510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HPPT225DZENGD	6	.432	.156	.039	.004	-	-	2957583	2957586	2957552	2271760	2271759	-	5895788	-	5895790	5895789

■ HPGT-GD

catalog number	cutting edges	D	S	Rε	hm	TN2510	TN6510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HPGT225DZENGD	6	.432	.156	.039	.004	2288069	2957589	-	2957588	2957546	2288067	2288066	5427387	5895782	5528978	-	5895783



● first choice  
○ alternate choice

■ HPGT-GD Wiper

catalog number	cutting edges	D	S	BS	Rε	hm	TN2510	TN6510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WP25PM	WS30PM	WP35CM	WP40PM
HPGT06T3DZERGD3W	3	.439	.158	.113	.039	.004	-	2957549	-	2957584	-	2288103	-	5427388	5895786	-	-	5895787

P	○			●	●	●	●	●	●	●	●	●	●	●	●	●	●
M					○	○	○	○	○	○	○	○	○	○	○	○	○
K	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N																	
S					●									●	●	●	○
H	●													○			

P	○			●	●	●	●	●	●	●	●	●	●	●	●	●	●
M					○	○	○	○	○	○	○	○	○	○	○	○	○
K	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N																	
S					●									●	●	●	○
H	●													○			

■ Recommended Starting Speeds [SFM]

Face Mills

Material Group		TN2510			TN6510			TN6520			TN6525			TN6540			TN7525		
P	1	2165	1910	1770	-	-	-	-	-	-	1340	1045	925	1180	925	785	1340	1025	925
	2	1340	1220	1080	-	-	-	-	-	-	1045	830	710	830	630	550	1025	830	710
	3	1220	1080	1000	-	-	-	-	-	-	925	710	610	710	550	450	925	710	610
	4	905	845	750	-	-	-	-	-	-	770	550	475	590	430	355	770	550	475
	5	1080	985	905	-	-	-	-	-	-	1025	770	650	785	590	490	1025	770	650
	6	750	670	570	-	-	-	-	-	-	670	535	430	535	395	335	670	535	430
M	1	890	785	690	-	-	-	-	-	-	630	395	260	430	260	200	805	725	610
	2	805	690	630	-	-	-	-	-	-	395	260	155	260	155	140	725	630	550
	3	630	570	490	-	-	-	-	-	-	415	260	180	275	155	140	570	510	450
K	1	1380	1180	985	1570	1140	845	1475	1045	750	905	805	725	725	670	590	1240	925	785
	2	1180	985	830	1380	925	670	1280	830	630	710	630	590	570	510	450	1060	785	650
	3	985	830	650	1105	845	650	985	750	535	590	535	475	510	475	415	785	650	550
N	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	-	-	-	-	-	-	155	120	95	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	80	60	40	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	235	140	95	-	-	-
	4	-	-	-	-	-	-	-	-	-	-	-	-	200	95	80	-	-	-
H	1	475	360	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	475	360	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	380	260	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Group		TN7535			WK15CM			WP25PM			WS30PM			WP35CM			WP40PM		
P	1	1790	1555	1460	-	-	-	1295	1120	1060	-	-	-	1790	1555	1460	1165	1025	965
	2	1105	1000	905	-	-	-	1080	940	785	-	-	-	1105	1000	905	985	845	710
	3	1000	905	805	-	-	-	1000	845	690	-	-	-	1000	905	805	905	770	630
	4	750	690	630	-	-	-	890	725	590	-	-	-	750	690	630	805	670	535
	5	1025	905	830	-	-	-	725	670	590	-	-	-	1025	905	830	670	610	535
	6	630	535	430	-	-	-	650	490	395	-	-	-	630	535	430	590	450	355
M	1	805	725	610	-	-	-	805	710	650	890	785	725	805	725	610	770	670	610
	2	725	630	550	-	-	-	725	630	510	805	710	570	725	630	550	690	590	490
	3	570	510	450	-	-	-	550	475	370	610	535	415	570	510	450	510	450	355
K	1	1165	1045	940	1655	1520	1340	905	805	725	-	-	-	1165	1045	940	-	-	-
	2	925	830	750	1320	1165	1080	710	630	590	-	-	-	925	830	750	-	-	-
	3	770	690	630	1105	985	905	590	535	475	-	-	-	770	690	630	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	155	140	95	180	155	120	-	-	-	155	140	120
	2	-	-	-	-	-	-	155	140	95	180	155	120	-	-	-	155	140	120
	3	-	-	-	-	-	-	200	155	95	215	180	120	-	-	-	200	155	120
	4	-	-	-	-	-	-	275	200	140	335	235	155	260	200	130	260	200	140
H	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

(Recommended Starting Speeds [SFM] — continued)

Material Group		TN6501			THM-U			THM		
P	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-
	5	-	-	-	-	-	-	-	-	-
	6	-	-	-	-	-	-	-	-	-
M	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
K	1	-	-	-	750	<b>670</b>	590	475	<b>355</b>	295
	2	-	-	-	-	-	-	490	<b>395</b>	275
	3	-	-	-	-	-	-	510	<b>370</b>	235
N	1	7870	<b>4720</b>	3935	7870	<b>4720</b>	3935	3540	<b>2365</b>	1970
	2	5370	<b>3210</b>	2615	5370	<b>3210</b>	2615	2695	<b>1830</b>	1520
	3	3150	<b>1970</b>	1570	3150	<b>1970</b>	1570	1770	<b>1105</b>	785
S	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-
H	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-

Face Mills

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
.F..LDAL	.005	<b>.013</b>	.018	.004	<b>.010</b>	.013	.003	<b>.007</b>	.010	.003	<b>.006</b>	.009	.002	<b>.006</b>	.008	.F..LDAL
.E..LD	.005	<b>.013</b>	.018	.004	<b>.010</b>	.013	.003	<b>.007</b>	.010	.003	<b>.006</b>	.009	.002	<b>.006</b>	.008	.E..LD
.E..GD	.005	<b>.019</b>	.021	.004	<b>.014</b>	.015	.003	<b>.010</b>	.011	.003	<b>.009</b>	.010	.002	<b>.008</b>	.009	.E..GD

NOTE: Use "Light Machining" value as starting feed rate.

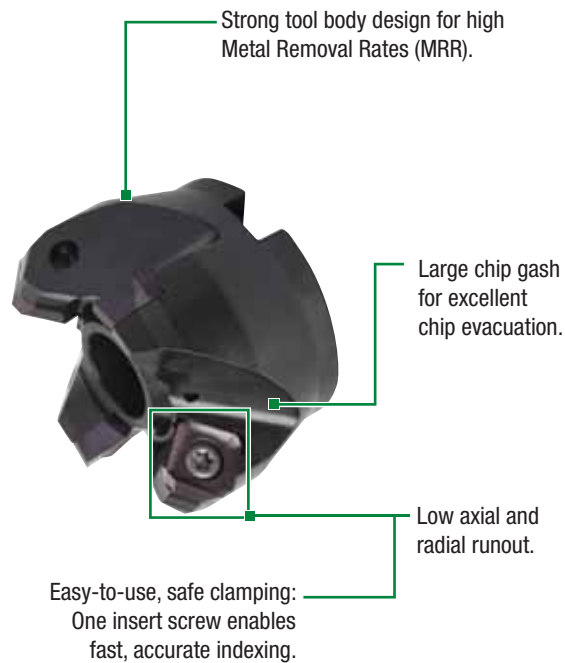
The Ideal Heavy-Duty Face Milling Platform •  
**M660 Series**

# M660



The M660 heavy-duty face milling platform, with its strong tool body design and accurate axial and radial runout, is the ultimate high-performance booster in the heavy machining of steel and cast iron.

- Three tailor-made chipbreakers with large chip gash ensures excellent chip evacuation.
- Easy, safe, and stable clamping ensures accurate indexing.
- Thick inserts for reliability and high MRR capability.





**Face Mills**



**M660 SN1205..**

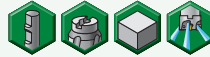
**Max depth of cut: 250"**

Lead angle: 45°

Indexes per insert: 4

Diameter: 1–6"

**Pages: H50–H55**



**■ Insert Offering**



Three tailor-made chipbreakers (-20, -21, -31) for all heavy-duty applications in steel and cast iron.

Thick inserts for reliability and high MRR capability.

Integrated wiper facet: Good surface finish in heavy roughing applications.

Positive rake angle:

- Soft cutting action.
- Less spindle power requirement.
- Less chipping on workpiece in cast iron.
- Less burs on workpiece in steel.
- High feed rate capability.

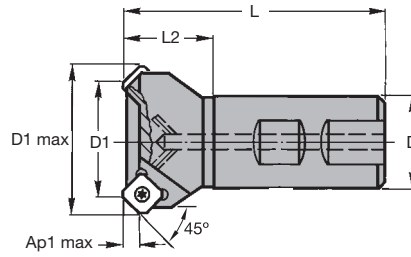
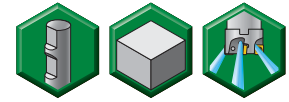
# Face Mills • M660 Series

Weldon® Shanks • SN1205..



Face Mills

- Four cutting edges.
- Strong tool body design.
- Excellent chip evacuation.



## Weldon Shanks

order number	catalog number	D1	D1 max	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
2646651	M660D100Z02W100SN12	1.000	1.540	1.000	3.750	1.470	.250	2	15000	Yes	.70
2646652	M660D125Z03W125SN12	1.250	1.790	1.250	4.000	1.720	.250	3	13500	Yes	.70
2646653	M660D150Z04W125SN12	1.500	2.040	1.250	4.000	1.720	.250	4	12000	Yes	1.40
2646654	M660D200Z04W125SN12	2.000	2.520	1.250	4.000	1.720	.250	4	10500	Yes	1.80

## Spare Parts



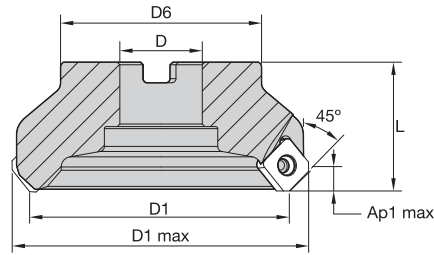
D1	insert screw	in. lbs.	Torx driver
1.000	MS2260	31	12148007600
1.250	MS2260	31	12148007600
1.500	MS2260	31	12148007600
2.000	MS2260	31	12148007600



- Four cutting edges.
- Strong tool body design.
- Excellent chip evacuation.



Face Mills



■ **Shell Mills**

order number	catalog number	D1	D1 max	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
2646747	M660D200Z04S075SN12	2.000	2.520	.750	1.700	2.000	.250	4	14000	Yes	.50
2646749	M660D300Z06S100SN12	3.000	3.560	1.000	2.300	2.000	.250	6	11000	Yes	.60
2646750	M660D400Z07S125SN12	4.000	4.580	1.250	2.800	2.000	.250	7	9900	No	1.20
2646752	M660D600Z10S150SN12	6.000	6.520	1.500	4.000	2.000	.250	10	7900	No	2.80

■ **Spare Parts**

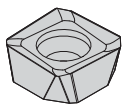


D1	insert screw	in. lbs.	Torx driver
2.000	MS2260	31	12148007600
3.000	MS2260	31	12148007600
4.000	MS2260	31	12148007600
6.000	MS2260	31	12148007600

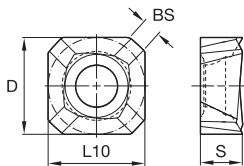
■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	...20	TN6540	...31	WP40PM	...31	WP40PM
P3-P4	...20	TN7535	...31	WP35CM	...31	WP35CM
P5-P6	...20	TN7535	...31	WP35CM	...31	WP35CM
M1-M2	...20	TN6540	...31	WP25PM	...31	WP25PM
M3	...20	TN7535	...31	WP35CM	...31	WP35CM
K1-K2	...21	WK15CM	...31	WK15CM	...31	WK15CM
K3	...21	WK15CM	...31	WP35CM	...31	WP35CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	...20	TN6540	...31	WP25PM	...31	WP25PM
S3	-	-	-	-	-	-
S4	...20	TN6540	...31	WP40PM	...31	WP25PM
H1	-	-	-	-	-	-

Inserts • SN1205..



SNKT-20  
SNKT-21



● first choice  
○ alternate choice

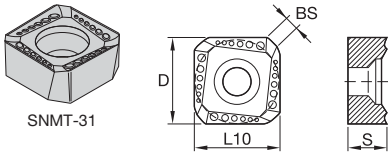
P	●	●	●	●	●	●
M	●	○	○	○	○	○
K	○	○	○	●	○	○
N	○	○	○	○	○	●
S	●	○	○	○	○	○
H						

■ SNKT-20

catalog number	cutting edges	D	L10	S	BS	hm	TN6540	TN7525	TN7535	WK15CM	WP40PM	TT125	THM
SNKT435AZER20	4	.500	.500	.217	.079	.004	2964201	2022370	2020691	-	-	2022371	-

■ SNKT-21

catalog number	cutting edges	D	L10	S	BS	hm	TN6540	TN7525	TN7535	WK15CM	WP40PM	TT125	THM
SNKT435AZR21	4	.500	.500	.219	.061	.006	-	2022373	-	5427983	-	2022374	2022375

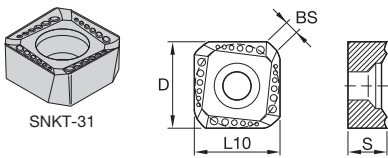


● first choice  
○ alternate choice

P	●	●	●	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○

■ SNMT-31

catalog number	cutting edges	D	L10	S	BS	hm	TN6525	TN6540	TN7525	TN7535	WK15CM	WP25PM	WP35CM	WP40PM	TT125	THM
SNMT435AZR31	4	.500	.500	.219	.061	.006	●	○	○	○	○	○	○	○	○	○

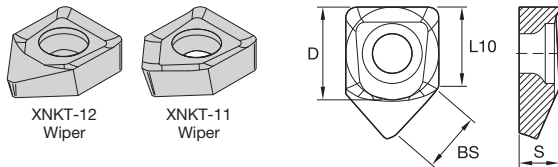


● first choice  
○ alternate choice

P	●	●	●	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○

■ SNKT-31

catalog number	cutting edges	D	L10	S	BS	hm	TN6525	TN6540	TN7525	TN7535	WK15CM	WP40PM	TT125	THM
SNKT435AZR31	4	.500	.500	.219	.061	.006	○	○	○	○	○	○	○	○



● first choice  
○ alternate choice

P	●	●	●	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○

■ XNKT-12 Wiper

catalog number	cutting edges	D	L10	S	BS	hm	TN6540	TN7525	TN7535	WK15CM	WP40PM	TT125	THM
XNKT1205AZTR12	1	.500	.500	.203	.315	.001	○	○	○	○	○	○	○

■ XNKT-11 Wiper

catalog number	cutting edges	D	L10	S	BS	hm	TN6540	TN7525	TN7535	WK15CM	WP40PM	TT125	THM
XNKT435AZER11	1	.500	.500	.203	.315	.002	○	○	○	○	○	○	○

■ Recommended Starting Speeds [SFM]

Face Mills

Material Group		TN6525			TN6540			TN7525			TN7535		
P	1	1340	1045	925	1180	925	785	1340	1025	925	1790	1555	1460
	2	1045	830	710	830	630	550	1025	830	710	1105	1000	905
	3	925	710	610	710	550	450	925	710	610	1000	905	805
	4	770	550	475	590	430	355	770	550	475	750	690	630
	5	1025	770	650	785	590	490	1025	770	650	1025	905	830
	6	670	535	430	535	395	335	670	535	430	630	535	430
M	1	630	395	260	430	260	200	805	725	610	805	725	610
	2	395	260	155	260	155	140	725	630	550	725	630	550
	3	415	260	180	275	155	140	570	510	450	570	510	450
K	1	905	805	725	725	670	590	1240	925	785	1165	1045	940
	2	710	630	590	570	510	450	1060	785	650	925	830	750
	3	590	535	475	510	475	415	785	650	550	770	690	630
N	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	155	120	95	-	-	-	-	-	-
	2	-	-	-	80	60	40	-	-	-	-	-	-
	3	-	-	-	235	140	95	-	-	-	-	-	-
	4	-	-	-	200	95	80	-	-	-	-	-	-
H	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

(Recommended Starting Speeds [SFM] — continued)

Material Group		WK15CM			WP40PM			TTI25			THM		
P	1	-	-	-	1165	<b>1025</b>	965	1415	<b>1180</b>	985	-	-	-
	2	-	-	-	985	<b>845</b>	710	1025	<b>830</b>	710	-	-	-
	3	-	-	-	905	<b>770</b>	630	1025	<b>830</b>	710	-	-	-
	4	-	-	-	805	<b>670</b>	535	865	<b>710</b>	590	-	-	-
	5	-	-	-	670	<b>610</b>	535	1045	<b>770</b>	650	-	-	-
	6	-	-	-	590	<b>450</b>	355	475	<b>355</b>	295	-	-	-
M	1	-	-	-	770	<b>670</b>	610	1570	<b>1025</b>	710	-	-	-
	2	-	-	-	690	<b>590</b>	490	1060	<b>670</b>	475	-	-	-
	3	-	-	-	510	<b>450</b>	355	1045	<b>690</b>	475	-	-	-
K	1	1655	<b>1520</b>	1340	-	-	-	725	<b>610</b>	510	475	<b>355</b>	295
	2	1320	<b>1165</b>	1080	-	-	-	590	<b>475</b>	415	490	<b>395</b>	275
	3	1105	<b>985</b>	905	-	-	-	475	<b>415</b>	335	510	<b>370</b>	235
N	1	-	-	-	-	-	-	-	-	-	3540	<b>2365</b>	1970
	2	-	-	-	-	-	-	-	-	-	2695	<b>1830</b>	1520
	3	-	-	-	-	-	-	-	-	-	1770	<b>1105</b>	785
S	1	-	-	-	155	<b>140</b>	120	-	-	-	-	-	-
	2	-	-	-	155	<b>140</b>	120	-	-	-	-	-	-
	3	-	-	-	200	<b>155</b>	120	-	-	-	-	-	-
	4	-	-	-	260	<b>200</b>	140	-	-	-	-	-	-
H	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

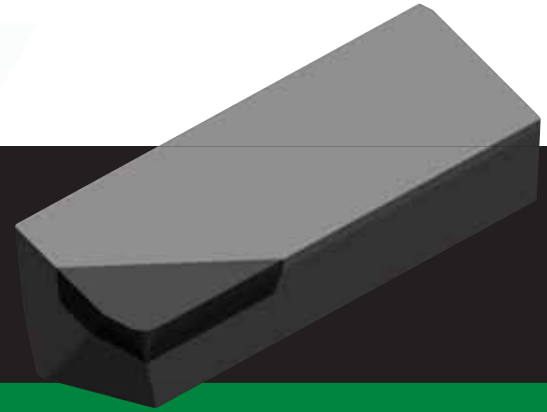
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
...20	.007	<b>.026</b>	.047	.005	<b>.018</b>	.033	.004	<b>.014</b>	.025	.003	<b>.012</b>	.022	.003	<b>.011</b>	.020	...20
...21	.010	<b>.029</b>	.049	.007	<b>.021</b>	.035	.005	<b>.016</b>	.026	.005	<b>.014</b>	.023	.004	<b>.013</b>	.021	...21
...31	.010	<b>.030</b>	.050	.007	<b>.022</b>	.036	.006	<b>.016</b>	.027	.005	<b>.014</b>	.023	.004	<b>.013</b>	.021	...31

NOTE: Use "Light Machining" value as starting feed rate.

Indexable Milling •

## SuperFeed™

The new SuperFeed face mills and end mills are the first choice platform for machining aluminum in the transportation and general engineering industries.



# SuperFeed

Our unique insert design delivers exceptional stability and performance. Reduced complexity with exceptional finishing capabilities make SuperFeed the go-to platform in aluminum and non-ferrous face and end milling applications.

- Durable cutter body protection.
- Five PCD cartridge options for increased flexibility.
- User-friendly axial adjustment .012–.030" (0,3–0,8mm).
- Reduce overall tooling costs with reconditioning options.

Features	Benefits
<ul style="list-style-type: none"><li>• Anodized aluminum cutter bodies.</li></ul>	<ul style="list-style-type: none"><li>• Durable and lightweight.</li></ul>
<ul style="list-style-type: none"><li>• Easy axial adjustment range .012–.032".</li></ul>	<ul style="list-style-type: none"><li>• Simple and very user-friendly.</li></ul>
<ul style="list-style-type: none"><li>• DovLok PCD cartridge design.</li></ul>	<ul style="list-style-type: none"><li>• Proven in demanding automotive applications.</li></ul>
<ul style="list-style-type: none"><li>• Fine pitch cutters.</li></ul>	<ul style="list-style-type: none"><li>• Shorter cycle times, higher MRR and productivity.</li></ul>





**Face Mills**



**SuperFeed™**

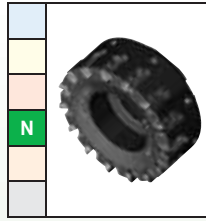
**Max depth of cut: .250"**  
(can be less depending on the cartridge)

Lead angle: 0°

Indexes per insert: 1 edge per PCD cartridge

Diameter: Standard Platform  
2.5–8"

Pages: H58–H62



**■ Insert Offering**



**SDR/EDR**

**Corner Radii:**

SDR — .031" and .093"

EDR — .031"

**Axial DOC:**

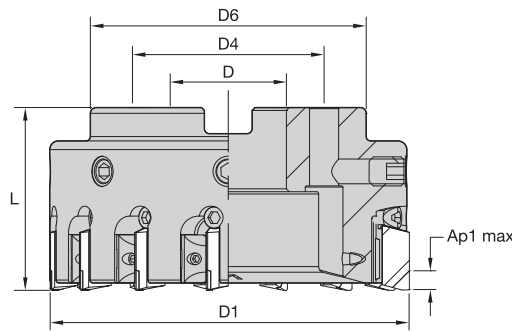
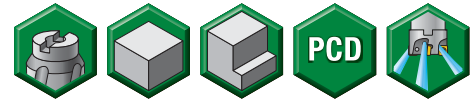
SDR — .250" max

EDR — .250" max

**WIDIA™ Grade WDN00U™:**

- Ultra fine grain PCD.
- Long tool life, consistent results, excellent surface qualities.

- Through coolant capability.
- +/- 3 micron axial adjustment range.
- Balanced design.
- Easy setup in a simple system design.
- Modified standards available.

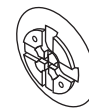
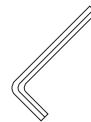


■ Face Mills • Inch

order number	catalog number	D1	D	D4	D6	L	Ap1 max	Z	Z ADJ	lbs	max RPM
5363040	SF02506RH	2.50	1.00	—	2.38	2.00	.25	6	6	1.00	20000
5363041	SF0308RH	3.00	1.00	—	2.88	2.00	.25	8	8	1.40	20000
5363042	SF0412RH	4.00	1.25	—	3.88	2.00	.25	12	12	2.50	17320
5363043	SF0515RH	5.00	1.50	—	4.88	2.38	.25	15	15	5.10	15500
5363044	SF0618RH	6.00	1.50	—	5.88	2.38	.25	18	18	7.00	14150
5363045	SF0824RH	8.00	2.50	4.00	7.94	2.38	.25	24	24	9.30	12240

NOTE: Z = Number of cartridges  
Z ADJ = Number of adjustable cartridges

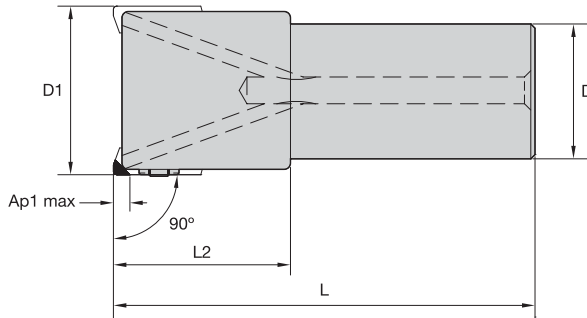
■ Spare Parts



D1	wedge screw	wrench size wedge screw	adjusting screw	wrench size-adjusting screw	coolant cap	coolant shower plate	wedge
2.50	DLS6	3/32	SWS38	.156	SALS25	—	HDW6EU4DD
3.00	DLS6	3/32	SWS38	.156	SALS30	—	HDW6EU4DD
4.00	DLS6	3/32	SWS38	.156	SALS40	—	HDW6EU4DD
5.00	DLS6	3/32	SWS38	.156	SALS50	—	HDW6EU4DD
6.00	DLS6	3/32	SWS38	.156	SALS6150	—	HDW6EU4DD
8.00	DLS6	3/32	SWS38	.156	—	SSP8	HDW6EU4DD

NOTE: Coolant cap screw or coolant shower plate must be ordered separately.

- Through coolant capability.
- +/- 3 micron axial adjustment range.
- Easy setup in a simple system design.
- Modified standards available.



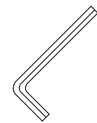
Face Mills

■ End Mills • Inch

order number	catalog number	D1	D	L2	L	Ap1 max	Z	Z ADJ	lbs	max RPM
5363198	WSSEM1002RH	1.00	.75	1.50	3.50	.25	2	2	0.50	35500
5363199	WSSEM12503RH	1.25	1.00	1.75	4.00	.25	3	3	1.20	31700
5363250	WSSEM1504RH	1.50	1.00	1.75	4.00	.25	4	4	1.15	29000
5363251	WSSEM2005RH	2.00	1.00	1.70	4.50	.25	5	5	1.10	25100

NOTE: Z = Number of cartridges  
Z ADJ = Number of adjustable cartridges

■ Spare Parts

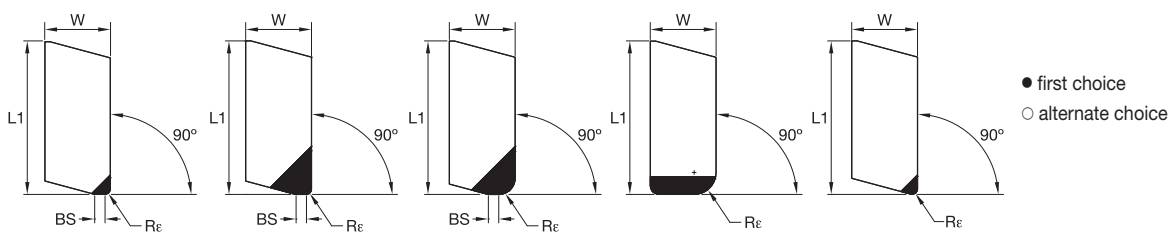


D1	wedge screw	wrench size wedge screw	wedge	adjusting screw	wrench size-adjusting screw
1.00	DSI6	3/32	HDW6S	SWS32	.156
1.25	DSI6	3/32	HDW6S	SWS32	.156
1.50	DSI6	3/32	HDW6S	SWS32	.156
2.00	DSI6	3/32	HDW6S	SWS32	.156

NOTE: For setting procedure, see page H62.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	-	-	-	-	-	-
P3-P4	-	-	-	-	-	-
P5-P6	-	-	-	-	-	-
M1-M2	-	-	-	-	-	-
M3	-	-	-	-	-	-
K1-K2	-	-	-	-	-	-
K3	-	-	-	-	-	-
N1-N2	SDR.../EDR...	WDN00U	SDR.../EDR...	WDN00U	SDR.../EDR...	WDN00U
N3	SDR.../EDR...	WDN00U	SDR.../EDR...	WDN00U	SDR.../EDR...	WDN00U
S1-S2	-	-	-	-	-	-
S3	-	-	-	-	-	-
S4	-	-	-	-	-	-
H1	-	-	-	-	-	-



P	■
M	■
K	■
N	●
S	■
H	■

■ PCD Inserts • Face Mills • SDR

catalog number	cutting edges	L1	BS	W	Rε	hm	WDN00U
SDR100031E0W4	1	.850	.06	.38	.031	.0008	5358407
SDR100031E1W4	1	.850	.06	.38	.031	.0008	5358408
SDR100093E1W4	1	.850	.06	.38	.093	.0008	5358409
SDR102	1	.850	-	.38	.125	.0008	5358451
SDR100031E0NW	1	.875	-	.38	.031	.0008	5358450

■ PCD Inserts • End Mills • EDR

catalog number	cutting edges	L1	BS	W	Rε	hm	WDN00U
EDR100031E1W4	1	.850	.06	.25	.031	.0008	5358452

NOTE: hm = Average chip thickness; BS = Wiper facet length; E0 = 0.100" Ap1 max ; E1 = 0.250" Ap1 max.

■ Recommended Starting Speeds [SFM]

Material Group		WDN00U		
P	1	-	-	-
	2	-	-	-
	3	-	-	-
	4	-	-	-
	5	-	-	-
	6	-	-	-
M	1	-	-	-
	2	-	-	-
	3	-	-	-
K	1	-	-	-
	2	-	-	-
	3	-	-	-
N	1-2	3000	6500	16000
	3	1500	2000	2500
S	1	-	-	-
	2	-	-	-
	3	-	-	-
	4	-	-	-
H	1	-	-	-

Recommended Starting Feeds

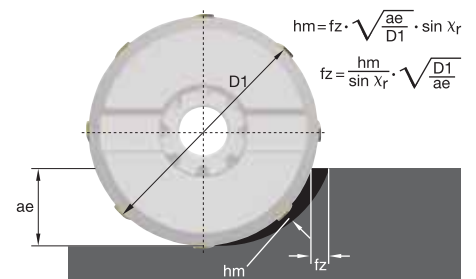
■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50-100%			
SDR...	.003	<b>.007</b>	<b>.011</b>	.003	<b>.005</b>	<b>.008</b>	.002	<b>.004</b>	<b>.007</b>	.002	<b>.004</b>	<b>.006</b>	.002	<b>.004</b>	<b>.006</b>	SDR...
EDR...	.003	<b>.007</b>	<b>.011</b>	.003	<b>.005</b>	<b>.008</b>	.002	<b>.004</b>	<b>.007</b>	.002	<b>.004</b>	<b>.006</b>	.002	<b>.004</b>	<b>.006</b>	EDR...

NOTE: First choice starting feed (fz) is in **bold** type.  
Use corresponding speed (vc).  
fz and vc are valid for ae ≥ 0.4 D1.  
For smaller ae, fz and vc should be multiplied by the factor given below:

ae/D1 =	0.2	0.3	0.4
fz-Factor	1.5	1.3	1.0
vc-Factor	1.3	1.2	1.1



## ■ General

- Non-contact gages are preferred.
- Contact gages can be used with the following precautions:
  - Indicator must be flat and parallel to the base.
  - Always approach the PCD cartridge from the relief angle under the PCD segment.
  - Do NOT let the indicator drop on the PCD segment.
- Remove all worn PCD cartridges.
- Clean the pockets of the cutter completely.

## ■ Face Mills

- Apply a small amount of lubricant to the following areas:
  - Pocket area where the wedge slides.
  - Threads of the cartridge locking screw.
  - Threads of the axial adjustment screw.
- Install cartridges applying light torque to the wedge assembly locking screw.
- Turn axial adjustment screw until the cartridge is .0004–.0006" (0,01–0,015mm) below the final set height.
- Tighten the wedge assembly locking screw to 35 in/lbs (4 Nm).
- Turn the axial adjustment screw moving the PCD cartridge .0002" (0,005mm) to the final set height position.
- Set all cartridges as above.

## ■ End Mills

- Apply a small amount of lubricant to the following areas:
  - Threads of the cartridge locking screw.
  - Threads of the axial adjustment screw.
- Install cartridges applying light torque to the locking screws.
- Turn axial adjustment screw until the cartridge is .0004–.0006" (0,01–0,015mm) below the final set height.
- Tighten the locking screw (left-hand threads) to 70 in/lbs (8 Nm) leaving .0002" (0,005mm) below the final set height.
- Turn the axial adjustment screw moving the PCD cartridge .0002" (0,005mm) to the final set height position.
- Set all cartridges as above.

# Making the Grade in Innovative Metalcutting Technology



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## Victory™ Milling Grades

Our new Victory milling grades are designed to deliver higher productivity, longer tool life, and increased application versatility.

- WP40PM™ — New best-in-class Victory milling grade for machining steel materials in ISO material group P40 in rough milling applications.
- WK15CM™ — New milling grade for cast irons for higher tool life and increased productivity.
- WS30PM™ — A new high-performance milling grade for machining titanium and stainless steels.

To learn more about the benefits of the new **WIDIA™ Victory Milling Grades**, contact your local distributor.

**WIDIA** 

Roughing and Finishing with a Single Tool •  
**WIDIA™ M4000**

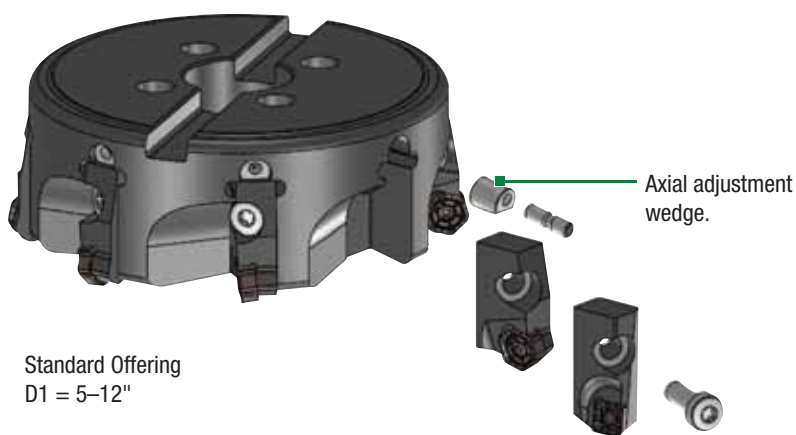
# M4000



Cartridges with different insert styles and lead angles can be easily changed.

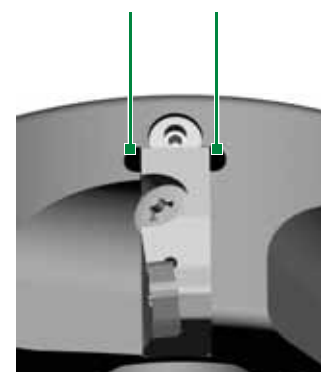
- Roughing and finishing solution with a single tool.
- Adjustable pockets and cartridge stop feature.
- Easily change cartridges with different insert styles and lead angles.
- Best-in-class flexibility for lower cost per tool.
- Easy runout adjustment.
- Perfect floor surface for finishing operations.

## Roughing and Finishing with a Single Tool



Standard Offering  
 D1 = 5–12"

Quick cartridge stop — ready to go in a minute with no adjustment for roughing.





**Face Mills**

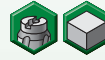


**M4000  
Cartridge Milling System**

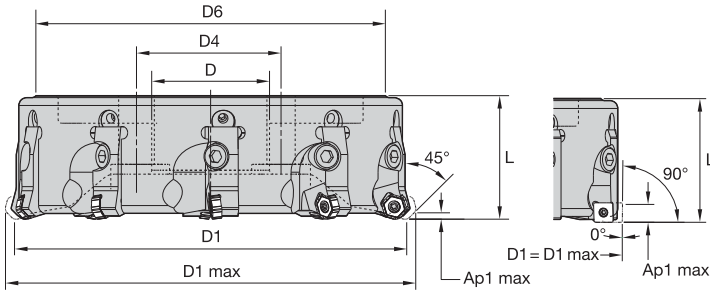
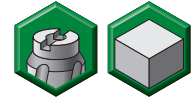
All front line insert styles  
available.

Diameter: 6–12"

Pages: **H66–H68**



- Roughing and finishing with one single tool.
- Quick cartridge stop feature.
- Easy runout adjustment.
- Easy change of cartridges with different insert styles and lead angles.



■ Cartridge Milling System

order number	catalog number	D1	D	D4	D6	L	number of cartridges	coolant supply	lbs
4136312	M4000D600Z08ADJ	6.000	2.000	—	5.394	2.480	8	No	9.73
4136353	M4000D600Z12ADJ	6.000	2.000	—	5.394	3.150	12	No	13.53
4136358	M4000D1200Z16ADJ	12.000	2.500	4.000	11.260	3.150	16	No	50.57
4136359	M4000D1200Z22ADJ	12.000	2.500	4.000	11.260	3.150	22	No	50.42

■ Spare Parts

D1	cartridge screw	in. lbs.	wedge	adjusting screw	hex wrench
6.000	MS1294	177	12748308500	12748600900	MW3
12.000	MS1294	177	12748308500	12748600900	MW3

■ Cartridge

order number	catalog number	insert style	master platform *	Ap1 max
4159022	M4000CA-AD1505	AD.T1505	CIP	.55
4159020	M4000CA-AP1003	AP.T1003	CIP	.40
4159021	M4000CA-AP1604	AP.T1604	CIP	.63
3968124	M4000CA-HN07	HN.J0704/XNGJ0704	M1200 Mini	.14
4159018	M4000CA-HN07HD	HN.J0704	M1200 Mini	.18
4159017	M4000CA-HN07HF	HN.J0704	M1200 Mini	.04
3126691	M4000CA-HN09	HN.J0905/XNGJ0905	M1200	.17
4159019	M4000CA-HN09HD	HN.J0905	M1200	.24
3954792	M4000CA-HN09HF	HN.J0905	M1200	.05
2511344	M4000CA-HP06	HP.T06T3	M640	.19
2006361	M4000CA-MDHX10	MDHX1004	—	.04
2006346	M4000CA-RC1606	RC.T1606	M100	.31
2067492	M4000CA-SD1204	SDM.1204	M690	.46
2006359	M4000CA-SD1506	SDM.1506	M690	.59
2006374	M4000CA-SE1203	SE.N1203/SE.R1203	M68	.23
2033495	M4000CA-SE1204	SE.N1204/SE.R1204	M68	.23
2006377	M4000CA-SE1504	SE.N1504/SE.R1504	M68	.31
2006348	M4000CA-SN12	SN.T1205/XNKT1205	M660	.25
2006357	M4000CA-SN12RC	SN.T1205	M660	.25
2006360	M4000CA-SN15	SN.T1505	M660	.31
2006362	M4000CA-SP12	121358680	M40Wiper	.35
2006373	M4000CA-SP1203	SP.N1203/SP.R1203	M40	.35
2006376	M4000CA-SP1504	SP.N1504	M40	.47
2033496	M4000CA-TP1603	TP.N1603/TP.R1603	M40	.47
2006379	M4000CA-TP2204	TP.N2204/TP.R2204	M40	.71
2006347	M4000CA-XP16	XP.T1604	M680	.55

\* For all details regarding insert offering and cutting conditions, please refer to the master platforms.

	M4000CA-MDHX10CA	M4000CA-HN07HF	M4000CA-HN07	M4000CA-HN07HD	M4000CA-HN09HF	M4000CA-HN09	M4000CA-HN09HD	M4000CA-HP06
	order number	order number	order number	order number	order number	order number	order number	order number
	2006361	4159017	3968124	4159018	3954792	3126691	4159019	2511344
D1	D1 max	D1 max	D1 max	D1 max	D1 max	D1 max	D1 max	D1 max
6.000	6.000	6.850	6.654	6.575	7.008	6.732	6.614	6.551
12.000	12.000	12.953	12.756	12.678	13.110	12.835	12.717	12.654

	M4000CA-SN12	M4000CA-SN12RC	M4000CA-SN15	M4000CA-XP16	M4000CA-AP1003	M4000CA-AD1505	M4000CA-AP1604	M4000CA-SD1204	M4000CA-SD1506
	order number	order number	order number	order number	order number	order number	order number	order number	order number
	2006348	2006357	2006360	2006347	4159020	4159022	4159021	2067492	2006359
D1	D1 max	D1 max	D1 max	D1 max	D1 max	D1 max	D1 max	D1 max	D1 max
6.000	6.862	6.862	7.008	6.000	6.000	6.000	6.000	6.000	6.000
12.000	12.965	12.965	13.110	12.000	12.000	12.000	12.000	12.000	12.000

	M4000CA-RC1606	M4000CA-SE1203	M4000CA-SE1204	M4000CA-SE1504	M4000CA-SP1203	M4000CA-SP12 Wiper	M4000CA-SP1504	M4000CA-TP1603	M4000CA-TP2204
	order number	order number	order number	order number	order number	order number	order number	order number	order number
	2006346	2006374	2033495	2006377	2006373	2006362	2006376	2033496	2006379
D1	D1 max	D1 max	D1 max	D1 max	D1 max	D1 max	D1 max	D1 max	D1 max
6.000	6.000	6.850	6.850	7.008	6.520	6.583	6.583	6.000	6.000
12.000	12.000	12.953	12.953	13.110	12.622	12.685	12.685	12.000	12.000

# Reduced Complexity with Exceptional Finishing Capabilities



EXTREME CHALLENGES.  
EXTREME RESULTS.

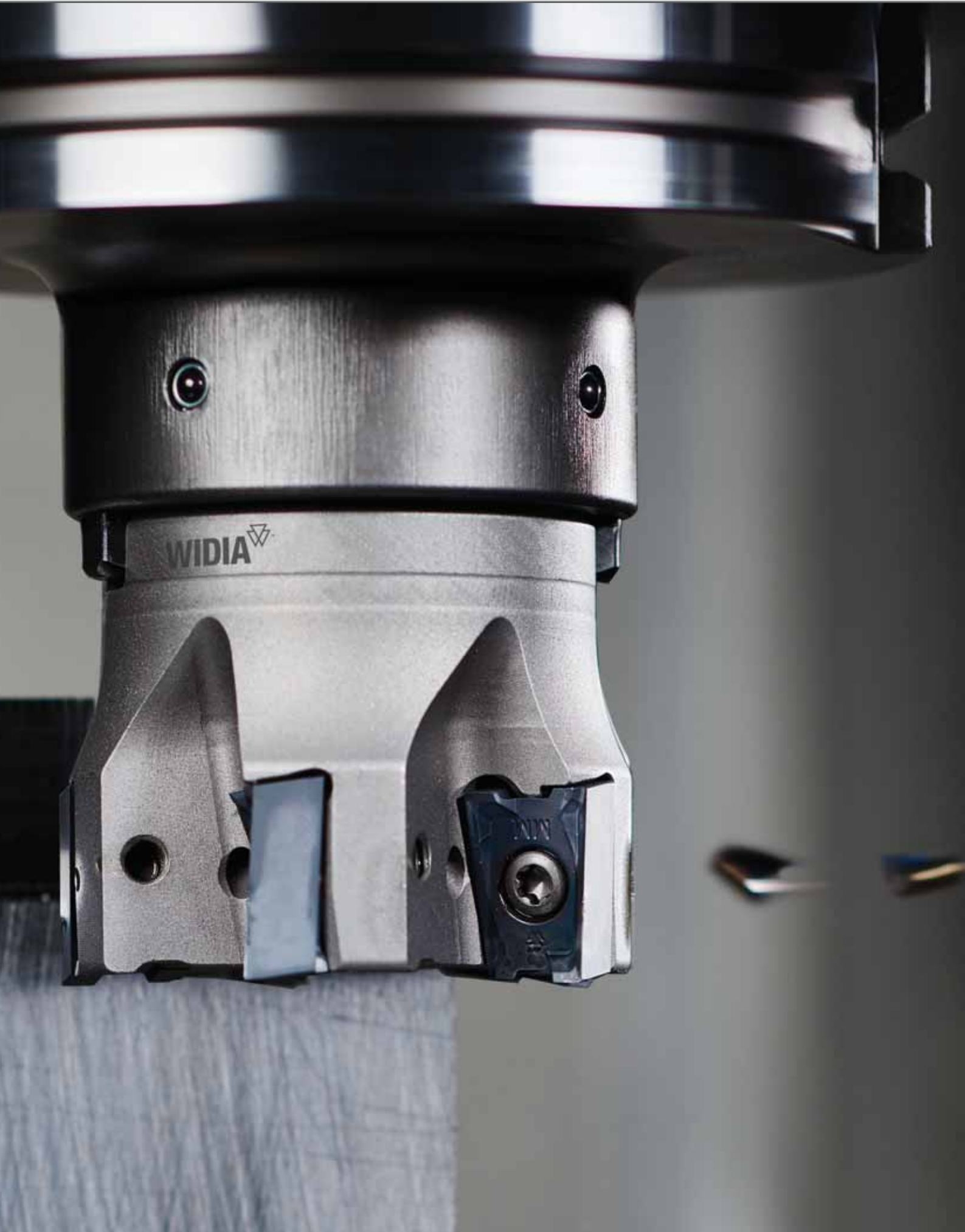
## SuperFeed™

The new SuperFeed face mills and end mills are the first choice PCD platform for machining aluminum in the transportation and general engineering industries.

- Durable, lightweight anodized aluminum cutter body.
- DovLok PCD cartridge design.
- Simple, user-friendly axial adjustment range from .012–.030" (0,3–0,8mm).
- Fine-pitch cutters reduce cycle times while offering higher MRR and productivity.
- Reduce overall tooling costs with reconditioning.

To learn more about the benefits of **WIDIA™ SuperFeed**, contact your local distributor.

**WIDIA** 



## Indexable Milling • 0° Shoulder Mills

VSM11 • Versatile – Single-Sided 0° Shoulder Mill Platform .....	I2-I16
VSM17 • Versatile – Single-Sided 0° Shoulder Mill Platform .....	I18-I29
VSM490-15 • Double-Sided Shoulder Milling Platform with 4 Cutting Edges .....	I30-I39
M690 • Square Insert Shoulder Mill Platform .....	I40-I51



WIDIA™ Victory™ Shoulder Mill 11™ •  
VSM11™

# VSM11



Victory™ Shoulder Mill 11™ is a high-performance, versatile, robust, 0° square shoulder milling platform. VSM11 is designed for versatility, low horsepower consumption, and easy cutting action. Cutters can be used for profiling, face milling, slotting, ramping, helical interpolation, circular interpolation, and other milling applications. Inserts are specially designed with innovative geometries and features like variable rake angles, negative T-land, small hone, and the latest Victory grades enhancing tool performance and versatility.

Take advantage of the high-performance, advanced carbide substrates, coatings, and surface treatment technologies of the available 6 Victory grades, 5 geometries, and broad range of cutter body product portfolio. This platform works with multiple material types and applications.

- State-of-the-art step down capability.
- Screw-on, end mill, and shell mill cutters with effective internal coolant supply.

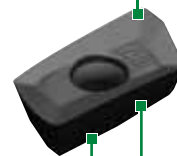
## Features

- Insert geometries and grades for all workpiece materials.
- Insert corner radius from .016–.122" (0,4–3,1mm).

## Benefits

- Achieve 0° wall finish.
- Longer tool life.
- Latest WIDIA Victory milling grades for all workpiece materials.
- Soft cutting action, reduced cycle times, and low horsepower consumption.
- Stability and reliability.

Multiple corner nose radii available.



Optimized cutting edge and positive rake face for reduced cutting forces and softer cutting action.

Innovative cutting geometry provides superior wall and surface finish.



**0° Shoulder Mills**

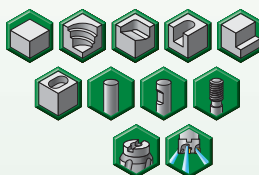
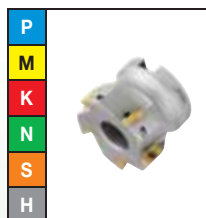


VSM11™

Max depth of cut: .461"

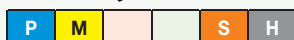
Lead angle: 0°  
Indexes per insert: 2  
Diameter: .5–4"

Pages: I4–I16



**■ Insert Offering**

**XDCT-ML**



Light to medium machining.  
First choice for stainless steel and titanium.  
Periphery ground.

**XDPT-MM**



Medium to heavy machining.  
First choice for general purpose.  
Precision pressed to size.

**XDPT-MH**



First choice for heavy-duty machining.  
Steel and cast iron materials.  
Precision pressed to size.

**XDCT-ALP**



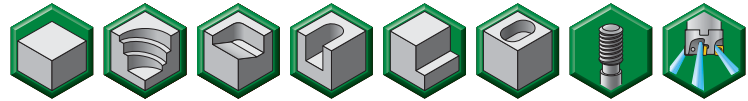
Roughing and finishing of aluminum alloys.  
High precision.  
Periphery ground.

**XDCW-PCD**

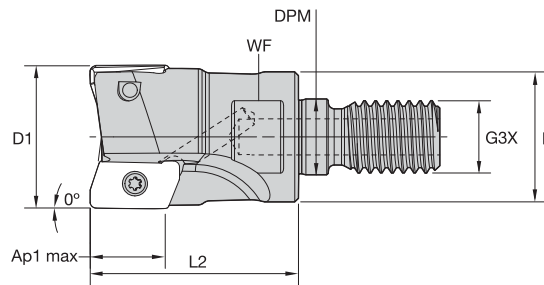


Roughing and finishing of aluminum alloys.  
Abrasive non-ferrous materials.  
High precision.  
Periphery ground.

- True 0° capability.
- Increased ramping capability.
- Superior wall and surface finish.
- Effective internal coolant feature, precisely reaching the cutting edge.



Shoulder Mills



■ Screw-On End Mills

order number	catalog number	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416990	VSM11D075Z03M10XD11	.750	.710	.410	M10	1.100	.590	.455	3	8.6°	36300	Yes	.09
5416991	VSM11D100Z04M12XD11	1.000	.827	.490	M12	1.250	.670	.453	4	5.1°	29900	Yes	.18
5416992	VSM11D125Z04M16XD11	1.250	1.140	.670	M16	1.500	.940	.451	4	3.6°	25900	Yes	.39
5416993	VSM11D150Z06M16XD11	1.500	1.142	.670	M16	1.500	.940	.449	6	1.9°	23300	Yes	.48

■ Spare Parts



insert screw

192.432



in. lbs.

9

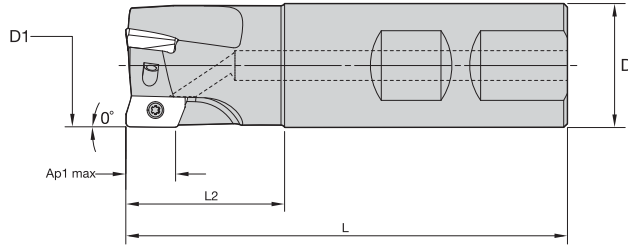
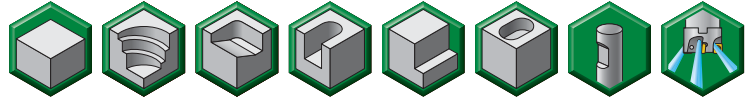


Torx Plus driver

170.028

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.  
For tool body modification instructions, see page I16.

- True 0° capability.
- Increased ramping capability.
- Superior wall and surface finish.
- Effective internal coolant feature, precisely reaching the cutting edge.



Shoulder Mills

■ **Weldon Shanks**

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416416	VSM11D062Z02W062XD11	.625	.625	2.750	.844	.454	2	12.5 °	41700	Yes	.18
5416417	VSM11D075Z02W075XD11	.750	.750	3.200	1.170	.455	2	8.6 °	36300	Yes	.30
5416418	VSM11D075Z03W075XD11	.750	.750	3.200	1.170	.455	3	8.6 °	36300	Yes	.31
6025663	VSM11D100Z03W075XD11	1.000	.750	3.250	1.220	.453	3	5.1 °	29900	Yes	.37
5416419	VSM11D100Z03W100XD11	1.000	1.000	3.500	1.220	.453	3	5.1 °	29900	Yes	.62
5416450	VSM11D100Z04W100XD11	1.000	1.000	3.500	1.220	.453	4	5.1 °	29900	Yes	.64
5416451	VSM11D125Z04W125XD11	1.250	1.250	4.000	1.720	.451	4	3.6 °	25900	Yes	1.12
5416452	VSM11D125Z05W125XD11	1.250	1.250	4.000	1.720	.451	5	3.6 °	25900	Yes	1.12

■ **Spare Parts**



insert screw

192.432



in. lbs.

9

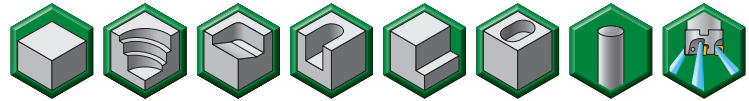


wrench

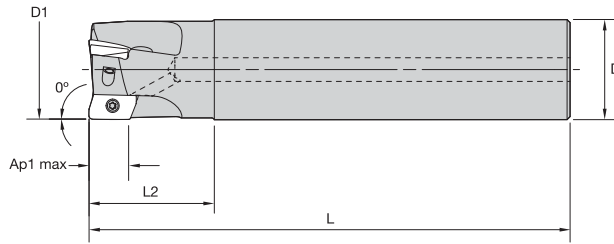
170.028

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification. For tool body modification instructions, see page I16.

- True 0° capability.
- Increased ramping capability.
- Superior wall and surface finish.
- Effective internal coolant feature, precisely reaching the cutting edge.



Shoulder Mills



■ Cylindrical End Mills

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416485	VSM11D050Z01C062XD11L400	.500	.625	4.000	.800	.461	1	4.2 °	50400	Yes	.29
5416486	VSM11D062Z02C062XD11L400	.625	.625	4.000	1.000	.454	2	12.5°	41700	Yes	.28
5416487	VSM11D075Z02C075XD11L450	.750	.750	4.500	1.100	.455	2	8.6 °	36300	Yes	.46
5416488	VSM11D075Z03C075XD11L450	.750	.750	4.500	1.100	.455	3	8.6 °	36300	Yes	.47
5416489	VSM11D100Z03C100XD11L480	1.000	1.000	4.800	1.250	.453	3	5.1 °	29900	Yes	.90
5416520	VSM11D100Z04C100XD11L480	1.000	1.000	4.800	1.250	.453	4	5.1 °	29900	Yes	.92
5416522	VSM11D125Z05C125XD11L520	1.250	1.250	5.200	1.600	.451	5	3.6 °	25900	Yes	1.56

■ Spare Parts



insert screw

192.432



in. lbs.

9

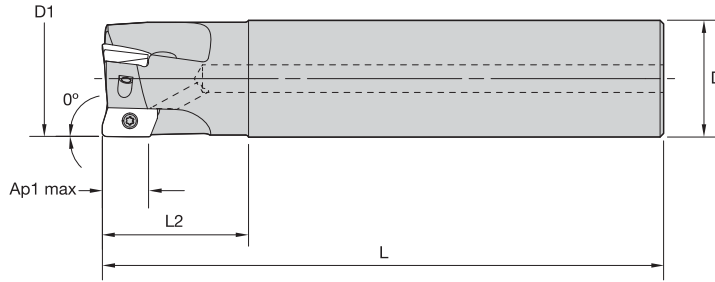
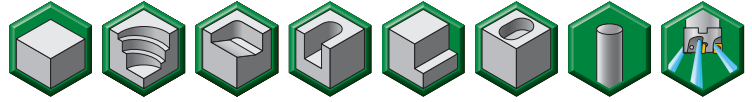


wrench

170.028

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.  
For tool body modification instructions, see page I16.

- True 0° capability.
- Increased ramping capability.
- Superior wall and surface finish.
- Effective internal coolant feature, precisely reaching the cutting edge.



Shoulder Mills

■ **Cylindrical End Mills • Long Shank**

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416726	VSM11D075Z02C075XD11L670	.750	.750	6.700	1.610	.455	2	8.6 °	36300	Yes	.69
5416727	VSM11D075Z03C075XD11L670	.750	.750	6.700	1.610	.455	3	8.6 °	36300	Yes	.70
6025664	VSM11D100Z03C075XD11L480	1.000	.750	4.800	1.282	.453	3	5.1 °	29900	Yes	—
5416728	VSM11D100Z03C100XD11L800	1.000	1.000	8.000	2.100	.453	3	5.1 °	29900	Yes	1.54
5416729	VSM11D100Z04C100XD11L800	1.000	1.000	8.000	2.100	.453	4	5.1 °	29900	Yes	1.56
5416750	VSM11D125Z03C125XD11L980	1.250	1.250	9.800	2.510	.451	3	3.6 °	25900	Yes	3.00

■ **Spare Parts**



insert screw

192.432



in. lbs.

9

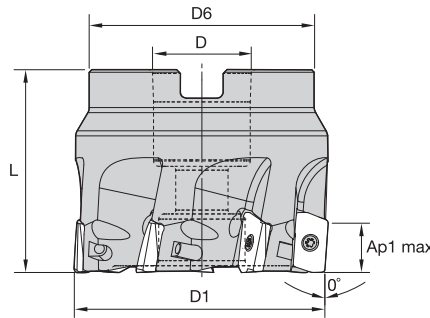
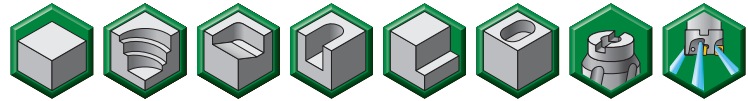


wrench

170.028

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.  
For tool body modification instructions, see page I16.

- True 0° capability.
- Increased ramping capability.
- Superior wall and surface finish.
- Effective internal coolant feature, precisely reaching the cutting edge.



Shoulder Mills

■ Shell Mills

order number	catalog number	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5416391	VSM11D150Z04S075XD11	1.500	.750	1.420	1.575	.449	4	2.8 °	23300	Yes	.41
5416392	VSM11D150Z06S075XD11	1.500	.750	1.420	1.575	.449	6	2.8 °	23300	Yes	.42
5416393	VSM11D200Z05S075XD11	2.000	.750	1.750	1.575	.446	5	1.9 °	19700	Yes	.79
5416394	VSM11D200Z08S075XD11	2.000	.750	1.750	1.575	.446	8	1.9 °	19700	Yes	.80
5416395	VSM11D250Z06S075XD11	2.500	.750	1.750	1.575	.446	6	1.5 °	17400	Yes	1.19
5416396	VSM11D250Z09S075XD11	2.500	.750	1.750	1.575	.446	9	1.5 °	17400	Yes	1.21
5416397	VSM11D300Z08S100XD11	3.000	1.000	2.190	1.750	.446	8	1.2 °	15700	Yes	1.96
5416399	VSM11D400Z09S150XD11	4.000	1.500	3.380	2.000	.446	9	.9 °	13500	Yes	3.95
5980393	VSM11D600Z07S150XD11	6.000	1.500	3.380	2.000	.446	7	.9 °	13500	Yes	7.52

■ Spare Parts



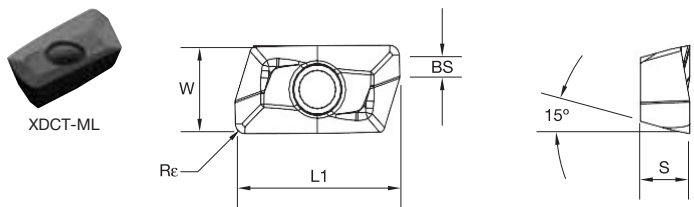
D1	insert screw	in. lbs.	wrench	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw assembly
2	192.432	9	170.028	S445	S445CG	-
3	192.432	9	170.028	S445	S445CG	-
3	192.432	9	170.028	S458	S458CG	-
4	192.432	9	170.028	-	-	S-2165-C
6	192.432	9	170.028	-	-	S-2165-C

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.  
For tool body modification instructions, see page 116.

■ **Insert Selection Guide**

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..ML	WP40PM	.E..MM	WP40PM	.S..MH	WP40PM
P3-P4	.E..ML	WP35CM	.E..MM	WP35CM	.S..MH	WP35CM
P5-P6	.E..MM	WP25PM	.S..MH	WP35CM	.S..MH	WP35CM
M1-M2	.E..ML	WU35PM	.E..MM	WU35PM	.S..MH	WU35PM
M3	.E..ML	WU35PM	.E..MM	WU35PM	.S..MH	WU35PM
K1-K2	.E..ML	WK15CM	.E..MM	WK15CM	.S..MH	WK15CM
K3	.E..ML	WP25PM	.E..MM	WP25PM	.S..MH	WP25PM
N1-N2	.F..ALP	WN25PM	.F..ALP	WN25PM	.E..ML	WP25PM
N3	.F..ALP	WN25PM	.F..ALP	WN25PM	.E..ML	WP25PM
S1-S2	.E..ML	WP25PM	.E..MM	WU35PM	.S..MH	WU35PM
S3	.E..ML	WP25PM	.E..MM	WU35PM	.S..MH	WU35PM
S4	.E..MM	WU35PM	.S..MH	WU35PM	-	-
H1	.E..MM	WP25PM	.E..MM	WP25PM	-	-

Shoulder Mills



• -ML is a light- to medium-machining geometry and is the first choice for stainless steel and titanium materials.

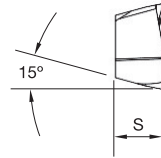
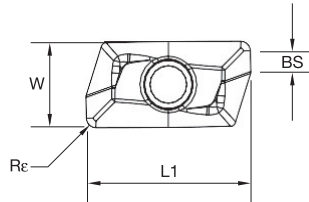
● first choice  
○ alternate choice



P	●				○	●	●		
M	●				○	○	○	○	○
K	●	●			○	○			
N	●		●						
S					●		○	●	●
H									

■ **XDCT-ML**

catalog number	cutting edges	L1	BS	S	W	Re	hm	WDN10J	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
XDCT1101ERML	2	.529	.082	.157	.272	.016	.002				5536671	5536670	5642230		
XDCT1102ERML	2	.529	.067	.157	.272	.031	.002		5415549		5415548	5415547	5545065	5517826	5415546



P	●	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○
N	●	○	○	○	○	○	○	○
S	●	○	○	○	○	○	○	○
H	●	○	○	○	○	○	○	○

• -MM is a medium- to heavy-machining geometry and is the first choice for general purpose and universal applications.

● first choice  
○ alternate choice

■ XDPT-MM

catalog number	cutting edges	L1	BS	S	W	Re	hm	WDN10U	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
XDPT1101SRMM	2	.529	.081	.157	.272	.016	.003	●	●	○	○	○	○	○	○
XDPT1102SRMM	2	.529	.066	.157	.272	.031	.003	●	●	○	○	○	○	○	○
XDPT1103SRMM	2	.529	.051	.157	.272	.047	.003	●	●	○	○	○	○	○	○
XDPT1104SRMM	2	.532	.034	.163	.274	.062	.003	●	●	○	○	○	○	○	○
XDPT1105SRMM	2	.532	.018	.163	.274	.078	.003	●	●	○	○	○	○	○	○
XDPT1106SRMM	2	.526	—	.158	.273	.094	.003	●	●	○	○	○	○	○	○
XDPT1108SRMM	2	.508	—	.157	.271	.122	.003	●	●	○	○	○	○	○	○

• -MH is a heavy-duty machining geometry and is the first choice for steel and cast iron materials.

■ XDPT-MH

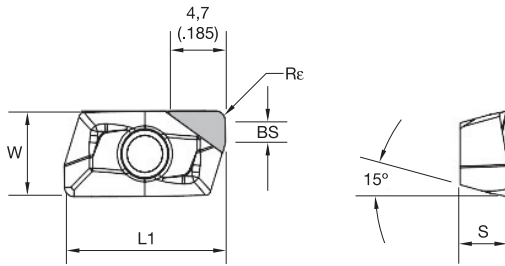
catalog number	cutting edges	L1	BS	S	W	Re	hm	WDN10U	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WS30PM	WU35PM
XDPT1102SRMH	2	.529	.066	.157	.272	.031	.005	●	●	○	○	○	○	○	○
XDPT1103SRMH	2	.529	.051	.157	.272	.047	.005	●	●	○	○	○	○	○	○
XDPT1104SRMH	2	.529	.035	.157	.272	.062	.005	●	●	○	○	○	○	○	○

Shoulder Mills





XDCW-PCD



P	●
M	○
K	○
N	●
S	○
H	○

- first choice
- alternate choice

Shoulder Mills

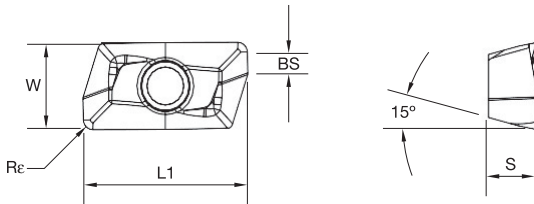
- -PCD is the first choice for roughing and finishing of abrasive non-ferrous materials and aluminum alloys.

■ XDCW-PCD

catalog number	cutting edges	L1	BS	S	W	Rε	hm	WDM10U
XDCT1101RPCD	1	.529	.083	.157	.272	.016	.001	5415420
XDCT1102RPCD	1	.529	.067	.157	.272	.031	.001	5415421



XDCT-ALP



P	○
M	○
K	○
N	●
S	○
H	○

- first choice
- alternate choice

- -ALP is the first choice for roughing and finishing of aluminum alloys.

■ XDCT-ALP

catalog number	cutting edges	L1	BS	S	W	Rε	hm	WN10HM	WN25PM
XDCT1101RALP	2	.529	.082	.157	.272	.016	.001	5933940	5417054
XDCT1102RALP	2	.529	.067	.157	.272	.031	.001	5936171	5417053

■ Recommended Starting Speeds [SFM]

Shoulder Mills

Material Group		WP25PM			WU35PM			WP40PM			WK15CM		
P	1	1080	940	890	850	750	710	980	850	820	-	-	-
	2	900	790	660	720	620	520	820	720	590	-	-	-
	3	840	710	570	660	560	460	750	660	520	-	-	-
	4	740	610	490	590	490	390	690	560	460	-	-	-
	5	610	560	490	490	440	390	560	520	460	-	-	-
	6	540	410	330	430	330	260	490	390	300	-	-	-
M	1	670	590	540	560	490	440	660	560	520	-	-	-
	2	610	520	430	510	430	360	590	490	430	-	-	-
	3	460	390	310	380	330	260	430	390	300	-	-	-
K	1	750	670	610	-	-	-	-	-	-	1380	1260	1120
	2	590	520	490	-	-	-	-	-	-	1100	970	900
	3	490	440	390	-	-	-	-	-	-	920	820	750
N	1-2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	130	110	80	110	100	80	130	130	100	-	-	-
	2	130	110	80	110	100	80	130	130	100	-	-	-
	3	160	130	80	150	110	80	160	130	100	-	-	-
	4	230	160	110	200	150	100	230	160	130	-	-	-
H	1	390	300	230	-	-	-	-	-	-	-	-	-

(continued)

(Recommended Starting Speeds [SFM] — continued)

Material Group		WS30PM			WP35CM			WN25PM			WDN10U		
P	1	—	—	—	1490	<b>1295</b>	1215	—	—	—	—	—	—
	2	—	—	—	920	<b>835</b>	755	—	—	—	—	—	—
	3	—	—	—	835	<b>755</b>	670	—	—	—	—	—	—
	4	—	—	—	625	<b>575</b>	525	—	—	—	—	—	—
	5	—	—	—	855	<b>755</b>	690	—	—	—	—	—	—
	6	—	—	—	525	<b>445</b>	360	—	—	—	—	—	—
M	1	740	<b>655</b>	605	670	<b>605</b>	510	—	—	—	—	—	—
	2	670	<b>590</b>	475	605	<b>525</b>	460	—	—	—	—	—	—
	3	510	<b>445</b>	345	475	<b>425</b>	375	—	—	—	—	—	—
K	1	—	—	—	970	<b>870</b>	785	—	—	—	—	—	—
	2	—	—	—	770	<b>690</b>	625	—	—	—	—	—	—
	3	—	—	—	640	<b>575</b>	525	—	—	—	—	—	—
N	1-2	—	—	—	—	—	—	3530	<b>3100</b>	2870	9040	<b>8040</b>	7400
	3	—	—	—	—	—	—	3100	<b>2870</b>	2495	7500	<b>5480</b>	4450
S	1	150	<b>130</b>	100	—	—	—	—	—	—	—	—	—
	2	150	<b>130</b>	100	215	<b>165</b>	110	—	—	—	—	—	—
	3	180	<b>150</b>	100	—	—	—	—	—	—	—	—	—
	4	280	<b>195</b>	130	—	—	—	—	—	—	—	—	—
H	1	—	—	—	—	—	—	—	—	—	—	—	—

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Shoulder Mills

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	10%			20%			30%			40%			50-100%			
.F.-PCD	.003	<b>.007</b>	.009	.003	<b>.005</b>	.007	.002	<b>.004</b>	.006	.002	<b>.004</b>	.006	.002	<b>.004</b>	.006	.F.-PCD
.F.ALP	.003	<b>.004</b>	.006	.003	<b>.003</b>	.005	.002	<b>.002</b>	.004	.002	<b>.002</b>	.004	.002	<b>.002</b>	.004	.F.ALP
.E..ML	.004	<b>.007</b>	.012	.003	<b>.005</b>	.009	.002	<b>.005</b>	.008	.002	<b>.004</b>	.007	.002	<b>.004</b>	.007	.E..ML
.S..MM	.007	<b>.008</b>	.014	.005	<b>.006</b>	.010	.004	<b>.005</b>	.009	.004	<b>.005</b>	.008	.004	<b>.005</b>	.008	.S..MM
.S..MH	.007	<b>.010</b>	.016	.005	<b>.007</b>	.012	.004	<b>.006</b>	.010	.004	<b>.006</b>	.009	.004	<b>.006</b>	.009	.S..MH

NOTE: Use "Light Machining" values as starting feed rate.

Achieve True 0° Shoulder Milling with the New High-Performance WIDIA™ VSM11™ Starter Kits.

# Victory™ Shoulder Mill 11™ Starter Kits

Order one of our starter kits and test the performance of our new VSM11 platform. The kits are set up to serve the majority of shoulder milling applications, delivered with a cutter body and the latest WIDIA Victory™ grades. Detailed order information can be found in the table below.

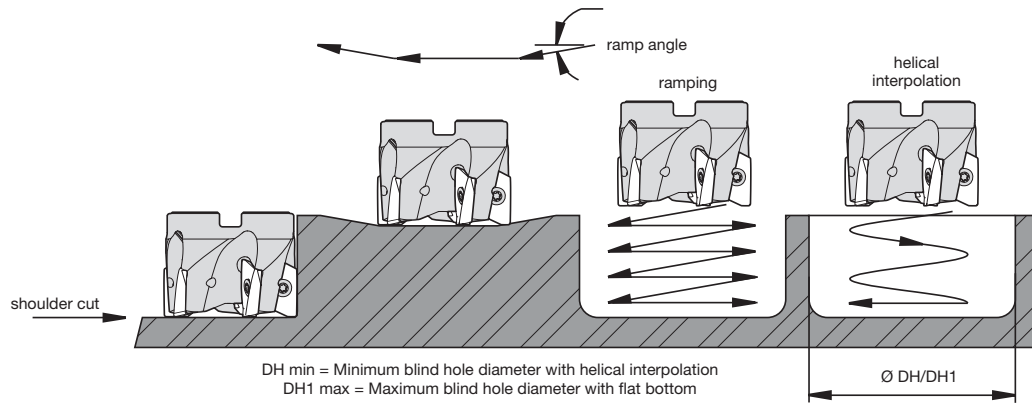


## ■ VSM11 Starter Kits • Inch

order number	catalog number	diameter D1 (inch)	cutter body type	material group	content				
					cutter	qty	inserts	grade	Z (pocket seats)
5528097	VSM11KITWD062Z02WP40PM	0.62	Weldon	P	VSM11D062Z02W062XD11	10	XDPT1102SRMM	WP40PM	2
5528098	VSM11KITWD075Z03WP40PM	0.75	Weldon	P	VSM11D075Z03W075XD11	10	XDPT1102SRMM	WP40PM	3
5528099	VSM11KITWD100Z04WP40PM	1.00	Weldon	P	VSM11D100Z04W100XD11	10	XDPT1102SRMM	WP40PM	4
5719056	VSM11KITCD075Z03WP40PM	0.75	Cylindrical	P	VSM11D075Z03C075XD11L450	10	XDPT1102SRMM	WP40PM	3
5719057	VSM11KITCD062Z02WP40PM	0.62	Cylindrical	P	VSM11D062Z02C062XD11L400	10	XDPT1102SRMM	WP40PM	2
5719058	VSM11KITCD100Z04WP40PM	1.00	Cylindrical	P	VSM11D100Z04C100XD11L480	10	XDPT1102SRMM	WP40PM	4
5719059	VSM11KITS0200Z05WP40PM	2.00	Shell	P	VSM11D200Z05S075XD11	10	XDPT1102SRMM	WP40PM	5
5719070	VSM11KITS0150Z04WP40PM	1.50	Shell	P	VSM11D150Z04S075XD11	10	XDPT1102SRMM	WP40PM	4

\*Starter Kit to be delivered in regular WIDIA™ corrugated box.

■ Application Examples

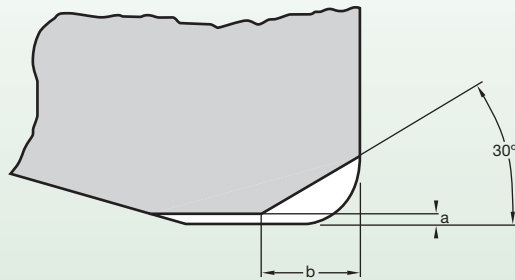


Shoulder Mills

order number	catalog number	number of inserts	max RPM	max ramp angle to steel body interference	max flat-bottom hole diameter (DH1 max)	min hole diameter (DH min)
5416990	VSM11D075Z03M10XD11	3	36300	8.600°	1.490	0.980
5416991	VSM11D100Z04M12XD11	4	29900	5.100°	1.990	1.480
5416992	VSM11D125Z04M16XD11	4	25900	3.600°	2.490	1.980
5416993	VSM11D150Z06M16XD11	6	23300	1.900°	2.990	2.480
5416416	VSM11D062Z02W062XD11	2	41700	12.500°	1.240	0.730
5416417	VSM11D075Z02W075XD11	2	36300	8.600°	1.490	0.980
5416418	VSM11D075Z03W075XD11	3	36300	8.600°	1.490	0.980
5416419	VSM11D100Z03W100XD11	3	29900	5.100°	1.990	1.480
5416450	VSM11D100Z04W100XD11	4	29900	5.100°	1.990	1.480
5416451	VSM11D125Z04W125XD11	4	25900	3.600°	2.490	1.980
5416452	VSM11D125Z05W125XD11	5	25900	3.600°	2.490	1.980
5416485	VSM11D050Z01C062XD11L400	1	50400	4.200°	0.990	0.480
5416486	VSM11D062Z02C062XD11L400	2	41700	12.500°	1.240	0.730
5416487	VSM11D075Z02C075XD11L450	2	36300	8.600°	1.490	0.980
5416488	VSM11D075Z03C075XD11L450	3	36300	8.600°	1.490	0.980
5416489	VSM11D100Z03C100XD11L480	3	29900	5.100°	1.990	1.480
5416520	VSM11D100Z04C100XD11L480	4	29900	5.100°	1.990	1.480
5416522	VSM11D125Z05C125XD11L520	5	25900	3.600°	2.490	1.980
5416726	VSM11D075Z02C075XD11L670	2	36300	8.600°	1.490	0.980
5416727	VSM11D075Z03C075XD11L670	3	36300	8.600°	1.490	0.980
5416728	VSM11D100Z03C100XD11L800	3	29900	5.100°	1.990	1.480
5416729	VSM11D100Z04C100XD11L800	4	29900	5.100°	1.990	1.480
5416750	VSM11D125Z03C125XD11L980	3	25900	3.600°	2.490	1.980
5416391	VSM11D150Z04S075XD11	4	23300	2.800°	3.000	2.490
5416392	VSM11D150Z06S075XD11	6	23300	2.800°	3.000	2.490
5416393	VSM11D200Z05S075XD11	5	19700	1.900°	4.000	3.490
5416394	VSM11D200Z08S075XD11	8	19700	1.900°	4.000	3.490
5416395	VSM11D250Z06S075XD11	6	17400	1.500°	5.000	4.490
5416396	VSM11D250Z09S075XD11	9	17400	1.500°	5.000	4.490
5416397	VSM11D300Z08S100XD11	8	15700	1.200°	6.000	5.490
5416399	VSM11D400Z09S150XD11	9	13500	.900°	8.000	7.490

NOTE: For DH1 max, subtract the insert corner radius from the max hole diameter.

**Modification Instructions for Use of Larger Radii Inserts  
(Shoulder Mills and Helical Mills)**



insert corner radius	material to remove	
	a	b
0.122"	0.008"	0.071"



Shoulder Mills

# Engineered to Achieve Superior Surface Quality



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## Victory™ Shoulder Mill Series

The Victory Shoulder Mill (VSM) family of tools provides a comprehensive solution for your most challenging shoulder milling applications. The unique design of the VSM11™, VSM17™, and VSM490™ is capable of producing a true 0° wall in multiple material types. When combined with the latest WIDIA™ Victory™ grades, VSM from WIDIA provides superior performance at high speeds.

- Innovative cutting geometry provides superior wall and surface finish.
- State-of-the-art step-down capability.
- Real soft cutting action results in lower cutting forces and low machine power consumption.
- VSM11 and VSM17 offer aggressive ramping capabilities.
- VSM490 provides outstanding step-down capabilities in applications that require multiple passes.

To learn more about the benefits of the WIDIA™ Victory Shoulder Mill Series, contact your local distributor.

**WIDIA** 

# WIDIA™ Victory™ Shoulder Mill 17™ • VSM17™



## VSM17

WIDIA Victory Shoulder Mill 17 is a high-performance, versatile, robust, 0° square shoulder milling platform. VSM17 is designed for versatility, low horsepower consumption, and easy cutting action. Cutters can be used for shoulder milling, profiling, face milling, slotting, ramping, helical interpolation, and circular interpolation milling applications. Inserts are specially designed with innovative geometries and features like variable rake angles, negative T-land, small hone, and the latest Victory grades enhancing tool performance and versatility.

Take advantage of the high-performance, advanced carbide substrates, coatings, and surface treatment technologies of the available 7 Victory grades, 4 geometries, and a broad-range cutter body product portfolio. This platform works with multiple material types and applications.

- Up to .65" (16,33mm) depth-of-cut capabilities.
- State-of-the-art step down capability.
- Screw-on, end mill, and shell mill cutters with effective internal coolant supply.

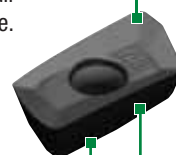
## Features

- Insert geometries and grades for all workpiece materials.
- Insert corner radius from .015–.157" (0,4–4mm).
- Max axial depth of cut .65" (16,3mm).

## Benefits

- Achieve true 0° wall finish.
- High performance and longer tool life.
- Latest WIDIA Victory milling grades for all workpiece materials.
- High positive geometry, soft cutting action, reduced cycle times, and low horsepower consumption.
- Stability and reliability.

Multiple corner nose radii available.



Optimized cutting edge and positive rake face for reduced cutting forces and softer cutting action.

Innovative cutting geometry provides superior wall and surface finish.



**0° Shoulder Mills**

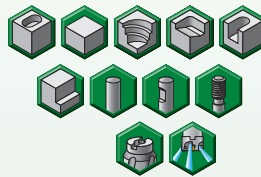
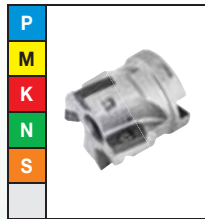


VSM17™

Max depth of cut: .642"

Lead angle: 0°  
Indexes per insert: 2  
Diameter: 1–6"

Pages: I20–I29



■ **Insert Offering**

**XDPT-MM**



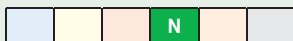
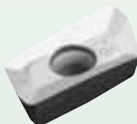
Medium to heavy machining.  
First choice for general purpose.  
Precision pressed to size.

**XDPT-MH**



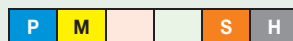
First choice for heavy-duty machining.  
Steel and cast iron materials.  
Precision pressed to size.

**XDCT-ALP**

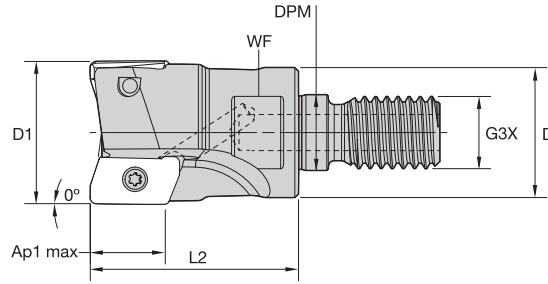
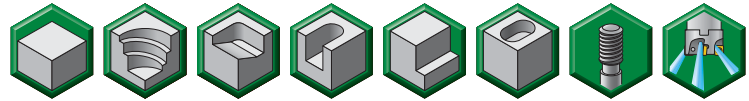


Roughing and finishing  
of aluminum alloys.  
High precision.  
Periphery ground.

**XDCT-ML**



Light to medium machining.  
First choice for stainless steel  
and titanium.  
Periphery ground.



■ Screw-On End Mills

order number	catalog number	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988017	VSM17D100Z02M12XD17	1.000	.827	.492	M12	1.250	.667	.642	2	8.5	41300	Yes	.17
5988046	VSM17D125Z02M16XD17	1.250	1.142	.669	M16	1.500	.943	.641	2	5.8	34700	Yes	.36
5988018	VSM17D125Z03M16XD17	1.250	1.142	.669	M16	1.500	.943	.641	3	5.8	34700	Yes	.35
5988045	VSM17D150Z03M16XD17	1.500	1.142	.669	M16	1.500	.943	.638	3	4.3	30700	Yes	.40
5988019	VSM17D150Z04M16XD17	1.500	1.142	.669	M16	1.500	.943	.638	4	4.3	30700	Yes	.38

■ Spare Parts



insert screw  
191.725

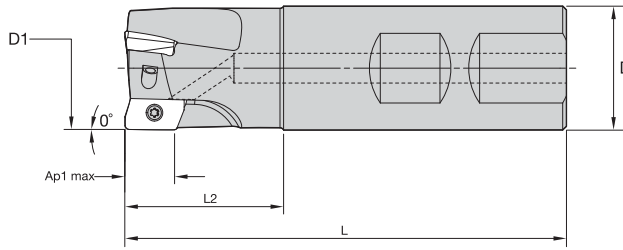
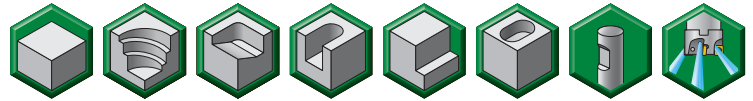


in. lbs.  
31



Torx Plus driver  
170.025

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.  
For tool body modification instructions, see page 116.



Shoulder Mills

■ **Weldon Shanks**

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988028	VSM17D100Z02W100XD17	1.000	1.000	3.500	1.220	.642	2	8.5°	41300	Yes	.59
5988052	VSM17D125Z02W125XD17	1.250	1.250	4.000	1.720	.641	2	5.8°	34700	Yes	1.06
5988029	VSM17D125Z03W125XD17	1.250	1.250	4.000	1.720	.641	3	5.8°	34700	Yes	1.05
5988051	VSM17D150Z03W150XD17	1.500	1.500	4.500	1.810	.638	3	4.3°	30700	Yes	1.77
5988030	VSM17D150Z04W150XD17	1.500	1.500	4.500	1.810	.638	4	4.3°	30700	Yes	1.77

■ **Spare Parts**



insert screw

191.725



in. lbs.

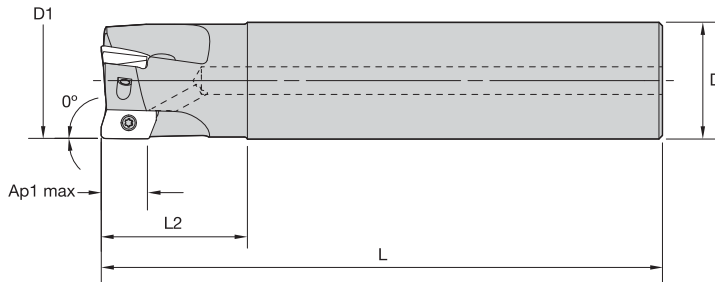
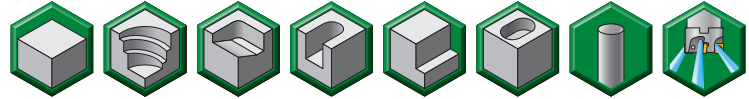
31



wrench

170.025

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.  
For tool body modification instructions, see page 116.



Shoulder Mills

■ Cylindrical End Mills

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988011	VSM17D100Z02C100XD17L450	1.000	1.000	4.500	1.750	.642	2	8.5°	41300	Yes	.78
5988041	VSM17D125Z02C125XD17L480	1.250	1.250	4.800	2.000	.641	2	5.8°	34700	Yes	1.32
5988013	VSM17D125Z03C125XD17L480	1.250	1.250	4.800	2.000	.641	3	5.8°	34700	Yes	1.31
5988043	VSM17D150Z03C150XD17L520	1.500	1.500	5.200	2.000	.638	3	4.3°	30700	Yes	2.11
5988015	VSM17D150Z04C150XD17L520	1.500	1.500	5.200	2.000	.638	4	4.3°	30700	Yes	2.11

■ Spare Parts



insert screw

191.725



in. lbs.

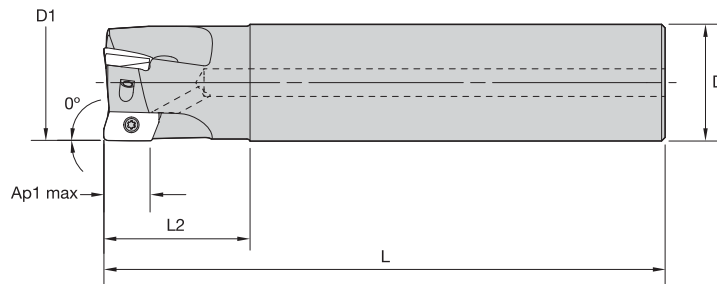
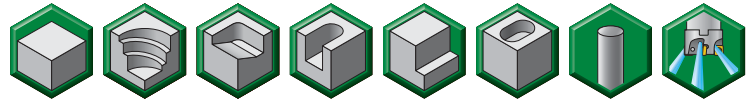
31



wrench

170.025

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.  
For tool body modification instructions, see page 116.



Shoulder Mills

■ **Cylindrical End Mills • Long Shank**

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988012	VSM17D100Z02C100XD17L670	1.000	1.000	6.700	1.750	.642	2	8.5°	41300	Yes	1.23
5988042	VSM17D125Z02C125XD17L800	1.250	1.250	8.000	2.000	.641	2	5.8°	34700	Yes	2.38
5988014	VSM17D125Z03C125XD17L800	1.250	1.250	8.000	2.000	.641	3	5.8°	34700	Yes	2.36
5988044	VSM17D150Z03C150XD17L980	1.500	1.500	9.800	2.000	.638	3	4.3°	30700	Yes	4.33
5988016	VSM17D150Z04C150XD17L980	1.500	1.500	9.800	2.000	.638	4	4.3°	30700	Yes	4.33

■ **Spare Parts**



insert screw

191.725



in. lbs.

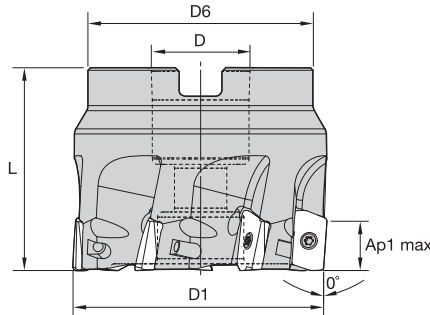
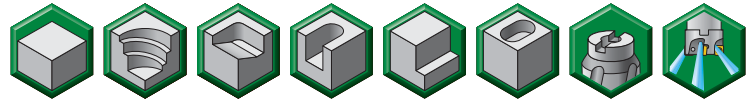
31



wrench

170.025

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.  
For tool body modification instructions, see page 116.



Shoulder Mills

■ Shell Mills

order number	catalog number	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
5988020	VSM17D150Z04S075XD17	1.500	.750	1.417	1.575	.638	4	4.3°	30700	Yes	.38
5988021	VSM17D200Z04S075XD17	2.000	.750	1.750	1.575	.635	4	3.0°	25600	Yes	.68
5988022	VSM17D200Z05S075XD17	2.000	.750	1.750	1.575	.635	5	3.0°	25600	Yes	.71
5988050	VSM17D200Z06S075XD17	2.000	.750	1.750	1.575	.635	6	3.0°	25600	Yes	.66
5988023	VSM17D250Z05S075XD17	2.500	.750	1.750	1.575	.629	5	2.1°	22300	Yes	.98
5988048	VSM17D250Z06S075XD17	2.500	.750	1.750	1.575	.629	6	2.1°	22300	Yes	.97
5988024	VSM17D300Z06S100XD17	3.000	1.000	2.188	1.750	.626	6	1.7°	20100	Yes	1.73
5988047	VSM17D300Z07S100XD17	3.000	1.000	2.188	1.750	.626	7	1.7°	20100	Yes	1.68
5988025	VSM17D400Z08S150XD17	4.000	1.500	3.375	2.000	.623	8	1.2°	17100	Yes	3.52
5988026	VSM17D500Z09S150XD17	5.000	1.500	3.375	2.000	.617	9	.9°	15100	Yes	5.07
5988027	VSM17D600Z12S150XD17	6.000	1.500	3.375	2.000	.616	12	.7°	13700	Yes	6.88

■ Spare Parts



D1	insert screw	in. lbs.	wrench	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw assembly
1.500	191.725	31	170.025	S445	S445CG	-
2.000	191.725	31	170.025	S445	S445CG	-
2.500	191.725	31	170.025	S445	S445CG	-
3.000	191.725	31	170.025	S458	S458CG	-
4.000	191.725	31	170.025	-	-	S2165C
5.000	191.725	31	170.025	-	-	S2165C
6.000	191.725	31	170.025	-	-	S2165C

NOTE: Standard milling cutters will accept insert nose radii up to .062" without modification.  
For tool body modification instructions, see page I16.

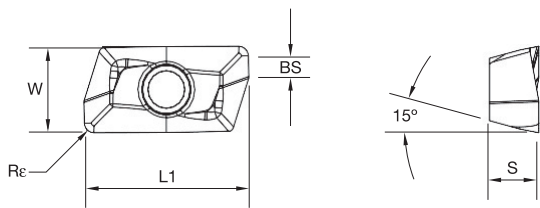
■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..ML	WP40PM	.S..MM	WP40PM	.S..MH	WP40PM
P3-P4	.E..ML	WP35CM	.S..MM	WP35CM	.S..MH	WP35CM
P5-P6	.E..ML	WP35CM	.S..MM	WU35PM	.S..MH	WP35CM
M1-M2	.E..ML	WP25PM	.S..MM	WP25PM	.S..MM	WU35PM
M3	.E..ML	WP35CM	.S..MM	WP35CM	.S..MH	WP35CM
K1-K2	.S..MM	WK15CM	.S..MM	WK15CM	.S..MH	WK15CM
K3	.E..ML	WP35CM	.S..MM	WP35CM	.S..MH	WP35CM
N1-N2	.F..ALP	WN10HM	.F..ALP	WN25PM	.F..ALP	WN25PM
N3	-	-	-	-	-	-
S1-S2	.S..MM	WP25PM	.S..MM	WU35PM	.S..MM	WU35PM
S3	.S..MM	WU35PM	.S..MM	WU35PM	.S..MM	WU35PM
S4	.S..MM	WP25PM	.S..MM	WU35PM	.S..MM	WU35PM
H1	-	-	-	-	-	-

Shoulder Mills



XDCT-ML



- first choice
- alternate choice



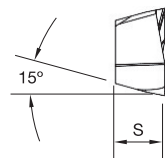
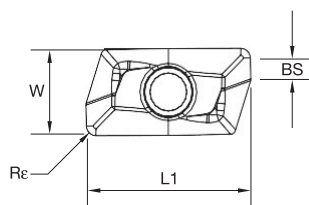
P	M	K	N	S	H
●	○	○	○	○	○
○	●	○	○	○	○
○	○	○	○	○	○
○	○	○	○	○	○
○	○	○	○	○	○
○	○	○	○	○	○

■ XDCT-ML

catalog number	cutting edges	L1	BS	S	W	Re	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WU35PM
XDCT1701ERML	2	.754	.103	.193	.378	.016	●	○	○	○	○	○
XDCT1702ERML	2	.754	.088	.193	.378	.031	○	○	○	○	○	○
XDCT1703ERML	2	.754	.072	.193	.378	.047	○	○	○	○	○	○
XDCT1704ERML	2	.755	.056	.193	.378	.063	○	○	○	○	○	○
XDCT1705ERML	2	.755	.040	.193	.378	.079	○	○	○	○	○	○
XDCT1706ERML	2	.755	.025	.193	.378	.094	○	○	○	○	○	○
XDCT1708ERML	2	.742	—	.192	.378	.125	○	○	○	○	○	○
XDCT1710ERML	2	.722	—	.192	.377	.157	○	○	○	○	○	○



XDCT-ALP



● first choice  
○ alternate choice

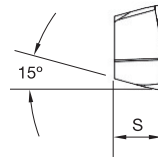
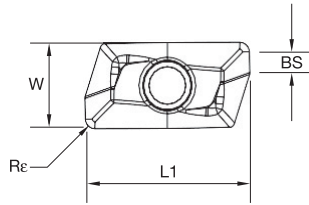
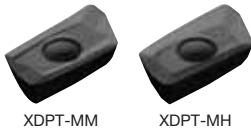
P	■		
M	■		
K	■		
N	■	●	●
S	■		
H	■		

■ XDCT-ALP

catalog number	cutting edges	L1	BS	S	W	Re	WIDIA	
							WN10HM	WN25PM
XDCT1701RALP	2	.754	.103	.193	.378	.016	6007341	6007220
XDCT1702RALP	2	.754	.088	.193	.378	.031	6007345	6007344
XDCT1703RALP	2	.755	.072	.193	.378	.047	6007342	6001537
XDCT1704RALP	2	.755	.056	.193	.378	.063	6001256	6001254
XDCT1705RALP	2	.755	.040	.193	.378	.079	6001252	6001254
XDCT1706RALP	2	.755	.025	.193	.378	.094	6001240	6001240
XDCT1708RALP	2	.742	—	.192	.378	.125	6001238	6001238
XDCT1710RALP	2	.722	—	.192	.377	.157	6001238	6001238

Shoulder Mills





● first choice  
○ alternate choice

P	●	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○

**XDPT-MM**

catalog number	cutting edges	L1	BS	S	W	Re	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WU35PM
XDPT1701SRMM	2	.754	.099	.193	.378	.016	○	○	○	○	○	○
XDPT1702SRMM	2	.754	.085	.193	.378	.031	●	○	○	○	○	○
XDPT1703SRMM	2	.754	.070	.193	.378	.047	○	○	○	○	○	○
XDPT1704SRMM	2	.755	.054	.193	.378	.063	○	○	○	○	○	○
XDPT1705SRMM	2	.755	.390	.193	.378	.079	○	○	○	○	○	○
XDPT1706SRMM	2	.755	.024	.193	.378	.094	○	○	○	○	○	○
XDPT1708SRMM	2	.742	—	.192	.378	.125	○	○	○	○	○	○
XDPT1710SRMM	2	.722	—	.192	.377	.157	○	○	○	○	○	○

**XDPT-MH**

catalog number	cutting edges	L1	BS	S	W	Re	WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WU35PM
XDPT1702SRMH	2	.754	.083	.193	.378	.031	○	○	○	○	○	○
XDPT1703SRMH	2	.754	.068	.193	.378	.047	○	○	○	○	○	○

Shoulder Mills

■ Recommended Starting Speeds [SFM]

Shoulder Mills

Material Group		WK15CM	WN25PM	WP25PM	WP35CM	WP40PM	WN10HM	WU35PM
P	1	- - -	- - -	1080 <b>935</b> 885	1490 <b>1295</b> 1215	970 <b>855</b> 805	- - -	850 <b>750</b> 710
	2	- - -	- - -	900 <b>785</b> 655	920 <b>835</b> 755	820 <b>705</b> 590	- - -	720 <b>620</b> 520
	3	- - -	- - -	835 <b>705</b> 575	835 <b>755</b> 670	755 <b>640</b> 525	- - -	660 <b>560</b> 460
	4	- - -	- - -	740 <b>605</b> 490	625 <b>575</b> 525	670 <b>560</b> 445	- - -	590 <b>490</b> 390
	5	- - -	- - -	605 <b>560</b> 490	855 <b>755</b> 690	560 <b>510</b> 445	- - -	490 <b>440</b> 390
	6	- - -	- - -	540 <b>410</b> 330	525 <b>445</b> 360	490 <b>375</b> 295	- - -	430 <b>330</b> 260
M	1	- - -	- - -	670 <b>590</b> 540	670 <b>605</b> 510	640 <b>560</b> 510	- - -	560 <b>490</b> 440
	2	- - -	- - -	605 <b>525</b> 425	605 <b>525</b> 460	575 <b>490</b> 410	- - -	510 <b>430</b> 360
	3	- - -	- - -	460 <b>395</b> 310	475 <b>425</b> 375	425 <b>375</b> 295	- - -	380 <b>330</b> 260
K	1	1380 <b>1265</b> 1115	- - -	755 <b>670</b> 605	970 <b>870</b> 785	- - -	625 <b>560</b> 490	- - -
	2	1100 <b>970</b> 900	- - -	590 <b>525</b> 490	770 <b>690</b> 625	- - -	- - -	- - -
	3	920 <b>820</b> 755	- - -	490 <b>445</b> 395	640 <b>575</b> 525	- - -	- - -	- - -
N	1	- - -	3525 <b>3100</b> 2870	- - -	- - -	- - -	6560 <b>3935</b> 3280	- - -
	2	- - -	3100 <b>2870</b> 2495	- - -	- - -	- - -	4475 <b>2675</b> 2180	- - -
	3	- - -	3100 <b>2870</b> 2495	- - -	- - -	- - -	2625 <b>1640</b> 1310	- - -
S	1	- - -	- - -	130 <b>115</b> 80	- - -	130 <b>115</b> 100	- - -	110 <b>100</b> 80
	2	- - -	- - -	130 <b>115</b> 80	- - -	130 <b>115</b> 100	- - -	110 <b>100</b> 80
	3	- - -	- - -	165 <b>130</b> 80	- - -	165 <b>130</b> 100	- - -	150 <b>110</b> 80
	4	- - -	- - -	230 <b>165</b> 115	215 <b>165</b> 110	215 <b>165</b> 115	- - -	200 <b>150</b> 100
H	1	- - -	- - -	395 <b>295</b> 230	- - -	- - -	- - -	- - -
	2	- - -	- - -	- - -	- - -	- - -	- - -	- - -
	3	- - -	- - -	- - -	- - -	- - -	- - -	- - -

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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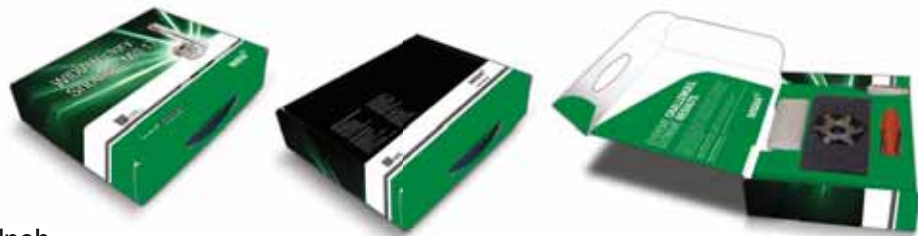
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
.F..ALP	.005	<b>.009</b>	.023	.003	<b>.007</b>	.017	.003	<b>.005</b>	.013	.002	<b>.004</b>	.011	.002	<b>.004</b>	.010	.F..ALP
.E..ML	.007	<b>.014</b>	.028	.005	<b>.010</b>	.020	.004	<b>.008</b>	.015	.003	<b>.007</b>	.013	.003	<b>.006</b>	.012	.E..ML
.S..MM	.007	<b>.019</b>	.035	.005	<b>.013</b>	.025	.004	<b>.010</b>	.019	.003	<b>.009</b>	.016	.003	<b>.008</b>	.015	.S..MM
.S..MH	.009	<b>.023</b>	.037	.007	<b>.017</b>	.027	.005	<b>.013</b>	.020	.004	<b>.011</b>	.017	.004	<b>.010</b>	.016	.S..MH

NOTE: Use "Light Machining" value as starting feed rate.

Order a VSM17™ Kit to achieve true 0° high-performance shoulder milling!

# Victory™ Shoulder Mill 17™ Starter Kits

Order one of our starter kits and test the performance of our new VSM17 platform. The kits are set up to serve the majority of shoulder milling applications, delivered with a cutter body and the latest WIDIA™ Victory™ grades. Detailed order information can be found in the table below.



## ■ VSM17 Starter Kits • Inch

order number	catalog number	diameter D1 (in)	cutter body type	material group	content					
					cutter	qty	inserts	qty	grade	Z (pocket seats)
6049335	VSM17KITCD100Z2WP40PM	1.00	CYLINDRICAL	P	VSM17D100Z02C100XD17L450	1	XDPT170408PESRMM	10	WP40PM	2
6049334	VSM17KITSW100Z2WP40PM	1.00	SCREW ON	P	VSM17D100Z02M12XD17	1	XDPT170408PESRMM	10	WP40PM	2
6049339	VSM17KITCD125Z2WP40PM	1.25	CYLINDRICAL	P	VSM17D125Z02C125XD17L480	1	XDPT170408PESRMM	10	WP40PM	2
6049338	VSM17KITCD125Z3WP40PM	1.25	CYLINDRICAL	P	VSM17D125Z03C125XD17L480	1	XDPT170408PESRMM	10	WP40PM	3
6049336	VSM17KITSW125Z3WP40PM	1.25	SCREW ON	P	VSM17D125Z03M16XD17	1	XDPT170408PESRMM	10	WP40PM	3
6049337	VSM17KITWD125Z3WP40PM	1.25	WELDON	P	VSM17D125Z03W125XD17	1	XDPT170408PESRMM	10	WP40PM	3
6049340	VSM17KITWD150Z3WP40PM	1.50	WELDON	P	VSM17D150Z03W150XD17	1	XDPT170408PESRMM	10	WP40PM	3
6049352	VSM17KITCD150Z4WP40PM	1.50	CYLINDRICAL	P	VSM17D150Z04C150XD17L520	1	XDPT170408PESRMM	10	WP40PM	4
6049351	VSM17KITSD150Z4WP40PM	1.50	SHELL MILL	P	VSM17D150Z04S075XD17	1	XDPT170408PESRMM	10	WP40PM	4
6049353	VSM17KITSD200Z4WP40PM	2.00	SHELL MILL	P	VSM17D200Z04S075XD17	1	XDPT170408PESRMM	10	WP40PM	4
6049354	VSM17KITSD200Z5WP40PM	2.00	SHELL MILL	P	VSM17D200Z05S075XD17	1	XDPT170408PESRMM	10	WP40PM	5
6049355	VSM17KITSD250Z5WP40PM	2.50	SHELL MILL	P	VSM17D250Z05S075XD17	1	XDPT170408PESRMM	10	WP40PM	5
6049356	VSM17KITSD300Z6WP40PM	3.00	SHELL MILL	P	VSM17D300Z06S100XD17	1	XDPT170408PESRMM	10	WP40PM	6
6049357	VSM17KITSD400Z8WP40PM	4.00	SHELL MILL	P	VSM17D400Z08S150XD17	1	XDPT170408PESRMM	10	WP40PM	8
6049359	VSM17KITCD100Z2WK15CM	1.00	CYLINDRICAL	K	VSM17D100Z02C100XD17L450	1	XDPT170408PESRMM	10	WK15CM	2
6049358	VSM17KITSW100Z2WK15CM	1.00	SCREW ON	K	VSM17D100Z02M12XD17	1	XDPT170408PESRMM	10	WK15CM	2
6049363	VSM17KITCD125Z2WK15CM	1.25	CYLINDRICAL	K	VSM17D125Z02C125XD17L480	1	XDPT170408PESRMM	10	WK15CM	2
6049362	VSM17KITCD125Z3WK15CM	1.25	CYLINDRICAL	K	VSM17D125Z03C125XD17L480	1	XDPT170408PESRMM	10	WK15CM	3
6049360	VSM17KITSW125Z3WK15CM	1.25	SCREW ON	K	VSM17D125Z03M16XD17	1	XDPT170408PESRMM	10	WK15CM	3
6049361	VSM17KITWD125Z3WK15CM	1.25	WELDON	K	VSM17D125Z03W125XD17	1	XDPT170408PESRMM	10	WK15CM	3
6049364	VSM17KITWD150Z3WK15CM	1.50	WELDON	K	VSM17D150Z03W150XD17	1	XDPT170408PESRMM	10	WK15CM	3
6049366	VSM17KITCD150Z4WK15CM	1.50	CYLINDRICAL	K	VSM17D150Z04C150XD17L520	1	XDPT170408PESRMM	10	WK15CM	4
6049365	VSM17KITSD150Z4WK15CM	1.50	SHELL MILL	K	VSM17D150Z04S075XD17	1	XDPT170408PESRMM	10	WK15CM	4
6049367	VSM17KITSD200Z4WK15CM	2.00	SHELL MILL	K	VSM17D200Z04S075XD17	1	XDPT170408PESRMM	10	WK15CM	4
6049368	VSM17KITSD200Z5WK15CM	2.00	SHELL MILL	K	VSM17D200Z05S075XD17	1	XDPT170408PESRMM	10	WK15CM	5
6049369	VSM17KITSD250Z5WK15CM	2.50	SHELL MILL	K	VSM17D250Z05S075XD17	1	XDPT170408PESRMM	10	WK15CM	5
6049370	VSM17KITSD300Z6WK15CM	3.00	SHELL MILL	K	VSM17D300Z06S100XD17	1	XDPT170408PESRMM	10	WK15CM	6
6049371	VSM17KITSD400Z8WK15CM	4.00	SHELL MILL	K	VSM17D400Z08S150XD17	1	XDPT170408PESRMM	10	WK15CM	8

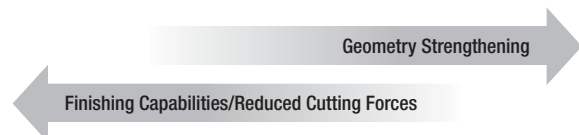
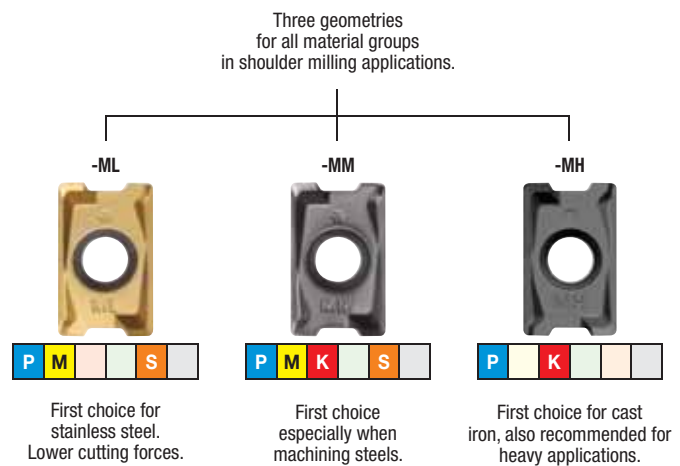
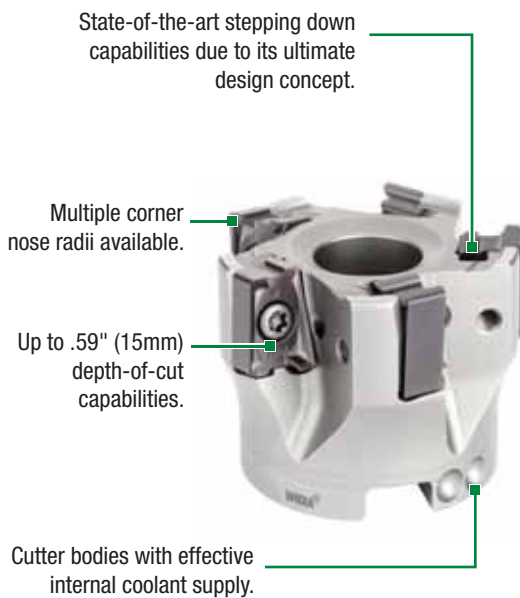
Double-Sided Shoulder Mill •  
**VSM490™ -15**

# VSM490-15



WIDIA™ Victory™ Shoulder Milling Series (VSM series) is specially engineered to achieve excellent surface quality as well as higher material removal rates in shoulder milling applications. The VSM490 series, with its unique design, enables the tool to be applied in multiple passes (stepping down) with outstanding results. VSM490-15 is applicable in a wide range of workpiece materials: steel, cast iron, stainless steel, and titanium, from roughing to finishing applications.

- Double-sided strong insert with 4 cutting edges.
- High positive geometry for lower cutting forces.
- Superior wall and surface finish capabilities.



**0° Shoulder Mills**

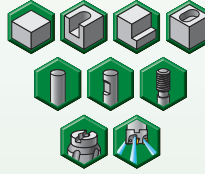


VSM490™-15

Max depth of cut: .590"

Lead angle: 0°  
Indexes per insert: 4  
Diameter: 1–6"

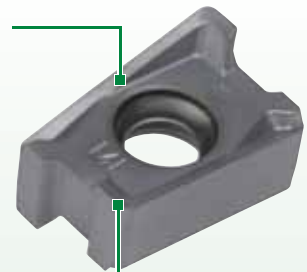
Pages: I32–I39



**VSM490™-15 • Unbeatable Performance in Shoulder Milling**

- “Stepless” solution.
- No mismatch when machining walls in different steps.

Innovative cutting geometry provides superior wall and surface finish.



Integrated wiper facet for excellent floor finishing.

**Competitor Tool • Wall Quality**



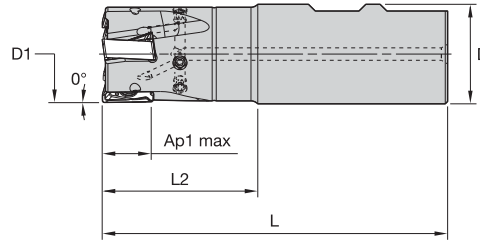
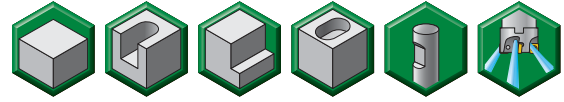
Traditional tools are designed to achieve a 0° wall, but exhibit poor performance when machining walls in multiple passes.

**VSM490-15 • Wall Quality**



VSM490-15 minimizes the marks left. By increasing wall quality and avoiding a second tool, productivity increases significantly.

- Superior wall and surface finish capabilities.
- “Stepless” solution. True 0° to run precise applications in multiple axial passes.
- Strong concept to run up to .590" (15mm) depth of cut.
- Effective internal coolant feature, reaching the cutting edge precisely.



Shoulder Mills

■ Weldon Shanks

order number	catalog number	D1	D	L	L2	Ap1 max	Z	lbs	max RPM
5873069	VSM490D100Z02W075XN15	1.000	.750	3.780	1.750	.591	2	.92	26300
5710590	VSM490D100Z02W100XN15	1.000	1.000	4.030	1.750	.591	2	.73	26300
5710591	VSM490D125Z03W100XN15	1.250	1.000	4.530	2.250	.591	3	.90	22100
5873070	VSM490D150Z03W125XN15	1.500	1.250	4.530	2.250	.591	3	1.41	19500
5710592	VSM490D150Z04W125XN15	1.500	1.250	4.530	2.250	.591	4	1.42	19500

NOTE: Weldon type not recommended for finishing operations.

■ Spare Parts



insert  
screw

MS-2071



in. lbs.

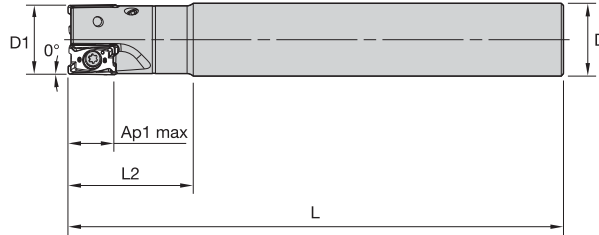
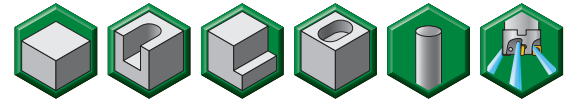
31



Torx Plus  
driver

DT15IP

- Superior wall and surface finish capabilities.
- “Stepless” solution. True 0° to run precise applications in multiple axial passes.
- Strong concept to run up to .590" (15mm) depth of cut.
- Effective internal coolant feature, reaching the cutting edge precisely.



Shoulder Mills

**■ Cylindrical End Mills**

order number	catalog number	D1	D	L	L2	Ap1 max	Z	lbs	max RPM
5873101	VSM490D100Z02C100XN15L800	1.000	1.000	8.000	1.750	.591	2	1.60	26300
5873102	VSM490D125Z03C125XN15L800	1.250	1.250	8.000	2.250	.591	3	2.50	22100
5873103	VSM490D150Z04C125XN15L800	1.500	1.250	8.000	2.250	.591	4	2.61	19500

**■ Spare Parts**



insert screw

MS-2071



in. lbs.

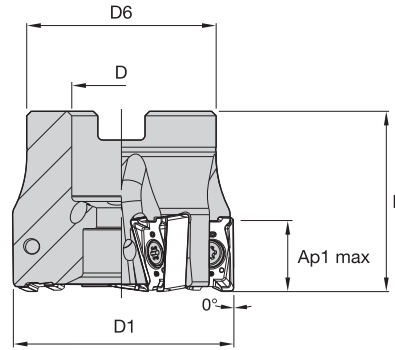
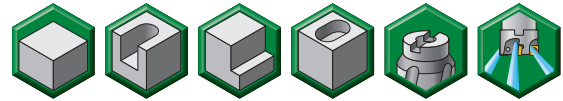
31



Torx Plus driver

DT15IP

- Superior wall and surface finish capabilities.
- “Stepless” solution. True 0° to run precise applications in multiple axial passes.
- Strong concept to run up to .590" (15mm) depth of cut.
- Effective internal coolant feature, reaching the cutting edge precisely.



Shoulder Mills

■ Shell Mills

order number	catalog number	D1	D	D6	L	Ap1 max	Z	lbs	max RPM
5710593	VSM490D150Z05S050XN15	1.500	.500	1.420	1.575	.591	5	.43	19500
5710594	VSM490D200Z05S075XN15	2.000	.750	1.750	1.575	.591	5	.78	16100
5710595	VSM490D200Z06S075XN15	2.000	.750	1.750	1.575	.591	6	.77	16100
5873104	VSM490D250Z05S075XN15	2.500	.750	1.750	1.575	.591	5	1.11	14100
5710596	VSM490D250Z06S075XN15	2.500	.750	1.750	1.575	.591	6	1.06	14100
5710597	VSM490D250Z07S100XN15	2.500	1.000	2.190	1.750	.591	7	1.31	14100
5710598	VSM490D300Z07S100XN15	3.000	1.000	2.190	1.750	.591	7	1.83	12700
5873105	VSM490D300Z09S100XN15	3.000	1.000	2.190	1.750	.591	9	1.85	12700
5873106	VSM490D400Z08S150XN15	4.000	1.500	3.380	2.000	.591	8	3.31	10800
5710599	VSM490D400Z11S150XN15	4.000	1.500	3.380	2.000	.591	11	3.26	10800
5873107	VSM490D500Z09S150XN15	5.000	1.500	3.907	2.380	.591	9	7.67	9600
5873108	VSM490D500Z12S150XN15	5.000	1.500	3.907	2.380	.591	12	6.83	9600
5873109	VSM490D600Z10S200XN15	6.000	2.000	4.880	2.380	.591	10	10.42	8600

■ Spare Parts



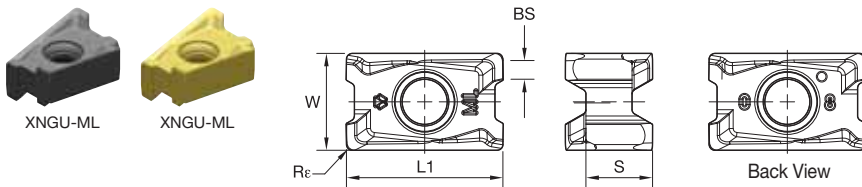
D1	insert screw	in. lbs.	Torx Plus driver	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw	coolant lock screw assembly
1.5	MS-2071	31	DT15IP	S424	—	—	—
2.0	MS-2071	31	DT15IP	S445	S445CG	—	—
2.5	MS-2071	31	DT15IP	S445	S445CG	—	—
2.5	MS-2071	31	DT15IP	S458	S458CG	—	—
3.0	MS-2071	31	DT15IP	S458	S458CG	—	—
4.0	MS-2071	31	DT15IP	—	—	420.201	S2165C
5.0	MS-2071	31	DT15IP	—	—	420.201	S2165C
6.0	MS-2071	31	DT15IP	—	—	420.241	S2192C

NOTE: Socket-head cap screw with coolant groove and coolant lock screw assembly need to be ordered separately.



■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	XNGU-ML	WP40PM	XNPU-ML	WP40PM	XNPU-MM	WP40PM
P3-P4	XNGU-ML	WP25PM	XNPU-MM	WP35CM	XNPU-MM	WP40PM
P5-P6	XNGU-MM	WP25PM	XNPU-MM	WP35CM	XNPU-MM	WP35CM
M1-M2	XNGU-ML	WP25PM	XNGU-ML	WU35PM	XNGU-MM	WU35PM
M3	XNGU-ML	WP25PM	XNGU-ML	WU35PM	XNGU-MM	WU35PM
K1-K2	XNGU-MH	WK15CM	XNGU-MH	WK15CM	XNGU-MH	WP35CM
K3	XNGU-MH	WK15PM	XNGU-MH	WK15PM	XNGU-MH	WP40PM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	XNGU-ML	WP25PM	XNGU-ML	WU35PM	XNGU-MM	WU35PM
S3	XNGU-ML	WP25PM	XNGU-ML	WU35PM	XNGU-MM	WU35PM
S4	XNGU-ML	WU35PM	XNGU-ML	WU35PM	XNPU-MM	WU35PM
H1	-	-	-	-	-	-



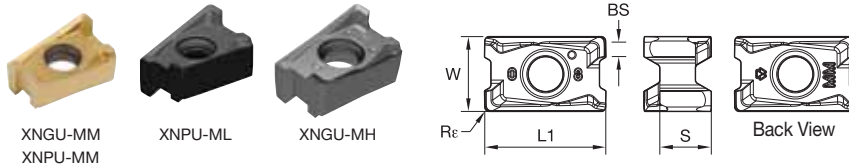
• -ML geometry is the first choice for machining stainless steel. With reduced cutting forces, this is recommended for improved wall finishing capabilities in steels.

● first choice  
○ alternate choice

P	●	○	○	○	○	○	○
M	●	●	●	○	○	○	○
K	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○

■ XNGU-ML • Precision Finishing

catalog number	cutting edges	L1	W	S	BS	Rε	hm	WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
XNGU1501ERML	4	.638	.394	.271	.088	.016	.003		5890821	5890823	5890822		
XNGU1502ERML	4	.638	.394	.271	.072	.032	.003		5873481	5873483	5873482		



Shoulder Mills

- -ML geometry is the first choice for machining stainless steel. With reduced cutting forces, this is recommended for improved wall finishing capabilities in steels.
- -MM is the universal geometry for VSM490-15. First choice when machining steel, as well as stainless steel and high-temp alloys in heavy applications.
- -MH geometry is the first choice for cast iron machining in the medium and heavy applications.

● first choice  
○ alternate choice

P	●	○	○	○	○	○	○
M	●	●	●	●	○	○	○
K	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○

■ XNGU-MM • Precision Finishing

catalog number	cutting edges	L1	W	S	BS	Rε	hm	WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
XNGU1501SRMM	4	.638	.394	.271	.088	.016	.004	●	●	●	●	○	○
XNGU1502SRMM	4	.638	.394	.271	.076	.032	.004	○	○	○	○	○	○

■ XNPU-ML • Utility Roughing

catalog number	cutting edges	L1	W	S	BS	Rε	hm	WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
XNPU1502ERML	4	.634	.394	.271	.073	.032	.003	○	○	○	○	○	○

■ XNPU-MM • Utility Roughing

catalog number	cutting edges	L1	W	S	BS	Rε	hm	WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
XNPU1502SRMM	4	.634	.394	.271	.076	.032	.004	○	○	○	○	○	○
XNPU1503SRMM	4	.634	.394	.271	.059	.047	.004	○	○	○	○	○	○
XNPU1504SRMM	4	.634	.394	.271	.045	.063	.004	○	○	○	○	○	○

■ XNGU-MH • Utility Roughing

catalog number	cutting edges	L1	W	S	BS	Rε	hm	WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
XNGU1502SRMH	4	.638	.394	.271	.069	.031	.004	○	○	○	○	○	○

**Recommended Starting Speeds [SFM]**

Material Group		WK15PM	WP25PM	WU35PM	WP40PM	WK15CM	WP35CM
<b>P</b>	1	- - -	1080 <b>940</b> 880	860 <b>750</b> 700	970 <b>850</b> 800	- - -	1490 <b>1295</b> 1215
	2	- - -	900 <b>790</b> 660	720 <b>630</b> 530	820 <b>710</b> 590	- - -	920 <b>835</b> 755
	3	- - -	830 <b>700</b> 580	660 <b>560</b> 460	750 <b>640</b> 520	- - -	835 <b>755</b> 670
	4	- - -	740 <b>610</b> 490	590 <b>490</b> 390	670 <b>560</b> 440	- - -	625 <b>575</b> 525
	5	- - -	610 <b>550</b> 490	490 <b>440</b> 390	560 <b>510</b> 440	- - -	855 <b>755</b> 690
	6	- - -	540 <b>410</b> 330	430 <b>330</b> 260	490 <b>380</b> 300	- - -	525 <b>445</b> 360
<b>M</b>	1	- - -	670 <b>590</b> 540	560 <b>490</b> 450	640 <b>560</b> 510	- - -	670 <b>605</b> 510
	2	- - -	610 <b>520</b> 430	510 <b>430</b> 360	570 <b>490</b> 410	- - -	605 <b>525</b> 460
	3	- - -	460 <b>400</b> 310	380 <b>330</b> 260	430 <b>380</b> 300	- - -	475 <b>425</b> 375
<b>K</b>	1	880 <b>800</b> 710	750 <b>680</b> 600	- - -	- - -	1380 <b>1255</b> 1115	970 <b>870</b> 785
	2	690 <b>620</b> 580	590 <b>530</b> 490	- - -	- - -	1095 <b>975</b> 910	770 <b>690</b> 625
	3	580 <b>520</b> 470	490 <b>440</b> 400	- - -	- - -	920 <b>815</b> 750	640 <b>575</b> 525
<b>N</b>	1-2	- - -	- - -	- - -	- - -	- - -	- - -
	3	- - -	- - -	- - -	- - -	- - -	- - -
<b>S</b>	1	- - -	130 <b>120</b> 90	115 <b>100</b> 80	130 <b>110</b> 100	- - -	- - -
	2	- - -	130 <b>120</b> 90	115 <b>100</b> 80	130 <b>110</b> 100	- - -	- - -
	3	- - -	170 <b>130</b> 90	150 <b>115</b> 80	160 <b>130</b> 100	- - -	- - -
	4	- - -	230 <b>170</b> 120	200 <b>150</b> 100	210 <b>160</b> 110	- - -	215 <b>165</b> 110
<b>H</b>	1	- - -	- - -	- - -	- - -	- - -	- - -

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Shoulder Mills

**Recommended Starting Feeds**
**Recommended Starting Feeds [IPT]**

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
XN.U-ML	.007	<b>.011</b>	.018	.005	<b>.008</b>	.013	.004	<b>.006</b>	.010	.003	<b>.005</b>	.008	.003	<b>.005</b>	.008	XN.U-ML
XN.U-MM	.008	<b>.015</b>	.022	.006	<b>.011</b>	.016	.004	<b>.008</b>	.012	.004	<b>.007</b>	.010	.003	<b>.006</b>	.010	XN.U-MM
XNGU-MH	.009	<b>.017</b>	.026	.006	<b>.012</b>	.019	.005	<b>.009</b>	.014	.004	<b>.008</b>	.012	.004	<b>.007</b>	.011	XNGU-MH

NOTE: Use "Light Machining" values as starting feed rate.

Order a VSM490™ Kit and experience the next level of shoulder milling!

# VSM490-15 Starter Kits

Order one of our starter kits and test the performance of our new VSM490-15 platform. The kits are set up to serve the majority of shoulder milling applications and workpiece materials, delivered with a cutter body as well as 20 inserts from a premium WIDIA™ grade. Detailed order information can be found in the table below.



## ■ VSM490-15 Starter Kits • Inch

order number	catalog number	cutter diameter/ flutes	cutter body type	material group	application range	content				
						cutter	qty	inserts	grade	qty
5964869	VSM490KIT-WD100Z02WP40PM	1.00z2	WELDON	P	▽▽	VSM-490D100Z02W100XN15	1	XNPU15T608SRMM	WP40PM	20
5964870	VSM490KIT-WD125Z03WP40PM	1.25z3	WELDON	P	▽▽	VSM-490D125Z03W100XN15	1	XNPU15T608SRMM	WP40PM	20
5965011	VSM490KIT-WD150Z04WP40PM	1.50z4	WELDON	P	▽▽	VSM-490D150Z04W125XN15	1	XNPU15T608SRMM	WP40PM	20
5965012	VSM490KITS-D150Z05WP40PM	1.50z5	SHELL MILL	P	▽▽	VSM-490D150Z05S050XN15	1	XNPU15T608SRMM	WP40PM	20
5965013	VSM490KITS-D200Z05WP40PM	2.00z5	SHELL MILL	P	▽▽	VSM-490D200Z05S075XN15	1	XNPU15T608SRMM	WP40PM	20
5965014	VSM490KITS-D200Z06WP40PM	2.00z6	SHELL MILL	P	▽▽	VSM-490D200Z06S075XN15	1	XNPU15T608SRMM	WP40PM	20
5965015	VSM490KITS-D250Z06WP40PM	2.50z6	SHELL MILL	P	▽▽	VSM-490D250Z06S075XN15	1	XNPU15T608SRMM	WP40PM	20
5965016	VSM490KITS-D300Z07WP40PM	3.00z7	SHELL MILL	P	▽▽	VSM-490D300Z07S100XN15	1	XNPU15T608SRMM	WP40PM	20
5965017	VSM490KITS-D400Z08WP40PM	4.00z8	SHELL MILL	P	▽▽	VSM-490D400Z08S150XN15	1	XNPU15T608SRMM	WP40PM	20

(continued)



*(VSM490-15 Starter Kits • Inch — continued)*

order number	catalog number	cutter diameter/ flutes	cutter body type	material group	application range	content				
						cutter	qty	inserts	grade	qty
5965018	VSM490KITC-D100Z02WU35PM	1.00z2	CYLINDRICAL	M+S	▽▽▽	VSM490D100Z02C100X-N15L800	1	XNGU15T608ERML	WU35PM	20
5965019	VSM490KITC-D125Z03WU35PM	1.25z3	CYLINDRICAL	M+S	▽▽▽	VSM490D125Z03C125X-N15L800	1	XNGU15T608ERML	WU35PM	20
5965031	VSM490KITS-D150Z05WU35PM	1.50z5	SHELL MILL	M+S	▽▽▽	VSM-490D150Z05S050XN15	1	XNGU15T608ERML	WU35PM	20
5965032	VSM490KITS-D200Z05WU35PM	2.00z5	SHELL MILL	M+S	▽▽▽	VSM-490D200Z05S075XN15	1	XNGU15T608ERML	WU35PM	20
5965033	VSM490KITS-D200Z06WU35PM	2.00z6	SHELL MILL	M+S	▽▽▽	VSM-490D200Z06S075XN15	1	XNGU15T608ERML	WU35PM	20
5965034	VSM490KITS-D250Z06WU35PM	2.50z6	SHELL MILL	M+S	▽▽▽	VSM-490D250Z06S075XN15	1	XNGU15T608ERML	WU35PM	20
5965035	VSM490KITS-D300Z07WU35PM	3.00z7	SHELL MILL	M+S	▽▽▽	VSM-490D300Z07S100XN15	1	XNGU15T608ERML	WU35PM	20
5965036	VSM490KIT-WD100Z02WK15PM	1.00z2	WELDON	K	▽	VSM-490D100Z02W100XN15	1	XNPU15T608SRMM	WK15PM	20
5965037	VSM490KIT-WD125Z03WK15PM	1.25z3	WELDON	K	▽	VSM-490D125Z03W100XN15	1	XNPU15T608SRMM	WK15PM	20
5965038	VSM490KITS-D150Z05WK15PM	1.50z5	SHELL MILL	K	▽	VSM-490D150Z05S050XN15	1	XNPU15T608SRMM	WK15PM	20
5965039	VSM490KITS-D200Z06WK15PM	2.00z6	SHELL MILL	K	▽	VSM-490D200Z06S075XN15	1	XNPU15T608SRMM	WK15PM	20
5965040	VSM490KITS-D250Z07WK15PM	2.50z7	SHELL MILL	K	▽	VSM-490D250Z07S100XN15	1	XNPU15T608SRMM	WK15PM	20
5965041	VSM490KITS-D300Z09WK15PM	3.00z9	SHELL MILL	K	▽	VSM-490D300Z09S100XN15	1	XNPU15T608SRMM	WK15PM	20
5965042	VSM490KITS-D400Z11WK15PM	4.00z11	SHELL MILL	K	▽	VSM-490D400Z11S150XN15	1	XNPU15T608SRMM	WK15PM	20

▽ Heavy/Roughing  
 ▽▽ Medium  
 ▽▽▽ Light Machining/Finishing

First Choice for Economical Shoulder Milling •  
**M690 Series 0° Shoulder Mills**

# M690



Designed to streamline even your most challenging milling operations, the M690 Series provides optimal chip evacuation, excellent shoulder finish, free cutting action, and solid tool design for optimal insert support.

- New SDMX inserts — helical cutting edges for smooth cutting.
- Strong insert and tool design for maximum productivity.
- Four cutting edges enable excellent machining economy.

Positive pockets and geometry for free cutting action.

Strong tool design for optimum insert support.

Accurate PSTS inserts offer excellent shoulder finish.

Designed for optimal chip evacuation.



**0° Shoulder Mills**



**M690 SD1204..**

**Max depth of cut: .400"**

Lead angle: 0°

Indexes per insert: 4

Diameter: 1.50–6"

**Pages: I42–I47**



**M690 SD1506..**

**Max depth of cut: .500"**

Lead angle: 0°

Indexes per insert: 4

Diameter: 2–10"

**Pages: I48–I51**



**■ Insert Offering**

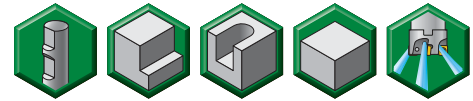


**12mm iC insert**

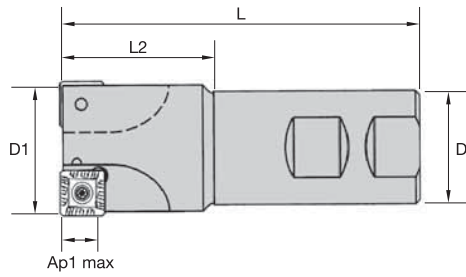


**15mm iC insert**

- Four cutting edges.
- 0° shoulders.
- Excellent for slot and profile milling.



Shoulder Mills



■ Weldon Shanks

order number	catalog number	D1	D	L	L2	Ap1 max	Z	max RPM	coolant supply	lbs
2646782	M690D150Z03W125SD12	1.500	1.250	4.000	1.720	.400	3	22400	Yes	1.40
2646784	M690D200Z04W125SD12	2.000	1.250	4.000	1.720	.400	4	22400	Yes	1.80

■ Spare Parts



insert screw

12148037700



in. lbs.

32

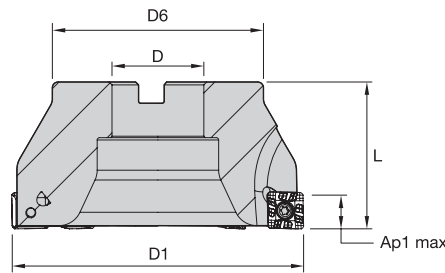
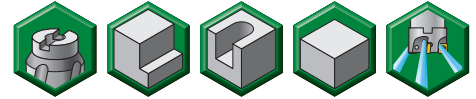


Torx wrench

12148000600



- Four cutting edges.
- 0° shoulders.
- Excellent for slot and profile milling.



Shoulder Mills

■ **Shell Mills**

order number	catalog number	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
2646783	M690D200Z04S075SD12	2.000	.750	1.700	1.500	.400	4	22400	Yes	.50
2646785	M690D200Z05S075SD12	2.000	.750	1.700	1.500	.400	5	22400	Yes	.50
2646788	M690D250Z06S100SD12	2.500	1.000	2.200	1.750	.400	6	20000	Yes	1.35
2646787	M690ID250Z05SD12	2.500	1.000	2.200	1.750	.400	5	20000	Yes	1.00
2646790	M690ID300Z06SD12	3.000	1.000	2.300	2.000	.400	6	17200	No	2.00
2646792	M690ID400Z08SD12	4.000	1.500	3.100	2.000	.400	8	15800	No	2.70
2646794	M690ID500Z09SD12	5.000	1.500	3.500	2.000	.400	9	14200	No	5.25
2646796	M690D600Z10S200SD12	6.000	2.000	4.000	2.500	.400	10	12500	No	8.15

NOTE: Standard milling cutters will accept insert nose radius up to 0.79" without modification.  
For larger radii, clearance must be added.

■ **Spare Parts**



insert screw

12148037700



in. lbs.

32



Torx wrench

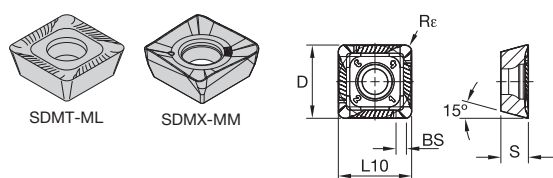
12148000600

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..ML	TN6540	.S..MM	TN6540	.S..MH	TN6540
P3-P4	.E..ML	TN7535	.S..MM	TN6540	.S..MH	TN6540
P5-P6	.E..ML	TN7535	.S..MM	TN6540	.S..MH	TN6540
M1-M2	.E..ML	TN6540	.S..MM	TN6540	.S..MH	TN6540
M3	.E..ML	TN7535	.S..MM	TN7535	.S..MH	TN7535
K1-K2	.E..ML	WK15CM	.E..ML	WK15CM	.S..MH	WK15CM
K3	.E..ML	WK15CM	.S..MM	TN6525	.S..MH	TN6525
N1-N2	.ALP	THM-U	.E..ML	THM-U	.S..ML	THM-U
N3	.ALP	THM-U	.E..ML	THM-U	.S..ML	THM-U
S1-S2	.E..ML	TN6540	.S..MM	TN6540	.S..MM	TN6540
S3	.E..ML	TN6540	.S..MM	WS30PM	.S..MM	TN6540
S4	.E..ML	TN6540	.S..MM	WS30PM	.S..MM	TN6540
H1	.S..MM	WS30PM	.S..MM	WS30PM	.S..MM	WS30PM

Shoulder Mills

Inserts • SD1204..



● first choice  
○ alternate choice

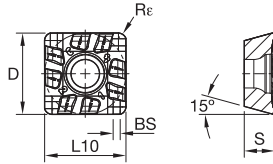
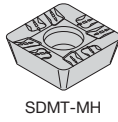
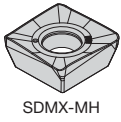
P	●	○							
M	●	○	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○	○
N	●								
S	●								
H	●								

■ SDMT-ML

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN2510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM
SDMT1204PDRML	4	.500	.500	.188	.043	.047	.003	3094667							

■ SDMX-MM

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN2510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM
SDMX120408RMM	4	.500	.500	.188	.076	.031	.004			3950588	3950589	3950590	3950591		
SDMX120412RMM	4	.500	.500	.188	.061	.048	.004			3950596	3950597	3950599	3950600		5519572
SDMX120416RMM	4	.500	.500	.188	.059	.063	.004		4145063	4145064	4145065				
SDMX120424RMM	4	.500	.500	.188	.024	.095	.004				4145072				
SDMX120432RMM	4	.500	.500	.188	—	.126	.004				4145094		4145095		



● first choice  
○ alternate choice

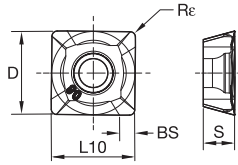
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M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SDMX-MH**

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN2510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM
SDMX120408RMH	4	.500	.500	.188	.076	.031	.006	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SDMX120412RMH	4	.500	.500	.188	.061	.047	.006	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SDMX120416RMH	4	.500	.500	.188	.059	.063	.006	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**SDMT-MH**

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN2510	TN6520	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM
SDMT1204PDRMH	4	.500	.500	.189	.043	.047	.006	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



● first choice  
○ alternate choice

P	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**SDEX-ALP**

catalog number	cutting edges	D	L10	S	BS	Re	hm	THM-U
SDEX120408FRALP	4	.500	.500	.187	.060	.031	.001	<input checked="" type="checkbox"/>

■ Recommended Starting Speeds [SFM]

Shoulder Mills

Material Group		TN2510			TN6520			TN6525			TN6540			TN7525		
<b>P</b>	1	-	-	-	-	-	-	1115	<b>870</b>	770	985	<b>770</b>	655	1115	<b>855</b>	770
	2	-	-	-	-	-	-	870	<b>690</b>	590	690	<b>525</b>	460	855	<b>690</b>	590
	3	-	-	-	-	-	-	770	<b>590</b>	510	590	<b>460</b>	375	770	<b>590</b>	510
	4	-	-	-	-	-	-	640	<b>460</b>	395	490	<b>360</b>	295	640	<b>460</b>	395
	5	-	-	-	-	-	-	855	<b>640</b>	540	655	<b>490</b>	410	855	<b>640</b>	540
	6	-	-	-	-	-	-	560	<b>445</b>	360	445	<b>330</b>	280	560	<b>445</b>	360
<b>M</b>	1	-	-	-	-	-	-	525	<b>330</b>	215	360	<b>215</b>	165	670	<b>605</b>	510
	2	-	-	-	-	-	-	330	<b>215</b>	130	215	<b>130</b>	115	605	<b>525</b>	460
	3	-	-	-	-	-	-	345	<b>215</b>	150	230	<b>130</b>	115	475	<b>425</b>	375
<b>K</b>	1	1150	<b>985</b>	820	1230	<b>870</b>	625	755	<b>670</b>	605	605	<b>560</b>	490	1035	<b>770</b>	655
	2	985	<b>820</b>	690	1065	<b>690</b>	525	590	<b>525</b>	490	475	<b>425</b>	375	885	<b>655</b>	540
	3	820	<b>690</b>	540	820	<b>625</b>	445	490	<b>445</b>	395	425	<b>395</b>	345	655	<b>540</b>	460
<b>N</b>	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>S</b>	1	-	-	-	-	-	-	-	-	-	130	<b>100</b>	80	-	-	-
	2	-	-	-	-	-	-	-	-	-	65	<b>50</b>	35	-	-	-
	3	-	-	-	-	-	-	-	-	-	195	<b>115</b>	80	-	-	-
	4	-	-	-	-	-	-	-	-	-	165	<b>80</b>	65	-	-	-
<b>H</b>	1	380	<b>300</b>	195	-	-	-	-	-	-	-	-	-	-	-	-
	2	380	<b>300</b>	195	-	-	-	-	-	-	-	-	-	-	-	-
	3	280	<b>210</b>	150	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

(Recommended Starting Speeds [SFM] — continued)

Material Group		TN7535			WK15CM			WS30PM			TTI25			THM-U		
P	1	1490	<b>1295</b>	1215	-	-	-	-	-	-	1180	<b>985</b>	820	-	-	-
	2	920	<b>835</b>	755	-	-	-	-	-	-	855	<b>690</b>	590	-	-	-
	3	835	<b>755</b>	670	-	-	-	-	-	-	855	<b>690</b>	590	-	-	-
	4	625	<b>575</b>	525	-	-	-	-	-	-	720	<b>590</b>	490	-	-	-
	5	855	<b>755</b>	690	-	-	-	-	-	-	870	<b>640</b>	540	-	-	-
	6	525	<b>445</b>	360	-	-	-	-	-	-	395	<b>295</b>	245	-	-	-
M	1	670	<b>605</b>	510	-	-	-	740	<b>655</b>	605	1310	<b>855</b>	590	-	-	-
	2	605	<b>525</b>	460	-	-	-	670	<b>590</b>	475	885	<b>560</b>	395	-	-	-
	3	475	<b>425</b>	375	-	-	-	510	<b>445</b>	345	870	<b>575</b>	395	-	-	-
K	1	970	<b>870</b>	785	1380	<b>1265</b>	1115	-	-	-	605	<b>510</b>	425	625	<b>560</b>	490
	2	770	<b>690</b>	625	1100	<b>970</b>	900	-	-	-	490	<b>395</b>	345	-	-	-
	3	640	<b>575</b>	525	920	<b>820</b>	755	-	-	-	395	<b>345</b>	280	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-	6560	<b>3935</b>	3280
	2	-	-	-	-	-	-	-	-	-	-	-	-	4475	<b>2675</b>	2180
	3	-	-	-	-	-	-	-	-	-	-	-	-	2625	<b>1640</b>	1310
S	1	-	-	-	-	-	-	150	<b>130</b>	100	-	-	-	-	-	-
	2	-	-	-	-	-	-	150	<b>130</b>	100	-	-	-	-	-	-
	3	-	-	-	-	-	-	180	<b>150</b>	100	-	-	-	-	-	-
	4	-	-	-	-	-	-	280	<b>195</b>	130	-	-	-	-	-	-
H	1	-	-	-	-	-	-	445	<b>330</b>	245	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Shoulder Mills

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

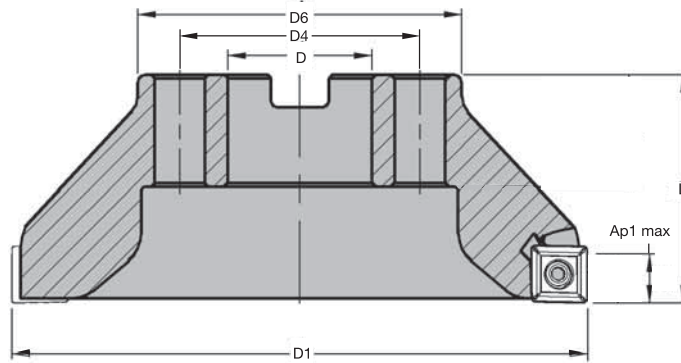
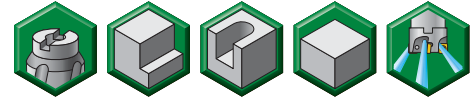
■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)														Insert Geometry	
	5%			10%			20%			30%		40-100%				
.F..ALP	.005	<b>.009</b>	.019	.003	<b>.007</b>	.013	.003	<b>.005</b>	.010	.002	<b>.004</b>	.009	.002	<b>.004</b>	.008	.F..ALP
.E..ML	.005	<b>.014</b>	.022	.003	<b>.010</b>	.016	.003	<b>.007</b>	.012	.002	<b>.006</b>	.010	.002	<b>.006</b>	.010	.E..ML
.S..MM	.005	<b>.016</b>	.027	.003	<b>.012</b>	.020	.003	<b>.009</b>	.015	.002	<b>.008</b>	.013	.002	<b>.007</b>	.012	.S..MM
.S..MH	.009	<b>.021</b>	.033	.007	<b>.015</b>	.024	.005	<b>.011</b>	.018	.004	<b>.010</b>	.016	.004	<b>.009</b>	.014	.S..MH

NOTE: Use "Light Machining" value as starting feed rate.

- Four cutting edges.
- 0° shoulders.
- Excellent for slot and profile milling.



Shoulder Mills

■ Shell Mills

order number	catalog number	D1	D	D4	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
2646786	M690D200Z04S075SD15	2.000	.750	—	1.700	1.500	.500	4	22400	Yes	.50
2646789	M690D250Z05S100SD15	2.500	1.000	—	2.200	1.750	.500	5	20000	Yes	1.00
2646791	M690D300Z06S100SD15	3.000	1.000	—	2.300	2.000	.500	6	17700	Yes	2.00
2646793	M690D400Z08S150SD15	4.000	1.500	—	3.100	2.000	.500	8	15800	No	2.70
2646795	M690D500Z09S150SD15	5.000	1.500	—	3.500	2.000	.500	9	14200	No	5.25
2646797	M690D600Z10S200SD15	6.000	2.000	—	4.000	2.500	.500	10	12500	No	8.15
2646562	M690D800Z13S250SD15	8.000	2.500	4.000	5.500	2.500	.500	13	7000	No	14.40
2646781	M690D1000Z16S250SD15	10.000	2.500	4.000	6.000	2.500	.500	16	6100	No	22.70

■ Spare Parts



insert screw

MS2260



in. lbs.

54



Torx driver

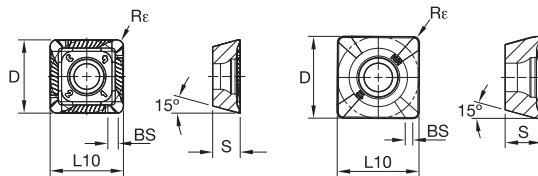
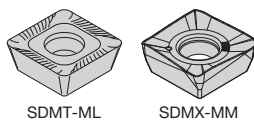
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■ **Insert Selection Guide**

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	.E..ML	TN6540	.S..MM	TN6540	.S..MH	TN6540
P3-P4	.E..ML	TN7535	.S..MM	TN6540	.S..MH	TN6540
P5-P6	.E..ML	TN7535	.S..MM	TN6540	.S..MH	TN6540
M1-M2	.E..ML	TN6540	.S..MM	TN6540	.S..MH	TN6540
M3	.E..ML	TN7535	.S..MM	TN7535	.S..MH	TN7535
K1-K2	.E..ML	WK15CM	.E..ML	WK15CM	.S..MH	WK15CM
K3	.E..ML	WK15CM	.S..MM	WK15CM	.S..MH	WK15CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	.E..ML	TN6540	.S..MM	TN6540	.S..MM	TN6540
S3	.E..ML	TN6540	.S..MM	TN6540	.S..MM	TN6540
S4	.E..ML	TN6540	.S..MM	TN6540	.S..MM	TN6540
H1	.S..MM	TN6540	.S..MM	TN6540	.S..MM	TN6540

Shoulder Mills

Inserts • SD1506..



● first choice  
○ alternate choice

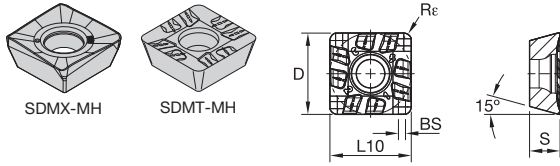
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M	●	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○

■ **SDMT-ML**

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN2510	TN6540	TN7525	TN7535	WK15CM
SDMT1506PDRML	4	.625	.625	.249	.043	.047	.003	●	○	○	○	○

■ **SDMX-MM**

catalog number	cutting edges	D	L10	S	BS	Re	hm	TN2510	TN6540	TN7525	TN7535	WK15CM
SDMX150612RMM	4	.625	.625	.250	.057	.047	.006	○	○	○	○	○



● first choice  
○ alternate choice

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M	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
K	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
N	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
S	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

■ SDMX-MH

catalog number	cutting edges	D	L10	S	BS	Re	hm
SDMX150612RMH	4	.625	.625	.250	.057	.047	.008
SDMX150616RMH	4	.625	.625	.250	.059	.063	.008

■ SDMT-MH

catalog number	cutting edges	D	L10	S	BS	Re	hm
SDMT1506PDRMH	4	.625	.625	.250	.043	.047	.008

TN2510	TN6540	TN7525	TN7535	WK15CM
3949811	3950585	3950583	3950584	5427426
2028325	2030414	2030400	5427424	
3378676				

Shoulder Mills



■ Recommended Starting Speeds [SFM]

Material Group		TN2510			TN6540			TN7525			TN7535			WK15CM		
P	1	-	-	-	985	<b>770</b>	655	1115	<b>855</b>	770	1490	<b>1295</b>	1215	-	-	-
	2	-	-	-	690	<b>525</b>	460	855	<b>690</b>	590	920	<b>835</b>	755	-	-	-
	3	-	-	-	590	<b>460</b>	375	770	<b>590</b>	510	835	<b>755</b>	670	-	-	-
	4	-	-	-	490	<b>360</b>	295	640	<b>460</b>	395	625	<b>575</b>	525	-	-	-
	5	-	-	-	655	<b>490</b>	410	855	<b>640</b>	540	855	<b>755</b>	690	-	-	-
	6	-	-	-	445	<b>330</b>	280	560	<b>445</b>	360	525	<b>445</b>	360	-	-	-
M	1	-	-	-	360	<b>215</b>	165	670	<b>605</b>	510	670	<b>605</b>	510	-	-	-
	2	-	-	-	215	<b>130</b>	115	605	<b>525</b>	460	605	<b>525</b>	460	-	-	-
	3	-	-	-	230	<b>130</b>	115	475	<b>425</b>	375	475	<b>425</b>	375	-	-	-
K	1	1150	<b>985</b>	820	605	<b>560</b>	490	1035	<b>770</b>	655	970	<b>870</b>	785	1380	<b>1265</b>	1115
	2	985	<b>820</b>	690	475	<b>425</b>	375	885	<b>655</b>	540	770	<b>690</b>	625	1100	<b>970</b>	900
	3	820	<b>690</b>	540	425	<b>395</b>	345	655	<b>540</b>	460	640	<b>575</b>	525	920	<b>820</b>	755
N	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	130	<b>100</b>	80	-	-	-	-	-	-	-	-	-
	2	-	-	-	65	<b>50</b>	35	-	-	-	-	-	-	-	-	-
	3	-	-	-	195	<b>115</b>	80	-	-	-	-	-	-	-	-	-
	4	-	-	-	165	<b>80</b>	65	-	-	-	-	-	-	-	-	-
H	1	380	<b>300</b>	195	-	-	-	-	-	-	-	-	-	-	-	-
	2	380	<b>300</b>	195	-	-	-	-	-	-	-	-	-	-	-	-
	3	280	<b>210</b>	150	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Shoulder Mills

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
.E..ML	.007	<b>.019</b>	.032	.005	<b>.014</b>	.023	.004	<b>.010</b>	.017	.003	<b>.009</b>	.015	.003	<b>.008</b>	.014	.E..ML
.S..MM	.008	<b>.021</b>	.035	.006	<b>.015</b>	.025	.004	<b>.011</b>	.019	.004	<b>.010</b>	.016	.003	<b>.009</b>	.015	.S..MM
.S..MH	.009	<b>.023</b>	.037	.007	<b>.017</b>	.027	.005	<b>.013</b>	.020	.004	<b>.011</b>	.017	.004	<b>.010</b>	.016	.S..MH

NOTE: Use "Light Machining" value as starting feed rate.



## **Indexable Milling • Slotting Mills**

<b>M16 • T-Slotting Platform.....</b>	<b>J2–J7</b>
<b>M94 • Precise Slotting and Grooving .....</b>	<b>J8–J14</b>
<b>M95 • Square Style Insert Slotting Platform .....</b>	<b>J16–J21</b>
<b>M900 • Adjustable Slotting Platform .....</b>	<b>J22–J33</b>



Reliable, Powerful, and Durable Milling Tools •

## M16 Series T-Slotting Mills

# M16

Designed for maximum chip evacuation and optimum security, the M16 Series Slotting Mills are an excellent choice for T-slot milling of steel and cast iron.

- Strong and sturdy tool design ensures reliable steel and cast iron machining, time after time.
- Maximum chip evacuation streamlines your most challenging milling operations.



Excellent T-slot mill for steel and cast iron.

Strong tool design for optimum security.

Designed for maximum chip evacuation.

**Slotting Mills**

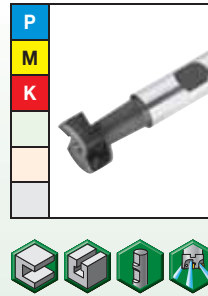


M16

Slot Width Range:  
11–21,9mm

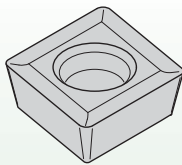
Indexes per insert: 2  
Diameter: 25–50mm

Pages: J4–J7



*These products are available for metric only.*

**■ Insert Offering**



Inserts with positive chipbreaker providing low cutting forces.

**T-Slotting**

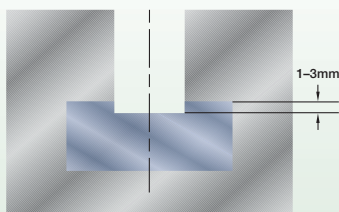
**Steel**

- If machining a vertical slot, minimize depth; reference Figure 1. If the depth is greater than Figure 1, chip evacuation problems could occur.
- Vibrations could occur when the T-slot cutter diameter increases; use Figure 1 as the starting point. If vibrations are a concern, adopt the Figure 2 solution.

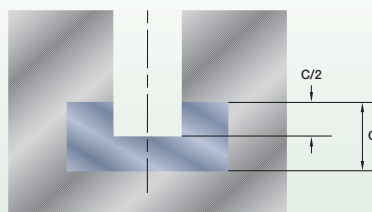
**Cast Iron**

- Fewer problems with chip evacuation and reduced cutting forces enable deeper vertical slots as shown in Figures 2 and 3.

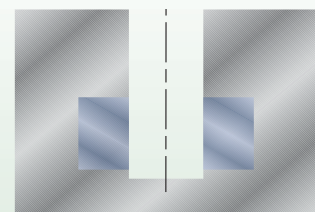
**Figure 1**



**Figure 2**

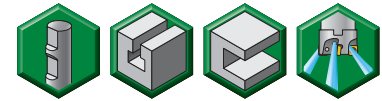


**Figure 3**

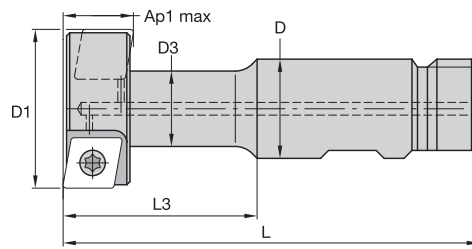


*NOTE: Air blast is recommended to disperse the chips.*

These products are available for metric only.



- T-slot mill.
- Ideal for steel and cast iron machining.



Slotting Mills

■ Weldon Shanks

order number	catalog number	D1	D	D3	L	L3	Ap1 max	Z	Z U	insert 1	coolant supply	kg
2021380	12391602600M	25	16	13	80	32	11,0	4	2	CPNT060204T	Yes	0,1
2021381	12391603000	32	16	15	90	42	13,9	4	2	CPNT080308T	Yes	0,2
2021382	12391603400	40	25	19	105	49	17,9	4	2	CPNT09T308T	Yes	0,4
2021383	12391603800	50	32	25	120	60	21,9	4	2	CPNT120408T	Yes	0,7

NOTE: Z = number of pocket seats.  
ZU = number of effective teeth.

■ Spare Parts



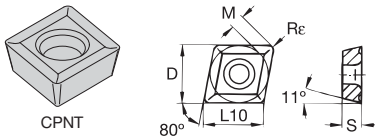
D1	insert screw	Nm	Torx driver	Torx wrench
25	12148068700	1,0	—	12148086600
32	12148067200	2,0	—	12148086600
40	12148038800	3,0	—	12148000600
50	12148007200	4,0	12148007500	—

■ **Insert Selection Guide**

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	CPNT	WP40PM	CPNT	WP40PM	CPNT	WP40PM
P3-P4	CPNT	WP35CM	CPNT	WP35CM	CPNT	WP35CM
P5-P6	CPNT	WP35CM	CPNT	WP40PM	CPNT	WP40PM
M1-M2	CPNT	WP40PM	CPNT	WP40PM	CPNT	WP40PM
M3	CPNT	TN7535	CPNT	WP35CM	CPNT	WP35CM
K1-K2	CPNT	WK15CM	CPNT	WK15CM	CPNT	WK15CM
K3	CPNT	WK15CM	CPNT	WP35CM	CPNT	WP35CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	-	-	-	-
S3	-	-	-	-	-	-
S4	-	-	-	-	-	-
H1	-	-	-	-	-	-

Slotting Mills

*These products are available for metric only.*



- first choice
- alternate choice

P	●	●		
M	○	●		
K	●	○		
N				
S			○	
H				

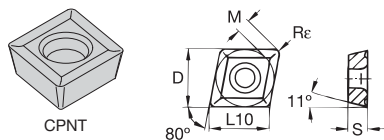
■ **CPNT • CP0602..**

catalog number	cutting edges	D	L10	M	S	Re	hm	WK15CM	WP35CM	WP40PM
CPNT060204T	2	6,35	6,45	1,54	2,38	0,40	0,03	5903680	5903676	5578222

■ **CPNT • CP0803..**

catalog number	cutting edges	D	L10	M	S	Re	hm	WK15CM	WP35CM	WP40PM
CPNT080308T	2	7,94	8,06	1,76	3,18	0,80	0,09	5903701	5903677	-

These products are available for metric only.



● first choice  
○ alternate choice

P	●	○	○
M	●	○	○
K	●	○	○
N	○	○	○
S	○	○	○
H	○	○	○

■ CPNT • CP09T3..

catalog number	cutting edges	D	L10	M	S	Re	hm	WK15CM	WP35CM	WP40PM
CPNT09T308T	2	9,52	9,67	2,20	3,97	0,80	0,04	5903702	5903678	-

■ CPNT • CP1204..

catalog number	cutting edges	D	L10	M	S	Re	hm	WK15CM	WP35CM	WP40PM
CPNT120408T	2	12,70	12,90	3,08	4,76	0,80	0,03	5903703	5903679	-

Slotting Mills



**Recommended Starting Speeds [m/min]**

Material Group		WK15CM			WP35CM			WP40PM		
P	0	-	-	-	455	<b>395</b>	370	295	<b>260</b>	245
	1	-	-	-	455	<b>395</b>	370	295	<b>260</b>	245
	2	-	-	-	280	<b>255</b>	230	250	<b>215</b>	180
	3	-	-	-	255	<b>230</b>	205	230	<b>195</b>	160
	4	-	-	-	190	<b>175</b>	160	205	<b>170</b>	135
	5	-	-	-	260	<b>230</b>	210	170	<b>155</b>	135
	6	-	-	-	160	<b>135</b>	110	150	<b>115</b>	90
M	1	-	-	-	205	<b>185</b>	155	195	<b>170</b>	155
	2	-	-	-	185	<b>160</b>	140	175	<b>150</b>	125
	3	-	-	-	145	<b>130</b>	115	130	<b>115</b>	90
K	1	420	<b>385</b>	340	295	<b>265</b>	240	-	-	-
	2	335	<b>295</b>	275	235	<b>210</b>	190	-	-	-
	3	280	<b>250</b>	230	195	<b>175</b>	160	-	-	-
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	40	<b>35</b>	30
	2	-	-	-	-	-	-	40	<b>35</b>	30
	3	-	-	-	-	-	-	50	<b>40</b>	30
	4	-	-	-	66	<b>50</b>	33	65	<b>50</b>	35
H	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
 As the average chip thickness increases, the speed should be decreased.

Slotting Mills

**Recommended Starting Feeds**
**Recommended Starting Feeds [mm]**

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
CPNT	0,12	<b>0,29</b>	0,46	0,09	<b>0,21</b>	0,33	0,07	<b>0,16</b>	0,25	0,06	<b>0,14</b>	0,22	0,05	<b>0,13</b>	0,20	CPNT
CPNT	0,12	<b>0,29</b>	0,46	0,09	<b>0,21</b>	0,33	0,07	<b>0,16</b>	0,25	0,06	<b>0,14</b>	0,22	0,05	<b>0,13</b>	0,20	CPNT
CPNT	0,12	<b>0,29</b>	0,46	0,08	<b>0,21</b>	0,33	0,06	<b>0,16</b>	0,25	0,06	<b>0,14</b>	0,22	0,05	<b>0,13</b>	0,20	CPNT
CPNT	0,12	<b>0,35</b>	0,58	0,08	<b>0,25</b>	0,42	0,06	<b>0,19</b>	0,32	0,06	<b>0,16</b>	0,28	0,05	<b>0,15</b>	0,25	CPNT

NOTE: Use "Light Machining" value as starting feed rate.

For Precise Slotting and Grooving Applications •

## M94 Series Slotting Mills

# M94



The M94 Series Slotting Mills are equipped with three cutting edges per insert and precise cooling capabilities for the most demanding small width slotting and grooving operations.

- Coolant grooves provide accurate and consistent cooling performance.
- Perfect choice when shallow grooving and slotting are required.
- Tangential mounted inserts ensure maximum strength and stability.



## Slotting Mills



M94

Slot Width Range:  
1,93–5,23mm

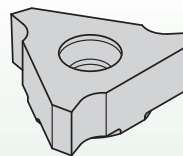
Indexes per insert: 3  
Diameter: 25–80mm

Pages: J10–J14



*These products are available for metric only.*

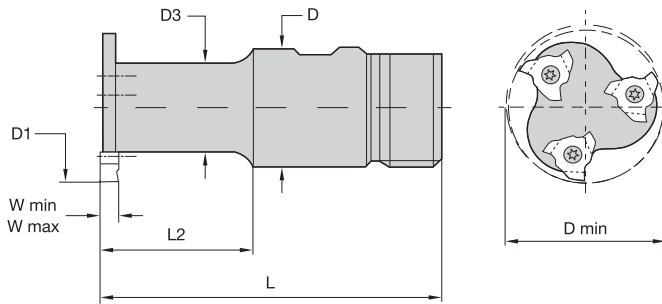
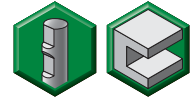
## ■ Insert Offering



Inserts with free-cutting  
geometry providing  
low cutting forces.

These products are available for metric only.

- Three cutting edges per insert.
- Tangential mounted inserts.
- Shallow grooving and slotting.



Slotting Mills

■ Weldon Shanks

order number	catalog number	D1	D	D3	D min	L	L2	W min	W max	Z	insert 1	coolant supply	kg
2022619	12290900800	25	25	21	34	100	44	1,93	2,73	3	TCAX1103ZZ..	No	0,4
2022620	12290901200	40	32	32	65	110	50	2,73	4,26	3	TNAX1604ZZ..	No	0,7

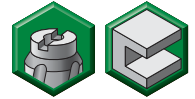
NOTE: D min = minimum internal hole diameter required for clearance.

■ Spare Parts

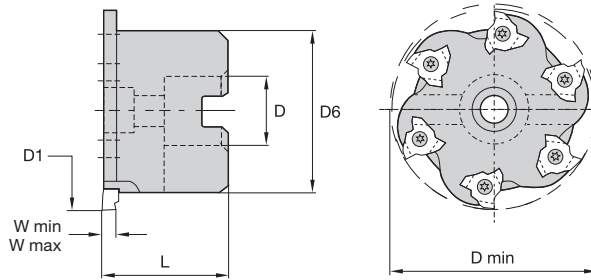


D1	insert screw	Nm	Torx driver
25	12148080000	1,0	12148086600
40	12148067200	3,5	12148086600

*These products are available for metric only.*



- Three cutting edges per insert.
- Tangential mounted inserts.
- Shallow grooving and slotting.



Slotting Mills

■ **Shell Mills**

order number	catalog number	D1	D	D min	D6	L	W min	W max	Z	insert 1	coolant supply	kg
2022621	12290911600	63	22	85	55	40	2,73	4,26	6	TNAX1604ZZ..	No	0,7
2022622	12290911800	80	27	102	68	50	4,26	5,23	6	TNAX2206ZZ..	No	1,3

NOTE: D min = minimum internal hole diameter required for clearance.

■ **Spare Parts**



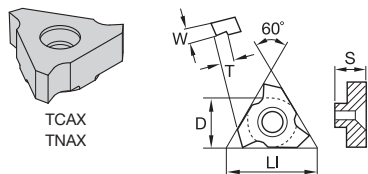
D1	insert screw	Nm	Torx driver
63	12148067200	3,5	12148086600
80	12148007200	6,0	12148007500

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08
P3-P4	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08
P5-P6	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08
M1-M2	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08
M3	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08
K1-K2	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08	TCAX/TNAX	TTM/TTM08
K3	TCAX/TNAX	THM	TCAX/TNAX	THM	TCAX/TNAX	THM
N1-N2	TCAX/TNAX	THM	TCAX/TNAX	THM	TCAX/TNAX	THM
N3	TCAX/TNAX	THM	TCAX/TNAX	THM	TCAX/TNAX	THM
S1-S2	TCAX/TNAX	THM	TCAX/TNAX	THM	TCAX/TNAX	THM
S3	TCAX/TNAX	THM	TCAX/TNAX	THM	TCAX/TNAX	THM
S4	TCAX/TNAX	THM	TCAX/TNAX	THM	TCAX/TNAX	THM
H1	-	-	-	-	-	-

Slotting Mills

These products are available for metric only.



● first choice  
○ alternate choice

P	●	●		
M	○	○		
K	○	○	○	○
N	●			
S	○			
H				

■ TCAX • 1103..

catalog number	cutting edges	D	LI	W	T	S	hm	THM	TTM	TTM08
TCAX1103ZZ18	3	6,35	11,00	1,93	2,10	3,20	0,07			2014041
TCAX1103ZZ21	3	6,35	11,00	2,23	2,25	3,20	0,07	2026017		2026018
TCAX1103ZZ26	3	6,35	11,00	2,73	2,35	3,20	0,07	2014054	2014056	

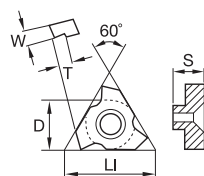
■ TNAX • 1604..

catalog number	cutting edges	D	LI	W	T	S	hm	THM	TTM	TTM08
TNAX1604ZZ26	3	9,52	16,49	2,73	3,08	4,76	0,07	2014152		2014164
TNAX1604ZZ31	3	9,52	16,49	3,26	3,04	4,76	0,07	2014166		2014168
TNAX1604ZZ41	3	9,52	16,49	4,26	3,32	4,76	0,07	2014170	2014172	

*These products are available for metric only.*



TNAX



- first choice
- alternate choice

P	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

■ TNAX • 2206..

catalog number	cutting edges	D	LI	W	T	S	hm	THM	TTM	TTM08
TNAX2206ZZ41	3	12,70	22,00	4,26	4,02	6,40	0,07	-	2014176	-
TNAX2206ZZ51	3	12,70	22,00	5,23	4,43	6,40	0,07	-	2026022	-



Slotting Mills

■ Recommended Starting Speeds [m/min]

Material Group		THM			TTM/TTM08		
P	1	-	-	-	560	490	460
	2	-	-	-	345	280	245
	3	-	-	-	345	280	245
	4	-	-	-	280	195	180
	5	-	-	-	360	280	260
	6	-	-	-	165	130	115
M	1	-	-	-	330	195	130
	2	-	-	-	195	115	80
	3	-	-	-	215	130	100
K	1	395	295	245	-	-	-
	2	410	330	230	-	-	-
	3	425	310	195	-	-	-
N	1	2950	1970	1640	-	-	-
	2	2245	1525	1265	-	-	-
	3	1475	920	655	-	-	-
S	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-
	4	-	-	-	-	-	-
H	1	-	-	-	-	-	-
	2	-	-	-	-	-	-
	3	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
TCAX/TNAX	0,12	<b>0,29</b>	0,45	0,08	<b>0,21</b>	0,33	0,06	<b>0,16</b>	0,25	0,06	<b>0,14</b>	0,21	0,05	<b>0,13</b>	0,20	TCAX/TNAX

NOTE: Use "Light Machining" value as starting feed rate.



## Easy Access to Proven Metalworking Expertise!

WIDIA™ Customer Application Engineers assist customers and engineering groups throughout the world with expert tool selection and application recommendations for the entire range of WIDIA tooling.

# Customer Application Support (CAS)

EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

ORIGINATING COUNTRY	LANGUAGE	TEL	FAX	EMAIL
Australia	English	+61 001 724 539 6921 *	001 724 539 6830 *	ap.techsupport@widia.com
Austria	German	0800 291630	0049 911 9735 429*	eu.techsupport@widia.com
Belgium	English / French	0800 80410	0049 911 9735 429*	eu.techsupport@widia.com
China	Chinese	+86 400 889 2237	+86 21 58999985 *	w-cn.techsupport@widia.com
Denmark	English	+45 808 89295	001 724 539 6830 *	na.techsupport@widia.com
Finland	English	0800 919413	001 724 539 6830 *	na.techsupport@widia.com
France	French	+33 080 5540 379	0049 911 9735 429*	eu.techsupport@widia.com
Germany	German	0800 1015774	0911 9735 429*	eu.techsupport@widia.com
India	English	+91 001 724539 6921 *	001 724 539 6830 *	ap.techsupport@widia.com
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Italy	Italian	800 916568	02 89512146 *	eu.techsupport@widia.com
Japan	English	+81 001 724539 6921 *	001 724 539 6830 *	ap.techsupport@widia.com
Korea (South)	English	+82 001 724539 6921 *	001 724 539 6830 *	ap.techsupport@widia.com
Malaysia	English	+60 001 724539 6921 *	001 724 539 6830 *	ap.techsupport@widia.com
Netherlands	English	0800 0201131	001 724 539 6830 *	na.techsupport@widia.com
New Zealand	English	+64 001 724539 6921 *	001 724 539 6830 *	ap.techsupport@widia.com
Norway	English	800 10081	001 724 539 6830 *	na.techsupport@widia.com
Poland	Polish	00800 4411943	06166 56504*	eu.techsupport@widia.com
Russia (landline)	Russian	+7 8800 5556395	0048 6166 56504*	eu.techsupport@widia.com
Russia (cell phone)	Russian	+7 8005556395	0048 6166 56504*	eu.techsupport@widia.com
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South Africa	English	+27 0800 981644	001 724 539 6830 *	na.techsupport@widia.com
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Thailand	English	+66 001 724539 6921 *	001 724 539 6830 *	ap.techsupport@widia.com
United Kingdom	English	+44 0800 028 2996	001 724 539 6830 *	na.techsupport@widia.com
Ukraine	Russian	+380 0800502665	0048 6166 56504*	eu.techsupport@widia.com
USA	English	888 539 5145	001 724 539 6830 *	na.techsupport@widia.com

Phone and fax numbers marked with \* are not toll free.

For more information, contact your local WIDIA  
Authorized Distributor or visit [widia.com/services](http://widia.com/services).

**WIDIA** 

## M95 Series Slotting Mills

# M95



M95 slotting cutters are ideal for deeper applications that require the cutting load to be shared from one insert to the other. They provide groove widths from 4–10mm and cutter diameters from 100–200mm as well as an economical way to achieve balanced cutting.

### Features and Benefits

- Cutters available in arbor mount.
- Inserts with four indexes.
- Staggered keyways in mounting bore, used for multiple ganged cutters.
- Slot width 4–10mm.
- Three insert geometries available; SNHX in 11 and 12mm iC.
- Requires only one spare part.
- Economical to use.
- Available in Latest WIDIA™ Victory™ Grade.

## Slotting Mills

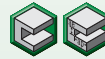
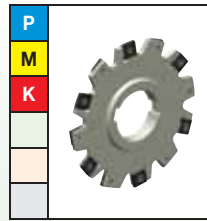


M95

Slot Width Range:  
4–10mm

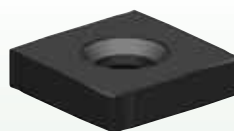
Indexes per insert: 4  
Diameter: 100–200mm

Pages: J18–J21



*These products are available for metric only.*

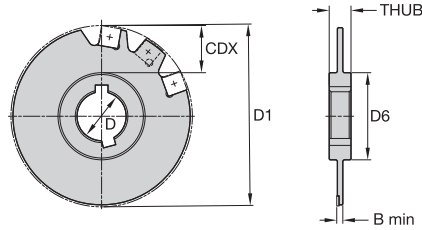
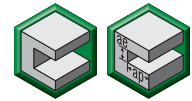
### ■ Insert Offering



**SNHX**

Inserts with free-cutting  
geometry providing  
low cutting forces.

These products are available for metric only.



Slotting Mills

■ M95

order number	catalog number	D1	D	D6	B min	CDX	THUB	Z	Z S	coolant supply	kg
2016502	12299510400	100	27	48	4	26,0	12,0	12	6	No	0,3
2016514	12299515500	100	27	48	5	26,0	12,0	12	6	No	0,3
2016516	12299515600	100	27	48	6	26,0	12,0	10	5	No	0,3
2016518	12299515700	100	27	48	7	26,0	12,0	9	3	No	0,3
2016520	12299515800	100	27	48	8	26,0	12,0	9	3	No	0,4
2016524	12299520400	125	40	58	4	91,5	12,0	14	7	No	0,4
2016526	12299525500	125	40	58	5	91,5	12,0	14	7	No	0,4
2016528	12299525600	125	40	58	6	91,5	12,0	12	6	No	0,5
2016530	12299525700	125	40	58	7	91,5	12,0	12	4	No	0,5
2016532	12299525800	125	40	58	8	91,5	12,0	12	4	No	0,6
2016544	12299526000	125	40	58	10	91,5	12,0	12	6	No	0,6
2016547	12299530400	160	40	68	4	114,0	12,0	18	9	No	0,7
2022648	12299535500	160	40	68	5	114,0	12,0	18	9	No	0,7
2016551	12299535600	160	40	68	6	114,0	12,0	16	8	No	1,0
2016555	12299535800	160	40	68	8	114,0	12,0	15	5	No	1,1
2022650	12299536000	160	40	68	10	114,0	12,0	16	8	No	1,2
2016562	12299546000	200	22	72	10	136,0	12,0	18	9	No	1,9
2022652	12299545800	200	50	72	8	136,0	12,0	18	6	No	1,6

■ Spare Parts

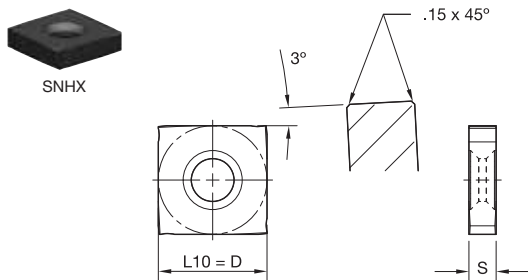


D1	B min	insert screw	Nm	wrench	bushing
100	4	12147548500	1,2	170.023	—
100	5	12147562300	1,2	170.023	12147676800
100	6	12147548600	5,0	170.025	12147676900
100	7	12147548600	5,0	170.025	12147676900
100	8	12147548600	5,0	170.025	12147676900
125	4	12147548500	1,2	170.023	—
125	5	12147562300	1,2	170.023	12147676800
125	6	12147548600	5,0	170.025	12147676900
125	7	12147548600	5,0	170.025	12147676900
125	8	12147548600	5,0	170.025	12147676900
125	10	12147572400	5,0	170.025	12147677000
160	4	12147548500	1,2	170.023	—
160	5	12147562300	1,2	170.023	12147676800
160	6	12147548600	5,0	170.025	12147676900
160	8	12147548600	5,0	170.025	12147676900
160	10	12147572400	5,0	170.025	12147677000
200	8	12147548600	5,0	170.025	12147676900
200	10	12147572400	5,0	170.025	12147677000

■ **Insert Selection Guide**

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	SNHX	WP40PM	SNHX	WP40PM	SNHX	WP40PM
P3-P4	SNHX	WP35CM	SNHX	WP35CM	SNHX	WP35CM
P5-P6	SNHX	WP35CM	SNHX	WP35CM	SNHX	WP35CM
M1-M2	SNHX	WP40PM	SNHX	WP40PM	SNHX	WP40PM
M3	SNHX	WP35CM	SNHX	WP35CM	SNHX	WP35CM
K1-K2	SNHX	WK15CM	SNHX	WK15CM	SNHX	WK15CM
K3	SNHX	WP35CM	SNHX	WP35CM	SNHX	WP35CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	-	-	-	-
S3	-	-	-	-	-	-
S4	-	-	-	-	-	-
H1	-	-	-	-	-	-

Slotting Mills



● first choice  
○ alternate choice

P	●	○	○	○
M	○	○	○	○
K	○	○	○	○
N	○	○	○	○
S	○	○	○	○
H	○	○	○	○

■ **SNHX • 12,7mm iC**

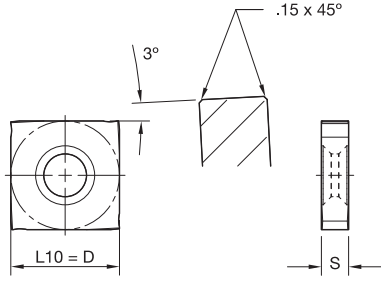
catalog number	cutting edges	D	L10	S	hm	WK15CM	WP35CM	WP40PM
123506601	4	12,70	12,70	3,18	0,08	5903650	5903674	5903646

■ **SNHX • 11mm iC**

catalog number	cutting edges	D	L10	S	hm	WK15CM	WP35CM	WP40PM
123506599	4	11,00	11,00	2,38	0,08	5903648	5903672	5903644



SNHX



● first choice  
○ alternate choice

P	●	●
M	○	●
K	●	○
N	○	○
S	○	○
H		

■ SNHX • 11mm iC

catalog number	cutting edges	D	L10	S	hm		
123506600	4	11,00	11,00	2,70	0,08	5903649	5903673

■ SNHX • 12,7mm iC

catalog number	cutting edges	D	L10	S	hm		
123506602	4	12,70	12,70	5,40	0,08	5903671	5903647

Slotting Mills

■ Recommended Starting Speeds [m/min]

Material Group		WK15CM			WP35CM			WP40PM		
P	0	-	-	-	455	<b>395</b>	370	295	<b>260</b>	245
	1	-	-	-	455	<b>395</b>	370	295	<b>260</b>	245
	2	-	-	-	280	<b>255</b>	230	250	<b>215</b>	180
	3	-	-	-	255	<b>230</b>	205	230	<b>195</b>	160
	4	-	-	-	190	<b>175</b>	160	205	<b>170</b>	135
	5	-	-	-	260	<b>230</b>	210	170	<b>155</b>	135
	6	-	-	-	160	<b>135</b>	110	150	<b>115</b>	90
M	1	-	-	-	205	<b>185</b>	155	195	<b>170</b>	155
	2	-	-	-	185	<b>160</b>	140	175	<b>150</b>	125
	3	-	-	-	145	<b>130</b>	115	130	<b>115</b>	90
K	1	420	<b>385</b>	340	295	<b>265</b>	240	-	-	-
	2	335	<b>295</b>	275	235	<b>210</b>	190	-	-	-
	3	280	<b>250</b>	230	195	<b>175</b>	160	-	-	-
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
	4	-	-	-	66	<b>50</b>	33	-	-	-
H	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Slotting Mills

Recommended Starting Feeds

■ Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
SNHX	0,12	<b>0,28</b>	0,71	0,08	<b>0,20</b>	0,51	0,06	<b>0,15</b>	0,38	0,06	<b>0,13</b>	0,33	0,05	<b>0,12</b>	0,30	SNHX

NOTE: Use "Light Machining" value as starting feed rate.

## WIDIA™ M900™ Series •

### Adjustable Slotting Cutters

The WIDIA M900 Series is a multipurpose slotting cutter with high-precision capability for numerous operations. The cutter is one of the most productive of its kind for slotting and for cut-off operations. Two keyways in the cutter provide wide slot options by mounting several cutters together in a gang-slotting style operation.

# M900



## Features

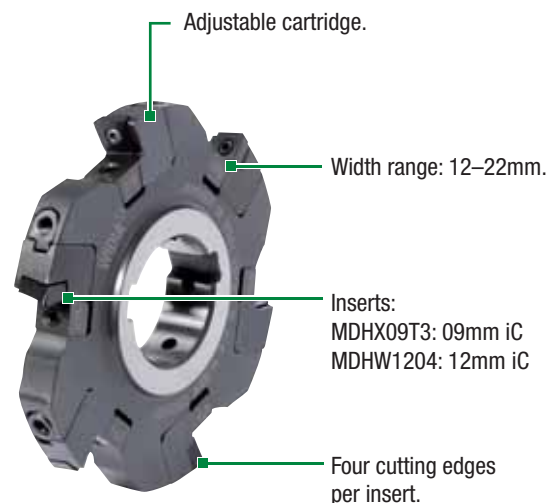
- Insert geometries and grades for various workpiece materials.
- Easy setting for desired width.
- Superior cartridge sliding mechanism.
- Available in arbor and shell mount.
- Two keyways for staggered slotting.
- Strong, reliable pocket seat.

## Benefits

- Wide range of slot width options.
- High accuracy of slots.
- Security/stability of cartridge cutter.
- Wide range of mounting options.
- Multiple slots by gang slotting.

## Application

- Full slotting.
- Half slotting (left and right styles).
- Gang slotting.
- Shoulder milling.
- Face milling.
- Back face milling.





## Slotting Mills



M900™

Slot Width Range:  
12–22mm

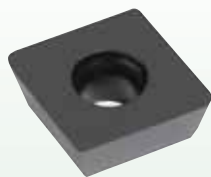
Indexes per insert: 2  
Diameter: 100–315mm

Pages: J24–J30

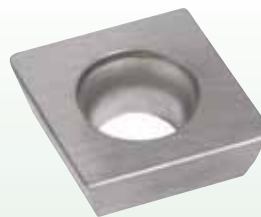


*These products are available for metric only.*

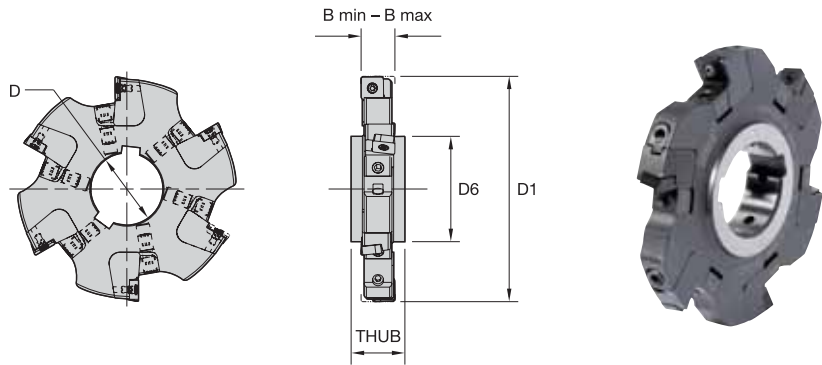
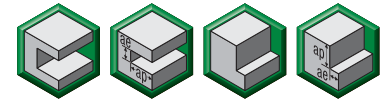
### ■ Insert Offering



**MDHX Geometry**  
iC 09mm



**MDHW Geometry**  
iC 12mm

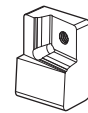


Slotting Mills

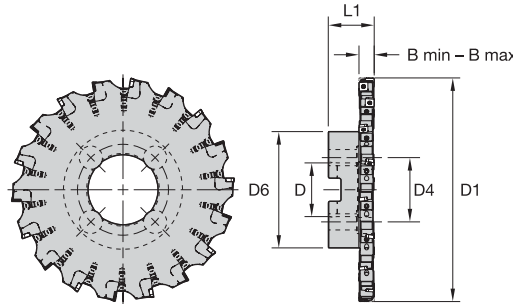
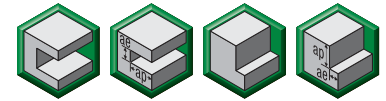
■ Arbor Mount • 9mm

order number	catalog number	D1	D	D6	B min	B max	THUB	Z	max RPM	coolant supply	kg
2003598	12399010200	100	32	48	12	14	16,0	6	7070	No	0,5
2067540	12399011400	100	32	48	14	16	16,0	6	7070	No	0,8
2003695	12399010400	125	40	58	12	14	16,0	8	6370	No	0,8
2003696	12399011600	125	40	58	14	16	16,0	8	6370	No	0,9
2003697	12399012800	125	40	58	16	18	20,0	8	6370	No	1,1
2003796	12399011800	160	40	58	14	16	16,0	10	5600	No	1,6
2003797	12399013000	160	40	58	16	18	20,0	10	5600	No	1,9
2065591	12399010800	200	50	72	12	14	16,0	12	5040	No	2,1
2003879	12399012000	200	50	72	14	16	16,0	12	5040	No	2,6
2003880	12399013200	200	50	72	16	18	20,0	12	5040	No	2,9
2067541	12399013400	250	50	72	16	18	20,0	16	4480	No	7,0
2116241	12399013600	315	60	84	16	18	20,0	20	3990	No	7,6

■ Spare Parts



D1	insert screw	Torx driver	STC screw	T-handle hex wrench	clamp wedge	cartridge left-hand	cartridge right-hand	adjusting wedge left-hand	adjusting wedge right-hand
100	12148067200	12749726100	12148574100	12148050000	12748307600	12748210100	12748210200	12748551100	12748551200
100	12148067200	12749726100	12148574100	12148050000	12748307600	12748210300	12748210400	12748551100	12748551200
125	12148067200	12749726100	12148574100	12148050000	12748307600	12748210100	12748210200	12748551100	12748551200
125	12148067200	12749726100	12148574100	12148050000	12748307600	12748210300	12748210400	12748551100	12748551200
125	12148067200	12749726100	12148574100	12148050000	12748307700	12748210500	12748210600	12748551100	12748551200
160	12148067200	12749726100	12148574100	12148050000	12748307600	12748210300	12748210400	12748551100	12748551200
160	12148067200	12749726100	12148574100	12148050000	12748307700	12748210500	12748210600	12748551100	12748551200
200	12148067200	12749726100	12148574100	12148050000	12748307600	12748210100	12748210200	12748551100	12748551200
200	12148067200	12749726100	12148574100	12148050000	12748307600	12748210300	12748210400	12748551100	12748551200
200	12148067200	12749726100	12148574100	12148050000	12748307700	12748210500	12748210600	12748551100	12748551200
250	12148067200	12749726100	12148574100	12148050000	12748307700	12748210500	12748210600	12748551100	12748551200
315	12148067200	12749726100	12148574100	12148050000	12748307700	12748210500	12748210600	12748551100	12748551200

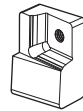


Slotting Mills

■ Shell Mount • 9mm

order number	catalog number	D1	D	D4	D6	B min	B max	L1	Z	max RPM	coolant supply	kg
2003602	12399111400	100	27	—	48	14	16	33,0	6	7070	No	0,8
2003700	12399110400	125	32	—	58	12	14	37,0	8	6370	No	1,1
2003701	12399111600	125	32	—	58	14	16	37,0	8	6370	No	1,2
2003702	12399112800	125	32	—	58	16	18	37,0	8	6370	No	1,4
2003800	12399110600	160	40	—	70	12	14	42,0	10	5600	No	1,8
2003801	12399111800	160	40	—	70	14	16	42,0	10	5600	No	2,1
2003802	12399113000	160	40	—	70	16	18	42,0	10	5600	No	2,3
2003897	12399110800	200	40	67	90	12	14	44,0	12	5040	No	3,0
2003898	12399112000	200	40	67	90	14	16	44,0	12	5040	No	3,3
2003899	12399113200	200	40	67	90	16	18	44,0	12	5040	No	3,7
2003997	12399113400	250	60	102	130	16	18	50,0	16	4480	No	7,0
2004095	12399113600	315	60	102	130	16	18	50,0	20	3990	No	9,7

■ Spare Parts



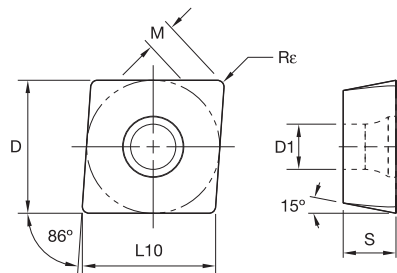
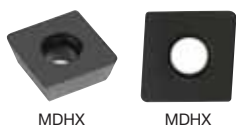
D1	insert screw	Torx driver	STC screw	T-handle hex wrench	clamp wedge	cartridge left-hand	cartridge right-hand	adjusting wedge left-hand	adjusting wedge right-hand
125	12148067200	12749726100	12148574100	12148050000	12748307600	12748210100	12748210200	12748551100	12748551200
100	12148067200	12749726100	12148574100	12148050000	12748307600	12748210300	12748210400	12748551100	12748551200
125	12148067200	12749726100	12148574100	12148050000	12748307600	12748210100	12748210200	12748551100	12748551200
125	12148067200	12749726100	12148574100	12148050000	12748307700	12748210500	12748210600	12748551100	12748551200
160	12148067200	12749726100	12148574100	12148050000	12748307600	12748210100	12748210200	12748551100	12748551200
160	12148067200	12749726100	12148574100	12148050000	12748307600	12748210300	12748210400	12748551100	12748551200
160	12148067200	12749726100	12148574100	12148050000	12748307700	12748210500	12748210600	12748551100	12748551200
200	12148067200	12749726100	12148574100	12148050000	12748307600	12748210100	12748210200	12748551100	12748551200
200	12148067200	12749726100	12148574100	12148050000	12748307600	12748210300	12748210400	12748551100	12748551200
200	12148067200	12749726100	12148574100	12148050000	12748307700	12748210500	12748210600	12748551100	12748551200
250	12148067200	12749726100	12148574100	12148050000	12748307700	12748210500	12748210600	12748551100	12748551200
315	12148067200	12749726100	12148574100	12148050000	12748307700	12748210500	12748210600	12748551100	12748551200

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	MDHX	WP40PM	MDHX	WP40PM	MDHX	WP40PM
P3-P4	MDHX	WP35CM	MDHX	WP35CM	MDHX	WP35CM
P5-P6	MDHX	WP35CM	MDHX	WP40PM	MDHX	WU35PM
M1-M2	MDHX	WP25PM	MDHX	WP25PM	MDHX	WU35PM
M3	MDHX	WP35CM	MDHX	WP40PM	MDHX	WU35PM
K1-K2	MDHX	WK15CM	MDHX	WK15CM	MDHX	WK15CM
K3	MDHX	WK15CM	MDHX	WP35CM	MDHX	WP35CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	MDHX	WP25PM	MDHX	WU35PM	MDHX	WU35PM
S3	MDHX	WU35PM	MDHX	WU35PM	MDHX	WU35PM
S4	MDHX	WP25PM	MDHX	WU35PM	MDHX	WU35PM
H1	-	-	-	-	-	-

Slotting Mills

Inserts • MDH..



● first choice  
○ alternate choice

P	●	●	●	●
M	●	●	○	●
K	●	○	○	○
N	○	○	○	○
S	○	○	○	○
H	○	○	○	○

■ MDHX

catalog number	cutting edges	D	D1	L10	M	S	Rε	WK15CM	WP25PM	WU35PM	WP35CM	WP40PM
MDHX09T308	2	9,53	3,40	9,55	1,85	3,97	0,80	5903706	5903722	5903710	5903708	5903704

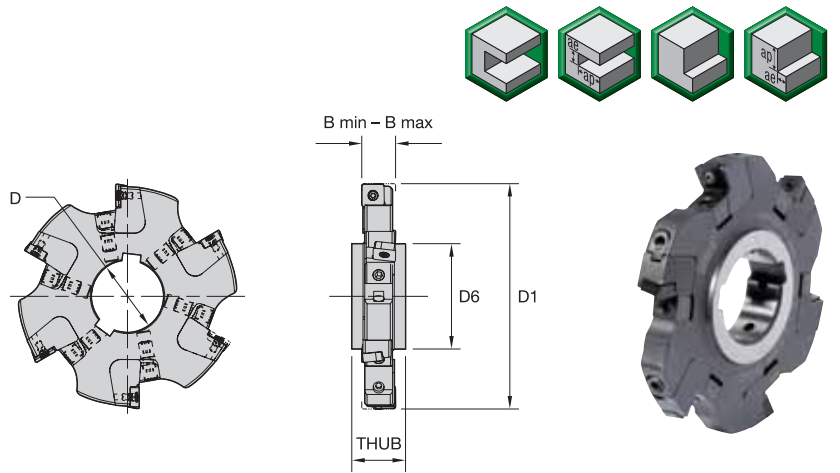
Recommended Starting Feeds

■ Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MDHX	0,12	0,23	0,46	0,08	0,17	0,33	0,06	0,13	0,25	0,06	0,11	0,22	0,05	0,10	0,20	MDHX

NOTE: Use "Light Machining" value as starting feed rate.



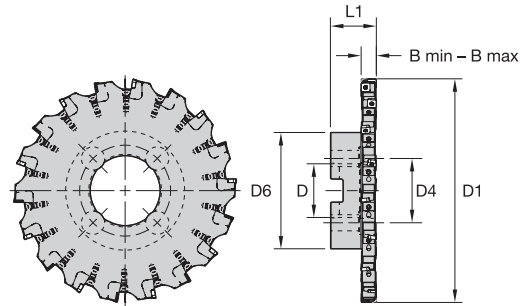
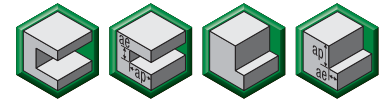
Slotting Mills

■ Arbor Mount • 12mm

order number	catalog number	D1	D	D6	B min	B max	THUB	Z	max RPM	coolant supply	kg
2003881	12399014400	200	50	72	18	20	20,0	12	5040	No	3,2
2003882	12399015600	200	50	72	20	22	24,0	12	3990	No	3,7
2003993	12399014600	250	50	72	18	20	20,0	16	4480	No	5,1
2003994	12399015800	250	50	72	20	22	24,0	16	3570	No	5,9
2004081	12399014800	315	60	84	18	20	20,0	20	3990	No	8,1
2004082	12399016000	315	60	84	20	22	24,0	20	3220	No	9,4

■ Spare Parts

D1	insert screw	Torx driver	STC screw	T-handle hex wrench	clamp wedge	cartridge left-hand	cartridge right-hand	adjusting wedge left-hand	adjusting wedge right-hand
200	12748605300	12749723200	12148574100	12148050000	12748307700	12748210700	12748210800	12748551100	12748551200
200	12748605300	12749723200	12148574100	12148050000	12748307800	12748210900	12748211000	12748551100	12748551200
250	12748605300	12749723200	12148574100	12148050000	12748307700	12748210700	12748210800	12748551100	12748551200
250	12748605300	12749723200	12148574100	12148050000	12748307800	12748210900	12748211000	12748551100	12748551200
315	12748605300	12749723200	12148574100	12148050000	12748307700	12748210700	12748210800	12748551100	12748551200
315	12748605300	12749723200	12148574100	12148050000	12748307800	12748210900	12748211000	12748551100	12748551200



Slotting Mills

■ Shell Mount • 12mm

order number	catalog number	D1	D	D4	D6	B min	B max	L1	Z	max RPM	coolant supply	kg
2003900	12399114400	200	40	67	90	18	20	44,8	12	5040	No	3,8
2003901	12399115600	200	40	67	90	20	22	46,0	12	3990	No	4,3
2003998	12399114600	250	60	102	130	18	20	51,8	16	4480	No	7,2
2003999	12399115800	250	60	102	130	20	22	53,0	16	3570	No	7,9
2004096	12399114800	315	60	102	130	18	20	51,8	20	3990	No	10,2
2004097	12399116000	315	60	102	130	20	22	53,0	20	3220	No	11,3

■ Spare Parts

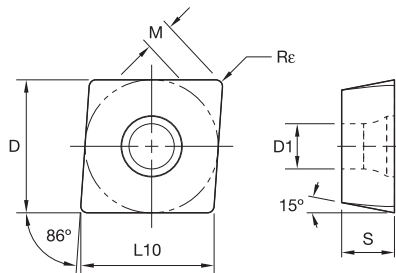
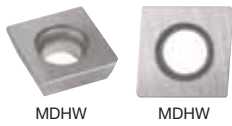
D1	insert screw	Torx driver	STC screw	T-handle hex wrench	clamp wedge	cartridge left-hand	cartridge right-hand	adjusting wedge left-hand	adjusting wedge right-hand
200	12748605300	12749723200	12148574100	12148050000	12748307700	12748210700	12748210800	12748551100	12748551200
200	12748605300	12749723200	12148574100	12148050000	12748307800	12748210900	12748211000	12748551100	12748551200
250	12748605300	12749723200	12148574100	12148050000	12748307700	12748210700	12748210800	12748551100	12748551200
250	12748605300	12749723200	12148574100	12148050000	12748307800	12748210900	12748211000	12748551100	12748551200
315	12748605300	12749723200	12148574100	12148050000	12748307700	12748210700	12748210800	12748551100	12748551200
315	12748605300	12749723200	12148574100	12148050000	12748307800	12748210900	12748211000	12748551100	12748551200

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	MDHW	WP40PM	MDHW	WP40PM	MDHW	WP40PM
P3-P4	MDHW	WP35CM	MDHW	WP35CM	MDHW	WP35CM
P5-P6	MDHW	WP35CM	MDHW	WP40PM	MDHW	WU35PM
M1-M2	MDHW	WP25PM	MDHW	WP25PM	MDHW	WU35PM
M3	MDHW	WP35CM	MDHW	WP40PM	MDHW	WU35PM
K1-K2	MDHW	WK15CM	MDHW	WK15CM	MDHW	WK15CM
K3	MDHW	WK15CM	MDHW	WP35CM	MDHW	WP35CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	MDHW	WP25PM	MDHW	WU35PM	MDHW	WU35PM
S3	MDHW	WU35PM	MDHW	WU35PM	MDHW	WU35PM
S4	MDHW	WP25PM	MDHW	WU35PM	MDHW	WU35PM
H1	-	-	-	-	-	-

Slotting Mills

Inserts • MDH..



● first choice  
○ alternate choice

P	●	●	●	●
M	●	●	○	●
K	●	○	○	○
N	○	○	○	○
S	●	●	○	○
H	○	○	○	○

■ MDHW

catalog number	cutting edges	D	D1	L10	M	S	Rε	5903707	5903723	5903721	5903709	5903705
MDHW120408	2	12,70	5,50	12,73	2,58	4,76	0,80	WK15CM	WP25PM	WU35PM	WP35CM	WP40PM

■ Recommended Starting Speeds [m/min]

Slotting Mills

Material Group		WK15CM			WP25PM			WU35PM			WP35CM			WP40PM		
P	0	-	-	-	330	<b>285</b>	270	260	<b>230</b>	215	455	<b>395</b>	370	295	<b>260</b>	245
	1	-	-	-	330	<b>285</b>	270	260	<b>230</b>	215	455	<b>395</b>	370	295	<b>260</b>	245
	2	-	-	-	275	<b>240</b>	200	220	<b>190</b>	160	280	<b>255</b>	230	250	<b>215</b>	180
	3	-	-	-	255	<b>215</b>	175	200	<b>170</b>	140	255	<b>230</b>	205	230	<b>195</b>	160
	4	-	-	-	225	<b>185</b>	150	180	<b>150</b>	120	190	<b>175</b>	160	205	<b>170</b>	135
	5	-	-	-	185	<b>170</b>	150	150	<b>135</b>	120	260	<b>230</b>	210	170	<b>155</b>	135
	6	-	-	-	165	<b>125</b>	100	130	<b>100</b>	80	160	<b>135</b>	110	150	<b>115</b>	90
M	1	-	-	-	205	<b>180</b>	165	170	<b>150</b>	135	205	<b>185</b>	155	195	<b>170</b>	155
	2	-	-	-	185	<b>160</b>	130	155	<b>130</b>	110	185	<b>160</b>	140	175	<b>150</b>	125
	3	-	-	-	140	<b>120</b>	95	115	<b>100</b>	80	145	<b>130</b>	115	130	<b>115</b>	90
K	1	420	<b>385</b>	340	230	<b>205</b>	185	-	-	-	295	<b>265</b>	240	-	-	-
	2	335	<b>295</b>	275	180	<b>160</b>	150	-	-	-	235	<b>210</b>	190	-	-	-
	3	280	<b>250</b>	230	150	<b>135</b>	120	-	-	-	195	<b>175</b>	160	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	40	<b>35</b>	25	35	<b>30</b>	25	-	-	-	40	<b>35</b>	30
	2	-	-	-	40	<b>35</b>	25	35	<b>30</b>	25	-	-	-	40	<b>35</b>	30
	3	-	-	-	50	<b>40</b>	25	45	<b>35</b>	25	-	-	-	50	<b>40</b>	30
	4	-	-	-	70	<b>50</b>	35	60	<b>45</b>	30	66	<b>50</b>	33	65	<b>50</b>	35
H	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MDHW	0,12	<b>0,23</b>	0,46	0,08	<b>0,17</b>	0,33	0,06	<b>0,13</b>	0,25	0,06	<b>0,11</b>	0,22	0,05	<b>0,10</b>	0,20	MDHW

NOTE: Use "Light Machining" value as starting feed rate.





# WIDIA™ Knowledge Center



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## **Classes to Suit Everyone**

Doing things the same way year after year can stall productivity. Continuing education and training in the latest machining practices are necessary to stay competitive.

The Knowledge Center offers several ways to get trained: industry- and application-specific courses, customer onsite programs, and online-based certified metalcutting professional courses. In-person classes include lecture, lab, and machining demonstrations.

## **Regional Training**

The Regional Application Engineering Program is designed to provide a broad base of knowledge for the selection and use of metalcutting tools. Instruction includes lecture-style presentations and video demonstrations. Participants receive notes and text materials, and the video demonstrations reinforce the theories presented in the lecture.

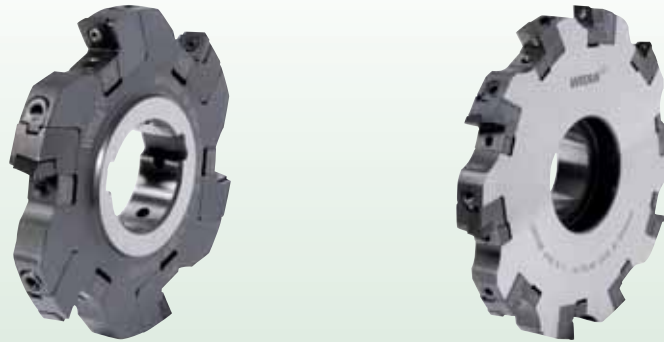
## **Metalcutting Application Training**

The Comprehensive Metalworking Application Course provides a broad base of knowledge for the selection and use of metalcutting tools. Lecture-style presentations and laboratory demonstrations enhance course material through actual cutting tests and reinforce the theories presented in the lecture.

For more information, contact your local WIDIA  
Authorized Distributor or visit [widia.com/services](http://widia.com/services).

**WIDIA** 

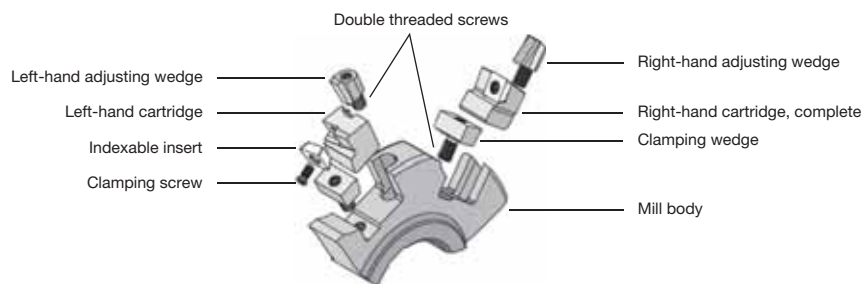
## ■ Assembly and Operating Instructions



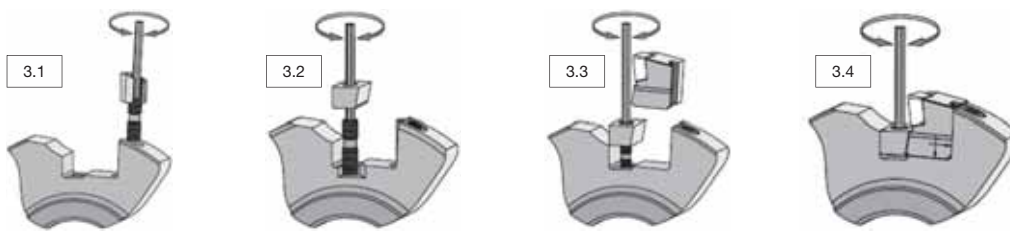
### 1. General

The runout tolerance of the milling cutter has a decisive effect on the quality of workpieces and the life cycle of tools. Proper tool fitting and the precise axial setting of the milling insert are essential for a successful application and optimum results. One key requirement for assembly and setting work is that all components are clean. Bearing surfaces must be free from grease, and only the threads of indexable insert clamping screws and double threaded screws of clamping and adjusting wedges should be lubricated with copper grease. The indexable inserts should be inserted in the cleaned insert seats so that they are positioned correctly on the bearing surfaces. The indexable insert clamping screws should be tightened with the specified torque.

### 2. Exploded Diagram of Spare Parts



### 3. Mounting the Cartridges in the Mill Body



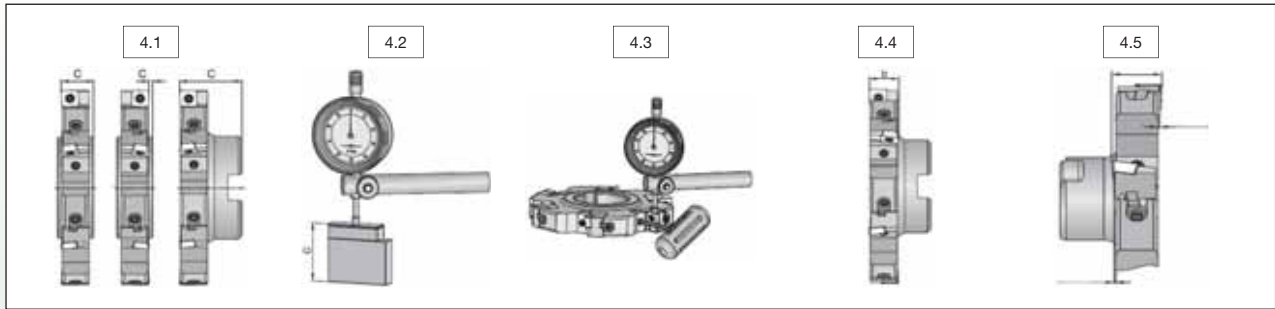
3.1 Turn double threaded screw 1 clockwise in the adjusting wedge. Then insert both parts in the slot in the mill body and turn the double threaded screw clockwise until the adjusting wedge is flush with the milling cutter.

3.2 Turn double threaded screw 3 clockwise in the mill body. Then mount the clamping wedge on the double threaded screw and screw both parts together until the lower edge of the clamping wedge is at the same height as the chip space runout.

3.3 Push the top of the fully assembled cartridge into the mill body using the rear bearing surface of the milling cutter so that the cartridge slot makes contact with the adjusting wedge spring. Ensure a perfect axial/radial surface.

3.4 Secure the correctly positioned cartridge by tightening the clamping wedge with a preset torque of  $MA_{pre} = 1 \text{ Nm}$  to set the runout or cutting width.

**4. Setting the Runout for Milling Cutters with 2–3 Cutting Edges**



- 4.1 Possible interpretations of the measuring dimension C.
- 4.2 Set gage to desired measurement C using gage blocks set to 0.
- 4.3 Set cartridge to -0,1mm before final measurement. Clamping wedge is tightened with torque  $MA_{pre} = 1 \text{ Nm}$ . Then briefly loosen clamping wedge and tighten again.
- 4.4 Set cartridge to 0,02mm before final measurement. Then briefly loosen clamping wedge so that the contact surfaces can level out. Tighten clamping.
- 4.4 Wedge again with torque  $MA_{pre} = 1 \text{ Nm}$ .
- 4.5 Adjust cartridge to final measurement. Tighten clamping wedge with torque  $MA = 4 \text{ Nm}$ . Check runout of the fully adjusted milling cutter.

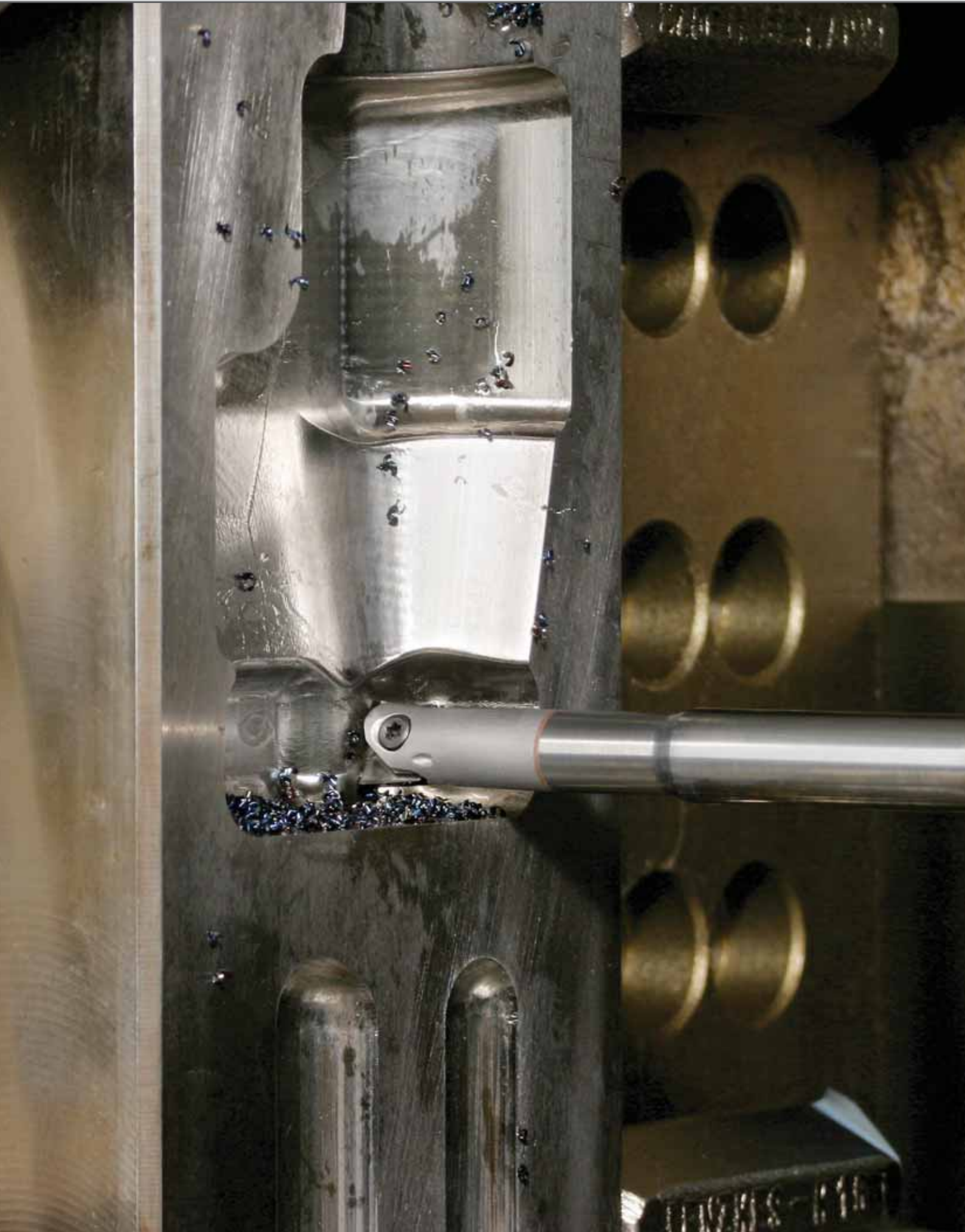
**5. Setting the Runout for Milling Cutters with 3 Cutting Edges**

The cutting widths for milling cutters with 3 cutting edges are set using purpose-designed optical tool presetting equipment. Note that the projection of the cartridges from the mill body must be almost exactly the same on both sides. The sequence of steps required for setting the cartridge is identical to those for tools with 2 cutting edges.

**ATTENTION:**

At each tool adjustment, the body, cartridges, indexable inserts, and spare parts must be checked and replaced if necessary. Before each tool use, the clamping and double threaded screws must be tightened with the specified torque. The tools must only be used in accordance with their function. We accept no liability for their improper use. Changes of any kind and/or printing errors are not valid grounds for claims.





## **Indexable Milling • Copy Mills**

<b>M370 • High-Feed Double-Sided Platforms.....</b>	<b>K2-K18</b>
<b>M200 • Double-Sided Round Inserts.....</b>	<b>K20-K41</b>
<b>M170 • Round Inserts, Ideal for Die and Mold Applications .....</b>	<b>K42-K72</b>
<b>M100 • Positive Round Inserts.....</b>	<b>K74-K101</b>
<b>M270 • Indexable Ball Nose and Toroidal Inserts for Complex Parts .....</b>	<b>K102-K126</b>



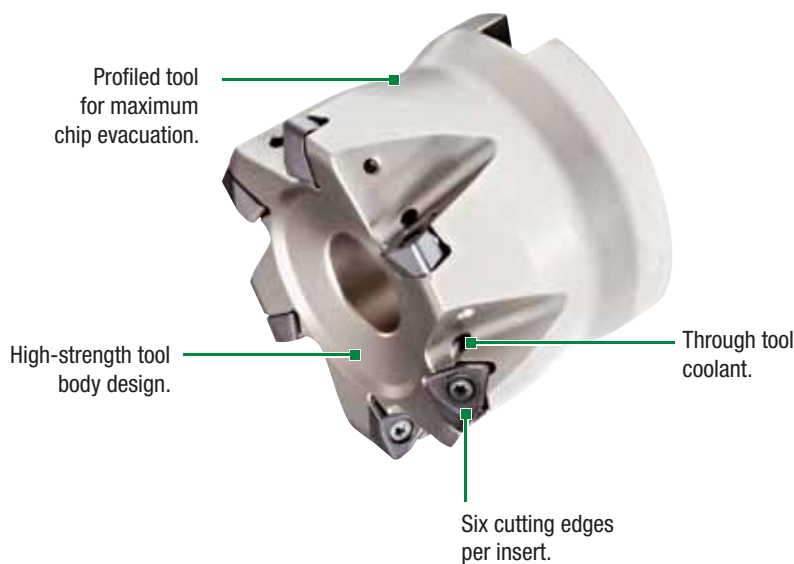
High-Feed Applications •  
**M370™ Series**

# M370



Designed for high feed rate productivity, the M370 Series provides the latest insert technology with outstanding performance and reliability. Its double-sided concept and six cutting edges provide security and optimal metal removal with an efficient cost per edge.

- Double-sided design offers six cutting edges per insert.
- Extremely high metal removal rates.
- First choice for high-feed roughing applications.



**Copy Mills**



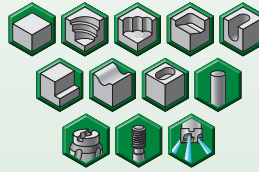
**M370™**

**Max depth of cut: .078"**

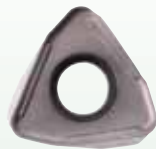
Indexes per insert: 6

Diameter: 1–5"

**Pages: K4–K18**



**■ Insert Offering**

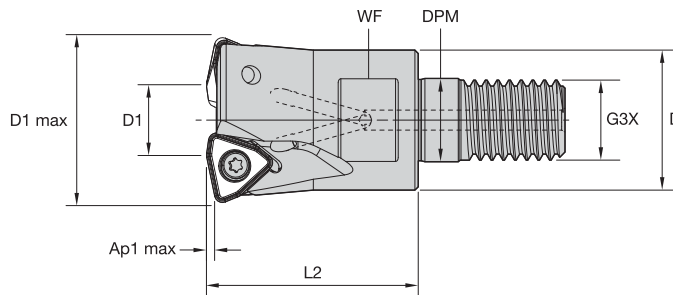
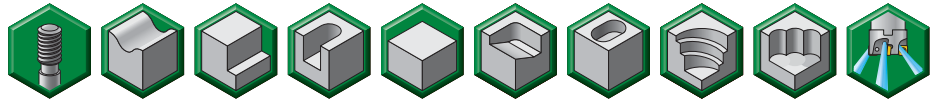


**8mm iC Insert WOEJ0804**  
Up to .049" Ap max  
Diameter range 1–3"



**12mm iC Insert WOEJ1207**  
Up to .078" Ap max  
Diameter range 1.5–5"

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.



Copy Mills

■ Screw-On End Mills

order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
4047591	M370D100Z02M12WO08	1.000	.460	.827	.492	M12.000	1.250	.669	.049	2	45500	Yes	.19
4171164	M370D100Z03M12WO08	1.000	.460	.827	.492	M12.000	1.378	.667	.049	3	46000	Yes	.19
4171165	M370D125Z02M16WO08	1.250	.700	1.132	.669	M16.000	1.500	.940	.049	2	38900	Yes	.41
4047592	M370D125Z03M16WO08	1.250	.700	1.132	.669	M16.000	1.500	.945	.049	3	38900	Yes	.41
4047653	M370D150Z03M16WO08	1.500	.950	1.142	.669	M16.000	1.500	.866	.049	3	34500	Yes	.49
4171166	M370D150Z04M16WO08	1.500	.950	1.142	.669	M16.000	1.500	.945	.049	4	34500	Yes	.48

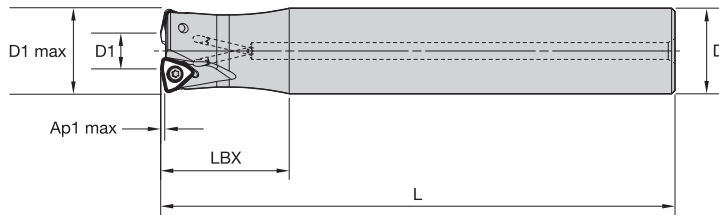
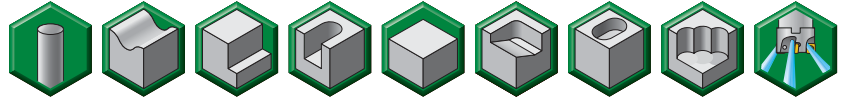
■ Spare Parts



D1 max	insert screw	in. lbs.	Torx Plus driver
1.000	MS2219	16	DT9IP
1.250	MS2219	16	DT9IP
1.500	MS2219	16	DT9IP



- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.



■ **Cylindrical End Mills**

order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
4047654	M370D100Z02C100WO08L600	1.000	.460	1.000	6.000	1.500	.049	2	45500	Yes	1.17
4047655	M370D100Z02C100WO08L800	1.000	.460	1.000	8.000	1.500	.049	2	45500	Yes	1.60
4047656	M370D100Z03C100WO08L600	1.000	.460	1.000	6.000	1.500	.049	3	45500	Yes	1.16
4047657	M370D125Z03C125WO08L600	1.250	.700	1.250	6.000	1.500	.049	3	38900	Yes	1.87
4047658	M370D125Z03C125WO08L800	1.250	.700	1.250	8.000	1.500	.049	3	38900	Yes	2.55
4047659	M370D150Z03C125WO08L600	1.500	.950	1.250	6.000	1.500	.049	3	34500	Yes	1.97
4171167	M370D150Z03C125WO08L800	1.500	.950	1.250	7.686	1.500	.049	3	34500	Yes	5.11
4171168	M370D150Z04C150WO08L600	1.500	.950	1.500	6.000	1.500	.049	4	34500	Yes	2.70

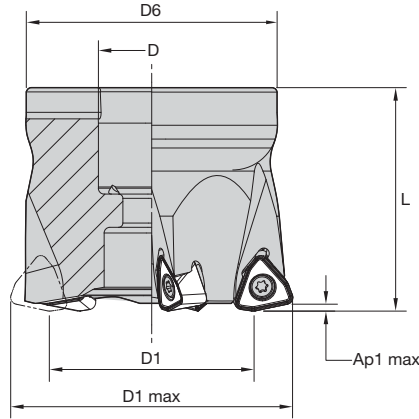
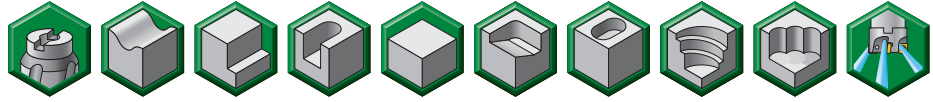
■ **Spare Parts**



D1 max	insert screw	in. lbs.	wrench
1.000	MS2219	16	DT9IP
1.250	MS2219	16	DT9IP
1.500	MS2219	16	DT9IP

Copy Mills

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.



Copy Mills

■ Shell Mills

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
4047660	M370D150Z04S050WO08	1.500	.950	.500	1.417	1.575	.049	4	34500	Yes	.41
4047661	M370D200Z05S075WO08	2.000	1.450	.750	1.732	1.575	.049	5	29000	Yes	.82
4047662	M370D200Z07S075WO08	2.000	1.450	.750	1.732	1.575	.049	7	29000	Yes	.83
4171169	M370D250Z07S075WO08	2.500	1.950	.750	1.732	1.575	.049	7	29000	Yes	1.42
4171170	M370D300Z08S100WO08	3.000	2.270	1.000	2.362	1.968	.049	8	22900	Yes	4.82

■ Spare Parts

D1 max	insert screw	in. lbs.	Torx Plus driver	socket-head cap screw	socket-head cap screw with coolant groove
1.500	MS2219	16	DT9IP	S424	—
2.000	MS2219	16	DT9IP	S445	S445CG
2.500	MS2219	16	DT9IP	S445	S445CG
3.000	MS2219	16	DT9IP	S459	S459CG

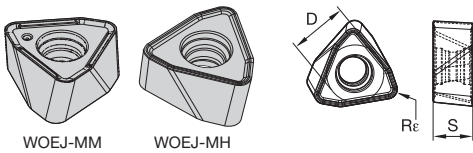
NOTE: Socket-head cap screw with coolant groove must be ordered separately.

**Insert Selection Guide**

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	...MM	WP40PM	...MM	WP40PM	...MM	WP40PM
P3-P4	...MM	WP25PM	...MM	WP40PM	...MH	WP40PM
P5-P6	...MM	WP25PM	...MH	WP25PM	...MH	WP40PM
M1-M2	...MM	WP25PM	...MM	WS30PM	...MM	WP40PM
M3	...MM	WP25PM	...MM	WP25PM	...MM	WP40PM
K1-K2	...MH	WK15CM	...MH	WK15CM	...MH	WK15CM
K3	...MH	TN6520	...MH	TN6520	...MH	WK15CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	...MM	WP25PM	...MM	WS30PM	...MM	WP40PM
S3	...MM	WS30PM	...MM	WS30PM	...MM	WP40PM
S4	...MM	WS30PM	...MM	WP40PM	...MM	WP40PM
H1	...MH	WP25PM	-	-	-	-

Copy Mills

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- MM geometry provides lower cutting forces. First choice for steel, stainless steel, and high-temp alloys.
- MH geometry is the first choice for high-strength steel and cast iron.

- first choice
- alternate choice

P	●	○	○	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○

**WOEJ-MM**

catalog number	cutting edges	D	S	Re	TN6520	TN6525	TN7535	WK15CM	WP25PM	WS30PM	WP40PM
WOEJ080412SRMM	6	.307	.185	.048	○	○	○	○	○	○	○

**WOEJ-MH**

catalog number	cutting edges	D	S	Re	TN6520	TN6525	TN7535	WK15CM	WP25PM	WS30PM	WP40PM
WOEJ080412SRMH	6	.307	.187	.048	○	○	○	○	○	○	○

■ Recommended Starting Speeds [SFM]

Material Group		TN6520			TN6525			TN7535		
<b>P</b>	1	-	-	-	1340	<b>1045</b>	925	1790	<b>1555</b>	1460
	2	-	-	-	1045	<b>830</b>	710	1105	<b>1000</b>	905
	3	-	-	-	925	<b>710</b>	610	1000	<b>905</b>	805
	4	-	-	-	770	<b>550</b>	475	750	<b>690</b>	630
	5	-	-	-	1025	<b>770</b>	650	1025	<b>905</b>	830
	6	-	-	-	670	<b>535</b>	430	630	<b>535</b>	430
<b>M</b>	1	-	-	-	630	<b>395</b>	260	805	<b>725</b>	610
	2	-	-	-	395	<b>260</b>	155	725	<b>630</b>	550
	3	-	-	-	415	<b>260</b>	180	570	<b>510</b>	450
<b>K</b>	1	1475	<b>1045</b>	750	905	<b>805</b>	725	1165	<b>1045</b>	940
	2	1280	<b>830</b>	630	710	<b>630</b>	590	925	<b>830</b>	750
	3	985	<b>750</b>	535	590	<b>535</b>	475	770	<b>690</b>	630
<b>N</b>	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
<b>S</b>	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-
<b>H</b>	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-

(continued)

Copy Mills

(Recommended Starting Speeds [SFM] — continued)

Material Group		WK15CM			WP25PM			WS30PM			WP40PM		
P	1	-	-	-	1295	<b>1120</b>	1060	-	-	-	1165	<b>1025</b>	965
	2	-	-	-	1080	<b>940</b>	785	-	-	-	985	<b>845</b>	710
	3	-	-	-	1000	<b>845</b>	690	-	-	-	905	<b>770</b>	630
	4	-	-	-	890	<b>725</b>	590	-	-	-	805	<b>670</b>	535
	5	-	-	-	725	<b>670</b>	590	-	-	-	670	<b>610</b>	535
	6	-	-	-	650	<b>490</b>	395	-	-	-	590	<b>450</b>	355
M	1	-	-	-	805	<b>710</b>	650	890	<b>785</b>	725	770	<b>670</b>	610
	2	-	-	-	725	<b>630</b>	510	805	<b>710</b>	570	690	<b>590</b>	490
	3	-	-	-	550	<b>475</b>	370	610	<b>535</b>	415	510	<b>450</b>	355
K	1	1655	<b>1520</b>	1340	905	<b>805</b>	725	-	-	-	-	-	-
	2	1320	<b>1165</b>	1080	710	<b>630</b>	590	-	-	-	-	-	-
	3	1105	<b>985</b>	905	590	<b>535</b>	475	-	-	-	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	155	<b>140</b>	95	180	<b>155</b>	120	155	<b>140</b>	120
	2	-	-	-	155	<b>140</b>	95	180	<b>155</b>	120	155	<b>140</b>	120
	3	-	-	-	200	<b>155</b>	95	215	<b>180</b>	120	200	<b>155</b>	120
	4	-	-	-	275	<b>200</b>	140	335	<b>235</b>	155	260	<b>200</b>	140
H	1	-	-	-	475	<b>355</b>	275	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Copy Mills

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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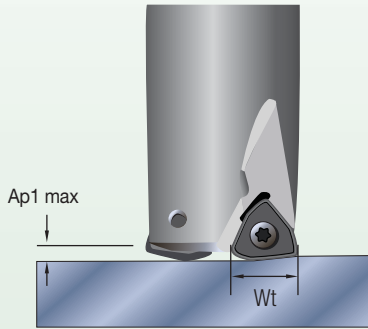
For Plunging Applications

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
...MM	.035	<b>.061</b>	.150	.025	<b>.044</b>	.104	.019	<b>.033</b>	.076	.017	<b>.028</b>	.066	.015	<b>.026</b>	.061	...MM
...MH	.035	<b>.092</b>	.197	.025	<b>.065</b>	.134	.019	<b>.048</b>	.098	.017	<b>.042</b>	.085	.015	<b>.038</b>	.078	...MH

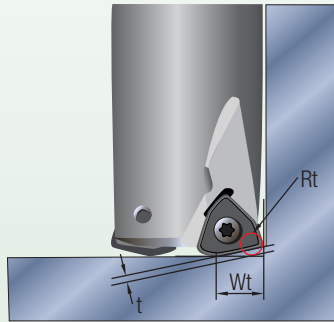
NOTE: Use "Light Machining" value as starting feed rate.

### Applying High-Feed Tools

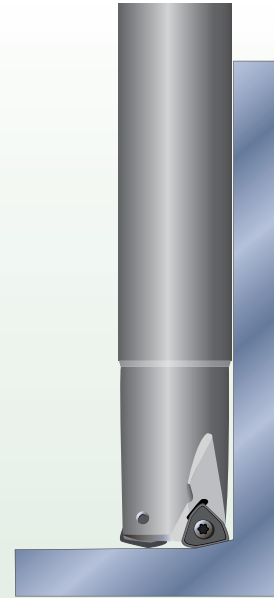
The high-feed concept bases its strategy on small depth of cut and higher fz values, which results in a higher MRR and productivity with low radial forces.



Small Ap1 values and higher feed rates generate lower cutting forces versus traditional milling strategies.



For CAM programming, the tools can be programmed as a toroidal tool type by using the Rt value as the insert radius.



Recommended when long overhang is necessary due to lower radial forces. Maximum L/D ratio of 10 x D.

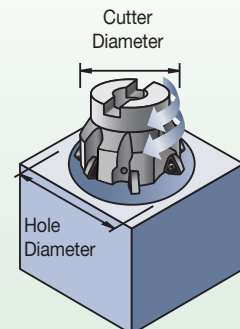
### General Programming Information for Applying M370

L/D ratio	starting Ap1	starting fz range
<3	.035"	.04-.051"
>3-~5	.024"	.04-.051"
>5-~7	.016"	.024"

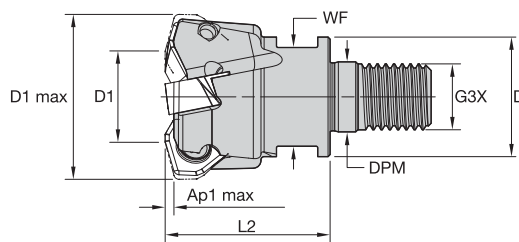
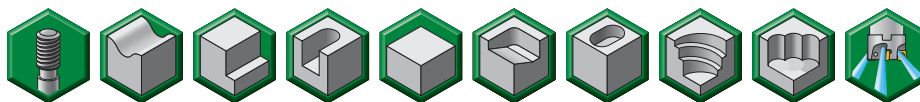
Rt	t	Wt
0.10"	0.04"	0.30"

### Maximum Linear Ramping and Helical Interpolation from Solid • Inch

cutter diameter	max linear ramp angle (straight line)	min hole diameter	max hole diameter	Ap1 max per revolution
1.00"	3.1°	1.41"	1.98"	.049"
1.25"	2.2°	1.91"	2.48"	.049"
1.50"	1.8°	2.41"	2.98"	.049"
2.00"	1.3°	3.40"	3.98"	.049"
2.50"	1.0°	4.66"	4.98"	.049"
3.00"	0.8°	5.22"	5.98"	.049"



- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.



■ **Screw-On End Mills**

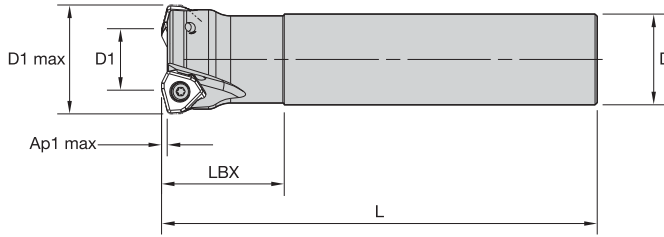
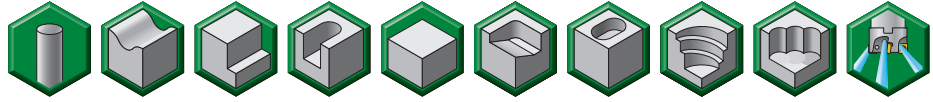
order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
5352393	M370D150Z02M16WO12	1.500	.837	1.142	.670	M16.000	1.690	.943	.078	2	22380	Yes	.49

■ **Spare Parts**

			
D1 max	insert screw	in. lbs.	Torx Plus driver
1.500	MS2085	35	DT15IP

Copy Mills

- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.



Copy Mills

■ Cylindrical End Mills

order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5352394	M370D150Z02C125WO12L600	1.500	.837	1.250	6.000	1.690	.078	2	22380	Yes	1.92
5352395	M370D150Z02C150WO12L1000	1.500	.837	1.500	10.000	2.500	.078	2	22380	Yes	4.50

■ Spare Parts



insert screw



in. lbs.

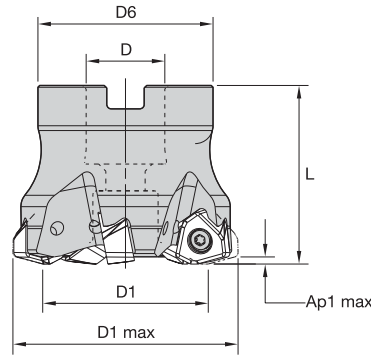
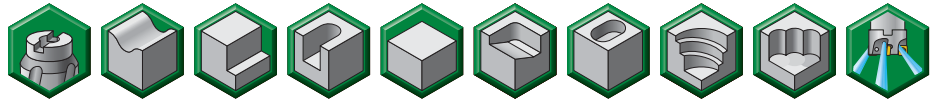


Torx Plus driver

D1 max	MS2085	35	DT15IP
1.500			



- Double-sided, six cutting edges.
- Highest metal removal rates.
- First choice for roughing applications.



■ **Shell Mills**

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5352396	M370D200Z03S075WO12	2.000	1.335	.750	1.750	1.575	.078	3	19380	Yes	.70
5352397	M370D200Z04S075WO12	2.000	1.335	.750	1.750	1.575	.078	4	19380	Yes	.69
5698432	M370D200Z04S075WO12L200	2.000	1.335	.750	1.750	2.000	.078	4	19380	Yes	.92
5352398	M370D250Z05S075WO12	2.500	1.834	.750	1.750	1.750	.078	5	17330	Yes	1.06
5352399	M370D250Z05S100WO12	2.500	1.834	1.000	2.190	1.750	.078	5	17330	Yes	1.27
5352420	M370D300Z06S100WO12	3.000	2.333	1.000	2.750	1.750	.078	6	15820	Yes	2.08
5698433	M370D300Z06S100WO12L197	3.000	2.328	1.000	2.750	1.970	.078	6	15820	Yes	2.38
5352421	M370D300Z05S125WO12	3.000	2.333	1.250	2.750	2.000	.078	5	15820	Yes	2.30
5352422	M370D300Z06S125WO12	3.000	2.333	1.250	2.750	2.000	.078	6	15820	Yes	2.32
5352423	M370D400Z06S150WO12	4.000	3.333	1.500	3.625	2.000	.078	6	13700	Yes	3.81
5352424	M370D400Z08S150WO12	4.000	3.333	1.500	3.625	2.000	.078	8	13700	Yes	3.85
5352425	M370D500Z07S150WO12	5.000	4.333	1.500	3.810	2.375	.078	7	12260	Yes	6.62
5352426	M370D500Z09S150WO12	5.000	4.333	1.500	3.810	2.375	.078	9	12260	Yes	6.68

■ **Spare Parts**



D1 max	insert screw	in. lbs.	Torx Plus driver	socket-head cap screw	socket-head cap screw with coolant groove	low-head cap screw with coolant groove	lock screw	coolant lock screw assembly
2.000	MS2085	35	DT15IP	S445	S445CG	—	—	—
2.500	MS2085	35	DT15IP	S445	S445CG	—	—	—
2.500	MS2085	35	DT15IP	S458	S458CG	—	—	—
3.000	MS2085	35	DT15IP	S458	S458CG	—	—	—
3.000	MS2085	35	DT15IP	S467	—	S2172CG	—	—
4.000	MS2085	35	DT15IP	—	—	—	KLS15	S-2165-C
5.000	MS2085	35	DT15IP	—	—	—	KLS15	S2163C

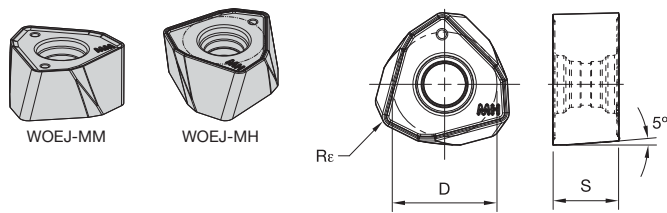
NOTE: Socket-head cap screw with coolant groove and coolant lock screw assembly must be ordered separately.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	...MM	WU35PM	...MM	WP40PM	...MM	WP40PM
P3-P4	...MM	WP25PM	...MM	WP25PM	...MH	WP40PM
P5-P6	...MM	WP25PM	...MM	WP35CM	...MH	WP35CM
M1-M2	...MM	WS30PM	...MM	WU35PM	...MM	WP40PM
M3	...MM	WP25PM	...MM	WP35CM	...MM	WP40PM
K1-K2	...MH	WK15CM	...MH	WK15CM	...MH	WP20CM
K3	...MH	WK15CM	...MH	WK15CM	...MH	WP20CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	...MM	WS30PM	...MM	WU35PM	...MM	WP40PM
S3	...MM	WS30PM	...MM	WU35PM	...MM	WP40PM
S4	...MM	WS30PM	...MM	WU35PM	...MM	WP40PM
H1	...MH	WP35CM	...MR	WP25PM	-	-

Copy Mills

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- MM geometry provides lower cutting forces. First choice for steel, stainless steel, and high-temp alloys.
- MH geometry is the first choice for high-strength steel and cast iron.
- MR geometry is designed for heavy-duty steel and cast iron applications.

● first choice  
○ alternate choice

P	●	●	●	●	●	●
M	○	○	○	○	○	○
K	●	○	○	○	○	○
N	○	○	○	○	○	○
S	○	○	○	○	○	○
H	○	○	○	○	○	○

■ WOEJ-MM

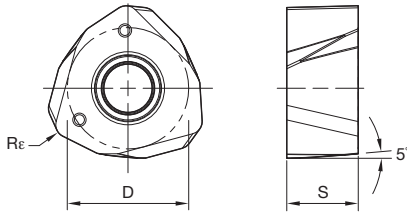
catalog number	cutting edges	D	S	Rε	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM	WS30PM	WP40PM
WOEJ120712SRMM	6	.472	.287	.050	●	○	○	○	○	○	○

■ WOEJ-MH

catalog number	cutting edges	D	S	Rε	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM	WS30PM	WP40PM
WOEJ120712SRMH	6	.472	.287	.050	○	○	○	○	○	○	○



WOEJ-MR



● first choice  
○ alternate choice

P	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

■ WOEJ-MR

catalog number	cutting edges	D	S	Rε	WK15CM	WP20CM	WP25PM	WU35PM	WP35CM	WS30PM	WP40PM
WOEJ120712SRMR	6	.472	.287	.050	•	•	•	•	•	•	•



Copy Mills

■ Recommended Starting Speeds [SFM]

Material Group		WK15CM			WP20CM			WP25PM			WU35PM		
P	1	-	-	-	2165	<b>1910</b>	1770	1295	<b>1120</b>	1060	1165	<b>1025</b>	965
	2	-	-	-	1340	<b>1220</b>	1080	1080	<b>940</b>	785	985	<b>845</b>	710
	3	-	-	-	1220	<b>1080</b>	1000	1000	<b>845</b>	690	905	<b>770</b>	630
	4	-	-	-	905	<b>845</b>	750	890	<b>725</b>	590	805	<b>670</b>	535
	5	-	-	-	1080	<b>985</b>	905	725	<b>670</b>	590	670	<b>610</b>	535
	6	-	-	-	750	<b>670</b>	570	650	<b>490</b>	395	590	<b>450</b>	355
M	1	-	-	-	890	<b>785</b>	690	805	<b>710</b>	650	770	<b>670</b>	610
	2	-	-	-	805	<b>690</b>	630	725	<b>630</b>	510	690	<b>590</b>	490
	3	-	-	-	630	<b>570</b>	490	550	<b>475</b>	370	510	<b>450</b>	355
K	1	1655	<b>1520</b>	1340	1415	<b>1280</b>	1165	905	<b>805</b>	725	-	-	-
	2	1320	<b>1165</b>	1080	1120	<b>1000</b>	925	710	<b>630</b>	590	-	-	-
	3	1105	<b>985</b>	905	940	<b>845</b>	785	590	<b>535</b>	475	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	155	<b>140</b>	95	155	<b>140</b>	120
	2	-	-	-	-	-	-	155	<b>140</b>	95	155	<b>140</b>	120
	3	-	-	-	-	-	-	200	<b>155</b>	95	200	<b>155</b>	120
	4	-	-	-	-	-	-	275	<b>200</b>	140	260	<b>200</b>	140
H	1	-	-	-	550	<b>450</b>	370	475	<b>355</b>	275	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

Copy Mills

(Recommended Starting Speeds [SFM] — continued)

Material Group		WP35CM			WS30PM			WP40PM		
P	1	1790	<b>1555</b>	1460	-	-	-	1165	<b>1025</b>	965
	2	1105	<b>1000</b>	905	-	-	-	985	<b>845</b>	710
	3	1000	<b>905</b>	805	-	-	-	905	<b>770</b>	630
	4	750	<b>690</b>	630	-	-	-	805	<b>670</b>	535
	5	1025	<b>905</b>	830	-	-	-	670	<b>610</b>	535
	6	630	<b>535</b>	430	-	-	-	590	<b>450</b>	355
M	1	805	<b>725</b>	610	890	<b>785</b>	725	770	<b>670</b>	610
	2	725	<b>630</b>	550	805	<b>710</b>	570	690	<b>590</b>	490
	3	570	<b>510</b>	450	610	<b>535</b>	415	510	<b>450</b>	355
K	1	1165	<b>1045</b>	940	-	-	-	-	-	-
	2	925	<b>830</b>	750	-	-	-	-	-	-
	3	770	<b>690</b>	630	-	-	-	-	-	-
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	-	-	-	180	<b>155</b>	120	155	<b>140</b>	120
	2	-	-	-	180	<b>155</b>	120	155	<b>140</b>	120
	3	-	-	-	215	<b>180</b>	120	200	<b>155</b>	120
	4	260	<b>200</b>	130	335	<b>235</b>	155	260	<b>200</b>	140
H	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Copy Mills

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

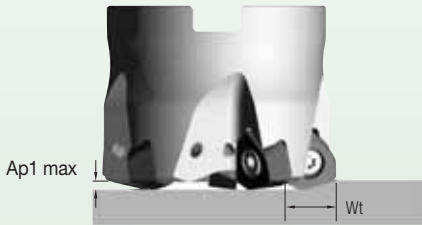
For All Other Applications

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
...MM	.035	<b>.073</b>	.143	.026	<b>.052</b>	.099	.019	<b>.039</b>	.073	.017	<b>.034</b>	.063	.015	<b>.031</b>	.058	...MM
...MH	.035	<b>.093</b>	.196	.026	<b>.066</b>	.134	.019	<b>.049</b>	.098	.017	<b>.042</b>	.085	.015	<b>.039</b>	.077	...MH
...MR	.035	<b>.111</b>	.214	.026	<b>.078</b>	.145	.019	<b>.057</b>	.106	.017	<b>.050</b>	.092	.015	<b>.046</b>	.084	...MR

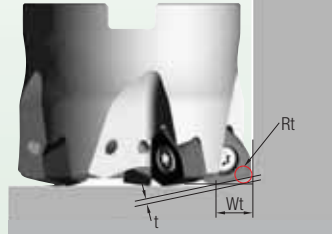
NOTE: Use "Light Machining" value as starting feed rate.

### Applying High-Feed Tools

The high-feed concept bases its strategy on small depth of cut and higher fz values, which results in a higher MRR and productivity with low radial forces.



Small  $A_{p1}$  values and higher feed rates generate lower cutting forces versus traditional milling strategies.



For CAM programming, the tools can be programmed as a toroidal tool type by using the  $R_t$  value as the insert radius.



Recommended when long overhang is necessary due to lower radial forces. Maximum L/D ratio of  $10 \times D$ .

### General Programming Information for Applying M370

	CAM programming information		
	$R_t$	$W_t$	$t$
inch value	0.13"	0.37"	0.06"

### ■ Maximum Linear Ramping and Helical Interpolation from Solid • Inch

diameter	max ramp angle	max ramp angle for 360° helical interpolation	D1	min hole diameter (DH min)	max flat-bottom hole diameter (DH1 max)	max diameter (no flat bottom)
1.50"	6.4°	1.70°	0.837"	1.96"	2.26"	3.00"
2.00"	3.6°	1.06°	1.335"	2.94"	3.26"	4.00"
2.50"	2.5°	0.78°	1.834"	3.93"	4.26"	5.00"
3.00"	1.9°	0.61°	2.333"	4.93"	5.26"	6.00"
4.00"	1.3°	0.43°	3.333"	6.93"	7.26"	8.00"
5.00"	1.0°	0.33°	4.333"	8.92"	9.26"	10.00"

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# WIDIA™

Double-Sided Round Insert •

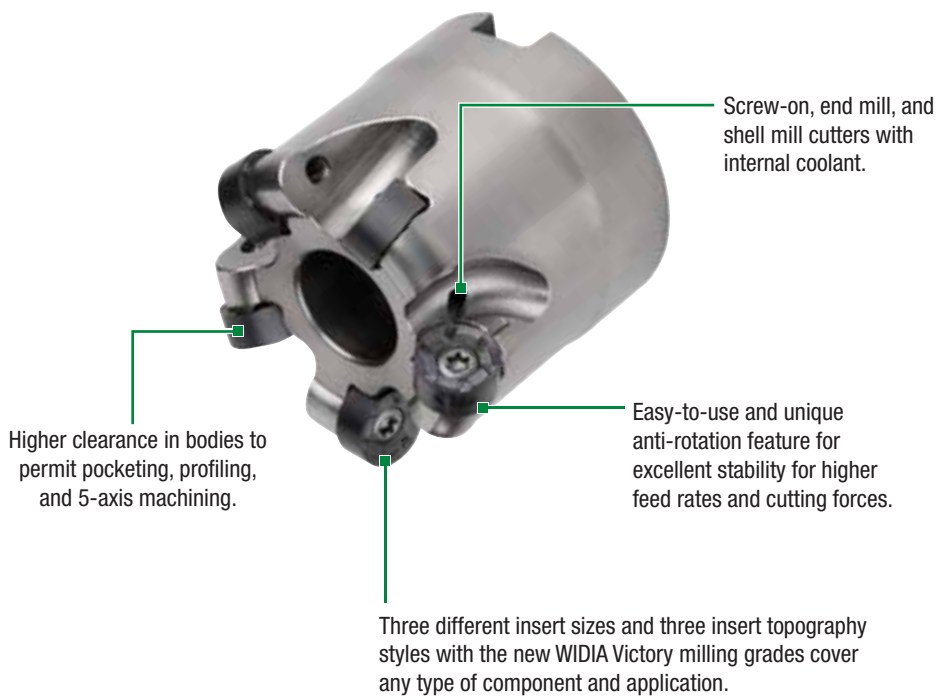
## M200™ Series

Revolutionary double-sided round insert, capable of running in multiple types of milling operations and workpiece materials, increases customers' productivity with the most efficient cost per edge.

# M200



- Up to 12 cutting edges per insert.
- Effective anti-rotation feature.
- Able to apply in all type of materials and milling applications.
- Latest WIDIA™ Victory™ grades offered.





**Copy Mills**

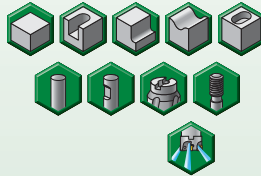
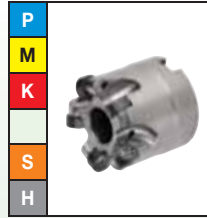


**M200™**

**Max depth of cut: .200"**

Indexes per insert up to: 12  
Diameter: 1–4"

Pages: K22–K41



■ **Insert Offering**



**M200 iC 10**  
10mm iC insert  
8 cutting edges

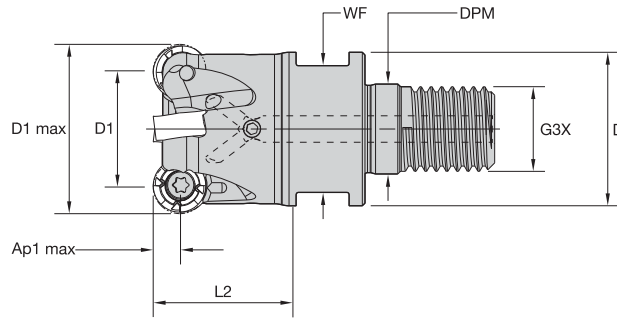


**M200 iC 12**  
12mm iC insert  
12 cutting edges



**M200 iC 16**  
16mm iC insert  
12 cutting edges

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



Copy Mills

■ Screw-On End Mills

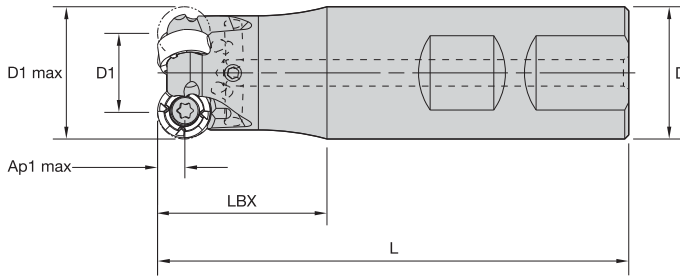
order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
5283432	M200D100Z03M12RN10	1.000	.606	.827	.490	M12.000	1.250	.667	.200	3	54200	Yes	.16
5283433	M200D125Z03M16RN10	1.250	.856	1.142	.670	M16.000	1.500	.943	.200	3	48500	Yes	.38
5283434	M200D125Z04M16RN10	1.250	.856	1.142	.670	M16.000	1.500	.943	.200	4	48500	Yes	.38
5283435	M200D150Z05M16RN10	1.500	1.106	1.142	.670	M16.000	1.500	.943	.200	5	44300	Yes	.45

■ Spare Parts



D1 max	insert screw	in. lbs.	Torx driver
1.000	191.848	18	170.025
1.250	191.848	18	170.025
1.500	191.848	18	170.025

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



■ **Weldon Shanks**

order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5283436	M200D100Z03W100RN10	1.000	.606	1.000	4.280	2.000	.200	3	54200	Yes	.75
5283437	M200D125Z03W125RN10	1.250	.856	1.250	4.280	2.000	.200	3	48500	Yes	1.20

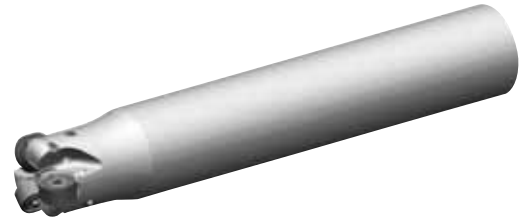
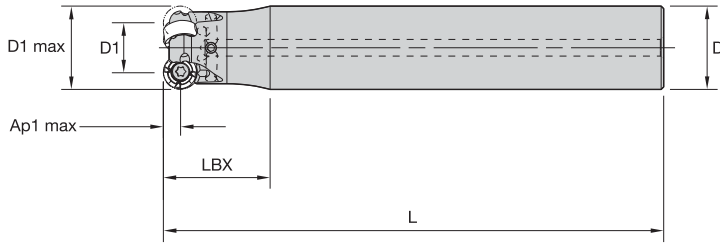
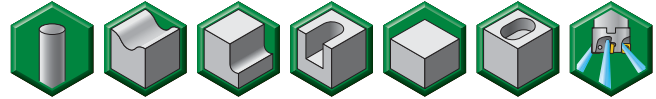
■ **Spare Parts**



D1 max	insert screw	in. lbs.	Torx driver
1.000	191.848	18	170.025
1.250	191.848	18	170.025

Copy Mills

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



Copy Mills

■ Cylindrical End Mills

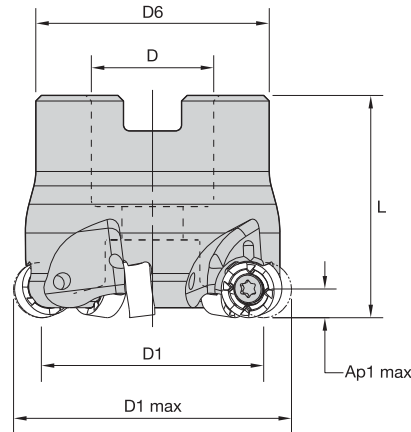
order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5283438	M200D100Z03C100RN10L600	1.000	.606	1.000	6.000	1.500	.200	3	54200	Yes	1.15
5283439	M200D100Z03C100RN10L800	1.000	.606	1.000	8.000	1.500	.200	3	54200	Yes	1.58
5283480	M200D125Z03C125RN10L900	1.250	.856	1.250	9.000	1.500	.200	3	48500	Yes	2.85

■ Spare Parts



D1 max	insert screw	in. lbs.	Torx driver
1.000	191.848	18	170.025
1.250	191.848	18	170.025

- Double-sided, eight cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



Copy Mills

■ Shell Mills

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5283481	M200D150Z03S050RN10	1.500	1.106	.500	1.300	1.570	.200	3	44300	Yes	.46
5283482	M200D150Z05S050RN10	1.500	1.106	.500	1.300	1.570	.200	5	44300	Yes	.43
5283483	M200D200Z04S075RN10	2.000	1.606	.750	1.654	2.000	.200	4	38300	Yes	1.04
5283484	M200D200Z06S075RN10	2.000	1.606	.750	1.654	2.000	.200	6	38300	Yes	1.02

■ Spare Parts



D1 max	insert screw	in. lbs.	wrench	socket-head cap screw	socket-head cap screw with coolant groove
1.500	191.848	18	170.025	S422	S422CG
2.000	191.848	18	170.025	S445	S445CG

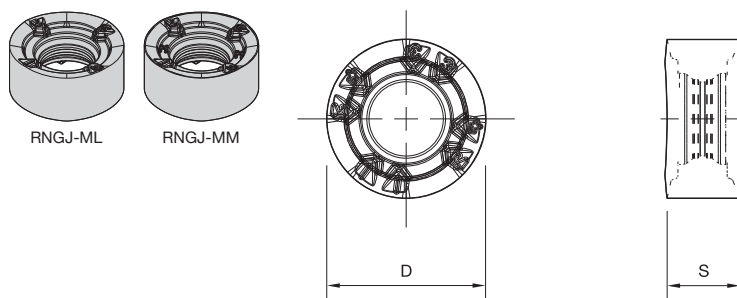
NOTE: Socket-head cap screw with coolant groove needs must be ordered separately.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	ML	WP25PM	MM	WP40PM	MM	WP40PM
P3-P4	ML	WP25PM	MM	WP25PM	MH	WP40PM
P5-P6	ML	WP35CM	MM	WP35CM	MH	WP35CM
M1-M2	ML	WP25PM	ML	WU35PM	MM	WU35PM
M3	ML	WP25PM	MM	WU35PM	MM	WU35PM
K1-K2	MH	WK15CM	MH	WK15CM	MH	WP20CM
K3	MH	WK15CM	MH	WK15CM	MH	WP25PM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	ML	WS30PM	MM	WS30PM	MM	WU35PM
S3	ML	WS30PM	MM	WU35PM	MM	WU35PM
S4	ML	WS30PM	MM	WU35PM	MM	WU35PM
H1	MH	WP25PM	MH	WP20CM	-	-

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iC10 • Inserts • RN.J10...



- -ML geometry is the first choice for stainless steel and high-temp alloys.
- -MM geometry is for general purpose, especially for steel.

● first choice  
○ alternate choice

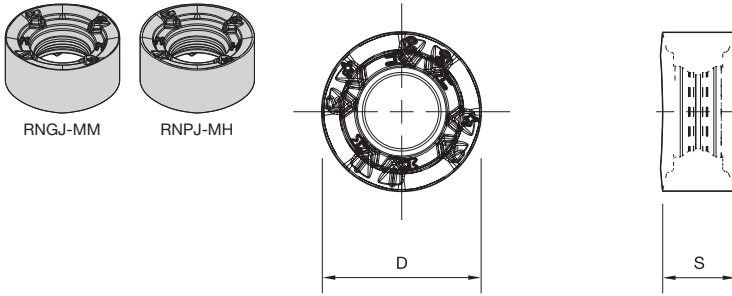
P	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○
N	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○

■ RINGJ-ML

catalog number	number of indexes	D	S	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNGJ10T3M0EML	8	.394	.188	○	○	●	●	●	○	○

■ RINGJ-MM

catalog number	number of indexes	D	S	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNGJ10T3M0SMM	8	.394	.188	○	○	○	○	○	○	○



- -MM geometry is for general purpose, especially for steel.
- -MH geometry is the first choice for heavy applications, cast iron, and high-strength steel.

- first choice
- alternate choice

P	●	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○

■ **RNPJ-MM**

catalog number	number of indexes	D	S	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNPJ10T3M0SMM	8	.394	.188	●	○	○	○	○	○	○

■ **RNPJ-MH**

catalog number	number of indexes	D	S	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNPJ10T3M0SMH	8	.394	.187	○	○	○	○	○	○	○



Copy Mills

■ Recommended Starting Speeds [SFM]

Material Group		WK15CM			WP20CM			WP25PM			WS30PM		
P	1	-	-	-	2165	<b>1910</b>	1770	1295	<b>1120</b>	1060	-	-	-
	2	-	-	-	1340	<b>1220</b>	1080	1080	<b>940</b>	785	-	-	-
	3	-	-	-	1220	<b>1080</b>	1000	1000	<b>845</b>	690	-	-	-
	4	-	-	-	905	<b>845</b>	750	890	<b>725</b>	590	-	-	-
	5	-	-	-	1080	<b>985</b>	905	725	<b>670</b>	590	-	-	-
	6	-	-	-	750	<b>670</b>	570	650	<b>490</b>	395	-	-	-
M	1	-	-	-	890	<b>785</b>	690	805	<b>710</b>	650	890	<b>785</b>	725
	2	-	-	-	805	<b>690</b>	630	725	<b>630</b>	510	805	<b>710</b>	570
	3	-	-	-	630	<b>570</b>	490	550	<b>475</b>	370	610	<b>535</b>	415
K	1	1655	<b>1520</b>	1340	1415	<b>1280</b>	1165	905	<b>805</b>	725	-	-	-
	2	1320	<b>1165</b>	1080	1120	<b>1000</b>	925	710	<b>630</b>	590	-	-	-
	3	1105	<b>985</b>	905	940	<b>845</b>	785	590	<b>535</b>	475	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	155	<b>140</b>	95	180	<b>155</b>	120
	2	-	-	-	-	-	-	155	<b>140</b>	95	180	<b>155</b>	120
	3	-	-	-	-	-	-	200	<b>155</b>	95	215	<b>180</b>	120
	4	-	-	-	-	-	-	275	<b>200</b>	140	335	<b>235</b>	155
H	1	-	-	-	550	<b>450</b>	370	475	<b>355</b>	275	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-

Copy Mills

Material Group		WU35PM			WP35CM			WP40PM		
P	1	1025	<b>905</b>	845	1790	<b>1555</b>	1460	1165	<b>1025</b>	965
	2	865	<b>750</b>	630	1105	<b>1000</b>	905	985	<b>845</b>	710
	3	785	<b>670</b>	550	1000	<b>905</b>	805	905	<b>770</b>	630
	4	710	<b>590</b>	475	750	<b>690</b>	630	805	<b>670</b>	535
	5	590	<b>535</b>	475	1025	<b>905</b>	830	670	<b>610</b>	535
	6	510	<b>395</b>	310	630	<b>535</b>	430	590	<b>450</b>	355
M	1	670	<b>590</b>	535	805	<b>725</b>	610	770	<b>670</b>	610
	2	610	<b>510</b>	430	725	<b>630</b>	550	690	<b>590</b>	490
	3	450	<b>395</b>	310	570	<b>510</b>	450	510	<b>450</b>	355
K	1	-	-	-	1165	<b>1045</b>	940	-	-	-
	2	-	-	-	925	<b>830</b>	750	-	-	-
	3	-	-	-	770	<b>690</b>	630	-	-	-
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	140	<b>120</b>	95	-	-	-	155	<b>140</b>	120
	2	140	<b>120</b>	95	-	-	-	155	<b>140</b>	120
	3	180	<b>140</b>	95	-	-	-	200	<b>155</b>	120
	4	235	<b>180</b>	120	260	<b>200</b>	130	260	<b>200</b>	140
H	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.



■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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At .197 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
ML	.005	<b>.017</b>	.031	.004	<b>.013</b>	.023	.003	<b>.009</b>	.017	.002	<b>.008</b>	.015	.002	<b>.008</b>	.014	ML
MM	.011	<b>.020</b>	.036	.008	<b>.014</b>	.026	.006	<b>.011</b>	.019	.005	<b>.009</b>	.017	.005	<b>.009</b>	.015	MM
MH	.018	<b>.023</b>	.038	.013	<b>.016</b>	.027	.010	<b>.012</b>	.020	.009	<b>.011</b>	.018	.008	<b>.010</b>	.016	MH

At .098 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
ML	.006	<b>.020</b>	.036	.004	<b>.014</b>	.026	.003	<b>.011</b>	.020	.003	<b>.009</b>	.017	.003	<b>.009</b>	.016	ML
MM	.013	<b>.023</b>	.041	.009	<b>.016</b>	.030	.007	<b>.012</b>	.022	.006	<b>.011</b>	.019	.005	<b>.010</b>	.018	MM
MH	.021	<b>.026</b>	.044	.015	<b>.019</b>	.031	.011	<b>.014</b>	.023	.010	<b>.012</b>	.020	.009	<b>.011</b>	.019	MH

At .049 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
ML	.008	<b>.026</b>	.048	.006	<b>.019</b>	.034	.004	<b>.014</b>	.026	.004	<b>.012</b>	.022	.003	<b>.011</b>	.020	ML
MM	.017	<b>.030</b>	.054	.012	<b>.022</b>	.039	.009	<b>.016</b>	.029	.008	<b>.014</b>	.025	.007	<b>.013</b>	.023	MM
MH	.028	<b>.035</b>	.058	.020	<b>.025</b>	.041	.015	<b>.019</b>	.031	.013	<b>.016</b>	.027	.012	<b>.015</b>	.024	MH

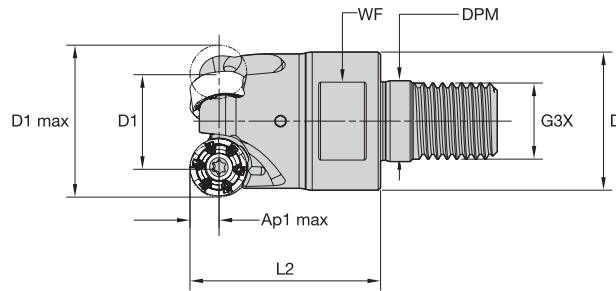
At .025 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
ML	.011	<b>.036</b>	.066	.008	<b>.026</b>	.047	.006	<b>.019</b>	.035	.005	<b>.017</b>	.030	.005	<b>.015</b>	.028	ML
MM	.023	<b>.041</b>	.075	.016	<b>.029</b>	.053	.012	<b>.022</b>	.040	.011	<b>.019</b>	.035	.010	<b>.018</b>	.032	MM
MH	.038	<b>.048</b>	.079	.027	<b>.034</b>	.056	.020	<b>.025</b>	.042	.018	<b>.022</b>	.036	.016	<b>.020</b>	.033	MH

NOTE: Use "Light Machining" value as starting feed rate.

Copy Mills

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



Copy Mills

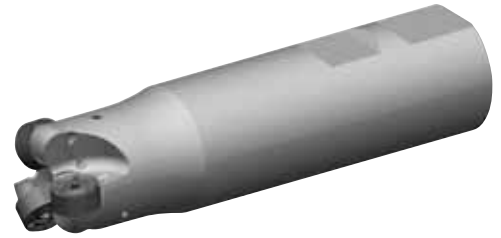
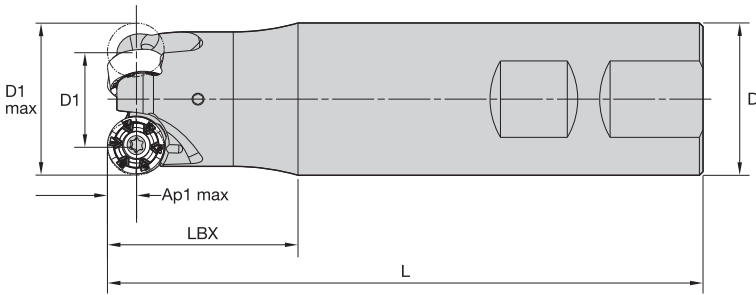
■ Screw-On End Mills

order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max RPM	coolant supply	lbs
5068352	M200D125Z03M16RN12	1.250	.778	1.142	.670	M16.000	1.500	.943	.117	3	39160	Yes	.37

■ Spare Parts

D1 max	insert screw	in. lbs.	Torx driver
1.250	193.492	35	170.025

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



■ **Weldon Shanks**

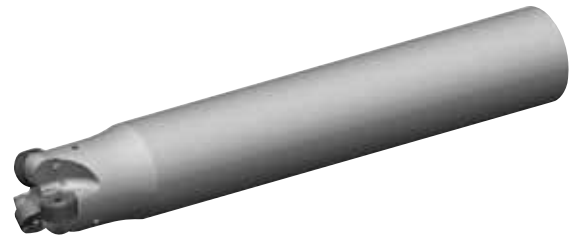
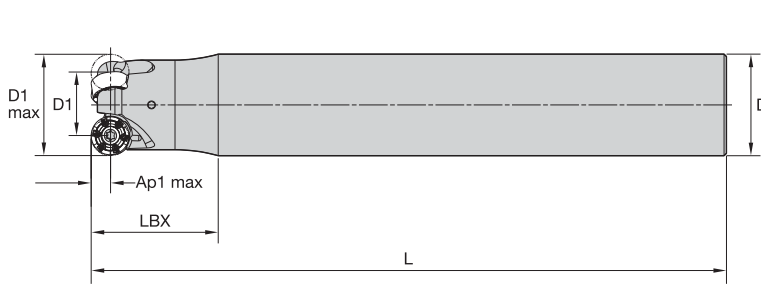
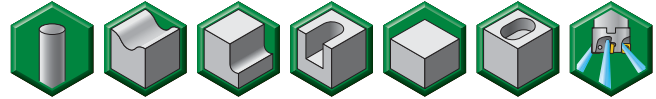
order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5068372	M200D125Z02W125RN12	1.250	.778	1.250	3.530	1.250	.117	2	39160	Yes	.98

■ **Spare Parts**

			
D1 max	insert screw	in. lbs.	Torx driver
1.250	193.492	35	170.025

Copy Mills

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



Copy Mills

■ Cylindrical End Mills

order number	catalog number	D1 max	D1	D	L	LBX	Ap1 max	Z	max RPM	coolant supply	lbs
5068374	M200D125Z02C125RN12L900	1.250	.778	1.250	9.000	1.250	.117	2	39160	Yes	2.85
5068400	M200D150Z03C150RN12L900	1.500	1.028	1.500	9.250	1.499	.117	3	35890	Yes	4.21

■ Spare Parts



insert screw

193.492



in. lbs.

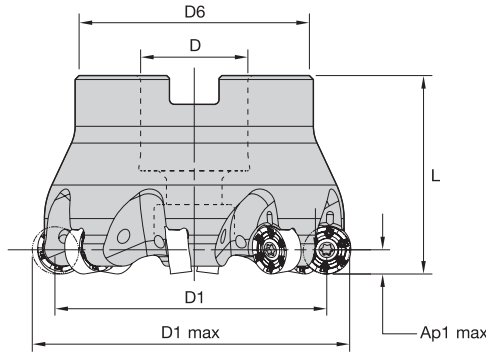
35



Torx driver

170.025

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



■ **Shell Mills**

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5068401	M200D150Z04S050RN12	1.500	1.028	.500	1.300	1.570	.117	4	35890	Yes	.41
5068402	M200D200Z04S075RN12	2.000	1.528	.750	1.750	2.000	.117	4	31080	Yes	1.02
5068403	M200D200Z05S075RN12	2.000	1.528	.750	1.750	2.000	.117	5	31080	Yes	1.03
5068404	M200D250Z07S075RN12	2.500	2.028	.750	1.750	2.000	.117	7	27800	Yes	1.53
5068405	M200D300Z08S100RN12	3.000	2.528	1.000	2.189	2.000	.117	8	25370	Yes	2.08
5068406	M200D400Z09S150RN12	4.000	3.528	1.500	3.380	2.000	.117	9	21970	Yes	3.29

■ **Spare Parts**



D1 max	insert screw	in. lbs.	wrench	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw	coolant lock screw assembly
1.500	193.492	35	170.025	S422	S422CG	—	—
2.000	193.492	35	170.025	S422	S422CG	—	—
2.000	193.492	35	170.025	S445	S445CG	—	—
2.500	193.492	35	170.025	S445	S445CG	—	—
3.000	193.492	35	170.025	S445	S445CG	—	—
4.000	193.492	35	170.025	—	—	12146110500	S-2165-C

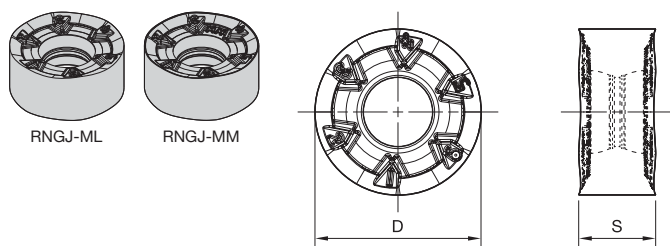
NOTE: Socket-head cap screw with coolant groove and coolant lock screw assembly must be ordered separately.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	ML	WP25PM	MM	WP40PM	MM	WP40PM
P3-P4	ML	WP25PM	MM	WP25PM	MH	WP40PM
P5-P6	ML	WP35CM	MM	WP35CM	MH	WP35CM
M1-M2	ML	WP25PM	ML	WU35PM	MM	WU35PM
M3	ML	WP25PM	MM	WU35PM	MM	WU35PM
K1-K2	MH	WK15CM	MH	WK15CM	MH	WP20CM
K3	MH	WK15PM	MH	WK15PM	MH	WP25PM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	ML	WS30PM	MM	WS30PM	MM	WU35PM
S3	ML	WS30PM	MM	WU35PM	MM	WU35PM
S4	ML	WS30PM	MM	WU35PM	MM	WU35PM
H1	MH	WP25PM	MH	WP20CM	-	-

Copy Mills

iC12 • Inserts • RN.J12..



- -ML geometry is the first choice for stainless steel and high-temp alloys.
- -MM geometry is for general purpose, especially for steel.

- first choice
- alternate choice

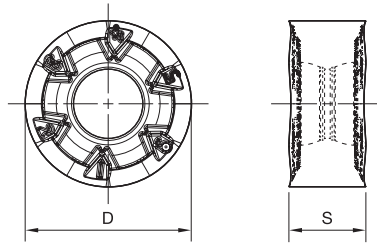
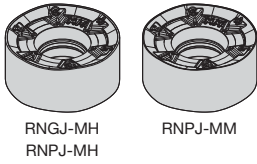
P	●	●	●	●	●	●	●	●	●	●	●
M	●	○	○	○	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○

■ RINGJ-ML

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNGJ1204M0EML	12	.472	.187	●	○	○	○	○	○	○	○

■ RINGJ-MM

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNGJ1204M0SMM	12	.472	.187	○	○	○	○	○	○	○	○



- -MM geometry is for general purpose, especially for steel.
- -MH geometry is the first choice for heavy applications, cast iron, and high-strength steels.

- first choice
- alternate choice

P	●	○	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○

**■ RNGJ-MH**

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNGJ1204M0SMH	12	.472	.187	5123900	-	-	5123901	-	5123902	5123903	-

**■ RNPJ-MM**

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNPJ1204M0SMM	12	.472	.187	-	-	5276362	5276361	-	5476634	5276360	5542329

**■ RNPJ-MH**

catalog number	cutting edges	D	S	WK15PM	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNPJ1204M0SMH	12	.472	.187	-	5276366	5276365	5276364	-	5476635	5276363	5542340



Copy Mills

■ Recommended Starting Speeds [SFM]

Copy Mills

Material Group		WK15PM			WK15CM			WP20CM			WP25PM		
P	1	-	-	-	-	-	-	2165	<b>1910</b>	1770	1295	<b>1120</b>	1060
	2	-	-	-	-	-	-	1340	<b>1220</b>	1080	1080	<b>940</b>	785
	3	-	-	-	-	-	-	1220	<b>1080</b>	1000	1000	<b>845</b>	690
	4	-	-	-	-	-	-	905	<b>845</b>	750	890	<b>725</b>	590
	5	-	-	-	-	-	-	1080	<b>985</b>	905	725	<b>670</b>	590
	6	-	-	-	-	-	-	750	<b>670</b>	570	650	<b>490</b>	395
M	1	-	-	-	-	-	-	890	<b>785</b>	690	805	<b>710</b>	650
	2	-	-	-	-	-	-	805	<b>690</b>	630	725	<b>630</b>	510
	3	-	-	-	-	-	-	630	<b>570</b>	490	550	<b>475</b>	370
K	1	1060	<b>965</b>	845	1655	<b>1520</b>	1340	1415	<b>1280</b>	1165	905	<b>805</b>	725
	2	830	<b>750</b>	690	1320	<b>1165</b>	1080	1120	<b>1000</b>	925	710	<b>630</b>	590
	3	690	<b>630</b>	570	1105	<b>985</b>	905	940	<b>845</b>	785	590	<b>535</b>	475
N	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	-	-	-	155	<b>140</b>	95
	2	-	-	-	-	-	-	-	-	-	155	<b>140</b>	95
	3	-	-	-	-	-	-	-	-	-	200	<b>155</b>	95
	4	-	-	-	-	-	-	-	-	-	275	<b>200</b>	140
H	1	-	-	-	-	-	-	550	<b>450</b>	370	475	<b>355</b>	275
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-

Material Group		WS30PM			WU35PM			WP35CM			WP40PM		
P	1	-	-	-	1025	<b>905</b>	845	1790	<b>1555</b>	1460	1165	<b>1025</b>	965
	2	-	-	-	865	<b>750</b>	630	1105	<b>1000</b>	905	985	<b>845</b>	710
	3	-	-	-	785	<b>670</b>	550	1000	<b>905</b>	805	905	<b>770</b>	630
	4	-	-	-	710	<b>590</b>	475	750	<b>690</b>	630	805	<b>670</b>	535
	5	-	-	-	590	<b>535</b>	475	1025	<b>905</b>	830	670	<b>610</b>	535
	6	-	-	-	510	<b>395</b>	310	630	<b>535</b>	430	590	<b>450</b>	355
M	1	890	<b>785</b>	725	670	<b>590</b>	535	805	<b>725</b>	610	770	<b>670</b>	610
	2	805	<b>710</b>	570	610	<b>510</b>	430	725	<b>630</b>	550	690	<b>590</b>	490
	3	610	<b>535</b>	415	450	<b>395</b>	310	570	<b>510</b>	450	510	<b>450</b>	355
K	1	-	-	-	-	-	-	1165	<b>1045</b>	940	-	-	-
	2	-	-	-	-	-	-	925	<b>830</b>	750	-	-	-
	3	-	-	-	-	-	-	770	<b>690</b>	630	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	180	<b>155</b>	120	140	<b>120</b>	95	-	-	-	155	<b>140</b>	120
	2	180	<b>155</b>	120	140	<b>120</b>	95	-	-	-	155	<b>140</b>	120
	3	215	<b>180</b>	120	180	<b>140</b>	95	-	-	-	200	<b>155</b>	120
	4	335	<b>235</b>	155	235	<b>180</b>	120	260	<b>200</b>	130	260	<b>200</b>	140
H	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.



■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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At .236 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
ML	.005	<b>.007</b>	.013	.004	<b>.005</b>	.009	.003	<b>.004</b>	.007	.002	<b>.003</b>	.006	.002	<b>.003</b>	.006	ML
MM	.011	<b>.020</b>	.032	.008	<b>.014</b>	.023	.006	<b>.011</b>	.017	.005	<b>.009</b>	.015	.005	<b>.009</b>	.014	MM
MH	.018	<b>.027</b>	.040	.013	<b>.020</b>	.029	.010	<b>.015</b>	.022	.009	<b>.013</b>	.019	.008	<b>.012</b>	.017	MH

At .118 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
ML	.006	<b>.008</b>	.015	.004	<b>.006</b>	.011	.003	<b>.004</b>	.008	.003	<b>.004</b>	.007	.002	<b>.004</b>	.006	ML
MM	.013	<b>.023</b>	.038	.009	<b>.016</b>	.027	.007	<b>.012</b>	.020	.006	<b>.011</b>	.018	.005	<b>.010</b>	.016	MM
MH	.021	<b>.032</b>	.047	.015	<b>.023</b>	.033	.011	<b>.017</b>	.025	.010	<b>.015</b>	.022	.009	<b>.014</b>	.020	MH

At .059 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
ML	.007	<b>.011</b>	.020	.005	<b>.008</b>	.014	.004	<b>.006</b>	.011	.003	<b>.005</b>	.009	.003	<b>.005</b>	.008	ML
MM	.017	<b>.030</b>	.050	.012	<b>.022</b>	.035	.009	<b>.016</b>	.026	.008	<b>.014</b>	.023	.007	<b>.013</b>	.021	MM
MH	.028	<b>.042</b>	.062	.020	<b>.030</b>	.044	.015	<b>.022</b>	.033	.013	<b>.019</b>	.028	.012	<b>.018</b>	.026	MH

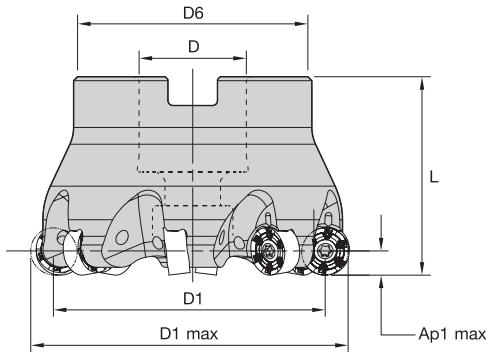
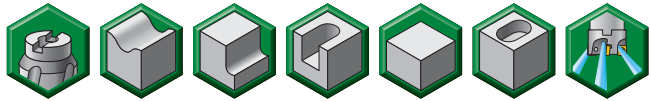
At .030 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
ML	.010	<b>.015</b>	.027	.007	<b>.011</b>	.019	.005	<b>.008</b>	.014	.005	<b>.007</b>	.013	.004	<b>.006</b>	.012	ML
MM	.023	<b>.041</b>	.068	.016	<b>.029</b>	.049	.012	<b>.022</b>	.036	.011	<b>.019</b>	.031	.010	<b>.018</b>	.029	MM
MH	.038	<b>.058</b>	.085	.027	<b>.041</b>	.060	.020	<b>.031</b>	.045	.018	<b>.027</b>	.039	.016	<b>.024</b>	.036	MH

NOTE: Use "Light Machining" value as starting feed rate.

Copy Mills

- Double-sided, 12 cutting edges.
- Anti-rotation feature for better stability and higher feed rates.
- Pocketing and profiling capabilities.



Copy Mills

■ Shell Mills

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max RPM	coolant supply	lbs
5283521	M200D200Z04S075RN16	2.000	1.370	.750	1.752	2.000	.156	4	26400	Yes	.91
5283522	M200D250Z05S100RN16	2.500	1.870	1.000	2.189	2.000	.156	5	22600	Yes	1.51
5283523	M200D300Z05S100RN16	3.000	2.370	1.000	2.189	2.000	.156	5	20100	Yes	2.01
5283524	M200D300Z07S100RN16	3.000	2.370	1.000	2.189	2.000	.156	7	20100	Yes	1.91
5283525	M200D400Z06S150RN16	4.000	3.370	1.500	3.812	2.000	.156	6	16800	Yes	3.31
5283526	M200D400Z08S150RN16	4.000	3.370	1.500	3.812	2.000	.156	8	16800	Yes	3.34

■ Spare Parts

D1 max	insert screw	in. lbs.	wrench	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw	coolant lock screw assembly
2.000	192.932	35	170.026	S445	S445CG	—	—
2.500	MS2260	35	170.026	S459	S459CG	—	—
3.000	MS2260	35	170.026	S459	S459CG	—	—
3.000	192.932	35	170.026	S459	S459CG	—	—
4.000	MS2260	35	170.026	—	—	12146110500	S2165C

NOTE: Socket-head cap screw with coolant groove and coolant lock screw assembly must be ordered separately.

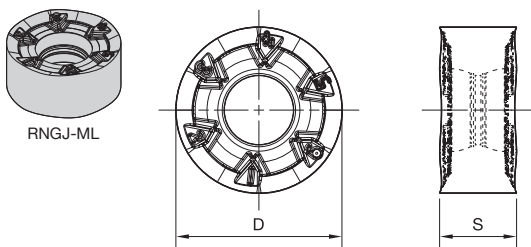
■ **Insert Selection Guide**

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	ML	WP25PM	MM	WP40PM	MM	WP40PM
P3-P4	ML	WP25PM	MM	WP25PM	MH	WP40PM
P5-P6	ML	WP35CM	MM	WP35CM	MH	WP35CM
M1-M2	ML	WP25PM	ML	WU35PM	MM	WU35PM
M3	ML	WP25PM	MM	WU35PM	MM	WU35PM
K1-K2	MH	WK15CM	MH	WK15CM	MH	WP20CM
K3	MH	WK15CM	MH	WP20CM	MH	WP35CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	ML	WS30PM	ML	WS30PM	ML	WU35PM
S3	ML	WS30PM	ML	WU35PM	ML	WU35PM
S4	ML	WS30PM	ML	WU35PM	ML	WU35PM
H1	MH	WP25PM	MH	WP20CM	-	-



Copy Mills

iC16 • Inserts • RN.J16...



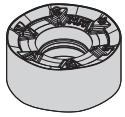
• -ML geometry is the first choice for stainless steel and high-temp alloys.

● first choice  
○ alternate choice

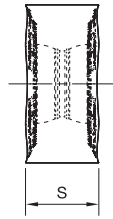
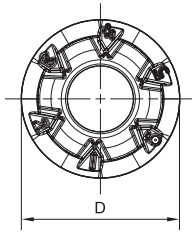
P	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○
N	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○

■ **RNgJ-ML**

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNgJ1605M0EML	12	.630	.250	-	-	5274561	5520354	5274562	5274560	-



RNPJ-MM  
RNPJ-MH



- -MM geometry is for general purpose, especially for steel.
- -MH geometry is the first choice for heavy applications, cast iron, and high-strength steels.

- first choice
- alternate choice

P	●	●	●	●	●	●	●	●	●	●	●
M	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○

■ RNPJ-MM

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNPJ1605M0SMM	12	.630	.250	○	●	●	○	○	○	○

■ RNPJ-MH

catalog number	cutting edges	D	S	WK15CM	WP20CM	WP25PM	WS30PM	WU35PM	WP35CM	WP40PM
RNPJ1605M0SMH	12	.630	.250	●	○	○	○	○	○	○

Recommended Starting Speeds

■ Recommended Starting Speeds [SFM]

Material Group		WK15CM			WP20CM			WP25PM			WS30PM		
P	1	-	-	-	2165	1910	1770	1295	1120	1060	-	-	-
	2	-	-	-	1340	1220	1080	1080	940	785	-	-	-
	3	-	-	-	1220	1080	1000	1000	845	690	-	-	-
	4	-	-	-	905	845	750	890	725	590	-	-	-
	5	-	-	-	1080	985	905	725	670	590	-	-	-
	6	-	-	-	750	670	570	650	490	395	-	-	-
M	1	-	-	-	890	785	690	805	710	650	890	785	725
	2	-	-	-	805	690	630	725	630	510	805	710	570
	3	-	-	-	630	570	490	550	475	370	610	535	415
K	1	1655	1520	1340	1415	1280	1165	905	805	725	-	-	-
	2	1320	1165	1080	1120	1000	925	710	630	590	-	-	-
	3	1105	985	905	940	845	785	590	535	475	-	-	-
N	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	155	140	95	180	155	120
	2	-	-	-	-	-	-	155	140	95	180	155	120
	3	-	-	-	-	-	-	200	155	95	215	180	120
	4	-	-	-	-	-	-	275	200	140	335	235	155
H	1	-	-	-	550	450	370	475	355	275	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-

(continued)

(Recommended Starting Speeds [SFM] — continued)

Material Group		WU35PM			WP35CM			WP40PM		
<b>P</b>	1	1025	<b>905</b>	845	1790	<b>1555</b>	1460	1165	<b>1025</b>	965
	2	865	<b>750</b>	630	1105	<b>1000</b>	905	985	<b>845</b>	710
	3	785	<b>670</b>	550	1000	<b>905</b>	805	905	<b>770</b>	630
	4	710	<b>590</b>	475	750	<b>690</b>	630	805	<b>670</b>	535
	5	590	<b>535</b>	475	1025	<b>905</b>	830	670	<b>610</b>	535
	6	510	<b>395</b>	310	630	<b>535</b>	430	590	<b>450</b>	355
<b>M</b>	1	670	<b>590</b>	535	805	<b>725</b>	610	770	<b>670</b>	610
	2	610	<b>510</b>	430	725	<b>630</b>	550	690	<b>590</b>	490
	3	450	<b>395</b>	310	570	<b>510</b>	450	510	<b>450</b>	355
<b>K</b>	1	-	-	-	1165	<b>1045</b>	940	-	-	-
	2	-	-	-	925	<b>830</b>	750	-	-	-
	3	-	-	-	770	<b>690</b>	630	-	-	-
<b>N</b>	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
<b>S</b>	1	140	<b>120</b>	95	-	-	-	155	<b>140</b>	120
	2	140	<b>120</b>	95	-	-	-	155	<b>140</b>	120
	3	180	<b>140</b>	95	-	-	-	200	<b>155</b>	120
	4	235	<b>180</b>	120	260	<b>200</b>	130	260	<b>200</b>	140
<b>H</b>	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

At .315 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)														Insert Geometry	
	5%			10%			20%			30%			40-100%			
ML	.005	<b>.015</b>	.019	.004	<b>.011</b>	.014	.003	<b>.008</b>	.010	.002	<b>.007</b>	.009	.002	<b>.006</b>	.008	ML
MM	.011	<b>.027</b>	.032	.008	<b>.020</b>	.023	.006	<b>.015</b>	.017	.005	<b>.013</b>	.015	.005	<b>.012</b>	.014	MM
MH	.021	<b>.027</b>	.046	.015	<b>.020</b>	.033	.011	<b>.015</b>	.025	.010	<b>.013</b>	.021	.009	<b>.012</b>	.020	MH

At .157 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)														Insert Geometry	
	5%			10%			20%			30%			40-100%			
ML	.006	<b>.017</b>	.022	.004	<b>.012</b>	.016	.003	<b>.009</b>	.012	.003	<b>.008</b>	.010	.002	<b>.007</b>	.010	ML
MM	.013	<b>.032</b>	.037	.009	<b>.023</b>	.026	.007	<b>.017</b>	.020	.006	<b>.015</b>	.017	.006	<b>.014</b>	.016	MM
MH	.024	<b>.032</b>	.053	.018	<b>.023</b>	.038	.013	<b>.017</b>	.029	.011	<b>.015</b>	.025	.010	<b>.014</b>	.023	MH

At .079 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)														Insert Geometry	
	5%			10%			20%			30%			40-100%			
ML	.007	<b>.022</b>	.029	.005	<b>.016</b>	.021	.004	<b>.012</b>	.016	.003	<b>.010</b>	.014	.003	<b>.010</b>	.012	ML
MM	.017	<b>.042</b>	.048	.012	<b>.030</b>	.035	.009	<b>.022</b>	.026	.008	<b>.019</b>	.022	.007	<b>.018</b>	.021	MM
MH	.032	<b>.042</b>	.071	.023	<b>.030</b>	.050	.017	<b>.022</b>	.037	.015	<b>.019</b>	.033	.014	<b>.018</b>	.030	MH

At .039 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)														Insert Geometry	
	5%			10%			20%			30%			40-100%			
ML	.010	<b>.030</b>	.040	.007	<b>.022</b>	.029	.005	<b>.016</b>	.021	.005	<b>.014</b>	.019	.004	<b>.013</b>	.017	ML
MM	.023	<b>.058</b>	.067	.017	<b>.041</b>	.047	.012	<b>.031</b>	.035	.011	<b>.027</b>	.031	.010	<b>.024</b>	.028	MM
MH	.044	<b>.058</b>	.098	.031	<b>.041</b>	.069	.023	<b>.031</b>	.051	.020	<b>.027</b>	.044	.019	<b>.024</b>	.041	MH

NOTE: Use "Light Machining" value as starting feed rate.

Ideal for Die and Mold Applications •

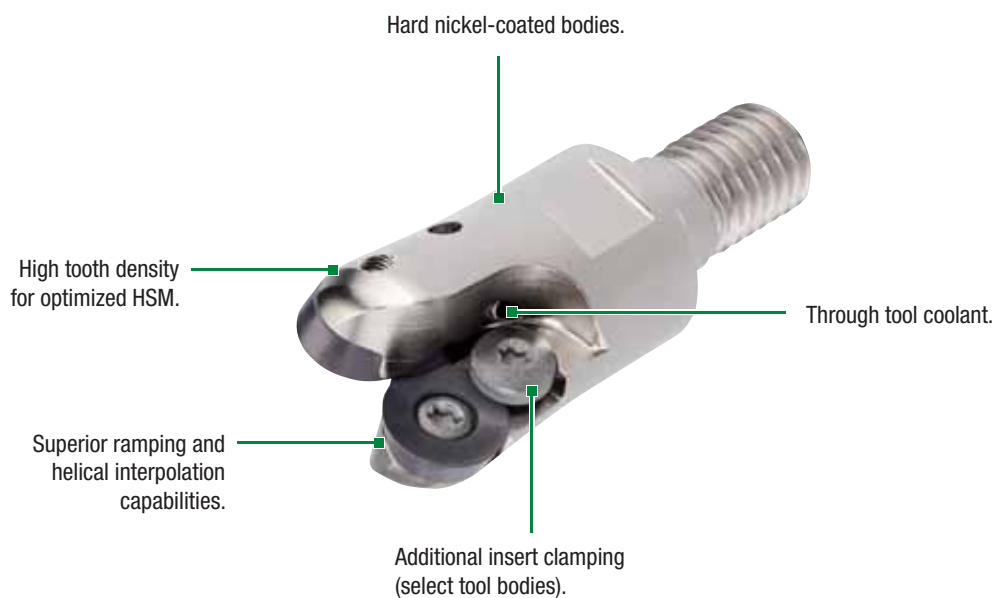
## M170™ Series



# M170

Specially engineered with industry standard insert sizes, the M170 Series offers the highest performance rates for best-in-class cost efficiency, high-strength steel, and hard machining capability, and a strong, solid cutter body designed for maximum performance.

- Nickel-coated cutter bodies ensure improved tool life and chip flow.
- Screw-on end mills and shell mills.
- High tooth density for optimized HSM.
- High-accuracy PSTS inserts are ideal for die and mold manufacturing.



**Copy Mills**

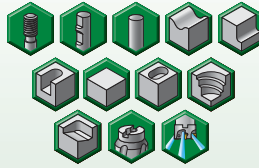


**M170™**

**Max depth of cut: 8mm**

Indexes per insert: 6  
Diameter: 12–125mm

**Pages: K44–K72**



*These products are available for metric only.*

**■ Insert Offering**



**iC07**

7mm iC insert RD.X  
Up to 3,5mm Ap max.  
Diameter range  
12–35mm



**iC10**

10mm iC insert RDPX  
Up to 5mm Ap max.  
Diameter range  
20–52mm



**iC12**

12mm iC insert RDPX  
Up to 6mm Ap max.  
Diameter range  
24–100mm

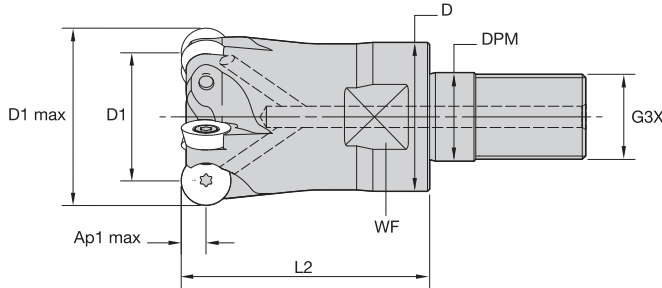
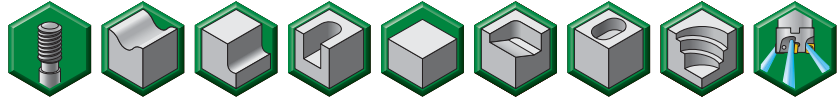


**iC16**

16mm iC insert RDPX  
Up to 8mm Ap max.  
Diameter range  
32–125mm

These products are available for metric only.

- Longer cutter tool life.
- Premium nickel-coated bodies.
- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



■ Screw-On End Mills

order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3935336	M170D012Z02M06RD07T	12	5	10	6,5	M6	18	7	3,5	2	22.0°	26200	Yes	0,02
3935337	M170D012Z02M08RD07T	12	5	13	8,5	M8	23	10	3,5	2	22.0°	26200	Yes	0,02
3935338	M170D015Z03M08RD07T	15	8	13	8,5	M8	18	10	3,5	3	11.0°	21200	Yes	0,02

■ Spare Parts



D1 max	insert screw	Nm	Torx driver
12	193.364	1,0	12147549000
15	193.364	1,0	12147549000

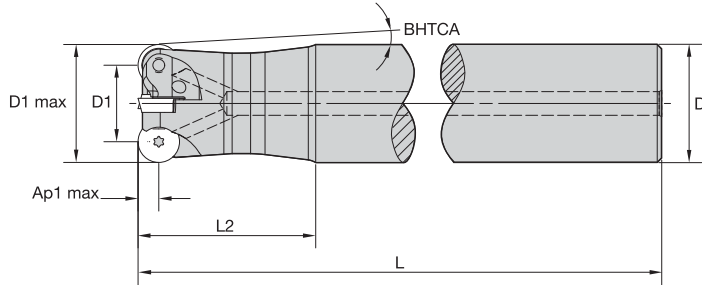
NOTE: All spare parts except the insert screws must be ordered separately.

Copy Mills



*These products are available for metric only.*

- Longer cutter tool life.
- Premium nickel-coated bodies.
- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



■ **Cylindrical Shanks**

order number	catalog number	D1 max	D1	D	L	L2	BHTCA	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3935339	M170D012Z02A12RD07TL100	12	5	12	100	20	—	3,5	2	22.0°	26200	Yes	0,07
3935340	M170D012Z02A16RD07TL120	12	5	16	120	60	2.0°	3,5	2	22.0°	26200	Yes	0,14
3935341	M170D012Z02A16RD07TL140	12	5	16	140	80	1.5°	3,5	2	22.0°	26200	Yes	0,16
3935342	M170D015Z03A16RD07TL130	15	8	16	130	60	0.5°	3,5	3	11.0°	21200	Yes	0,13

■ **Spare Parts**



insert screw



Nm



Torx driver

D1 max	insert screw	Nm	Torx driver
12	193.364	1,0	12147549000
15	193.364	1,0	12147549000

NOTE: All spare parts except the insert screws must be ordered separately.

Copy Mills

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	-	-	-	-	-	-
P3-P4	MH	TN2505	MH	TN6525	MH	TN6540
P5-P6	MH	TN2505	MH	TN6525	MH	TN6540
M1-M2	-	-	-	-	-	-
M3	-	-	-	-	-	-
K1-K2	MH	TN2505	MH	TN2505	MH	TN6525
K3	MH	TN2505	MH	TN2505	MH	TN6525
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	-	-	-	-
S3	-	-	-	-	-	-
S4	-	-	-	-	-	-
H1	MH	TN2505	MH	TN2505	-	-

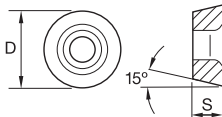
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iC07 • Inserts

*These products are available for metric only.*



RDHX-MH



- MH geometry is suitable for high-strength steels, cast iron, and hard machining.

- first choice
- alternate choice

P	●	○	○	○
M	●	○	○	○
K	●	○	○	○
N	○	○	○	○
S	○	○	○	○
H	●	○	○	○

■ RDHX-MH

catalog number	D	S	hm		TN2505	TN6525	TN6540
RDHX07T1M0SNMH	7,00	1,98	0,08		●	○	○
					3960578	3960573	3960532

■ Recommended Starting Speeds [m/min]

Material Group		TN2505			TN6525			TN6540		
P	1	-	-	-	410	<b>320</b>	280	360	<b>280</b>	240
	2	-	-	-	320	<b>250</b>	215	250	<b>190</b>	170
	3	-	-	-	280	<b>215</b>	185	215	<b>170</b>	140
	4	-	-	-	235	<b>170</b>	145	180	<b>130</b>	110
	5	-	-	-	310	<b>235</b>	200	240	<b>180</b>	150
	6	-	-	-	205	<b>160</b>	130	160	<b>120</b>	100
M	1	-	-	-	190	<b>120</b>	80	130	<b>80</b>	60
	2	-	-	-	120	<b>80</b>	50	80	<b>50</b>	40
	3	-	-	-	125	<b>80</b>	55	85	<b>50</b>	40
K	1	400	<b>300</b>	250	275	<b>245</b>	220	220	<b>205</b>	180
	2	540	<b>365</b>	280	215	<b>190</b>	180	175	<b>155</b>	140
	3	310	<b>190</b>	155	180	<b>160</b>	145	155	<b>145</b>	125
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	50	<b>35</b>	30
	2	-	-	-	-	-	-	25	<b>20</b>	10
	3	-	-	-	-	-	-	70	<b>40</b>	30
	4	-	-	-	-	-	-	60	<b>30</b>	25
H	1	175	<b>140</b>	95	-	-	-	-	-	-
	2	175	<b>140</b>	95	-	-	-	-	-	-
	3	140	<b>115</b>	80	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Copy Mills

Recommended Starting Feeds

■ Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

At 3,50 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MH	0,23	<b>0,46</b>	0,74	0,17	<b>0,33</b>	0,54	0,13	<b>0,25</b>	0,40	0,11	<b>0,22</b>	0,35	0,10	<b>0,20</b>	0,32	MH

At 1,50 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MH	0,28	<b>0,56</b>	0,91	0,20	<b>0,41</b>	0,65	0,15	<b>0,31</b>	0,49	0,13	<b>0,27</b>	0,43	0,12	<b>0,24</b>	0,39	MH

At 0,75 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MH	0,37	<b>0,75</b>	1,21	0,27	<b>0,54</b>	0,87	0,20	<b>0,40</b>	0,65	0,18	<b>0,35</b>	0,56	0,16	<b>0,32</b>	0,52	MH

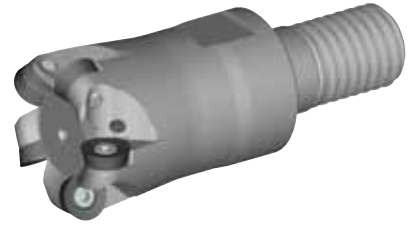
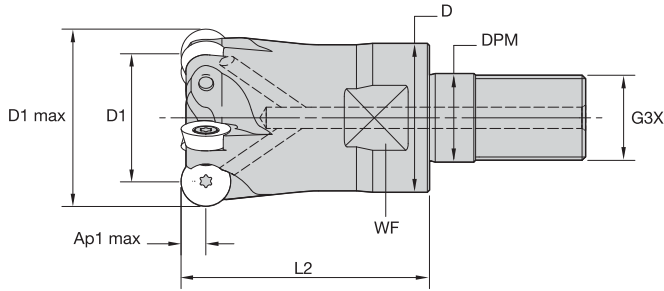
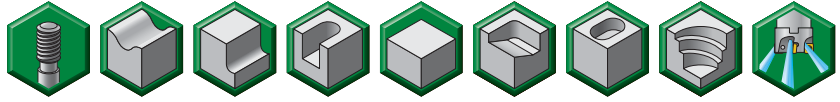
At 0,50 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MH	0,45	<b>0,91</b>	1,47	0,32	<b>0,65</b>	1,05	0,24	<b>0,49</b>	0,78	0,21	<b>0,42</b>	0,68	0,19	<b>0,39</b>	0,62	MH

NOTE: Use "Light Machining" value as starting feed rate.

*These products are available for metric only.*

- Premium nickel-coated bodies.
- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



■ **Screw-On End Mills**

order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3926607	M170D015Z02M08RD07	15	8	13	8,5	M8	23	10	3,5	2	18.0°	21200	Yes	0,03
3926608	M170D016Z03M08RD07	16	9	13	8,5	M8	23	10	3,5	3	9.0°	21200	Yes	0,03
3926609	M170D020Z04M10RD07	20	13	18	10,5	M10	30	14	3,5	4	12.5°	19600	Yes	0,06
3926610	M170D025Z05M12RD07	25	18	21	12,5	M12	35	19	3,5	5	8.5°	12700	Yes	0,10
3926611	M170D030Z05M16RD07	30	23	29	17,0	M16	43	22	3,5	5	6.5°	10600	Yes	0,20
3926612	M170D035Z06M16RD07	35	28	29	17,0	M16	43	22	3,5	6	4.8°	9900	Yes	0,23

■ **Spare Parts**



insert screw

193.341



Nm

1,0



Torx

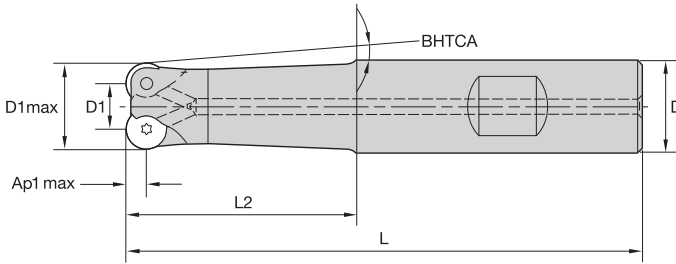
12147549000

NOTE: All spare parts except the insert screws must be ordered separately.

Copy Mills

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- Ideally suited for die and mold manufacturing.



■ **Weldon Shanks**

order number	catalog number	D1 max	D1	D	L	L2	BHTCA	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3929403	M170D015Z02B16RD07	15	8	16	90	40	1.0°	3,5	2	18.0°	21200	Yes	0,11

■ **Spare Parts**

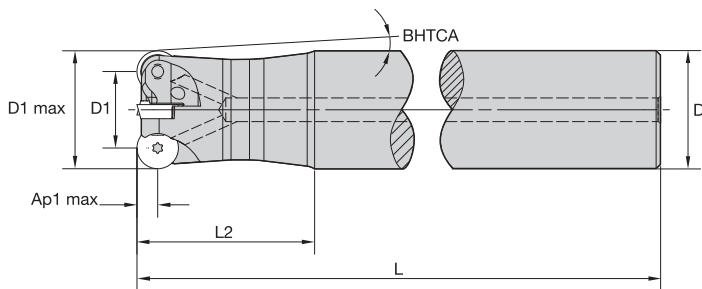
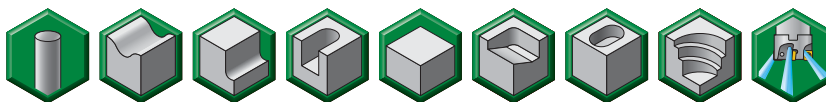
D1 max	insert screw	Nm	Torx driver
15	193.341	1,0	12147549000

NOTE: All spare parts except the insert screws must be ordered separately.

Copy Mills

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- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



■ Cylindrical Shanks

order number	catalog number	D1 max	D1	D	L	L2	BHTCA	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3929404	M170D015Z02A16RD07L110	15	8	16	110	60	0.5°	3,5	2	18.0°	21200	Yes	0,14
3929405	M170D015Z02A16RD07L150	15	8	16	150	60	0.5°	3,5	2	18.0°	21200	Yes	0,20
3929407	M170D016Z02A16RD07L150	16	9	16	150	30	—	3,5	2	9.0°	21200	Yes	0,21
3929406	M170D016Z03A16RD07L110	16	9	16	110	20	—	3,5	3	9.0°	21200	Yes	0,16
3929409	M170D020Z03A20RD07L140	20	13	20	140	40	—	3,5	3	12.0°	10600	Yes	0,29
3929408	M170D020Z04A20RD07L115	20	13	20	115	30	—	3,5	4	12.0°	10600	Yes	0,25

■ Spare Parts



D1 max	insert screw	Nm	Torx driver
15	193.341	1,0	12147549000
16	193.341	1,0	12147549000
20	193.341	1,0	12147549000

NOTE: All spare parts except the insert screws must be ordered separately.

Copy Mills

■ Insert Selection Guide

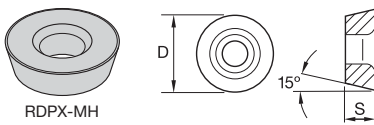
Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	-	-	-	-	-	-
P3-P4	MH	TN2505	MH	TN6525	MH	TN6540
P5-P6	MH	TN2505	MH	TN6525	MH	TN6540
M1-M2	-	-	-	-	-	-
M3	-	-	-	-	-	-
K1-K2	MH	TN2505	MH	TN2505	MH	TN6525
K3	MH	TN2505	MH	TN2505	MH	TN6525
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	-	-	-	-
S3	-	-	-	-	-	-
S4	-	-	-	-	-	-
H1	MH	TN2505	MH	TN2505	-	-



Copy Mills

iC07 • Inserts

*These products are available for metric only.*



- -MH geometry is suitable for high-strength steels, cast iron, and hard machining.

- first choice
- alternate choice

P	●	○	○	○
M	●	○	○	○
K	●	○	○	○
N	○	○	○	○
S	○	○	○	○
H	●	○	○	○

■ RDPX-MH

catalog number	D	S	hm													
RDPX0702M0SNMH	7,00	2,38	0,08	<table border="1"> <tr> <td>3959627</td> <td>TN2505</td> <td></td> <td></td> </tr> <tr> <td>3959626</td> <td>TN6525</td> <td></td> <td></td> </tr> <tr> <td>3959625</td> <td>TN6540</td> <td></td> <td></td> </tr> </table>	3959627	TN2505			3959626	TN6525			3959625	TN6540		
3959627	TN2505															
3959626	TN6525															
3959625	TN6540															

■ Recommended Starting Speeds [m/min]

Material Group		TN2505			TN6525			TN6540		
P	1	-	-	-	410	<b>320</b>	280	360	<b>280</b>	240
	2	-	-	-	320	<b>250</b>	215	250	<b>190</b>	170
	3	-	-	-	280	<b>215</b>	185	215	<b>170</b>	140
	4	-	-	-	235	<b>170</b>	145	180	<b>130</b>	110
	5	-	-	-	310	<b>235</b>	200	240	<b>180</b>	150
	6	-	-	-	205	<b>160</b>	130	160	<b>120</b>	100
M	1	-	-	-	190	<b>120</b>	80	130	<b>80</b>	60
	2	-	-	-	120	<b>80</b>	50	80	<b>50</b>	40
	3	-	-	-	125	<b>80</b>	55	85	<b>50</b>	40
K	1	400	<b>300</b>	250	275	<b>245</b>	220	220	<b>205</b>	180
	2	540	<b>365</b>	280	215	<b>190</b>	180	175	<b>155</b>	140
	3	310	<b>190</b>	155	180	<b>160</b>	145	155	<b>145</b>	125
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	50	<b>35</b>	30
	2	-	-	-	-	-	-	25	<b>20</b>	10
	3	-	-	-	-	-	-	70	<b>40</b>	30
	4	-	-	-	-	-	-	60	<b>30</b>	25
H	1	175	<b>140</b>	95	-	-	-	-	-	-
	2	175	<b>140</b>	95	-	-	-	-	-	-
	3	140	<b>115</b>	80	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

At 3,50 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MH	0,23	<b>0,46</b>	0,74	0,17	<b>0,33</b>	0,54	0,13	<b>0,25</b>	0,40	0,11	<b>0,22</b>	0,35	0,10	<b>0,20</b>	0,32	MH

At 1,50 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MH	0,28	<b>0,56</b>	0,91	0,20	<b>0,41</b>	0,65	0,15	<b>0,31</b>	0,49	0,13	<b>0,27</b>	0,43	0,12	<b>0,24</b>	0,39	MH

At 0,75 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MH	0,37	<b>0,75</b>	1,21	0,27	<b>0,54</b>	0,87	0,20	<b>0,40</b>	0,65	0,18	<b>0,35</b>	0,56	0,16	<b>0,32</b>	0,52	MH

At 0,50 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MH	0,45	<b>0,91</b>	1,47	0,32	<b>0,65</b>	1,05	0,24	<b>0,49</b>	0,78	0,21	<b>0,42</b>	0,68	0,19	<b>0,39</b>	0,62	MH

NOTE: Use "Light Machining" value as starting feed rate.

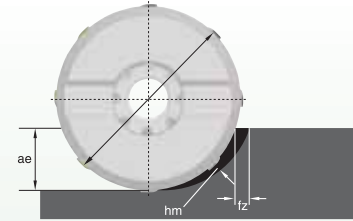
Copy Mills



## Selecting the Correct Cutting Values

### 1. fz depends on the Ap1 and ae values

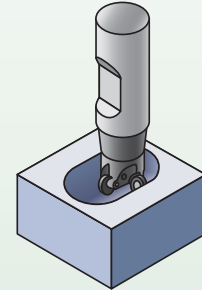
With round inserts, two factors can affect the hm: Ap1 and ae. fz has to be adjusted accordingly.



Recommended Starting Feed Rate Values (fz) Related to the Ap1 and ae Values:

ae engagement	10%	20%	30%	40%	50%	100%
Ap1 = 0,5mm	0,59mm	0,42mm	0,34mm	0,30mm	0,26mm	0,19mm
Ap1 = 0,75mm	0,50mm	0,36mm	0,29mm	0,25mm	0,22mm	0,16mm
Ap1 = 1mm	0,42mm	0,30mm	0,24mm	0,21mm	0,19mm	0,13mm
Ap1 = 1,5mm	0,34mm	0,24mm	0,20mm	0,17mm	0,15mm	0,11mm
Ap1 = 3,5mm	0,22mm	0,16mm	0,13mm	0,11mm	0,10mm	0,08mm

Example application highlighted.



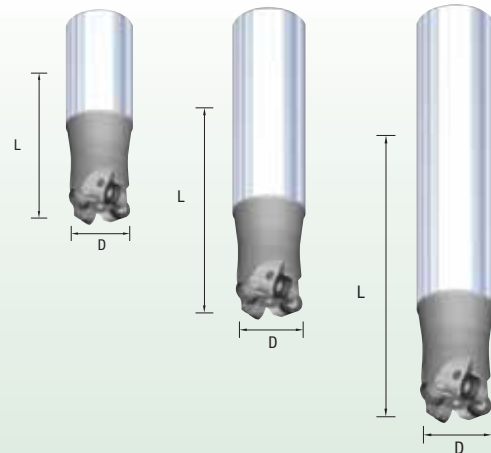
Example Cutting Conditions for RD..07... Insert in Pocketing, L/D ratio = 2 x D:

insert = RDPX0702M0SNMH		TN2505			TN6525			TN6540		
		feed per tooth fz (mm)/ae>50%								
		min	med	max	min	med	max	min	med	max
ae>50%	Recommended starting Ap1 = 0,5mm	0,19mm	0,22mm	0,30mm	0,19mm	0,30mm	0,35mm	0,19mm	0,30mm	50,4mm

### 2. Ap1 and vc corrections depend on L/D ratio

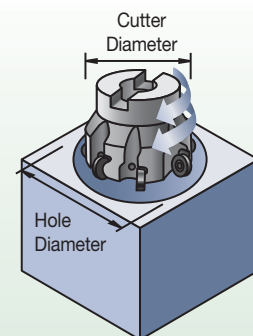
With increasing L/D ratios, or overhang, vibrations can occur due to reduced rigidity. To ensure successful application, it is recommended to adjust Ap1 and vc values according to the following table:

L/D ratio	% of Ap1 max to reduce	% of vc to reduce
<2	0%	0%
2<L/D<4	65-75%	10-15%
>4	80-95%	20-40%



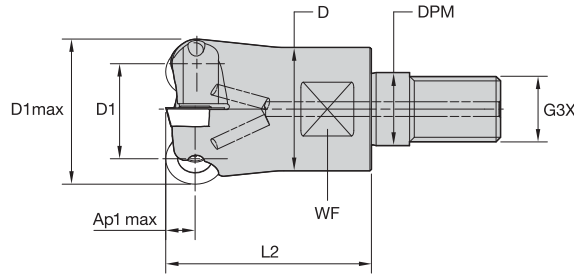
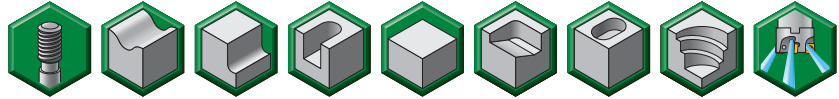
### Recommended Cutting Conditions • Helical Interpolation from Solid

cutter diameter	min hole diameter	max hole diameter (flat bottom)	Ap1 max per revolution	max ramp angle	Ap1 max when plunging
12	17mm	17mm	3,5mm	22°	1mm
15	18mm	23mm	2,8mm	18°	2,2mm
16	20mm	25mm	1,9mm	9°	1,4mm
20	28mm	33mm	3,5mm	12°	1,5mm
25	36,5mm	43mm	3,5mm	8,5°	2,5mm
30	46,4mm	53mm	3,5mm	6,5°	2,5mm



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- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



■ Screw-On End Mills

order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3934647	M170D020Z02M10RD10	20	10	18	10,5	M10	30	15	5,0	2	20.0°	15900	Yes	0,06
3934648	M170D025Z02M12RD10	25	15	21	12,5	M12	35	19	5,0	2	8.0°	12800	Yes	0,10
3934649	M170D025Z03M12RD10	25	15	21	12,5	M12	35	19	5,0	3	8.0°	12800	Yes	0,10
3934650	M170D030Z04M16RD10	30	20	29	17,0	M16	43	22	5,0	4	10.0°	10600	Yes	0,24
3934651	M170D035Z05M16RD10	35	25	29	17,0	M16	45	22	5,0	5	8.5°	9100	Yes	0,23
3934652	M170D042Z06M16RD10	42	32	29	17,0	M16	45	22	5,0	6	6.0°	7800	Yes	0,28

■ Spare Parts



insert screw

193.342



Nm

3,5



Torx driver

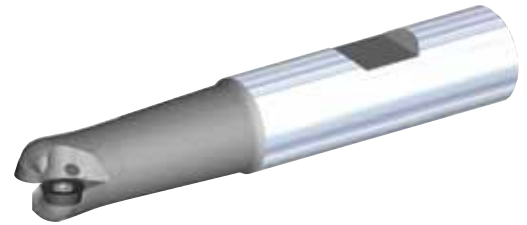
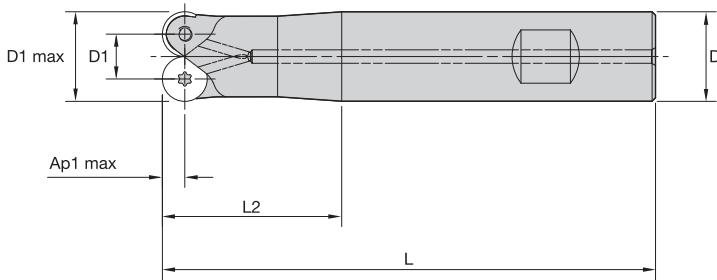
12148082400

NOTE: All spare parts except the insert screws must be ordered separately.

Copy Mills

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■ **Weldon Shanks**

order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3940703	M170D020Z02B20RD10	20	10	20	110	40	5,0	2	20.0°	15900	Yes	0,24
3940708	M170D025Z03B25RD10	25	15	25	110	40	5,0	3	9.0°	12900	Yes	0,35

■ **Spare Parts**



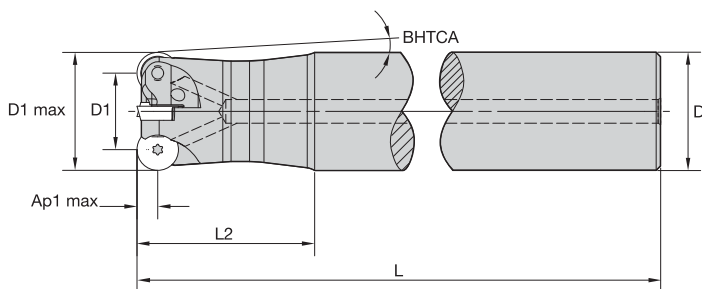
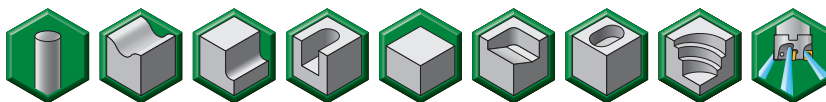
D1 max	insert screw	Nm	Torx driver
20	193.342	3,5	12148082400
25	193.342	3,5	12148082400

NOTE: All spare parts except the insert screws must be ordered separately.

Copy Mills

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- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



■ Cylindrical Shanks

order number	catalog number	D1 max	D1	D	L	L2	BHTCA	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3940704	M170D020Z02A20RD10L140	20	10	20	140	60	—	5,0	2	20.0°	15900	Yes	0,30
3940705	M170D020Z02A25RD10L160	20	10	25	160	80	2.0°	5,0	2	20.0°	15900	Yes	0,48
3940706	M170D020Z02A25RD10L180	20	10	25	180	100	1.5°	5,0	2	20.0°	15900	Yes	0,53
3940707	M170D022Z02A20RD10L160	22	12	20	160	40	—	5,0	2	12.0°	14400	Yes	0,35
3940709	M170D025Z02A25RD10L180	25	15	25	180	70	—	5,0	2	9.0°	12800	Yes	0,61
3940710	M170D025Z02A25RD10L220	25	15	25	220	100	—	5,0	2	9.0°	12800	Yes	0,74
3940711	M170D028Z02A25RD10L200	28	18	25	200	40	—	5,0	2	15.0°	11300	Yes	0,74

■ Spare Parts



insert screw

193.342



Nm

3,5



Torx driver

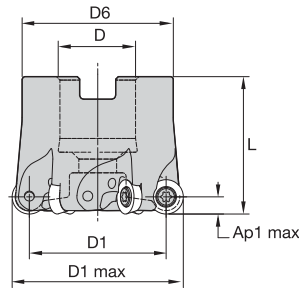
12148082400

NOTE: All spare parts except the insert screws must be ordered separately.

Copy Mills

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- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



■ **Shell Mills**

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3940712	M170D040Z05RD10	40	30	16	37	40	5,0	5	7.2°	9950	Yes	0,28
3940723	M170D042Z05RD10	42	32	16	37	40	5,0	5	5.8°	9500	Yes	0,28
3940724	M170D050Z06RD10	50	40	22	44	40	5,0	6	5.2°	7950	Yes	0,35
3940725	M170D052Z06RD10	52	42	22	44	50	5,0	6	3.0°	7650	Yes	0,51

■ **Spare Parts**

D1 max	insert screw	Nm	Torx driver	socket-head cap screw	low-head cap screw	socket-head cap screw with coolant groove
40	193.342	3,5	12148082400	MS1294	—	MS1294CG
42	193.342	3,5	12148082400	MS1294	—	MS1294CG
50	193.342	3,5	12148082400	—	129.025	MS2072CG
52	193.342	3,5	12148082400	—	129.025	MS2072CG

NOTE: All spare parts except the insert screws must be ordered separately.

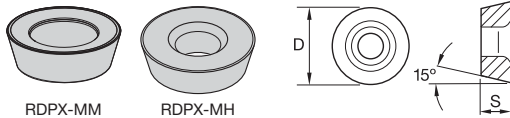
■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	MM	TN6525	MM	TN6525	MM	TN6540
P3-P4	MH	TN2505	MH	TN6525	MH	TN6540
P5-P6	MH	TN2505	MH	TN6525	MH	TN6540
M1-M2	-	-	MM	TN6525	MM	TN6540
M3	-	-	MM	TN6525	MM	TN6540
K1-K2	MH	TN2505	MH	TN2505	MH	TN6525
K3	MH	TN2505	MH	TN2505	MH	TN6525
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	MM	TN6540	-	-
S3	-	-	MM	TN6540	-	-
S4	-	-	MM	TN6540	-	-
H1	MH	TN2505	MH	TN2505	-	-

Copy Mills

iC10 • Inserts

*These products are available for metric only.*



- first choice
- alternate choice

- -MM geometry is the best option for general-purpose use, materials, and applications. Used for reduced cutting forces.

■ RDPX-MM

catalog number	D	S	hm	TN2505	TN6525	TN6540
RDPX1003M0SNMM	10,00	3,18	0,11	●	○	○

- -MH geometry is the first choice for heavy machining.
- Suitable for high-strength steels, cast iron, and hard machining.

■ RDPX-MH

catalog number	D	S	hm	TN2505	TN6525	TN6540
RDPX1003M0SNMH	10,00	3,18	0,12	●	○	○

P	●	○	○	○	○	○
M	●	○	○	○	○	○
K	●	○	○	○	○	○
N	○	○	○	○	○	○
S	○	○	○	○	○	○
H	○	○	○	○	○	○

■ Recommended Starting Speeds [m/min]

Material Group		TN2505			TN6525			TN6540		
P	1	-	-	-	410	<b>320</b>	280	360	<b>280</b>	240
	2	-	-	-	320	<b>250</b>	215	250	<b>190</b>	170
	3	-	-	-	280	<b>215</b>	185	215	<b>170</b>	140
	4	-	-	-	235	<b>170</b>	145	180	<b>130</b>	110
	5	-	-	-	310	<b>235</b>	200	240	<b>180</b>	150
	6	-	-	-	205	<b>160</b>	130	160	<b>120</b>	100
M	1	-	-	-	190	<b>120</b>	80	130	<b>80</b>	60
	2	-	-	-	120	<b>80</b>	50	80	<b>50</b>	40
	3	-	-	-	125	<b>80</b>	55	85	<b>50</b>	40
K	1	400	<b>300</b>	250	275	<b>245</b>	220	220	<b>205</b>	180
	2	540	<b>365</b>	280	215	<b>190</b>	180	175	<b>155</b>	140
	3	310	<b>190</b>	155	180	<b>160</b>	145	155	<b>145</b>	125
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	50	<b>35</b>	30
	2	-	-	-	-	-	-	25	<b>20</b>	10
	3	-	-	-	-	-	-	70	<b>40</b>	30
	4	-	-	-	-	-	-	60	<b>30</b>	25
H	1	175	<b>140</b>	95	-	-	-	-	-	-
	2	175	<b>140</b>	95	-	-	-	-	-	-
	3	140	<b>115</b>	80	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining
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At 5,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,28	<b>0,41</b>	0,74	0,20	<b>0,29</b>	0,53	0,15	<b>0,22</b>	0,4	0,13	<b>0,19</b>	0,35	0,12	<b>0,18</b>	0,32	MM
MH	0,33	<b>0,58</b>	0,98	0,24	<b>0,42</b>	0,71	0,18	<b>0,32</b>	0,53	0,16	<b>0,28</b>	0,46	0,14	<b>0,25</b>	0,42	MH

At 2,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,35	<b>0,51</b>	0,93	0,25	<b>0,37</b>	0,67	0,19	<b>0,28</b>	0,50	0,17	<b>0,24</b>	0,44	0,15	<b>0,22</b>	0,40	MM
MH	0,42	<b>0,73</b>	1,23	0,30	<b>0,53</b>	0,88	0,23	<b>0,39</b>	0,66	0,20	<b>0,34</b>	0,57	0,18	<b>0,32</b>	0,53	MH

At 1,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,47	<b>0,68</b>	1,25	0,34	<b>0,49</b>	0,89	0,25	<b>0,37</b>	0,67	0,22	<b>0,32</b>	0,58	0,20	<b>0,29</b>	0,53	MM
MH	0,56	<b>0,98</b>	1,66	0,40	<b>0,71</b>	1,18	0,30	<b>0,53</b>	0,88	0,26	<b>0,46</b>	0,76	0,24	<b>0,42</b>	0,70	MH

At 0,50 Axial Depth of Cut (ap)

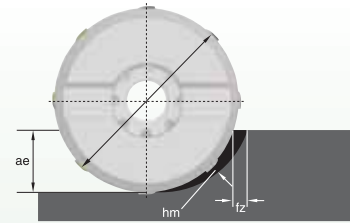
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,64	<b>0,94</b>	1,73	0,46	<b>0,68</b>	1,24	0,35	<b>0,51</b>	0,92	0,30	<b>0,44</b>	0,80	0,28	<b>0,40</b>	0,73	MM
MH	0,77	<b>1,36</b>	2,31	0,55	<b>0,97</b>	1,63	0,41	<b>0,73</b>	1,21	0,36	<b>0,63</b>	1,05	0,33	<b>0,58</b>	0,96	MH

NOTE: Use "Light Machining" value as starting feed rate.

## Selecting the Correct Cutting Values

### 1. fz depends on the Ap1 and ae values

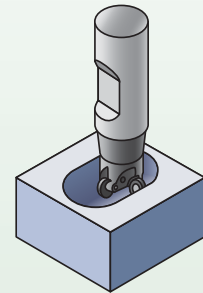
With round inserts, two factors can affect the hm: Ap1 and ae. fz has to be adjusted accordingly.



Recommended Starting Feed Rate Values (fz) Related to the Ap1 and ae Values:

ae engagement	10%	20%	30%	40%	50%	100%
Ap1 = 0,5mm	1,18mm	0,70mm	0,63mm	0,56mm	0,50mm	0,35mm
Ap1 = 0,75mm	0,95mm	0,62mm	0,56mm	0,50mm	0,45mm	0,30mm
Ap1 = 1mm	0,80mm	0,57mm	0,46mm	0,40mm	0,36mm	0,25mm
Ap1 = 2mm	0,57mm	0,40mm	0,33mm	0,28mm	0,25mm	0,18mm
Ap1 = 3mm	0,46mm	0,33mm	0,27mm	0,23mm	0,21mm	0,15mm
Ap1 = 5mm	0,36mm	0,25mm	0,21mm	0,18mm	0,16mm	0,11mm

Example application highlighted.



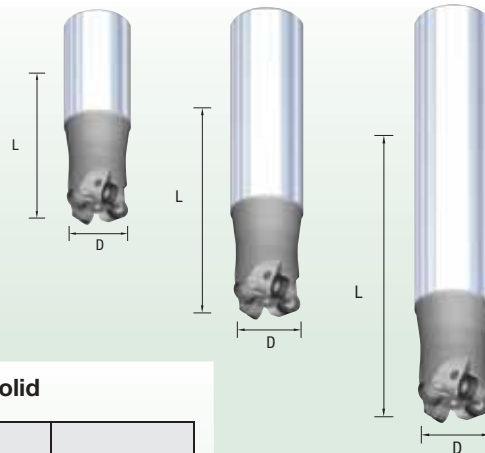
Example Cutting Conditions for RD..10... Insert in Pocketing, L/D ratio = 2 x D:

insert = RDPX1003M0SN			TN2505			TN6525			TN6540		
			feed per tooth fz (mm)/ae>50%								
			min	med	max	min	med	max	min	med	max
Edge Geometry MM	ae>50%	Recommended starting Ap1 = 1mm	-	-	-	0,25mm	0,30mm	0,40mm	0,25mm	0,32mm	0,45mm
Edge Geometry MH	ae>50%	Recommended starting Ap1 = 1mm	0,25mm	0,32mm	0,40mm	0,25mm	0,35mm	0,55mm	0,25mm	0,45mm	0,65mm

### 2. Ap1 and vc corrections depend on L/D ratio

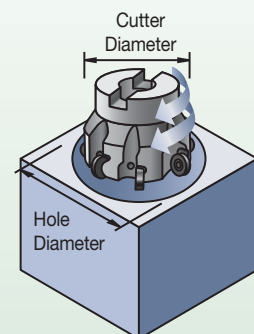
With increasing L/D ratios, or overhang, vibrations can occur due to reduced rigidity. To ensure successful application, it is recommended to adjust Ap1 and vc values according to the following table:

L/D ratio	% of Ap1 max to reduce	% of vc to reduce
<2	0%	0%
2<L/D<4	65-75%	10-15%
>4	80-95%	20-40%



### Recommended Cutting Conditions • Helical Interpolation from Solid

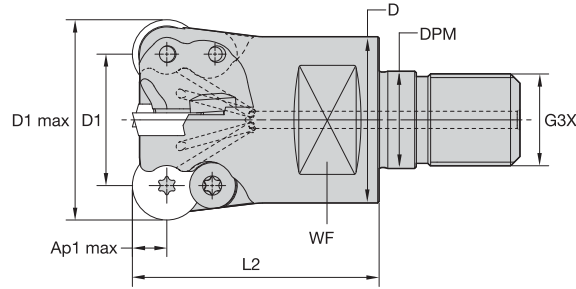
cutter diameter	min hole diameter	max hole diameter (flat bottom)	Ap1 max per revolution	max ramp angle	Ap1 max when plunging
20	22mm	30mm	2,1mm	20°	4mm
22	24mm	34mm	2,1mm	20°	2,4mm
25	33mm	40mm	3,2mm	8°	1,7mm
28	36mm	46mm	5mm	15°	3,8mm
30	40,6mm	50mm	5mm	10°	3,4mm
35	50,7mm	60mm	5mm	8,5°	3,4mm
40	60,5mm	70mm	5mm	7,2°	3,6mm
42	64,5mm	74mm	5mm	5,8°	3,6mm
50	80,3mm	90mm	5mm	5,2°	4mm
52	85,8mm	94mm	5mm	3°	2,2mm





*These products are available for metric only.*

- Premium nickel-coated bodies.
- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



■ **Screw-On End Mills**

order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3930950	M170D024Z02M12RD12	24	12	21	12,5	M12	35	19	6,0	2	15.0°	13200	Yes	0,08
3930954	M170D035Z03M16RD12	35	23	29	17,0	M16	43	22	6,0	3	11.0°	9900	Yes	0,22
3930956	M170D035Z04M16RD12	35	23	29	17,0	M16	43	22	6,0	4	10.5°	9900	Yes	0,21
3930958	M170D042Z05M16RD12	42	30	29	17,0	M16	43	22	6,0	5	7.2°	7500	Yes	0,26

■ **Spare Parts**

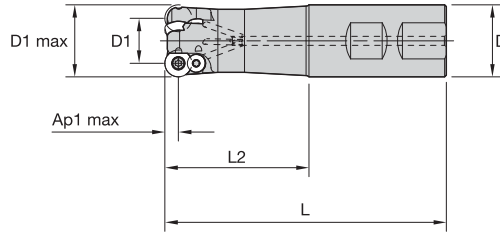
D1 max	insert screw	Nm	clamp screw	Torx driver
24	193.342	3,5	193.338	12148082400
35	193.342	3,5	193.338	12148082400
42	193.342	3,5	193.338	12148082400

NOTE: All spare parts except the insert screws must be ordered separately.

Copy Mills

These products are available for metric only.

- Premium nickel-coated bodies.
- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.







Copy Mills

■ Weldon Shanks

order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3930960	M170D032Z03B32RD12	32	20	32	125	64	6,0	3	12.0°	9500	Yes	0,63

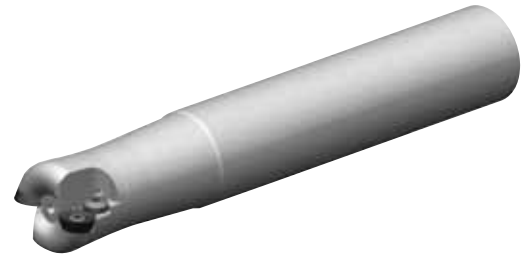
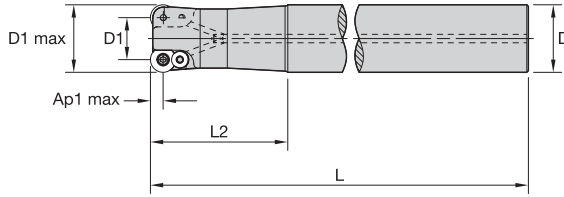
■ Spare Parts

				
D1 max	insert screw	Nm	clamp screw	Torx driver
32	193.342	3,5	193.338	12148082400

NOTE: All spare parts except the insert screws must be ordered separately.

**These products are available for metric only.**





- Premium nickel-coated bodies.
- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



**■ Cylindrical Shanks**

order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3930962	M170D032Z02A32RD12L200	32	20	32	200	65	6,0	2	12.0°	9500	Yes	1,12
3930964	M170D032Z02A32RD12L300	32	20	32	300	65	6,0	2	12.0°	9500	Yes	1,74
3930966	M170D035Z02A32RD12L300	35	23	32	300	40	6,0	2	11.0°	9100	Yes	1,79

**■ Spare Parts**

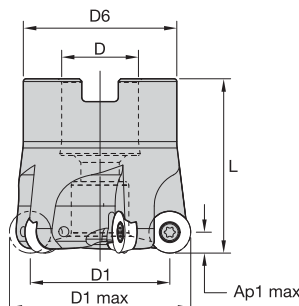
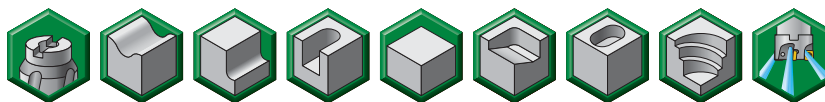
D1 max	insert screw 	Nm 	clamp screw 	Torx driver 
32	193.342	3,5	193.338	12148082400
35	193.342	3,5	193.338	12148082400

NOTE: All spare parts except the insert screws must be ordered separately.

Copy Mills

These products are available for metric only.

- Premium nickel-coated bodies.
- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



Copy Mills

■ Shell Mills

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3930968	M170D040Z04RD12	40	28	16	37	40	6,0	4	9.3°	7000	Yes	0,22
3930970	M170D050Z05RD12	50	38	22	44	40	6,0	5	6.1°	7950	Yes	0,32
3930972	M170D052Z05RD12	52	40	22	44	50	6,0	5	4.5°	7600	Yes	0,44
3930975	M170D063Z06RD12	63	51	22	44	40	6,0	6	4.5°	6300	Yes	0,45
3930976	M170D066Z06RD12	66	54	27	60	50	6,0	6	4.5°	6030	Yes	0,81
3930979	M170D080Z07RD12	80	68	27	60	50	6,0	7	3.5°	4900	Yes	0,97
3930981	M170D100Z08RD12	100	88	32	80	55	6,0	8	2.2°	3900	Yes	1,95

■ Spare Parts



D1 max	insert screw	Nm	clamp screw	Torx driver	low-head cap screw	low-head cap screw with coolant groove	socket-head cap screw	socket-head cap screw with coolant groove
40	193.342	3,5	193.338	12148082400	—	—	MS1294	MS1294CG
50	193.342	3,5	193.338	12148082400	129.025	—	—	MS2072CG
52	193.342	3,5	193.338	12148082400	129.025	—	—	MS2072CG
63	193.342	3,5	193.338	12148082400	129.025	—	—	MS2072CG
66	193.342	3,5	193.338	12148082400	—	—	MS2038	MS2038CG
80	193.342	3,5	193.338	12148082400	—	—	MS2038	MS2038CG
100	193.342	3,5	193.338	12148082400	MS1254	MS1254CG	—	—

NOTE: Socket-head cap screw, socket-head cap screw with coolant groove, low-head cap screw with coolant groove, and Torx driver must be ordered separately.

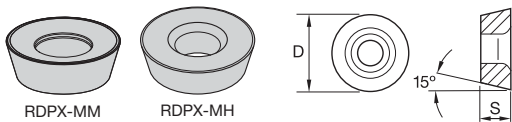
■ **Insert Selection Guide**

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	MM	TN6525	MM	TN6525	MM	TN6540
P3-P4	MH	TN2505	MH	TN6525	MH	TN6540
P5-P6	MH	TN2505	MH	TN6525	MH	TN6540
M1-M2	-	-	MM	TN6525	MM	TN6540
M3	-	-	MM	TN6525	MM	TN6540
K1-K2	MH	TN2505	MH	TN2505	MH	TN6525
K3	MH	TN2505	MH	TN2505	MH	TN6525
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	MM	TN6540	-	-
S3	-	-	MM	TN6540	-	-
S4	-	-	MM	TN6540	-	-
H1	MH	TN2505	MH	TN2505	-	-

Copy Mills

iC12 • Inserts

*These products are available for metric only.*



- -MM geometry is the best option for general-purpose use, materials, and applications. Used for reduced cutting forces.

- first choice
- alternate choice

P	●	○	○	○
M	●	○	○	○
K	●	○	○	○
N	○	○	○	○
S	○	○	○	○
H	○	○	○	○

■ **RDPX-MM**

catalog number	D	S	hm	TN2505	TN6525	TN6540
RDPX12T3M0SNMM	12,00	3,97	0,13	●	○	○

- -MH geometry is the first choice for heavy machining.
- Suitable for high-strength steels, cast iron, and hard machining.

■ **RDPX-MH**

catalog number	D	S	hm	TN2505	TN6525	TN6540
RDPX12T3M0SNMH	12,00	3,97	0,17	○	●	○

■ Recommended Starting Speeds [m/min]

Material Group		TN2505			TN6525			TN6540		
P	1	-	-	-	410	<b>320</b>	280	360	<b>280</b>	240
	2	-	-	-	320	<b>250</b>	215	250	<b>190</b>	170
	3	-	-	-	280	<b>215</b>	185	215	<b>170</b>	140
	4	-	-	-	235	<b>170</b>	145	180	<b>130</b>	110
	5	-	-	-	310	<b>235</b>	200	240	<b>180</b>	150
	6	-	-	-	205	<b>160</b>	130	160	<b>120</b>	100
M	1	-	-	-	190	<b>120</b>	80	130	<b>80</b>	60
	2	-	-	-	120	<b>80</b>	50	80	<b>50</b>	40
	3	-	-	-	125	<b>80</b>	55	85	<b>50</b>	40
K	1	400	<b>300</b>	250	275	<b>245</b>	220	220	<b>205</b>	180
	2	540	<b>365</b>	280	215	<b>190</b>	180	175	<b>155</b>	140
	3	310	<b>190</b>	155	180	<b>160</b>	145	155	<b>145</b>	125
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	50	<b>35</b>	30
	2	-	-	-	-	-	-	25	<b>20</b>	10
	3	-	-	-	-	-	-	70	<b>40</b>	30
	4	-	-	-	-	-	-	60	<b>30</b>	25
H	1	175	<b>140</b>	95	-	-	-	-	-	-
	2	175	<b>140</b>	95	-	-	-	-	-	-
	3	140	<b>115</b>	80	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Recommended Starting Feeds

■ Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

At 6,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,33	<b>0,48</b>	0,76	0,24	<b>0,35</b>	0,54	0,18	<b>0,26</b>	0,41	0,16	<b>0,23</b>	0,35	0,14	<b>0,21</b>	0,33	MM
MH	0,35	<b>0,70</b>	1,17	0,25	<b>0,50</b>	0,84	0,19	<b>0,38</b>	0,63	0,16	<b>0,33</b>	0,55	0,15	<b>0,30</b>	0,50	MH

At 3,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,38	<b>0,56</b>	0,88	0,28	<b>0,40</b>	0,63	0,21	<b>0,30</b>	0,47	0,18	<b>0,26</b>	0,41	0,17	<b>0,24</b>	0,38	MM
MH	0,40	<b>0,81</b>	1,36	0,29	<b>0,58</b>	0,97	0,22	<b>0,43</b>	0,72	0,19	<b>0,38</b>	0,63	0,17	<b>0,35</b>	0,58	MH

At 2,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,44	<b>0,65</b>	1,02	0,32	<b>0,47</b>	0,73	0,24	<b>0,35</b>	0,55	0,21	<b>0,30</b>	0,48	0,19	<b>0,28</b>	0,44	MM
MH	0,47	<b>0,94</b>	1,59	0,34	<b>0,68</b>	1,13	0,25	<b>0,50</b>	0,84	0,22	<b>0,44</b>	0,73	0,20	<b>0,40</b>	0,67	MH

At 1,00 Axial Depth of Cut (ap)

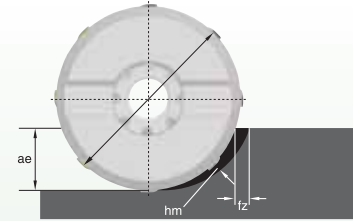
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,60	<b>0,88</b>	1,38	0,43	<b>0,63</b>	0,99	0,32	<b>0,47</b>	0,74	0,28	<b>0,41</b>	0,64	0,26	<b>0,38</b>	0,59	MM
MH	0,63	<b>1,28</b>	2,16	0,45	<b>0,91</b>	1,53	0,34	<b>0,68</b>	1,14	0,30	<b>0,59</b>	0,99	0,27	<b>0,54</b>	0,90	MH

NOTE: Use "Light Machining" value as starting feed rate.

## Selecting the Correct Cutting Values

### 1. fz depends on the Ap1 and ae values

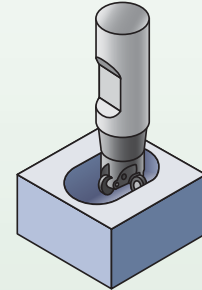
With round inserts, two factors can affect the hm: Ap1 and ae. fz has to be adjusted accordingly.



Recommended Starting Feed Rate Values (fz) Related to the Ap1 and ae Values:

ae engagement	10%	20%	30%	40%	50%	100%
Ap1 = 1mm	1,01mm	0,77mm	0,63mm	0,55mm	0,49mm	0,35mm
Ap1 = 2mm	0,77mm	0,55mm	0,45mm	0,39mm	0,35mm	0,24mm
Ap1 = 3mm	0,63mm	0,45mm	0,37mm	0,32mm	0,28mm	0,20mm
Ap1 = 4mm	0,55mm	0,39mm	0,32mm	0,27mm	0,24mm	0,17mm
Ap1 = 5mm	0,49mm	0,35mm	0,28mm	0,24mm	0,22mm	0,15mm
Ap1 = 6mm	0,45mm	0,32mm	0,26mm	0,22mm	0,20mm	0,14mm

Example application highlighted.



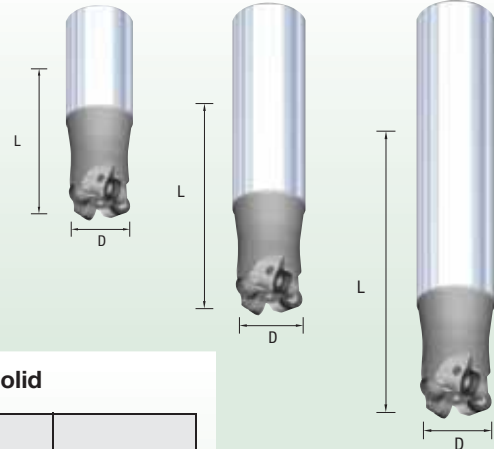
Example Cutting Conditions for RD..10... Insert in Pocketing, L/D ratio = 2 x D:

insert = RDPX12T3M0SN			TN2505			TN6525			TN6540		
			feed per tooth fz (mm)/ae>50%								
			min	med	max	min	med	max	min	med	max
Edge Geometry MM	ae>50%	Recommended starting Ap1 = 2mm	-	-	-	0,24mm	0,30mm	0,50mm	0,24mm	0,40mm	0,60mm
Edge Geometry MH	ae>50%	Recommended starting Ap1 = 2mm	0,24mm	0,30mm	0,50mm	0,24mm	0,40mm	0,65mm	0,24mm	0,50mm	0,70mm

### 2. Ap1 and vc corrections depend on L/D ratio

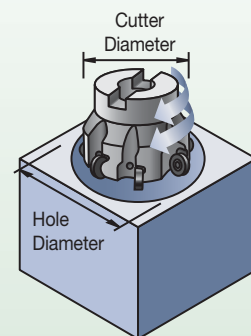
With increasing L/D ratios, or overhang, vibrations can occur due to reduced rigidity. To ensure successful application, it is recommended to adjust Ap1 and vc values according to the following table:

L/D ratio	% of Ap1 max to reduce	% of vc to reduce
<2	0%	0%
2<L/D<4	65-75%	10-15%
>4	80-95%	20-40%



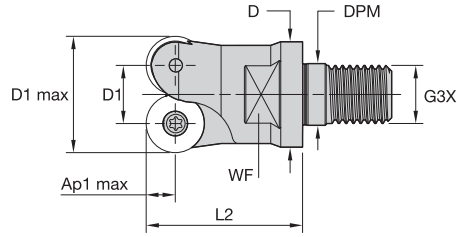
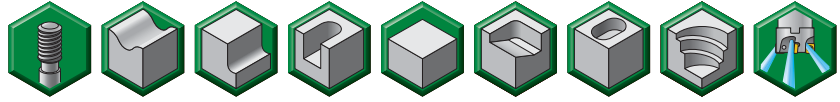
### Recommended Cutting Conditions • Helical Interpolation from Solid

cutter diameter	min hole diameter	max hole diameter (flat bottom)	Ap1 max per revolution	max ramp angle	Ap1 max when plunging
24	25,6mm	36mm	1,3mm	15°	3mm
32	40,6mm	52mm	5,3mm	12°	4,4mm
35	46,9mm	58mm	6mm	11°	3,9mm
40	57,4mm	68mm	6mm	9.3°	3,3mm
42	61,2mm	72mm	6mm	7.2°	3,5mm
50	77,4mm	88mm	6mm	6.1°	3,5mm
52	81,3mm	92mm	6mm	4.5°	3,2mm
63	102,4mm	114mm	6mm	4.5°	4,6mm
66	108,5mm	120mm	6mm	4.5°	4,4mm
80	136,5mm	148mm	6mm	3.5°	4,2mm
100	176,5mm	188mm	6mm	2.2°	4,2mm



*These products are available for metric only.*

- Premium nickel-coated bodies.
- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



Copy Mills

■ **Screw-On End Mills**

order number	catalog number	D1 max	D1	D	DPM	G3X	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3926601	M170D032Z02M16RD16	32	16	29	17,0	M16	43	22	8,0	2	20.0°	9950	Yes	0,17

■ **Spare Parts**

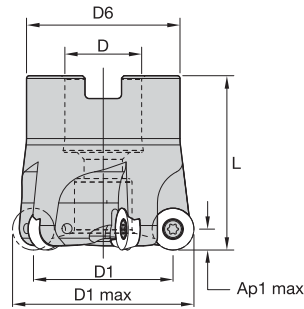
D1 max	insert screw	Nm	Torx driver
32	193.343	6,0	12148099400

NOTE: All spare parts except the insert screws must be ordered separately.



*These products are available for metric only.*

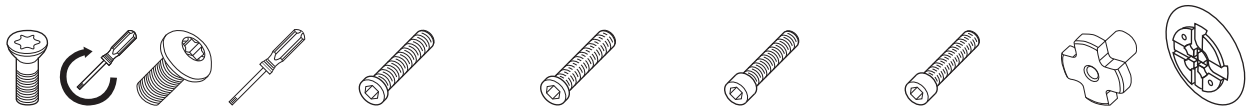
- Premium nickel-coated bodies.
- Designed for maximum performance.
- Ideally suited for die and mold manufacturing.



■ **Shell Mills**

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	kg
3926602	M170D050Z04RD16	50	34	22	44	40	8,0	4	8.5°	7900	Yes	0,28
3934623	M170D052Z04RD16	52	36	22	44	50	8,0	4	8.2°	7650	Yes	0,36
3934624	M170D063Z05RD16	63	47	22	44	40	8,0	5	5.5°	5300	Yes	0,39
3934625	M170D066Z05RD16	66	50	27	60	50	8,0	5	4.0°	6000	Yes	0,74
3934626	M170D080Z06RD16	80	64	27	60	50	8,0	6	3.0°	4900	Yes	1,06
3934628	M170D100Z07RD16	100	84	32	80	55	8,0	7	2.4°	3950	Yes	1,94
3934629	M170D125Z08RD16	125	109	40	90	60	8,0	8	2.2°	3200	Yes	2,90

■ **Spare Parts**



D1 max	insert screw	Nm	clamp screw	Torx driver	low-head cap screw	low-head cap screw with coolant groove	socket-head cap screw	socket-head cap screw with coolant groove	coolant lock screw	coolant cap
50	193.343	6,0	193.383 12148099400	129.025	—	—	MS2072CG	—	—	—
52	193.343	6,0	193.383 12148099400	129.025	—	—	MS2072CG	—	—	—
63	193.343	6,0	193.383 12148099400	129.025	—	—	MS2072CG	—	—	—
66	193.343	6,0	193.383 12148099400	—	—	MS2038	MS2038CG	—	—	—
80	193.343	6,0	193.383 12148099400	—	—	MS2038	MS2038CG	—	—	—
100	193.343	6,0	193.383 12148099400	MS1254	MS1254CG	—	—	—	—	—
125	193.343	6,0	193.383 12148099400	129.512	—	—	—	—	420.200	470.232

NOTE: All spare parts except the insert screws and clamp screws must be ordered separately.

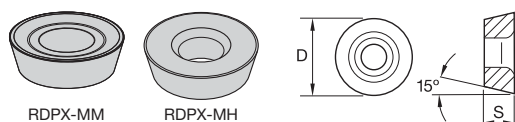
■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	MM	TN6525	MM	TN6525	MM	TN6540
P3-P4	MH	TN2505	MH	TN6525	MH	TN6540
P5-P6	MH	TN2505	MH	TN6525	MH	TN6540
M1-M2	-	-	MM	TN6525	MM	TN6540
M3	-	-	MM	TN6525	MM	TN6540
K1-K2	MH	TN2505	MH	TN2505	MH	TN6525
K3	MH	TN2505	MH	TN2505	MH	TN6525
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	MM	TN6540	-	-
S3	-	-	MM	TN6540	-	-
S4	-	-	MM	TN6540	-	-
H1	MH	TN2505	MH	TN2505	-	-

Copy Mills

iC16 • Inserts

*These products are available for metric only.*



- -MM geometry is the first choice for general-purpose use, materials, and applications. Used for reduced cutting forces.

- first choice
- alternate choice

P	●	○	○	○
M	○	○	○	○
K	○	○	○	○
N	○	○	○	○
S	○	○	○	○
H	○	○	○	○

■ RDPX-MM

catalog number	D	S	hm	TN2505	TN6525	TN6540
RDPX1604M0SNMM	16,00	4,76	0,14	●	○	○

- -MH geometry is the first choice for heavy machining.
- Suitable for high-strength steels, cast iron, and hard machining.

■ RDPX-MH

catalog number	D	S	hm	TN2505	TN6525	TN6540
RDPX1604M0SNMH	16,00	4,76	0,22	○	○	○

■ Recommended Starting Speeds [m/min]

Material Group		TN2505			TN6525			TN6540		
P	1	-	-	-	410	320	280	360	280	240
	2	-	-	-	320	250	215	250	190	170
	3	-	-	-	280	215	185	215	170	140
	4	-	-	-	235	170	145	180	130	110
	5	-	-	-	310	235	200	240	180	150
	6	-	-	-	205	160	130	160	120	100
M	1	-	-	-	190	120	80	130	80	60
	2	-	-	-	120	80	50	80	50	40
	3	-	-	-	125	80	55	85	50	40
K	1	400	300	250	275	245	220	220	205	180
	2	540	365	280	215	190	180	175	155	140
	3	310	190	155	180	160	145	155	145	125
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	50	35	30
	2	-	-	-	-	-	-	25	20	10
	3	-	-	-	-	-	-	70	40	30
	4	-	-	-	-	-	-	60	30	25
H	1	175	140	95	-	-	-	-	-	-
	2	175	140	95	-	-	-	-	-	-
	3	140	115	80	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Copy Mills

Recommended Starting Feeds

■ Recommended Starting Feeds [mm]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

At 8,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,39	<b>0,52</b>	0,82	0,28	<b>0,37</b>	0,59	0,21	<b>0,28</b>	0,44	0,18	<b>0,24</b>	0,38	0,17	<b>0,22</b>	0,35	MM
MH	0,51	<b>0,70</b>	1,17	0,37	<b>0,50</b>	0,84	0,28	<b>0,38</b>	0,63	0,24	<b>0,33</b>	0,55	0,22	<b>0,30</b>	0,50	MH

At 4,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,45	<b>0,60</b>	0,94	0,32	<b>0,43</b>	0,68	0,24	<b>0,32</b>	0,51	0,21	<b>0,28</b>	0,44	0,19	<b>0,26</b>	0,40	MM
MH	0,59	<b>0,81</b>	1,36	0,43	<b>0,58</b>	0,97	0,32	<b>0,43</b>	0,72	0,28	<b>0,38</b>	0,63	0,25	<b>0,35</b>	0,58	MH

At 2,00 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,59	<b>0,79</b>	1,24	0,43	<b>0,57</b>	0,89	0,32	<b>0,42</b>	0,66	0,28	<b>0,37</b>	0,58	0,25	<b>0,34</b>	0,53	MM
MH	0,77	<b>1,06</b>	1,79	0,56	<b>0,76</b>	1,28	0,42	<b>0,57</b>	0,95	0,36	<b>0,50</b>	0,83	0,33	<b>0,45</b>	0,76	MH

At 1,00 Axial Depth of Cut (ap)

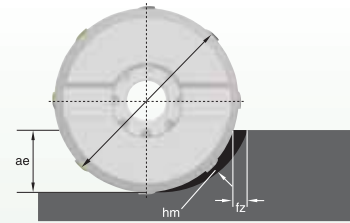
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
MM	0,81	<b>1,08</b>	1,71	0,58	<b>0,78</b>	1,22	0,43	<b>0,58</b>	0,91	0,38	<b>0,51</b>	0,79	0,35	<b>0,46</b>	0,72	MM
MH	1,06	<b>1,46</b>	2,48	0,76	<b>1,04</b>	1,75	0,57	<b>0,78</b>	1,30	0,50	<b>0,68</b>	1,13	0,45	<b>0,62</b>	1,03	MH

NOTE: Use "Light Machining" value as starting feed rate.

## Selecting the Correct Cutting Values

### 1. fz depends on the Ap1 and ae values

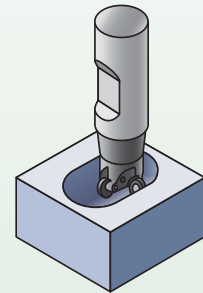
With round inserts, two factors can affect the hm: Ap1 and ae. fz has to be adjusted accordingly.



Recommended Starting Feed Rate Values (fz) Related to the Ap1 and ae Values:

ae engagement	10%	20%	30%	40%	50%	100%
Ap1 = 1mm	1,52mm	1,07mm	0,88mm	0,76mm	0,68mm	0,48mm
Ap1 = 2mm	1,07mm	0,76mm	0,62mm	0,54mm	0,48mm	0,34mm
Ap1 = 3mm	0,88mm	0,62mm	0,51mm	0,44mm	0,39mm	0,28mm
Ap1 = 4mm	0,76mm	0,54mm	0,44mm	0,38mm	0,34mm	0,24mm
Ap1 = 5mm	0,62mm	0,44mm	0,36mm	0,31mm	0,26mm	0,20mm
Ap1 = 6mm	0,54mm	0,38mm	0,31mm	0,27mm	0,24mm	0,17mm

Example application highlighted.



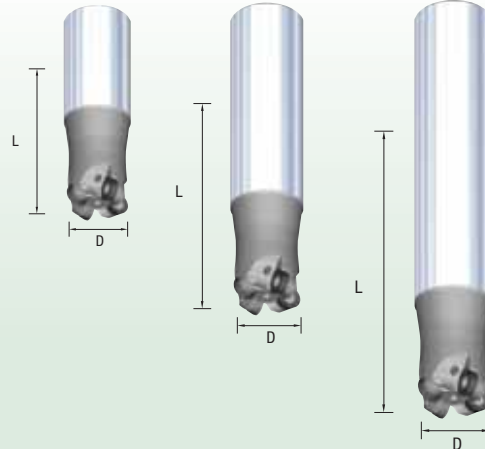
Example Cutting Conditions for iC16mm... Insert in Pocketing, up to 3 L/D approximately:

insert = RDPX1604M0SN			TN2505			TN6525			TN6540		
			feed per tooth fz (mm)/ae>50%								
			min	med	max	min	med	max	min	med	max
Edge Geometry MM	ae>50%	Recommended starting Ap1 = 3mm	-	-	-	0,28mm	0,45mm	0,65mm	0,28mm	0,50mm	0,70mm
Edge Geometry MH	ae>50%	Recommended starting Ap1 = 3mm	0,28mm	0,35mm	0,50mm	0,28mm	0,50mm	0,75mm	0,28mm	0,60mm	0,80mm

### 2. Ap1 and vc corrections depend on L/D ratio

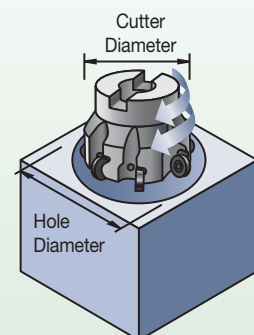
With increasing L/D ratios, or overhang, vibrations can occur due to reduced rigidity. To ensure successful application, it is recommended to adjust Ap1 and vc values according to the following table:

L/D ratio	% of Ap1 max to reduce	% of vc to reduce
<2	0%	0%
2<L/D<4	65-75%	10-15%
>4	80-95%	20-40%



### Recommended Cutting Conditions • Helical Interpolation from Solid

cutter diameter	min hole diameter	max hole diameter (flat bottom)	Ap1 max per revolution	max ramp angle	Ap1 max when plunging
32	36mm	48mm	3mm	20°	3mm
50	69mm	84mm	8mm	9,5°	4,8mm
52	73mm	88mm	8mm	8,2°	5mm
63	95mm	110mm	8mm	5,5°	4,7mm
66	101mm	120mm	8mm	4°	4,2mm
80	129mm	144mm	8mm	3°	4,1mm
100	169mm	184mm	8mm	2,4°	4,6mm
125	219mm	234mm	8mm	2,2°	4,4mm





# REPAIR SERVICES

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EXTREME **RESULTS.**

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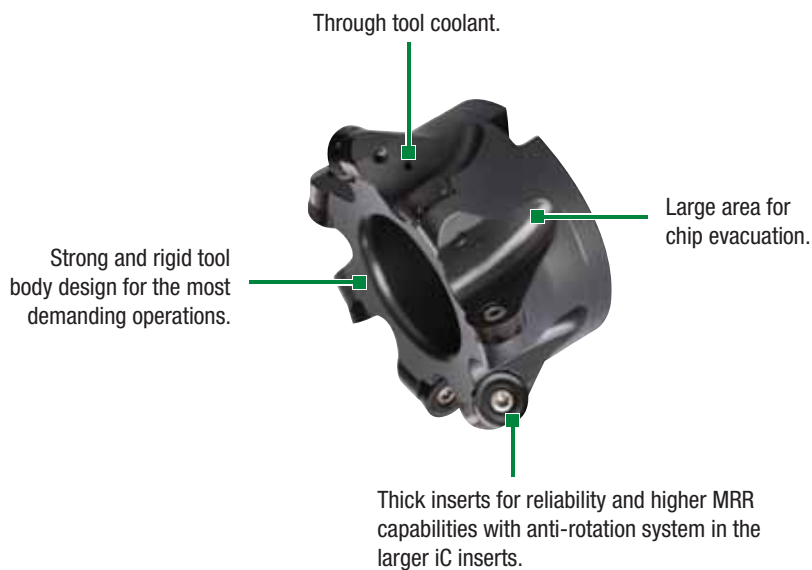
Versatile Platform for All Materials and Applications •  
**M100™ Series Copy Mills**



# M100

A trusted multipurpose solution for profiling and copy applications, the M100 Series ensures a reliable platform for all of your copy milling, face milling, helical interpolation, and roughing needs. The strong and rigid body design ensures superior results in even the most demanding operations.

- Thick inserts ensure reliability and consistent results.
- Anti-rotation systems in larger iC inserts provide higher MRR capabilities.
- Increased chip evacuation and through tool coolant for enhanced performance.



**Copy Mills**

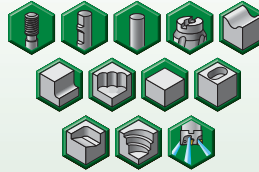


**M100™**

**Max depth of cut: .236"**

**Diameter: 1–8"**

**Pages: K76–K101**



**■ Insert Offering**



**08mm iC**  
RD Insert Type  
Ground and PSTS



**10mm iC**  
RD Insert Type  
Ground and PSTS



**12mm iC**  
RD Insert Type  
Anti-rotation Feature  
Ground and PSTS

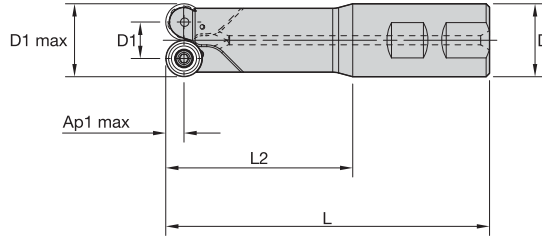
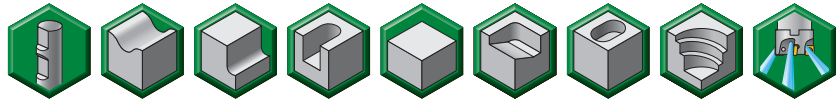


**16mm iC**  
RD Insert Type  
Anti-rotation Feature  
Ground and PSTS



**16mm iC**  
RC Insert Type  
Anti-rotation Feature  
Ground and PSTS

- General purpose face and copy milling.



Copy Mills

■ Weldon Shanks

order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646596	M100D075Z02W075RD08L453	.750	.435	.750	4.530	2.500	.158	2	22.0°	26000	Yes	.85

■ Spare Parts

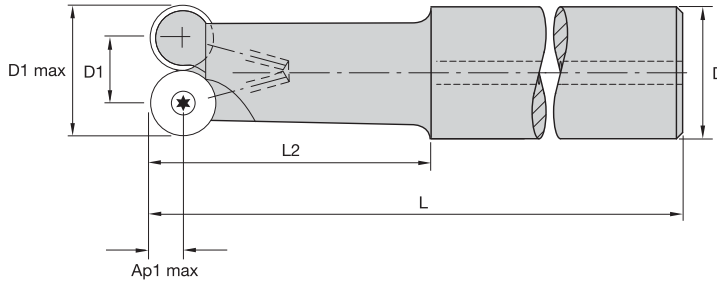


D1 max	insert screw	in. lbs.	Torx driver
.750	12148001300	27	12148086600

NOTE: All spare parts except the insert screws must be ordered separately.



- General purpose face and copy milling.



■ **Cylindrical Shanks**

order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646581	M100D062Z02C075RD08L603	.625	.310	.750	6.030	4.000	.158	2	60.0°	31000	Yes	1.00
2646591	M100D075Z02C075RD08L378	.750	.435	.750	3.780	1.750	.158	2	22.0°	26000	Yes	.60
2646592	M100D075Z02C075RD08L453	.750	.435	.750	4.530	2.500	.158	2	22.0°	26000	Yes	.75

■ **Spare Parts**



D1 max	insert screw	in. lbs.	Torx driver
.625	12148001300	27	12148086600
.750	12148001300	27	12148086600

NOTE: All spare parts except the insert screws must be ordered separately.

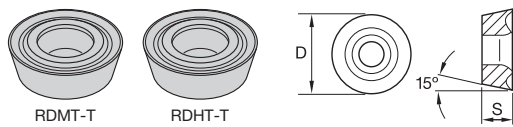
Copy Mills

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	RDMT-T	TN7525	RDMT-T	TN7525	RDMT-T	TN7535
P3-P4	RDMT-T	TN7525	RDMW-T	TN6540	RDMW-T	TN6540
P5-P6	RDMT-T	TN7525	RDMT-T	TN7535	RDMT-T	TN7535
M1-M2	RDHT-T	TN7525	RDHT-T	TN7525	RDMT-T	TN7535
M3	RDHT-T	TN7525	RDHT-T	TN7525	RDMT-T	TN7535
K1-K2	-	-	RDMW-T	TN7535	RDMW-T	TN7535
K3	-	-	RDMW-T	TN7535	RDMW-T	TN7535
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	-	-	-	-
S3	-	-	-	-	-	-
S4	-	-	-	-	-	-
H1	-	-	-	-	-	-

Copy Mills

iC08 • Inserts



- Precision ground positive geometry for lower cutting forces.
- First choice for general machining, stainless steel, and high-temp alloys.

- first choice
- alternate choice

P	●	○	○	○	○
M	●	○	○	○	○
K	●	○	○	○	○
N	○	○	○	○	○
S	○	○	○	○	○
H	○	○	○	○	○

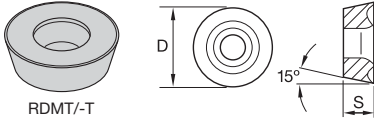
■ RDHT-T

catalog number	D	S	hm	TN2510	TN6540	TN7525	TN7535
RDHT0802M0T	.315	.094	.004	●	○	○	○

- Precision pressed positive geometry for lower cutting forces.
- First choice for general machining, stainless steel, and high-temp alloys in roughing operations.

■ RDMT-T

catalog number	D	S	hm	TN2510	TN6540	TN7525	TN7535
RDMT0802M0T	.315	.094	.004	●	○	○	○



RDMT/-T

- Precision pressed insert.
- First choice for roughing operations, especially for steel and cast iron.

■ **RDMW/-T**

- first choice
- alternate choice

P	●	○	○	○
M	●	○	○	○
K	●	○	○	○
N	○	○	○	○
S	○	○	○	○
H	○	○	○	○

catalog number	D	S	hm	TN2510	TN6540	TN7525	TN7535
RDMW0802M0	.315	.094	.004	2012564	-	-	-
RDMW0802M0T	.315	.094	.004	3359278	-	-	2020727



Copy Mills

■ Recommended Starting Speeds [SFM]

Material Group		TN2510			TN6540			TN7525			TN7535		
P	1	2165	<b>1910</b>	1770	1180	<b>925</b>	785	1340	<b>1025</b>	925	1790	<b>1555</b>	1460
	2	1340	<b>1220</b>	1080	830	<b>630</b>	550	1025	<b>830</b>	710	1105	<b>1000</b>	905
	3	1220	<b>1080</b>	1000	710	<b>550</b>	450	925	<b>710</b>	610	1000	<b>905</b>	805
	4	905	<b>845</b>	750	590	<b>430</b>	355	770	<b>550</b>	475	750	<b>690</b>	630
	5	1080	<b>985</b>	905	785	<b>590</b>	490	1025	<b>770</b>	650	1025	<b>905</b>	830
	6	750	<b>670</b>	570	535	<b>395</b>	335	670	<b>535</b>	430	630	<b>535</b>	430
M	1	890	<b>785</b>	690	430	<b>260</b>	200	805	<b>725</b>	610	805	<b>725</b>	610
	2	805	<b>690</b>	630	260	<b>155</b>	140	725	<b>630</b>	550	725	<b>630</b>	550
	3	630	<b>570</b>	490	275	<b>155</b>	140	570	<b>510</b>	450	570	<b>510</b>	450
K	1	1380	<b>1180</b>	985	725	<b>670</b>	590	1240	<b>925</b>	785	1165	<b>1045</b>	940
	2	1180	<b>985</b>	830	570	<b>510</b>	450	1060	<b>785</b>	650	925	<b>830</b>	750
	3	985	<b>830</b>	650	510	<b>475</b>	415	785	<b>650</b>	550	770	<b>690</b>	630
N	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	155	<b>120</b>	95	-	-	-	-	-	-
	2	-	-	-	80	<b>60</b>	40	-	-	-	-	-	-
	3	-	-	-	235	<b>140</b>	95	-	-	-	-	-	-
	4	-	-	-	200	<b>95</b>	80	-	-	-	-	-	-
H	1	475	<b>360</b>	230	-	-	-	-	-	-	-	-	-
	2	475	<b>360</b>	230	-	-	-	-	-	-	-	-	-
	3	380	<b>260</b>	150	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Copy Mills

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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At .157 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDMW-	.007	.011	.016	.005	.008	.012	.004	.006	.009	.003	.005	.008	.003	.005	.007	RDMW-
RDHT-T	.009	.012	.024	.007	.009	.018	.005	.007	.013	.004	.006	.011	.004	.005	.011	RDHT-T
RDMT-T	.009	.012	.024	.007	.009	.018	.005	.007	.013	.004	.006	.011	.004	.005	.011	RDMT-T
RDMW-T	.009	.016	.028	.007	.012	.021	.005	.009	.015	.004	.008	.013	.004	.007	.012	RDMW-T

At .079 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDMW-	.008	.013	.019	.006	.009	.014	.005	.007	.010	.004	.006	.009	.004	.006	.008	RDMW-
RDHT-T	.010	.014	.028	.008	.010	.020	.006	.008	.015	.005	.007	.013	.005	.006	.012	RDHT-T
RDMT-T	.010	.014	.028	.008	.010	.020	.006	.008	.015	.005	.007	.013	.005	.006	.012	RDMT-T
RDMW-T	.010	.019	.033	.008	.014	.024	.006	.010	.018	.005	.009	.015	.005	.008	.014	RDMW-T

At .039 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDMW-	.011	.017	.025	.008	.012	.018	.006	.009	.013	.005	.008	.012	.005	.007	.011	RDMW-
RDHT-T	.014	.018	.037	.010	.013	.027	.007	.010	.020	.006	.009	.017	.006	.008	.016	RDHT-T
RDMT-T	.014	.018	.037	.010	.013	.027	.007	.010	.020	.006	.009	.017	.006	.008	.016	RDMT-T
RDMW-T	.014	.025	.043	.010	.018	.031	.007	.013	.023	.006	.012	.020	.006	.011	.019	RDMW-T

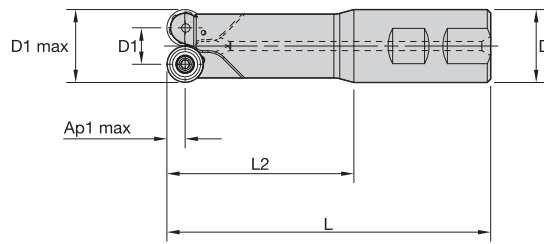
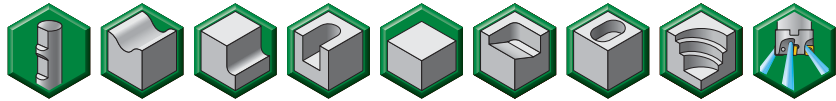
At .020 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDMW-	.015	.023	.034	.011	.017	.024	.008	.013	.018	.007	.011	.016	.007	.010	.014	RDMW-
RDHT-T	.019	.025	.051	.014	.018	.037	.010	.014	.027	.009	.012	.024	.008	.011	.022	RDHT-T
RDMT-T	.019	.025	.051	.014	.018	.037	.010	.014	.027	.009	.012	.024	.008	.011	.022	RDMT-T
RDMW-T	.019	.034	.060	.014	.024	.043	.010	.018	.032	.009	.016	.028	.008	.014	.025	RDMW-T

NOTE: Use "Light Machining" value as starting feed rate.

Copy Mills

- General purpose face and copy milling.



Copy Mills

■ Weldon Shanks

order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646600	M100D075Z02W075RD10L453	.750	.356	.750	4.530	2.500	.197	2	40.0°	26000	Yes	.85
2646599	M100D075Z02W075RD10	.750	.356	.750	3.780	1.750	.197	2	40.0°	26000	Yes	.66
2646602	M100D075Z02W100RD10L628	.750	.356	1.000	6.280	4.000	.197	2	40.0°	26000	Yes	1.10
2646601	M100D075Z02W100RD10	.750	.356	1.000	5.530	3.250	.197	2	40.0°	26000	Yes	1.00
2646604	M100D100Z02W100RD10	1.000	.606	1.000	5.280	3.000	.197	2	17.0°	23000	Yes	1.25
2646605	M100D100Z02W125RD10	1.000	.606	1.250	6.780	4.500	.197	2	17.0°	23000	Yes	1.75

■ Spare Parts



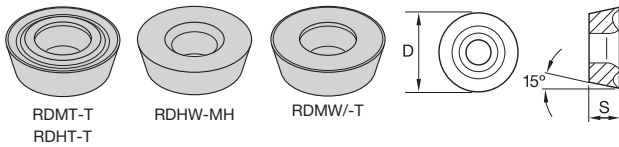
D1 max	insert screw	in. lbs.	Torx driver
.750	12148036700	27	12148000600
1.000	12148036700	27	12148000600

NOTE: All spare parts except the insert screws must be ordered separately.

Inserts

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	RDMT-T	TN6525	RDMT-T	TN6540	RDMW-T	TN6540
P3-P4	RDMT-T	TN6525	RDMW-T	TN6540	RDMW-T	TN6540
P5-P6	RDMT-T	TN7525	RDMT-T	TN7535	RDMW-T	TN7535
M1-M2	RDHT-T	TN7525	RDMT-T	TN6540	RDMT-T	TN6540
M3	RDHT-T	TN7525	RDMT-T	TN6540	RDMT-T	TN6540
K1-K2	RDMW-MH	TN2510	RDMW-MH	TN2510	RDMW-T	TN7535
K3	RDMW-MH	TN2510	RDMW-MH	TN2510	RDMW-T	TN7535
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	RDMT-T	TN6540	-	-
S3	-	-	RDMT-T	TN6540	-	-
S4	-	-	RDMT-T	TN6540	RDMT-T	TN6540
H1	RDMW-MH	TN2510	RDMW-MH	TN2510	-	-



- Precision pressed positive geometry for lower cutting forces.
- First choice for general machining, stainless steel, and high-temp alloys in roughing operations.

- first choice
- alternate choice

P	●	○	●	●	●	●	●
M	●	○	○	○	○	○	○
K	●	○	○	○	○	○	○
N	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○

**RDMT-T**

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	TT125
RDMT1003M0T	.394	.125	.006	-	2957429	2957428	2012534	2276618	-

- Precision insert.
- Alternative choice for stable milling operations.

**RDHW-MH**

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	TT125
RDHW1003M0MH	.394	.125	.006	2012480	-	-	-	-	-

- Precision ground positive geometry for lower cutting forces.
- First choice for general machining, stainless steel, and high-temp alloys.

**RDHT-T**

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	TT125
RDHT1003M0T	.394	.125	.006	-	-	-	2012446	-	-

- Precision pressed insert.
- First choice for roughing operations, especially for steel and cast iron.

**RDMW/-T**

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	TT125
RDMW1003M0	.394	.125	.004	2012572	-	-	-	-	-
RDMW1003M0T	.394	.125	.006	-	-	3353279	2109381	2020735	2012578



■ Recommended Starting Speeds [SFM]

Material Group		TN2510			TN6525			TN6540			TN7525			TN7535			TTI25		
P	1	2165	<b>1910</b>	1770	1340	<b>1045</b>	925	1180	<b>925</b>	785	1340	<b>1025</b>	925	1790	<b>1555</b>	1460	1415	<b>1180</b>	985
	2	1340	<b>1220</b>	1080	1045	<b>830</b>	710	830	<b>630</b>	550	1025	<b>830</b>	710	1105	<b>1000</b>	905	1025	<b>830</b>	710
	3	1220	<b>1080</b>	1000	925	<b>710</b>	610	710	<b>550</b>	450	925	<b>710</b>	610	1000	<b>905</b>	805	1025	<b>830</b>	710
	4	905	<b>845</b>	750	770	<b>550</b>	475	590	<b>430</b>	355	770	<b>550</b>	475	750	<b>690</b>	630	865	<b>710</b>	590
	5	1080	<b>985</b>	905	1025	<b>770</b>	650	785	<b>590</b>	490	1025	<b>770</b>	650	1025	<b>905</b>	830	1045	<b>770</b>	650
	6	750	<b>670</b>	570	670	<b>535</b>	430	535	<b>395</b>	335	670	<b>535</b>	430	630	<b>535</b>	430	475	<b>355</b>	295
M	1	890	<b>785</b>	690	630	<b>395</b>	260	430	<b>260</b>	200	805	<b>725</b>	610	805	<b>725</b>	610	1570	<b>1025</b>	710
	2	805	<b>690</b>	630	395	<b>260</b>	155	260	<b>155</b>	140	725	<b>630</b>	550	725	<b>630</b>	550	1060	<b>670</b>	475
	3	630	<b>570</b>	490	415	<b>260</b>	180	275	<b>155</b>	140	570	<b>510</b>	450	570	<b>510</b>	450	1045	<b>690</b>	475
K	1	1380	<b>1180</b>	985	905	<b>805</b>	725	725	<b>670</b>	590	1240	<b>925</b>	785	1165	<b>1045</b>	940	725	<b>610</b>	510
	2	1180	<b>985</b>	830	710	<b>630</b>	590	570	<b>510</b>	450	1060	<b>785</b>	650	925	<b>830</b>	750	590	<b>475</b>	415
	3	985	<b>830</b>	650	590	<b>535</b>	475	510	<b>475</b>	415	785	<b>650</b>	550	770	<b>690</b>	630	475	<b>415</b>	335
N	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	155	<b>120</b>	95	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	80	<b>60</b>	40	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	235	<b>140</b>	95	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	200	<b>95</b>	80	-	-	-	-	-	-	-	-	-
H	1	475	<b>360</b>	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	475	<b>360</b>	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	380	<b>260</b>	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Copy Mills



■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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At .197 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHT-T	.009	.015	.026	.007	.011	.018	.005	.008	.014	.004	.007	.012	.004	.007	.011	RDHT-T
RDHW-MH	.009	.017	.035	.007	.012	.025	.005	.009	.019	.004	.008	.016	.004	.007	.015	RDHW-MH
RDMT-T	.009	.015	.026	.007	.011	.018	.005	.008	.014	.004	.007	.012	.004	.007	.011	RDMT-T
RDMW-	.009	.008	.024	.007	.006	.017	.005	.004	.013	.004	.004	.011	.004	.004	.010	RDMW-
RDMW-T	.009	.022	.035	.007	.016	.025	.005	.012	.019	.004	.011	.016	.004	.010	.015	RDMW-T

At .098 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHT-T	.010	.018	.030	.008	.013	.021	.006	.010	.016	.005	.008	.014	.005	.008	.013	RDHT-T
RDHW-MH	.010	.019	.040	.008	.014	.029	.006	.010	.021	.005	.009	.019	.005	.008	.017	RDHW-MH
RDMT-T	.010	.018	.030	.008	.013	.021	.006	.010	.016	.005	.008	.014	.005	.008	.013	RDMT-T
RDMW-	.010	.009	.027	.008	.007	.020	.006	.005	.015	.005	.004	.013	.005	.004	.012	RDMW-
RDMW-T	.010	.026	.040	.008	.019	.029	.006	.014	.021	.005	.012	.019	.005	.011	.017	RDMW-T

At .049 Axial Depth of Cut (ap)

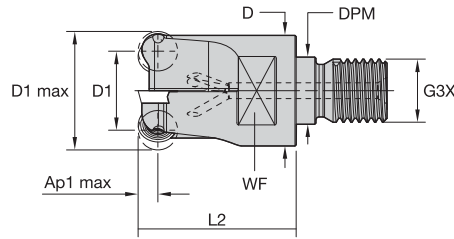
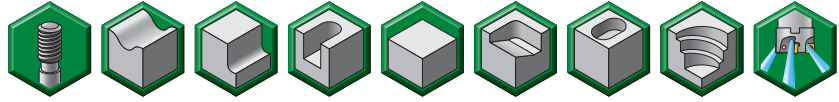
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHT-T	.014	.023	.039	.010	.017	.028	.007	.012	.021	.006	.011	.018	.006	.010	.017	RDHT-T
RDHW-MH	.014	.025	.053	.010	.018	.038	.007	.014	.028	.006	.012	.025	.006	.011	.022	RDHW-MH
RDMT-T	.014	.023	.039	.010	.017	.028	.007	.012	.021	.006	.011	.018	.006	.010	.017	RDMT-T
RDMW-	.014	.012	.036	.010	.009	.026	.007	.007	.019	.006	.006	.017	.006	.005	.015	RDMW-
RDMW-T	.014	.034	.053	.010	.024	.038	.007	.018	.028	.006	.016	.025	.006	.015	.022	RDMW-T

At .025 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHT-T	.019	.032	.053	.014	.023	.038	.010	.017	.028	.009	.015	.025	.008	.014	.023	RDHT-T
RDHW-MH	.019	.034	.073	.014	.025	.052	.010	.019	.039	.009	.016	.034	.008	.015	.031	RDHW-MH
RDMT-T	.019	.032	.053	.014	.023	.038	.010	.017	.028	.009	.015	.025	.008	.014	.023	RDMT-T
RDMW-	.019	.017	.049	.014	.012	.035	.010	.009	.026	.009	.008	.023	.008	.007	.021	RDMW-
RDMW-T	.019	.047	.073	.014	.033	.052	.010	.025	.039	.009	.022	.034	.008	.020	.031	RDMW-T

NOTE: Use "Light Machining" value as starting feed rate.

- General purpose face and copy milling.
- Anti-rotation feature for top security.



Copy Mills

■ **Screw-On End Mills**

order number	catalog number	D1 max	D1	D	G3X	L	L2	WF	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646609	M100D100Z02M12RD12	1.000	.528	.827	M12.000	2.366	1.500	.750	.236	2	50.0°	23000	Yes	.44
2646620	M100D150Z02M16RD12	1.500	1.028	1.142	M16.000	2.715	1.750	1.000	.236	3	27.0°	17000	Yes	.71

■ **Spare Parts**



insert screw

12148038800



in. lbs.

27

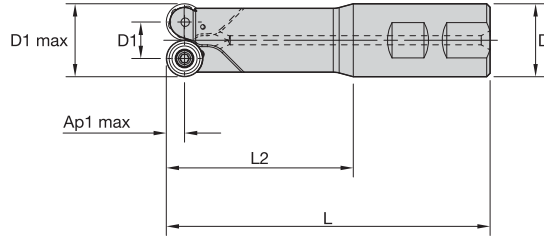


Torx driver

12148000600

NOTE: All spare parts except the insert screws must be ordered separately.

- General purpose face and copy milling.
- Anti-rotation feature for top security.



■ **Weldon Shanks**

order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646611	M100D100Z02W100RD12L553	1.000	.528	1.000	5.530	3.250	.236	2	50.0°	23000	Yes	1.25
2646610	M100D100Z02W100RD12	1.000	.528	1.000	4.780	2.500	.236	2	50.0°	23000	Yes	1.00
2646614	M100D100Z02W125RD12L715	1.000	.528	1.250	7.150	4.870	.236	2	50.0°	23000	Yes	1.75
2646612	M100D100Z02W125RD12	1.000	.528	1.250	6.400	4.120	.236	2	50.0°	23000	Yes	1.60
2646617	M100D125Z02W125RD12L615	1.250	.778	1.250	6.150	3.870	.236	2	23.0°	19000	Yes	1.60
2646616	M100D125Z02W125RD12	1.250	.778	1.250	5.400	3.120	.236	2	23.0°	19000	Yes	1.40
2646618	M100D125Z02W150RD12	1.250	.778	1.500	7.250	4.560	.236	2	23.0°	19000	Yes	2.10
2646622	M100D150Z03W125RD12L715	1.500	1.028	1.250	7.150	4.870	.236	3	27.0°	17000	Yes	2.25
2646621	M100D150Z03W125RD12	1.500	1.028	1.250	5.650	3.370	.236	3	27.0°	17000	Yes	1.80

■ **Spare Parts**



insert screw

12148038800



in. lbs.

27



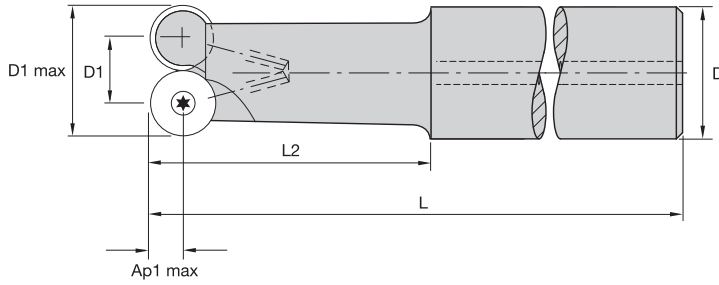
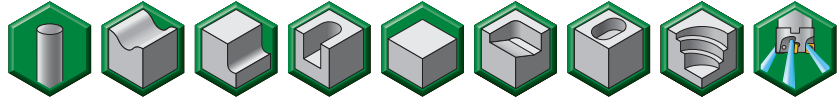
Torx driver

12148000600

NOTE: All spare parts except the insert screws must be ordered separately.

Copy Mills

- General purpose face and copy milling.
- Anti-rotation feature for top security.



Copy Mills

**■ Cylindrical End Mills**

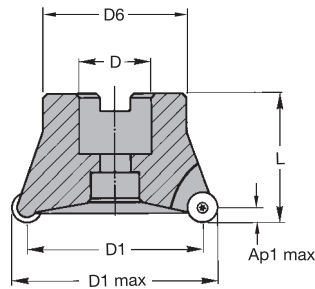
order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646607	M100D100Z02C100RD12L478	1.000	.528	1.000	4.780	2.500	.236	2	50.0°	23000	Yes	1.00

**■ Spare Parts**

D1 max	insert screw	in. lbs.	Torx driver
1.000	12148038800	27	12148000600

NOTE: All spare parts except the insert screws must be ordered separately.





- General purpose face and copy milling.
- Anti-rotation feature for top security.



■ **Shell Mills**

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646724	M100D200Z04S075RD12	2.000	1.530	.750	1.700	1.630	.236	4	10.0°	15000	Yes	.55
2646725	M100D200Z05S075RD12	2.000	1.530	.750	1.700	1.630	.236	5	10.0°	15000	Yes	.55
2646732	M100D300Z07S100RD12	3.000	2.528	1.000	2.300	2.000	.236	7	5.0°	12000	Yes	1.65

■ **Spare Parts**

D1 max	insert screw	in. lbs.	Torx driver	socket-head cap screw	socket-head cap screw with coolant groove
2.000	 12148038800	27	 12148000600	 S445	 S445CG
3.000	12148038800	27	12148000600	S458	S458CG

NOTE: All spare parts except the insert screws must be ordered separately.

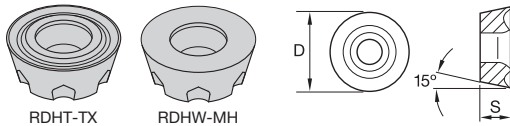
Copy Mills

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	RDMT-TX	TN7525	RDMT-TX	TN6540	RDMT-TX	TN6540
P3-P4	RDMT-TX	TN7525	RDMW-TX	TN6540	RDMW-TX	TN6540
P5-P6	RDMT-TX	TN7525	RDPT-MMX	TN7535	RDPT-MMX	TN7535
M1-M2	RDHT-TX	TN7525	RDMT-TX	TN6540	RDPT-MMX	TN6540
M3	RDHT-TX	TN7525	RDMT-TX	TN6540	RDPT-MMX	TN6540
K1-K2	RDMW-TX	WK15CM	RDMW-TX	WK15CM	RDMW-TX	TN7535
K3	RDHW-MH	TN2510	RDMW-TX	WK15CM	RDMW-TX	WK15CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	RDMT-TX	TN6540	-	-
S3	-	-	RDMT-TX	TN6540	-	-
S4	-	-	RDMT-TX	TN6540	RDPT-MMX	TN6540
H1	RDHW-MH	TN2510	RDHW-MH	TN2510	-	-

Copy Mills

iC12 • Inserts



- Precision ground positive geometry for lower cutting forces.
- First choice for general machining, stainless steel, and high-temp alloys.

- first choice
- alternate choice

P	●	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○

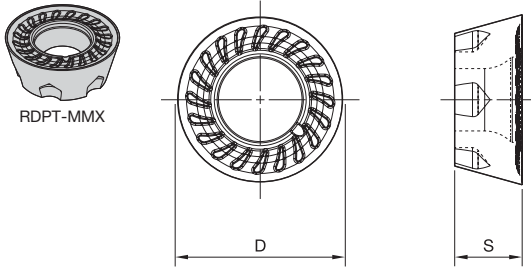
■ RDHT-TX

catalog number	number of indexes	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM
RDHT1204M0TX	6	.472	.188	.005	●	○	○	○	○	○	○

- Precision ground flat top insert.
- Alternative choice for stable milling operations in high-strength steel and hardened material.

■ RDHW-MH

catalog number	number of indexes	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM
RDHW1204M0MH	6	.472	.188	.006	○	○	○	○	○	○	○



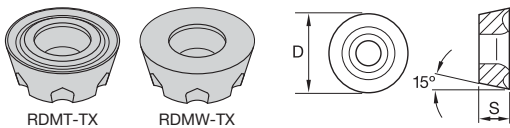
- Precision pressed insert.
- Improved performance in stainless steel and high-temp alloys.

**RDPT-MMX**

catalog number	number of indexes	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM
RDPT1204M0SMMX	6	.472	.187	.007	•	•	•	•	•	•	•

P	•	•	•	•	•	•	•	•	•	•	•
M	•	•	•	•	•	•	•	•	•	•	•
K	•	•	•	•	•	•	•	•	•	•	•
N	•	•	•	•	•	•	•	•	•	•	•
S	•	•	•	•	•	•	•	•	•	•	•
H	•	•	•	•	•	•	•	•	•	•	•

• first choice  
○ alternate choice



- Precision pressed positive geometry for lower cutting forces.
- First choice for general machining, stainless steel, and high-temp alloys in roughing operations.

**RDMT-TX**

catalog number	number of indexes	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM
RDMT1204M0TX	6	.472	.188	.006	•	•	•	•	•	•	•

P	•	•	•	•	•	•	•	•	•	•	•
M	•	•	•	•	•	•	•	•	•	•	•
K	•	•	•	•	•	•	•	•	•	•	•
N	•	•	•	•	•	•	•	•	•	•	•
S	•	•	•	•	•	•	•	•	•	•	•
H	•	•	•	•	•	•	•	•	•	•	•

• first choice  
○ alternate choice

- Precision pressed insert.
- First choice for roughing operations, especially for steel and cast iron.

**RDMW-TX**

catalog number	number of indexes	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	WK15CM	WS30PM
RDMW1204M0TX	6	.472	.188	.006	•	•	•	•	•	•	•

■ Recommended Starting Speeds [SFM]

Material Group		TN2510			TN6525			TN6540			TN7525		
P	1	2165	<b>1910</b>	1770	1340	<b>1045</b>	925	1180	<b>925</b>	785	1340	<b>1025</b>	925
	2	1340	<b>1220</b>	1080	1045	<b>830</b>	710	830	<b>630</b>	550	1025	<b>830</b>	710
	3	1220	<b>1080</b>	1000	925	<b>710</b>	610	710	<b>550</b>	450	925	<b>710</b>	610
	4	905	<b>845</b>	750	770	<b>550</b>	475	590	<b>430</b>	355	770	<b>550</b>	475
	5	1080	<b>985</b>	905	1025	<b>770</b>	650	785	<b>590</b>	490	1025	<b>770</b>	650
	6	750	<b>670</b>	570	670	<b>535</b>	430	535	<b>395</b>	335	670	<b>535</b>	430
M	1	890	<b>785</b>	690	630	<b>395</b>	260	430	<b>260</b>	200	805	<b>725</b>	610
	2	805	<b>690</b>	630	395	<b>260</b>	155	260	<b>155</b>	140	725	<b>630</b>	550
	3	630	<b>570</b>	490	415	<b>260</b>	180	275	<b>155</b>	140	570	<b>510</b>	450
K	1	1380	<b>1180</b>	985	905	<b>805</b>	725	725	<b>670</b>	590	1240	<b>925</b>	785
	2	1180	<b>985</b>	830	710	<b>630</b>	590	570	<b>510</b>	450	1060	<b>785</b>	650
	3	985	<b>830</b>	650	590	<b>535</b>	475	510	<b>475</b>	415	785	<b>650</b>	550
N	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	155	<b>120</b>	95	-	-	-
	2	-	-	-	-	-	-	80	<b>60</b>	40	-	-	-
	3	-	-	-	-	-	-	235	<b>140</b>	95	-	-	-
	4	-	-	-	-	-	-	200	<b>95</b>	80	-	-	-
H	1	475	<b>360</b>	230	-	-	-	-	-	-	-	-	-
	2	475	<b>360</b>	230	-	-	-	-	-	-	-	-	-
	3	380	<b>260</b>	150	-	-	-	-	-	-	-	-	-

Copy Mills

Material Group		TN7535			WK15CM			WS30PM			TTI25		
P	1	1790	<b>1555</b>	1460	-	-	-	-	-	-	1415	<b>1180</b>	985
	2	1105	<b>1000</b>	905	-	-	-	-	-	-	1025	<b>830</b>	710
	3	1000	<b>905</b>	805	-	-	-	-	-	-	1025	<b>830</b>	710
	4	750	<b>690</b>	630	-	-	-	-	-	-	865	<b>710</b>	590
	5	1025	<b>905</b>	830	-	-	-	-	-	-	1045	<b>770</b>	650
	6	630	<b>535</b>	430	-	-	-	-	-	-	475	<b>355</b>	295
M	1	805	<b>725</b>	610	-	-	-	890	<b>785</b>	725	1570	<b>1025</b>	710
	2	725	<b>630</b>	550	-	-	-	805	<b>710</b>	570	1060	<b>670</b>	475
	3	570	<b>510</b>	450	-	-	-	610	<b>535</b>	415	1045	<b>690</b>	475
K	1	1165	<b>1045</b>	940	1655	<b>1520</b>	1340	-	-	-	725	<b>610</b>	510
	2	925	<b>830</b>	750	1320	<b>1165</b>	1080	-	-	-	590	<b>475</b>	415
	3	770	<b>690</b>	630	1105	<b>985</b>	905	-	-	-	475	<b>415</b>	335
N	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	180	<b>155</b>	120	-	-	-
	2	-	-	-	-	-	-	180	<b>155</b>	120	-	-	-
	3	-	-	-	-	-	-	215	<b>180</b>	120	-	-	-
	4	-	-	-	-	-	-	335	<b>235</b>	155	-	-	-
H	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.



■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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At .236 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHT-TX	.014	<b>.013</b>	.022	.010	<b>.009</b>	.016	.007	<b>.007</b>	.012	.006	<b>.006</b>	.010	.006	<b>.006</b>	.009	RDHT-TX
RDMT-TX	.014	<b>.016</b>	.027	.010	<b>.012</b>	.020	.007	<b>.009</b>	.015	.006	<b>.008</b>	.013	.006	<b>.007</b>	.012	RDMT-TX
RDPT-MMX	.014	<b>.023</b>	.037	.010	<b>.016</b>	.026	.007	<b>.012</b>	.020	.006	<b>.011</b>	.017	.006	<b>.010</b>	.016	RDPT-MMX
RDHW-MH	.014	<b>.027</b>	.042	.010	<b>.020</b>	.031	.007	<b>.015</b>	.023	.006	<b>.013</b>	.020	.006	<b>.012</b>	.018	RDHW-MH
RDMW-TX	.014	<b>.027</b>	.046	.010	<b>.020</b>	.033	.007	<b>.015</b>	.024	.006	<b>.013</b>	.021	.006	<b>.012</b>	.019	RDMW-TX

At .118 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHT-TX	.016	<b>.015</b>	.025	.011	<b>.011</b>	.018	.009	<b>.008</b>	.014	.007	<b>.007</b>	.012	.007	<b>.007</b>	.011	RDHT-TX
RDMT-TX	.016	<b>.019</b>	.032	.011	<b>.014</b>	.023	.009	<b>.010</b>	.017	.007	<b>.009</b>	.015	.007	<b>.008</b>	.014	RDMT-TX
RDPT-MMX	.016	<b>.026</b>	.043	.011	<b>.019</b>	.031	.009	<b>.014</b>	.023	.007	<b>.012</b>	.020	.007	<b>.011</b>	.018	RDPT-MMX
RDHW-MH	.016	<b>.032</b>	.049	.011	<b>.023</b>	.035	.009	<b>.017</b>	.026	.007	<b>.015</b>	.023	.007	<b>.014</b>	.021	RDHW-MH
RDMW-TX	.016	<b>.032</b>	.053	.011	<b>.023</b>	.038	.009	<b>.017</b>	.028	.007	<b>.015</b>	.025	.007	<b>.014</b>	.022	RDMW-TX

At .059 Axial Depth of Cut (ap)

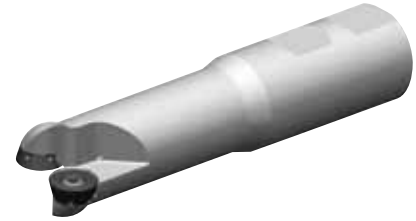
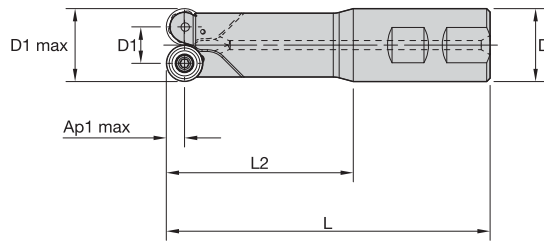
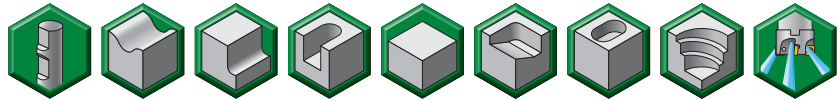
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHT-TX	.021	<b>.020</b>	.033	.015	<b>.014</b>	.024	.011	<b>.011</b>	.018	.010	<b>.009</b>	.016	.009	<b>.009</b>	.014	RDHT-TX
RDMT-TX	.021	<b>.025</b>	.042	.015	<b>.018</b>	.030	.011	<b>.013</b>	.022	.010	<b>.012</b>	.019	.009	<b>.011</b>	.018	RDMT-TX
RDPT-MMX	.021	<b>.035</b>	.056	.015	<b>.025</b>	.040	.011	<b>.019</b>	.030	.010	<b>.016</b>	.026	.009	<b>.015</b>	.024	RDPT-MMX
RDHW-MH	.021	<b>.042</b>	.065	.015	<b>.030</b>	.046	.011	<b>.022</b>	.034	.010	<b>.019</b>	.030	.009	<b>.018</b>	.027	RDHW-MH
RDMW-TX	.021	<b>.042</b>	.070	.015	<b>.030</b>	.050	.011	<b>.022</b>	.037	.010	<b>.019</b>	.032	.009	<b>.018</b>	.029	RDMW-TX

At .030 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHT-TX	.028	<b>.027</b>	.046	.020	<b>.020</b>	.033	.015	<b>.015</b>	.024	.013	<b>.013</b>	.021	.012	<b>.012</b>	.019	RDHT-TX
RDMT-TX	.028	<b>.034</b>	.057	.020	<b>.025</b>	.041	.015	<b>.018</b>	.031	.013	<b>.016</b>	.027	.012	<b>.015</b>	.024	RDMT-TX
RDPT-MMX	.028	<b>.047</b>	.077	.020	<b>.034</b>	.055	.015	<b>.025</b>	.041	.013	<b>.022</b>	.036	.012	<b>.020</b>	.033	RDPT-MMX
RDHW-MH	.028	<b>.058</b>	.090	.020	<b>.041</b>	.064	.015	<b>.031</b>	.047	.013	<b>.027</b>	.041	.012	<b>.024</b>	.037	RDHW-MH
RDMW-TX	.028	<b>.058</b>	.097	.020	<b>.041</b>	.068	.015	<b>.031</b>	.051	.013	<b>.027</b>	.044	.012	<b>.024</b>	.040	RDMW-TX

NOTE: Use "Light Machining" value as starting feed rate.

- General purpose face and copy milling.
- Anti-rotation feature for top security.



Copy Mills

■ Weldon Shanks

order number	catalog number	D1 max	D1	D	L	L2	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646623	M100D150Z02W125RD16	1.500	.870	1.250	5.400	3.120	.315	2	27.0°	17000	Yes	.65

■ Spare Parts



insert screw



in. lbs.

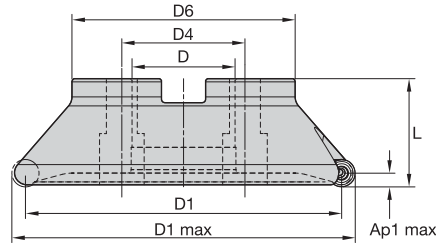
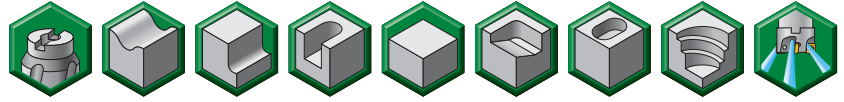


Torx driver

D1 max	1.500	12148007200	35	12148007500
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NOTE: All spare parts except the insert screws must be ordered separately.

- General purpose face and copy milling.
- Anti-rotation feature for top security.



■ **Shell Mills**

order number	catalog number	D1 max	D1	D	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646726	M100D200Z03S075RD16	2.000	1.370	.750	1.700	1.630	.315	3	12.0°	15000	Yes	.55
2646729	M100D250Z04S100RD16	2.500	1.870	1.000	2.200	1.750	.315	4	8.0°	14000	Yes	1.05
2646733	M100D300Z05S100RD16	3.000	2.370	1.000	2.300	2.000	.315	5	11.0°	12000	Yes	1.65
2646736	M100D400Z06S125RD16	4.000	3.370	1.250	2.800	2.000	.315	6	7.0°	11000	No	2.55

■ **Spare Parts**

D1 max	insert screw	in. lbs.	Torx driver	socket-head cap screw	socket-head cap screw with coolant groove
2.000	12148007200	35	12148007500	S445	S445CG
2.500	12148007200	35	12148007500	S458	S458CG
3.000	12148007200	35	12148007500	S458	S458CG
4.000	12148007200	35	12148007500	—	—

NOTE: All spare parts except the insert screws must be ordered separately.

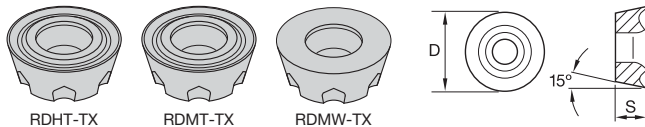
Copy Mills

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	RDMT-TX	TN6525	RDMT-TX	TN6540	RDMT-TX	TN6540
P3-P4	RDMT-TX	TN6525	RDMW-TX	TN6540	RDMW-TX	TN6540
P5-P6	RDMT-TX	TN7525	RDMT-TX	TN7535	RDMT-TX	TN7535
M1-M2	RDMT-TX	TN6525	RDMT-TX	TN6540	RDMT-TX	TN6540
M3	RDMT-TX	TN6525	RDMT-TX	TN6540	RDMT-TX	TN6540
K1-K2	RDMW-TX	TN2510	RDMW-TX	TN7535	RDMW-TX	TN7535
K3	RDMW-TX	TN2510	RDMW-TX	TN7535	RDMW-TX	TN7535
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	RDMT-TX	TN6540	-	-
S3	-	-	RDMT-TX	TN6540	-	-
S4	-	-	RDMT-TX	TN6540	RDMT-TX	TN6540
H1	RDMW-TX	TN2510	RDMW-TX	TN2510	-	-

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iC16 • Inserts



- Precision ground positive geometry for lower cutting forces.
- First choice for general machining, stainless steel, and high-temp alloys.

- first choice
- alternate choice

P	●	○	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○

■ RDHT-TX

catalog number	cutting edges	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	TT125
RDHT1605M0TX	6	.630	.219	.005	○	○	○	○	○	○

- Precision pressed positive geometry for lower cutting forces.
- First choice for general machining, stainless steel, and high-temp alloys in roughing operations.

■ RDMT-TX

catalog number	cutting edges	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	TT125
RDMT1605M0TX	6	.630	.219	.007	○	○	○	○	○	○

- Precision pressed insert.
- First choice for roughing operations, especially for steel and cast iron.

■ RDMW-TX

catalog number	cutting edges	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	TT125
RDMW1605M0TX	6	.630	.219	.006	○	○	○	○	○	○

■ Recommended Starting Speeds [SFM]

Material Group		TN2510			TN6525			TN6540			TN7525			TN7535			TTI25		
P	1	2165	<b>1910</b>	1770	1340	<b>1045</b>	925	1180	<b>925</b>	785	1340	<b>1025</b>	925	1790	<b>1555</b>	1460	1415	<b>1180</b>	985
	2	1340	<b>1220</b>	1080	1045	<b>830</b>	710	830	<b>630</b>	550	1025	<b>830</b>	710	1105	<b>1000</b>	905	1025	<b>830</b>	710
	3	1220	<b>1080</b>	1000	925	<b>710</b>	610	710	<b>550</b>	450	925	<b>710</b>	610	1000	<b>905</b>	805	1025	<b>830</b>	710
	4	905	<b>845</b>	750	770	<b>550</b>	475	590	<b>430</b>	355	770	<b>550</b>	475	750	<b>690</b>	630	865	<b>710</b>	590
	5	1080	<b>985</b>	905	1025	<b>770</b>	650	785	<b>590</b>	490	1025	<b>770</b>	650	1025	<b>905</b>	830	1045	<b>770</b>	650
	6	750	<b>670</b>	570	670	<b>535</b>	430	535	<b>395</b>	335	670	<b>535</b>	430	630	<b>535</b>	430	475	<b>355</b>	295
M	1	890	<b>785</b>	690	630	<b>395</b>	260	430	<b>260</b>	200	805	<b>725</b>	610	805	<b>725</b>	610	1570	<b>1025</b>	710
	2	805	<b>690</b>	630	395	<b>260</b>	155	260	<b>155</b>	140	725	<b>630</b>	550	725	<b>630</b>	550	1060	<b>670</b>	475
	3	630	<b>570</b>	490	415	<b>260</b>	180	275	<b>155</b>	140	570	<b>510</b>	450	570	<b>510</b>	450	1045	<b>690</b>	475
K	1	1380	<b>1180</b>	985	905	<b>805</b>	725	725	<b>670</b>	590	1240	<b>925</b>	785	1165	<b>1045</b>	940	725	<b>610</b>	510
	2	1180	<b>985</b>	830	710	<b>630</b>	590	570	<b>510</b>	450	1060	<b>785</b>	650	925	<b>830</b>	750	590	<b>475</b>	415
	3	985	<b>830</b>	650	590	<b>535</b>	475	510	<b>475</b>	415	785	<b>650</b>	550	770	<b>690</b>	630	475	<b>415</b>	335
N	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	155	<b>120</b>	95	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	80	<b>60</b>	40	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	235	<b>140</b>	95	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	200	<b>95</b>	80	-	-	-	-	-	-	-	-	-
H	1	475	<b>360</b>	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	475	<b>360</b>	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	380	<b>260</b>	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Copy Mills

Recommended Starting Feeds

■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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At .315 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHX-TX	.005	<b>.014</b>	.027	.003	<b>.010</b>	.020	.002	<b>.007</b>	.015	.002	<b>.006</b>	.013	.002	<b>.006</b>	.012	RDHX-TX
RDMT-TX	.009	<b>.016</b>	.033	.007	<b>.012</b>	.024	.005	<b>.009</b>	.018	.004	<b>.008</b>	.016	.004	<b>.007</b>	.014	RDMT-TX
RDMW-TX	.009	<b>.020</b>	.041	.007	<b>.015</b>	.030	.005	<b>.011</b>	.022	.004	<b>.010</b>	.019	.004	<b>.009</b>	.018	RDMW-TX

At .157 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHX-TX	.005	<b>.016</b>	.032	.004	<b>.011</b>	.023	.003	<b>.008</b>	.017	.002	<b>.007</b>	.015	.002	<b>.007</b>	.014	RDHX-TX
RDMT-TX	.010	<b>.019</b>	.038	.008	<b>.014</b>	.028	.006	<b>.010</b>	.021	.005	<b>.009</b>	.018	.005	<b>.008</b>	.016	RDMT-TX
RDMW-TX	.010	<b>.024</b>	.048	.008	<b>.017</b>	.034	.006	<b>.013</b>	.026	.005	<b>.011</b>	.022	.005	<b>.010</b>	.020	RDMW-TX

At .079 Axial Depth of Cut (ap)

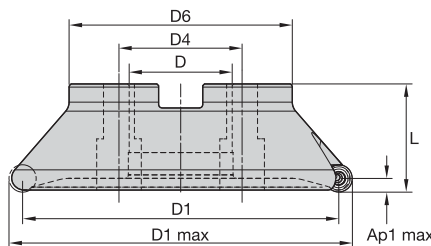
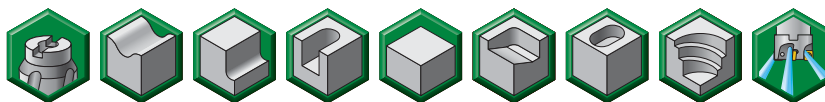
Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHX-TX	.007	<b>.021</b>	.042	.005	<b>.015</b>	.030	.004	<b>.011</b>	.022	.003	<b>.010</b>	.019	.003	<b>.009</b>	.018	RDHX-TX
RDMT-TX	.014	<b>.025</b>	.050	.010	<b>.018</b>	.036	.007	<b>.013</b>	.027	.006	<b>.012</b>	.023	.006	<b>.011</b>	.021	RDMT-TX
RDMW-TX	.014	<b>.031</b>	.063	.010	<b>.022</b>	.045	.007	<b>.017</b>	.034	.006	<b>.015</b>	.029	.006	<b>.013</b>	.027	RDMW-TX

At .039 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
RDHX-TX	.009	<b>.028</b>	.057	.007	<b>.020</b>	.041	.005	<b>.015</b>	.030	.004	<b>.013</b>	.027	.004	<b>.012</b>	.024	RDHX-TX
RDMT-TX	.019	<b>.034</b>	.070	.014	<b>.025</b>	.050	.010	<b>.018</b>	.037	.009	<b>.016</b>	.032	.008	<b>.015</b>	.029	RDMT-TX
RDMW-TX	.019	<b>.043</b>	.088	.014	<b>.031</b>	.062	.010	<b>.023</b>	.046	.009	<b>.020</b>	.040	.008	<b>.018</b>	.037	RDMW-TX

NOTE: Use "Light Machining" value as starting feed rate.

- General purpose face and copy milling.
- Anti-rotation feature for top security.



Copy Mills

■ Shell Mills

order number	catalog number	D1 max	D1	D	D4	D6	L	Ap1 max	Z	max ramp angle	max RPM	coolant supply	lbs
2646723	M100D200Z04S075RC16	2.000	1.370	.750	—	1.700	1.630	.315	4	12.0°	15000	Yes	.60
2646727	M100D250Z04S100RC16	2.500	1.870	1.000	—	2.200	1.750	.315	4	8.0°	14000	Yes	1.10
2646730	M100D300Z05S100RC16	3.000	2.370	1.000	—	2.300	2.000	.315	5	11.0°	12000	Yes	1.70
2646731	M100D300Z05S125RC16	3.000	2.370	1.250	—	2.800	2.000	.315	5	11.0°	12000	No	2.60
2646734	M100D400Z07S125RC16	4.000	3.370	1.250	—	2.800	2.000	.315	7	7.0°	11000	No	2.60
2646735	M100D400Z07S150RC16	4.000	3.370	1.500	—	3.100	2.000	.315	7	7.0°	11000	No	2.65
2646738	M100D600Z09S200RC16	6.000	5.370	2.000	—	4.000	2.500	.315	9	7.0°	7000	No	7.15
2646740	M100D800Z11S200RC16	8.000	7.370	2.000	4.000	5.500	2.500	.315	11	8.0°	5500	No	14.25

■ Spare Parts



D1 max	insert screw	in. lbs.	Torx driver	socket-head cap screw	socket-head cap screw with coolant groove
2.000	12148007200	35	12148007500	S445	S445CG
2.500	12148007200	35	12148007500	S458	S458CG
3.000	12148007200	35	12148007500	S458	S458CG
3.000	12148007200	35	12148007500	—	—
4.000	12148007200	35	12148007500	—	—
6.000	12148007200	35	12148007500	—	—
8.000	12148007200	35	12148007500	—	—

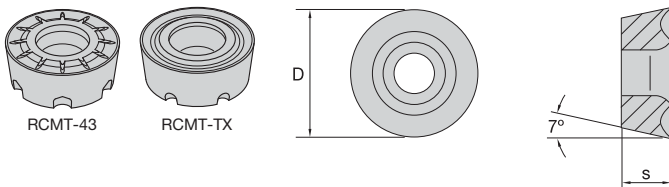
NOTE: All spare parts except the insert screws must be ordered separately.

■ **Insert Selection Guide**

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	...TX	TN6525	...43M	TN6540	...43M	TN6540
P3-P4	...TX	TN6525	...TX	TN6540	...43M	TN6540
P5-P6	...TX	TN6525	...TX	TN7535	...TX	TN7535
M1-M2	...TX	TN6525	...TX	TN6540	...TX	TN6540
M3	...TX	TN6525	...TX	TN6540	...TX	TN6540
K1-K2	...43	TN2510	...TX	WK15CM	...TX	WK15CM
K3	...TX	TN6525	...TX	WK15CM	...TX	WK15CM
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	-	-	-	-
S3	-	-	-	-	-	-
S4	...43M	TN6540	...TX	TN6540	...TX	TN6540
H1	-	-	...TX	TN2510	-	-

Copy Mills

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- Optimized geometry providing excellent chip control, even at lower depth of cut.

- first choice
- alternate choice

P	●	○	○	○	○	○	○	○
M	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○

■ **RCMT-43**

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	WK15CM
RCMT1606M043M	.630	.250	.008	○	○	●	○	○	○

- Precision pressed positive geometry for lower cutting forces.
- First choice for general machining, stainless steel, and high-temp alloys in roughing operations.

■ **RCMT-TX**

catalog number	D	S	hm	TN2510	TN6525	TN6540	TN7525	TN7535	WK15CM
RCMT1606M0TX	.630	.250	.009	○	○	○	○	○	○

■ Recommended Starting Speeds [SFM]

Material Group		TN2510			TN6525			TN6540			TN7525			TN7535			WK15CM		
P	1	2165	<b>1910</b>	1770	1340	<b>1045</b>	925	1180	<b>925</b>	785	1340	<b>1025</b>	925	1790	<b>1555</b>	1460	-	-	-
	2	1340	<b>1220</b>	1080	1045	<b>830</b>	710	830	<b>630</b>	550	1025	<b>830</b>	710	1105	<b>1000</b>	905	-	-	-
	3	1220	<b>1080</b>	1000	925	<b>710</b>	610	710	<b>550</b>	450	925	<b>710</b>	610	1000	<b>905</b>	805	-	-	-
	4	905	<b>845</b>	750	770	<b>550</b>	475	590	<b>430</b>	355	770	<b>550</b>	475	750	<b>690</b>	630	-	-	-
	5	1080	<b>985</b>	905	1025	<b>770</b>	650	785	<b>590</b>	490	1025	<b>770</b>	650	1025	<b>905</b>	830	-	-	-
	6	750	<b>670</b>	570	670	<b>535</b>	430	535	<b>395</b>	335	670	<b>535</b>	430	630	<b>535</b>	430	-	-	-
M	1	890	<b>785</b>	690	630	<b>395</b>	260	430	<b>260</b>	200	805	<b>725</b>	610	805	<b>725</b>	610	-	-	-
	2	805	<b>690</b>	630	395	<b>260</b>	155	260	<b>155</b>	140	725	<b>630</b>	550	725	<b>630</b>	550	-	-	-
	3	630	<b>570</b>	490	415	<b>260</b>	180	275	<b>155</b>	140	570	<b>510</b>	450	570	<b>510</b>	450	-	-	-
K	1	1380	<b>1180</b>	985	905	<b>805</b>	725	725	<b>670</b>	590	1240	<b>925</b>	785	1165	<b>1045</b>	940	1655	<b>1520</b>	1340
	2	1180	<b>985</b>	830	710	<b>630</b>	590	570	<b>510</b>	450	1060	<b>785</b>	650	925	<b>830</b>	750	1320	<b>1165</b>	1080
	3	985	<b>830</b>	650	590	<b>535</b>	475	510	<b>475</b>	415	785	<b>650</b>	550	770	<b>690</b>	630	1105	<b>985</b>	905
N	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	155	<b>120</b>	95	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	80	<b>60</b>	40	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	235	<b>140</b>	95	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	200	<b>95</b>	80	-	-	-	-	-	-	-	-	-
H	1	475	<b>360</b>	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	475	<b>360</b>	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	380	<b>260</b>	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Copy Mills



■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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At .315 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
...43	.018	<b>.024</b>	.037	.013	<b>.017</b>	<b>.027</b>	.010	<b>.013</b>	<b>.020</b>	.009	<b>.011</b>	<b>.017</b>	.008	<b>.010</b>	<b>.016</b>	...43
...TX	.018	<b>.027</b>	.044	.013	<b>.020</b>	<b>.032</b>	.010	<b>.015</b>	<b>.024</b>	.009	<b>.013</b>	<b>.021</b>	.008	<b>.012</b>	<b>.019</b>	...TX

At .157 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
...43	.021	<b>.028</b>	.043	.015	<b>.020</b>	<b>.031</b>	.011	<b>.015</b>	<b>.023</b>	.010	<b>.013</b>	<b>.020</b>	.009	<b>.012</b>	<b>.018</b>	...43
...TX	.021	<b>.032</b>	.051	.015	<b>.023</b>	<b>.037</b>	.011	<b>.017</b>	<b>.027</b>	.010	<b>.015</b>	<b>.024</b>	.009	<b>.014</b>	<b>.022</b>	...TX

At .079 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
...43	.028	<b>.036</b>	.056	.020	<b>.026</b>	<b>.040</b>	.015	<b>.019</b>	<b>.030</b>	.013	<b>.017</b>	<b>.026</b>	.012	<b>.016</b>	<b>.024</b>	...43
...TX	.028	<b>.042</b>	.067	.020	<b>.030</b>	<b>.048</b>	.015	<b>.022</b>	<b>.036</b>	.013	<b>.019</b>	<b>.031</b>	.012	<b>.018</b>	<b>.028</b>	...TX

At .039 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
...43	.038	<b>.050</b>	.078	.027	<b>.036</b>	<b>.055</b>	.020	<b>.027</b>	<b>.041</b>	.018	<b>.023</b>	<b>.036</b>	.016	<b>.021</b>	<b>.033</b>	...43
...TX	.038	<b>.058</b>	.093	.027	<b>.041</b>	<b>.066</b>	.020	<b>.031</b>	<b>.049</b>	.018	<b>.027</b>	<b>.042</b>	.016	<b>.024</b>	<b>.039</b>	...TX

NOTE: Use "Light Machining" value as starting feed rate.



For Secure and Rigid Insert Clamping •

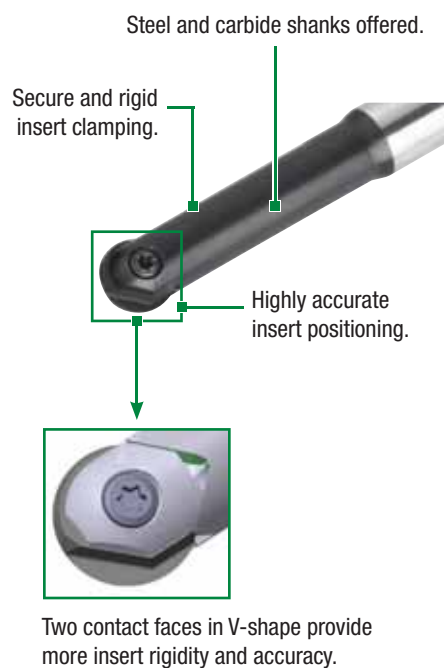
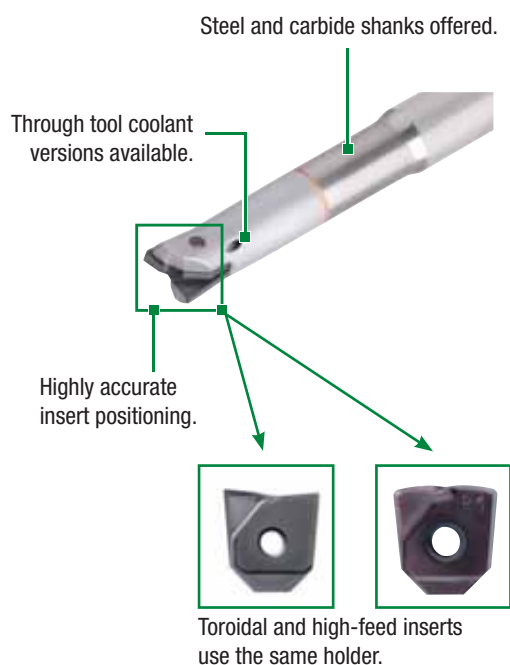
## M270™ Series

# M270



With precision-engineered ball nose, toroidal, and new high-feed inserts, the M270 Series provides the highest accuracy and insert stability for exceptional reliability and performance.

- Ball nose and toroidal tools for semi-finishing through finishing.
- Performance-boosting High-Feed (HF) inserts offered standard.
- V-shaped contact faces enable maximum stability and accuracy.



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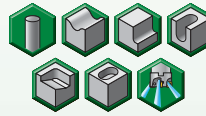
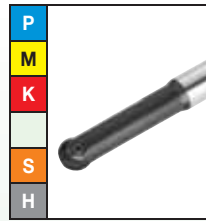


**M270™ Ball Nose**

Max depth of cut: .188–.500"

Diameter: .375–1"

Pages: K104–K115

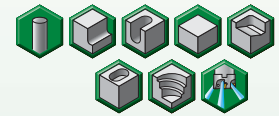
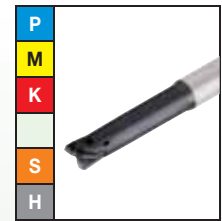


**M270 Toroidal**

Max depth of cut: .031–.126"

Diameter: .375–.750"

Pages: K116–K119

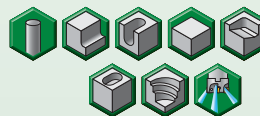


**M270 High-Feed**

Max depth of cut: .024–.043"

Diameter: .375–.750"

Pages: K120–K126



■ **Insert Offering**



**Ball nose inserts**  
BF/BR

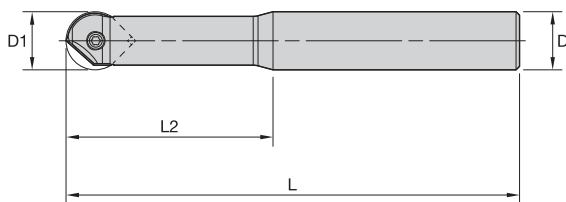
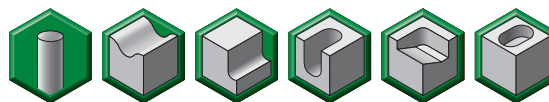


**Toroidal inserts**  
TF



**High-Feed inserts**  
HF

- Rough, semi-finishing, and finishing with one system.
- Secure and rigid insert clamping.



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■ Ball Nose • Cylindrical Shank

order number	catalog number	D1	D	L	L2	Z	Z U	inserts	max RPM	coolant supply	lbs
2639138	M270BD037C050L550	.375	.500	5.550	1.800	1	2	M270B.0375	57000	No	.22
2639139	M270BD050C050L575	.500	.500	5.750	2.000	1	2	M270B.0500	55000	No	.22
2639140	M270BD062C062L600	.625	.625	6.000	2.300	1	2	M270B.0625	53000	No	.44
2639141	M270BD075C075L700	.750	.750	7.000	2.800	1	2	M270B.0750	52000	No	.77
2639142	M270BD100C100L800	1.000	1.000	8.000	3.500	1	2	M270B.1000	50000	No	1.54

NOTE: Z = number of pocket seats.  
ZU = number of effective teeth.

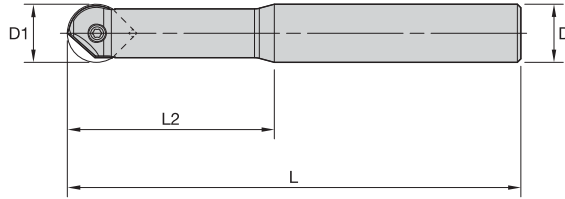
■ Spare Parts



D1	insert screw	in. lbs.	Torx driver
.375	12748610500	18	12148788900
.500	12748610600	18	12148788900
.625	12748610700	44	12148099300
.750	12748610800	44	12148099300
1.000	12748610900	62	12148086800

NOTE: All spare parts except the insert screws must be ordered separately.

- Rough, semi-finishing, and finishing with one system.
- Through tool coolant.
- Carbide shank to improve rigidity.



■ **Ball Nose • Carbide Cylindrical Shank**

order number	catalog number	D1	D	L	L2	Z	Z U	inserts	max RPM	coolant supply	lbs
2639253	M270BD037C050L555C	.375	.500	5.550	1.800	1	2	M270B.0375	57000	Yes	.44
2639254	M270BD050C050L575C	.500	.500	5.750	2.000	1	2	M270B.0500	55000	Yes	.55
2639255	M270BD062C062L600C	.625	.625	6.000	2.300	1	2	M270B.0625	53000	Yes	.88
2639256	M270BD075C075L700C	.750	.750	7.000	2.800	1	2	M270B.0750	52000	Yes	1.32

■ **Spare Parts**



D1	insert screw	in. lbs.	Torx driver
.375	12748610500	18	12148788900
.500	12748610600	18	12148788900
.625	12748610700	44	12148099300
.750	12748610800	44	12148099300

NOTE: All spare parts except the insert screws must be ordered separately.

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■ Insert Selection Guide • .375"

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	BF	TN2505	BR	TN7535	BR	TN7535
P3-P4	BF	TN2505	BR	TN7535	BR	TN7535
P5-P6	BF	TN2505	BR	TN7535	BR	TN7535
M1-M2	BR	TN7535	BR	TN7535	BR	TN7535
M3	BR	TN7535	BR	TN7535	BR	TN7535
K1-K2	BF	TN2505	BR	TN7535	BR	TN7535
K3	BF	TN2505	BR	TN7535	BR	TN7535
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	-	-	-	-
S3	-	-	-	-	-	-
S4	-	-	-	-	-	-
H1	BF	TN2505	BF	TN2505	-	-

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■ Insert Selection Guide • .500" and .652"

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	BF	TN2505	BR	TN7535	BR	TN7535
P3-P4	BF	TN2505	BR	TN7535	BR	TN7535
P5-P6	BF	TN2505	BR	TN7535	BR	TN7535
M1-M2	BR	TN7535	BR	TN7535	BR	TN7535
M3	BR	TN7535	BR	TN7535	BR	TN7535
K1-K2	BF	TN2505	BR	TN2510	BR	TN7535
K3	BF	TN2505	BR	TN2510	BR	TN7535
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	-	-	-	-
S3	-	-	-	-	-	-
S4	-	-	-	-	-	-
H1	BF	TN2505	BF	TN2505	BR	TN2510

■ Insert Selection Guide • 0.750"

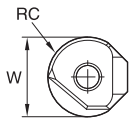
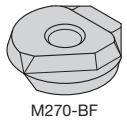
Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	BF	TN6525	BR	TN7535	BR	TN7535
P3-P4	BF	TN6525	BR	TN7535	BR	TN7535
P5-P6	BF	TN6525	BR	TN7535	BR	TN7535
M1-M2	BF	TN6525	BF	TN6525	BR	TN7535
M3	BF	TN6525	BF	TN6525	BR	TN7535
K1-K2	BF	TN2505	BR	TN7535	BR	TN7535
K3	BF	TN2505	BR	TN7535	BR	TN7535
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	-	-	-	-
S3	-	-	-	-	-	-
S4	BF	TN2505	-	-	-	-
H1	BF	TN2505	BF	TN2505	BR	TN2510



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■ Insert Selection Guide • 1.000"

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	BF	TN6540	BF	TN6540	BF	TN6540
P3-P4	BF	TN6540	BF	TN6540	BF	TN7535
P5-P6	BF	TN6540	BF	TN7535	BF	TN7535
M1-M2	BF	TN6540	BF	TN6540	BF	TN7535
M3	BF	TN6540	BF	TN6540	BF	TN7535
K1-K2	BR	TN2505	BR	TN2505	-	-
K3	BR	TN2505	BR	TN2505	-	-
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	BF	TN6540	-	-
S3	-	-	BF	TN6540	-	-
S4	-	-	BF	TN6540	-	-
H1	-	-	BR	TN2505	-	-



- -BF geometry is the first choice for all finishing and light operations.

■ BF • Inch

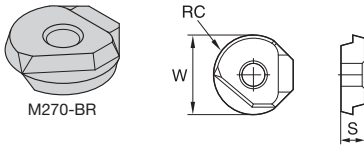
- first choice
- alternate choice

P	●	○	○	○	○	○	○
M	●	○	○	○	○	○	○
K	●	○	○	○	○	○	○
N	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○

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catalog number	W	S	RC	hm	TN2505	TN2510	TN6525	TN6540	TN7525	TN7535
M270BF0375	.375	.094	.188	.003	●	○	○	○	○	○
M270BF0500	.500	.125	.250	.003	●	○	○	○	○	○
M270BF0625	.625	.187	.313	.003	○	○	○	○	○	○
M270BF0750	.750	.187	.375	.004	○	○	○	○	○	○
M270BF1000	1.000	.187	.500	.004	○	○	○	○	○	○





- -BR geometry is the first choice for all semi-finishing and medium duty applications.

■ BR • Inch

● first choice  
○ alternate choice

P	●	○	○	○	○	○	○	○	○
M	●	○	○	○	○	○	○	○	○
K	●	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○

catalog number	W	S	RC	hm	TN2505	TN2510	TN6525	TN6540	TN7525	TN7535
M270BR0375	.375	.094	.188	.003	●	○	○	○	○	○
M270BR0500	.500	.125	.250	.003	○	●	○	○	○	○
M270BR0625	.625	.187	.313	.003	○	○	●	○	○	○
M270BR0750	.750	.187	.375	.003	○	○	○	●	○	○
M270BR1000	1.000	.187	.500	.003	○	○	○	○	○	●



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■ Recommended Starting Speeds [SFM]

Material Group		TN2505			TN2510			TN6525			TN6540		
P	1	1810	<b>1380</b>	1180	2165	<b>1910</b>	1770	1340	<b>1045</b>	925	1180	<b>925</b>	785
	2	1045	<b>785</b>	670	1340	<b>1220</b>	1080	1045	<b>830</b>	710	830	<b>630</b>	550
	3	1045	<b>785</b>	670	1220	<b>1080</b>	1000	925	<b>710</b>	610	710	<b>550</b>	450
	4	-	-	-	905	<b>845</b>	750	770	<b>550</b>	475	590	<b>430</b>	355
	5	-	-	-	1080	<b>985</b>	905	1025	<b>770</b>	650	785	<b>590</b>	490
	6	-	-	-	750	<b>670</b>	570	670	<b>535</b>	430	535	<b>395</b>	335
M	1	-	-	-	890	<b>785</b>	690	630	<b>395</b>	260	430	<b>260</b>	200
	2	-	-	-	805	<b>690</b>	630	395	<b>260</b>	155	260	<b>155</b>	140
	3	-	-	-	630	<b>570</b>	490	415	<b>260</b>	180	275	<b>155</b>	140
K	1	1320	<b>985</b>	830	1380	<b>1180</b>	985	905	<b>805</b>	725	725	<b>670</b>	590
	2	1770	<b>1200</b>	925	1180	<b>985</b>	830	710	<b>630</b>	590	570	<b>510</b>	450
	3	1025	<b>630</b>	510	985	<b>830</b>	650	590	<b>535</b>	475	510	<b>475</b>	415
N	1	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	-	-	-	155	<b>120</b>	95
	2	-	-	-	-	-	-	-	-	-	80	<b>60</b>	40
	3	-	-	-	-	-	-	-	-	-	235	<b>140</b>	95
	4	-	-	-	-	-	-	-	-	-	200	<b>95</b>	80
H	1	570	<b>450</b>	310	475	<b>360</b>	230	-	-	-	-	-	-
	2	570	<b>450</b>	310	475	<b>360</b>	230	-	-	-	-	-	-
	3	450	<b>370</b>	260	380	<b>260</b>	150	-	-	-	-	-	-

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Material Group		TN7525			TN7535			TTI25		
P	1	1340	<b>1025</b>	925	1790	<b>1555</b>	1460	1415	<b>1180</b>	985
	2	1025	<b>830</b>	710	1105	<b>1000</b>	905	1025	<b>830</b>	710
	3	925	<b>710</b>	610	1000	<b>905</b>	805	1025	<b>830</b>	710
	4	770	<b>550</b>	475	750	<b>690</b>	630	865	<b>710</b>	590
	5	1025	<b>770</b>	650	1025	<b>905</b>	830	1045	<b>770</b>	650
	6	670	<b>535</b>	430	630	<b>535</b>	430	475	<b>355</b>	295
M	1	805	<b>725</b>	610	805	<b>725</b>	610	1570	<b>1025</b>	710
	2	725	<b>630</b>	550	725	<b>630</b>	550	1060	<b>670</b>	475
	3	570	<b>510</b>	450	570	<b>510</b>	450	1045	<b>690</b>	475
K	1	1240	<b>925</b>	785	1165	<b>1045</b>	940	725	<b>610</b>	510
	2	1060	<b>785</b>	650	925	<b>830</b>	750	590	<b>475</b>	415
	3	785	<b>650</b>	550	770	<b>690</b>	630	475	<b>415</b>	335
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-
H	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

■ Recommended Starting Feeds [IPT] • 0.375"

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

At .188 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.005	.009	.016	.003	.006	.011	.002	.005	.008	.002	.004	.007	.002	.004	.007	BF
BR	.007	.011	.020	.005	.008	.013	.004	.006	.010	.003	.005	.008	.003	.005	.008	BR

At .094 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.005	.010	.019	.004	.007	.013	.003	.005	.010	.002	.005	.008	.002	.004	.008	BF
BR	.009	.013	.023	.006	.009	.016	.004	.007	.011	.004	.006	.010	.004	.005	.009	BR

At .047 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.007	.014	.026	.005	.010	.017	.004	.007	.013	.003	.006	.011	.003	.006	.010	BF
BR	.011	.018	.033	.008	.012	.021	.006	.009	.015	.005	.008	.013	.005	.007	.012	BR

At .023 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.010	.020	.039	.007	.013	.024	.005	.010	.017	.004	.008	.015	.004	.008	.013	BF
BR	.016	.025	.051	.011	.017	.029	.008	.012	.021	.007	.011	.018	.006	.010	.016	BR

NOTE: Use "Light Machining" value as starting feed rate.



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■ Recommended Starting Feeds [IPT] • 0.500"

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

At .250 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.005	.011	.017	.004	.008	.012	.003	.006	.009	.002	.005	.007	.002	.005	.007	BF
BR	.008	.015	.023	.006	.011	.016	.004	.008	.011	.004	.007	.010	.003	.006	.009	BR

At .125 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.006	.013	.020	.004	.009	.014	.003	.007	.010	.003	.006	.009	.003	.005	.008	BF
BR	.009	.018	.027	.007	.012	.018	.005	.009	.013	.004	.008	.011	.004	.007	.010	BR

At .063 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.008	.017	.026	.006	.012	.018	.004	.009	.013	.004	.008	.011	.003	.007	.010	BF
BR	.012	.024	.036	.009	.016	.024	.006	.012	.017	.006	.010	.015	.005	.009	.014	BR

At .031 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.011	.024	.038	.008	.017	.025	.006	.012	.018	.005	.011	.015	.004	.010	.014	BF
BR	.017	.034	.055	.012	.022	.034	.009	.016	.024	.008	.014	.020	.007	.013	.019	BR

NOTE: Use "Light Machining" value as starting feed rate.

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■ Recommended Starting Feeds [IPT] • 0.750"

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

At .375 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BR	.005	.011	.017	.004	.008	.012	.003	.006	.009	.003	.005	.008	.002	.005	.007	BR
BF	.007	.014	.022	.005	.010	.015	.004	.007	.011	.003	.006	.010	.003	.006	.009	BF

At .188 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BR	.006	.013	.020	.005	.009	.014	.003	.007	.010	.003	.006	.009	.003	.005	.008	BR
BF	.008	.016	.025	.006	.011	.018	.005	.008	.013	.004	.007	.011	.004	.007	.010	BF

At .094 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BR	.008	.017	.027	.006	.012	.018	.004	.009	.014	.004	.008	.012	.004	.007	.011	BR
BF	.011	.021	.034	.008	.015	.023	.006	.011	.017	.005	.010	.015	.005	.009	.014	BF

At .047 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BR	.011	.023	.037	.008	.016	.026	.006	.012	.019	.005	.011	.016	.005	.010	.015	BR
BF	.015	.030	.049	.011	.021	.032	.008	.015	.024	.007	.013	.020	.006	.012	.019	BF

NOTE: Use "Light Machining" value as starting feed rate.

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■ Recommended Starting Feeds [IPT] • 1.000"

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

At .500 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.007	<b>.009</b>	.015	.005	<b>.007</b>	.011	.004	<b>.005</b>	.008	.003	<b>.004</b>	.007	.003	<b>.004</b>	.007	BF
BR	.009	<b>.015</b>	.025	.007	<b>.011</b>	.018	.005	<b>.008</b>	.013	.004	<b>.007</b>	.012	.004	<b>.006</b>	.011	BR

At .250 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.008	<b>.011</b>	.018	.006	<b>.008</b>	.013	.004	<b>.006</b>	.009	.004	<b>.005</b>	.008	.004	<b>.005</b>	.008	BF
BR	.011	<b>.017</b>	.030	.008	<b>.012</b>	.021	.006	<b>.009</b>	.015	.005	<b>.008</b>	.013	.005	<b>.007</b>	.012	BR

At .125 Axial Depth of Cut (ap)

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.011	<b>.014</b>	.024	.008	<b>.010</b>	.017	.006	<b>.008</b>	.012	.005	<b>.007</b>	.011	.005	<b>.006</b>	.010	BF
BR	.014	<b>.023</b>	.040	.010	<b>.016</b>	.027	.008	<b>.012</b>	.020	.007	<b>.010</b>	.017	.006	<b>.009</b>	.016	BR

At .063 Axial Depth of Cut (ap)




Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
BF	.015	<b>.020</b>	.033	.011	<b>.014</b>	.023	.008	<b>.010</b>	.017	.007	<b>.009</b>	.015	.006	<b>.008</b>	.013	BF
BR	.020	<b>.031</b>	.056	.014	<b>.022</b>	.038	.010	<b>.016</b>	.028	.009	<b>.014</b>	.024	.008	<b>.013</b>	.022	BR

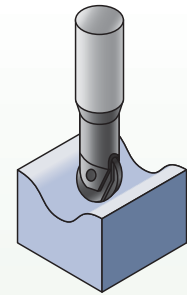
NOTE: Use "Light Machining" value as starting feed rate.

Copy Mills

## Selecting the Correct Insert and Cutting Conditions for Your Application

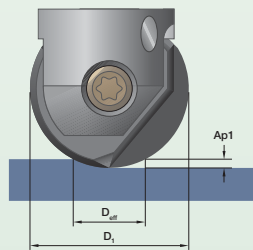
### 1. Insert Style: Considerations for selecting the correct insert

Best Choices for Insert and Grade Selection ● First choice ○ Alternate choice	BR Geometry		BF Geometry
			
Grade	TN7535	TN2510	TN2505
Roughing Operation	●	○	
Finishing Operation		○	●
Low RPM Machine	●	○	
Flat Areas or Face Milling (less than 10° inclination)	●	○	
Hard Machining		○	●
Unstable and/or Long Overhangs	●	○	
HSM or 5-Axis Machining (smaller ap/ae values)	●	○	

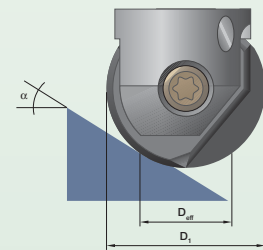


### 2. Calculating effective diameter and resulting surface speed

It is important to consider the effective diameter ( $D_{eff}$ ) when using light depths of cut in order to properly calculate RPM values. Use the following formula when machining flat surfaces or inclinations of 10° or less to find the  $D_{eff}$  value, and then use this for RPM calculations as opposed to using the overall insert diameter ( $D_1$ ).



When machining inclinations between 11° and 55°, further modification of  $v_c$  is required. Apply factor "k" from the given formula to calculate the correct  $v_c$  ( $v_{c,eff}$ ). This corrected value is then used to calculate the proper RPM for the tool.



$$D_{eff} = \sqrt{D_1^2 - (D_1 - 2Ap_1)^2}$$

$$k = \frac{1}{\sin [\alpha + \arccos (1 - (2 (Ap_1 / D_1)))]}$$

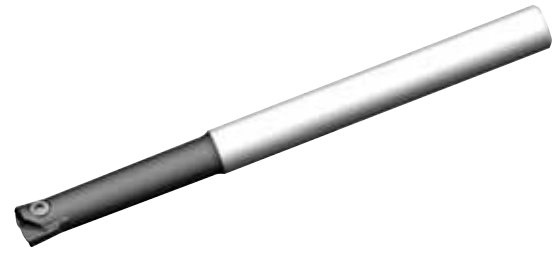
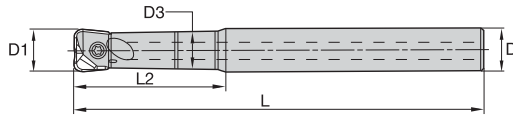
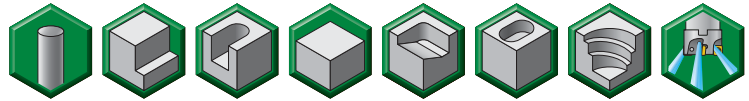
$$v_{c,eff} = v_c \times k$$

### Starting Values for Semi-Finishing in Common Material Types (L/D ratio <3 x D1)

M270 is usually applied for semi-finishing and finishing operations;  $Ap_1/ae$  conditions depend on the operation. As a general rule:  $Ap_1/ae \leq 0.05D$ .

Material	Tool Diameter															
	.375"		.500"		.625"		.750"		1.000"							
	max rec. (inch)		fz (inch/tooth)		max rec. (inch)		fz (inch/tooth)		max rec. (inch)		fz (inch/tooth)		max rec. (inch)		fz (inch/tooth)	
	Ap1	ae	Ap1	ae	Ap1	ae	Ap1	ae	Ap1	ae	Ap1	ae	Ap1	ae	Ap1	ae
Soft Steel <250 HB	.028	.028	.008	.031	.031	.008	.043	.043	.011	.051	.051	.011	.067	.067	.012	
High-Strength Steel 33-44 HRC	.020	.020	.006	.024	.024	.008	.031	.031	.010	.039	.039	.010	.051	.051	.010	
Hardened Steel 44-55 HRC	.012	.012	.006	.016	.016	.008	.020	.020	.009	.028	.028	.009	.031	.031	.010	
Gray Cast Iron GG25...	.039	.039	.008	.047	.047	.010	.063	.063	.010	.078	.078	.010	.098	.098	.012	
Nodular Cast Iron GGG60...	.028	.028	.008	.031	.031	.010	.043	.043	.010	.051	.051	.010	.067	.067	.012	

- Semi-finishing and finishing applications.
- Through tool coolant.
- Secure and rigid insert clamping.



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■ Toroidal • Cylindrical Shanks

order number	catalog number	D1	D	D3	L	L2	Z	Z U	inserts	max RPM	coolant supply	lbs
3904063	M270TD037C037L555	.375	.375	.345	5.550	1.800	1	2	M270TF0375R..	57000	Yes	.14
3904064	M270TD050C050L575	.500	.500	.417	5.750	2.000	1	2	M270TF0500R..	55000	Yes	.24
3904065	M270TD062C062L600	.625	.625	.559	6.000	2.300	1	2	M270TF0625R..	53000	Yes	.40
3904066	M270TD075C075L700	.750	.750	.707	7.000	2.800	1	2	M270TF0750R..	52000	Yes	.70

NOTE: Z = number of pocket seats.  
ZU = number of effective teeth.

■ Spare Parts

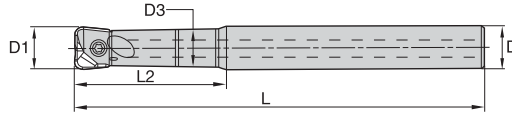
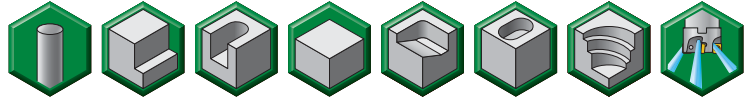


D1	insert screw	in. lbs.	Torx driver
.375	12748610500	18	12148788900
.500	12748610600	18	12148788900
.625	12748610700	44	12148099300
.750	12748610800	44	12148099300

NOTE: All spare parts except the insert screws must be ordered separately.



- Semi-finishing and finishing applications.
- Through tool coolant.
- Secure and rigid insert clamping.



■ **Toroidal • Carbide Cylindrical Shanks**

order number	catalog number	D1	D	D3	L	L2	Z	Z U	inserts	max RPM	coolant supply	lbs
2639258	M270TD037C050L555C	.375	.500	.345	5.550	1.800	1	2	M270TF0375R..	57000	Yes	.44
2639259	M270TD050C050L575C	.500	.500	.417	5.750	2.000	1	2	M270TF0500R..	55000	Yes	.55
2639260	M270TD062C062L600C	.625	.625	.559	6.000	2.300	1	2	M270TF0625R..	53000	Yes	.88
2639261	M270TD075C075L700C	.750	.750	.707	7.000	2.800	1	2	M270TF0750R..	52000	Yes	1.32

NOTE: Z = number of pocket seats.  
ZU = number of effective teeth.

■ **Spare Parts**



D1	insert screw	in. lbs.	Torx driver
.375	12748610500	18	12148788900
.500	12748610600	18	12148788900
.625	12748610700	44	12148099300
.750	12748610800	44	12148099300

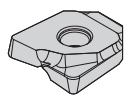
NOTE: All spare parts except the insert screws must be ordered separately.

■ Insert Selection Guide

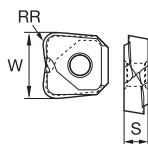
Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	TF	TN2505	-	-	-	-
P3-P4	TF	TN2505	-	-	-	-
P5-P6	TF	TN2505	-	-	-	-
M1-M2	-	-	-	-	-	-
M3	-	-	-	-	-	-
K1-K2	TF	TN2505	-	-	-	-
K3	TF	TN2505	-	-	-	-
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	-	-	-	-	-	-
S3	-	-	-	-	-	-
S4	-	-	-	-	-	-
H1	TF	TN2505	TF	TN2505	-	-

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Toroidal • Inserts



M270-TF



● first choice  
○ alternate choice

P	○	○	●
M	○	○	○
K	●	●	○
N	○	○	○
S	○	○	○
H	●	●	○

■ M270 Toroidal

catalog number	W	S	RR	hm	TN2505	TN2510	TN2525
M270TF0375R0031	.375	.094	.031	.003	2638674		
M270TF0500R0063	.500	.125	.063	.003	2638676		2638757

NOTE: Ap1 max is equal to RR.

■ Recommended Starting Speeds [SFM]

Material Group		TN2505			TN2510			TN2525		
P	1	1810	<b>1380</b>	1180	2165	<b>1910</b>	1770	1810	<b>1380</b>	1180
	2	1045	<b>785</b>	670	1340	<b>1220</b>	1080	1045	<b>785</b>	670
	3	1045	<b>785</b>	670	1220	<b>1080</b>	1000	1045	<b>785</b>	670
	4	-	-	-	905	<b>845</b>	750	-	-	-
	5	-	-	-	1080	<b>985</b>	905	-	-	-
	6	-	-	-	750	<b>670</b>	570	-	-	-
M	1	-	-	-	890	<b>785</b>	690	-	-	-
	2	-	-	-	805	<b>690</b>	630	-	-	-
	3	-	-	-	630	<b>570</b>	490	-	-	-
K	1	1320	<b>985</b>	830	1380	<b>1180</b>	985	-	-	-
	2	1770	<b>1200</b>	925	1180	<b>985</b>	830	-	-	-
	3	1025	<b>630</b>	510	985	<b>830</b>	650	-	-	-
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	-	-	-	-	-
H	1	570	<b>450</b>	310	475	<b>360</b>	230	430	<b>295</b>	200
	2	570	<b>450</b>	310	475	<b>360</b>	230	430	<b>295</b>	200
	3	450	<b>370</b>	260	380	<b>260</b>	150	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

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Recommended Starting Feeds

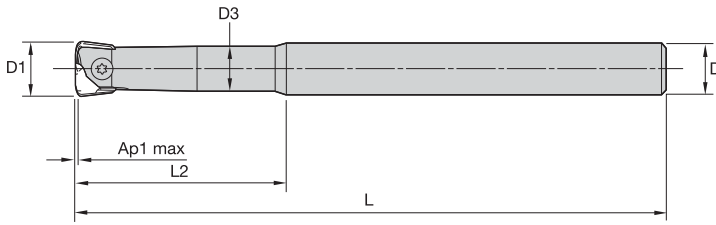
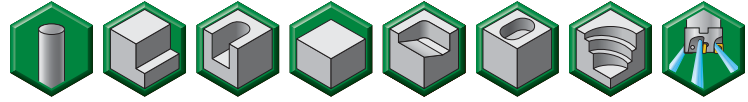
■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
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Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)														Insert Geometry	
	5%			10%			20%			30%			40-100%			
TF	.005	<b>.014</b>	.024	.003	<b>.010</b>	.017	.002	<b>.007</b>	.012	.002	<b>.006</b>	.011	.002	<b>.006</b>	.010	TF

NOTE: Use "Light Machining" value as starting feed rate.

- High metal removal rates.
- Excellent in long reach applications.
- Rough and semi-finishing applications.



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■ **High-Feed • Cylindrical Shanks**

order number	catalog number	D1	D	D3	L	L2	Ap1 max	Z	Z U	inserts	max RPM	coolant supply	lbs
4145101	M270TD037C037L525	.375	.375	—	5.250	.750	.024	1	2	M270HF0375	57000	Yes	.14
3904063	M270TD037C037L555	.375	.375	.345	5.550	1.800	.024	1	2	M270HF0375	57000	Yes	.14
4145102	M270TD050C050L550	.500	.500	.417	5.500	1.000	.024	1	2	M270HF0500	55000	Yes	.24
3904064	M270TD050C050L575	.500	.500	.417	5.750	2.000	.024	1	2	M270HF0500	55000	Yes	.24
4145103	M270TD062C062L575	.625	.625	.509	5.750	1.250	.035	1	2	M270HF0625	53000	Yes	.39
3904065	M270TD062C062L600	.625	.625	.559	6.000	2.300	.035	1	2	M270HF0625	53000	Yes	.40
3904066	M270TD075C075L700	.750	.750	.707	7.000	2.800	.043	1	2	M270HF0750	52000	Yes	.70

NOTE: Z = number of pocket seats.  
ZU = number of effective teeth.

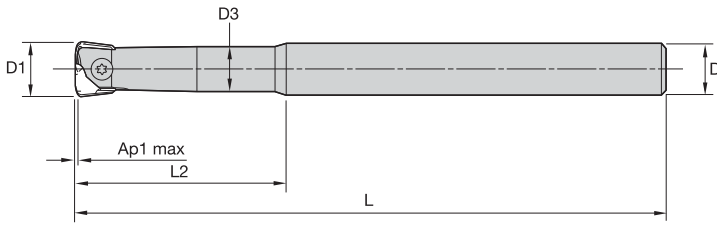
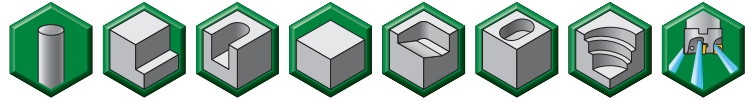
■ **Spare Parts**



D1	insert screw	in. lbs.	Torx driver
.375	12748610500	18	12148788900
.500	12748610600	18	12148788900
.625	12748610700	44	12148099300
.750	12748610800	44	12148099300

NOTE: All spare parts except the insert screws must be ordered separately.

- High metal removal rates.
- Excellent in long reach applications.
- Carbide shank for higher rigidity.



■ High-Feed • Carbide Cylindrical Shanks

order number	catalog number	D1	D	D3	L	L2	Ap1 max	Z	Z U	inserts	max RPM	coolant supply	lbs
2639258	M270TD037C050L555C	.375	.500	.345	5.550	1.800	.024	1	2	M270HF0375	57000	Yes	.44
2639259	M270TD050C050L575C	.500	.500	.417	5.750	2.000	.024	1	2	M270HF0500	55000	Yes	.55
2639260	M270TD062C062L600C	.625	.625	.559	6.000	2.300	.035	1	2	M270HF0625	53000	Yes	.88
2639261	M270TD075C075L700C	.750	.750	.707	7.000	2.800	.043	1	2	M270HF0750	52000	Yes	1.32

NOTE: Z = number of pocket seats.  
ZU = number of effective teeth.

■ Spare Parts



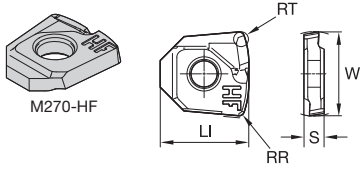
D1	insert screw	in. lbs.	Torx driver
.375	12748610500	18	12148788900
.500	12748610600	18	12148788900
.625	12748610700	44	12148099300
.750	12748610800	44	12148099300

NOTE: All spare parts except the insert screws must be ordered separately.

■ Insert Selection Guide

Material Group	Light Machining		General Purpose		Heavy Machining	
	Geometry	Grade	Geometry	Grade	Geometry	Grade
P1-P2	HF	TN6525	HF	TN6540	HF	TN6540
P3-P4	HF	TN6525	HF	TN6540	HF	TN6540
P5-P6	HF	TN6525	HF	TN6540	HF	TN6540
M1-M2	HF	TN6525	HF	TN6540	HF	TN6540
M3	HF	TN6525	HF	TN6540	HF	TN6540
K1-K2	HF	TN2505	HF	TN6525	-	-
K3	HF	TN2505	HF	TN6525	-	-
N1-N2	-	-	-	-	-	-
N3	-	-	-	-	-	-
S1-S2	HF	TN6525	HF	TN6540	-	-
S3	HF	TN6525	HF	TN6540	-	-
S4	HF	TN6525	HF	TN6540	HF	TN6540
H1	HF	TN2505	HF	TN2505	HF	TN6525

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● first choice  
○ alternate choice

P	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

■ High-Feed

catalog number	W	LI	S	RR	RT	TN2505	TN6525	TN6540
M270HF0375	.375	.414	.094	.023	.044	-	4161104	3903955
M270HF0500	.500	.488	.125	.031	.057	-	4161105	3903957
M270HF0625	.625	.654	.187	.039	.070	3903960	4161106	3903959
M270HF0750	.750	.792	.187	.047	.090	3903962	4161107	3903961

NOTE: RT = Programming Radius.



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■ Recommended Starting Speeds [SFM]

Material Group		TN2505			TN6525			TN6540		
P	1	1810	<b>1380</b>	1180	1340	<b>1045</b>	925	1180	<b>925</b>	785
	2	1045	<b>785</b>	670	1045	<b>830</b>	710	830	<b>630</b>	550
	3	1045	<b>785</b>	670	925	<b>710</b>	610	710	<b>550</b>	450
	4	-	-	-	770	<b>550</b>	475	590	<b>430</b>	355
	5	-	-	-	1025	<b>770</b>	650	785	<b>590</b>	490
	6	-	-	-	670	<b>535</b>	430	535	<b>395</b>	335
M	1	-	-	-	630	<b>395</b>	260	430	<b>260</b>	200
	2	-	-	-	395	<b>260</b>	155	260	<b>155</b>	140
	3	-	-	-	415	<b>260</b>	180	275	<b>155</b>	140
K	1	1320	<b>985</b>	830	905	<b>805</b>	725	725	<b>670</b>	590
	2	1770	<b>1200</b>	925	710	<b>630</b>	590	570	<b>510</b>	450
	3	1025	<b>630</b>	510	590	<b>535</b>	475	510	<b>475</b>	415
N	1	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-
S	1	-	-	-	-	-	-	155	<b>120</b>	95
	2	-	-	-	-	-	-	80	<b>60</b>	40
	3	-	-	-	-	-	-	235	<b>140</b>	95
	4	-	-	-	-	-	-	200	<b>95</b>	80
H	1	570	<b>450</b>	310	-	-	-	-	-	-
	2	570	<b>450</b>	310	-	-	-	-	-	-
	3	450	<b>370</b>	260	-	-	-	-	-	-

NOTE: FIRST choice starting speeds are in **bold** type.  
As the average chip thickness increases, the speed should be decreased.

Copy Mills



■ Recommended Starting Feeds [IPT]

Light Machining	General Purpose	Heavy Machining
-----------------	-----------------	-----------------

At .024 Axial Depth of Cut (ap) • .375"

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
HF	.005	.017	.090	.003	.012	.017	.003	.009	.012	.002	.008	.011	.002	.007	.010	HF

At .024 Axial Depth of Cut (ap) • .500"

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
HF	.010	.015	.022	.007	.011	.015	.005	.008	.011	.005	.007	.010	.004	.006	.009	HF

At .035 Axial Depth of Cut (ap) • .625"

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
HF	.041	.066	.080	.027	.041	.060	.020	.029	.041	.017	.025	.035	.016	.023	.032	HF

At .043 Axial Depth of Cut (ap) • .750"

Insert Geometry	Programmed Feed per Tooth (fz) as a % of Radial Depth of Cut (ae)															Insert Geometry
	5%			10%			20%			30%			40-100%			
HF	.012	.018	.026	.009	.013	.018	.006	.009	.013	.006	.008	.011	.005	.008	.011	HF

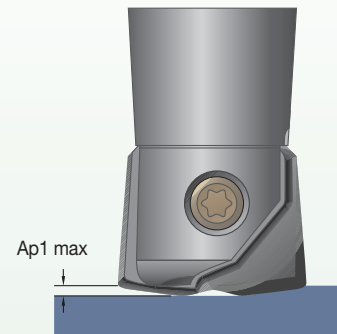
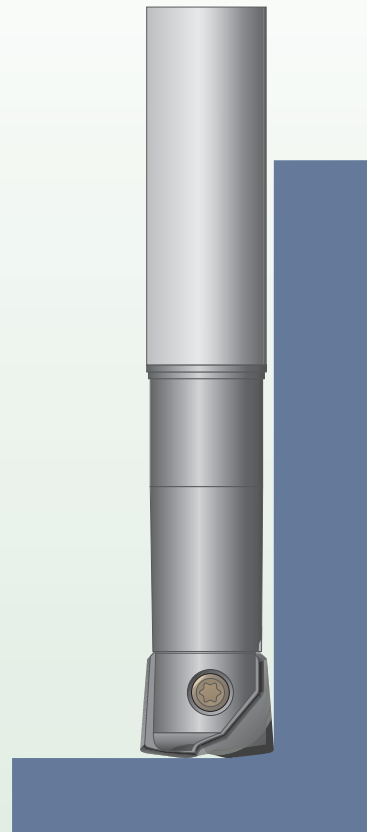
NOTE: Use "Light Machining" value as starting feed rate.

Copy Mills

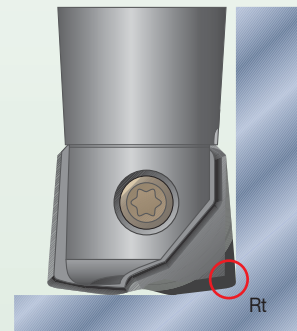
### Applying High-Feed Tools

The high-feed concept bases its strategy in small depth of cut and high fz values, which results in a higher MRR and productivity with low radial forces.

Recommended when long overhang is necessary due to lower radial forces.  
 Maximum L/D ratio of 10 x D.



Small Ap1 values and higher feed rate generate lower cutting forces versus traditional milling strategies.



For CAM programming, the tools can be programmed as a toroidal tool type by using the Rt value as the insert radius.

L/D ratio	% of Ap1 max to reduce	% of vc to reduce
<4	0%	0%
4<L/D<7	55-65%	10-15%
>8	65-75%	20-30%

### General Programming Information for Applying M270 High-Feed

tool diameter	.375"	.500"	.625"	.750"
recommended starting Ap1 (inch)	.016	.016	.023	.030
Rt CAM programming	.044	.057	.070	.090
fz recommended for general purpose	.020	.022	.024	.030
fz recommended for 45 HRC (approx.)	.015	.018	.022	.026
fz recommended for 55 HRC (approx.)	.012	.014	.018	.020

NOTE: Use two effective teeth for feed calculations.  
 For materials above 45 HRC, we recommend adjusting the ae max to 55% of cutting diameter and using no more than 50% of Ap1 max.  
 While center cutting is possible, we recommend using a ramp angle of 0.5°-1.0° to ensure smooth operation.

# ToolBOSS™

## ToolBOSS Vending Solutions

ToolBOSS vending solutions help to reduce costs and improve efficiencies to give you a competitive edge.

- Cut tooling inventory by 50% or more.
- Decrease spending on tooling by up to 30%.
- Reduce administrative costs by as much as 90%.

## Customer Offering

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### Direct Purchase of Equipment

ToolBOSS vending machines are available for purchase. Maintenance and service packages available with annual agreements.

For more information, please contact us at:

Tel: 888 281 8080

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## Solid End Milling

Solid End Milling Introduction .....	L2-L17
High-Performance Solid Carbide End Mills .....	M1-M166
General Purpose Solid Carbide End Mills .....	N1-N31
High-Performance High-Speed Steel (HSS-E/PM).....	O1-O18
Burs.....	P1-P20



End Mills									
Z = number of teeth		Fine Finishing	Finishing	Roughing	Slot Milling	Plunging	Contour Milling	Peel Milling	Trochoidal Milling
end mill Z = 1		○	○	●	●	●	○	○	○
end mill Z = 2		○	○	◐	●	●	○	○	○
end mill Z = 3		○	◐	◐	●	◐	○	○	○
end mill Z = 4/5		◐	●	●	●*	○	○	●	●
multi-flute cutter Z = 6-8		●	●	○	○	○	○	●	●
Ball Nose and Torus End Mills									
ball nose end mill Z = 2					●		●		
ball nose end mill Z = 4					◐		●		

\*VariMill™/VariMill™ GP Only

- first choice
- suitable with limitations
- not recommended

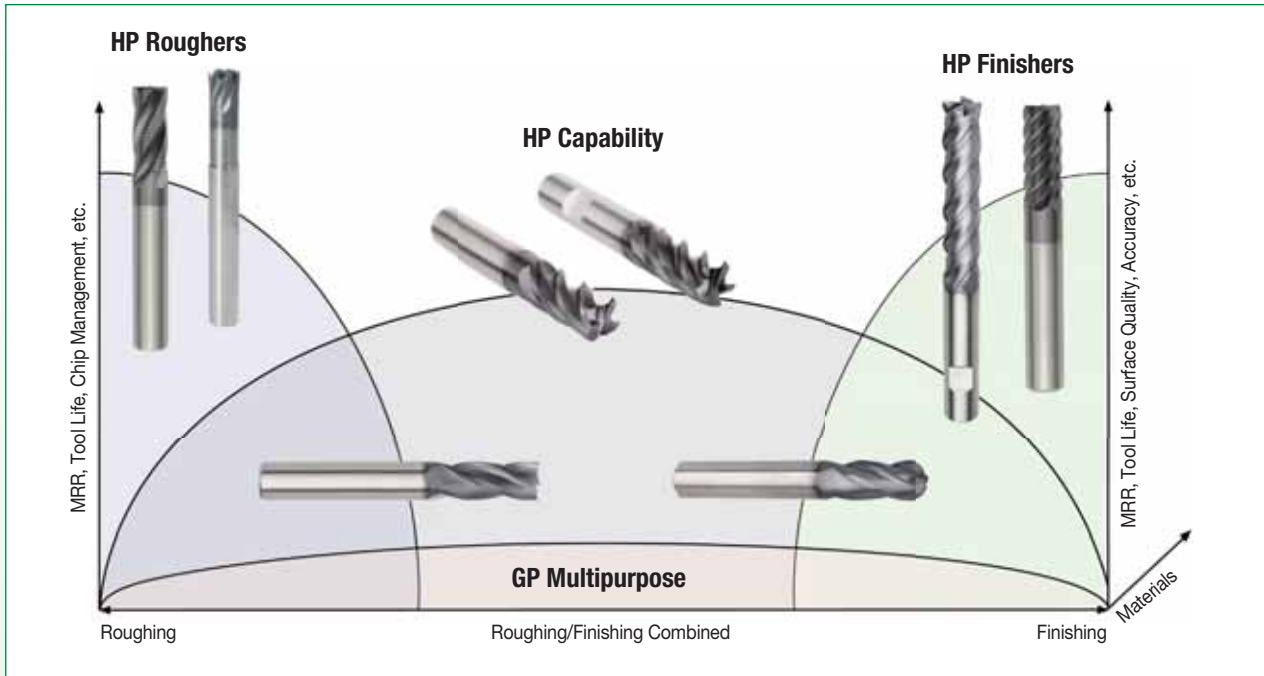
Always select a tool with the shortest possible flute length whenever possible. This will increase the stability of the tool and give the best results.

When selecting an end mill, the following machining factors will affect your selection of the correct end mill for your application:

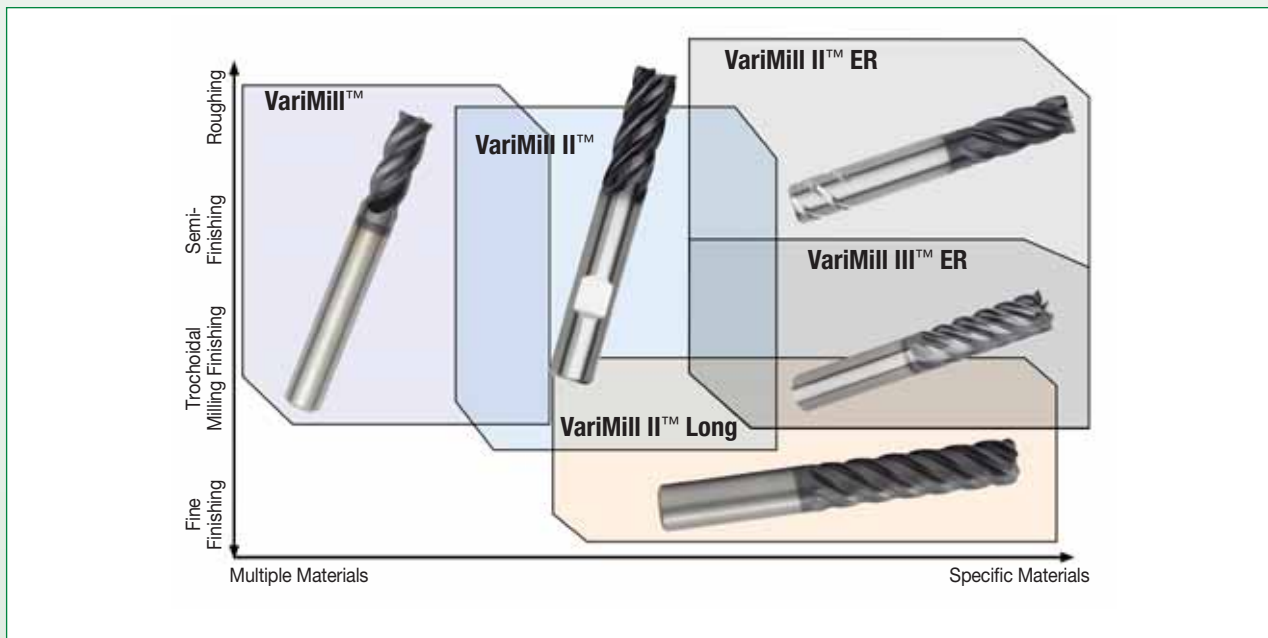
1. Tool overhang.
2. Coolant flow.
3. Machine and setup stability.
4. Machine power and torque.
5. Material to be machined.
6. Machine adapter size (CV40, CV50, HSK63, etc.).
7. See Tool Reference Guides on pages L6-L11.

	Recommended Series																								Page Reference			
	P						M			K			N						S				H					
	Steels & Alloyed Steels						Stainless Steel			Cast Iron			Non-Ferrous						High-Temp Alloys & Titanium				Hardened Materials					
Materials	0	1	2	3	4	5	6	1	2	3	1	2	3	1	2	3	4	5	6	1	2	3	4	1	2	3	4	
<b>Roughing</b>																												
4Q03 4Q05	■	■	■	■	■	■	■	■	■	■	■	■	■															M54
4MOR, 4M4R						■	■	■	■	■										■	■	■	■					M56
X-Feed™ 7FN6				■	■																				■	■		M120
X-Feed 7FN7																										■	■	M121
4A0R														■	■	■	■	■	■									M113
<b>Semi-Finishing</b>																												
VariMill I™ – 4V05	■	■	■	■	■	■	■	■	■	■	■	■	■															M4–M8
VariMill II™ – 5V0C		■	■	■	■	■	■	■	■	■	■	■	■															M26–M27
VariMill II ER – 5V0E																				■	■	■	■			■		M34
VariMill III™ ER – 7V1E, 7V2E											■	■	■							■	■	■	■			■		M47
Vision Plus™ – 7S05				■	■																					■	■	M138
AluSurf™ 5A02, 5A03														■	■	■	■	■	■									M82–M85
<b>Finishing</b>																												
4S07	■	■	■	■	■	■	■	■	■	■	■	■	■															M66
VariMill III ER – 7VNX, 7V1E, 7V2E											■	■	■							■	■	■	■			■		M46–M47
7S15, 7S25				■	■																					■	■	M138
AluSurf 5A02, 5A03														■	■	■	■	■	■									M82–M85
<b>Finishing Pockets</b>																												
VariMill I – 4VN5, 4VPT	■	■	■	■	■	■	■	■	■	■	■	■	■															M12–M14
VariMill II – 5VNC											■	■	■							■	■	■	■			■		M28
VariMill II ER – 5VNE											■	■	■							■	■	■	■			■		M35
VariMill III ER – 7VNX											■	■	■							■	■	■	■			■		M46
AluSurf 5AN2, 5AN3														■	■	■	■	■	■									M86–M89
<b>Long Wall Milling</b>																												
VariMill II Long – 5W1S	■	■	■	■	■	■	■	■	■	■	■	■	■															M40–M41
VariMill III ER – 7V2E											■	■	■							■	■	■	■			■		M47
<b>3D Ball Nose</b>																												
VariMill I – 4V00, 4VP0	■	■	■	■	■	■	■	■	■	■	■	■	■															M15–M16
7S5F				■	■																					■	■	M139
4A01/4AN1														■	■	■	■	■	■									M111–M112
<b>HPC/Peel Milling</b>																												
VariMill I – 4V05	■	■	■	■	■	■	■	■	■	■	■	■	■															M4–M8
VariMill II – 5V0C		■	■	■	■	■	■	■	■	■	■	■	■															M26–M27
VariMill II ER – 5V0E																				■	■	■	■			■		M34
VariMill II Long – 5W1S	■	■	■	■	■	■	■	■	■	■	■	■	■															M40–M41
VariMill III ER – 7VNX, 7V1E, 7V2E											■	■	■							■	■	■	■			■		M46–M47
AluSurf 5A02, 5A03														■	■	■	■	■	■									M82–M85
<b>Trochoidal Milling</b>																												
VariMill I – 4V05	■	■	■	■	■	■	■	■	■	■	■	■	■															M4–M8
VariMill II – 5V0C		■	■	■	■	■	■	■	■	■	■	■	■															M26–M27
VariMill II ER – 5V0E																				■	■	■	■			■		M34
VariMill III ER – 7V1E, 7V2E											■	■	■							■	■	■	■			■		M47
AluSurf 5A02, 5A03														■	■	■	■	■	■									M82–M85

■ Best Selection Per Application



■ Best Selection For Trochoidal/High-Speed Machining Concepts





■ Recommended Adapters per End Mill Platform

SCEM Platform	Recommended Adapters	
	First Choice	Alternate Choice
VariMill I™	HydroForce™	Shrink Fit
VariMill II™/VariMill II™ ER	HydroForce	Shrink Fit
VariMill III™ ER	HydroForce	Shrink Fit
VariMill II™ Long	HydroForce	Shrink Fit
High-Performance Finishers	HydroForce	Shrink Fit
High-Performance Roughers	HydroForce	Weldon® Adapter
AluSurf™/Arcut™/Aluminum Tools	HydroForce	Shrink Fit
Vision Plus™/Vision Plus X-Feed™	HydroForce	Shrink Fit
VariMill GP	Shrink Fit	Weldon Adapter
HSS/WavCut™	Weldon Adapter	—
HSS ER Rougher	Weldon/Whistle Adapter	—

■ Select Adapter per Technical Data/Characteristics


























Technical data/characteristics	Toolholders				
	HydroForce high torque	Shrink Fit	Milling chuck	ER collet chuck	Weldon adapter
torque transmission	★★★★★	★★★★	★★★★★	★★	★★★★★
radial runout (T.I.R.) <sup>1</sup>	★★★★★	★★★★★	★★★★	★★★	★
radial rigidity <sup>2</sup>	★★★★	★★★★★	★★★	★★★	★★★
tool length adjustment	★★★★★	★★★★	★	★★★★	★★
tool shank tolerance requirement	★★★★	★★	★★★	★★★★★	★★★
through coolant	★★★★★	★★★★★	★★★	★★★	★★
minimum quantity lubrication (MQL)	★★★★★	★★★★★	★	★	★
dampening capability	★★★★★	★	★★★	★★★	★★★
shank diameter range <sup>3</sup>	★★★★★	★	★★★★★	★★★★★	★
cost of toolholder	★★	★★★	★	★★★★	★★★★★
low requirement of external devices <sup>4</sup>	★★★★★	★	★★★★	★★★★	★★★★★
ease of handling	★★★★★	★★★	★★	★★★★	★★★★
dust resistance	★★★★★	★★★★★	★★★	★★★	★★★★
high-speed capability	★★★★★	★★★★★	★★★	★★★	★
balancing accuracy	★★★★★	★★★★★	★★★	★★★	★

<sup>1</sup> Radial runout may affect tool life.





























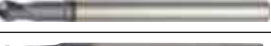
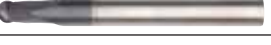


<sup>2</sup> Radial rigidity for Weldon holder is low at a direction perpendicular to the screw.

<sup>3</sup> Accepts different shank diameters through the use of reduction sleeves or due to collapse range.














<sup>4</sup> Collet chucks and milling chucks may require the use of a torque or special wrench; Shrink Fit adapter requires a shrinking unit.

<ul style="list-style-type: none"> <li>● first choice</li> <li>○ alternate choice</li> </ul>	Series	Range of Diameter Ø min- Ø max inch/metric	Number of Flutes	Cutting Center	Uncoated	TiCN	AlTiN	TiAlN
<b>High-Performance Solid Carbide End Mills • VariMill™</b>								
<b>VariMill I™</b>								
	4V05	1/8-1-1/4"	4	Yes			X	
	4V0T	1/2-1-1/4"	4	Yes			X	
	4VP5	1/4-1"	4	Yes				X
	4VPT	1/2-1"	4	Yes			X	
	4VN5	1/4-1"	4	Yes				X
	4VPO	1/4-1"	4	Yes				X
	4V00	1/8-1-1/4"	4	Yes			X	
<b>VariMill II™</b>								
	5V0C	3/16-1"	5	Yes			X	
	5VNC	1/4-1"	5	Yes			X	
<b>VariMill II™ ER</b>								
	5V0E	3/8-1"	5	Yes			X	
	5VNE	3/8-1"	5	Yes			X	
<b>VariMill II™ Long</b>								
	5W1S	1/4-1"	5	No			X	
<b>VariMill III™ ER</b>								
	7VNX	3/8-1"	7	No			X	
	7V1E	3/8-1"	7	Yes			X	
<b>High-Performance Solid Carbide End Mills • Roughing</b>								
	4Q03/4Q05	3/16-1"	3/4	Yes			X	
	4QN3	1/4-3/4"	3	Yes				X
	4M0R	1/4-1"	3/4/6	Yes			X	
	4S0R	1/4-1"	3/4/5	Yes			X	
<b>High-Performance Solid Carbide End Mills • Finishing</b>								
	4C03	1/8-1"	3	Yes	X	X		X
	4C05	1/8-1"	5	Yes			X	
	4S07	1/4-1"	6	Yes			X	
	4S0F	1/4-1"	6/8/10	Yes				X
<b>High-Performance Solid Carbide End Mills • Micro End Mills</b>								
	4632	0,4-2,0mm	2	Yes	X			X
	4633	0,4-3,0mm	3	Yes	X			X
	4651	1,0-2,0mm	2	Yes	X	X		X

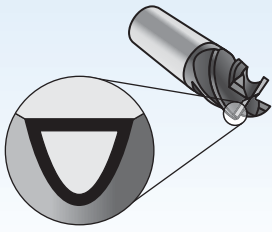
P				M			K	N				S				H		Page References	
1 2 3	4	5	6	1 2 3	4 5 6	1 2 3	1 2 3 4 5	6	1	2	3	4	1 2	3 4	Product Information	Cutting Data			
Steel <35 HRC	Steel >36-48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Cast Iron	Non-Ferrous	Graphite	Iron Based	Nickel Based	Pure Titanium	Titanium Alloys	Hardened Steels H1 = <48 HRC H2 = 48-55	H3 = 56-60 HRC H4 = >60 HRC						
<b>High-Performance Solid Carbide End Mills • VariMill™ (continued)</b>																			
<b>VariMill I™ (continued)</b>																			
●	●	●	●	●	●	●			○	●	●	●	●		M4-M8	M17			
●	○	●	●	○	○				○	●	●	●	●		M9	M18			
●	●	○	○	●	○				○	○	○	○	●		M10-M11	M19			
○	○	●	●	●	○				○	●	●	●	●		M12	M20			
●	●	○	○	●	○				●	○	○	○	●		M13-M14	M21			
●	●	●	●	●	○				●	●	●	●	●		M15	M22			
●	●	○	○	●	●				●	○	○	○	●		M16	M23			
<b>VariMill II™ (continued)</b>																			
●	●	●	●	●	○				●	○	○	○	●		M26-M27	M29			
●	○	●	●	●	○				○	●	●	●	●		M28	M30			
<b>VariMill II™ ER (continued)</b>																			
○	○	●	●	●					●	●	●	●	○		M34	M36			
○	○	●	●	●					●	●	●	●	○		M35	M37			
<b>VariMill II™ Long (continued)</b>																			
●	●	●	●	●	○				○	●	●	●	●		M40-M41	M42			
<b>VariMill III™ ER (continued)</b>																			
		○	○	○						●	●	●	○		M46	M48			
		○	○	○						●	●	●	○		M47	M49			
<b>High-Performance Solid Carbide End Mills • Roughing (continued)</b>																			
●	●	●	●	○	●				○	○	○	●	○		M54	M58			
●	●	●	●	●	●				●	●	●	●	●		M55	M59			
●	●	●	●	●	○				○	○	○	●	●	●	M56	M60			
●	●	●		○	●				○		○		●		M57	M61			
<b>High-Performance Solid Carbide End Mills • Finishing (continued)</b>																			
●	●	●	●	●	●				●	●	●	●	●		M64	M68			
●	○	○	○	○	○				○	○	○	○	○		M65	M69			
●	●	●	●	●	●				○	○	●	●	○		M66	M70			
●	○	○	○	●	○				○	○	●	○	○		M67	M71			
<b>High-Performance Solid Carbide End Mills • Micro End Mills (continued)</b>																			
●	●	●	●	●	●	●									M74	M77			
●	●	●	●	●	●	●									M75	M78			
●	●	●	●	●	●	●									M76	M79			

	Series	Range of Diameter Ø min- Ø max inch/metric	Number of Flutes	Cutting Center	Uncoated	TiCN	AlTiN	TiAlN
<b>High-Performance Solid Carbide End Mills • Aluminum</b>								
<b>AluSurf™</b>								
	5A02	1/4-1"	2	Yes	X			
	5A03	1/4-1"	3	Yes	X			
	5AN2	1/8-1"	2	Yes	X			
	5AN3	1/8-1"	3	Yes	X			
<b>ArCut™</b>								
	4K02	1/8-1"	2	Yes	X	X		
	4K03	1/4-1"	3	Yes	X	X		
<b>High-Performance Aluminum</b>								
	4AN2	1/8-1"	2	Yes	X	X		
	4AN3	3/8-1"	3	Yes	X	X		
	4AP2	1/8-1"	2	Yes	X			
	4AP3	3/8-1"	3	Yes	X			
	4B02	1/4-1"	2	Yes	X			
	4A01	1/8-1"	2	Yes	X	X		
	4AN1	1/4-1"	2	Yes	X			
	4A0R	1/4-1"	3	Yes	X	X		
	4A0B	1/4-3/4"	3	Yes	X			
<b>High-Performance Solid Carbide End Mills • Hard Materials</b>								
<b>VisionPlus™ X-Feed™</b>								
	7FN6	1/4-3/4"	6	No			X	
	7FN7	1/4-3/4"	6	No			X	
<b>VisionPlus™ Micro</b>								
	7N02/7N12/7N22	0,3-3,1mm	2	Yes			X	X
	423034	0,5-3,0mm	2	Yes			X	
	7N01	0,3-6,0mm	2	Yes			X	X
	7N21	0,5-3,0mm	2	Yes				X
<b>VisionPlus™</b>								
	7S05	1/4-1"	4/5/6	Yes			X	
	7S5F	1/8-3/4"	4	Yes			X	
	7S7R	5/32-1"	3/4/6	Yes			X	
	75N2	3,0-12,0mm	2	Yes				X
	422875	2,0-12,0mm	2	Yes			X	
	7151	1,0-20,0mm	2	Yes				X
	7061	1,0-12,0mm	2	Yes				X
	70N1	1,0-12,0mm	2	Yes				X
	422869/422868	1,0-16,0mm	2	Yes			X	
	422870	2,0-12,0mm	2	Yes			X	
	422873	5,0-10,0mm	2	Yes			X	

P		M		K		N		S				H		Page References	
1 2 3	4	5	6	1 2 3	1 2 3	1 2 3 4 5	6	1	2	3	4	1 2	3 4	Product Information	Cutting Data
Steel <35 HRC	Steel >36-48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Cast Iron	Non-Ferrous	Graphite	Iron Based	Nickel Based	Pure Titanium	Titanium Alloys	Hardened Steels H1 = <48 HRC H2 = 48-55	H3 = 56-60 HRC H4 = >60 HRC		
<b>High-Performance Solid Carbide End Mills • Aluminum (continued)</b>															
<b>AluSurf™ (continued)</b>															
							●							M82-M83	M90
							●							M84-M85	M90
							●							M86-M87	M90
							●							M88-M89	M90
<b>ArCut™ (continued)</b>															
							●							M94-M96	M100
							●							M97-M99	M100
<b>High-Performance Aluminum (continued)</b>															
							●							M104-M105	M115
							●							M106-M107	M115
							●							M108	M115
							●							M109	M115
							●							M110	M115
							●	○						M111	M116
							●	○						M112	M116
							●							M113	M117
							●							M114	M117
<b>High-Performance Solid Carbide End Mills • Hard Materials (continued)</b>															
<b>VisionPlus™ X-Feed™ (continued)</b>															
	○											●		M120	M122
												●	●	M121	M123
<b>VisionPlus™ Micro (continued)</b>															
●	●	●			●							●	●	M126-M129	M133
○	○											●	●	M130	M134
○	○											●	●	M131	M135
○	○											●	●	M132	M136
<b>VisionPlus™ (continued)</b>															
○	●											●	●	M138	M149
○	●											●	●	M139	M150
○	○	○	○	○	○	○	○	○	○	○	○	●	●	M140	M151
○	○											●	●	M141	M152
○	○											●	●	M142	M152
○	○											●	●	M143	M153
○	○											●	●	M144	M154
○	○											●	●	M145	M155
○	○											●	●	M146	M156
○	○											●	●	M147	M157
○	○											●	●	M148	M158

<input checked="" type="radio"/> first choice <input type="radio"/> alternate choice	Series	Range of Diameter Ø min- Ø max inch/metric	Number of Flutes	Cutting Center	Uncoated	TiCN	AlTiN	TiAlN
<b>General Purpose Solid Carbide End Mills • Roughing/Finishing</b>								
<b>VariMill™ GP • 2-Flute</b>								
	I2C	1/8-1"	2	Yes	X			X
	I2S	1/64-1"	2	Yes	X			X
	I2B	1/32-1"	2	Yes	X			X
<b>VariMill GP • 4-Flute</b>								
	I4C	1/16-1 1/4"	4	Yes	X			X
	I4S	1/64-1"	4	Yes	X			X
	I4B	1/32-1"	4	Yes				X
<b>High-Performance High-Speed Steel (HSS-E-PM) • Roughing</b>								
<b>HSS-E ER Rougher</b>								
	620E/621E/623E/625E	1-1/4-2"	6	Yes	X			
<b>WavCut™</b>								
	620W	3/4-2"	4/6	Yes	X			
<b>High-Performance High-Speed Steel</b>								
	6A0R	1/2-1 1/4"	3	Yes	X	X		
	6ANR	1/2-1-1/4"	3	Yes		X		
	6T0R	1/2-1-1/2"	4/5/6	Yes				X
	6TNR	5/8-1-1/4"	4/5/6	Yes				X
	3405/3407	3/8-2"	4/6	Yes	X			X

P		M		K		N				S				H		Page References	
1 2 3	4	5	6	1 2 3	1 2 3	1 2 3 4 5	6	1	2	3	4	1 2	3 4	Product Information	Cutting Data		
Steel <35 HRC	Steel >36-48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Cast Iron	Non-Ferrous	Graphite	Iron Based	Nickel Based	Pure Titanium	Titanium Alloys	Hardened Steels H1 = <48 HRC H2 = 48-55	H3 = 56-60 HRC H4 = >60 HRC				
<b>General Purpose Solid Carbide End Mills • Roughing/Finishing (continued)</b>																	
<b>VariMill™ GP • 2-Flute (continued)</b>																	
●	○			●	●									N4-N5	N11-N12		
●	○			●	●									N6-N8	N11-N12		
●	○			●	●									N9-N10	N13-N14		
<b>VariMill GP • 4-Flute (continued)</b>																	
●	○			●	●									N20-N22	N28-N29		
●	○			●	●									N23-N25	N28-N29		
●	○			●	●									N26-N27	N30		
<b>High-Performance High Speed Steel (HSS-E-PM) • Roughing (continued)</b>																	
<b>HSS-E ER Rougher (continued)</b>																	
				○							●			O4-O5	O5		
<b>WavCut™ (continued)</b>																	
		○		○							○			O8-O9	O16		
<b>High-Performance High-Speed Steel (continued)</b>																	
						●								O10	O17		
						●								O11	O17		
										○	●			O12	O18		
										○	●			O13	O18		
										○	●			O14-O15	O18		



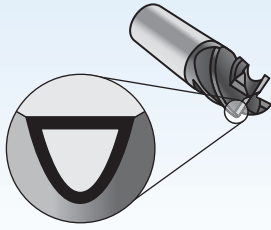
Coatings provide high-speed capability and are engineered for roughing to finishing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Grade	Coating	Grade Description	Material																							
			P	M	K	N	S	H	P	M	K	N	S	H	P	M	K	N	S	H						
Uncoated -WW, -JJ		Carbide grade made from high-quality, micrograin materials for cutting all types of workpiece materials. Very high toughness ensures a controlled wear rate. The micrograin structure enables extremely sharp cutting edges.																								
WP15PE		Coated carbide grade with thick PVD coating and optimized chemistry and process for increased wear resistance. Outstanding protection in milling of steels to mitigate crater, DOCN (depth-of-cut notching), and flank wear. Excellent performance up to 52 HRC.																								
WS15PE		PVD coated carbide grade with optimized chemistry and process for increased wear resistance. State-of-the-art post-coat treatment reduces friction and helps manage heat when cutting super alloys.																								
TiN-TT, -TW		This TiN PVD coated grade offers well-balanced machining performance for general purpose applications. This grade offers great versatility at intermediate Metal Removal Rates (MRR).																								
TiAlN-LT1, -LW1		Ultra-fine grain carbide grade with TiAlN PVD multilayer coating for high-performance machining of most materials. This grade is especially designed for dry milling hardened steels due to its unique combination of a high hardness substrate and tough multilayer coating.																								
TiAlN-RT1, -RW1		Ultra-fine carbide grade with TiAlN PVD coating. This grade is a high-performance grade for finishing operations, especially for hardened steels. This grade is characterized by high hardness and wear resistance.																								
TiCN-CT, -CW, -CJ		General purpose coated carbide grade with TiCN PVD coating for use at intermediate cutting speeds. For universal use due to its high wear resistance and hardness. Only use wet or with MQL (Minimum Quantity Lubrication).																								





**Coatings provide high-speed capability and are engineered for roughing to finishing.**

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Grade	Coating	Grade Description	Material Hardness (HRC)																						
			05	10	15	20	25	30	35	40	45														
TiAlN-LT, -LW		Coated carbide grade with PVD multilayer coating. This grade is designed for dry milling most types of material, apart from the hardened variety. This grade is characterized by excellent toughness and wear resistance. It provides outstanding protection against cratering and abrasion.	P																						
			M																						
			K																						
			S																						
			H																						
			N																						
			P																						
TiAlN-RT, -RW, -RJ		Universal carbide grade with TiAlN PVD coating. This grade is a high-performance grade for finishing operations and is characterized by high hardness and wear resistance.	P																						
			M																						
			K																						
			S																						
			H																						
			N																						
			P																						
AlTiN-MT1, -MW1, -MJ1		AlTiN PVD coated ultra-fine carbide grade. The combination between hard substrate and wear-resistant coating provides outstanding performance in high-feed milling of hardened materials (58-65 HRC).	P																						
			M																						
			K																						
			S																						
			H																						
			N																						
			P																						
AlTiN-MT, -MW		Coated fine-grain grade with AlTiN PVD coating. This grade is a thin, hard PVD coating particularly suitable for cutting steel, cast iron, stainless steel (wet), and titanium (wet) with high metal removal rates. This grade can be used for materials with hardness up to 52 HRC.	P																						
			M																						
			K																						
			S																						
			H																						
			N																						
			P																						
KC10F		High-quality submicron carbide grade for high-performance machining of non-ferrous alloys. Excellent toughness ensures a controlled wear rate and the submicron structure enables extremely sharp cutting edges.	P																						
			M																						
			K																						
			S																						
			H																						
			N																						
			P																						
K30F-DCF		Coated carbide grade with PVD multilayer coating. K30F-DCF is designed for dry milling most types of material, apart from the hardened variety. This grade is characterized by excellent hardness and wear resistance. It provides outstanding protection against cratering and abrasion.	P																						
			M																						
			K																						
			S																						
			H																						
			N																						
			P																						
K30F-TiCN		General purpose coated carbide grade with TiCN PVD coating for use at intermediate cutting speeds. For universal use due to its high wear resistance and hardness. Only use wet or with MQL (Minimum Quantity Lubrication).	P																						
			M																						
			K																						
			N																						
			S																						
			H																						
			P																						

Victory™ Grades for High-Performance  
**Solid Carbide End Mills**

# Victory

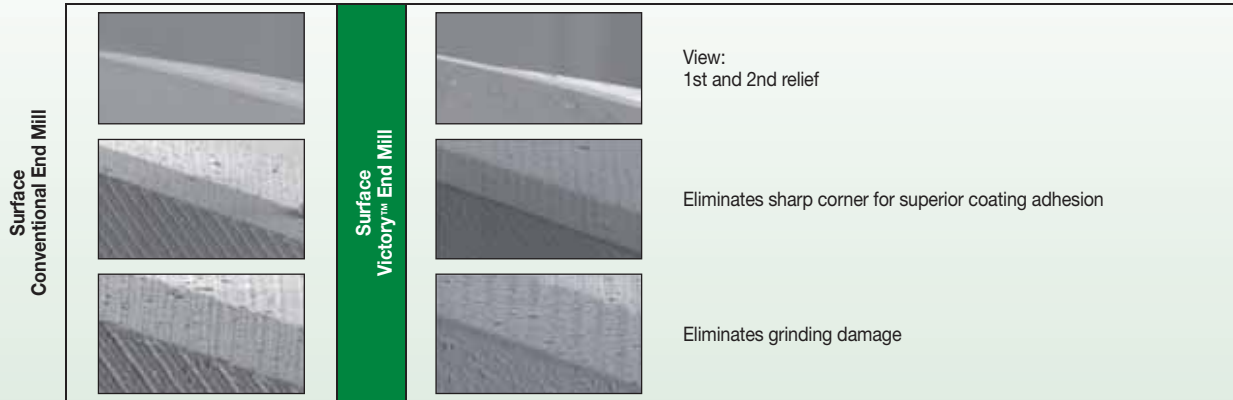


WIDIA™ has taken the next step in solid carbide end mill innovation by introducing the Victory™ Grades WP15PE™ and WS15PE™. Victory combines state-of-the-art surface treatments and proprietary edge technology with the successful market-leading WIDIA geometries, delivering significant improvement to tool life and Metal Removal Rates (MRR). The new Victory Grades can be found across the entire high-performance offering, which includes the VariMill™ family, high-performance roughers, and high-performance finishers.

### Features and Benefits

- Innovative edge preparation providing consistent tool life by eliminating most edge microchipping caused by grinding.
- Advanced post-coat finish reducing chip build-up and improving chip flow.
- First-time use of Victory grade nomenclature for better identification of grades.
- Center cutting addition on VariMill II™.

Innovative Advantage of Victory™ Grades



<p><b>WP15PE™</b> W = WIDIA™ P = Steels 15 = Application Range (Medium to Roughing) P = Carbide + PVD E = Solid End Mills</p>	<p><b>WS15PE™</b> W = WIDIA™ S = High-Temp Alloys 15 = Application Range (Medium to Roughing) P = Carbide + PVD E = Solid End Mills</p>
<b>Primary Materials</b>	<b>Primary Materials</b>
P0 through P4 Steels M1 through M3 Austenitic Stainless Steels K1 through K3 Cast Irons H1 Hardened Steels	S1 through S4 High-Temp Alloys P5 through P6 Ferritic and Martensitic Stainless Steels H1 Hardened Steels
<b>Secondary Materials</b>	<b>Secondary Materials</b>
S1 through S4 High-Temp Alloys H2 Hardened Steels	M1 through M3 Austenitic Stainless Steels H2 Hardened Steels

The new Victory grades are spread across the high-performance offering, including high-performance roughers, high-performance finishers, and select VariMill™ platforms.

Inch	series	Victory Grade		● first choice ○ alternate choice					
		WP15PE	WS15PE	P	M	K	N	S	H
				●	●	●	●	○	○
VariMill I™	4V05, 4V00	✓		●	●	●	●	○	○
VariMill II™	5V0C, 5VNC	✓		●	●	●	●	○	○
VariMill II™ ER	5V0E, 5VNE		✓	○	○	○	○	●	○
HP Roughers	4Q03, 4M0R, 4S0R	✓		●	●	●	●	○	○
HP Finishers	4C05, 4Q05, 4S07	✓		●	●	●	●	○	○

## How do the new Victory Catalog numbers work?

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.

Grade Designation		Series Number			
<b>T</b>	<b>M</b>	<b>5</b>	<b>V</b>	<b>0</b>	<b>S</b>
		Tool Material	Type of tool	Length of cut	End Geometry
	<b>M</b> = AlTiN <b>F</b> = TiAlN <b>C</b> = TiCN <b>R</b> = TiAlN	<b>4</b> = Solid Carbide <b>5</b> = Solid Carbide	<b>V</b> = VariMill™	<b>0</b> Regular <b>1</b> Long <b>2</b> Extra Long <b>3</b> Medium <b>4</b> Stub <b>N</b> Extended Neck <b>P</b> Long Reach; No Neck	<b>0</b> 4FL Ball <b>1</b> 2FL Ball <b>2</b> 2FL CC <b>3</b> 3FL CC <b>4</b> 4FL NCC <b>5</b> 4FL CC <b>6</b> 6FL NCC <b>7</b> 6FL CC <b>8</b> 8FL NCC <b>9</b> 8FL CC <b>A</b> 3FL Ball <b>B</b> 6FL Ball <b>F</b> Javelin Finisher <b>R</b> Javelin Rougher <b>S</b> 5FL NCC <b>X</b> Central Coolant Hole <b>C</b> Center Cutting <b>E</b> Eccentric CC

Series Number				
<b>5</b>	<b>V</b>	<b>0</b>	<b>C</b>	<b>130</b>
Tool Material	Type of Tool	Length of Cut	End Geometry	Cutting Diameter
<b>4</b> = Solid Carbide <b>5</b> = Solid Carbide	<b>V</b> = VariMill	<b>0</b> Regular <b>1</b> Long <b>2</b> Extra Long <b>3</b> Medium <b>4</b> Stub <b>N</b> Extended Neck <b>P</b> Long Reach; No Neck	<b>0</b> 4FL Ball <b>1</b> 2FL Ball <b>2</b> 2FL CC <b>3</b> 3FL CC <b>4</b> 4FL NCC <b>5</b> 4FL CC <b>6</b> 6FL NCC <b>7</b> 6FL CC <b>8</b> 8FL NCC <b>9</b> 8FL CC <b>A</b> 3FL Ball <b>B</b> 6FL Ball <b>F</b> Javelin Finisher <b>R</b> Javelin Rougher <b>S</b> 5FL NCC <b>X</b> Central Coolant Hole <b>C</b> Center Cutting <b>E</b> Eccentric CC	<b>030</b> 1/8" <b>050</b> 3/16" <b>070</b> 1/4" <b>080</b> 5/16" <b>100</b> 3/8" <b>110</b> 7/16" <b>130</b> 1/2" <b>140</b> 9/16" <b>160</b> 5/8" <b>190</b> 3/4" <b>250</b> 1" <b>320</b> 1-1/4"

By referencing this easy-to-use guide, you can identify the correct product to meet your needs.

**OLD Grade Nomenclature • Inch**

<b>130</b>		<b>1</b>	<b>5</b>	<b>B</b>	<b>W</b>
Cutting Diameter		Special Designation	Shank Diameter	Corner Condition	Shank Clamping
<b>030</b>	1/8"		<b>0</b>	<b>A</b> = .015"	<b>L</b> = Plain
<b>050</b>	3/16"		<b>1</b>	<b>B</b> = .030"	<b>W</b> = Weldon®
<b>070</b>	1/4"		<b>2</b>	<b>C</b> = .060"	
<b>080</b>	5/16"		<b>3</b>	<b>D</b> = .090"	
<b>100</b>	3/8"		<b>4</b>	<b>E</b> = .120"	
<b>110</b>	7/16"		<b>5</b>	<b>F</b> = .250"	
<b>130</b>	1/2"		<b>6</b>	<b>N</b> = Chamfer	
<b>140</b>	9/16"		<b>7</b>	<b>X</b> = SPCL Corner Condition	
<b>160</b>	5/8"		<b>8</b>	<b>S</b> = Sharp	
<b>190</b>	3/4"		<b>9</b>		
<b>250</b>	1"				
<b>320</b>	1-1/4"				

**NEW Victory Nomenclature • Inch**

<b>1</b>	<b>5</b>	<b>B</b>	<b>W</b>	<b>W</b>	<b>P</b>	<b>15</b>	<b>P</b>	<b>E</b>
Special Designation	Shank Diameter	Corner Condition	Shank Clamping	Brand	ISO Material Code	Wear Range	Coating Type	Product Family
	<b>0</b> 3/16"	<b>A</b> = .015"	<b>T</b> = Plain	WIDIA™	<b>P</b> = Steel	<b>15</b> = High Wear	<b>P</b> = PVD	<b>E</b> = End Mill
	<b>1</b> 1/8"	<b>B</b> = .030"	<b>W</b> = Weldon®		<b>S</b> = High-Temperature Alloys			
	<b>2</b> 1/4"	<b>C</b> = .060"	<b>V</b> = SAFE-LOCK®					
	<b>3</b> 5/16"	<b>D</b> = .090"						
	<b>4</b> 3/8"	<b>E</b> = .120"						
	<b>5</b> 1/2"	<b>F</b> = .250"						
	<b>6</b> 5/8"	<b>N</b> = Chamfer						
	<b>7</b> 3/4"	<b>X</b> = SPCL Corner Condition						
	<b>8</b> 1"	<b>S</b> = Sharp						
	<b>9</b> 1-1/4"							



# Reconditioning Services

## **WIDIA™ Reconditioning Services Optimize the Total Value of Metalcutting Tools Throughout Their Entire Life**

WIDIA Reconditioning Services optimize the value of metalcutting tools throughout their entire lifecycle by giving like-new performance — with rapid turnaround time — so tools are always on hand and perform just like new.

- Local support you can trust.
- Rapid turnaround to minimize inventory.
- Like-new performance continues delivering productivity.
- Application support throughout the tool lifecycle.
- WIDIA proprietary geometry specifications after each regrind.
- WIDIA certified coatings.
- Easy logistics through the reconditioning process.

### **Simple Logistics**

Our unique reconditioning program simplifies sending and receiving reconditioned tools to reduce shipping time and increase on-hand inventory.

To use WIDIA tool reconditioning services, contact your authorized WIDIA distributor to get started.





## Global Reconditioning Network



To locate a reconditioning center near you, visit [widia.com/services](http://widia.com/services).







## Solid End Milling • High-Performance Solid Carbide End Mills

VariMill.....	M2-M50
Roughing.....	M52-M61
Finishing.....	M62-M71
Micro Solid Carbide End Mills.....	M72-M79
Aluminum.....	M80-M117
Hard Materials.....	M118-M159
Trochoidal Milling.....	M160-M166



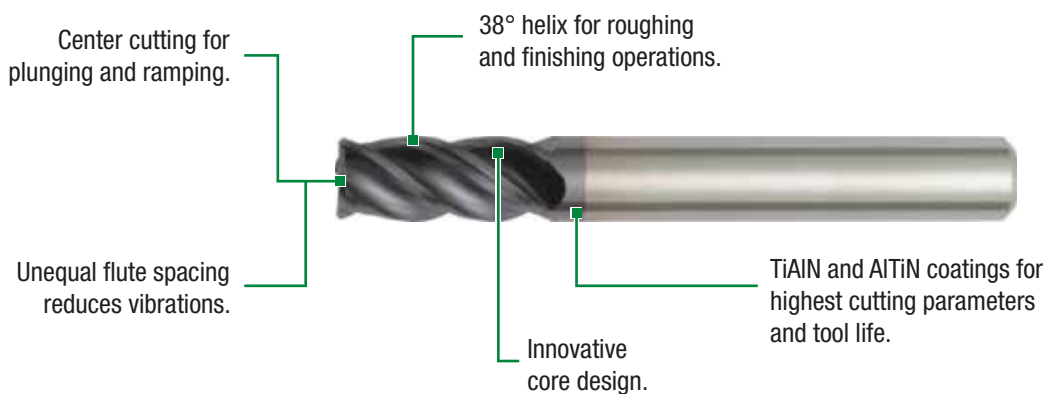
High-Performance Solid Carbide End Mills •  
**VariMill I™**

# VariMill I



VariMill I offers plunging, slotting, and profiling at the highest possible feed rates for a wide range of materials. They are designed to provide maximum Metal Removal Rates (MRR) and to achieve superior surface conditions. A wide range of diameters and corner configurations, such as chamfer, radii, and sharp edges, are available from stock.

- High-performance universal tools for almost all workpiece materials.
- Roughing and finishing with one tool.
- Various length-of-cut, long reach and necked versions, ball nose, corner chamfer, and corner radius available.

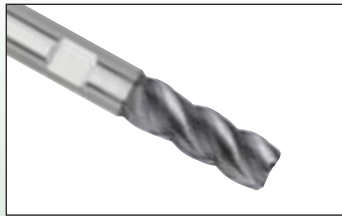


### VariMill I™ Series

- Four unequally spaced flutes.
- Increase your output with less tool changes and increased Metal Removal Rates (MRR).
- No specific tools for roughing and finishing required.
- Less passes due to 1 x D slotting capability.

#### 4V05 Series

- High metal removal rates and tool life in:
  - Stainless steels, steels, and alloyed steels.
  - High-temperature alloys and titanium.
- Radii, sharp, and corner chamfer configuration.



#### 4V0T

- Titanium geometry design.
- Sharp and corner chamfer configuration.



#### 4VP5 Series

- Stainless steel and steel geometry design.
- Sharp and corner chamfer configuration.
- Benefit from long reach design for deep cavities.



#### 4VPT Series

- Titanium geometry design.
- Sharp and corner chamfer configuration.
- Benefit from long reach design for deep cavities.



#### 4VN5 Series

- Stainless steel and steel geometry design.
- Sharp and corner chamfer configuration.
- Benefit from long reach and neck design for deep cavities.



#### 4VP0 Series

- Center cutting ball nose series.
- Benefit from long reach design for deep cavities.

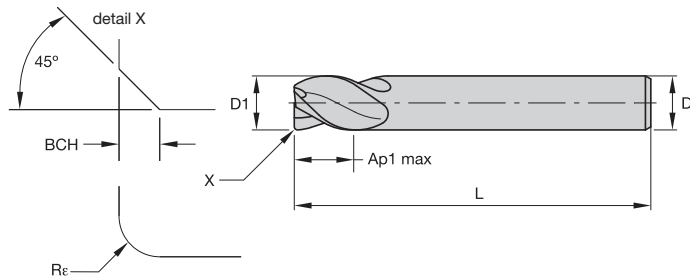
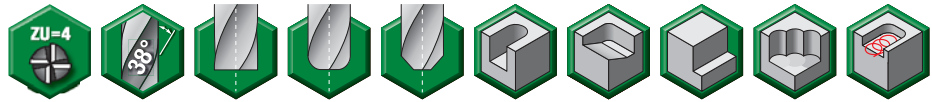


#### 4V00 Series

- Center cutting ball nose series.
- Benefit from long length of cut.



- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.

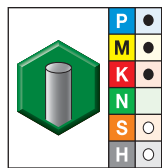


End Mill Tolerances

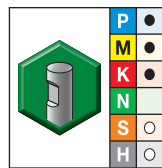
D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8-1/4"	0/0.00031
		> 1/4-3/8"	0/0.00035
		> 3/8-23/32"	0/0.00043
		> 23/32-1 3/16"	0/0.00051



■ Series 4V05 4V15 4V45 4V65 • VariMill I • Victory Grades



grade WP15PE  
AITiN



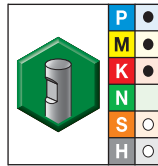
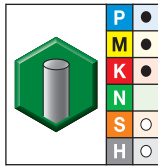
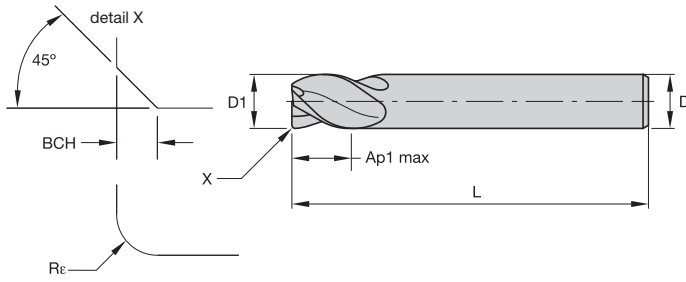
grade WP15PE  
AITiN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	BCH
5576590	4V4503001NT	-	-	1/8	1/8	1/4	1 1/2	-	.010
5576591	4V4503001ST	-	-	1/8	1/8	1/4	1 1/2	-	-
5576530	4V0503001AT	-	-	1/8	1/8	1/2	2	.015	-
5576346	4V0503001ST	-	-	1/8	1/8	1/2	2	-	-
5576345	4V0503001NT	-	-	1/8	1/8	1/2	2	-	.010
5576592	4V4505000NT	-	-	3/16	3/16	5/16	1 1/2	-	.010
5576593	4V4505000ST	-	-	3/16	3/16	5/16	1 1/2	-	-
5576531	4V0505000AT	-	-	3/16	3/16	5/8	2 1/4	.015	-
5576532	4V0505000BT	-	-	3/16	3/16	5/8	2 1/4	.030	-
5576347	4V0505000NT	-	-	3/16	3/16	5/8	2 1/4	-	.010
5576348	4V0505000ST	-	-	3/16	3/16	5/8	2 1/4	-	-
5576610	4V4507002BT	-	-	1/4	1/4	3/8	2	.030	-
5576596	4V4507002ST	-	-	1/4	1/4	3/8	2	-	-
5576595	4V4507002NT	-	-	1/4	1/4	3/8	2 1/2	-	.016
5576533	4V0507002AT	-	-	1/4	1/4	3/4	2 1/2	.015	-
5576534	4V0507002BT	-	-	1/4	1/4	3/4	2 1/2	.030	-
5576535	4V0507002CT	-	-	1/4	1/4	3/4	2 1/2	.060	-
5576349	4V0507002NT	-	-	1/4	1/4	3/4	2 1/2	-	.016
5576510	4V0507002ST	-	-	1/4	1/4	3/4	2 1/2	-	-
5576577	4V1507002AT	-	-	1/4	1/4	1 1/4	3 1/4	.015	-

(continued)

(Series 4V05 4V15 4V45 4V65 • VariMill I • Victory Grades — continued)

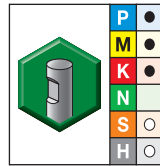
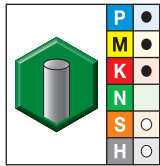
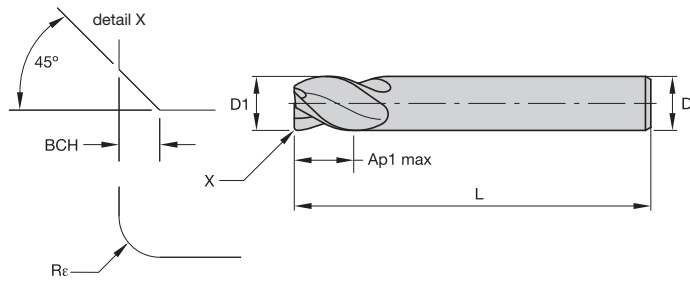


● first choice  
○ alternate choice

grade WP15PE AITiN		grade WP15PE AITiN		D1	D	length of cut Ap1 max	length L	Re	BCH
order #	catalog #	order #	catalog #						
5576579	4V1507002BT	-	-	1/4	1/4	1 1/4	3 1/4	.030	-
5576566	4V1507002ST	-	-	1/4	1/4	1 1/4	3 1/4	-	-
5576611	4V4508003BT	-	-	5/16	5/16	1/2	2	.030	-
5576597	4V4508003NT	-	-	5/16	5/16	1/2	2	-	.016
5576598	4V4508003ST	-	-	5/16	5/16	1/2	2	-	-
5576536	4V0508003AT	-	-	5/16	5/16	3/4	2 1/2	.015	-
5576537	4V0508003BT	-	-	5/16	5/16	3/4	2 1/2	.030	-
5576538	4V0508003CT	-	-	5/16	5/16	3/4	2 1/2	.060	-
5576511	4V0508003NT	-	-	5/16	5/16	3/4	2 1/2	-	.016
5576512	4V0508003ST	-	-	5/16	5/16	3/4	2 1/2	-	-
5576580	4V1508003BT	-	-	5/16	5/16	1 1/4	3 1/4	.030	-
5576567	4V1508003ST	-	-	5/16	5/16	1 1/4	3 1/4	-	-
5576612	4V4510004BT	-	-	3/8	3/8	1/2	2	.030	-
5576599	4V4510004NT	-	-	3/8	3/8	1/2	2	-	.020
5576600	4V4510004ST	-	-	3/8	3/8	1/2	2	-	-
5576539	4V0510004AT	-	-	3/8	3/8	7/8	2 1/2	.015	-
5576540	4V0510004BT	-	-	3/8	3/8	7/8	2 1/2	.030	-
5576542	4V0510004CT	-	-	3/8	3/8	7/8	2 1/2	.060	-
5576543	4V0510004DT	-	-	3/8	3/8	7/8	2 1/2	.090	-
5576513	4V0510004NT	-	-	3/8	3/8	7/8	2 1/2	-	.020
5576514	4V0510004ST	-	-	3/8	3/8	7/8	2 1/2	-	-
5576581	4V1510004BT	-	-	3/8	3/8	1 1/2	4	.030	-
5576582	4V1510004CT	-	-	3/8	3/8	1 1/2	4	.060	-
5576568	4V1510004ST	-	-	3/8	3/8	1 1/2	4	-	-
5576601	4V451101ANT	-	-	7/16	7/16	5/8	2 1/2	-	.020
5576602	4V451101AST	-	-	7/16	7/16	5/8	2 1/2	-	-
5576515	4V051101ANT	-	-	7/16	7/16	7/8	2 1/2	-	.020
5576516	4V051101AST	-	-	7/16	7/16	7/8	2 1/2	-	-
5576569	4V151100AST	-	-	7/16	7/16	2	4	-	-
-	-	5576613	4V4513005BW	1/2	1/2	5/8	2 1/2	.030	-
-	-	5576614	4V4513005CW	1/2	1/2	5/8	2 1/2	.060	-
-	-	5576604	4V4513005NW	1/2	1/2	5/8	2 1/2	-	.020

(continued)

(Series 4V05 4V15 4V45 4V65 • VariMill I • Victory Grades — continued)



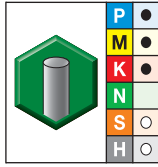
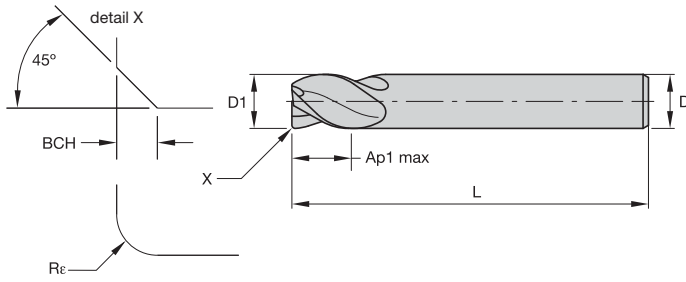
● first choice  
○ alternate choice

High-Performance Solid Carbide End Mills

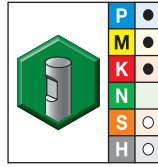
grade WP15PE AlTiN		grade WP15PE AlTiN		D1	D	length of cut Ap1 max	length L	Rε	BCH
order #	catalog #	order #	catalog #						
-		5576605	4V4513005SW	1/2	1/2	5/8	2 1/2	-	-
-		5576518	4V0513005SW	1/2	1/2	1	3	-	-
-		5576517	4V0513005NW	1/2	1/2	1	3	-	.020
-		5576544	4V0513015AW	1/2	1/2	1 1/4	3	.015	-
-		5576545	4V0513015BW	1/2	1/2	1 1/4	3	.030	-
-		5576546	4V0513015CW	1/2	1/2	1 1/4	3	.060	-
-		5576547	4V0513015DW	1/2	1/2	1 1/4	3	.090	-
-		5576548	4V0513015EW	1/2	1/2	1 1/4	3	.120	-
-		5576519	4V0513015NW	1/2	1/2	1 1/4	3	-	.020
-		5576520	4V0513015SW	1/2	1/2	1 1/4	3	-	-
-		5576636	4V6513015BW	1/2	1/2	1 1/2	4	.030	-
-		5576637	4V6513015CW	1/2	1/2	1 1/2	4	.060	-
-		5576621	4V6513015NW	1/2	1/2	1 1/2	4	-	.020
-		5576622	4V6513015SW	1/2	1/2	1 1/2	4	-	-
-		5576583	4V1513005BW	1/2	1/2	2	4	.030	-
-		5576584	4V1513005CW	1/2	1/2	2	4	.060	-
-		5576570	4V1513005SW	1/2	1/2	2	4	-	-
-		5576638	4V6513025BW	1/2	1/2	2 1/4	4 1/2	.030	-
-		5576639	4V6513025CW	1/2	1/2	2 1/4	4 1/2	.060	-
-		5576623	4V6513025SW	1/2	1/2	2 1/4	4 1/2	-	-
-		5576615	4V4516006CW	5/8	5/8	3/4	3	.060	-
-		5576617	4V4516006EW	5/8	5/8	3/4	3	.120	-
-		5576606	4V4516006NW	5/8	5/8	3/4	3	-	.020
-		5576607	4V4516006SW	5/8	5/8	3/4	3	-	-
-		5576549	4V0516006BW	5/8	5/8	1 1/4	3 1/2	.030	-
-		5576550	4V0516006CW	5/8	5/8	1 1/4	3 1/2	.060	-
-		5576551	4V0516006DW	5/8	5/8	1 1/4	3 1/2	.090	-
-		5576552	4V0516006EW	5/8	5/8	1 1/4	3 1/2	.120	-
-		5576528	4V0516006SW	5/8	5/8	1 1/4	3 1/2	-	-
-		5576521	4V0516006NW	5/8	5/8	1 1/4	3 1/4	-	.020
-		5576650	4V6516016CW	5/8	5/8	1 5/8	4 1/8	.060	-
-		5576624	4V6516016NW	5/8	5/8	1 5/8	4 1/8	-	.020

(continued)

(Series 4V05 4V15 4V45 4V65 • VariMill I • Victory Grades — continued)



grade WP15PE  
AITiN



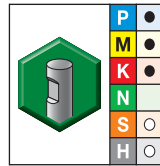
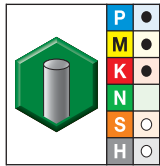
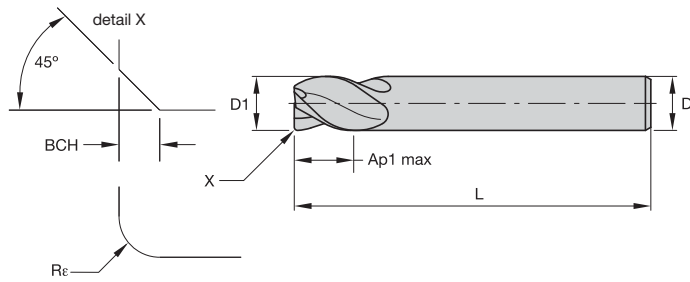
grade WP15PE  
AITiN

- first choice
- alternate choice

grade WP15PE AITiN		grade WP15PE AITiN		D1	D	length of cut Ap1 max	length L	Re	BCH
order #	catalog #	order #	catalog #						
-		5576625	4V6516016SW	5/8	5/8	1 5/8	4 1/8	-	-
-		5576585	4V1516006CW	5/8	5/8	2 1/4	5	.060	-
-		5576571	4V1516006NW	5/8	5/8	2 1/4	5	-	.020
-		5576572	4V1516006SW	5/8	5/8	2 1/4	5	-	-
-		5576618	4V4519007BW	3/4	3/4	7/8	3 1/2	.030	-
-		5576619	4V4519007CW	3/4	3/4	7/8	3 1/2	.060	-
-		5576620	4V4519007EW	3/4	3/4	7/8	3 1/2	.120	-
-		5576608	4V4519007NW	3/4	3/4	7/8	3 1/2	-	.020
-		5576609	4V4519007SW	3/4	3/4	7/8	3 1/2	-	-
-		5576553	4V0519007BW	3/4	3/4	1 1/2	4	.030	-
-		5576554	4V0519007CW	3/4	3/4	1 1/2	4	.060	-
-		5576555	4V0519007DW	3/4	3/4	1 1/2	4	.090	-
-		5576557	4V0519007EW	3/4	3/4	1 1/2	4	.120	-
-		5576529	4V0519007SW	3/4	3/4	1 1/2	4	-	-
-		5576522	4V0519007NW	3/4	3/4	1 1/2	4	-	.020
-		5576630	4V6519017NW	3/4	3/4	1 5/8	4	-	.020
-		5576631	4V6519017SW	3/4	3/4	1 5/8	4	-	-
-		5576586	4V1519007BW	3/4	3/4	2 1/4	5	.030	-
-		5576587	4V1519007CW	3/4	3/4	2 1/4	5	.060	-
-		5576573	4V1519007NW	3/4	3/4	2 1/4	5	-	.020
-		5576574	4V1519007SW	3/4	3/4	2 1/4	5	-	-
-		5576651	4V6519007BW	3/4	3/4	3	6	.030	-
-		5576652	4V6519007CW	3/4	3/4	3	6	.060	-
-		5576626	4V6519007NW	3/4	3/4	3	6	-	.020
-		5576627	4V6519007SW	3/4	3/4	3	6	-	-
-		5576558	4V0525008BW	1	1	1 1/2	4	.030	-
-		5576560	4V0525008CW	1	1	1 1/2	4	.060	-
-		5576561	4V0525008DW	1	1	1 1/2	4	.090	-
-		5576562	4V0525008EW	1	1	1 1/2	4	.120	-
-		5576563	4V0525008FW	1	1	1 1/2	4	.250	-
-		5576525	4V0525008SW	1	1	1 1/2	4	-	-
-		5576523	4V0525008NW	1	1	1 1/2	4	-	.020

(continued)

(Series 4V05 4V15 4V45 4V65 • VariMill I • Victory Grades — continued)



● first choice  
 ○ alternate choice

grade WP15PE  
 AITiN

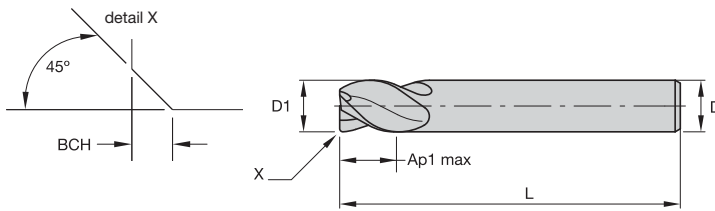
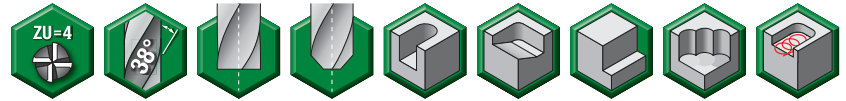
grade WP15PE  
 AITiN

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε	BCH
-	-	5576632	4V6525018NW	1	1	2	5	-	.020
-	-	5576633	4V6525018SW	1	1	2	5	-	-
-	-	5576588	4V1525008BW	1	1	2 1/4	5	.030	-
-	-	5576589	4V1525008CW	1	1	2 1/4	5	.060	-
-	-	5576576	4V1525008SW	1	1	2 1/4	5	-	-
-	-	5576575	4V1525008NW	1	1	2 1/4	5	-	.020
-	-	5576653	4V6525028BW	1	1	4	7	.030	-
-	-	5576654	4V6525028CW	1	1	4	7	.060	-
-	-	5576634	4V6525028NW	1	1	4	7	-	.020
-	-	5576635	4V6525028SW	1	1	4	7	-	-
-	-	5576564	4V0532009BW	1 1/4	1 1/4	2 1/4	5	.030	-
-	-	5576565	4V0532009EW	1 1/4	1 1/4	2 1/4	5	.120	-
-	-	5576526	4V0532009NW	1 1/4	1 1/4	2 1/4	5	-	.020
-	-	5576527	4V0532009SW	1 1/4	1 1/4	2 1/4	5	-	-

High-Performance Solid Carbide End Mills



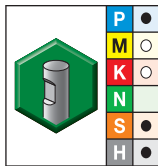
- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 +/-
All	+0.00/-0.002	≤ 1/8"	0/0.0024
		> 1/8-1/4"	0/0.00031
		> 1/4-3/8"	0/0.00035
		> 3/8-23/32"	0/0.00043
		> 23/32-1 3/16"	0/0.00051

■ Series 4V0T 4V4T • VariMill I

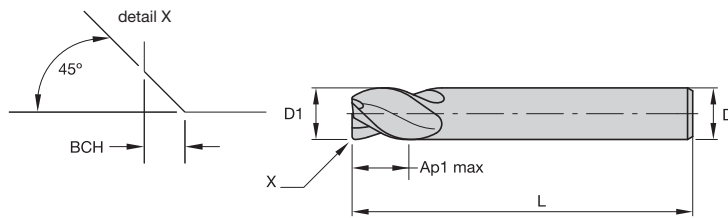


grade AlTiN-MW  
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH
2870168	TM4V4T13005	1/2	1/2	5/8	2 1/2	.020
2870167	TM4V4T13005S	1/2	1/2	5/8	2 1/2	—
2832003	TM4V0T13015	1/2	1/2	1 1/4	3	.020
2831994	TM4V0T13015S	1/2	1/2	1 1/4	3	—
2870166	TM4V4T16006	5/8	5/8	3/4	3	.020
2870165	TM4V4T16006S	5/8	5/8	3/4	3	—
2831988	TM4V0T16006	5/8	5/8	1 1/4	3 1/2	.020
2831980	TM4V0T16006S	5/8	5/8	1 1/4	3 1/2	—
2870164	TM4V4T19007	3/4	3/4	7/8	3 1/2	.020
2870163	TM4V4T19007S	3/4	3/4	7/8	3 1/2	—
2831974	TM4V0T19007	3/4	3/4	1 1/2	4	.020
2831967	TM4V0T19007S	3/4	3/4	1 1/2	4	—
2831961	TM4V0T25008	1	1	1 1/2	4	.020
2831954	TM4V0T25008S	1	1	1 1/2	4	—
2831947	TM4V0T32009	1 1/4	1 1/4	2 1/4	5	.020
3003329	TM4V0T32009S	1 1/4	1 1/4	2 1/4	5	—

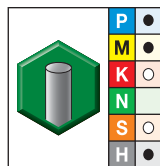
- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+ .000 / - .002	≤ 1/8"	0 / .00024
		> 1/8–1/4"	0 / .00031
		> 1/4–3/8"	0 / .00035
		> 3/8–23/32"	0 / .00043
		> 23/32–1 3/16"	0 / .00051

■ Series 4VP5 • VariMill I • Extended Reach



grade TiAlN-LT  
TiAlN

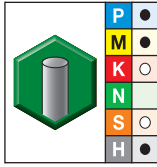
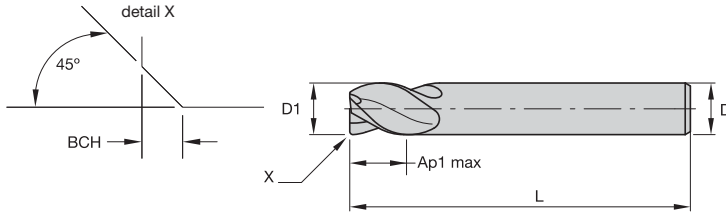
- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH
2837046	TF4VP507012S	1/4	1/4	3/8	4	—
2837055	TF4VP507012	1/4	1/4	3/8	4	.016
2837032	TF4VP510014S	3/8	3/8	1/2	4	—
2837038	TF4VP510014	3/8	3/8	1/2	4	.020
2837017	TF4VP513005S	1/2	1/2	5/8	5	—
2837025	TF4VP513005	1/2	1/2	5/8	5	.020
2837002	TF4VP513015S	1/2	1/2	5/8	6	—
2837007	TF4VP513015	1/2	1/2	5/8	6	.020
2836985	TF4VP516006S	5/8	5/8	3/4	5	—
2836992	TF4VP516006	5/8	5/8	3/4	5	.020
2836970	TF4VP516016S	5/8	5/8	3/4	6	—
2836977	TF4VP516016	5/8	5/8	3/4	6	.020
2836951	TF4VP516026S	5/8	5/8	3/4	7	—
2836956	TF4VP516026	5/8	5/8	3/4	7	.020
2836936	TF4VP519007S	3/4	3/4	1	5	—
2836946	TF4VP519007	3/4	3/4	1	5	.020

(continued)

High-Performance Solid Carbide End Mills

(Series 4VP5 • VariMill I • Extended Reach – continued)



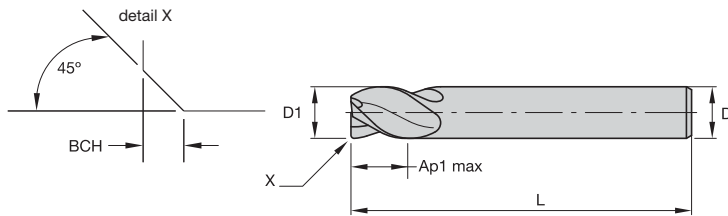
● first choice  
○ alternate choice

grade TiAlN-LT  
TiAlN

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH
2836921	TF4VP519017S	3/4	3/4	1	6	—
2836930	TF4VP519017	3/4	3/4	1	6	.020
2836907	TF4VP519027S	3/4	3/4	1	7	—
2836916	TF4VP519027	3/4	3/4	1	7	.020
2836892	TF4VP525008S	1	1	1 1/8	5	—
2836900	TF4VP525008	1	1	1 1/8	5	.020
2836879	TF4VP525018S	1	1	1 1/8	6	—
2836887	TF4VP525018	1	1	1 1/8	6	.020
2836863	TF4VP525028S	1	1	1 1/8	7	—
2836872	TF4VP525028	1	1	1 1/8	7	.020

High-Performance Solid Carbide End Mills

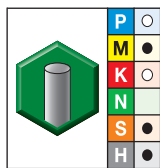
- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium machining.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8-1/4"	0/0.00031
		> 1/4-3/8"	0/0.00035
		> 3/8-23/32"	0/0.00043
		> 23/32-1 3/16"	0/0.00051

### Series 4VPT • VariMill I • Extended Reach

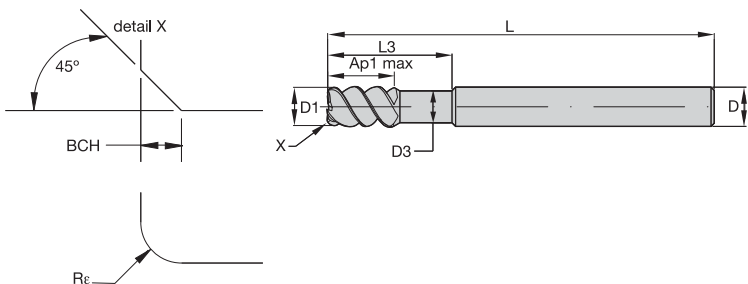


grade AlTiN-MT  
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH
2831918	TM4VPT13005	1/2	1/2	5/8	5	.020
2831913	TM4VPT13005S	1/2	1/2	5/8	5	—
2831907	TM4VPT13015	1/2	1/2	5/8	6	.020
2831901	TM4VPT13015S	1/2	1/2	5/8	6	—
2831895	TM4VPT16006	5/8	5/8	3/4	5	.020
3003330	TM4VPT16006S	5/8	5/8	3/4	5	—
2831889	TM4VPT16016	5/8	5/8	3/4	6	.020
3003331	TM4VPT16016S	5/8	5/8	3/4	6	—
2831883	TM4VPT16026	5/8	5/8	3/4	7	.020
2831878	TM4VPT16026S	5/8	5/8	3/4	7	—
2831871	TM4VPT19007	3/4	3/4	1	5	.020
3003332	TM4VPT19007S	3/4	3/4	1	5	—
2831865	TM4VPT19017	3/4	3/4	1	6	.020
3004373	TM4VPT19017S	3/4	3/4	1	6	—
2831858	TM4VPT19027	3/4	3/4	1	7	.020
2988603	TM4VPT19027S	3/4	3/4	1	7	—
2831852	TM4VPT25008	1	1	1 1/8	5	.020
3004374	TM4VPT25008S	1	1	1 1/8	5	—
2831847	TM4VPT25018	1	1	1 1/8	6	.020
2831840	TM4VPT25018S	1	1	1 1/8	6	—
2831835	TM4VPT25028	1	1	1 1/8	7	.020
3004375	TM4VPT25028S	1	1	1 1/8	7	—

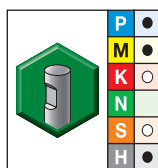
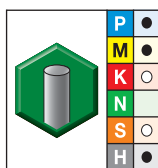
- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8-1/4"	0/0.00031
		> 1/4-3/8"	0/0.00035
		> 3/8-23/32"	0/0.00043
		> 23/32-1 3/16"	0/0.00051

■ Series 4VN5 • VariMill I • Extended Reach and Neck

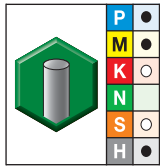
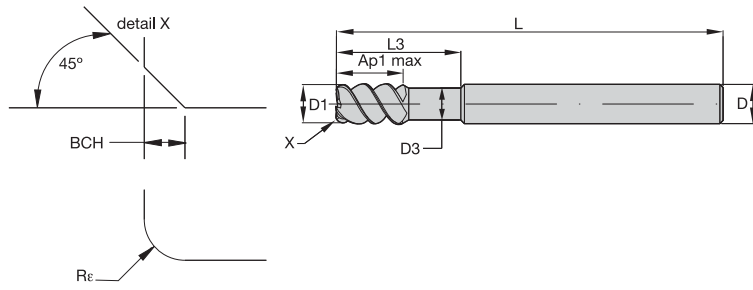


- first choice
- alternate choice

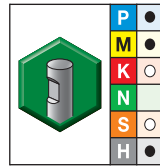
grade TiAlN-LT TiAlN		grade TiAlN-LW TiAlN		D1	D	D3	length of cut Ap1 max	L3	length L	Re	BCH
order #	catalog #	order #	catalog #								
3738940	TF4VN507012A	-	-	1/4	1/4	.24	3/8	1 1/4	4	.015	-
3738941	TF4VN507012B	-	-	1/4	1/4	.24	3/8	1 1/4	4	.030	-
2837188	TF4VN507012	-	-	1/4	1/4	.24	3/8	1 1/4	4	-	.016
3738973	TF4VN510014B	-	-	3/8	3/8	.35	1/2	1 7/8	4	.030	-
3738974	TF4VN510014C	-	-	3/8	3/8	.35	1/2	1 7/8	4	.060	-
2837182	TF4VN510014	-	-	3/8	3/8	.35	1/2	1 7/8	4	-	.020
-	-	3738975	TF4VN513005B	1/2	1/2	.47	5/8	2 1/4	4	.030	-
-	-	3738976	TF4VN513005C	1/2	1/2	.47	5/8	2 1/4	4	.060	-
-	-	3738977	TF4VN513005E	1/2	1/2	.47	5/8	2 1/4	4	.120	-
-	-	2837178	TF4VN513005	1/2	1/2	.47	5/8	2 1/4	4	-	.020
-	-	3738978	TF4VN516006C	5/8	5/8	.59	3/4	2 1/4	4 1/8	.060	-
-	-	3738979	TF4VN516006E	5/8	5/8	.59	3/4	2 1/4	4 1/8	.120	-
-	-	2837171	TF4VN516006	5/8	5/8	.59	3/4	2 1/4	4 1/8	-	.020
-	-	2837160	TF4VN516016	5/8	5/8	.59	3/4	3 1/8	5	-	.020
-	-	2837154	TF4VN519007	3/4	3/4	.71	1	2 1/4	4 1/4	-	.020
-	-	3738980	TF4VN519017B	3/4	3/4	.71	1	3 1/4	5 1/4	.030	-
-	-	3738981	TF4VN519017C	3/4	3/4	.71	1	3 1/4	5 1/4	.060	-
-	-	3738982	TF4VN519017E	3/4	3/4	.71	1	3 1/4	5 1/4	.120	-
-	-	2837146	TF4VN519017	3/4	3/4	.71	1	3 1/4	5 1/4	-	.020
-	-	2837125	TF4VN525008	1	1	.94	1 1/8	2 1/4	4 1/2	-	.020

(continued)

(Series 4VN5 • VariMill I • Extended Reach and Neck – continued)



grade TiAlN-LT  
TiAlN



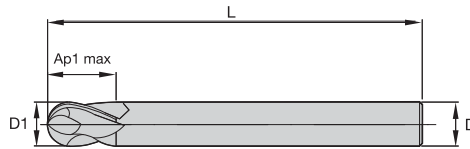
grade TiAlN-LW  
TiAlN

● first choice  
○ alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Re	BCH
-		3738993	TF4VN525018B	1	1	.94	1 1/8	3 1/4	5 1/2	.030	-
-		3738994	TF4VN525018C	1	1	.94	1 1/8	3 1/4	5 1/2	.060	-
-		3738995	TF4VN525018E	1	1	.94	1 1/8	3 1/4	5 1/2	.120	-
-		2837117	TF4VN525018	1	1	.94	1 1/8	3 1/4	5 1/2	-	.020
-		2837110	TF4VN525028	1	1	.94	1 1/8	4 1/4	6 1/2	-	.020

High-Performance Solid Carbide End Mills

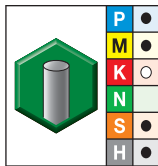
- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+ .000 / - .002	≤ 1/8"	0 / .00024
		> 1/8-1/4"	0 / .00031
		> 1/4-3/8"	0 / .00035
		> 3/8-23/32"	0 / .00043
		> 23/32-1 3/16"	0 / .00051

■ Series 4VP0 • VariMill I • Extended Reach • Ball Nose

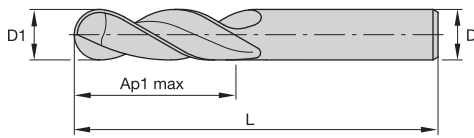
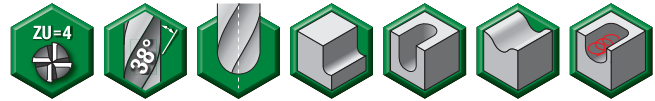


grade TiAlN-LT  
TiAlN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L
2837105	TF4VP007012	1/4	1/4	3/8	4
3018276	TF4VP010014	3/8	3/8	1/2	4
2837088	TF4VP013005	1/2	1/2	5/8	5
2837081	TF4VP016016	5/8	5/8	3/4	6
2837073	TF4VP019017	3/4	3/4	1	6
2837061	TF4VP025018	1	1	1 1/8	6

- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.

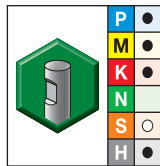
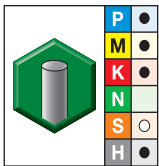


End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8-1/4"	0/0.00031
		> 1/4-3/8"	0/0.00035
		> 3/8-23/32"	0/0.00043
		> 23/32-1 3/16"	0/0.00051



■ Series 4V00 • VariMill I • Extended Length of Cut • Ball Nose • Victory Grades



- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
5576655	4V0003001XT	-	-	1/8	1/8	1/2	2
5576656	4V0005000XT	-	-	3/16	3/16	5/8	2 1/4
5576658	4V0007002XT	-	-	1/4	1/4	3/4	2 1/2
5576659	4V0008003XT	-	-	5/16	5/16	3/4	2 1/2
5576660	4V0010004XT	-	-	3/8	3/8	7/8	2 1/2
5576661	4V001101AXT	-	-	7/16	7/16	7/8	2 1/2
-	5576662	4V0013005XW		1/2	1/2	1	3
-	5576663	4V0013015XW		1/2	1/2	1 1/4	3
-	5576664	4V0016006XW		5/8	5/8	1 1/4	3 1/2
-	5576665	4V0019007XW		3/4	3/4	1 1/2	4
-	5576666	4V0025008XW		1	1	1 1/2	4
-	5576667	4V0032009XW		1 1/4	1 1/4	2 1/4	5

High-Performance Solid Carbide End Mills



■ Series 4V05 • VariMill I • Victory Grades



Material Group					Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.															
	Side Milling (A) and Slotting (B)		WP15PE			D1 – Diameter														
	A		B	Cutting Speed – vc SFM			frac.	1/8	3/16	1/4	5/16	7/16	3/8	1/2	5/8	3/4	1	1 1/4		
	ap	ae	ap	min		max	dec.	.1250	.1875	.2500	.3125	.4375	.3750	.5000	.6250	.7500	1.0000	1.2500		
P	0	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0031	.0027	.0034	.0039	.0044	.0049	.0049	
	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0031	.0027	.0034	.0039	.0044	.0049	.0049	
	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0031	.0027	.0034	.0039	.0044	.0049	.0049	
	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0026	.0023	.0029	.0034	.0039	.0045	.0048	
	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0007	.0010	.0014	.0017	.0023	.0020	.0026	.0030	.0034	.0039	.0040	
	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0006	.0009	.0012	.0016	.0021	.0018	.0023	.0027	.0031	.0036	.0039	
M	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0005	.0008	.0010	.0013	.0017	.0015	.0019	.0022	.0025	.0028	.0029	
	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	.0007	.0011	.0015	.0020	.0026	.0023	.0029	.0034	.0039	.0045	.0048	
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0021	.0018	.0023	.0027	.0031	.0036	.0039	
K	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	.0005	.0008	.0010	.0013	.0017	.0015	.0019	.0022	.0025	.0028	.0029	
	1	1.5 x D	0.5 x D	1 x D	390	–	490	IPT	.0009	.0013	.0018	.0023	.0031	.0027	.0034	.0039	.0044	.0049	.0049	
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0026	.0023	.0029	.0034	.0039	.0045	.0048	
S	3	1.5 x D	0.5 x D	1 x D	360	–	430	IPT	.0006	.0009	.0012	.0016	.0021	.0018	.0023	.0027	.0031	.0036	.0039	
	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0007	.0011	.0015	.0020	.0026	.0023	.0029	.0034	.0039	.0045	.0048	
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0004	.0006	.0008	.0010	.0014	.0012	.0015	.0018	.0021	.0024	.0026	
	3	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0021	.0018	.0023	.0027	.0031	.0036	.0039	
H	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	.0005	.0008	.0011	.0014	.0019	.0017	.0021	.0025	.0028	.0033	.0036	
	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0007	.0010	.0014	.0017	.0023	.0020	.0026	.0030	.0034	.0039	.0040	
	2	1.5 D	0.2 x D	0.5 x D	230	–	390	IPT	.0005	.0008	.0010	.0013	.0017	.0015	.0019	.0022	.0025	.0028	.0029	

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills




■ Series 4V0T 4V4T • VariMill I

Material Group								Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.					
	Side Milling (A) and Slotting (B)		AITiN					D1 – Diameter					
	A		B	Cutting Speed – vc SFM			frac.	1/2	5/8	3/4	1	1-1/4	
	ap	ae	ap	min		max	dec.	.5000	.6250	.7500	1.0000	1.2500	
P	0	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0034	.0039	.0044	.0049	.0049
	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0034	.0039	.0044	.0049	.0049
	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	.0034	.0039	.0044	.0049	.0049
	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0029	.0034	.0039	.0045	.0048
	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0026	.0030	.0034	.0039	.0040
	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0023	.0027	.0031	.0036	.0039
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	.0029	.0034	.0039	.0045	.0048
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0023	.0027	.0031	.0036	.0039
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	.0019	.0022	.0025	.0028	.0029
K	1	1.5 x D	0.5 x D	1 x D	390	–	490	IPT	.0034	.0039	.0044	.0049	.0049
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0029	.0034	.0039	.0045	.0048
	3	1.5 x D	0.5 x D	1 x D	360	–	430	IPT	.0023	.0027	.0031	.0036	.0039
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0029	.0034	.0039	.0045	.0048
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0015	.0018	.0021	.0024	.0026
	3	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0023	.0027	.0031	.0036	.0039
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	.0021	.0025	.0028	.0033	.0036
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0026	.0030	.0034	.0039	.0040
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	IPT	.0019	.0022	.0025	.0028	.0029

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

■ Series 4VP5 • VariMill I

Material Group														
	Side Milling (A) and Slotting (B)				TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.						
	A		B		Cutting Speed – vc SFM			D1 – Diameter						
	ap	ae	ap	min					max	frac.	1/4	3/8	1/2	5/8
							dec.	.2500	.3750	.5000	.6250	.7500	1.000	
P	0	0.75 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	1	0.75 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	2	0.75 x D	0.5 x D	0.75 x D	460	–	620	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	3	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	4	0.75 x D	0.5 x D	0.5 x D	300	–	490	IPT	.0014	.0020	.0026	.0030	.0034	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0012	.0018	.0023	.0027	.0031	.0036
M	6	0.75 x D	0.5 x D	0.5 x D	160	–	250	IPT	.0010	.0015	.0019	.0022	.0025	.0028
	1	0.75 x D	0.5 x D	0.75 x D	300	–	380	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0031	.0036
K	3	0.75 x D	0.5 x D	0.75 x D	200	–	230	IPT	.0010	.0015	.0019	.0022	.0025	.0028
	1	0.75 x D	0.5 x D	0.75 x D	390	–	490	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0039	.0045
S	3	0.75 x D	0.5 x D	0.75 x D	360	–	430	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	1	0.75 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	0.75 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0031	.0036
H	4	0.75 x D	0.5 x D	0.75 x D	160	–	200	IPT	.0011	.0017	.0021	.0025	.0028	.0033
	1	0.75 x D	0.5 x D	0.5 x D	260	–	460	IPT	.0014	.0020	.0026	.0030	.0034	.0039
	2	0.75 x D	0.2 x D	0.75 x D	230	–	390	IPT	.0010	.0015	.0019	.0022	.0025	.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".  
 Side milling applications – for longest reach (L3) tools, reduce ae by 30%.  
 Slot milling applications – for longest reach (L3) tools, reduce ae by 30%.



■ Series 4VPT • VariMill I • Extended Reach

Material Group												
		Side Milling (A) and Slotting (B)			AITiN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.				
		A		B	Cutting Speed – vc SFM			D1 – Diameter				
		ap	ae	ap	min		max	frac.	1/2	5/8	3/4	1
P	1	0.75 x D	0.5 x D	0.75 x D	500	–	650	IPT	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	450	–	625	IPT	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	400	–	525	IPT	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	–	475	IPT	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	325	IPT	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	150	–	225	IPT	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	–	330	IPT	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	–	430	IPT	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	150	–	275	IPT	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	–	260	IPT	.0023	.0027	.0030	.0036
	4	0.75 x D	0.5 x D	0.75 x D	150	–	210	IPT	.0022	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	450	IPT	.0026	.0030	.0033	.0039

NOTE: Side milling applications – for longest reach (L3) tools, reduce ae by 30%.  
 Slot milling applications – for longest reach (L3) tools, reduce ap by 30%.  
 Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

■ Series 4VN5 • VariMill I

Material Group														
	Side Milling (A) and Slotting (B)			TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
	A		B	Cutting Speed – vc SFM			frac.	D1 – Diameter						
	ap	ae	ap	min		max		dec.	.2500	.3750	.5000	.6250	.7500	1.000
P	1	0.75 x D	0.5 x D	0.75 x D	500	–	650	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	450	–	625	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	0.75 x D	0.5 x D	0.75 x D	400	–	525	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	4	0.75 x D	0.5 x D	0.5 x D	300	–	475	IPT	.0014	.0020	.0026	.0030	.0033	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	325	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	0.75 x D	0.5 x D	0.5 x D	150	–	225	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	0.75 x D	0.5 x D	0.75 x D	260	–	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	0.75 x D	0.5 x D	0.75 x D	330	–	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	0.75 x D	0.3 x D	0.3 x D	150	–	275	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	0.75 x D	0.3 x D	0.3 x D	70	–	130	IPT	.0008	.0012	.0016	.0018	.0020	.0025
	3	0.75 x D	0.5 x D	0.75 x D	160	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	4	0.75 x D	0.5 x D	0.75 x D	150	–	210	IPT	.0011	.0017	.0022	.0025	.0028	.0033
H	1	0.75 x D	0.5 x D	0.5 x D	260	–	450	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Side milling applications – for longest reach (L3) tools, reduce ae by 30%.  
 Slot milling applications – for longest reach (L3) tools, reduce ap by 30%.  
 Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series 4VP0 • VariMill I

Material Group							Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
	Side Milling (A) and Slotting (B)		TiAlN			D1 – Diameter								
	A		B	Cutting Speed – vc SFM			frac.	1/4	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	dec.	.2500	.3750	.5000	.6250	.7500	1.000	
P	0	0.75 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	1	0.75 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	2	0.75 x D	0.5 x D	0.75 x D	460	–	620	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	3	0.75 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	4	0.75 x D	0.5 x D	0.5 x D	300	–	490	IPT	.0014	.0020	.0026	.0030	.0034	.0039
	5	0.75 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0012	.0018	.0023	.0027	.0031	.0036
M	6	0.75 x D	0.5 x D	0.5 x D	160	–	250	IPT	.0010	.0015	.0019	.0022	.0025	.0028
	1	0.75 x D	0.5 x D	0.75 x D	300	–	380	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0031	.0036
K	3	0.75 x D	0.5 x D	0.75 x D	200	–	230	IPT	.0010	.0015	.0019	.0022	.0025	.0028
	1	0.75 x D	0.5 x D	0.75 x D	390	–	490	IPT	.0018	.0027	.0034	.0039	.0044	.0049
	2	0.75 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0039	.0045
S	3	0.75 x D	0.5 x D	0.75 x D	360	–	430	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	1	0.75 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	0.75 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	3	0.75 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0031	.0036
H	4	0.75 x D	0.5 x D	0.75 x D	160	–	200	IPT	.0011	.0017	.0021	.0025	.0028	.0033
	1	0.75 x D	0.5 x D	0.5 x D	260	–	460	IPT	.0014	.0020	.0026	.0030	.0034	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters greater than 1/2".  
 Side milling applications – for longest reach (L3) tools, reduce ae by 30%.  
 Slot milling applications – for longest reach (L3) tools, reduce ae by 30%.

High-Performance Solid Carbide End Mills

■ Series 4V00 • VariMill I • Victory Grades



Material Group																			
	Side Milling (A) and Slotting (B)			WP15PE		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.													
	A		B	Cutting Speed – vc SFM		D1 – Diameter													
	ap	ae	ap	min	max	frac.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	1-1/4		
P	0	1.25 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	1	1.25 x D	0.5 x D	1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	2	1.25 x D	0.5 x D	1 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	3	1.25 x D	0.5 x D	1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	4	1.25 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039	.0040
	5	1.25 x D	0.5 x D	1 x D	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	.0039
M	1	1.25 x D	0.5 x D	1 x D	300	–	380	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	2	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	.0039
	3	1.25 x D	0.5 x D	1 x D	200	–	230	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028	.0029
K	1	1.25 x D	0.5 x D	1 x D	390	–	490	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049	.0049
	2	1.25 x D	0.5 x D	1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	3	1.25 x D	0.5 x D	1 x D	360	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	.0039
S	1	1 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045	.0048
	2	1 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024	.0026
	3	1.25 x D	0.5 x D	1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036	.0039
	4	1.25 x D	0.5 x D	1 x D	160	–	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033	.0036
H	1	1.25 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039	.0040
	2	1.25 x D	0.2 x D	0.5 x D	230	–	390	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028	.0029

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

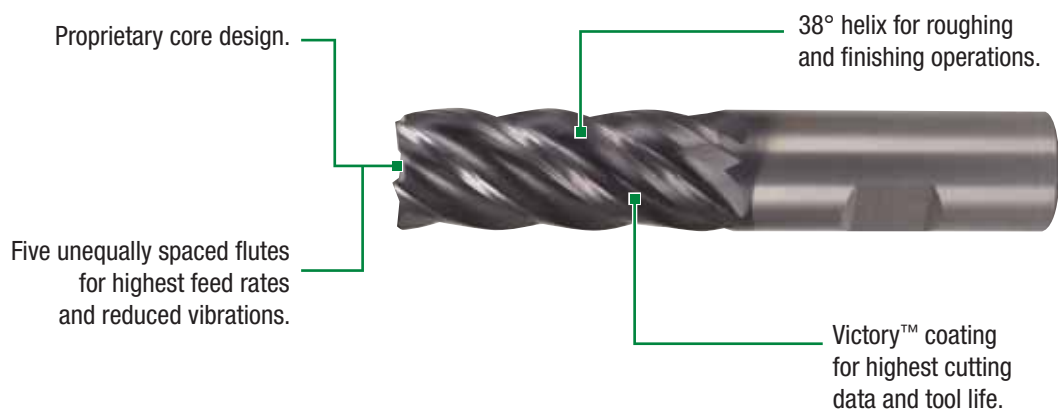
High-Performance Solid Carbide End Mills •  
**VariMill II™**

# VariMill II



VariMill II end mills are the proven leader in the field of high-performance, chatter-free machining. They are designed to provide maximum metal removal rates and to achieve supreme surface conditions. Utilizing an innovative and proprietary design with unequal flute spacing, VariMill II carbide end mills provide users with the most versatile technology available, capable of outperforming other high-performance tools.

- 1 x D slotting in titanium and stainless steels with five unequally spaced flutes.
- Roughing and finishing with one tool.
- Various lengths-of-cut; necked and corner radius versions available.



**WIDIA**  
**VICTORY**



### VariMill II™ Series

- Five unequally spaced flutes boosting your output with higher feed rates.
- Center cutting.
- Roughing and finishing with one tool.
- Less passes due to 1 x D slotting capability on almost all materials, including titanium.
- Ramping up to 3°.

### 5V0C Series

- Highest metal removal rates and tool life in:
  - Stainless steels, steels, and alloyed steels.
  - Cast iron.
  - High temperature alloys and titanium.
- Corner radii and sharp edges.

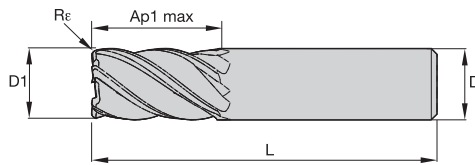
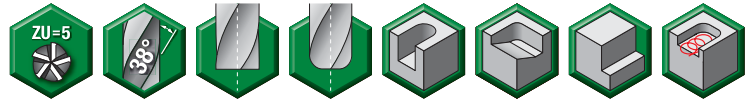


### 5VNC Series

- Steels, stainless steels, and high temperature alloys.
- Radii corner and neck design for depths requiring additional passes.



- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Slotting up to 1 x D.
- Standard items listed. Additional styles and coatings made to order.

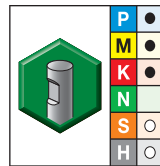
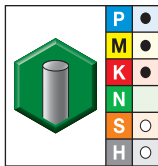


End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+ .000 / - .002	≤ 1/8"	0 / .00024
		> 1/8 - 1/4"	0 / .00031
		> 1/4 - 3/8"	0 / .00035
		> 3/8 - 23/32"	0 / .00043
		> 23/32 - 1 3/16"	0 / .00051



■ Series 5V0C • VariMill II • Victory Grades

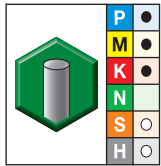
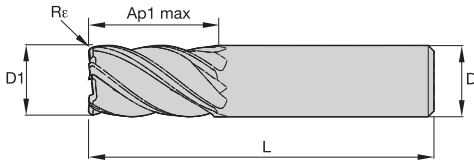


- first choice
- alternate choice

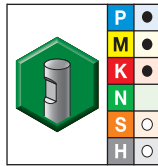
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε
5577051	5V0C05000AT	-	-	3/16	3/16	5/8	2 1/4	.015
5577052	5V0C05000BT	-	-	3/16	3/16	5/8	2 1/4	.030
5577053	5V0C05000ST	-	-	3/16	3/16	5/8	2 1/4	-
5577054	5V0C07002AT	-	-	1/4	1/4	3/4	2 1/2	.015
5577055	5V0C07002BT	-	-	1/4	1/4	3/4	2 1/2	.030
5577056	5V0C07002CT	-	-	1/4	1/4	3/4	2 1/2	.060
5577057	5V0C07002ST	-	-	1/4	1/4	3/4	2 1/2	-
5577058	5V0C08003AT	-	-	5/16	5/16	3/4	2 1/2	.015
5577059	5V0C08003BT	-	-	5/16	5/16	3/4	2 1/2	.030
5577100	5V0C08003CT	-	-	5/16	5/16	3/4	2 1/2	.060
5577101	5V0C08003ST	-	-	5/16	5/16	3/4	2 1/2	-
5577102	5V0C10004AT	-	-	3/8	3/8	7/8	2 1/2	.015
5577103	5V0C10004BT	-	-	3/8	3/8	7/8	2 1/2	.030
5577104	5V0C10004CT	-	-	3/8	3/8	7/8	2 1/2	.060
5577105	5V0C10004ST	-	-	3/8	3/8	7/8	2 1/2	-
5577106	5V0C13015AT	5577107	5V0C13015AW	1/2	1/2	1 1/4	3	.015
5577108	5V0C13015BT	5577109	5V0C13015BW	1/2	1/2	1 1/4	3	.030
5577110	5V0C13015CT	5577111	5V0C13015CW	1/2	1/2	1 1/4	3	.060
5577112	5V0C13015DT	5577113	5V0C13015DW	1/2	1/2	1 1/4	3	.090
5577114	5V0C13015ET	5577115	5V0C13015EW	1/2	1/2	1 1/4	3	.120

(continued)

(Series 5V0C • VariMill II • Victory Grades — continued)



grade WP15PE  
AITiN



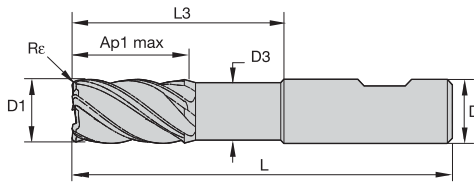
grade WP15PE  
AITiN

● first choice  
○ alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
5577116	5V0C13015ST	5577117	5V0C13015SW	1/2	1/2	1 1/4	3	—
5577118	5V0C16006BT	5577119	5V0C16006BW	5/8	5/8	1 1/4	3 1/2	.030
5577130	5V0C16006CT	5577131	5V0C16006CW	5/8	5/8	1 1/4	3 1/2	.060
5577132	5V0C16006DT	5577133	5V0C16006DW	5/8	5/8	1 1/4	3 1/2	.090
5577134	5V0C16006ST	5577135	5V0C16006SW	5/8	5/8	1 1/4	3 1/2	—
5577136	5V0C19007BT	5577137	5V0C19007BW	3/4	3/4	1 1/2	4	.030
5577138	5V0C19007CT	5577139	5V0C19007CW	3/4	3/4	1 1/2	4	.060
5577160	5V0C19007DT	5577161	5V0C19007DW	3/4	3/4	1 1/2	4	.090
5577162	5V0C19007ET	5577163	5V0C19007EW	3/4	3/4	1 1/2	4	.120
5577164	5V0C19007ST	5577165	5V0C19007SW	3/4	3/4	1 1/2	4	—
5577166	5V0C25008BT	5577167	5V0C25008BW	1	1	1 3/4	4 1/2	.030
5577168	5V0C25008CT	5577169	5V0C25008CW	1	1	1 3/4	4 1/2	.060
5577180	5V0C25008DT	5577181	5V0C25008DW	1	1	1 3/4	4 1/2	.090
5577182	5V0C25008ET	5577183	5V0C25008EW	1	1	1 3/4	4 1/2	.120
5577184	5V0C25008ST	5577185	5V0C25008SW	1	1	1 3/4	4 1/2	—

High-Performance Solid Carbide End Mills

- Unequal flute spacing.
- Center cutting.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Slotting up to 1 x D.
- Standard items listed. Additional styles and coatings made to order.

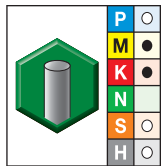


End Mill Tolerances

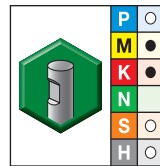
D1	tolerance	D	tolerance h6 + / -
All	+.000/-0.002	≤ 1/8"	0/.00024
		> 1/8-1/4"	0/.00031
		> 1/4-3/8"	0/.00035
		> 3/8-23/32"	0/.00043
		> 23/32-1 3/16"	0/.00051



■ Series 5VNC • VariMill II • With Neck • Victory Grades



grade WP15PE  
AITiN



grade WP15PE  
AITiN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Re
5594727	5VNC07012AT	—	—	1/4	1/4	.24	1/2	1.250	4	.015
5594728	5VNC10014AT	—	—	3/8	3/8	.35	7/8	1.875	4	.015
5594729	5VNC13005BT	5594850	5VNC13005BW	1/2	1/2	.47	1 1/4	2.250	4	.030
5594851	5VNC16006BT	5594852	5VNC16006BW	5/8	5/8	.59	1 1/4	2.250	4	.030
5594853	5VNC19017BT	5594854	5VNC19017BW	3/4	3/4	.71	1 1/2	3.250	5.5	.030
5594855	5VNC25018BT	5594856	5VNC25018BW	1	1	.94	1 3/4	3.250	5.5	.030

■ Series 5V0C • VariMill II • Victory Grades



Material Group																
	Side Milling (A) and Slotting (B)			WP15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.									
	A		B	Cutting Speed – vc SFM			D1 – Diameter									
	ap	ae	ap				frac.	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	dec.	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000	
<b>P</b>	0	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	1	1.5 x D	0.5 x D	1 x D	490	–	660	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	2	1.5 x D	0.5 x D	1 x D	460	–	620	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	3	1.5 x D	0.5 x D	1 x D	390	–	520	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	1.5 x D	0.5 x D	0.75 x D	300	–	490	IPT	.0010	.0014	.0018	.0020	.0026	.0030	.0034	.0039
<b>M</b>	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
<b>K</b>	1	1.5 x D	0.5 x D	1 x D	390	–	490	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	3	1.5 x D	0.5 x D	1 x D	360	–	430	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
<b>S</b>	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	3	1.5 x D	0.3 x D	0.3 x D	200	–	260	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	.0008	.0011	.0014	.0017	.0021	.0025	.0028	.0033
<b>H</b>	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0010	.0014	.0018	.0020	.0026	.0030	.0034	.0039
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	IPT	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

■ Series 5VNC • VariMill II • With Neck • Victory Grades



		Side Milling (A) and Slotting (B)			WP15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.								
Material Group	A		B	Cutting Speed – vc SFM			frac.	D1 – Diameter								
	ap	ae	ap	min		max		dec.	1/4	5/16	3/8	1/2	5/8	3/4	1	
P	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0012	.0016	.0018	.0023	.0027	.0031	.0036	
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0010	.0013	.0015	.0019	.0022	.0025	.0028	
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	.0015	.0020	.0023	.0029	.0034	.0039	.0045	
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0012	.0016	.0018	.0023	.0027	.0031	.0036	
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	.0010	.0013	.0015	.0019	.0022	.0025	.0028	
K	1	1.5 x D	0.5 x D	1 x D	390	–	490	IPT	.0018	.0023	.0027	.0034	.0040	.0044	.0049	
	2	1.5 x D	0.5 x D	1 x D	360	–	460	IPT	.0015	.0020	.0023	.0029	.0034	.0039	.0045	
	3	1.5 x D	0.5 x D	1 x D	360	–	430	IPT	.0012	.0016	.0018	.0023	.0027	.0031	.0036	
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0015	.0020	.0023	.0029	.0034	.0039	.0045	
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0010	.0012	.0015	.0018	.0021	.0024	
	3	1.5 x D	0.3 x D	0.3 x D	200	–	260	IPT	.0012	.0016	.0018	.0023	.0027	.0031	.0036	
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	.0011	.0014	.0017	.0021	.0025	.0028	.0033	
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0014	.0018	.0020	.0026	.0030	.0034	.0039	
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	IPT	.0010	.0013	.0015	.0019	.0022	.0025	.0028	

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

# HydroForce™ HT Chuck



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

HydroForce™ HT Chuck High Torque for High Metal Removal Rates (MRR) and Superior Surface Finish

- HydroForce gives you an unmatched combination of accuracy and clamping forces.
- Compact and stable design.
- Advanced hydraulic clamping with lowest runout and superior vibration dampening.
- Balanced quality to lower vibration, especially at high speeds.
- Focused and flexible product offering.

To learn more about our innovations, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA** 

High-Performance Solid Carbide End Mills •

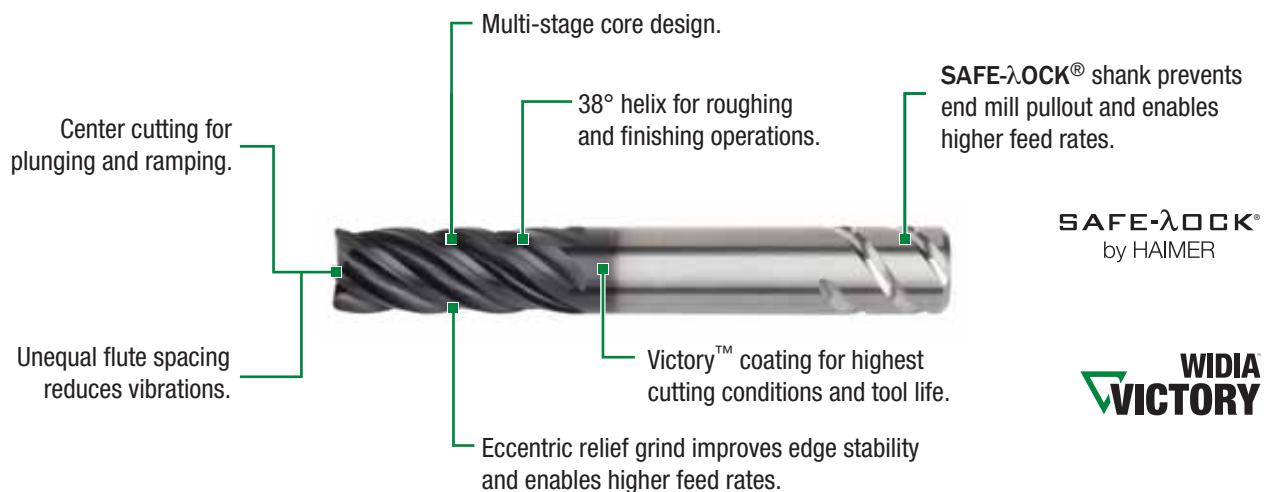
## VariMill II™ ER

# VariMill II ER



Engineered with Eccentric Relief (ER) grind at the cutting edges for greater edge strength, enabling higher metal removal rates and increased productivity. The new VariMill II ER is the first WIDIA™ off-the-shelf end mill available with **SAFE-λOCK®** by HAIMER, providing excellent stability, eliminating end mill pullout, and increasing concentric tool clamping. Though primarily designed for roughing and finishing applications in the aerospace industry, VariMill II ER can be used as a solution for any titanium or stainless steel application and is capable of slotting, ramping, and plunging.

- High-performance tools for titanium and stainless steel workpiece materials.
- Roughing and finishing with one tool, lowering tool costs.
- Various radius and necked versions available.
- Standard offering with **SAFE-λOCK®** by HAIMER.





**VariMill II™ ER Series**

- Unique geometry providing increased tool life and higher metal removal rates in difficult-to-machine workpiece materials.
- Increased output due to fewer tool changes and higher metal removal rates.
- Roughing and finishing with one tool, lowering tool costs.
- 1 x D slotting capability requires less passes, increasing productivity.

**5V0E Series**

- Eccentric relief for edge stability and strength.
- Extensive radii corner offering.



**5VNE Series**

- Eccentric relief for edge stability and strength.
- Extensive radii corner offering.
- Neck design for depths requiring additional passes.



**Application Example**

Side milling of INCONEL® 718 component.

Workpiece material: INCONEL 718

Tool: D = 5/8"

Cutting data: ap = 1.08"

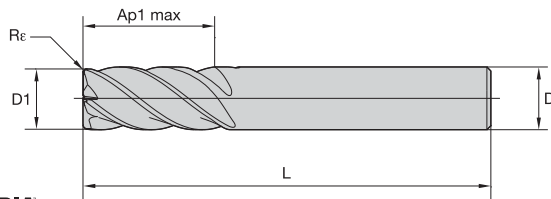
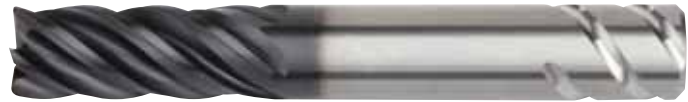
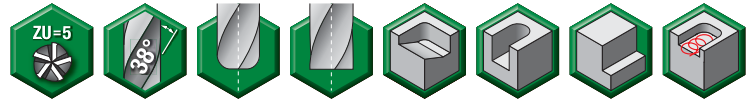
ae = .05"

vc = 65 SFM

fz = .0019 in/z

Result: Increased tool life from 2 years to 5.

- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium and stainless steel.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.

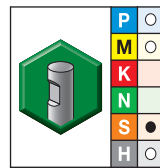
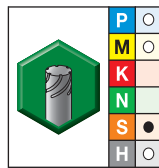
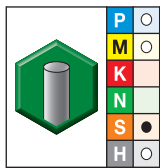


End Mill Tolerances

D1	tolerance	D	tolerance h6 +/-
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8-1/4"	0/0.00031
		> 1/4-3/8"	0/0.00035
		> 3/8-23/32"	0/0.00043
		> 23/32-1 3/16"	0/0.00051



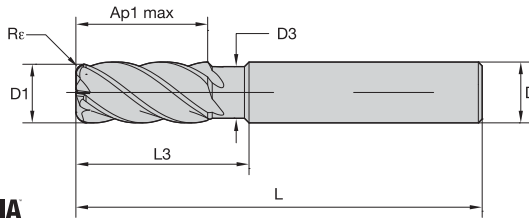
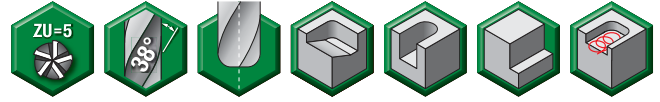
■ Series 5V0E • VariMill II ER • Victory Grades



- first choice
- alternate choice

grade WS15PE AITiN		grade WS15PE AITiN		grade WS15PE AITiN		D1	D	length of cut Ap1 max	length L	Rε
order #	catalog #	order #	catalog #	order #	catalog #					
5594857	5V0E10004AT	-	-	-	-	3/8	3/8	7/8	2 1/2	.015
5594858	5V0E10004BT	-	-	-	-	3/8	3/8	7/8	2 1/2	.030
5594859	5V0E10004ST	-	-	-	-	3/8	3/8	7/8	2 1/2	-
-	5594860	5V0E13015AV	5594861	5V0E13015AW	1/2	1/2	1 1/4	3	.015	
-	5594862	5V0E13015BV	5594863	5V0E13015BW	1/2	1/2	1 1/4	3	.030	
-	5594864	5V0E13015CV	5594865	5V0E13015CW	1/2	1/2	1 1/4	3	.060	
-	5594866	5V0E13015DV	5594867	5V0E13015DW	1/2	1/2	1 1/4	3	.090	
-	5594868	5V0E13015EV	5594869	5V0E13015EW	1/2	1/2	1 1/4	3	.120	
-	5594870	5V0E13015SV	5594871	5V0E13015SW	1/2	1/2	1 1/4	3	-	
-	5594872	5V0E16006BV	5594873	5V0E16006BW	5/8	5/8	1 1/4	3 1/2	.030	
-	5594874	5V0E16006CV	5594875	5V0E16006CW	5/8	5/8	1 1/4	3 1/2	.060	
-	5594876	5V0E16006SV	5594877	5V0E16006SW	5/8	5/8	1 1/4	3 1/2	-	
-	5594878	5V0E19007BV	5594879	5V0E19007BW	3/4	3/4	1 1/2	4	.030	
-	5594880	5V0E19007CV	5594881	5V0E19007CW	3/4	3/4	1 1/2	4	.060	
-	5594882	5V0E19007DV	5594883	5V0E19007DW	3/4	3/4	1 1/2	4	.090	
-	5594884	5V0E19007EV	5594885	5V0E19007EW	3/4	3/4	1 1/2	4	.120	
-	5594886	5V0E19007SV	5594887	5V0E19007SW	3/4	3/4	1 1/2	4	-	
-	5594888	5V0E25008BV	5594889	5V0E25008BW	1	1	1 3/4	4 1/2	.030	
-	5594890	5V0E25008CV	5594891	5V0E25008CW	1	1	1 3/4	4 1/2	.060	
-	5594892	5V0E25008EV	5594893	5V0E25008EW	1	1	1 3/4	4 1/2	.120	
-	5594894	5V0E25008FV	5594895	5V0E25008FW	1	1	1 3/4	4 1/2	.250	
-	5594896	5V0E25008SV	5594897	5V0E25008SW	1	1	1 3/4	4 1/2	-	

- Unequal flute spacing.
- Center cutting.
- Optimized geometry for titanium and stainless steel.
- Single tool for both roughing and finishing operations requiring fewer setups.
- Standard items listed. Additional styles and coatings made to order.

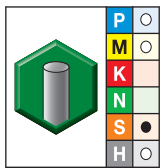


End Mill Tolerances

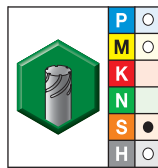
D1	tolerance	D	tolerance h6 +/-
All	+.000/-.002	≤ 1/8"	0/.00024
		> 1/8-1/4"	0/.00031
		> 1/4-3/8"	0/.00035
		> 3/8-23/32"	0/.00043
		> 23/32-1 3/16"	0/.00051



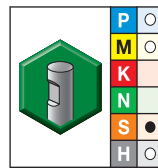
■ Series 5VNE • VariMill II ER • With Neck • Victory Grades



grade WS15PE  
AITiN



grade WS15PE  
AITiN



grade WS15PE  
AITiN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Re
5594898	5VNE10014AT	—	—	—	—	3/8	3/8	.35	7/8	1.875	4	.015
—	—	5594899	5VNE13005BV	5594900	5VNE13005BW	1/2	1/2	.47	1 1/4	2.250	4	.030
—	—	5594901	5VNE16006BV	5594902	5VNE16006BW	5/8	5/8	.59	1 1/4	2.250	4	.030
—	—	5594903	5VNE19017BV	5594904	5VNE19017BW	3/4	3/4	.71	1 1/2	3.250	5.5	.030
—	—	5594905	5VNE25018BV	5594906	5VNE25018BW	1	1	.94	1 3/4	3.250	5.5	.030

■ Series 5V0E • VariMill II ER • Victory Grades





Material Group								Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.					
	Side Milling (A) and Slotting (B)				WS15PE			D1 – Diameter					
	A		B		Cutting Speed – vc SFM			frac.	3/8	1/2	5/8	3/4	1
	ap	ae	ap		min		max	dec.	.3750	.5000	.6250	.7500	1.0000
P	5	1.5 x D	0.5 x D	1 x D	200	–	330	IPT	.0018	.0023	.0027	.0031	.0036
	6	1.5 x D	0.5 x D	0.75 x D	160	–	250	IPT	.0015	.0019	.0022	.0025	.0028
M	1	1.5 x D	0.5 x D	1 x D	300	–	380	IPT	.0023	.0029	.0034	.0039	.0045
	2	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0018	.0023	.0027	.0031	.0036
	3	1.5 x D	0.5 x D	1 x D	200	–	230	IPT	.0015	.0019	.0022	.0025	.0028
S	1	1.5 x D	0.3 x D	0.3 x D	160	–	300	IPT	.0023	.0029	.0034	.0039	.0045
	2	1.5 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0012	.0015	.0018	.0021	.0024
	3	1.5 x D	0.5 x D	1 x D	200	–	260	IPT	.0018	.0023	.0027	.0031	.0036
	4	1.5 x D	0.5 x D	1 x D	160	–	200	IPT	.0017	.0021	.0025	.0028	.0033
H	1	1.5 x D	0.5 x D	0.75 x D	260	–	460	IPT	.0020	.0026	.0030	.0034	.0039
	2	1.5 x D	0.2 x D	0.5 x D	230	–	390	IPT	.0015	.0019	.0022	.0025	.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

■ Series 5VNE • VariMill II ER • With Neck • Victory Grades



Material Group	 							Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.					
	Side Milling (A) and Slotting (B)			WS15PE			D1 – Diameter						
	A		B	Cutting Speed – vc SFM			frac.	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	dec.	.3750	.5000	.6250	.7500	1.0000	
P	5	1.5 x D	0.5 X D	1 x D	200	–	330	IPT	.0018	.0023	.0027	.0031	.0036
	6	1.5 x D	0.5 X D	0.75 x D	160	–	250	IPT	.0015	.0019	.0022	.0025	.0028
M	1	1.5 x D	0.5 X D	1 x D	300	–	380	IPT	.0023	.0029	.0034	.0039	.0045
	2	1.5 x D	0.5 X D	1 x D	200	–	260	IPT	.0018	.0023	.0027	.0031	.0036
	3	1.5 x D	0.5 X D	1 x D	200	–	230	IPT	.0015	.0019	.0022	.0025	.0028
S	1	1.5 x D	0.3 X D	0.3 X D	160	–	300	IPT	.0023	.0029	.0034	.0039	.0045
	2	1.5 x D	0.3 X D	0.3 X D	80	–	130	IPT	.0012	.0015	.0018	.0021	.0024
	3	1.5 x D	0.3 X D	0.3 X D	200	–	260	IPT	.0018	.0023	.0027	.0031	.0036
	4	1.5 x D	0.5 X D	1 x D	160	–	200	IPT	.0017	.0021	.0025	.0028	.0033
H	1	1.5 x D	0.5 X D	0.75 x D	260	–	460	IPT	.0020	.0026	.0030	.0034	.0039
	2	1.5 x D	0.2 X D	0.5 x D	230	–	390	IPT	.0015	.0019	.0022	.0025	.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

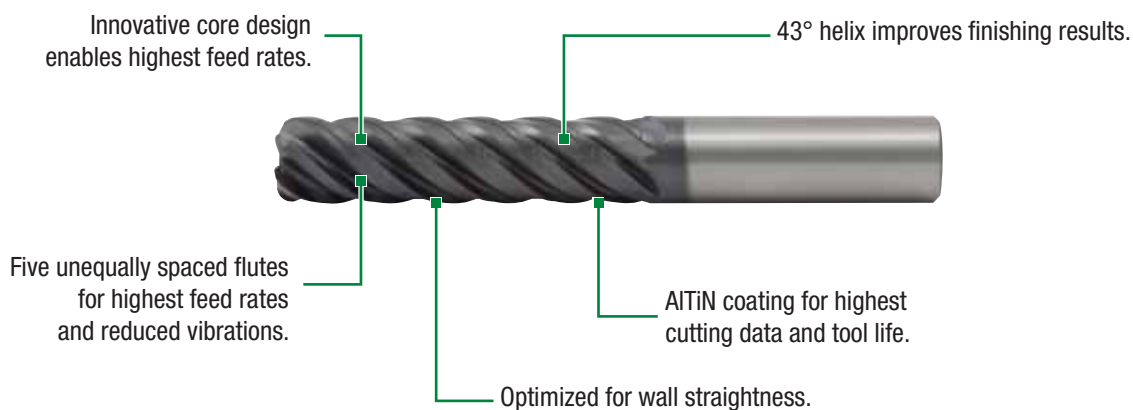
High-Performance Solid Carbide End Mills •  
**VariMill II™ Long**

# VariMill II Long



Designed to achieve highest surface quality and tool life in titanium, stainless steels, and steels. Innovative core and tool geometry design enable chatter-free corner machining in one pass. VariMill II Long covers 4 x D lengths-of-cut for semi-finishing and fine finishing operations with radii and sharp corner versions from stock.

- Tailored 43° helix improves surface finish.
- Less passes in side milling with 4 x D length-of-cut capability.
- One tool for semi-finishing and fine finishing operations.
- No need for feed rate reduction when machining corners.

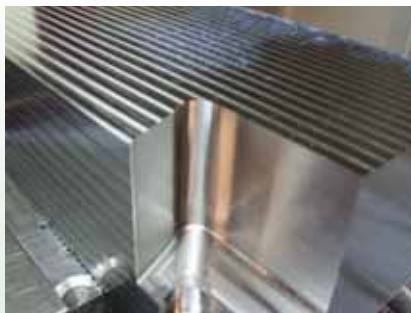
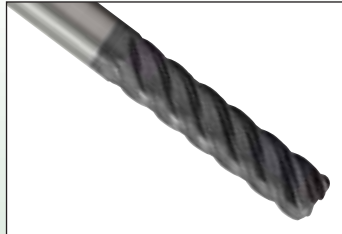


### VariMill II™ Long Series

- Achieve excellent surface finish and outstanding wall straightness.
- Benefit from high accuracy even with thin wall machining.
- Simplify your programming of cavities by keeping the feed rate and radial engagement constant.

### 5W1S Series

- Highest surface quality and tool life in:
  - Titanium
  - Stainless steels
- Corner radii and sharp edges.
- 4 x D length of cut.



### Application Example

Side milling 60° angled corner with constant feed rate.

Workpiece material: Titanium 6Al-4V

Tool: D = 5/8"

Cutting data: ap = 2.5"

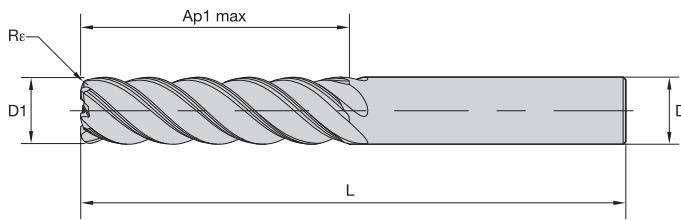
ae = .02"

vc = 328 SFM

fz = .0023 IPT

Result: Surface finish 16 RMS

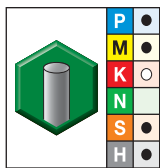
- Unequal flute spacing.
- Non-center cutting.
- For finishing and semi-finishing applications.
- Standard items listed. Additional styles and coatings made to order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002"	≤1/8"	+0/-0.00024"
		>1/8-1/4"	+0/-0.00031"
		>1/4-3/8"	+0/-0.00035"
		>3/8-23/32"	+0/-0.00043"
		>23/32-1-3/16"	0/0.00051"

### Series 5W1S • VariMill II Long • 4 x D Length of Cut



grade AlTiN-MT  
AlTiN

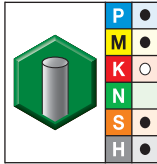
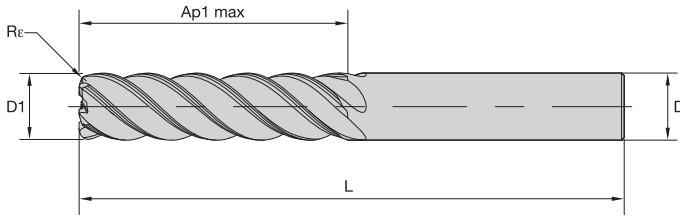
- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
5095168	TM5W1S07002A	1/4	1/4	1	3	.015
5095169	TM5W1S07002B	1/4	1/4	1	3	.030
5095167	TM5W1S07002S	1/4	1/4	1	3	—
5095341	TM5W1S08003A	5/16	5/16	1 1/4	3	.015
5095342	TM5W1S08003B	5/16	5/16	1 1/4	3	.030
5095340	TM5W1S08003S	5/16	5/16	1 1/4	3	—
5095345	TM5W1S10004A	3/8	3/8	1 1/2	4	.015
5095346	TM5W1S10004B	3/8	3/8	1 1/2	4	.030
5095347	TM5W1S10004C	3/8	3/8	1 1/2	4	.060
5095343	TM5W1S10004S	3/8	3/8	1 1/2	4	—
5095420	TM5W1S13005A	1/2	1/2	2	5	.015
5095421	TM5W1S13005B	1/2	1/2	2	5	.030
5095422	TM5W1S13005C	1/2	1/2	2	5	.060
5095348	TM5W1S13005S	1/2	1/2	2	5	—
5095425	TM5W1S16006A	5/8	5/8	2 1/2	5 1/4	.015
5095426	TM5W1S16006B	5/8	5/8	2 1/2	5 1/4	.030
5095427	TM5W1S16006C	5/8	5/8	2 1/2	5 1/4	.060
5095533	TM5W1S16006D	5/8	5/8	2 1/2	5 1/4	.090
5095428	TM5W1S16006E	5/8	5/8	2 1/2	5 1/4	.120
5095423	TM5W1S16006S	5/8	5/8	2 1/2	5 1/4	—

(continued)



(Series 5W1S • VariMill II Long • 4 x D Length of Cut — continued)



● first choice  
○ alternate choice

grade AlTiN-MT  
AlTiN

order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
5095471	TM5W6S19007A	3/4	3/4	3	6	.015
5095472	TM5W1S19007B	3/4	3/4	3	6	.030
5095473	TM5W1S19007C	3/4	3/4	3	6	.060
5095534	TM5W1S19007D	3/4	3/4	3	6	.090
5095474	TM5W1S19007E	3/4	3/4	3	6	.120
5095429	TM5W1S19007S	3/4	3/4	3	6	—
5095477	TM5W1S25008A	1	1	4	7	.015
5095530	TM5W1S25008B	1	1	4	7	.030
5095531	TM5W1S25008C	1	1	4	7	.060
5095535	TM5W1S25008D	1	1	4	7	.090
5095532	TM5W1S25008E	1	1	4	7	.120
5095475	TM5W1S25008S	1	1	4	7	—

High-Performance Solid Carbide End Mills

■ Series 5W1S • VariMill II Long

Material Group													
	Side Milling (A)		AlTiN-MT		Recommended feed per tooth (IPT = inch/th) for side milling (A).								
	A		Cutting Speed – vc SFM		frac.	D1 – Diameter							
	ap	ae	min	max		dec.	1/4	5/16	3/8	1/2	5/8	3/4	1
P	1	Ap1 max	0.05 x D*	990	1320	IPT	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	2	Ap1 max	0.05 x D*	924	1254	IPT	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	3	Ap1 max	0.05 x D*	792	1056	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	4	Ap1 max	0.05 x D*	594	990	IPT	.0014	.0018	.0020	.0026	.0030	.0033	.0039
	5	Ap1 max	0.05 x D*	396	660	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	6	Ap1 max	0.05 x D*	330	495	IPT	.0010	.0013	.0015	.0019	.0022	.0024	.0028
M	1	Ap1 max	0.05 x D*	594	759	IPT	.0015	.0020	.0023	.0029	.0034	.0038	.0046
	2	Ap1 max	0.05 x D*	396	528	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	3	Ap1 max	0.05 x D*	396	462	IPT	.0010	.0013	.0015	.0019	.0022	.0024	.0028
K	1	Ap1 max	0.05 x D*	792	990	IPT	.0018	.0023	.0027	.0035	.0039	.0043	.0050
	2	Ap1 max	0.05 x D*	726	858	IPT	.0015	.0020	.0028	.0029	.0034	.0038	.0046
	3	Ap1 max	0.05 x D*	660	858	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
S	1	Ap1 max	0.05 x D*	330	594	IPT	.0015	.0020	.0028	.0029	.0034	.0038	.0046
	2	Ap1 max	0.05 x D*	165	264	IPT	.0008	.0010	.0012	.0016	.0018	.0020	.0025
	3	Ap1 max	0.05 x D*	396	528	IPT	.0012	.0016	.0018	.0023	.0027	.0030	.0036
	4	Ap1 max	0.05 x D*	330	396	IPT	.0011	.0014	.0017	.0022	.0025	.0028	.0033
H	1	Ap1 max	0.05 x D*	462	528	IPT	.0014	.0018	.0020	.0026	.0030	.0033	.0039

\*For the above cutting data, do not exceed an overall ae of .032".

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.

Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

# X-Feed™ End Mills for High- Feed Milling



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

**Specifically engineered to machine hardened steel up to 67 HRC at extreme speeds and feeds**

- Unique tool with new 6-flute style for high productivity.
- Necked shanks provide extended reach in deep cavities.
- High feed rates, up to 0.24" per tooth on a 3/4" tool.
- Machine hardened materials at 2–3x the metal removal rate of competitive end mills.
- Wide range of cutting diameters: down to 1/4" for small and medium pocket work.
- Innovative new geometry maximizes metal removal rates.
- High metal removal rates and lower manufacturing costs.

To learn more about our innovations, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA** 

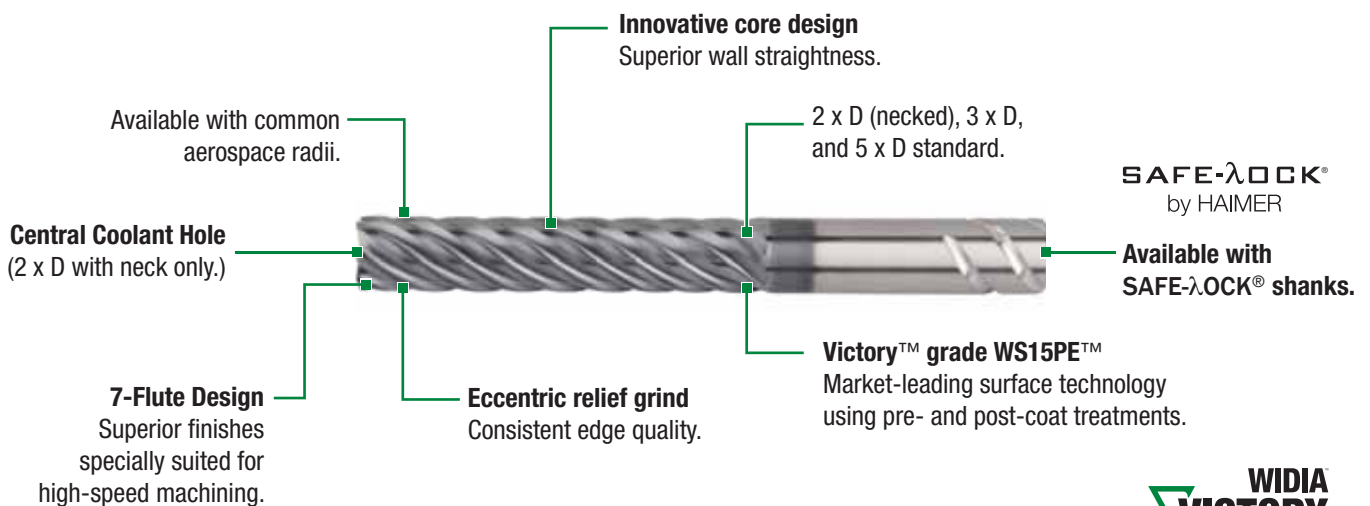
High-Performance Solid Carbide End Mills •  
**VariMill III™ ER**

# VariMill III ER



The trend towards more efficiency and increased productivity using high-speed machining techniques such as trochoidal and peel milling will continue to be a focus for aerospace components. The new VariMill III ER is designed to provide the highest Metal Removal Rates (MRR) and extended tool life in the most demanding materials in the aerospace industry. VariMill III ER is designed to be applied in titanium and stainless steel workpiece materials for both semi-finishing and finishing applications.

- 7-flute eccentric relief design provides edge strength along with high productivity.
- Superior surface finishes and wall straightness capability from specialized core.
- Finishing and semi-finishing at up to 30% of the diameter with one tool.
- Central coolant hole on necked 2 x D length-of-cut tools designed for pocketing applications.
- First choice for high-speed machining in difficult-to-cut workpiece materials.



**WIDIA**  
**VICTORY**

### VariMill III™ ER Series

- Seven unequally spaced flutes provide the maximum output and surface quality.
- Eccentric relief for edge strength and stability.
- Semi-finishing and finishing with one tool.
- Victory™ grade WS15PE™ for increased heat and wear resistance.

#### 7VNX Series

- Titanium and stainless steel geometry design.
- Corner radii.
- 2 x D length of cut.
- Necked 5 x D reach.
- Central coolant hole.
- SAFE-λ.OCK®.



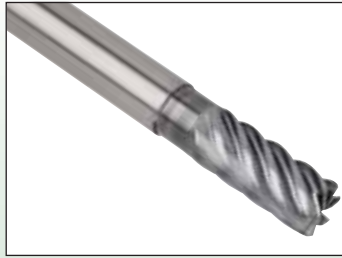
#### 7V2E Series

- Titanium and stainless steel geometry design.
- Corner radii.
- 5 x D length of cut.
- Center cutting.
- SAFE-λ.OCK®.

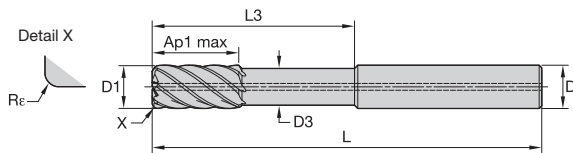
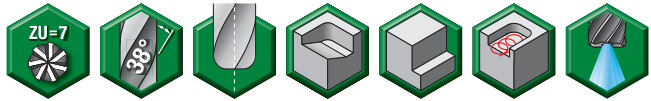


#### 7V1E Series

- Titanium and stainless steel geometry design.
- Corner radii.
- 3 x D length of cut.
- Center cutting.
- SAFE-λ.OCK®.



- Unequal flute spacing.
- Non-center cutting.
- Ramping angle 3°.
- Coolant through the tool.
- Optimized for difficult-to-machine workpiece materials.
- Semi-finishing to finishing applications.
- Standard items listed. Additional styles and coatings made to order.

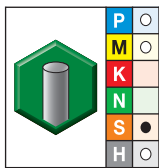


End Mill Tolerances

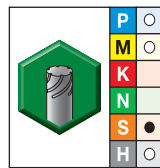
D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.0024
		> 1/8-1/4"	0/0.0031
		> 1/4-3/8"	0/0.0035
		> 3/8-23/32"	0/0.0043
		> 23/32-1 3/16"	0/0.0051



■ Series 7VNX • VariMill III ER • With Neck • Coolant Hole • Victory Grades



grade WS15PE  
AITiN

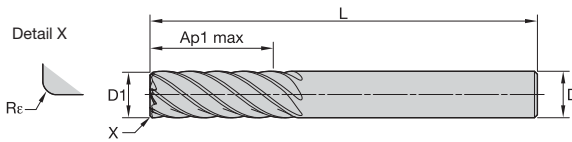
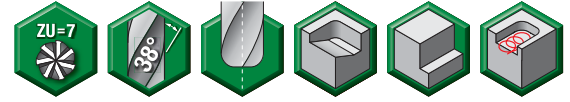


grade WS15PE  
AITiN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
5971348	7VNX10004AT	—	—	3/8	3/8	.35	3/4	2.125	4	.015
5971349	7VNX10004BT	—	—	3/8	3/8	.35	3/4	2.125	4	.030
5971424	7VNX13005BT	—	—	1/2	1/2	.47	1	2.375	4 1/2	.030
5971425	7VNX13005CT	—	—	1/2	1/2	.47	1	2.375	4 1/2	.060
5971426	7VNX13005ET	—	—	1/2	1/2	.47	1	2.375	4 1/2	.120
5971433	7VNX16006BT	—	—	5/8	5/8	.59	1 1/4	2.750	5	.030
5971434	7VNX16006CT	—	—	5/8	5/8	.59	1 1/4	2.750	5	.060
5971439	7VNX19007BT	5971442	7VNX19007BV	3/4	3/4	.71	1 1/2	3.125	5 1/2	.030
5971440	7VNX19007CT	5971443	7VNX19007CV	3/4	3/4	.71	1 1/2	3.125	5 1/2	.060
5971441	7VNX19007ET	5971444	7VNX19007EV	3/4	3/4	.71	1 1/2	3.125	5 1/2	.120
5971454	7VNX25008CT	5971455	7VNX25008CV	1	1	.94	2	3.375	6	.060

- Unequal flute spacing.
- Center cutting.
- Ramping angle 3°.
- Optimized for difficult-to-machine workpiece materials.
- Semi-finishing to finishing applications.
- High-speed machining capability.
- Standard items listed. Additional styles and coatings made to order.

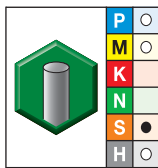


End Mill Tolerances

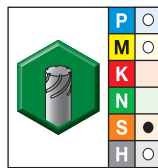
D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8-1/4"	0/0.00031
		> 1/4-3/8"	0/0.00035
		> 3/8-23/32"	0/0.00043
		> 23/32-1 3/16"	0/0.00051



■ Series 7V1E 7V2E • VariMill III ER • Victory Grades



grade WS15PE  
AITiN



grade WS15PE  
AITiN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε
5971350	7V1E10004AT	—	—	3/8	3/8	1 1/8	3	.015
5971421	7V1E10004BT	—	—	3/8	3/8	1 1/8	3	.030
5971422	7V2E10004AT	—	—	3/8	3/8	1 7/8	4	.015
5971423	7V2E10004BT	—	—	3/8	3/8	1 7/8	4	.030
5971427	7V1E13005BT	—	—	1/2	1/2	1 1/2	3 1/2	.030
5971428	7V1E13005CT	—	—	1/2	1/2	1 1/2	3 1/2	.060
5971429	7V1E13005ET	—	—	1/2	1/2	1 1/2	3 1/2	.120
—	—	5971430	7V2E13005BV	1/2	1/2	2 1/2	4 1/2	.030
—	—	5971431	7V2E13005CV	1/2	1/2	2 1/2	4 1/2	.060
—	—	5971432	7V2E13005EV	1/2	1/2	2 1/2	4 1/2	.120
5971435	7V1E16006BT	—	—	5/8	5/8	1 7/8	4	.030
5971436	7V1E16006CT	—	—	5/8	5/8	1 7/8	4	.060
—	—	5971437	7V2E16006BV	5/8	5/8	3 1/8	5 1/2	.030
—	—	5971438	7V2E16006CV	5/8	5/8	3 1/8	5 1/2	.060
5971445	7V1E19007BT	5971448	7V1E19007BV	3/4	3/4	2 1/4	5	.030
5971446	7V1E19007CT	5971449	7V1E19007CV	3/4	3/4	2 1/4	5	.060
5971447	7V1E19007ET	5971450	7V1E19007EV	3/4	3/4	2 1/4	5	.120
—	—	5971451	7V2E19007BV	3/4	3/4	3 3/4	6	.030
—	—	5971452	7V2E19007CV	3/4	3/4	3 3/4	6	.060
—	—	5971453	7V2E19007EV	3/4	3/4	3 3/4	6	.120
5971456	7V1E25008CT	5971457	7V1E25008CV	1	1	3	5 1/2	.060
—	—	5971458	7V2E25008CV	1	1	5	7 1/2	.060

■ Series 7VNX • VariMill III ER • With Neck • Semi-Finishing • Victory Grades



Material Group		Side Milling (A)		WS15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A).					
		A		Cutting Speed – vc SFM			D1 – Diameter					
		ap	ae	min		max	frac. dec.	3/8	1/2	5/8	3/4	1
P	4	Ap1 max	0.3 x D	300	–	490	IPT	.0020	.0026	.0030	.0034	.0039
	5	Ap1 max	0.3 x D	200	–	330	IPT	.0018	.0023	.0027	.0031	.0036
M	1	Ap1 max	0.3 x D	300	–	380	IPT	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.3 x D	200	–	260	IPT	.0018	.0023	.0027	.0031	.0036
	3	Ap1 max	0.3 x D	200	–	230	IPT	.0015	.0019	.0022	.0025	.0028
S	1	Ap1 max	0.3 x D	160	–	300	IPT	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.3 x D	80	–	130	IPT	.0012	.0015	.0018	.0021	.0024
	3	Ap1 max	0.3 x D	200	–	260	IPT	.0018	.0023	.0027	.0031	.0036
	4	Ap1 max	0.3 x D	160	–	200	IPT	.0017	.0021	.0025	.0028	.0033
H	1	Ap1 max	0.3 x D	260	–	460	IPT	.0020	.0026	.0030	.0034	.0039
	2	Ap1 max	0.3 x D	230	–	390	IPT	.0015	.0019	.0022	.0025	.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series 7VNX • VariMill III ER • With Neck • Finishing • Victory Grades



Material Group		Side Milling (A)		WS15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A).					
		A		Cutting Speed – vc SFM			D1 – Diameter					
		ap	ae	min		max	frac. dec.	3/8	1/2	5/8	3/4	1
P	4	Ap1 max	0.06 x D	590	–	980	IPT	.0025	.0031	.0036	.0040	.0046
	5	Ap1 max	0.06 x D	390	–	660	IPT	.0022	.0028	.0033	.0037	.0043
M	1	Ap1 max	0.06 x D	590	–	750	IPT	.0027	.0035	.0041	.0046	.0054
	2	Ap1 max	0.06 x D	390	–	520	IPT	.0022	.0028	.0033	.0037	.0043
	3	Ap1 max	0.06 x D	390	–	460	IPT	.0018	.0023	.0027	.0030	.0034
S	1	Ap1 max	0.06 x D	330	–	590	IPT	.0027	.0035	.0041	.0046	.0054
	2	Ap1 max	0.06 x D	160	–	260	IPT	.0015	.0018	.0022	.0025	.0029
	3	Ap1 max	0.06 x D	390	–	520	IPT	.0022	.0028	.0033	.0037	.0043
	4	Ap1 max	0.06 x D	330	–	390	IPT	.0020	.0026	.0030	.0034	.0040
H	1	Ap1 max	0.06 x D	520	–	920	IPT	.0025	.0031	.0036	.0040	.0046
	2	Ap1 max	0.06 x D	460	–	790	IPT	.0018	.0023	.0027	.0030	.0034

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills



■ Series 7V1E • VariMill III ER • Semi-Finishing • Victory Grades

Material Group		Side Milling (A)		WS15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A).					
		A		Cutting Speed – vc SFM			frac. dec.	D1 – Diameter				
		ap	ae	min		max		3/8	1/2	5/8	3/4	1
P	4	3 x D	0.2 x D	300	–	490	IPT	.0020	.0026	.0030	.0034	.0039
	5	3 x D	0.2 x D	200	–	330	IPT	.0018	.0023	.0027	.0031	.0036
M	1	3 x D	0.2 x D	300	–	380	IPT	.0023	.0029	.0034	.0039	.0045
	2	3 x D	0.2 x D	200	–	260	IPT	.0018	.0023	.0027	.0031	.0036
	3	3 x D	0.2 x D	200	–	230	IPT	.0015	.0019	.0022	.0025	.0028
S	1	3 x D	0.2 x D	160	–	300	IPT	.0023	.0029	.0034	.0039	.0045
	2	3 x D	0.2 x D	80	–	130	IPT	.0012	.0015	.0018	.0021	.0024
	3	3 x D	0.2 x D	200	–	260	IPT	.0018	.0023	.0027	.0031	.0036
	4	3 x D	0.2 x D	160	–	200	IPT	.0017	.0021	.0025	.0028	.0033
H	1	3 x D	0.2 x D	260	–	460	IPT	.0020	.0026	.0030	.0034	.0039
	2	3 x D	0.2 x D	230	–	390	IPT	.0015	.0019	.0022	.0025	.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series 7V1E • VariMill III ER • Finishing • Victory Grades

Material Group		Side Milling (A)		WS15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A).					
		A		Cutting Speed – vc SFM			frac. dec.	D1 – Diameter				
		ap	ae	min		max		3/8	1/2	5/8	3/4	1
P	4	3 x D	0.06 x D	590	–	980	IPT	.0025	.0031	.0036	.0040	.0046
	5	3 x D	0.06 x D	390	–	660	IPT	.0022	.0028	.0033	.0037	.0043
M	1	3 x D	0.06 x D	590	–	750	IPT	.0027	.0035	.0041	.0046	.0054
	2	3 x D	0.06 x D	390	–	520	IPT	.0022	.0028	.0033	.0037	.0043
	3	3 x D	0.06 x D	390	–	460	IPT	.0018	.0023	.0027	.0030	.0034
S	1	3 x D	0.06 x D	330	–	590	IPT	.0027	.0035	.0041	.0046	.0054
	2	3 x D	0.06 x D	160	–	260	IPT	.0015	.0018	.0022	.0025	.0029
	3	3 x D	0.06 x D	390	–	520	IPT	.0022	.0028	.0033	.0037	.0043
	4	3 x D	0.06 x D	330	–	390	IPT	.0020	.0026	.0030	.0034	.0040
H	1	3 x D	0.06 x D	520	–	920	IPT	.0025	.0031	.0036	.0040	.0046
	2	3 x D	0.06 x D	460	–	790	IPT	.0018	.0023	.0027	.0030	.0034

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series 7V2E • VariMill III ER • Finishing • Victory Grades



Material Group		Side Milling (A)		WS15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A).					
		A		Cutting Speed – vc SFM			frac.	D1 – Diameter				
		ap	ae	min		max		dec.	3/8	1/2	5/8	3/4
P	0	5 x D	0.05 x D	980	–	1310	IPT	.0033	.0041	.0047	.0053	.0059
	1	5 x D	0.05 x D	980	–	1310	IPT	.0033	.0041	.0047	.0053	.0059
	2	5 x D	0.05 x D	920	–	1250	IPT	.0033	.0041	.0047	.0053	.0059
	3	5 x D	0.05 x D	790	–	1050	IPT	.0027	.0035	.0041	.0046	.0054
	4	5 x D	0.05 x D	590	–	980	IPT	.0025	.0031	.0036	.0040	.0046
	5	5 x D	0.05 x D	390	–	660	IPT	.0022	.0028	.0033	.0037	.0043
M	6	5 x D	0.05 x D	330	–	490	IPT	.0018	.0023	.0027	.0030	.0034
	1	5 x D	0.05 x D	590	–	750	IPT	.0027	.0035	.0041	.0046	.0054
	2	5 x D	0.05 x D	390	–	520	IPT	.0022	.0028	.0033	.0037	.0043
K	3	5 x D	0.05 x D	390	–	460	IPT	.0018	.0023	.0027	.0030	.0034
	1	5 x D	0.05 x D	790	–	980	IPT	.0033	.0041	.0047	.0053	.0059
	2	5 x D	0.05 x D	720	–	920	IPT	.0027	.0035	.0041	.0046	.0054
S	3	5 x D	0.05 x D	720	–	850	IPT	.0022	.0028	.0033	.0037	.0043
	1	5 x D	0.05 x D	330	–	590	IPT	.0027	.0035	.0041	.0046	.0054
	2	5 x D	0.05 x D	160	–	260	IPT	.0015	.0018	.0022	.0025	.0029
	3	5 x D	0.05 x D	390	–	520	IPT	.0022	.0028	.0033	.0037	.0043
H	4	5 x D	0.05 x D	330	–	390	IPT	.0020	.0026	.0030	.0034	.0040
	1	5 x D	0.05 x D	520	–	920	IPT	.0025	.0031	.0036	.0040	.0046
	2	5 x D	0.06 x D	460	–	790	IPT	.0018	.0023	.0027	.0030	.0034

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

# Designed to significantly reduce machining time in aluminum!



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## AluSurf™ Carbide End Mills for High Metal Removal Rates and Superior Surface Finishes

- Use only one tool for roughing and finishing operations.
- Slotting is effective up to full, 1 x D axial depth; side milling (profiling) is effective up to 0.5 x D, radial by 1.5 x D axial depth.
- Three-flute series uses unequal flute spacing for chatter-free performance.
- Effective in a full range of machine speeds.
- Multiple corner radii and extended neck configurations are available as standard.

To learn more about our innovations, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA** 

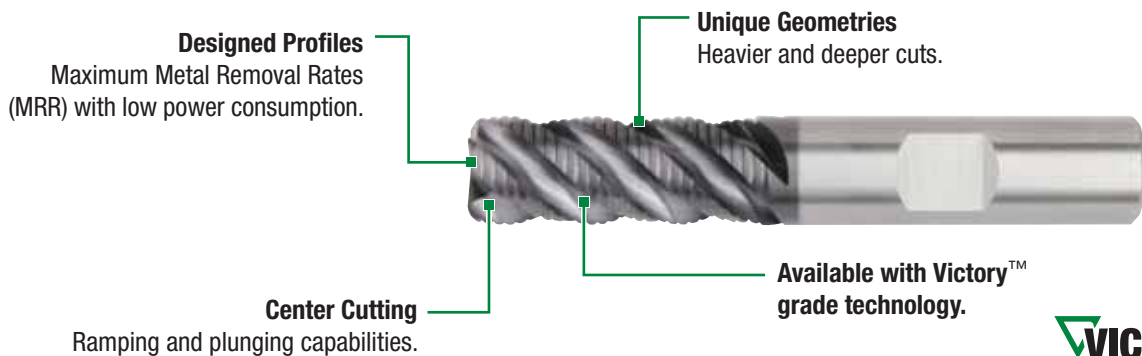
High-Performance Solid Carbide •  
**Roughers**

# HP ROUGHER



Special proprietary carbide substrates and state-of-the-art surface technology, combined with unique geometries, provides end users with the capability to significantly reduce machining time with heavier and deeper cuts, fewer passes, and faster surface speed. WIDIA™ geometries are uniquely formed and fine-tuned to optimize chip form, size, and evacuation generated by a given workpiece material.

- For all ferrous workpiece materials.
- Low power consumption at high speeds with long tool life.
- Provides maximum metal removal rates in both slotting and profiling operations.
- Alternative solution for productivity gains on light machines.



**WIDIA**  
**VICTORY**

## High-Performance Solid Carbide Roughers

- Reduce machine time with heavier, deeper cuts requiring fewer passes.
- Lower power consumption at higher speeds providing productivity even when horsepower may be limited.
- Maximum Metal Removal Rates (MRR) in both slotting and profiling.

### 4Q03 4Q05 Series

- Center cutting.
- Chipbreaker profile.
- All ferrous workpiece materials.



### 4M0R Series

- Center cutting.
- Flat shallow profile.
- Steels, stainless steel, high-temperature alloys.



### 4Q03 Series

- Center cutting.
- Chipbreaker profile.
- Necked for reach.
- Steels, stainless steels, high-temperature alloys, and hardened steels.



### 4S0R Series

- Center cutting.
- Fine profile.
- All ferrous workpiece materials.



## Rougher Profiles

### Finishing End Mill

Straight cutting edge  
Ra = 0,5–0,8  
Rz = 4–6



### Fine-Profile Rougher

Cord profile  
Ra = 12–14  
Rz = 90–110



### Semi-Finishing End Mill

Flat profile  
Ra = 2,5–3,5  
Rz = 20–25



### Coarse Profile Rougher

Roughing profile  
Ra = 2,5–3,5  
Rz = 20–25



### Coarse profile

For slotting, pocketing, and heavy profile cuts in ferrous materials.



### Fine profile

For profile cuts and shallow slots (less than .50) in ferrous materials.



### Extra-Fine profile

For profiling cuts in medium to hard steels.



### Chamfered profile

For machining non-ferrous materials.



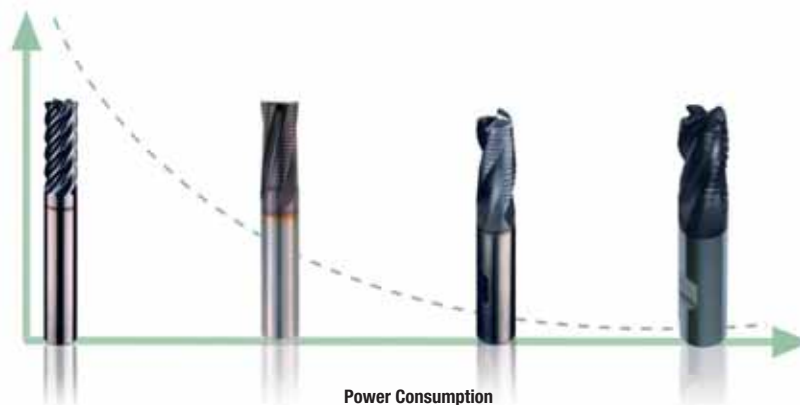
### Flat shallow profile

For machining alloyed steels, stainless steels, high-temp alloys, titanium, and hard materials.

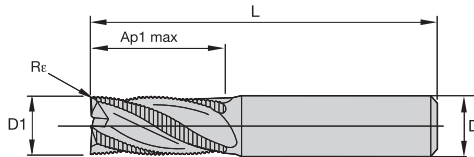
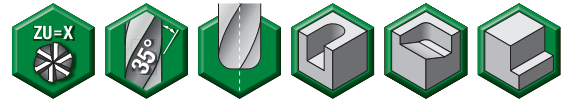


### Chipbreaker profile

For roughing and semi-finishing.



- Center cutting.
- Chipbreaker profile.
- Standard items listed. Additional styles and coatings made-to-order.

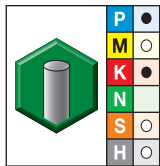


End Mill Tolerances

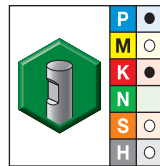
D1	tolerance d11	D	tolerance h6 + / -
< 1/8"	-.0008/- .0031	< 1/8"	0/.00024
1/8–7/32"	-.0012/- .0041	1/8–7/32"	0/.00031
1/4–3/8"	-.0016/- .0051	1/4–3/8"	0/.00035
13/32–11/16"	-.002/- .0063	13/32–11/16"	0/.00043
23/32–1-3/16"	-.0026/- .0077	23/32–1-3/16"	0/.00051



### Series 4Q03 4Q05 4Q43 • Victory Grades



grade WP15PE  
AITiN



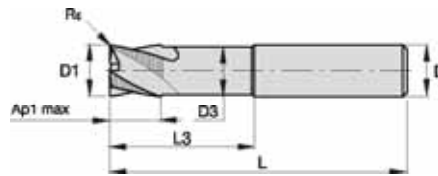
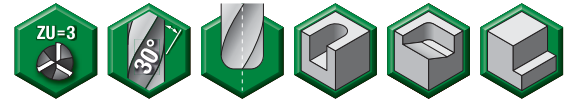
grade WP15PE  
AITiN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re	ZU
-	-	5576744	4Q4305000XW	3/16	3/16	5/16	2	.010	3
5576674	4Q0305000XT	-	-	3/16	3/16	5/8	2	.010	3
-	-	5576745	4Q4307002XW	1/4	1/4	3/8	2	.020	3
-	-	5576675	4Q0307002XW	1/4	1/4	3/4	2 1/2	.020	3
-	-	5576746	4Q4308003XW	5/16	5/16	7/16	2	.020	3
-	-	5576676	4Q0308003XW	5/16	5/16	13/16	2 1/2	.020	3
-	-	5576747	4Q4310014XW	3/8	3/8	1/2	2	.020	3
-	-	5576677	4Q0310014XW	3/8	3/8	1	2 1/2	.020	3
-	-	5576748	4Q4313015BW	1/2	1/2	5/8	2 1/2	.030	3
-	-	5576678	4Q0313015BW	1/2	1/2	1 1/4	3	.030	3
-	-	5576749	4Q4316016BW	5/8	5/8	3/4	3	.030	3
-	-	5576679	4Q0316006BW	5/8	5/8	1 5/8	3 1/2	.030	3
-	-	5576750	4Q4319017BW	3/4	3/4	1	3 1/2	.030	3
-	-	5576740	4Q0319007BW	3/4	3/4	1 5/8	4	.030	3
-	-	5576742	4Q0519007BW	3/4	3/4	1 5/8	4	.030	4
-	-	5576741	4Q0325008BW	1	1	2	4	.030	3
-	-	5576743	4Q0525008BW	1	1	2	4	.030	4

High-Performance Solid Carbide End Mills

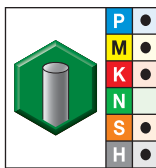
- Center cutting.
- Chipbreaker profile.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance d11	D	tolerance h6 + / -
< 1/8"	-.0008/- .0031	< 1/8"	0/.00024
1/8-7/32"	-.0012/- .0041	1/8-7/32"	0/.00031
1/4-3/8"	-.0016/- .0051	1/4-3/8"	0/.00035
13/32-11/16"	-.002/- .0063	13/32-11/16"	0/.00043
23/32-1-3/16"	-.0026/- .0077	23/32-1 3/16"	0/.00051

■ Series 4QN3

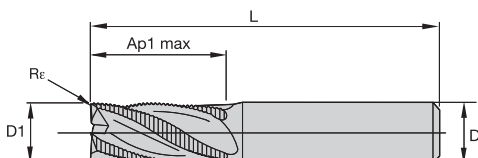


grade TiAlN-LT  
TiAlN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
2837893	TF4QN307012A	1/4	1/4	.24	3/8	2 1/4	4	.020
2837886	TF4QN310014A	3/8	3/8	.35	1/2	2 1/4	4	.020
2837879	TF4QN310024A	3/8	3/8	.35	1/2	3 1/4	5	.020
2837870	TF4QN313005A	1/2	1/2	.47	5/8	2 1/4	5	.030
2837862	TF4QN313015A	1/2	1/2	.47	5/8	3 1/4	6	.030
2837856	TF4QN313025A	1/2	1/2	.47	5/8	4	6	.030
2837849	TF4QN316006A	5/8	5/8	.59	3/4	2 1/4	5	.030
2837845	TF4QN316016A	5/8	5/8	.59	3/4	3 1/4	6	.030
2837833	TF4QN316026A	5/8	5/8	.59	3/4	4 1/4	7	.030
2837826	TF4QN319007A	3/4	3/4	.71	1	2 1/4	5	.030
2837821	TF4QN319017A	3/4	3/4	.71	1	3 1/4	6	.030
2837812	TF4QN319027A	3/4	3/4	.71	1	4 1/4	7	.030

- Center cutting.
- Flat shallow profile.
- Standard items listed. Additional styles and coatings made-to-order.

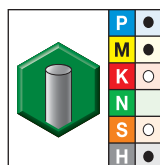


End Mill Tolerances

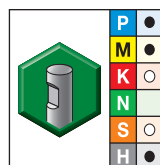
D1	tolerance d11	D	tolerance h6 + / -
< 1/8"	-.0008/- .0031	< 1/8"	0/.00024
1/8–7/32"	-.0012/- .0041	1/8–7/32"	0/.00031
1/4–3/8"	-.0016/- .0051	1/4–3/8"	0/.00035
13/32–11/16"	-.002/- .0063	13/32–11/16"	0/.00043
23/32–1-3/16"	-.0026/- .0077	23/32–1 3/16"	0/.00051



### Series 4M0R 4M4R • Victory Grades



grade WP15PE  
AlTiN



grade WP15PE  
AlTiN

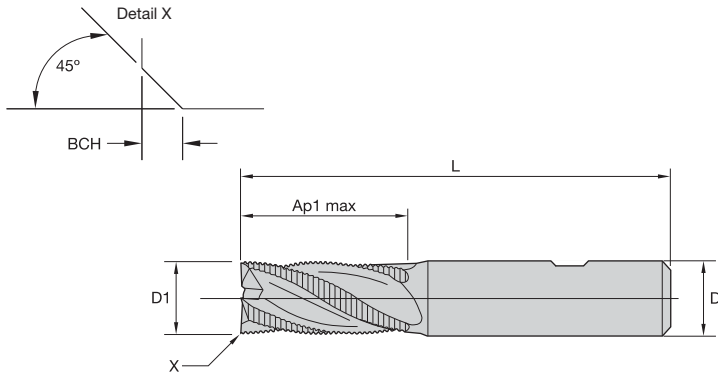
- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re	ZU
5577384	4M4R07002BT	–	–	1/4	1/4	3/8	2	.030	3
5577315	4M0R07002BT	–	–	1/4	1/4	3/4	2 1/2	.030	4
5577385	4M4R10004BT	–	–	3/8	3/8	1/2	2	.030	4
5577316	4M0R10004BT	–	–	3/8	3/8	7/8	2 1/2	.030	4
–	5577386	4M4R13005XW	–	1/2	1/2	5/8	2 1/2	.040	4
–	5577317	4M0R13005XW	–	1/2	1/2	1 1/4	3	.040	4
–	5577387	4M4R16006XW	–	5/8	5/8	3/4	3	.040	4
–	5577318	4M0R16006XW	–	5/8	5/8	1 1/4	3 1/2	.040	4
–	5577319	4M0R16016XW	–	5/8	5/8	1 1/4	3 1/2	.040	6
–	5577388	4M4R19009XW	–	3/4	3/4	7/8	3 1/2	.050	4
–	5577380	4M0R19007XW	–	3/4	3/4	1 1/2	4	.050	4
–	5577381	4M0R19017XW	–	3/4	3/4	1 1/2	4	.050	6
–	5577383	4M0R25018XW	–	1	1	1 1/2	4	.050	6
–	5577382	4M0R25008XW	–	1	1	1 1/2	4	.050	4

High-Performance Solid Carbide End Mills



- Center cutting.
- Fine profile.
- Standard items listed. Additional styles and coatings made-to-order.

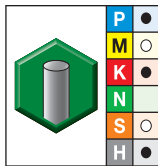


End Mill Tolerances

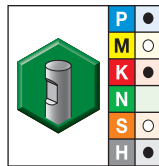
D1	tolerance d11	D	tolerance h6 + / -
< 1/8"	-.0008/- .0031	< 1/8"	0/.00024
1/8-7/32"	-.0012/- .0041	1/8-7/32"	0/.00031
1/4-3/8"	-.0016/- .0051	1/4-3/8"	0/.00035
13/32-11/16"	-.002/- .0063	13/32-11/16"	0/.00043
23/32-1-3/16"	-.0026/- .0077	23/32-1 3/16"	0/.00051



■ Series 4S0R • Victory Grades



grade WP15PE  
AITiN



grade WP15PE  
AITiN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
5577389	4S0R07002NT	-	-	1/4	1/4	3/4	2 1/2	.012	3
-	-	5577390	4S0R10004NW	3/8	3/8	7/8	2 1/2	.020	4
-	-	5577391	4S0R13005NW	1/2	1/2	1	3	.020	4
-	-	5577392	4S0R16006NW	5/8	5/8	1 1/4	3 1/2	.020	4
-	-	5577393	4S0R19007NW	3/4	3/4	1 1/2	4	.020	4
-	-	5577394	4S0R25008NW	1	1	1 1/2	4	.020	5
-	-	5577395	4S0R25018NW	1	1	1 1/2	4	.020	4

Series 4Q03 4Q05 4Q43 • Victory Grades



Material Group																
	Side Milling (A) and Slotting (B)			WP15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.									
	A		B	Cutting Speed – vc SFM			frac.	D1 – Diameter								
	ap	ae	ap	min		max		dec.	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000
P	0	1 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	1	1 x D	0.5 x D	0.75 x D	490	–	660	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	2	1 x D	0.5 x D	0.75 x D	460	–	620	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	3	1 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	1 x D	0.4 x D	0.5 x D	300	–	490	IPT	.0010	.0014	.0018	.0020	.0026	.0030	.0034	.0039
	5	1 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
M	1	1 x D	0.5 x D	0.75 x D	300	–	380	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1 x D	0.4 x D	0.75 x D	200	–	260	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	3	1 x D	0.4 x D	0.75 x D	200	–	230	IPT	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
K	1	1 x D	0.5 x D	0.75 x D	390	–	490	IPT	.0014	.0018	.0023	.0027	.0034	.0040	.0044	.0049
	2	1 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	3	1 x D	0.4 x D	0.75 x D	360	–	430	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
S	1	1 x D	0.3 x D	0.4 x D	160	–	300	IPT	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	1 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	3	1 x D	0.4 x D	0.75 x D	200	–	260	IPT	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	4	1 x D	0.4 x D	0.75 x D	160	–	200	IPT	.0008	.0011	.0014	.0017	.0021	.0025	.0028	.0033
H	1	1 x D	0.2 x D	0.3 x D	260	–	460	IPT	.0010	.0014	.0018	.0020	.0026	.0030	.0034	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

■ Series 4QN3

Material Group								Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.					
	Side Milling (A) and Slotting (B)				TiAlN			D1 – Diameter					
	A		B	Cutting Speed – vc SFM			frac.	1/4	3/8	1/2	5/8	3/4	
	ap	ae	ap	min		max	dec.	.2500	.3750	.5000	.6250	.7500	
P	1	1 x D	0.3 x D	0.5 x D	500	–	650	IPT	.0018	.0027	.0035	.0039	.0043
	2	1 x D	0.3 x D	0.5 x D	450	–	625	IPT	.0018	.0027	.0035	.0039	.0043
	3	1 x D	0.3 x D	0.5 x D	400	–	525	IPT	.0015	.0023	.0029	.0034	.0038
	4	1 x D	0.25 x D	0.25 x D	350	–	475	IPT	.0014	.0020	.0026	.0030	.0033
	5	1 x D	0.3 x D	0.5 x D	200	–	325	IPT	.0012	.0018	.0023	.0027	.0030
	6	1 x D	0.25 x D	0.25 x D	150	–	225	IPT	.0010	.0015	.0019	.0022	.0024
M	1	1 x D	0.3 x D	0.5 x D	250	–	325	IPT	.0015	.0023	.0029	.0034	.0038
	2	1 x D	0.3 x D	0.5 x D	190	–	260	IPT	.0012	.0018	.0023	.0027	.0030
	3	1 x D	0.3 x D	0.5 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0024
K	1	1 x D	0.3 x D	0.5 x D	400	–	525	IPT	.0018	.0027	.0035	.0039	.0043
	2	1 x D	0.3 x D	0.5 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0038
	3	1 x D	0.3 x D	0.5 x D	330	–	430	IPT	.0012	.0018	.0023	.0027	.0030
S	1	1 x D	0.25 x D	0.25 x D	150	–	275	IPT	.0015	.0023	.0029	.0034	.0038
	2	1 x D	0.25 x D	0.25 x D	65	–	125	IPT	.0008	.0012	.0016	.0018	.0020
	3	1 x D	0.3 x D	0.5 x D	160	–	275	IPT	.0012	.0018	.0023	.0027	.0030
	4	1 x D	0.3 x D	0.5 x D	150	–	220	IPT	.0011	.0017	.0022	.0025	.0028
H	1	1 x D	0.25 x D	0.25 x D	300	–	450	IPT	.0014	.0020	.0026	.0030	.0033

NOTE: Side milling applications — For longest reach (L3) tools, reduce ae by 30%.  
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Series 4M0R 4M4R • Victory Grades



Material Group							Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
	Side Milling (A) and Slotting (B)			WP15PE			D1 – Diameter							
	A		B	Cutting Speed – VC SFM			frac.	1/4	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	dec.	.2500	.3750	.5000	.6250	.7500	1.0000	
P	3	1 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	4	1 x D	0.3 x D	0.75 x D	300	–	490	IPT	.0014	.0020	.0026	.0030	.0034	.0039
	5	1 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	6	1 x D	0.3 x D	0.3 x D	160	–	250	IPT	.0010	.0015	.0019	.0022	.0025	.0028
M	1	1 x D	0.5 x D	0.75 x D	300	–	380	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	1 x D	0.5 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	3	1 x D	0.5 x D	0.75 x D	200	–	230	IPT	.0010	.0015	.0019	.0022	.0025	.0028
K	1	1 x D	0.5 x D	1 x D	390	–	490	IPT	.0018	.0027	.0034	.0040	.0044	.0049
	2	1 x D	0.5 x D	1 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	3	1 x D	0.5 x D	1 x D	360	–	430	IPT	.0012	.0018	.0023	.0027	.0031	.0036
S	1	1 x D	0.3 x D	0.75 x D	160	–	300	IPT	.0015	.0023	.0029	.0034	.0039	.0045
	2	1 x D	0.3 x D	0.3 x D	80	–	130	IPT	.0008	.0012	.0015	.0018	.0021	.0024
	3	1 x D	0.4 x D	0.75 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	4	1 x D	0.4 x D	0.75 x D	160	–	200	IPT	.0011	.0017	.0021	.0025	.0028	.0033
H	1	1 x D	0.3 x D	0.3 x D	260	–	460	IPT	.0014	.0020	.0026	.0030	.0034	.0039
	2	1 x D	0.2 x D	0.2 x D	230	–	390	IPT	.0010	.0015	.0019	.0022	.0025	.0028
	3	1 x D	0.2 x D	0.2 x D	200	–	300	IPT	.0008	.0012	.0015	.0018	.0021	.0024

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

■ Series 4SOR • Victory Grades



Material Group														
	Side Milling (A) and Slotting (B)				WP15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.						
	A		B	Cutting Speed — vc SFM			frac.	D1 — Diameter						
	ap	ae	ap	min		max		dec.	1/4	3/8	1/2	5/8	3/4	1
P	0	1 x D	0.5 x D	0.5 x D	490	–	660	IPT	.0015	.0022	.0027	.0032	.0035	.0039
	1	1 x D	0.5 x D	0.5 x D	490	–	660	IPT	.0015	.0022	.0027	.0032	.0035	.0039
	2	1 x D	0.5 x D	0.5 x D	460	–	620	IPT	.0015	.0022	.0027	.0032	.0035	.0039
	3	1 x D	0.4 x D	0.5 x D	390	–	520	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	4	1 x D	0.3 x D	0.4 x D	300	–	490	IPT	.0011	.0016	.0021	.0024	.0027	.0031
M	1	1 x D	0.4 x D	0.5 x D	300	–	380	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	2	1 x D	0.4 x D	0.5 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0025	.0029
	3	1 x D	0.4 x D	0.5 x D	200	–	230	IPT	.0008	.0012	.0015	.0018	.0020	.0023
K	1	1 x D	0.5 x D	0.5 x D	390	–	490	IPT	.0015	.0022	.0027	.0032	.0035	.0039
	2	1 x D	0.4 x D	0.5 x D	360	–	460	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	3	1 x D	0.4 x D	0.5 x D	360	–	430	IPT	.0010	.0015	.0019	.0022	.0025	.0029
S	1	1 x D	0.5 x D	0.3 x D	160	–	300	IPT	.0012	.0018	.0023	.0027	.0031	.0036
	3	1 x D	0.5 x D	0.4 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0025	.0029
H	1	1 x D	0.3 x D	0.3 x D	260	–	460	IPT	.0011	.0016	.0021	.0024	.0027	.0031

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

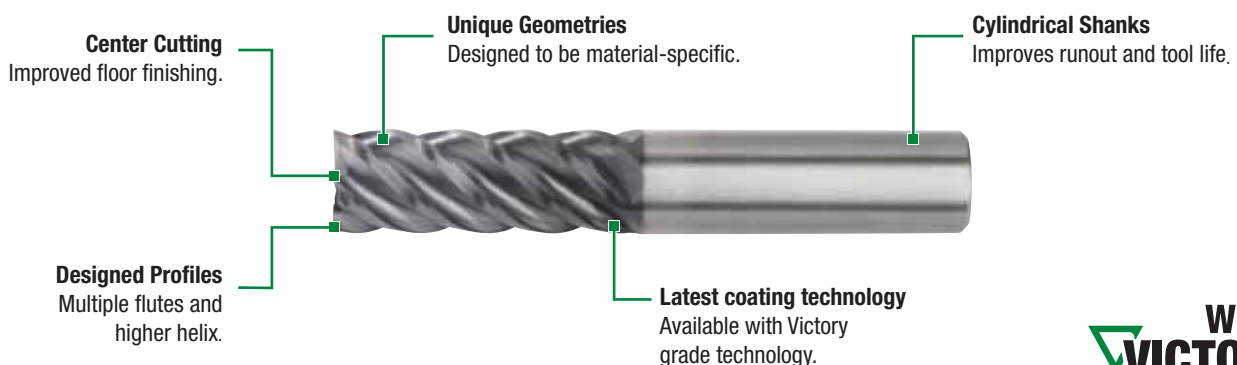
## High-Performance Finishing Solid Carbide End Mills

# HP Finishers



Only the finest carbide substrates with market-leading geometries and state-of-the-art surface technology are used to ensure the highest quality finishing end mills are produced. These tools are fully compliant with NAS specifications. Whether you require higher metal removal rates, improved surface finishes, fewer passes, or longer tool life, WIDIA-Hanita™ high-performance finishing end mills deliver the reliability and consistency you can depend on during your critical finishing operations.

- Specific geometries targeted for steels, stainless steels, high-temperature alloys, and titanium.
- Stub, regular, long, and extra long lengths for all applications.
- Special designs with higher number of flutes and increased helix angles for super finishing applications.
- Latest coating technology, including Victory™ grades.



**WIDIA**  
**VICTORY**

## High-Performance Solid Carbide Finishing

- Specifically designed geometries for finishing in a wide range of materials.
- Higher number of flutes and higher helix angles for super finishing applications.
- High Metal Removal Rates (MRR) requiring fewer passes and longer tool life while providing superior surface finishes.

### 4C03 Series

- Center cutting.
- 3-flute.
- 35° helix.
- Material-specific coatings.



### 4S07 Series

- Center cutting.
- 6-flute.
- High helix.
- Use for super finishing in multiple workpiece materials.



### 4C05 4C15 Series

- Center cutting.
- 5-flute.
- High helix.
- Works in a variety of workpiece materials.
- Light finishing cuts.

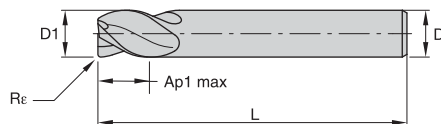


### 4S0F Series

- Center cutting.
- High number of flutes.
- Light finishing cuts in multiple materials.
- Use for super finishing.



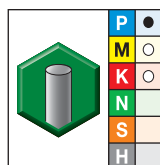
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



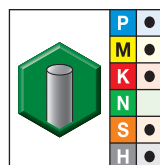
End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/- .002	< 1/8"	0/.00024
		1/8-7/32"	0/.00031
		1/4-3/8"	0/.00035
		13/32-11/16"	0/.00043
		23/32-1 3/16"	0/.00051

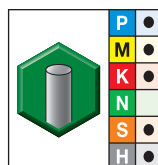
### Series 4C03 4C43



grade UNCOATED



grade TiCN-CT  
TiCN



grade TiAlN-RT  
TiAlN

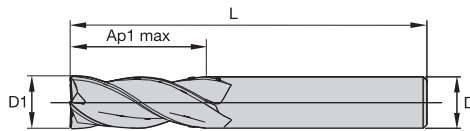
- first choice
- alternate choice

order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
2863974	4C0303001A	2842506	TC4C0303001A	-	-	1/8	1/8	1/2	1 1/2	.010
2863884	4C4305000A	3208530	TC4C4305000A	-	-	3/16	3/16	5/16	1 1/2	.010
2863972	4C0305000A	2842502	TC4C0305000A	-	-	3/16	3/16	5/8	2	.010
2863880	4C4307002A	2842361	TC4C4307002A	2831637	TR4C4307002A	1/4	1/4	1/2	2	.018
2863969	4C0307002A	2842498	TC4C0307002A	2831802	TR4C0307002A	1/4	1/4	3/4	2 1/2	.018
2863879	4C4308003A	2842358	TC4C4308003A	-	-	5/16	5/16	7/16	2	.018
2863966	4C0308003A	2842493	TC4C0308003A	2831796	TR4C0308003A	5/16	5/16	13/16	2 1/2	.018
-	-	2842353	TC4C4310004A	2831623	TR4C4310004A	3/8	3/8	1/2	2	.018
2863964	4C0310004A	2842487	TC4C0310004A	2831789	TR4C0310004A	3/8	3/8	7/8	2 1/2	.018
-	-	3320829	4C431101AA	-	-	7/16	7/16	9/16	2 1/2	.018
-	-	2842348	TC4C431101AA	-	-	7/16	7/16	9/16	2 1/2	.018
2863959	4C031101AA	2842484	TC4C031101AA	-	-	7/16	7/16	7/8	2 1/2	.018
2863873	4C4313005A	2842344	TC4C4313005A	2831609	TR4C4313005A	1/2	1/2	5/8	2 1/2	.030
2863956	4C0313005A	2842479	TC4C0313005A	2831778	TR4C0313005A	1/2	1/2	1	3	.030
2863953	4C0313015A	2842474	TC4C0313015A	2831773	TR4C0313015A	1/2	1/2	1 1/4	3	.030
2863868	4C4316006A	2842338	TC4C4316006A	2831604	TR4C4316006A	5/8	5/8	3/4	3	.030
2863951	4C0316006A	2842469	TC4C0316006A	2831768	TR4C0316006A	5/8	5/8	1 1/4	3 1/2	.030
2863865	4C4319007A	2842332	TC4C4319007A	2831598	TR4C4319007A	3/4	3/4	1	3	.030
2863947	4C0319007A	2842464	TC4C0319007A	2831761	TR4C0319007A	3/4	3/4	1 1/2	4	.030
2863944	4C0325008A	2842458	TC4C0325008A	2831754	TR4C0325008A	1	1	1 1/2	4	.030

High-Performance Solid Carbide End Mills



- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.

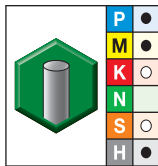


End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.00/-0.002	≤ 1/8"	0/.00024
		> 1/8-1/4"	0/.00031
		> 1/4-3/8"	0/.00035
		> 3/8-23/32"	0/.00043
		> 23/32-1 3/16"	0/.00051



■ Series 4C05 4C15 • Victory Grades



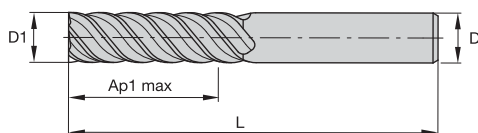
grade WP15PE  
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L
5577187	4C0503001ST	1/8	1/8	1/2	1 1/2
5577188	4C0505000ST	3/16	3/16	5/8	2
5577189	4C0507002ST	1/4	1/4	3/4	2 1/2
5577247	4C1507002ST	1/4	1/4	1 1/4	4
5577240	4C0508003ST	5/16	5/16	13/16	2 1/2
5577248	4C1508003ST	5/16	5/16	1 1/4	4
5577241	4C0510004ST	3/8	3/8	7/8	2 1/2
5577249	4C1510004ST	3/8	3/8	1 1/2	4
5577242	4C0513005ST	1/2	1/2	1	3
5577243	4C0513015ST	1/2	1/2	1 1/4	3
5577250	4C1513005ST	1/2	1/2	2	4 1/2
5577244	4C0516006ST	5/8	5/8	1 1/4	3 1/2
5577251	4C1516006ST	5/8	5/8	2 1/4	5
5577245	4C0519007ST	3/4	3/4	1 1/2	4
5577252	4C1519007ST	3/4	3/4	2 1/4	5
5577246	4C0525008ST	1	1	1 1/2	4
5577253	4C1525008ST	1	1	2 1/4	5

High-Performance Solid Carbide End Mills

- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.

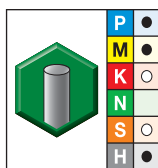


End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.0024
		> 1/8-1/4"	0/0.0031
		> 1/4-3/8"	0/0.0035
		> 3/8-23/32"	0/0.0043
		> 23/32-1 3/16"	0/0.0051



### Series 4S07 • Victory Grades



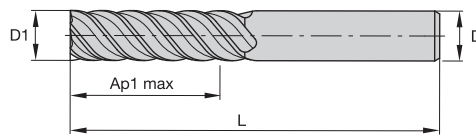
grade WP15PE  
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L
5577255	4S0707002ST	1/4	1/4	3/4	2 1/2
5577256	4S0708003ST	5/16	5/16	13/16	2 1/2
5577254	4S0710004ST	3/8	3/8	7/8	2 1/2
5577257	4S071100AST	7/16	7/16	7/8	2 1/2
5577258	4S0713005ST	1/2	1/2	1	3
5577259	4S0716006ST	5/8	5/8	1 1/4	3 1/2
5577260	4S0719007ST	3/4	3/4	1 1/2	4
5577261	4S0725008ST	1	1	1 1/2	4

High-Performance Solid Carbide End Mills

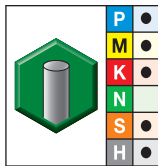
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+ .000 / - .002	< 1/8"	0 / .00024
		1/8–7/32"	0 / .00031
		1/4–3/8"	0 / .00035
		13/32–11/16"	0 / .00043
		23/32–1 3/16"	0 / .00051

■ Series 4S0F 4S1F



grade TiAlN-RT  
TiAlN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
3321644	TR4S0F07002	1/4	1/4	3/4	2 1/2	6
3321645	TR4S0F10004	3/8	3/8	7/8	2 1/2	6
3125357	TR4S0F13005	1/2	1/2	1	3	8
3321654	TR4S1F13005	1/2	1/2	2	4 1/2	8
3321646	TR4S0F16006	5/8	5/8	1 1/4	3 1/2	8
3321655	TR4S1F16006	5/8	5/8	2 1/4	5	8
3321647	TR4S0F19007	3/4	3/4	1 1/2	4	8
3321656	TR4S1F19007	3/4	3/4	2 1/4	5	8
3321648	TR4S0F25008	1	1	1 1/2	4	10
3321657	TR4S1F25008	1	1	2 1/4	5	10

High-Performance Solid Carbide End Mills

Series 4C03

Material Group	Side Milling (A) and Slotting (B)			uncoated		TiCN		TiAlN		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.											
	A		B	Cutting Speed – vc SFM		Cutting Speed – vc SFM		Cutting Speed – vc SFM		D1 – Diameter											
	ap	ae	ap	min	max	min	max	min	max	frac.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	
	ap	ae	ap	min	max	min	max	min	max	dec.	.1250	.1875	.2500	.3125	.3750	.4375	.5000	.6250	.7500	1.0000	
P	0	1.5 x D	0.3 x D	0.5 x D	245	– 330	392	– 528	490	– 660	IPT	.0088	.0135	.0183	.0234	.0273	.0308	.0340	.0395	.0438	.0489
	1	1.5 x D	0.3 x D	0.5 x D	245	– 330	392	– 528	490	– 660	IPT	.0088	.0135	.0183	.0234	.0273	.0308	.0340	.0395	.0438	.0489
	2	1.5 x D	0.3 x D	0.5 x D	230	– 310	368	– 496	460	– 620	IPT	.0088	.0135	.0183	.0234	.0273	.0308	.0340	.0395	.0438	.0489
	3	1.5 x D	0.3 x D	0.5 x D	195	– 260	312	– 416	390	– 520	IPT	.0072	.0111	.0152	.0195	.0229	.0260	.0289	.0341	.0386	.0451
	4	1.5 x D	0.3 x D	0.3 x D	150	– 245	240	– 392	300	– 490	IPT	.0066	.0101	.0138	.0175	.0204	.0231	.0257	.0301	.0337	.0386
	5	1.5 x D	0.3 x D	0.5 x D	100	– 165	160	– 264	200	– 330	IPT	.0059	.0091	.0123	.0156	.0183	.0208	.0231	.0273	.0309	.0361
M	1	1.5 x D	0.3 x D	0.5 x D	80	– 125	128	– 200	160	– 250	IPT	.0050	.0076	.0103	.0131	.0153	.0173	.0191	.0223	.0249	.0281
	2	1.5 x D	0.3 x D	0.5 x D	150	– 190	240	– 304	300	– 380	IPT	.0072	.0111	.0152	.0195	.0229	.0260	.0289	.0341	.0386	.0451
	3	1.5 x D	0.3 x D	0.5 x D	100	– 130	160	– 208	200	– 260	IPT	.0059	.0091	.0123	.0156	.0183	.0208	.0231	.0273	.0309	.0361
K	1	1.5 x D	0.3 x D	0.5 x D	100	– 115	160	– 184	200	– 230	IPT	.0050	.0076	.0103	.0131	.0153	.0173	.0191	.0223	.0249	.0281
	2	1.5 x D	0.3 x D	0.5 x D	195	– 245	312	– 392	390	– 490	IPT	.0088	.0135	.0183	.0234	.0273	.0308	.0340	.0395	.0438	.0489
	3	1.5 x D	0.3 x D	0.5 x D	180	– 230	288	– 368	360	– 460	IPT	.0072	.0111	.0152	.0195	.0229	.0260	.0289	.0341	.0386	.0451
S	1	1.5 x D	0.3 x D	0.5 x D	180	– 215	288	– 344	360	– 430	IPT	.0059	.0091	.0123	.0156	.0183	.0208	.0231	.0273	.0309	.0361
	2	1.5 x D	0.3 x D	0.3 x D	80	– 150	128	– 240	160	– 300	IPT	.0072	.0111	.0152	.0195	.0229	.0260	.0289	.0341	.0386	.0451
	3	1.5 x D	0.3 x D	0.3 x D	40	– 65	64	– 104	80	– 130	IPT	.0039	.0060	.0081	.0103	.0121	.0138	.0153	.0182	.0206	.0243
	4	1.5 x D	0.3 x D	0.5 x D	100	– 130	160	– 208	200	– 260	IPT	.0059	.0091	.0123	.0156	.0183	.0208	.0231	.0273	.0309	.0361
H	1	1.5 x D	0.3 x D	0.3 x D	80	– 100	128	– 160	160	– 200	IPT	.0048	.0077	.0108	.0143	.0168	.0191	.0213	.0251	.0284	.0331
H	1	1.5 x D	0.3 x D	0.3 x D	130	– 230	208	– 368	260	– 460	IPT	.0066	.0101	.0138	.0175	.0204	.0231	.0257	.0301	.0337	.0386

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group. Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

High-Performance Solid Carbide End Mills

Series 4C43

Material Group	Side Milling (A) and Slotting (B)			uncoated		TiCN		TiAlN		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.													
	A		B	Cutting Speed – vc SFM		Cutting Speed – vc SFM		Cutting Speed – vc SFM		D1 – Diameter													
	ap	ae	ap	min	max	min	max	min	max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1				
	ap	ae	ap	min	max	min	max	min	max	dec.	.1250	.1880	.2500	.3130	.3750	.5000	.6250	.7500	1.000				
P	0	1.25 x D	0.3 x D	0.5 x D	245	–	330	392	–	528	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	1.25 x D	0.3 x D	0.5 x D	245	–	330	392	–	528	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	1.25 x D	0.3 x D	0.5 x D	230	–	310	368	–	496	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	1.25 x D	0.3 x D	0.5 x D	195	–	260	312	–	416	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	1.25 x D	0.3 x D	0.3 x D	150	–	245	240	–	392	300	–	490	IPT	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
	5	1.25 x D	0.3 x D	0.5 x D	100	–	165	160	–	264	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
M	1	1.25 x D	0.3 x D	0.5 x D	80	–	125	128	–	200	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
	2	1.25 x D	0.3 x D	0.5 x D	150	–	190	240	–	304	300	–	380	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	3	1.25 x D	0.3 x D	0.5 x D	100	–	130	160	–	208	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	1.25 x D	0.3 x D	0.5 x D	100	–	115	160	–	184	200	–	230	IPT	.0005	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
	2	1.25 x D	0.3 x D	0.5 x D	195	–	245	312	–	392	390	–	490	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	1.25 x D	0.3 x D	0.5 x D	180	–	230	288	–	368	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
S	1	1.25 x D	0.3 x D	0.5 x D	180	–	215	288	–	344	360	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	2	1.25 x D	0.3 x D	0.3 x D	80	–	150	128	–	240	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	3	1.25 x D	0.3 x D	0.3 x D	40	–	65	64	–	104	80	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024
	4	1.25 x D	0.3 x D	0.5 x D	100	–	130	160	–	208	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
H	1	1.25 x D	0.3 x D	0.3 x D	80	–	100	128	–	160	160	–	200	IPT	.0005	.0008	.0011	.0014	.0017	.0021	.0025	.0028	.0033
	2	1.25 x D	0.3 x D	0.3 x D	130	–	230	208	–	368	260	–	460	IPT	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039

Application Data • Series 4C05 4C15 • Victory™ Grades

Series 4C05 4C15 • Victory Grades



Material Group	Side Milling (A)			WP15PE		Recommended feed per tooth (IPT = inch/th) for side milling (A).										
	A		Cutting Speed – vc SFM	D1 – Diameter												
	ap	ae		min	max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	min	max	dec.	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000		
P	0	Ap1 max	0.1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	300	–	490	IPT	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
	5	Ap1 max	0.1 x D	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
M	1	Ap1 max	0.1 x D	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
	2	Ap1 max	0.1 x D	300	–	380	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	3	Ap1 max	0.1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	200	–	230	IPT	.0005	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
	2	Ap1 max	0.1 x D	390	–	490	IPT	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
H	1	Ap1 max	0.1 x D	360	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
	2	Ap1 max	0.1 x D	260	–	460	IPT	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
H	1	Ap1 max	0.1 x D	230	–	390	IPT	.0005	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028
	2	Ap1 max	0.1 x D	230	–	390	IPT	.0005	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series 4S07 • Victory Grades



Material Group																	
	Side Milling (A)		WP15PE			Recommended feed per tooth (IPT = inch/th) for side milling (A).											
	A		Cutting Speed — vc SFM			D1 – Diameter											
	ap	ae	min		max	frac.	1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	1	
P	0	1 x D	0.2 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	1	1 x D	0.2 x D	490	–	660	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	1 x D	0.2 x D	460	–	620	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	3	1 x D	0.1 x D	390	–	520	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	4	1 x D	0.1 x D	300	–	490	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039
	5	1 x D	0.1 x D	200	–	330	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
M	6	1 x D	0.1 x D	160	–	250	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
	1	1 x D	0.1 x D	300	–	380	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	1 x D	0.1 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
K	3	1 x D	0.1 x D	200	–	230	IPT	.0005	.0008	.0010	.0013	.0015	.0017	.0019	.0022	.0025	.0028
	1	1 x D	0.1 x D	390	–	490	IPT	.0009	.0013	.0018	.0023	.0027	.0031	.0034	.0039	.0044	.0049
	2	1 x D	0.1 x D	360	–	460	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
S	3	1 x D	0.1 x D	360	–	430	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
	1	1 x D	0.1 x D	160	–	300	IPT	.0007	.0011	.0015	.0020	.0023	.0026	.0029	.0034	.0039	.0045
	2	1 x D	0.1 x D	80	–	130	IPT	.0004	.0006	.0008	.0010	.0012	.0014	.0015	.0018	.0021	.0024
	3	1 x D	0.15 x D	200	–	260	IPT	.0006	.0009	.0012	.0016	.0018	.0021	.0023	.0027	.0031	.0036
H	4	1 x D	0.15 x D	160	–	200	IPT	.0005	.0008	.0011	.0014	.0017	.0019	.0021	.0025	.0028	.0033
H	1	1 x D	0.1 x D	260	–	460	IPT	.0007	.0010	.0014	.0017	.0020	.0023	.0026	.0030	.0034	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

High-Performance Solid Carbide End Mills

■ Series 4S0F 4S1F

Material Group		Side Milling (A)		TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A).						
		A		Cutting Speed — vc SFM			frac.	D1 — Diameter					
								1/4	3/8	1/2	5/8	3/4	1
		ap	ae	min		max	dec.	.2500	.3750	.5000	.6250	.7500	1.000
P	1	1.5 x D	0.07 x D	500	–	650	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	1.5 x D	0.07 x D	450	–	625	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	3	1.5 x D	0.07 x D	400	–	525	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	4	1.5 x D	0.03 x D	300	–	475	IPT	.0014	.0020	.0026	.0030	.0033	.0039
	5	1.5 x D	0.05 x D	200	–	325	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	6	1.5 x D	0.03 x D	150	–	225	IPT	.0010	.0015	.0019	.0022	.0024	.0028
M	1	1.5 x D	0.07 x D	260	–	330	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	1.5 x D	0.07 x D	200	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	3	1.5 x D	0.05 x D	200	–	260	IPT	.0010	.0015	.0019	.0022	.0024	.0028
K	1	1.5 x D	0.07 x D	390	–	520	IPT	.0018	.0027	.0035	.0039	.0043	.0050
	2	1.5 x D	0.07 x D	360	–	460	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	3	1.5 x D	0.05 x D	330	–	430	IPT	.0012	.0018	.0023	.0027	.0030	.0036
S	1	1.5 x D	0.03 x D	150	–	275	IPT	.0015	.0023	.0029	.0034	.0038	.0046
	2	1.5 x D	0.02 x D	70	–	130	IPT	.0008	.0012	.0016	.0018	.0020	.0025
	3	1.5 x D	0.05 x D	160	–	260	IPT	.0012	.0018	.0023	.0027	.0030	.0036
	4	1.5 x D	0.05 x D	150	–	210	IPT	.0011	.0017	.0022	.0025	.0028	.0033
H	1	1.5 x D	0.03 x D	260	–	450	IPT	.0014	.0020	.0026	.0030	.0033	.0039

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

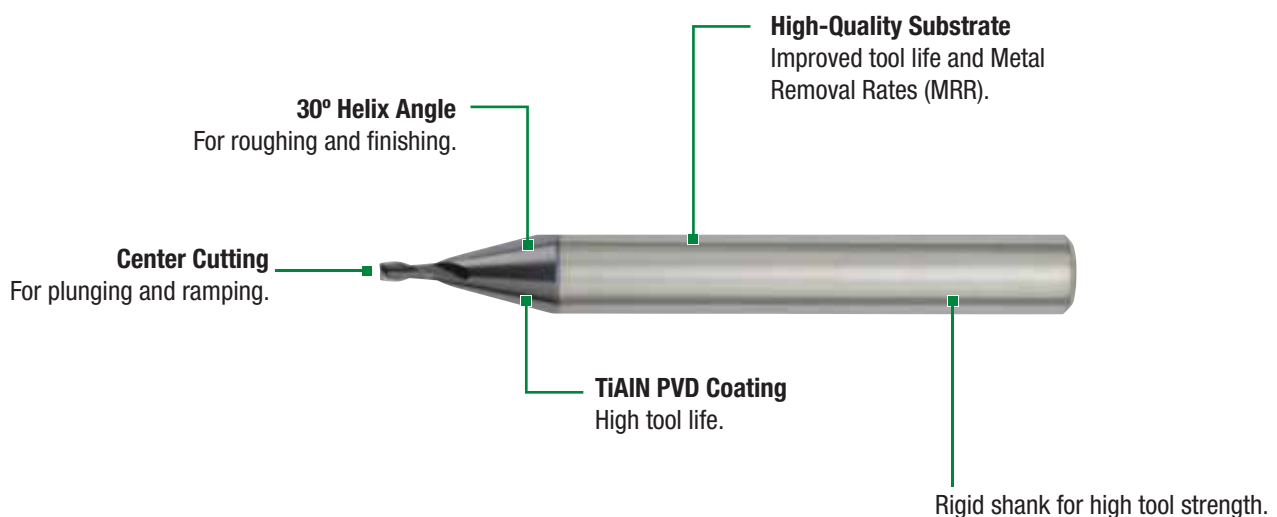
## Micro Solid Carbide End Mills

# Micro Solid Carbide End Mills



Micro solid carbide end mills offer plunging, slotting, profiling, and 3D milling for a wide range of materials and applications. They are designed to provide efficient machining in a wide range of steel, cast iron, copper and copper alloys, and aluminum materials. Micro square and ball nose tools, designed for the most demanding end users, offer exceptional tool life and precision at high operating parameters.

- 2-flute ball nose and 2–3 flute cutters with sharp corner.
- Micro tools for a wide range of materials.
- Roughing and finishing in one tool.
- Diameter range from 0.4–3mm.



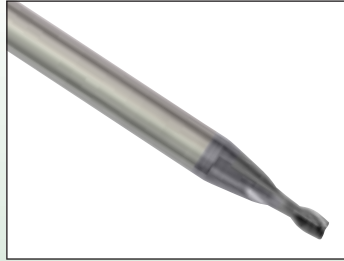


## Micro Solid Carbide End Mills

- Increases your manufacturing flexibility and cost efficiency.
- Suitable for roughing and finishing.
- Rigid shank gives extra toughness and strength.

### 4632 Series

- Wide range of diameters from 0.4–2mm.
- Medium steel, aluminum, copper, and cast iron.
- Center cut.
- Available coated and uncoated.



### 4633 Series

- Wide range of diameters from 0.4–3mm.
- Medium steel, aluminum, copper, and cast iron.
- Center cut.
- Available coated and uncoated.
- Rigid shank gives extra toughness and strength.

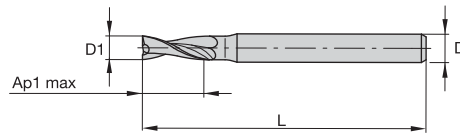


### 4651 Series

- Ball nose tool in range of diameter from 1–2mm with 3mm shank.
- Medium steel, aluminum, copper, and cast iron.
- Center cut ball nose.
- Available coated and uncoated.



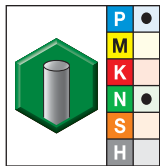
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



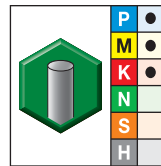
End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

■ Series 4632



grade UNCOATED



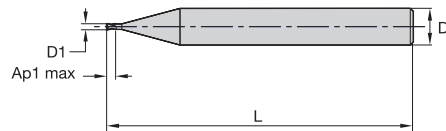
grade TiAlN-RT  
TiAlN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
1656841	463200400..	1602266	463200400RT	0,4	3	1,50	38
1656844	463200500..	1602268	463200500RT	0,5	3	1,50	38
1656849	463200600..	1602270	463200600RT	0,6	3	1,50	38
1656853	463200800..	1602273	463200800RT	0,8	3	1,50	38
1656858	463201000..	1602274	463201000RT	1,0	3	2,00	38
1656863	463201500..	1602275	463201500RT	1,5	3	2,00	38
1656867	463202000..	-	-	2,0	3	8,00	38

High-Performance Solid Carbide End Mills

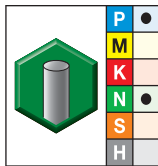
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



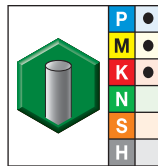
End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

■ Series 4633



grade UNCOATED



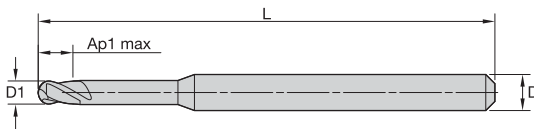
grade TiAlN-RT  
TiAlN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
1656873	463300400..	1656875	463300400RT	0,4	3	1,50	38
1656878	463300500..	1656880	463300500RT	0,5	3	1,50	38
1656883	463300600..	1656885	463300600RT	0,6	3	1,50	38
1656888	463300800..	1656890	463300800RT	0,8	3	1,50	38
1656893	463301000..	1656895	463301000RT	1,0	3	2,00	38
1656898	463301200..	1656900	463301200RT	1,2	3	2,00	38
1656901	463301500..	1656903	463301500RT	1,5	3	2,00	38
1656906	463301800..	1656908	463301800RT	1,8	3	2,00	38
1656909	463302000..	1656910	463302000RT	2,0	3	8,00	38
—		1656913	463302500RT	2,5	3	9,00	38
—		1656916	463303000RT	3,0	3	12,00	38

High-Performance Solid Carbide End Mills

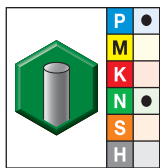
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



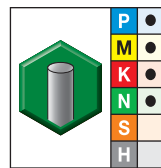
End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

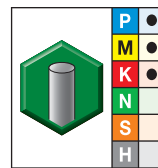
■ Series 4651



grade UNCOATED



grade TiCN-CT  
TiCN



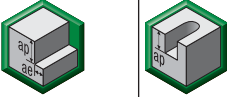

grade TiAlN-RT  
TiAlN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
1656950	465101000..	1656951	465101000CT	1611066	465101000RT	1,0	3	2,00	38
1656952	465101200..	1656953	465101200CT	1656954	465101200RT	1,2	3	2,00	38
1656955	465101500..	1656956	465101500CT	1656957	465101500RT	1,5	3	2,00	38
	—	1656959	465101800CT	1656960	465101800RT	1,8	3	2,00	38
1656971	465102000..	1656972	465102000CT	1602538	465102000RT	2,0	3	2,00	38

High-Performance Solid Carbide End Mills

■ Series 4632

Material Group																		
	Side Milling (A) and Slotting (B)			uncoated			TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.								
	A		B	Cutting Speed – vc SFM			Cutting Speed – vc SFM			D1 – Diameter								
	ap	ae	ap	min		max	min		max	mm	0.4	0.5	0.6	0.8	1.0	1.5	2.0	
P	0	1 x D	0.1 x D	0.25 x D	246	-	328	492	-	656	IPT	.0001	.0001	.0002	.0002	.0003	.0004	.0006
	1	1 x D	0.1 x D	0.25 x D	246	-	328	492	-	656	IPT	.0001	.0001	.0002	.0002	.0003	.0004	.0006
	2	1 x D	0.1 x D	0.25 x D	-	-	-	459	-	623	IPT	.0001	.0001	.0002	.0002	.0003	.0004	.0006
	3	1 x D	0.1 x D	0.25 x D	-	-	-	394	-	525	IPT	.0001	.0001	.0001	.0002	.0002	.0004	.0005
	4	1 x D	0.1 x D	0.25 x D	-	-	-	295	-	492	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0005
M	1	1 x D	0.1 x D	0.25 x D	-	-	-	295	-	377	IPT	.0001	.0001	.0001	.0002	.0002	.0004	.0005
	2	1 x D	0.1 x D	0.25 x D	-	-	-	197	-	262	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004
K	1	1 x D	0.1 x D	0.25 x D	-	-	-	394	-	492	IPT	.0001	.0001	.0002	.0002	.0003	.0004	.0006
	2	1 x D	0.1 x D	0.25 x D	-	-	-	361	-	459	IPT	.0001	.0001	.0001	.0002	.0002	.0004	.0005
N	1	1 x D	0.1 x D	0.25 x D	820	-	3280	1640	-	6560	IPT	.0002	.0002	.0003	.0003	.0004	.0006	.0009
	2	1 x D	0.1 x D	0.25 x D	820	-	2460	1640	-	4920	IPT	.0002	.0002	.0002	.0003	.0004	.0006	.0008
	5	1 x D	0.1 x D	0.25 x D	410	-	1312	820	-	3280	IPT	.0002	.0002	.0002	.0003	.0004	.0006	.0008

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.




Series 4633

Material Group	Side Milling (A) and Slotting (B)			uncoated		TiAlN		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.														
	A		B	Cutting Speed – vc SFM		Cutting Speed – vc SFM		D1 – Diameter														
	ap	ae	ap	min	max	min	max	mm	0.4	0.5	0.6	0.8	1.0	1.2	1.5	1.8	2.0	2.5	3.0			
	1 x D	0.1 x D	0.25 x D																			
P	0	1 x D	0.1 x D	0.25 x D	246	–	328	492	–	656	IPT	.0001	.0001	.0002	.0002	.0003	.0004	.0004	.0005	.0006	.0008	.0009
	1	1 x D	0.1 x D	0.25 x D	246	–	328	492	–	656	IPT	.0001	.0001	.0002	.0002	.0003	.0004	.0004	.0005	.0006	.0008	.0009
	2	1 x D	0.1 x D	0.25 x D	–	–	–	459	–	623	IPT	.0001	.0001	.0002	.0002	.0003	.0004	.0004	.0005	.0006	.0008	.0009
	3	1 x D	0.1 x D	0.25 x D	–	–	–	394	–	525	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0004	.0005	.0006	.0007
	4	1 x D	0.1 x D	0.25 x D	–	–	–	295	–	492	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0005	.0006	.0007
M	1	1 x D	0.1 x D	0.25 x D	–	–	–	295	–	377	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0004	.0005	.0006	.0007
	2	1 x D	0.1 x D	0.25 x D	–	–	–	197	–	262	IPT	.0001	.0001	.0001	.0002	.0002	.0002	.0003	.0004	.0004	.0005	.0006
K	1	1 x D	0.1 x D	0.25 x D	–	–	–	394	–	492	IPT	.0001	.0001	.0002	.0002	.0003	.0004	.0004	.0005	.0006	.0008	.0009
	2	1 x D	0.1 x D	0.25 x D	–	–	–	361	–	459	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0004	.0005	.0006	.0007
N	1	1 x D	0.1 x D	0.25 x D	820	–	3280	1640	–	6560	IPT	.0002	.0002	.0003	.0003	.0004	.0005	.0006	.0008	.0009	.0011	.0013
	2	1 x D	0.1 x D	0.25 x D	820	–	2460	1640	–	4920	IPT	.0002	.0002	.0002	.0003	.0004	.0005	.0006	.0007	.0008	.0010	.0012
	5	1 x D	0.1 x D	0.25 x D	410	–	1312	820	–	3280	IPT	.0002	.0002	.0002	.0003	.0004	.0005	.0006	.0007	.0008	.0010	.0012

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

High-Performance Solid Carbide End Mills

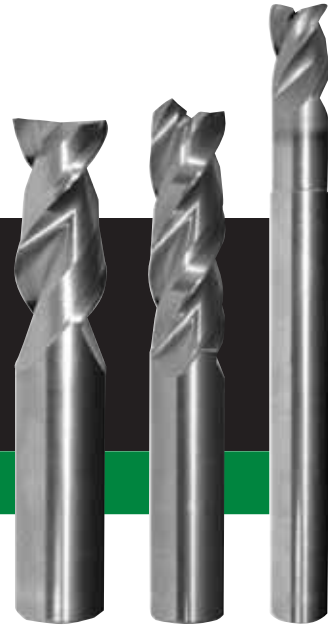
■ Series 4651

Material Group																
	Side Milling (A) and Slotting (B)			uncoated		TiAlN		TiCN		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.						
	A		B	Cutting Speed – vc SFM		Cutting Speed – vc SFM		Cutting Speed – vc SFM		D1 – Diameter						
	ap	ae	ap	min	max	min	max	min	max	mm	1.0	1.2	1.5	1.8	2.0	
P	0	0.5 x D	0.5 x D	0.5 x D	246	328	492	656	394	525	IPT	.0003	.0004	.0004	.0005	.0006
	1	0.5 x D	0.5 x D	0.5 x D	246	328	492	656	394	525	IPT	.0003	.0004	.0004	.0005	.0006
	2	0.5 x D	0.5 x D	0.5 x D	–	–	459	623	367	499	IPT	.0003	.0004	.0004	.0005	.0006
	3	0.3 x D	0.3 x D	0.3 x D	–	–	394	525	315	420	IPT	.0002	.0003	.0004	.0004	.0005
M	4	0.3 x D	0.3 x D	0.3 x D	–	–	295	492	236	394	IPT	.0002	.0003	.0003	.0004	.0005
	1	0.3 x D	0.3 x D	0.3 x D	–	–	295	377	236	302	IPT	.0002	.0003	.0004	.0004	.0005
K	2	0.3 x D	0.3 x D	0.3 x D	–	–	197	262	157	210	IPT	.0002	.0002	.0003	.0004	.0004
	1	0.5 x D	0.5 x D	0.5 x D	–	–	394	492	315	394	IPT	.0003	.0004	.0004	.0005	.0006
N	2	0.5 x D	0.5 x D	0.5 x D	–	–	361	459	289	367	IPT	.0002	.0003	.0004	.0004	.0005
	1	0.5 x D	0.5 x D	0.5 x D	820	3280	1640	6560	1312	5248	IPT	.0004	.0005	.0006	.0008	.0009
	2	0.5 x D	0.5 x D	0.5 x D	820	2460	1640	4920	1312	3936	IPT	.0004	.0005	.0006	.0007	.0008
	5	0.5 x D	0.5 x D	0.5 x D	410	1312	820	3280	656	2624	IPT	.0004	.0005	.0006	.0007	.0008

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

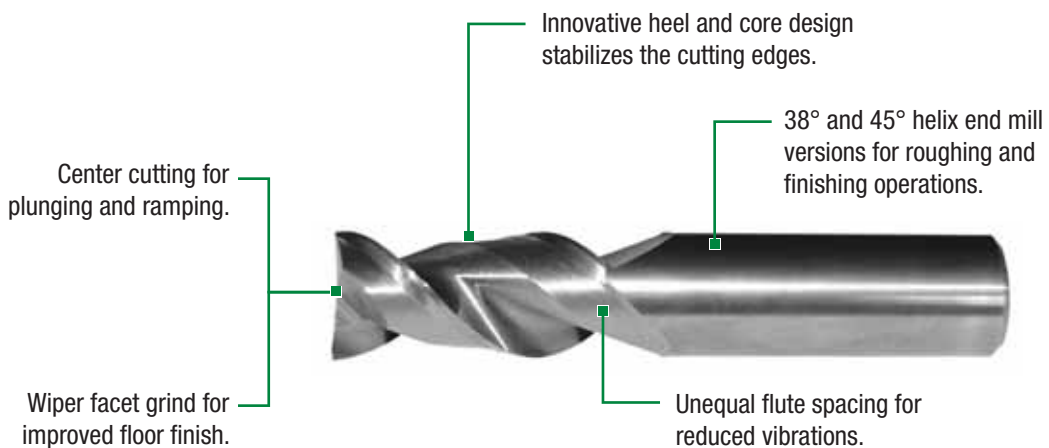
High-Performance Solid Carbide End Mills •  
**AluSurf™**

# AluSurf Aluminum



AluSurf provides extraordinary Metal Removal Rates (MRR) by combining roughing and finishing operations for any aluminum plunging, slotting, and profiling application. Its proprietary flute geometry is designed for rigidity and improved chip evacuation generating exceptional wall-to-floor perpendicularity, even in thin wall applications. To ensure a superior floor surface finish the AluSurf front geometry is equipped with a wiper facet grind.

- One tool for roughing and finishing operations.
- Slotting depths up to 1 x D and peripheral milling up to 1.5 x D axial at .5 x D radially.
- Unequal flute spacing for chatter-free performance (3-flute series only).
- Multiple corner radii and extended neck configurations available as standard.





**AluSurf™ Series**

- Increase your output due to less tool changes and increased Metal Removal Rates (MRR).
- No specific tools for roughing and finishing necessary.
- Less passes due to 1 x D slotting capability.
- Perfect for MQL (Minimum Quantity Lubrication) methods.

**5A02 Series**

- 2-flute, 45° helix.
- Radii and sharp corner configuration.



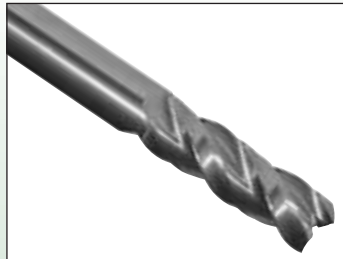
**5AN2 Series**

- 2-flute, 45° helix.
- Extended neck for long-reach applications.
- Radii and sharp corner configuration.



**5A03 Series**

- 3-flute, 38° helix.
- Unequal flute spacing.
- Radii and sharp corner configuration.



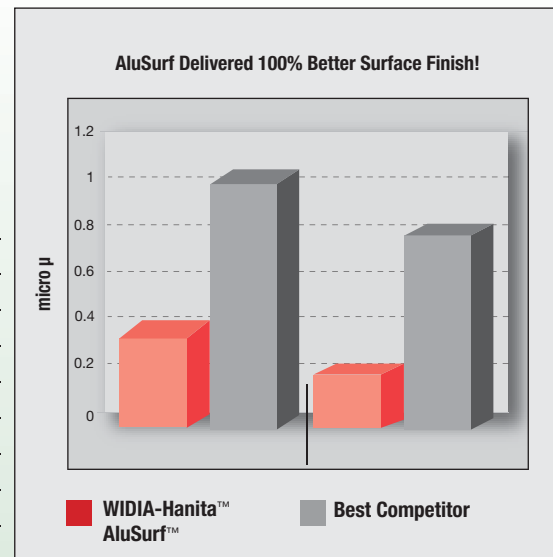
**5AN3 Series**

- 3-flute, 38° helix.
- Unequal flute spacing.
- Extended neck for long-reach applications.
- Radii and sharp corner configuration.

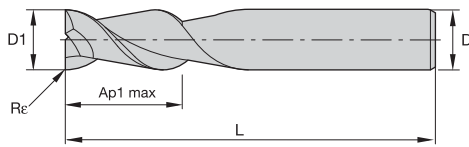


Operation: Slotting  
 Customer: Aluminum Block  
 Material: 6061 Aluminum  
 Workpiece: AluSurf solid carbide end mill.  
 Results: 100% better surface finish on walls and floor.

	COMPETITOR	WIDIA-Hanita™
tool:	uncoated tools	uncoated tools
end mill:	5/8" (16mm) 3-flute	5/8" (16mm) 3-flute
material:	aluminum	aluminum
depth of cut (ap):	.3150" (8mm)	.3150" (8mm)
width of cut (ae):	.3150" (8mm)	.3150" (8mm)
speed (Vc):	2,000 SFM (610 m/min)	2,000 SFM (610 m/min)
RPM (N):	12,000 RPM	12,000 RPM
feed rate (Vf):	142 IPM (3,600 mm/min)	142 IPM (3,600 mm/min)
chip load per tooth (Fz):	.004 in/th (0,1 mm/th)	.004 in/th (0,1 mm/th)
metal removal rate:	14 in <sup>3</sup> /min (230 cm <sup>3</sup> /min)	14 in <sup>3</sup> /min (230 cm <sup>3</sup> /min)



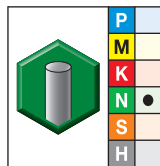
- Center cutting.
- Wiper facet design for improved floor finishes.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

### Series 5A02 • AluSurf



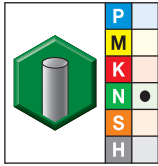
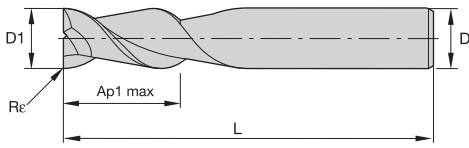
grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
3336099	5A0207002A	1/4	1/4	1/2	2 1/2	.015
3649650	5A0207002B	1/4	1/4	1/2	2 1/2	.030
3738203	5A0207002C	1/4	1/4	1/2	2 1/2	.060
3336098	5A0207002	1/4	1/4	1/2	2 1/2	—
3336101	5A0208003B	5/16	5/16	5/8	2 1/2	.030
3336100	5A0208003	5/16	5/16	5/8	2 1/2	—
3336103	5A0210004B	3/8	3/8	3/4	2 1/2	.030
3649651	5A0210004C	3/8	3/8	3/4	2 1/2	.060
3336102	5A0210004	3/8	3/8	3/4	2 1/2	—
3336105	5A0213015B	1/2	1/2	1 1/4	3	.030
3649652	5A0213015C	1/2	1/2	1 1/4	3	.060
3738879	5A0213015D	1/2	1/2	1 1/4	3	.090
3649753	5A0213015E	1/2	1/2	1 1/4	3	.120
3336104	5A0213015	1/2	1/2	1 1/4	3	—
3738881	5A0216006B	5/8	5/8	1 1/4	3 1/2	.030
3336107	5A0216006C	5/8	5/8	1 1/4	3 1/2	.060
3738882	5A0216006D	5/8	5/8	1 1/4	3 1/2	.090
3336106	5A0216006	5/8	5/8	1 1/4	3 1/2	—
3649754	5A0219007B	3/4	3/4	1 1/2	4	.030
3336109	5A0219007C	3/4	3/4	1 1/2	4	.060

(continued)

(Series 5A02 • AluSurf – continued)



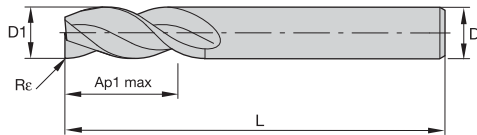
grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
3738923	5A0219007D	3/4	3/4	1 1/2	4	.090
3649755	5A0219007E	3/4	3/4	1 1/2	4	.120
3336108	5A0219007	3/4	3/4	1 1/2	4	—
3649756	5A0225008B	1	1	1 1/2	4	.030
3336111	5A0225008C	1	1	1 1/2	4	.060
3738928	5A0225008D	1	1	1 1/2	4	.090
3649757	5A0225008E	1	1	1 1/2	4	.120
3336110	5A0225008	1	1	1 1/2	4	—

High-Performance Solid Carbide End Mills

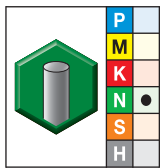
- Center cutting.
- Unequal flute spacing.
- Wiper facet design for improved floor finishes.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

### Series 5A03 • AluSurf



grade UNCOATED

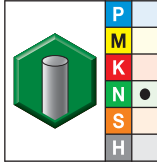
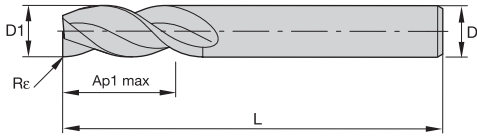
- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
3336113	5A0307002A	1/4	1/4	1/2	2 1/2	.015
3649758	5A0307002B	1/4	1/4	1/2	2 1/2	.030
3738929	5A0307002C	1/4	1/4	1/2	2 1/2	.060
3336112	5A0307002	1/4	1/4	1/2	2 1/2	—
3336115	5A0308003B	5/16	5/16	5/8	2 1/2	.030
3336114	5A0308003	5/16	5/16	5/8	2 1/2	—
3336117	5A0310004B	3/8	3/8	3/4	2 1/2	.030
3649759	5A0310004C	3/8	3/8	3/4	2 1/2	.060
3336116	5A0310004	3/8	3/8	3/4	2 1/2	—
3336119	5A0313015B	1/2	1/2	1 1/4	3	.030
3649760	5A0313015C	1/2	1/2	1 1/4	3	.060
3739147	5A0313015D	1/2	1/2	1 1/4	3	.090
3649761	5A0313015E	1/2	1/2	1 1/4	3	.120
3336118	5A0313015	1/2	1/2	1 1/4	3	—
3738933	5A0316006B	5/8	5/8	1 1/4	3 1/2	.030
3336121	5A0316006C	5/8	5/8	1 1/4	3 1/2	.060
3738934	5A0316006D	5/8	5/8	1 1/4	3 1/2	.090
3336120	5A0316006	5/8	5/8	1 1/4	3 1/2	—
3649762	5A0319007B	3/4	3/4	1 1/2	4	.030
3336123	5A0319007C	3/4	3/4	1 1/2	4	.060

(continued)

High-Performance Solid Carbide End Mills

(Series 5A03 • AluSurf – continued)



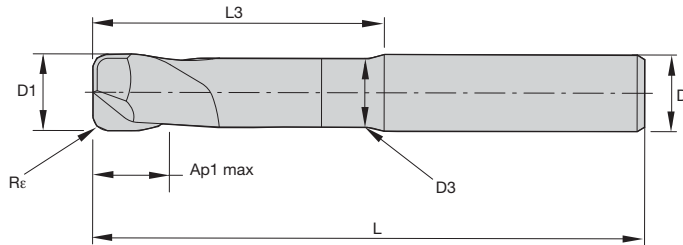
grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε
3738937	5A0319007D	3/4	3/4	1 1/2	4	.090
3649763	5A0319007E	3/4	3/4	1 1/2	4	.120
3336122	5A0319007	3/4	3/4	1 1/2	4	—
3649764	5A0325008B	1	1	1 1/2	4	.030
3336125	5A0325008C	1	1	1 1/2	4	.060
3649765	5A0325008E	1	1	1 1/2	4	.120
3336124	5A0325008	1	1	1 1/2	4	—

High-Performance Solid Carbide End Mills

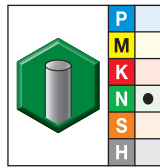
- Center cutting.
- Wiper facet design for improved floor finishes.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

### Series 5AN2 • AluSurf



grade UNCOATED

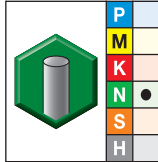
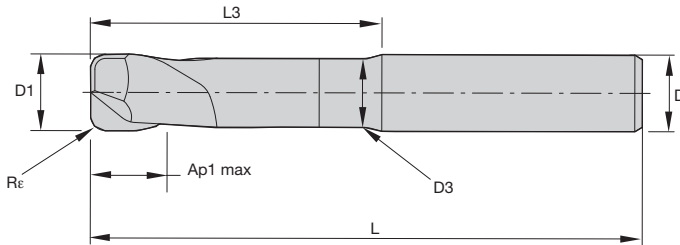
- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
3336000	5AN203042A	1/8	1/4	.12	3/16	1/2	3	.015
3336001	5AN205042A	3/16	1/4	.18	1/4	9/16	3	.015
3336002	5AN207042A	1/4	1/4	.23	5/16	3/4	3	.015
3659287	5AN207042	1/4	1/4	.23	5/16	3/4	3	—
3683906	5AN207012B	1/4	1/4	.23	3/8	2 1/4	4	.030
3659288	5AN207012	1/4	1/4	.23	3/8	2 1/4	4	—
3336083	5AN208043B	5/16	5/16	.29	3/8	1	4	.030
3683907	5AN208023B	5/16	5/16	.29	3/8	2	4	.030
3659289	5AN208023	5/16	5/16	.29	3/8	2	4	—
3336084	5AN210044B	3/8	3/8	.35	7/16	1 1/8	4	.030
3683908	5AN210044C	3/8	3/8	.35	7/16	1 1/8	4	.060
3659290	5AN210044	3/8	3/8	.35	7/16	1 1/8	4	—
3683909	5AN210014B	3/8	3/8	.35	7/16	2 1/4	4	.030
3683910	5AN210014C	3/8	3/8	.35	7/16	2 1/4	4	.060
3474843	5AN210014	3/8	3/8	.35	7/16	2 1/4	4	—
3336085	5AN213045B	1/2	1/2	.47	9/16	1 1/2	5	.030
3683911	5AN213045C	1/2	1/2	.47	9/16	1 1/2	5	.060
3683912	5AN213045D	1/2	1/2	.47	9/16	1 1/2	5	.090
3659292	5AN213045	1/2	1/2	.47	9/16	1 1/2	5	—
3683913	5AN213005B	1/2	1/2	.47	9/16	2 1/4	5	.030

(continued)

High-Performance Solid Carbide End Mills

(Series 5AN2 • AluSurf — continued)

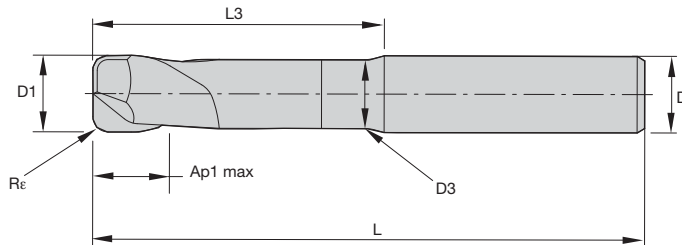


- first choice
- alternate choice

grade UNCOATED

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
3683914	5AN213005C	1/2	1/2	.47	9/16	2 1/4	5	.060
3683915	5AN213005D	1/2	1/2	.47	9/16	2 1/4	5	.090
3474844	5AN213005	1/2	1/2	.47	9/16	2 1/4	5	—
3683916	5AN213015B	1/2	1/2	.47	9/16	3 1/4	6	.030
3683917	5AN213015C	1/2	1/2	.47	9/16	3 1/4	6	.060
3683918	5AN213015D	1/2	1/2	.47	9/16	3 1/4	6	.090
3659487	5AN213015	1/2	1/2	.47	9/16	3 1/4	6	—
3336086	5AN216046C	5/8	5/8	.59	3/4	2	5	.060
3683919	5AN216016B	5/8	5/8	.59	3/4	3 1/4	6	.030
3683920	5AN216016C	5/8	5/8	.59	3/4	3 1/4	6	.060
3683921	5AN216016D	5/8	5/8	.59	3/4	3 1/4	6	.090
3659488	5AN216016	5/8	5/8	.59	3/4	3 1/4	6	—
3336087	5AN219047C	3/4	3/4	.70	7/8	2 1/2	5	.060
3683922	5AN219057B	3/4	3/4	.70	1	1 1/2	6	.030
3683923	5AN219057C	3/4	3/4	.70	1	1 1/2	6	.060
3683924	5AN219057D	3/4	3/4	.70	1	1 1/2	6	.090
3659489	5AN219057	3/4	3/4	.70	1	1 1/2	6	—
3683925	5AN219077B	3/4	3/4	.70	1	2 1/4	6	.030
3683926	5AN219077C	3/4	3/4	.70	1	2 1/4	6	.060
3683927	5AN219077D	3/4	3/4	.70	1	2 1/4	6	.090
3659490	5AN219077	3/4	3/4	.70	1	2 1/4	6	—
3683928	5AN219017B	3/4	3/4	.70	1	3 1/4	6	.030
3683929	5AN219017C	3/4	3/4	.70	1	3 1/4	6	.060
3683930	5AN219017D	3/4	3/4	.70	1	3 1/4	6	.090
3659491	5AN219017	3/4	3/4	.70	1	3 1/4	6	—
3683931	5AN225048B	1	1	.94	1 1/8	3	5 1/2	.030
3336088	5AN225048C	1	1	.94	1 1/8	3	5 1/2	.060
3659492	5AN225048	1	1	.94	1 1/8	3	5 1/2	—
3683932	5AN225028B	1	1	.94	1 1/8	4 1/4	7	.030
3683933	5AN225028C	1	1	.94	1 1/8	4 1/4	7	.060
3659493	5AN225028	1	1	.94	1 1/8	4 1/4	7	—

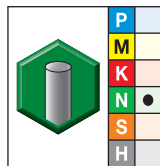
- Center cutting.
- Unequal flute spacing.
- Wiper facet design for improved floor finishes.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

### Series 5AN3 • AluSurf



grade UNCOATED

- first choice
- alternate choice

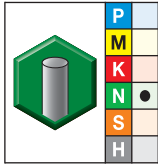
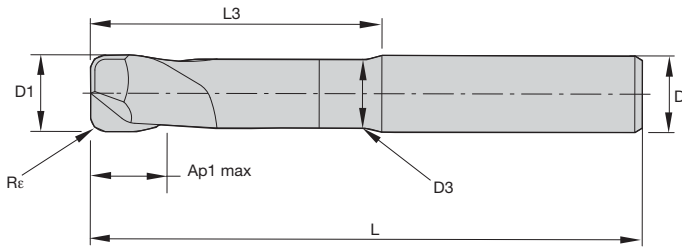
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
3336089	5AN303042A	1/8	1/4	.12	3/16	1/2	3	.015
3336090	5AN305042A	3/16	1/4	.18	1/4	9/16	3	.015
3336091	5AN307042A	1/4	1/4	.23	5/16	3/4	3	.015
3336092	5AN308043B	5/16	5/16	.29	3/8	1	4	.030
3336093	5AN310044B	3/8	3/8	.35	7/16	1 1/8	4	.030
3474848	5AN310044C	3/8	3/8	.35	7/16	1 1/8	4	.060
3663015	5AN310044	3/8	3/8	.35	7/16	1 1/8	4	—
3684127	5AN310014B	3/8	3/8	.35	7/16	2 1/4	4	.030
3684128	5AN310014C	3/8	3/8	.35	7/16	2 1/4	4	.060
3474847	5AN310014	3/8	3/8	.35	7/16	2 1/4	4	—
3336094	5AN313045B	1/2	1/2	.47	9/16	1 1/2	5	.030
3684129	5AN313045C	1/2	1/2	.47	9/16	1 1/2	5	.060
3684130	5AN313045D	1/2	1/2	.47	9/16	1 1/2	5	.090
3664610	5AN313045	1/2	1/2	.47	9/16	1 1/2	5	—
3684131	5AN313005B	1/2	1/2	.47	9/16	2 1/4	5	.030
3684132	5AN313005C	1/2	1/2	.47	9/16	2 1/4	5	.060
3684143	5AN313005D	1/2	1/2	.47	9/16	2 1/4	5	.090
3664611	5AN313005	1/2	1/2	.47	9/16	2 1/4	5	—
3684144	5AN313015B	1/2	1/2	.47	9/16	3 1/4	6	.030
3684145	5AN313015C	1/2	1/2	.47	9/16	3 1/4	6	.060

(continued)

High-Performance Solid Carbide End Mills



(Series 5AN3 • AluSurf — continued)



grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
3684146	5AN313015D	1/2	1/2	.47	9/16	3 1/4	6	.090
3664636	5AN313015	1/2	1/2	.47	9/16	3 1/4	6	—
3336095	5AN316046C	5/8	5/8	.59	3/4	2	5	.060
3684147	5AN316016B	5/8	5/8	.59	3/4	3 1/4	6	.030
3684148	5AN316016C	5/8	5/8	.59	3/4	3 1/4	6	.060
3684149	5AN316016D	5/8	5/8	.59	3/4	3 1/4	6	.090
3664637	5AN316016	5/8	5/8	.59	3/4	3 1/4	6	—
3336096	5AN319047C	3/4	3/4	.70	7/8	2 1/2	5	.060
3684150	5AN319057B	3/4	3/4	.70	1	1 1/2	6	.030
3684151	5AN319057C	3/4	3/4	.70	1	1 1/2	6	.060
3684152	5AN319057D	3/4	3/4	.70	1	1 1/2	6	.090
3474883	5AN319057	3/4	3/4	.70	1	1 1/2	6	—
3684153	5AN319077B	3/4	3/4	.70	1	2 1/4	6	.030
3684154	5AN319077C	3/4	3/4	.70	1	2 1/4	6	.060
3684155	5AN319077D	3/4	3/4	.70	1	2 1/4	6	.090
3664639	5AN319077	3/4	3/4	.70	1	2 1/4	6	—
3684156	5AN319017B	3/4	3/4	.70	1	3 1/4	6	.030
3684157	5AN319017C	3/4	3/4	.70	1	3 1/4	6	.060
3684158	5AN319017D	3/4	3/4	.70	1	3 1/4	6	.090
3664640	5AN319017	3/4	3/4	.70	1	3 1/4	6	—
3684159	5AN319067B	3/4	3/4	.70	1	4 1/4	7	.030
3664641	5AN319067	3/4	3/4	.70	1	4 1/4	7	—
3684160	5AN325048B	1	1	.94	1 1/8	3	5 1/2	.030
3336097	5AN325048C	1	1	.94	1 1/8	3	5 1/2	.060
3664642	5AN325048	1	1	.94	1 1/8	3	5 1/2	—
3684161	5AN325028B	1	1	.94	1 1/8	4 1/4	7	.030
3664694	5AN325028C	1	1	.94	1 1/8	4 1/4	7	.060
3684162	5AN325028D	1	1	.94	1 1/8	4 1/4	7	.090
3664693	5AN325028	1	1	.94	1 1/8	4 1/4	7	—

■ Series 5A02 5A03 • AluSurf

Material Group	Side Milling (A) and Slotting (B)		uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.									
	A		B		Cutting Speed – vc SFM			D1 – Diameter							
	ap	ae	ap	ap				frac.	1/4	5/16	3/8	1/2	5/8	3/4	1
	ap	ae	ap	min	max	dec.	.2500	.3130	.3750	.5000	.6250	.7500	1.000		
N	1	1.5 x D	0.5 x D	1 x D	1640	–	6560	IPT	.0023	.0028	.0034	.0045	.0056	.0068	.0090
	2	1.5 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0018	.0023	.0027	.0036	.0045	.0054	.0072
	3	1.5 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0016	.0020	.0024	.0032	.0039	.0047	.0063
	4	1.5 x D	0.5 x D	1 x D	1310	–	2460	IPT	.0016	.0020	.0024	.0032	.0039	.0047	.0063
	5	1.5 x D	0.5 x D	1 x D	820	–	3280	IPT	.0020	.0025	.0030	.0041	.0051	.0061	.0081

NOTE: For cutting aluminum with high silicon, coating is recommended.  
 For spindles with ceramic bearings, multiply ap by 0.5.  
 For better surface finish, reduce feed per tooth.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

Application Data • Series 5AN2 5AN3 • AluSurf™

■ Series 5AN2 5AN3 • AluSurf

Material Group	Side Milling (A) and Slotting (B)		uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.											
	A		B		Cutting Speed – vc SFM			D1 – Diameter									
	ap	ae	ap	ap				frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
	ap	ae	ap	min	max	dec.	.1250	.1880	.2500	.3130	.3750	.5000	.6250	.7500	1.000		
N	1	1 x D	0.5 x D	1 x D	1640	–	6560	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100
	2	1 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
	3	1 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	4	1 x D	0.5 x D	1 x D	1310	–	2460	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	4	1 x D	0.5 x D	1 x D	820	–	3280	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090

NOTE: Side milling applications – For longest reach (L3) tools, reduce ae by 30%.  
 Slot milling applications – For longest reach (L3) tools, reduce ap by 30%.  
 For cutting aluminum with high silicon, coating is recommended.  
 For spindles with ceramic bearings, multiply ap by 0.5.  
 For better surface finish, reduce feed per tooth.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

High-Performance Solid Carbide End Mills

# Putting your round tools in a position to succeed



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## Precision Collet Chuck

- Minimizes runout to dramatically boost performance.
- Creates an upsurge in tool life.
- Eliminates pullout with **SAFE-LOCK®** by HAIMER option.
- Chatter-free refined balancing to G2.5@25,000 RPM.
- Extreme versatility for use with most rotating applications.

To learn more about our innovations, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA** 

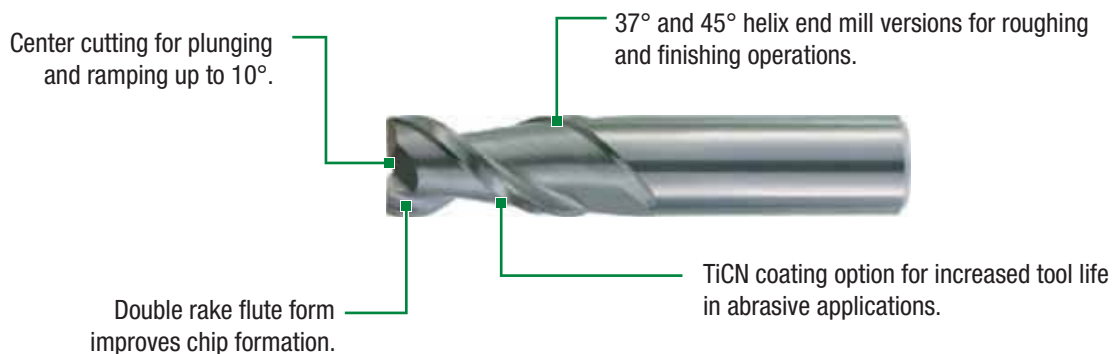
High-Performance Solid Carbide End Mills •  
**ArCut™**

# ArCut Aluminum



ArCut end mills are equipped with a double rake face chip flute form, having a smaller than normal contact zone. This accelerates the chip during formation, resulting in a short curled chip, improving chip evacuation and surface quality. Due to the short curled chips, machining corners is drastically improved as chip packing is avoided. ArCut end mills are also a preferred choice when highly accurate machined straight walls are required.

- One tool for roughing and finishing operations.
- Slotting depths up to 1 x D.
- Double rake design to manage chip formation.



### ArCut™ Series

- Increase your output due to less tool changes and increased Metal Removal Rates (MRR).
- No specific tools for roughing and finishing necessary.
- Optimize chip formation and evacuation.

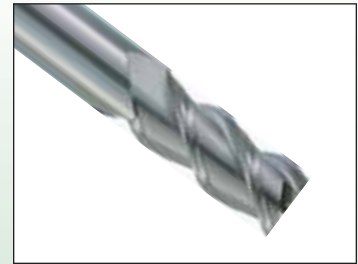
#### 4K02 Series

- 2-flute, 45° helix.
- Radii and sharp corner configuration.

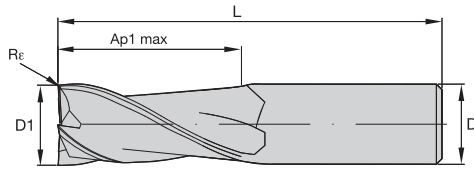


#### 4K03 Series

- 3-flute, 37° helix.
- Radii and sharp corner configuration.



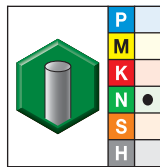
- Center cutting.
- Maximum ramp angle = 10°.
- Double rake flute form for chatter-free machining.



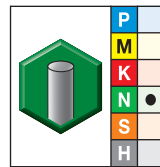
End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	< 1/8"	0/0.00024
		1/8-7/32"	0/0.00031
		1/4-3/8"	0/0.00035
		13/32-11/16"	0/0.00043
		23/32-1 3/16"	0/0.00051

### Series 4K02 • Series 4K02 4K12 4K22 4K42 4K62 • ArCut



grade UNCOATED



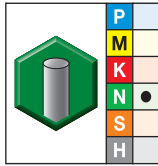
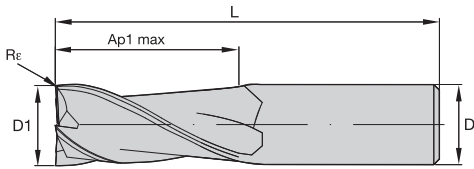
grade TiCN-CT TiCN

- first choice
- alternate choice

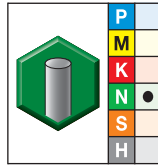
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
2863577	4K4203071	2841813	TC4K4203071	1/8	1/8	1/4	2	—
3638629	4K0203071A	—	—	1/8	1/8	1/2	2	.015
2863838	4K0203071	2842224	TC4K0203071	1/8	1/8	1/2	2	—
2863570	4K4205070	2841803	TC4K4205070	3/16	3/16	5/16	2	—
3638630	4K0205070A	—	—	3/16	3/16	5/8	2	.015
2863833	4K0205070	2842214	TC4K0205070	3/16	3/16	5/8	2	—
3638631	4K4207072B	—	—	1/4	1/4	3/8	2	.030
2863566	4K4207072	2841793	TC4K4207072	1/4	1/4	3/8	2	—
3638632	4K0207072A	—	—	1/4	1/4	3/4	2 1/2	.015
3638643	4K0207072B	—	—	1/4	1/4	3/4	2 1/2	.030
2863826	4K0207072	2842204	TC4K0207072	1/4	1/4	3/4	2 1/2	—
3638644	4K1207072A	—	—	1/4	1/4	1 1/4	3 1/4	.015
3638645	4K1207072B	—	—	1/4	1/4	1 1/4	3 1/4	.030
2863728	4K1207072	2842046	TC4K1207072	1/4	1/4	1 1/4	3 1/4	—
3638646	4K2207072A	—	—	1/4	1/4	1 3/4	4	.015
3638647	4K2207072B	—	—	1/4	1/4	1 3/4	4	.030
2863644	4K2207072	2841908	TC4K2207072	1/4	1/4	1 3/4	4	—
3638648	4K4208073B	—	—	5/16	5/16	7/16	2	.030
2863560	4K4208073	2841784	TC4K4208073	5/16	5/16	7/16	2	—
3638649	4K0208073B	—	—	5/16	5/16	13/16	2 1/2	.030

(continued)

(Series 4K02 • Series 4K02 4K12 4K22 4K42 4K62 • ArCut – continued)



grade UNCOATED



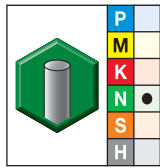
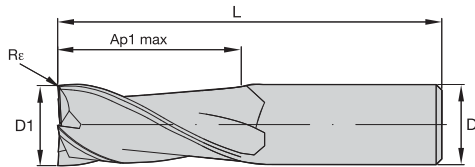
grade TiCN-CT  
TiCN

- first choice
- alternate choice

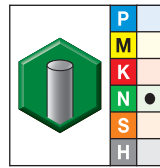
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
3638650	4K0208073C	-	-	5/16	5/16	13/16	2 1/2	.060
2863820	4K0208073	2842193	TC4K0208073	5/16	5/16	13/16	2 1/2	-
3638651	4K1208073B	-	-	5/16	5/16	1 1/4	3 1/4	.030
2863722	4K1208073	2842037	TC4K1208073	5/16	5/16	1 1/4	3 1/4	-
3638652	4K4210074B	-	-	3/8	3/8	1/2	2	.030
2863552	4K4210074	2841772	TC4K4210074	3/8	3/8	1/2	2	-
3638653	4K0210074B	-	-	3/8	3/8	7/8	2 1/2	.030
3638654	4K0210074C	-	-	3/8	3/8	7/8	2 1/2	.060
2863815	4K0210074	2842183	TC4K0210074	3/8	3/8	7/8	2 1/2	-
3638655	4K1210074B	-	-	3/8	3/8	1 1/2	4	.030
3638656	4K1210074C	-	-	3/8	3/8	1 1/2	4	.060
2863715	4K1210074	2842027	TC4K1210074	3/8	3/8	1 1/2	4	-
3638657	4K2210074B	-	-	3/8	3/8	2 1/2	4	.030
3638658	4K2210074C	-	-	3/8	3/8	2 1/2	4	.060
2863638	4K2210074	2841899	TC4K2210074	3/8	3/8	2 1/2	4	-
2863810	4K021107A	2983521	TC4K021107A	7/16	7/16	7/8	2 1/2	-
3638659	4K4213075B	-	-	1/2	1/2	5/8	2 1/2	.030
3638660	4K4213075C	-	-	1/2	1/2	5/8	2 1/2	.060
2863546	4K4213075	2841762	TC4K4213075	1/2	1/2	5/8	2 1/2	-
2863804	4K0213075	2842170	TC4K0213075	1/2	1/2	1	3	-
3638661	4K0213085B	-	-	1/2	1/2	1 1/4	3	.030
3638662	4K0213085C	-	-	1/2	1/2	1 1/4	3	.060
3638663	4K0213085E	-	-	1/2	1/2	1 1/4	3	.120
3061880	4K0213085	2842163	TC4K0213085	1/2	1/2	1 1/4	3	-
3638664	4K6213055B	-	-	1/2	1/2	1 1/2	4	.030
3638665	4K6213055C	-	-	1/2	1/2	1 1/2	4	.060
2863499	4K6213055	3041444	TC4K6213055	1/2	1/2	1 1/2	4	-
3638666	4K1213075B	-	-	1/2	1/2	2	4	.030
3638667	4K1213075C	-	-	1/2	1/2	2	4	.060
2863709	4K1213075	2842016	TC4K1213075	1/2	1/2	2	4	-
3638668	4K6213065B	-	-	1/2	1/2	2 1/2	5	.030
3638669	4K6213065C	-	-	1/2	1/2	2 1/2	5	.060
2863497	4K6213065	3048586	TC4K6213065	1/2	1/2	2 1/2	5	-
3638670	4K2213075B	-	-	1/2	1/2	3	5	.030
3061692	4K2213075	2841890	TC4K2213075	1/2	1/2	3	5	-
2863541	4K4216076	2841753	TC4K4216076	5/8	5/8	3/4	3	-

(continued)

(Series 4K02 • Series 4K02 4K12 4K22 4K42 4K62 • ArCut – continued)



grade UNCOATED



grade TiCN-CT  
TiCN

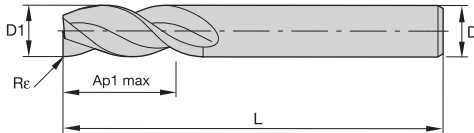
- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
2863794	4K0216076	2842154	TC4K0216076	5/8	5/8	1 1/4	3 1/2	—
3638675	4K6216076C	—	—	5/8	5/8	1 5/8	3 1/2	.060
2863494	4K6216076	2841675	TC4K6216076	5/8	5/8	1 5/8	3 1/2	—
3638676	4K1216076C	—	—	5/8	5/8	2 1/4	5	.060
2863704	4K1216076	2842007	TC4K1216076	5/8	5/8	2 1/4	5	—
3638677	4K2216076C	—	—	5/8	5/8	3	5 1/4	.060
2863628	4K2216076	3048585	TC4K2216076	5/8	5/8	3	5 1/4	—
3638678	4K4219077B	—	—	3/4	3/4	7/8	3	.030
3638679	4K4219077C	—	—	3/4	3/4	7/8	3	.060
3638680	4K4219077E	—	—	3/4	3/4	7/8	3	.120
2863534	4K4219077	2841743	TC4K4219077	3/4	3/4	7/8	3	—
3638681	4K0219077B	—	—	3/4	3/4	1 1/2	4	.030
3638682	4K0219077C	—	—	3/4	3/4	1 1/2	4	.060
3638683	4K0219077E	—	—	3/4	3/4	1 1/2	4	.120
2863788	4K0219077	2842145	TC4K0219077	3/4	3/4	1 1/2	4	—
2863491	4K6219067	2841672	TC4K6219067	3/4	3/4	1 5/8	4	—
3638684	4K1219077B	—	—	3/4	3/4	2 1/4	5	.030
3638685	4K1219077C	—	—	3/4	3/4	2 1/4	5	.060
2863698	4K1219077	2841997	TC4K1219077	3/4	3/4	2 1/4	5	—
3638686	4K6219077B	—	—	3/4	3/4	3	5 1/4	.030
3738131	4K6219077C	—	—	3/4	3/4	3	5 1/4	.060
2863488	4K6219077	2991957	TC4K6219077	3/4	3/4	3	5 1/4	—
2863623	4K2219077	3082933	TC4K2219077	3/4	3/4	4	6 1/4	—
3638689	4K0225078B	—	—	1	1	1 1/2	4	.030
3638690	4K0225078C	—	—	1	1	1 1/2	4	.060
3638691	4K0225078E	—	—	1	1	1 1/2	4	.120
2863782	4K0225078	2971373	TC4K0225078	1	1	1 1/2	4	—
2863485	4K6225078	3048587	TC4K6225078	1	1	2	4 1/2	—
3638692	4K1225078B	—	—	1	1	2 1/4	5	.030
3638693	4K1225078C	—	—	1	1	2 1/4	5	.060
2863691	4K1225078	2841987	TC4K1225078	1	1	2 1/4	5	—
3638694	4K2225078B	—	—	1	1	3	5 1/2	.030
3638695	4K2225078C	—	—	1	1	3	5 1/2	.060
2863617	4K2225078	3056326	TC4K2225078	1	1	3	5 1/2	—
2863482	4K6225088	3048588	TC4K6225088	1	1	4	7	—

High-Performance Solid Carbide End Mills

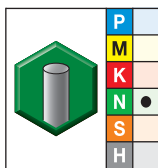


- Center cutting.
- Maximum ramp angle = 10°.
- Double rake flute form for chatter-free machining.

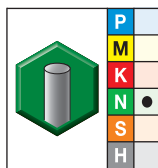


End Mill Tolerances			
D1	tolerance	D	tolerance h6 + / -
All	+ .000 / - .002	< 1/8"	0 / .00024
		1/8 - 7/32"	0 / .00031
		1/4 - 3/8"	0 / .00035
		13/32 - 11/16"	0 / .00043
		23/32 - 1 3/16"	0 / .00051

■ Series 4K03 • Series 4K03 4K13 4K23 4K43 4K63 • ArCut



grade UNCOATED



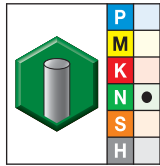
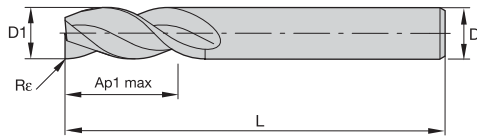
grade TiCN-CT  
TiCN

- first choice
- alternate choice

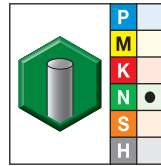
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
3638696	4K4307072B	-	-	1/4	1/4	3/8	2	.030
2863529	4K4307072	2841733	TC4K4307072	1/4	1/4	3/8	2	-
3638697	4K0307072A	-	-	1/4	1/4	3/4	2 1/2	.015
3638698	4K0307072B	-	-	1/4	1/4	3/4	2 1/2	.030
2863775	4K0307072	2842127	TC4K0307072	1/4	1/4	3/4	2 1/2	-
3638699	4K1307072A	-	-	1/4	1/4	1 1/4	3 1/4	.015
3638700	4K1307072B	-	-	1/4	1/4	1 1/4	3 1/4	.030
2863686	4K1307072	2841978	TC4K1307072	1/4	1/4	1 1/4	3 1/4	-
3638701	4K2307072A	-	-	1/4	1/4	1 3/4	4	.015
3638702	4K2307072B	-	-	1/4	1/4	1 3/4	4	.030
2863610	4K2307072	2841870	TC4K2307072	1/4	1/4	1 3/4	4	-
3638743	4K4308073B	-	-	5/16	5/16	7/16	2	.030
2863525	4K4308073	3019793	TC4K4308073	5/16	5/16	7/16	2	-
3638744	4K0308073B	-	-	5/16	5/16	13/16	2 1/2	.030
3638745	4K0308073C	-	-	5/16	5/16	13/16	2 1/2	.060
2863769	4K0308073	2842118	TC4K0308073	5/16	5/16	13/16	2 1/2	-
3638746	4K1308073B	-	-	5/16	5/16	1 1/4	3 1/4	.030
2863679	4K1308073	2841967	TC4K1308073	5/16	5/16	1 1/4	3 1/4	-
3638747	4K4310074B	-	-	3/8	3/8	1/2	2	.030
2863521	4K4310074	2841716	TC4K4310074	3/8	3/8	1/2	2	-

(continued)

(Series 4K03 • Series 4K03 4K13 4K23 4K43 4K63 • ArCut — continued)



grade UNCOATED



grade TiCN-CT  
TiCN

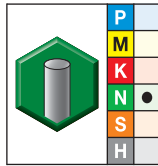
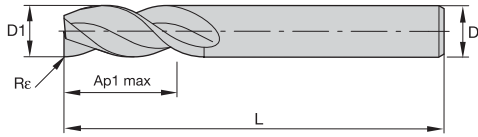
- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε
3638748	4K0310074B	-	-	3/8	3/8	7/8	2 1/2	.030
3638749	4K0310074C	-	-	3/8	3/8	7/8	2 1/2	.060
2863765	4K0310074	2842108	TC4K0310074	3/8	3/8	7/8	2 1/2	-
3638750	4K1310074B	-	-	3/8	3/8	1 1/2	4	.030
3638751	4K1310074C	-	-	3/8	3/8	1 1/2	4	.060
2863674	4K1310074	2841958	TC4K1310074	3/8	3/8	1 1/2	4	-
3638752	4K2310074B	-	-	3/8	3/8	2 1/2	4	.030
3638753	4K2310074C	-	-	3/8	3/8	2 1/2	4	.060
2863605	4K2310074	2841858	TC4K2310074	3/8	3/8	2 1/2	4	-
2863761	4K031107A	2842103	TC4K031107A	7/16	7/16	7/8	2 1/2	-
3638754	4K4313075B	-	-	1/2	1/2	5/8	2 1/2	.030
3638755	4K4313075C	-	-	1/2	1/2	5/8	2 1/2	.060
2863515	4K4313075	2841705	TC4K4313075	1/2	1/2	5/8	2 1/2	-
2863754	4K0313075	2990466	TC4K0313075	1/2	1/2	1	3	-
3638756	4K0313085B	-	-	1/2	1/2	1 1/4	3	.030
3638758	4K0313085C	-	-	1/2	1/2	1 1/4	3	.060
3638759	4K0313085E	-	-	1/2	1/2	1 1/4	3	.120
2863752	4K0313085	2842087	TC4K0313085	1/2	1/2	1 1/4	3	-
3638760	4K6313055B	-	-	1/2	1/2	1 1/2	4	.030
3638761	4K6313055C	-	-	1/2	1/2	1 1/2	4	.060
2863479	4K6313055	2870236	TC4K6313055	1/2	1/2	1 1/2	4	-
3638762	4K1313075B	-	-	1/2	1/2	2	4	.030
3638763	4K1313075C	-	-	1/2	1/2	2	4	.060
2863667	4K1313075	2841948	TC4K1313075	1/2	1/2	2	4	-
3638764	4K6313065B	-	-	1/2	1/2	2 1/2	5	.030
3638765	4K6313065C	-	-	1/2	1/2	2 1/2	5	.060
2863476	4K6313065	2841665	TC4K6313065	1/2	1/2	2 1/2	5	-
3638766	4K2313075B	-	-	1/2	1/2	3	5	.030
3638767	4K2313075C	-	-	1/2	1/2	3	5	.060
2863599	4K2313075	2841848	TC4K2313075	1/2	1/2	3	5	-
3638768	4K4316076C	-	-	5/8	5/8	3/4	3	.060
3638769	4K4316076E	-	-	5/8	5/8	3/4	3	.120
2863507	4K4316076	2841695	TC4K4316076	5/8	5/8	3/4	3	-
3638770	4K0316076C	-	-	5/8	5/8	1 1/4	3 1/2	.060
2863746	4K0316076	2990464	TC4K0316076	5/8	5/8	1 1/4	3 1/2	-
3638771	4K6316076C	-	-	5/8	5/8	1 5/8	3 1/2	.060

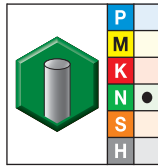
(continued)

High-Performance Solid Carbide End Mills

(Series 4K03 • Series 4K03 4K13 4K23 4K43 4K63 • ArCut — continued)



grade UNCOATED



grade TiCN-CT  
TiCN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
2863473	4K6316076	2841660	TC4K6316076	5/8	5/8	1 5/8	3 1/2	—
3638772	4K1316076C	—	—	5/8	5/8	2 1/4	5	.060
2863661	4K1316076	2841939	TC4K1316076	5/8	5/8	2 1/4	5	—
3638773	4K2316076C	—	—	5/8	5/8	3	5 1/4	.060
2863595	4K2316076	2841844	TC4K2316076	5/8	5/8	3	5 1/4	—
3638774	4K4319077B	—	—	3/4	3/4	7/8	3	.030
3638775	4K4319077C	—	—	3/4	3/4	7/8	3	.060
3638776	4K4319077E	—	—	3/4	3/4	7/8	3	.120
2863502	4K4319077	2841686	TC4K4319077	3/4	3/4	7/8	3	—
3638777	4K0319077B	—	—	3/4	3/4	1 1/2	4	.030
3638778	4K0319077C	—	—	3/4	3/4	1 1/2	4	.060
3638779	4K0319077E	—	—	3/4	3/4	1 1/2	4	.120
2863739	4K0319077	2842066	TC4K0319077	3/4	3/4	1 1/2	4	—
2863470	4K6319067	2841655	TC4K6319067	3/4	3/4	1 5/8	4	—
3638780	4K1319077B	—	—	3/4	3/4	2 1/4	5	.030
3638781	4K1319077C	—	—	3/4	3/4	2 1/4	5	.060
2863656	4K1319077	2841928	TC4K1319077	3/4	3/4	2 1/4	5	—
3638782	4K6319077B	—	—	3/4	3/4	3	5 1/4	.030
3738132	4K6319077C	—	—	3/4	3/4	3	5 1/4	.060
2530382	4K6319077	2841650	TC4K6319077	3/4	3/4	3	5 1/4	—
3638783	4K2319077B	—	—	3/4	3/4	4	6 1/4	.030
3638784	4K2319077C	—	—	3/4	3/4	4	6 1/4	.060
2530406	4K2319077	2841834	TC4K2319077	3/4	3/4	4	6 1/4	—
3638785	4K0325078B	—	—	1	1	1 1/2	4	.030
3638786	4K0325078C	—	—	1	1	1 1/2	4	.060
3638787	4K0325078E	—	—	1	1	1 1/2	4	.120
2863734	4K0325078	2842056	TC4K0325078	1	1	1 1/2	4	—
2863464	4K6325078	2841645	TC4K6325078	1	1	2	4 1/2	—
3638788	4K1325078B	—	—	1	1	2 1/4	5	.030
3638789	4K1325078C	—	—	1	1	2 1/4	5	.060
2863650	4K1325078	2990465	TC4K1325078	1	1	2 1/4	5	—
3638790	4K2325078B	—	—	1	1	3	5 1/2	.030
3638791	4K2325078C	—	—	1	1	3	5 1/2	.060
2863584	4K2325078	2841823	TC4K2325078	1	1	3	5 1/2	—
2863461	4K6325088	2841640	TC4K6325088	1	1	4	7	—

High-Performance Solid Carbide End Mills

■ Series 4K02 4K03 • ArCut

Material Group																	
	Side Milling (A) and Slotting (B)				uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.									
	A		B		Cutting Speed – vc SFM			D1 – Diameter									
	ap	ae	ap	min	max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
N	1	Ap1 max	0.5 x D	1.0 x D	1640	–	6560	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090
	2	Ap1 max	0.5 x D	1.0 x D	1640	–	4920	IPT	.0009	.0014	.0018	.0023	.0027	.0036	.0045	.0054	.0072
	3	Ap1 max	0.5 x D	1.0 x D	1640	–	4920	IPT	.0008	.0012	.0016	.0020	.0024	.0032	.0039	.0047	.0063
	4	Ap1 max	0.5 x D	1.0 x D	1310	–	2460	IPT	.0008	.0012	.0016	.0020	.0024	.0032	.0039	.0047	.0063
	5	Ap1 max	0.5 x D	1.0 x D	820	–	3280	IPT	.0010	.0015	.0020	.0025	.0030	.0041	.0051	.0061	.0081

NOTE: For cutting aluminum with high silicon, coating is recommended.  
 For spindles with ceramic bearings, multiply ap by 0.5.  
 For better surface finish, reduce feed per tooth.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

High-Performance Solid Carbide End Mills

## NOVO KNOWS CAD/CAM

With the addition of NOVO™ to your team, your CAD/CAM capabilities become much more accurate, streamlined, and productive.

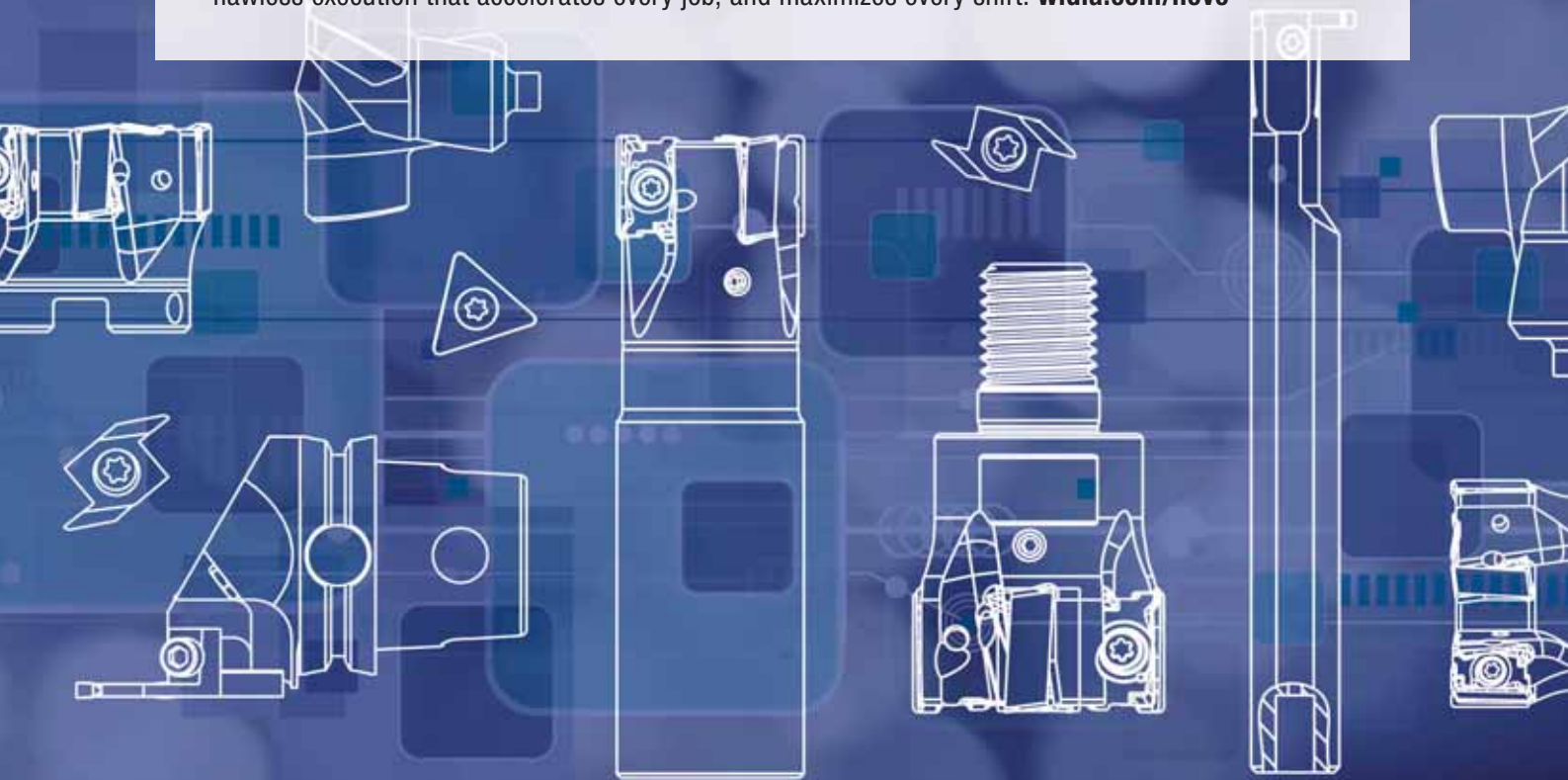
**Before NOVO:** The programmer would be in their CAD/CAM software, programming a part. Using the outdated method of finding a tool in a catalog, and then manually inputting the tooling information from the catalog into the CAD/CAM software.

The concern is that assumptions are made, and only partial tooling information is entered.

**With NOVO:** The powerful digital intelligence of NOVO not only helps the programmer find the right tool for the metalcutting job, but also automatically integrates all the tooling data into a complete CAD/CAM solution.

The integration of all the tooling data increases the viability of the part being programmed, and is delivered quickly — saving you time.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift. [widia.com/novo](http://widia.com/novo)



**High-Performance Aluminum  
Solid Carbide End Mills**

# HP Aluminum End Mills Series



WIDIA™ solid carbide end mills provide maximum Metal Removal Rates (MRR) and superior surface quality while reducing machining time in aluminum. The center cutting design allows for plunging, slotting, and profiling applications in any type of aluminum workpiece materials. The proprietary flute geometry is designed to deliver exceptional chip evacuation while generating floor-to-wall straightness, especially thin wall applications. With many styles to choose from, you can be sure WIDIA will have a solution for your aluminum applications.

- Capable of slotting depths up to 1 x D and side milling up to 1.5 x D axially at 0.5 x D radially (please follow application data for specific tool).
- Unequal flute spacing for chatter-free performance with 3-flute series.
- Multiple corner radii and extended neck configurations available as standard.

## HP Aluminum End Mills Series

- Increase your output due to less tool changes and increased Metal Removal Rates (MRR).
- No specific tools for roughing and finishing necessary.
- Less passes due to 1 x D slotting capability.
- Perfect for MQL (Minimum Quantity Lubrication) applications.

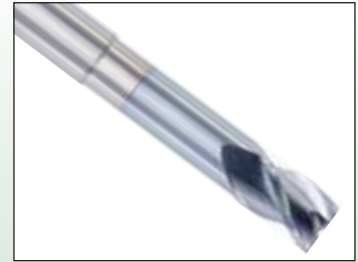
### 4AN2 Series

- 2-flute, 37° helix.
- Extended neck for long-reach applications.
- TiCN coated option for abrasive aluminum applications.
- Sharp corner configuration.



### 4AN3 Series

- 3-flute, 37° helix.
- Extended neck for long-reach applications.
- TiCN coated option for abrasive aluminum applications.
- Sharp corner configuration.



### 4AP2 Series

- 2-flute, 37° helix.
- Sharp corner configuration.



### 4AP3 Series

- 3-flute, 38° helix.
- Unequal flute spacing Radii and sharp corner configuration.



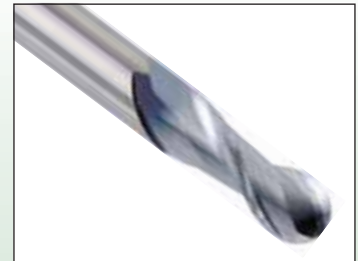
### 4B02 Series

- 2-flute, 30° helix.
- TiCN coated option for abrasive aluminum applications.
- Protective radii configuration.



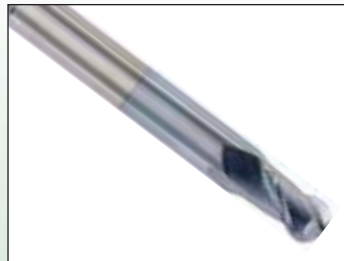
### 4A01 Series

- 2-flute, 37° helix.
- TiCN coated option for abrasive aluminum applications.



### 4AN1 Series

- 2-flute, 37° helix.
- Extended neck for long-reach applications.
- TiCN coated option for abrasive aluminum applications.



### 4A0R Series

- 3-flute, 30° helix.
- Coarse cord style roughing profile.

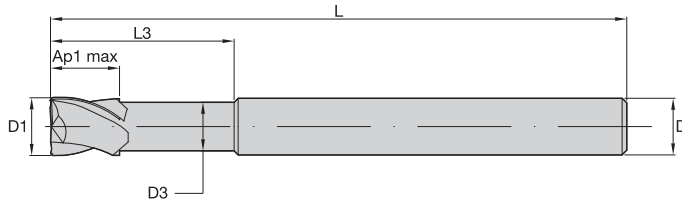
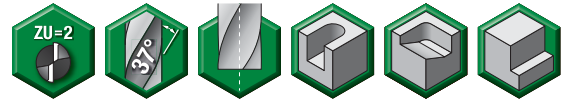


### 4A0B Series

- 3-flute, 30° helix.
- Coarse cord style roughing profile.



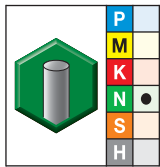
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



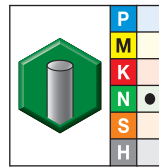
End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

■ Series 4AN2



grade UNCOATED



grade TiCN-CT  
TiCN

- first choice
- alternate choice

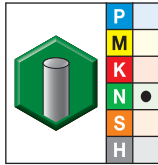
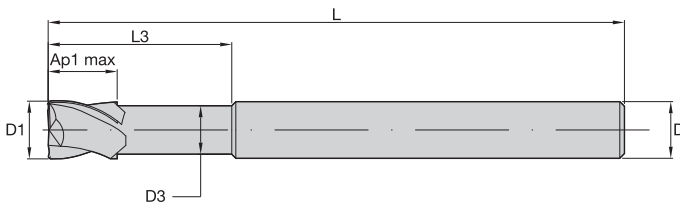
order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2870516	4AN203001	2965251	TC4AN203001	1/8	1/8	.12	1/4	1/2	3
2870513	4AN203011	2950852	TC4AN203011	1/8	1/8	.12	1/4	3/4	3
2870511	4AN203021	3056325	TC4AN203021	1/8	1/8	.12	1/4	1	3
2870509	4AN205000	3035269	TC4AN205000	3/16	3/16	.18	1/4	1/2	3
2870508	4AN205010	3105270	TC4AN205010	3/16	3/16	.18	1/4	3/4	3
2870505	4AN205020	2898545	TC4AN205020	3/16	3/16	.18	1/4	1	3
2870503	4AN207022	2870295	TC4AN207022	1/4	1/4	.24	3/8	1	4
2870501	4AN207032	2950851	TC4AN207032	1/4	1/4	.24	3/8	1 1/2	4
2864276	4AN207012	2842805	TC4AN207012	1/4	1/4	.24	3/8	2 1/4	4
2870500	4AN208003	3320921	TC4AN208003	5/16	5/16	.29	7/16	1	4
2870498	4AN208013	3320922	TC4AN208013	5/16	5/16	.29	7/16	1 1/2	4
2951832	4AN208023	-	-	5/16	5/16	.29	7/16	2	4
2870495	4AN210034	3032084	TC4AN210034	3/8	3/8	.35	1/2	3/4	4
3965508	4AN210024	-	-	3/8	3/8	.34	1/2	1 1/8	2 1/2
2870493	4AN210044	-	-	3/8	3/8	.35	1/2	1 1/8	4
2864265	4AN210014	2842798	TC4AN210014	3/8	3/8	.35	1/2	2 1/4	4
3965513	4AN213055	-	-	1/2	1/2	.47	5/8	1 1/8	3
2870491	4AN213035	3005443	TC4AN213035	1/2	1/2	.47	5/8	1 1/8	5
2870489	4AN213045	3041429	TC4AN213045	1/2	1/2	.47	5/8	1 1/2	5
3965514	4AN213065	-	-	1/2	1/2	.47	5/8	2 1/4	4

(continued)

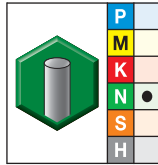
High-Performance Solid Carbide End Mills



(Series 4AN2 — continued)



grade UNCOATED



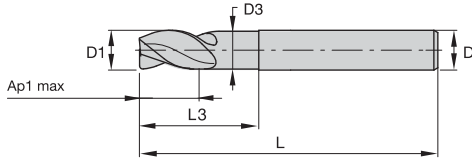
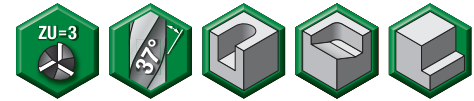
grade TiCN-CT  
TiCN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2864258	4AN213005	2842788	TC4AN213005	1/2	1/2	.47	5/8	2 1/4	5
2864255	4AN213015	2842784	TC4AN213015	1/2	1/2	.47	5/8	3 1/4	6
2864252	4AN213025	2842778	TC4AN213025	1/2	1/2	.47	5/8	4	6
3965515	4AN216026	-		5/8	5/8	.59	3/4	1 1/2	4
2870485	4AN216046	-		5/8	5/8	.59	3/4	1 1/2	5
2864245	4AN216006	2842772	TC4AN216006	5/8	5/8	.59	3/4	2 1/4	5
2864244	4AN216016	2842766	TC4AN216016	5/8	5/8	.59	3/4	3 1/4	6
2870487	4AN216036	2870289	TC4AN216036	5/8	5/8	.59	3/4	4	6
3965516	4AN219027	-		3/4	3/4	.70	1	1 1/2	4
2870481	4AN219057	3133433	TC4AN219057	3/4	3/4	.71	1	1 1/2	6
3965517	4AN219097	-		3/4	3/4	.70	1	2 1/4	4
3965518	4AN219087	-		3/4	3/4	.70	1	2 1/4	5
-		2842754	TC4AN219007	3/4	3/4	.71	1	2 1/4	5
2870477	4AN219077	2870284	TC4AN219077	3/4	3/4	.71	1	2 1/4	6
2870484	4AN219047	3165768	TC4AN219047	3/4	3/4	.71	1	2 3/4	6
2864233	4AN219017	2842749	TC4AN219017	3/4	3/4	.71	1	3 1/4	6
2870479	4AN219067	3367685	TC4AN219067	3/4	3/4	.71	1	4 1/4	7
3965519	4AN225058	-		1	1	.94	1 1/8	1 1/2	4
3048583	4AN225038	3320925	TC4AN225038	1	1	.94	1 1/8	1 1/2	6
3965520	4AN225068	-		1	1	.94	1 1/8	2 1/4	5
2870475	4AN225078	-		1	1	.94	1 1/8	2 1/4	6
2898628	4AN225048	3320926	TC4AN225048	1	1	.94	1 1/8	2 3/4	6
2864212	4AN225018	-		1	1	.94	1 1/8	3 1/4	6
2864209	4AN225028	1902255	TC4AN225028	1	1	.94	1 1/8	4 1/4	7

High-Performance Solid Carbide End Mills

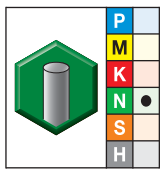
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



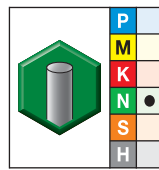
End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0.00024	< 1/8"	0.00024
1/8–7/32"	0.00031	1/8–7/32"	0.00031
1/4–3/8"	0.00035	1/4–3/8"	0.00035
13/32–11/16"	0.00043	13/32–11/16"	0.00043
23/32–1 3/16"	0.00051	23/32–1 3/16"	0.00051

### Series 4AN3



grade UNCOATED



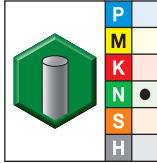
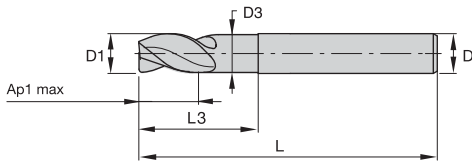
grade TiCN-CT TiCN

- first choice
- alternate choice

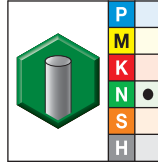
order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2870471	4AN310034	2870278	TC4AN310034	3/8	3/8	.35	1/2	3/4	4
3965521	4AN310024	-	-	3/8	3/8	.34	1/2	1 1/8	2 1/2
2870470	4AN310044	2870275	TC4AN310044	3/8	3/8	.35	1/2	1 1/8	4
2870474	4AN310014	2870281	TC4AN310014	3/8	3/8	.35	1/2	2 1/4	4
3965522	4AN313025	-	-	1/2	1/2	.47	5/8	1 1/8	3
2870463	4AN313035	2870269	TC4AN313035	1/2	1/2	.47	5/8	1 1/8	5
2870461	4AN313045	2870266	TC4AN313045	1/2	1/2	.47	5/8	1 1/2	5
3965523	4AN313055	-	-	1/2	1/2	.47	5/8	2 1/4	4
2870468	4AN313005	2870272	TC4AN313005	1/2	1/2	.47	5/8	2 1/4	5
2870466	4AN313015	2951772	TC4AN313015	1/2	1/2	.47	5/8	3 1/4	5
3965524	4AN316026	-	-	5/8	5/8	.59	3/4	1 1/2	4
2870455	4AN316046	3133261	TC4AN316046	5/8	5/8	.59	3/4	1 1/2	5
2870459	4AN316006	3133262	TC4AN316006	5/8	5/8	.59	3/4	2 1/4	5
2870457	4AN316016	2870263	TC4AN316016	5/8	5/8	.59	3/4	3 1/4	6
3965553	4AN319037	-	-	3/4	3/4	.70	1	1 1/2	4
2870444	4AN319057	3320928	TC4AN319057	3/4	3/4	.71	1	1 1/2	6
3965528	4AN319087	-	-	3/4	3/4	.70	1	2 1/4	4
3965526	4AN319097	-	-	3/4	3/4	.70	1	2 1/4	5
2870438	4AN319077	-	-	3/4	3/4	.71	1	2 1/4	6
2870447	4AN319047	3122745	TC4AN319047	3/4	3/4	.71	1	2 3/4	6

(continued)

(Series 4AN3 — continued)



grade UNCOATED



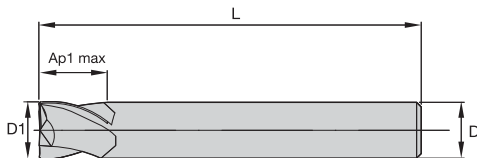
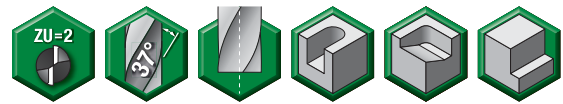
grade TiCN-CT  
TiCN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2870451	4AN319017	2973503	TC4AN319017	3/4	3/4	.71	1	3 1/4	6
2870441	4AN319067	3019217	TC4AN319067	3/4	3/4	.71	1	4 1/4	7
3965529	4AN325058	-	-	1	1	.94	1	1 1/2	4
3965531	4AN325068	-	-	1	1	.94	1	2 1/4	5
2870427	4AN325038	3320929	TC4AN325038	1	1	.94	1 1/8	1 1/2	6
3022868	4AN325078	-	-	1	1	.94	1 1/8	2 1/4	6
2870424	4AN325048	-	-	1	1	.94	1 1/8	2 3/4	6
2870432	4AN325018	-	-	1	1	.94	1 1/8	3 1/4	6
2870430	4AN325028	-	-	1	1	.94	1 1/8	4 1/4	7

High-Performance Solid Carbide End Mills

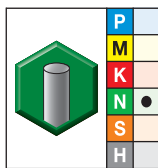
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/00024	< 1/8"	0/00024
1/8-7/32"	0/00031	1/8-7/32"	0/00031
1/4-3/8"	0/00035	1/4-3/8"	0/00035
13/32-11/16"	0/00043	13/32-11/16"	0/00043
23/32-1 3/16"	0/00051	23/32-1 3/16"	0/00051

Series 4AP2



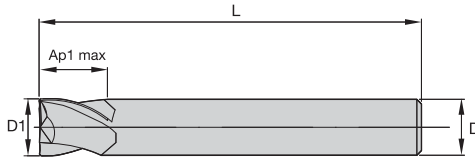
grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L
2870421	4AP203001	1/8	1/8	1/4	3
2870418	4AP205000	3/16	3/16	1/4	3
2870415	4AP207012	1/4	1/4	3/8	4
2870409	4AP210014	3/8	3/8	1/2	4
2870406	4AP213005	1/2	1/2	5/8	5
2870403	4AP216006	5/8	5/8	3/4	5
2870400	4AP216026	5/8	5/8	3/4	8
2870397	4AP219017	3/4	3/4	1	6
2870394	4AP219027	3/4	3/4	1	8
2870391	4AP225018	1	1	1 1/8	6
2870388	4AP225028	1	1	1 1/8	8

High-Performance Solid Carbide End Mills

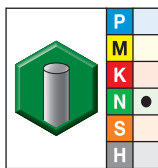
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

■ Series 4AP3



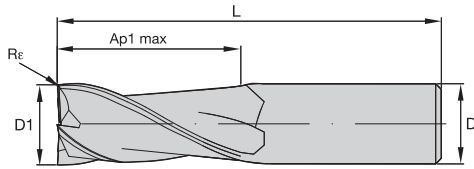
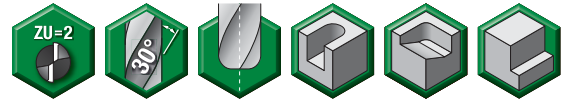
grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L
2870382	4AP310014	3/8	3/8	1/2	4
2870379	4AP313005	1/2	1/2	5/8	5
2870372	4AP316006	5/8	5/8	3/4	5
2870369	4AP319017	3/4	3/4	1	6
2870363	4AP325018	1	1	1 1/8	6

High-Performance Solid Carbide End Mills

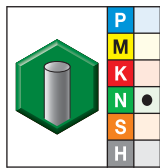
- Center cutting.
- For heavy stock removal.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8-7/32"	0/.00031	1/8-7/32"	0/.00031
1/4-3/8"	0/.00035	1/4-3/8"	0/.00035
13/32-11/16"	0/.00043	13/32-11/16"	0/.00043
23/32-1 3/16"	0/.00051	23/32-1 3/16"	0/.00051

■ Series 4B02



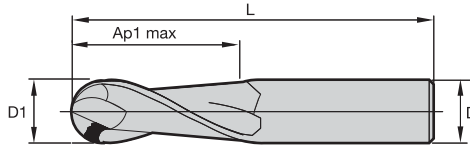
grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε
2864060	4B0207072A	1/4	1/4	3/8	2	.018
2864057	4B0208073A	5/16	5/16	1/2	2	.018
2864051	4B0210074A	3/8	3/8	9/16	2	.018
2864041	4B0213075A	1/2	1/2	3/4	3	.030
2864035	4B0216076A	5/8	5/8	1	3	.030
2864029	4B0219077A	3/4	3/4	1 1/8	4	.030
2864024	4B0225078A	1	1	1 1/2	4	.030

High-Performance Solid Carbide End Mills

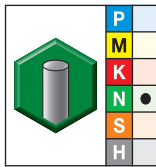
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



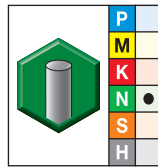
End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8-7/32"	0/.00031	1/8-7/32"	0/.00031
1/4-3/8"	0/.00035	1/4-3/8"	0/.00035
13/32-11/16"	0/.00043	13/32-11/16"	0/.00043
23/32-1 3/16"	0/.00051	23/32-1 3/16"	0/.00051

■ Series 4A01 • Series 4A01 4A11 4A41



grade UNCOATED

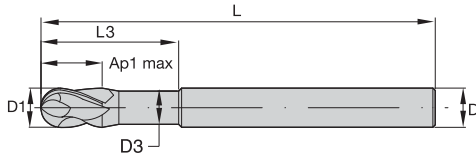


grade TiCN-CT  
TiCN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
2864388	4A4103001	2842903	TC4A4103001	1/8	1/8	1/4	2
2864580	4A0103001	2843170	TC4A0103001	1/8	1/8	1/2	2
2864385	4A4105000	2842899	TC4A4105000	3/16	3/16	5/16	2
2864576	4A0105000	2843165	TC4A0105000	3/16	3/16	5/8	2
2864382	4A4107002	2842891	TC4A4107002	1/4	1/4	3/8	2
2864573	4A0107002	2843160	TC4A0107002	1/4	1/4	3/4	2 1/2
2864482	4A1107002	2843015	TC4A1107002	1/4	1/4	1 1/4	3 1/4
2864570	4A0108003	2898548	TC4A0108003	5/16	5/16	13/16	2 1/2
2864567	4A0110004	2843156	TC4A0110004	3/8	3/8	7/8	2 1/2
2864476	4A1110004	2843006	TC4A1110004	3/8	3/8	1 1/2	4
2864373	4A4113005	2842886	TC4A4113005	1/2	1/2	5/8	2 1/2
2864560	4A0113005	2843149	TC4A0113005	1/2	1/2	1	3
2864558	4A0113015	2843144	TC4A0113015	1/2	1/2	1 1/4	3
2864473	4A1113005	2843001	TC4A1113005	1/2	1/2	2	4
2864370	4A4116006	—	—	5/8	5/8	3/4	3
2864555	4A0116006	2843139	TC4A0116006	5/8	5/8	1 1/4	3 1/2
2864470	4A1116006	—	—	5/8	5/8	2 1/4	5
2864367	4A4119007	—	—	3/4	3/4	7/8	3
2864552	4A0119007	2843134	TC4A0119007	3/4	3/4	1 1/2	4
2864466	4A1119007	—	—	3/4	3/4	2 1/2	5
2864549	4A0125008	2843129	TC4A0125008	1	1	1 1/2	4
2864464	4A1125008	—	—	1	1	2 1/4	5

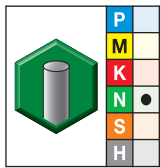
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 +/-
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8-7/32"	0/.00031	1/8-7/32"	0/.00031
1/4-3/8"	0/.00035	1/4-3/8"	0/.00035
13/32-11/16"	0/.00043	13/32-11/16"	0/.00043
23/32-1 3/16"	0/.00051	23/32-1 3/16"	0/.00051

■ Series 4AN1



grade UNCOATED

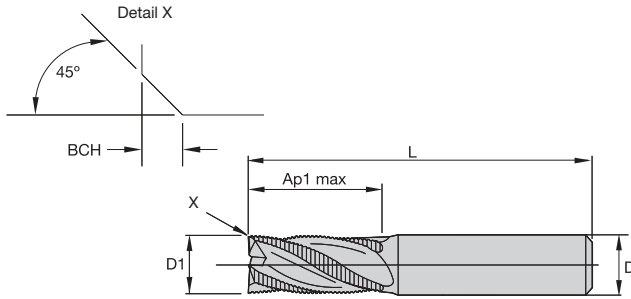
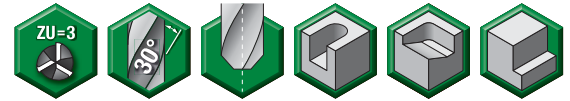
- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2864330	4AN107012	1/4	1/4	.24	3/8	2 1/4	4
2864327	4AN110014	3/8	3/8	.35	1/2	2 1/4	4
2864323	4AN113005	1/2	1/2	.47	5/8	2 1/4	5
2864320	4AN113015	1/2	1/2	.47	5/8	3 1/4	6
2864318	4AN113025	1/2	1/2	.47	5/8	4	6
2864314	4AN116006	5/8	5/8	.59	3/4	2 1/4	5
2864311	4AN116016	5/8	5/8	.59	3/4	3 1/4	6
2864308	4AN116026	5/8	5/8	.59	3/4	4 1/4	7
2864305	4AN119007	3/4	3/4	.71	1	2 1/4	5
2864303	4AN119017	3/4	3/4	.71	1	3 1/4	6
2864300	4AN119027	3/4	3/4	.71	1	4 1/4	7
2864297	4AN125008	1	1	.94	1 1/8	2 1/4	5
2864293	4AN125018	1	1	.94	1 1/8	3 1/4	6
2864291	4AN125028	1	1	.94	1 1/8	4 1/4	7

High-Performance Solid Carbide End Mills



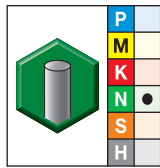
- Center cutting.
- Coarse profile.
- Standard items listed. Additional styles and coatings made-to-order.



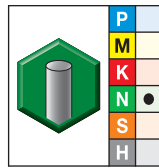
End Mill Tolerances

D1	d11	D	tolerance h6 +/-
< 1/8"	-.0008/-0.0031	< 1/8"	0/0.00024
1/8-7/32"	-.0012/-0.0041	1/8-7/32"	0/0.00031
1/4-3/8"	-.0016/-0.0051	1/4-3/8"	0/0.00035
13/32-11/16"	-.002/-0.0063	13/32-11/16"	0/0.00043
23/32-1 3/16"	-.0026/-0.0077	23-32-1 3/16"	0/0.00051

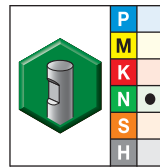
■ Series 4A0R • Series 4A0R 4A1R 4A4R



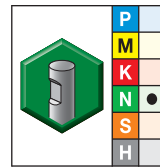
grade UNCOATED



grade TiCN-CT TiCN



grade UNCOATED-WW

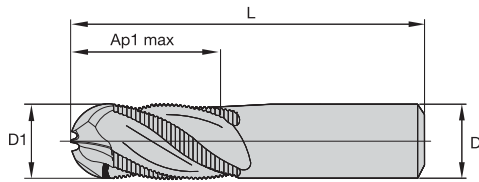


grade TiCN-CW TiCN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH
2864498	4A0R07002	2843045	TC4A0R07002	-	-	-	-	1/4	1/4	3/4	2 1/2	.024
2864345	4A4R10004	-	-	-	-	-	-	3/8	3/8	1/2	2	.024
-	-	-	-	2864495	4A0R10004	2843040	TC4A0R10004	3/8	3/8	7/8	2 1/2	.024
2864342	4A4R13005	-	-	-	-	-	-	1/2	1/2	5/8	2 1/2	.040
-	-	-	-	2864492	4A0R13005	2843035	TC4A0R13005	1/2	1/2	1	3	.040
2864420	4A1R13005	-	-	-	-	2842926	TC4A1R13005	1/2	1/2	2	4 1/2	.040
-	-	-	-	2864490	4A0R16006	2843030	TC4A0R16006	5/8	5/8	1 1/4	3 1/2	.040
2864419	4A1R16006	-	-	-	-	2842921	TC4A1R16006	5/8	5/8	2 1/4	5	.040
-	-	-	-	2864488	4A0R19007	2843025	TC4A0R19007	3/4	3/4	1 1/2	4	.040
2864416	4A1R19007	-	-	-	-	2842915	TC4A1R19007	3/4	3/4	2 1/4	5	.040
-	-	-	-	2864485	4A0R25008	2843020	TC4A0R25008	1	1	1 1/2	4	.040
2864412	4A1R25008	-	-	-	-	2842911	TC4A1R25008	1	1	2 1/4	5	.040

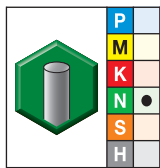
- Center cutting.
- Coarse profile.
- Standard items listed. Additional styles and coatings made-to-order.



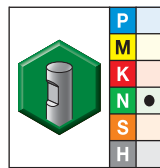
End Mill Tolerances

D1	d11	D	tolerance h6 + / -
< 1/8"	-0.008/-0.0031	< 1/8"	0.00024
1/8-7/32"	-0.012/-0.0041	1/8-7/32"	0.00031
1/4-3/8"	-0.016/-0.0051	1/4-3/8"	0.00035
13/32-11/16"	-0.02/-0.0063	13/32-11/16"	0.00043
23/32-1 3/16"	-0.026/-0.0077	23-32-1 3/16"	0.00051

■ Series 4A0B



grade UNCOATED



grade UNCOATED-WW

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
3320818	4A0B07002	—	—	1/4	1/4	3/4	2 1/2
—	—	3320819	4A0B10004	3/8	3/8	7/8	2 1/2
—	—	3320820	4A0B13005	1/2	1/2	1	3
—	—	3320821	4A0B16006	5/8	5/8	1 1/4	3 1/2
—	—	3320822	4A0B19007	3/4	3/4	1 1/2	4

High-Performance Solid Carbide End Mills

■ Series 4AN2 4AN3 4AP2 4AP3

Material Group	Side Milling (A) and Slotting (B)		uncoated		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.												
	A		B		Cutting Speed – vc SFM		D1 – Diameter										
	ap	ae	ap	ap			frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	ap	min	max	dec.	.125	.188	.250	.313	.375	.500	.625	.750	1.000	
N	1	1 x D	0.5 x D	1.0 x D	1640	–	6560	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100
	2	1 x D	0.5 x D	1.0 x D	1640	–	4920	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
	3	1 x D	0.5 x D	1.0 x D	1640	–	4920	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	4	1 x D	0.5 x D	1.0 x D	1310	–	2460	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	5	1 x D	0.5 x D	1.0 x D	820	–	3280	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090

NOTE: Side milling applications – For longest reach (L3) tools, reduce ae by 30%.  
 Slot milling applications – For longest reach (L3) tools, reduce ap by 30%.  
 For cutting, aluminum with high silicon, coating is recommended.  
 For spindles with ceramic bearings, multiply ap by 0.5.  
 For better surface finish, reduce feed per tooth.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters > 1/2".

Application Data • Series 4B02

■ Series 4B02

Material Group	For Side Milling (A) and Slotting (B)		uncoated		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.											
	A		B		Cutting Speed – vc SFM		D1 – Diameter									
	ap	ae	ap	ap			frac.	1/4	5/16	3/8	1/2	5/8	3/4	1		
	ap	ae	ap	ap	min	max	dec.	.250	.313	.375	.500	.625	.750	1.000		
N	1	1 x D	0.5 x D	1.5 x D	1600	–	6500	IPT	.0100	.0150	.0200	.0300	.0350	.0450	.0500	
	2	1 x D	0.5 x D	1.5 x D	1600	–	4500	IPT	.0100	.0150	.0030	.0300	.0350	.0450	.0500	

NOTE: For cutting aluminum with high silicon, coating is recommended.  
 For spindles with ceramic bearings, multiply ap by 0.5.  
 For better surface finish, reduce feed per tooth.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters > 1/2".

High-Performance Solid Carbide End Mills

■ Series 4A01 4A41

Material Group	Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.										
	A		B	Cutting Speed – vc SFM			D1 – Diameter										
	ap	ae	ap	min		max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	dec.	.1250	.1880	.2500	.3130	.3750	.5000	.6250	.7500	1.000	
N	1	1 x D	0.5 x D	1 x D	1640	–	6560	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100
	2	1 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
	3	1 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	4	1 x D	0.5 x D	1 x D	1310	–	2460	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	5	1 x D	0.5 x D	1 x D	820	–	3280	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090

NOTE: For cutting aluminum with high silicon, coating is recommended.  
 For spindles with ceramic bearings, multiply ap by 0.5.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

■ Series 4A11

Material Group	Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.										
	A		B	Cutting Speed – vc SFM			D1 – Diameter										
	ap	ae	ap	min		max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	dec.	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.000	
N	1	1 x D	0.25 x D	0.5 x D	1640	–	6560	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100
	2	1 x D	0.25 x D	0.5 x D	1640	–	4920	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
	3	1 x D	0.25 x D	0.5 x D	1640	–	4920	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	4	1 x D	0.25 x D	0.5 x D	1310	–	2460	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	5	1 x D	0.25 x D	0.5 x D	820	–	3280	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090

Application Data • Series 4AN1


■ Series 4AN1

Material Group	Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.										
	A		B	Cutting Speed – vc SFM			D1 – Diameter										
	ap	ae	ap	min		max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	dec.	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.000	
N	1	1 x D	0.25 x D	0.5 x D	1640	–	6560	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100
	2	1 x D	0.25 x D	0.5 x D	1640	–	4920	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
	3	1 x D	0.25 x D	0.5 x D	1640	–	4920	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	4	1 x D	0.25 x D	0.5 x D	1310	–	2460	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	5	1 x D	0.25 x D	0.5 x D	820	–	3280	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090

NOTE: Side milling applications – For longest reach (L3) tools, reduce ae by 30%.  
 Slot milling applications – For longest reach (L3) tools, reduce ap by 30%.  
 For cutting aluminum with high silicon, coating is recommended.  
 For spindles with ceramic bearings, multiply ap by 0.5.  
 For better surface finish, reduce feed per tooth.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

High-Performance Solid Carbide End Mills



■ Series 4A0R

Material Group								Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
	Side Milling (A) and Slotting (B)			uncoated			frac.	D1 – Diameter							
	A		B	Cutting Speed – vc SFM				1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	dec.	.2500	.3125	.3750	.5000	.6250	.7500	1.000	
N	1	1.5 x D	0.5 x D	1 x D	1640	–	6560	IPT	.0030	.0038	.0045	.0060	.0075	.0090	.0120
	2	1.5 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0024	.0030	.0036	.0048	.0060	.0072	.0096
	3	1.5 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0021	.0026	.0032	.0042	.0053	.0063	.0084
	4	1.5 x D	0.5 x D	1 x D	1310	–	2460	IPT	.0021	.0026	.0032	.0042	.0053	.0063	.0084
	5	1.5 x D	0.5 x D	1 x D	820	–	3280	IPT	.0027	.0034	.0041	.0054	.0068	.0081	.0108

NOTE: Side milling applications – For longest reach (L3) tools, reduce ae by 30%.  
 Slot milling applications – For longest reach (L3) tools, reduce ap by 30%.  
 For cutting aluminum with high silicon, coating is recommended.  
 For spindles with ceramic bearings, multiply ap by 0.5.  
 For better surface finish, reduce feed per tooth.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

Application Data • Series 4A0B

■ Series 4A0B

Material Group								Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
	Side Milling (A) and Slotting (B)			uncoated			frac.	D1 – Diameter							
	A		B	Cutting Speed – vc SFM				1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	dec.	.2500	.3125	.3750	.5000	.6250	.7500	1.000	
N	1	1.5 x D	0.5 x D	1 x D	1640	–	6560	IPT	.0028	.0034	.0041	.0055	.0069	.0083	.0110
	2	1.5 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0022	.0028	.0033	.0044	.0055	.0066	.0088
	3	1.5 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0019	.0024	.0029	.0039	.0048	.0058	.0077
	4	1.5 x D	0.5 x D	1 x D	1310	–	2460	IPT	.0019	.0024	.0029	.0039	.0048	.0058	.0077
	5	1.5 x D	0.5 x D	1 x D	820	–	3280	IPT	.0025	.0031	.0037	.0050	.0062	.0074	.0099

NOTE: For cutting aluminum with high silicon, coating is recommended.  
 For spindles with ceramic bearings, multiply ap by 0.5.  
 For better surface finish, reduce feed per tooth.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

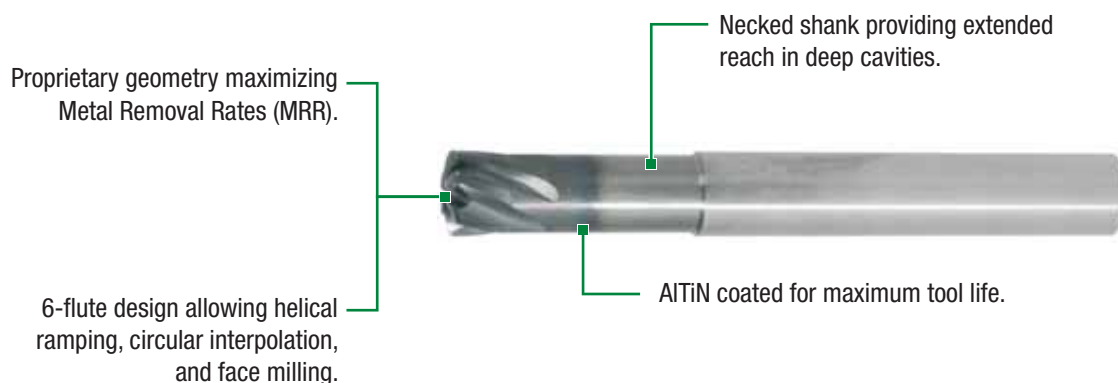
## X-Feed™ End Mills for High-Feed Milling

# X-Feed



X-Feed significantly reduces manufacturing time machining heat-treated steels up to 67 HRC hardness, having 50% more effective cutting edges than regular solid carbide tooling. X-Feed combines roughing and semi-finishing into one operation by taking shallow depths-of-cut at extremely high feed rates, maximizing Metal Removal Rates (MRR). X-Feed, which has a 3 x D neck and extended reach design, is perfectly suited for pocketing using 3D machining techniques such as ramping and helical interpolation. During face milling, the proprietary front-end geometry of X-Feed is entirely in contact with the workpiece, providing up to 55% engagement compared to the regular 5–10% provided by ball nose-type tooling.

- Proprietary 6-flute design for high productivity.
- One tool for roughing and semi-finishing operations.
- Covering hardened materials ranging from 37–67 HRC with two dedicated geometries.
- Custom solutions tailored for machining titanium and other high-temperature alloys available.



**X-Feed™ Series**

- Significantly reduces manufacturing time in machining hardened steels.
- Providing the benefits of indexable style high-feed milling starting as small as 1/4".
- Increases your capability to perform 3D machining, helical ramping, circular interpolation, face milling, and pocketing.
- One tool for roughing and semi-finishing.

**7FN6 Series**

- 6-flute.
- Extended neck for long-reach applications.
- Applicable for hardened steels from 40–52 HRC.



**7FN7 Series**

- 6-flute.
- Extended neck for long-reach applications.
- Applicable for hardened steels from 50–67 HRC.

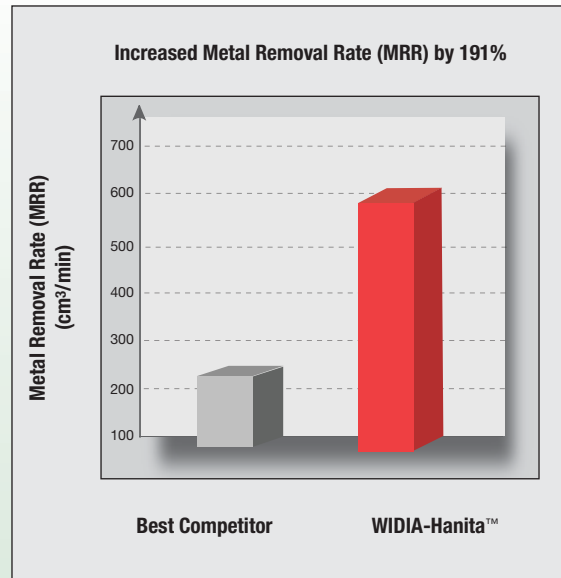


**Operation:** Pocket Milling  
**Customer:** Die and Mold Manufacturer  
**Material:** AISI 4340 hardened steel (52 HRC)  
**Workpiece:** Mold  
**Results:**

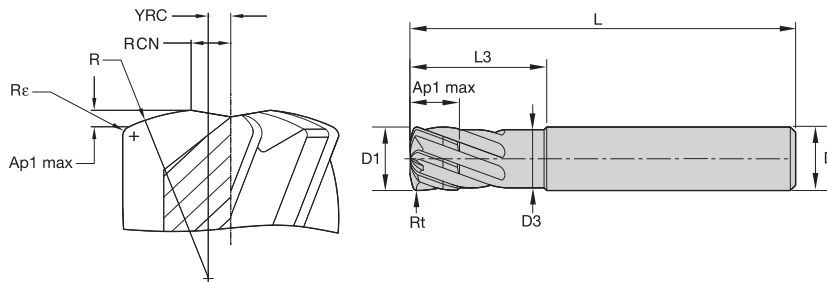
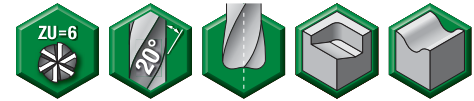
- 3x better Metal Removal Rate (MRR) than competitive tool!
- Machined at more than 3x faster feed!

	COMPETITOR	WIDIA-Hanita™
tool:	6-flute H/P for die & mold	TM7FN613005
material:	medium-hardened steel (52 HRC)	medium-hardened steel (52 HRC)
surface speed:	400 SFM (120 m/min)	530 SFM (160 m/min)
feed per tooth:	.013" (0,34mm)	.013" (0,34mm)
depth of cut:	.031" (0,8mm)	.023" (0,6mm)
table feed:	170 in/min (4,331 mm/min)	600 in/min (15,287 mm/min)
metal removal rate:	1.4 in <sup>3</sup> (22,8 cm <sup>3</sup> )	3.7 in <sup>3</sup> (60,5 cm <sup>3</sup> )

Individual results may vary.



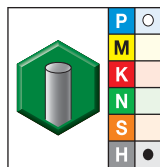
- Non-center cutting.
- High feed.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+ .000 / - .002	< 1/8"	0 / .00024
		1/8–7/32"	0 / .00031
		1/4–3/8"	0 / .00035
		13/32–11/16"	0 / .00043
		23/32–1 3/16"	0 / .00051

### Series 7FN6 • 37–52 HRC • Vision Plus X-Feed



grade AlTiN-MT1  
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rt
3484760	TM7FN607002	1/4	1/4	.21	.013	3/4	2 1/2	.027
3484761	TM7FN608003	5/16	5/16	.27	.017	1	3	.034
3484762	TM7FN610004	3/8	3/8	.34	.020	1 1/4	3 1/2	.040
3484763	TM7FN613005	1/2	1/2	.46	.027	1 1/2	4	.054
3484764	TM7FN616006	5/8	5/8	.59	.033	2	4 1/2	.067
3484765	TM7FN619007	3/4	3/4	.71	.040	2 1/2	5	.080

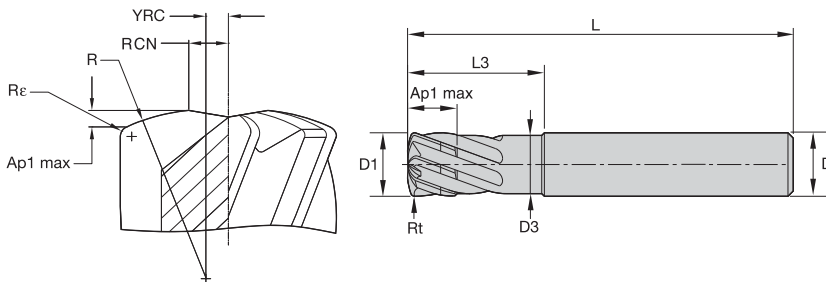
NOTE: YRC = distance from center line to the crown of the R radius.  
 RCN = distance from center line to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.  
 R = the head radius size.  
 R<sub>c</sub> = the shoulder radius or radius at the corner of the cutter.

### Programming Data

Tool List 7FN6															
Geometrical Parameters									Ramping Guide for Circular and Linear Interpolation						
									Circular Interpolation		Linear Interpolation				
									Allowed Range of Hole Diameter		Calculated Length (mm) per Ramp Angle				
diameter	Ap1 max	Rfm	Rt	Rc	Xfm	Yfm	YD	Number	Smallest	Largest	Ramp Angle (degree)				
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	flutes			1	2	3	4	5
1/4	0.0133	1/4	0.0269	0.0160	0.0133	0.0313	0.0525	6	0.355	0.5	0.76	0.38	0.25	0.19	0.15
5/16	0.0166	5/16	0.0336	0.0200	0.0166	0.0391	0.0656	6	0.44375	0.625	0.95	0.48	0.32	0.24	0.19
3/8	0.0200	3/8	0.0399	0.0235	0.0200	0.0469	0.0788	6	0.5325	0.75	1.14	0.57	0.38	0.29	0.23
1/2	0.0266	1/2	0.0538	0.0320	0.0266	0.0625	0.1050	6	0.71	1	1.52	0.76	0.51	0.38	0.30
5/8	0.0333	5/8	0.0672	0.0400	0.0333	0.0781	0.1313	6	0.8875	1.25	1.91	0.95	0.63	0.48	0.38
3/4	0.0399	3/4	0.0798	0.0470	0.0399	0.0938	0.1575	6	1.065	1.5	2.29	1.14	0.76	0.57	0.46
1	0.0532	1	0.1059	0.0620	0.0532	0.1250	0.2100	6	1.42	2	3.05	1.52	1.02	0.76	0.61
Recommended Feed											100%	70%	50%	30%	10%



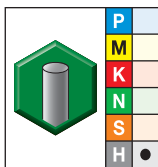
- Non-center cutting.
- High feed.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+ .000/- .002	< 1/8"	0/.00024
		1/8-7/32"	0/.00031
		1/4-3/8"	0/.00035
		13/32-11/16"	0/.00043
		23/32-1 3/16"	0/.00051

■ Series 7FN7 • >52 HRC • Vision Plus X-Feed



grade AITiN-MT1  
AITiN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rt
3484767	TM7FN707002	1/4	1/4	.21	.008	3/4	2 1/2	.024
3484768	TM7FN708003	5/16	5/16	.27	.010	1	3	.030
3484769	TM7FN710004	3/8	3/8	.34	.012	1 1/4	3 1/2	.036
3484770	TM7FN713005	1/2	1/2	.46	.016	1 1/2	4	.048
3484771	TM7FN716006	5/8	5/8	.59	.021	2	4 1/2	.061
3484772	TM7FN719007	3/4	3/4	.71	.025	2 1/2	5	.072

NOTE: YRC = distance from center line to the crown of the R radius.  
 RCN = distance from center line to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.  
 R = the head radius size.  
 Re = the shoulder radius or radius at the corner of the cutter.

■ Programming Data



Tool List 7FN7																
Geometrical Parameters									Ramping Guide for Circular and Linear Interpolation							
									Circular Interpolation				Linear Interpolation			
									Allowed Range of Hole Diameter				Calculated Length (mm) per Ramp Angle			
diameter	Ap1 max	Rfm	Rt	Rc	Xfm	Yfm	YD	Number	Smallest	Largest	Ramp Angle (degree)					
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	flutes			1	2	3	4	5	
1/4	.0082	3/8	.0242	.0160	.0082	.0313	.0550	6	0.36	0.5	0.47	0.24	0.16	0.12	0.09	
5/16	.0103	1/2	.0303	.0200	.0103	.0391	.0688	6	0.45	0.625	0.59	0.29	0.20	0.15	0.12	
3/8	.0123	9/16	.0358	.0240	.0123	.0469	.0825	6	0.54	0.75	0.71	0.35	0.24	0.18	0.14	
1/2	.0164	3/4	.0484	.0320	.0164	.0625	.1100	6	0.72	1	0.94	0.47	0.31	0.23	0.19	
5/8	.0205	15/16	.0605	.0400	.0205	.0781	.1375	6	0.9	1.25	1.18	0.59	0.39	0.29	0.23	
3/4	.0246	1 1/8	.0716	.0470	.0246	.0938	.1650	6	1.08	1.5	1.41	0.71	0.47	0.35	0.28	
1	.0328	1 1/2	.0948	.0620	.0328	.1250	.2200	6	1.44	2	1.88	0.94	0.63	0.47	0.38	
Recommended Feed											100%	70%	50%	30%	10%	

■ Series 7FN6 • Vision Plus X-Feed

Material Group							Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A)						
		Profile Milling		AlTiN			D1 – Diameter						
		A		Cutting Speed – vc SFM			frac.	1/4	5/16	3/8	1/2	5/8	3/4
		ap	ae	min		max	dec.	.2500	.3130	.3750	.5000	.6250	.7500
P	4	0.05 x D	0.55 x D	528	–	594	IPT	.0130	.0160	.0190	.0250	.0260	.0280
	1	0.05 x D	0.55 x D	462	–	528	IPT	.0130	.0160	.0190	.0250	.0260	.0280
H	2	0.05 x D	0.55 x D	330	–	396	IPT	.0080	.0090	.0110	.0150	.0190	.0230

High-Performance Solid Carbide End Mills

■ Series 7FN7 • Vision Plus X-Feed

Material Group													
		Profile Milling		AlTiN			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)						
		A		Cutting Speed – vc SFM			D1 – Diameter						
		ap	ae	min		max	frac.	1/4	5/16	3/8	1/2	5/8	3/4
					dec.	0.250	0.313	0.375	0.500	0.625	0.750		
H	2	0.03 x D	0.55 x D	330	–	396	IPT	.0080	.0090	.0110	.0150	.0190	.0230
	3	0.03 x D	0.55 x D	265	–	330	IPT	.0080	.0090	.0110	.0150	.0190	.0230
	4	0.03 x D	0.55 x D	165	–	230	IPT	.0060	.0080	.0090	.0130	.0160	.0190

High-Performance Solid Carbide End Mills •  
**Vision Plus™**

# Vision Plus



Engineered to machine hardened steels up to 67 HRC at extreme speeds and feeds, Vision Plus solid carbide end mills are designed with a special substrate and geometries to extend tool life and lower manufacturing costs. Vision Plus end mills offer a complete portfolio for the die and mold industry or any application that requires machining of hardened workpiece materials. Vision Plus end mills will make your next application in hardened materials more productive and efficient.

- Capable of machining hardened steels up to 67 HRC.
- Complete line of Vision Plus micro end mills.
- Unique design allows higher feeds and speeds, increasing Metal Removal Rates (MRR).
- Wide range of diameters from 0.012–1" (0,3–25mm).
- AlTiN coating for maximum wear resistance.



## Vision Plus™ Series

- Machine hardened materials up to 67 HRC.
- Long overall length for deep-reach applications.
- Reinforced core for better rigidity.
- High helix for better surface finishes.

### 7N02 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Extended neck for long-reach applications.
- JIS.
- Sharp corner.
- 0,3–3,1mm diameter range.



### 423034 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- 0,5–3mm diameter range.



### 7N01 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- JIS.
- 0,3–6mm diameter range.



### 7N21 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- Extended neck for long-reach applications.
- 0,5–3mm diameter range.



### 7S05 Series

- Center cutting.
- 4-, 5-, and 6-flutes.
- 50° helix.
- Sharp corner.
- 1/4–1" diameter range.



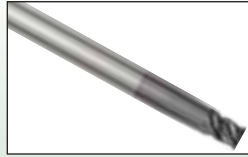
### 7S5F Series

- Center cutting.
- 4-flute.
- 15° helix.
- Ball nose.
- 1/8–3/4" diameter range.



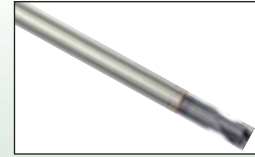
### 7S7R Series

- Center cutting.
- 3-, 4-, and 6-flutes.
- 45° helix.
- Roughing end mill.
- Works in multiple materials.
- 5/32–1" diameter range.



### 75N2 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Radii corner.
- Extended neck for long-reach applications.
- 3–12mm diameter range.



### 422875 Series

- Center cutting.
- 2-flute.
- 20° helix.
- Extended neck for long-reach applications.
- Torus corner.
- 2–12mm diameter range.



### 7151 Series

- Center cutting.
- 2-flute.
- 15° helix.
- Ball nose.
- 1–20mm diameter range.



### 7061 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- Extended neck for long-reach applications.
- 1–12mm diameter range.



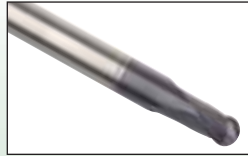
### 70N1 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- Extended neck for long-reach applications.
- 1–12mm diameter range.



### 422869 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- Extended neck for long-reach applications.
- 1–16mm diameter range.



### 422870 Series

- Center cutting.
- 2-flute.
- 20° helix.
- Ball nose.
- Extended neck for long-reach applications.
- 2–12mm diameter range.

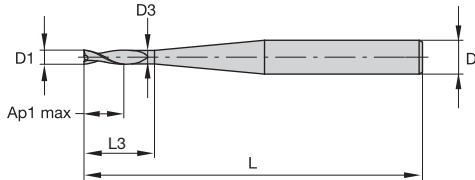


### 422873 Series

- Center cutting.
- 2-flute.
- 0° helix.
- Extended neck for long-reach applications.
- 3–10mm diameter range.



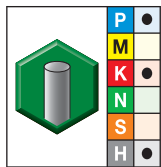
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



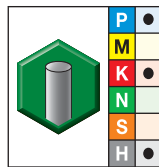
End Mill Tolerances

D1	tolerance e8	D	tolerance h6 +/-
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

Series 7N02 7N12 7N22 • Vision Plus Micro



grade AlTiN-MJ1  
AlTiN



grade TiAlN-RJ1  
TiAlN

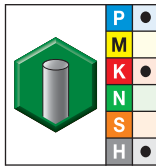
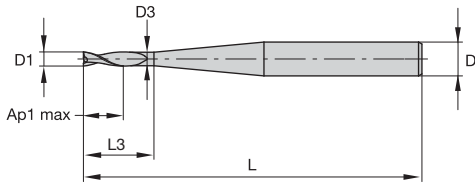
- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3321518	7N0200302MJ	2256390	7N0200302RJ	0,3	6	0,84	0,40	0,40	50
3321529	7N2200400MJ	2256438	7N2200400RJ	0,4	3	0,34	0,60	2,00	38
3321530	7N2200410MJ	2256439	7N2200410RJ	0,4	3	0,34	0,60	4,00	38
	—	2256391	7N0200402RJ	0,4	6	0,84	0,60	0,60	50
3089244	7N0200402MJ	—	—	0,4	6	—	0,60	0,60	50
3321531	7N2200500MJ	2256440	7N2200500RJ	0,5	3	0,44	0,70	2,00	38
3321532	7N2200510MJ	2256441	7N2200510RJ	0,5	3	0,44	0,70	4,00	38
3321533	7N2200520MJ	2256442	7N2200520RJ	0,5	3	0,44	0,70	6,00	38
3321519	7N0200502MJ	2256392	7N0200502RJ	0,5	6	0,44	0,70	1,50	50
3089248	7N1200502MJ	2256403	7N1200502RJ	0,5	6	0,44	0,70	2,50	60
3321534	7N2200600MJ	2256443	7N2200600RJ	0,6	3	0,54	0,90	2,00	38
3321535	7N2200610MJ	2256444	7N2200610RJ	0,6	3	0,54	0,90	4,00	38
3321536	7N2200620MJ	2256445	7N2200620RJ	0,6	3	0,54	0,90	6,00	38
3321520	7N0200602MJ	2256393	7N0200602RJ	0,6	6	0,54	0,90	1,80	50
3089249	7N1200602MJ	2256404	7N1200602RJ	0,6	6	0,54	0,90	3,00	60
3321537	7N2200701MJ	2256446	7N2200701RJ	0,7	4	0,64	1,00	2,00	50
3321538	7N2200711MJ	2256447	7N2200711RJ	0,7	4	0,64	1,00	4,00	50
3321539	7N2200721MJ	2256448	7N2200721RJ	0,7	4	0,64	1,00	6,00	50
3321540	7N2200801MJ	2256449	7N2200801RJ	0,8	4	0,74	1,20	4,00	50
3321541	7N2200811MJ	2256450	7N2200811RJ	0,8	4	0,74	1,20	6,00	50

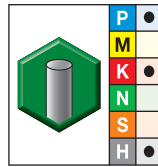
(continued)

High-Performance Solid Carbide End Mills

(Series 7N02 7N12 7N22 • Vision Plus Micro – continued)



grade AlTiN-MJ1  
AlTiN



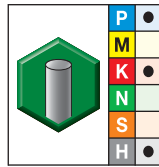
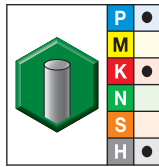
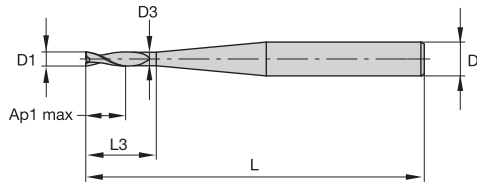
grade TiAlN-RJ1  
TiAlN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3321542	7N2200821MJ	2256451	7N2200821RJ	0,8	4	0,74	1,20	8,00	50
3321521	7N0200802MJ	2256394	7N0200802RJ	0,8	6	0,74	1,20	2,40	50
3089250	7N1200802MJ	2256405	7N1200802RJ	0,8	6	0,74	1,20	4,00	60
3321543	7N2200901MJ	2256452	7N2200901RJ	0,9	4	0,84	1,35	6,00	50
3321544	7N2200911MJ	2256453	7N2200911RJ	0,9	4	0,84	1,35	8,00	50
3321545	7N2200921MJ	2256454	7N2200921RJ	0,9	4	0,84	1,35	10,00	50
3321546	7N2201001MJ	2256455	7N2201001RJ	1,0	4	0,94	1,50	6,00	50
3321547	7N2201011MJ	2256456	7N2201011RJ	1,0	4	0,94	1,50	8,00	50
3321548	7N2201021MJ	2256457	7N2201021RJ	1,0	4	0,94	1,50	10,00	50
3321549	7N2201031MJ	2256458	7N2201031RJ	1,0	4	0,94	1,50	12,00	50
3089245	7N0201002MJ	2256395	7N0201002RJ	1,0	6	0,94	1,50	2,50	50
3089251	7N1201002MJ	2256406	7N1201002RJ	1,0	6	0,94	1,50	5,00	60
3321550	7N2201201MJ	2256459	7N2201201RJ	1,2	4	1,14	1,50	6,00	50
3321551	7N2201211MJ	2256460	7N2201211RJ	1,2	4	1,14	1,80	8,00	50
3321552	7N2201221MJ	2256461	7N2201221RJ	1,2	4	1,14	1,80	10,00	50
3321553	7N2201231MJ	2256462	7N2201231RJ	1,2	4	1,14	1,80	12,00	50
3321522	7N0201202MJ	2256396	7N0201202RJ	1,2	6	1,14	1,80	3,00	50
3089252	7N1201202MJ	2256407	7N1201202RJ	1,2	6	1,14	1,80	6,00	60
3321554	7N2201401MJ	2256463	7N2201401RJ	1,4	4	1,34	2,10	6,00	50
3321555	7N2201411MJ	2256464	7N2201411RJ	1,4	4	1,34	2,10	8,00	50
3321556	7N2201421MJ	—	—	1,4	4	1,34	2,10	10,00	50
3321557	7N2201431MJ	2256466	7N2201431RJ	1,4	4	1,34	2,10	12,00	50
3321558	7N2201441MJ	2256467	7N2201441RJ	1,4	4	1,34	2,10	16,00	50
—	—	2256465	7N2201421RJ	1,4	4	1,35	2,10	10,00	50
3089246	7N0201402MJ	2256397	7N0201402RJ	1,4	6	1,34	2,10	3,50	50
3321527	7N1201402MJ	2256408	7N1201402RJ	1,4	6	1,34	2,10	7,00	60
—	—	3454427	7N2201561RJ	1,5	4	1,44	2,30	5,70	50
3321559	7N2201501MJ	2256468	7N2201501RJ	1,5	4	1,44	2,30	6,00	50
3321560	7N2201511MJ	2256469	7N2201511RJ	1,5	4	1,44	2,30	10,00	50
3321561	7N2201521MJ	2256470	7N2201521RJ	1,5	4	1,44	2,30	12,00	50
3321562	7N2201531MJ	2256471	7N2201531RJ	1,5	4	1,44	2,30	16,00	50
3321563	7N2201541MJ	2256472	7N2201541RJ	1,5	4	1,44	2,30	18,00	63

(continued)

(Series 7N02 7N12 7N22 • Vision Plus Micro — continued)



● first choice  
○ alternate choice

grade AlTiN-MJ1  
AlTiN

grade TiAlN-RJ1  
TiAlN

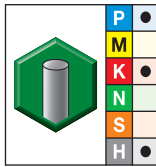
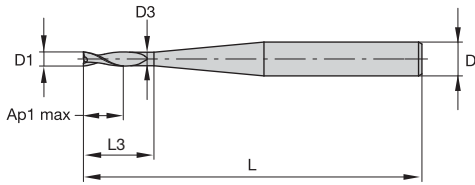
order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3321564	7N2201551MJ	2256473	7N2201551RJ	1,5	4	1,44	2,30	20,00	63
3321523	7N0201502MJ	2256398	7N0201502RJ	1,5	6	1,44	2,30	3,80	50
3089253	7N1201502MJ	2256409	7N1201502RJ	1,5	6	1,44	2,30	7,50	60
3321566	7N2201611MJ	2256475	7N2201611RJ	1,6	4	1,54	2,40	10,00	50
3321567	7N2201621MJ	2256476	7N2201621RJ	1,6	4	1,54	2,40	12,00	50
3321568	7N2201631MJ	2256477	7N2201631RJ	1,6	4	1,54	2,40	16,00	50
3321569	7N2201641MJ	2256478	7N2201641RJ	1,6	4	1,54	2,40	20,00	63
—	—	3454428	7N2201571RJ	1,6	4	1,54	2,80	11,70	50
3321565	7N2201601MJ	2256474	7N2201601RJ	1,6	4	1,57	2,40	6,00	50
3321524	7N0201602MJ	2256399	7N0201602RJ	1,6	6	1,54	2,40	4,00	50
3321528	7N1201602MJ	2256410	7N1201602RJ	1,6	6	1,54	2,40	8,00	60
3321570	7N2201701MJ	2256479	7N2201701RJ	1,7	4	1,64	2,60	6,00	50
3321571	7N2201711MJ	2256480	7N2201711RJ	1,7	4	1,64	2,60	10,00	50
3321572	7N2201721MJ	2256481	7N2201721RJ	1,7	4	1,64	2,60	12,00	50
3321573	7N2201731MJ	2256482	7N2201731RJ	1,7	4	1,64	2,60	16,00	50
3321574	7N2201741MJ	2256483	7N2201741RJ	1,7	4	1,64	2,60	20,00	63
3321575	7N2201801MJ	2256484	7N2201801RJ	1,8	4	1,74	2,70	6,00	50
3321576	7N2201811MJ	2256485	7N2201811RJ	1,8	4	1,74	2,70	10,00	50
3321577	7N2201821MJ	2256486	7N2201821RJ	1,8	4	1,74	2,70	12,00	50
3321578	7N2201831MJ	2256487	7N2201831RJ	1,8	4	1,74	2,70	16,00	50
3321579	7N2201841MJ	2256488	7N2201841RJ	1,8	4	1,74	2,70	20,00	63
3321525	7N0201802MJ	2256400	7N0201802RJ	1,8	6	1,74	2,70	4,50	50
3089254	7N1201802MJ	2256411	7N1201802RJ	1,8	6	1,74	2,70	9,00	60
3321580	7N2201901MJ	2256489	7N2201901RJ	1,9	4	1,84	2,80	6,00	50
3321581	7N2201911MJ	2256490	7N2201911RJ	1,9	4	1,84	2,80	10,00	50
3321582	7N2201921MJ	2256491	7N2201921RJ	1,9	4	1,84	2,80	12,00	50
3321583	7N2201931MJ	2256492	7N2201931RJ	1,9	4	1,84	2,80	16,00	50
3321584	7N2201941MJ	2256493	7N2201941RJ	1,9	4	1,84	2,80	20,00	63
3321585	7N2202001MJ	2256494	7N2202001RJ	2,0	4	1,96	3,00	6,00	50
3321586	7N2202011MJ	2256495	7N2202011RJ	2,0	4	1,96	3,00	10,00	50
3321587	7N2202021MJ	2256496	7N2202021RJ	2,0	4	1,96	3,00	16,00	50
3321588	7N2202031MJ	2256497	7N2202031RJ	2,0	4	1,96	3,00	20,00	63

(continued)

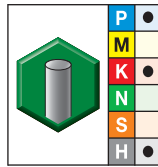
High-Performance Solid Carbide End Mills



(Series 7N02 7N12 7N22 • Vision Plus Micro – continued)



grade AlTiN-MJ1  
AlTiN



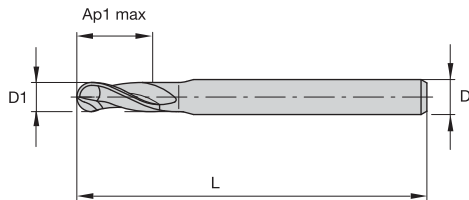
grade TiAlN-RJ1  
TiAlN

● first choice  
○ alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3321589	7N2202041MJ	2256498	7N2202041RJ	2,0	4	1,96	3,00	20,00	75
3089247	7N0202002MJ	2256401	7N0202002RJ	2,0	6	1,96	3,00	5,00	50
3089255	7N1202002MJ	2256412	7N1202002RJ	2,0	6	1,96	3,00	10,00	60
—	—	3454429	7N2202051RJ	2,1	4	2,00	3,00	8,00	50
—	—	3454430	7N2202061RJ	2,1	4	2,00	3,00	12,00	50
—	—	3454431	7N2202071RJ	2,1	4	2,00	3,00	14,00	50
—	—	3454432	7N2202091RJ	2,1	4	2,00	3,00	25,00	63
3321590	7N2202501MJ	2256499	7N2202501RJ	2,5	4	2,40	3,70	8,00	50
3321591	7N2202511MJ	2256500	7N2202511RJ	2,5	4	2,40	3,70	10,00	50
3321592	7N2202521MJ	2256501	7N2202521RJ	2,5	4	2,44	3,70	16,00	63
3321593	7N2202531MJ	2256502	7N2202531RJ	2,5	4	2,44	3,70	20,00	63
3321594	7N2202541MJ	2256503	7N2202541RJ	2,5	4	2,44	3,70	30,00	80
3321526	7N0202502MJ	2256402	7N0202502RJ	2,5	6	2,44	3,70	5,00	50
3089256	7N1202502MJ	2256413	7N1202502RJ	2,5	6	2,44	3,70	12,50	60
3321595	7N2203002MJ	2256504	7N2203002RJ	3,0	6	2,94	4,50	8,00	50
3321596	7N2203012MJ	2256505	7N2203012RJ	3,0	6	2,94	4,50	10,00	50
3321597	7N2203022MJ	2256506	7N2203022RJ	3,0	6	2,94	4,50	16,00	63
3321598	7N2203032MJ	2256507	7N2203032RJ	3,0	6	2,94	4,50	20,00	63
3321599	7N2203042MJ	2256508	7N2203042RJ	3,0	6	2,94	4,50	20,00	80
—	—	3454433	7N2203052RJ	3,1	6	3,00	4,50	12,00	50
—	—	3454434	7N2203062RJ	3,1	6	3,00	4,50	25,00	76

High-Performance Solid Carbide End Mills

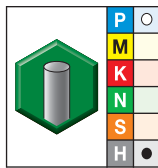
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance h8 + / -	D	tolerance h6 + / -
≤ 3	0/0,014	≤ 3	0/0,006
> 3-6	0/0,018	> 3-6	0/0,008
> 6-10	0/0,022	> 6-10	0/0,009
> 10-18	0/0,027	> 10-18	0/0,011
> 18-30	0/0,033	> 18-30	0/0,013

### Series 423034 • Vision Plus Micro



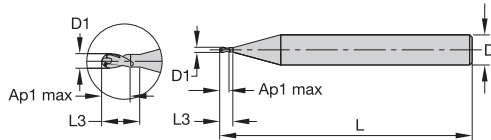
- first choice
- alternate choice

grade K10UF-DCHP  
AITiN

order #	catalog #	D1	D	length of cut Ap1 max	length L
2343490	423034-000005	0,5	3	1,50	38
2343492	423034-000006	0,6	3	1,60	38
2343494	423034-000008	0,8	3	1,80	38
2343496	423034-000010	1,0	3	2,00	38
2343498	423034-000012	1,2	3	2,20	38
2343500	423034-000015	1,5	3	2,50	38
2343502	423034-000020	2,0	3	3,00	38
2343504	423034-000025	2,5	3	4,00	38
2343506	423034-000030	3,0	3	5,00	38

High-Performance Solid Carbide End Mills

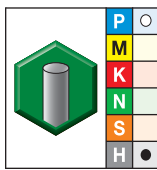
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



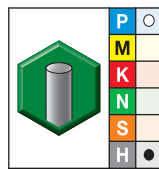
End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

■ Series 7N01 • Vision Plus Micro



grade AlTiN-MJ1  
AlTiN



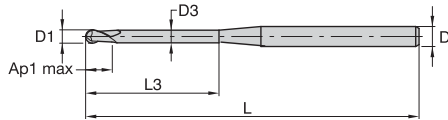
grade TiAlN-RJ1  
TiAlN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3321510	7N0100302MJ	2256358	7N0100302RJ	0,3	6	—	0,30	0,30	50
3321511	7N0100402MJ	2256359	7N0100402RJ	0,4	6	—	0,40	0,40	50
3089237	7N0100502MJ	2256360	7N0100502RJ	0,5	6	0,45	0,50	1,50	50
3089238	7N0100602MJ	2256361	7N0100602RJ	0,6	6	0,55	0,60	1,80	50
3321512	7N0100802MJ	2256362	7N0100802RJ	0,8	6	0,75	0,80	2,40	50
3321513	7N0101002MJ	2256363	7N0101002RJ	1,0	6	0,95	2,50	2,50	50
3089239	7N0101202MJ	2256364	7N0101202RJ	1,2	6	1,15	1,20	3,00	50
3089240	7N0101402MJ	2256365	7N0101402RJ	1,4	6	1,35	1,40	3,50	50
3321514	7N0101502MJ	2256366	7N0101502RJ	1,5	6	1,45	1,50	3,80	50
3089241	7N0101602MJ	2256367	7N0101602RJ	1,6	6	1,55	1,60	4,00	50
3089242	7N0101802MJ	2256368	7N0101802RJ	1,8	6	1,75	1,80	4,50	50
3321515	7N0102002MJ	2256369	7N0102002RJ	2,0	6	1,95	2,00	5,00	50
3321516	7N0102502MJ	2256370	7N0102502RJ	2,5	6	2,40	2,50	5,00	50
3321517	7N0103002MJ	2256371	7N0103002RJ	3,0	6	2,85	3,00	6,00	50
3089243	7N0104002MJ	2256372	7N0104002RJ	4,0	6	3,85	4,00	6,00	50
3091240	7N0106002MJ	2256373	7N0106002RJ	6,0	6	5,85	6,00	9,00	50

High-Performance Solid Carbide End Mills

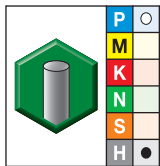
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

### Series 7N21 • Vision Plus Micro





grade TiAlN-RT1  
TiAlN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3665122	7N2100501RT	0,5	4	0,44	1,00	5,00	63
3665140	7N2100601RT	0,6	4	0,54	1,00	6,00	63
3665141	7N2100801RT	0,8	4	0,74	1,30	8,00	63
3665142	7N2101001RT	1,0	4	0,94	1,60	10,00	63
3665163	7N2101201RT	1,2	4	1,14	1,90	12,00	63
3665164	7N2101501RT	1,5	4	1,44	2,40	16,00	63
3665166	7N2102001RT	2,0	4	1,94	3,20	20,00	63
3665167	7N2102501RT	2,5	4	2,44	3,80	25,00	63
3665168	7N2103001RT	3,0	4	2,90	4,50	30,00	63

■ Series 7N02 7N12 7N22 • Vision Plus Micro

Material Group																		
	Side Milling (A) and Slotting (B)			AlTiN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.											
	A		B	Cutting Speed – vc SFM			D1 – Diameter											
	ap	ae	ap	min	–	max	mm	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	
P	0	1.25 x D	0.25 x D	0.75 x D	492	–	656	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	1	1.25 x D	0.25 x D	0.75 x D	492	–	656	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	2	1.25 x D	0.25 x D	0.75 x D	459	–	623	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	3	1.25 x D	0.25 x D	0.75 x D	394	–	525	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0006	.0007
	4	1.25 x D	0.25 x D	0.5 x D	295	–	492	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0006
K	1	1.25 x D	0.25 x D	0.75 x D	394	–	492	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	2	1.25 x D	0.25 x D	0.5 x D	361	–	459	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0006	.0007
H	1	1.25 x D	0.25 x D	0.5 x D	262	–	459	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0006
	2	1.25 x D	0.25 x D	0.3 x D	230	–	394	IPT	.0000	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005
	3	1.25 x D	0.25 x D	0.25 x D	197	–	295	IPT	.0000	.0000	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
For tools with reach > 3 x D, reduce fz by 20%.  
For tools with reach > 5 x D, reduce fz by 30%.

■ Series 423034 • Vision Plus Micro

High-Performance Solid Carbide End Mills

Material Group	Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Finishing									
			AITiN												
	A		Cutting Speed – vc SFM			D1 – Diameter									
	ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	
P	3	0.04 x D	0.04 x D	1210	–	1613	IPT	.0005	.0006	.0008	.0010	.0015	.0020	.0025	.0031
	4	0.04 x D	0.04 x D	907	–	1512	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
H	1	0.03 x D	0.03 x D	806	–	1411	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
	2	0.03 x D	0.03 x D	706	–	1210	IPT	.0003	.0004	.0006	.0007	.0010	.0014	.0018	.0021
	3	0.02 x D	0.02 x D	605	–	907	IPT	.0003	.0003	.0004	.0005	.0008	.0011	.0014	.0017
	4	0.02 x D	0.02 x D	504	–	706	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011

Material Group	Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Semi-Finishing									
			AITiN												
	A		Cutting Speed – vc SFM			D1 – Diameter									
	ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	
P	3	0.1 x D	0.05 x D	840	–	1120	IPT	.0003	.0004	.0005	.0007	.0010	.0013	.0017	.0020
	4	0.1 x D	0.05 x D	630	–	1050	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019
H	1	0.07 x D	0.1 x D	560	–	980	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019
	2	0.05 x D	0.04 x D	490	–	840	IPT	.0002	.0003	.0004	.0005	.0007	.0009	.0012	.0014
	3	0.03 x D	0.03 x D	420	–	630	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011
	4	0.03 x D	0.03 x D	350	–	490	IPT	.0001	.0001	.0002	.0002	.0004	.0005	.0006	.0007

Material Group	Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Roughing									
			AITiN												
	A		Cutting Speed – vc SFM			D1 – Diameter									
	ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	
P	3	0.2 x D	0.1 x D	605	–	806	IPT	.0002	.0002	.0003	.0003	.0005	.0007	.0008	.0010
	4	0.2 x D	0.1 x D	454	–	756	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
H	1	0.15 x D	0.1 x D	403	–	706	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
	2	0.1 x D	0.075 x D	353	–	605	IPT	.0001	.0001	.0002	.0002	.0003	.0005	.0006	.0007
	3	0.05 x D	0.05 x D	302	–	454	IPT	.0001	.0001	.0001	.0002	.0003	.0004	.0005	.0006
	4	0.05 x D	0.05 x D	252	–	353	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004

NOTE: Please use reference table for correction of vc based on average degree of the mold. See page M159.

■ Series 7N01 • Vision Plus Micro

Material Group	Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Finishing									
			AITiN												
	A		Cutting Speed – vc SFM			D1 – Diameter									
	ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	
P	3	0.04 x D	0.04 x D	1210	–	1613	IPT	.0005	.0006	.0008	.0010	.0015	.0020	.0025	.0031
	4	0.04 x D	0.04 x D	907	–	1512	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
H	1	0.03 x D	0.03 x D	806	–	1411	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
	2	0.03 x D	0.03 x D	706	–	1210	IPT	.0003	.0004	.0006	.0007	.0010	.0014	.0018	.0021
	3	0.02 x D	0.02 x D	605	–	907	IPT	.0003	.0003	.0004	.0005	.0008	.0011	.0014	.0017
	4	0.02 x D	0.02 x D	504	–	706	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011

Material Group	Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Semi-Finishing									
			AITiN												
	A		Cutting Speed – vc SFM			D1 – Diameter									
	ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	
P	3	0.1 x D	0.05 x D	840	–	1120	IPT	.0003	.0004	.0005	.0007	.0010	.0013	.0017	.0020
	4	0.1 x D	0.05 x D	630	–	1050	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019
H	1	0.07 x D	0.1 x D	560	–	980	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019
	2	0.05 x D	0.04 x D	490	–	840	IPT	.0002	.0003	.0004	.0005	.0007	.0009	.0012	.0014
	3	0.03 x D	0.03 x D	420	–	630	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011
	4	0.03 x D	0.03 x D	350	–	490	IPT	.0001	.0001	.0002	.0002	.0004	.0005	.0006	.0007

Material Group	Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Roughing									
			AITiN												
	A		Cutting Speed – vc SFM			D1 – Diameter									
	ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	
P	3	0.2 x D	0.1 x D	605	–	806	IPT	.0002	.0002	.0003	.0003	.0005	.0007	.0008	.0010
	4	0.2 x D	0.1 x D	454	–	756	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
H	1	0.15 x D	0.1 x D	403	–	706	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
	2	0.1 x D	0.075 x D	353	–	605	IPT	.0001	.0001	.0002	.0002	.0003	.0005	.0006	.0007
	3	0.05 x D	0.05 x D	302	–	454	IPT	.0001	.0001	.0001	.0002	.0003	.0004	.0005	.0006
	4	0.05 x D	0.05 x D	252	–	353	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004

NOTE: Please use reference table for correction of vc based on average degree of the mold. See page M159.

■ Series 7N21 • Vision Plus Micro

Material Group															
		Profile Milling		K10UF-DCHP		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Finishing									
				AlTiN											
		A		Cutting Speed – vc SFM			D1 – Diameter								
		ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
P	3	0.04 x D	0.04 x D	1210	–	1613	IPT	.0005	.0006	.0008	.0010	.0015	.0020	.0025	.0031
	4	0.04 x D	0.04 x D	907	–	1512	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
H	1	0.03 x D	0.03 x D	806	–	1411	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
	2	0.03 x D	0.03 x D	706	–	1210	IPT	.0003	.0004	.0006	.0007	.0010	.0014	.0018	.0021
	3	0.02 x D	0.02 x D	605	–	907	IPT	.0003	.0003	.0004	.0005	.0008	.0011	.0014	.0017
	4	0.02 x D	0.02 x D	504	–	706	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011

Material Group															
		Profile Milling		K10UF-DCHP		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Semi-Finishing									
				AlTiN											
		A		Cutting Speed – vc SFM			D1 – Diameter								
		ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
P	3	0.1 x D	0.05 x D	840	–	1120	IPT	.0003	.0004	.0005	.0007	.0010	.0013	.0017	.0020
	4	0.1 x D	0.05 x D	630	–	1050	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019
H	1	0.07 x D	0.1 x D	560	–	980	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019
	2	0.05 x D	0.04 x D	490	–	840	IPT	.0002	.0003	.0004	.0005	.0007	.0009	.0012	.0014
	3	0.03 x D	0.03 x D	420	–	630	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011
	4	0.03 x D	0.03 x D	350	–	490	IPT	.0001	.0001	.0002	.0002	.0004	.0005	.0006	.0007

Material Group															
		Profile Milling		K10UF-DCHP		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Roughing									
				AlTiN											
		A		Cutting Speed – vc SFM			D1 – Diameter								
		ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
P	3	0.2 x D	0.1 x D	605	–	806	IPT	.0002	.0002	.0003	.0003	.0005	.0007	.0008	.0010
	4	0.2 x D	0.1 x D	454	–	756	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
H	1	0.15 x D	0.1 x D	403	–	706	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
	2	0.1 x D	0.075 x D	353	–	605	IPT	.0001	.0001	.0002	.0002	.0003	.0005	.0006	.0007
	3	0.05 x D	0.05 x D	302	–	454	IPT	.0001	.0001	.0001	.0002	.0003	.0004	.0005	.0006
	4	0.05 x D	0.05 x D	252	–	353	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004

NOTE: Please use reference table for correction of vc based on average degree of the mold. See page M159.

High-Performance Solid Carbide End Mills



# Fast Response and Superior Performance When You Need It



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## Solid End Mill Custom Solutions

WIDIA-Hanita™ provides exceptional application and design engineering services. Whether you need tools produced according to a blueprint, a finished part, or a drawing, assistance in process development, or expertise in optimizing an application, our world-renowned Advanced Engineering Team is available. Our engineering departments are fully integrated with specialized production cells located in our focused factories throughout the world. ISO-Certified manufacturing facilities, with state-of-the-art CNC equipment, simulation capabilities, CAD/CAM production, and inspection processes, ensure that customers receive the highest-quality product with accurate compliance to specifications and repeatability for future production.

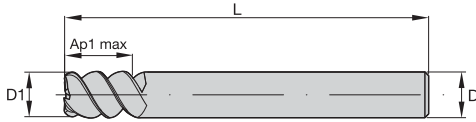
### Custom Solution Services:

- Blueprint Specials
- Complex Geometries
- Form Tools
- Modified Standards
- Application Engineering and Optimization
- Tool Design
- Project Development

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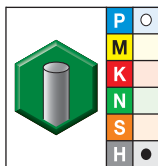
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+ .000 / - .002	≤ 1/8"	0.00024
		> 1/8-1/4"	0.00031
		> 1/4-3/8"	0.00035
		> 3/8-23/32"	0.00043
		> 23/32-1 3/16"	0.00051

### Series 7S05 • Series 7S05 7S15 7S25 • Vision Plus

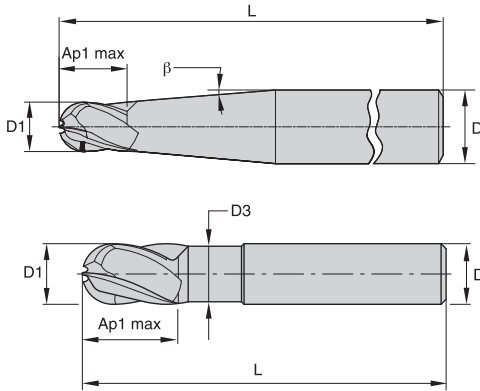


grade AlTiN-MT1  
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
3083618	TM7S0507002	1/4	1/4	3/8	3	4
3321600	TM7S1507002	1/4	1/4	5/8	3	4
3060845	TM7S2507002	1/4	1/4	7/8	3	4
3043480	TM7S0508000	5/16	5/16	1/2	4	4
3054914	TM7S1508000	5/16	5/16	3/4	4	4
3082394	TM7S2508000	5/16	5/16	1 1/8	4	4
3100520	TM7S0510004	3/8	3/8	9/16	4	4
3048589	TM7S1510004	3/8	3/8	15/16	4	5
3054915	TM7S2510004	3/8	3/8	1 5/16	4	5
3047518	TM7S0513005	1/2	1/2	3/4	5	4
3084183	TM7S1513005	1/2	1/2	1 1/4	5	6
3081614	TM7S2513005	1/2	1/2	1 3/4	5	6
3044788	TM7S0516006	5/8	5/8	1 5/16	5	4
3063997	TM7S1516006	5/8	5/8	1 9/16	5	6
3050197	TM7S2516006	5/8	5/8	2 3/16	5	6
3119082	TM7S0519007	3/4	3/4	1 1/8	6	4
3091702	TM7S1519007	3/4	3/4	1 7/8	6	6
3321602	TM7S2519007	3/4	3/4	2 5/8	6	6
3125355	TM7S0525008	1	1	1 1/2	6	5
3321601	TM7S1525008	1	1	2 1/2	6	6
3104294	TM7S2525008	1	1	3 1/2	6	6

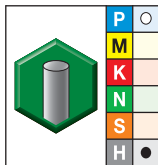
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8-1/4"	0/0.00031
		> 1/4-3/8"	0/0.00035
		> 3/8-23/32"	0/0.00043
		> 23/32-1 3/16"	0/0.00051

■ Series 7S5F • Vision Plus

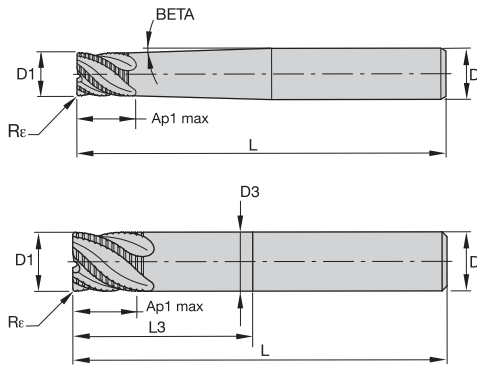
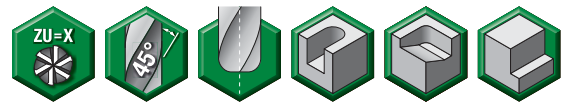


grade AlTiN-MT1  
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	BETA
3047519	TM7S5F03002	1/8	1/4	—	1/8	1/8	3	2.5
3040874	TM7S5F04002	5/32	1/4	—	5/32	5/32	3	2.5
3062915	TM7S5F05002	3/16	1/4	—	3/16	3/16	3	2.5
3058580	TM7S5F07004	1/4	3/8	—	1/4	1/4	4	2.5
3061865	TM7S5F08004	5/16	3/8	—	5/16	5/16	4	2.5
3058738	TM7S5F10005	3/8	1/2	—	3/8	3/8	5	2.5
3062363	TM7S5F13006	1/2	5/8	—	1/2	1/2	5	2.5
3058739	TM7S5F16006	5/8	5/8	.59	5/8	3/4	5	—
3289670	TM7S5F19007	3/4	3/4	.71	3/4	3/4	6	—

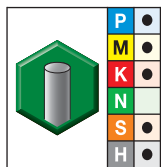
- Center cutting.
- Flat shallow profile.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance d11	D	tolerance h6 + / -
< 1/8"	-.0008/-0.0031	< 1/8"	0/.00024
1/8-7/32"	-.0012/-0.0041	1/8-7/32"	0/.00031
1/4-3/8"	-.0016/-0.0051	1/4-3/8"	0/.00035
13/32-11/16"	-.002/-0.0063	13/32-11/16"	0/.00043
23/32-1 3/16"	-.0026/-0.0077	23/32-1 3/16"	0/.00051

### Series 7S7R • Vision Plus



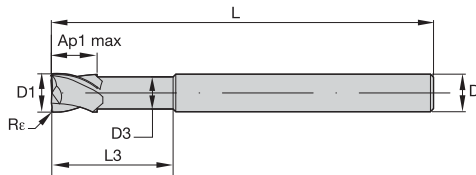
grade AITiN-MT1  
AITiN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	BETA	ZU
3063998	TM7S7R04002A	5/32	1/4	—	5/32	5/32	3	.030	2.500	3
3096624	TM7S7R05002A	3/16	1/4	—	3/16	3/16	3	.030	2.500	3
3116104	TM7S7R07004A	1/4	3/8	—	1/4	1/4	4	.030	2.500	4
3119746	TM7S7R08004A	5/16	3/8	—	5/16	5/16	4	.030	2.500	4
3096974	TM7S7R10005A	3/8	1/2	—	3/8	3/8	5	.030	2.500	4
3116105	TM7S7R13006A	1/2	5/8	.470	1/2	—	5	.040	—	4
3113795	TM7S7R16006A	5/8	5/8	.588	5/8	5/8	5	.040	—	6
3044789	TM7S7R19007A	3/4	3/4	.705	3/4	3/4	6	.050	—	6
3061866	TM7S7R25008A	1	1	.940	1	1	6	.050	—	6

High-Performance Solid Carbide End Mills

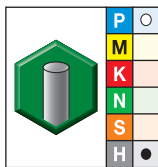
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

■ Series 75N2 • Vision Plus

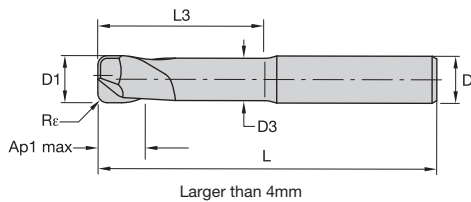
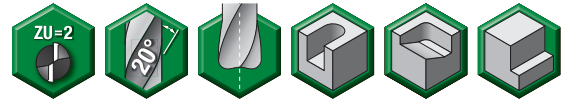


- first choice
- alternate choice

grade TiAlN-RT1  
TiAlN

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Re
2544530	75N203022RT	3,0	6	2,80	3,00	9,00	75	0,30
2544735	75N203042RT	3,0	6	2,80	3,00	9,00	75	0,50
2544736	75N203062RT	3,0	6	2,80	3,00	9,00	75	1,00
2544737	75N204022RT	4,0	6	3,70	4,00	12,00	75	0,30
2544738	75N204042RT	4,0	6	3,70	4,00	12,00	75	0,50
2544739	75N204062RT	4,0	6	3,70	4,00	12,00	75	1,00
2544740	75N205022RT	5,0	6	4,60	5,00	15,00	75	0,30
2544741	75N205042RT	5,0	6	4,60	5,00	15,00	75	1,00
2544742	75N206032RT	6,0	6	5,50	6,00	18,00	75	0,30
2545163	75N206042RT	6,0	6	5,50	6,00	18,00	75	0,50
2545164	75N206052RT	6,0	6	5,50	6,00	18,00	75	0,75
2545166	75N206062RT	6,0	6	5,50	6,00	18,00	75	1,00
2545167	75N206072RT	6,0	6	5,50	6,00	18,00	75	1,50
2545168	75N208023RT	8,0	8	7,40	8,00	24,00	100	0,50
2545169	75N208043RT	8,0	8	7,40	8,00	24,00	100	1,00
2545170	75N208063RT	8,0	8	7,40	8,00	24,00	100	1,50
2545171	75N210024RT	10,0	10	9,20	10,00	30,00	100	0,50
2545172	75N210034RT	10,0	10	9,20	10,00	30,00	100	0,75
2545183	75N210044RT	10,0	10	9,20	10,00	30,00	100	1,00
2545184	75N210064RT	10,0	10	9,20	10,00	30,00	100	2,00
2545185	75N212025RT	12,0	12	11,00	12,00	36,00	125	0,50
2545186	75N212035RT	12,0	12	11,00	12,00	36,00	125	0,75
2545187	75N212045RT	12,0	12	11,00	12,00	36,00	125	1,00
2545188	75N212055RT	12,0	12	11,00	12,00	36,00	125	1,50
2545189	75N212065RT	12,0	12	11,00	12,00	36,00	125	2,00

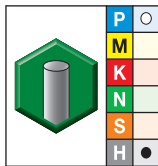
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance h8 + / -	D	tolerance h6 + / -
≤ 3	0/0,014	≤ 3	0/0,006
> 3-6	0/0,018	> 3-6	0/0,008
> 6-10	0/0,022	> 6-10	0/0,009
> 10-18	0/0,027	> 10-18	0/0,011
> 18-30	0/0,033	> 18-30	0/0,013

### Series 422875 • Vision Plus

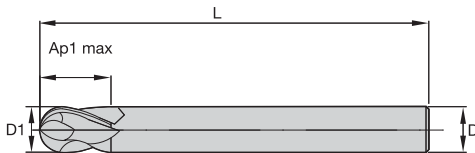


grade K10UF-DCHP  
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
2343319	422875-002003	2,0	6	1,90	2,00	17,50	70	0,30
2343303	422875-002005	2,0	6	1,90	2,00	17,50	70	0,50
2343305	422875-003005	3,0	6	2,90	3,00	18,50	70	0,50
2343321	422875-003010	3,0	6	2,90	3,00	18,50	70	1,00
2343307	422875-004005	4,0	6	3,80	4,00	19,50	80	0,50
2343323	422875-004010	4,0	6	3,80	4,00	19,50	80	1,00
2343309	422875-005005	5,0	6	4,80	5,00	42,00	80	0,50
2343325	422875-005010	5,0	6	4,80	5,00	42,00	80	1,00
2343327	422875-006005	6,0	6	5,80	6,00	42,00	80	0,50
2343311	422875-006010	6,0	6	5,80	6,00	42,00	80	1,00
2629541	422875-008005	8,0	8	7,80	8,00	51,00	90	0,50
2343329	422875-008010	8,0	8	7,80	8,00	51,00	90	1,00
2629555	422875-008015	8,0	8	7,80	8,00	51,00	90	1,50
2343313	422875-008020	8,0	8	7,80	8,00	51,00	90	2,00
2629559	422875-010005	10,0	10	9,70	10,00	57,00	100	0,50
2629560	422875-010010	10,0	10	9,70	10,00	57,00	100	1,00
3048961	422875-010015	10,0	10	9,70	10,00	57,00	100	1,50
2343331	422875-010020	10,0	10	9,70	10,00	57,00	100	2,00
2343315	422875-010030	10,0	10	9,70	10,00	57,00	100	3,00
2629561	422875-012005	12,0	12	11,70	12,00	62,00	110	0,50
2629573	422875-012010	12,0	12	11,70	12,00	62,00	110	1,00
2343333	422875-012030	12,0	12	11,70	12,00	62,00	110	3,00
2343317	422875-012040	12,0	12	11,70	12,00	62,00	110	4,00

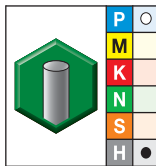
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

■ Series 7151 • Vision Plus



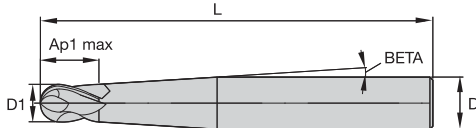
- first choice
- alternate choice

grade TiAlN-RT1  
TiAlN

order #	catalog #	D1	D	length of cut Ap1 max	length L
1860036	715101000RT	1,0	3	3,00	38
1860090	715102000RT	2,0	3	3,00	38
1860103	715102500RT	2,5	3	3,00	38
1860106	715103000RT	3,0	3	3,00	38
1860109	715104001RT	4,0	4	4,00	50
1860111	715105001RT	5,0	5	5,00	50
1860112	715106002RT	6,0	6	6,00	50
1860133	715108003RT	8,0	8	8,00	63
1860134	715110004RT	10,0	10	10,00	76
1860135	715112005RT	12,0	12	12,00	76
1860136	715116006RT	16,0	16	16,00	89
1860137	715120007RT	20,0	20	20,00	104

High-Performance Solid Carbide End Mills

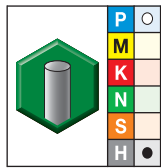
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

### Series 7061 • Vision Plus



- first choice
- alternate choice

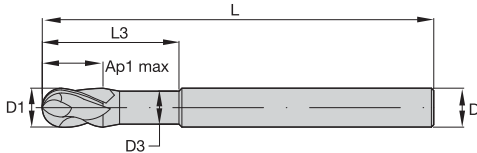
grade TiAlN-RT1  
TiAlN

order #	catalog #	D1	D	length of cut Ap1 max	length L	BETA
2495994	706101001RT	1,0	4	1,00	63	3.50
2495995	706102001RT	2,0	4	2,00	63	3.50
2495996	706102501RT	2,5	4	2,50	63	3.00
2495997	706103002RT	3,0	6	3,00	75	1.50
2495998	706104002RT	4,0	6	4,00	75	1.50
2495999	706105002RT	5,0	6	5,00	75	1.50
2496000	706106004RT	6,0	10	6,00	100	1.50
2496001	706108004RT	8,0	10	8,00	100	1.50
2496002	706110005RT	10,0	12	10,00	125	1.50
2496023	706112006RT	12,0	16	12,00	125	1.50

High-Performance Solid Carbide End Mills



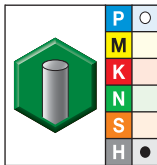
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

■ Series 70N1 • Vision Plus

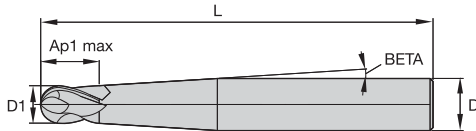


grade TiAlN-RT1  
TiAlN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2545190	70N101001RT	1,0	4	0,80	1,00	3,00	63
2545191	70N101501RT	1,5	4	1,30	1,50	4,50	63
2545192	70N102002RT	2,0	6	1,80	2,00	6,00	76
2545213	70N103002RT	3,0	6	2,80	3,00	9,00	76
2545214	70N104002RT	4,0	6	3,70	4,00	12,00	76
2545215	70N105002RT	5,0	6	4,60	5,00	15,00	76
2545216	70N106002RT	6,0	6	5,50	6,00	18,00	76
2545217	70N108003RT	8,0	8	7,50	8,00	24,00	100
2545218	70N110004RT	10,0	10	9,50	10,00	30,00	100
2545219	70N112005RT	12,0	12	11,50	12,00	36,00	125

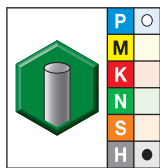
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance h8 + / -	D	tolerance h6 + / -
≤ 3	0/0,014	≤ 3	0/0,006
> 3-6	0/0,018	> 3-6	0/0,008
> 6-10	0/0,022	> 6-10	0/0,009
> 10-18	0/0,027	> 10-18	0/0,011
> 18-30	0/0,033	> 18-30	0/0,013

## Series 422869 422868 • Vision Plus



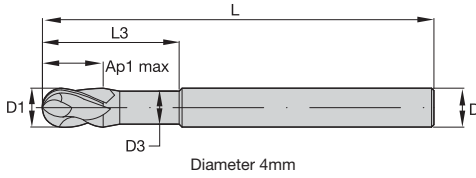
grade K10UF-DCHP  
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BETA
2343179	422869-000010	1,0	4	1,00	40	7.50
2343183	422869-000020	2,0	6	2,00	45	7.50
2343186	422869-000030	3,0	6	3,00	45	7.50
2343188	422869-000040	4,0	6	4,00	45	7.50
2343190	422869-000050	5,0	6	5,00	50	7.50
2343169	422868-000060	6,0	6	6,00	80	—
2343192	422869-000060	6,0	6	6,00	50	—
2343171	422868-000080	8,0	8	8,00	90	—
2343194	422869-000080	8,0	8	8,00	60	—
2343173	422868-000100	10,0	10	10,00	100	—
2343196	422869-000100	10,0	10	10,00	70	—
2343198	422869-000120	12,0	12	12,00	75	—
2343200	422869-000160	16,0	16	16,00	80	—

High-Performance Solid Carbide End Mills

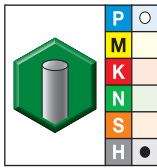
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance h8 + / -	D	tolerance h6 + / -
≤ 3	0/0,014	≤ 3	0/0,006
> 3-6	0/0,018	> 3-6	0/0,008
> 6-10	0/0,022	> 6-10	0/0,009
> 10-18	0/0,027	> 10-18	0/0,011
> 18-30	0/0,033	> 18-30	0/0,013

■ Series 422870 • Vision Plus



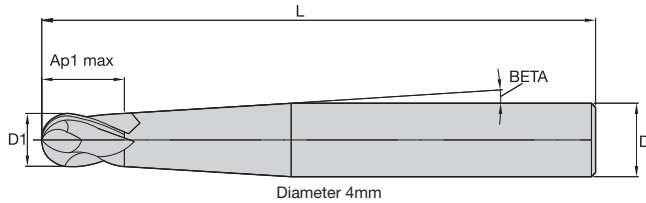
- first choice
- alternate choice

grade K10UF-DCHP  
AlTiN

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2343202	422870-000020	2,0	6	1,90	2,00	17,50	70
2343204	422870-000030	3,0	6	2,90	3,00	18,50	70
2343206	422870-000040	4,0	6	3,80	4,00	19,50	80
2343208	422870-000050	5,0	6	4,80	5,00	39,00	80
2343210	422870-000060	6,0	6	5,80	6,00	42,00	80
2343212	422870-000080	8,0	8	7,80	8,00	52,00	90
2343214	422870-000100	10,0	10	9,70	10,00	58,00	100
2343216	422870-000120	12,0	12	11,70	12,00	63,00	110

High-Performance Solid Carbide End Mills

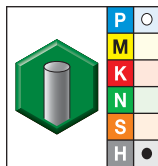
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance h10 + / -	D	tolerance h6 + / -
≤ 3	0/0,040	≤ 3	0/0,006
> 3-6	0/0,048	> 3-6	0/0,008
> 6-10	0/0,058	> 6-10	0/0,009
> 10-18	0/0,070	> 10-18	0/0,011
> 18-30	0/0,084	> 18-30	0/0,013

■ Series 422873 • Vision Plus



grade K10UF-DCHP  
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BETA
2343265	422873-050100	5,0	8	6,00	100	1.75
2343269	422873-060100	6,0	10	8,00	100	2.52
2343275	422873-100100	10,0	12	15,00	100	1.83
2343277	422873-100150	10,0	12	15,00	150	0.80

High-Performance Solid Carbide End Mills

■ Series 7S05 • Vision Plus

Material Group	Side Milling (A) and Slotting (B)			AlTiN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.								
	A		B	Cutting Speed – vc SFM			D1 – Diameter								
	ap	ae	ap	min		max	frac.	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	dec.	.2500	.3100	.3800	.5000	.6300	.7500	1.000	
P	3	1 x D	0.4 x D	1 x D	390	–	520	IPT	.0017	.0021	.0025	.0032	.0037	.0042	.0050
	4	1 x D	0.4 x D	0.75 x D	300	–	490	IPT	.0015	.0019	.0022	.0029	.0033	.0036	.0043
H	1	1 x D	0.4 x D	0.75 x D	260	–	460	IPT	.0015	.0019	.0022	.0029	.0033	.0036	.0043
	2	1 x D	0.3 x D	0.5 x D	230	–	390	IPT	.0011	.0014	.0017	.0021	.0024	.0027	.0031
	3	1 x D	0.15 x D	0.3 x D	200	–	300	IPT	.0009	.0011	.0013	.0017	.0020	.0022	.0027
	4	1 x D	0.1 x D	0.15 x D	160	–	230	IPT	.0006	.0008	.0009	.0011	.0013	.0015	.0018

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
When using tools with 6 flutes, reduce slotting ap by 60%.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >1/2".

■ Series 7S15 • Vision Plus

Material Group	Side Milling (A) and Slotting (B)			AlTiN-MT			TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.								
	A		B	Cutting Speed – vc SFM			Cutting Speed – vc SFM			D1 – Diameter								
	ap	ae	ap	min		max	min		max	frac.	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	min		max	dec.	.2500	.3125	.3750	.5000	.6250	.7500	1.0000	
P	3	2.0 x D	0.3 x D	0.75 x D	390	–	520	390	–	520	IPT	.0017	.0021	.0025	.0032	.0038	.0042	.0050
	4	2.0 x D	0.25 x D	0.5 x D	300	–	490	300	–	490	IPT	.0015	.0019	.0022	.0028	.0033	.0037	.0042
H	1	2.0 x D	0.25 x D	0.5 x D	260	–	460	260	–	460	IPT	.0015	.0019	.0022	.0028	.0033	.0037	.0042
	2	2.0 x D	0.2 x D	0.4 x D	230	–	390	230	–	390	IPT	.0011	.0014	.0017	.0021	.0025	.0027	.0031
	3	2.0 x D	0.1 x D	0.2 x D	200	–	300	200	–	300	IPT	.0009	.0011	.0013	.0017	.0020	.0023	.0027
	4	2.0 x D	0.05 x D	0.05 x D	160	–	230	160	–	230	IPT	.0006	.0008	.0009	.0011	.0013	.0015	.0018

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >1/2".  
For better surface finish, reduce feed per tooth.

■ Series 7S25 • Vision Plus

Material Group	Side Milling (A) and Slotting (B)			AlTiN-MT			TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.								
	A		B	Cutting Speed – vc SFM			Cutting Speed – vc SFM			D1 – Diameter								
	ap	ae	ap	min		max	min		max	frac.	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	ap	min		max	min		max	dec.	.2500	.3125	.3750	.5000	.6250	.7500	1.0000	
P	3	3.0 x D	0.2 x D	0.5 x D	390	–	520	390	–	520	IPT	.0017	.0021	.0025	.0032	.0038	.0042	.0050
	4	3.0 x D	0.2 x D	0.3 x D	300	–	490	300	–	490	IPT	.0015	.0019	.0022	.0028	.0033	.0037	.0042
H	1	3.0 x D	0.2 x D	0.3 x D	260	–	460	260	–	460	IPT	.0015	.0019	.0022	.0028	.0033	.0037	.0042
	2	3.0 x D	0.15 x D	0.2 x D	230	–	390	230	–	390	IPT	.0011	.0014	.0017	.0021	.0025	.0027	.0031
	3	3.0 x D	0.05 x D	–	200	–	300	200	–	300	IPT	.0009	.0011	.0013	.0017	.0020	.0023	.0027
	4	3.0 x D	0.03 x D	–	160	–	230	160	–	230	IPT	.0006	.0008	.0009	.0011	.0013	.0015	.0018

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >1/2".  
For better surface finish, reduce feed per tooth.

■ Series 7S5F • Vision Plus

Material Group	Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)													
	A		Cutting Speed – vc SFM			D1 – Diameter												
	ap	ae	min	max	frac. dec.	1/8	5/32	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4			
						.1250	.1563	.1875	.2500	.3125	.3750	.4375	.5000	.6250	.7500			
P	3	0.5 x D	0.5 x D	910	–	1210	IPT	.0031	.0039	.0048	.0065	.0084	.0098	.0112	.0124	.0147	.0166	
	4	0.5 x D	0.5 x D	680	–	1130	IPT	.0029	.0036	.0044	.0059	.0075	.0088	.0099	.0110	.0129	.0145	
H	1	0.5 x D	0.5 x D	600	–	1060	IPT	.0029	.0036	.0044	.0059	.0075	.0088	.0099	.0110	.0129	.0145	
	2	0.5 x D	0.5 x D	530	–	910	IPT	.0022	.0027	.0033	.0044	.0056	.0066	.0074	.0082	.0096	.0107	
	3	0.5 x D	0.5 x D	450	–	680	IPT	.0017	.0021	.0026	.0035	.0044	.0052	.0059	.0066	.0078	.0089	
	4	0.5 x D	0.5 x D	380	–	530	IPT	.0011	.0014	.0017	.0023	.0030	.0035	.0039	.0044	.0052	.0058	

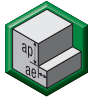


Material Group	Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)													
	A		Cutting Speed – vc SFM			D1 – Diameter												
	ap	ae	min	max	frac. dec.	1/8	5/32	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4			
						.1250	.1563	.1875	.2500	.3125	.3750	.4375	.5000	.6250	.7500			
P	3	0.1 x D	0.1 x D	790	–	1050	IPT	.0022	.0027	.0033	.0046	.0059	.0069	.0078	.0087	.0102	.0116	
	4	0.1 x D	0.1 x D	590	–	980	IPT	.0020	.0025	.0030	.0041	.0052	.0061	.0069	.0077	.0090	.0101	
H	1	0.1 x D	0.1 x D	520	–	920	IPT	.0020	.0025	.0030	.0041	.0052	.0061	.0069	.0077	.0090	.0101	
	2	0.1 x D	0.1 x D	460	–	790	IPT	.0015	.0019	.0023	.0031	.0039	.0046	.0052	.0057	.0067	.0075	
	3	0.1 x D	0.1 x D	390	–	590	IPT	.0012	.0015	.0018	.0024	.0031	.0036	.0041	.0046	.0054	.0062	
	4	0.1 x D	0.1 x D	330	–	460	IPT	.0008	.0010	.0012	.0016	.0021	.0024	.0027	.0031	.0036	.0041	

Material Group	Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)													
	A		Cutting Speed – vc SFM			D1 – Diameter												
	ap	ae	min	max	frac. dec.	1/8	5/32	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4			
						.1250	.1563	.1875	.2500	.3125	.3750	.4375	.5000	.6250	.7500			
P	3	0.2 x D	0.2 x D	510	–	680	IPT	.0009	.0012	.0014	.0020	.0025	.0030	.0034	.0038	.0044	.0050	
	4	0.2 x D	0.2 x D	380	–	640	IPT	.0009	.0011	.0013	.0018	.0023	.0027	.0030	.0033	.0039	.0044	
H	1	0.2 x D	0.2 x D	340	–	600	IPT	.0009	.0011	.0013	.0018	.0023	.0027	.0030	.0033	.0039	.0044	
	2	0.2 x D	0.2 x D	300	–	510	IPT	.0007	.0008	.0010	.0013	.0017	.0020	.0022	.0025	.0029	.0032	
	3	0.2 x D	0.2 x D	260	–	380	IPT	.0005	.0006	.0008	.0011	.0013	.0016	.0018	.0020	.0024	.0027	
	4	0.2 x D	0.2 x D	210	–	300	IPT	.0003	.0004	.0005	.0007	.0009	.0010	.0012	.0013	.0016	.0018	

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 For better surface finish, reduce feed per tooth.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >1/2".

High-Performance Solid Carbide End Mills

■ Series 7S7R • Vision Plus

Material Group																			
	Side Milling (A) and Slotting (B)					AlTiN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.										
	A		B		Cutting Speed – vc SFM			D1 – Diameter											
	ap	ae	ap	min				–	max	frac.	5/32	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
							dec.	.1563	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.000			
P	3	0.8 x D	0.5 x D	0.75 x D	390	–	520	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045		
	4	0.8 x D	0.4 x D	0.5 x D	300	–	490	IPT	.0008	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039		
	5	0.8 x D	0.5 x D	0.75 x D	200	–	330	IPT	.0007	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036		
	6	0.8 x D	0.4 x D	0.5 x D	160	–	250	IPT	.0006	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028		
M	1	0.8 x D	0.5 x D	0.75 x D	300	–	380	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045		
	2	0.8 x D	0.4 x D	0.75 x D	200	–	260	IPT	.0007	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036		
	3	0.8 x D	0.4 x D	0.75 x D	200	–	230	IPT	.0006	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028		
K	1	0.8 x D	0.5 x D	0.75 x D	390	–	490	IPT	.0011	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	2	0.8 x D	0.5 x D	0.75 x D	360	–	460	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045		
	3	0.8 x D	0.4 x D	0.75 x D	360	–	430	IPT	.0007	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036		
S	1	0.8 x D	0.4 x D	0.75 x D	160	–	300	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045		
	2	0.8 x D	0.4 x D	0.75 x D	80	–	130	IPT	.0005	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024		
	3	0.8 x D	0.25 x D	0.3 x D	200	–	260	IPT	.0007	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036		
	4	0.8 x D	0.3 x D	0.5 x D	160	–	200	IPT	.0006	.0008	.0011	.0014	.0017	.0021	.0025	.0028	.0033		
H	1	0.8 x D	0.5 x D	0.5 x D	260	–	460	IPT	.0008	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039		
	2	0.8 x D	0.2 x D	0.3 x D	230	–	390	IPT	.0006	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028		
	3	0.8 x D	0.15 x D	0.2 x D	200	–	300	IPT	.0005	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024		

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 When using tools with 6 flutes, reduce slotting ap by 40%.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >1/2".

High-Performance Solid Carbide End Mills

■ Series 75N2 • Vision Plus

Material Group					TiAlN		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.													
	A		B		Cutting Speed – vc SFM		D1 – Diameter													
	ap	ae	ap	min	max	mm	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	25.0		
	<b>P</b>	3	0.75 x D	0.1 x D	0.4 x D	390	–	520	IPT	.0007	.0009	.0012	.0014	.0020	.0024	.0028	.0031	.0034	.0037	.0040
	4	0.75 x D	0.1 x D	0.4 x D	300	–	490	IPT	.0006	.0008	.0011	.0013	.0018	.0021	.0025	.0028	.0030	.0033	.0035	.0038
<b>H</b>	1	0.75 x D	0.1 x D	0.4 x D	260	–	460	IPT	.0006	.0008	.0011	.0013	.0018	.0021	.0025	.0028	.0030	.0033	.0035	.0038
	2	0.75 x D	0.05 x D	0.3 x D	230	–	390	IPT	.0005	.0006	.0008	.0010	.0013	.0016	.0018	.0021	.0022	.0024	.0026	.0028
	3	0.75 x D	0.03 x D	0.2 x D	200	–	300	IPT	.0004	.0005	.0006	.0008	.0010	.0013	.0015	.0017	.0018	.0020	.0021	.0024
	4	0.75 x D	0.01 x D	0.1 x D	160	–	230	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010	.0011	.0012	.0013	.0014	.0016

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group. Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Application Data • Series 422875 • Vision Plus™

■ Series 422875 • Vision Plus

Material Group					K10UF-DCHP		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.									
	A		B		AITiN		D1 – Diameter									
	ap	ae	ap	min	max	mm	3.0	4.0	5.0	6.0	8.0	10.0	12.0			
	<b>P</b>	3	0.5 x D	0.4 x D	0.3 x D	350	–	470	IPT	.0007	.0009	.0012	.0014	.0020	.0024	.0028
	4	0.5 x D	0.4 x D	0.3 x D	270	–	440	IPT	.0006	.0008	.0011	.0013	.0018	.0021	.0025	
<b>H</b>	1	0.5 x D	0.4 x D	0.3 x D	240	–	410	IPT	.0006	.0008	.0011	.0013	.0018	.0021	.0025	
	2	0.5 x D	0.3 x D	0.2 x D	210	–	350	IPT	.0005	.0006	.0008	.0010	.0013	.0016	.0018	
	3	0.5 x D	0.15 x D	0.15 x D	180	–	270	IPT	.0004	.0005	.0006	.0008	.0010	.0013	.0015	
	4	0.5 x D	0.1 x D	0.1 x D	150	–	210	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010	

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group. Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group. For better surface finish, reduce feed per tooth.

High-Performance Solid Carbide End Mills



■ Series 7151 • Vision Plus

Material Group	Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Finishing															
	A		Cutting Speed – vc SFM		mm	D1 – Diameter														
	ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0		
P	3	0.05 x D	0.05 x D	905	–	1207	IPT	.0010	.0019	.0024	.0029	.0040	.0050	.0061	.0085	.0102	.0119	.0148	.0160	.0171
	4	0.05 x D	0.05 x D	679	–	1132	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149
H	1	0.05 x D	0.05 x D	604	–	1056	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149
	2	0.05 x D	0.05 x D	528	–	905	IPT	.0007	.0013	.0017	.0020	.0027	.0035	.0042	.0057	.0068	.0079	.0096	.0104	.0110
	3	0.05 x D	0.05 x D	453	–	679	IPT	.0005	.0011	.0013	.0016	.0022	.0027	.0033	.0045	.0054	.0063	.0079	.0085	.0091
	4	0.05 x D	0.05 x D	377	–	528	IPT	.0004	.0007	.0009	.0011	.0014	.0018	.0022	.0030	.0036	.0042	.0052	.0056	.0060

Material Group	Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Semi-Finishing															
	A		Cutting Speed – vc SFM		mm	D1 – Diameter														
	ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0		
P	3	0.1 x D	0.1 x D	787	–	1050	IPT	.0007	.0013	.0017	.0020	.0028	.0035	.0043	.0059	.0071	.0083	.0103	.0112	.0119
	4	0.1 x D	0.1 x D	590	–	984	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104
H	1	0.1 x D	0.1 x D	525	–	918	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104
	2	0.1 x D	0.1 x D	459	–	787	IPT	.0005	.0009	.0012	.0014	.0019	.0024	.0029	.0040	.0048	.0055	.0067	.0072	.0077
	3	0.1 x D	0.1 x D	394	–	590	IPT	.0004	.0007	.0009	.0011	.0015	.0019	.0023	.0031	.0038	.0044	.0055	.0060	.0064
	4	0.1 x D	0.1 x D	328	–	459	IPT	.0002	.0005	.0006	.0007	.0010	.0013	.0015	.0021	.0025	.0029	.0036	.0039	.0042

Material Group	Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Roughing															
	A		Cutting Speed – vc SFM		mm	D1 – Diameter														
	ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0		
P	3	0.2 x D	0.2 x D	512	–	682	IPT	.0003	.0006	.0007	.0009	.0012	.0015	.0019	.0026	.0031	.0036	.0045	.0048	.0052
	4	0.2 x D	0.2 x D	384	–	640	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045
H	1	0.2 x D	0.2 x D	341	–	597	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045
	2	0.2 x D	0.2 x D	298	–	512	IPT	.0002	.0004	.0005	.0006	.0008	.0010	.0013	.0017	.0021	.0024	.0029	.0031	.0033
	3	0.2 x D	0.2 x D	256	–	384	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010	.0014	.0016	.0019	.0024	.0026	.0028
	4	0.2 x D	0.2 x D	213	–	298	IPT	.0001	.0002	.0003	.0003	.0004	.0005	.0007	.0009	.0011	.0013	.0016	.0017	.0018

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

High-Performance Solid Carbide End Mills

■ Series 7061 • Vision Plus

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Finishing														
		A		Cutting Speed – vc SFM		mm	D1 – Diameter													
		ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.05 x D	0.05 x D	905	– 1207	IPT	.0010	.0019	.0024	.0029	.0040	.0050	.0061	.0085	.0102	.0119	.0148	.0160	.0171	
	4	0.05 x D	0.05 x D	679	– 1132	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149	
H	1	0.05 x D	0.05 x D	604	– 1056	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149	
	2	0.05 x D	0.05 x D	528	– 905	IPT	.0007	.0013	.0017	.0020	.0027	.0035	.0042	.0057	.0068	.0079	.0096	.0104	.0110	
	3	0.05 x D	0.05 x D	453	– 679	IPT	.0005	.0011	.0013	.0016	.0022	.0027	.0033	.0045	.0054	.0063	.0079	.0085	.0091	
	4	0.05 x D	0.05 x D	377	– 528	IPT	.0004	.0007	.0009	.0011	.0014	.0018	.0022	.0030	.0036	.0042	.0052	.0056	.0060	

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Semi-Finishing														
		A		Cutting Speed – vc SFM		mm	D1 – Diameter													
		ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.1 x D	0.1 x D	787	– 1050	IPT	.0007	.0013	.0017	.0020	.0028	.0035	.0043	.0059	.0071	.0083	.0103	.0112	.0119	
	4	0.1 x D	0.1 x D	590	– 984	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104	
H	1	0.1 x D	0.1 x D	525	– 918	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104	
	2	0.1 x D	0.1 x D	459	– 787	IPT	.0005	.0009	.0012	.0014	.0019	.0024	.0029	.0040	.0048	.0055	.0067	.0072	.0077	
	3	0.1 x D	0.1 x D	394	– 590	IPT	.0004	.0007	.0009	.0011	.0015	.0019	.0023	.0031	.0038	.0044	.0055	.0060	.0064	
	4	0.1 x D	0.1 x D	328	– 459	IPT	.0002	.0005	.0006	.0007	.0010	.0013	.0015	.0021	.0025	.0029	.0036	.0039	.0042	

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Roughing														
		A		Cutting Speed – vc SFM		mm	D1 – Diameter													
		ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.2 x D	0.2 x D	512	– 682	IPT	.0003	.0006	.0007	.0009	.0012	.0015	.0019	.0026	.0031	.0036	.0045	.0048	.0052	
	4	0.2 x D	0.2 x D	384	– 640	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045	
H	1	0.2 x D	0.2 x D	341	– 597	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045	
	2	0.2 x D	0.2 x D	298	– 512	IPT	.0002	.0004	.0005	.0006	.0008	.0010	.0013	.0017	.0021	.0024	.0029	.0031	.0033	
	3	0.2 x D	0.2 x D	256	– 384	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010	.0014	.0016	.0019	.0024	.0026	.0028	
	4	0.2 x D	0.2 x D	213	– 298	IPT	.0001	.0002	.0003	.0003	.0004	.0005	.0007	.0009	.0011	.0013	.0016	.0017	.0018	

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

High-Performance Solid Carbide End Mills

■ Series 70N1 • Vision Plus

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Finishing														
		A		Cutting Speed – vc SFM		mm	D1 – Diameter													
		ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.05 x D	0.05 x D	905	– 1207	IPT	.0010	.0019	.0024	.0029	.0040	.0050	.0061	.0085	.0102	.0119	.0148	.0160	.0171	
	4	0.05 x D	0.05 x D	679	– 1132	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149	
H	1	0.05 x D	0.05 x D	604	– 1056	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149	
	2	0.05 x D	0.05 x D	528	– 905	IPT	.0007	.0013	.0017	.0020	.0027	.0035	.0042	.0057	.0068	.0079	.0096	.0104	.0110	
	3	0.05 x D	0.05 x D	453	– 679	IPT	.0005	.0011	.0013	.0016	.0022	.0027	.0033	.0045	.0054	.0063	.0079	.0085	.0091	
	4	0.05 x D	0.05 x D	377	– 528	IPT	.0004	.0007	.0009	.0011	.0014	.0018	.0022	.0030	.0036	.0042	.0052	.0056	.0060	

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Semi-Finishing														
		A		Cutting Speed – vc SFM		mm	D1 – Diameter													
		ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.1 x D	0.1 x D	787	– 1050	IPT	.0007	.0013	.0017	.0020	.0028	.0035	.0043	.0059	.0071	.0083	.0103	.0112	.0119	
	4	0.1 x D	0.1 x D	590	– 984	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104	
H	1	0.1 x D	0.1 x D	525	– 918	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104	
	2	0.1 x D	0.1 x D	459	– 787	IPT	.0005	.0009	.0012	.0014	.0019	.0024	.0029	.0040	.0048	.0055	.0067	.0072	.0077	
	3	0.1 x D	0.1 x D	394	– 590	IPT	.0004	.0007	.0009	.0011	.0015	.0019	.0023	.0031	.0038	.0044	.0055	.0060	.0064	
	4	0.1 x D	0.1 x D	328	– 459	IPT	.0002	.0005	.0006	.0007	.0010	.0013	.0015	.0021	.0025	.0029	.0036	.0039	.0042	

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Roughing														
		A		Cutting Speed – vc SFM		mm	D1 – Diameter													
		ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.2 x D	0.2 x D	512	– 682	IPT	.0003	.0006	.0007	.0009	.0012	.0015	.0019	.0026	.0031	.0036	.0045	.0048	.0052	
	4	0.2 x D	0.2 x D	384	– 640	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045	
H	1	0.2 x D	0.2 x D	341	– 597	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045	
	2	0.2 x D	0.2 x D	298	– 512	IPT	.0002	.0004	.0005	.0006	.0008	.0010	.0013	.0017	.0021	.0024	.0029	.0031	.0033	
	3	0.2 x D	0.2 x D	256	– 384	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010	.0014	.0016	.0019	.0024	.0026	.0028	
	4	0.2 x D	0.2 x D	213	– 298	IPT	.0001	.0002	.0003	.0003	.0004	.0005	.0007	.0009	.0011	.0013	.0016	.0017	.0018	

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

High-Performance Solid Carbide End Mills

■ Series 422869 422868 • Vision Plus

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Finishing											
		A		Cutting Speed – vc SFM		mm	D1 – Diameter										
		ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0
P	3	0.05 x D	0.05 x D	905	– 1207	IPT	.0010	.0019	.0024	.0029	.0040	.0050	.0061	.0085	.0102	.0119	.0148
	4	0.05 x D	0.05 x D	679	– 1132	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130
H	1	0.05 x D	0.05 x D	604	– 1056	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130
	2	0.05 x D	0.05 x D	528	– 905	IPT	.0007	.0013	.0017	.0020	.0027	.0035	.0042	.0057	.0068	.0079	.0096
	3	0.05 x D	0.05 x D	453	– 679	IPT	.0005	.0011	.0013	.0016	.0022	.0027	.0033	.0045	.0054	.0063	.0079
	4	0.05 x D	0.05 x D	377	– 528	IPT	.0004	.0007	.0009	.0011	.0014	.0018	.0022	.0030	.0036	.0042	.0052

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Semi-Finishing											
		A		Cutting Speed – vc SFM		mm	D1 – Diameter										
		ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0
P	3	0.1 x D	0.1 x D	787	– 1050	IPT	.0007	.0013	.0017	.0020	.0028	.0035	.0043	.0059	.0071	.0083	.0103
	4	0.1 x D	0.1 x D	590	– 984	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091
H	1	0.1 x D	0.1 x D	525	– 918	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091
	2	0.1 x D	0.1 x D	459	– 787	IPT	.0005	.0009	.0012	.0014	.0019	.0024	.0029	.0040	.0048	.0055	.0067
	3	0.1 x D	0.1 x D	394	– 590	IPT	.0004	.0007	.0009	.0011	.0015	.0019	.0023	.0031	.0038	.0044	.0055
	4	0.1 x D	0.1 x D	328	– 459	IPT	.0002	.0005	.0006	.0007	.0010	.0013	.0015	.0021	.0025	.0029	.0036

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Roughing											
		A		Cutting Speed – vc SFM		mm	D1 – Diameter										
		ap	ae	min	max		1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0
P	3	0.2 x D	0.2 x D	512	– 682	IPT	.0003	.0006	.0007	.0009	.0012	.0015	.0019	.0026	.0031	.0036	.0045
	4	0.2 x D	0.2 x D	384	– 640	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039
H	1	0.2 x D	0.2 x D	341	– 597	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039
	2	0.2 x D	0.2 x D	298	– 512	IPT	.0002	.0004	.0005	.0006	.0008	.0010	.0013	.0017	.0021	.0024	.0029
	3	0.2 x D	0.2 x D	256	– 384	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010	.0014	.0016	.0019	.0024
	4	0.2 x D	0.2 x D	213	– 298	IPT	.0001	.0002	.0003	.0003	.0004	.0005	.0007	.0009	.0011	.0013	.0016

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

High-Performance Solid Carbide End Mills

■ Series 422870 • Vision Plus

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Finishing								
		A		Cutting Speed – vc SFM		mm	D1 – Diameter							
		ap	ae	min	max		2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0
P	3	0.05 x D	0.05 x D	905	– 1207	IPT	.0019	.0029	.0040	.0050	.0061	.0085	.0102	.0119
	4	0.05 x D	0.05 x D	679	– 1132	IPT	.0018	.0027	.0036	.0046	.0056	.0076	.0091	.0106
H	1	0.05 x D	0.05 x D	604	– 1056	IPT	.0018	.0027	.0036	.0046	.0056	.0076	.0091	.0106
	2	0.05 x D	0.05 x D	528	– 905	IPT	.0013	.0020	.0027	.0035	.0042	.0057	.0068	.0079
	3	0.05 x D	0.05 x D	453	– 679	IPT	.0011	.0016	.0022	.0027	.0033	.0045	.0054	.0063
	4	0.05 x D	0.05 x D	377	– 528	IPT	.0007	.0011	.0014	.0018	.0022	.0030	.0036	.0042

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Semi-Finishing								
		A		Cutting Speed – vc SFM		mm	D1 – Diameter							
		ap	ae	min	max		2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0
P	3	0.1 x D	0.1 x D	787	– 1050	IPT	.0013	.0020	.0028	.0035	.0043	.0059	.0071	.0083
	4	0.1 x D	0.1 x D	590	– 984	IPT	.0012	.0019	.0025	.0032	.0039	.0053	.0064	.0074
H	1	0.1 x D	0.1 x D	525	– 918	IPT	.0012	.0019	.0025	.0032	.0039	.0053	.0064	.0074
	2	0.1 x D	0.1 x D	459	– 787	IPT	.0009	.0014	.0019	.0024	.0029	.0040	.0048	.0055
	3	0.1 x D	0.1 x D	394	– 590	IPT	.0007	.0011	.0015	.0019	.0023	.0031	.0038	.0044
	4	0.1 x D	0.1 x D	328	– 459	IPT	.0005	.0007	.0010	.0013	.0015	.0021	.0025	.0029

Material Group		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Roughing								
		A		Cutting Speed – vc SFM		mm	D1 – Diameter							
		ap	ae	min	max		2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0
P	3	0.2 x D	0.2 x D	512	– 682	IPT	.0006	.0009	.0012	.0015	.0019	.0026	.0031	.0036
	4	0.2 x D	0.2 x D	384	– 640	IPT	.0005	.0008	.0011	.0014	.0017	.0023	.0028	.0032
H	1	0.2 x D	0.2 x D	341	– 597	IPT	.0005	.0008	.0011	.0014	.0017	.0023	.0028	.0032
	2	0.2 x D	0.2 x D	298	– 512	IPT	.0004	.0006	.0008	.0010	.0013	.0017	.0021	.0024
	3	0.2 x D	0.2 x D	256	– 384	IPT	.0003	.0005	.0007	.0008	.0010	.0014	.0016	.0019
	4	0.2 x D	0.2 x D	213	– 298	IPT	.0002	.0003	.0004	.0005	.0007	.0009	.0011	.0013

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

■ Series 422873 • Vision Plus

Material Group	Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Finishing								
	A		Cutting Speed – vc SFM		D1 – Diameter								
	ap	ae	min	max	mm	3.0	4.0	5.0	6.0	8.0	10.0		
	<b>P</b>	3	0.05 x D	0.05 x D	905	–	1207	IPT	.0029	.0040	.0050	.0061	.0085
	4	0.05 x D	0.05 x D	679	–	1132	IPT	.0027	.0036	.0046	.0056	.0076	.0091
<b>H</b>	1	0.05 x D	0.05 x D	604	–	1056	IPT	.0027	.0036	.0046	.0056	.0076	.0091
	2	0.05 x D	0.05 x D	528	–	905	IPT	.0020	.0027	.0035	.0042	.0057	.0068
	3	0.05 x D	0.05 x D	453	–	679	IPT	.0016	.0022	.0027	.0033	.0045	.0054
	4	0.05 x D	0.05 x D	377	–	528	IPT	.0011	.0014	.0018	.0022	.0030	.0036

Material Group	Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Semi-Finishing								
	A		Cutting Speed – vc SFM		D1 – Diameter								
	ap	ae	min	max	mm	3.0	4.0	5.0	6.0	8.0	10.0		
	<b>P</b>	3	0.1 x D	0.1 x D	787	–	1050	IPT	.0020	.0028	.0035	.0043	.0059
	4	0.1 x D	0.1 x D	590	–	984	IPT	.0019	.0025	.0032	.0039	.0053	.0064
<b>H</b>	1	0.1 x D	0.1 x D	525	–	918	IPT	.0019	.0025	.0032	.0039	.0053	.0064
	2	0.1 x D	0.1 x D	459	–	787	IPT	.0014	.0019	.0024	.0029	.0040	.0048
	3	0.1 x D	0.1 x D	394	–	590	IPT	.0011	.0015	.0019	.0023	.0031	.0038
	4	0.1 x D	0.1 x D	328	–	459	IPT	.0007	.0010	.0013	.0015	.0021	.0025

Material Group	Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) – Roughing								
	A		Cutting Speed – vc SFM		D1 – Diameter								
	ap	ae	min	max	mm	3.0	4.0	5.0	6.0	8.0	10.0		
	<b>P</b>	3	0.2 x D	0.2 x D	512	–	682	IPT	.0009	.0012	.0015	.0019	.0026
	4	0.2 x D	0.2 x D	384	–	640	IPT	.0008	.0011	.0014	.0017	.0023	.0028
<b>H</b>	1	0.2 x D	0.2 x D	341	–	597	IPT	.0008	.0011	.0014	.0017	.0023	.0028
	2	0.2 x D	0.2 x D	298	–	512	IPT	.0006	.0008	.0010	.0013	.0017	.0021
	3	0.2 x D	0.2 x D	256	–	384	IPT	.0005	.0007	.0008	.0010	.0014	.0016
	4	0.2 x D	0.2 x D	213	–	298	IPT	.0003	.0004	.0005	.0007	.0009	.0011

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

High-Performance Solid Carbide End Mills

**Calculation Examples**

**Table of Factor for Speed Calculation Ball Nose**

Average Wall Angle	ap/D						
	0.003	0.006	0.010	0.016	0.020	0.025	0.030
0.0°	9.1	6.5	5.0	4.0	3.6	3.2	2.9
3.0°	6.2	4.9	4.0	3.3	3.0	2.8	2.6
5.0°	5.1	4.2	3.5	3.0	2.8	2.5	2.4
8.0°	4.1	3.4	3.0	2.6	2.4	2.3	2.1
10.0°	3.6	3.1	2.7	2.4	2.3	2.1	2.0
15.0°	2.8	2.5	2.2	2.0	1.9	1.8	1.7
20.0°	2.3	2.1	1.9	1.8	1.7	1.6	1.6
30.0°	1.7	1.6	1.5	1.4	1.4	1.3	1.3
40.0°	1.4	1.3	1.3	1.2	1.2	1.2	1.2
50.0°	1.2	1.2	1.1	1.1	1.1	1.1	1.1
55.0°	1.1	1.1	1.1	1.1	1.1	1.0	1.0

For calculating real cutting speed, use formula: Basic cutting speed \* Factor

Choose the coefficient according to the ap/D and average wall angle.

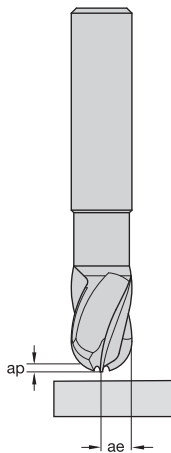
**Example 1:** For Tool = 3/8" and ap = .008" for average wall angle 0°, ap/D ratio equal .008/.375 = .02. Factor equal 3.6.

**Example 2:** For Tool = 5/16" and ap = .004" for average wall angle 10°, ap/D ratio equal .004"/.312 = 0.12. Factor will be between 2.7 and 2.4, choose 2.6.

Keep in mind shank diameter and length effect.

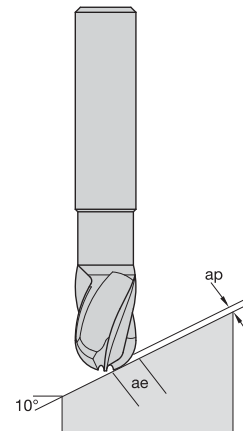
If tool length out of the chuck is more than 2 x D, please decrease feed per tooth by 15% each 1 x D.

Material Group	Basic vc for Factor Calculation		
	Min		Max
P3	160	—	180
P4	140	—	160
H1	100	—	140
H2	70	—	120
H3	60	—	90
H4	50	—	70



**Application example #1** = face milling a flat surface

D = 3/8"  
ap = .008"  
Average wall angle = 0°  
Finishing H2  
Starting vc from chart = 300 SFM  
ap/D = 0.02  
Factor from table = **3.6**  
vc to program into machine = 300 \* 3.6 = 1080 SFM  
RPM = 1080 \* 12/3.14/.375 = 11000 RPM

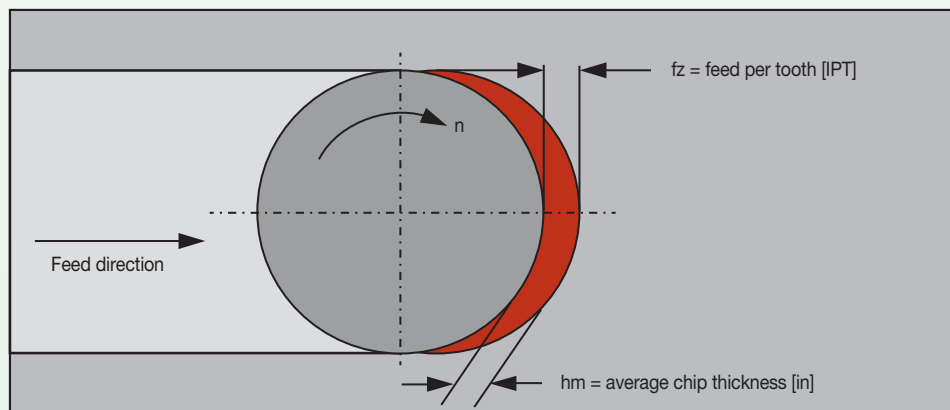


**Application example #2** = face milling a 10° average wall angle

D = 5/16"  
ap = .004"  
Average wall angle = 10°  
Finishing H2  
Starting vc from chart = 300 SFM  
ap/D = 0,1/8 = .012  
Factor from table = **2.6**  
vc to program into machine = 300 \* 2.6 = 780 SFM  
RPM = 780 \* 12/3.14/.312 = 9554 RPM

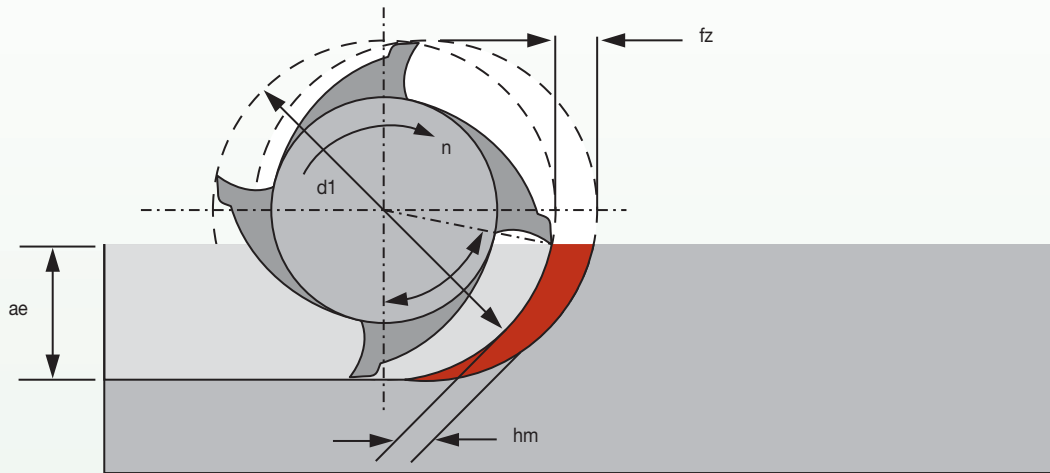
## ■ Conventional Slotting

- Full slotting limitations:
  - Usually not more than  $a_p = 1 \times D$ .
  - Conventional and climb milling at the same time.
  - High heat development on the tool and on the workpiece.
  - Difficult chip evacuation.
  - High radial forces.
- This Means:
  - No constant chip thickness.
  - Low MRR.
  - Surface quality from the left to right side are different.
  - Limited tool life.
  - High power and torque requirements for the machine.





■ ae and Chip Thickness



To calculate average chip thickness:

$$hm = fz \cdot \left( \sqrt{\frac{ae}{d_1}} \right)$$

Simplified formula for shown application and 90° angles on the tool.

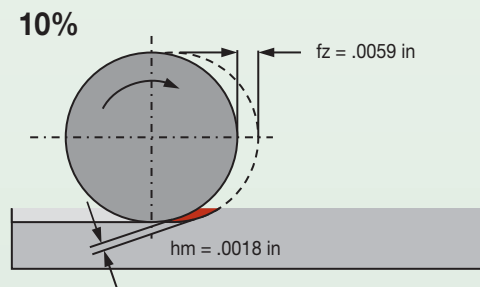
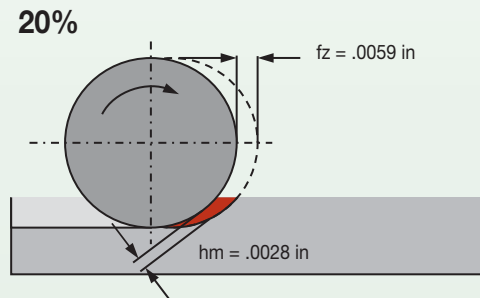
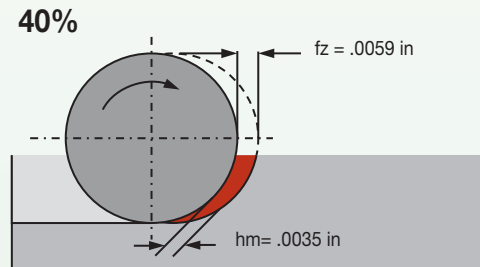
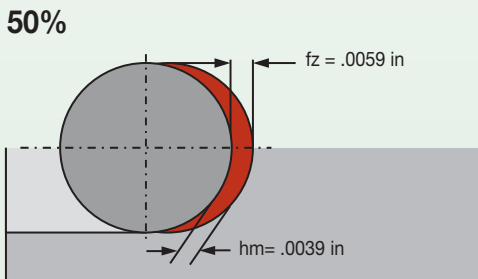
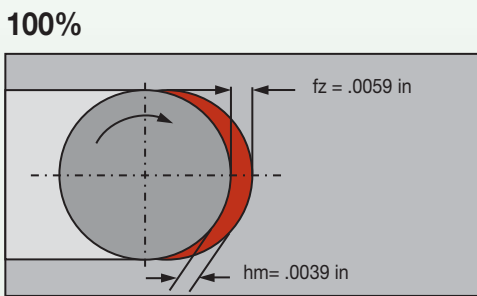
The chip thickness defines the load on the cutting edge.

■ ae and Chip Thickness

chip thinning effect

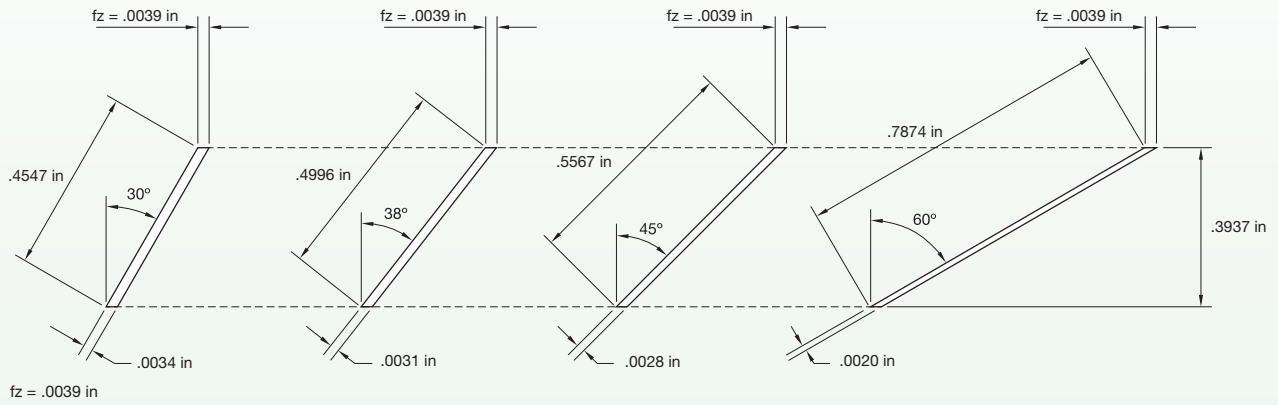
$a_e$	programmed feed ( $f_z$ )	chip thickness ( $h_m$ )
100%	.0059 in	.0039 in
50%	.0059 in	.0039 in
40%	.0059 in	.0035 in
20%	.0059 in	.0028 in
10%	.0059 in	.0018 in

The chip thickness needs to be compensated by feed.



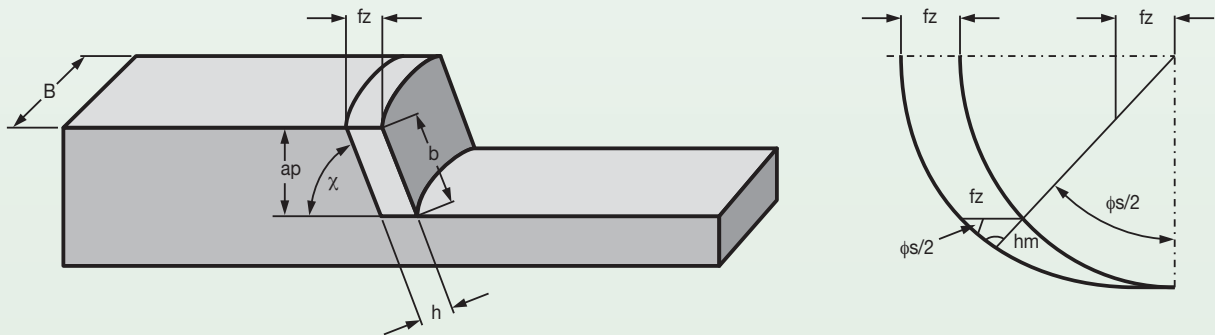
■ **Helix Angle and Chip Thickness**

The chip thickness (h) depends on the helix angle of the cutting edge. If the feed fz is constant, the chip thickness gets thinner as helix angle rises. That means with more helix angle, the chip gets thinner — or you can rise feed rate to increase productivity and load to the cutting edge.



■ **Calculation of Chip Thickness**

The chip thickness (h) is not constant, but defines the load of the cutting edge. By reducing the load on the cutting edge, machining at higher speeds is possible through the machining parameters. For easier calculation, use an average chip thickness  $h_m$ . When calculating machining data this way cutting data may be compromised because the workpiece is often a different shape.



$$h_m = \frac{360^\circ}{\pi \cdot \phi_s} \cdot \frac{a_e}{D} \cdot f_z \cdot \sin \chi$$

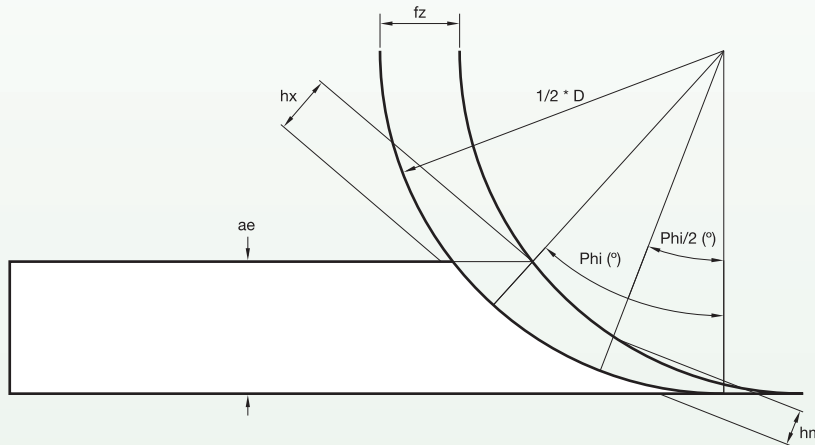
$h_m$ [in]	=	average chip thickness
$\phi_s$ [°]	=	engagement angle
$a_e$ [in]	=	width of engagement
$D$ [in]	=	outer diameter tool
$f_z$ [IPT]	=	feed per tooth
$\chi$ [°]	=	lead angle
$\lambda$ [°]	=	helix angle *

\* Solid End Mills:  $\chi = 90^\circ - \lambda$

NOTE: It makes no difference if the tool is solid or an indexable milling tool.

■ Differences between hm and hx

In conventional milling, it makes sense to calculate the load to the cutting edge through hm. With reducing the ae to very low values, you can calculate with the maximum chip thickness hx to make sure that the feed per tooth is set up correctly.



**Conventional**

$$hm = 360^\circ / \pi \cdot \phi_s \cdot ae / D \cdot fz \cdot \sin x$$

- hm [in] = average chip thickness
- fs [°] = engagement angle
- ae [in] = width of engagement
- D1 [in] = outer diameter tool
- fz [IPT] = feed per tooth
- $\chi$  [°] = lead angle
- $\lambda$  [°] = helix angle \*

**Smart Machining**

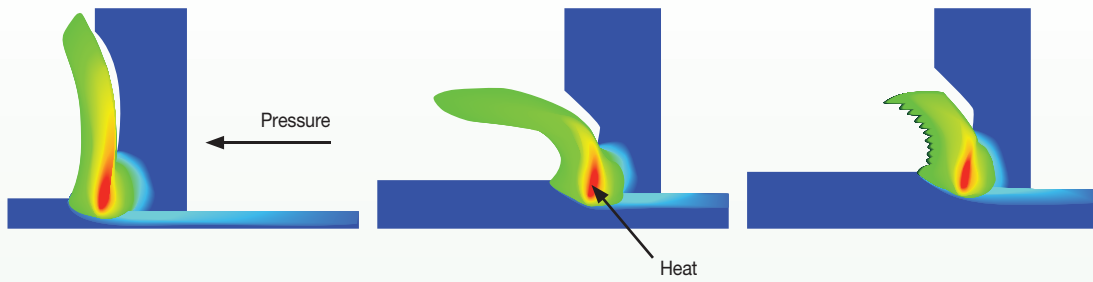
$$hx = 360^\circ / \pi \cdot \phi_s \cdot 2 \cdot ae / D \cdot fz \cdot \sin x$$

- hx [in] = maximum chip thickness
- fs [°] = engagement angle
- ae [in] = width of engagement
- D1 [in] = outer diameter tool
- fz [IPT] = feed per tooth
- $\chi$  [°] = lead angle
- $\lambda$  [°] = helix angle \*

\* Solid End Mills:  $\chi = 90^\circ - \lambda$

Trochoidal Milling can be performed with solid or indexable milling tools.

■ Cutting Speed

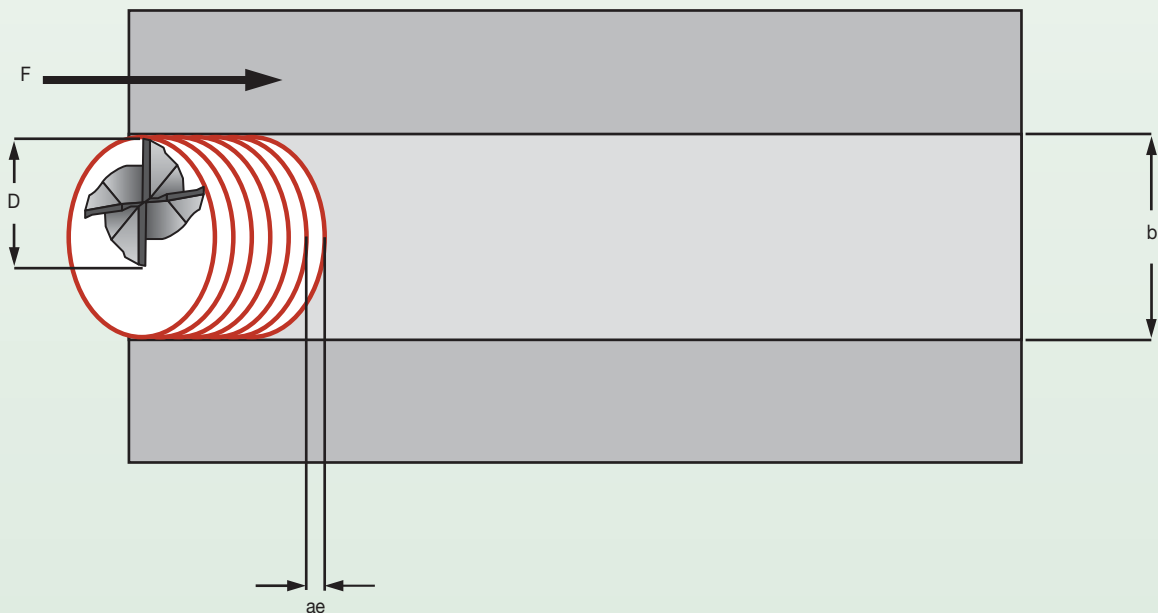


Reduced radial engagement influences the cutting speed, because the heat produced through the cutting process limits the cutting speed.

ae/D	full slot	50% ae	40% ae	30% ae	20% ae	10 % ae	5% ae	4% ae
speed factors	0.9	1	1.1	1.2	1.3	1.4	2.5	3
phi [°]	180	90	78.46	66.42	53.13	36.87	25.84	23.07

■ Static Trochoidal Milling for a Full Slot

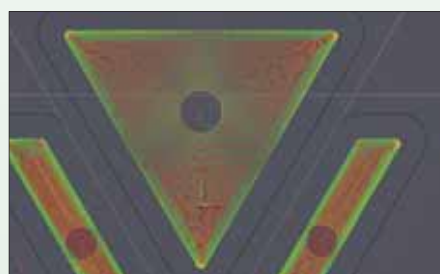
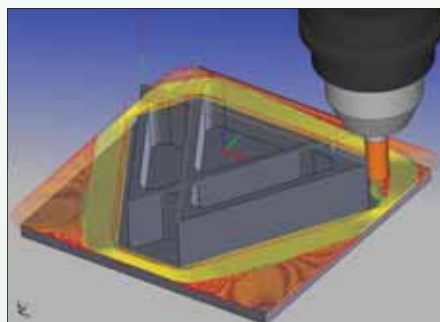
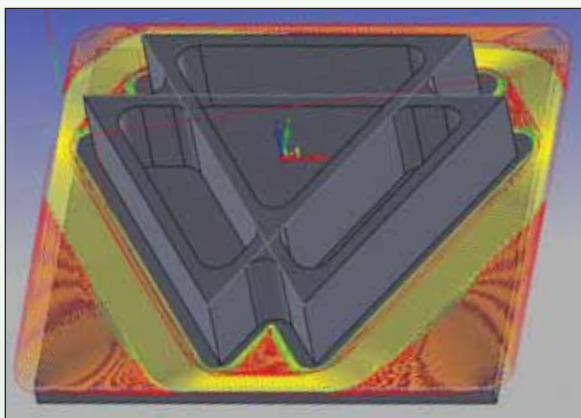
- Use a tool which  $D < b$ .
- Program circles in the CNC program (as a cycle).
- After one circle, repeat the same with an offset.
- Optimize by shortening the lane "in the air" to a form like a "D".



Trochoidal Milling can be performed with solid or indexable milling tools.

## ■ Dynamic Trochoidal Milling

- Transfer the basic idea control of chip thickness to dynamic processes.
- Dynamic adaption of feed in relation to ae and wrap angle through an intelligent CAM Software.
- Using helix interpolation, D-lanes, and morphing cycles.



## ■ Requirements

### Static trochoidal milling

- Dynamic machine.
- CNC Program.
- Modern tool.
- Cutting data for trochoidal machining.

### Dynamic trochoidal milling

- Dynamic CNC machine.
- CAD/CAM optimization software.
- Modern tool.
- Cutting data for trochoidal machining.

## ■ Benefits

- Constant chip thickness.
- Reduced arc/angle engagement (wrap angle).
- Tremendously reduced load on the cutting edge.
- Reduced temperature during the machining process.
- Higher cutting speed and feed per tooth possible.
- Reduced cycle time and increased tool life.
- Better chip evacuation.
- Better usage of the tool length.
- Less torque and power requirements for the machine.
- Less risk of spindle damages through torque fluctuation and reduced torque peaks caused by conventional milling processes.

# VariMill III™ ER



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

VariMill III ER provides the highest metal removal rates and superior surface finish in the most demanding workpiece materials in the aerospace industry. WIDIA-Hanita™ combines its unmatched tooling technology with state-of-the-art surface treatments to deliver the highest quality and productivity you can rely on when it comes down to critical semi-finishing and finishing operations.

- 7-Flute design maximizes Metal Removal Rates (MRR) and surface quality.
- Up to 30% radial engagement allowing for increased productivity.
- Perfectly suited for high-speed machining techniques such as trochoidal and peel milling.
- Central coolant hole on 2 x D tools; chip evacuation during pocketing.
- Available with **SAFE-λOCK®** as standard for increased tool life and anti-pullout.
- Available with all common aerospace radii.

To learn more about our innovations, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA** 

High-Performance Solid Carbide End Mills •

## SAFE-λOCK®

In High-Performance Cutting (HPC), slow microcreeping can cause the cutting tool to be pulled out of the chuck, turning high-quality workpieces to scrap.

# SAFE-λOCK®



## Be on the safe side with SAFE-λOCK® in High-Performance Cutting (HPC).

- Highly accurate clamping due to positive connection.
- No loss of accuracy.
- No pullout or spinning of the tool.
- No damage to the workpiece or machine.
- Groove on tool shank is directed so the tool will be pulled into the chuck (depending on direction of rotation).

### Order Information

WIDIA™ high-performance end mills with shank diameters of 1/2" and larger are available with SAFE-λOCK® technology, as a special tool, upon request. Please contact your local customer service location to receive a quote.

#### Features

- Form-closed clamping.
- High accuracy clamping.
- Helical grooves.

#### Functions

- No pullout.
- Excellent runout.
- Adjustable clamping length.

#### Benefits

- Reduce scrap rate.
- Higher tool life.
- No need to change NC program after regrinding.







## Example for Highest Metal Removal Rates (MRR)

The VariMill II ER proprietary design with unequal flute spacing and unique core geometry for chatter-free machining enables slotting operations in titanium up to 1 x D.



### SAFE-λOCK®

The safety belt for high-performance solid carbide end mills provide form-closed clamping with high accuracy and helical grooves for length adjustment.



# WIDIA™ and the Machine Tool Industry (MTI)

## Partners from Point to Part

Challenges are always better faced with a partner. Getting the most out of a manufacturing process means a 3-point partnership between the end user, the machine tool builder, and the tooling provider. The right partner works with you every step of the way, from the point of the spindle connection to the completed part.

Let the WIDIA Machine Tool Industry (MTI) specialists be your partners. We'll work with you from pre-planning, time studies, and machine tool selection through setup, runoff, operator training, and process optimization. The MTI team focuses simultaneously on engineering, process and application support, and tool selection. We look at the total solution to get you where you want and need to be in your manufacturing.

We have MTI specialists in more than 60 countries around the world, so there's always someone near you: [W-MTI.Solutions@WIDIA.com](mailto:W-MTI.Solutions@WIDIA.com).

## Components of a Winning Strategy

Our mission is to build lasting relationships with all of the focused builders, end users, and dealers to provide continuous communications and to ensure we have their mind share. WIDIA is the number one choice of machine tool builders, dealers, and end users globally for total tooling solutions. We provide world class quality, service, and on-time delivery to meet and exceed your expectations

- Trust
- Innovation
- Dedicated Support
- Capability
- Engineered Solutions



## Global Manufacturers

Our global organization and network is ensuring a reliable support at the home of the machine tool builder and the final place of installation, and following the machines worldwide.

- Simultaneous engineering support from art to part.
- Seamless transition from the initial investment phase to full production by qualified technical hand-off to local WIDIA™ staff at the end user stage, guaranteeing satisfying continued service and support.
- Starter kits for machine tool equipment.

## Global WIDIA MTI

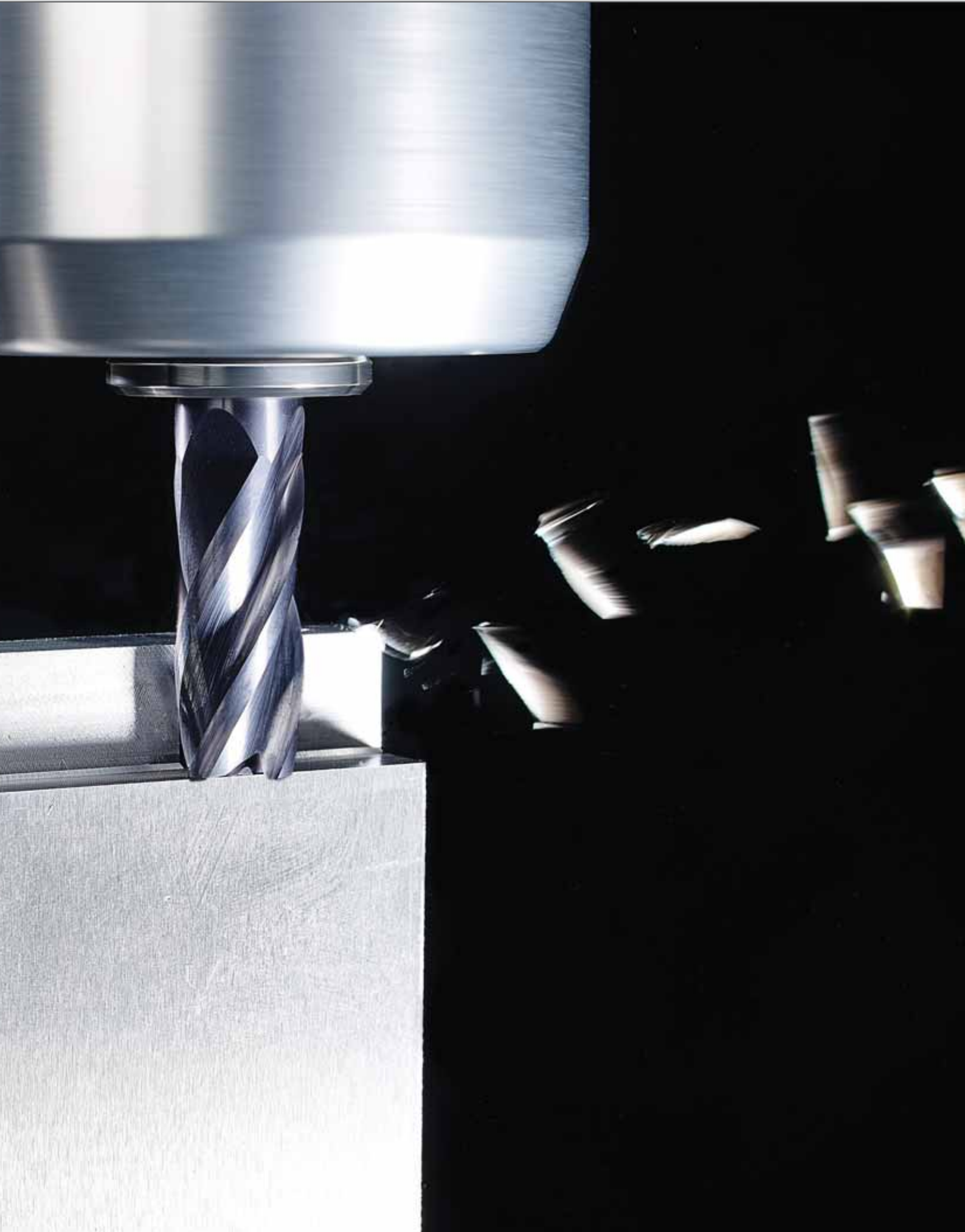
We will provide our customers with a total solution from spindle connection to the part. We include all brands of the WIDIA family of companies to enhance this total solution.

## Global Machine Tool Builders

Providing machine tool builders with a long term expertise in the OEM business and an unreached bandwidth of competitive technical solutions, consisting of standard, as well as customized cutting tool technology.

For more information, contact your local WIDIA Authorized Distributor or visit [widia.com/services](http://widia.com/services).

**WIDIA** 



## Solid End Milling • General Purpose Solid Carbide End Mills

VariMill General Purpose 2-Flute End Mills .....	N2-N14
VariMill General Purpose 3-Flute End Mills .....	N16
VariMill General Purpose 4-Flute End Mills .....	N18-N31



General Purpose 2-Flute End Mills •  
**VariMill™ GP**

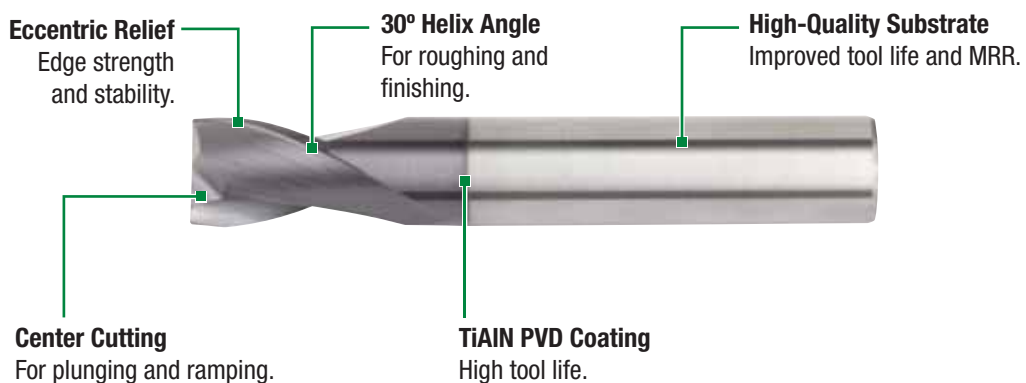
# VariMill GP



VariMill GP offers plunging, slotting, and profiling for a wide range of materials and applications. Designed to provide high metal removal rates and excellent surface conditions at a value price. A wide range of diameters, lengths, and corner styles (such as chamfered, sharp edge, and ball nose) are available from stock.

## VariMill GP • 2-Flute

- General purpose tools for a wide range of workpiece materials.
- Roughing and finishing with one tool.
- Various lengths-of-cut and overall lengths with different front end designs available.
- Two flutes for high flexibility in unstable conditions.

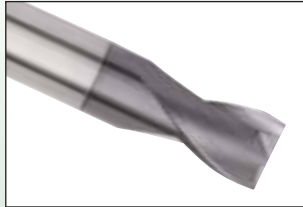


## VariMill™ GP

- Increased manufacturing flexibility and reduced tool cost.
- Fewer tool changes and high Metal Removal Rates (MRR).
- No specific tool for roughing and finishing required.
- Eccentric relief for improved edge stability and high tool life.
- Easy and cost-efficient regrinding due to eccentric relief.

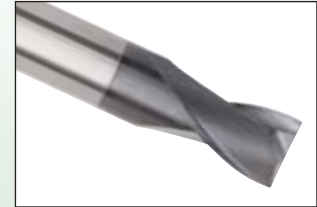
### I2C Series

- Wide range of lengths-of-cut — short, regular, long, and extra long.
- Steel, stainless steel, and cast iron.
- Corner chamfer for increased tool life.
- Center cut.



### I2S Series

- Wide range of lengths-of-cut — short, regular, long, and extra long.
- Steel, stainless steel, and cast iron.
- Center cut.

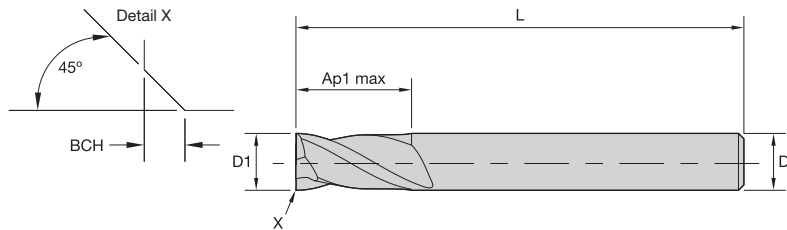
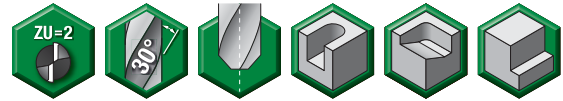


### I2B Series

- Wide range of lengths-of-cut — short, regular, long, and extra long.
- Steel, stainless steel, and cast iron.
- Center cut ball nose.



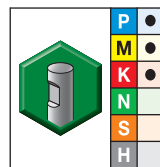
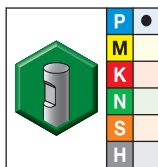
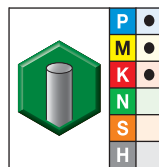
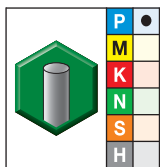
- Center cutting.
- Chamfered corners.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 +/-
All	+.000/-0.002	≤ 1/8"	0/.00024
		> 1/8-1/4"	0/.00031
		> 1/4-3/8"	0/.00035
		> 3/8-23/32"	0/.00043
		> 23/32-1 3/16"	0/.00051

■ Series I2C • VariMill GP



- first choice
- alternate choice

grade UNCOATED

grade TiAlN  
TiAlN

grade UNCOATED

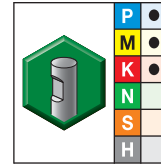
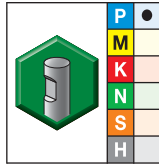
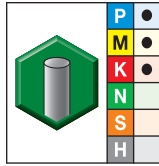
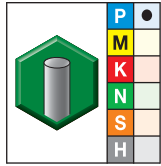
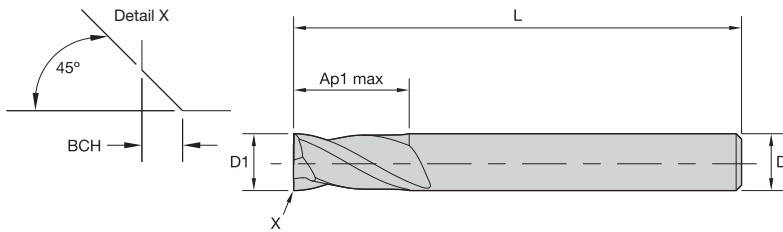
grade TiAlN  
TiAlN

order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH
5877923	I2C0125T025S	5873898	I2C0125T025S	—	—	—	—	1/8	1/8	1/4	1 1/2	.010
5877924	I2C0125T050R	5873899	I2C0125T050R	—	—	—	—	1/8	1/8	1/2	1 1/2	.010
5877925	I2C0125T075L	5873900	I2C0125T075L	—	—	—	—	1/8	1/8	3/4	2 1/4	.010
5877926	I2C0125T075X	5873901	I2C0125T075X	—	—	—	—	1/8	1/8	3/4	3	.010
5877927	I2C0141T056R	5873902	I2C0141T056R	—	—	—	—	9/64	3/16	9/16	2	.010
5877928	I2C0156T031R	5873903	I2C0156T031R	—	—	—	—	5/32	3/16	5/16	2	.010
5877929	I2C0156T056L	5873904	I2C0156T056L	—	—	—	—	5/32	3/16	9/16	2	.010
5877930	I2C0172T062R	5873905	I2C0172T062R	—	—	—	—	11/64	3/16	5/8	2	.010
—	—	5873906	I2C0188T031S	—	—	—	—	3/16	3/16	5/16	1 1/2	.010
5877931	I2C0188T062R	5873907	I2C0188T062R	—	—	—	—	3/16	3/16	5/8	2	.010
5877932	I2C0188T075L	5873908	I2C0188T075L	—	—	—	—	3/16	3/16	3/4	2 1/2	.010
5877933	I2C0188T112X	5873909	I2C0188T112X	—	—	—	—	3/16	3/16	1 1/8	3	.010
5877934	I2C0219T043R	5873910	I2C0219T043R	—	—	—	—	7/32	1/4	7/16	2	.016
5877935	I2C0219T062L	5873911	I2C0219T062L	—	—	—	—	7/32	1/4	5/8	2 1/2	.016
5877936	I2C0250T050S	5873912	I2C0250T050S	—	—	—	—	1/4	1/4	1/2	2	.016
5877937	I2C0250T075R	5873913	I2C0250T075R	—	—	—	—	1/4	1/4	3/4	2 1/2	.016
5877938	I2C0250T112R	5873914	I2C0250T112L	—	—	—	—	1/4	1/4	1 1/8	3	.016
5877939	I2C0250T125L	—	—	—	—	—	—	1/4	1/4	1 1/4	3 1/2	.016
5877940	I2C0250T150X	5873915	I2C0250T150X	—	—	—	—	1/4	1/4	1 1/2	4	.016
5877951	I2C0281T075R	5873916	I2C0281T075R	—	—	—	—	9/32	5/16	3/4	2 1/2	.016
5878021	I2C0312T050S	5873986	I2C0312T050S	—	—	—	—	5/16	5/16	1/2	2	.016
5877952	I2C0312T081R	5873917	I2C0312T081R	—	—	—	—	5/16	5/16	13/16	2 1/2	.016
5877953	I2C0312T112L	5873918	I2C0312T112L	—	—	—	—	5/16	5/16	1 1/8	3	.016
5877954	I2C0312T162X	5873919	I2C0312T162X	—	—	—	—	5/16	5/16	1 5/8	4	.016

(continued)



(Series I2C • VariMill GP – continued)

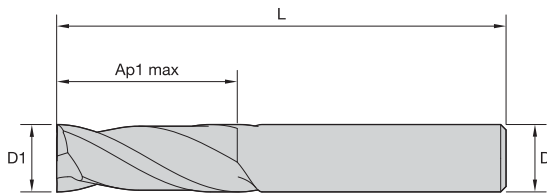
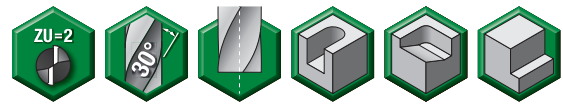


● first choice  
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN		D1	D	length of cut Ap1 max	length L	BCH
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #					
5877955	I2C0344T100R	5873920	I2C0344T100R	—	—	—	—	11/32	3/8	1	2 1/2	.020
5877956	I2C0375T062S	5873921	I2C0375T062S	—	—	—	—	3/8	3/8	5/8	2	.020
5877957	I2C0375T100R	5873922	I2C0375T100R	—	—	—	—	3/8	3/8	1	2 1/2	.020
5877958	I2C0375T112R	5873923	I2C0375T112R	—	—	—	—	3/8	3/8	1 1/8	3	.020
5877959	I2C0375T175L	5873924	I2C0375T175L	—	—	—	—	3/8	3/8	1 3/4	4	.020
5877960	I2C0375T300X	5873925	I2C0375T300X	—	—	—	—	3/8	3/8	3	6	.020
5877961	I2C0406T100R	5873926	I2C0406T100R	—	—	—	—	13/32	7/16	1	2 3/4	.020
5877962	I2C0437T062S	5873927	I2C0437T062S	—	—	—	—	7/16	7/16	5/8	2 1/2	.020
5877963	I2C0437T100R	5873928	I2C0437T100R	—	—	—	—	7/16	7/16	1	2 1/2	.020
5877964	I2C0437T200L	5873929	I2C0437T200L	—	—	—	—	7/16	7/16	2	4	.020
5877965	I2C0437T300X	5873930	I2C0437T300X	—	—	—	—	7/16	7/16	3	6	.020
5877967	I2C0469T100R	5873931	I2C0469T100R	—	—	—	—	15/32	1/2	1	3	.020
5877968	I2C0500T062S	5873932	I2C0500T062S	—	—	—	—	1/2	1/2	5/8	2 1/2	.020
5877969	I2C0500T100R	5873933	I2C0500T100R	5878002	I2C0500W100R	5873966	I2C0500W100R	1/2	1/2	1	3	.020
5877970	I2C0500T200L	5873934	I2C0500T200L	5878003	I2C0500W200L	5873967	I2C0500W200L	1/2	1/2	2	4	.020
5877971	I2C0500T300X	5873935	I2C0500T300X	5878004	I2C0500W300X	5873968	I2C0500W300X	1/2	1/2	3	6	.020
5877972	I2C0562T075R	5873936	I2C0562T075R	5878005	I2C0562W075R	5873969	I2C0562W075R	9/16	9/16	3/4	3	.020
5877973	I2C0562T125L	5873937	I2C0562T125L	5878006	I2C0562W125L	5873971	I2C0562W125L	9/16	9/16	1 1/4	3 1/2	.020
5877974	I2C0562T225X	5873938	I2C0562T225X	5878007	I2C0562W225X	5873972	I2C0562W225X	9/16	9/16	2 1/4	5	.020
5877975	I2C0625T075S	5873939	I2C0625T075S	—	—	—	—	5/8	5/8	3/4	3	.020
5877976	I2C0625T125R	5873940	I2C0625T125R	5878008	I2C0625W125R	5873973	I2C0625W125R	5/8	5/8	1 1/4	3 1/2	.020
5877977	I2C0625T225R	5873951	I2C0625T225R	5878009	I2C0625W225R	5873974	I2C0625W225R	5/8	5/8	2 1/4	5	.020
5877978	I2C0625T300L	5873952	I2C0625T300L	5878010	I2C0625W300L	5873975	I2C0625W300L	5/8	5/8	3	6	.020
5877979	I2C0625T400X	5873953	I2C0625T400X	5878011	I2C0625W400X	5873976	I2C0625W400X	5/8	5/8	4	7	.020
5877980	I2C0687T137R	5873954	I2C0687T137R	5878012	I2C0687W137R	5873977	I2C0687W137R	11/16	3/4	1 3/8	4	.020
5877991	I2C0750T100S	5873955	I2C0750T100S	—	—	—	—	3/4	3/4	1	3	.020
5877992	I2C0750T150R	5873956	I2C0750T150R	—	—	—	—	3/4	3/4	1 1/2	4	.020
5877993	I2C0750T225R	5873957	I2C0750T225R	5878013	I2C0750W225R	5873978	I2C0750W225R	3/4	3/4	2 1/4	5	.020
5877994	I2C0750T300L	5873958	I2C0750T300L	5878014	I2C0750W300L	5873979	I2C0750W300L	3/4	3/4	3	6	.020
5877995	I2C0750T400X	5873959	I2C0750T400X	5878015	I2C0750W400X	5873980	I2C0750W400X	3/4	3/4	4	7	.020
5877996	I2C0875T150R	5873960	I2C0875T150R	5878016	I2C0875W150R	5873981	I2C0875W150R	7/8	7/8	1 1/2	4	.020
5877997	I2C0875T225L	5873961	I2C0875T225L	5878017	I2C0875W225L	5873982	I2C0875W225L	7/8	7/8	2 1/4	5	.020
5877998	I2C1000T150S	5873962	I2C1000T150S	—	—	—	—	1	1	1 1/2	4	.020
5877999	I2C1000T225R	5873963	I2C1000T225R	5878018	I2C1000W225R	5873983	I2C1000W225R	1	1	2 1/4	5	.020
5878000	I2C1000T300L	5873964	I2C1000T300L	5878019	I2C1000W300L	5873984	I2C1000W300L	1	1	3	6	.020
5878001	I2C1000T400X	5873965	I2C1000T400X	5878020	I2C1000W400X	5873985	I2C1000W400X	1	1	4	7	.020

NOTE: For application data, please see pages N11–N12.

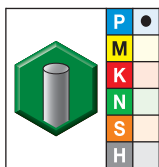
- Center cutting.
- Sharp corners.
- Standard items listed. Additional styles and coatings made-to-order.



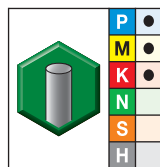
End Mill Tolerances

D1	tolerance e8	D	tolerance h6 +/-
All	+0.00/-0.002	≤ 1/8"	0.00024
		> 1/8-1/4"	0.00031
		> 1/4-3/8"	0.00035
		> 3/8-23/32"	0.00043
		> 23/32-1 3/16"	0.00051

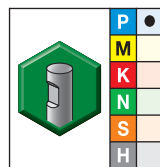
Series I2S • VariMill GP



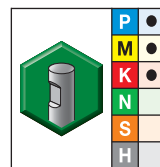
grade UNCOATED



grade TiAlN  
TiAlN



grade UNCOATED



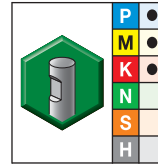
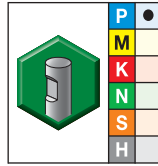
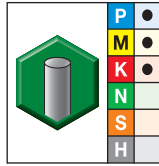
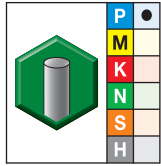
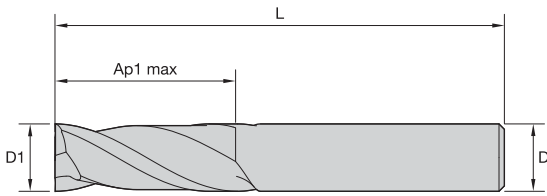
grade TiAlN  
TiAlN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
5873648	I2S0016T003R	5872793	I2S0016T003R	—	—	—	—	1/64	1/8	1/32	1 1/2
5873649	I2S0031T007R	5872794	I2S0031T007R	—	—	—	—	1/32	1/8	5/64	1 1/2
5873661	I2S0062T012R	5872796	I2S0062T012R	—	—	—	—	1/16	1/8	1/8	1 1/2
5873650	I2S0062T018L	5872795	I2S0062T018L	—	—	—	—	1/16	1/8	3/16	1 1/2
5873662	I2S0062T050X	5872797	I2S0062T050X	—	—	—	—	1/16	1/8	1/2	2
5873663	I2S0078T018R	5872798	I2S0078T018R	—	—	—	—	5/64	1/8	3/16	1 1/2
5873664	I2S0094T018S	5872799	I2S0094T018S	—	—	—	—	3/32	1/8	3/16	1 1/2
5873665	I2S0094T037R	5872800	I2S0094T037R	—	—	—	—	3/32	1/8	3/8	1 1/2
5873666	I2S0094T062L	5872841	I2S0094T062L	—	—	—	—	3/32	1/8	5/8	2
—	—	5872843	I2S0109T037R	—	—	—	—	7/64	1/8	3/8	1 1/2
5873667	I2S0125T025S	5872844	I2S0125T025S	—	—	—	—	1/8	1/8	1/4	1 1/2
5873669	I2S0125T050R	5872845	I2S0125T050R	—	—	—	—	1/8	1/8	1/2	1 1/2
5873670	I2S0125T075L	5872846	I2S0125T075L	—	—	—	—	1/8	1/8	3/4	2 1/4
5873671	I2S0125T075X	5872847	I2S0125T075X	—	—	—	—	1/8	1/8	3/4	3
5873672	I2S0141T056R	5872848	I2S0141T056R	—	—	—	—	9/64	3/16	9/16	2
5873673	I2S0156T031R	5872849	I2S0156T031R	—	—	—	—	5/32	3/16	5/16	2
5873674	I2S0156T056L	5872850	I2S0156T056L	—	—	—	—	5/32	3/16	9/16	2
5873675	I2S0172T062R	5872851	I2S0172T062R	—	—	—	—	11/64	3/16	5/8	2
—	—	5872852	I2S0188T031S	—	—	—	—	3/16	3/16	5/16	1 1/2
5873676	I2S0188T062R	5872853	I2S0188T062R	—	—	—	—	3/16	3/16	5/8	2
5873677	I2S0188T075L	5872854	I2S0188T075L	—	—	—	—	3/16	3/16	3/4	2 1/2
5873678	I2S0188T112X	5872855	I2S0188T112X	—	—	—	—	3/16	3/16	1 1/8	3
5873679	I2S0219T043R	5872856	I2S0219T043R	—	—	—	—	7/32	1/4	7/16	2
5873680	I2S0219T062L	5872857	I2S0219T062L	—	—	—	—	7/32	1/4	5/8	2 1/2

(continued)

(Series I2S • VariMill GP – continued)

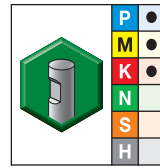
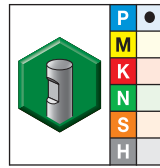
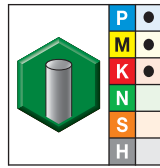
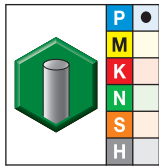
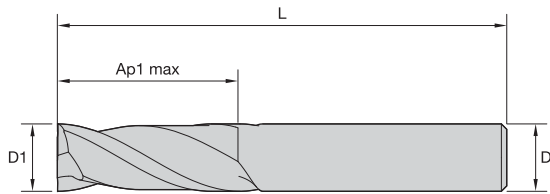


● first choice  
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN		D1	D	length of cut Ap1 max	length L
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #				
5873681	I2S0250T050S	5872858	I2S0250T050S	—	—	—	—	1/4	1/4	1/2	2
5873682	I2S0250T075R	5872859	I2S0250T075R	—	—	—	—	1/4	1/4	3/4	2 1/2
5873683	I2S0250T112R	5872860	I2S0250T112R	—	—	—	—	1/4	1/4	1 1/8	3
5873684	I2S0250T125L	—	—	—	—	—	—	1/4	1/4	1 1/4	3 1/2
5873685	I2S0250T150X	5872861	I2S0250T150X	—	—	—	—	1/4	1/4	1 1/2	4
5873686	I2S0281T075R	5872862	I2S0281T075R	—	—	—	—	9/32	5/16	3/4	2 1/2
5873755	I2S0312T050S	5872941	I2S0312T050S	—	—	—	—	5/16	5/16	1/2	2
5873687	I2S0312T081R	5872863	I2S0312T081R	—	—	—	—	5/16	5/16	13/16	2 1/2
5873688	I2S0312T112L	5872864	I2S0312T112L	—	—	—	—	5/16	5/16	1 1/8	3
5873689	I2S0312T162X	5872865	I2S0312T162X	—	—	—	—	5/16	5/16	1 5/8	4
5873690	I2S0344T100R	5872866	I2S0344T100R	—	—	—	—	11/32	3/8	1	2 1/2
5873691	I2S0375T062S	5872867	I2S0375T062S	—	—	—	—	3/8	3/8	5/8	2
5873692	I2S0375T100R	5872868	I2S0375T100R	—	—	—	—	3/8	3/8	1	2 1/2
5873693	I2S0375T112R	5872869	I2S0375T112R	—	—	—	—	3/8	3/8	1 1/8	3
5873694	I2S0375T175L	5872870	I2S0375T175L	—	—	—	—	3/8	3/8	1 3/4	4
5873695	I2S0375T300X	5872881	I2S0375T300X	—	—	—	—	3/8	3/8	3	6
5873696	I2S0406T100R	5872882	I2S0406T100R	—	—	—	—	13/32	7/16	1	2 3/4
5873697	I2S0437T062S	5872883	I2S0437T062S	—	—	—	—	7/16	7/16	5/8	2 1/2
5873698	I2S0437T100R	5872884	I2S0437T100R	—	—	—	—	7/16	7/16	1	2 1/2
5873699	I2S0437T200L	5872885	I2S0437T200L	—	—	—	—	7/16	7/16	2	4
5873700	I2S0437T300X	5872886	I2S0437T300X	—	—	—	—	7/16	7/16	3	6
5873711	I2S0469T100R	5872887	I2S0469T100R	—	—	—	—	15/32	1/2	1	3
5873712	I2S0500T062S	5872888	I2S0500T062S	—	—	—	—	1/2	1/2	5/8	2 1/2
5873713	I2S0500T100R	5872889	I2S0500T100R	5873736	I2S0500W100R	5872922	I2S0500W100R	1/2	1/2	1	3
5873714	I2S0500T200L	5872890	I2S0500T200L	5873737	I2S0500W200L	5872923	I2S0500W200L	1/2	1/2	2	4
5873715	I2S0500T300X	5872891	I2S0500T300X	5873738	I2S0500W300X	5872924	I2S0500W300X	1/2	1/2	3	6
5873716	I2S0562T075R	5872892	I2S0562T075R	5873739	I2S0562W075R	5872925	I2S0562W075R	9/16	9/16	3/4	3
5873717	I2S0562T125L	5872893	I2S0562T125L	5873740	I2S0562W125L	5872926	I2S0562W125L	9/16	9/16	1 1/4	3 1/2
5873718	I2S0562T225X	5872894	I2S0562T225X	5873741	I2S0562W225X	5872927	I2S0562W225X	9/16	9/16	2 1/4	5
5873719	I2S0625T075S	5872895	I2S0625T075S	—	—	—	—	5/8	5/8	3/4	3
5873720	I2S0625T125R	5872896	I2S0625T125R	5873742	I2S0625W125R	5872928	I2S0625W125R	5/8	5/8	1 1/4	3 1/2
5873721	I2S0625T225R	5872897	I2S0625T225R	5873743	I2S0625W225R	5872929	I2S0625W225R	5/8	5/8	2 1/4	5
5873722	I2S0625T300L	5872898	I2S0625T300L	5873744	I2S0625W300L	5872930	I2S0625W300L	5/8	5/8	3	6
5873723	I2S0625T400X	5872899	I2S0625T400X	5873745	I2S0625W400X	5872931	I2S0625W400X	5/8	5/8	4	7
5873724	I2S0687T137R	5872900	I2S0687T137R	5873746	I2S0687W137R	5872932	I2S0687W137R	11/16	3/4	1 3/8	4
5873725	I2S0750T100S	5872901	I2S0750T100S	—	—	—	—	3/4	3/4	1	3

(continued)

(Series I2S • VariMill GP — continued)



● first choice  
○ alternate choice

grade UNCOATED

grade TiAlN  
TiAlN

grade UNCOATED

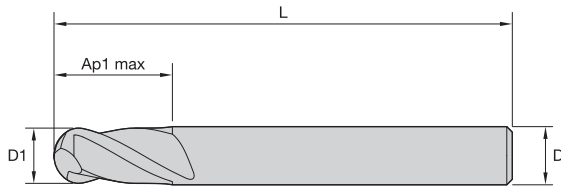
grade TiAlN  
TiAlN

order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
5873726	I2S0750T150R	5872902	I2S0750T150R	—	—	5872933	I2S0750W225R	3/4	3/4	1 1/2	4
5873727	I2S0750T225R	5872903	I2S0750T225R	5873747	I2S0750W225R	5872933	I2S0750W225R	3/4	3/4	2 1/4	5
5873728	I2S0750T300L	5872904	I2S0750T300L	5873748	I2S0750W300L	5872934	I2S0750W300L	3/4	3/4	3	6
5873729	I2S0750T400X	5872905	I2S0750T400X	5873749	I2S0750W400X	5872935	I2S0750W400X	3/4	3/4	4	7
5873730	I2S0875T150R	5872906	I2S0875T150R	5873750	I2S0875W150R	5872936	I2S0875W150R	7/8	7/8	1 1/2	4
5873731	I2S0875T225L	5872907	I2S0875T225L	5873751	I2S0875W225L	5872937	I2S0875W225L	7/8	7/8	2 1/4	5
5873732	I2S1000T150S	5872908	I2S1000T150S	—	—	—	—	1	1	1 1/2	4
5873733	I2S1000T225R	5872909	I2S1000T225R	5873752	I2S1000W225R	5872938	I2S1000W225R	1	1	2 1/4	5
5873734	I2S1000T300L	5872910	I2S1000T300L	5873753	I2S1000W300L	5872939	I2S1000W300L	1	1	3	6
5873735	I2S1000T400X	5872921	I2S1000T400X	5873754	I2S1000W400X	5872940	I2S1000W400X	1	1	4	7

NOTE: For application data, please see pages N11–N12.

General Purpose Solid Carbide End Mills

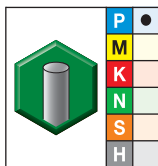
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



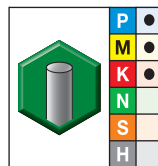
End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
All	+.000/- .002	≤ 1/8"	0/.00024
		> 1/8-1/4"	0/.00031
		> 1/4-3/8"	0/.00035
		> 3/8-23/32"	0/.00043
		> 23/32-1 3/16"	0/.00051

■ Series I2B • VariMill GP



grade UNCOATED



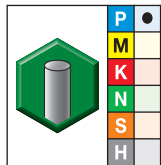
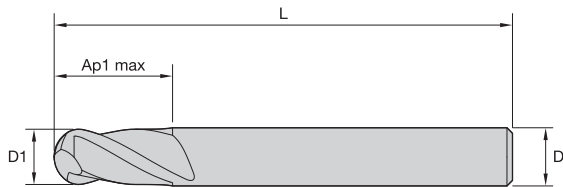
grade TiAlN  
TiAlN

- first choice
- alternate choice

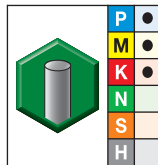
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
5878223	I2B0031T007R	5878172	I2B0031T007R	1/32	1/8	5/64	1 1/2
-	-	5878174	I2B0046T018R	3/64	1/8	3/16	1 1/2
5878224	I2B0062T018R	5878173	I2B0062T018R	1/16	1/8	3/16	1 1/2
-	-	5878175	I2B0078T018R	5/64	1/8	3/16	1 1/2
-	-	5878176	I2B0093T018R	3/32	1/8	3/16	1 1/2
5878225	I2B0093T037L	5878177	I2B0093T037L	3/32	1/8	3/8	1 1/2
-	-	5878178	I2B0109T037R	7/64	1/8	3/8	1 1/2
5878226	I2B0125T025S	5878179	I2B0125T025S	1/8	1/8	1/4	1 1/2
5878227	I2B0125T050R	5878180	I2B0125T050R	1/8	1/8	1/2	1 1/2
-	-	5878181	I2B0125T075L	1/8	1/8	3/4	2 1/4
-	-	5878182	I2B0125T075X	1/8	1/8	3/4	3
-	-	5878183	I2B0156T031R	5/32	3/16	5/16	2
-	-	5878184	I2B0156T056L	5/32	3/16	9/16	2
-	-	5878185	I2B0187T031S	3/16	3/16	5/16	1 1/2
5878228	I2B0187T062R	5878186	I2B0187T062R	3/16	3/16	5/8	2
-	-	5878187	I2B0187T075L	3/16	3/16	3/4	2 1/2
-	-	5878188	I2B0187T100X	3/16	3/16	1	4
-	-	5878189	I2B0218T062R	7/32	1/4	5/8	2 1/2
-	-	5878190	I2B0250T050S	1/4	1/4	1/2	2
5878229	I2B0250T075R	5878191	I2B0250T075R	1/4	1/4	3/4	2 1/2
-	-	5878192	I2B0250T112R	1/4	1/4	1 1/8	3
-	-	5878193	I2B0250T150L	1/4	1/4	1 1/2	4
-	-	5878194	I2B0250T150X	1/4	1/4	1 1/2	6
-	-	5878195	I2B0312T050S	5/16	5/16	1/2	2

(continued)

(Series I2B • VariMill GP— continued)



grade UNCOATED



grade TiAlN  
TiAlN

● first choice  
○ alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
5878230	I2B0312T081R	5878196	I2B0312T081R	5/16	5/16	13/16	2 1/2
-	-	5878197	I2B0312T112L	5/16	5/16	1 1/8	3
-	-	5878198	I2B0312T150X	5/16	5/16	1 1/2	6
-	-	5878199	I2B0375T062S	3/8	3/8	5/8	2
5878241	I2B0375T087R	5878200	I2B0375T087R	3/8	3/8	7/8	2 1/2
-	-	5878201	I2B0375T112R	3/8	3/8	1 1/8	3
-	-	5878202	I2B0375T175L	3/8	3/8	1 3/4	4
-	-	5878203	I2B0375T300X	3/8	3/8	3	6
-	-	5878204	I2B0406T100R	13/32	7/16	1	2 1/2
-	-	5878205	I2B0437T100R	7/16	7/16	1	2 1/2
-	-	5878206	I2B0500T062S	1/2	1/2	5/8	2 1/2
5878242	I2B0500T100R	5878207	I2B0500T100R	1/2	1/2	1	3
-	-	5878208	I2B0500T150X	1/2	1/2	1 1/2	6
5878243	I2B0500T200L	5878209	I2B0500T200L	1/2	1/2	2	4
-	-	5878210	I2B0500T300L	1/2	1/2	3	6
-	-	5878211	I2B0625T125R	5/8	5/8	1 1/4	3 1/2
5878244	I2B0625T225L	5878212	I2B0625T225L	5/8	5/8	2 1/4	5
-	-	5878213	I2B0625T300X	5/8	5/8	3	6
-	-	5878214	I2B0750T100S	3/4	3/4	1	3
5878245	I2B0750T150R	5878215	I2B0750T150R	3/4	3/4	1 1/2	4
-	-	5878216	I2B0750T200X	3/4	3/4	2	6
-	-	5878217	I2B0750T225L	3/4	3/4	2 1/4	5
-	-	5878218	I2B0750T300X	3/4	3/4	3	6
5878246	I2B0875T150R	5878219	I2B0875T150R	7/8	7/8	1 1/2	4
-	-	5878220	I2B1000T150R	1	1	1 1/2	4
5878247	I2B1000T300L	5878221	I2B1000T300L	1	1	3	6

NOTE: For application data, please see pages N13–N14.

General Purpose Solid Carbide End Mills

■ Series I2C..S I2S..S I2C..R I2S..R • TiALN • VariMill GP

Material Group	Side Milling (A) and Slotting (B)		TiAIN		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.																		
	A		B		Cutting Speed – vc SFM		D1 – Diameter																
	ap	ae	ap	min	max	frac.	1/64	1/32	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1			
	ap	ae	ap	min	max	dec.	.0156	.0313	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000			
P	0	Ap1 max	0.1 x D	0.5 X D	490	– 660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	1	Ap1 max	0.1 x D	0.5 X D	490	– 660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	2	Ap1 max	0.1 x D	0.5 X D	460	– 620	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	3	Ap1 max	0.1 x D	0.5 X D	390	– 520	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045		
	4	Ap1 max	0.1 x D	0.5 X D	300	– 490	IPT	.0001	.0002	.0003	.0004	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039		
M	1	Ap1 max	0.1 x D	0.5 X D	300	– 380	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045		
	2	Ap1 max	0.1 x D	0.5 X D	200	– 260	IPT	.0001	.0001	.0003	.0004	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036		
K	1	Ap1 max	0.1 x D	0.5 X D	390	– 490	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	2	Ap1 max	0.1 x D	0.5 X D	360	– 460	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045		

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series I2C..S I2S..S I2C..R I2S..R • Uncoated • VariMill GP

Material Group	Side Milling (A) and Slotting (B)		uncoated		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.																		
	A		B		Cutting Speed – vc SFM		D1 – Diameter																
	ap	ae	ap	min	max	frac.	1/64	1/32	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1			
	ap	ae	ap	min	max	dec.	.0156	.0313	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000			
P	0	Ap1 max	0.1 x D	0.5 X D	390	– 520	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	1	1.25 x D	0.1 x D	0.5 X D	390	– 520	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	2	1.25 x D	0.1 x D	0.5 X D	370	– 500	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series I2C..L I2S..L I2C..X I2S..X • TiAlN • VariMill GP

Material Group	Side Milling (A)		TiAlN		Recommended feed per tooth (IPT = inch/th) for side milling (A).														
	A		Cutting Speed – vc SFM			D1 – Diameter													
	ap	ae	min	max	frac.	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
						dec.	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000	
P	0	Ap1 max	0.1 x D	490	–	660	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	490	–	660	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	460	–	620	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	390	–	520	IPT	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	300	–	490	IPT	.0003	.0004	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	300	–	380	IPT	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.1 x D	200	–	260	IPT	.0003	.0004	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	390	–	490	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	360	–	460	IPT	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series I2C..L I2S..L I2C..X I2S..X • Uncoated • VariMill GP

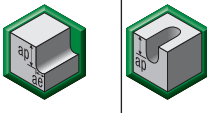

Material Group	Side Milling (A)		uncoated		Recommended feed per tooth (IPT = inch/th) for side milling (A).														
	A		Cutting Speed – vc SFM			D1 – Diameter													
	ap	ae	min	max	frac.	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
						dec.	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000	
P	0	Ap1 max	0.1 x D	390	–	520	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	390	–	520	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	370	–	500	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

General Purpose Solid Carbide End Mills

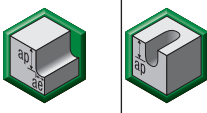



■ Series I2B..S I2B..R • TiAlN • VariMill GP

Material Group																							
	Side Milling (A) and Slotting (B)			TiAlN		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.																	
	A		B	Cutting Speed – vc SFM		frac.	D1 – Diameter																
	ap	ae	ap	min	max		dec.	1/64	1/32	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
P	0	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	1	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	2	Ap1 max	0.1 x D	0.5 x D	460	–	620	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	3	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045	
	4	Ap1 max	0.1 x D	0.5 x D	300	–	490	IPT	.0001	.0002	.0003	.0004	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039	
M	1	Ap1 max	0.1 x D	0.5 x D	300	–	380	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045	
	2	Ap1 max	0.1 x D	0.5 x D	200	–	260	IPT	.0001	.0001	.0003	.0004	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036	
K	1	Ap1 max	0.1 x D	0.5 x D	390	–	490	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	2	Ap1 max	0.1 x D	0.5 x D	360	–	460	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045	

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series I2B..S I2B..R • Uncoated • VariMill GP

Material Group																							
	Side Milling (A) and Slotting (B)			uncoated		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.																	
	A		B	Cutting Speed – vc SFM		frac.	D1 – Diameter																
	ap	ae	ap	min	max		dec.	1/64	1/32	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
P	0	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	1	1.25 x D	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	2	1.25 x D	0.1 x D	0.5 x D	370	–	500	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series I2B..L I2B..X • TiAlN • VariMill GP

Material Group	Side Milling (A)		TiAlN		Recommended feed per tooth (IPT = inch/th) for side milling (A).													
	A		Cutting Speed – vc SFM			D1 – Diameter												
	ap	ae	min		max	frac.	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
						dec.	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000		
P	0	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	1	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	2	Ap1 max	0.1 x D	460	–	620	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	3	Ap1 max	0.1 x D	390	–	520	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045	
M	4	Ap1 max	0.1 x D	300	–	490	IPT	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039	
	1	Ap1 max	0.1 x D	300	–	380	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045	
K	2	Ap1 max	0.1 x D	200	–	260	IPT	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036	
	1	Ap1 max	0.1 x D	390	–	490	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
K	2	Ap1 max	0.1 x D	360	–	460	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045	

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series I2B..L I2B..X • Uncoated • VariMill GP

Material Group	Side Milling (A)		uncoated		Recommended feed per tooth (IPT = inch/th) for side milling (A).													
	A		Cutting Speed – vc SFM			D1 – Diameter												
	ap	ae	min		max	frac.	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
						dec.	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000		
P	0	Ap1 max	0.1 x D	390	–	520	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	1	1.25 x D	0.1 x D	390	–	520	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	2	1.25 x D	0.1 x D	370	–	500	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

General Purpose Solid Carbide End Mills

# Tooling Systems

**ERICKSON™**



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## **ERICKSON™ Toolholders**

WIDIA™ proudly offers premium quality ERICKSON toolholder products, so you can be sure that you're buying the best the industry has to offer. The entire portfolio — including steep taper, HSK, straight shank extensions, collets, sleeves, and accompanying products — offers high productivity, increased accuracy, and application flexibility.

Designed for both manual and automatic tool changing, ERICKSON interfaces are ideally suited for most machine tools and feature a compact and rigid construction guaranteed to handle high torque and deliver optimal metal removal rates.

To learn more about our innovations, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA** 



# Solid Carbide End Mills

WIDIA™ offers a complete line of 3-flute general-purpose solid carbide end mill tools

General purpose offers plunging, slotting, and profiling for a wide range of materials and applications. Designed to provide high Metal Removal Rates (MRR) and excellent surface conditions at economic pricing. For a complete line of comprehensive tools, visit [widia.com](http://widia.com).

## NOVO KNOWS ART TO PART TO PROFIT

Being as productive and profitable as possible is your fundamental goal. With the addition of NOVO™ to your team, your goal can be achieved. NOVO possesses powerful digital tools that link together process planning, inventory availability and purchase, cost-per-part management, and productivity improvements.

NOVO can ensure you have the right tools on your machines, in the right sequence. This results in flawless execution that accelerates every job, and maximizes every shift.

01

THE DIGITAL SOURCE FOR DELIVERING SMART MACHINING SOLUTIONS

[widia.com/novo](http://widia.com/novo)

**NOVO™**

# WIDIA-Hanita™ Means Quality

**WIDIA**  
**HANITA**

WIDIA-Hanita™ solid carbide end mill products have a strong history of providing revolutionary and innovative solutions for your most extreme solid end milling challenges.



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

As an industry-leading manufacturer of carbide round tools, WIDIA-Hanita™ offers a complete portfolio of precision-engineered products with solutions for a wide range of workpiece materials at [widia.com](http://widia.com).

**The VariMill™ line offers superior performance high-speed machining.**

- The versatile 2- and 4-flute general-purpose line, VariMill™ GP, is ideal for a wide range of materials.
- The 4-flute VariMill I™ offers plunging, slotting, and profiling at the highest possible feed rates for a wide range of materials.
- The 5-flute VariMill II™ end mills are the proven leader in the field of high-performance, chatter-free machining.
- The 5-flute VariMill II™ ER end mills are specifically designed for machining high-performance aerospace materials.
- The 7-flute VariMill III™ ER high-performance tool has true finishing capabilities for walls and floors.

**WIDIA**

General Purpose 4-Flute End Mills •

**VariMill™ GP**

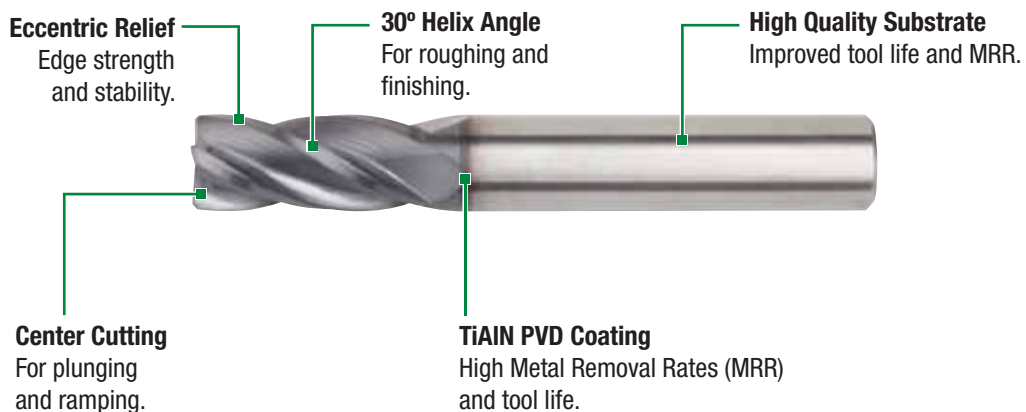
# VariMill GP



VariMill GP offers plunging, slotting, and profiling for a wide range of materials and applications. Designed to provide high metal removal rates and excellent surface conditions at a value price. A wide range of diameters, lengths, and corner styles (such as chamfered, sharp edge, and ball nose) are available from stock.

## VariMill GP • 4-Flute

- General purpose tools for a wide range of workpiece materials.
- Roughing and finishing with one tool.
- Various lengths-of-cut and overall lengths with different front-end designs available.
- Four flutes for high Metal Removal Rates (MRR) and tool life.



## VariMill™ GP

- Increased manufacturing flexibility and reduced tooling cost.
- Less tool changes and high Metal Removal Rates (MRR).
- One tool required for roughing and finishing.
- Eccentric relief for improved edge stability and high tool life.
- Easy and cost-efficient regrinding due to eccentric relief.

### I4C Series

- Wide range of lengths-of-cut — short, regular, long, and extra long.
- Steel, stainless steel, and cast iron.
- Corner chamfer for improved tool life.
- Center cut.



### I4S Series

- Wide range of lengths-of-cut — short, regular, long, and extra long.
- Steel, stainless steel, and cast iron.

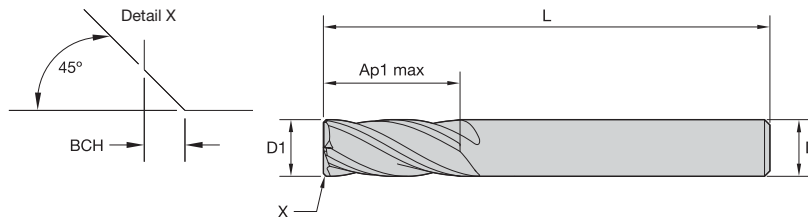
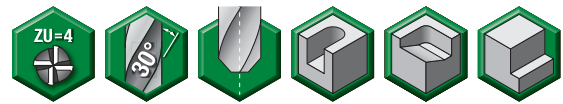


### I4B Series

- Wide range of lengths-of-cut — short, regular, long, and extra long.
- Steel, stainless steel, and cast iron.
- Center cut ball nose.



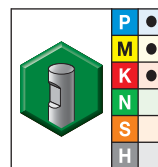
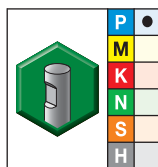
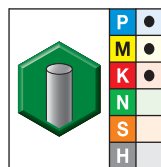
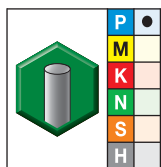
- Center cutting.
- Chamfered corners.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
All	+0.000/-0.002	≤ 1/8"	0.00024
		> 1/8-1/4"	0.00031
		> 1/4-3/8"	0.00035
		> 3/8-23/32"	0.00043
		> 23/32-1 3/16"	0.00051

Series I4C • VariMill GP



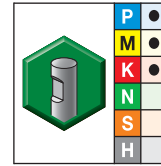
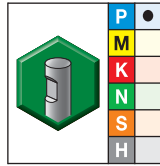
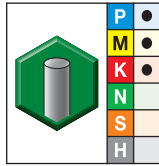
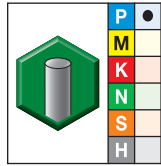
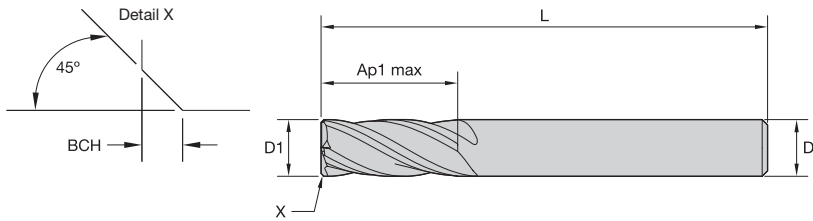
- first choice
- alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN		D1	D	length of cut Ap1 max	length L	BCH
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #					
5825840	I4C0125T050R	5825747	I4C0125T025S					1/8	1/8	1/4	1 1/2	.010
		5825748	I4C0125T050R					1/8	1/8	1/2	1 1/2	.010
		5825749	I4C0125T075L					1/8	1/8	3/4	2 1/4	.010
5825851	I4C0125T100X	5825751	I4C0125T100X					1/8	1/8	1	3	.010
		5825752	I4C0140T056R					9/64	3/16	9/16	2	.010
		5825753	I4C0156T056R					5/32	3/16	9/16	2	.010
5825852	I4C0187T062R	5825754	I4C0187T062R					3/16	3/16	5/8	2	.010
		5825756	I4C0187T075L					3/16	3/16	3/4	2 1/2	.010
		5825755	I4C0187T075S					3/16	3/16	3/4	1 1/2	.010
		5825757	I4C0187T112L					3/16	3/16	1 1/8	3	.010
		5825758	I4C0187T112X					3/16	3/16	1 1/8	3 1/4	.010
5825853	I4C0187T112X							3/16	3/16	1 1/2	3	.010
		5825759	I4C0203T062R					13/64	1/4	5/8	2 1/2	.016
		5825760	I4C0218T043R					7/32	1/4	7/16	2	.016
		5825761	I4C0218T062L					7/32	1/4	5/8	2 1/2	.016
		5825762	I4C0234T075R					15/64	1/4	3/4	2 1/2	.016
5825854	I4C0250T050S	5825764	I4C0250T050S					1/4	1/4	1/2	2	.016
5825855	I4C0250T075R	5825765	I4C0250T075R					1/4	1/4	3/4	2 1/2	.016
5825856	I4C0250T112L	5825766	I4C0250T112L					1/4	1/4	1 1/8	3	.016
5825857	I4C0250T150X	5825767	I4C0250T150X					1/4	1/4	1 1/2	4	.016
		5825768	I4C0265T075R					17/64	5/16	3/4	2 1/2	.016
		5825769	I4C0281T075R					9/32	5/16	3/4	2 1/2	.016
		5825770	I4C0296T081R					19/64	5/16	13/16	2 1/2	.016
5825858	I4C0312T050S	5825771	I4C0312T050S					5/16	5/16	1/2	2	.016

(continued)



(Series I4C • VariMill GP – continued)

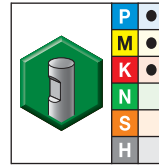
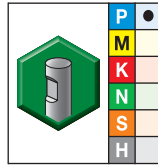
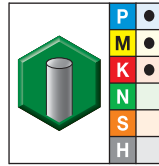
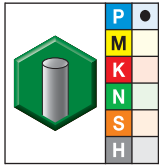
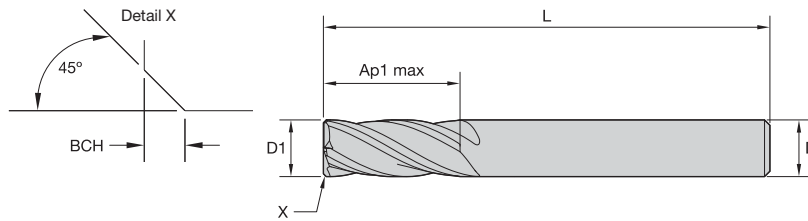


● first choice  
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN		D1	D	length of cut Ap1 max	length L	BCH
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #					
5825859	I4C0312T081R	5825772	I4C0312T081R	—	—	—	—	5/16	5/16	13/16	2 1/2	.016
5825860	I4C0312T112L	5825773	I4C0312T112L	—	—	—	—	5/16	5/16	1 1/8	3	.016
5825861	I4C0312T162X	5825774	I4C0312T162X	—	—	—	—	5/16	5/16	1 5/8	4	.016
—	—	5825775	I4C0328T100R	—	—	—	—	21/64	3/8	1	2 1/2	.020
—	—	5825776	I4C0343T100R	—	—	—	—	11/32	3/8	1	2 1/2	.020
—	—	5825777	I4C0359T100R	—	—	—	—	23/64	3/8	1	2 1/2	.020
5825862	I4C0375T062S	5825778	I4C0375T062S	—	—	—	—	3/8	3/8	5/8	2	.020
5825863	I4C0375T100R	5825779	I4C0375T100R	—	—	—	—	3/8	3/8	1	2 1/2	.020
5825864	I4C0375T112L	5825780	I4C0375T112L	—	—	—	—	3/8	3/8	1 1/8	3	.020
5825865	I4C0375T175X	5825781	I4C0375T175X	—	—	—	—	3/8	3/8	1 3/4	4	.020
—	—	5825782	I4C0390T100R	—	—	—	—	25/64	7/16	1	2 3/4	.020
—	—	5825783	I4C0406T100R	—	—	—	—	13/32	7/16	1	2 3/4	.020
—	—	5825784	I4C0421T100R	—	—	—	—	27/64	7/16	1	2 3/4	.020
—	—	5825786	I4C0437T100R	—	—	—	—	7/16	7/16	1	2 3/4	.020
5825866	I4C0437T100S	5825785	I4C0437T100S	—	—	—	—	7/16	7/16	1	2 1/2	.020
5825867	I4C0437T200L	5825787	I4C0437T200L	—	—	—	—	7/16	7/16	2	4	.020
5825868	I4C0437T300X	5825788	I4C0437T300X	—	—	—	—	7/16	7/16	3	6	.020
—	—	5825789	I4C0453T100R	—	—	—	—	29/64	1/2	1	3	.020
—	—	5825790	I4C0468T100R	—	—	—	—	15/32	1/2	1	3	.020
—	—	5825791	I4C0484T100R	—	—	—	—	31/64	1/2	1	3	.020
5825869	I4C0500T062S	5825792	I4C0500T062S	5825484	I4C0500W062S	5825461	I4C0500W062S	1/2	1/2	5/8	2 1/2	.020
5825870	I4C0500T100R	5825793	I4C0500T100R	5825485	I4C0500W100R	5825462	I4C0500W100R	1/2	1/2	1	3	.020
5825871	I4C0500T200L	5825794	I4C0500T200L	5825486	I4C0500W200L	5825463	I4C0500W200L	1/2	1/2	2	4	.020
5825872	I4C0500T300X	5825795	I4C0500T300X	—	—	5825464	I4C0500W300X	1/2	1/2	3	6	.020
5825873	I4C0562T075R	5825796	I4C0562T075R	—	—	5825465	I4C0562W075R	9/16	9/16	3/4	3	.020
5825874	I4C0562T125L	5825797	I4C0562T125L	5825487	I4C0562W125L	5825466	I4C0562W125L	9/16	9/16	1 1/4	3 1/2	.020
5825875	I4C0562T225X	5825798	I4C0562T225X	—	—	5825467	I4C0562W225X	9/16	9/16	2 1/4	5	.020
5825876	I4C0625T075S	5825799	I4C0625T075S	—	—	5825469	I4C0625W075S	5/8	5/8	3/4	3	.020
5825877	I4C0625T125R	5825800	I4C0625T125R	5825488	I4C0625W125R	5825470	I4C0625W125R	5/8	5/8	1 1/4	3 1/2	.020
5825878	I4C0625T225L	5825821	I4C0625T225L	5825489	I4C0625W225L	5825471	I4C0625W225L	5/8	5/8	2 1/4	5	.020
5825879	I4C0625T400X	5825822	I4C0625T400X	—	—	5825472	I4C0625W400X	5/8	5/8	4	7	.020
—	—	5825823	I4C0687T137R	—	—	—	—	11/16	3/4	1 3/8	4	.020
5825880	I4C0750T100S	5825824	I4C0750T100S	—	—	5825473	I4C0750W100S	3/4	3/4	1	3	.020
5825881	I4C0750T150R	5825825	I4C0750T150R	5825490	I4C0750W150R	5825474	I4C0750W150R	3/4	3/4	1 1/2	4	.020
5825882	I4C0750T225R	5825826	I4C0750T225R	5825491	I4C0750W225R	5825475	I4C0750W225R	3/4	3/4	2 1/4	5	.020
5825883	I4C0750T300L	5825827	I4C0750T300L	5825492	I4C0750W300L	5825476	I4C0750W300L	3/4	3/4	3	6	.020

(continued)

(Series I4C • VariMill GP – continued)

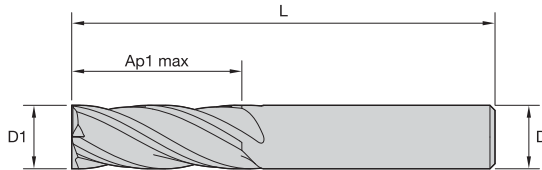


● first choice  
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN		D1	D	length of cut Ap1 max	length L	BCH
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #					
5825884	I4C0750T400X	5825828	I4C0750T400X	—	—	5825477	I4C0750W400X	3/4	3/4	4	7	.020
—	—	5825829	I4C0812T150R	—	—	—	—	13/16	7/8	1 1/2	4	.020
5825885	I4C0875T150R	5825830	I4C0875T150R	5825493	I4C0875W150R	5825478	I4C0875W150R	7/8	7/8	1 1/2	4	.020
5825886	I4C0875T225L	5825831	I4C0875T225L	5825494	I4C0875W225L	5825479	I4C0875W225L	7/8	7/8	2 1/4	5	.020
5825887	I4C1000T150S	5825832	I4C1000T150S	—	—	5825480	I4C1000W150S	1	1	1 1/2	4	.020
5825888	I4C1000T225R	5825833	I4C1000T225R	5825495	I4C1000W225R	5825481	I4C1000W225R	1	1	2 1/4	5	.020
5825889	I4C1000T300L	5825834	I4C1000T300L	5825496	I4C1000W300L	5825482	I4C1000W300L	1	1	3	6	.020
5825890	I4C1000T400X	5825835	I4C1000T400X	—	—	5825483	I4C1000W400X	1	1	4	7	.020
5825891	I4C1250T200R	5825836	I4C1250T200R	—	—	—	—	1 1/4	1 1/4	2	4 1/2	.020

NOTE: For application data, please see pages N28–N29.

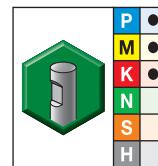
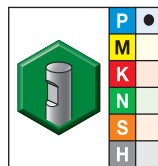
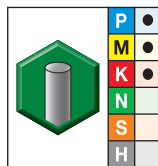
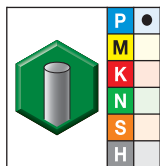
- Center cutting.
- Sharp corners.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
All	+ .000/- .002	≤ 1/8"	0/.00024
		> 1/8–1/4"	0/.00031
		> 1/4–3/8"	0/.00035
		> 3/8–23/32"	0/.00043
		> 23/32–1 3/16"	0/.00051

■ Series I4S • VariMill GP

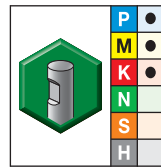
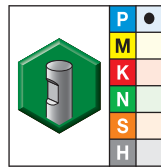
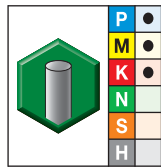
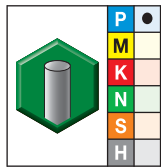
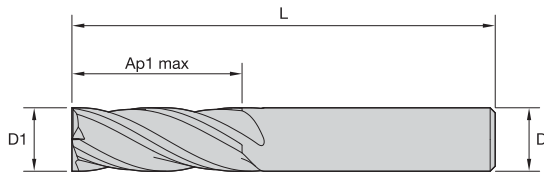


- first choice
- alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN		D1	D	length of cut Ap1 max	length L
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #				
–	–	5879053	I4S0016T003R	–	–	–	–	1/64	1/8	1/32	1 1/2
–	–	5879054	I4S0031T008R	–	–	–	–	1/32	1/8	5/64	1 1/2
5879198	I4S0062T010R	5879055	I4S0062T011R	–	–	–	–	1/16	1/8	7/64	1 1/2
5879199	I4S0078T019R	5879056	I4S0078T018R	–	–	–	–	5/64	1/8	3/16	1 1/2
5879200	I4S0094T037R	5879057	I4S0093T037R	–	–	–	–	3/32	1/8	3/8	1 1/2
–	–	5879058	I4S0093T062L	–	–	–	–	3/32	1/8	5/8	2
–	–	5879059	I4S0109T037R	–	–	–	–	7/64	1/8	3/8	1 1/2
–	–	5879060	I4S0125T025S	–	–	–	–	1/8	1/8	1/4	1 1/2
5879201	I4S0125T050R	5879131	I4S0125T050R	–	–	–	–	1/8	1/8	1/2	1 1/2
–	–	5879132	I4S0125T075L	–	–	–	–	1/8	1/8	3/4	2 1/4
5879202	I4S0125T100X	5879133	I4S0125T100X	–	–	–	–	1/8	1/8	1	3
–	–	5879134	I4S0140T056R	–	–	–	–	9/64	3/16	9/16	2
–	–	5879135	I4S0156T056R	–	–	–	–	5/32	3/16	9/16	2
5879203	I4S0187T062R	5879136	I4S0187T062R	–	–	–	–	3/16	3/16	5/8	2
–	–	5879137	I4S0187T075S	–	–	–	–	3/16	3/16	3/4	1 1/2
–	–	5879138	I4S0187T075L	–	–	–	–	3/16	3/16	3/4	2 1/2
5879204	I4S0187T112L	5879139	I4S0187T112L	–	–	–	–	3/16	3/16	1 1/8	3
–	–	5879140	I4S0187T112X	–	–	–	–	3/16	3/16	1 1/8	3 1/4
–	–	5879141	I4S0203T062R	–	–	–	–	13/64	1/4	5/8	2 1/2
–	–	5879142	I4S0218T043R	–	–	–	–	7/32	1/4	7/16	2
–	–	5879143	I4S0218T062L	–	–	–	–	7/32	1/4	5/8	2 1/2
–	–	5879144	I4S0234T075R	–	–	–	–	15/64	1/4	3/4	2 1/2
5879205	I4S0250T050S	5879145	I4S0250T050S	–	–	–	–	1/4	1/4	1/2	2
5879206	I4S0250T075R	5879146	I4S0250T075R	–	–	–	–	1/4	1/4	3/4	2 1/2

(continued)

(Series I4S • VariMill GP — continued)



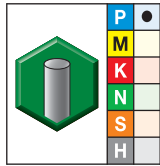
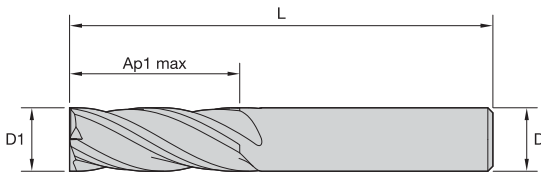
● first choice  
○ alternate choice

grade UNCOATED		grade TiAlN TiAlN		grade UNCOATED		grade TiAlN TiAlN		D1	D	length of cut Ap1 max	length L
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #				
5879207	I4S0250T112L	5879147	I4S0250T112L	—	—	—	—	1/4	1/4	1 1/8	3
5879208	I4S0250T150X	5879148	I4S0250T150X	—	—	—	—	1/4	1/4	1 1/2	4
—	—	5879149	I4S0265T075R	—	—	—	—	17/64	5/16	3/4	2 1/2
—	—	5879150	I4S0281T075R	—	—	—	—	9/32	5/16	3/4	2 1/2
—	—	5879151	I4S0296T081R	—	—	—	—	19/64	5/16	13/16	2 1/2
5879209	I4S0312T050S	5879152	I4S0312T050S	—	—	—	—	5/16	5/16	1/2	2
5879210	I4S0312T081R	5879153	I4S0312T081R	—	—	—	—	5/16	5/16	13/16	2 1/2
5879211	I4S0312T112L	5879154	I4S0312T112L	—	—	—	—	5/16	5/16	1 1/8	3
5879212	I4S0312T162X	5879155	I4S0312T162X	—	—	—	—	5/16	5/16	1 5/8	4
—	—	5879156	I4S0328T100R	—	—	—	—	21/64	3/8	1	2 1/2
—	—	5879157	I4S0343T100R	—	—	—	—	11/32	3/8	1	2 1/2
—	—	5879158	I4S0359T100R	—	—	—	—	23/64	3/8	1	2 1/2
5879213	I4S0375T062S	5879159	I4S0375T062S	—	—	—	—	3/8	3/8	5/8	2
5879214	I4S0375T100R	5879160	I4S0375T100R	—	—	—	—	3/8	3/8	1	2 1/2
5879215	I4S0375T112L	5879161	I4S0375T112L	—	—	—	—	3/8	3/8	1 1/8	3
5879216	I4S0375T175X	5879162	I4S0375T175X	—	—	—	—	3/8	3/8	1 3/4	4
—	—	5879163	I4S0390T100R	—	—	—	—	25/64	7/16	1	2 3/4
—	—	5879164	I4S0406T100R	—	—	—	—	13/32	7/16	1	2 3/4
—	—	5879165	I4S0421T100R	—	—	—	—	27/64	7/16	1	2 3/4
5879217	I4S0437T100S	5879166	I4S0437T100S	—	—	—	—	7/16	7/16	1	2 1/2
—	—	5879167	I4S0437T100R	—	—	—	—	7/16	7/16	1	2 3/4
5879218	I4S0437T200L	5879168	I4S0437T200L	—	—	—	—	7/16	7/16	2	4
5879219	I4S0437T300X	5879169	I4S0437T300X	—	—	—	—	7/16	7/16	3	6
—	—	5879170	I4S0453T100R	—	—	—	—	29/64	1/2	1	3
—	—	5879171	I4S0468T100R	—	—	—	—	15/32	1/2	1	3
—	—	5879172	I4S0484T100R	—	—	—	—	31/64	1/2	1	3
5879220	I4S0500T062S	5879173	I4S0500T062S	5879568	I4S0500W062S	5879526	I4S0500W062S	1/2	1/2	5/8	2 1/2
5879221	I4S0500T100R	5879174	I4S0500T100R	5879569	I4S0500W100R	5879527	I4S0500W100R	1/2	1/2	1	3
5879222	I4S0500T200L	5879175	I4S0500T200L	5879570	I4S0500W200L	5879528	I4S0500W200L	1/2	1/2	2	4
5879223	I4S0500T300X	5879176	I4S0500T300X	—	—	5879529	I4S0500W300X	1/2	1/2	3	6
5879224	I4S0562T075R	5879177	I4S0562T075R	—	—	5879530	I4S0562W075R	9/16	9/16	3/4	3
5879225	I4S0562T125L	5879178	I4S0562T125L	5879571	I4S0562W125L	5879551	I4S0562W125L	9/16	9/16	1 1/4	3 1/2
5879226	I4S0562T225X	5879179	I4S0562T225X	—	—	5879552	I4S0562W225X	9/16	9/16	2 1/4	5
5879227	I4S0625T075S	5879180	I4S0625T075S	—	—	5879553	I4S0625W075S	5/8	5/8	3/4	3
5879228	I4S0625T125R	5879181	I4S0625T125R	5879572	I4S0625W125R	5879554	I4S0625W125R	5/8	5/8	1 1/4	3 1/2
5879229	I4S0625T225L	5879182	I4S0625T225L	5879573	I4S0625W225L	5879555	I4S0625W225L	5/8	5/8	2 1/4	5

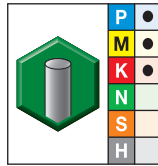
(continued)

General Purpose Solid Carbide End Mills

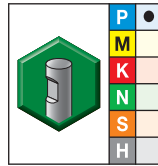
(Series I4S • VariMill GP – continued)



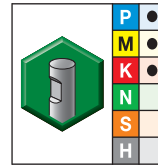
grade UNCOATED



grade TiAlN  
TiAlN



grade UNCOATED



grade TiAlN  
TiAlN

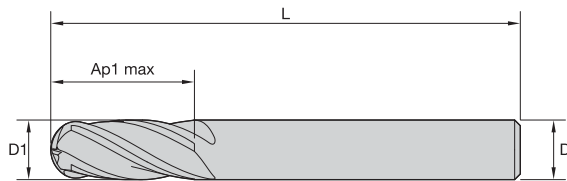
- first choice
- alternate choice

order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
5879230	I4S0625T400X	5879183	I4S0625T400X	—	—	5879556	I4S0625W400X	5/8	5/8	4	7
—	—	5879184	I4S0687T137R	—	—	—	—	11/16	3/4	1 3/8	4
5879241	I4S0750T100S	5879185	I4S0750T100S	—	—	5879557	I4S0750W100S	3/4	3/4	1	3
5879242	I4S0750T150R	5879186	I4S0750T150R	5879574	I4S0750W150R	5879558	I4S0750W150R	3/4	3/4	1 1/2	4
5879243	I4S0750T225R	5879187	I4S0750T225R	5879575	I4S0750W225R	5879559	I4S0750W225R	3/4	3/4	2 1/4	5
5879244	I4S0750T300L	5879188	I4S0750T300L	5879576	I4S0750W300L	5879560	I4S0750W300L	3/4	3/4	3	6
5879245	I4S0750T400X	5879189	I4S0750T400X	—	—	5879561	I4S0750W400X	3/4	3/4	4	7
—	—	5879190	I4S0812T150R	—	—	—	—	13/16	7/8	1 1/2	4
5879246	I4S0875T150R	5879191	I4S0875T150R	5879577	I4S0875W150R	5879562	I4S0875W150R	7/8	7/8	1 1/2	4
5879247	I4S0875T225L	5879192	I4S0875T225L	5879578	I4S0875W225L	5879563	I4S0875W225L	7/8	7/8	2 1/4	5
5879248	I4S1000T150S	5879193	I4S1000T150S	—	—	5879564	I4S1000W150S	1	1	1 1/2	4
5879249	I4S1000T225R	5879194	I4S1000T225R	5879579	I4S1000W225R	5879565	I4S1000W225R	1	1	2 1/4	5
5879250	I4S1000T300L	5879195	I4S1000T300L	5879580	I4S1000W300L	5879566	I4S1000W300L	1	1	3	6
5879261	I4S1000T400X	5879196	I4S1000T400X	—	—	5879567	I4S1000W400X	1	1	4	7
5879262	I4S1250T200R	5879197	I4S1250T200R	—	—	—	—	1 1/4	1 1/4	2	4 1/2

NOTE: For application data, please see pages N28–N29.

General Purpose Solid Carbide End Mills

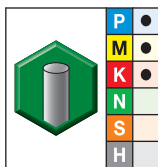
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 +/-
All	+0.00/-0.002	≤ 1/8"	0/0.00024
		> 1/8-1/4"	0/0.00031
		> 1/4-3/8"	0/0.00035
		> 3/8-23/32"	0/0.00043
		> 23/32-1 3/16"	0/0.00051

■ Series I4B • VariMill GP



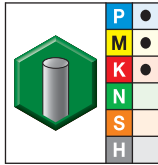
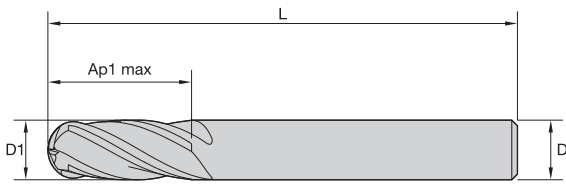
grade TiAlN  
TiAlN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L
5825624	I4B0031T008R	1/32	1/8	5/64	1 1/2
5825625	I4B0047T012R	3/64	1/8	1/8	1 1/2
5825626	I4B0062T019R	1/16	1/8	3/16	1 1/2
5825627	I4B0078T019R	5/64	1/8	3/16	1 1/2
5825628	I4B0094T019R	3/32	1/8	3/16	1 1/2
5825643	I4B0094T037L	3/32	1/8	3/8	1 1/2
5825645	I4B0109T037R	7/64	1/8	3/8	1 1/2
5825646	I4B0125T025S	1/8	1/8	1/4	1 1/2
5825647	I4B0125T050R	1/8	1/8	1/2	1 1/2
5825648	I4B0125T075L	1/8	1/8	3/4	2 1/4
5825649	I4B0125T075X	1/8	1/8	3/4	3
5825650	I4B0141T056R	9/64	3/16	9/16	2
5825651	I4B0156T031R	5/32	3/16	5/16	2
5825652	I4B0156T056L	5/32	3/16	9/16	2
5825653	I4B0172T062R	11/64	3/16	5/8	2
5825654	I4B0187T031S	3/16	3/16	5/16	1 1/2
5825655	I4B0187T062R	3/16	3/16	5/8	2
5825656	I4B0187T075L	3/16	3/16	3/4	2 1/2
5825657	I4B0187T100X	3/16	3/16	1	4
5825658	I4B0203T062R	13/64	1/4	5/8	2 1/2
5825659	I4B0219T062R	7/32	1/4	5/8	2 1/2
5825660	I4B0234T075R	15/64	1/4	3/4	2 1/2
5825661	I4B0250T050S	1/4	1/4	1/2	2
5825663	I4B0250T075R	1/4	1/4	3/4	2 1/2

(continued)

(Series I4B • VariMill GP – continued)



- first choice
- alternate choice

grade TiAlN TiAlN				length of cut Ap1 max	length L
order #	catalog #	D1	D		
5825664	I4B0250T112R	1/4	1/4	1 1/8	3
5825665	I4B0250T150L	1/4	1/4	1 1/2	4
5825666	I4B0250T150X	1/4	1/4	1 1/2	6
5825667	I4B0266T075R	17/64	5/16	3/4	2 1/2
5825668	I4B0281T075R	9/32	5/16	3/4	2 1/2
5825669	I4B0312T050S	5/16	5/16	1/2	2
5825670	I4B0312T081R	5/16	5/16	13/16	2 1/2
5825681	I4B0312T112L	5/16	5/16	1 1/8	3
5825682	I4B0312T162X	5/16	5/16	1 5/8	4
5825683	I4B0344T100R	11/32	3/8	1	2 1/2
5825684	I4B0375T100S	3/8	3/8	1	2 1/2
5825685	I4B0375T100L	3/8	3/8	1	4
5825686	I4B0375T112R	3/8	3/8	1 1/8	3
5825687	I4B0375T150X	3/8	3/8	1 1/2	6
5825688	I4B0437T100R	7/16	1/2	1	2 1/2
5825689	I4B0500T100S	1/2	1/2	1	3
5825690	I4B0500T100R	1/2	1/2	1	4
5825691	I4B0500T150X	1/2	1/2	1 1/2	6
5825693	I4B0500T200L	1/2	1/2	2	4 1/2
5825692	I4B0500T200R	1/2	1/2	2	4
5825694	I4B0500T300X	1/2	1/2	3	6
5825695	I4B0562T125R	9/16	9/16	1 1/4	3 1/2
5825696	I4B0625T075S	5/8	5/8	3/4	3
5825697	I4B0625T125R	5/8	5/8	1 1/4	3 1/2
5825698	I4B0625T225L	5/8	5/8	2 1/4	5
5825699	I4B0625T300X	5/8	5/8	3	6
5825700	I4B0750T100R	3/4	3/4	1	3
5825711	I4B0750T150L	3/4	3/4	1 1/2	4
5825712	I4B0750T300X	3/4	3/4	3	6
5825713	I4B0875T150R	7/8	7/8	1 1/2	4
5825714	I4B1000T150R	1	1	1 1/2	4
5825715	I4B1000T225L	1	1	2 1/4	5

NOTE: For application data, please see page N30.

General Purpose Solid Carbide End Mills

■ Series I4C..S I4S..S I4C..R I4S..R • TiAlN • VariMill GP

Material Group	Side Milling (A) and Slotting (B)		TiAlN		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.																	
	A		B		Cutting Speed – vc SFM	frac.	D1 – Diameter															
	ap	ae	ap				1/64	1/32	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
	ap	ae	ap	min	max	dec.	.0156	.0313	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000		
P	0	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	0.5 x D	460	–	620	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	0.5 x D	300	–	490	IPT	.0001	.0002	.0003	.0004	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	0.5 x D	300	–	380	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.1 x D	0.5 x D	200	–	260	IPT	.0001	.0001	.0003	.0004	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	0.5 x D	390	–	490	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	0.5 x D	360	–	460	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series I4C..S I4S..S I4C..R I4S..R • Uncoated • VariMill GP

Material Group	Side Milling (A) and Slotting (B)		uncoated		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.																	
	A		B		Cutting Speed – vc SFM	frac.	D1 – Diameter															
	ap	ae	ap				1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1				
	ap	ae	ap	min	max	dec.	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000				
P	0	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	1	1.25 x D	0.1 x D	0.5 x D	390	–	520	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		
	2	1.25 x D	0.1 x D	0.5 x D	370	–	500	IPT	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049		

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.



■ Series I4C..L I4S..L I4C..X I4S..X • TiAlN • VariMill GP

Material Group	Side Milling (A)		Recommended feed per tooth (IPT = inch/th) for side milling (A).														
	A		Cutting Speed – vc SFM			D1 – Diameter											
	ap	ae	min		max	frac.	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	min		max	dec.	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000	
P	0	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	460	–	620	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	390	–	520	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	300	–	490	IPT	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	300	–	380	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.1 x D	200	–	260	IPT	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	390	–	490	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	360	–	460	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series I4C..L I4S..L I4C..X I4S..X • Uncoated • VariMill GP

Material Group	Side Milling (A)		Recommended feed per tooth (IPT = inch/th) for side milling (A).														
	A		Cutting Speed – vc SFM			D1 – Diameter											
	ap	ae	min		max	frac.	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	min		max	dec.	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000	
P	0	Ap1 max	0.1 x D	390	–	520	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	390	–	520	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	370	–	500	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

■ Series I4B..S I4B..R • TiAlN • VariMill GP

Material Group	Side Milling (A) and Slotting (B)		TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.																
	A		B		Cutting Speed – vc SFM	frac.	D1 – Diameter															
	ap	ae	ap	min			max	dec.	1/64	1/32	1/16	5/64	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1
	ap	ae	ap	min	max	dec.	.0156	.0313	.0625	.0781	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000		
P	0	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	0.5 x D	490	–	660	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	0.5 x D	460	–	620	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	0.5 x D	390	–	520	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	0.5 x D	300	–	490	IPT	.0001	.0002	.0003	.0004	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	0.5 x D	300	–	380	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.1 x D	0.5 x D	200	–	260	IPT	.0001	.0001	.0003	.0004	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	0.5 x D	390	–	490	IPT	.0001	.0002	.0004	.0005	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	0.5 x D	360	–	460	IPT	.0001	.0002	.0004	.0004	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

Application Data • Series I4B..L I4B..X • VariMill GP

■ Series I4B..L I4B..X • TiAlN • VariMill GP

Material Group	Side Milling (A)		TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A).											
	A		Cutting Speed – vc SFM		frac.	D1 – Diameter											
	ap	ae	min	max		dec.	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
	ap	ae	min	max	dec.	.0938	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.0000		
P	0	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	1	Ap1 max	0.1 x D	490	–	660	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	460	–	620	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	3	Ap1 max	0.1 x D	390	–	520	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	4	Ap1 max	0.1 x D	300	–	490	IPT	.0005	.0007	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039
M	1	Ap1 max	0.1 x D	300	–	380	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045
	2	Ap1 max	0.1 x D	200	–	260	IPT	.0004	.0006	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036
K	1	Ap1 max	0.1 x D	390	–	490	IPT	.0007	.0009	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049
	2	Ap1 max	0.1 x D	360	–	460	IPT	.0005	.0007	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter.

General Purpose Solid Carbide End Mills

## How Do Catalog Numbers Work?

Each character in our catalog number signifies a specific trait of that product. Use the following key columns and corresponding images to easily identify which attributes apply.



I4S0250T075R

I	4	S	0250	T	075	R
Standard	Flutes	End Mill Style	Diameter Inch	Shank Style	Ap1 max Inch	Length
Inch	2 = 2 Flutes 4 = 4 Flutes	S = Sharp Edge C = Chamfer B = Ball Nose		T = Plain Shank W = Weldon® Shank		S = Stub R = Regular L = Long X = Extra Long



General Purpose Solid Carbide End Mills



# WIDIA™ Repair Services

WIDIA tooling products are produced to the highest specifications and manufactured from premium materials. However, like all mechanical devices, they wear and require repair.

Milling cutters

Boring bars — standard, tunable, and de-vibe

Indexable drills

Line boring bars

Feed-out heads

Motion tools

Standard indexable tooling

Eccentric toolholders

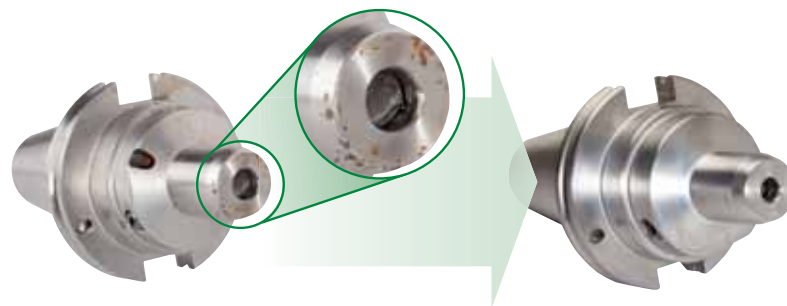
Floating toolholders

Hydraulic chucks

KM™ clamping units (manual and spring packs)

KM-LOC™ and KM-LOC II™ clamping units

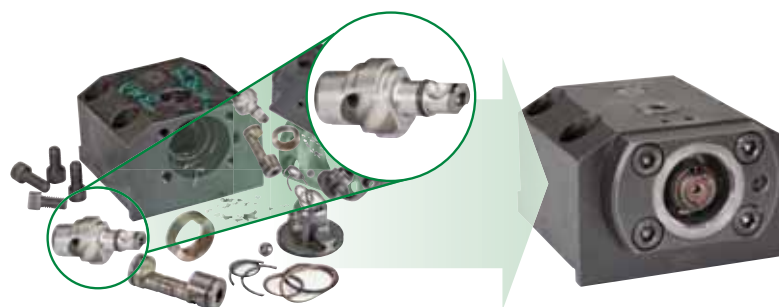
## Hydraulic Chucks



Damaged WIDIA Tools

Repaired WIDIA Tools

## KM-LOC™



Damaged WIDIA Tools

Repaired WIDIA Tools

# Tools Are Valuable. Protect Them and Get the Most from Your Investment.



## EXTREME CHALLENGES. EXTREME RESULTS.

### Live/driven tooling

When your WIDIA™ advanced tooling products need to be serviced, the WIDIA Service and Repair Department has the highly trained staff to provide expert assistance.

### Milling chucks

For about half the cost of a new WIDIA tool purchase, your existing damaged WIDIA tools can be repaired to like-new condition. In certain circumstances, it is not cost effective to repair some tooling. Contact the WIDIA Service and Repair Department with any questions about your requirements.

### Right-angle heads

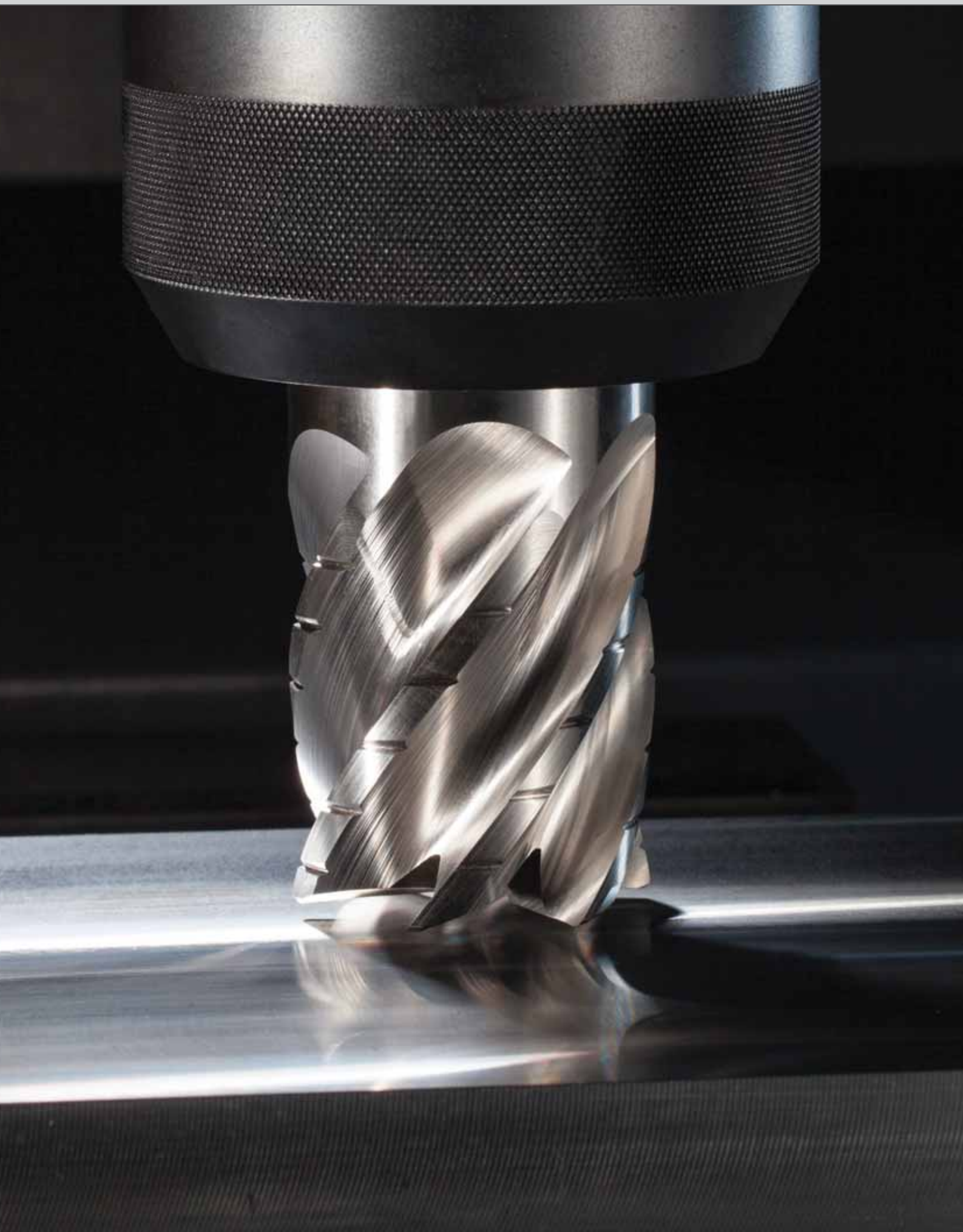
### Tapping holders (excluding tap adapters)

### Integral tapping tools (excluding tap adapters)

### Tuned tooling units

For more information, contact your local WIDIA  
Authorized Distributor or visit [widia.com/services](http://widia.com/services).

**WIDIA** 



## Solid End Milling • High-Performance High-Speed Steel (HSS-E/PM)

High-Performance High-Speed Steel (HSS-E/PM)..... 02-018



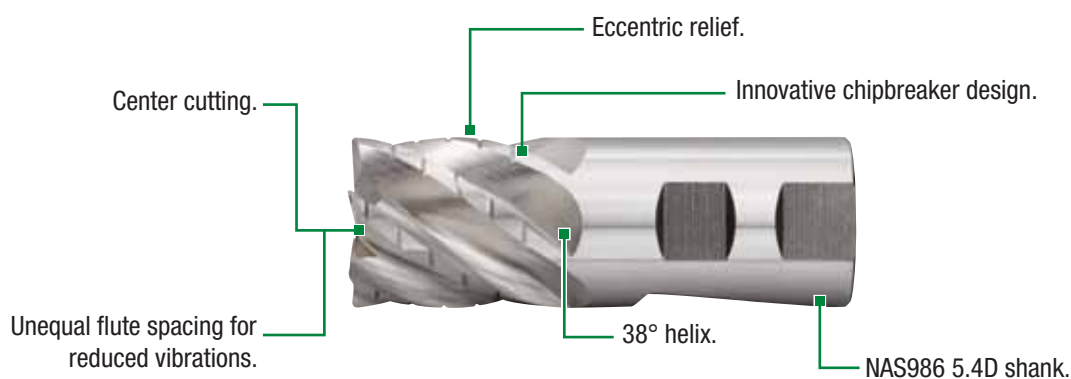
## High-Speed Steel ER Rougher

# HSS ER ROUGHER



The next generation of premium cobalt HSS roughers are designed specifically for titanium and stainless steels. They are engineered with an Eccentric Relief (ER) grind to provide a stronger cutting edge that requires less torque to operate. The unique proprietary chipbreaker geometry will break and control the chip, enabling higher metal removal rates and greater productivity. The HSS rougher offers the best-in-class performance for difficult-to-machine workpiece materials.

- 6-flute design with proprietary chipbreaker providing superior chip control.
- Eccentric relief geometry provides a stronger cutting edge resulting in longer tool life.
- NAS986 5.4D shank adds the flexibility of dual clamping.
- Higher metal removal rates enable productivity with lower tool costs.





### High-Speed Steel ER Rougher

- Achieve outstanding tool life results due to unequal flute spacing and eccentric relief reinforcing the cutting edge.
- Benefit from proprietary chipbreaker pattern for improved chip formation.
- Apply at highest feed rates in full slotting, ramping, and side milling due to proprietary core design.

### 620E Series

- Highest metal removal rates and tool life in:
  - Titanium
  - Stainless steels
- Corner radii.
- Various lengths-of-cut.



### Application Example

Roughing a forged landing gear link.  
Gantry-type vertical milling machine.

Workpiece material: Titanium 6Al-4V

Tool: D = 1 1/2"

Cutting data: ap = 3"

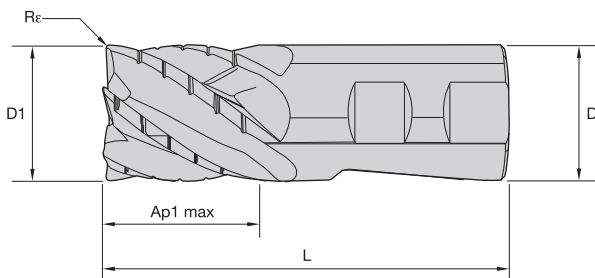
ae = 1/4"

vc = 60 SFM

fz = .006 IPT

Result: 20% higher cutting speed and more than 70% higher feed per tooth. 110% higher tool life compared to previous competitive tool.

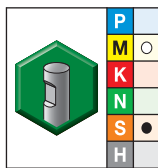
- Center cutting.
- Premium cobalt HSS.
- Eccentric relief grind with chipbreaker.
- Optimized geometry for titanium machining.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.002/-0.0	All	h6

■ Series 620E • HSS ER Roughers



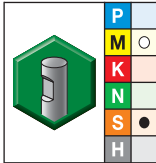
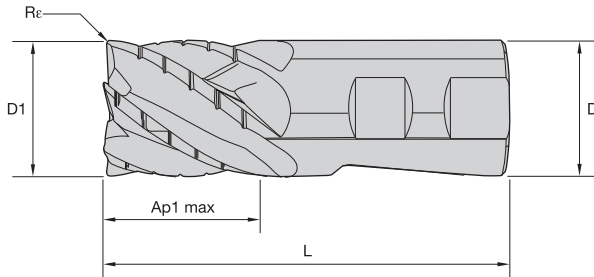
grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε
5329387	620E32009CW	1 1/4	1 1/4	2	4 1/2	.060
5599913	620E32009EW	1 1/4	1 1/4	2	4 1/2	.120
5329388	623E32009CW	1 1/4	1 1/4	3	5 1/2	.060
5599914	623E32009EW	1 1/4	1 1/4	3	5 1/2	.120
5329389	621E32009CW	1 1/4	1 1/4	4	6 1/2	.060
5599915	621E32009EW	1 1/4	1 1/4	4	6 1/2	.120
5329550	620E38009CW	1 1/2	1 1/4	2	4 1/2	.060
5599916	620E38009EW	1 1/2	1 1/4	2	4 1/2	.120
5329551	623E38009CW	1 1/2	1 1/4	3	5 1/2	.060
5599917	623E38009EW	1 1/2	1 1/4	3	5 1/2	.120
5329552	621E38009CW	1 1/2	1 1/4	4	6 1/2	.060
5599918	621E38009EW	1 1/2	1 1/4	4	6 1/2	.120
5329553	620E3800ACW	1 1/2	1 1/2	2	5 1/4	.060
5599919	620E3800AEW	1 1/2	1 1/2	2	5 1/4	.120
5329554	623E3800ACW	1 1/2	1 1/2	3	6 1/4	.060
5599970	623E3800AEW	1 1/2	1 1/2	3	6 1/4	.120

(continued)

(Series 620E • HSS ER Roughers — continued)



grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
5329555	621E3800ACW	1 1/2	1 1/2	4	7 1/4	.060
5599971	621E3800AEW	1 1/2	1 1/2	4	7 1/4	.120
5329556	625E51022CW	2	2	2	5 3/4	.060
5599972	625E51022EW	2	2	2	5 3/4	.120
5329557	625E51032CW	2	2	3	6 3/4	.060
5599973	625E51032EW	2	2	3	6 3/4	.120
5329558	625E51042CW	2	2	4	7 3/4	.060
5599974	625E51042EW	2	2	4	7 3/4	.120
5329559	625E51062CW	2	2	6	9 3/4	.060
5599975	625E51062EW	2	2	6	9 3/4	.120

Application Data • Series 620E • HSS ER Roughers

■ Series 620E • HSS ER Roughers

Material Group	Side Milling (A) and Slotting (B)		uncoated		Recommended feed per tooth (IPT=inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.						
	A		B	Cutting Speed — vc SFM			D1 — Diameter				
	ap	ae	ap	min		max	frac.	1 1/4	1 1/2	2	
							dec.	1.2500	1.5000	2.0000	
M	1	1.5 x D	0.5 x D	1 x D	40	–	60	IPT	.0052	.0053	.0053
	2	1.5 x D	0.5 x D	1 x D	40	–	60	IPT	.0042	.0042	.0043
S	4	1.5 x D	0.5 x D	1 x D	16	–	50	IPT	.0038	.0039	.0039

NOTE: Side milling applications — for longest length tools, reduce ae by 30%.  
Slot milling applications — for longest length tools, reduce ap by 30%.  
Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

High-Performance Solid Carbide End Mills •

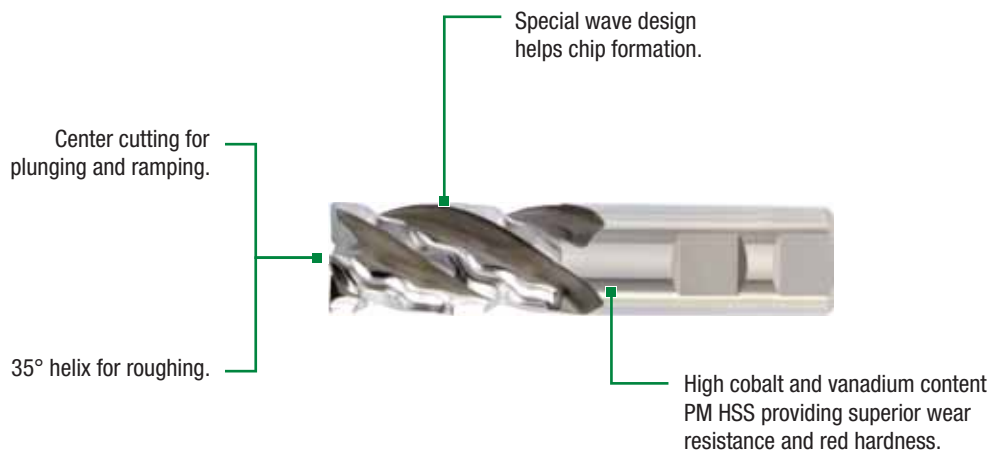
**WavCut™**

# WavCut



WavCut tools for machining titanium are best suited for applications in aerospace and energy, providing high Metal Removal Rates (MRR) and increased tool life. The special wave design of these 4- and 6-fluted end mills require less horsepower during roughing and semi-finishing, and provide excellent chip formation. Since chips evacuate easily, WavCut tools do not recut chips thus increasing tool life. Also, the edges change the radial cutting edge position without changing the diameter.

- Center cutting offering excellent performance in roughing applications, especially in titanium.
- Capable of deep-slotting cuts for high Metal Removal Rates (MRR).
- Special wave design for excellent chip formation and evacuation preventing re-cutting of chips.



### WavCut™ Series

- Benefit from reliable and trouble-free machining results using HSS WavCut cutter.
- Drastically reduce the risk of re-cutting chips, especially with vertical machines having multiple spindles.
- Increase stock removal rates over regular roughing tools due to reduced horsepower consumption.

#### 620W Series

- 4-flute 35° helix for slotting.
- 6-flute 35° helix, for slotting, and in certain cases, pocketing and profiling.
- Center cutting, chamfered corner, uncoated.



### Other featured HSS Series

- Sophisticated roughing profiles capable of dealing with chip formation issues.
- High cobalt and vanadium content PM HSS providing superior wear resistance and red hardness.
- High-performance finishers with specific geometries for different workpiece materials.

#### 6A0R Series

- 3-flute, 45° helix.
- Coarse cord style roughing profile.
- Non-ferrous materials.



#### 6ANR Series

- 3-flute, 45° helix.
- Extended neck for long-reach applications.
- Coarse cord style roughing profile.
- Non-ferrous materials.



#### 6T0R Series

- 4-, 5-, and 6-flute, 35° helix.
- Fine cord style roughing profile.
- High-temp alloys and titanium.



#### 6TNR Series

- 4-, 5-, and 6-flute, 35° helix.
- Extended neck for long-reach applications.
- Fine cord style roughing profile.
- High-temp alloys and titanium.

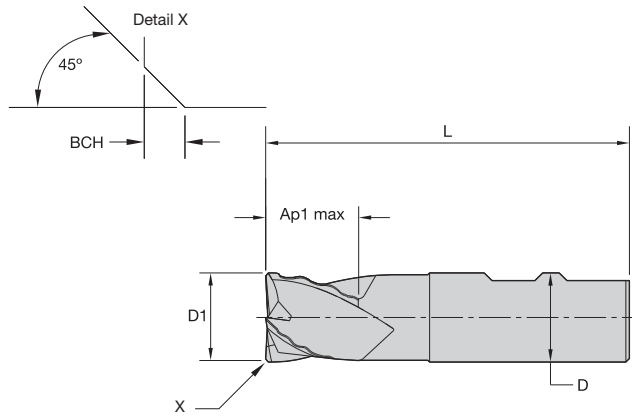


#### 3405/3407 Series

- Center Cutting.
- NAS Type 986 46 + 66 compliant.
- 4 and 6 flute, 35° helix.
- High-temp alloys and titanium.



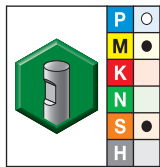
- Center cutting.
- NAS 986 5.2W Shank.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.004/-0.0	All	-0.0002/-0.0005

■ Series 620W • WavCut I



grade UNCOATED

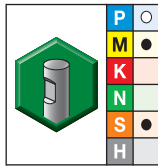
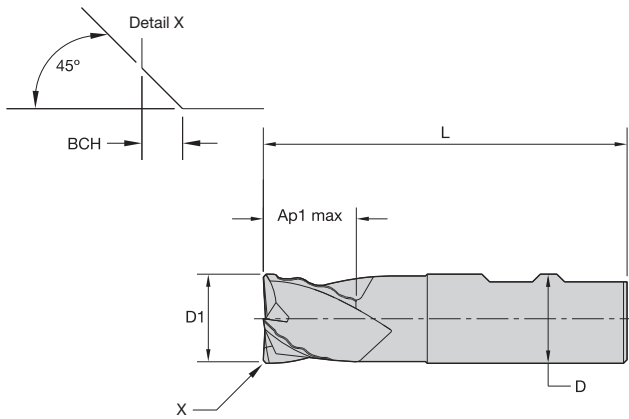
- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
2709800	620W19077	3/4	3/4	1 5/8	3 7/8	.039	4
2709403	623W19077	3/4	3/4	2 1/4	4 1/2	.039	4
2709627	621W19077	3/4	3/4	3	5 1/4	.039	4
2709772	620W25088	1	1	2	4 1/2	.039	6
2709779	620W25078	1	1	2	4 1/2	.039	4
2709389	623W25078	1	1	3	5 1/2	.039	4
3032729	623W25088	1	1	3	5 1/2	.039	6
2709613	621W25078	1	1	4	6 1/2	.039	4
2709606	621W25088	1	1	4	6 1/2	.039	6
2709494	622W25078	1	1	6	8 1/2	.039	4
2709755	620W32079	1 1/4	1 1/4	2	4 1/2	.039	4
2709747	620W32089	1 1/4	1 1/4	2	4 1/2	.039	6
2709375	623W32089	1 1/4	1 1/4	3	5 1/2	.039	6
2709591	621W32079	1 1/4	1 1/4	4	6 1/2	.039	4
2709583	621W32089	1 1/4	1 1/4	4	6 1/2	.039	6
2709487	622W32089	1 1/4	1 1/4	6	8 1/2	.039	6
2709723	620W38079	1 1/2	1 1/4	2	4 1/2	.039	4
2709715	620W38089	1 1/2	1 1/4	2	4 1/2	.039	6
2709361	623W38089	1 1/2	1 1/4	3	5 1/2	.039	6
2709562	621W38089	1 1/2	1 1/4	4	6 1/2	.039	6

(continued)

High-Performance High-Speed Steel (HSS-E/PM)

(Series 620W • WavCut I — continued)



● first choice  
○ alternate choice

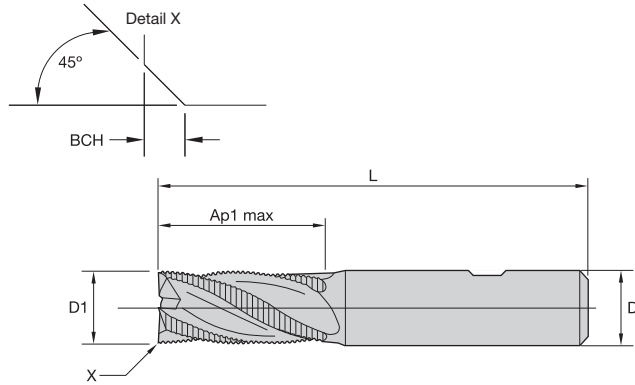
grade UNCOATED

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
2709569	621W38079	1 1/2	1 1/4	4	6 1/2	.039	4
2709473	622W38089	1 1/2	1 1/4	4	8 1/2	.039	6
2709233	625W51722	2	2	2	5 3/4	.039	6
2709219	625W51732	2	2	3	6 3/4	.039	6
2709206	625W51742	2	2	4	7 3/4	.039	6
2709200	625W51762	2	2	6	9 3/4	.039	6
2709191	625W51782	2	2	8	11 3/4	.039	6

NOTE: For application data, please see page O16.

High-Performance High-Speed Steel (HSS-E/PM)

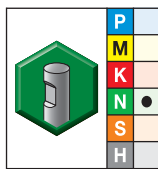
- Center cutting.
- Chamfered profile.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance
All	+0.0047/-0.0047	All	-0.0002/-0.0005

■ Series 6A0R



grade TiCN  
TiCN

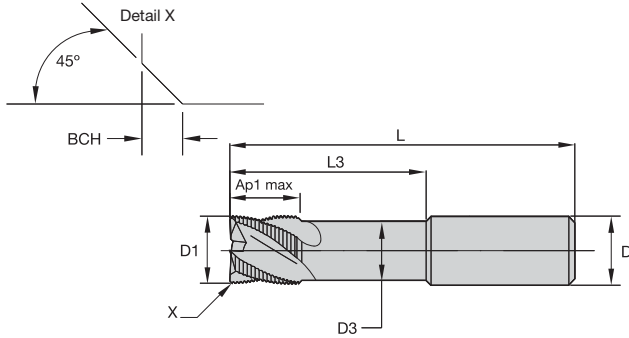
- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH
2840160	TC6A0R13005	1/2	1/2	1 1/4	3 1/4	.014
2840121	TC6A1R13005	1/2	1/2	2	4	.014
2840146	TC6A0R19007	3/4	3/4	1 5/8	3 7/8	.014
2840087	TC6A3R19007	3/4	3/4	2 1/4	4 1/2	.014
2840108	TC6A1R19007	3/4	3/4	3	5 1/4	.014
2840138	TC6A0R25008	1	1	2	4 1/2	.020
1839782	TC6A3R25008	1	1	3	5 1/2	.020
2840103	TC6A1R25008	1	1	4	6 1/2	.020
2840132	TC6A0R32009	1 1/4	1 1/4	2	4 1/2	.020
2840073	TC6A3R32009	1 1/4	1 1/4	3	5 1/2	.020
2840099	TC6A1R32009	1 1/4	1 1/4	4	6 1/2	.020

NOTE: For application data, please see page O17.



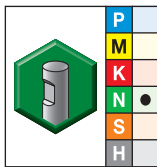
- Center cutting.
- Chamfered profile.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance
All	+0.0047/-0.0047	All	-0.0002/-0.0005

■ Series 6ANR



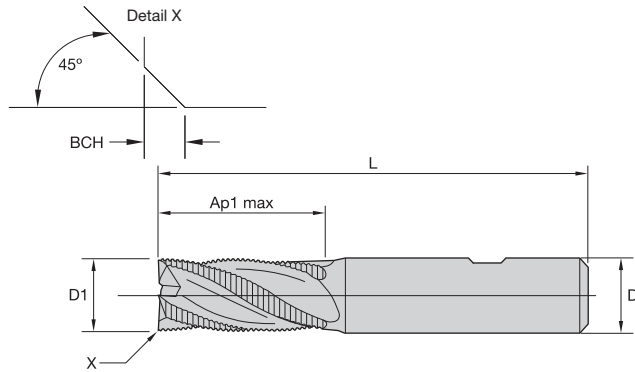
- first choice
- alternate choice

grade TiCN TiCN		D1	D	D3	length of cut Ap1 max	L3	length L	BCH
order #	catalog #							
2840040	TC6ANR13005	1/2	1/2	.470	1 1/4	2	4	.014
2840034	TC6ANR13015	1/2	1/2	.470	1 1/4	3	5	.014
2840028	TC6ANR13025	1/2	1/2	.470	1 1/4	4	6	.014
2840007	TC6ANR19007	3/4	3/4	.705	1 5/8	4	6 1/4	.014
2840000	TC6ANR19017	3/4	3/4	.705	1 5/8	6	8 1/4	.014
2839994	TC6ANR25008	1	1	.940	2	4	6 1/2	.020
1907409	TC6ANR25018	1	1	.940	2	6	8 1/2	.020
2839981	TC6ANR32009	1 1/4	1 1/4	1.175	2	4	6 1/2	.020
2839975	TC6ANR32019	1 1/4	1 1/4	1.175	2	6	8 1/2	.020
2839969	TC6ANR32029	1 1/4	1 1/4	1.175	2	8	10 1/2	.020

NOTE: For application data, please see page O17.

High-Performance High-Speed Steel (HSS-E/PM)

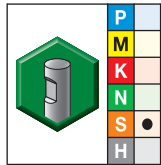
- Center cutting.
- Chamfered profile.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance
All	+0.0047/-0.0047	All	-0.0002/-0.0005

■ Series 6TOR • Series 6TOR 6T1R 6T3R



- first choice
- alternate choice

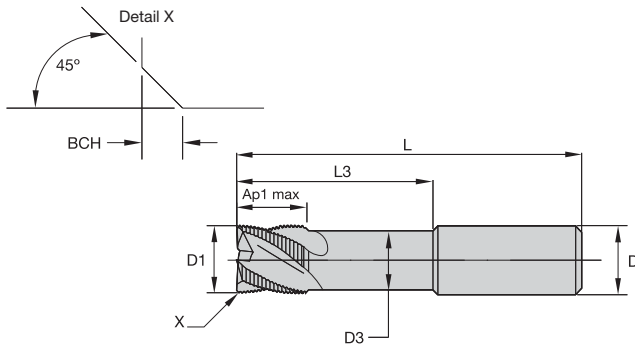
grade TiAlN  
TiAlN

order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH	ZU
2836219	TF6TOR13005	1/2	1/2	1 1/4	3 1/4	.035	4
2836188	TF6T1R13005	1/2	1/2	2	4	.035	4
2836212	TF6TOR16006	5/8	5/8	1 5/8	3 3/4	.047	4
2836182	TF6T1R16006	5/8	5/8	2 1/2	4 5/8	.047	4
2836206	TF6TOR19007	3/4	3/4	1 5/8	3 7/8	.047	4
2836151	TF6T3R19007	3/4	3/4	2 1/4	4 1/2	.047	4
2836176	TF6T1R19007	3/4	3/4	3	5 1/4	.047	4
2836204	TF6TOR25008	1	1	2	4 1/2	.059	5
2836145	TF6T3R25008	1	1	3	5 1/2	.059	5
2836169	TF6T1R25008	1	1	4	6 1/2	.059	5
2836199	TF6TOR32009	1 1/4	1 1/4	2	4 1/2	.059	6
2836138	TF6T3R32009	1 1/4	1 1/4	3	5 1/2	.059	6
2836163	TF6T1R32009	1 1/4	1 1/4	4	6 1/2	.059	6
2836193	TF6TOR38009	1 1/2	1 1/4	2	4 1/2	.059	6
2836132	TF6T3R38009	1 1/2	1 1/4	3	5 1/2	.059	6
2836157	TF6T1R38009	1 1/2	1 1/4	4	6 1/2	.059	6

NOTE: For application data, please see page O18.

High-Performance High-Speed Steel (HSS-E/PM)

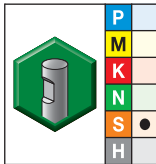
- Center cutting.
- Chamfered profile.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance
All	+0.0047/-0.0047	All	-0.0002/-0.0005

■ Series 6TNR



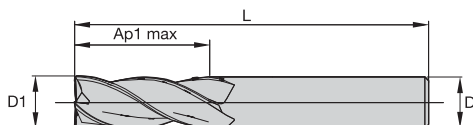
- first choice
- alternate choice

grade TiAlN TiAlN		D1	D	D3	length of cut Ap1 max	L3	length L	BCH	ZU
2836090	TF6TNR16006	5/8	5/8	.588	1 5/8	3	5 1/8	.047	4
2836087	TF6TNR16016	5/8	5/8	.588	1 5/8	4	6 1/8	.047	4
2836081	TF6TNR19007	3/4	3/4	.705	1 5/8	4	6 1/4	.047	4
2836075	TF6TNR19017	3/4	3/4	.705	1 5/8	6	8 1/4	.047	4
2836068	TF6TNR25008	1	1	.940	2	4	6 1/2	.059	5
2836063	TF6TNR25018	1	1	.940	2	6	8 1/2	.059	5
2836059	TF6TNR32009	1 1/4	1 1/4	1.175	2	4	6 1/2	.059	6
2836054	TF6TNR32019	1 1/4	1 1/4	1.175	2	6	8 1/2	.059	6
2836048	TF6TNR32029	1 1/4	1 1/4	1.175	2	8	10 1/2	.059	6

NOTE: For application data, please see page O18.

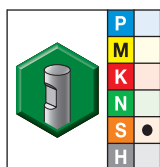
High-Performance High-Speed Steel (HSS-E/PM)

- Center cutting.
- NAS Type 986 46 + 66 compliant.
- Standard items listed. Additional styles and coatings made-to-order.

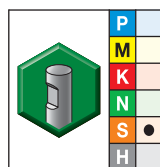


End Mill Tolerances			
D1	tolerance	D	tolerance
All	+0.02/-0.0	All	-0.0002/-0.0005

■ Series 3405 3415 3425 3435 3455 3407 3417 3427 3437 3457



grade UNCOATED



grade TiAlN  
TiAlN

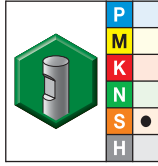
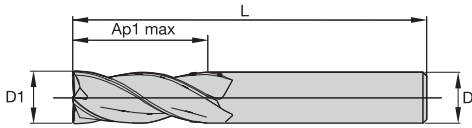
- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
2866066	341510004	—	—	3/8	3/8	1 1/2	3 1/4	4
2866063	341513005	2838292	TF341513005	1/2	1/2	2	4	4
2866027	342513005	—	—	1/2	1/2	3	5	4
2866099	340516006	—	—	5/8	5/8	1 5/8	3 3/4	4
—	—	2838285	TF341516006	5/8	5/8	2 1/2	4 5/8	4
2865994	343519007	2838241	TF343519007	3/4	3/4	2 1/4	4 1/2	4
—	—	2838218	TF343719007	3/4	3/4	2 1/4	4 1/2	6
2866057	341519007	2838277	TF341519007	3/4	3/4	3	5 1/4	4
—	—	2838260	TF341719007	3/4	3/4	3	5 1/4	6
2866021	342519007	—	—	3/4	3/4	4	6 1/4	4
2866009	342719007	—	—	3/4	3/4	4	6 1/4	6
2866090	340525008	—	—	1	1	2	4 1/2	4
2865990	343525008	2838234	TF343525008	1	1	3	5 1/2	4
2865982	343725008	2838212	TF343725008	1	1	3	5 1/2	6
2866036	341725008	2838254	TF341725008	1	1	4	6 1/2	6
2866051	341525008	2838273	TF341525008	1	1	4	6 1/2	4
2866018	342525008	—	—	1	1	6	8 1/2	4
2866006	342725008	—	—	1	1	6	8 1/2	6
2866072	340732009	—	—	1 1/4	1 1/4	2	4 1/2	6
2865988	343532009	2838227	TF343532009	1 1/4	1 1/4	3	5 1/2	4
2865978	343732009	2838205	TF343732009	1 1/4	1 1/4	3	5 1/2	6
—	—	2838265	TF341532009	1 1/4	1 1/4	4	6 1/2	4
2866033	341732009	2838248	TF341732009	1 1/4	1 1/4	4	6 1/2	6
2866015	342532009	—	—	1 1/4	1 1/4	6	8 1/2	4

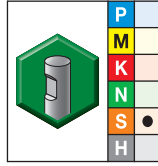
(continued)

High-Performance High-Speed Steel (HSS-E/PM)

(Series 3405 3415 3425 3435 3455 3407 3417 3427 3437 3457 — continued)



grade UNCOATED



grade TiAlN  
TiAlN

- first choice
- alternate choice

grade UNCOATED		grade TiAlN TiAlN		D1	D	length of cut Ap1 max	length L	ZU
order #	catalog #	order #	catalog #					
2866003	342732009	—	—	1 1/4	1 1/4	6	8 1/2	6
2865999	342738009	—	—	1 1/2	1 1/4	6	8 1/2	6
2865975	343738009	—	—	1 1/2	1 1/2	3	5 1/2	6
2866030	341738009	—	—	1 1/2	1 1/2	4	6 1/2	6
2865960	345751020	—	—	2	2	2	5 3/4	6
2865958	345751030	—	—	2	2	3	6 3/4	6
2865955	345751040	2838177	TF345751040	2	2	4	7 3/4	6
2865969	345551040	2838193	TF345551040	2	2	4	7 3/4	4
2865951	345751060	2838170	TF345751060	2	2	6	9 3/4	6
2865948	345751080	—	—	2	2	8	11 3/4	6
2865963	345551080	—	—	2	2	8	11 3/4	4

NOTE: For application data, please see page O18.




■ Series 620W • WavCut I

Material Group									Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.				
		Side Milling (A) and Slotting (B)				uncoated							
		A		B		Cutting Speed – vc SFM			D1 – Diameter				
		ap	ae	ap	min		max	frac.	3/4	1	1 1/4	1 1/2	2
<b>P</b>	<b>5</b>	1.5 x D	0.4 x D	1 x D	30	–	50	IPT	.0030	.0040	.0045	.0050	.0055
<b>M</b>	<b>1</b>	1.5 x D	0.4 x D	1 x D	30	–	50	IPT	.0040	.0045	.0050	.0055	.0060
	<b>2</b>	1.5 x D	0.4 x D	1 x D	30	–	40	IPT	.0035	.0040	.0045	.0050	.0055
<b>S</b>	<b>4</b>	1.5 x D	0.4 x D	0.75 x D	50	–	70	IPT	.0033	.0040	.0050	.0055	.0060

NOTE: Side milling applications – For longest length tools, reduce ae by 30%.  
 Slot milling applications – For longest length tools, reduce ap by 30%.  
 Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

High-Performance High-Speed Steel (HSS-E/PM)


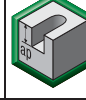

■ Series 6A0R

Material Group															
	Side Milling (A) and Slotting (B)				uncoated			TiCN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.				
	A		B		Cutting Speed – vc SFM			Cutting Speed – vc SFM			frac. dec.	D1 – Diameter			
	ap	ae	ap	min		max	min		max	1/2		3/4	1	1 1/4	
N	1	1.25 x D	0.5 x D	1 x D	1050	–	1750	1500	–	2500	IPT	.0055	.0075	.0085	.0100
	2	1.25 x D	0.5 x D	1 x D	840	–	1400	1200	–	2000	IPT	.0050	.0068	.0077	.0090

NOTE: Side milling applications – For longest length tools, reduce ae by 30%.  
 Slot milling applications – For longest length tools, reduce ap by 30%.  
 Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

Application Data • Series 6ANR

■ Series 6ANR

Material Group												
	Side Milling (A) and Slotting (B)				TiCN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.				
	A		B		Cutting Speed – vc SFM			frac. dec.	D1 – Diameter			
	ap	ae	ap	min		max	1/2		3/4	1	1 1/4	
N	1	1 x D	0.3 x D	0.75 x D	1500	–	2500	IPT	.0055	.0075	.0085	.0100
	2	1 x D	0.3 x D	0.5 x D	1200	–	2000	IPT	.0050	.0068	.0077	.0090

NOTE: Side milling applications – For longest length tools, reduce ae by 30%.  
 Slot milling applications – For longest length tools, reduce ap by 30%.  
 Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

High-Performance High-Speed Steel (HSS-E/PM)

Series 6TOR

Material Group	Side Milling (A) and Slotting (B)		TiAlN		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.									
	A		B	Cutting Speed – vc SFM			D1 – Diameter							
	ap	ae	ap	min		max	frac.	1/2	5/8	3/4	1	1 1/4	1 1/2	
	ap	ae	ap	min		max	dec.	.5000	.6250	.7500	1.0000	1.2500	1.5000	
S	3	1.25 x D	0.5 x D	1 x D	50	–	90	IPT	.0028	.0033	.0036	.0040	.0050	.0060
	4	1.25 x D	0.3 x D	0.5 x D	50	–	90	IPT	.0026	.0030	.0033	.0036	.0045	.0055

NOTE: Side milling applications – For longest length tools, reduce ae by 30%.  
 Slot milling applications – For longest length tools, reduce ap by 30%.  
 Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

Application Data • Series 6TNR

Series 6TNR

Material Group	Side Milling (A) and Slotting (B)		TiAlN		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
	A		B	Cutting Speed – vc SFM			D1 – Diameter					
	ap	ae	ap	min		max	frac.	5/8	3/4	1	1 1/4	
	ap	ae	ap	min		max	dec.	.6250	.7500	1.0000	1.2500	
S	3	0.75 x D	0.4 x D	0.5 x D	50	–	90	IPT	.0033	.0036	.0040	.0050
	4	0.75 x D	0.3 x D	0.3 x D	50	–	90	IPT	.0030	.0033	.0036	.0045

NOTE: Side milling applications – For longest length tools, reduce ae by 30%.  
 Slot milling applications – For longest length tools, reduce ap by 30%.  
 Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

Application Data • Series 3405 3415 3425 3435 3455 3407 3417 3427 3437 3457

Series 3405 3415 3425 3435 3455 3407 3417 3427 3437 3457

Material Group	Side Milling (A) and Slotting (B)		uncoated		TiAlN		Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.												
	A		B	Cutting Speed – vc SFM		Cutting Speed – vc SFM		D1 – Diameter											
	ap	ae	ap	min	max	min	max	frac.	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2			
	ap	ae	ap	min	max	min	max	dec.	.3750	.5000	.6250	.7500	1.0000	1.2500	1.5000	2.0000			
S	3	1.5 x D	0.1 x D	0.5 x D	50	–	80	50	–	90	IPT	.0020	.0025	.0029	.0032	.0038	.0042	.0045	.0048
	4	1.5 x D	0.1 x D	0.4 x D	40	–	60	50	–	90	IPT	.0018	.0023	.0026	.0029	.0035	.0038	.0041	.0044

NOTE: Side milling applications – For longest reach (L3) tools, reduce ae by 30%.  
 Slot milling applications – For longest reach (L3) tools, reduce ap by 30%.  
 For cutting aluminum with high silicon, coating is recommended.  
 Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.  
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.  
 Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

High-Performance High-Speed Steel (HSS-E/PM)



# Solid Carbide-Tipped End Mills



## EXTREME CHALLENGES. EXTREME RESULTS.

WIDIA-Hanita™ carbide-tipped end mills can provide unique advantages over solid tools, especially in large diameter sizes. They can be run at the same high cutting speeds of solid carbide but are usually less costly because of their steel body. The tougher body also absorbs shock, which enables it to perform well in conventional machines with less-than-rigid setups. Our in-house brazing capabilities and expertise provide our customers with flexibility in using carbide-tipped cutting edges on many styles, geometries, and sizes of standard and custom solution tooling.


- Available up to a diameter of 9.84" (250mm).
- Continuous edge carbide diameter of up to 11.81" (300mm).
- Center cutting geometries available.
- Maximum helix angle is 45°.
- Available in multiple spindle connections.
- Outstanding custom solutions capabilities.

To learn more about our innovations, contact your local Authorized Distributor or visit [widia.com](http://widia.com).

**WIDIA** 

# NOVO KNOWS

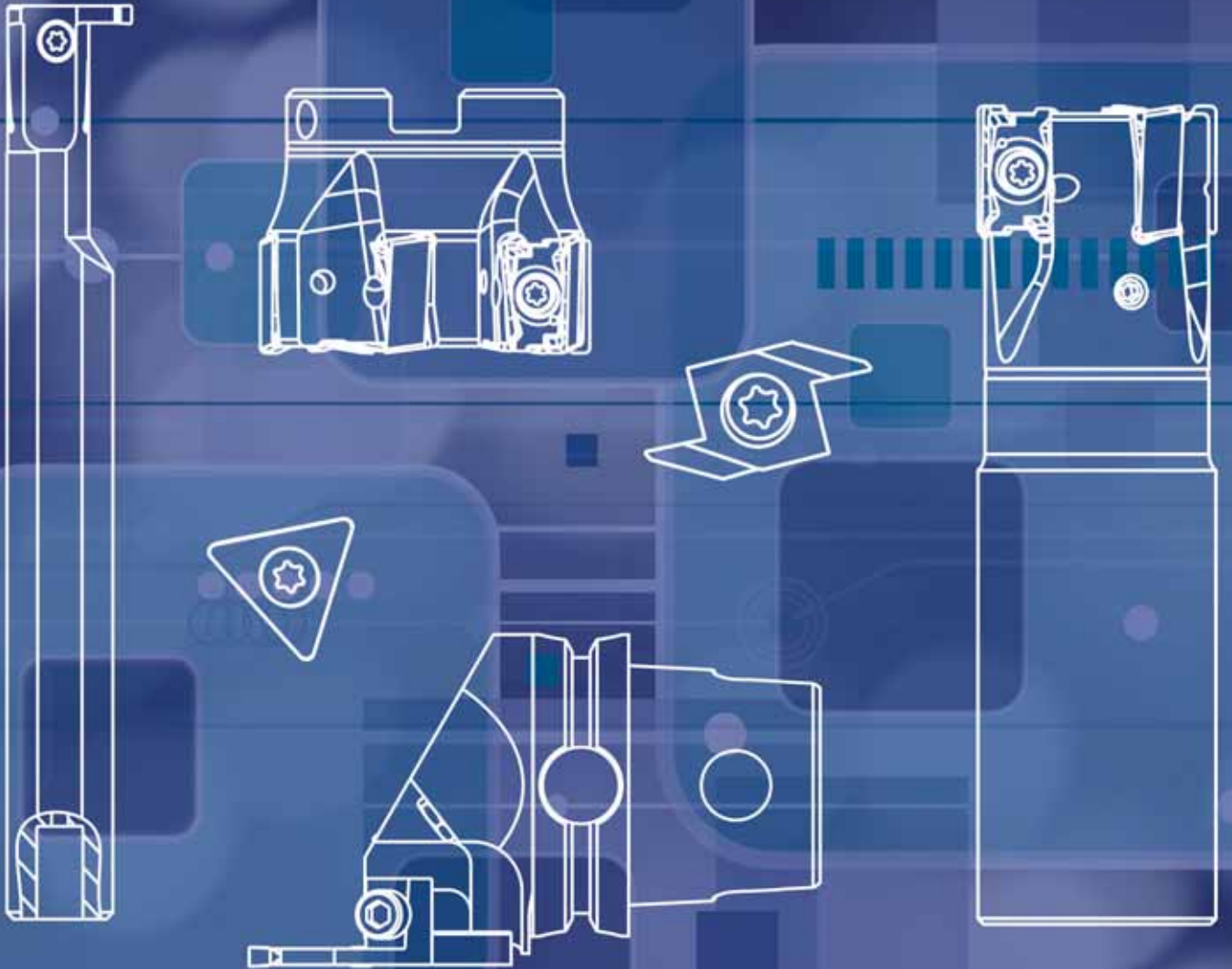
## ART TO PART TO PROFIT



Being as productive and profitable as possible is your fundamental goal. With the addition of NOVO™ to your team, your goal can be achieved. NOVO possesses powerful digital tools that link together process planning, inventory availability and purchase, cost-per-part management, and productivity improvements.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift.

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**01**

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## Solid End Milling • Burs

Burs.....P2-P20



**WIDIA™ Metal Removal Carbide Burs**

# Carbide Burs

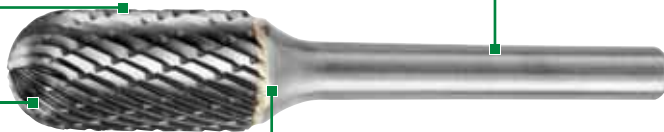


WIDIA™ carbide burs are manufactured in compliance with USCTI standards and are the highest quality in the industry, delivering excellent performance and safety. Our unique manufacturing process ensures exceptional tool life with the reliability to operate safely at high speeds. WIDIA burs offer a comprehensive portfolio of sizes and shapes for all applications and workpiece materials.

- Complete selection of shapes and cut styles for all materials and applications.
- Solid shank and brazed-on steel styles.
- Highest quality materials and construction deliver exceptional tool life.
- Wide array of sizes and shank lengths.
- Available in multiple size and style kits.
- Use of industry-standard USCTI codes for easy identification.

**Micrograin carbide**  
Consistent performance  
and tool life.

**USCTI Standards**  
Industry-standard  
shapes and sizes.



**High-quality brazing and testing**  
Ensures safety at high RPMs.

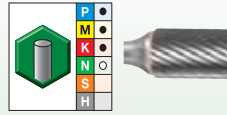
**High-quality steel shanks**  
Multiple lengths and styles.

### Standard Cut Styles

#### Standard Cut (Right-Hand Spiral)

The WIDIA™ **standard (right-hand spiral)** cut produces a smooth finish for general-purpose use on steel, cast iron, and other ferrous and non-ferrous materials.

Most WIDIA carbide burs are available in the right-hand spiral design.



### Special Cut Styles

#### Coarse Cut

**Coarse cut** burs are favored for applications in softer materials such as brass, lead, annealed low-carbon steels, and some aluminum alloys. The combination of fewer flutes with greater depths provides the chip clearance necessary for these materials.

Available as specials.

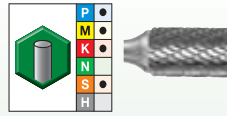


#### Master Cut (Double Cut)

The WIDIA exclusive **master cut**, with its chisel-type cutting edge, is a machine-ground tool built to exacting tolerances of concentricity, size, and shape. This accuracy, when combined with precision grinders, results in smooth-running, fast metal removal, and fine finishes. The right- and left-hand helical flutes combine to produce a chisel-type cutting tooth. This results in faster penetration and stock removal with minimal bounce or chatter.

The master cut design also produces an easy-to-handle granular-type chip in most metals, as opposed to the conventional sliver-type chips.

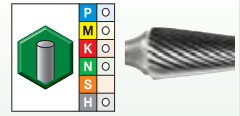
Throughout its life, the master cut gives faster stock removal and less operator fatigue, and maintains a good finish on the widest possible variety of workpiece materials.



#### Fine Cut RHS

The WIDIA **fine cut right-hand spiral** is used in applications where stock removal is light and workpiece finish is critical. A greater number of flutes reduces chip load and provides excellent control in deburring small, intricate areas.

Available as specials.



#### Aluminum Cut

The WIDIA **aluminum cut** burs are outstanding on soft or non-ferrous type materials. Use the aluminum cut design on aluminum, magnesium, brass, lead, and most plastics.

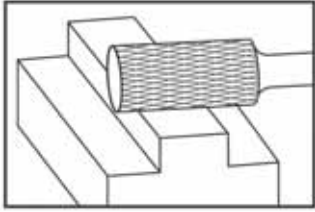


## How to select a Bur

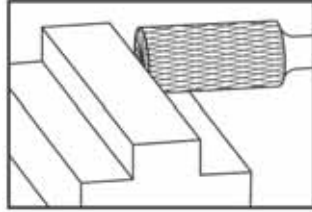
Applications	Material	Cut	
<b>Efficient stock removal</b> — deburring, finishing, and cleaning.	Ferrous metals Non-ferrous metals	Double Master Cut	
<b>Heavy stock removal</b> — deburring, milling, cleaning, and machining.	Non-ferrous metal: aluminum alloys Plastics	Aluminum Cut	
<b>Medium stock removal</b> — deburring, milling, cleaning, and finishing.	Non-ferrous metal: aluminum alloys Plastics Hard rubber	Coarse Cut Special Cut Style	
<b>Medium stock removal</b> — deburring, milling, cleaning, and finishing.	Non-Hardened steel >45 HRC Hardened steel >45 HRC: stainless steel High-temperature resistant metals: nickel, cobalt, titanium Non-ferrous light metals: brass, copper, and zinc	Single Cut	
<b>Light stock removal</b> — fine deburring and fine finishing.	Hardened steel >45 HRC	Fine Cut Special Cut Style	

**Bur Shapes**

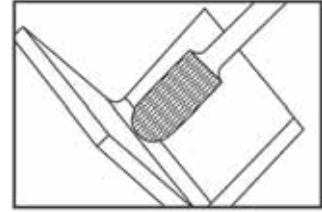
**A Shape**



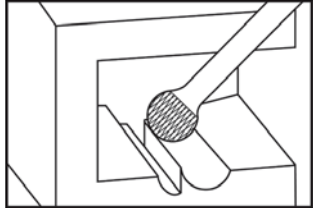
**B Shape**



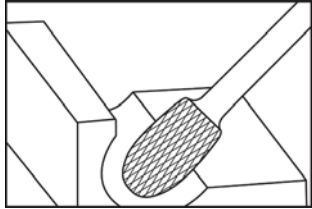
**C Shape**



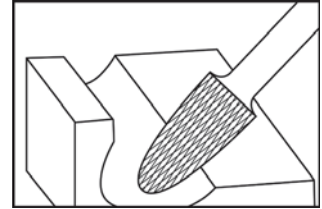
**D Shape**



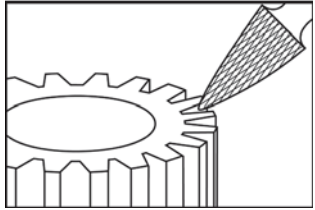
**E Shape**



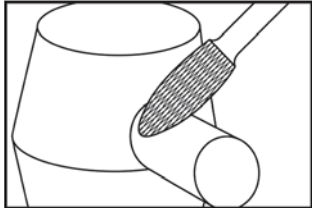
**F Shape**



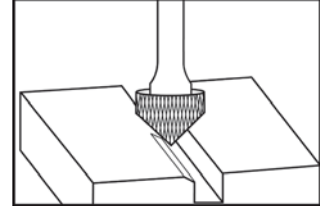
**G Shape**



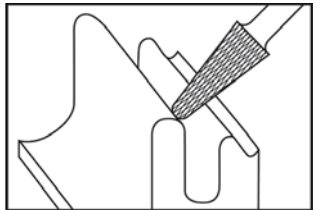
**H Shape**



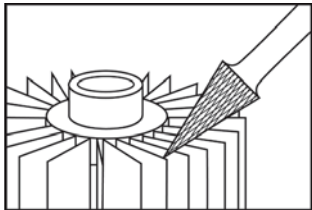
**K Shape**



**L Shape**



**M Shape**





## Shank Styles

### A Shank

1/8" solid carbide shank



### B Shank

1/8" hardened steel shank



### C Shank

1/4" hardened steel shank



### D Shank

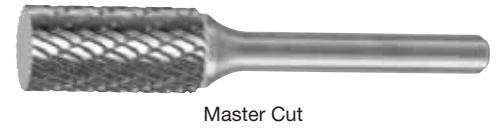
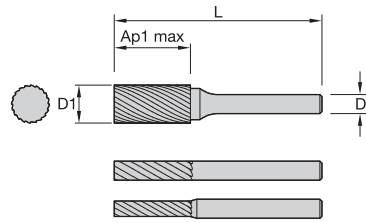
1/8" solid carbide shank



## Bur Cutting Speeds

Bur Diameter Inch	Recommended Cutting Speed (RPM)	Maximum Cutting Speed (RPM)
1/16	60,000–90,000	100,000
1/8	40,000–70,000	90,000
3/16	35,000–60,000	80,000
1/4	30,000–50,000	70,000
5/16	20,000–40,000	68,000
3/8	20,000–40,000	66,000
7/16	15,000–40,000	58,000
1/2	15,000–40,000	50,000
5/8	12,000–25,000	40,000
3/4	10,000–20,000	33,000
1	7,500–20,000	25,000
1-1/8	7,000–13,000	20,000
1-1/2	5,000–10,000	17,000
1-3/4	4,500–9,000	14,000
2	4,000–8,000	12,500

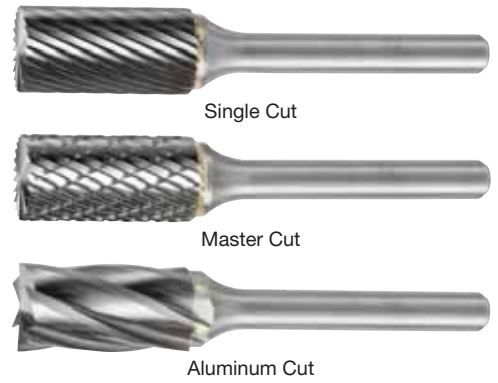
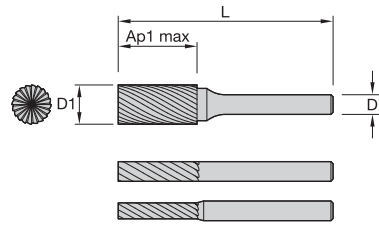
- Cylindrical shape.
- No end cut.
- Shank styles A, B, and C — see page P5 for shank style definitions.



■ Series SA Cylindrical

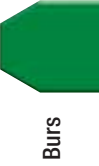
USCTI Number	Single Cut		Master Cut		D1	D	Ap1 max	length L	shank style
	order #	catalog #	order #	catalog #					
SA-41	2736627	M40200	2735826	M41200	1/16	1/8	1/4	1 1/2	A
SA-42	2736622	M40201	2735821	M41201	3/32	1/8	7/16	1 1/2	A
SA-43	2736616	M40202	2735816	M41202	1/8	1/8	9/16	1 1/2	A
SA-43L2	2736613	M40203	2735811	M41203	1/8	1/8	9/16	2	A
SA-43L3	2736608	M40204	2735806	M41204	1/8	1/8	9/16	3	A
SA-11	2736603	M40205	2735801	M41205	1/8	1/4	1/2	2	C
SA-52	2736598	M40206	2735796	M41206	5/32	1/8	1/2	1 1/2	A
SA-53	-		2735792	M41207	3/16	1/8	1/2	1 1/2	A
SA-14	2736589	M40208	2735787	M41208	3/16	1/4	5/8	2	C
SA-51	2736583	M40209	2735782	M41209	1/4	1/8	3/16	1 7/16	B
SA-51-2	2736578	M40210	2735777	M41210	1/4	1/8	1/2	1 3/4	B
SA-1L6	2736569	M40212	2735767	M41212	1/4	1/4	5/8	6 5/8	C
SA-1	2736574	M40211	2735772	M41211	1/4	1/4	5/8	2	C
SA-2	2736564	M40213	2735763	M41213	5/16	1/4	3/4	2 1/2	C
SA-3	1293725	M40214	3063092	M41214	3/8	1/4	3/4	2 1/2	C
SA-3L6	-		2735752	M41215	3/8	1/4	3/4	6 3/4	C
SA-4	2736549	M40216	2735747	M41216	7/16	1/4	1	2 3/4	C
SA-5	2736544	M40217	2735742	M41217	1/2	1/4	1	2 3/4	C
SA-5L6	-		2735737	M41218	1/2	1/4	1	7	C
SA-6	2736534	M40219	2735732	M41219	5/8	1/4	1	2 3/4	C
SA-7	3046342	M40220	2735727	M41220	3/4	1/4	1	2 3/4	C
SA-9	2736525	M40221	2735722	M41221	1	1/4	1	2 3/4	C

- Cylindrical shape.
- With end cut.
- Shank styles A and C — see page P5 for shank style definitions.

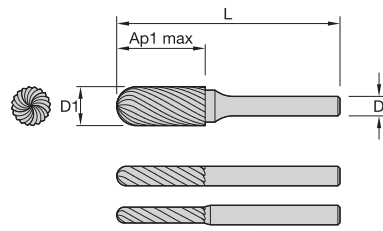


■ Series SB Cylindrical with End Cut

USCTI Number	Single Cut		Master Cut		Aluminum Cut		D1	D	Ap1 max	length L	shank style
	order #	catalog #	order #	catalog #	order #	catalog #					
SB-41	2736483	M40247	-	-	-	-	1/16	1/8	1/4	1 1/2	A
SB-42	2736480	M40248	-	-	-	-	3/32	1/8	7/16	1 1/2	A
SB-43	1750953	M40249	-	-	-	-	1/8	1/8	9/16	1 1/2	A
SB-11	-	-	2735677	M41250	-	-	1/8	1/4	1/2	2	C
SB-14	2736465	M40251	2735672	M41251	-	-	3/16	1/4	5/8	2	C
SB-51	2736459	M40252	2735666	M41252	-	-	1/4	1/8	3/16	1 7/16	A
SB-51-2	-	-	2735662	M41253	-	-	1/4	1/8	1/2	1 3/4	A
SB-1	2736449	M40254	2735657	M41254	2736311	M40527	1/4	1/4	5/8	2	C
SB-2	2736446	M40255	3055771	M41255	-	-	5/16	1/4	3/4	2 1/2	C
SB-3	2736441	M40256	2735646	M41256	2736307	M40528	3/8	1/4	3/4	2 1/2	C
SB-4	-	-	3050640	M41257	-	-	7/16	1/4	1	2 3/4	C
SB-5	2736436	M40258	2735636	M41258	2736300	M40529	1/2	1/4	1	2 3/4	C
SB-6	-	-	2735631	M41259	2736296	M40530	5/8	1/4	1	2 3/4	C
SB-7	-	-	2735626	M41260	2736291	M40531	3/4	1/4	1	2 3/4	C



- Cylindrical shape.
- Ball nose end cut.
- Shank styles A, B, and C — see page P5 for shank style definitions.



Single Cut



Master Cut



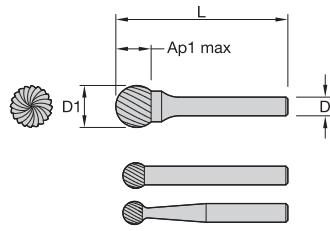
Aluminum Cut

■ Series SC Cylindrical Ball Nose

USCTI Number	Single Cut		Master Cut		Aluminum Cut		D1	D	Ap1 max	length L	shank style
	order #	catalog #	order #	catalog #	order #	catalog #					
SC-41	3046343	M40284	2735611	M41284	-	-	3/32	1/8	7/16	1 1/2	A
SC-42	2736406	M40285	2735606	M41285	-	-	1/8	1/8	9/16	1 1/2	A
SC-42L2	2736401	M40286	2735600	M41286	-	-	1/8	1/8	9/16	2	A
SC-42L3	2736397	M40287	2735596	M41287	-	-	1/8	1/8	9/16	3	A
SC-11	2736392	M40288	2735591	M41288	-	-	1/8	1/4	1/2	2	A
SC-52	2736387	M40289	1568786	M41289	-	-	5/32	1/8	1/2	1 1/2	A
SC-53	3050059	M40290	2735581	M41290	-	-	3/16	1/8	1/2	1 1/2	A
SC14	2736379	M40291	2735576	M41291	-	-	3/16	1/4	5/8	2	A
SC-51	3056826	M40292	2735571	M41292	-	-	1/4	1/8	1/2	1 3/4	B
SC-1	2736369	M40293	2735566	M41293	2736287	M40532	1/4	1/4	5/8	2	A
SC-1L6	3043496	M40294	2735561	M41294	-	-	1/4	1/4	5/8	6 5/8	C
SC-2	2736358	M40295	2735556	M41295	-	-	5/16	1/4	3/4	2 1/2	A
SC-3	2736353	M40296	2735551	M41296	2736281	M40533	3/8	1/4	3/4	2 1/2	A
SC-3L6	2736349	M40297	2735546	M41297	-	-	3/8	1/4	3/4	6 3/4	C
SC-4	-	-	3050641	M41298	-	-	7/16	1/4	1	2 3/4	A
SC-5L6	2736334	M40300	2735526	M41300	-	-	1/2	1/4	1	7	C
SC-5	2736339	M40299	2735531	M41299	2736276	M40534	1/2	1/4	1	2 3/4	A
SC-6	2736329	M40301	2735521	M41301	2736272	M40535	5/8	1/4	1	2 3/4	A
SC-7	2736324	M40302	2735516	M41302	2736265	M40536	3/4	1/4	1	2 3/4	C

Burs

- Ball shape.
- Shank styles A, B, and C — see page P5 for shank style definitions.



Single Cut



Master Cut



Aluminum Cut

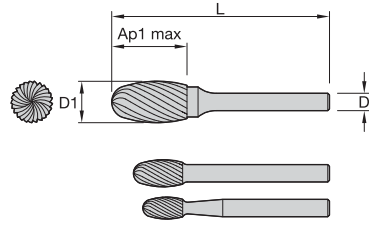
■ Series SD BALL

USCTI Number	Single Cut		Master Cut		Aluminum Cut		D1	D	Ap1 max	length L	shank style
	order #	catalog #	order #	catalog #	order #	catalog #					
—	2730676	M40322	—	—	—	—	1/16	1/8	1/16	1 1/2	A
SD-41	2730671	M40323	2729967	M41323	—	—	3/32	1/8	3/32	1 1/2	A
SD-42L2	3044078	M40325	—	—	—	—	1/8	1/8	1/8	2	A
SD-42L3	2730659	M40326	2729951	M41326	—	—	1/8	1/8	1/8	3	A
SD-42	—	—	2729963	M41324	—	—	1/8	1/8	1/8	1 1/2	A
SD-11	3043497	M40327	2729946	M41327	—	—	1/8	1/4	1/8	2	C
SD-53	2730649	M40328	2729942	M41328	—	—	3/16	1/8	3/16	1 1/2	A
SD-14	2730644	M40329	2729936	M41329	—	—	3/16	1/4	3/16	2	C
SD-42L2	—	—	1752141	M41325	—	—	1/8	1/8	1/8	2	A
SD-51	2730639	M40330	2729930	M41330	—	—	1/4	1/8	1/4	1 3/4	B
SD-1L6	2730629	M40332	2729920	M41332	—	—	1/4	1/4	1/4	6 1/4	C
SD-1	2730634	M40331	2729926	M41331	2730077	M40537	1/4	1/4	1/4	2	C
SD-2	2730624	M40333	2729914	M41333	—	—	5/16	1/4	5/16	2 1/32	C
SD-3L6	2730614	M40335	2729906	M41335	—	—	3/8	1/4	3/8	6 3/8	C
SD-3	2730619	M40334	2729910	M41334	2730072	M40538	3/8	1/4	3/8	2 5/64	C
SD-4	2730609	M40336	2729901	M41336	—	—	7/16	1/4	7/16	2 9/64	C
SD-5	—	—	2729895	M41337	2730067	M40539	1/2	1/4	1/2	2 13/16	C
SD-5L6	2730598	M40338	3046344	M41338	—	—	1/2	1/4	1/2	6 1/2	C
SD-5	2730603	M40337	—	—	—	—	1/2	1/4	1/2	2 13/64	C
SD-6	2730593	M40339	2729885	M41339	2730063	M40540	5/8	1/4	5/8	2 5/16	C
SD-7	2730588	M40340	—	—	—	—	3/4	1/4	3/4	4 7/16	C
SD-7	—	—	2729880	M41340	—	—	3/4	1/4	3/4	2 7/16	C
SD-9	2730583	M40341	2729873	M41341	—	—	1	1/4	1	2 11/16	C



Burs

- Egg shape.
- Shank styles A, B, and C — see page P5 for shank style definitions.



Single Cut



Master Cut



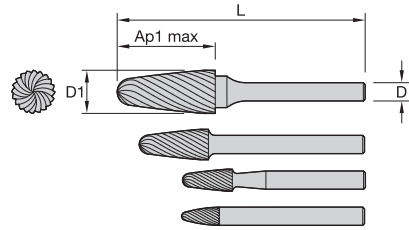
Aluminum Cut

■ Series SE EGG

USCTI Number	Single Cut		Master Cut		Aluminum Cut		D1	D	Ap1 max	length L	shank style
	order #	catalog #	order #	catalog #	order #	catalog #					
SE-41	2730561	M40360	2729835	M41360	-	-	1/8	1/8	7/32	1 1/2	A
SE-53	-	-	2729830	M41361	-	-	3/16	1/8	9/32	1 1/2	A
SE-51	2730551	M40362	2729825	M41362	-	-	1/4	1/8	3/8	1 5/8	B
SE-1	2730544	M40363	2729820	M41363	-	-	1/4	1/4	3/8	2	C
SE-3	-	-	-	-	2730058	M40541	3/8	1/4	5/8	2 3/4	C
SE-3	2730542	M40364	2729814	M41364	-	-	3/8	1/4	5/8	2 3/8	C
SE-5	2730536	M40365	2729808	M41365	2730053	M40542	1/2	1/4	7/8	2 5/8	C
SE-6	-	-	2729803	M41366	2730048	M40543	5/8	1/4	1	2 3/4	C
SE-7	-	-	2729797	M41367	-	-	3/4	1/4	1	2 3/4	C

Burs

- Round nose tree shape.
- Shank styles A, B, and C — see page P5 for shank style definitions.



Single Cut



Master Cut



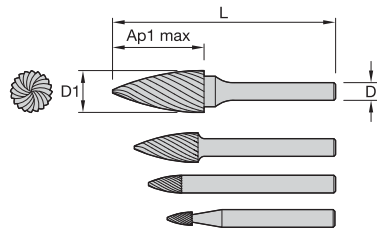
Aluminum Cut

**Series SF Round Nose Tree**

USCTI Number	Single Cut		Master Cut		Aluminum Cut		D1	D	Ap1 max	length L	shank style
	order #	catalog #	order #	catalog #	order #	catalog #					
SF-41	2730511	M40379	2729782	M41379	-	-	1/8	1/8	1/4	1 1/2	A
SF-42	2730506	M40380	2729778	M41380	-	-	1/8	1/8	1/2	1 1/2	A
SF-53	2730501	M40381	3051757	M41381	-	-	3/16	1/8	1/2	1 1/2	A
SF-51	2730495	M40382	2729768	M41382	-	-	1/4	1/8	1/2	1 3/4	B
SF-1	2730491	M40383	1750297	M41383	2730042	M40544	1/4	1/4	5/8	2	C
SF-1L6	2730486	M40384	2729756	M41384	-	-	1/4	1/4	5/8	6	C
SF-3	2730481	M40385	2729751	M41385	2730037	M40545	3/8	1/4	3/4	2 1/2	C
SF-3L6	2730477	M40386	2729746	M41386	-	-	3/8	1/4	3/4	6 3/4	C
SF-4	2730472	M40387	2729741	M41387	-	-	7/16	1/4	1	2 3/4	C
SF-13	2730467	M40388	2729736	M41388	-	-	1/2	1/4	3/4	2 1/2	C
SF-5	2730461	M40389	2729731	M41389	2730032	M40546	1/2	1/4	1	2 3/4	C
SF-5L6	2730456	M40390	2729726	M41390	-	-	1/2	1/4	1	7	C
SF-6	2730451	M40391	2729721	M41391	2730027	M40547	5/8	1/4	1	2 3/4	C
SF-7	-	-	2729716	M41392	-	-	3/4	1/4	1	2 3/4	C
SF-15	-	-	2729711	M41393	-	-	3/4	1/4	1 1/2	3 1/4	C
SF-14	-	-	2729706	M41394	-	-	3/4	1/4	1 1/4	3	C

Burs

- Pointed tree shape.
- Shank styles A, B, and C — see page P5 for shank style definitions.



Single Cut



Master Cut

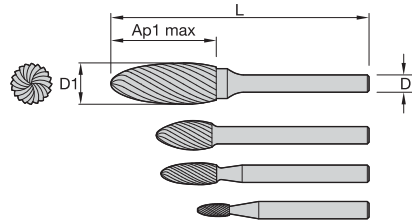
■ Series SG Pointed Tree

USCTI Number	Single Cut		Master Cut		D1	D	Ap1 max	length L	shank style
	order #	catalog #	order #	catalog #					
SG-41	2730399	19M40414-SAV	2729675	M41414	1/8	1/8	1/4	1 1/2	A
SG-42	2730395	M40415	2729669	M41415	1/8	1/8	5/16	1 1/2	A
SG-43	3054754	M40416	2729664	M41416	1/8	1/8	3/8	1 1/2	A
SG-44	2730385	M40417	2729660	M41417	1/8	1/8	1/2	1 1/2	A
SG-53	2730380	M40418	2729656	M41418	3/16	1/8	1/2	1 1/2	A
SG-51	2730375	M40419	2729651	M41419	1/4	1/8	1/2	1 3/4	B
SG-1	2730371	M40420	2729646	M41420	1/4	1/4	5/8	2	C
SG-2	-		2729641	M41421	5/16	1/4	3/4	2 1/2	C
SG-3	2730360	M40422	2729636	M41422	3/8	1/4	3/4	2 1/2	C
SG-13	2730355	M40423	2729631	M41423	1/2	1/4	3/4	2 1/2	C
SG-5	2730350	M40424	2729626	M41424	1/2	1/4	1	2 3/4	C
SG-6	2730345	M40425	2729621	M41425	5/8	1/4	1	2 3/4	C

Burs



- Flame shape.
- Shank styles A and C — see page P5 for shank style definitions.



Single Cut

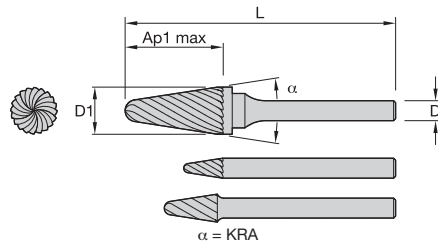


Master Cut

■ Series SH Flame

USCTI Number	Single Cut		Master Cut		D1	D	Ap1 max	length L	shank style
	order #	catalog #	order #	catalog #					
SH-41	2730325	M40446	2729586	M41446	1/8	1/8	1/4	1 1/2	A
SH-53	2730320	M40447	2729581	M41447	3/16	1/8	3/8	1 1/2	A
SH-2	2730315	M40448	2729575	M41448	5/16	1/4	3/4	2 1/2	C
SH-5	2730310	M40449	2729570	M41449	1/2	1/4	1 1/4	3	C
SH-6	2730305	M40450	2729566	M41450	5/8	1/4	1 7/16	3 3/16	C
SH-7	-	-	2729559	M41451	3/4	1/4	1 5/8	3 3/8	C

- Included angle shape.
- Shank styles A and C — see page P5 for shank style definitions.



Single Cut



Master Cut



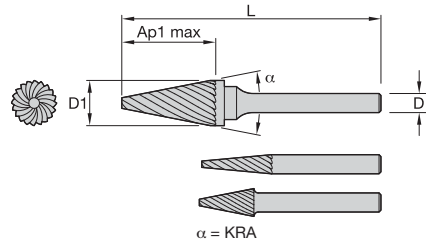
Aluminum Cut

■ Series SL Included Angle

USCTI Number	Single Cut		Master Cut		Aluminum Cut		D1	D	Ap1 max	length L	shank style	KRA
	order #	catalog #	order #	catalog #	order #	catalog #						
SL-41	2730295	M40461	3046345	M41461	-	-	1/8	1/8	3/8	1 1/2	A	8
SL-42	2730290	M40462	2729539	M41462	-	-	1/8	1/8	1/2	1 1/2	A	8
SL-53	2730285	M40463	3052817	M41463	-	-	3/16	1/8	1/2	1 1/2	A	14
SL-1	2730280	M40464	2729529	M41464	-	-	1/4	1/4	5/8	2	C	14
SL-1L6	3046916	M40465	2729523	M41465	-	-	1/4	1/4	5/8	6 5/8	C	14
SL-2	2730270	M40466	1752788	M41466	-	-	5/16	1/4	7/8	2 3/4	C	14
SL-3	2730264	M40467	2729513	M41467	2730022	M40548	3/8	1/4	1 1/16	2 15/16	C	14
SL-3L6	2730259	M40468	2729508	M41468	-	-	3/8	1/4	1 1/16	7 3/16	C	14
SL-4	2730254	M40469	2729503	M41469	2730017	M40549	1/2	1/4	1 1/8	3	C	14
SL-4L6	2730249	M40470	2729498	M41470	-	-	1/2	1/4	1 1/8	7 1/4	C	14
SL-6	2730244	M40471	2729493	M41471	2730012	M40550	5/8	1/4	1 5/16	3 3/16	C	14
SL-7	2730239	M40472	2729488	M41472	-	-	3/4	1/4	1 1/2	3 3/8	C	14

Burs

- Pointed cone shape.
- Shank styles A, B, and C — see page P5 for shank style definitions.



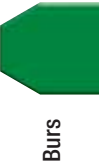
Single Cut



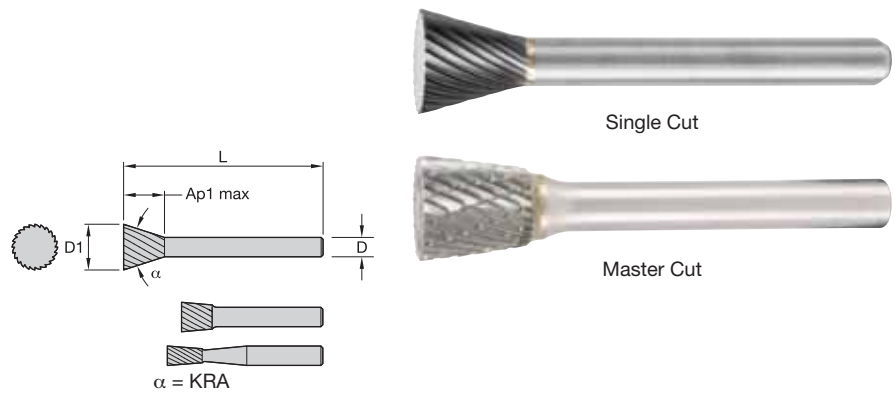
Master Cut

■ Series SM Pointed Cone

USCTI Number	Single Cut		Master Cut		D1	D	Ap1 max	length L	shank style	KRA
	order #	catalog #	order #	catalog #						
SM-41	2730206	M40485	2729447	M41485	1/8	1/8	3/8	1 1/2	A	12
SM-42	2730202	M40486	2729443	M41486	1/8	1/8	7/16	1 1/2	A	14
SM-43	2730196	M40487	2729438	M41487	1/8	1/8	5/8	1 1/2	A	7
SM-53	2730191	M40488	2729433	M41488	3/16	1/8	1/2	1 1/2	A	16
SM-51	2730185	M40489	3050060	M41489	1/4	1/8	1/2	1 7/8	B	22
SM-1	2730179	M40490	2729423	M41490	1/4	1/4	1/2	2	C	22
SM-2	2730174	M40491	2729418	M41491	1/4	1/4	3/4	2	C	14
SM-3	2730169	M40492	2729413	M41492	1/4	1/4	1	2	C	10
SM-4	2730164	M40493	2729407	M41493	3/8	1/4	5/8	2 1/2	C	28
SM-5	2730159	M40494	2729402	M41494	1/2	1/4	7/8	2 3/4	C	28
SM-6	2730154	M40495	2729397	M41495	5/8	1/4	1	2 7/8	C	31



- Inverted taper shape.
- Shank styles A and C — see page P5 for shank style definitions.



■ Series SN Inverted Taper

USCTI Number	Single Cut		Master Cut		D1	D	Ap1 max	length L	shank style	KRA
	order #	catalog #	order #	catalog #						
SN-41	2730119	M40509	-	-	3/32	1/8	3/16	1 1/2	A	10
SN-42	-	-	2729371	M41510	1/8	1/8	3/16	1 1/2	A	10
SN-51	-	-	3051758	M41512	1/4	1/8	1/4	1 1/2	A	10
SN-1	2730100	M40513	2729356	M41513	1/4	1/4	5/16	2	C	10
SN-4	2730095	M40515	-	-	1/2	1/4	1/2	2 1/4	C	28
SN-3	-	-	2729351	M41514	1/2	1/4	1/2	2 1/4	C	16

- Fine master-cut style.
- Cylindrical shape.
- Series IGT has no end cut.
- Series IGT-EC has end cut.
- Solid carbide construction.



Master Cut

### ■ Series IGT Internal Grinding Tool

Master Cut		D1	D	Ap1 max	length L
order #	catalog #				
2735469	M42006	1/16	1/8	1/8	1 1/2
2735464	M42007	5/64	1/8	5/32	1 1/2
2735459	M42008	3/32	1/8	5/32	1 1/2
2735454	M42009	7/64	1/8	3/16	1 1/2
2735449	M42010	1/8	1/8	3/16	1 1/2
2735411	M42019	9/64	3/16	7/32	2
2735406	M42020	5/32	3/16	7/32	2
2735401	M42021	11/64	3/16	1/4	2
2735396	M42022	3/16	3/16	1/4	2
2735443	M42012	7/32	1/4	9/32	2
2735439	M42013	15/64	1/4	5/16	2
2735432	M42014	1/4	1/4	5/16	2
2735427	M42015	9/32	1/4	11/32	2 1/2
2735423	M42016	5/16	1/4	11/32	2 1/2
2735417	M42018	3/8	1/4	3/8	2 1/2

### Series IGT-EC Internal Grinding Tool



Master Cut

### ■ Series IGT-EC Internal Grinding Tool

Master Cut		D1	D	Ap1 max	length L
order #	catalog #				
2735391	M42023	1/16	1/8	1/8	1 1/2
2735386	M42024	5/64	1/8	5/32	1 1/2
2735381	M42025	3/32	1/8	5/32	1 1/2
2735376	M42026	7/64	1/8	3/16	1 1/2
2735371	M42027	1/8	1/8	3/16	1 1/2
2735326	M42036	9/64	3/16	7/32	2
2735320	M42037	5/32	3/16	7/32	2
2735316	M42038	11/64	3/16	1/4	2
2735310	M42039	3/16	3/16	1/4	2
2735366	M42028	13/64	1/4	9/32	2
2735361	M42029	7/32	1/4	9/32	2
2735357	M42030	15/64	1/4	5/16	2
2735352	M42031	1/4	1/4	5/16	2
2735346	M42032	9/32	1/4	11/32	2 1/2
2735341	M42033	5/16	1/4	11/32	2 1/2
2735336	M42034	11/32	1/4	3/8	2 1/2
2735331	M42035	3/8	1/4	3/8	2 1/2

- Shank styles A, B, and C — see page P5 for shank style definitions.
- Assortment of bur styles for multiple applications.
- Most popular inch sizes.



■ Series Bur Sets

order number	catalog number	D1	D	quantity	shank style	cut style	includes
2736246	M40588	1/8	1/8	9	A	Master	SA-42, SA-43, SC-41, SC-42, SD-42, SE-41, SF-42, SG-42, SM-43
2736236	M40591	1/4	1/8	9	B	Master	SA-51, SB-51, SC-51, SD-51, SE-51, SF-51, SG-51, SM-51, SN-51
2736227	M40593	1/4	1/4	8	C	Master	SA-1, SC-1, SD-1, SE-1, SF-1, SG-1, SL-1, SM-2
2736221	M40594	1/2	1/4	8	C	Master	SA-5, SC-5, SD-5, SE-5, SF-5, SG-5, SL-4, SM-5

- Solid carbide construction.
- Multiple flute, 30° left-hand spiral, right-hand cut with diamond cut flutes.
- Straight shank.
- Four end cut styles
  - Series CRTF-N E – no end cut
  - Series CRTF-B E – bur end cut
  - Series CRTF-CC – end mill end cut
  - Series CRTF-DP – drill-point end cut



Master Cut

■ Series CRTF-BE

Master Cut		D1	D	Ap1 max	length L
order #	catalog #				
2737550	M34820	1/16	1/8	3/16	1 1/2
2737545	M34821	1/8	1/8	1/2	1 1/2
2894631	M34822	3/16	3/16	5/8	2
2737540	M34830	3/16	1/4	5/8	2
2737535	M34831	1/4	1/4	3/4	2
2737530	M34832	1/4	1/4	3/4	2 1/2
2737521	M34841	3/8	3/8	1	2 1/2
3045679	M34842	1/2	1/2	1	3

Series CRTF-CC

- Solid carbide construction.
- Multiple flute, 30° left-hand spiral, right-hand cut with diamond cut flutes.
- Straight shank.



Master Cut

■ Series CRTF-CC

Master Cut		D1	D	Ap1 max	length L
order #	catalog #				
2737593	M34792	1/16	1/8	3/16	1 1/2
2737583	M34800	1/8	1/8	1/2	1 1/2
2737573	M34802	1/4	1/4	3/4	2
2737564	M34810	5/16	5/16	1	2 1/2
2737558	M34811	3/8	3/8	1	2 1/2
2737555	M34812	1/2	1/2	1	3

- Solid carbide construction.
- Multiple flute, 30° left-hand spiral, right-hand cut with diamond cut flutes.
- Straight shank.



Master Cut

■ Series CRTF-DP

Master Cut		D1	D	Ap1 max	length L
order #	catalog #				
2737511	M34850	1/16	1/8	3/16	1 1/2
2737506	M34851	1/8	1/8	1/2	1 1/2
2737497	M34860	1/4	1/4	3/4	2
2737492	M34861	1/4	1/4	1	3
2737482	M34870	3/8	3/8	1	2 1/2
2737478	M34871	1/2	1/2	1	3

Series CRTF-NE

- Solid carbide construction.
- Multiple flute, 30° left-hand spiral, right-hand cut with diamond cut flutes.
- Straight shank.



Master Cut

■ Series CRTF-NE

Master Cut		D1	D	Ap1 max	length L
order #	catalog #				
2737455	M34882	1/4	1/4	3/4	2
2737449	M34890	1/4	1/4	1	3
2978031	M34892	3/8	3/8	1	2 1/2
2737438	M34900	1/2	1/2	1	3



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The WIDIA™ Carbide Recycling Program can turn accumulated scrap carbide tooling in your shop into cash.

# Carbide Recycling

## EXTREME CHALLENGES. EXTREME RESULTS.

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It's good for the environment and a responsible way to dispose of scrap carbide.

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- Online forms that make it easy to ship scrap carbide to WIDIA.
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- Cash payment for used carbide tooling.



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**WIDIA** 

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# HydroForce™ HT Chuck



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

HydroForce™ HT Chuck High Torque for High Metal  
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- HydroForce gives you an unmatched combination of accuracy and clamping forces.
- Compact and stable design.
- Advanced hydraulic clamping with lowest runout and superior vibration dampening.
- Balanced quality to lower vibration, especially at high speeds.
- Focused and flexible product offering.

**WIDIA** 



## Holemaking

Holemaking Introduction .....	Q2-Q8
Solid Carbide Drills.....	R1-R139
Modular Drills.....	S1-S51
Indexable Drills .....	T1-T60
Hole Finishing .....	U1-U95

# HOLEMAKING PRODUCTS

## Holemaking Made Easy and Economical

From sturdy, general-purpose solid carbide drills to high-precision fine boring systems, we offer the most comprehensive line of holemaking products available on the market today. If you need unmatched performance and reliability, look no further than our wide range of solid carbide, modular, and indexable drills, and hole finishing products.

### Solid Carbide Drills

- VariDrill™
- TOP DRILL S™ for Steel
- TOP DRILL S™ for Cast Iron
- TOP DRILL S+™
- TOP DRILL S+ 12 x D
- TOP DRILL Deep-Hole Drill
- TOP DRILL G™



### Modular Drills

- TOP DRILL M1™
- Spade Blades





## Indexable Drills

- Top Cut 4™



## Hole Finishing

- Reaming Tools
- ROTAFLEX™ Boring System
- Countersinking Tools



**Added Value for Your Performance**

**Increase of Productivity and Efficiency**

- Material and application-specific solutions.
- Maximum metal removal rates and repeatability.
- Standardized design platforms for special tools based on “proven solutions” for individual optimizations and combination tools.

**Optimized Purchase**

- Broad selection of holemaking tools.
- Integrated into a full range of cutting tools and service offers.
- Onsite service for an efficient development and implementation of machining solutions.

**Control of Total Tooling Costs**

- High tool utilization through material and application-specific solutions.
- Process-safe regrinding service.
- Reduction of stocks through efficient modular concepts.
- Multiple platforms per application to achieve the most cost-efficient solution.

**Select the Correct Holemaking Product Platform for Your Application**

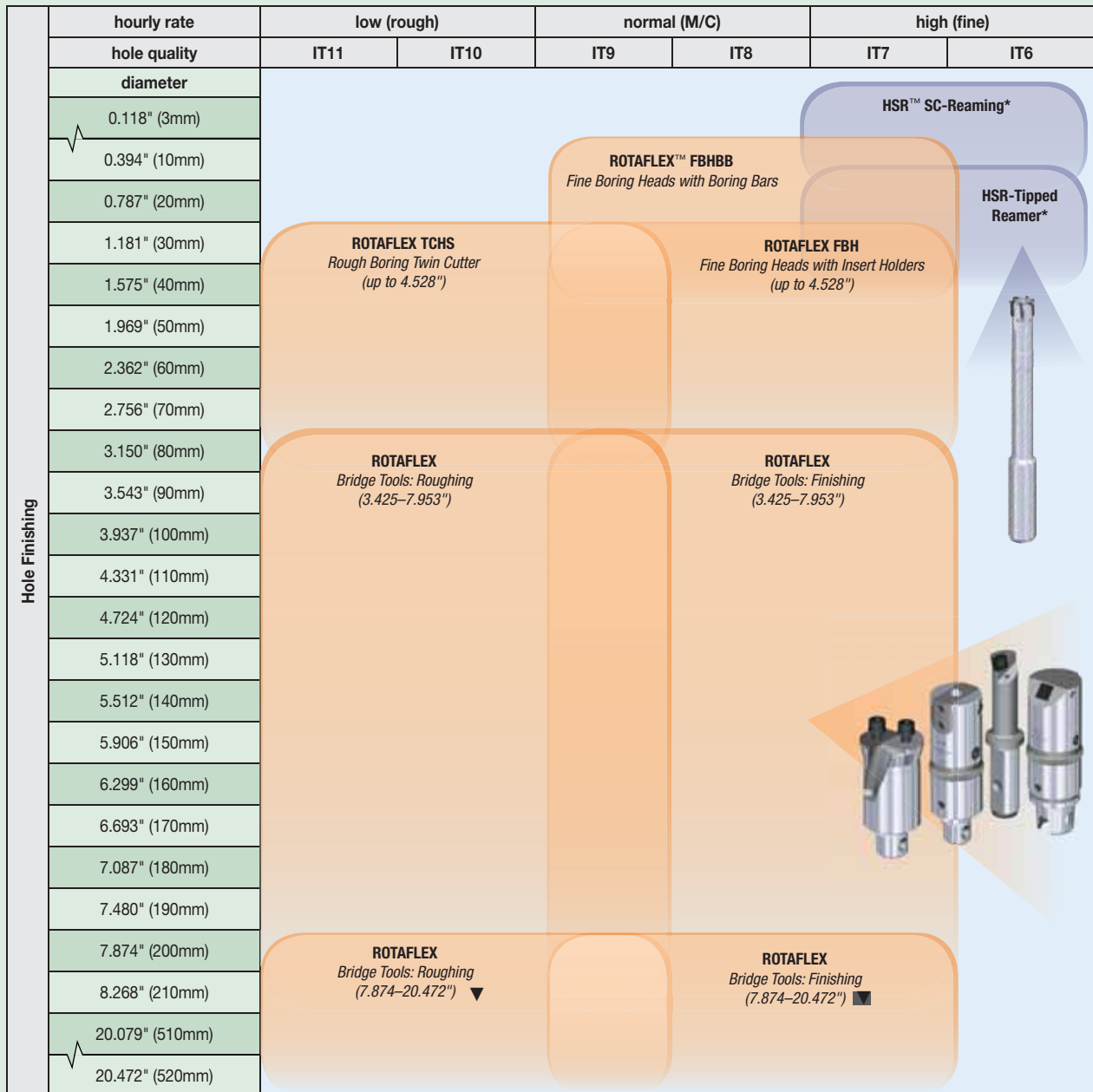
	hourly rate	low (rough)		normal (M/C)		high (fine)	
	hole quality	IT11	IT10	IT9	IT8	IT7	IT6
<b>Solid Drilling</b>	<b>diameter</b>						
	0.118" (3mm)						
	0.236" (6mm)						
	0.354" (9mm)						
	0.472" (12mm)						
	0.591" (15mm)						
	0.709" (18mm)						
	0.827" (21mm)						
	0.945" (24mm)						
	1.063" (27mm)						
	1.181" (30mm)						
	1.299" (33mm)						
	1.417" (36mm)						
	1.535" (39mm)						
	1.654" (42mm)						
	1.772" (45mm)						
	2.283" (58mm)						
	2.008" (51mm)						
	2.126" (54mm)						
	2.244" (57mm)						
2.362" (60mm)							
4.331" (110mm)							



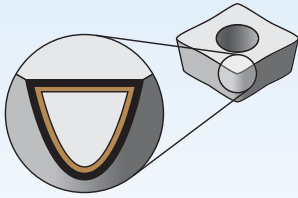
Determine the hole quality and diameter to show the available options and then decide the platform that will best fulfill your requirements.

- Solid Carbide Drills
- Modular Drills
- Indexable Drills
- Precision Hole Finishing
- Reaming

### Select the Correct Holemaking Product Platform for Your Application



\*IT6 is possible above 0.394" (10mm) for both HSR SC-reaming and HSR-tipped reamer in custom solutions.

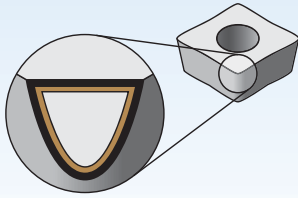


Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45		
Grade	WU25PD	<p><b>Composition:</b> With a multilayered PVD TiN-TiAlN coating and a high-quality submicron carbide substrate, this grade gives a high level of wear resistance at medium to high cutting speeds.</p> <p><b>Application:</b> First choice for high reliability in all materials. This grade should be used at medium to high speeds and feeds. It is a general purpose grade that performs very well for alloyed and high-alloy steel and cast iron, but can also be used with excellent performance in all other material groups.</p>	P											
			M											
			K											
			N											
			S											
Grade	WP20PD	<p><b>Composition:</b> With a multilayered PVD TiN-TiAlN coating, a high-quality submicron carbide substrate and a state-of-the-art surface condition, this grade gives the highest level of wear resistance at high cutting speeds.</p> <p><b>Application:</b> A high productivity grade for high speeds and feeds. First choice for high productivity with excellent reliability in alloyed and high-alloyed steels and cast irons.</p>	P											
			M											
			K											
			N											
			S											
Grade	WK15PD	<p><b>Composition:</b> With a newly developed unique multilayered PVD AlCrN coating and a high-quality submicron carbide substrate, this grade gives the highest level of wear resistance at high cutting speeds.</p> <p><b>Application:</b> This grade offers extraordinary wear resistance in drilling of cast iron materials. With its high hot hardness it allows for high speed machining.</p>	P											
			M											
			K											
			N											
			S											
Grade	WU20PD	<p><b>Composition:</b> With a multilayered PVD TiN-TiAlN coating, a high-quality submicron carbide substrate and a state-of-the-art surface condition, this grade gives the highest level of wear resistance at high cutting speeds.</p> <p><b>Application:</b> First choice for alloyed and high-alloyed steels and cast irons. A state-of-the-art surface condition enables superior chip evacuation even when MQL is applied.</p>	P											
			M											
			K											
			N											
			S											
Grade	WN10HD	<p><b>Composition:</b> This uncoated fine-grain carbide with high hardness offers excellent abrasive wear resistance.</p> <p><b>Application:</b> First choice for precision drilling of non-ferrous materials.</p>	P											
			M											
			K											
			N											
			S											

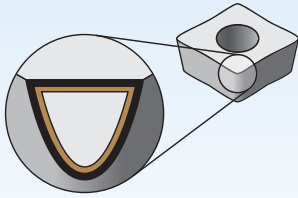


Coatings provide high-speed capability and are engineered for finishing to light roughing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45		
Grade	WU25PD	<p><b>Composition:</b> With a multilayered PVD TiN-TiAlN coating and a high-quality submicron carbide substrate, this grade gives a high level of wear resistance at medium to high cutting speeds.</p> <p><b>Application:</b> First choice for high reliability in most materials. This grade should be used at medium to high speeds and feeds. It is a general purpose grade that performs very well for alloyed and high-alloy steel and cast iron, but can also be used with excellent performance in stainless steels.</p> <p>NOTE: Previously named K20FTiAlN.</p>	<b>P</b>											
			<b>M</b>											
			<b>K</b>											
Grade	WPK10CH	<p><b>Composition:</b> With an advanced CVD TiCN-Al<sub>2</sub>O<sub>3</sub> coating combined with a cobalt-enriched carbide substrate, this grade offers a balanced combination of deformation resistance and edge toughness.</p> <p><b>Application:</b> Offers outstanding abrasion and crater wear resistance for high-speed machining of steels and cast irons. Use for very high cutting speeds with low to medium feed rates.</p>	<b>P</b>											
			<b>M</b>											
			<b>K</b>											
Grade	WU25CH	<p><b>Composition:</b> Advanced CVD TiCN-Al<sub>2</sub>O<sub>3</sub> coating together with a newly engineered tough carbide substrate. Ensures adequate deformation resistance and excellent edge strength and offers very good wear resistance over a wide range of machining conditions.</p> <p><b>Application:</b> A high productivity grade with high speeds and feeds. First choice for high productivity with excellent reliability in steels, stainless steels, and cast iron rates.</p>	<b>P</b>											
			<b>M</b>											
			<b>K</b>											
Grade	WU40PH	<p><b>Composition:</b> With a multilayered PVD TiN-TiAlN coating and a tough substrate, this grade withstands interruptions and provides high wear resistance for long tool life.</p> <p><b>Application:</b> First choice for high reliability in most materials. This grade should be used at medium speeds and high feeds due to sharper edges and as a grade for high-toughness applications. It covers steel, stainless steel, cast iron, and high-temp alloys under certain conditions.</p>	<b>P</b>											
			<b>M</b>											
			<b>K</b>											



Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Coating		Grade Description		05	10	15	20	25	30	35	40	45	
K10F		<p><b>Composition:</b> This uncoated fine-grain carbide with high hardness offers excellent abrasive wear resistance paired with excellent toughness for fine-finishing applications.</p> <p><b>Application:</b> First choice for precision reaming of non-ferrous materials.</p>	P										
			M										
			K										
			N										
			S										
K10F-DCFD		<p><b>Composition:</b> With a PVD TiAlN coating and a fine-grain carbide substrate, this grade offers excellent wear resistance paired with excellent toughness for medium-speed fine-finishing applications.</p> <p><b>Application:</b> First choice for precision reaming of steels, stainless steel, and cast irons.</p>	P										
			M										
			K										
			N										
			S										
CERMETDCFD		<p><b>Composition:</b> With a PVD TiAlN coating and a cermet substrate, this grade offers exceptional wear resistance for high-speed fine-finishing applications.</p> <p><b>Application:</b> First choice for precision reaming of steels and cast irons.</p>	P										
			M										
			K										
			N										
			S										

## NOVO KNOWS SEARCH

Searching for a tool by using the outdated method of a catalog has been replaced with the Advise and Select functions from NOVO™ — saving you time and money.

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### ADVISE

Uses a rules-based approach to provide cutting tool recommendations:

- Define Machining Feature (face milling, slotting, blind hole, etc.)
- Apply Constraint Requirements (geometric, material, tolerance, etc.)
- Set Machining Sequence (single or multi-step operations, rough then finish, etc.)
- Receive Ranked Results

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### SELECT

A method of selecting cutting tools from a tree structure via a hierarchy or parametric search:

- If you know which product you are looking for, a quick search can be performed by just the catalog number or product description.
- Smart filters significantly reduce the amount of potential tooling solutions.
- After the tool is selected, NOVO also provides cutting and adaptive item options that fit with your solution.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift. [widia.com/novo](http://widia.com/novo)



## High-Performance Solid Carbide Drills

Introduction.....	R2-R4
VariDrill.....	R6-R32
TOP DRILL S.....	R34-R63
TOP DRILL S+.....	R64-R86
TOP DRILL S+ 12 x D.....	R88-R93
TOP DRILL Deep-Hole Drills.....	R94-R107
TOP DRILL G.....	R108-R129
Technical Information.....	R132-R139



solid carbide drills for external coolant or dry machining		series	grade	standard						hole tolerance	standard range		
				● first choice ○ alternate choice							diameter range		drilling depth L/D1
				P	M	K	N	S	H		min-max	min-max	
	VariDrill™ multiple-material drilling	VDS20	WU25PD	●	●	●	●	●	○	IT9-IT10	1,0-20,0	.0394-.7874	3 x-5 x
	TOP DRILL S™ for steel application-specific drilling	TDS202	WP20PD	●	○	○	○	○	○	IT9-IT10	3,0-20,0	.1181-.7874	5 x D
	TOP DRILL S for cast iron application-specific drilling	TDS212	WK15PD	○	○	●	○	○	○	IT9-IT10	3,0-20,0	.1181-.7874	5 x D
	TOP DRILL S+™ multiple-application drilling	TDS301	WU25PD	●	○	●	○	○	○	IT9-IT10	3,0-20,0	.1181-.7874	3 x D

solid carbide drills with internal coolant channel		series	grade	standard						hole tolerance	standard range		
				● first choice ○ alternate choice							diameter range		drilling depth L/D1
				P	M	K	N	S	H		min-max	min-max	
	VariDrill multiple-material drilling	VDS40	WU25PD	●	●	●	●	●	○	IT9-IT10	1,0-20,0	.0394-.7874	3 x-8 x
	TOP DRILL S for steel application-specific drilling	TDS40	WP20PD	●	○	○	○	○	○	IT9-IT10	3,0-20,0	.1181-.7874	3 x-8 x
	TOP DRILL S for cast iron application-specific drilling	TDS41	WK15PD	○	○	●	○	○	○	IT9-IT10	3,0-20,0	.1181-.7874	3 x-8 x
	TOP DRILL S+ multiple-application drilling	TDS50	WU25PD	●	○	●	○	○	○	IT9-IT10	3,0-20,0	.1181-.7874	3 x-8 x
	TOP DRILL S+ 12 x D deep-hole drilling without piloting	TDS504	WU20PD	●	●	●	○	○	○	IT9-IT10	3,0-20,0	.1181-.7874	3 x-8 x
	TOP DRILL Deep superior deep-hole drilling	TDD10	WU20PD	●	○	●	○	○	○	IT9-IT10	3,0-20,0	.1181-.5118	15 x- 30 x
	TOP DRILL G™ difficult drilling applications	TDG53	WN10HD	○	○	○	●	○	○	IT8-IT9	3,0-20,0	.1181-.7874	5 x-12 x
	TOP DRILL Flat-Bottom for flat-bottom applications	TDF51	WU20PD	●	○	●	○	○	○	IT9-IT10	-	-	-
			WN15HD	○	○	○	●	○	○	IT9-IT10	-	-	-



custom solution range			<ul style="list-style-type: none"> <li>● standard</li> <li>○ engineered solution capabilities</li> </ul>																page(s)	
diameter range		drilling depth																		
D1 mm	D1 in																			
min-max	min-max																			
1,0–20,0	.0394–1.00		1.5–8 x	●	●			●		●			○	○			○	●	●	○
3,0–25,0	.1181–1.00	1.5–8 x	●	●			●	●		●			○	○	●	○	○	○	○	R36–R41
3,0–25,0	.1181–1.00	1.5–8 x	●	●			●	●		●			○	○	○	●	●	●	○	R36–R41
3,0–25,0	.1181–1.00	1.5–5 x	●	●			●	●		●			○	○	○	●	○	●	●	R66–R69

engineered solution range			<ul style="list-style-type: none"> <li>● standard</li> <li>○ engineered solution capabilities</li> </ul>																page(s)		
diameter range		drilling depth																			
D1 mm	D1 in																				
min-max	min-max																				
1,0–20,0	.0394–1.00		1.5–8 x			●	●	●			●			○	○			○	●	●	○
3,0–25,0	.1181–1.00	1.5–8 x			●	●	●			●			○	●	●	○	○	○	○	○	R42–R59
2,4–20,0	.1181–1.00	1.5–8 x			●	●	●	●		●			○	○		●	●	●	○	○	R42–R59
3,0–25,0	.1181–1.00	1.5–8 x			●	●	●	●		●			○	○	○	●	○	○	○	○	R70–R82
2,4–16,0	.1181–.7874	1.5–12 x			●	●	●	●		●			○	○	○	●	○	○	○	○	R90–R92
3,0–25,0	.0938–.6299	500mm			●	●	●	●		●					○	●	○	○	○	○	R96–R103
3,0–25,0	.1181–1.00	1.5–12 x			●	●	●	●	●	●			○	○	○	●	○	○	○	○	R110–R128
3,0–25,0	.1181–1.00	1.5–8 x			●	●	●	●	●	●		●	●	○	○	○	●	●	●	○	R33
3,0–25,0	.1181–1.00	1.5–8 x			●	●	●	●	●	●		●	●	○	○	○	●	●	●	○	R33

Solid Carbide Drills • Recommendation Chart

		Versatile				Application-Specific			
		General Purpose	General Purpose	Multipurpose	Multipurpose	High-Performance	High-Performance	Deep-Hole Drilling	
		VariDrill™	VariDrill™	Top Drill S+™	Top Drill S+	Top Drill S/G	Top Drill S/G	WIDIA TDS+ WIDIA TDD	
<b>P</b>	Steel	3 x D - VDS201A 3 x D - VDS201F 5 x D - VDS202A 5 x D - VDS202F	3 x D - VDS401A 3 x D - VDS401F 5 x D - VDS402A 5 x D - VDS402F 8 x D - VDS403A 8 x D - VDS403F	3 x D - TDS301A	3 x D - TDS501A 5 x D - TDS502A 8 x D - TDS503A	5 x D - TDS202A	3 x D - TDS401A 5 x D - TDS402A 8 x D - TDS403A	12 x D - TDS504A 15 x D - TDD105Z 20 x D - TDD106Z 25 x D - TDD107Z 30 x D - TDD108Z	
<b>M</b>	Stainless Steel	3 x D - VDS201A 3 x D - VDS201F 5 x D - VDS202A 5 x D - VDS202F	3 x D - VDS401A 3 x D - VDS401F 5 x D - VDS402A 5 x D - VDS402F 8 x D - VDS403A 8 x D - VDS403F	3 x D - TDS301A	3 x D - TDS501A 5 x D - TDS502A 8 x D - TDS503A	-	WIDIA-Rübig™ Series Type WD	12 x D - TDS504A 15 x D - TDD105Z 20 x D - TDD106Z 25 x D - TDD107Z 30 x D - TDD108Z	
<b>K</b>	Cast Iron	3 x D - VDS201A 3 x D - VDS201F 5 x D - VDS202A 5 x D - VDS202F	3 x D - VDS401A 3 x D - VDS401F 5 x D - VDS402A 5 x D - VDS402F 8 x D - VDS403A 8 x D - VDS403F	3 x D - TDS301A	3 x D - TDS501A 5 x D - TDS502A 8 x D - TDS503A	5 x D - TDS212A	3 x D - TDS411A 5 x D - TDS412A 8 x D - TDS413A	12 x D - TDS504A 15 x D - TDD105Z 20 x D - TDD106Z 25 x D - TDD107Z 30 x D - TDD108Z	
<b>N</b>	Non-Ferrous	3 x D - VDS201A 3 x D - VDS201F 5 x D - VDS202A 5 x D - VDS202F	3 x D - VDS401A 3 x D - VDS401F 5 x D - VDS402A 5 x D - VDS402F 8 x D - VDS403A 8 x D - VDS403F	3 x D - TDS301A	3 x D - TDS501A 5 x D - TDS502A 8 x D - TDS503A		5 x D - TDG531A 8 x D - TDG532A 12 x D - TDG533A	TDD* uncoated, sharp	
<b>S</b>	Heat-Resistant Alloys, Titanium Alloys	3 x D - VDS201A 3 x D - VDS201F 5 x D - VDS202A 5 x D - VDS202F	3 x D - VDS401A 3 x D - VDS401F 5 x D - VDS402A 5 x D - VDS402F 8 x D - VDS403A 8 x D - VDS403F	3 x D - TDS301A	3 x D - TDS501A 5 x D - TDS502A 8 x D - TDS503A	-	WIDIA-Rübig Series Type WD	12 x D - TDS504A 15 x D - TDD105Z 20 x D - TDD106Z 25 x D - TDD107Z 30 x D - TDD108Z	
<b>H</b>	Hard Materials	VDS 3 x D - M155	VDS		TDS+				

standard first choice  
alternate choice  
simple special

# Application-Specific Drilling for Steel and Cast Iron



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## Top Drill S™

Top Drill S is the WIDIA line of solid carbide drills engineered to provide maximum performance and superior finish to application-specific tasks in steel and cast iron.

- Victory grades WP20PD™ for steel and WK15PD™ for cast iron are specially designed to resist high heat and wear.
- Lower cost-per-hole and greater productivity due to high MRR and long tool life.
- One of the broadest ranges in the market for diameter selection, length series, and coolant options.

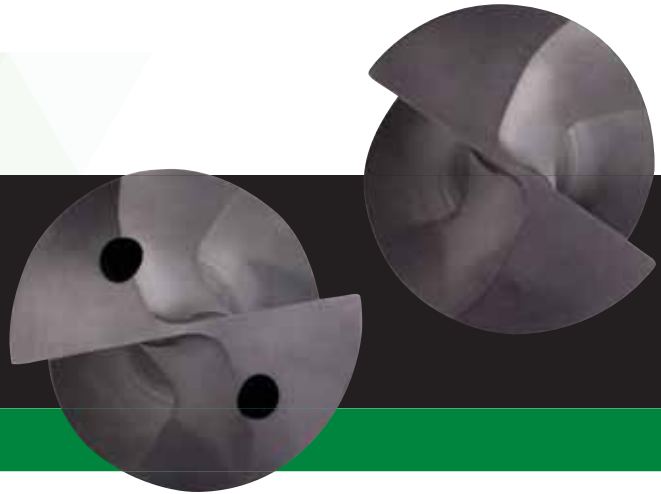
To learn more about the benefits of WIDIA™ Top Drill S, contact your local distributor.

**WIDIA** 

Multiple-Material Drilling •

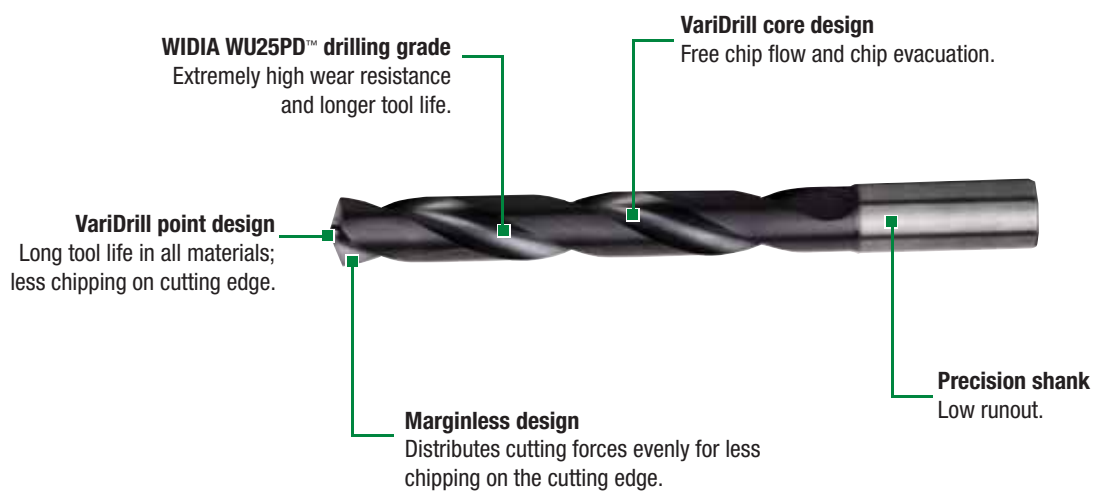
**WIDIA™ VariDrill™**

# VariDrill



The VariDrill advanced-point geometry design offers the ultimate solution for multipurpose drilling operations. It offers dependable tool life in all materials due to less chipping on the cutting edge.

- Reduced chipping on cutting edge means longer tool life.
- Geometry design offers strength and versatility.
- Delivers proper surface finish across multiple materials: steel, stainless steel, cast iron, aluminum, and high-temp alloys.



## Innovative Technology

VariDrill™ is a technologically advanced holemaking solution. These high-performance solid carbide drills were designed in Germany to provide the transportation, aerospace, general engineering, and energy industries with a tool that performs on multiple materials.

## Elegance, Strength, and Versatility

The engineers at WIDIA™ developed an innovative new design to deliver drilling performance. These solid carbide drills have a distinctive geometry and marginless design. The VariDrill point is versatile enough to work through steel, stainless steel, cast iron, aluminum, and a range of high-temp alloys.

## Optimum Hole Quality

The unique marginless design reduces chipping on the tool's edge and stabilizes cutting forces. This unique tool geometry enables chips to roll smoothly and evacuate easily, resulting in noticeably less friction, heat, jamming, and scratching. By minimizing these drilling issues, VariDrill delivers an optimum surface finish with every hole — no matter the material.

## More Options and Longer Tool Life

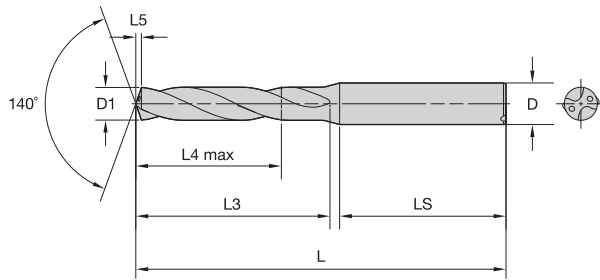
Aside from its uniquely engineered design, VariDrill also offers a broad portfolio of drilling options. With more than 2,200 items, VariDrill offers more choices than any other drill for general engineering operations. And because most drills can be reconditioned, your tools will gain extended life.

*VariDrill — Innovatively designed and technologically advanced.  
Make VariDrill your go-to drill for hole after hole...after hole.*

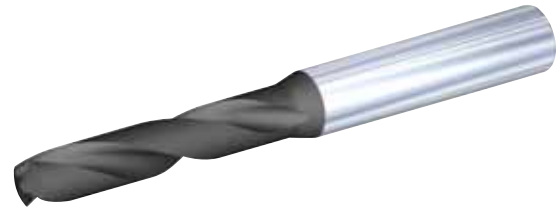


# Solid Carbide Drills

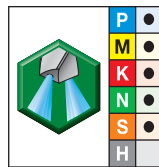
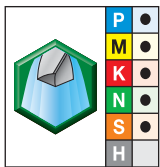
VariDrill™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 3 x D



For information on L, L3, and L4 max, see page R133.



## ■ VDS201A • VDS401A • 3 x D



● first choice  
○ alternate choice

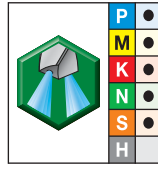
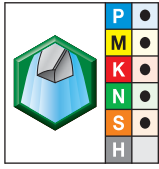
D1 diameter

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4144195	VDS201A01000	-	-	1,000	.0394	-	-	5	7	0,1	58	28	4
4144196	VDS201A01016	-	-	1,016	.0400	-	-	5	7	0,1	58	28	4
4144197	VDS201A01041	-	-	1,041	.0410	-	-	5	7	0,2	58	28	4
4144198	VDS201A01067	-	-	1,067	.0420	-	-	5	7	0,2	58	28	4
4144199	VDS201A01092	-	-	1,092	.0430	-	-	5	7	0,2	58	28	4
4144200	VDS201A01100	-	-	1,100	.0433	-	-	5	7	0,2	58	28	4
4144201	VDS201A01181	-	-	1,181	.0465	-	-	5	7	0,2	58	28	4
4144202	VDS201A01191	-	-	1,191	.0469	-	-	5	7	0,2	58	28	4
4144523	VDS201A01200	-	-	1,200	.0472	-	-	5	7	0,2	58	28	4
4144524	VDS201A01300	-	-	1,300	.0512	-	-	5	7	0,2	58	28	4
4144525	VDS201A01321	-	-	1,321	.0520	-	-	5	7	0,2	58	28	4
4144526	VDS201A01397	-	-	1,397	.0550	-	-	5	7	0,2	58	28	4
4144527	VDS201A01400	-	-	1,400	.0551	-	-	5	7	0,2	58	28	4
4144528	VDS201A01500	4140270	VDS401A01500	1,500	.0591	-	-	6	9	0,2	58	28	4
4144529	VDS201A01600	4140271	VDS401A01600	1,600	.0630	-	-	6	9	0,2	58	28	4
4144530	VDS201A01700	4140272	VDS401A01700	1,700	.0669	-	-	6	9	0,3	58	28	4
4144531	VDS201A01800	4140423	VDS401A01800	1,800	.0709	-	-	6	9	0,3	58	28	4
4144532	VDS201A01900	4140424	VDS401A01900	1,900	.0748	-	-	6	9	0,3	58	28	4
4144533	VDS201A01984	4140425	VDS401A01984	1,984	.0781	-	-	10	13	0,3	58	28	4
4144534	VDS201A02000	4140426	VDS401A02000	2,000	.0787	-	-	10	13	0,3	58	28	4
4144535	VDS201A02100	4140427	VDS401A02100	2,100	.0827	-	-	10	13	0,3	58	28	4
4144536	VDS201A02200	4140428	VDS401A02200	2,200	.0866	-	-	10	13	0,3	58	28	4
4144537	VDS201A02300	4140429	VDS401A02300	2,300	.0906	-	-	10	13	0,4	58	28	4
4144538	VDS201A02383	4140430	VDS401A02383	2,383	.0938	3/32	-	12	17	0,4	58	28	4

(continued)

Solid Carbide Drills

(VDS201A • VDS401A • 3 x D — continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4144539	VDS201A02400	4140431	VDS401A02400	2,400	.0945	—	—	12	17	0,4	58	28	4
4144540	VDS201A02439	4140432	VDS401A02439	2,439	.0960	—	41	12	17	0,4	58	28	4
4144541	VDS201A02489	4140433	VDS401A02489	2,489	.0980	—	40	12	17	0,4	58	28	4
4144542	VDS201A02500	4140434	VDS401A02500	2,500	.0984	—	—	12	17	0,4	58	28	4
4144543	VDS201A02578	4140435	VDS401A02578	2,578	.1015	—	38	12	17	0,4	58	28	4
4144544	VDS201A02600	4140436	VDS401A02600	2,600	.1024	—	—	12	17	0,4	58	28	4
4144545	VDS201A02642	4140437	VDS401A02642	2,642	.1040	—	37	12	17	0,4	58	28	4
4144546	VDS201A02700	4140438	VDS401A02700	2,700	.1063	—	—	12	17	0,4	58	28	4
4144547	VDS201A02705	4140439	VDS401A02705	2,705	.1065	—	36	12	17	0,4	58	28	4
4144548	VDS201A02779	4140440	VDS401A02779	2,779	.1094	7/64	—	12	17	0,4	58	28	4
4144549	VDS201A02800	4140441	VDS401A02800	2,800	.1102	—	—	12	17	0,5	58	28	4
4144550	VDS201A02820	4140442	VDS401A02820	2,820	.1110	—	34	12	17	0,5	58	28	4
4144551	VDS201A02870	4140443	VDS401A02870	2,870	.1130	—	33	12	17	0,5	58	28	4
4144552	VDS201A02900	4140444	VDS401A02900	2,900	.1142	—	—	12	17	0,5	58	28	4
4144553	VDS201A02947	4140445	VDS401A02947	2,947	.1160	—	32	12	17	0,5	58	28	4
4143907	VDS201A03000	4140299	VDS401A03000	3,000	.1181	—	—	14	20	0,5	62	36	6
4143908	VDS201A03048	4140300	VDS401A03048	3,048	.1200	—	31	14	20	0,5	62	36	6
4143909	VDS201A03100	4140301	VDS401A03100	3,100	.1220	—	—	14	20	0,5	62	36	6
4143910	VDS201A03175	4140302	VDS401A03175	3,175	.1250	1/8	—	14	20	0,5	62	36	6
4143911	VDS201A03200	4140303	VDS401A03200	3,200	.1260	—	—	14	20	0,5	62	36	6
4143912	VDS201A03264	4140304	VDS401A03264	3,264	.1285	—	30	14	20	0,5	62	36	6
4143913	VDS201A03300	4140305	VDS401A03300	3,300	.1299	—	—	14	20	0,5	62	36	6
4143914	VDS201A03400	4140306	VDS401A03400	3,400	.1339	—	—	14	20	0,6	62	36	6
4143915	VDS201A03455	4140307	VDS401A03455	3,455	.1360	—	29	14	20	0,6	62	36	6
4143916	VDS201A03500	4140308	VDS401A03500	3,500	.1378	—	—	14	20	0,6	62	36	6
4143917	VDS201A03571	4140309	VDS401A03571	3,571	.1406	9/64	—	14	20	0,6	62	36	6
4143918	VDS201A03600	4140310	VDS401A03600	3,600	.1417	—	—	14	20	0,6	62	36	6
4143919	VDS201A03658	4140311	VDS401A03658	3,658	.1440	—	27	14	20	0,6	62	36	6
4143920	VDS201A03700	4140312	VDS401A03700	3,700	.1457	—	—	14	20	0,6	62	36	6
4143921	VDS201A03734	4140313	VDS401A03734	3,734	.1470	—	26	14	20	0,6	62	36	6
4143922	VDS201A03800	4140314	VDS401A03800	3,800	.1496	—	—	17	24	0,6	66	36	6
4143923	VDS201A03900	4140315	VDS401A03900	3,900	.1535	—	—	17	24	0,6	66	36	6
4143924	VDS201A03970	4140316	VDS401A03970	3,970	.1563	5/32	—	17	24	0,7	66	36	6
4143925	VDS201A04000	4140317	VDS401A04000	4,000	.1575	—	—	17	24	0,7	66	36	6
4143926	VDS201A04039	4140318	VDS401A04039	4,039	.1590	—	21	17	24	0,7	66	36	6
4143927	VDS201A04090	4140319	VDS401A04090	4,090	.1610	—	20	17	24	0,7	66	36	6
4143928	VDS201A04100	4140320	VDS401A04100	4,100	.1614	—	—	17	24	0,7	66	36	6
4143929	VDS201A04200	4140321	VDS401A04200	4,200	.1654	—	—	17	24	0,7	66	36	6
4143930	VDS201A04217	4140322	VDS401A04217	4,217	.1660	—	19	17	24	0,7	66	36	6
4143931	VDS201A04300	4140323	VDS401A04300	4,300	.1693	—	—	17	24	0,7	66	36	6

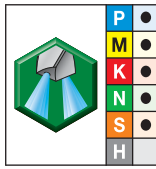
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# Solid Carbide Drills

VariDrill™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 3 x D



(VDS201A • VDS401A • 3 x D — continued)



● first choice  
○ alternate choice

D1 diameter

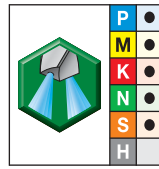
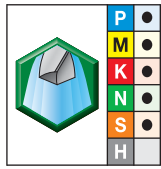
grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4143932	VDS201A04366	4140324	VDS401A04366	4,366	.1719	11/64	—	17	24	0,7	66	36	6
4143933	VDS201A04400	4140325	VDS401A04400	4,400	.1732	—	—	17	24	0,7	66	36	6
4143934	VDS201A04500	4140326	VDS401A04500	4,500	.1772	—	—	17	24	0,7	66	36	6
4143935	VDS201A04600	4140328	VDS401A04600	4,600	.1811	—	—	17	24	0,8	66	36	6
4143936	VDS201A04623	4140329	VDS401A04623	4,623	.1820	—	14	17	24	0,8	66	36	6
4143937	VDS201A04700	4140330	VDS401A04700	4,700	.1850	—	13	17	24	0,8	66	36	6
4143938	VDS201A04763	4140331	VDS401A04763	4,763	.1875	3/16	—	20	28	0,8	66	36	6
4143939	VDS201A04800	4140332	VDS401A04800	4,800	.1890	—	12	20	28	0,8	66	36	6
4143940	VDS201A04852	4140333	VDS401A04852	4,852	.1910	—	11	20	28	0,8	66	36	6
4143941	VDS201A04900	4140334	VDS401A04900	4,900	.1929	—	—	20	28	0,8	66	36	6
4143942	VDS201A05000	4140335	VDS401A05000	5,000	.1969	—	—	20	28	0,8	66	36	6
4143943	VDS201A05100	4140336	VDS401A05100	5,100	.2008	—	—	20	28	0,8	66	36	6
4143944	VDS201A05106	4140337	VDS401A05106	5,106	.2010	—	7	20	28	0,8	66	36	6
4143945	VDS201A05159	4140338	VDS401A05159	5,159	.2031	13/64	—	20	28	0,9	66	36	6
4143946	VDS201A05200	4140339	VDS401A05200	5,200	.2047	—	—	20	28	0,9	66	36	6
4143947	VDS201A05300	4140340	VDS401A05300	5,300	.2087	—	—	20	28	0,9	66	36	6
4143948	VDS201A05400	4140341	VDS401A05400	5,400	.2126	—	—	20	28	0,9	66	36	6
4143949	VDS201A05410	4140342	VDS401A05410	5,410	.2130	—	3	20	28	0,9	66	36	6
4143950	VDS201A05500	4140343	VDS401A05500	5,500	.2165	—	—	20	28	0,9	66	36	6
4143951	VDS201A05558	4140344	VDS401A05558	5,558	.2188	7/32	—	20	28	0,9	66	36	6
4143952	VDS201A05600	4140345	VDS401A05600	5,600	.2205	—	—	20	28	0,9	66	36	6
4143953	VDS201A05616	4140346	VDS401A05616	5,616	.2211	—	2	20	28	0,9	66	36	6
4143954	VDS201A05700	4140347	VDS401A05700	5,700	.2244	—	—	20	28	1,0	66	36	6
4143955	VDS201A05800	4140348	VDS401A05800	5,800	.2283	—	—	20	28	1,0	66	36	6
4143956	VDS201A05900	4140349	VDS401A05900	5,900	.2323	—	—	20	28	1,0	66	36	6
4143957	VDS201A05954	4140350	VDS401A05954	5,954	.2344	15/64	—	20	28	1,0	66	36	6
4143958	VDS201A06000	4140351	VDS401A06000	6,000	.2362	—	—	20	28	1,0	66	36	6
4143959	VDS201A06100	4140352	VDS401A06100	6,100	.2402	—	—	24	34	1,0	79	36	8
4143960	VDS201A06200	4140353	VDS401A06200	6,200	.2441	—	—	24	34	1,0	79	36	8
4143961	VDS201A06300	4140354	VDS401A06300	6,300	.2480	—	—	24	34	1,1	79	36	8
4143962	VDS201A06350	4140355	VDS401A06350	6,350	.2500	1/4	E	24	34	1,1	79	36	8
4143963	VDS201A06400	4140356	VDS401A06400	6,400	.2520	—	—	24	34	1,1	79	36	8
4143964	VDS201A06500	4140357	VDS401A06500	6,500	.2559	—	—	24	34	1,1	79	36	8
4143965	VDS201A06528	4140358	VDS401A06528	6,528	.2570	—	F	24	34	1,1	79	36	8
4143966	VDS201A06600	4140359	VDS401A06600	6,600	.2598	—	—	24	34	1,1	79	36	8
4143967	VDS201A06630	4140360	VDS401A06630	6,630	.2610	—	G	24	34	1,1	79	36	8
4143968	VDS201A06700	4140361	VDS401A06700	6,700	.2638	—	—	24	34	1,1	79	36	8
4143969	VDS201A06746	4140362	VDS401A06746	6,746	.2656	17/64	—	24	34	1,1	79	36	8
4143970	VDS201A06800	4140363	VDS401A06800	6,800	.2677	—	—	24	34	1,1	79	36	8
4143971	VDS201A06900	4140364	VDS401A06900	6,900	.2717	—	—	24	34	1,2	79	36	8

(continued)

Solid Carbide Drills



(VDS201A • VDS401A • 3 x D — continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4143972	VDS201A07000	4140365	VDS401A07000	7,000	.2756	—	—	24	34	1,2	79	36	8
4143973	VDS201A07100	4140366	VDS401A07100	7,100	.2795	—	—	29	41	1,2	79	36	8
4143974	VDS201A07145	4140367	VDS401A07145	7,145	.2813	9/32	—	29	41	1,2	79	36	8
4143975	VDS201A07200	4140368	VDS401A07200	7,200	.2835	—	—	29	41	1,2	79	36	8
4143976	VDS201A07300	4140369	VDS401A07300	7,300	.2874	—	—	29	41	1,2	79	36	8
4143977	VDS201A07400	4140370	VDS401A07400	7,400	.2913	—	—	29	41	1,3	79	36	8
4143978	VDS201A07500	4140371	VDS401A07500	7,500	.2953	—	—	29	41	1,3	79	36	8
4143979	VDS201A07541	4140372	VDS401A07541	7,541	.2969	19/64	—	29	41	1,3	79	36	8
4143980	VDS201A07600	4140373	VDS401A07600	7,600	.2992	—	—	29	41	1,3	79	36	8
4143981	VDS201A07700	4140374	VDS401A07700	7,700	.3031	—	—	29	41	1,3	79	36	8
4143982	VDS201A07800	4140375	VDS401A07800	7,800	.3071	—	—	29	41	1,3	79	36	8
4143983	VDS201A07900	4140376	VDS401A07900	7,900	.3110	—	—	29	41	1,3	79	36	8
4143984	VDS201A07938	4140377	VDS401A07938	7,938	.3125	5/16	—	29	41	1,3	79	36	8
4143985	VDS201A08000	4140378	VDS401A08000	8,000	.3150	—	—	29	41	1,4	79	36	8
4143986	VDS201A08100	4140379	VDS401A08100	8,100	.3189	—	—	35	47	1,4	89	40	10
4143987	VDS201A08200	4140380	VDS401A08200	8,200	.3228	—	—	35	47	1,4	89	40	10
4143988	VDS201A08300	4140381	VDS401A08300	8,300	.3268	—	—	35	47	1,4	89	40	10
4143989	VDS201A08334	4140382	VDS401A08334	8,334	.3281	21/64	—	35	47	1,4	89	40	10
4143990	VDS201A08400	4140383	VDS401A08400	8,400	.3307	—	—	35	47	1,4	89	40	10
4143991	VDS201A08433	4140384	VDS401A08433	8,433	.3320	—	Q	35	47	1,4	89	40	10
4143992	VDS201A08500	4140385	VDS401A08500	8,500	.3346	—	—	35	47	1,4	89	40	10
4143993	VDS201A08600	4140386	VDS401A08600	8,600	.3386	—	—	35	47	1,5	89	40	10
4143994	VDS201A08700	4140387	VDS401A08700	8,700	.3425	—	—	35	47	1,5	89	40	10
4143995	VDS201A08733	4140388	VDS401A08733	8,733	.3438	11/32	—	35	47	1,5	89	40	10
4143996	VDS201A08800	4140389	VDS401A08800	8,800	.3465	—	—	35	47	1,5	89	40	10
4143997	VDS201A08900	4140390	VDS401A08900	8,900	.3504	—	—	35	47	1,5	89	40	10
4143998	VDS201A09000	4140391	VDS401A09000	9,000	.3543	—	—	35	47	1,5	89	40	10
4143999	VDS201A09100	4140392	VDS401A09100	9,100	.3583	—	—	35	47	1,5	89	40	10
4144000	VDS201A09129	4140393	VDS401A09129	9,129	.3594	23/64	—	35	47	1,6	89	40	10
4144001	VDS201A09200	4140394	VDS401A09200	9,200	.3622	—	—	35	47	1,6	89	40	10
4144002	VDS201A09300	4140395	VDS401A09300	9,300	.3661	—	—	35	47	1,6	89	40	10
4144003	VDS201A09347	4140396	VDS401A09347	9,347	.3680	—	U	35	47	1,6	89	40	10
4144004	VDS201A09400	4140397	VDS401A09400	9,400	.3701	—	—	35	47	1,6	89	40	10
4144005	VDS201A09500	4140398	VDS401A09500	9,500	.3740	—	—	35	47	1,6	89	40	10
4144006	VDS201A09525	4140399	VDS401A09525	9,525	.3750	3/8	—	35	47	1,6	89	40	10
4144007	VDS201A09600	4140400	VDS401A09600	9,600	.3780	—	—	35	47	1,6	89	40	10
4144008	VDS201A09700	4140401	VDS401A09700	9,700	.3819	—	—	35	47	1,7	89	40	10
4144009	VDS201A09800	4140402	VDS401A09800	9,800	.3858	—	—	35	47	1,7	89	40	10
4144010	VDS201A09900	4140403	VDS401A09900	9,900	.3898	—	—	35	47	1,7	89	40	10
4144011	VDS201A09921	4140404	VDS401A09921	9,921	.3906	25/64	—	35	47	1,7	89	40	10

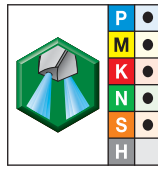
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# Solid Carbide Drills

VariDrill™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 3 x D



(VDS201A • VDS401A • 3 x D — continued)



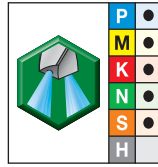
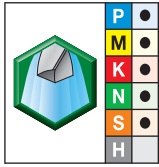
● first choice  
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4144172	VDS201A10000	4140001	VDS401A10000	10,000	.3937	—	—	35	47	1,7	89	40	10
4144423	VDS201A10100	4140002	VDS401A10100	10,100	.3976	—	—	40	55	1,7	102	45	12
4144424	VDS201A10200	4140163	VDS401A10200	10,200	.4016	—	—	40	55	1,7	102	45	12
4144425	VDS201A10300	4140164	VDS401A10300	10,300	.4055	—	—	40	55	1,8	102	45	12
4144426	VDS201A10320	4140165	VDS401A10320	10,320	.4063	13/32	—	40	55	1,8	102	45	12
4144427	VDS201A10400	4140166	VDS401A10400	10,400	.4094	—	—	40	55	1,8	102	45	12
4144428	VDS201A10500	4140167	VDS401A10500	10,500	.4134	—	—	40	55	1,8	102	45	12
4144429	VDS201A10600	4140168	VDS401A10600	10,600	.4173	—	—	40	55	1,8	102	45	12
4144430	VDS201A10700	4140169	VDS401A10700	10,700	.4213	—	—	40	55	1,8	102	45	12
4144431	VDS201A10716	4140170	VDS401A10716	10,716	.4219	27/64	—	40	55	1,8	102	45	12
4144432	VDS201A10800	4140171	VDS401A10800	10,800	.4252	—	—	40	55	1,8	102	45	12
4144433	VDS201A10900	4140172	VDS401A10900	10,900	.4291	—	—	40	55	1,9	102	45	12
4144434	VDS201A11000	4140173	VDS401A11000	11,000	.4331	—	—	40	55	1,9	102	45	12
4144435	VDS201A11100	4140174	VDS401A11100	11,100	.4370	—	—	40	55	1,9	102	45	12
4144436	VDS201A11113	4140175	VDS401A11113	11,113	.4375	7/16	—	40	55	1,9	102	45	12
4144437	VDS201A11200	4140176	VDS401A11200	11,200	.4409	—	—	40	55	1,9	102	45	12
4144438	VDS201A11300	4140177	VDS401A11300	11,300	.4449	—	—	40	55	1,9	102	45	12
4144439	VDS201A11400	4140178	VDS401A11400	11,400	.4488	—	—	40	55	2,0	102	45	12
4144440	VDS201A11500	4140179	VDS401A11500	11,500	.4528	—	—	40	55	2,0	102	45	12
4144441	VDS201A11509	4140180	VDS401A11509	11,509	.4531	29/64	—	40	55	2,0	102	45	12
4144442	VDS201A11600	4140181	VDS401A11600	11,600	.4567	—	—	40	55	2,0	102	45	12
4144443	VDS201A11700	4140182	VDS401A11700	11,700	.4606	—	—	40	55	2,0	102	45	12
4144444	VDS201A11800	4140183	VDS401A11800	11,800	.4646	—	—	40	55	2,0	102	45	12
4144445	VDS201A11900	4140184	VDS401A11900	11,900	.4685	—	—	40	55	2,0	102	45	12
4144446	VDS201A11908	4140185	VDS401A11908	11,908	.4688	15/32	—	40	55	2,0	102	45	12
4144447	VDS201A12000	4140186	VDS401A12000	12,000	.4724	—	—	40	55	2,1	102	45	12
4144448	VDS201A12100	4140187	VDS401A12100	12,100	.4764	—	—	43	60	2,1	107	45	14
4144449	VDS201A12200	4140188	VDS401A12200	12,200	.4803	—	—	43	60	2,1	107	45	14
4144450	VDS201A12300	4140189	VDS401A12300	12,300	.4843	—	—	43	60	2,1	107	45	14
4144451	VDS201A12304	4140190	VDS401A12304	12,304	.4844	31/64	—	43	60	2,1	107	45	14
4144452	VDS201A12400	4140191	VDS401A12400	12,400	.4882	—	—	43	60	2,1	107	45	14
4144453	VDS201A12500	4140192	VDS401A12500	12,500	.4921	—	—	43	60	2,1	107	45	14
4144454	VDS201A12600	4140194	VDS401A12600	12,600	.4961	—	—	43	60	2,2	107	45	14
4144455	VDS201A12700	4140195	VDS401A12700	12,700	.5000	1/2	—	43	60	2,2	107	45	14
4144456	VDS201A12800	4140196	VDS401A12800	12,800	.5039	—	—	43	60	2,2	107	45	14
4144457	VDS201A12900	4140197	VDS401A12900	12,900	.5079	—	—	43	60	2,2	107	45	14
4144458	VDS201A13000	4140198	VDS401A13000	13,000	.5118	—	—	43	60	2,2	107	45	14
4144459	VDS201A13096	4140199	VDS401A13096	13,096	.5156	33/64	—	43	60	2,3	107	45	14
4144460	VDS201A13100	4140200	VDS401A13100	13,100	.5157	—	—	43	60	2,3	107	45	14
4144461	VDS201A13200	4140201	VDS401A13200	13,200	.5197	—	—	43	60	2,3	107	45	14

(continued)

Solid Carbide Drills

(VDS201A • VDS401A • 3 x D — continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L4 max	L3	L5	L	LS	D
4144462	VDS201A13300	4140202	VDS401A13300	13,300	.5236	—	—	43	60	2,3	107	45	14
4144463	VDS201A13400	4140203	VDS401A13400	13,400	.5276	—	—	43	60	2,3	107	45	14
4144464	VDS201A13500	4140204	VDS401A13500	13,500	.5315	—	—	43	60	2,3	107	45	14
4144465	VDS201A13600	4140205	VDS401A13600	13,600	.5354	—	—	43	60	2,3	107	45	14
4144466	VDS201A13700	4140206	VDS401A13700	13,700	.5394	—	—	43	60	2,4	107	45	14
4144467	VDS201A13800	4140207	VDS401A13800	13,800	.5433	—	—	43	60	2,4	107	45	14
4144468	VDS201A13891	4140208	VDS401A13891	13,891	.5469	35/64	—	43	60	2,4	107	45	14
4144469	VDS201A13900	4140209	VDS401A13900	13,900	.5472	—	—	43	60	2,4	107	45	14
4144470	VDS201A14000	4140210	VDS401A14000	14,000	.5512	—	—	43	60	2,4	107	45	14
4144471	VDS201A14100	4140211	VDS401A14100	14,100	.5551	—	—	45	65	2,4	115	48	16
4144472	VDS201A14200	4140212	VDS401A14200	14,200	.5591	—	—	45	65	2,5	115	48	16
4144473	VDS201A14288	4140213	VDS401A14288	14,288	.5625	9/16	—	45	65	2,5	115	48	16
4144474	VDS201A14300	4140214	VDS401A14300	14,300	.5630	—	—	45	65	2,5	115	48	16
4144475	VDS201A14400	4140215	VDS401A14400	14,400	.5669	—	—	45	65	2,5	115	48	16
4144476	VDS201A14500	4140216	VDS401A14500	14,500	.5709	—	—	45	65	2,5	115	48	16
4144477	VDS201A14600	4140217	VDS401A14600	14,600	.5748	—	—	45	65	2,5	115	48	16
4144478	VDS201A14684	4140218	VDS401A14684	14,684	.5781	37/64	—	45	65	2,5	115	48	16
4144479	VDS201A14700	4140219	VDS401A14700	14,700	.5787	—	—	45	65	2,5	115	48	16
4144480	VDS201A14800	4140220	VDS401A14800	14,800	.5827	—	—	45	65	2,6	115	48	16
4144481	VDS201A14900	4140221	VDS401A14900	14,900	.5866	—	—	45	65	2,6	115	48	16
4144482	VDS201A15000	4140222	VDS401A15000	15,000	.5906	—	—	45	65	2,6	115	48	16
4144483	VDS201A15083	4140223	VDS401A15083	15,083	.5938	19/32	—	45	65	2,6	115	48	16
4144484	VDS201A15100	4140224	VDS401A15100	15,100	.5945	—	—	45	65	2,6	115	48	16
4144485	VDS201A15200	4140225	VDS401A15200	15,200	.5984	—	—	45	65	2,6	115	48	16
4144486	VDS201A15300	4140226	VDS401A15300	15,300	.6024	—	—	45	65	2,6	115	48	16
4144487	VDS201A15400	4140227	VDS401A15400	15,400	.6063	—	—	45	65	2,7	115	48	16
4144488	VDS201A15479	4140228	VDS401A15479	15,479	.6094	39/64	—	45	65	2,7	115	48	16
4144489	VDS201A15500	4140229	VDS401A15500	15,500	.6102	—	—	45	65	2,7	115	48	16
4144490	VDS201A15600	4140230	VDS401A15600	15,600	.6142	—	—	45	65	2,7	115	48	16
4144491	VDS201A15700	4140231	VDS401A15700	15,700	.6181	—	—	45	65	2,7	115	48	16
4144492	VDS201A15800	4140232	VDS401A15800	15,800	.6220	—	—	45	65	2,7	115	48	16
4144493	VDS201A15875	4140233	VDS401A15875	15,875	.6250	5/8	—	45	65	2,7	115	48	16
4144494	VDS201A15900	4140234	VDS401A15900	15,900	.6260	—	—	45	65	2,8	115	48	16
4144495	VDS201A16000	4140235	VDS401A16000	16,000	.6299	—	—	45	65	2,8	115	48	16
4144496	VDS201A16100	4140236	VDS401A16100	16,100	.6339	—	—	51	73	2,8	123	48	18
4144497	VDS201A16200	4140237	VDS401A16200	16,200	.6378	—	—	51	73	2,8	123	48	18
4144498	VDS201A16271	4140238	VDS401A16271	16,271	.6406	41/64	—	51	73	2,8	123	48	18
4144499	VDS201A16300	4140239	VDS401A16300	16,300	.6417	—	—	51	73	2,8	123	48	18
4144500	VDS201A16400	4140241	VDS401A16400	16,400	.6457	—	—	51	73	2,8	123	48	18
4144501	VDS201A16500	4140242	VDS401A16500	16,500	.6496	—	—	51	73	2,9	123	48	18

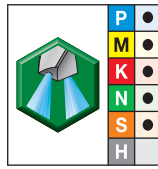
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# Solid Carbide Drills

VariDrill™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 3 x D



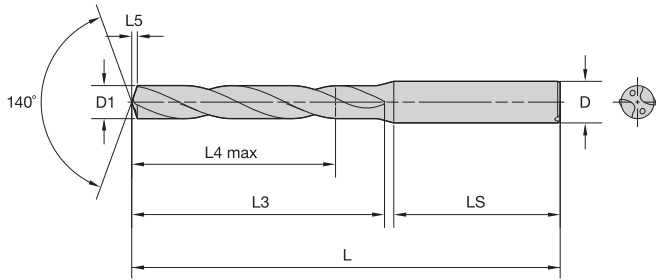
(VDS201A • VDS401A • 3 x D — continued)



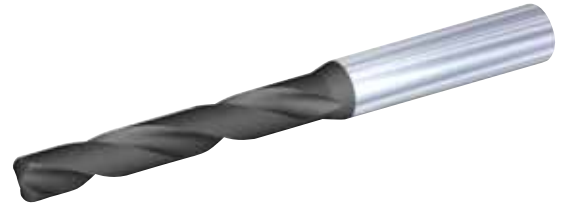
● first choice  
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4144503	VDS201A16600	4140243	VDS401A16600	16,600	.6535	—	—	51	73	2,9	123	48	18
4144504	VDS201A16670	4140244	VDS401A16670	16,670	.6563	21/32	—	51	73	2,9	123	48	18
4144505	VDS201A16700	4140245	VDS401A16700	16,700	.6575	—	—	51	73	2,9	123	48	18
4144506	VDS201A16800	4140246	VDS401A16800	16,800	.6614	—	—	51	73	2,9	123	48	18
4144507	VDS201A16900	4140247	VDS401A16900	16,900	.6654	—	—	51	73	2,9	123	48	18
4144508	VDS201A17000	4140248	VDS401A17000	17,000	.6693	—	—	51	73	2,9	123	48	18
4144509	VDS201A17100	4140249	VDS401A17100	17,100	.6732	—	—	51	73	3,0	123	48	18
4144510	VDS201A17200	4140250	VDS401A17200	17,200	.6772	—	—	51	73	3,0	123	48	18
4144511	VDS201A17300	4140251	VDS401A17300	17,300	.6811	—	—	51	73	3,0	123	48	18
4144512	VDS201A17400	4140252	VDS401A17400	17,400	.6850	—	—	51	73	3,0	123	48	18
4144513	VDS201A17463	4140253	VDS401A17463	17,463	.6875	11/16	—	51	73	3,0	123	48	18
4144514	VDS201A17500	4140254	VDS401A17500	17,500	.6890	—	—	51	73	3,0	123	48	18
4144515	VDS201A17600	4140255	VDS401A17600	17,600	.6929	—	—	51	73	3,1	123	48	18
4144516	VDS201A17700	4140256	VDS401A17700	17,700	.6969	—	—	51	73	3,1	123	48	18
4144517	VDS201A17800	4140257	VDS401A17800	17,800	.7008	—	—	51	73	3,1	123	48	18
4144518	VDS201A17859	4140258	VDS401A17859	17,859	.7031	45/64	—	51	73	3,1	123	48	18
4144519	VDS201A17900	4140259	VDS401A17900	17,900	.7047	—	—	51	73	3,1	123	48	18
4144590	VDS201A18000	4140449	VDS401A18000	18,000	.7087	—	—	51	73	3,1	123	48	18
4144591	VDS201A18100	4140450	VDS401A18100	18,100	.7126	—	—	55	79	3,1	131	50	20
4144592	VDS201A18200	4140451	VDS401A18200	18,200	.7165	—	—	55	79	3,2	131	50	20
4144593	VDS201A18258	4140452	VDS401A18258	18,258	.7188	23/32	—	55	79	3,2	131	50	20
4144594	VDS201A18300	4140463	VDS401A18300	18,300	.7205	—	—	55	79	3,2	131	50	20
4144595	VDS201A18400	4140464	VDS401A18400	18,400	.7244	—	—	55	79	3,2	131	50	20
4144596	VDS201A18500	4140465	VDS401A18500	18,500	.7283	—	—	55	79	3,2	131	50	20
4144597	VDS201A18600	4140466	VDS401A18600	18,600	.7323	—	—	55	79	3,2	131	50	20
4144598	VDS201A18654	4140467	VDS401A18654	18,654	.7344	47/64	—	55	79	3,2	131	50	20
4144599	VDS201A18700	4140468	VDS401A18700	18,700	.7362	—	—	55	79	3,2	131	50	20
4144600	VDS201A18800	4140469	VDS401A18800	18,800	.7402	—	—	55	79	3,3	131	50	20
4144601	VDS201A18900	4140470	VDS401A18900	18,900	.7441	—	—	55	79	3,3	131	50	20
4144602	VDS201A19000	4140471	VDS401A19000	19,000	.7480	—	—	55	79	3,3	131	50	20
4144603	VDS201A19050	4140472	VDS401A19050	19,050	.7500	3/4	—	55	79	3,3	131	50	20
4144604	VDS201A19100	4140473	VDS401A19100	19,100	.7520	—	—	55	79	3,3	131	50	20
4144605	VDS201A19200	4140474	VDS401A19200	19,200	.7559	—	—	55	79	3,3	131	50	20
4144606	VDS201A19300	4140475	VDS401A19300	19,300	.7598	—	—	55	79	3,4	131	50	20
4144607	VDS201A19400	4140476	VDS401A19400	19,400	.7638	—	—	55	79	3,4	131	50	20
4144608	VDS201A19500	4140477	VDS401A19500	19,500	.7677	—	—	55	79	3,4	131	50	20
4144609	VDS201A19600	4140478	VDS401A19600	19,600	.7717	—	—	55	79	3,4	131	50	20
4144610	VDS201A19700	4140479	VDS401A19700	19,700	.7756	—	—	55	79	3,4	131	50	20
4144611	VDS201A19800	4140480	VDS401A19800	19,800	.7795	—	—	55	79	3,4	131	50	20
4144612	VDS201A19900	4140481	VDS401A19900	19,900	.7835	—	—	55	79	3,5	131	50	20
4144613	VDS201A20000	4140482	VDS401A20000	20,000	.7874	—	—	55	79	3,5	131	50	20

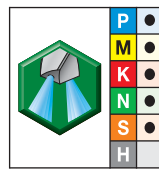
Solid Carbide Drills



For information on L, L3, and L4 max, see page R133.



■ VDS202A • VDS402A • 5 x D



● first choice  
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4148000	VDS202A01000	-	-	1,000	.0394	-	-	6	9	0,1	58	28	4
4148001	VDS202A01016	-	-	1,016	.0400	-	-	6	9	0,1	58	28	4
4148002	VDS202A01041	-	-	1,041	.0410	-	-	6	9	0,2	58	28	4
4148003	VDS202A01067	-	-	1,067	.0420	-	-	6	9	0,2	58	28	4
4148004	VDS202A01092	-	-	1,092	.0430	-	-	6	9	0,2	58	28	4
4148005	VDS202A01100	-	-	1,100	.0433	-	-	6	9	0,2	58	28	4
4148006	VDS202A01181	-	-	1,181	.0465	-	-	6	9	0,2	58	28	4
4148007	VDS202A01191	-	-	1,191	.0469	-	-	6	9	0,2	58	28	4
4148008	VDS202A01200	-	-	1,200	.0472	-	-	6	9	0,2	58	28	4
4148009	VDS202A01300	-	-	1,300	.0512	-	-	6	9	0,2	58	28	4
4148010	VDS202A01321	-	-	1,321	.0520	-	-	6	9	0,2	58	28	4
4148011	VDS202A01397	-	-	1,397	.0550	-	-	6	9	0,2	58	28	4
4148012	VDS202A01400	-	-	1,400	.0551	-	-	6	9	0,2	58	28	4
4148013	VDS202A01500	4142871	VDS402A01500	1,500	.0591	-	-	9	12	0,2	58	40	4
4148014	VDS202A01600	4142884	VDS402A01600	1,600	.0630	-	-	9	12	0,2	58	28	4
4148015	VDS202A01700	4142887	VDS402A01700	1,700	.0669	-	-	9	12	0,3	58	28	4
4148016	VDS202A01800	4142890	VDS402A01800	1,800	.0709	-	-	9	12	0,3	58	28	4
4148017	VDS202A01900	4142893	VDS402A01900	1,900	.0748	-	-	9	12	0,3	58	28	4
4148018	VDS202A01984	4142896	VDS402A01984	1,984	.0781	-	-	14	18	0,3	58	28	4
4148019	VDS202A02000	4142899	VDS402A02000	2,000	.0787	-	-	14	18	0,3	58	28	4
4148020	VDS202A02100	4142902	VDS402A02100	2,100	.0827	-	-	14	18	0,3	58	28	4
4148021	VDS202A02200	4142905	VDS402A02200	2,200	.0866	-	-	14	18	0,3	58	28	4
4148022	VDS202A02300	4142908	VDS402A02300	2,300	.0906	-	-	14	18	0,4	58	28	4
4148023	VDS202A02383	4142911	VDS402A02383	2,383	.0938	3/32	-	17	22	0,4	58	28	4

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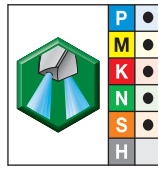
Solid Carbide Drills

# Solid Carbide Drills

VariDrill™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 5 x D



(VDS202A • VDS402A • 5 x D — continued)



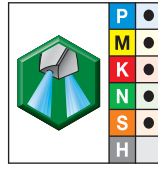
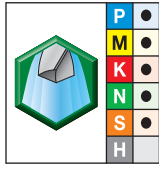
● first choice  
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4148024	VDS202A02400	4142924	VDS402A02400	2,400	.0945	—	—	17	22	0,4	58	28	4
4148025	VDS202A02439	4142927	VDS402A02439	2,439	.0960	—	41	17	22	0,4	58	28	4
4148026	VDS202A02489	4142930	VDS402A02489	2,489	.0980	—	40	17	22	0,4	58	28	4
4148027	VDS202A02500	4142933	VDS402A02500	2,500	.0984	—	—	17	22	0,4	58	28	4
4148028	VDS202A02578	4142936	VDS402A02578	2,578	.1015	—	38	17	22	0,4	58	28	4
4148029	VDS202A02600	4142939	VDS402A02600	2,600	.1024	—	—	17	22	0,4	58	28	4
4148030	VDS202A02642	4142942	VDS402A02642	2,642	.1040	—	37	17	22	0,4	58	28	4
4148031	VDS202A02700	4142945	VDS402A02700	2,700	.1063	—	—	17	22	0,4	58	28	4
4148032	VDS202A02705	4142948	VDS402A02705	2,705	.1065	—	36	17	22	0,4	58	28	4
4148033	VDS202A02779	4142951	VDS402A02779	2,779	.1094	7/64	—	17	22	0,4	58	28	4
4148034	VDS202A02800	4142964	VDS402A02800	2,800	.1102	—	—	17	22	0,5	58	28	4
4148035	VDS202A02820	4142967	VDS402A02820	2,820	.1110	—	34	17	22	0,5	58	28	4
4148036	VDS202A02870	4142970	VDS402A02870	2,870	.1130	—	33	17	22	0,5	58	28	4
4148037	VDS202A02900	4142973	VDS402A02900	2,900	.1142	—	—	17	22	0,5	58	28	4
4148038	VDS202A02947	4142976	VDS402A02947	2,947	.1160	—	32	17	22	0,5	58	28	4
4148142	VDS202A03000	4142844	VDS402A03000	3,000	.1181	—	—	23	28	0,5	66	36	6
4148143	VDS202A03048	4142846	VDS402A03048	3,048	.1200	—	31	23	28	0,5	66	36	6
4148144	VDS202A03100	4142847	VDS402A03100	3,100	.1220	—	—	23	28	0,5	66	36	6
4148145	VDS202A03175	4142849	VDS402A03175	3,175	.1250	1/8	—	23	28	0,5	66	36	6
4148146	VDS202A03200	4142851	VDS402A03200	3,200	.1260	—	—	23	28	0,5	66	36	6
4148147	VDS202A03264	4142864	VDS402A03264	3,264	.1285	—	30	23	28	0,5	66	36	6
4148148	VDS202A03300	4142865	VDS402A03300	3,300	.1299	—	—	23	28	0,5	66	36	6
4148149	VDS202A03400	4142867	VDS402A03400	3,400	.1339	—	—	23	28	0,6	66	36	6
4148150	VDS202A03455	4142869	VDS402A03455	3,455	.1360	—	29	23	28	0,6	66	36	6
4148151	VDS202A03500	4142872	VDS402A03500	3,500	.1378	—	—	23	28	0,6	66	36	6
4148152	VDS202A03571	4142885	VDS402A03571	3,571	.1406	9/64	—	23	28	0,6	66	36	6
4148153	VDS202A03600	4142888	VDS402A03600	3,600	.1417	—	—	23	28	0,6	66	36	6
4148154	VDS202A03658	4142891	VDS402A03658	3,658	.1440	—	27	23	28	0,6	66	36	6
4148155	VDS202A03700	4142894	VDS402A03700	3,700	.1457	—	—	23	28	0,6	66	36	6
4148156	VDS202A03734	4142897	VDS402A03734	3,734	.1470	—	26	23	28	0,6	66	36	6
4148157	VDS202A03800	4142900	VDS402A03800	3,800	.1496	—	—	29	36	0,6	74	36	6
4148158	VDS202A03900	4142903	VDS402A03900	3,900	.1535	—	—	29	36	0,6	74	36	6
4148159	VDS202A03970	4142906	VDS402A03970	3,970	.1563	5/32	—	29	36	0,7	74	36	6
4148160	VDS202A04000	4142909	VDS402A04000	4,000	.1575	—	—	29	36	0,7	74	36	6
4148161	VDS202A04039	4142912	VDS402A04039	4,039	.1590	—	21	29	36	0,7	74	36	6
4148162	VDS202A04090	4142925	VDS402A04090	4,090	.1610	—	20	29	36	0,7	74	36	6
4148163	VDS202A04100	4142928	VDS402A04100	4,100	.1614	—	—	29	36	0,7	74	36	6
4148164	VDS202A04200	4142931	VDS402A04200	4,200	.1654	—	—	29	36	0,7	74	36	6
4148165	VDS202A04217	4142934	VDS402A04217	4,217	.1660	—	19	29	36	0,7	74	36	6
4148166	VDS202A04300	4142937	VDS402A04300	4,300	.1693	—	—	29	36	0,7	74	36	6

(continued)

Solid Carbide Drills

(VDS202A • VDS402A • 5 x D — continued)



● first choice  
○ alternate choice

D1 diameter

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4148167	VDS202A04366	4142940	VDS402A04366	4,366	.1719	11/64	—	29	36	0,7	74	36	6
4148168	VDS202A04400	4142943	VDS402A04400	4,400	.1732	—	—	29	36	0,7	74	36	6
4148169	VDS202A04500	4142946	VDS402A04500	4,500	.1772	—	—	29	36	0,7	74	36	6
4148170	VDS202A04600	4142949	VDS402A04600	4,600	.1811	—	—	29	36	0,8	74	36	6
4148171	VDS202A04623	4142952	VDS402A04623	4,623	.1820	—	14	29	36	0,8	74	36	6
4148172	VDS202A04700	4142965	VDS402A04700	4,700	.1850	—	13	29	36	0,8	74	36	6
4148173	VDS202A04763	4142968	VDS402A04763	4,763	.1875	3/16	—	35	44	0,8	82	36	6
4148174	VDS202A04800	4142971	VDS402A04800	4,800	.1890	—	12	35	44	0,8	82	36	6
4148175	VDS202A04852	4142974	VDS402A04852	4,852	.1910	—	11	35	44	0,8	82	36	6
4148176	VDS202A04900	4142977	VDS402A04900	4,900	.1929	—	—	35	44	0,8	82	36	6
4148177	VDS202A05000	4142979	VDS402A05000	5,000	.1969	—	—	35	44	0,8	82	36	6
4148178	VDS202A05100	4142981	VDS402A05100	5,100	.2008	—	—	35	44	0,8	82	36	6
4148179	VDS202A05106	4142994	VDS402A05106	5,106	.2010	—	7	35	44	0,8	82	36	6
4148180	VDS202A05159	4142996	VDS402A05159	5,159	.2031	13/64	—	35	44	0,9	82	36	6
4148181	VDS202A05200	4142997	VDS402A05200	5,200	.2047	—	—	35	44	0,9	82	36	6
4148182	VDS202A05300	4142999	VDS402A05300	5,300	.2087	—	—	35	44	0,9	82	36	6
4148183	VDS202A05400	4143000	VDS402A05400	5,400	.2126	—	—	35	44	0,9	82	36	6
4148184	VDS202A05410	4143001	VDS402A05410	5,410	.2130	—	3	35	44	0,9	82	36	6
4148185	VDS202A05500	4143002	VDS402A05500	5,500	.2165	—	—	35	44	0,9	82	36	6
4148186	VDS202A05558	4143003	VDS402A05558	5,558	.2188	7/32	—	35	44	0,9	82	36	6
4148187	VDS202A05600	4143004	VDS402A05600	5,600	.2205	—	—	35	44	0,9	82	36	6
4148188	VDS202A05616	4143005	VDS402A05616	5,616	.2211	—	2	35	44	0,9	82	36	6
4148189	VDS202A05700	4143006	VDS402A05700	5,700	.2244	—	—	35	44	1,0	82	36	6
4148190	VDS202A05800	4143007	VDS402A05800	5,800	.2283	—	—	35	44	1,0	82	36	6
4148191	VDS202A05900	4143008	VDS402A05900	5,900	.2323	—	—	35	44	1,0	82	36	6
4148192	VDS202A05954	4143009	VDS402A05954	5,954	.2344	15/64	—	35	44	1,0	82	36	6
4148193	VDS202A06000	4143010	VDS402A06000	6,000	.2362	—	—	35	44	1,0	82	36	6
4148194	VDS202A06100	4143011	VDS402A06100	6,100	.2402	—	—	43	53	1,0	91	36	8
4148195	VDS202A06200	4143012	VDS402A06200	6,200	.2441	—	—	43	53	1,0	91	36	8
4148196	VDS202A06300	4143023	VDS402A06300	6,300	.2480	—	—	43	53	1,1	91	36	8
4148197	VDS202A06350	4143024	VDS402A06350	6,350	.2500	1/4	E	43	53	1,1	91	36	8
4148198	VDS202A06400	4143025	VDS402A06400	6,400	.2520	—	—	43	53	1,1	91	36	8
4148199	VDS202A06500	4143026	VDS402A06500	6,500	.2559	—	—	43	53	1,1	91	36	8
4148200	VDS202A06528	4143027	VDS402A06528	6,528	.2570	—	F	43	53	1,1	91	36	8
4148201	VDS202A06600	4143028	VDS402A06600	6,600	.2598	—	—	43	53	1,1	91	36	8
4148202	VDS202A06630	4143029	VDS402A06630	6,630	.2610	—	G	43	53	1,1	91	36	8
4148203	VDS202A06700	4143030	VDS402A06700	6,700	.2638	—	—	43	53	1,1	91	36	8
4148204	VDS202A06746	4143031	VDS402A06746	6,746	.2656	17/64	—	43	53	1,1	91	36	8
4148205	VDS202A06800	4143032	VDS402A06800	6,800	.2677	—	—	43	53	1,1	91	36	8
4148206	VDS202A06900	4143043	VDS402A06900	6,900	.2717	—	—	43	53	1,2	91	36	8

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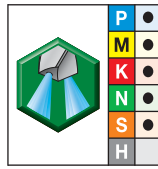
Solid Carbide Drills

# Solid Carbide Drills

VariDrill™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 5 x D



(VDS202A • VDS402A • 5 x D — continued)



● first choice  
○ alternate choice

D1 diameter

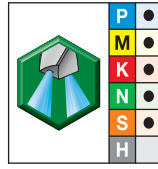
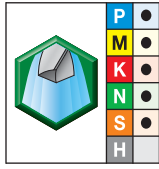
grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4148207	VDS202A07000	4143044	VDS402A07000	7,000	.2756	—	—	43	53	1,2	91	36	8
4148208	VDS202A07100	4143045	VDS402A07100	7,100	.2795	—	—	43	53	1,2	91	36	8
4148209	VDS202A07145	4143046	VDS402A07145	7,145	.2813	9/32	—	43	53	1,2	91	36	8
4148210	VDS202A07200	4143047	VDS402A07200	7,200	.2835	—	—	43	53	1,2	91	36	8
4148211	VDS202A07300	4143048	VDS402A07300	7,300	.2874	—	—	43	53	1,2	91	36	8
4148212	VDS202A07400	4143049	VDS402A07400	7,400	.2913	—	—	43	53	1,3	91	36	8
4148213	VDS202A07500	4143050	VDS402A07500	7,500	.2953	—	—	43	53	1,3	91	36	8
4148214	VDS202A07541	4143051	VDS402A07541	7,541	.2969	19/64	—	43	53	1,3	91	36	8
4148215	VDS202A07600	4143052	VDS402A07600	7,600	.2992	—	—	43	53	1,3	91	36	8
4148216	VDS202A07700	4143063	VDS402A07700	7,700	.3031	—	—	43	53	1,3	91	36	8
4148217	VDS202A07800	4143064	VDS402A07800	7,800	.3071	—	—	43	53	1,3	91	36	8
4148218	VDS202A07900	4143065	VDS402A07900	7,900	.3110	—	—	43	53	1,3	91	36	8
4148219	VDS202A07938	4143066	VDS402A07938	7,938	.3125	5/16	—	43	53	1,3	91	36	8
4148220	VDS202A08000	4143067	VDS402A08000	8,000	.3150	—	—	43	53	1,4	91	36	8
4148221	VDS202A08100	4143068	VDS402A08100	8,100	.3189	—	—	49	61	1,4	103	40	10
4148222	VDS202A08200	4143069	VDS402A08200	8,200	.3228	—	—	49	61	1,4	103	40	10
4148223	VDS202A08300	4143070	VDS402A08300	8,300	.3268	—	—	49	61	1,4	103	40	10
4148224	VDS202A08334	4143071	VDS402A08334	8,334	.3281	21/64	—	49	61	1,4	103	40	10
4148225	VDS202A08400	4143072	VDS402A08400	8,400	.3307	—	—	49	61	1,4	103	40	10
4148226	VDS202A08433	4143083	VDS402A08433	8,433	.3320	—	Q	49	61	1,4	103	40	10
4148227	VDS202A08500	4143084	VDS402A08500	8,500	.3346	—	—	49	61	1,4	103	40	10
4148228	VDS202A08600	4143085	VDS402A08600	8,600	.3386	—	—	49	61	1,5	103	40	10
4148229	VDS202A08700	4143086	VDS402A08700	8,700	.3425	—	—	49	61	1,5	103	40	10
4148230	VDS202A08733	4143087	VDS402A08733	8,733	.3438	11/32	—	49	61	1,5	103	40	10
4148231	VDS202A08800	4143088	VDS402A08800	8,800	.3465	—	—	49	61	1,5	103	40	10
4148232	VDS202A08900	4143089	VDS402A08900	8,900	.3504	—	—	49	61	1,5	103	40	10
4148233	VDS202A09000	4143090	VDS402A09000	9,000	.3543	—	—	49	61	1,5	103	40	10
4148234	VDS202A09100	4143091	VDS402A09100	9,100	.3583	—	—	49	61	1,5	103	40	10
4148235	VDS202A09129	4143092	VDS402A09129	9,129	.3594	23/64	—	49	61	1,6	103	40	10
4148236	VDS202A09200	4143103	VDS402A09200	9,200	.3622	—	—	49	61	1,6	103	40	10
4148237	VDS202A09300	4143104	VDS402A09300	9,300	.3661	—	—	49	61	1,6	103	40	10
4148238	VDS202A09347	4143105	VDS402A09347	9,347	.3680	—	U	49	61	1,6	103	40	10
4148239	VDS202A09400	4143106	VDS402A09400	9,400	.3701	—	—	49	61	1,6	103	40	10
4148240	VDS202A09500	4143107	VDS402A09500	9,500	.3740	—	—	49	61	1,6	103	40	10
4148241	VDS202A09525	4143108	VDS402A09525	9,525	.3750	3/8	—	49	61	1,6	103	40	10
4148242	VDS202A09600	4143109	VDS402A09600	9,600	.3780	—	—	49	61	1,6	103	40	10
4148243	VDS202A09700	4143110	VDS402A09700	9,700	.3819	—	—	49	61	1,7	103	40	10
4148244	VDS202A09800	4143111	VDS402A09800	9,800	.3858	—	—	49	61	1,7	103	40	10
4148245	VDS202A09900	4143112	VDS402A09900	9,900	.3898	—	—	49	61	1,7	103	40	10
4148246	VDS202A09921	4143113	VDS402A09921	9,921	.3906	25/64	—	49	61	1,7	103	40	10

(continued)

Solid Carbide Drills



(VDS202A • VDS402A • 5 x D — continued)



● first choice  
○ alternate choice

D1 diameter

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4148258	VDS202A10000	4142823	VDS402A10000	10,000	.3937	—	—	49	61	1,7	103	40	10
4148259	VDS202A10100	4142825	VDS402A10100	10,100	.3976	—	—	56	71	1,7	118	45	12
4148260	VDS202A10200	4142827	VDS402A10200	10,200	.4016	—	—	56	71	1,7	118	45	12
4148261	VDS202A10300	4142829	VDS402A10300	10,300	.4055	—	—	56	71	1,8	118	45	12
4148262	VDS202A10320	4142831	VDS402A10320	10,320	.4063	13/32	—	56	71	1,8	118	45	12
4148283	VDS202A10400	4142832	VDS402A10400	10,400	.4094	—	—	56	71	1,8	118	45	12
4148284	VDS202A10500	4142834	VDS402A10500	10,500	.4134	—	—	56	71	1,8	118	45	12
4148285	VDS202A10600	4142836	VDS402A10600	10,600	.4173	—	—	56	71	1,8	118	45	12
4148286	VDS202A10700	4142838	VDS402A10700	10,700	.4213	—	—	56	71	1,8	118	45	12
4148287	VDS202A10716	4142840	VDS402A10716	10,716	.4219	27/64	—	56	71	1,8	118	45	12
4148288	VDS202A10800	4142842	VDS402A10800	10,800	.4252	—	—	56	71	1,8	118	45	12
4148289	VDS202A10900	4142855	VDS402A10900	10,900	.4291	—	—	56	71	1,9	118	45	12
4148290	VDS202A11000	4142857	VDS402A11000	11,000	.4331	—	—	56	71	1,9	118	45	12
4148291	VDS202A11100	4142858	VDS402A11100	11,100	.4370	—	—	56	71	1,9	118	45	12
4148292	VDS202A11113	4142861	VDS402A11113	11,113	.4375	7/16	—	56	71	1,9	118	45	12
4148293	VDS202A11200	4142862	VDS402A11200	11,200	.4409	—	—	56	71	1,9	118	45	12
4148294	VDS202A11300	4142873	VDS402A11300	11,300	.4449	—	—	56	71	1,9	118	45	12
4148295	VDS202A11400	4142874	VDS402A11400	11,400	.4488	—	—	56	71	2,0	118	45	12
4148296	VDS202A11500	4142875	VDS402A11500	11,500	.4528	—	—	56	71	2,0	118	45	12
4148297	VDS202A11509	4142876	VDS402A11509	11,509	.4531	29/64	—	56	71	2,0	118	45	12
4148298	VDS202A11600	4142877	VDS402A11600	11,600	.4567	—	—	56	71	2,0	118	45	12
4148299	VDS202A11700	4142878	VDS402A11700	11,700	.4606	—	—	56	71	2,0	118	45	12
4148300	VDS202A11800	4142879	VDS402A11800	11,800	.4646	—	—	56	71	2,0	118	45	12
4148301	VDS202A11900	4142880	VDS402A11900	11,900	.4685	—	—	56	71	2,0	118	45	12
4148302	VDS202A11908	4142881	VDS402A11908	11,908	.4688	15/32	—	56	71	2,0	118	45	12
4148313	VDS202A12000	4142882	VDS402A12000	12,000	.4724	—	—	56	71	2,1	118	45	12
4148314	VDS202A12100	4142913	VDS402A12100	12,100	.4764	—	—	60	77	2,1	124	45	14
4148315	VDS202A12200	4142914	VDS402A12200	12,200	.4803	—	—	60	77	2,1	124	45	14
4148316	VDS202A12300	4142915	VDS402A12300	12,300	.4843	—	—	60	77	2,1	124	45	14
4148317	VDS202A12304	4142916	VDS402A12304	12,304	.4844	31/64	—	60	77	2,1	124	45	14
4148318	VDS202A12400	4142917	VDS402A12400	12,400	.4882	—	—	60	77	2,1	124	45	14
4148319	VDS202A12500	4142918	VDS402A12500	12,500	.4921	—	—	60	77	2,1	124	45	14
4148320	VDS202A12600	4142919	VDS402A12600	12,600	.4961	—	—	60	77	2,2	124	45	14
4148321	VDS202A12700	4142920	VDS402A12700	12,700	.5000	1/2	—	60	77	2,2	124	45	14
4148322	VDS202A12800	4142921	VDS402A12800	12,800	.5039	—	—	60	77	2,2	124	45	14
4148343	VDS202A12900	4142922	VDS402A12900	12,900	.5079	—	—	60	77	2,2	124	45	14
4148344	VDS202A13000	4142953	VDS402A13000	13,000	.5118	—	—	60	77	2,2	124	45	14
4148345	VDS202A13096	4142954	VDS402A13096	13,096	.5156	33/64	—	60	77	2,3	124	45	14
4148346	VDS202A13100	4142955	VDS402A13100	13,100	.5157	—	—	60	77	2,3	124	45	14
4148347	VDS202A13200	4142956	VDS402A13200	13,200	.5197	—	—	60	77	2,3	124	45	14

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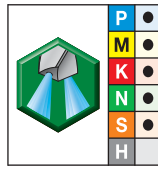
Solid Carbide Drills

# Solid Carbide Drills

VariDrill™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 5 x D



(VDS202A • VDS402A • 5 x D — continued)



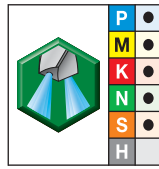
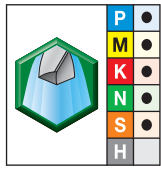
● first choice  
○ alternate choice

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4148348	VDS202A13300	4142957	VDS402A13300	13,300	.5236	—	—	60	77	2,3	124	45	14
4148349	VDS202A13400	4142958	VDS402A13400	13,400	.5276	—	—	60	77	2,3	124	45	14
4148350	VDS202A13500	4142959	VDS402A13500	13,500	.5315	—	—	60	77	2,3	124	45	14
4148351	VDS202A13600	4142960	VDS402A13600	13,600	.5354	—	—	60	77	2,3	124	45	14
4148352	VDS202A13700	4142961	VDS402A13700	13,700	.5394	—	—	60	77	2,4	124	45	14
4148353	VDS202A13800	4142962	VDS402A13800	13,800	.5433	—	—	60	77	2,4	124	45	14
4148354	VDS202A13891	4142983	VDS402A13891	13,891	.5469	35/64	—	60	77	2,4	124	45	14
4148355	VDS202A13900	4142984	VDS402A13900	13,900	.5472	—	—	60	77	2,4	124	45	14
4148356	VDS202A14000	4142985	VDS402A14000	14,000	.5512	—	—	60	77	2,4	124	45	14
4148357	VDS202A14100	4142986	VDS402A14100	14,100	.5551	—	—	63	83	2,4	133	48	16
4148358	VDS202A14200	4142987	VDS402A14200	14,200	.5591	—	—	63	83	2,5	133	48	16
4148359	VDS202A14288	4142988	VDS402A14288	14,288	.5625	9/16	—	63	83	2,5	133	48	16
4148360	VDS202A14300	4142989	VDS402A14300	14,300	.5630	—	—	63	83	2,5	133	48	16
4148361	VDS202A14400	4142990	VDS402A14400	14,400	.5669	—	—	63	83	2,5	133	48	16
4148362	VDS202A14500	4142991	VDS402A14500	14,500	.5709	—	—	63	83	2,5	133	48	16
4148363	VDS202A14600	4142992	VDS402A14600	14,600	.5748	—	—	63	83	2,5	133	48	16
4148364	VDS202A14684	4143013	VDS402A14684	14,684	.5781	37/64	—	63	83	2,5	133	48	16
4148365	VDS202A14700	4143014	VDS402A14700	14,700	.5787	—	—	63	83	2,5	133	48	16
4148366	VDS202A14800	4143015	VDS402A14800	14,800	.5827	—	—	63	83	2,6	133	48	16
4148367	VDS202A14900	4143016	VDS402A14900	14,900	.5866	—	—	63	83	2,6	133	48	16
4148368	VDS202A15000	4143017	VDS402A15000	15,000	.5906	—	—	63	83	2,6	133	48	16
4148369	VDS202A15083	4143018	VDS402A15083	15,083	.5938	19/32	—	63	83	2,6	133	48	16
4148370	VDS202A15100	4143019	VDS402A15100	15,100	.5945	—	—	63	83	2,6	133	48	16
4148371	VDS202A15200	4143020	VDS402A15200	15,200	.5984	—	—	63	83	2,6	133	48	16
4148372	VDS202A15300	4143021	VDS402A15300	15,300	.6024	—	—	63	83	2,6	133	48	16
4148373	VDS202A15400	4143022	VDS402A15400	15,400	.6063	—	—	63	83	2,7	133	48	16
4148374	VDS202A15479	4143033	VDS402A15479	15,479	.6094	39/64	—	63	83	2,7	133	48	16
4148375	VDS202A15500	4143034	VDS402A15500	15,500	.6102	—	—	63	83	2,7	133	48	16
4148376	VDS202A15600	4143035	VDS402A15600	15,600	.6142	—	—	63	83	2,7	133	48	16
4148377	VDS202A15700	4143036	VDS402A15700	15,700	.6181	—	—	63	83	2,7	133	48	16
4148378	VDS202A15800	4143037	VDS402A15800	15,800	.6220	—	—	63	83	2,7	133	48	16
4148379	VDS202A15875	4143038	VDS402A15875	15,875	.6250	5/8	—	63	83	2,7	133	48	16
4148380	VDS202A15900	4143039	VDS402A15900	15,900	.6260	—	—	63	83	2,8	133	48	16
4148381	VDS202A16000	4143040	VDS402A16000	16,000	.6299	—	—	63	83	2,8	133	48	16
4148382	VDS202A16100	4143041	VDS402A16100	16,100	.6339	—	—	71	93	2,8	143	48	18
4148383	VDS202A16200	4143042	VDS402A16200	16,200	.6378	—	—	71	93	2,8	143	48	18
4148384	VDS202A16271	4143053	VDS402A16271	16,271	.6406	41/64	—	71	93	2,8	143	48	18
4148385	VDS202A16300	4143054	VDS402A16300	16,300	.6417	—	—	71	93	2,8	143	48	18
4148386	VDS202A16400	4143055	VDS402A16400	16,400	.6457	—	—	71	93	2,8	143	48	18
4148387	VDS202A16500	4143056	VDS402A16500	16,500	.6496	—	—	71	93	2,9	143	48	18

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Solid Carbide Drills

(VDS202A • VDS402A • 5 x D — continued)



● first choice  
○ alternate choice

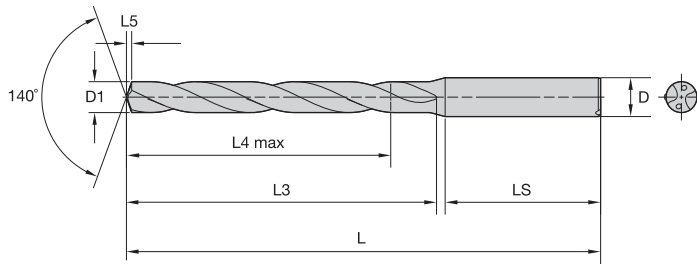
D1 diameter

grade WU25PD TiAlN		grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4148388	VDS202A16600	4143057	VDS402A16600	16,600	.6535	—	—	71	93	2,9	143	48	18
4148389	VDS202A16670	4143058	VDS402A16670	16,670	.6563	21/32	—	71	93	2,9	143	48	18
4148390	VDS202A16700	4143059	VDS402A16700	16,700	.6575	—	—	71	93	2,9	143	48	18
4148391	VDS202A16800	4143060	VDS402A16800	16,800	.6614	—	—	71	93	2,9	143	48	18
4148392	VDS202A16900	4143061	VDS402A16900	16,900	.6654	—	—	71	93	2,9	143	48	18
4148393	VDS202A17000	4143062	VDS402A17000	17,000	.6693	—	—	71	93	2,9	143	48	18
4148394	VDS202A17100	4143073	VDS402A17100	17,100	.6732	—	—	71	93	3,0	143	48	18
4148395	VDS202A17200	4143074	VDS402A17200	17,200	.6772	—	—	71	93	3,0	143	48	18
4148396	VDS202A17300	4143075	VDS402A17300	17,300	.6811	—	—	71	93	3,0	143	48	18
4148397	VDS202A17400	4143076	VDS402A17400	17,400	.6850	—	—	71	93	3,0	143	48	18
4148398	VDS202A17463	4143077	VDS402A17463	17,463	.6875	11/16	—	71	93	3,0	143	48	18
4148399	VDS202A17500	4143078	VDS402A17500	17,500	.6890	—	—	71	93	3,0	143	48	18
4148400	VDS202A17600	4143079	VDS402A17600	17,600	.6929	—	—	71	93	3,1	143	48	18
4148401	VDS202A17700	4143080	VDS402A17700	17,700	.6969	—	—	71	93	3,1	143	48	18
4148402	VDS202A17800	4143081	VDS402A17800	17,800	.7008	—	—	71	93	3,1	143	48	18
4148403	VDS202A17859	4143082	VDS402A17859	17,859	.7031	45/64	—	71	93	3,1	143	48	18
4148404	VDS202A17900	4143093	VDS402A17900	17,900	.7047	—	—	71	93	3,1	143	48	18
4147921	VDS202A18000	4142803	VDS402A18000	18,000	.7087	—	—	71	93	3,1	143	48	18
4147922	VDS202A18100	4142804	VDS402A18100	18,100	.7126	—	—	77	101	3,1	153	50	20
4148303	VDS202A18200	4142805	VDS402A18200	18,200	.7165	—	—	77	101	3,2	153	50	20
4148304	VDS202A18258	4142806	VDS402A18258	18,258	.7188	23/32	—	77	101	3,2	153	50	20
4148305	VDS202A18300	4142807	VDS402A18300	18,300	.7205	—	—	77	101	3,2	153	50	20
4148306	VDS202A18400	4142808	VDS402A18400	18,400	.7244	—	—	77	101	3,2	153	50	20
4148307	VDS202A18500	4142809	VDS402A18500	18,500	.7283	—	—	77	101	3,2	153	50	20
4148308	VDS202A18600	4142810	VDS402A18600	18,600	.7323	—	—	77	101	3,2	153	50	20
4148309	VDS202A18654	4142811	VDS402A18654	18,654	.7344	47/64	—	77	101	3,2	153	50	20
4148310	VDS202A18700	4142812	VDS402A18700	18,700	.7362	—	—	77	101	3,2	153	50	20
4148311	VDS202A18800	4142824	VDS402A18800	18,800	.7402	—	—	77	101	3,3	153	50	20
4148312	VDS202A18900	4142826	VDS402A18900	18,900	.7441	—	—	77	101	3,3	153	50	20
4148323	VDS202A19000	4142828	VDS402A19000	19,000	.7480	—	—	77	101	3,3	153	50	20
4148324	VDS202A19050	4142830	VDS402A19050	19,050	.7500	3/4	—	77	101	3,3	153	50	20
4148325	VDS202A19100	4142833	VDS402A19100	19,100	.7520	—	—	77	101	3,3	153	50	20
4148326	VDS202A19200	4142835	VDS402A19200	19,200	.7559	—	—	77	101	3,3	153	50	20
4148327	VDS202A19300	4142837	VDS402A19300	19,300	.7598	—	—	77	101	3,4	153	50	20
4148328	VDS202A19400	4142839	VDS402A19400	19,400	.7638	—	—	77	101	3,4	153	50	20
4148329	VDS202A19500	4142841	VDS402A19500	19,500	.7677	—	—	77	101	3,4	153	50	20
4148330	VDS202A19600	4142853	VDS402A19600	19,600	.7717	—	—	77	101	3,4	153	50	20
4148331	VDS202A19700	4142854	VDS402A19700	19,700	.7756	—	—	77	101	3,4	153	50	20
4148332	VDS202A19800	4142856	VDS402A19800	19,800	.7795	—	—	77	101	3,4	153	50	20
4148333	VDS202A19900	4142859	VDS402A19900	19,900	.7835	—	—	77	101	3,5	153	50	20
4148334	VDS202A20000	4142860	VDS402A20000	20,000	.7874	—	—	77	101	3,5	153	50	20

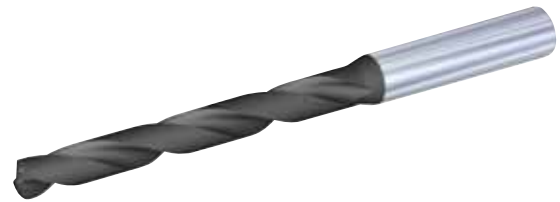
Solid Carbide Drills

# Solid Carbide Drills

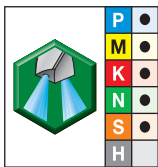
VariDrill™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 8 x D



For information on L, L3, and L4 max, see page R133.



## ■ VDS403A • 8 x D



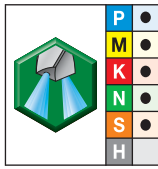
● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	mm	in	fraction	wire size						
6023126	VDS403A01000	1,000	.0394	—	—	10	12	0,1	58	28	4
6023127	VDS403A01016	1,016	.0400	—	60	10	12	0,1	58	28	4
6023128	VDS403A01067	1,067	.0420	—	58	10	12	0,2	58	28	4
6023129	VDS403A01100	1,100	.0433	—	—	10	12	0,2	58	28	4
6023130	VDS403A01181	1,181	.0465	—	56	10	12	0,2	58	28	4
6023131	VDS403A01191	1,191	.0469	3/64	—	10	12	0,2	58	28	4
6023132	VDS403A01200	1,200	.0472	—	—	10	12	0,2	58	28	4
6023133	VDS403A01300	1,300	.0512	—	—	10	12	0,2	58	28	4
6023134	VDS403A01321	1,321	.0520	—	55	10	12	0,2	58	28	4
6023135	VDS403A01397	1,397	.0550	—	54	10	12	0,2	58	28	4
6023136	VDS403A01400	1,400	.0551	—	—	10	12	0,2	58	28	4
4143700	VDS403A01500	1,500	.0591	—	—	15	18	0,2	58	28	4
4143701	VDS403A01600	1,600	.0630	—	—	15	18	0,2	58	28	4
4143702	VDS403A01700	1,700	.0669	—	—	15	18	0,3	58	28	4
4143723	VDS403A01800	1,800	.0709	—	—	15	18	0,3	58	28	4
4143724	VDS403A01900	1,900	.0748	—	—	15	18	0,3	58	28	4
4143725	VDS403A01984	1,984	.0781	—	—	22	26	0,3	66	28	4
4143726	VDS403A02000	2,000	.0787	—	—	22	26	0,3	66	28	4
4143727	VDS403A02100	2,100	.0827	—	—	22	26	0,3	66	28	4
4143728	VDS403A02200	2,200	.0866	—	—	22	26	0,3	66	28	4
4143729	VDS403A02300	2,300	.0906	—	—	22	26	0,4	66	28	4
4143730	VDS403A02383	2,383	.0938	3/32	—	25	30	0,4	66	28	4
4143731	VDS403A02400	2,400	.0945	—	—	25	30	0,4	66	28	4
4143732	VDS403A02439	2,439	.0960	—	41	25	30	0,4	66	28	4
4143733	VDS403A02489	2,489	.0980	—	40	25	30	0,4	66	28	4
4143734	VDS403A02500	2,500	.0984	—	—	25	30	0,4	66	28	4
4143735	VDS403A02578	2,578	.1015	—	38	25	30	0,4	66	28	4
4143736	VDS403A02600	2,600	.1024	—	—	25	30	0,4	66	28	4

(continued)

Solid Carbide Drills

(VDS403A • 8 x D — continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	mm	in	fraction	wire size						
4143737	VDS403A02642	2,642	.1040	—	37	25	30	0,4	66	28	4
4143738	VDS403A02700	2,700	.1063	—	—	25	30	0,4	66	28	4
4143739	VDS403A02705	2,705	.1065	—	36	25	30	0,4	66	28	4
4143740	VDS403A02779	2,779	.1094	7/64	—	25	30	0,4	66	28	4
4143741	VDS403A02800	2,800	.1102	—	—	25	30	0,5	66	28	4
4143742	VDS403A02820	2,820	.1110	—	34	25	30	0,5	66	28	4
4143743	VDS403A02870	2,870	.1130	—	33	25	30	0,5	66	28	4
4143744	VDS403A02900	2,900	.1142	—	—	25	30	0,5	66	28	4
4143745	VDS403A02947	2,947	.1160	—	32	25	30	0,5	66	28	4
4143746	VDS403A03000	3,000	.1181	—	—	33	40	0,5	78	36	6
4143747	VDS403A03048	3,048	.1200	—	31	33	40	0,5	78	36	6
4143748	VDS403A03100	3,100	.1220	—	—	33	40	0,5	78	36	6
4143749	VDS403A03175	3,175	.1250	1/8	—	33	40	0,5	78	36	6
4143750	VDS403A03200	3,200	.1260	—	—	33	40	0,5	78	36	6
4143751	VDS403A03264	3,264	.1285	—	30	33	40	0,5	78	36	6
4143752	VDS403A03300	3,300	.1299	—	30	33	40	0,5	78	36	6
4143753	VDS403A03400	3,400	.1339	—	—	33	40	0,6	78	36	6
4143754	VDS403A03455	3,455	.1360	—	29	33	49	0,6	78	36	6
4143755	VDS403A03500	3,500	.1378	—	21	33	49	0,6	78	36	6
4143756	VDS403A03571	3,571	.1406	9/64	—	33	49	0,6	78	36	6
4143757	VDS403A03600	3,600	.1417	—	—	33	40	0,6	78	36	6
4143758	VDS403A03658	3,658	.1440	—	27	33	49	0,6	78	36	6
4143759	VDS403A03700	3,700	.1457	—	—	33	40	0,6	78	36	6
4143760	VDS403A03734	3,734	.1470	—	26	33	40	0,6	78	36	6
4143761	VDS403A03800	3,800	.1496	—	—	41	49	0,6	87	36	6
4143762	VDS403A03900	3,900	.1535	—	—	41	40	0,6	87	36	6
4143763	VDS403A03970	3,970	.1563	5/32	—	41	49	0,7	87	36	6
4143764	VDS403A04000	4,000	.1575	—	—	41	40	0,7	87	36	6
4143765	VDS403A04039	4,039	.1590	—	21	41	40	0,7	87	36	6
4143766	VDS403A04090	4,090	.1610	—	20	41	40	0,7	87	36	6
4143767	VDS403A04100	4,100	.1614	—	—	41	49	0,7	87	36	6
4143768	VDS403A04200	4,200	.1654	—	—	41	49	0,7	87	36	6
4143769	VDS403A04217	4,217	.1660	—	19	41	49	0,7	87	36	6
4143770	VDS403A04300	4,300	.1693	—	14	41	49	0,7	87	36	6
4143771	VDS403A04366	4,366	.1719	11/64	—	41	49	0,7	87	36	6
4143772	VDS403A04400	4,400	.1732	—	—	41	49	0,7	87	36	6
4143773	VDS403A04500	4,500	.1772	—	—	41	49	0,7	87	36	6
4143774	VDS403A04600	4,600	.1811	—	19	41	49	0,8	87	36	6
4143775	VDS403A04623	4,623	.1820	—	14	41	49	0,8	87	36	6
4143776	VDS403A04700	4,700	.1850	—	13	41	56	0,8	87	36	6

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Solid Carbide Drills

(VDS403A • 8 x D – continued)



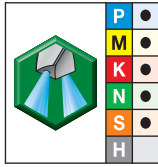
● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	mm	in	fraction	wire size						
4143777	VDS403A04763	4,763	.1875	3/16	13	48	49	0,8	94	36	6
4143778	VDS403A04800	4,800	.1890	—	12	48	56	0,8	94	36	6
4143779	VDS403A04852	4,852	.1910	—	11	48	56	0,8	94	36	6
4143780	VDS403A04900	4,900	.1929	—	—	48	56	0,8	94	36	6
4143781	VDS403A05000	5,000	.1969	—	—	48	56	0,8	94	36	6
4143782	VDS403A05100	5,100	.2008	—	—	48	56	0,8	94	36	6
4143783	VDS403A05106	5,106	.2010	—	7	48	56	0,8	94	36	6
4143784	VDS403A05159	5,159	.2031	13/64	—	48	56	0,9	94	36	6
4143785	VDS403A05200	5,200	.2047	—	—	48	56	0,9	94	36	6
4143786	VDS403A05300	5,300	.2087	—	12	48	56	0,9	94	36	6
4143787	VDS403A05400	5,400	.2126	—	7	48	56	0,9	94	36	6
4143788	VDS403A05410	5,410	.2130	—	3	48	56	0,9	94	36	6
4143789	VDS403A05500	5,500	.2165	—	3	48	56	0,9	94	36	6
4143790	VDS403A05558	5,558	.2188	7/32	2	48	56	0,9	94	36	6
4143791	VDS403A05600	5,600	.2205	—	—	48	56	0,9	94	36	6
4143792	VDS403A05616	5,616	.2211	—	2	48	56	0,9	94	36	6
4143793	VDS403A05700	5,700	.2244	—	—	48	56	1,0	94	36	6
4143794	VDS403A05800	5,800	.2283	—	—	48	67	1,0	94	36	6
4143795	VDS403A05900	5,900	.2323	—	—	48	67	1,0	94	36	6
4143796	VDS403A05954	5,954	.2344	15/64	—	48	56	1,0	94	36	6
4143797	VDS403A06000	6,000	.2362	—	—	48	67	1,0	94	36	6
4143798	VDS403A06100	6,100	.2402	—	—	57	67	1,0	105	36	8
4143799	VDS403A06200	6,200	.2441	—	F	57	67	1,0	105	36	8
4143800	VDS403A06300	6,300	.2480	—	—	57	56	1,1	105	36	8
4143801	VDS403A06350	6,350	.2500	1/4	E	57	67	1,1	105	36	8
4143802	VDS403A06400	6,400	.2520	—	—	57	67	1,1	105	36	8
4143803	VDS403A06500	6,500	.2559	—	—	57	67	1,1	105	36	8
4143804	VDS403A06528	6,528	.2570	—	F	57	67	1,1	105	36	8
4143805	VDS403A06600	6,600	.2598	—	E	57	67	1,1	105	36	8
4143806	VDS403A06630	6,630	.2610	—	G	57	56	1,1	105	36	8
4143807	VDS403A06700	6,700	.2638	—	—	57	67	1,1	105	36	8
4143808	VDS403A06746	6,746	.2656	17/64	—	57	56	1,1	105	36	8
4143809	VDS403A06800	6,800	.2677	—	—	57	67	1,1	105	36	8
4143810	VDS403A06900	6,900	.2717	—	—	57	67	1,2	105	36	8
4143811	VDS403A07000	7,000	.2756	—	—	57	72	1,2	105	36	8
4143812	VDS403A07100	7,100	.2795	—	—	61	72	1,2	110	36	8
4143813	VDS403A07145	7,145	.2813	9/32	—	61	67	1,2	110	36	8
4143814	VDS403A07200	7,200	.2835	—	—	61	72	1,2	110	36	8
4143815	VDS403A07300	7,300	.2874	—	—	61	72	1,2	110	36	8
4143816	VDS403A07400	7,400	.2913	—	—	61	72	1,3	110	36	8

(continued)

Solid Carbide Drills

(VDS403A • 8 x D — continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	mm	in	fraction	wire size						
4143817	VDS403A07500	7,500	.2953	—	—	61	72	1,3	110	36	8
4143818	VDS403A07541	7,541	.2969	19/64	—	61	72	1,3	110	36	8
4143819	VDS403A07600	7,600	.2992	—	—	61	80	1,3	110	36	8
4143820	VDS403A07700	7,700	.3031	—	—	61	80	1,3	110	36	8
4143821	VDS403A07800	7,800	.3071	—	—	61	80	1,3	110	36	8
4143822	VDS403A07900	7,900	.3110	—	—	61	80	1,3	110	36	8
4143823	VDS403A07938	7,938	.3125	5/16	Q	61	80	1,3	110	36	8
4143824	VDS403A08000	8,000	.3150	—	—	61	80	1,4	110	36	8
4143825	VDS403A08100	8,100	.3189	—	—	68	80	1,4	122	40	10
4143826	VDS403A08200	8,200	.3228	—	—	68	80	1,4	122	40	10
4143827	VDS403A08300	8,300	.3268	—	—	68	80	1,4	122	40	10
4143828	VDS403A08334	8,334	.3281	21/64	—	68	80	1,4	122	40	10
4143829	VDS403A08400	8,400	.3307	—	—	68	72	1,4	122	40	10
4143830	VDS403A08433	8,433	.3320	—	Q	68	80	1,4	122	40	10
4143831	VDS403A08500	8,500	.3346	—	—	68	80	1,4	122	40	10
4143832	VDS403A08600	8,600	.3386	—	—	68	80	1,5	122	40	10
4143833	VDS403A08700	8,700	.3425	—	—	68	72	1,5	122	40	10
4143834	VDS403A08733	8,733	.3438	11/32	—	68	72	1,5	122	40	10
4143835	VDS403A08800	8,800	.3465	—	—	68	72	1,5	122	40	10
4143836	VDS403A08900	8,900	.3504	—	—	68	72	1,5	122	40	10
4143837	VDS403A09000	9,000	.3543	—	—	68	72	1,5	122	40	10
4143838	VDS403A09100	9,100	.3583	—	—	68	80	1,5	122	40	10
4143839	VDS403A09129	9,129	.3594	23/64	—	68	80	1,6	122	40	10
4143840	VDS403A09200	9,200	.3622	—	—	68	80	1,6	122	40	10
4143841	VDS403A09300	9,300	.3661	—	—	68	80	1,6	122	40	10
4143842	VDS403A09347	9,347	.3680	—	U	68	80	1,6	122	40	10
4143843	VDS403A09400	9,400	.3701	—	—	68	80	1,6	122	40	10
4143844	VDS403A09500	9,500	.3740	—	—	68	80	1,6	122	40	10
4143845	VDS403A09525	9,525	.3750	3/8	—	68	80	1,6	122	40	10
4143846	VDS403A09600	9,600	.3780	—	U	68	80	1,6	122	40	10
4143847	VDS403A09700	9,700	.3819	—	—	68	80	1,7	122	40	10
4143848	VDS403A09800	9,800	.3858	—	—	68	80	1,7	122	40	10
4143849	VDS403A09900	9,900	.3898	—	—	68	80	1,7	122	40	10
4143850	VDS403A09921	9,921	.3906	25/64	—	68	80	1,7	122	40	10
4143421	VDS403A10000	10,000	.3937	—	—	68	80	1,7	122	40	10
4143422	VDS403A10100	10,100	.3976	—	—	79	94	1,7	141	45	12
4143473	VDS403A10200	10,200	.4016	—	—	79	94	1,7	141	45	12
4143474	VDS403A10300	10,300	.4055	—	—	79	94	1,8	141	45	12
4143475	VDS403A10320	10,320	.4063	13/32	—	79	94	1,8	141	45	12
4143476	VDS403A10400	10,400	.4094	—	—	79	94	1,8	141	45	12

(continued)

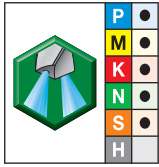
Solid Carbide Drills

# Solid Carbide Drills

VariDrill™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 8 x D



(VDS403A • 8 x D — continued)



● first choice  
○ alternate choice

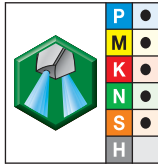
grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	mm	in	fraction	wire size						
4143477	VDS403A10500	10,500	.4134	—	—	79	94	1,8	141	45	12
4143478	VDS403A10600	10,600	.4173	—	—	79	94	1,8	141	45	12
4143479	VDS403A10700	10,700	.4213	—	—	79	94	1,8	141	45	12
4143480	VDS403A10716	10,716	.4219	27/64	—	79	94	1,8	141	45	12
4143481	VDS403A10800	10,800	.4252	—	—	79	94	1,8	141	45	12
4143482	VDS403A10900	10,900	.4291	—	—	79	94	1,9	141	45	12
4143483	VDS403A11000	11,000	.4331	—	—	79	94	1,9	141	45	12
4143484	VDS403A11100	11,100	.4370	—	—	79	94	1,9	141	45	12
4143485	VDS403A11113	11,113	.4375	7/16	—	79	94	1,9	141	45	12
4143486	VDS403A11200	11,200	.4409	—	—	79	94	1,9	141	45	12
4143487	VDS403A11300	11,300	.4449	—	—	79	94	1,9	141	45	12
4143488	VDS403A11400	11,400	.4488	—	—	79	94	2,0	141	45	12
4143489	VDS403A11500	11,500	.4528	—	—	79	94	2,0	141	45	12
4143490	VDS403A11509	11,509	.4531	29/64	—	79	94	2,0	141	45	12
4143491	VDS403A11600	11,600	.4567	—	—	79	94	2,0	141	45	12
4143492	VDS403A11700	11,700	.4606	—	—	79	94	2,0	141	45	12
4143493	VDS403A11800	11,800	.4646	—	—	79	94	2,0	141	45	12
4143494	VDS403A11900	11,900	.4685	—	—	79	94	2,0	141	45	12
4143495	VDS403A11908	11,908	.4688	15/32	—	79	94	2,0	141	45	12
4143496	VDS403A12000	12,000	.4724	—	—	79	94	2,1	141	45	12
4143497	VDS403A12100	12,100	.4764	—	—	91	108	2,1	155	45	14
4143498	VDS403A12200	12,200	.4803	—	—	91	108	2,1	155	45	14
4143499	VDS403A12300	12,300	.4843	—	—	91	108	2,1	155	45	14
4143500	VDS403A12304	12,304	.4844	31/64	—	91	108	2,1	155	45	14
4143501	VDS403A12400	12,400	.4882	—	—	91	108	2,1	155	45	14
4143502	VDS403A12500	12,500	.4921	—	—	91	108	2,1	155	45	14
4143503	VDS403A12600	12,600	.4961	—	—	91	108	2,2	155	45	14
4143504	VDS403A12700	12,700	.5000	1/2	—	91	108	2,2	155	45	14
4143505	VDS403A12800	12,800	.5039	—	—	91	108	2,2	155	45	14
4143506	VDS403A12900	12,900	.5079	—	—	91	108	2,2	155	45	14
4143507	VDS403A13000	13,000	.5118	—	—	91	108	2,2	155	45	14
4143508	VDS403A13096	13,096	.5156	33/64	—	91	108	2,3	155	45	14
4143509	VDS403A13100	13,100	.5157	—	—	91	108	2,3	155	45	14
4143510	VDS403A13200	13,200	.5197	—	—	91	108	2,3	155	45	14
4143511	VDS403A13300	13,300	.5236	—	—	91	108	2,3	155	45	14
4143512	VDS403A13400	13,400	.5276	—	—	91	108	2,3	155	45	14
4143513	VDS403A13500	13,500	.5315	—	—	91	108	2,3	155	45	14
4143514	VDS403A13600	13,600	.5354	—	—	91	108	2,3	155	45	14
4143515	VDS403A13700	13,700	.5394	—	—	91	108	2,4	155	45	14
4143516	VDS403A13800	13,800	.5433	—	—	91	108	2,4	155	45	14

(continued)

Solid Carbide Drills



(VDS403A • 8 x D — continued)

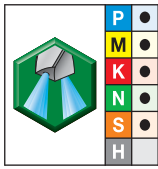


● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	mm	in	fraction	wire size						
4143517	VDS403A13891	13,891	.5469	35/64	—	91	108	2,4	155	45	14
4143518	VDS403A13900	13,900	.5472	—	—	91	108	2,4	155	45	14
4143519	VDS403A14000	14,000	.5512	—	—	91	108	2,4	155	45	14
4143520	VDS403A14100	14,100	.5551	—	—	101	121	2,4	171	48	16
4143521	VDS403A14200	14,200	.5591	—	—	101	121	2,5	171	48	16
4143522	VDS403A14288	14,288	.5625	9/16	—	101	121	2,5	171	48	16
4143523	VDS403A14300	14,300	.5630	—	—	101	121	2,5	171	48	16
4143524	VDS403A14400	14,400	.5669	—	—	101	121	2,5	171	48	16
4143525	VDS403A14500	14,500	.5709	—	—	101	121	2,5	171	48	16
4143526	VDS403A14600	14,600	.5748	—	—	101	121	2,5	171	48	16
4143527	VDS403A14684	14,684	.5781	37/64	—	101	121	2,5	171	48	16
4143528	VDS403A14700	14,700	.5787	—	—	101	121	2,5	171	48	16
4143529	VDS403A14800	14,800	.5827	—	—	101	121	2,6	171	48	16
4143530	VDS403A14900	14,900	.5866	—	—	101	121	2,6	171	48	16
4143531	VDS403A15000	15,000	.5906	—	—	101	121	2,6	171	48	16
4143532	VDS403A15083	15,083	.5938	19/32	—	101	121	2,6	171	48	16
4143533	VDS403A15100	15,100	.5945	—	—	101	121	2,6	171	48	16
4143534	VDS403A15200	15,200	.5984	—	—	101	121	2,6	171	48	16
4143535	VDS403A15300	15,300	.6024	—	—	101	121	2,6	171	48	16
4143536	VDS403A15400	15,400	.6063	—	—	101	121	2,7	171	48	16
4143537	VDS403A15479	15,479	.6094	39/64	—	101	121	2,7	171	48	16
4143538	VDS403A15500	15,500	.6102	—	—	101	121	2,7	171	48	16
4143539	VDS403A15600	15,600	.6142	—	—	101	121	2,7	171	48	16
4143540	VDS403A15700	15,700	.6181	—	—	101	121	2,7	171	48	16
4143541	VDS403A15800	15,800	.6220	—	—	101	121	2,7	171	48	16
4143542	VDS403A15875	15,875	.6250	5/8	—	101	121	2,7	171	48	16
4143543	VDS403A15900	15,900	.6260	—	—	101	121	2,8	171	48	16
4143544	VDS403A16000	16,000	.6299	—	—	101	121	2,8	171	48	16
4143545	VDS403A16100	16,100	.6339	—	—	113	135	2,8	185	48	18
4143546	VDS403A16200	16,200	.6378	—	—	113	135	2,8	185	48	18
4143547	VDS403A16271	16,271	.6406	41/64	—	113	135	2,8	185	48	18
4143548	VDS403A16300	16,300	.6417	—	—	113	135	2,8	185	48	18
4143549	VDS403A16400	16,400	.6457	—	—	113	135	2,8	185	48	18
4143550	VDS403A16500	16,500	.6496	—	—	113	135	2,9	185	48	18
4143551	VDS403A16600	16,600	.6535	—	—	113	135	2,9	185	48	18
4143552	VDS403A16670	16,670	.6563	21/32	—	113	135	2,9	185	48	18
4143553	VDS403A16700	16,700	.6575	—	—	113	135	2,9	185	48	18
4143554	VDS403A16800	16,800	.6614	—	—	113	135	2,9	185	48	18
4143555	VDS403A16900	16,900	.6654	—	—	113	135	2,9	185	48	18
4143556	VDS403A17000	17,000	.6693	—	—	113	135	2,9	185	48	18

(continued)

(VDS403A • 8 x D – continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				L4 max	L3	L5	L	LS	D
order #	catalog #	mm	in	fraction	wire size						
4143557	VDS403A17100	17,100	.6732	—	—	113	135	3,0	185	48	18
4143558	VDS403A17200	17,200	.6772	—	—	113	135	3,0	185	48	18
4143559	VDS403A17300	17,300	.6811	—	—	113	135	3,0	185	48	18
4143560	VDS403A17400	17,400	.6850	—	—	113	135	3,0	185	48	18
4143561	VDS403A17463	17,463	.6875	11/16	—	113	135	3,0	185	48	18
4143562	VDS403A17500	17,500	.6890	—	—	113	135	3,0	185	48	18
4143563	VDS403A17600	17,600	.6929	—	—	113	135	3,1	185	48	18
4143564	VDS403A17700	17,700	.6969	—	—	113	135	3,1	185	48	18
4143565	VDS403A17800	17,800	.7008	—	—	113	135	3,1	185	48	18
4143566	VDS403A17859	17,859	.7031	45/64	—	113	135	3,1	185	48	18
4143567	VDS403A17900	17,900	.7047	—	—	113	135	3,1	185	48	18
4144209	VDS403A18000	18,000	.7087	—	—	113	135	3,1	185	48	18
4144211	VDS403A18100	18,100	.7126	—	—	124	148	3,1	200	50	20
4144212	VDS403A18200	18,200	.7165	—	—	124	148	3,2	200	50	20
4144244	VDS403A18258	18,258	.7188	23/32	—	124	148	3,2	200	50	20
4144246	VDS403A18300	18,300	.7205	—	—	124	148	3,2	200	50	20
4144248	VDS403A18400	18,400	.7244	—	—	124	148	3,2	200	50	20
4144250	VDS403A18500	18,500	.7283	—	—	124	148	3,2	200	50	20
4144252	VDS403A18600	18,600	.7323	—	—	124	148	3,2	200	50	20
4144254	VDS403A18654	18,654	.7344	47/64	—	124	148	3,2	200	50	20
4144256	VDS403A18700	18,700	.7362	—	—	124	148	3,2	200	50	20
4144258	VDS403A18800	18,800	.7402	—	—	124	148	3,3	200	50	20
4144260	VDS403A18900	18,900	.7441	—	—	124	148	3,3	200	50	20
4144262	VDS403A19000	19,000	.7480	—	—	124	148	3,3	200	50	20
4144275	VDS403A19050	19,050	.7500	3/4	—	124	148	3,3	200	50	20
4144277	VDS403A19100	19,100	.7520	—	—	124	148	3,3	200	50	20
4144279	VDS403A19200	19,200	.7559	—	—	124	148	3,3	200	50	20
4144281	VDS403A19300	19,300	.7598	—	—	124	148	3,4	200	50	20
4144283	VDS403A19400	19,400	.7638	—	—	124	148	3,4	200	50	20
4144285	VDS403A19500	19,500	.7677	—	—	124	148	3,4	200	50	20
4144287	VDS403A19600	19,600	.7717	—	—	124	148	3,4	200	50	20
4144289	VDS403A19700	19,700	.7756	—	—	124	148	3,4	200	50	20
4144291	VDS403A19800	19,800	.7795	—	—	124	148	3,4	200	50	20
4144303	VDS403A19900	19,900	.7835	—	—	124	148	3,5	200	50	20
4144305	VDS403A20000	20,000	.7874	—	—	124	148	3,5	200	50	20

Solid Carbide Drills

**VariDrill • VDS2\_Series • WU25PD™ • Flood Coolant • Inch**

Material Group		Cutting Speed – vc Range – SFM	Tool Diameter (inch)	Recommended Feed Rate (f) by Diameter									
				.0469– 3/64	.0781– 5/64	.125– 1/8	.188– 3/16	.250– 1/4	.313– 5/16	.375– 3/8	.500– 1/2	.625– 5/8	.750– 3/4
				min	-	max							
P	1	200 – 330	IPR	.002– .004	.002– .005	.003– .006	.003– .006	.004– .009	.005– .010	.006– .012	.007– .014	.009– .017	.011– .021
	2, 3, 4, 6, 7	160 – 300	IPR	.002– .004	.002– .005	.003– .006	.004– .007	.005– .009	.006– .011	.007– .013	.009– .015	.010– .018	.013– .023
	5, 9, 10, 11	160 – 330	IPR	.002– .004	.002– .005	.003– .006	.003– .007	.005– .009	.006– .011	.007– .013	.007– .015	.009– .018	.011– .023
	12, 13	100 – 200	IPR	.001– .002	.001– .002	.002– .003	.002– .004	.003– .006	.004– .007	.005– .009	.005– .010	.007– .012	.009– .016
M	14.1	100 – 160	IPR	.001– .002	.001– .002	.002– .003	.002– .004	.003– .004	.004– .005	.004– .006	.005– .006	.006– .007	.006– .008
	14.3	130 – 200	IPR	.001– .002	.001– .003	.002– .003	.002– .004	.003– .005	.004– .006	.004– .006	.005– .007	.006– .008	.006– .009
	14.2, 14.4	100 – 160	IPR	.001– .002	.001– .002	.002– .003	.002– .004	.003– .004	.004– .005	.004– .006	.005– .006	.006– .007	.006– .008
K	15, 16	230 – 490	IPR	.003– .005	.003– .005	.003– .007	.004– .008	.005– .010	.006– .012	.007– .014	.008– .015	.010– .019	.012– .023
	17, 18, 19	300 – 390	IPR	.003– .004	.003– .005	.004– .005	.004– .006	.005– .008	.006– .010	.007– .011	.008– .013	.010– .015	.012– .019
	20	260 – 390	IPR	.002– .004	.002– .005	.003– .005	.003– .006	.004– .008	.004– .009	.005– .011	.006– .013	.008– .015	.009– .019
N	21	300 – 890	IPR	.002– .005	.003– .005	.003– .006	.004– .006	.005– .008	.006– .009	.008– .011	.009– .013	.011– .016	.013– .019
	22, 23, 24	300 – 890	IPR	.002– .003	.003– .005	.003– .006	.004– .008	.005– .009	.006– .011	.008– .013	.009– .014	.011– .017	.013– .020
	25	300 – 740	IPR	.004– .005	.004– .005	.005– .006	.005– .006	.006– .008	.006– .009	.008– .011	.009– .013	.011– .016	.013– .017
	26, 27, 28	300 – 890	IPR	.002– .003	.003– .005	.003– .006	.004– .008	.005– .009	.006– .011	.008– .013	.009– .014	.011– .016	.013– .019
S	31, 32	70 – 100	IPR	.001– .002	.001– .002	.001– .002	.002– .003	.002– .004	.003– .005	.004– .005	.004– .006	.005– .006	.006– .007
	33, 34, 35	30 – 100	IPR	.001	.001	.001– .002	.001– .002	.002– .003	.003– .004	.003– .004	.004– .005	.004– .006	.004– .006
	36	70 – 130	IPR	.001	.001	.001– .002	.001– .002	.002– .003	.002– .004	.003– .004	.003– .004	.004– .005	.004– .006
	37	70 – 160	IPR	.001	.001	.001– .002	.001– .002	.002– .003	.003– .004	.003– .004	.004– .005	.004– .006	.004– .006

**Inch  
tolerance**

nominal size range	D1 tolerance	D tolerance h6
.0394–.1181	.0000/-0.0006 (h8)	.0000/-0.0002
>.1181–.2362	.0000/-0.0005 (h7)	.0000/-0.0003
>.2362–.3937	.0000/-0.0006 (h7)	.0000/-0.0004
>.3937–.7087	.0000/-0.0007 (h7)	.0000/-0.0004
>.7087–.7874	.0000/-0.0008 (h7)	.0000/-0.0005

■ VariDrill • VDS4\_Series • WU25PD™ • Through Coolant • Inch



Material Group		Cutting Speed – vc Range – SFM		Recommended Feed Rate (f) by Diameter										
		min	max	Tool Diameter (inch)	.0469–3/64	.0781–5/64	.125–1/8	.188–3/16	.250–1/4	.313–5/16	.375–3/8	.500–1/2	.625–5/8	.750–3/4
P	1	230	460	IPR	.002–.004	.002–.005	.003–.006	.003–.006	.004–.009	.005–.010	.006–.012	.007–.014	.009–.017	.011–.021
	2, 3, 4, 6, 7	200	330	IPR	.002–.004	.002–.005	.003–.006	.004–.007	.005–.009	.006–.011	.007–.013	.009–.015	.010–.018	.013–.023
	5, 9, 10, 11	160	330	IPR	.002–.004	.002–.005	.003–.006	.003–.007	.005–.009	.006–.011	.007–.013	.007–.015	.009–.018	.011–.023
	12, 13	130	230	IPR	.001–.002	.001–.002	.002–.003	.002–.004	.003–.006	.004–.007	.005–.009	.005–.010	.007–.012	.009–.016
M	14.1	100	160	IPR	.001–.002	.001–.002	.002–.003	.002–.004	.003–.004	.004–.005	.004–.006	.005–.006	.006–.007	.006–.008
	14.3	130	200	IPR	.001–.002	.001–.003	.002–.003	.002–.004	.003–.005	.004–.006	.004–.006	.005–.007	.006–.008	.006–.009
	14.2, 14.4	100	160	IPR	.001–.002	.001–.002	.002–.003	.002–.004	.003–.004	.004–.005	.004–.006	.005–.006	.006–.007	.006–.008
K	15, 16	260	520	IPR	.003–.006	.003–.006	.004–.008	.004–.009	.006–.011	.007–.013	.008–.016	.009–.017	.011–.021	.013–.026
	17, 18, 19	290	460	IPR	.004–.005	.004–.005	.004–.006	.005–.007	.006–.009	.007–.011	.008–.013	.009–.014	.011–.017	.013–.021
	20	260	430	IPR	.002–.005	.002–.005	.003–.006	.003–.007	.004–.009	.005–.011	.006–.012	.007–.014	.009–.017	.011–.021
N	21	290	1030	IPR	.002–.005	.003–.005	.003–.006	.004–.006	.005–.008	.006–.009	.008–.011	.009–.013	.011–.016	.013–.019
	22, 23, 24	290	890	IPR	.002–.003	.003–.005	.003–.006	.004–.008	.005–.009	.006–.011	.008–.013	.009–.014	.011–.017	.013–.020
	25	290	890	IPR	.004–.005	.004–.005	.005–.006	.005–.006	.006–.008	.006–.009	.008–.011	.009–.013	.011–.016	.013–.017
	26, 27, 28	290	890	IPR	.002–.003	.003–.005	.003–.006	.004–.008	.005–.009	.006–.011	.008–.013	.009–.014	.011–.016	.013–.019
S	31, 32	70	100	IPR	.001–.002	.001–.002	.001–.002	.002–.003	.002–.004	.003–.005	.004–.005	.004–.006	.005–.006	.006–.007
	33, 34, 35	30	100	IPR	.001	.001	.001–.002	.001–.002	.002–.003	.003–.004	.003–.004	.004–.005	.004–.006	.004–.006
	36	30	130	IPR	.001	.001	.001–.002	.001–.002	.002–.003	.002–.004	.003–.004	.003–.004	.004–.005	.004–.006
	37	30	130	IPR	.001	.001	.001–.002	.001–.002	.002–.003	.003–.004	.003–.004	.004–.005	.004–.006	.004–.006

Solid Carbide Drills

Inch tolerance

nominal size range	D1 tolerance	D tolerance h6
.0394–.1181	.0000/-.0006 (h8)	.0000/-.0002
>.1181–.2362	.0000/-.0005 (h7)	.0000/-.0003
>.2362–.3937	.0000/-.0006 (h7)	.0000/-.0004
>.3937–.7087	.0000/-.0007 (h7)	.0000/-.0004
>.7087–.7874	.0000/-.0008 (h7)	.0000/-.0005

■ VariDrill • VDS2\_Series • WU25PD™ • Flood Coolant • Metric

Material Group		Cutting Speed – vc Range – m/min	 	Recommended Feed Rate (f) by Diameter										
				Tool Diameter (mm)	1,0	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
					min - max									
P	1	60 - 100	mm/r	0,04-0,09	0,05-0,12	0,07-0,14	0,08-0,16	0,11-0,22	0,13-0,26	0,15-0,31	0,18-0,35	0,22-0,42	0,28-0,54	
	2, 3, 4, 6, 7	50 - 90	mm/r	0,05-0,10	0,06-0,13	0,08-0,15	0,09-0,17	0,13-0,23	0,15-0,28	0,19-0,33	0,22-0,38	0,26-0,47	0,34-0,59	
	5, 9, 10, 11	50 - 100	mm/r	0,05-0,10	0,06-0,13	0,07-0,15	0,08-0,17	0,12-0,23	0,14-0,28	0,17-0,33	0,19-0,38	0,23-0,47	0,29-0,59	
	12, 13	30 - 60	mm/r	0,03-0,05	0,04-0,06	0,05-0,08	0,06-0,10	0,08-0,14	0,10-0,18	0,13-0,22	0,14-0,24	0,18-0,32	0,23-0,41	
M	14.1	30 - 50	mm/r	0,02-0,05	0,03-0,06	0,04-0,07	0,05-0,09	0,08-0,11	0,09-0,12	0,10-0,14	0,12-0,16	0,14-0,18	0,16-0,20	
	14.3	40 - 60	mm/r	0,02-0,06	0,03-0,07	0,04-0,08	0,06-0,10	0,08-0,12	0,09-0,14	0,10-0,16	0,12-0,18	0,14-0,20	0,16-0,22	
	14.2, 14.4	30 - 50	mm/r	0,02-0,05	0,03-0,06	0,04-0,07	0,06-0,09	0,08-0,11	0,09-0,12	0,10-0,14	0,12-0,16	0,14-0,18	0,16-0,20	
K	15, 16	70 - 150	mm/r	0,06-0,13	0,07-0,14	0,09-0,18	0,10-0,19	0,13-0,25	0,16-0,30	0,18-0,35	0,20-0,39	0,25-0,48	0,30-0,59	
	17, 18, 19	90 - 120	mm/r	0,08-0,11	0,09-0,12	0,10-0,13	0,10-0,15	0,13-0,20	0,16-0,25	0,18-0,29	0,20-0,32	0,25-0,38	0,30-0,48	
	20	80 - 120	mm/r	0,04-0,10	0,06-0,12	0,06-0,14	0,07-0,15	0,10-0,20	0,11-0,24	0,14-0,28	0,15-0,32	0,19-0,38	0,24-0,48	
N	21	90 - 270	mm/r	0,05-0,12	0,06-0,13	0,08-0,14	0,10-0,16	0,12-0,20	0,16-0,24	0,20-0,28	0,24-0,32	0,28-0,40	0,32-0,48	
	22, 23, 24	90 - 270	mm/r	0,04-0,08	0,06-0,12	0,08-0,16	0,10-0,20	0,12-0,24	0,16-0,28	0,20-0,32	0,24-0,36	0,28-0,44	0,32-0,52	
	25	90 - 225	mm/r	0,10-0,13	0,11-0,14	0,12-0,14	0,13-0,16	0,14-0,20	0,16-0,24	0,20-0,28	0,24-0,32	0,28-0,40	0,32-0,44	
	26, 27, 28	90 - 270	mm/r	0,04-0,08	0,06-0,12	0,08-0,16	0,10-0,20	0,12-0,24	0,16-0,28	0,20-0,32	0,24-0,36	0,28-0,40	0,32-0,48	
S	31, 32	20 - 30	mm/r	0,01-0,04	0,02-0,05	0,03-0,06	0,04-0,08	0,06-0,10	0,08-0,12	0,09-0,13	0,10-0,14	0,12-0,16	0,14-0,18	
	33, 34, 35	10 - 30	mm/r	0,01-0,03	0,02-0,03	0,02-0,04	0,03-0,06	0,05-0,08	0,07-0,10	0,08-0,11	0,09-0,12	0,10-0,14	0,11-0,16	
	36	20 - 40	mm/r	0,01-0,03	0,02-0,03	0,02-0,04	0,02-0,05	0,04-0,07	0,06-0,09	0,07-0,10	0,08-0,11	0,09-0,13	0,10-0,15	
	37	20 - 50	mm/r	0,01-0,03	0,02-0,03	0,02-0,04	0,03-0,06	0,05-0,08	0,07-0,10	0,08-0,11	0,09-0,12	0,10-0,14	0,11-0,16	

Solid Carbide Drills

**Metric tolerance**

nominal size range	D1 tolerance	D tolerance h6
1-3	0,000/-0,014 (h8)	0,000/-0,006
>3-6	0,000/-0,012 (h7)	0,000/-0,008
>6-10	0,000/-0,015 (h7)	0,000/-0,009
>10-18	0,000/-0,018 (h7)	0,000/-0,011
>18-20	0,000/-0,021 (h7)	0,000/-0,013

■ VariDrill • VDS4\_Series • WU25PD™ • Through Coolant • Metric

Material Group		Cutting Speed – vc Range – m/min	Recommended Feed Rate (f) by Diameter											
			Tool Diameter (mm)	Recommended Feed Rate (f) by Diameter										
				1,0	2,0	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0	
min	max	mm/r												
P	1	70 – 140	mm/r	0,04–0,09	0,05–0,12	0,07–0,14	0,08–0,16	0,11–0,22	0,13–0,26	0,15–0,31	0,18–0,35	0,22–0,42	0,28–0,54	
	2, 3, 4, 6, 7	60 – 100	mm/r	0,05–0,10	0,06–0,13	0,08–0,15	0,09–0,17	0,13–0,23	0,15–0,28	0,19–0,33	0,22–0,38	0,26–0,47	0,34–0,59	
	5, 9, 10, 11	50 – 100	mm/r	0,05–0,10	0,06–0,13	0,07–0,15	0,08–0,17	0,12–0,23	0,14–0,28	0,17–0,33	0,19–0,38	0,23–0,47	0,29–0,59	
	12, 13	40 – 70	mm/r	0,03–0,05	0,04–0,06	0,05–0,08	0,06–0,10	0,08–0,14	0,10–0,18	0,13–0,22	0,14–0,24	0,18–0,32	0,23–0,41	
M	14.1	30 – 50	mm/r	0,02–0,05	0,03–0,06	0,04–0,07	0,05–0,09	0,08–0,11	0,09–0,12	0,10–0,14	0,12–0,16	0,14–0,18	0,16–0,20	
	14.3	40 – 60	mm/r	0,02–0,06	0,03–0,07	0,04–0,08	0,06–0,10	0,08–0,12	0,09–0,14	0,10–0,16	0,12–0,18	0,14–0,20	0,16–0,22	
	14.2, 14.4	30 – 50	mm/r	0,02–0,05	0,03–0,06	0,04–0,07	0,06–0,09	0,08–0,11	0,09–0,12	0,10–0,14	0,12–0,16	0,14–0,18	0,16–0,20	
K	15, 16	80 – 160	mm/r	0,07–0,14	0,08–0,15	0,10–0,20	0,11–0,22	0,14–0,28	0,18–0,34	0,21–0,40	0,23–0,44	0,28–0,54	0,34–0,67	
	17, 18, 19	90 – 140	mm/r	0,09–0,13	0,10–0,14	0,11–0,14	0,12–0,17	0,14–0,23	0,18–0,28	0,21–0,32	0,23–0,36	0,28–0,43	0,34–0,54	
	20	80 – 130	mm/r	0,05–0,12	0,06–0,14	0,07–0,15	0,08–0,17	0,11–0,23	0,13–0,27	0,15–0,32	0,17–0,36	0,22–0,43	0,27–0,54	
N	21	90 – 315	mm/r	0,05–0,12	0,06–0,13	0,08–0,14	0,10–0,16	0,12–0,20	0,16–0,24	0,20–0,28	0,24–0,32	0,28–0,40	0,32–0,48	
	22, 23, 24	90 – 270	mm/r	0,04–0,08	0,06–0,12	0,08–0,16	0,10–0,20	0,12–0,24	0,16–0,28	0,20–0,32	0,24–0,36	0,28–0,44	0,32–0,52	
	25	90 – 270	mm/r	0,10–0,13	0,11–0,14	0,12–0,14	0,13–0,16	0,14–0,20	0,16–0,24	0,20–0,28	0,24–0,32	0,28–0,40	0,32–0,44	
	26, 27, 28	90 – 270	mm/r	0,04–0,08	0,06–0,12	0,08–0,16	0,10–0,20	0,12–0,24	0,16–0,28	0,20–0,32	0,24–0,36	0,28–0,40	0,32–0,48	
S	31, 32	20 – 30	mm/r	0,01–0,04	0,02–0,05	0,03–0,06	0,04–0,08	0,06–0,10	0,08–0,12	0,09–0,13	0,10–0,14	0,12–0,16	0,14–0,18	
	33, 34, 35	10 – 30	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,03–0,06	0,05–0,08	0,07–0,10	0,08–0,11	0,09–0,12	0,10–0,14	0,11–0,16	
	36	10 – 40	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,02–0,05	0,04–0,07	0,06–0,09	0,07–0,10	0,08–0,11	0,09–0,13	0,10–0,15	
	37	10 – 40	mm/r	0,01–0,03	0,02–0,03	0,02–0,04	0,03–0,06	0,05–0,08	0,07–0,10	0,08–0,11	0,09–0,12	0,10–0,14	0,11–0,16	

Solid Carbide Drills

nominal size range	Metric tolerance	
	D1 tolerance	D tolerance h6
1–3	0,000/-0,014 (h8)	0,000/-0,006
>3–6	0,000/-0,012 (h7)	0,000/-0,008
>6–10	0,000/-0,015 (h7)	0,000/-0,009
>10–18	0,000/-0,018 (h7)	0,000/-0,011
>18–20	0,000/-0,021 (h7)	0,000/-0,013



# EXTREME CHALLENGES. EXTREME RESULTS.

## TDF Drills for Flat-Bottom Applications (Available as Semi-Standards)

### Primary Application

Engineered specifically to eliminate the need for a two-part operation when drilling flat-bottom holes or on an inclined surface:

- Drill flat-bottom holes in one step.
- Eliminate the need to use both an end mill and a drill to machine a flat on an inclined surface.
- After full cylindrical engagement, the drills run at normal solid carbide drilling parameters.

### Features and Benefits

- Four-Margin Design
  - Increases contact with material at full diameter.
  - Improves hold quality and drill stability in the cut.
  - Enables interrupted cuts and inclined exits.
- Special Point-Thinning
  - Increases centering capability.
  - Improves chip formation and flow.
  - Reduces cutting forces.

### Product Portfolio

- The Flat-Bottom Drill product series TDF51\* is pre-designed in four lengths and available in two grades, WN15HD for non-ferrous materials, and WU20PD™ for steel, iron, and stainless steel.

– TDF510*	1,5 x D
– TDF511*	3 x D
– TDF512*	5 x D
– TDF513*	8 x D
- Length variations and step drills available as engineered solutions.

### Ordering Process

- Please contact your local Authorized Distributor for a quote.

Application-Specific Drilling •

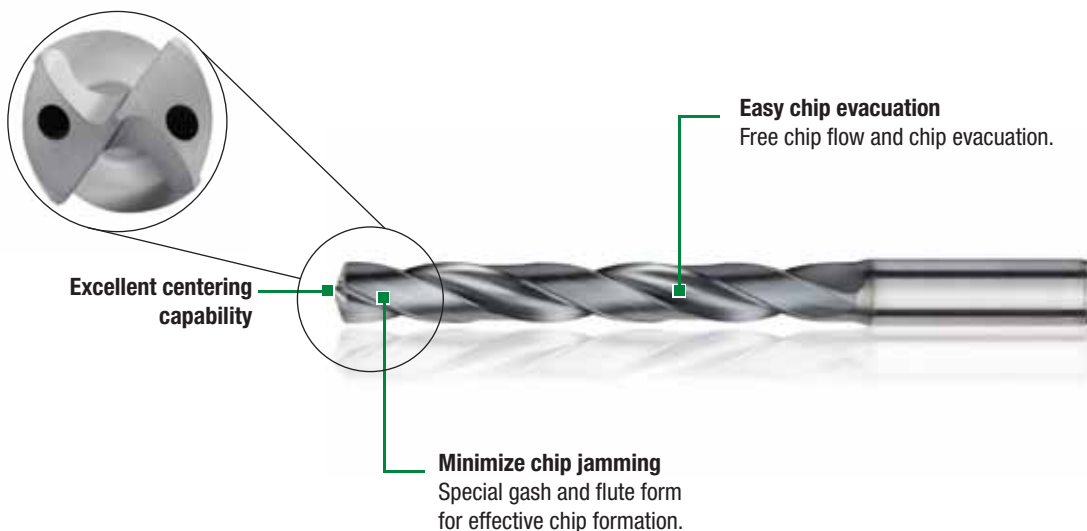
## WIDIA™ TOP DRILL S™ for Steel and Cast Iron

# TOP DRILL S



TOP DRILL S is the WIDIA line of solid carbide drills engineered to provide maximum performance and superior finish for application-specific tasks. Available in two material applications, TDS for steel and cast iron are each specially designed and coated to maximize output and increase tool life — offering less cost-per-hole and greater productivity.

- Designed for maximum productivity and longer tool life for steel and cast iron.
- Easy to choose and apply.
- One of the broadest ranges on the market for diameter selection, length series, and coolant options.
- Highest metal removal rates possible without sacrificing tool life.
- Latest Victory™ grades from WIDIA.





## TOP DRILL S™ for Steel

TOP DRILL S for steel is a high-performance solid carbide drill with an application-specific design. Although the point geometry is strong enough to drill stainless steel and cast iron, it is engineered to maximize performance when drilling steel. The WP20PD™ grade, designed to resist high heat and wear, is the latest in WIDIA™ technology. The two-margin design facilitates excellent hole quality and less friction when drilling steel at high speeds.

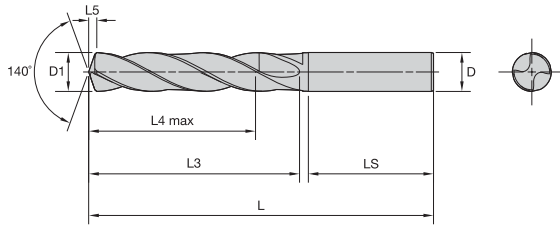
## TOP DRILL S for Cast Iron

TOP DRILL S for cast iron is designed with application-specific point geometry for maximum performance in cast iron materials. The point features corner chamfers that minimize breakout on exit holes. A four-margin design improves hole straightness, increasing tool life and extending cross-hole and inclined exit capabilities when drilling tough cast iron. The technologically advanced WK15PD™ grade is specially engineered to withstand high wear.

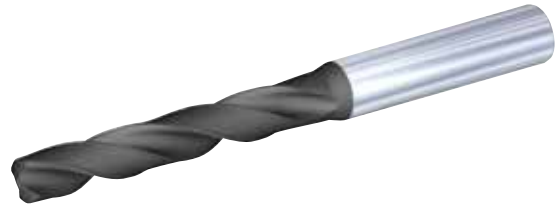
## WIDIA Advantage

- Application-specific geometry with the latest WIDIA grade technology.
- Lower cost-per-hole due to high MRR and long tool life.
- Consistent performance from internally controlled supply chain:  
Powder > Rod > Grinding > Coating
- Part of the complete WIDIA holemaking solution.
- Broad range of standard lengths, diameters, and coolant options in one line, including extensive intermediate metric, inch, fraction, and wire sizes.

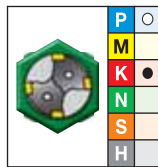




For information on L, L3, and L4 max, see page R133.



■ TDS202A • TDS212A • 5 x D



● first choice  
○ alternate choice

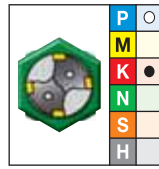
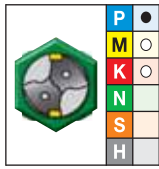
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4162258	TDS202A03000	4162417	TDS212A03000	3,000	.1181	—	—	66	28	23	0,5	36	6
4162259	TDS202A03048	4162418	TDS212A03048	3,048	.1200	—	31	66	28	23	0,5	36	6
4162260	TDS202A03100	4162419	TDS212A03100	3,100	.1220	—	—	66	28	23	0,5	36	6
4162261	TDS202A03175	4162420	TDS212A03175	3,175	.1250	1/8	—	66	28	23	0,5	36	6
4162262	TDS202A03200	4162421	TDS212A03200	3,200	.1260	—	—	66	28	23	0,5	36	6
4162283	TDS202A03264	4162422	TDS212A03264	3,264	.1285	—	30	66	28	23	0,5	36	6
4162284	TDS202A03300	4162543	TDS212A03300	3,300	.1299	—	—	66	28	23	0,5	36	6
4162285	TDS202A03400	4162544	TDS212A03400	3,400	.1339	—	—	66	28	23	0,6	36	6
4162286	TDS202A03455	4162545	TDS212A03455	3,455	.1360	—	29	66	28	23	0,6	36	6
4162287	TDS202A03500	4162546	TDS212A03500	3,500	.1378	—	—	66	28	23	0,6	36	6
4162288	TDS202A03571	4162547	TDS212A03571	3,571	.1406	9/64	—	66	28	23	0,6	36	6
4162289	TDS202A03600	4162548	TDS212A03600	3,600	.1417	—	—	66	28	23	0,6	36	6
4162290	TDS202A03658	4162549	TDS212A03658	3,658	.1440	—	27	66	28	23	0,6	36	6
4162291	TDS202A03700	4162550	TDS212A03700	3,700	.1457	—	—	66	28	23	0,6	36	6
4162292	TDS202A03734	4162551	TDS212A03734	3,734	.1470	—	26	66	28	23	0,6	36	6
4162293	TDS202A03800	4162552	TDS212A03800	3,800	.1496	—	—	74	36	29	0,6	36	6
4162294	TDS202A03900	4162553	TDS212A03900	3,900	.1535	—	—	74	36	29	0,6	36	6
4162295	TDS202A03970	4162554	TDS212A03970	3,970	.1563	5/32	—	74	36	29	0,7	36	6
4162296	TDS202A04000	4162555	TDS212A04000	4,000	.1575	—	—	74	36	29	0,7	36	6
4162297	TDS202A04039	4162556	TDS212A04039	4,039	.1590	—	21	74	36	29	0,7	36	6
4162298	TDS202A04090	4162557	TDS212A04090	4,090	.1610	—	20	74	36	29	0,7	36	6
4162299	TDS202A04100	4162558	TDS212A04100	4,100	.1614	—	—	74	36	29	0,7	36	6
4162300	TDS202A04200	4162559	TDS212A04200	4,200	.1654	—	—	74	36	29	0,7	36	6
4162301	TDS202A04217	4162560	TDS212A04217	4,217	.1660	—	19	74	36	29	0,7	36	6

(continued)

Solid Carbide Drills

(TDS202A • TDS212A • 5 x D — continued)



● first choice  
○ alternate choice

D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L	L3	L4 max	L5	LS	D
4162302	TDS202A04300	4162561	TDS212A04300	4,300	.1693	—	—	74	36	29	0,7	36	6
4162303	TDS202A04366	4162562	TDS212A04366	4,366	.1719	11/64	—	74	36	29	0,7	36	6
4162304	TDS202A04400	4162563	TDS212A04400	4,400	.1732	—	—	74	36	29	0,7	36	6
4162305	TDS202A04500	4162564	TDS212A04500	4,500	.1772	—	—	74	36	29	0,7	36	6
4162306	TDS202A04600	4162565	TDS212A04600	4,600	.1811	—	—	74	36	29	0,8	36	6
4162307	TDS202A04623	4162566	TDS212A04623	4,623	.1820	—	14	74	36	29	0,8	36	6
4162308	TDS202A04700	4162567	TDS212A04700	4,700	.1850	—	13	74	36	29	0,8	36	6
4162309	TDS202A04763	4162568	TDS212A04763	4,763	.1875	3/16	—	82	44	35	0,8	36	6
4162310	TDS202A04800	4162569	TDS212A04800	4,800	.1890	—	12	82	44	35	0,8	36	6
4162311	TDS202A04852	4162570	TDS212A04852	4,852	.1910	—	11	82	44	35	0,8	36	6
4162312	TDS202A04900	4162571	TDS212A04900	4,900	.1929	—	—	82	44	35	0,8	36	6
4162313	TDS202A05000	4162572	TDS212A05000	5,000	.1969	—	—	82	44	35	0,8	36	6
4162314	TDS202A05100	4162573	TDS212A05100	5,100	.2008	—	—	82	44	35	0,8	36	6
4162315	TDS202A05106	4162574	TDS212A05106	5,106	.2010	—	7	82	44	35	0,8	36	6
4162316	TDS202A05159	4162575	TDS212A05159	5,159	.2031	13/64	—	82	44	35	0,9	36	6
4162317	TDS202A05200	4162576	TDS212A05200	5,200	.2047	—	—	82	44	35	0,9	36	6
4162318	TDS202A05300	4162577	TDS212A05300	5,300	.2087	—	—	82	44	35	0,9	36	6
4162319	TDS202A05400	4162578	TDS212A05400	5,400	.2126	—	—	82	44	35	0,9	36	6
4162320	TDS202A05410	4162579	TDS212A05410	5,410	.2130	—	3	82	44	35	0,9	36	6
4162321	TDS202A05500	4162580	TDS212A05500	5,500	.2165	—	—	82	44	35	0,9	36	6
4162322	TDS202A05558	4162581	TDS212A05558	5,558	.2188	7/32	—	82	44	35	0,9	36	6
4162323	TDS202A05600	4162582	TDS212A05600	5,600	.2205	—	—	82	44	35	0,9	36	6
4162324	TDS202A05616	4162583	TDS212A05616	5,616	.2211	—	2	82	44	35	0,9	36	6
4162325	TDS202A05700	4162584	TDS212A05700	5,700	.2244	—	—	82	44	35	1,0	36	6
4162326	TDS202A05800	4162585	TDS212A05800	5,800	.2283	—	—	82	44	35	1,0	36	6
4162327	TDS202A05900	4162586	TDS212A05900	5,900	.2323	—	—	82	44	35	1,0	36	6
4162328	TDS202A05954	4162587	TDS212A05954	5,954	.2344	15/64	—	82	44	35	1,0	36	6
4162329	TDS202A06000	4162588	TDS212A06000	6,000	.2362	—	—	82	44	35	1,0	36	6
4162330	TDS202A06100	4162589	TDS212A06100	6,100	.2402	—	—	91	53	43	1,0	36	8
4162331	TDS202A06200	4162590	TDS212A06200	6,200	.2441	—	—	91	53	43	1,0	36	8
4162332	TDS202A06300	4162591	TDS212A06300	6,300	.2480	—	—	91	53	43	1,1	36	8
4162333	TDS202A06350	4162592	TDS212A06350	6,350	.2500	1/4	—	91	53	43	1,1	36	8
4162334	TDS202A06400	4162593	TDS212A06400	6,400	.2520	—	—	91	53	43	1,1	36	8
4162335	TDS202A06500	4162594	TDS212A06500	6,500	.2559	—	—	91	53	43	1,1	36	8
4162336	TDS202A06528	4162595	TDS212A06528	6,528	.2570	—	—	91	53	43	1,1	36	8
4162337	TDS202A06600	4162596	TDS212A06600	6,600	.2598	—	—	91	53	43	1,1	36	8
4162338	TDS202A06630	4162597	TDS212A06630	6,630	.2610	—	—	91	53	43	1,1	36	8
4162339	TDS202A06700	4162598	TDS212A06700	6,700	.2638	—	—	91	53	43	1,1	36	8
4162340	TDS202A06746	4162599	TDS212A06746	6,746	.2656	17/64	—	91	53	43	1,1	36	8
4148908	TDS202A06800	4148983	TDS212A06800	6,800	.2677	—	—	91	53	43	1,1	36	8

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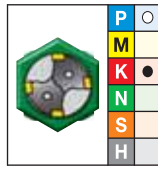
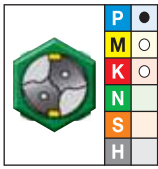
Solid Carbide Drills

# Solid Carbide Drills

TOP DRILL S™ without Through Coolant • Steel and Cast Iron



(TDS202A • TDS212A • 5 x D — continued)



● first choice  
○ alternate choice

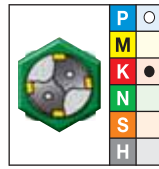
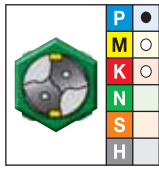
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4162341	TDS202A06900	4162600	TDS212A06900	6,900	.2717	—	—	91	53	43	1,2	36	8
4162342	TDS202A07000	4162601	TDS212A07000	7,000	.2756	—	—	91	53	43	1,2	36	8
4162343	TDS202A07100	4162602	TDS212A07100	7,100	.2795	—	—	91	53	43	1,2	36	8
4162344	TDS202A07145	4162603	TDS212A07145	7,145	.2813	9/32	—	91	53	43	1,2	36	8
4162345	TDS202A07200	4162604	TDS212A07200	7,200	.2835	—	—	91	53	43	1,2	36	8
4162346	TDS202A07300	4162605	TDS212A07300	7,300	.2874	—	—	91	53	43	1,2	36	8
4162347	TDS202A07400	4162606	TDS212A07400	7,400	.2913	—	—	91	53	43	1,3	36	8
4162348	TDS202A07500	4162607	TDS212A07500	7,500	.2953	—	—	91	53	43	1,3	36	8
4162349	TDS202A07541	4162608	TDS212A07541	7,541	.2969	19/64	—	91	53	43	1,3	36	8
4162350	TDS202A07600	4162609	TDS212A07600	7,600	.2992	—	—	91	53	43	1,3	36	8
4162351	TDS202A07700	4162610	TDS212A07700	7,700	.3031	—	—	91	53	43	1,3	36	8
4162352	TDS202A07800	4162611	TDS212A07800	7,800	.3071	—	—	91	53	43	1,3	36	8
4162353	TDS202A07900	4162612	TDS212A07900	7,900	.3110	—	—	91	53	43	1,3	36	8
4162354	TDS202A07938	4162613	TDS212A07938	7,938	.3125	5/16	—	91	53	43	1,3	36	8
4162355	TDS202A08000	4162614	TDS212A08000	8,000	.3150	—	—	91	53	43	1,4	36	8
4162356	TDS202A08100	4162615	TDS212A08100	8,100	.3189	—	—	103	61	49	1,4	40	10
4162357	TDS202A08200	4162616	TDS212A08200	8,200	.3228	—	—	103	61	49	1,4	40	10
4162358	TDS202A08300	4162617	TDS212A08300	8,300	.3268	—	—	103	61	49	1,4	40	10
4162359	TDS202A08334	4162618	TDS212A08334	8,334	.3281	21/64	—	103	61	49	1,4	40	10
4162360	TDS202A08400	4162619	TDS212A08400	8,400	.3307	—	—	103	61	49	1,4	40	10
4162361	TDS202A08433	4162620	TDS212A08433	8,433	.3320	—	—	103	61	49	1,4	40	10
4162362	TDS202A08500	4162621	TDS212A08500	8,500	.3346	—	—	103	61	49	1,4	40	10
4162363	TDS202A08600	4162622	TDS212A08600	8,600	.3386	—	—	103	61	49	1,5	40	10
4162364	TDS202A08700	4162623	TDS212A08700	8,700	.3425	—	—	103	61	49	1,5	40	10
4162365	TDS202A08733	4162624	TDS212A08733	8,733	.3438	11/32	—	103	61	49	1,5	40	10
4162366	TDS202A08800	4162625	TDS212A08800	8,800	.3465	—	—	103	61	49	1,5	40	10
4162367	TDS202A08900	4162626	TDS212A08900	8,900	.3504	—	—	103	61	49	1,5	40	10
4162368	TDS202A09000	4162627	TDS212A09000	9,000	.3543	—	—	103	61	49	1,5	40	10
4162369	TDS202A09100	4162628	TDS212A09100	9,100	.3583	—	—	103	61	49	1,5	40	10
4162370	TDS202A09129	4162629	TDS212A09129	9,129	.3594	23/64	—	103	61	49	1,6	40	10
4162371	TDS202A09200	4162630	TDS212A09200	9,200	.3622	—	—	103	61	49	1,6	40	10
4162372	TDS202A09300	4162631	TDS212A09300	9,300	.3661	—	—	103	61	49	1,6	40	10
4162373	TDS202A09347	4162632	TDS212A09347	9,347	.3680	—	—	103	61	49	1,6	40	10
4162374	TDS202A09400	4162633	TDS212A09400	9,400	.3701	—	—	103	61	49	1,6	40	10
4162375	TDS202A09500	4162634	TDS212A09500	9,500	.3740	—	—	103	61	49	1,6	40	10
4162376	TDS202A09525	4162635	TDS212A09525	9,525	.3750	3/8	—	103	61	49	1,6	40	10
4162377	TDS202A09600	4162636	TDS212A09600	9,600	.3780	—	—	103	61	49	1,6	40	10
4162378	TDS202A09700	4162637	TDS212A09700	9,700	.3819	—	—	103	61	49	1,7	40	10
4162379	TDS202A09800	4162638	TDS212A09800	9,800	.3858	—	—	103	61	49	1,7	40	10
4162380	TDS202A09900	4162639	TDS212A09900	9,900	.3898	—	—	103	61	49	1,7	40	10

(continued)

Solid Carbide Drills

(TDS202A • TDS212A • 5 x D — continued)



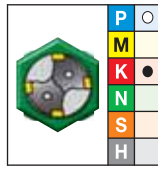
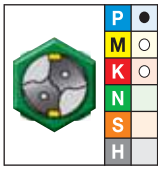
● first choice  
○ alternate choice

D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L	L3	L4 max	L5	LS	D
4162381	TDS202A09921	4162640	TDS212A09921	9,921	.3906	25/64	—	103	61	49	1,7	40	10
4167196	TDS202A10000	4162408	TDS212A10000	10,000	.3937	—	—	103	61	49	1,7	40	10
4167198	TDS202A10100	4162409	TDS212A10100	10,100	.3976	—	—	118	71	56	1,7	45	12
4167199	TDS202A10200	4162410	TDS212A10200	10,200	.4016	—	—	118	71	56	1,7	45	12
4167200	TDS202A10300	4162411	TDS212A10300	10,300	.4055	—	—	118	71	56	1,8	45	12
4167201	TDS202A10320	4162412	TDS212A10320	10,320	.4063	13/32	—	118	71	56	1,8	45	12
4167202	TDS202A10400	4162423	TDS212A10400	10,400	.4094	—	—	118	71	56	1,8	45	12
4167203	TDS202A10500	4162424	TDS212A10500	10,500	.4134	—	—	118	71	56	1,8	45	12
4167204	TDS202A10600	4162425	TDS212A10600	10,600	.4173	—	—	118	71	56	1,8	45	12
4167205	TDS202A10700	4162426	TDS212A10700	10,700	.4213	—	—	118	71	56	1,8	45	12
4167206	TDS202A10716	4162427	TDS212A10716	10,716	.4219	27/64	—	118	71	56	1,8	45	12
4167207	TDS202A10800	4162428	TDS212A10800	10,800	.4252	—	—	118	71	56	1,8	45	12
4167208	TDS202A10900	4162429	TDS212A10900	10,900	.4291	—	—	118	71	56	1,9	45	12
4167209	TDS202A11000	4162430	TDS212A11000	11,000	.4331	—	—	118	71	56	1,9	45	12
4167210	TDS202A11100	4162431	TDS212A11100	11,100	.4370	—	—	118	71	56	1,9	45	12
4167211	TDS202A11113	4162432	TDS212A11113	11,113	.4375	7/16	—	118	71	56	1,9	45	12
4167212	TDS202A11200	4162433	TDS212A11200	11,200	.4409	—	—	118	71	56	1,9	45	12
4167213	TDS202A11300	4162434	TDS212A11300	11,300	.4449	—	—	118	71	56	1,9	45	12
4167214	TDS202A11400	4162435	TDS212A11400	11,400	.4488	—	—	118	71	56	2,0	45	12
4167215	TDS202A11500	4162436	TDS212A11500	11,500	.4528	—	—	118	71	56	2,0	45	12
4167216	TDS202A11509	4162437	TDS212A11509	11,509	.4531	29/64	—	118	71	56	2,0	45	12
4167217	TDS202A11600	4162438	TDS212A11600	11,600	.4567	—	—	118	71	56	2,0	45	12
4167218	TDS202A11700	4162439	TDS212A11700	11,700	.4606	—	—	118	71	56	2,0	45	12
4167219	TDS202A11800	4162440	TDS212A11800	11,800	.4646	—	—	118	71	56	2,0	45	12
4167220	TDS202A11900	4162441	TDS212A11900	11,900	.4685	—	—	118	71	56	2,0	45	12
4167221	TDS202A11908	4162442	TDS212A11908	11,908	.4688	15/32	—	118	71	56	2,0	45	12
4167222	TDS202A12000	4162443	TDS212A12000	12,000	.4724	—	—	118	71	56	2,1	45	12
4167223	TDS202A12100	4162444	TDS212A12100	12,100	.4764	—	—	124	77	60	2,1	45	14
4167224	TDS202A12200	4162445	TDS212A12200	12,200	.4803	—	—	124	77	60	2,1	45	14
4167225	TDS202A12300	4162446	TDS212A12300	12,300	.4843	—	—	124	77	60	2,1	45	14
4167226	TDS202A12304	4162447	TDS212A12304	12,304	.4844	31/64	—	124	77	60	2,1	45	14
4167227	TDS202A12400	4162448	TDS212A12400	12,400	.4882	—	—	124	77	60	2,1	45	14
4167228	TDS202A12500	4162449	TDS212A12500	12,500	.4921	—	—	124	77	60	2,1	45	14
4167229	TDS202A12600	4162450	TDS212A12600	12,600	.4961	—	—	124	77	60	2,2	45	14
4167230	TDS202A12700	4162451	TDS212A12700	12,700	.5000	1/2	—	124	77	60	2,2	45	14
4167231	TDS202A12800	4162452	TDS212A12800	12,800	.5039	—	—	124	77	60	2,2	45	14
4167232	TDS202A12900	4162453	TDS212A12900	12,900	.5079	—	—	124	77	60	2,2	45	14
4167233	TDS202A13000	4162454	TDS212A13000	13,000	.5118	—	—	124	77	60	2,2	45	14
4167234	TDS202A13096	4162455	TDS212A13096	13,096	.5156	33/64	—	124	77	60	2,3	45	14
4167235	TDS202A13100	4162456	TDS212A13100	13,100	.5157	—	—	124	77	60	2,3	45	14

(continued)

(TDS202A • TDS212A • 5 x D — continued)



● first choice  
○ alternate choice

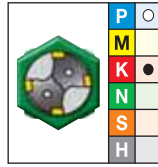
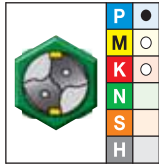
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4167236	TDS202A13200	4162457	TDS212A13200	13,200	.5197	—	—	124	77	60	2,3	45	14
4167237	TDS202A13300	4162458	TDS212A13300	13,300	.5236	—	—	124	77	60	2,3	45	14
4167238	TDS202A13400	4162459	TDS212A13400	13,400	.5276	—	—	124	77	60	2,3	45	14
4167239	TDS202A13500	4162460	TDS212A13500	13,500	.5315	—	—	124	77	60	2,3	45	14
4167240	TDS202A13600	4162461	TDS212A13600	13,600	.5354	—	—	124	77	60	2,3	45	14
4167241	TDS202A13700	4162462	TDS212A13700	13,700	.5394	—	—	124	77	60	2,4	45	14
4167242	TDS202A13800	4162463	TDS212A13800	13,800	.5433	—	—	124	77	60	2,4	45	14
4167243	TDS202A13891	4162464	TDS212A13891	13,891	.5469	35/64	—	124	77	60	2,4	45	14
4167244	TDS202A13900	4162465	TDS212A13900	13,900	.5472	—	—	124	77	60	2,4	45	14
4167245	TDS202A14000	4162466	TDS212A14000	14,000	.5512	—	—	124	77	60	2,4	45	14
4167246	TDS202A14100	4162467	TDS212A14100	14,100	.5551	—	—	133	83	63	2,4	48	16
4167247	TDS202A14200	4162468	TDS212A14200	14,200	.5591	—	—	133	83	63	2,5	48	16
4167248	TDS202A14288	4162469	TDS212A14288	14,288	.5625	9/16	—	133	83	63	2,5	48	16
4167249	TDS202A14300	4162470	TDS212A14300	14,300	.5630	—	—	133	83	63	2,5	48	16
4167250	TDS202A14400	4162471	TDS212A14400	14,400	.5669	—	—	133	83	63	2,5	48	16
4167251	TDS202A14500	4162472	TDS212A14500	14,500	.5709	—	—	133	83	63	2,5	48	16
4167252	TDS202A14600	4162473	TDS212A14600	14,600	.5748	—	—	133	83	63	2,5	48	16
4167253	TDS202A14684	4162474	TDS212A14684	14,684	.5781	37/64	—	133	83	63	2,5	48	16
4167254	TDS202A14700	4162475	TDS212A14700	14,700	.5787	—	—	133	83	63	2,5	48	16
4167255	TDS202A14800	4162476	TDS212A14800	14,800	.5827	—	—	133	83	63	2,6	48	16
4167256	TDS202A14900	4162477	TDS212A14900	14,900	.5866	—	—	133	83	63	2,6	48	16
4167257	TDS202A15000	4162478	TDS212A15000	15,000	.5906	—	—	133	83	63	2,6	48	16
4167258	TDS202A15083	4162479	TDS212A15083	15,083	.5938	19/32	—	133	83	63	2,6	48	16
4167259	TDS202A15100	4162480	TDS212A15100	15,100	.5945	—	—	133	83	63	2,6	48	16
4167260	TDS202A15200	4162481	TDS212A15200	15,200	.5984	—	—	133	83	63	2,6	48	16
4167261	TDS202A15300	4162482	TDS212A15300	15,300	.6024	—	—	133	83	63	2,6	48	16
4167262	TDS202A15400	4162483	TDS212A15400	15,400	.6063	—	—	133	83	63	2,7	48	16
4167263	TDS202A15479	4162484	TDS212A15479	15,479	.6094	39/64	—	133	83	63	2,7	48	16
4167264	TDS202A15500	4162485	TDS212A15500	15,500	.6102	—	—	133	83	63	2,7	48	16
4167265	TDS202A15600	4162486	TDS212A15600	15,600	.6142	—	—	133	83	63	2,7	48	16
4167266	TDS202A15700	4162487	TDS212A15700	15,700	.6181	—	—	133	83	63	2,7	48	16
4167267	TDS202A15800	4162488	TDS212A15800	15,800	.6220	—	—	133	83	63	2,7	48	16
4167268	TDS202A15875	4162489	TDS212A15875	15,875	.6250	5/8	—	133	83	63	2,7	48	16
4167269	TDS202A15900	4162490	TDS212A15900	15,900	.6260	—	—	133	83	63	2,8	48	16
4167270	TDS202A16000	4162491	TDS212A16000	16,000	.6299	—	—	133	83	63	2,8	48	16
4167271	TDS202A16100	4162492	TDS212A16100	16,100	.6339	—	—	143	93	71	2,8	48	18
4167272	TDS202A16200	4162493	TDS212A16200	16,200	.6378	—	—	143	93	71	2,8	48	18
4167273	TDS202A16271	4162494	TDS212A16271	16,271	.6406	41/64	—	143	93	71	2,8	48	18
4167274	TDS202A16300	4162495	TDS212A16300	16,300	.6417	—	—	143	93	71	2,8	48	18
4167275	TDS202A16400	4162496	TDS212A16400	16,400	.6457	—	—	143	93	71	2,8	48	18

(continued)

Solid Carbide Drills

(TDS202A • TDS212A • 5 x D – continued)

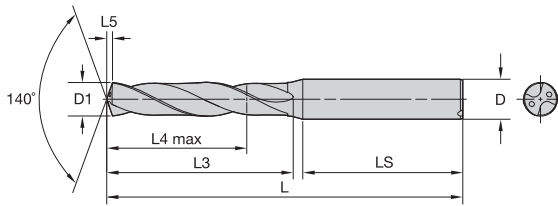


● first choice  
○ alternate choice

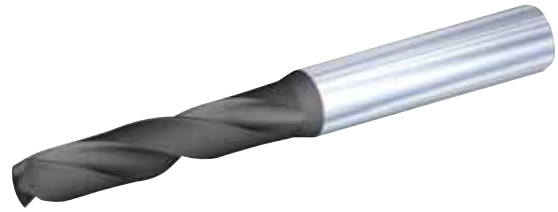
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L	L3	L4 max	L5	LS	D
4167276	TDS202A16500	4162497	TDS212A16500	16,500	.6496	—	—	143	93	71	2,9	48	18
4167277	TDS202A16600	4162498	TDS212A16600	16,600	.6535	—	—	143	93	71	2,9	48	18
4167278	TDS202A16670	4162499	TDS212A16670	16,670	.6563	21/32	—	143	93	71	2,9	48	18
4167279	TDS202A16700	4162500	TDS212A16700	16,700	.6575	—	—	143	93	71	2,9	48	18
4167280	TDS202A16800	4162501	TDS212A16800	16,800	.6614	—	—	143	93	71	2,9	48	18
4167281	TDS202A16900	4162502	TDS212A16900	16,900	.6654	—	—	143	93	71	2,9	48	18
4167282	TDS202A17000	4162503	TDS212A17000	17,000	.6693	—	—	143	93	71	2,9	48	18
4167283	TDS202A17100	4162504	TDS212A17100	17,100	.6732	—	—	143	93	71	3,0	48	18
4167284	TDS202A17200	4162505	TDS212A17200	17,200	.6772	—	—	143	93	71	3,0	48	18
4167285	TDS202A17300	4162506	TDS212A17300	17,300	.6811	—	—	143	93	71	3,0	48	18
4167286	TDS202A17400	4162507	TDS212A17400	17,400	.6850	—	—	143	93	71	3,0	48	18
4167287	TDS202A17463	4162508	TDS212A17463	17,463	.6875	11/16	—	143	93	71	3,0	48	18
4167288	TDS202A17500	4162509	TDS212A17500	17,500	.6890	—	—	143	93	71	3,0	48	18
4167289	TDS202A17600	4162510	TDS212A17600	17,600	.6929	—	—	143	93	71	3,1	48	18
4167290	TDS202A17700	4162511	TDS212A17700	17,700	.6969	—	—	143	93	71	3,1	48	18
4167291	TDS202A17800	4162512	TDS212A17800	17,800	.7008	—	—	143	93	71	3,1	48	18
4167292	TDS202A17859	4162513	TDS212A17859	17,859	.7031	45/64	—	143	93	71	3,1	48	18
4167293	TDS202A17900	4162514	TDS212A17900	17,900	.7047	—	—	143	93	71	3,1	48	18
4163313	TDS202A18000	4160528	TDS212A18000	18,000	.7087	—	—	143	93	71	3,1	48	18
4163314	TDS202A18100	4160464	TDS212A18100	18,100	.7126	—	—	153	101	77	3,1	50	20
4163305	TDS202A18200	4160465	TDS212A18200	18,200	.7165	—	—	153	101	77	3,2	50	20
4163306	TDS202A18258	4160466	TDS212A18258	18,258	.7188	23/32	—	153	101	77	3,2	50	20
4163307	TDS202A18300	4160467	TDS212A18300	18,300	.7205	—	—	153	101	77	3,2	50	20
4163308	TDS202A18400	4160468	TDS212A18400	18,400	.7244	—	—	153	101	77	3,2	50	20
4163309	TDS202A18500	4160469	TDS212A18500	18,500	.7283	—	—	153	101	77	3,2	50	20
4163310	TDS202A18600	4160470	TDS212A18600	18,600	.7323	—	—	153	101	77	3,2	50	20
4163311	TDS202A18654	4160471	TDS212A18654	18,654	.7344	47/64	—	153	101	77	3,2	50	20
4163312	TDS202A18700	4160472	TDS212A18700	18,700	.7362	—	—	153	101	77	3,2	50	20
4163323	TDS202A18800	4160583	TDS212A18800	18,800	.7402	—	—	153	101	77	3,3	50	20
4163324	TDS202A18900	4160584	TDS212A18900	18,900	.7441	—	—	153	101	77	3,3	50	20
4163325	TDS202A19000	4160585	TDS212A19000	19,000	.7480	—	—	153	101	77	3,3	50	20
4163326	TDS202A19050	4160586	TDS212A19050	19,050	.7500	3/4	—	153	101	77	3,3	50	20
4163327	TDS202A19100	4160587	TDS212A19100	19,100	.7520	—	—	153	101	77	3,3	50	20
4163328	TDS202A19200	4160588	TDS212A19200	19,200	.7559	—	—	153	101	77	3,3	50	20
4163329	TDS202A19300	4160589	TDS212A19300	19,300	.7598	—	—	153	101	77	3,4	50	20
4163330	TDS202A19400	4160590	TDS212A19400	19,400	.7638	—	—	153	101	77	3,4	50	20
4163331	TDS202A19500	4160591	TDS212A19500	19,500	.7677	—	—	153	101	77	3,4	50	20
4163332	TDS202A19600	4160592	TDS212A19600	19,600	.7717	—	—	153	101	77	3,4	50	20
4163333	TDS202A19700	4160593	TDS212A19700	19,700	.7756	—	—	153	101	77	3,4	50	20
4163334	TDS202A19800	4160594	TDS212A19800	19,800	.7795	—	—	153	101	77	3,4	50	20
4163335	TDS202A19900	4160595	TDS212A19900	19,900	.7835	—	—	153	101	77	3,5	50	20
4163336	TDS202A20000	4160596	TDS212A20000	20,000	.7874	—	—	153	101	77	3,5	50	20

Solid Carbide Drills



For information on L, L3, and L4 max, see page R133.



■ TDS401A • TDS411A • 3 x D



● first choice  
○ alternate choice

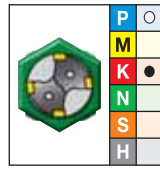
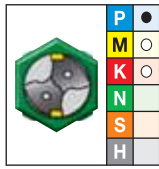
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4163315	TDS401A03000	4157799	TDS411A03000	3,000	.1181	—	—	62	20	14	0,5	36	6
4163337	TDS401A03048	4157800	TDS411A03048	3,048	.1200	—	31	62	20	14	0,5	36	6
4163338	TDS401A03100	4157801	TDS411A03100	3,100	.1220	—	—	62	20	14	0,5	36	6
4163339	TDS401A03175	4157802	TDS411A03175	3,175	.1250	1/8	—	62	20	14	0,5	36	6
4163340	TDS401A03200	4157803	TDS411A03200	3,200	.1260	—	—	62	20	14	0,5	36	6
4163341	TDS401A03264	4157804	TDS411A03264	3,264	.1285	—	30	62	20	14	0,5	36	6
4163342	TDS401A03300	4157805	TDS411A03300	3,300	.1299	—	—	62	20	14	0,5	36	6
4163463	TDS401A03400	4157806	TDS411A03400	3,400	.1339	—	—	62	20	14	0,6	36	6
4163464	TDS401A03455	4157807	TDS411A03455	3,455	.1360	—	29	62	20	14	0,6	36	6
4163465	TDS401A03500	4157808	TDS411A03500	3,500	.1378	—	—	62	20	14	0,6	36	6
4163466	TDS401A03571	4157809	TDS411A03571	3,571	.1406	9/64	—	62	20	14	0,6	36	6
4163467	TDS401A03600	4157810	TDS411A03600	3,600	.1417	—	—	62	20	14	0,6	36	6
4163468	TDS401A03658	4157811	TDS411A03658	3,658	.1440	—	27	62	20	14	0,6	36	6
4163469	TDS401A03700	4157812	TDS411A03700	3,700	.1457	—	—	62	20	14	0,6	36	6
4163470	TDS401A03734	4157813	TDS411A03734	3,734	.1470	—	26	62	20	14	0,6	36	6
4163471	TDS401A03800	4157814	TDS411A03800	3,800	.1496	—	—	66	24	17	0,6	36	6
4163472	TDS401A03900	4157815	TDS411A03900	3,900	.1535	—	—	66	24	17	0,6	36	6
4163473	TDS401A03970	4157816	TDS411A03970	3,970	.1563	5/32	—	66	24	17	0,7	36	6
4163474	TDS401A04000	4157817	TDS411A04000	4,000	.1575	—	—	66	24	17	0,7	36	6
4163475	TDS401A04039	4157818	TDS411A04039	4,039	.1590	—	21	66	24	17	0,7	36	6
4163476	TDS401A04090	4157819	TDS411A04090	4,090	.1610	—	20	66	24	17	0,7	36	6
4163477	TDS401A04100	4157820	TDS411A04100	4,100	.1614	—	—	66	24	17	0,7	36	6
4163478	TDS401A04200	4157821	TDS411A04200	4,200	.1654	—	—	66	24	17	0,7	36	6
4163479	TDS401A04217	4157822	TDS411A04217	4,217	.1660	—	19	66	24	17	0,7	36	6

(continued)



(TDS401A • TDS411A • 3 x D — continued)



● first choice  
○ alternate choice

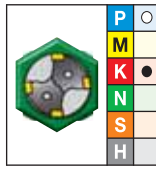
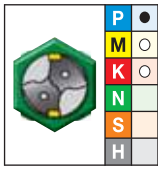
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4163480	TDS401A04300	4157823	TDS411A04300	4,300	.1693	—	—	66	24	17	0,7	36	6
4163481	TDS401A04366	4157824	TDS411A04366	4,366	.1719	11/64	—	66	24	17	0,7	36	6
4163482	TDS401A04400	4157825	TDS411A04400	4,400	.1732	—	—	66	24	17	0,7	36	6
4163483	TDS401A04500	4157826	TDS411A04500	4,500	.1772	—	—	66	24	17	0,7	36	6
4163484	TDS401A04600	4157827	TDS411A04600	4,600	.1811	—	—	66	24	17	0,8	36	6
4163485	TDS401A04623	4157828	TDS411A04623	4,623	.1820	—	14	66	24	17	0,8	36	6
4163486	TDS401A04700	4157829	TDS411A04700	4,700	.1850	—	13	66	24	17	0,8	36	6
4163487	TDS401A04763	4157830	TDS411A04763	4,763	.1875	3/16	—	66	28	20	0,8	36	6
4163488	TDS401A04800	4157831	TDS411A04800	4,800	.1890	—	12	66	28	20	0,8	36	6
4163489	TDS401A04852	4157832	TDS411A04852	4,852	.1910	—	11	66	28	20	0,8	36	6
4163490	TDS401A04900	4157833	TDS411A04900	4,900	.1929	—	—	66	28	20	0,8	36	6
4163491	TDS401A05000	4157834	TDS411A05000	5,000	.1969	—	—	66	28	20	0,8	36	6
4163492	TDS401A05100	4157835	TDS411A05100	5,100	.2008	—	—	66	28	20	0,8	36	6
4163493	TDS401A05106	4157836	TDS411A05106	5,106	.2010	—	7	66	28	20	0,8	36	6
4163494	TDS401A05159	4157837	TDS411A05159	5,159	.2031	13/64	—	66	28	20	0,9	36	6
4163495	TDS401A05200	4157838	TDS411A05200	5,200	.2047	—	—	66	28	20	0,9	36	6
4163496	TDS401A05300	4157839	TDS411A05300	5,300	.2087	—	—	66	28	20	0,9	36	6
4163497	TDS401A05400	4157840	TDS411A05400	5,400	.2126	—	—	66	28	20	0,9	36	6
4163498	TDS401A05410	4157841	TDS411A05410	5,410	.2130	—	3	66	28	20	0,9	36	6
4163499	TDS401A05500	4157842	TDS411A05500	5,500	.2165	—	—	66	28	20	0,9	36	6
4163500	TDS401A05558	4157843	TDS411A05558	5,558	.2188	7/32	—	66	28	20	0,9	36	6
4163501	TDS401A05600	4157844	TDS411A05600	5,600	.2205	—	—	66	28	20	0,9	36	6
4163502	TDS401A05616	4157845	TDS411A05616	5,616	.2211	—	2	66	28	20	0,9	36	6
4163503	TDS401A05700	4157846	TDS411A05700	5,700	.2244	—	—	66	28	20	1,0	36	6
4163504	TDS401A05800	4157847	TDS411A05800	5,800	.2283	—	—	66	28	20	1,0	36	6
4163505	TDS401A05900	4157848	TDS411A05900	5,900	.2323	—	—	66	28	20	1,0	36	6
4163506	TDS401A05954	4157849	TDS411A05954	5,954	.2344	15/64	—	66	28	20	1,0	36	6
4163507	TDS401A06000	4157850	TDS411A06000	6,000	.2362	—	—	66	28	20	1,0	36	6
4163508	TDS401A06100	4157851	TDS411A06100	6,100	.2402	—	—	79	34	24	1,0	36	8
4163509	TDS401A06200	4157852	TDS411A06200	6,200	.2441	—	—	79	34	24	1,0	36	8
4163510	TDS401A06300	4157853	TDS411A06300	6,300	.2480	—	—	79	34	24	1,1	36	8
4163511	TDS401A06350	4157854	TDS411A06350	6,350	.2500	1/4	—	79	34	24	1,1	36	8
4163512	TDS401A06400	4157855	TDS411A06400	6,400	.2520	—	—	79	34	24	1,1	36	8
4163513	TDS401A06500	4157856	TDS411A06500	6,500	.2559	—	—	79	34	24	1,1	36	8
4163514	TDS401A06528	4157857	TDS411A06528	6,528	.2570	—	—	79	34	24	1,1	36	8
4163515	TDS401A06600	4157858	TDS411A06600	6,600	.2598	—	—	79	34	24	1,1	36	8
4163516	TDS401A06630	4157859	TDS411A06630	6,630	.2610	—	—	79	34	24	1,1	36	8
4163517	TDS401A06700	4157860	TDS411A06700	6,700	.2638	—	—	79	34	24	1,1	36	8
4163518	TDS401A06746	4157861	TDS411A06746	6,746	.2656	17/64	—	79	34	24	1,1	36	8
4163519	TDS401A06800	4157862	TDS411A06800	6,800	.2677	—	—	79	34	24	1,1	36	8

(continued)

Solid Carbide Drills

(TDS401A • TDS411A • 3 x D — continued)



● first choice  
○ alternate choice

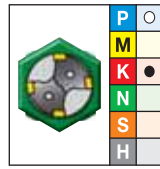
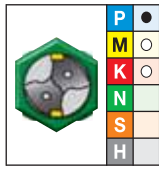
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4163520	TDS401A06900	4157863	TDS411A06900	6,900	.2717	—	—	79	34	24	1,2	36	8
4163521	TDS401A07000	4157864	TDS411A07000	7,000	.2756	—	—	79	34	24	1,2	36	8
4163522	TDS401A07100	4157865	TDS411A07100	7,100	.2795	—	—	79	41	29	1,2	36	8
4163523	TDS401A07145	4157866	TDS411A07145	7,145	.2813	9/32	—	79	41	29	1,2	36	8
4163524	TDS401A07200	4157867	TDS411A07200	7,200	.2835	—	—	79	41	29	1,2	36	8
4163525	TDS401A07300	4157868	TDS411A07300	7,300	.2874	—	—	79	41	29	1,2	36	8
4163526	TDS401A07400	4157869	TDS411A07400	7,400	.2913	—	—	79	41	29	1,3	36	8
4163527	TDS401A07500	4157870	TDS411A07500	7,500	.2953	—	—	79	41	29	1,3	36	8
4163528	TDS401A07541	4157871	TDS411A07541	7,541	.2969	19/64	—	79	41	29	1,3	36	8
4163529	TDS401A07600	4157872	TDS411A07600	7,600	.2992	—	—	79	41	29	1,3	36	8
4163530	TDS401A07700	4157873	TDS411A07700	7,700	.3031	—	—	79	41	29	1,3	36	8
4163531	TDS401A07800	4157874	TDS411A07800	7,800	.3071	—	—	79	41	29	1,3	36	8
4163532	TDS401A07900	4157875	TDS411A07900	7,900	.3110	—	—	79	41	29	1,3	36	8
4163533	TDS401A07938	4157876	TDS411A07938	7,938	.3125	5/16	—	79	41	29	1,3	36	8
4163534	TDS401A08000	4157877	TDS411A08000	8,000	.3150	—	—	79	41	29	1,4	36	8
4163535	TDS401A08100	4157878	TDS411A08100	8,100	.3189	—	—	89	47	35	1,4	40	10
4163536	TDS401A08200	4157879	TDS411A08200	8,200	.3228	—	—	89	47	35	1,4	40	10
4163537	TDS401A08300	4157880	TDS411A08300	8,300	.3268	—	—	89	47	35	1,4	40	10
4163538	TDS401A08334	4157881	TDS411A08334	8,334	.3281	21/64	—	89	47	35	1,4	40	10
4163539	TDS401A08400	4157882	TDS411A08400	8,400	.3307	—	—	89	47	35	1,4	40	10
4163540	TDS401A08433	4157883	TDS411A08433	8,433	.3320	—	—	89	47	35	1,4	40	10
4163541	TDS401A08500	4157884	TDS411A08500	8,500	.3346	—	—	89	47	35	1,4	40	10
4163542	TDS401A08600	4157885	TDS411A08600	8,600	.3386	—	—	89	47	35	1,5	40	10
4163543	TDS401A08700	4157886	TDS411A08700	8,700	.3425	—	—	89	47	35	1,5	40	10
4163544	TDS401A08733	4157887	TDS411A08733	8,733	.3438	11/32	—	89	47	35	1,5	40	10
4163545	TDS401A08800	4157888	TDS411A08800	8,800	.3465	—	—	89	47	35	1,5	40	10
4163546	TDS401A08900	4157889	TDS411A08900	8,900	.3504	—	—	89	47	35	1,5	40	10
4163547	TDS401A09000	4157890	TDS411A09000	9,000	.3543	—	—	89	47	35	1,5	40	10
4163548	TDS401A09100	4157891	TDS411A09100	9,100	.3583	—	—	89	47	35	1,5	40	10
4163549	TDS401A09129	4157892	TDS411A09129	9,129	.3594	23/64	—	89	47	35	1,6	40	10
4163550	TDS401A09200	4157893	TDS411A09200	9,200	.3622	—	—	89	47	35	1,6	40	10
4163551	TDS401A09300	4157894	TDS411A09300	9,300	.3661	—	—	89	47	35	1,6	40	10
4163552	TDS401A09347	4157895	TDS411A09347	9,347	.3680	—	—	89	47	35	1,6	40	10
4163553	TDS401A09400	4157896	TDS411A09400	9,400	.3701	—	—	89	47	35	1,6	40	10
4163554	TDS401A09500	4157897	TDS411A09500	9,500	.3740	—	—	89	47	35	1,6	40	10
4163555	TDS401A09525	4157898	TDS411A09525	9,525	.3750	3/8	—	89	47	35	1,6	40	10
4163556	TDS401A09600	4157899	TDS411A09600	9,600	.3780	—	—	89	47	35	1,6	40	10
4163557	TDS401A09700	4157900	TDS411A09700	9,700	.3819	—	—	89	47	35	1,7	40	10
4163558	TDS401A09800	4157901	TDS411A09800	9,800	.3858	—	—	89	47	35	1,7	40	10
4163559	TDS401A09900	4157902	TDS411A09900	9,900	.3898	—	—	89	47	35	1,7	40	10

(continued)

Solid Carbide Drills

(TDS401A • TDS411A • 3 x D — continued)



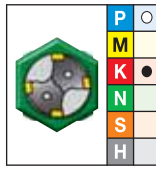
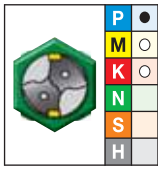
● first choice  
○ alternate choice

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4163560	TDS401A09921	4157903	TDS411A09921	9,921	.3906	25/64	—	89	47	35	1,7	40	10
4162950	TDS401A10000	4156562	TDS411A10000	10,000	.3937	—	—	89	47	35	1,7	40	10
4162951	TDS401A10100	4156603	TDS411A10100	10,100	.3976	—	—	102	55	40	1,7	45	12
4162952	TDS401A10200	4156604	TDS411A10200	10,200	.4016	—	—	102	55	40	1,7	45	12
4163343	TDS401A10300	4156605	TDS411A10300	10,300	.4055	—	—	102	55	40	1,8	45	12
4163344	TDS401A10320	4156606	TDS411A10320	10,320	.4063	13/32	—	102	55	40	1,8	45	12
4163345	TDS401A10400	4156607	TDS411A10400	10,400	.4094	—	—	102	55	40	1,8	45	12
4163346	TDS401A10500	4156608	TDS411A10500	10,500	.4134	—	—	102	55	40	1,8	45	12
4163347	TDS401A10600	4156609	TDS411A10600	10,600	.4173	—	—	102	55	40	1,8	45	12
4163348	TDS401A10700	4156610	TDS411A10700	10,700	.4213	—	—	102	55	40	1,8	45	12
4163349	TDS401A10716	4156611	TDS411A10716	10,716	.4219	27/64	—	102	55	40	1,8	45	12
4163350	TDS401A10800	4156612	TDS411A10800	10,800	.4252	—	—	102	55	40	1,8	45	12
4163351	TDS401A10900	4156613	TDS411A10900	10,900	.4291	—	—	102	55	40	1,9	45	12
4163352	TDS401A11000	4156614	TDS411A11000	11,000	.4331	—	—	102	55	40	1,9	45	12
4163353	TDS401A11100	4156615	TDS411A11100	11,100	.4370	—	—	102	55	40	1,9	45	12
4163354	TDS401A11113	4156616	TDS411A11113	11,113	.4375	7/16	—	102	55	40	1,9	45	12
4163355	TDS401A11200	4156617	TDS411A11200	11,200	.4409	—	—	102	55	40	1,9	45	12
4163356	TDS401A11300	4156618	TDS411A11300	11,300	.4449	—	—	102	55	40	1,9	45	12
4163357	TDS401A11400	4156619	TDS411A11400	11,400	.4488	—	—	102	55	40	2,0	45	12
4163358	TDS401A11500	4156620	TDS411A11500	11,500	.4528	—	—	102	55	40	2,0	45	12
4163359	TDS401A11509	4156621	TDS411A11509	11,509	.4531	29/64	—	102	55	40	2,0	45	12
4163360	TDS401A11600	4156622	TDS411A11600	11,600	.4567	—	—	102	55	40	2,0	45	12
4163361	TDS401A11700	4156623	TDS411A11700	11,700	.4606	—	—	102	55	40	2,0	45	12
4163362	TDS401A11800	4156624	TDS411A11800	11,800	.4646	—	—	102	55	40	2,0	45	12
4163363	TDS401A11900	4156625	TDS411A11900	11,900	.4685	—	—	102	55	40	2,0	45	12
4163364	TDS401A11908	4156626	TDS411A11908	11,908	.4688	15/32	—	102	55	40	2,0	45	12
4163365	TDS401A12000	4156627	TDS411A12000	12,000	.4724	—	—	102	55	40	2,1	45	12
4163366	TDS401A12100	4156628	TDS411A12100	12,100	.4764	—	—	107	60	43	2,1	45	14
4163367	TDS401A12200	4156629	TDS411A12200	12,200	.4803	—	—	107	60	43	2,1	45	14
4163368	TDS401A12300	4156630	TDS411A12300	12,300	.4843	—	—	107	60	43	2,1	45	14
4163369	TDS401A12304	4156631	TDS411A12304	12,304	.4844	31/64	—	107	60	43	2,1	45	14
4163370	TDS401A12400	4156632	TDS411A12400	12,400	.4882	—	—	107	60	43	2,1	45	14
4163371	TDS401A12500	4156633	TDS411A12500	12,500	.4921	—	—	107	60	43	2,1	45	14
4163372	TDS401A12600	4156634	TDS411A12600	12,600	.4961	—	—	107	60	43	2,2	45	14
4163373	TDS401A12700	4156635	TDS411A12700	12,700	.5000	1/2	—	107	60	43	2,2	45	14
4163374	TDS401A12800	4156636	TDS411A12800	12,800	.5039	—	—	107	60	43	2,2	45	14
4163375	TDS401A12900	4156637	TDS411A12900	12,900	.5079	—	—	107	60	43	2,2	45	14
4163376	TDS401A13000	4156638	TDS411A13000	13,000	.5118	—	—	107	60	43	2,2	45	14
4163377	TDS401A13096	4156639	TDS411A13096	13,096	.5156	33/64	—	107	60	43	2,3	45	14
4163378	TDS401A13100	4156640	TDS411A13100	13,100	.5157	—	—	107	60	43	2,3	45	14

(continued)

Solid Carbide Drills

(TDS401A • TDS411A • 3 x D — continued)



● first choice  
○ alternate choice

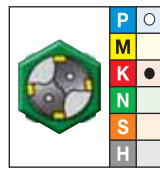
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4163379	TDS401A13200	4156641	TDS411A13200	13,200	.5197	—	—	107	60	43	2,3	45	14
4163380	TDS401A13300	4156642	TDS411A13300	13,300	.5236	—	—	107	60	43	2,3	45	14
4163381	TDS401A13400	4156643	TDS411A13400	13,400	.5276	—	—	107	60	43	2,3	45	14
4163382	TDS401A13500	4156644	TDS411A13500	13,500	.5315	—	—	107	60	43	2,3	45	14
4163383	TDS401A13600	4156645	TDS411A13600	13,600	.5354	—	—	107	60	43	2,3	45	14
4163384	TDS401A13700	4156646	TDS411A13700	13,700	.5394	—	—	107	60	43	2,4	45	14
4163385	TDS401A13800	4156647	TDS411A13800	13,800	.5433	—	—	107	60	43	2,4	45	14
4163386	TDS401A13891	4156648	TDS411A13891	13,891	.5469	35/64	—	107	60	43	2,4	45	14
4163387	TDS401A13900	4156649	TDS411A13900	13,900	.5472	—	—	107	60	43	2,4	45	14
4163388	TDS401A14000	4156650	TDS411A14000	14,000	.5512	—	—	107	60	43	2,4	45	14
4163389	TDS401A14100	4156651	TDS411A14100	14,100	.5551	—	—	115	65	45	2,4	48	16
4163390	TDS401A14200	4156652	TDS411A14200	14,200	.5591	—	—	115	65	45	2,5	48	16
4163391	TDS401A14288	4156653	TDS411A14288	14,288	.5625	9/16	—	115	65	45	2,5	48	16
4163392	TDS401A14300	4156654	TDS411A14300	14,300	.5630	—	—	115	65	45	2,5	48	16
4163393	TDS401A14400	4156655	TDS411A14400	14,400	.5669	—	—	115	65	45	2,5	48	16
4163394	TDS401A14500	4156656	TDS411A14500	14,500	.5709	—	—	115	65	45	2,5	48	16
4163395	TDS401A14600	4156657	TDS411A14600	14,600	.5748	—	—	115	65	45	2,5	48	16
4163396	TDS401A14684	4156658	TDS411A14684	14,684	.5781	37/64	—	115	65	45	2,5	48	16
4163397	TDS401A14700	4156659	TDS411A14700	14,700	.5787	—	—	115	65	45	2,5	48	16
4163398	TDS401A14800	4156660	TDS411A14800	14,800	.5827	—	—	115	65	45	2,6	48	16
4163399	TDS401A14900	4156661	TDS411A14900	14,900	.5866	—	—	115	65	45	2,6	48	16
4163400	TDS401A15000	4156662	TDS411A15000	15,000	.5906	—	—	115	65	45	2,6	48	16
4163401	TDS401A15083	4156663	TDS411A15083	15,083	.5938	19/32	—	115	65	45	2,6	48	16
4163402	TDS401A15100	4156664	TDS411A15100	15,100	.5945	—	—	115	65	45	2,6	48	16
4163403	TDS401A15200	4156665	TDS411A15200	15,200	.5984	—	—	115	65	45	2,6	48	16
4163404	TDS401A15300	4156666	TDS411A15300	15,300	.6024	—	—	115	65	45	2,6	48	16
4163405	TDS401A15400	4156667	TDS411A15400	15,400	.6063	—	—	115	65	45	2,7	48	16
4163406	TDS401A15479	4156668	TDS411A15479	15,479	.6094	39/64	—	115	65	45	2,7	48	16
4163407	TDS401A15500	4156669	TDS411A15500	15,500	.6102	—	—	115	65	45	2,7	48	16
4163408	TDS401A15600	4156670	TDS411A15600	15,600	.6142	—	—	115	65	45	2,7	48	16
4163409	TDS401A15700	4156671	TDS411A15700	15,700	.6181	—	—	115	65	45	2,7	48	16
4163410	TDS401A15800	4156672	TDS411A15800	15,800	.6220	—	—	115	65	45	2,7	48	16
4163411	TDS401A15875	4156673	TDS411A15875	15,875	.6250	5/8	—	115	65	45	2,7	48	16
4163412	TDS401A15900	4156674	TDS411A15900	15,900	.6260	—	—	115	65	45	2,8	48	16
4163413	TDS401A16000	4156675	TDS411A16000	16,000	.6299	—	—	115	65	45	2,8	48	16
4163414	TDS401A16100	4156676	TDS411A16100	16,100	.6339	—	—	123	73	51	2,8	48	18
4163415	TDS401A16200	4156677	TDS411A16200	16,200	.6378	—	—	123	73	51	2,8	48	18
4163416	TDS401A16271	4156678	TDS411A16271	16,271	.6406	41/64	—	123	73	51	2,8	48	18
4163417	TDS401A16300	4156679	TDS411A16300	16,300	.6417	—	—	123	73	51	2,8	48	18
4163418	TDS401A16400	4156680	TDS411A16400	16,400	.6457	—	—	123	73	51	2,8	48	18

(continued)

Solid Carbide Drills

(TDS401A • TDS411A • 3 x D — continued)

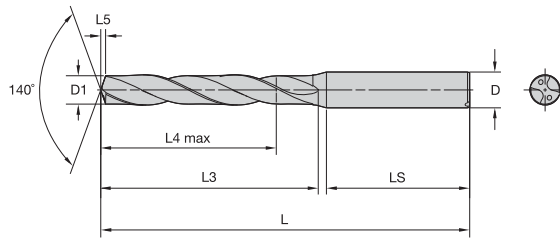


● first choice  
○ alternate choice

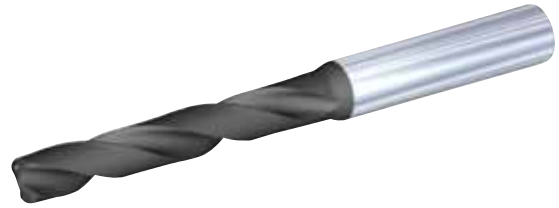
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4163419	TDS401A16500	4156681	TDS411A16500	16,500	.6496	—	—	123	73	51	2,9	48	18
4163420	TDS401A16600	4156682	TDS411A16600	16,600	.6535	—	—	123	73	51	2,9	48	18
4163421	TDS401A16670	4156683	TDS411A16670	16,670	.6563	21/32	—	123	73	51	2,9	48	18
4163422	TDS401A16700	4156684	TDS411A16700	16,700	.6575	—	—	123	73	51	2,9	48	18
4163423	TDS401A16800	4156685	TDS411A16800	16,800	.6614	—	—	123	73	51	2,9	48	18
4163424	TDS401A16900	4156686	TDS411A16900	16,900	.6654	—	—	123	73	51	2,9	48	18
4163425	TDS401A17000	4156687	TDS411A17000	17,000	.6693	—	—	123	73	51	2,9	48	18
4163426	TDS401A17100	4156688	TDS411A17100	17,100	.6732	—	—	123	73	51	3,0	48	18
4163427	TDS401A17200	4156689	TDS411A17200	17,200	.6772	—	—	123	73	51	3,0	48	18
4163428	TDS401A17300	4156690	TDS411A17300	17,300	.6811	—	—	123	73	51	3,0	48	18
4163429	TDS401A17400	4156691	TDS411A17400	17,400	.6850	—	—	123	73	51	3,0	48	18
4163430	TDS401A17463	4156692	TDS411A17463	17,463	.6875	11/16	—	123	73	51	3,0	48	18
4163431	TDS401A17500	4156693	TDS411A17500	17,500	.6890	—	—	123	73	51	3,0	48	18
4163432	TDS401A17600	4156694	TDS411A17600	17,600	.6929	—	—	123	73	51	3,1	48	18
4163433	TDS401A17700	4156695	TDS411A17700	17,700	.6969	—	—	123	73	51	3,1	48	18
4163434	TDS401A17800	4156696	TDS411A17800	17,800	.7008	—	—	123	73	51	3,1	48	18
4163435	TDS401A17859	4156697	TDS411A17859	17,859	.7031	45/64	—	123	73	51	3,1	48	18
4163436	TDS401A17900	4156698	TDS411A17900	17,900	.7047	—	—	123	73	51	3,1	48	18
4163271	TDS401A18000	4156699	TDS411A18000	18,000	.7087	—	—	123	73	51	3,1	48	18
4163272	TDS401A18100	4156700	TDS411A18100	18,100	.7126	—	—	131	79	55	3,1	50	20
4163283	TDS401A18200	4156701	TDS411A18200	18,200	.7165	—	—	131	79	55	3,2	50	20
4163284	TDS401A18258	4156702	TDS411A18258	18,258	.7188	23/32	—	131	79	55	3,2	50	20
4163285	TDS401A18300	4156713	TDS411A18300	18,300	.7205	—	—	131	79	55	3,2	50	20
4163286	TDS401A18400	4156714	TDS411A18400	18,400	.7244	—	—	131	79	55	3,2	50	20
4163287	TDS401A18500	4156715	TDS411A18500	18,500	.7283	—	—	131	79	55	3,2	50	20
4163288	TDS401A18600	4156716	TDS411A18600	18,600	.7323	—	—	131	79	55	3,2	50	20
4163289	TDS401A18654	4156717	TDS411A18654	18,654	.7344	47/64	—	131	79	55	3,2	50	20
4163290	TDS401A18700	4156718	TDS411A18700	18,700	.7362	—	—	131	79	55	3,2	50	20
4163291	TDS401A18800	4156719	TDS411A18800	18,800	.7402	—	—	131	79	55	3,3	50	20
4163292	TDS401A18900	4156720	TDS411A18900	18,900	.7441	—	—	131	79	55	3,3	50	20
4163293	TDS401A19000	4156721	TDS411A19000	19,000	.7480	—	—	131	79	55	3,3	50	20
4163294	TDS401A19050	4156722	TDS411A19050	19,050	.7500	3/4	—	131	79	55	3,3	50	20
4163295	TDS401A19100	4156723	TDS411A19100	19,100	.7520	—	—	131	79	55	3,3	50	20
4163296	TDS401A19200	4156724	TDS411A19200	19,200	.7559	—	—	131	79	55	3,3	50	20
4163297	TDS401A19300	4156725	TDS411A19300	19,300	.7598	—	—	131	79	55	3,4	50	20
4163298	TDS401A19400	4156726	TDS411A19400	19,400	.7638	—	—	131	79	55	3,4	50	20
4163299	TDS401A19500	4156727	TDS411A19500	19,500	.7677	—	—	131	79	55	3,4	50	20
4163300	TDS401A19600	4156728	TDS411A19600	19,600	.7717	—	—	131	79	55	3,4	50	20
4163301	TDS401A19700	4156729	TDS411A19700	19,700	.7756	—	—	131	79	55	3,4	50	20
4163302	TDS401A19800	4156730	TDS411A19800	19,800	.7795	—	—	131	79	55	3,4	50	20
4163303	TDS401A19900	4156731	TDS411A19900	19,900	.7835	—	—	131	79	55	3,5	50	20
4163304	TDS401A20000	4156732	TDS411A20000	20,000	.7874	—	—	131	79	55	3,5	50	20

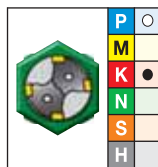
Solid Carbide Drills



For information on L, L3, and L4 max, see page R133.



■ TDS402A • TDS412A • 5 x D



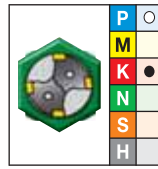
● first choice  
○ alternate choice

D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter		wire size	L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in							
4162967	TDS402A03000	4158757	TDS412A03000	3,000	.1181	—	66	28	23	0,5	36	6
4162968	TDS402A03048	4158758	TDS412A03048	3,048	.1200	—	66	28	23	0,5	36	6
4162969	TDS402A03100	4158759	TDS412A03100	3,100	.1220	—	66	28	23	0,5	36	6
4162970	TDS402A03175	4158760	TDS412A03175	3,175	.1250	1/8	66	28	23	0,5	36	6
4162972	TDS402A03200	4158761	TDS412A03200	3,200	.1260	—	66	28	23	0,5	36	6
4162983	TDS402A03264	4158762	TDS412A03264	3,264	.1285	—	66	28	23	0,5	36	6
4162984	TDS402A03300	4158793	TDS412A03300	3,300	.1299	—	66	28	23	0,5	36	6
4162985	TDS402A03400	4158794	TDS412A03400	3,400	.1339	—	66	28	23	0,6	36	6
4162986	TDS402A03455	4158795	TDS412A03455	3,455	.1360	—	66	28	23	0,6	36	6
4162987	TDS402A03500	4158796	TDS412A03500	3,500	.1378	—	66	28	23	0,6	36	6
4162988	TDS402A03571	4158797	TDS412A03571	3,571	.1406	9/64	66	28	23	0,6	36	6
4162989	TDS402A03600	4158798	TDS412A03600	3,600	.1417	—	66	28	23	0,6	36	6
4162990	TDS402A03658	4158799	TDS412A03658	3,658	.1440	—	66	28	23	0,6	36	6
4162991	TDS402A03700	4158800	TDS412A03700	3,700	.1457	—	66	28	23	0,6	36	6
4162992	TDS402A03734	4158801	TDS412A03734	3,734	.1470	—	66	28	23	0,6	36	6
4162993	TDS402A03800	4158802	TDS412A03800	3,800	.1496	—	74	36	29	0,6	36	6
4162994	TDS402A03900	4158803	TDS412A03900	3,900	.1535	—	74	36	29	0,6	36	6
4162995	TDS402A03970	4158804	TDS412A03970	3,970	.1563	5/32	74	36	29	0,7	36	6
4162996	TDS402A04000	4158805	TDS412A04000	4,000	.1575	—	74	36	29	0,7	36	6
4162997	TDS402A04039	4158806	TDS412A04039	4,039	.1590	—	74	36	29	0,7	36	6
4162998	TDS402A04090	4158807	TDS412A04090	4,090	.1610	—	74	36	29	0,7	36	6
4162999	TDS402A04100	4158808	TDS412A04100	4,100	.1614	—	74	36	29	0,7	36	6
4163000	TDS402A04200	4158809	TDS412A04200	4,200	.1654	—	74	36	29	0,7	36	6
4163001	TDS402A04217	4158810	TDS412A04217	4,217	.1660	—	74	36	29	0,7	36	6

(continued)

(TDS402A • TDS412A • 5 x D — continued)



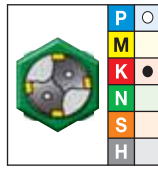
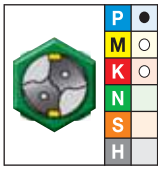
● first choice  
○ alternate choice

D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L	L3	L4 max	L5	LS	D
4163002	TDS402A04300	4158811	TDS412A04300	4,300	.1693	—	—	74	36	29	0,7	36	6
4163013	TDS402A04366	4158812	TDS412A04366	4,366	.1719	11/64	—	74	36	29	0,7	36	6
4163014	TDS402A04400	4158813	TDS412A04400	4,400	.1732	—	—	74	36	29	0,7	36	6
4163015	TDS402A04500	4158814	TDS412A04500	4,500	.1772	—	—	74	36	29	0,7	36	6
4163016	TDS402A04600	4158815	TDS412A04600	4,600	.1811	—	—	74	36	29	0,8	36	6
4163017	TDS402A04623	4158816	TDS412A04623	4,623	.1820	—	14	74	36	29	0,8	36	6
4163018	TDS402A04700	4158817	TDS412A04700	4,700	.1850	—	13	74	36	29	0,8	36	6
4163019	TDS402A04763	4158818	TDS412A04763	4,763	.1875	3/16	—	82	44	35	0,8	36	6
4163020	TDS402A04800	4158819	TDS412A04800	4,800	.1890	—	12	82	44	35	0,8	36	6
4163021	TDS402A04852	4158820	TDS412A04852	4,852	.1910	—	11	82	44	35	0,8	36	6
4163022	TDS402A04900	4158821	TDS412A04900	4,900	.1929	—	—	82	44	35	0,8	36	6
4163023	TDS402A05000	4158822	TDS412A05000	5,000	.1969	—	—	82	44	35	0,8	36	6
4163024	TDS402A05100	4158823	TDS412A05100	5,100	.2008	—	—	82	44	35	0,8	36	6
4163025	TDS402A05106	4158824	TDS412A05106	5,106	.2010	—	7	82	44	35	0,8	36	6
4163026	TDS402A05159	4158825	TDS412A05159	5,159	.2031	13/64	—	82	44	35	0,9	36	6
4163027	TDS402A05200	4158826	TDS412A05200	5,200	.2047	—	—	82	44	35	0,9	36	6
4163028	TDS402A05300	4158827	TDS412A05300	5,300	.2087	—	—	82	44	35	0,9	36	6
4163029	TDS402A05400	4158828	TDS412A05400	5,400	.2126	—	—	82	44	35	0,9	36	6
4163030	TDS402A05410	4158829	TDS412A05410	5,410	.2130	—	3	82	44	35	0,9	36	6
4163031	TDS402A05500	4158830	TDS412A05500	5,500	.2165	—	—	82	44	35	0,9	36	6
4163032	TDS402A05558	4158831	TDS412A05558	5,558	.2188	7/32	—	82	44	35	0,9	36	6
4163034	TDS402A05600	4158832	TDS412A05600	5,600	.2205	—	—	82	44	35	0,9	36	6
4163035	TDS402A05616	4158833	TDS412A05616	5,616	.2211	—	2	82	44	35	0,9	36	6
4163036	TDS402A05700	4158834	TDS412A05700	5,700	.2244	—	—	82	44	35	1,0	36	6
4163037	TDS402A05800	4158835	TDS412A05800	5,800	.2283	—	—	82	44	35	1,0	36	6
4163038	TDS402A05900	4158836	TDS412A05900	5,900	.2323	—	—	82	44	35	1,0	36	6
4163039	TDS402A05954	4158837	TDS412A05954	5,954	.2344	15/64	—	82	44	35	1,0	36	6
4163040	TDS402A06000	4158838	TDS412A06000	6,000	.2362	—	—	82	44	35	1,0	36	6
4163041	TDS402A06100	4158839	TDS412A06100	6,100	.2402	—	—	91	53	43	1,0	36	8
4163042	TDS402A06200	4158840	TDS412A06200	6,200	.2441	—	—	91	53	43	1,0	36	8
4163043	TDS402A06300	4158841	TDS412A06300	6,300	.2480	—	—	91	53	43	1,1	36	8
4163044	TDS402A06350	4158842	TDS412A06350	6,350	.2500	1/4	—	91	53	43	1,1	36	8
4163045	TDS402A06400	4158843	TDS412A06400	6,400	.2520	—	—	91	53	43	1,1	36	8
4163046	TDS402A06500	4158844	TDS412A06500	6,500	.2559	—	—	91	53	43	1,1	36	8
4163047	TDS402A06528	4158845	TDS412A06528	6,528	.2570	—	—	91	53	43	1,1	36	8
4163048	TDS402A06600	4158846	TDS412A06600	6,600	.2598	—	—	91	53	43	1,1	36	8
4163049	TDS402A06630	4158847	TDS412A06630	6,630	.2610	—	—	91	53	43	1,1	36	8
4163050	TDS402A06700	4158848	TDS412A06700	6,700	.2638	—	—	91	53	43	1,1	36	8
4163051	TDS402A06746	4158849	TDS412A06746	6,746	.2656	17/64	—	91	53	43	1,1	36	8
4163052	TDS402A06800	4158850	TDS412A06800	6,800	.2677	—	—	91	53	43	1,1	36	8

(continued)

(TDS402A • TDS412A • 5 x D — continued)



● first choice  
○ alternate choice

D1 diameter

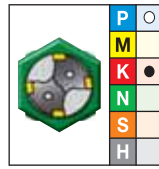
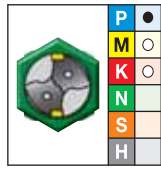
grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4163053	TDS402A06900	4158851	TDS412A06900	6,900	.2717	—	—	91	53	43	1,2	36	8
4163054	TDS402A07000	4158852	TDS412A07000	7,000	.2756	—	—	91	53	43	1,2	36	8
4163055	TDS402A07100	4158853	TDS412A07100	7,100	.2795	—	—	91	53	43	1,2	36	8
4163056	TDS402A07145	4158854	TDS412A07145	7,145	.2813	9/32	—	91	53	43	1,2	36	8
4163057	TDS402A07200	4158855	TDS412A07200	7,200	.2835	—	—	91	53	43	1,2	36	8
4163058	TDS402A07300	4158856	TDS412A07300	7,300	.2874	—	—	91	53	43	1,2	36	8
4163059	TDS402A07400	4158857	TDS412A07400	7,400	.2913	—	—	91	53	43	1,3	36	8
4163060	TDS402A07500	4158858	TDS412A07500	7,500	.2953	—	—	91	53	43	1,3	36	8
4163061	TDS402A07541	4158859	TDS412A07541	7,541	.2969	19/64	—	91	53	43	1,3	36	8
4163062	TDS402A07600	4158860	TDS412A07600	7,600	.2992	—	—	91	53	43	1,3	36	8
4163063	TDS402A07700	4158861	TDS412A07700	7,700	.3031	—	—	91	53	43	1,3	36	8
4163064	TDS402A07800	4158862	TDS412A07800	7,800	.3071	—	—	91	53	43	1,3	36	8
4163065	TDS402A07900	4158863	TDS412A07900	7,900	.3110	—	—	91	53	43	1,3	36	8
4163066	TDS402A07938	4158864	TDS412A07938	7,938	.3125	5/16	—	91	53	43	1,3	36	8
4163067	TDS402A08000	4158865	TDS412A08000	8,000	.3150	—	—	91	53	43	1,4	36	8
4163068	TDS402A08100	4158866	TDS412A08100	8,100	.3189	—	—	103	61	49	1,4	40	10
4163069	TDS402A08200	4158867	TDS412A08200	8,200	.3228	—	—	103	61	49	1,4	40	10
4163070	TDS402A08300	4158868	TDS412A08300	8,300	.3268	—	—	103	61	49	1,4	40	10
4163071	TDS402A08334	4158869	TDS412A08334	8,334	.3281	21/64	—	103	61	49	1,4	40	10
4163072	TDS402A08400	4158870	TDS412A08400	8,400	.3307	—	—	103	61	49	1,4	40	10
4163073	TDS402A08433	4158871	TDS412A08433	8,433	.3320	—	—	103	61	49	1,4	40	10
4163074	TDS402A08500	4158872	TDS412A08500	8,500	.3346	—	—	103	61	49	1,4	40	10
4163075	TDS402A08600	4158873	TDS412A08600	8,600	.3386	—	—	103	61	49	1,5	40	10
4163077	TDS402A08700	4158874	TDS412A08700	8,700	.3425	—	—	103	61	49	1,5	40	10
4163078	TDS402A08733	4158875	TDS412A08733	8,733	.3438	11/32	—	103	61	49	1,5	40	10
4163079	TDS402A08800	4158876	TDS412A08800	8,800	.3465	—	—	103	61	49	1,5	40	10
4163080	TDS402A08900	4158877	TDS412A08900	8,900	.3504	—	—	103	61	49	1,5	40	10
4163081	TDS402A09000	4158878	TDS412A09000	9,000	.3543	—	—	103	61	49	1,5	40	10
4163082	TDS402A09100	4158879	TDS412A09100	9,100	.3583	—	—	103	61	49	1,5	40	10
4163083	TDS402A09129	4158880	TDS412A09129	9,129	.3594	23/64	—	103	61	49	1,6	40	10
4163084	TDS402A09200	4158881	TDS412A09200	9,200	.3622	—	—	103	61	49	1,6	40	10
4163085	TDS402A09300	4158882	TDS412A09300	9,300	.3661	—	—	103	61	49	1,6	40	10
4163086	TDS402A09347	4158883	TDS412A09347	9,347	.3680	—	—	103	61	49	1,6	40	10
4163087	TDS402A09400	4158884	TDS412A09400	9,400	.3701	—	—	103	61	49	1,6	40	10
4163088	TDS402A09500	4158885	TDS412A09500	9,500	.3740	—	—	103	61	49	1,6	40	10
4163089	TDS402A09525	4158886	TDS412A09525	9,525	.3750	3/8	—	103	61	49	1,6	40	10
4163090	TDS402A09600	4158887	TDS412A09600	9,600	.3780	—	—	103	61	49	1,6	40	10
4163091	TDS402A09700	4158888	TDS412A09700	9,700	.3819	—	—	103	61	49	1,7	40	10
4163092	TDS402A09800	4158889	TDS412A09800	9,800	.3858	—	—	103	61	49	1,7	40	10
4163093	TDS402A09900	4158890	TDS412A09900	9,900	.3898	—	—	103	61	49	1,7	40	10

(continued)

Solid Carbide Drills



(TDS402A • TDS412A • 5 x D — continued)

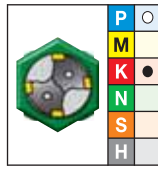
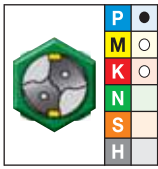


● first choice  
○ alternate choice

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4163094	TDS402A09921	4158891	TDS412A09921	9,921	.3906	25/64	—	103	61	49	1,7	40	10
4162803	TDS402A10000	4156602	TDS412A10000	10,000	.3937	—	—	103	61	49	1,7	40	10
4162804	TDS402A10100	4156733	TDS412A10100	10,100	.3976	—	—	118	71	56	1,7	45	12
4162805	TDS402A10200	4156734	TDS412A10200	10,200	.4016	—	—	118	71	56	1,7	45	12
4162806	TDS402A10300	4156735	TDS412A10300	10,300	.4055	—	—	118	71	56	1,8	45	12
4162807	TDS402A10320	4156736	TDS412A10320	10,320	.4063	13/32	—	118	71	56	1,8	45	12
4162808	TDS402A10400	4156737	TDS412A10400	10,400	.4094	—	—	118	71	56	1,8	45	12
4162809	TDS402A10500	4156738	TDS412A10500	10,500	.4134	—	—	118	71	56	1,8	45	12
4162810	TDS402A10600	4156739	TDS412A10600	10,600	.4173	—	—	118	71	56	1,8	45	12
4162811	TDS402A10700	4156740	TDS412A10700	10,700	.4213	—	—	118	71	56	1,8	45	12
4162812	TDS402A10716	4156741	TDS412A10716	10,716	.4219	27/64	—	118	71	56	1,8	45	12
4162813	TDS402A10800	4156742	TDS412A10800	10,800	.4252	—	—	118	71	56	1,8	45	12
4162814	TDS402A10900	4156743	TDS412A10900	10,900	.4291	—	—	118	71	56	1,9	45	12
4162815	TDS402A11000	4156744	TDS412A11000	11,000	.4331	—	—	118	71	56	1,9	45	12
4162816	TDS402A11100	4156745	TDS412A11100	11,100	.4370	—	—	118	71	56	1,9	45	12
4162817	TDS402A11113	4156746	TDS412A11113	11,113	.4375	7/16	—	118	71	56	1,9	45	12
4162818	TDS402A11200	4156747	TDS412A11200	11,200	.4409	—	—	118	71	56	1,9	45	12
4162819	TDS402A11300	4156748	TDS412A11300	11,300	.4449	—	—	118	71	56	1,9	45	12
4162820	TDS402A11400	4156749	TDS412A11400	11,400	.4488	—	—	118	71	56	2,0	45	12
4162821	TDS402A11500	4156750	TDS412A11500	11,500	.4528	—	—	118	71	56	2,0	45	12
4162822	TDS402A11509	4156751	TDS412A11509	11,509	.4531	29/64	—	118	71	56	2,0	45	12
4162823	TDS402A11600	4156752	TDS412A11600	11,600	.4567	—	—	118	71	56	2,0	45	12
4162824	TDS402A11700	4156753	TDS412A11700	11,700	.4606	—	—	118	71	56	2,0	45	12
4162825	TDS402A11800	4156754	TDS412A11800	11,800	.4646	—	—	118	71	56	2,0	45	12
4162826	TDS402A11900	4156755	TDS412A11900	11,900	.4685	—	—	118	71	56	2,0	45	12
4162827	TDS402A11908	4156756	TDS412A11908	11,908	.4688	15/32	—	118	71	56	2,0	45	12
4162828	TDS402A12000	4156757	TDS412A12000	12,000	.4724	—	—	118	71	56	2,1	45	12
4162829	TDS402A12100	4156758	TDS412A12100	12,100	.4764	—	—	124	77	60	2,1	45	14
4162830	TDS402A12200	4156759	TDS412A12200	12,200	.4803	—	—	124	77	60	2,1	45	14
4162831	TDS402A12300	4156760	TDS412A12300	12,300	.4843	—	—	124	77	60	2,1	45	14
4162832	TDS402A12304	4156761	TDS412A12304	12,304	.4844	31/64	—	124	77	60	2,1	45	14
4162833	TDS402A12400	4156762	TDS412A12400	12,400	.4882	—	—	124	77	60	2,1	45	14
4162834	TDS402A12500	4156763	TDS412A12500	12,500	.4921	—	—	124	77	60	2,1	45	14
4162835	TDS402A12600	4156764	TDS412A12600	12,600	.4961	—	—	124	77	60	2,2	45	14
4162836	TDS402A12700	4156765	TDS412A12700	12,700	.5000	1/2	—	124	77	60	2,2	45	14
4162837	TDS402A12800	4156766	TDS412A12800	12,800	.5039	—	—	124	77	60	2,2	45	14
4162838	TDS402A12900	4156767	TDS412A12900	12,900	.5079	—	—	124	77	60	2,2	45	14
4162839	TDS402A13000	4156768	TDS412A13000	13,000	.5118	—	—	124	77	60	2,2	45	14
4162840	TDS402A13096	4156769	TDS412A13096	13,096	.5156	33/64	—	124	77	60	2,3	45	14
4162841	TDS402A13100	4156770	TDS412A13100	13,100	.5157	—	—	124	77	60	2,3	45	14

(continued)

(TDS402A • TDS412A • 5 x D – continued)



● first choice  
○ alternate choice

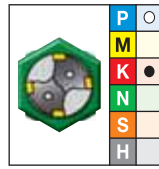
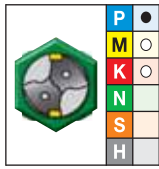
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4162842	TDS402A13200	4156771	TDS412A13200	13,200	.5197	—	—	124	77	60	2,3	45	14
4162843	TDS402A13300	4156772	TDS412A13300	13,300	.5236	—	—	124	77	60	2,3	45	14
4162844	TDS402A13400	4156773	TDS412A13400	13,400	.5276	—	—	124	77	60	2,3	45	14
4162845	TDS402A13500	4156774	TDS412A13500	13,500	.5315	—	—	124	77	60	2,3	45	14
4162846	TDS402A13600	4156775	TDS412A13600	13,600	.5354	—	—	124	77	60	2,3	45	14
4162847	TDS402A13700	4156776	TDS412A13700	13,700	.5394	—	—	124	77	60	2,4	45	14
4162848	TDS402A13800	4156777	TDS412A13800	13,800	.5433	—	—	124	77	60	2,4	45	14
4162849	TDS402A13891	4156778	TDS412A13891	13,891	.5469	35/64	—	124	77	60	2,4	45	14
4162850	TDS402A13900	4156779	TDS412A13900	13,900	.5472	—	—	124	77	60	2,4	45	14
4162851	TDS402A14000	4156780	TDS412A14000	14,000	.5512	—	—	124	77	60	2,4	45	14
4162852	TDS402A14100	4156781	TDS412A14100	14,100	.5551	—	—	133	83	63	2,4	48	16
4162853	TDS402A14200	4156782	TDS412A14200	14,200	.5591	—	—	133	83	63	2,5	48	16
4162854	TDS402A14288	4156783	TDS412A14288	14,288	.5625	9/16	—	133	83	63	2,5	48	16
4162855	TDS402A14300	4156784	TDS412A14300	14,300	.5630	—	—	133	83	63	2,5	48	16
4162856	TDS402A14400	4156785	TDS412A14400	14,400	.5669	—	—	133	83	63	2,5	48	16
4162857	TDS402A14500	4156786	TDS412A14500	14,500	.5709	—	—	133	83	63	2,5	48	16
4162858	TDS402A14600	4156787	TDS412A14600	14,600	.5748	—	—	133	83	63	2,5	48	16
4162859	TDS402A14684	4156788	TDS412A14684	14,684	.5781	37/64	—	133	83	63	2,5	48	16
4162860	TDS402A14700	4156789	TDS412A14700	14,700	.5787	—	—	133	83	63	2,5	48	16
4162861	TDS402A14800	4156790	TDS412A14800	14,800	.5827	—	—	133	83	63	2,6	48	16
4162862	TDS402A14900	4156791	TDS412A14900	14,900	.5866	—	—	133	83	63	2,6	48	16
4162863	TDS402A15000	4156792	TDS412A15000	15,000	.5906	—	—	133	83	63	2,6	48	16
4162864	TDS402A15083	4156793	TDS412A15083	15,083	.5938	19/32	—	133	83	63	2,6	48	16
4162865	TDS402A15100	4156794	TDS412A15100	15,100	.5945	—	—	133	83	63	2,6	48	16
4162866	TDS402A15200	4156795	TDS412A15200	15,200	.5984	—	—	133	83	63	2,6	48	16
4162867	TDS402A15300	4156796	TDS412A15300	15,300	.6024	—	—	133	83	63	2,6	48	16
4162868	TDS402A15400	4156797	TDS412A15400	15,400	.6063	—	—	133	83	63	2,7	48	16
4162869	TDS402A15479	4156798	TDS412A15479	15,479	.6094	39/64	—	133	83	63	2,7	48	16
4162870	TDS402A15500	4156799	TDS412A15500	15,500	.6102	—	—	133	83	63	2,7	48	16
4162871	TDS402A15600	4156800	TDS412A15600	15,600	.6142	—	—	133	83	63	2,7	48	16
4162872	TDS402A15700	4156801	TDS412A15700	15,700	.6181	—	—	133	83	63	2,7	48	16
4162873	TDS402A15800	4156802	TDS412A15800	15,800	.6220	—	—	133	83	63	2,7	48	16
4162874	TDS402A15875	4156803	TDS412A15875	15,875	.6250	5/8	—	133	83	63	2,7	48	16
4162875	TDS402A15900	4156804	TDS412A15900	15,900	.6260	—	—	133	83	63	2,8	48	16
4162876	TDS402A16000	4156805	TDS412A16000	16,000	.6299	—	—	133	83	63	2,8	48	16
4162877	TDS402A16100	4156806	TDS412A16100	16,100	.6339	—	—	143	93	71	2,8	48	18
4162878	TDS402A16200	4156807	TDS412A16200	16,200	.6378	—	—	143	93	71	2,8	48	18
4162879	TDS402A16271	4156808	TDS412A16271	16,271	.6406	41/64	—	143	93	71	2,8	48	18
4162880	TDS402A16300	4156809	TDS412A16300	16,300	.6417	—	—	143	93	71	2,8	48	18
4162881	TDS402A16400	4156810	TDS412A16400	16,400	.6457	—	—	143	93	71	2,8	48	18

(continued)

Solid Carbide Drills

(TDS402A • TDS412A • 5 x D — continued)

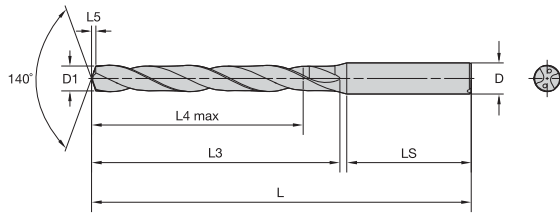


● first choice  
○ alternate choice

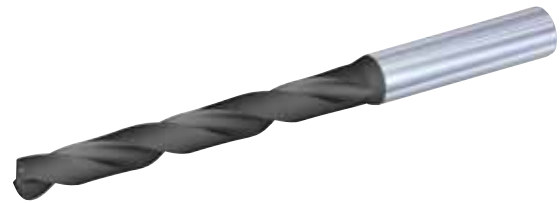
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L	L3	L4 max	L5	LS	D
4162882	TDS402A16500	4156811	TDS412A16500	16,500	.6496	—	—	143	93	71	2,9	48	18
4162883	TDS402A16600	4156812	TDS412A16600	16,600	.6535	—	—	143	93	71	2,9	48	18
4162884	TDS402A16670	4156813	TDS412A16670	16,670	.6563	21/32	—	143	93	71	2,9	48	18
4162885	TDS402A16700	4156814	TDS412A16700	16,700	.6575	—	—	143	93	71	2,9	48	18
4162886	TDS402A16800	4156815	TDS412A16800	16,800	.6614	—	—	143	93	71	2,9	48	18
4162887	TDS402A16900	4156816	TDS412A16900	16,900	.6654	—	—	143	93	71	2,9	48	18
4162888	TDS402A17000	4156817	TDS412A17000	17,000	.6693	—	—	143	93	71	2,9	48	18
4162889	TDS402A17100	4156818	TDS412A17100	17,100	.6732	—	—	143	93	71	3,0	48	18
4162890	TDS402A17200	4156819	TDS412A17200	17,200	.6772	—	—	143	93	71	3,0	48	18
4162891	TDS402A17300	4156820	TDS412A17300	17,300	.6811	—	—	143	93	71	3,0	48	18
4162892	TDS402A17400	4156821	TDS412A17400	17,400	.6850	—	—	143	93	71	3,0	48	18
4162893	TDS402A17463	4156822	TDS412A17463	17,463	.6875	11/16	—	143	93	71	3,0	48	18
4162894	TDS402A17500	4156823	TDS412A17500	17,500	.6890	—	—	143	93	71	3,0	48	18
4162895	TDS402A17600	4156824	TDS412A17600	17,600	.6929	—	—	143	93	71	3,1	48	18
4162896	TDS402A17700	4156825	TDS412A17700	17,700	.6969	—	—	143	93	71	3,1	48	18
4162897	TDS402A17800	4156826	TDS412A17800	17,800	.7008	—	—	143	93	71	3,1	48	18
4162898	TDS402A17859	4156827	TDS412A17859	17,859	.7031	45/64	—	143	93	71	3,1	48	18
4162899	TDS402A17900	4156828	TDS412A17900	17,900	.7047	—	—	143	93	71	3,1	48	18
4162274	TDS402A18000	4156853	TDS412A18000	18,000	.7087	—	—	143	93	71	3,1	48	18
4162275	TDS402A18100	4156854	TDS412A18100	18,100	.7126	—	—	153	101	77	3,1	50	20
4162276	TDS402A18200	4156855	TDS412A18200	18,200	.7165	—	—	153	101	77	3,2	50	20
4162277	TDS402A18258	4156856	TDS412A18258	18,258	.7188	23/32	—	153	101	77	3,2	50	20
4162278	TDS402A18300	4156857	TDS412A18300	18,300	.7205	—	—	153	101	77	3,2	50	20
4162279	TDS402A18400	4156858	TDS412A18400	18,400	.7244	—	—	153	101	77	3,2	50	20
4162280	TDS402A18500	4156859	TDS412A18500	18,500	.7283	—	—	153	101	77	3,2	50	20
4162281	TDS402A18600	4156860	TDS412A18600	18,600	.7323	—	—	153	101	77	3,2	50	20
4162282	TDS402A18654	4156861	TDS412A18654	18,654	.7344	47/64	—	153	101	77	3,2	50	20
4162393	TDS402A18700	4156862	TDS412A18700	18,700	.7362	—	—	153	101	77	3,2	50	20
4162394	TDS402A18800	4156863	TDS412A18800	18,800	.7402	—	—	153	101	77	3,3	50	20
4162395	TDS402A18900	4156864	TDS412A18900	18,900	.7441	—	—	153	101	77	3,3	50	20
4162396	TDS402A19000	4156865	TDS412A19000	19,000	.7480	—	—	153	101	77	3,3	50	20
4162397	TDS402A19050	4156866	TDS412A19050	19,050	.7500	3/4	—	153	101	77	3,3	50	20
4162398	TDS402A19100	4156867	TDS412A19100	19,100	.7520	—	—	153	101	77	3,3	50	20
4162399	TDS402A19200	4156868	TDS412A19200	19,200	.7559	—	—	153	101	77	3,3	50	20
4162400	TDS402A19300	4156869	TDS412A19300	19,300	.7598	—	—	153	101	77	3,4	50	20
4162401	TDS402A19400	4156870	TDS412A19400	19,400	.7638	—	—	153	101	77	3,4	50	20
4162402	TDS402A19500	4156871	TDS412A19500	19,500	.7677	—	—	153	101	77	3,4	50	20
4162403	TDS402A19600	4156872	TDS412A19600	19,600	.7717	—	—	153	101	77	3,4	50	20
4162404	TDS402A19700	4156873	TDS412A19700	19,700	.7756	—	—	153	101	77	3,4	50	20
4162405	TDS402A19800	4156874	TDS412A19800	19,800	.7795	—	—	153	101	77	3,4	50	20
4162406	TDS402A19900	4156875	TDS412A19900	19,900	.7835	—	—	153	101	77	3,5	50	20
4162407	TDS402A20000	4156876	TDS412A20000	20,000	.7874	—	—	153	101	77	3,5	50	20

Solid Carbide Drills



For information on L, L3, and L4 max, see page R133.



■ TDS403A • TDS413A • 8 x D



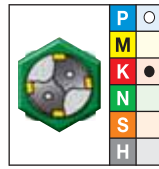
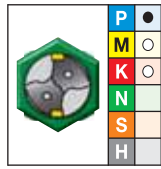
● first choice  
○ alternate choice

D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter		wire size	L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in							
4162796	TDS403A03000	4156972	TDS413A03000	3,000	.1181	—	78	40	33	0,5	36	6
4162797	TDS403A03048	4156993	TDS413A03048	3,048	.1200	—	78	40	33	0,5	36	6
4162798	TDS403A03100	4156994	TDS413A03100	3,100	.1220	—	78	40	33	0,5	36	6
4162799	TDS403A03175	4156995	TDS413A03175	3,175	.1250	1/8	78	40	33	0,5	36	6
4162800	TDS403A03200	4156996	TDS413A03200	3,200	.1260	—	78	40	33	0,5	36	6
4162801	TDS403A03264	4156997	TDS413A03264	3,264	.1285	—	78	40	33	0,5	36	6
4162802	TDS403A03300	4156998	TDS413A03300	3,300	.1299	—	78	40	33	0,5	36	6
4163163	TDS403A03400	4156999	TDS413A03400	3,400	.1339	—	78	40	33	0,6	36	6
4163164	TDS403A03455	4157000	TDS413A03455	3,455	.1360	—	78	40	33	0,6	36	6
4163165	TDS403A03500	4157001	TDS413A03500	3,500	.1378	—	78	40	33	0,6	36	6
4163166	TDS403A03571	4157002	TDS413A03571	3,571	.1406	9/64	78	40	33	0,6	36	6
4163167	TDS403A03600	4157003	TDS413A03600	3,600	.1417	—	78	40	33	0,6	36	6
4163168	TDS403A03658	4157004	TDS413A03658	3,658	.1440	—	78	40	33	0,6	36	6
4163169	TDS403A03700	4157005	TDS413A03700	3,700	.1457	—	78	40	33	0,6	36	6
4163170	TDS403A03734	4157006	TDS413A03734	3,734	.1470	—	78	40	33	0,6	36	6
4163171	TDS403A03800	4157007	TDS413A03800	3,800	.1496	—	87	49	41	0,6	36	6
4163172	TDS403A03900	4157008	TDS413A03900	3,900	.1535	—	87	49	41	0,6	36	6
4163173	TDS403A03970	4157009	TDS413A03970	3,970	.1563	5/32	87	49	41	0,7	36	6
4163174	TDS403A04000	4157010	TDS413A04000	4,000	.1575	—	87	49	41	0,7	36	6
4163175	TDS403A04039	4157011	TDS413A04039	4,039	.1590	—	87	49	41	0,7	36	6
4163176	TDS403A04090	4157012	TDS413A04090	4,090	.1610	—	87	49	41	0,7	36	6
4163177	TDS403A04100	4157013	TDS413A04100	4,100	.1614	—	87	49	41	0,7	36	6
4163178	TDS403A04200	4157014	TDS413A04200	4,200	.1654	—	87	49	41	0,7	36	6
4163179	TDS403A04217	4157015	TDS413A04217	4,217	.1660	—	87	49	41	0,7	36	6
4163180	TDS403A04300	4157016	TDS413A04300	4,300	.1693	—	87	49	41	0,7	36	6
4163181	TDS403A04366	4157017	TDS413A04366	4,366	.1719	11/64	87	49	41	0,7	36	6
4163182	TDS403A04400	4157018	TDS413A04400	4,400	.1732	—	87	49	41	0,7	36	6
4163193	TDS403A04500	4157019	TDS413A04500	4,500	.1772	—	87	49	41	0,7	36	6

(continued)

(TDS403A • TDS413A • 8 x D — continued)



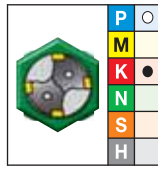
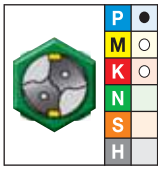
● first choice  
○ alternate choice

D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L	L3	L4 max	L5	LS	D
4163194	TDS403A04600	4157020	TDS413A04600	4,600	.1811	—	—	87	49	41	0,8	36	6
4163195	TDS403A04623	4157021	TDS413A04623	4,623	.1820	—	14	87	49	41	0,8	36	6
4163196	TDS403A04700	4157022	TDS413A04700	4,700	.1850	—	13	87	49	41	0,8	36	6
4163197	TDS403A04763	4157023	TDS413A04763	4,763	.1875	3/16	—	94	56	48	0,8	36	6
4163198	TDS403A04800	4157024	TDS413A04800	4,800	.1890	—	12	94	56	48	0,8	36	6
4163199	TDS403A04852	4157025	TDS413A04852	4,852	.1910	—	11	94	56	48	0,8	36	6
4163200	TDS403A04900	4157026	TDS413A04900	4,900	.1929	—	—	94	56	48	0,8	36	6
4163201	TDS403A05000	4157027	TDS413A05000	5,000	.1969	—	—	94	56	48	0,8	36	6
4163202	TDS403A05100	4157028	TDS413A05100	5,100	.2008	—	—	94	56	48	0,8	36	6
4163203	TDS403A05106	4157029	TDS413A05106	5,106	.2010	—	7	94	56	48	0,8	36	6
4163204	TDS403A05159	4157030	TDS413A05159	5,159	.2031	13/64	—	94	56	48	0,9	36	6
4163205	TDS403A05200	4157031	TDS413A05200	5,200	.2047	—	—	94	56	48	0,9	36	6
4163206	TDS403A05300	4157032	TDS413A05300	5,300	.2087	—	—	94	56	48	0,9	36	6
4163207	TDS403A05400	4157033	TDS413A05400	5,400	.2126	—	—	94	56	48	0,9	36	6
4163208	TDS403A05410	4157034	TDS413A05410	5,410	.2130	—	3	94	56	48	0,9	36	6
4163209	TDS403A05500	4157035	TDS413A05500	5,500	.2165	—	—	94	56	48	0,9	36	6
4163210	TDS403A05558	4157036	TDS413A05558	5,558	.2188	7/32	—	94	56	48	0,9	36	6
4163211	TDS403A05600	4157037	TDS413A05600	5,600	.2205	—	—	94	56	48	0,9	36	6
4163212	TDS403A05616	4157038	TDS413A05616	5,616	.2211	—	2	94	56	48	0,9	36	6
4163213	TDS403A05700	4157039	TDS413A05700	5,700	.2244	—	—	94	56	48	1,0	36	6
4163214	TDS403A05800	4157040	TDS413A05800	5,800	.2283	—	—	94	56	48	1,0	36	6
4163215	TDS403A05900	4157041	TDS413A05900	5,900	.2323	—	—	94	56	48	1,0	36	6
4163216	TDS403A05954	4157042	TDS413A05954	5,954	.2344	15/64	—	94	56	48	1,0	36	6
4163217	TDS403A06000	4157043	TDS413A06000	6,000	.2362	—	—	94	56	48	1,0	36	6
4163218	TDS403A06100	4157044	TDS413A06100	6,100	.2402	—	—	105	67	57	1,0	36	8
4163219	TDS403A06200	4157045	TDS413A06200	6,200	.2441	—	—	105	67	57	1,0	36	8
4163220	TDS403A06300	4157046	TDS413A06300	6,300	.2480	—	—	105	67	57	1,1	36	8
4163221	TDS403A06350	4157047	TDS413A06350	6,350	.2500	1/4	—	105	67	57	1,1	36	8
4163222	TDS403A06400	4157048	TDS413A06400	6,400	.2520	—	—	105	67	57	1,1	36	8
4163223	TDS403A06500	4157049	TDS413A06500	6,500	.2559	—	—	105	67	57	1,1	36	8
4163224	TDS403A06528	4157050	TDS413A06528	6,528	.2570	—	—	105	67	57	1,1	36	8
4163225	TDS403A06600	4157051	TDS413A06600	6,600	.2598	—	—	105	67	57	1,1	36	8
4163226	TDS403A06630	4157052	TDS413A06630	6,630	.2610	—	—	105	67	57	1,1	36	8
4163227	TDS403A06700	4157053	TDS413A06700	6,700	.2638	—	—	105	67	57	1,1	36	8
4163228	TDS403A06746	4157054	TDS413A06746	6,746	.2656	17/64	—	105	67	57	1,1	36	8
4163229	TDS403A06800	4157055	TDS413A06800	6,800	.2677	—	—	105	67	57	1,1	36	8
4163230	TDS403A06900	4157056	TDS413A06900	6,900	.2717	—	—	105	67	57	1,2	36	8
4163231	TDS403A07000	4157057	TDS413A07000	7,000	.2756	—	—	105	67	57	1,2	36	8
4163232	TDS403A07100	4157058	TDS413A07100	7,100	.2795	—	—	110	72	61	1,2	36	8
4163233	TDS403A07145	4157059	TDS413A07145	7,145	.2813	9/32	—	110	72	61	1,2	36	8

(continued)

(TDS403A • TDS413A • 8 x D — continued)



● first choice  
○ alternate choice

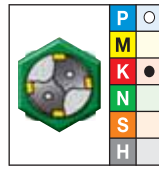
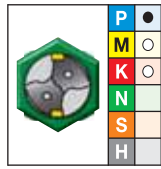
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4163234	TDS403A07200	4157060	TDS413A07200	7,200	.2835	—	—	110	72	61	1,2	36	8
4163235	TDS403A07300	4157061	TDS413A07300	7,300	.2874	—	—	110	72	61	1,2	36	8
4163236	TDS403A07400	4157062	TDS413A07400	7,400	.2913	—	—	110	72	61	1,3	36	8
4163237	TDS403A07500	4157063	TDS413A07500	7,500	.2953	—	—	110	72	61	1,3	36	8
4163238	TDS403A07541	4157064	TDS413A07541	7,541	.2969	19/64	—	110	72	61	1,3	36	8
4163239	TDS403A07600	4157065	TDS413A07600	7,600	.2992	—	—	110	72	61	1,3	36	8
4163240	TDS403A07700	4157066	TDS413A07700	7,700	.3031	—	—	110	72	61	1,3	36	8
4163241	TDS403A07800	4157067	TDS413A07800	7,800	.3071	—	—	110	72	61	1,3	36	8
4163242	TDS403A07900	4157068	TDS413A07900	7,900	.3110	—	—	110	72	61	1,3	36	8
4163243	TDS403A07938	4157069	TDS413A07938	7,938	.3125	5/16	—	110	72	61	1,3	36	8
4163244	TDS403A08000	4157070	TDS413A08000	8,000	.3150	—	—	110	72	61	1,4	36	8
4163245	TDS403A08100	4157071	TDS413A08100	8,100	.3189	—	—	122	80	68	1,4	40	10
4163246	TDS403A08200	4157072	TDS413A08200	8,200	.3228	—	—	122	80	68	1,4	40	10
4163247	TDS403A08300	4157073	TDS413A08300	8,300	.3268	—	—	122	80	68	1,4	40	10
4163248	TDS403A08334	4157074	TDS413A08334	8,334	.3281	21/64	—	122	80	68	1,4	40	10
4163249	TDS403A08400	4157075	TDS413A08400	8,400	.3307	—	—	122	80	68	1,4	40	10
4163250	TDS403A08433	4157076	TDS413A08433	8,433	.3320	—	—	122	80	68	1,4	40	10
4163251	TDS403A08500	4157077	TDS413A08500	8,500	.3346	—	—	122	80	68	1,4	40	10
4163252	TDS403A08600	4157078	TDS413A08600	8,600	.3386	—	—	122	80	68	1,5	40	10
4163253	TDS403A08700	4157079	TDS413A08700	8,700	.3425	—	—	122	80	68	1,5	40	10
4163254	TDS403A08733	4157080	TDS413A08733	8,733	.3438	11/32	—	122	80	68	1,5	40	10
4163255	TDS403A08800	4157081	TDS413A08800	8,800	.3465	—	—	122	80	68	1,5	40	10
4163256	TDS403A08900	4157082	TDS413A08900	8,900	.3504	—	—	122	80	68	1,5	40	10
4163257	TDS403A09000	4157083	TDS413A09000	9,000	.3543	—	—	122	80	68	1,5	40	10
4163258	TDS403A09100	4157084	TDS413A09100	9,100	.3583	—	—	122	80	68	1,5	40	10
4163259	TDS403A09129	4157085	TDS413A09129	9,129	.3594	23/64	—	122	80	68	1,6	40	10
4163260	TDS403A09200	4157086	TDS413A09200	9,200	.3622	—	—	122	80	68	1,6	40	10
4163261	TDS403A09300	4157087	TDS413A09300	9,300	.3661	—	—	122	80	68	1,6	40	10
4163262	TDS403A09347	4157088	TDS413A09347	9,347	.3680	—	—	122	80	68	1,6	40	10
4163263	TDS403A09400	4157089	TDS413A09400	9,400	.3701	—	—	122	80	68	1,6	40	10
4163264	TDS403A09500	4157090	TDS413A09500	9,500	.3740	—	—	122	80	68	1,6	40	10
4163265	TDS403A09525	4157091	TDS413A09525	9,525	.3750	3/8	—	122	80	68	1,6	40	10
4163266	TDS403A09600	4157092	TDS413A09600	9,600	.3780	—	—	122	80	68	1,6	40	10
4163267	TDS403A09700	4157093	TDS413A09700	9,700	.3819	—	—	122	80	68	1,7	40	10
4163268	TDS403A09800	4157094	TDS413A09800	9,800	.3858	—	—	122	80	68	1,7	40	10
4163269	TDS403A09900	4157095	TDS413A09900	9,900	.3898	—	—	122	80	68	1,7	40	10
4163270	TDS403A09921	4157096	TDS413A09921	9,921	.3906	25/64	—	122	80	68	1,7	40	10
4162679	TDS403A10000	4156836	TDS413A10000	10,000	.3937	—	—	122	80	68	1,7	40	10
4162680	TDS403A10100	4156837	TDS413A10100	10,100	.3976	—	—	141	94	79	1,7	45	12
4162382	TDS403A10200	4156838	TDS413A10200	10,200	.4016	—	—	141	94	79	1,7	45	12

(continued)

Solid Carbide Drills

(TDS403A • TDS413A • 8 x D — continued)



● first choice  
○ alternate choice

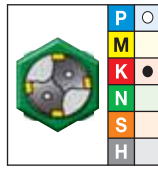
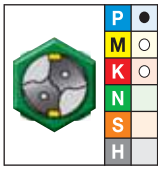
D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter									
order #	catalog #	order #	catalog #	mm	in	fraction	wire size	L	L3	L4 max	L5	LS	D
4162703	TDS403A10300	4156839	TDS413A10300	10,300	.4055	—	—	141	94	79	1,8	45	12
4162704	TDS403A10320	4156840	TDS413A10320	10,320	.4063	13/32	—	141	94	79	1,8	45	12
4162705	TDS403A10400	4156841	TDS413A10400	10,400	.4094	—	—	141	94	79	1,8	45	12
4162706	TDS403A10500	4156842	TDS413A10500	10,500	.4134	—	—	141	94	79	1,8	45	12
4162707	TDS403A10600	4156883	TDS413A10600	10,600	.4173	—	—	141	94	79	1,8	45	12
4162708	TDS403A10700	4156884	TDS413A10700	10,700	.4213	—	—	141	94	79	1,8	45	12
4162709	TDS403A10716	4156885	TDS413A10716	10,716	.4219	27/64	—	141	94	79	1,8	45	12
4162710	TDS403A10800	4156886	TDS413A10800	10,800	.4252	—	—	141	94	79	1,8	45	12
4162711	TDS403A10900	4156887	TDS413A10900	10,900	.4291	—	—	141	94	79	1,9	45	12
4162712	TDS403A11000	4156888	TDS413A11000	11,000	.4331	—	—	141	94	79	1,9	45	12
4162713	TDS403A11100	4156889	TDS413A11100	11,100	.4370	—	—	141	94	79	1,9	45	12
4162714	TDS403A11113	4156890	TDS413A11113	11,113	.4375	7/16	—	141	94	79	1,9	45	12
4162715	TDS403A11200	4156891	TDS413A11200	11,200	.4409	—	—	141	94	79	1,9	45	12
4162716	TDS403A11300	4156892	TDS413A11300	11,300	.4449	—	—	141	94	79	1,9	45	12
4162717	TDS403A11400	4156893	TDS413A11400	11,400	.4488	—	—	141	94	79	2,0	45	12
4162718	TDS403A11500	4156894	TDS413A11500	11,500	.4528	—	—	141	94	79	2,0	45	12
4162719	TDS403A11509	4156895	TDS413A11509	11,509	.4531	29/64	—	141	94	79	2,0	45	12
4162720	TDS403A11600	4156896	TDS413A11600	11,600	.4567	—	—	141	94	79	2,0	45	12
4162721	TDS403A11700	4156897	TDS413A11700	11,700	.4606	—	—	141	94	79	2,0	45	12
4162722	TDS403A11800	4156898	TDS413A11800	11,800	.4646	—	—	141	94	79	2,0	45	12
4162723	TDS403A11900	4156899	TDS413A11900	11,900	.4685	—	—	141	94	79	2,0	45	12
4162724	TDS403A11908	4156900	TDS413A11908	11,908	.4688	15/32	—	141	94	79	2,0	45	12
4162725	TDS403A12000	4156901	TDS413A12000	12,000	.4724	—	—	141	94	79	2,1	45	12
4162726	TDS403A12100	4156902	TDS413A12100	12,100	.4764	—	—	155	108	91	2,1	45	14
4162727	TDS403A12200	4156903	TDS413A12200	12,200	.4803	—	—	155	108	91	2,1	45	14
4162728	TDS403A12300	4156904	TDS413A12300	12,300	.4843	—	—	155	108	91	2,1	45	14
4162729	TDS403A12304	4156905	TDS413A12304	12,304	.4844	31/64	—	155	108	91	2,1	45	14
4162730	TDS403A12400	4156906	TDS413A12400	12,400	.4882	—	—	155	108	91	2,1	45	14
4162681	TDS403A12500	4148984	TDS413A12500	12,500	.4921	—	—	155	108	91	2,1	45	14
4162731	TDS403A12600	4156907	TDS413A12600	12,600	.4961	—	—	155	108	91	2,2	45	14
4162732	TDS403A12700	4156908	TDS413A12700	12,700	.5000	1/2	—	155	108	91	2,2	45	14
4162733	TDS403A12800	4156909	TDS413A12800	12,800	.5039	—	—	155	108	91	2,2	45	14
4162734	TDS403A12900	4156910	TDS413A12900	12,900	.5079	—	—	155	108	91	2,2	45	14
4162735	TDS403A13000	4156911	TDS413A13000	13,000	.5118	—	—	155	108	91	2,2	45	14
4162736	TDS403A13096	4156912	TDS413A13096	13,096	.5156	33/64	—	155	108	91	2,3	45	14
4162737	TDS403A13100	4156913	TDS413A13100	13,100	.5157	—	—	155	108	91	2,3	45	14
4162738	TDS403A13200	4156914	TDS413A13200	13,200	.5197	—	—	155	108	91	2,3	45	14
4162739	TDS403A13300	4156915	TDS413A13300	13,300	.5236	—	—	155	108	91	2,3	45	14
4162740	TDS403A13400	4156916	TDS413A13400	13,400	.5276	—	—	155	108	91	2,3	45	14
4162741	TDS403A13500	4156917	TDS413A13500	13,500	.5315	—	—	155	108	91	2,3	45	14

(continued)

Solid Carbide Drills

(TDS403A • TDS413A • 8 x D — continued)



● first choice  
○ alternate choice

D1 diameter

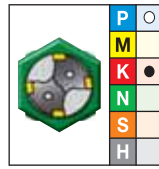
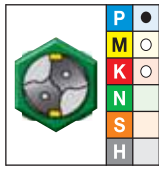
grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4162742	TDS403A13600	4156918	TDS413A13600	13,600	.5354	—	—	155	108	91	2,3	45	14
4162743	TDS403A13700	4156919	TDS413A13700	13,700	.5394	—	—	155	108	91	2,4	45	14
4162744	TDS403A13800	4156920	TDS413A13800	13,800	.5433	—	—	155	108	91	2,4	45	14
4162745	TDS403A13891	4156921	TDS413A13891	13,891	.5469	35/64	—	155	108	91	2,4	45	14
4162746	TDS403A13900	4156922	TDS413A13900	13,900	.5472	—	—	155	108	91	2,4	45	14
4162747	TDS403A14000	4156923	TDS413A14000	14,000	.5512	—	—	155	108	91	2,4	45	14
4162748	TDS403A14100	4156924	TDS413A14100	14,100	.5551	—	—	171	121	101	2,4	48	16
4162749	TDS403A14200	4156925	TDS413A14200	14,200	.5591	—	—	171	121	101	2,5	48	16
4162750	TDS403A14288	4156926	TDS413A14288	14,288	.5625	9/16	—	171	121	101	2,5	48	16
4162751	TDS403A14300	4156927	TDS413A14300	14,300	.5630	—	—	171	121	101	2,5	48	16
4162752	TDS403A14400	4156928	TDS413A14400	14,400	.5669	—	—	171	121	101	2,5	48	16
4162753	TDS403A14500	4156929	TDS413A14500	14,500	.5709	—	—	171	121	101	2,5	48	16
4162754	TDS403A14600	4156930	TDS413A14600	14,600	.5748	—	—	171	121	101	2,5	48	16
4162755	TDS403A14684	4156931	TDS413A14684	14,684	.5781	37/64	—	171	121	101	2,5	48	16
4162756	TDS403A14700	4156932	TDS413A14700	14,700	.5787	—	—	171	121	101	2,5	48	16
4162757	TDS403A14800	4156933	TDS413A14800	14,800	.5827	—	—	171	121	101	2,6	48	16
4162758	TDS403A14900	4156934	TDS413A14900	14,900	.5866	—	—	171	121	101	2,6	48	16
4162759	TDS403A15000	4156935	TDS413A15000	15,000	.5906	—	—	171	121	101	2,6	48	16
4162760	TDS403A15083	4156936	TDS413A15083	15,083	.5938	19/32	—	171	121	101	2,6	48	16
4162761	TDS403A15100	4156937	TDS413A15100	15,100	.5945	—	—	171	121	101	2,6	48	16
4162762	TDS403A15200	4156938	TDS413A15200	15,200	.5984	—	—	171	121	101	2,6	48	16
4162763	TDS403A15300	4156939	TDS413A15300	15,300	.6024	—	—	171	121	101	2,6	48	16
4162764	TDS403A15400	4156940	TDS413A15400	15,400	.6063	—	—	171	121	101	2,7	48	16
4162765	TDS403A15479	4156941	TDS413A15479	15,479	.6094	39/64	—	171	121	101	2,7	48	16
4162766	TDS403A15500	4156942	TDS413A15500	15,500	.6102	—	—	171	121	101	2,7	48	16
4162767	TDS403A15600	4156943	TDS413A15600	15,600	.6142	—	—	171	121	101	2,7	48	16
4162768	TDS403A15700	4156944	TDS413A15700	15,700	.6181	—	—	171	121	101	2,7	48	16
4162769	TDS403A15800	4156945	TDS413A15800	15,800	.6220	—	—	171	121	101	2,7	48	16
4162770	TDS403A15875	4156946	TDS413A15875	15,875	.6250	5/8	—	171	121	101	2,7	48	16
4162771	TDS403A15900	4156947	TDS413A15900	15,900	.6260	—	—	171	121	101	2,8	48	16
4162772	TDS403A16000	4156948	TDS413A16000	16,000	.6299	—	—	171	121	101	2,8	48	16
4162773	TDS403A16100	4156949	TDS413A16100	16,100	.6339	—	—	185	135	113	2,8	48	18
4162774	TDS403A16200	4156950	TDS413A16200	16,200	.6378	—	—	185	135	113	2,8	48	18
4162775	TDS403A16271	4156951	TDS413A16271	16,271	.6406	41/64	—	185	135	113	2,8	48	18
4162776	TDS403A16300	4156952	TDS413A16300	16,300	.6417	—	—	185	135	113	2,8	48	18
4162777	TDS403A16400	4156953	TDS413A16400	16,400	.6457	—	—	185	135	113	2,8	48	18
4162778	TDS403A16500	4156954	TDS413A16500	16,500	.6496	—	—	185	135	113	2,9	48	18
4162779	TDS403A16600	4156955	TDS413A16600	16,600	.6535	—	—	185	135	113	2,9	48	18
4162780	TDS403A16670	4156956	TDS413A16670	16,670	.6563	21/32	—	185	135	113	2,9	48	18
4162781	TDS403A16700	4156957	TDS413A16700	16,700	.6575	—	—	185	135	113	2,9	48	18

(continued)

Solid Carbide Drills



(TDS403A • TDS413A • 8 x D — continued)



● first choice  
○ alternate choice

D1 diameter

grade WP20PD TiAlN		grade WK15PD AlCrN		D1 diameter				L	L3	L4 max	L5	LS	D
order #	catalog #	order #	catalog #	mm	in	fraction	wire size						
4162782	TDS403A16800	4156958	TDS413A16800	16,800	.6614	—	—	185	135	113	2,9	48	18
4162783	TDS403A16900	4156959	TDS413A16900	16,900	.6654	—	—	185	135	113	2,9	48	18
4162784	TDS403A17000	4156960	TDS413A17000	17,000	.6693	—	—	185	135	113	2,9	48	18
4162785	TDS403A17100	4156961	TDS413A17100	17,100	.6732	—	—	185	135	113	3,0	48	18
4162786	TDS403A17200	4156962	TDS413A17200	17,200	.6772	—	—	185	135	113	3,0	48	18
4162787	TDS403A17300	4156963	TDS413A17300	17,300	.6811	—	—	185	135	113	3,0	48	18
4162788	TDS403A17400	4156964	TDS413A17400	17,400	.6850	—	—	185	135	113	3,0	48	18
4162789	TDS403A17463	4156965	TDS413A17463	17,463	.6875	11/16	—	185	135	113	3,0	48	18
4162790	TDS403A17500	4156966	TDS413A17500	17,500	.6890	—	—	185	135	113	3,0	48	18
4162791	TDS403A17600	4156967	TDS413A17600	17,600	.6929	—	—	185	135	113	3,1	48	18
4162792	TDS403A17700	4156968	TDS413A17700	17,700	.6969	—	—	185	135	113	3,1	48	18
4162793	TDS403A17800	4156969	TDS413A17800	17,800	.7008	—	—	185	135	113	3,1	48	18
4162794	TDS403A17859	4156970	TDS413A17859	17,859	.7031	45/64	—	185	135	113	3,1	48	18
4162795	TDS403A17900	4156971	TDS413A17900	17,900	.7047	—	—	185	135	113	3,1	48	18
4162515	TDS403A18000	4157206	TDS413A18000	18,000	.7087	—	—	185	135	113	3,1	48	18
4162516	TDS403A18100	4157207	TDS413A18100	18,100	.7126	—	—	200	148	124	3,1	50	20
4162517	TDS403A18200	4157208	TDS413A18200	18,200	.7165	—	—	200	148	124	3,2	50	20
4162518	TDS403A18258	4157209	TDS413A18258	18,258	.7188	23/32	—	200	148	124	3,2	50	20
4162519	TDS403A18300	4157210	TDS413A18300	18,300	.7205	—	—	200	148	124	3,2	50	20
4162520	TDS403A18400	4157211	TDS413A18400	18,400	.7244	—	—	200	148	124	3,2	50	20
4162521	TDS403A18500	4157212	TDS413A18500	18,500	.7283	—	—	200	148	124	3,2	50	20
4162522	TDS403A18600	4157253	TDS413A18600	18,600	.7323	—	—	200	148	124	3,2	50	20
4162663	TDS403A18654	4157254	TDS413A18654	18,654	.7344	47/64	—	200	148	124	3,2	50	20
4162664	TDS403A18700	4157255	TDS413A18700	18,700	.7362	—	—	200	148	124	3,2	50	20
4162665	TDS403A18800	4157256	TDS413A18800	18,800	.7402	—	—	200	148	124	3,3	50	20
4162666	TDS403A18900	4157257	TDS413A18900	18,900	.7441	—	—	200	148	124	3,3	50	20
4162667	TDS403A19000	4157258	TDS413A19000	19,000	.7480	—	—	200	148	124	3,3	50	20
4162668	TDS403A19050	4157259	TDS413A19050	19,050	.7500	3/4	—	200	148	124	3,3	50	20
4162669	TDS403A19100	4157260	TDS413A19100	19,100	.7520	—	—	200	148	124	3,3	50	20
4162670	TDS403A19200	4157261	TDS413A19200	19,200	.7559	—	—	200	148	124	3,3	50	20
4162671	TDS403A19300	4157262	TDS413A19300	19,300	.7598	—	—	200	148	124	3,4	50	20
4162672	TDS403A19400	4157263	TDS413A19400	19,400	.7638	—	—	200	148	124	3,4	50	20
4162673	TDS403A19500	4157264	TDS413A19500	19,500	.7677	—	—	200	148	124	3,4	50	20
4162674	TDS403A19600	4157265	TDS413A19600	19,600	.7717	—	—	200	148	124	3,4	50	20
4162675	TDS403A19700	4157266	TDS413A19700	19,700	.7756	—	—	200	148	124	3,4	50	20
4162676	TDS403A19800	4157267	TDS413A19800	19,800	.7795	—	—	200	148	124	3,4	50	20
4162677	TDS403A19900	4157268	TDS413A19900	19,900	.7835	—	—	200	148	124	3,5	50	20
4162678	TDS403A20000	4157269	TDS413A20000	20,000	.7874	—	—	200	148	124	3,5	50	20

Solid Carbide Drills

■ TOP DRILL S • TDS202 Series • WP20PD™ • Flood Coolant • Inch

		Cutting Speed – vc Range – SFM		Recommended Feed Rate (f) by Diameter							
Material Group	min – max	Tool Diameter (inch)	.125–1/8	.188–3/16	.250–1/4	.313–5/16	.375–3/8	.500–1/2	.625–5/8	.750–3/4	
P	1	230 – 460	IPR	.003–.006	.004–.007	.005–.010	.006–.012	.006–.013	.008–.015	.009–.018	.011–.022
	2, 3, 4, 6, 7	230 – 460	IPR	.003–.006	.004–.007	.005–.010	.006–.012	.007–.013	.009–.015	.011–.019	.013–.024
	5, 9, 10, 11	200 – 390	IPR	.003–.006	.004–.007	.005–.010	.006–.012	.007–.013	.008–.015	.009–.019	.011–.024
	12, 13.1, 13.2	130 – 200	IPR	.002–.004	.003–.005	.004–.008	.004–.009	.005–.009	.005–.011	.007–.012	.009–.017
M	14.1	100 – 160	IPR	.002–.004	.002–.004	.003–.005	.004–.006	.004–.007	.005–.008	.006–.009	.006–.010
	14.3	130 – 200	IPR	.002–.004	.003–.005	.004–.005	.004–.007	.004–.008	.005–.009	.006–.010	.006–.011
	14.2, 14.4	100 – 160	IPR	.002–.004	.003–.004	.003–.005	.004–.006	.004–.007	.005–.007	.006–.008	.006–.010



■ TOP DRILL S • TDS401/TDS402/TDS403 Series • WP20PD • Through Coolant • Inch

		Cutting Speed – vc Range – SFM		Recommended Feed Rate (f) by Diameter							
Material Group	min – max	Tool Diameter (inch)	.125–1/8	.188–3/16	.250–1/4	.313–5/16	.375–3/8	.500–1/2	.625–5/8	.750–3/4	
P	1	260 – 590	IPR	.003–.006	.004–.007	.005–.010	.006–.012	.006–.014	.008–.016	.010–.019	.012–.023
	2, 3, 4, 6, 7	260 – 520	IPR	.003–.007	.004–.008	.005–.010	.006–.012	.008–.014	.009–.016	.012–.020	.014–.025
	5, 9, 10, 11	260 – 460	IPR	.003–.007	.004–.008	.005–.010	.006–.012	.007–.014	.008–.016	.010–.020	.012–.025
	12, 13.1, 13.2	160 – 260	IPR	.002–.004	.003–.005	.004–.008	.004–.009	.005–.010	.006–.011	.007–.013	.010–.017
M	14.1	130 – 200	IPR	.002–.004	.002–.005	.003–.005	.004–.006	.004–.007	.005–.008	.006–.009	.007–.010
	14.3	130 – 230	IPR	.002–.004	.003–.005	.004–.005	.004–.007	.004–.008	.005–.009	.006–.010	.007–.012
	14.2, 14.4	110 – 160	IPR	.002–.004	.003–.005	.003–.005	.004–.006	.004–.007	.005–.008	.006–.009	.007–.010



Solid Carbide Drills

nominal size range	Inch tolerance	
	D1 tolerance m7	D tolerance h6
>.1181–.2362	.0000/.0005	.0000/-.0003
>.2360–.3937	.0000/.0006	.0000/-.0004
>.3937–.7087	.0000/.0007	.0000/-.0004
>.7078–1.0000	.0000/.0009	.0000/-.0005

■ TOP DRILL S • TDS202 Series • WP20PD™ • Flood Coolant • Metric

												
		Cutting Speed – vc Range – m/min		Recommended Feed Rate (f) by Diameter								
Material Group		min	– max	Tool Diameter (mm)	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
<b>P</b>	1	70	– 140	mm/r	0,08–0,15	0,10–0,18	0,12–0,25	0,15–0,30	0,15–0,34	0,20–0,38	0,23–0,45	0,28–0,55
	2, 3, 4, 6, 7	70	– 140	mm/r	0,08–0,16	0,10–0,19	0,12–0,25	0,15–0,30	0,19–0,34	0,22–0,38	0,28–0,48	0,34–0,60
	5, 9, 10, 11	60	– 120	mm/r	0,08–0,16	0,10–0,19	0,12–0,25	0,14–0,30	0,17–0,33	0,20–0,38	0,24–0,48	0,29–0,60
	12, 13.1, 13.2	40	– 60	mm/r	0,06–0,10	0,08–0,12	0,10–0,20	0,10–0,22	0,13–0,24	0,14–0,27	0,18–0,32	0,24–0,42
<b>M</b>	14.1	30	– 50	mm/r	0,05–0,09	0,06–0,11	0,08–0,13	0,09–0,15	0,10–0,17	0,12–0,20	0,14–0,22	0,16–0,25
	14.3	40	– 60	mm/r	0,05–0,10	0,07–0,12	0,09–0,13	0,10–0,18	0,10–0,20	0,12–0,22	0,14–0,25	0,16–0,28
	14.2, 14.4	30	– 50	mm/r	0,05–0,09	0,07–0,11	0,08–0,12	0,09–0,15	0,10–0,17	0,12–0,19	0,14–0,21	0,16–0,25

■ TOP DRILL S • TDS401/TDS402/TDS403 Series • WP20PD • Through Coolant • Metric

												
		Cutting Speed – vc Range – m/min		Recommended Feed Rate (f) by Diameter								
Material Group		min	– max	Tool Diameter (mm)	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
<b>P</b>	1	80	– 180	mm/r	0,08–0,16	0,11–0,19	0,13–0,26	0,16–0,32	0,16–0,36	0,21–0,40	0,24–0,47	0,29–0,58
	2, 3, 4, 6, 7	80	– 160	mm/r	0,09–0,17	0,11–0,20	0,13–0,26	0,16–0,32	0,20–0,36	0,23–0,40	0,29–0,50	0,36–0,63
	5, 9, 10, 11	80	– 140	mm/r	0,08–0,17	0,11–0,20	0,12–0,26	0,15–0,32	0,18–0,35	0,21–0,40	0,25–0,50	0,30–0,63
	12, 13.1, 13.2	50	– 80	mm/r	0,06–0,11	0,08–0,13	0,11–0,21	0,10–0,23	0,13–0,25	0,14–0,28	0,29–0,33	0,25–0,44
<b>M</b>	14.1	40	– 60	mm/r	0,05–0,09	0,06–0,12	0,08–0,14	0,09–0,16	0,11–0,18	0,13–0,21	0,15–0,23	0,17–0,26
	14.3	40	– 70	mm/r	0,05–0,11	0,07–0,13	0,09–0,14	0,11–0,19	0,11–0,21	0,13–0,23	0,15–0,26	0,17–0,29
	14.2, 14.4	35	– 50	mm/r	0,05–0,09	0,07–0,12	0,08–0,13	0,09–0,16	0,11–0,18	0,13–0,20	0,15–0,22	0,17–0,26

nominal size range	Metric tolerance	
	D1 tolerance m7	D tolerance h6
>3–6	0,004/0,016	0,000/-0,008
>6–10	0,006/0,021	0,000/-0,009
>10–18	0,007/0,025	0,000/-0,011
>18–25,4	0,008/0,029	0,000/-0,013

■ TOP DRILL S • TDS212 Series • WK15PD™ • Flood Coolant • Inch

		Cutting Speed – vc		Recommended Feed Rate (f) by Diameter							
		Range – SFM									
Material Group	min – max	Tool Diameter (inch)	.125–1/8	.188–3/16	.250–1/4	.313–5/16	.375–3/8	.500–1/2	.625–5/8	.750–3/4	
			K	15, 16	230 – 560	IPR	.004–.009	.005–.009	.006–.012	.008–.015	.009–.017
	17, 18, 19	260 – 460	IPR	.005–.006	.005–.007	.006–.010	.008–.012	.009–.014	.010–.016	.012–.019	.015–.024
	20	230 – 430	IPR	.003–.007	.004–.007	.005–.010	.006–.012	.007–.014	.007–.016	.009–.019	.012–.024

■ TOP DRILL S • TDS411/TDS412/TDS413 Series • WK15PD • Through Coolant • Inch

		Cutting Speed – vc		Recommended Feed Rate (f) by Diameter							
		Range – SFM									
Material Group	min – max	Tool Diameter (inch)	.125–1/8	.188–3/16	.250–1/4	.313–5/16	.375–3/8	.500–1/2	.625–5/8	.750–3/4	
			K	15, 16	260 – 620	IPR	.004–.009	.005–.009	.006–.012	.008–.015	.009–.017
	17, 18, 19	300 – 560	IPR	.005–.006	.005–.007	.006–.010	.008–.012	.009–.014	.010–.016	.012–.019	.015–.024
	20	260 – 490	IPR	.003–.007	.004–.007	.005–.010	.006–.012	.007–.014	.007–.016	.009–.019	.012–.024

Solid Carbide Drills

nominal size range	Inch tolerance	
	D1 tolerance m7	D tolerance h6
>.1181–.2362	.0000/.0005	.0000/-.0003
>.2360–.3937	.0000/.0006	.0000/-.0004
>.3937–.7087	.0000/.0007	.0000/-.0004
>.7078–1.0000	.0000/.0009	.0000/-.0005

■ TOP DRILL S • TDS212 Series • WK15PD™ • Flood Coolant • Metric

		Cutting Speed – vc Range – m/min	Recommended Feed Rate (f) by Diameter								
Material Group	min – max	Tool Diameter (mm)	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0	
			mm/r	mm/r	mm/r	mm/r	mm/r	mm/r	mm/r	mm/r	mm/r
<b>K</b>	15, 16	70 – 170	0,16–0,31	0,20–0,38	0,23–0,44	0,25–0,49	0,31–0,60	0,38–0,74	0,31–0,60	0,38–0,74	
	17, 18, 19	80 – 140	0,16–0,25	0,20–0,31	0,23–0,36	0,25–0,40	0,31–0,48	0,38–0,60	0,31–0,48	0,38–0,60	
	20	70 – 130	0,12–0,25	0,14–0,30	0,17–0,35	0,19–0,40	0,24–0,48	0,30–0,60	0,24–0,48	0,30–0,60	

■ TOP DRILL S • TDS411/TDS412/TDS413 Series • WK15PD • Through Coolant • Metric

		Cutting Speed – vc Range – m/min	Recommended Feed Rate (f) by Diameter								
Material Group	min – max	Tool Diameter (mm)	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0	
			mm/r	mm/r	mm/r	mm/r	mm/r	mm/r	mm/r	mm/r	mm/r
<b>K</b>	15, 16	80 – 190	0,11–0,22	0,12–0,24	0,16–0,31	0,20–0,38	0,23–0,44	0,25–0,49	0,31–0,60	0,38–0,74	
	17, 18, 19	90 – 170	0,12–0,16	0,13–0,19	0,16–0,25	0,20–0,31	0,23–0,36	0,25–0,40	0,31–0,48	0,38–0,60	
	20	80 – 150	0,08–0,17	0,09–0,19	0,12–0,25	0,14–0,30	0,17–0,35	0,19–0,40	0,24–0,48	0,30–0,60	

nominal size range	Metric tolerance	
	D1 tolerance m7	D tolerance h6
>3-6	0,004/0,016	0,000/-0,008
>6-10	0,006/0,021	0,000/-0,009
>10-18	0,007/0,025	0,000/-0,011
>18-25,4	0,008/0,029	0,000/-0,013

Multiple-Application Drilling •  
**TOP DRILL S+™**

# TOP DRILL S+



The WIDIA™ line of TOP DRILL S+ enables superior performance across a wide variety of even the most complex and challenging applications, such as drilling through inclined entries, x-holes, and exits. Proprietary technology ensures the highest speed and feed rates available. Advanced grade and geometry features define the TOP DRILL S+ as a true troubleshooter.

- Suitable for a broad range of materials and applications.
- Ensures increased tool life and enhanced wear resistance.
- Facilitates consistent chip forming and breaking.

The versatile TOP DRILL S+ provides reliable performance across a broad scope of applications, including alloyed and unalloyed steel, cast iron, and some stainless steels and high-temperature alloys.

- Four-margin design ensures stability, consistency, and improved hole quality.
- PVD coating provides increased tool life and wear resistance.
- Through tool coolant and solid versions available standard.



## Use as Pilot Drill

- Ideal point angle and tolerance make the TOP DRILL S+™ drill the preferred pilot drill for TDD Series solid carbide deep-hole drills.

## TOP DRILL S+ Drill-Point Design

- Low thrust. Works well on a variety of machines.
- Excellent centering capabilities.
- Easy to regrind.

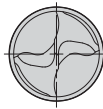
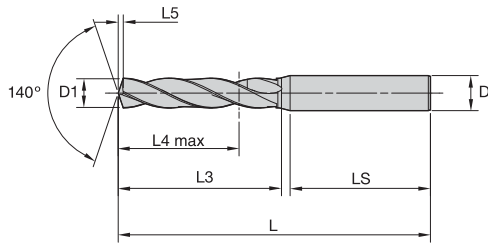
## Four-Margin Land Design

- Improves hole straightness and roundness.
- Provides good alignment and stability in tough drilling applications — even when drilling through cross holes.

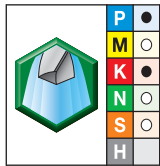


# Solid Carbide Drills

TOP DRILL S+™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 3 x D



## ■ TDS301A • 3 x D



● first choice  
○ alternate choice

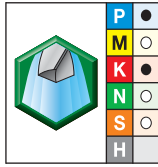
		D1 diameter									
grade WU25PD TiAlN		mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L
2964222	TDS301A03000	3,000	.1181	—	—	.24	.79	.55	.019	1.42	2.44
2964233	TDS301A03100	3,100	.1220	—	—	.24	.79	.55	.020	1.42	2.44
2964234	TDS301A03200	3,200	.1260	—	—	.24	.79	.55	.020	1.42	2.44
2964235	TDS301A03250	3,250	.1280	—	—	.24	.79	.55	.021	1.42	2.44
2964236	TDS301A03300	3,300	.1299	—	—	.24	.79	.55	.021	1.42	2.44
2964237	TDS301A03400	3,400	.1339	—	—	.24	.79	.55	.022	1.42	2.44
2964238	TDS301A03500	3,500	.1378	—	—	.24	.79	.55	.022	1.42	2.44
2964239	TDS301A03600	3,600	.1417	—	—	.24	.79	.55	.023	1.42	2.44
2964240	TDS301A03700	3,700	.1457	—	—	.24	.79	.55	.024	1.42	2.44
2964241	TDS301A03800	3,800	.1496	—	—	.24	.94	.67	.025	1.42	2.60
2964242	TDS301A03900	3,900	.1535	—	—	.24	.94	.67	.025	1.42	2.60
2964243	TDS301A04000	4,000	.1575	—	—	.24	.94	.67	.026	1.42	2.60
2964244	TDS301A04100	4,100	.1614	—	—	.24	.94	.67	.027	1.42	2.60
2964245	TDS301A04200	4,200	.1654	—	—	.24	.94	.67	.027	1.42	2.60
2964246	TDS301A04300	4,300	.1693	—	—	.24	.94	.67	.028	1.42	2.60
2964247	TDS301A04370	4,370	.1720	—	—	.24	.94	.67	.028	1.42	2.60
2964248	TDS301A04400	4,400	.1732	—	—	.24	.94	.67	.029	1.42	2.60
2964249	TDS301A04500	4,500	.1772	—	—	.24	.94	.67	.029	1.42	2.60
2964250	TDS301A04600	4,600	.1811	—	—	.24	.94	.67	.030	1.42	2.60
2964251	TDS301A04650	4,650	.1831	—	—	.24	.94	.67	.030	1.42	2.60
2964252	TDS301A04700	4,700	.1850	—	13	.24	.94	.67	.031	1.42	2.60
2964273	TDS301A04760	4,760	.1874	—	—	.24	1.10	.79	.031	1.42	2.60
2964274	TDS301A04800	4,800	.1890	—	12	.24	1.10	.79	.031	1.42	2.60
2964275	TDS301A04900	4,900	.1929	—	—	.24	1.10	.79	.032	1.42	2.60

(continued)

Solid Carbide Drills



(TDS301A • 3 x D – continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2964276	TDS301A05000	5,000	.1969	—	—	.24	1.10	.79	.033	1.42	2.60
2964277	TDS301A05100	5,100	.2008	—	—	.24	1.10	.79	.033	1.42	2.60
2964278	TDS301A05160	5,160	.2031	13/64	—	.24	1.10	.79	.034	1.42	2.60
2964279	TDS301A05200	5,200	.2047	—	—	.24	1.10	.79	.034	1.42	2.60
2964280	TDS301A05300	5,300	.2087	—	—	.24	1.10	.79	.035	1.42	2.60
2964281	TDS301A05400	5,400	.2126	—	—	.24	1.10	.79	.035	1.42	2.60
2964282	TDS301A05500	5,500	.2165	—	—	.24	1.10	.79	.036	1.42	2.60
2964293	TDS301A05550	5,550	.2185	—	—	.24	1.10	.79	.037	1.42	2.60
2964294	TDS301A05560	5,560	.2189	—	—	.24	1.10	.79	.037	1.42	2.60
2964295	TDS301A05600	5,600	.2205	—	—	.24	1.10	.79	.037	1.42	2.60
2964296	TDS301A05700	5,700	.2244	—	—	.24	1.10	.79	.038	1.42	2.60
2964297	TDS301A05800	5,800	.2283	—	—	.24	1.10	.79	.038	1.42	2.60
2964298	TDS301A05900	5,900	.2323	—	—	.24	1.10	.79	.039	1.42	2.60
2964299	TDS301A05950	5,950	.2343	—	—	.24	1.10	.79	.039	1.42	2.60
2964300	TDS301A06000	6,000	.2362	—	—	.24	1.10	.79	.040	1.42	2.60
2964301	TDS301A06100	6,100	.2402	—	—	.32	1.34	.94	.040	1.42	3.11
2964302	TDS301A06200	6,200	.2441	—	—	.32	1.34	.94	.041	1.42	3.11
2964313	TDS301A06300	6,300	.2480	—	—	.32	1.34	.94	.042	1.42	3.11
2964314	TDS301A06350	6,350	.2500	1/4	E	.32	1.34	.94	.042	1.42	3.11
2964315	TDS301A06400	6,400	.2520	—	—	.32	1.34	.94	.042	1.42	3.11
2964316	TDS301A06500	6,500	.2559	—	—	.32	1.34	.94	.043	1.42	3.11
2964317	TDS301A06600	6,600	.2598	—	—	.32	1.34	.94	.044	1.42	3.11
2964318	TDS301A06700	6,700	.2638	—	—	.32	1.34	.94	.044	1.42	3.11
2964319	TDS301A06750	6,750	.2657	—	—	.32	1.34	.94	.045	1.42	3.11
2964320	TDS301A06800	6,800	.2677	—	—	.32	1.34	.94	.045	1.42	3.11
2964321	TDS301A06900	6,900	.2717	—	—	.32	1.34	.94	.046	1.42	3.11
2964322	TDS301A07000	7,000	.2756	—	—	.32	1.34	.94	.046	1.42	3.11
2964333	TDS301A07100	7,100	.2795	—	—	.32	1.61	1.14	.047	1.42	3.11
2964334	TDS301A07140	7,140	.2811	—	—	.32	1.61	1.14	.047	1.42	3.11
2964335	TDS301A07200	7,200	.2835	—	—	.32	1.61	1.14	.048	1.42	3.11
2964336	TDS301A07300	7,300	.2874	—	—	.32	1.61	1.14	.049	1.42	3.11
2964337	TDS301A07400	7,400	.2913	—	—	.32	1.61	1.14	.049	1.42	3.11
2964338	TDS301A07500	7,500	.2953	—	—	.32	1.61	1.14	.050	1.42	3.11
2964339	TDS301A07540	7,540	.2969	19/64	—	.32	1.61	1.14	.050	1.42	3.11
2964340	TDS301A07600	7,600	.2992	—	—	.32	1.61	1.14	.051	1.42	3.11
2964341	TDS301A07700	7,700	.3031	—	—	.32	1.61	1.14	.051	1.42	3.11
2964342	TDS301A07800	7,800	.3071	—	—	.32	1.61	1.14	.052	1.42	3.11
2964353	TDS301A07900	7,900	.3110	—	—	.32	1.61	1.14	.053	1.42	3.11
2964354	TDS301A07940	7,940	.3126	—	—	.32	1.61	1.14	.053	1.42	3.11
2964355	TDS301A08000	8,000	.3150	—	—	.32	1.61	1.14	.053	1.42	3.11

(continued)

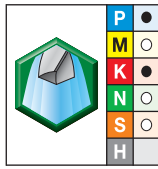
Solid Carbide Drills

# Solid Carbide Drills

TOP DRILL S+™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 3 x D



(TDS301A • 3 x D – continued)

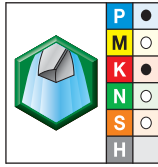


● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2964356	TDS301A08100	8,100	.3189	—	—	.39	1.85	1.38	.054	1.57	3.50
2964357	TDS301A08200	8,200	.3228	—	—	.39	1.85	1.38	.055	1.57	3.50
2964358	TDS301A08300	8,300	.3268	—	—	.39	1.85	1.38	.055	1.57	3.50
2964359	TDS301A08330	8,330	.3280	—	—	.39	1.85	1.38	.056	1.57	3.50
2964360	TDS301A08400	8,400	.3307	—	—	.39	1.85	1.38	.056	1.57	3.50
2964361	TDS301A08500	8,500	.3346	—	—	.39	1.85	1.38	.057	1.57	3.50
2964362	TDS301A08600	8,600	.3386	—	—	.39	1.85	1.38	.058	1.57	3.50
2964373	TDS301A08700	8,700	.3425	—	—	.39	1.85	1.38	.058	1.57	3.50
2964374	TDS301A08800	8,800	.3465	—	—	.39	1.85	1.38	.059	1.57	3.50
2964375	TDS301A08900	8,900	.3504	—	—	.39	1.85	1.38	.060	1.57	3.50
2964376	TDS301A09000	9,000	.3543	—	—	.39	1.85	1.38	.060	1.57	3.50
2964377	TDS301A09100	9,100	.3583	—	—	.39	1.85	1.38	.061	1.57	3.50
2964378	TDS301A09130	9,130	.3594	23/64	—	.39	1.85	1.38	.061	1.57	3.50
2964379	TDS301A09200	9,200	.3622	—	—	.39	1.85	1.38	.062	1.57	3.50
2964380	TDS301A09300	9,300	.3661	—	—	.39	1.85	1.38	.062	1.57	3.50
2964381	TDS301A09400	9,400	.3701	—	—	.39	1.85	1.38	.063	1.57	3.50
2964382	TDS301A09500	9,500	.3740	—	—	.39	1.85	1.38	.064	1.57	3.50
2964393	TDS301A09520	9,520	.3748	—	—	.39	1.85	1.38	.064	1.57	3.50
2964394	TDS301A09600	9,600	.3780	—	—	.39	1.85	1.38	.064	1.57	3.50
2964395	TDS301A09700	9,700	.3819	—	—	.39	1.85	1.38	.065	1.57	3.50
2964396	TDS301A09800	9,800	.3858	—	—	.39	1.85	1.38	.066	1.57	3.50
2964397	TDS301A09900	9,900	.3898	—	—	.39	1.85	1.38	.067	1.57	3.50
2964398	TDS301A09920	9,920	.3906	25/64	—	.39	1.85	1.38	.067	1.57	3.50
2964399	TDS301A10000	10,000	.3937	—	—	.39	1.85	1.38	.067	1.57	3.50
2964400	TDS301A10100	10,100	.3976	—	—	.47	2.17	1.57	.068	1.77	4.02
2964401	TDS301A10200	10,200	.4016	—	—	.47	2.17	1.57	.069	1.77	4.02
2964402	TDS301A10300	10,300	.4055	—	—	.47	2.17	1.57	.069	1.77	4.02
2964413	TDS301A10320	10,320	.4063	13/32	—	.47	2.17	1.57	.069	1.77	4.02
2964414	TDS301A10400	10,400	.4094	—	—	.47	2.17	1.57	.070	1.77	4.02
2964415	TDS301A10500	10,500	.4134	—	—	.47	2.17	1.57	.071	1.77	4.02
2964416	TDS301A10600	10,600	.4173	—	—	.47	2.17	1.57	.071	1.77	4.02
2964417	TDS301A10700	10,700	.4213	—	—	.47	2.17	1.57	.072	1.77	4.02
2964418	TDS301A10720	10,720	.4220	—	—	.47	2.17	1.57	.072	1.77	4.02
2964419	TDS301A10800	10,800	.4252	—	—	.47	2.17	1.57	.073	1.77	4.02
2964420	TDS301A10900	10,900	.4291	—	—	.47	2.17	1.57	.074	1.77	4.02
2964421	TDS301A11000	11,000	.4331	—	—	.47	2.17	1.57	.074	1.77	4.02
2964423	TDS301A11100	11,100	.4370	—	—	.47	2.17	1.57	.075	1.77	4.02
2964424	TDS301A11110	11,110	.4374	—	—	.47	2.17	1.57	.075	1.77	4.02
2964425	TDS301A11200	11,200	.4409	—	—	.47	2.17	1.57	.076	1.77	4.02
2964426	TDS301A11300	11,300	.4449	—	—	.47	2.17	1.57	.076	1.77	4.02

Solid Carbide Drills

(TDS301A • 3 x D – continued)



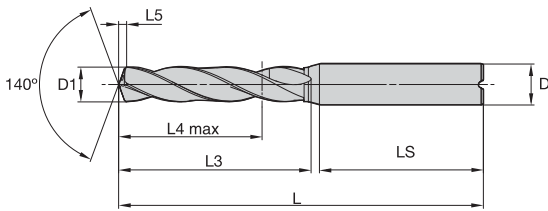
● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2964427	TDS301A11400	11,400	.4488	—	—	.47	2.17	1.57	.077	1.77	4.02
2964428	TDS301A11500	11,500	.4528	—	—	.47	2.17	1.57	.078	1.77	4.02
2964429	TDS301A11600	11,600	.4567	—	—	.47	2.17	1.57	.078	1.77	4.02
2964430	TDS301A11700	11,700	.4606	—	—	.47	2.17	1.57	.079	1.77	4.02
2964431	TDS301A11800	11,800	.4646	—	—	.47	2.17	1.57	.080	1.77	4.02
2964432	TDS301A11900	11,900	.4685	—	—	.47	2.17	1.57	.080	1.77	4.02
2964433	TDS301A11910	11,910	.4689	—	—	.47	2.17	1.57	.081	1.77	4.02
2964434	TDS301A12000	12,000	.4724	—	—	.47	2.17	1.57	.081	1.77	4.02
2964435	TDS301A12300	12,300	.4843	—	—	.55	2.36	1.69	.083	1.77	4.21
2964436	TDS301A12500	12,500	.4921	—	—	.55	2.36	1.69	.085	1.77	4.21
2964437	TDS301A12700	12,700	.5000	1/2	—	.55	2.36	1.69	.086	1.77	4.21
2964438	TDS301A12800	12,800	.5039	—	—	.55	2.36	1.69	.087	1.77	4.21
2964439	TDS301A13000	13,000	.5118	—	—	.55	2.36	1.69	.088	1.77	4.21
2964440	TDS301A13500	13,500	.5315	—	—	.55	2.36	1.69	.092	1.77	4.21
2964441	TDS301A13800	13,800	.5433	—	—	.55	2.36	1.69	.094	1.77	4.21
2964442	TDS301A14000	14,000	.5512	—	—	.55	2.36	1.69	.095	1.77	4.21
2964443	TDS301A14290	14,290	.5626	—	—	.63	2.56	1.77	.097	1.89	4.53
2964444	TDS301A14500	14,500	.5709	—	—	.63	2.56	1.77	.099	1.89	4.53
2964445	TDS301A14800	14,800	.5827	—	—	.63	2.56	1.77	.101	1.89	4.53
2964446	TDS301A15000	15,000	.5906	—	—	.63	2.56	1.77	.102	1.89	4.53
2964447	TDS301A15500	15,500	.6102	—	—	.63	2.56	1.77	.106	1.89	4.53
2964448	TDS301A15800	15,800	.6220	—	—	.63	2.56	1.77	.108	1.89	4.53
2964449	TDS301A15870	15,870	.6248	—	—	.63	2.56	1.77	.108	1.89	4.53
2964450	TDS301A16000	16,000	.6299	—	—	.63	2.56	1.77	.109	1.89	4.53
2964451	TDS301A16500	16,500	.6496	—	—	.71	2.87	2.01	.113	1.89	4.84
2964452	TDS301A16670	16,670	.6563	21/32	—	.71	2.87	2.01	.114	1.89	4.84
2964453	TDS301A16800	16,800	.6614	—	—	.71	2.87	2.01	.115	1.89	4.84
2964454	TDS301A17000	17,000	.6693	—	—	.71	2.87	2.01	.116	1.89	4.84
2964455	TDS301A17500	17,500	.6890	—	—	.71	2.87	2.01	.120	1.89	4.84
2964456	TDS301A17800	17,800	.7008	—	—	.71	2.87	2.01	.122	1.89	4.84
2964457	TDS301A18000	18,000	.7087	—	—	.71	2.87	2.01	.123	1.89	4.84
2964458	TDS301A18500	18,500	.7283	—	—	.79	3.11	2.17	.127	1.97	5.16
2964459	TDS301A18800	18,800	.7402	—	—	.79	3.11	2.17	.129	1.97	5.16
2964460	TDS301A19000	19,000	.7480	—	—	.79	3.11	2.17	.130	1.97	5.16
2964461	TDS301A19050	19,050	.7500	3/4	—	.79	3.11	2.17	.130	1.97	5.16
2964462	TDS301A19500	19,500	.7677	—	—	.79	3.11	2.17	.134	1.97	5.16
2964463	TDS301A19800	19,800	.7795	—	—	.79	3.11	2.17	.136	1.97	5.16
2964464	TDS301A20000	20,000	.7874	—	—	.79	3.11	2.17	.137	1.97	5.16

Solid Carbide Drills

# Solid Carbide Drills

TOP DRILL S+™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 3 x D



## ■ TDS501A • 3 x D



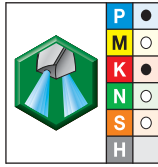
● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2964947	TDS501A03000	3,000	.1181	—	—	.24	.79	.55	.019	1.42	2.44
2964948	TDS501A03100	3,100	.1220	—	—	.24	.79	.55	.020	1.42	2.44
4051234	TDS501A03175	3,175	.1250	1/8	—	.24	.79	.55	.025	1.42	2.44
2964949	TDS501A03200	3,200	.1260	—	—	.24	.79	.55	.020	1.42	2.44
2964950	TDS501A03250	3,250	.1280	—	—	.24	.79	.55	.021	1.42	2.44
2964951	TDS501A03300	3,300	.1299	—	—	.24	.79	.55	.021	1.42	2.44
2964952	TDS501A03400	3,400	.1339	—	—	.24	.79	.55	.022	1.42	2.44
4051233	TDS501A03455	3,450	.1358	—	29	.24	.79	.55	.022	1.42	2.44
2964953	TDS501A03500	3,500	.1378	—	—	.24	.79	.55	.022	1.42	2.44
5661464	TDS501A03571	3,571	.1406	9/64	—	.24	.79	.55	.023	1.42	2.44
2964954	TDS501A03600	3,600	.1417	—	—	.24	.79	.55	.023	1.42	2.44
2964955	TDS501A03700	3,700	.1457	—	—	.24	.79	.55	.024	1.42	2.44
2964956	TDS501A03800	3,800	.1496	—	—	.24	.94	.67	.025	1.42	2.60
2964957	TDS501A03900	3,900	.1535	—	—	.24	.94	.67	.025	1.42	2.60
2964958	TDS501A04000	4,000	.1575	—	—	.24	.94	.67	.026	1.42	2.60
2964959	TDS501A04100	4,100	.1614	—	—	.24	.94	.67	.027	1.42	2.60
2964960	TDS501A04200	4,200	.1654	—	—	.24	.94	.67	.027	1.42	2.60
2964961	TDS501A04300	4,300	.1693	—	—	.24	.94	.67	.028	1.42	2.60
2964962	TDS501A04370	4,370	.1720	—	—	.24	.94	.67	.028	1.42	2.60
2964963	TDS501A04400	4,400	.1732	—	—	.24	.94	.67	.029	1.42	2.60
2964964	TDS501A04500	4,500	.1772	—	—	.24	.94	.67	.029	1.42	2.60
2964965	TDS501A04600	4,600	.1811	—	—	.24	.94	.67	.030	1.42	2.60
5661502	TDS501A04623	4,623	.1820	—	14	.24	.94	.67	.030	1.42	2.60
2964966	TDS501A04650	4,650	.1831	—	—	.24	.94	.67	.030	1.42	2.60

(continued)

Solid Carbide Drills

(TDS501A • 3 x D — continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2964967	TDS501A04700	4,700	.1850	—	13	.24	.94	.67	.031	1.42	2.60
5661503	TDS501A04763	4,763	.1875	3/16	—	.24	1.10	.79	.031	1.42	2.60
2964969	TDS501A04800	4,800	.1890	—	12	.24	1.10	.79	.031	1.42	2.60
2964970	TDS501A04900	4,900	.1929	—	—	.24	1.10	.79	.032	1.42	2.60
2964971	TDS501A05000	5,000	.1969	—	—	.24	1.10	.79	.033	1.42	2.60
2964972	TDS501A05100	5,100	.2008	—	—	.24	1.10	.79	.033	1.42	2.60
2964973	TDS501A05160	5,160	.2031	13/64	—	.24	1.10	.79	.034	1.42	2.60
2964974	TDS501A05200	5,200	.2047	—	—	.24	1.10	.79	.034	1.42	2.60
2964975	TDS501A05300	5,300	.2087	—	—	.24	1.10	.79	.035	1.42	2.60
2964976	TDS501A05400	5,400	.2126	—	—	.24	1.10	.79	.035	1.42	2.60
5661504	TDS501A05410	5,410	.2130	—	3	.24	1.10	.79	.036	1.42	2.60
2964977	TDS501A05500	5,500	.2165	—	—	.24	1.10	.79	.036	1.42	2.60
2964978	TDS501A05550	5,550	.2185	—	—	.24	1.10	.79	.037	1.42	2.60
5661505	TDS501A05558	5,558	.2188	7/32	—	.24	1.10	.79	.037	1.42	2.60
2964980	TDS501A05600	5,600	.2205	—	—	.24	1.10	.79	.037	1.42	2.60
2964981	TDS501A05700	5,700	.2244	—	—	.24	1.10	.79	.038	1.42	2.60
2964982	TDS501A05800	5,800	.2283	—	—	.24	1.10	.79	.038	1.42	2.60
2964983	TDS501A05900	5,900	.2323	—	—	.24	1.10	.79	.039	1.42	2.60
2964984	TDS501A05950	5,950	.2343	—	—	.24	1.10	.79	.039	1.42	2.60
2964985	TDS501A06000	6,000	.2362	—	—	.24	1.10	.79	.040	1.42	2.60
2964986	TDS501A06100	6,100	.2402	—	—	.32	1.34	.94	.040	1.42	3.11
2964987	TDS501A06200	6,200	.2441	—	—	.32	1.34	.94	.041	1.42	3.11
2964988	TDS501A06300	6,300	.2480	—	—	.32	1.34	.94	.042	1.42	3.11
2964989	TDS501A06350	6,350	.2500	1/4	E	.32	1.34	.94	.042	1.42	3.11
2964990	TDS501A06400	6,400	.2520	—	—	.32	1.34	.94	.042	1.42	3.11
2964991	TDS501A06500	6,500	.2559	—	—	.32	1.34	.94	.043	1.42	3.11
5661506	TDS501A06528	6,528	.2570	—	F	.32	1.34	.94	.043	1.42	3.11
2964992	TDS501A06600	6,600	.2598	—	—	.32	1.34	.94	.044	1.42	3.11
2964993	TDS501A06700	6,700	.2638	—	—	.32	1.34	.94	.044	1.42	3.11
5661507	TDS501A06746	6,746	.2656	17/64	—	.32	1.34	.94	.045	1.42	3.11
2964995	TDS501A06800	6,800	.2677	—	—	.32	1.34	.94	.045	1.42	3.11
2964996	TDS501A06900	6,900	.2717	—	—	.32	1.34	.94	.046	1.42	3.11
2964997	TDS501A07000	7,000	.2756	—	—	.32	1.34	.94	.046	1.42	3.11
2964998	TDS501A07100	7,100	.2795	—	—	.32	1.61	1.14	.047	1.42	3.11
5661509	TDS501A07145	7,145	.2813	9/32	—	.32	1.61	1.14	.047	1.42	3.11
2965000	TDS501A07200	7,200	.2835	—	—	.32	1.61	1.14	.048	1.42	3.11
2965001	TDS501A07300	7,300	.2874	—	—	.32	1.61	1.14	.049	1.42	3.11
2965002	TDS501A07400	7,400	.2913	—	—	.32	1.61	1.14	.049	1.42	3.11
2965003	TDS501A07500	7,500	.2953	—	—	.32	1.61	1.14	.050	1.42	3.11
2965004	TDS501A07541	7,540	.2969	19/64	—	.32	1.61	1.14	.050	1.42	3.11

(continued)

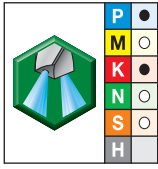
Solid Carbide Drills

# Solid Carbide Drills

TOP DRILL S+™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 3 x D



(TDS501A • 3 x D – continued)



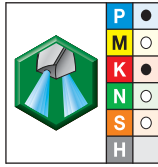
● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2965005	TDS501A07600	7,600	.2992	—	—	.32	1.61	1.14	.051	1.42	3.11
2965006	TDS501A07700	7,700	.3031	—	—	.32	1.61	1.14	.051	1.42	3.11
2965007	TDS501A07800	7,800	.3071	—	—	.32	1.61	1.14	.052	1.42	3.11
2965008	TDS501A07900	7,900	.3110	—	—	.32	1.61	1.14	.053	1.42	3.11
5661540	TDS501A07938	7,938	.3125	5/16	—	.32	1.61	1.14	.053	1.42	3.11
2965010	TDS501A08000	8,000	.3150	—	—	.32	1.61	1.14	.053	1.42	3.11
2965011	TDS501A08100	8,100	.3189	—	—	.39	1.85	1.38	.054	1.57	3.50
2965012	TDS501A08200	8,200	.3228	—	—	.39	1.85	1.38	.055	1.57	3.50
2965013	TDS501A08300	8,300	.3268	—	—	.39	1.85	1.38	.055	1.57	3.50
5661541	TDS501A08334	8,334	.3281	21/64	—	.39	1.85	1.38	.056	1.57	3.50
2965015	TDS501A08400	8,400	.3307	—	—	.39	1.85	1.38	.056	1.57	3.50
5661542	TDS501A08433	8,433	.3320	—	Q	.39	1.85	1.38	.056	1.57	3.50
2965016	TDS501A08500	8,500	.3346	—	—	.39	1.85	1.38	.057	1.57	3.50
2965017	TDS501A08600	8,600	.3386	—	—	.39	1.85	1.38	.058	1.57	3.50
2965018	TDS501A08700	8,700	.3425	—	—	.39	1.85	1.38	.058	1.57	3.50
5661543	TDS501A08733	8,733	.3438	11/32	—	.39	1.85	1.38	.058	1.57	3.50
2965019	TDS501A08800	8,800	.3465	—	—	.39	1.85	1.38	.059	1.57	3.50
2965020	TDS501A08900	8,900	.3504	—	—	.39	1.85	1.38	.060	1.57	3.50
2965021	TDS501A09000	9,000	.3543	—	—	.39	1.85	1.38	.060	1.57	3.50
2965022	TDS501A09100	9,100	.3583	—	—	.39	1.85	1.38	.061	1.57	3.50
2965023	TDS501A09129	9,130	.3594	23/64	—	.39	1.85	1.38	.061	1.57	3.50
2965024	TDS501A09200	9,200	.3622	—	—	.39	1.85	1.38	.062	1.57	3.50
2965025	TDS501A09300	9,300	.3661	—	—	.39	1.85	1.38	.062	1.57	3.50
5661544	TDS501A09347	9,347	.3680	—	U	.39	1.85	1.38	.063	1.57	3.50
2965026	TDS501A09400	9,400	.3701	—	—	.39	1.85	1.38	.063	1.57	3.50
2965027	TDS501A09500	9,500	.3740	—	—	.39	1.85	1.38	.064	1.57	3.50
2965029	TDS501A09600	9,600	.3780	—	—	.39	1.85	1.38	.064	1.57	3.50
2965030	TDS501A09700	9,700	.3819	—	—	.39	1.85	1.38	.065	1.57	3.50
5661546	TDS501A09750	9,750	.3839	—	—	.39	1.85	1.38	.066	1.57	3.50
2965031	TDS501A09800	9,800	.3858	—	—	.39	1.85	1.38	.066	1.57	3.50
2965032	TDS501A09900	9,900	.3898	—	—	.39	1.85	1.38	.067	1.57	3.50
2965033	TDS501A09921	9,920	.3906	25/64	—	.39	1.85	1.38	.067	1.57	3.50
2965034	TDS501A10000	10,000	.3937	—	—	.39	1.85	1.38	.067	1.57	3.50
2965035	TDS501A10100	10,100	.3976	—	—	.47	2.17	1.57	.068	1.77	4.02
2965036	TDS501A10200	10,200	.4016	—	—	.47	2.17	1.57	.069	1.77	4.02
2965037	TDS501A10300	10,300	.4055	—	—	.47	2.17	1.57	.069	1.77	4.02
2965038	TDS501A10320	10,320	.4063	13/32	—	.47	2.17	1.57	.069	1.77	4.02
2965039	TDS501A10400	10,400	.4094	—	—	.47	2.17	1.57	.070	1.77	4.02
2965040	TDS501A10500	10,500	.4134	—	—	.47	2.17	1.57	.071	1.77	4.02
2965041	TDS501A10600	10,600	.4173	—	—	.47	2.17	1.57	.071	1.77	4.02

(continued)

Solid Carbide Drills

(TDS501A • 3 x D – continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2965042	TDS501A10700	10,700	.4213	—	—	.47	2.17	1.57	.072	1.77	4.02
5661547	TDS501A10716	10,716	.4219	27/64	—	.47	2.17	1.57	.072	1.77	4.02
2965044	TDS501A10800	10,800	.4252	—	—	.47	2.17	1.57	.073	1.77	4.02
2965045	TDS501A10900	10,900	.4291	—	—	.47	2.17	1.57	.074	1.77	4.02
2965046	TDS501A11000	11,000	.4331	—	—	.47	2.17	1.57	.074	1.77	4.02
2965047	TDS501A11100	11,100	.4370	—	—	.47	2.17	1.57	.075	1.77	4.02
2965048	TDS501A11113	11,113	.4375	7/16	—	.47	2.17	1.57	.075	1.77	4.02
2964736	TDS501A11200	11,200	.4409	—	—	.47	2.17	1.57	.076	1.77	4.02
2964737	TDS501A11300	11,300	.4449	—	—	.47	2.17	1.57	.076	1.77	4.02
2964738	TDS501A11400	11,400	.4488	—	—	.47	2.17	1.57	.077	1.77	4.02
2964739	TDS501A11500	11,500	.4528	—	—	.47	2.17	1.57	.078	1.77	4.02
2964740	TDS501A11600	11,600	.4567	—	—	.47	2.17	1.57	.078	1.77	4.02
2964741	TDS501A11700	11,700	.4606	—	—	.47	2.17	1.57	.079	1.77	4.02
2964742	TDS501A11800	11,800	.4646	—	—	.47	2.17	1.57	.080	1.77	4.02
2965053	TDS501A11900	11,900	.4685	—	—	.47	2.17	1.57	.080	1.77	4.02
2965054	TDS501A11910	11,910	.4689	—	—	.47	2.17	1.57	.081	1.77	4.02
2965055	TDS501A12000	12,000	.4724	—	—	.47	2.17	1.57	.081	1.77	4.02
2965056	TDS501A12300	12,300	.4843	—	—	.55	2.36	1.69	.083	1.77	4.21
5661548	TDS501A12304	12,304	.4844	31/64	—	.55	2.36	1.69	.083	1.77	4.21
2965057	TDS501A12500	12,500	.4921	—	—	.55	2.36	1.69	.085	1.77	4.21
2965058	TDS501A12700	12,700	.5000	1/2	—	.55	2.36	1.69	.086	1.77	4.21
2965059	TDS501A12800	12,800	.5039	—	—	.55	2.36	1.69	.087	1.77	4.21
2965060	TDS501A13000	13,000	.5118	—	—	.55	2.36	1.69	.088	1.77	4.21
4051235	TDS501A13100	13,100	.5157	—	—	.55	2.36	1.69	.110	1.77	4.21
2965061	TDS501A13500	13,500	.5315	—	—	.55	2.36	1.69	.092	1.77	4.21
2965062	TDS501A13800	13,800	.5433	—	—	.55	2.36	1.69	.094	1.77	4.21
2965063	TDS501A14000	14,000	.5512	—	—	.55	2.36	1.69	.095	1.77	4.21
2965064	TDS501A14290	14,290	.5626	—	—	.63	2.56	1.77	.097	1.89	4.53
2965065	TDS501A14500	14,500	.5709	—	—	.63	2.56	1.77	.099	1.89	4.53
2965066	TDS501A14800	14,800	.5827	—	—	.63	2.56	1.77	.101	1.89	4.53
2965067	TDS501A15000	15,000	.5906	—	—	.63	2.56	1.77	.102	1.89	4.53
2965068	TDS501A15500	15,500	.6102	—	—	.63	2.56	1.77	.106	1.89	4.53
2965069	TDS501A15800	15,800	.6220	—	—	.63	2.56	1.77	.108	1.89	4.53
2965070	TDS501A15870	15,870	.6248	—	—	.63	2.56	1.77	.108	1.89	4.53
2965071	TDS501A16000	16,000	.6299	—	—	.63	2.56	1.77	.109	1.89	4.53
2965072	TDS501A16500	16,500	.6496	—	—	.71	2.87	2.01	.113	1.89	4.84
2965073	TDS501A16670	16,670	.6563	21/32	—	.71	2.87	2.01	.114	1.89	4.84
2965074	TDS501A16800	16,800	.6614	—	—	.71	2.87	2.01	.115	1.89	4.84
2965075	TDS501A17000	17,000	.6693	—	—	.71	2.87	2.01	.116	1.89	4.84
2965076	TDS501A17500	17,500	.6890	—	—	.71	2.87	2.01	.120	1.89	4.84

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Solid Carbide Drills

# Solid Carbide Drills

TOP DRILL S+™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 3 x D



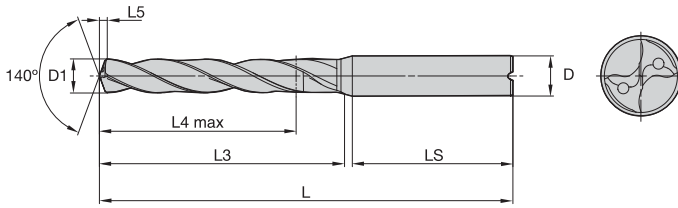
(TDS501A • 3 x D — continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2965077	TDS501A17800	17,800	.7008	—	—	.71	2.87	2.01	.122	1.89	4.84
2965078	TDS501A18000	18,000	.7087	—	—	.71	2.87	2.01	.123	1.89	4.84
2965079	TDS501A18500	18,500	.7283	—	—	.79	3.11	2.17	.127	1.97	5.16
2965080	TDS501A18800	18,800	.7402	—	—	.79	3.11	2.17	.129	1.97	5.16
2965081	TDS501A19000	19,000	.7480	—	—	.79	3.11	2.17	.130	1.97	5.16
2965082	TDS501A19050	19,050	.7500	3/4	—	.79	3.11	2.17	.130	1.97	5.16
2965083	TDS501A19500	19,500	.7677	—	—	.79	3.11	2.17	.134	1.97	5.16
2965084	TDS501A19800	19,800	.7795	—	—	.79	3.11	2.17	.136	1.97	5.16
2965085	TDS501A20000	20,000	.7874	—	—	.79	3.11	2.17	.137	1.97	5.16





■ TDS502A • 5 x D



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2964803	TDS502A03000	3,000	.1181	—	—	.24	1.10	.91	.019	1.42	2.60
2964804	TDS502A03100	3,100	.1220	—	—	.24	1.10	.91	.020	1.42	2.60
4051237	TDS502A03175	3,175	.1250	1/8	—	.24	1.10	.91	.025	1.42	2.60
2964805	TDS502A03200	3,200	.1260	—	—	.24	1.10	.91	.020	1.42	2.60
2964806	TDS502A03250	3,250	.1280	—	—	.24	1.10	.91	.021	1.42	2.60
2964807	TDS502A03300	3,300	.1299	—	—	.24	1.10	.91	.021	1.42	2.60
2964808	TDS502A03400	3,400	.1339	—	—	.24	1.10	.91	.022	1.42	2.60
4051236	TDS502A03455	3,455	.1360	—	29	.24	1.10	.91	.028	1.42	2.60
2964809	TDS502A03500	3,500	.1378	—	—	.24	1.10	.91	.022	1.42	2.60
2964810	TDS502A03600	3,600	.1417	—	—	.24	1.10	.91	.023	1.42	2.60
2964811	TDS502A03700	3,700	.1457	—	—	.24	1.10	.91	.024	1.42	2.60
2964812	TDS502A03800	3,800	.1496	—	—	.24	1.42	1.14	.025	1.42	2.91
2964813	TDS502A03900	3,900	.1535	—	—	.24	1.42	1.14	.025	1.42	2.91
2964814	TDS502A04000	4,000	.1575	—	—	.24	1.42	1.14	.026	1.42	2.91
2964815	TDS502A04100	4,100	.1614	—	—	.24	1.42	1.14	.027	1.42	2.91
2964816	TDS502A04200	4,200	.1654	—	—	.24	1.42	1.14	.027	1.42	2.91
2964817	TDS502A04300	4,300	.1693	—	—	.24	1.42	1.14	.028	1.42	2.91
2964818	TDS502A04370	4,370	.1720	—	—	.24	1.42	1.14	.028	1.42	2.91
2964819	TDS502A04400	4,400	.1732	—	—	.24	1.42	1.14	.029	1.42	2.91
2964820	TDS502A04500	4,500	.1772	—	—	.24	1.42	1.14	.029	1.42	2.91
2964821	TDS502A04600	4,600	.1811	—	—	.24	1.42	1.14	.030	1.42	2.91
2964822	TDS502A04650	4,650	.1831	—	—	.24	1.42	1.14	.030	1.42	2.91
2964823	TDS502A04700	4,700	.1850	—	13	.24	1.42	1.14	.031	1.42	2.91
2964824	TDS502A04760	4,760	.1874	—	—	.24	1.73	1.38	.031	1.42	3.23

(continued)

Solid Carbide Drills

# Solid Carbide Drills

TOP DRILL S+™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 5 x D



(TDS502A • 5 x D – continued)



● first choice  
○ alternate choice

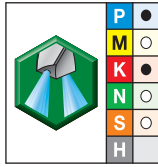
grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2964825	TDS502A04800	4,800	.1890	—	12	.24	1.73	1.38	.031	1.42	3.23
2964826	TDS502A04900	4,900	.1929	—	—	.24	1.73	1.38	.032	1.42	3.23
2964827	TDS502A05000	5,000	.1969	—	—	.24	1.73	1.38	.033	1.42	3.23
2964828	TDS502A05100	5,100	.2008	—	—	.24	1.73	1.38	.033	1.42	3.23
2964829	TDS502A05160	5,160	.2031	13/64	—	.24	1.73	1.38	.034	1.42	3.23
2964830	TDS502A05200	5,200	.2047	—	—	.24	1.73	1.38	.034	1.42	3.23
2964831	TDS502A05300	5,300	.2087	—	—	.24	1.73	1.38	.035	1.42	3.23
2964832	TDS502A05400	5,400	.2126	—	—	.24	1.73	1.38	.035	1.42	3.23
2964833	TDS502A05500	5,500	.2165	—	—	.24	1.73	1.38	.036	1.42	3.23
2964834	TDS502A05550	5,550	.2185	—	—	.24	1.73	1.38	.037	1.42	3.23
2964835	TDS502A05560	5,560	.2189	—	—	.24	1.73	1.38	.037	1.42	3.23
2964836	TDS502A05600	5,600	.2205	—	—	.24	1.73	1.38	.037	1.42	3.23
2964837	TDS502A05700	5,700	.2244	—	—	.24	1.73	1.38	.038	1.42	3.23
2964838	TDS502A05800	5,800	.2283	—	—	.24	1.73	1.38	.038	1.42	3.23
2964839	TDS502A05900	5,900	.2323	—	—	.24	1.73	1.38	.039	1.42	3.23
2964840	TDS502A05950	5,950	.2343	—	—	.24	1.73	1.38	.039	1.42	3.23
2964841	TDS502A06000	6,000	.2362	—	—	.24	1.73	1.38	.040	1.42	3.23
2964842	TDS502A06100	6,100	.2402	—	—	.32	2.09	1.69	.040	1.42	3.58
2964843	TDS502A06200	6,200	.2441	—	—	.32	2.09	1.69	.041	1.42	3.58
2964844	TDS502A06300	6,300	.2480	—	—	.32	2.09	1.69	.042	1.42	3.58
2964845	TDS502A06350	6,350	.2500	1/4	E	.32	2.09	1.69	.042	1.42	3.58
2964846	TDS502A06400	6,400	.2520	—	—	.32	2.09	1.69	.042	1.42	3.58
2964847	TDS502A06500	6,500	.2559	—	—	.32	2.09	1.69	.043	1.42	3.58
2964848	TDS502A06600	6,600	.2598	—	—	.32	2.09	1.69	.044	1.42	3.58
2964849	TDS502A06700	6,700	.2638	—	—	.32	2.09	1.69	.044	1.42	3.58
2964850	TDS502A06750	6,750	.2657	—	—	.32	2.09	1.69	.045	1.42	3.58
2964851	TDS502A06800	6,800	.2677	—	—	.32	2.09	1.69	.045	1.42	3.58
2964852	TDS502A06900	6,900	.2717	—	—	.32	2.09	1.69	.046	1.42	3.58
2964853	TDS502A07000	7,000	.2756	—	—	.32	2.09	1.69	.046	1.42	3.58
2964854	TDS502A07100	7,100	.2795	—	—	.32	2.09	1.69	.047	1.42	3.58
2964855	TDS502A07140	7,140	.2811	—	—	.32	2.09	1.69	.047	1.42	3.58
2964856	TDS502A07200	7,200	.2835	—	—	.32	2.09	1.69	.048	1.42	3.58
2964857	TDS502A07300	7,300	.2874	—	—	.32	2.09	1.69	.049	1.42	3.58
2964858	TDS502A07400	7,400	.2913	—	—	.32	2.09	1.69	.049	1.42	3.58
2964859	TDS502A07500	7,500	.2953	—	—	.32	2.09	1.69	.050	1.42	3.58
2964860	TDS502A07540	7,540	.2969	19/64	—	.32	2.09	1.69	.050	1.42	3.58
2964861	TDS502A07600	7,600	.2992	—	—	.32	2.09	1.69	.051	1.42	3.58
2964862	TDS502A07700	7,700	.3031	—	—	.32	2.09	1.69	.051	1.42	3.58
2964863	TDS502A07800	7,800	.3071	—	—	.32	2.09	1.69	.052	1.42	3.58
2964864	TDS502A07900	7,900	.3110	—	—	.32	2.09	1.69	.053	1.42	3.58

(continued)

Solid Carbide Drills



(TDS502A • 5 x D — continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2964865	TDS502A07940	7,940	.3126	—	—	.32	2.09	1.69	.053	1.42	3.58
2964866	TDS502A08000	8,000	.3150	—	—	.32	2.09	1.69	.053	1.42	3.58
2964867	TDS502A08100	8,100	.3189	—	—	.39	2.40	1.93	.054	1.57	4.06
2964868	TDS502A08200	8,200	.3228	—	—	.39	2.40	1.93	.055	1.57	4.06
2964869	TDS502A08300	8,300	.3268	—	—	.39	2.40	1.93	.055	1.57	4.06
2964870	TDS502A08330	8,330	.3280	—	—	.39	2.40	1.93	.056	1.57	4.06
2964871	TDS502A08400	8,400	.3307	—	—	.39	2.40	1.93	.056	1.57	4.06
2964872	TDS502A08500	8,500	.3346	—	—	.39	2.40	1.93	.057	1.57	4.06
2964873	TDS502A08600	8,600	.3386	—	—	.39	2.40	1.93	.058	1.57	4.06
2964874	TDS502A08700	8,700	.3425	—	—	.39	2.40	1.93	.058	1.57	4.06
2964875	TDS502A08800	8,800	.3465	—	—	.39	2.40	1.93	.059	1.57	4.06
2964876	TDS502A08900	8,900	.3504	—	—	.39	2.40	1.93	.060	1.57	4.06
2964877	TDS502A09000	9,000	.3543	—	—	.39	2.40	1.93	.060	1.57	4.06
2964878	TDS502A09100	9,100	.3583	—	—	.39	2.40	1.93	.061	1.57	4.06
2964879	TDS502A09130	9,130	.3594	23/64	—	.39	2.40	1.93	.061	1.57	4.06
2964880	TDS502A09200	9,200	.3622	—	—	.39	2.40	1.93	.062	1.57	4.06
2964881	TDS502A09300	9,300	.3661	—	—	.39	2.40	1.93	.062	1.57	4.06
2964882	TDS502A09400	9,400	.3701	—	—	.39	2.40	1.93	.063	1.57	4.06
2964883	TDS502A09500	9,500	.3740	—	—	.39	2.40	1.93	.064	1.57	4.06
2964884	TDS502A09520	9,520	.3748	—	—	.39	2.40	1.93	.064	1.57	4.06
2964885	TDS502A09600	9,600	.3780	—	—	.39	2.40	1.93	.064	1.57	4.06
2964886	TDS502A09700	9,700	.3819	—	—	.39	2.40	1.93	.065	1.57	4.06
2964887	TDS502A09800	9,800	.3858	—	—	.39	2.40	1.93	.066	1.57	4.06
2964888	TDS502A09900	9,900	.3898	—	—	.39	2.40	1.93	.067	1.57	4.06
2964889	TDS502A09920	9,920	.3906	25/64	—	.39	2.40	1.93	.067	1.57	4.06
2964890	TDS502A10000	10,000	.3937	—	—	.39	2.40	1.93	.067	1.57	4.06
2964891	TDS502A10100	10,100	.3976	—	—	.47	2.80	2.20	.068	1.77	4.65
2964892	TDS502A10200	10,200	.4016	—	—	.47	2.80	2.20	.069	1.77	4.65
2964893	TDS502A10300	10,300	.4055	—	—	.47	2.80	2.20	.069	1.77	4.65
2964894	TDS502A10320	10,320	.4063	13/32	—	.47	2.80	2.20	.069	1.77	4.65
2964895	TDS502A10400	10,400	.4094	—	—	.47	2.80	2.20	.070	1.77	4.65
2964896	TDS502A10500	10,500	.4134	—	—	.47	2.80	2.20	.071	1.77	4.65
2964897	TDS502A10600	10,600	.4173	—	—	.47	2.80	2.20	.071	1.77	4.65
2964898	TDS502A10700	10,700	.4213	—	—	.47	2.80	2.20	.072	1.77	4.65
2964899	TDS502A10720	10,720	.4220	—	—	.47	2.80	2.20	.072	1.77	4.65
2964900	TDS502A10800	10,800	.4252	—	—	.47	2.80	2.20	.073	1.77	4.65
2964901	TDS502A10900	10,900	.4291	—	—	.47	2.80	2.20	.074	1.77	4.65
2964902	TDS502A11000	11,000	.4331	—	—	.47	2.80	2.20	.074	1.77	4.65
2964903	TDS502A11100	11,100	.4370	—	—	.47	2.80	2.20	.075	1.77	4.65
2964904	TDS502A11110	11,110	.4374	—	—	.47	2.80	2.20	.075	1.77	4.65

(continued)

Solid Carbide Drills

# Solid Carbide Drills

TOP DRILL S+™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 5 x D



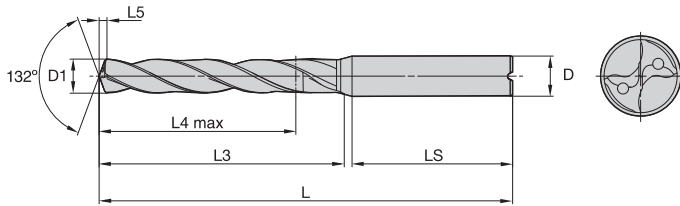
(TDS502A • 5 x D — continued)



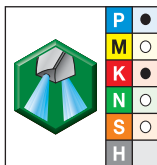
● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2964905	TDS502A11200	11,200	.4409	—	—	.47	2.80	2.20	.076	1.77	4.65
2964906	TDS502A11300	11,300	.4449	—	—	.47	2.80	2.20	.076	1.77	4.65
2968374	TDS502A11400	11,400	.4488	—	—	.47	2.80	2.20	.077	1.77	4.65
2968375	TDS502A11500	11,500	.4528	—	—	.47	2.80	2.20	.078	1.77	4.65
2968376	TDS502A11600	11,600	.4567	—	—	.47	2.80	2.20	.078	1.77	4.65
2968377	TDS502A11700	11,700	.4606	—	—	.47	2.80	2.20	.079	1.77	4.65
2968378	TDS502A11800	11,800	.4646	—	—	.47	2.80	2.20	.080	1.77	4.65
2968379	TDS502A11900	11,900	.4685	—	—	.47	2.80	2.20	.080	1.77	4.65
2968380	TDS502A11910	11,910	.4689	—	—	.47	2.80	2.20	.081	1.77	4.65
2968381	TDS502A12000	12,000	.4724	—	—	.47	2.80	2.20	.081	1.77	4.65
2968382	TDS502A12300	12,300	.4843	—	—	.55	3.03	2.36	.083	1.77	4.88
2968393	TDS502A12500	12,500	.4921	—	—	.55	3.03	2.36	.085	1.77	4.88
2968394	TDS502A12700	12,700	.5000	1/2	—	.55	3.03	2.36	.086	1.77	4.88
2968395	TDS502A12800	12,800	.5039	—	—	.55	3.03	2.36	.087	1.77	4.88
2968396	TDS502A13000	13,000	.5118	—	—	.55	3.03	2.36	.088	1.77	4.88
4051238	TDS502A13100	13,100	.5157	—	—	.55	3.03	2.36	.110	1.77	4.88
2968397	TDS502A13500	13,500	.5315	—	—	.55	3.03	2.36	.092	1.77	4.88
2968398	TDS502A13800	13,800	.5433	—	—	.55	3.03	2.36	.094	1.77	4.88
2968399	TDS502A14000	14,000	.5512	—	—	.55	3.03	2.36	.095	1.77	4.88
2968400	TDS502A14290	14,290	.5626	—	—	.63	3.27	2.48	.097	1.89	5.24
2968401	TDS502A14500	14,500	.5709	—	—	.63	3.27	2.48	.099	1.89	5.24
2968402	TDS502A14800	14,800	.5827	—	—	.63	3.27	2.48	.101	1.89	5.24
2968403	TDS502A15000	15,000	.5906	—	—	.63	3.27	2.48	.102	1.89	5.24
2968404	TDS502A15500	15,500	.6102	—	—	.63	3.27	2.48	.106	1.89	5.24
2968405	TDS502A15800	15,800	.6220	—	—	.63	3.27	2.48	.108	1.89	5.24
2968406	TDS502A15870	15,870	.6248	—	—	.63	3.27	2.48	.108	1.89	5.24
2968407	TDS502A16000	16,000	.6299	—	—	.63	3.27	2.48	.109	1.89	5.24
2968408	TDS502A16500	16,500	.6496	—	—	.71	3.66	2.80	.113	1.89	5.63
2968409	TDS502A16670	16,670	.6563	21/32	—	.71	3.66	2.80	.114	1.89	5.63
2968410	TDS502A16800	16,800	.6614	—	—	.71	3.66	2.80	.115	1.89	5.63
2968411	TDS502A17000	17,000	.6693	—	—	.71	3.66	2.80	.116	1.89	5.63
2968412	TDS502A17500	17,500	.6890	—	—	.71	3.66	2.80	.120	1.89	5.63
2968413	TDS502A17800	17,800	.7008	—	—	.71	3.66	2.80	.122	1.89	5.63
2968414	TDS502A18000	18,000	.7087	—	—	.71	3.66	2.80	.123	1.89	5.63
2968415	TDS502A18500	18,500	.7283	—	—	.79	3.98	3.03	.127	1.97	6.02
2968416	TDS502A18800	18,800	.7402	—	—	.79	3.98	3.03	.129	1.97	6.02
2968417	TDS502A19000	19,000	.7480	—	—	.79	3.98	3.03	.130	1.97	6.02
2968418	TDS502A19050	19,050	.7500	3/4	—	.79	3.98	3.03	.130	1.97	6.02
2968419	TDS502A19500	19,500	.7677	—	—	.79	3.98	3.03	.134	1.97	6.02
2968420	TDS502A19800	19,800	.7795	—	—	.79	3.98	3.03	.136	1.97	6.02
2968421	TDS502A20000	20,000	.7874	—	—	.79	3.98	3.03	.137	1.97	6.02

Solid Carbide Drills



■ **TDS503A • 8 x D**



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2968422	TDS503A03000	3,000	.1181	—	—	.24	1.57	1.30	.024	1.42	3.07
4051239	TDS503A03100	3,100	.1220	—	—	.24	1.57	1.30	.025	1.42	3.07
4051240	TDS503A03175	3,175	.1250	1/8	—	.24	1.57	1.30	.025	1.42	3.07
4051241	TDS503A03200	3,200	.1260	—	—	.24	1.57	1.30	.026	1.42	3.07
4051242	TDS503A03250	3,250	.1280	—	—	.24	1.57	1.30	.026	1.42	3.07
2968503	TDS503A03300	3,300	.1299	—	—	.24	1.57	1.30	.026	1.42	3.07
4051243	TDS503A03400	3,400	.1339	—	—	.24	1.57	1.30	.027	1.42	3.07
4051244	TDS503A03455	3,455	.1360	—	29	.24	1.57	1.30	.028	1.42	3.07
2968504	TDS503A03500	3,500	.1378	—	—	.24	1.57	1.30	.028	1.42	3.07
2968505	TDS503A03700	3,700	.1457	—	—	.24	1.57	1.30	.030	1.42	3.07
2968506	TDS503A03800	3,800	.1496	—	—	.24	1.93	1.61	.031	1.42	3.43
4051245	TDS503A03900	3,900	.1535	—	—	.24	1.93	1.61	.031	1.42	3.43
2968507	TDS503A04000	4,000	.1575	—	—	.24	1.93	1.61	.032	1.42	3.43
4051246	TDS503A04100	4,100	.1614	—	—	.24	1.93	1.61	.033	1.42	3.43
2968508	TDS503A04200	4,200	.1654	—	—	.24	1.93	1.61	.034	1.42	3.43
4051247	TDS503A04300	4,300	.1693	—	—	.24	1.93	1.61	.035	1.42	3.43
2968509	TDS503A04370	4,370	.1720	—	—	.24	1.93	1.61	.035	1.42	3.43
4051248	TDS503A04400	4,400	.1732	—	—	.24	1.93	1.61	.036	1.42	3.43
2968510	TDS503A04500	4,500	.1772	—	—	.24	1.93	1.61	.037	1.42	3.43
4051249	TDS503A04600	4,600	.1811	—	—	.24	1.93	1.61	.037	1.42	3.43
4051250	TDS503A04650	4,650	.1831	—	—	.24	1.93	1.61	.038	1.42	3.43
2968511	TDS503A04700	4,700	.1850	—	13	.24	1.93	1.61	.038	1.42	3.43
2968512	TDS503A04760	4,760	.1874	—	—	.24	2.20	1.89	.039	1.42	3.70
2968513	TDS503A04800	4,800	.1890	—	12	.24	2.20	1.89	.039	1.42	3.70

(continued)

Solid Carbide Drills

# Solid Carbide Drills

TOP DRILL S+™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 8 x D



(TDS503A • 8 x D — continued)



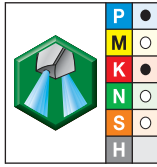
● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
4051251	TDS503A04900	4,900	.1929	—	—	.24	2.20	1.89	.040	1.42	3.70
2968514	TDS503A05000	5,000	.1969	—	—	.24	2.20	1.89	.041	1.42	3.70
4051252	TDS503A05100	5,100	.2008	—	—	.24	2.20	1.89	.042	1.42	3.70
2968515	TDS503A05160	5,160	.2031	13/64	—	.24	2.20	1.89	.042	1.42	3.70
4051253	TDS503A05200	5,200	.2047	—	—	.24	2.20	1.89	.042	1.42	3.70
4051254	TDS503A05300	5,300	.2087	—	—	.24	2.20	1.89	.043	1.42	3.70
4051255	TDS503A05400	5,400	.2126	—	—	.24	2.20	1.89	.044	1.42	3.70
2968516	TDS503A05500	5,500	.2165	—	—	.24	2.20	1.89	.045	1.42	3.70
4051256	TDS503A05550	5,550	.2185	—	—	.24	2.20	1.89	.045	1.42	3.70
2968517	TDS503A05560	5,560	.2189	—	—	.24	2.20	1.89	.045	1.42	3.70
4051257	TDS503A05600	5,600	.2205	—	—	.24	2.20	1.89	.046	1.42	3.70
4051258	TDS503A05700	5,700	.2244	—	—	.24	2.20	1.89	.047	1.42	3.70
2968518	TDS503A05800	5,800	.2283	—	—	.24	2.20	1.89	.047	1.42	3.70
4051259	TDS503A05900	5,900	.2323	—	—	.24	2.20	1.89	.048	1.42	3.70
2968519	TDS503A05950	5,950	.2343	—	—	.24	2.20	1.89	.049	1.42	3.70
2968520	TDS503A06000	6,000	.2362	—	—	.24	2.20	1.89	.049	1.42	3.70
4051260	TDS503A06100	6,100	.2402	—	—	.32	2.64	2.24	.050	1.42	4.13
4051261	TDS503A06200	6,200	.2441	—	—	.32	2.64	2.24	.051	1.42	4.13
4051262	TDS503A06300	6,300	.2480	—	—	.32	2.64	2.24	.052	1.42	4.13
2968521	TDS503A06350	6,350	.2500	1/4	E	.32	2.64	2.24	.052	1.42	4.13
4051263	TDS503A06400	6,400	.2520	—	—	.32	2.64	2.24	.053	1.42	4.13
2968522	TDS503A06500	6,500	.2559	—	—	.32	2.64	2.24	.053	1.42	4.13
4051264	TDS503A06600	6,600	.2598	—	—	.32	2.64	2.24	.054	1.42	4.13
4051265	TDS503A06700	6,700	.2638	—	—	.32	2.64	2.24	.055	1.42	4.13
2968523	TDS503A06750	6,750	.2657	—	—	.32	2.64	2.24	.056	1.42	4.13
2968524	TDS503A06800	6,800	.2677	—	—	.32	2.64	2.24	.056	1.42	4.13
4051266	TDS503A06900	6,900	.2717	—	—	.32	2.64	2.24	.057	1.42	4.13
2968525	TDS503A07000	7,000	.2756	—	—	.32	2.64	2.24	.058	1.42	4.13
4051267	TDS503A07100	7,100	.2795	—	—	.32	2.83	2.40	.059	1.42	4.33
2968526	TDS503A07140	7,140	.2811	—	—	.32	2.83	2.40	.059	1.42	4.33
4051268	TDS503A07200	7,200	.2835	—	—	.32	2.83	2.40	.059	1.42	4.33
4051269	TDS503A07300	7,300	.2874	—	—	.32	2.83	2.40	.060	1.42	4.33
4051270	TDS503A07400	7,400	.2913	—	—	.32	2.83	2.40	.061	1.42	4.33
2968527	TDS503A07500	7,500	.2953	—	—	.32	2.83	2.40	.062	1.42	4.33
2968528	TDS503A07540	7,540	.2969	19/64	—	.32	2.83	2.40	.062	1.42	4.33
3998454	TDS503A07600	7,600	.2992	—	—	.32	2.83	2.40	.063	1.42	4.33
4051271	TDS503A07700	7,700	.3031	—	—	.32	2.83	2.40	.064	1.42	4.33
2968529	TDS503A07800	7,800	.3071	—	—	.32	2.83	2.40	.064	1.42	4.33
4051272	TDS503A07900	7,900	.3110	—	—	.32	2.83	2.40	.065	1.42	4.33
2968530	TDS503A07940	7,940	.3126	—	—	.32	2.83	2.40	.066	1.42	4.33

(continued)

Solid Carbide Drills

(TDS503A • 8 x D — continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
2968531	TDS503A08000	8,000	.3150	—	—	.32	2.83	2.40	.066	1.42	4.33
4051273	TDS503A08100	8,100	.3189	—	—	.39	3.15	2.68	.067	1.57	4.80
4051274	TDS503A08200	8,200	.3228	—	—	.39	3.15	2.68	.068	1.57	4.80
4051275	TDS503A08300	8,300	.3268	—	—	.39	3.15	2.68	.069	1.57	4.80
2968532	TDS503A08330	8,330	.3280	—	—	.39	3.15	2.68	.069	1.57	4.80
4051276	TDS503A08400	8,400	.3307	—	—	.39	3.15	2.68	.070	1.57	4.80
2968533	TDS503A08500	8,500	.3346	—	—	.39	3.15	2.68	.070	1.57	4.80
4051277	TDS503A08600	8,600	.3386	—	—	.39	3.15	2.68	.071	1.57	4.80
4051278	TDS503A08700	8,700	.3425	—	—	.39	3.15	2.68	.072	1.57	4.80
4051279	TDS503A08800	8,800	.3465	—	—	.39	3.15	2.68	.073	1.57	4.80
4051280	TDS503A08900	8,900	.3504	—	—	.39	3.15	2.68	.074	1.57	4.80
2968534	TDS503A09000	9,000	.3543	—	—	.39	3.15	2.68	.075	1.57	4.80
4051281	TDS503A09100	9,100	.3583	—	—	.39	3.15	2.68	.076	1.57	4.80
2968535	TDS503A09130	9,130	.3594	23/64	—	.39	3.15	2.68	.076	1.57	4.80
4051282	TDS503A09200	9,200	.3622	—	—	.39	3.15	2.68	.076	1.57	4.80
4051283	TDS503A09300	9,300	.3661	—	—	.39	3.15	2.68	.077	1.57	4.80
4051284	TDS503A09400	9,400	.3701	—	—	.39	3.15	2.68	.078	1.57	4.80
2968536	TDS503A09500	9,500	.3740	—	—	.39	3.15	2.68	.079	1.57	4.80
2968537	TDS503A09520	9,520	.3748	—	—	.39	3.15	2.68	.079	1.57	4.80
4051285	TDS503A09600	9,600	.3780	—	—	.39	3.15	2.68	.080	1.57	4.80
4051286	TDS503A09700	9,700	.3819	—	—	.39	3.15	2.68	.081	1.57	4.80
2968538	TDS503A09800	9,800	.3858	—	—	.39	3.15	2.68	.082	1.57	4.80
4051287	TDS503A09900	9,900	.3898	—	—	.39	3.15	2.68	.082	1.57	4.80
2968539	TDS503A09920	9,920	.3906	25/64	—	.39	3.15	2.68	.083	1.57	4.80
2968540	TDS503A10000	10,000	.3937	—	—	.39	3.15	2.68	.083	1.57	4.80
4051288	TDS503A10100	10,100	.3976	—	—	.47	3.70	3.11	.084	1.77	5.55
2968541	TDS503A10200	10,200	.4016	—	—	.47	3.70	3.11	.085	1.77	5.55
4051289	TDS503A10300	10,300	.4055	—	—	.47	3.70	3.11	.086	1.77	5.55
2968542	TDS503A10320	10,320	.4063	13/32	—	.47	3.70	3.11	.086	1.77	5.55
4051290	TDS503A10400	10,400	.4094	—	—	.47	3.70	3.11	.087	1.77	5.55
2968543	TDS503A10500	10,500	.4134	—	—	.47	3.70	3.11	.088	1.77	5.55
4051291	TDS503A10600	10,600	.4173	—	—	.47	3.70	3.11	.088	1.77	5.55
4051292	TDS503A10700	10,700	.4213	—	—	.47	3.70	3.11	.089	1.77	5.55
2968544	TDS503A10720	10,720	.4220	—	—	.47	3.70	3.11	.089	1.77	5.55
2968545	TDS503A10800	10,800	.4252	—	—	.47	3.70	3.11	.090	1.77	5.55
4051293	TDS503A10900	10,900	.4291	—	—	.47	3.70	3.11	.091	1.77	5.55
2968546	TDS503A11000	11,000	.4331	—	—	.47	3.70	3.11	.092	1.77	5.55
4051294	TDS503A11100	11,100	.4370	—	—	.47	3.70	3.11	.093	1.77	5.55
3998456	TDS503A11110	11,110	.4374	—	—	.47	3.70	3.11	.093	1.77	5.55
4051295	TDS503A11200	11,200	.4409	—	—	.47	3.70	3.11	.094	1.77	5.55

(continued)

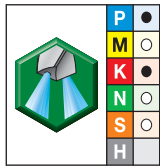
Solid Carbide Drills

# Solid Carbide Drills

TOP DRILL S+™ • Steel, Stainless Steel, Cast Iron, Aluminum, and High-Temp Alloys • 8 x D



(TDS503A • 8 x D — continued)





● first choice  
○ alternate choice

grade WU25PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L
order #	catalog #	mm	in	fraction	wire size						
4051296	TDS503A11300	11,300	.4449	—	—	.47	3.70	3.11	.094	1.77	5.55
4051297	TDS503A11400	11,400	.4488	—	—	.47	3.70	3.11	.095	1.77	5.55
2968547	TDS503A11500	11,500	.4528	—	—	.47	3.70	3.11	.096	1.77	5.55
4051298	TDS503A11600	11,600	.4567	—	—	.47	3.70	3.11	.097	1.77	5.55
4051299	TDS503A11700	11,700	.4606	—	—	.47	3.70	3.11	.098	1.77	5.55
2968548	TDS503A11800	11,800	.4646	—	—	.47	3.70	3.11	.099	1.77	5.55
4051300	TDS503A11900	11,900	.4685	—	—	.47	3.70	3.11	.099	1.77	5.55
2968549	TDS503A11910	11,910	.4689	—	—	.47	3.70	3.11	.100	1.77	5.55
2968550	TDS503A12000	12,000	.4724	—	—	.47	3.70	3.11	.100	1.77	5.55
2968551	TDS503A12300	12,300	.4843	—	—	.55	4.25	3.58	.103	1.77	6.10
2968552	TDS503A12500	12,500	.4921	—	—	.55	4.25	3.58	.105	1.77	6.10
2968553	TDS503A12700	12,700	.5000	1/2	—	.55	4.25	3.58	.106	1.77	6.10
2968554	TDS503A12800	12,800	.5039	—	—	.55	4.25	3.58	.107	1.77	6.10
2968555	TDS503A13000	13,000	.5118	—	—	.55	4.25	3.58	.109	1.77	6.10
4051301	TDS503A13100	13,100	.5157	—	—	.55	4.25	3.58	.110	1.77	6.10
2968556	TDS503A13500	13,500	.5315	—	—	.55	4.25	3.58	.113	1.77	6.10
2968557	TDS503A13800	13,800	.5433	—	—	.55	4.25	3.58	.116	1.77	6.10
2968558	TDS503A14000	14,000	.5512	—	—	.55	4.25	3.58	.117	1.77	6.10
2968559	TDS503A14290	14,290	.5626	—	—	.63	4.76	3.98	.120	1.89	6.73
2968560	TDS503A14500	14,500	.5709	—	—	.63	4.76	3.98	.122	1.89	6.73
2968561	TDS503A14800	14,800	.5827	—	—	.63	4.76	3.98	.124	1.89	6.73
2968562	TDS503A15000	15,000	.5906	—	—	.63	4.76	3.98	.126	1.89	6.73
2968563	TDS503A15500	15,500	.6102	—	—	.63	4.76	3.98	.130	1.89	6.73
2968564	TDS503A15800	15,800	.6220	—	—	.63	4.76	3.98	.133	1.89	6.73
2968565	TDS503A15870	15,870	.6248	—	—	.63	4.76	3.98	.134	1.89	6.73
2968566	TDS503A16000	16,000	.6299	—	—	.63	4.76	3.98	.135	1.89	6.73
4051302	TDS503A16500	16,500	.6496	—	—	.71	5.32	4.45	.139	1.89	7.28
4051303	TDS503A16670	16,670	.6563	—	—	.71	5.32	4.45	.140	1.89	7.28
4051304	TDS503A16800	16,800	.6614	—	—	.71	5.32	4.45	.142	1.89	7.28
4051305	TDS503A17000	17,000	.6693	—	—	.71	5.32	4.45	.143	1.89	7.28
4051306	TDS503A17500	17,500	.6890	—	—	.71	5.32	4.45	.148	1.89	7.28
4051307	TDS503A17800	17,800	.7008	—	—	.71	5.32	4.45	.150	1.89	7.28
4051308	TDS503A18000	18,000	.7087	—	—	.71	5.32	4.45	.152	1.89	7.28
4051309	TDS503A18500	18,500	.7283	—	—	.79	5.83	4.88	.156	1.97	7.87
4051310	TDS503A18800	18,800	.7402	—	—	.79	5.83	4.88	.159	1.97	7.87
4051311	TDS503A19000	19,000	.7480	—	—	.79	5.83	4.88	.160	1.97	7.87
4051312	TDS503A19050	19,050	.7500	3/4	—	.79	5.83	4.88	.161	1.97	7.87
4051313	TDS503A19500	19,500	.7677	—	—	.79	5.83	4.88	.165	1.97	7.87
4051314	TDS503A19800	19,800	.7795	—	—	.79	5.83	4.88	.167	1.97	7.87
4051315	TDS503A20000	20,000	.7874	—	—	.79	5.83	4.88	.169	1.97	7.87

Solid Carbide Drills



■ TOP DRILL S+ • TDS301 • WU25PD™ • Flood Coolant • Inch

Material Group												
		Cutting Speed – vc Range – SFM		Recommended Feed Rate (f) by Diameter								
		min	– max	Tool Diameter (inch)	.125–1/8	.188–3/16	.250 –1/4	.313–5/16	.375–3/8	.500–1/2	.625–5/8	.750–3/4
P	1	260	– 430	IPR	.002–.005	.004–.007	.005–.009	.006–.011	.007–.013	.008–.015	.009–.019	.012–.024
	2, 3, 4, 6, 7	200	– 390	IPR	.003–.005	.004–.007	.006–.010	.007–.012	.008–.015	.009–.017	.011–.020	.015–.026
	5, 9, 10, 11	200	– 390	IPR	.003–.005	.004–.007	.005–.010	.006–.012	.007–.015	.008–.017	.010–.020	.013–.026
	12, 13.1, 13.2	130	– 230	IPR	.002–.003	.002–.004	.004–.006	.004–.008	.005–.009	.006–.011	.008–.014	.010–.018
M	14.1	100	– 160	IPR	.002–.003	.002–.004	.003–.004	.004–.005	.004–.006	.005–.006	.006–.007	.006–.008
	14.3	100	– 200	IPR	.002–.003	.002–.004	.003–.005	.004–.006	.004–.006	.005–.007	.006–.008	.006–.009
	14.2, 14.4	100	– 160	IPR	.002–.003	.002–.004	.003–.004	.004–.005	.004–.006	.005–.006	.006–.007	.006–.008
K	15, 16	330	– 690	IPR	.003–.006	.005–.009	.006–.012	.008–.015	.009–.017	.010–.019	.012–.002	.015–.029
	17, 18, 19	430	– 520	IPR	.003–.005	.005–.007	.006–.010	.008–.012	.009–.014	.010–.016	.012–.019	.015–.024
	20	330	– 560	IPR	.002–.005	.004–.007	.005–.010	.006–.012	.007–.014	.007–.016	.010–.019	.012–.024
N	21	330	– 980	IPR	.004–.007	.005–.008	.006–.010	.008–.012	.010–.014	.012–.016	.014–.020	.016–.024
	22, 23, 24	330	– 980	IPR	.004–.008	.005–.010	.006–.012	.008–.014	.010–.016	.012–.018	.014–.022	.016–.026
	25	330	– 980	IPR	.006–.007	.006–.008	.007–.010	.008–.012	.010–.014	.012–.016	.014–.020	.016–.022
	26, 27, 28	330	– 820	IPR	.004–.008	.005–.010	.006–.012	.008–.014	.010–.016	.012–.018	.014–.020	.016–.024
S	31, 32	70	– 100	IPR	.001–.002	.002–.003	.002–.004	.003–.005	.004–.005	.004–.006	.005–.006	.006–.007
	33, 34, 35	30	– 100	IPR	.001–.002	.001–.002	.002–.003	.003–.004	.003–.004	.004–.005	.004–.006	.004–.006
	36	70	– 130	IPR	.001–.002	.001–.002	.002–.003	.002–.004	.003–.004	.003–.004	.004–.005	.004–.006
	37	70	– 160	IPR	.001–.002	.001–.002	.002–.003	.003–.004	.003–.004	.004–.005	.004–.006	.004–.006

Solid Carbide Drills

Inch tolerance			
D1	D1 tolerance m7	D	D tolerance h6
> .1181–.2362	.0002/.0006	.2362	.0000/- .0003
> .2362–.3937	.0002/.0008	.315–.3937	.0000/- .0004
> .3937–.7087	.0003/.0010	.4724–.7087	.0000/- .0004
> .7087–.7874	.0003/.0011	.7874	.0000/- .0005

■ TOP DRILL S+ • TDS301 • WU25PD™ • Flood Coolant • Metric

Material Group		Cutting Speed – vc Range – m/min		Recommended Feed Rate (f) by Diameter								
		min	max									
P	1	80	130	mm/r	0,06–0,12	0,10–0,18	0,12–0,24	0,14–0,29	0,17–0,34	0,20–0,39	0,24–0,47	0,31–0,60
	2, 3, 4, 6, 7	60	120	mm/r	0,07–0,13	0,10–0,19	0,14–0,25	0,17–0,31	0,21–0,37	0,24–0,42	0,29–0,52	0,38–0,65
	5, 9, 10, 11	60	120	mm/r	0,07–0,13	0,09–0,19	0,13–0,25	0,16–0,31	0,19–0,37	0,21–0,42	0,26–0,52	0,32–0,65
	12, 13.1, 13.2	40	70	mm/r	0,05–0,08	0,06–0,11	0,09–0,16	0,11–0,20	0,13–0,24	0,15–0,27	0,20–0,35	0,26–0,45
M	14.1	30	50	mm/r	0,04–0,07	0,05–0,09	0,08–0,11	0,09–0,12	0,10–0,14	0,12–0,16	0,14–0,18	0,16–0,20
	14.3	30	60	mm/r	0,04–0,08	0,06–0,10	0,08–0,12	0,09–0,14	0,10–0,16	0,12–0,18	0,14–0,20	0,16–0,22
	14.2, 14.4	30	50	mm/r	0,04–0,07	0,06–0,09	0,08–0,11	0,09–0,12	0,10–0,14	0,12–0,16	0,14–0,18	0,16–0,20
K	15, 16	100	210	mm/r	0,08–0,16	0,12–0,24	0,16–0,31	0,20–0,38	0,23–0,44	0,25–0,49	0,31–0,06	0,38–0,74
	17, 18, 19	130	160	mm/r	0,08–0,13	0,12–0,19	0,16–0,25	0,20–0,31	0,23–0,36	0,25–0,40	0,31–0,48	0,38–0,60
	20	100	170	mm/r	0,06–0,13	0,09–0,19	0,12–0,25	0,14–0,30	0,17–0,35	0,19–0,40	0,25–0,48	0,30–0,60
N	21	100	300	mm/r	0,10–0,18	0,12–0,20	0,15–0,25	0,20–0,30	0,25–0,35	0,30–0,40	0,35–0,50	0,40–0,60
	22, 23, 24	100	300	mm/r	0,10–0,20	0,12–0,25	0,15–0,30	0,20–0,35	0,25–0,40	0,30–0,45	0,35–0,55	0,40–0,65
	25	100	300	mm/r	0,15–0,18	0,16–0,20	0,18–0,25	0,20–0,30	0,25–0,35	0,30–0,40	0,35–0,50	0,40–0,55
	26, 27, 28	100	250	mm/r	0,10–0,20	0,12–0,25	0,15–0,30	0,20–0,35	0,25–0,40	0,30–0,45	0,35–0,50	0,40–0,60
S	31, 32	20	30	mm/r	0,03–0,06	0,04–0,08	0,06–0,10	0,08–0,12	0,09–0,13	0,10–0,14	0,12–0,16	0,14–0,18
	33, 34, 35	10	30	mm/r	0,02–0,04	0,03–0,06	0,05–0,08	0,07–0,10	0,08–0,11	0,09–0,12	0,10–0,14	0,11–0,16
	36	20	40	mm/r	0,02–0,04	0,02–0,05	0,04–0,07	0,06–0,09	0,07–0,10	0,08–0,11	0,09–0,13	0,10–0,15
	37	20	50	mm/r	0,02–0,04	0,03–0,06	0,05–0,08	0,07–0,10	0,08–0,11	0,09–0,12	0,10–0,14	0,11–0,16

Solid Carbide Drills

Metric tolerance

nominal size range	D1 tolerance	D tolerance h6
>3-6	0,004/0,016	0,000/-0,008
>6-10	0,006/0,021	0,000/-0,009
>10-18	0,007/0,025	0,000/-0,011
>18-21	0,008/0,029	0,000/-0,013

**TOP DRILL S+ • TDS501 TDS502 TDS503 • WU25PD™ • Through Coolant • Inch**

Material Group		 Cutting Speed – vc Range – SFM		 Recommended Feed Rate (f) by Diameter								
		P	1	300	590	IPR	.003–.006	.004–.007	.005–.009	.006–.011	.007–.013	.008–.015
2, 3, 4, 6, 7	260		390	IPR	.004–.007	.004–.007	.006–.010	.007–.012	.008–.015	.009–.017	.011–.020	.015–.026
5, 9, 10, 11	230		390	IPR	.003–.007	.004–.007	.005–.010	.006–.012	.007–.015	.008–.017	.010–.020	.013–.026
12, 13.1, 13.2	160		260	IPR	.002–.004	.002–.004	.004–.006	.004–.008	.006–.009	.006–.011	.008–.014	.010–.018
M	14.1	100	160	IPR	.002–.003	.002–.004	.003–.004	.004–.005	.004–.006	.005–.006	.006–.007	.006–.008
	14.3	100	200	IPR	.002–.003	.002–.004	.003–.005	.004–.006	.004–.006	.005–.007	.006–.008	.006–.009
	14.2, 14.4	100	160	IPR	.002–.003	.002–.004	.003–.004	.004–.005	.004–.006	.005–.006	.006–.007	.006–.008
K	15, 16	330	690	IPR	.004–.009	.005–.009	.006–.012	.008–.015	.009–.017	.010–.019	.012–.024	.015–.029
	17, 18, 19	430	520	IPR	.004–.007	.005–.007	.006–.010	.008–.012	.009–.014	.010–.016	.012–.019	.015–.024
	20	330	560	IPR	.003–.007	.004–.007	.005–.010	.006–.012	.007–.014	.007–.016	.009–.019	.012–.024
N	21	330	1150	IPR	.004–.007	.005–.008	.006–.010	.008–.012	.010–.014	.012–.016	.014–.020	.016–.024
	22, 23, 24	330	980	IPR	.004–.008	.005–.010	.006–.012	.008–.014	.010–.016	.012–.018	.014–.022	.016–.026
	25	330	980	IPR	.006–.007	.006–.008	.007–.010	.008–.012	.010–.014	.012–.016	.014–.020	.016–.022
	26, 27, 28	330	820	IPR	.004–.008	.005–.010	.006–.012	.008–.014	.010–.016	.012–.018	.014–.020	.016–.024
S	31, 32	70	100	IPR	.001–.002	.002–.003	.002–.004	.003–.005	.004–.005	.004–.006	.005–.006	.006–.007
	33, 34, 35	30	100	IPR	.001–.002	.001–.002	.002–.003	.003–.004	.003–.004	.004–.005	.004–.006	.004–.006
	36	70	130	IPR	.001–.002	.001–.002	.002–.003	.002–.004	.003–.004	.003–.004	.004–.005	.004–.006
	37	70	160	IPR	.001–.002	.001–.002	.002–.003	.003–.004	.003–.004	.004–.005	.004–.006	.004–.006

Solid Carbide Drills

Inch tolerance			
D1	D1 tolerance m7	D	D tolerance h6
> .1181–.2362	.0002/.0006	.2362	.0000/-.0003
> .2362–.3937	.0002/.0008	.315–.3937	.0000/-.0004
> .3937–.7087	.0003/.0010	.4724–.7087	.0000/-.0004
> .7087–.7874	.0003/.0011	.7874	.0000/-.0005

■ TOP DRILL S+ • TDS501 TDS502 TDS503 • WU25PD™ • Through Coolant • Metric

Material Group	Cutting Speed – vc Range – m/min	Recommended Feed Rate (f) by Diameter											
		min	-	max	Tool Diameter (mm)	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
						mm/r	mm/r	mm/r	mm/r	mm/r	mm/r	mm/r	mm/r
P	1	90	-	180	mm/r	0,08-0,16	0,09-0,18	0,12-0,24	0,14-0,29	0,17-0,34	0,20-0,39	0,24-0,47	0,31-0,60
	2, 3, 4, 6, 7	80	-	120	mm/r	0,09-0,17	0,10-0,19	0,14-0,25	0,17-0,31	0,21-0,37	0,24-0,42	0,29-0,52	0,38-0,65
	5, 9, 10, 11	70	-	120	mm/r	0,08-0,17	0,09-0,19	0,13-0,25	0,16-0,31	0,19-0,37	0,21-0,42	0,26-0,52	0,32-0,65
	12, 13.1, 13.2	50	-	80	mm/r	0,05-0,09	0,06-0,11	0,09-0,16	0,11-0,20	0,14-0,24	0,15-0,27	0,20-0,35	0,26-0,45
M	14.1	30	-	50	mm/r	0,04-0,07	0,05-0,09	0,08-0,11	0,09-0,12	0,10-0,14	0,12-0,16	0,14-0,18	0,16-0,20
	14.3	30	-	60	mm/r	0,04-0,08	0,06-0,10	0,08-0,12	0,09-0,14	0,10-0,16	0,12-0,18	0,14-0,20	0,16-0,22
	14.2, 14.4	30	-	50	mm/r	0,04-0,07	0,06-0,09	0,08-0,11	0,09-0,12	0,10-0,14	0,12-0,16	0,14-0,18	0,16-0,20
K	15, 16	100	-	210	mm/r	0,11-0,22	0,12-0,24	0,16-0,31	0,20-0,38	0,23-0,44	0,25-0,49	0,31-0,60	0,38-0,74
	17, 18, 19	130	-	160	mm/r	0,11-0,17	0,12-0,19	0,16-0,25	0,20-0,31	0,23-0,36	0,25-0,40	0,31-0,48	0,38-0,60
	20	100	-	170	mm/r	0,08-0,17	0,09-0,19	0,12-0,25	0,14-0,30	0,17-0,35	0,19-0,40	0,24-0,48	0,30-0,60
N	21	100	-	350	mm/r	0,10-0,18	0,12-0,20	0,15-0,25	0,20-0,30	0,25-0,35	0,30-0,40	0,35-0,50	0,40-0,60
	22, 23, 24	100	-	300	mm/r	0,10-0,20	0,12-0,25	0,15-0,30	0,20-0,35	0,25-0,40	0,30-0,45	0,35-0,55	0,40-0,65
	25	100	-	300	mm/r	0,15-0,18	0,16-0,20	0,18-0,25	0,20-0,30	0,25-0,35	0,30-0,40	0,35-0,50	0,40-0,55
	26, 27, 28	100	-	250	mm/r	0,10-0,20	0,12-0,25	0,15-0,30	0,20-0,35	0,25-0,40	0,30-0,45	0,35-0,50	0,40-0,60
S	31, 32	20	-	30	mm/r	0,03-0,06	0,04-0,08	0,06-0,10	0,08-0,12	0,09-0,13	0,10-0,14	0,12-0,16	0,14-0,18
	33, 34, 35	10	-	30	mm/r	0,02-0,04	0,03-0,06	0,05-0,08	0,07-0,10	0,08-0,11	0,09-0,12	0,10-0,14	0,11-0,16
	36	20	-	40	mm/r	0,02-0,04	0,02-0,05	0,04-0,07	0,06-0,09	0,07-0,10	0,08-0,11	0,09-0,13	0,10-0,15
	37	20	-	50	mm/r	0,02-0,04	0,03-0,06	0,05-0,08	0,07-0,10	0,08-0,11	0,09-0,12	0,10-0,14	0,11-0,16

Solid Carbide Drills

nominal size range	Metric tolerance	
	D1 tolerance	D tolerance h6
>3-6	0,004/0,016	0,000/-0,008
>6-10	0,006/0,021	0,000/-0,009
>10-18	0,007/0,025	0,000/-0,011
>18-21	0,008/0,029	0,000/-0,013

## Good for You, Better for the Environment!

The WIDIA™ Carbide Recycling Program can turn accumulated scrap carbide tooling in your shop into cash.

# Carbide Recycling

## EXTREME CHALLENGES. EXTREME RESULTS.

We pay cash for used carbide tooling, including coated or non-coated carbide inserts, drills, end mills, reamers, and taps, regardless of brand.

It's good for the environment and a responsible way to dispose of scrap carbide.

Our carbide recycling program features:

- Easy-to-use web portal that shows what your scrap carbide is worth before sending it to us.
- Online forms that make it easy to ship scrap carbide to WIDIA.
- Green Box™ containers for safe, convenient shipping of scrap carbide to WIDIA.
- Cash payment for used carbide tooling.



For more information, contact your local WIDIA  
Authorized Distributor or visit [widia.com/services](http://widia.com/services).

**WIDIA** 

Deep-Hole Drilling without Piloting •

## WIDIA™ TOP DRILL S+™ 12 x D

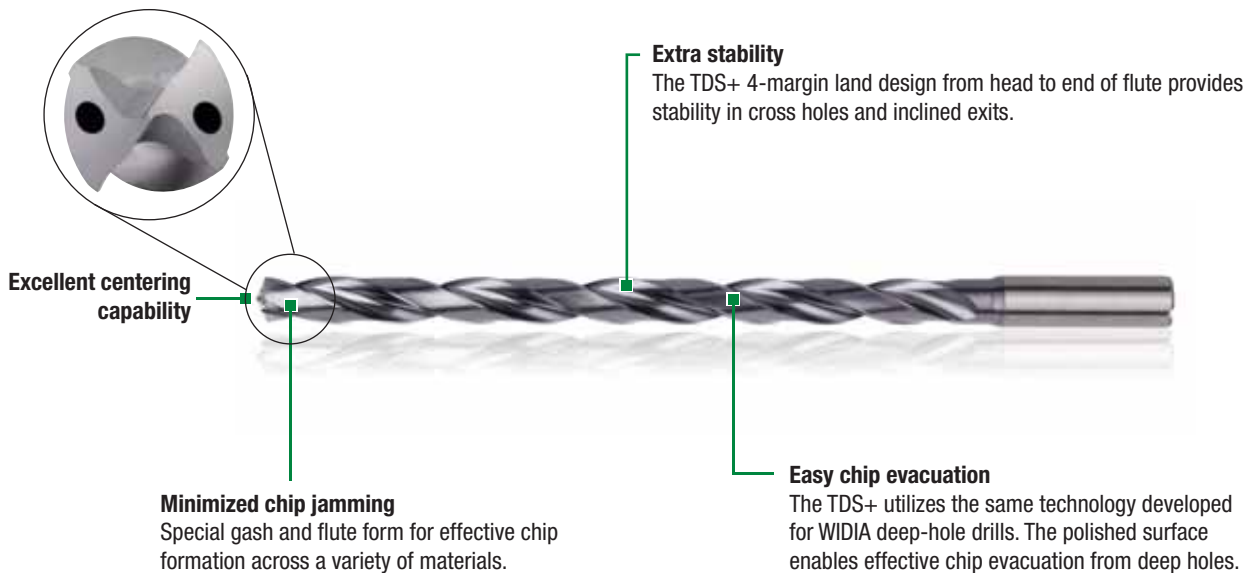
The versatile TOP DRILL S+ provides reliable performance across a broad scope of applications, including alloyed and unalloyed steel, cast iron, and some stainless steels and high-temperature alloys. TDS+ is now available in 12 x D, adding to its already wide range of options from 3–8 x D.



# TOP DRILL S+ 12 x D

TDS+ 12 x D is capable of drilling an array of materials. The 4-margin land configuration offers stability, minimizes chipping and jamming, and promotes chip evacuation. Because TDS+ 12 x D does not require a pilot drill, it increases efficiency by reducing the number of steps required for basic applications.

- 12 x D fits the gap between 8 x D and 15 x D.
- One drill that covers all materials.
- Can be used without a pilot.



## Improved Productivity

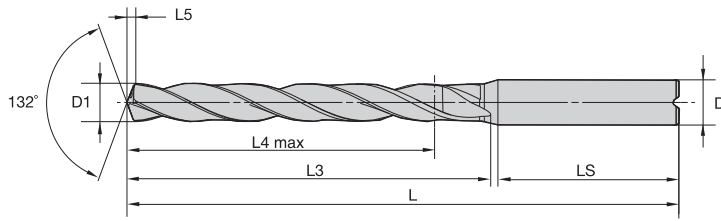
- Excellent centering capability — the new TDS+ 12 x D point is engineered to provide excellent centering capability.
- No pilot drill required — save time and money by reducing the number of steps required for your 12 x D application.

## Increased Tool Life

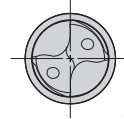
- Minimized runout — cylindrical body design provides guidance, and precision h6 shank is standard for better runout and less breakage.
- New WU20PD™ grade — designed specifically for long tool life.
- Factory regrind service — available through your WIDIA™ reconditioning service.

## WIDIA Advantage

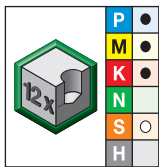
- Lower cost-per-hole due to high MRR and long tool life.
- Consistent performance from internally controlled supply chain:  
Powder > Rod > Grinding > Coating
- Part of the complete WIDIA holemaking solution.
- Get more predictable results from local regrind services using OEM standards to recondition, ensuring value throughout the entire life of the drill.
- Broad range of standard lengths, diameters, and coolant options in one line. Includes extensive intermediate metric, inch, fraction, and wire size, including tap drill sizes.



For information on L, L3, and L4 max, see page R133.



■ TDS504A • 12 x D



● first choice  
○ alternate choice

grade WU20PD  
TiAlN

D1 diameter

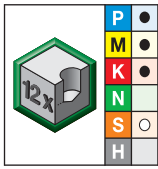
order #	catalog #	mm	in	fraction	wire size	L	L4 max	L3	L5	LS	D
4173459	TDS504A03000	3,000	.1181	—	—	93	44	52,0	0,6	36	6
4173460	TDS504A03175	3,175	.1250	1/8	—	93	44	52,0	0,7	36	6
4173461	TDS504A03264	3,264	.1285	—	30	93	44	53,0	0,7	36	6
4173545	TDS504A03455	3,455	.1360	—	29	93	44	53,0	0,7	36	6
4173462	TDS504A03500	3,500	.1378	—	—	93	44	53,0	0,7	36	6
4173546	TDS504A03734	3,734	.1470	—	26	93	45	54,0	0,8	36	6
4173463	TDS504A03970	3,970	.1563	5/32	—	107	56	66,0	0,8	36	6
4173464	TDS504A04000	4,000	.1575	—	—	107	56	66,0	0,8	36	6
4173465	TDS504A04500	4,500	.1772	—	—	107	56	67,0	0,9	36	6
4173466	TDS504A04600	4,600	.1811	—	—	107	57	68,0	1,0	36	6
4173467	TDS504A04763	4,763	.1875	3/16	—	125	69	82,0	1,0	36	6
4173468	TDS504A04800	4,800	.1890	—	12	125	69	82,0	1,0	36	6
4173469	TDS504A05000	5,000	.1969	—	—	125	70	83,0	1,1	36	6
4173470	TDS504A05100	5,100	.2008	—	—	125	70	83,0	1,1	36	6
4173471	TDS504A05200	5,200	.2047	—	—	125	70	83,0	1,1	36	6
4173472	TDS504A05300	5,300	.2087	—	—	125	71	84,0	1,1	36	6
4173473	TDS504A05410	5,410	.2130	—	3	125	71	84,0	1,1	36	6
4173474	TDS504A05500	5,500	.2165	—	—	125	71	84,0	1,2	36	6
4173475	TDS504A05558	5,558	.2188	7/32	—	125	71	84,0	1,2	36	6
4173476	TDS504A05600	5,600	.2205	—	—	125	72	85,0	1,2	36	6
4173477	TDS504A05700	5,700	.2244	—	—	125	72	85,0	1,2	36	6
4173478	TDS504A05800	5,800	.2283	—	—	125	71	85,0	1,2	36	6
4173479	TDS504A06000	6,000	.2362	—	—	125	72	86,0	1,3	36	6
4173480	TDS504A06200	6,200	.2441	—	—	139	82	97,0	1,3	36	8

(continued)

Solid Carbide Drills



(TDS504A • 12 x D — continued)



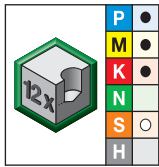
● first choice  
○ alternate choice

grade WU20PD TiAlN		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4173481	TDS504A06350	6,350	.2500	1/4	E	139	83	98,0	1,3	36	8
4173482	TDS504A06500	6,500	.2559	—	—	139	83	98,0	1,4	36	8
4173483	TDS504A06528	6,528	.2570	—	F	139	83	98,0	1,4	36	8
4173484	TDS504A06600	6,600	.2598	—	—	139	84	99,0	1,4	36	8
4173485	TDS504A06746	6,746	.2656	17/64	—	139	83	99,0	1,4	36	8
4173486	TDS504A06800	6,800	.2677	—	—	139	83	99,0	1,4	36	8
4173487	TDS504A06909	6,909	.2720	—	I	139	84	100,0	1,5	36	8
4173488	TDS504A07000	7,000	.2756	—	—	139	84	100,0	1,5	36	8
4173489	TDS504A07145	7,145	.2813	9/32	—	153	94	111,0	1,5	36	8
4173490	TDS504A07500	7,500	.2953	—	—	153	95	112,0	1,6	36	8
4173491	TDS504A07541	7,541	.2969	19/64	—	153	95	112,0	1,6	36	8
4173492	TDS504A07700	7,700	.3031	—	—	153	96	113,0	1,6	36	8
4173493	TDS504A07800	7,800	.3071	—	—	153	95	113,0	1,7	36	8
4173494	TDS504A07938	7,938	.3125	5/16	—	153	96	114,0	1,7	36	8
4173495	TDS504A08000	8,000	.3150	—	—	153	96	114,0	1,7	36	8
4173496	TDS504A08100	8,100	.3189	—	—	185	116	136,0	1,7	40	10
4173497	TDS504A08334	8,334	.3281	21/64	—	185	117	137,0	1,8	40	10
4173498	TDS504A08433	8,433	.3320	—	Q	185	117	137,0	1,8	40	10
4173499	TDS504A08500	8,500	.3346	—	—	185	117	137,0	1,8	40	10
4173500	TDS504A08700	8,700	.3425	—	—	185	118	138,0	1,9	40	10
4173501	TDS504A08733	8,733	.3438	11/32	—	185	117	138,0	1,9	40	10
4173502	TDS504A09000	9,000	.3543	—	—	185	118	139,0	1,9	40	10
4173503	TDS504A09100	9,100	.3583	—	—	185	118	139,0	1,9	40	10
4173504	TDS504A09129	9,129	.3594	23/64	—	185	118	139,0	1,9	40	10
4173547	TDS504A09347	9,347	.3680	—	U	185	119	140,0	2,0	40	10
4173505	TDS504A09500	9,500	.3740	—	—	185	119	140,0	2,0	40	10
4173506	TDS504A09525	9,525	.3750	3/8	—	185	119	140,0	2,0	40	10
4173507	TDS504A09921	9,921	.3906	25/64	—	185	120	142,0	2,1	40	10
4173508	TDS504A10000	10,000	.3937	—	—	185	120	142,0	2,1	40	10
4173509	TDS504A10200	10,200	.4016	—	—	218	140	164,0	2,2	45	12
4173510	TDS504A10300	10,300	.4055	—	—	218	141	165,0	2,2	45	12
4173511	TDS504A10320	10,320	.4063	13/32	—	218	141	165,0	2,2	45	12
4173512	TDS504A10500	10,500	.4134	—	—	218	141	165,0	2,2	45	12
4173513	TDS504A10716	10,716	.4219	27/64	—	218	142	166,0	2,3	45	12
4173514	TDS504A10800	10,800	.4252	—	—	218	141	166,0	2,3	45	12
4173515	TDS504A11000	11,000	.4331	—	—	218	142	167,0	2,4	45	12
4173516	TDS504A11113	11,113	.4375	7/16	—	218	142	167,0	2,4	45	12
4173517	TDS504A11500	11,500	.4528	—	—	218	143	168,0	2,5	45	12
4173518	TDS504A11800	11,800	.4646	—	—	218	143	169,0	2,5	45	12
4173519	TDS504A12000	12,000	.4724	—	—	218	144	170,0	2,6	45	12

(continued)

Solid Carbide Drills

(TDS504A • 12 x D — continued)



● first choice  
○ alternate choice

grade WU20PD TiAlN		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4173520	TDS504A12100	12,100	.4764	—	—	246	164	192,0	2,6	45	14
4173521	TDS504A12304	12,304	.4844	31/64	—	246	165	193,0	2,6	45	14
4148906	TDS504A12500	12,500	.4921	—	—	246	165	193,0	2,7	45	14
4173522	TDS504A12700	12,700	.5000	1/2	—	246	166	194,0	2,7	45	14
4173523	TDS504A13000	13,000	.5118	—	—	246	166	195,0	2,8	45	14
4173524	TDS504A13100	13,100	.5157	—	—	246	166	195,0	2,8	45	14
4173525	TDS504A13500	13,500	.5315	—	—	246	167	196,0	2,9	45	14
4173526	TDS504A14000	14,000	.5512	—	—	246	168	198,0	3,0	45	14
4173527	TDS504A14100	14,100	.5551	—	—	277	188	220,0	3,0	48	16
4173528	TDS504A14288	14,288	.5625	9/16	—	277	188	220,0	3,1	48	16
4173529	TDS504A14500	14,500	.5709	—	—	277	189	221,0	3,1	48	16
4173530	TDS504A14684	14,684	.5781	37/64	—	277	190	222,0	3,2	48	16
4173531	TDS504A15000	15,000	.5906	—	—	277	190	223,0	3,2	48	16
4173532	TDS504A15500	15,500	.6102	—	—	277	191	224,0	3,3	48	16
4173533	TDS504A15875	15,875	.6250	5/8	—	277	192	225,0	3,4	48	16
4173534	TDS504A16000	16,000	.6299	—	—	277	192	226,0	3,4	48	16
4173535	TDS504A16500	16,500	.6496	—	—	305	213	249,0	3,6	48	18
4173536	TDS504A17000	17,000	.6693	—	—	305	214	250,0	3,7	48	18
4173537	TDS504A17463	17,463	.6875	11/16	—	305	215	252,0	3,8	48	18
4173538	TDS504A17500	17,500	.6890	—	—	305	215	252,0	3,8	48	18
4173539	TDS504A18000	18,000	.7087	—	—	305	216	253,0	3,9	48	18
4173540	TDS504A18500	18,500	.7283	—	—	334	237	277,0	4,0	50	20
4173541	TDS504A19000	19,000	.7480	—	—	334	238	278,0	4,1	50	20
4173542	TDS504A19050	19,050	.7500	3/4	—	334	239	279,0	4,1	50	20
4173543	TDS504A19500	19,500	.7677	—	—	334	239	280,0	4,2	50	20
4173544	TDS504A20000	20,000	.7874	—	—	334	240	281,0	4,3	50	20

Solid Carbide Drills

■ TOP DRILL S+ • TDS504 Series • WU20PD™ • Through Coolant • Inch

Material Group		Cutting Speed – vc		Recommended Feed Rate (f) by Diameter								
		Range – SFM		Tool Diameter (inch)	.125–1/8	.188–3/16	.250–1/4	.313–5/16	.375–3/8	.500–1/2	.625–5/8	.750–3/4
		min	– max									
P	1	300	– 590	IPR	.003–.006	.004–.007	.005–.009	.006–.011	.007–.013	.008–.015	.009–.019	.012–.024
	2, 3, 4, 6, 7	260	– 390	IPR	.004–.007	.004–.007	.006–.010	.007–.012	.008–.015	.009–.017	.011–.020	.015–.026
	5, 9, 10, 11	230	– 390	IPR	.003–.007	.004–.007	.005–.010	.006–.012	.007–.015	.008–.017	.010–.020	.013–.026
	12, 13	160	– 260	IPR	.002–.004	.002–.004	.004–.006	.004–.008	.006–.009	.006–.011	.008–.014	.010–.018
M	14,1	100	– 160	IPR	.002–.003	.002–.004	.003–.004	.004–.005	.004–.006	.005–.006	.006–.007	.006–.008
	14,3	100	– 200	IPR	.002–.003	.002–.004	.003–.005	.004–.006	.004–.006	.005–.007	.006–.008	.006–.009
	14.2, 14.4	100	– 160	IPR	.002–.003	.002–.004	.003–.004	.004–.005	.004–.006	.005–.006	.006–.007	.006–.008
K	15, 16	330	– 690	IPR	.004–.009	.005–.009	.006–.012	.008–.015	.009–.017	.010–.019	.012–.024	.015–.029
	17, 18, 19	430	– 520	IPR	.004–.007	.005–.007	.006–.010	.008–.012	.009–.014	.010–.016	.012–.019	.015–.024
	20	330	– 560	IPR	.003–.007	.004–.007	.005–.010	.006–.012	.007–.014	.007–.016	.009–.019	.012–.024

■ TOP DRILL S+ • TDS504 Series • WU20PD • Through Coolant • Metric

Material Group		Cutting Speed – vc		Recommended Feed Rate (f) by Diameter								
		Range – m/min		Tool Diameter (mm)	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0
		min	– max									
P	1	90	– 180	mm/r	0,08–0,16	0,09–0,18	0,12–0,24	0,14–0,29	0,17–0,34	0,20–0,39	0,24–0,47	0,31–0,60
	2, 3, 4, 6, 7	80	– 120	mm/r	0,09–0,17	0,10–0,19	0,14–0,25	0,17–0,31	0,21–0,37	0,24–0,42	0,29–0,52	0,38–0,65
	5, 9, 10, 11	70	– 120	mm/r	0,08–0,17	0,09–0,19	0,13–0,25	0,16–0,31	0,19–0,37	0,21–0,42	0,26–0,52	0,32–0,65
	12, 13	50	– 80	mm/r	0,05–0,09	0,06–0,11	0,09–0,16	0,11–0,20	0,14–0,24	0,15–0,27	0,20–0,35	0,26–0,45
M	14,1	30	– 50	mm/r	0,04–0,07	0,05–0,09	0,08–0,11	0,09–0,12	0,10–0,14	0,12–0,16	0,14–0,18	0,16–0,20
	14,3	30	– 60	mm/r	0,04–0,08	0,06–0,10	0,08–0,12	0,09–0,14	0,10–0,16	0,12–0,18	0,14–0,20	0,16–0,22
	14.2, 14.4	30	– 50	mm/r	0,04–0,07	0,06–0,09	0,08–0,11	0,09–0,12	0,10–0,14	0,12–0,16	0,14–0,18	0,16–0,20
K	15, 16	100	– 210	mm/r	0,11–0,22	0,12–0,24	0,16–0,31	0,20–0,38	0,23–0,44	0,25–0,49	0,31–0,60	0,38–0,74
	17, 18, 19	130	– 160	mm/r	0,11–0,17	0,12–0,19	0,16–0,25	0,20–0,31	0,23–0,36	0,25–0,40	0,31–0,48	0,38–0,60
	20	100	– 170	mm/r	0,08–0,17	0,09–0,19	0,12–0,25	0,14–0,30	0,17–0,35	0,19–0,40	0,24–0,48	0,30–0,60

nominal size range	Inch tolerance	
	D1 tolerance m7	D tolerance h6
>.1181–.2362	.0000/.0005	.0000/-.0003
>.2360–.3937	.0000/.0006	.0000/-.0004
>.3937–.7087	.0000/.0007	.0000/-.0004
>.7078–.1.0000	.0000/.0009	.0000/-.0005

nominal size range	Metric tolerance	
	D1 tolerance m7	D tolerance h6
>3–6	0,004/0,016	0,000/–0,008
>6–10	0,006/0,021	0,000/–0,009
>10–18	0,007/0,025	0,000/–0,011
>18–25,4	0,008/0,029	0,000/–0,013

Superior Deep-Hole Drilling •

**WIDIA™ TOP DRILL™ Deep-Hole Drills for Steel and Cast Iron**



# TOP DRILL Deep-Hole Drills

Solid carbide deep-hole drills outperform gun drills and HSS deep-hole drills in deep-hole applications up to 30 x D by increasing metal removal rates by 3–4 times. Increased MRR equals bottom-line savings to customers in throughput, machine time, and personnel hours.

The TDD1\*Z\* Series in the WU20PD™ grade offers secure and consistent performance, excellent hole quality, and reduced cycle times. The standard lines are available from 3 to .512" (13mm) and lengths of 15, 20, 25, and 30 x D. It eliminates the traditional HSS or gun drilling without pecking, at up to 100% increased penetration rates.

## 132° TDS Point Geometry

- Low thrust.
- Excellent centering capabilities.
- Easy to regrind.

## 30° Helix with Optimized Flute Profile

- Reduces risk of chip jamming and catastrophic failure.

## Four-Margin Lands

- Improves hole straightness.
- Improves hole alignment when drilling through cross holes and inclined exits.

## Highly Polished Surfaces

- Reduction of friction in the chip flute and on the lands, resulting in superior chip evacuation.
- Shorter drilling time through omission of reversing cycles.

## WU20PD™ Grade

- Advanced TiAlN multilayer PVD coating for steel and cast iron.
- Ultra fine-grain carbide ensures process reliability at high feed rates.

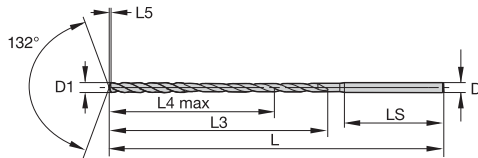
## Customization

- Intermediate sizes, even up to .6299" (16mm) diameter, available as semi-standards.
- Length variations, including longer versions up to 21.65" (550mm), available as custom solutions.
- For drilling non-ferrous and uncoated materials, sharp versions are recommended and available as custom solutions.
- Excellent surface finish and concentricity.

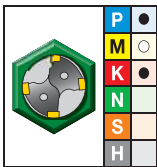


# Solid Carbide Drills

Deep-Hole Drills for Steel and Cast Iron • 2 Flute • 15 x D • Z Shank



## ■ Deep-Hole Drills for Steel and Cast Iron • 2 Flute • WU20PD™ • 15 x D • Z Shank • Inch



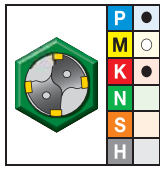
● first choice  
○ alternate choice

grade WU20PD TiAlN		D1 diameter											pilot drill
order #	catalog #	mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L		
3899626	TDD105Z03000	3,000	.1181	—	—	.1181	2.07	1.77	.02	1.18	3.39	TDS501A03000	
3899627	TDD105Z03175	3,175	.1250	1/8	—	.1575	2.64	2.30	.03	1.26	4.13	TDS501A03175	
3899628	TDD105Z03500	3,500	.1378	—	—	.1575	2.68	2.32	.03	1.26	4.13	TDS501A03500	
3899629	TDD105Z03571	3,571	.1406	9/64	—	.1575	2.68	2.32	.03	1.26	4.13	TDS501A03571	
3899630	TDD105Z03800	3,800	.1496	—	—	.1575	2.72	2.35	.03	1.26	4.13	TDS501A03800	
3899631	TDD105Z03970	3,970	.1563	5/32	—	.1575	2.74	2.36	.03	1.26	4.13	TDS501A03970	
3899632	TDD105Z04000	4,000	.1575	—	—	.1575	2.74	2.36	.03	1.26	4.13	TDS501A04000	
3899683	TDD105Z04039	4,039	.1590	—	21	.1969	3.30	2.88	.03	1.34	4.88	TDS501A04039	
3899684	TDD105Z04300	4,300	.1693	—	—	.1969	3.33	2.90	.03	1.34	4.88	TDS501A04300	
3899685	TDD105Z04500	4,500	.1772	—	—	.1969	3.35	2.91	.04	1.34	4.88	TDS501A04500	
3899686	TDD105Z04623	4,623	.1820	—	14	.1969	3.37	2.92	.04	1.34	4.88	TDS501A04623	
3899687	TDD105Z04763	4,763	.1875	3/16	—	.1969	3.39	2.93	.04	1.34	4.88	TDS501A04763	
3899688	TDD105Z05000	5,000	.1969	—	—	.1969	3.41	2.95	.04	1.34	4.88	TDS501A05000	
3899689	TDD105Z05159	5,159	.2031	13/64	—	.2362	4.00	3.48	.04	1.42	5.63	TDS501A05160	
3899690	TDD105Z05410	5,410	.2130	—	3	.2362	4.02	3.50	.04	1.42	5.63	TDS501A05410	
3899691	TDD105Z05500	5,500	.2165	—	—	.2362	4.02	3.50	.04	1.42	5.63	TDS501A05500	
3899692	TDD105Z05558	5,558	.2188	7/32	—	.2362	4.03	3.51	.05	1.42	5.63	TDS501A05558	
3899693	TDD105Z05800	5,800	.2283	—	—	.2362	4.06	3.53	.05	1.42	5.63	TDS501A05800	
3899694	TDD105Z06000	6,000	.2362	—	—	.2362	4.08	3.54	.05	1.42	5.63	TDS501A06000	
3899695	TDD105Z06200	6,200	.2441	—	—	.2756	4.66	4.07	.05	1.50	6.38	TDS501A06200	
3899696	TDD105Z06350	6,350	.2500	1/4	E	.2756	4.68	4.08	.05	1.50	6.38	TDS501A06350	
3899697	TDD105Z06500	6,500	.2559	—	—	.2756	4.70	4.09	.05	1.50	6.38	TDS501A06500	
3899698	TDD105Z06528	6,528	.2570	—	F	.2756	4.70	4.10	.05	1.50	6.38	TDS501A06528	
3899699	TDD105Z06746	6,746	.2656	17/64	—	.2756	4.72	4.11	.06	1.50	6.38	TDS501A06746	

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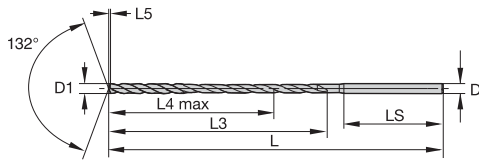
Solid Carbide Drills

(Deep-Hole Drills for Steel and Cast Iron • 2 Flute • WU20PD™ • 15 x D • Z Shank • Inch — continued)

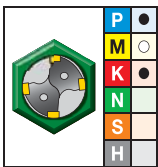

 ● first choice  
 ○ alternate choice

grade WU20PD TiAlN		D1 diameter											pilot drill
order #	catalog #	mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L		
3899700	TDD105Z06800	6,800	.2677	—	—	.2756	4.73	4.12	.06	1.50	6.38	TDS501A06800	
3899701	TDD105Z06909	6,909	.2720	—	I	.2756	4.74	4.13	.06	1.50	6.38	TDS501A06909	
3899702	TDD105Z07000	7,000	.2756	—	—	.2756	4.76	4.13	.06	1.50	6.38	TDS501A07000	
3900612	TDD105Z07145	7,145	.2813	9/32	—	.3150	5.32	4.66	.06	1.57	7.13	TDS501A07145	
3900633	TDD105Z07500	7,500	.2953	—	—	.3150	5.37	4.69	.06	1.57	7.13	TDS501A07500	
3899764	TDD106Z07500	7,500	.2953	—	—	.3150	6.84	6.16	.06	1.57	8.70	TDS501A07500	
3900634	TDD105Z07541	7,541	.2969	19/64	—	.3150	5.37	4.69	.06	1.57	7.13	TDS501A07541	
3900635	TDD105Z07938	7,938	.3125	5/16	—	.3150	5.42	4.72	.07	1.57	7.13	TDS501A07938	
3900636	TDD105Z08000	8,000	.3150	—	—	.3150	5.43	4.72	.07	1.57	7.13	TDS501A08000	
3900637	TDD105Z08334	8,334	.3281	21/64	—	.3543	6.02	5.26	.07	1.65	7.87	TDS501A08334	
3900638	TDD105Z08433	8,433	.3320	—	Q	.3543	6.03	5.27	.07	1.65	7.87	TDS501A08433	
3900639	TDD105Z08500	8,500	.3346	—	—	.3543	6.04	5.28	.07	1.65	7.87	TDS501A08500	
3900640	TDD105Z08733	8,733	.3438	11/32	—	.3543	6.06	5.29	.07	1.65	7.87	TDS501A08733	
3900641	TDD105Z09000	9,000	.3543	—	—	.3543	6.09	5.32	.07	1.65	7.87	TDS501A09000	
3900642	TDD105Z09347	9,347	.3680	—	U	.3937	6.69	5.85	.08	1.73	8.62	TDS501A09347	
3900643	TDD105Z09500	9,500	.3740	—	—	.3937	6.70	5.87	.08	1.73	8.62	TDS501A09500	
3900644	TDD105Z09525	9,525	.3750	3/8	—	.3937	6.71	5.87	.08	1.73	8.62	TDS501A09525	
3900645	TDD105Z09750	9,750	.3839	—	—	.3937	6.73	5.89	.08	1.73	8.62	TDS501A09750	
3900647	TDD105Z10000	10,000	.3937	—	—	.3937	6.76	5.91	.08	1.73	8.62	TDS501A10000	
3900648	TDD105Z10200	10,200	.4016	—	—	.4331	7.34	6.43	.08	1.81	9.37	TDS501A10200	
3900649	TDD105Z10320	10,317	.4062	13/32	—	.4331	7.35	6.44	.09	1.81	9.37	TDS501A10317	
3900650	TDD105Z10500	10,500	.4134	—	—	.4331	7.37	6.46	.09	1.81	9.37	TDS501A10500	
3900651	TDD105Z10716	10,716	.4219	27/64	—	.4331	7.40	6.47	.09	1.81	9.37	TDS501A10716	
3900652	TDD105Z11000	11,000	.4331	—	—	.4331	7.98	7.01	.09	1.81	9.37	TDS501A11000	
3900653	TDD105Z11113	11,113	.4375	7/16	—	.4724	8.00	7.02	.09	1.89	10.12	TDS501A11113	
3900654	TDD105Z11500	11,500	.4528	—	—	.4724	8.04	7.05	.10	1.89	10.12	TDS501A11500	
3900656	TDD105Z12000	12,000	.4724	—	—	.4724	8.10	7.09	.10	1.89	10.12	TDS501A12000	
3900657	TDD105Z12304	12,304	.4844	31/64	—	.5118	8.69	7.62	.10	1.97	10.87	TDS501A12304	
3900658	TDD105Z12500	12,500	.4921	—	—	.5118	8.71	7.64	.10	1.97	10.87	TDS501A12500	
3900659	TDD105Z12700	12,700	.5000	1/2	—	.5118	8.73	7.65	.11	1.97	10.87	TDS501A12700	
3900660	TDD105Z13000	13,000	.5118	—	—	.5118	8.77	7.68	.11	1.97	10.87	TDS501A13000	

Solid Carbide Drills



■ Deep-Hole Drills for Steel and Cast Iron • 2 Flute • WU20PD™ • 20 x D • Z Shank • Inch



● first choice  
○ alternate choice

D1 diameter

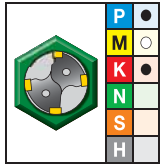
grade WU20PD TiAlN		D1 diameter										pilot drill
order #	catalog #	mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L	
3899782	TDD106Z03000	3,000	.1181	—	—	.1181	2.66	2.36	.02	1.18	3.98	TDS501A03000
3899803	TDD106Z03175	3,175	.1250	1/8	—	.1575	3.27	2.92	.03	1.26	4.92	TDS501A03175
3899804	TDD106Z03500	3,500	.1378	—	—	.1575	3.37	3.01	.03	1.26	4.92	TDS501A03500
3899805	TDD106Z03571	3,571	.1406	9/64	—	.1575	3.39	3.03	.03	1.26	4.92	TDS501A03571
3899806	TDD106Z03800	3,800	.1496	—	—	.1575	3.46	3.09	.03	1.26	4.92	TDS501A03800
3899807	TDD106Z03970	3,970	.1563	5/32	—	.1575	3.52	3.14	.03	1.26	4.92	TDS501A03970
3899808	TDD106Z04000	4,000	.1575	—	—	.1575	3.53	3.15	.03	1.26	4.92	TDS501A04000
3899809	TDD106Z04039	4,039	.1590	—	21	.1969	4.09	3.67	.03	1.34	5.87	TDS501A04039
3899810	TDD106Z04300	4,300	.1693	—	—	.1969	4.18	3.74	.03	1.34	5.87	TDS501A04300
3899811	TDD106Z04500	4,500	.1772	—	—	.1969	4.24	3.80	.04	1.34	5.87	TDS501A04500
3899812	TDD106Z04623	4,623	.1820	—	14	.1969	4.28	3.83	.04	1.34	5.87	TDS501A04623
3899813	TDD106Z04763	4,763	.1875	3/16	—	.1969	4.32	3.87	.04	1.34	5.87	TDS501A04763
3899814	TDD106Z05000	5,000	.1969	—	—	.1969	4.40	3.94	.04	1.34	5.87	TDS501A05000
3899815	TDD106Z05159	5,159	.2031	13/64	—	.2362	5.03	4.49	.04	1.42	6.81	TDS501A05160
3899816	TDD106Z05410	5,410	.2130	—	3	.2362	5.08	4.56	.04	1.42	6.81	TDS501A05410
3899818	TDD106Z05500	5,500	.2165	—	—	.2362	5.11	4.59	.04	1.42	6.81	TDS501A05500
3899819	TDD106Z05558	5,558	.2188	7/32	—	.2362	5.13	4.60	.05	1.42	6.81	TDS501A05558
3899820	TDD106Z05800	5,800	.2283	—	—	.2362	5.20	4.67	.05	1.42	6.81	TDS501A05800
3899821	TDD106Z06000	6,000	.2362	—	—	.2362	5.26	4.72	.05	1.42	6.81	TDS501A06000
3899822	TDD106Z06200	6,200	.2441	—	—	.2756	5.88	5.29	.05	1.50	7.76	TDS501A06200
3899823	TDD106Z06350	6,350	.2500	1/4	E	.2756	5.93	5.33	.05	1.50	7.76	TDS501A06350
3899824	TDD106Z06500	6,500	.2559	—	—	.2756	5.98	5.37	.05	1.50	7.76	TDS501A06500
3899825	TDD106Z06528	6,528	.2570	—	F	.2756	5.98	5.38	.05	1.50	7.76	TDS501A06528
3899826	TDD106Z06746	6,746	.2656	17/64	—	.2756	6.05	5.44	.06	1.50	7.76	TDS501A06746

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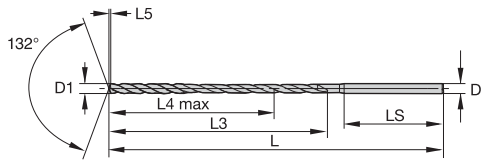
Solid Carbide Drills



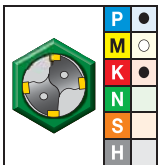
(Deep-Hole Drills for Steel and Cast Iron • 2 Flute • WU20PD™ • 20 x D • Z Shank • Inch — continued)


 ● first choice  
 ○ alternate choice

grade WU20PD TiAlN		D1 diameter										pilot drill
order #	catalog #	mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L	
3899827	TDD106Z06800	6,800	.2677	—	—	.2756	6.07	5.46	.06	1.50	7.76	TDS501A06800
3899828	TDD106Z06909	6,909	.2720	—	I	.2756	6.10	5.49	.06	1.50	7.76	TDS501A06909
3899829	TDD106Z07000	7,000	.2756	—	—	.2756	6.13	5.51	.06	1.50	7.76	TDS501A07000
3899763	TDD106Z07145	7,145	.2813	9/32	—	.3150	6.73	6.06	.06	1.57	8.70	TDS501A07145
3899765	TDD106Z07541	7,541	.2969	19/64	—	.3150	6.85	6.17	.06	1.57	8.70	TDS501A07541
3899766	TDD106Z07938	7,938	.3125	5/16	—	.3150	6.98	6.28	.07	1.57	8.70	TDS501A07938
3899767	TDD106Z08000	8,000	.3150	—	—	.3150	7.00	6.30	.07	1.57	8.70	TDS501A08000
3899768	TDD106Z08334	8,334	.3281	21/64	—	.3543	7.66	6.90	.07	1.65	9.65	TDS501A08334
3899769	TDD106Z08433	8,433	.3320	—	Q	.3543	7.69	6.93	.07	1.65	9.65	TDS501A08433
3899770	TDD106Z08500	8,500	.3346	—	—	.3543	7.71	6.95	.07	1.65	9.65	TDS501A08500
3899771	TDD106Z08733	8,733	.3438	11/32	—	.3543	7.78	7.01	.07	1.65	9.65	TDS501A08733
3899772	TDD106Z09000	9,000	.3543	—	—	.3543	7.87	7.09	.07	1.65	9.65	TDS501A09000
3899783	TDD106Z09347	9,347	.3680	—	U	.3937	8.53	7.69	.08	1.73	10.59	TDS501A09347
3899784	TDD106Z09500	9,500	.3740	—	—	.3937	8.57	7.74	.08	1.73	10.59	TDS501A09500
3899785	TDD106Z09525	9,525	.3750	3/8	—	.3937	8.58	7.74	.08	1.73	10.59	TDS501A09525
3899786	TDD106Z09750	9,750	.3839	—	—	.3937	8.65	7.81	.08	1.73	10.59	TDS501A09750
3899787	TDD106Z09921	9,921	.3906	25/64	—	.3937	8.71	7.85	.08	1.73	10.59	TDS501A09921
3899788	TDD106Z10000	10,000	.3937	—	—	.3937	8.73	7.87	.08	1.73	10.59	TDS501A10000
3899789	TDD106Z10200	10,200	.4016	—	—	.4331	9.35	8.44	.08	1.81	11.54	TDS501A10200
3899790	TDD106Z10320	10,317	.4062	13/32	—	.4331	9.38	8.47	.09	1.81	11.54	TDS501A10317
3899791	TDD106Z10500	10,500	.4134	—	—	.4331	9.44	8.52	.09	1.81	11.54	TDS501A10500
3899792	TDD106Z10716	10,716	.4219	27/64	—	.4331	9.51	8.58	.09	1.81	11.54	TDS501A10716
3899793	TDD106Z11000	11,000	.4331	—	—	.4331	10.15	9.17	.09	1.81	12.48	TDS501A11000
3899794	TDD106Z11113	11,113	.4375	7/16	—	.4724	10.19	9.20	.09	1.89	12.48	TDS501A11113
3899795	TDD106Z11500	11,500	.4528	—	—	.4724	10.31	9.31	.10	1.89	12.48	TDS501A11500
3899797	TDD106Z12000	12,000	.4724	—	—	.4724	10.46	9.45	.10	1.89	12.48	TDS501A12000
3899799	TDD106Z12500	12,500	.4921	—	—	.5118	11.17	10.10	.10	1.97	13.43	TDS501A12500
3899800	TDD106Z12700	12,700	.5000	1/2	—	.5118	11.23	10.15	.11	1.97	13.43	TDS501A12700
3899801	TDD106Z13000	13,000	.5118	—	—	.5118	11.33	10.24	.11	1.97	13.43	TDS501A13000



■ Deep-Hole Drills for Steel and Cast Iron • 2 Flute • WU20PD™ • 25 x D • Z Shank • Inch



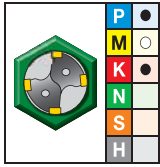
● first choice  
○ alternate choice

grade WU20PD TiAlN		D1 diameter				D	L3	L4 max	L5	LS	L	pilot drill
order #	catalog #	mm	in	fraction	wire size							
3899708	TDD107Z03000	3,000	.1181	—	—	.1181	3.25	2.95	.02	1.18	4.57	TDS501A03000
3899709	TDD107Z03175	3,175	.1250	1/8	—	.1575	3.89	3.55	.03	1.26	5.71	TDS501A03175
3899710	TDD107Z03500	3,500	.1378	—	—	.1575	4.06	3.70	.03	1.26	5.71	TDS501A03500
3899712	TDD107Z03800	3,800	.1496	—	—	.1575	4.21	3.84	.03	1.26	5.71	TDS501A03800
3899733	TDD107Z03970	3,970	.1563	5/32	—	.1575	4.30	3.92	.03	1.26	5.71	TDS501A03970
3899734	TDD107Z04000	4,000	.1575	—	—	.1575	4.32	3.94	.03	1.26	5.71	TDS501A04000
3899735	TDD107Z04039	4,039	.1590	—	21	.1969	4.89	4.47	.03	1.34	6.85	TDS501A04039
3899737	TDD107Z04500	4,500	.1772	—	—	.1969	5.13	4.69	.04	1.34	6.85	TDS501A04500
3899739	TDD107Z04763	4,763	.1875	3/16	—	.1969	5.26	4.81	.04	1.34	6.85	TDS501A04763
3899740	TDD107Z05000	5,000	.1969	—	—	.1969	5.38	4.92	.04	1.34	6.85	TDS501A05000
3899743	TDD107Z05500	5,500	.2165	—	—	.2362	6.19	5.67	.04	1.42	7.99	TDS501A05500
3899744	TDD107Z05558	5,558	.2188	7/32	—	.2362	6.22	5.70	.05	1.42	7.99	TDS501A05558
3899745	TDD107Z05800	5,800	.2283	—	—	.2362	6.34	5.81	.05	1.42	7.99	TDS501A05800
3899746	TDD107Z06000	6,000	.2362	—	—	.2362	6.44	5.91	.05	1.42	7.99	TDS501A06000
3899748	TDD107Z06350	6,350	.2500	1/4	E	.2756	7.18	6.58	.05	1.50	9.13	TDS501A06350
3899749	TDD107Z06500	6,500	.2559	—	—	.2756	7.26	6.65	.05	1.50	9.13	TDS501A06500
3899750	TDD107Z06528	6,528	.2570	—	—	.2756	7.27	6.67	.05	1.50	9.13	TDS501A06528
3899751	TDD107Z06746	6,746	.2656	17/64	—	.2756	7.38	6.77	.06	1.50	9.13	TDS501A06746
3899753	TDD107Z06909	6,909	.2720	—	—	.2756	7.46	6.85	.06	1.50	9.13	TDS501A06909
3899754	TDD107Z07000	7,000	.2756	—	—	.2756	7.51	6.89	.06	1.50	9.13	TDS501A07000
3899567	TDD107Z07541	7,541	.2969	19/64	—	.3150	8.34	7.66	.06	1.57	10.28	TDS501A07541
3899568	TDD107Z07938	7,938	.3125	5/16	—	.3150	8.54	7.84	.07	1.57	10.28	TDS501A07938
3899569	TDD107Z08000	8,000	.3150	—	—	.3150	8.57	7.87	.07	1.57	10.28	TDS501A08000
3899571	TDD107Z08433	8,433	.3320	—	Q	.3543	9.35	8.59	.07	1.65	11.42	TDS501A08433

(continued)

Solid Carbide Drills

(Deep-Hole Drills for Steel and Cast Iron • 2 Flute • WU20PD™ • 25 x D • Z Shank • Inch — continued)

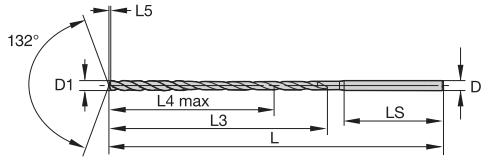


● first choice  
○ alternate choice

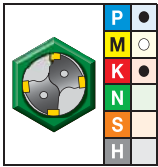
grade WU20PD TiAlN		D1 diameter										pilot drill
order #	catalog #	mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L	
3899572	TDD107Z08500	8,500	.3346	—	—	.3543	9.38	8.62	.07	1.65	11.42	TDS501A08500
3899603	TDD107Z08733	8,733	.3438	11/32	—	.3543	9.50	8.73	.07	1.65	11.42	TDS501A08733
3899604	TDD107Z09000	9,000	.3543	—	—	.3543	9.64	8.86	.07	1.65	11.42	TDS501A09000
3899605	TDD107Z09347	9,347	.3680	—	U	.3937	10.37	9.53	.08	1.73	12.56	TDS501A09347
3899606	TDD107Z09500	9,500	.3740	—	—	.3937	10.44	9.61	.08	1.73	12.56	TDS501A09500
3899607	TDD107Z09525	9,525	.3750	3/8	—	.3937	10.46	9.62	.08	1.73	12.56	TDS501A09525
3899610	TDD107Z10000	10,000	.3937	—	—	.3937	10.70	9.84	.08	1.73	12.56	TDS501A10000
3899611	TDD107Z10300	10,200	.4016	—	—	.4331	11.35	10.45	.08	1.81	13.70	TDS501A10300
3899612	TDD107Z10320	10,317	.4062	13/32	—	.4331	11.41	10.50	.09	1.81	13.70	TDS501A10317
3899613	TDD107Z10500	10,500	.4134	—	—	.4331	11.51	10.59	.09	1.81	13.70	TDS501A10500
3899614	TDD107Z10716	10,716	.4219	27/64	—	.4331	11.62	10.69	.09	1.81	13.70	TDS501A10716
3899615	TDD107Z11000	11,000	.4331	—	—	.4331	12.32	11.34	.09	1.81	14.84	TDS501A11000
3899616	TDD107Z11113	11,113	.4375	7/16	—	.4724	12.37	11.39	.09	1.89	14.84	TDS501A11113
3899617	TDD107Z11500	11,500	.4528	—	—	.4724	12.57	11.57	.10	1.89	14.84	TDS501A11500
3899619	TDD107Z12000	12,000	.4724	—	—	.4724	12.83	11.81	.10	1.89	14.84	TDS501A12000
3899621	TDD107Z12500	12,500	.4921	—	—	.5118	13.63	12.56	.10	1.97	15.98	TDS501A12500
3899622	TDD107Z12700	12,700	.5000	1/2	—	.5118	13.73	12.65	.11	1.97	15.98	TDS501A12700
3899623	TDD107Z13000	13,000	.5118	—	—	.5118	13.89	12.80	.11	1.97	15.98	TDS501A13000



Solid Carbide Drills



■ Deep-Hole Drills for Steel and Cast Iron • 2 Flute • WU20PD™ • 30 x D • Z Shank • Inch



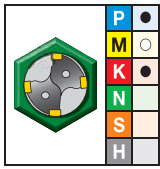
● first choice  
○ alternate choice

		D1 diameter										
grade WU20PD TiAlN		mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L	pilot drill
3899539	TDD108Z03000	3,000	.1181	—	—	.1181	3.84	3.54	.02	1.18	5.16	TDS501A03000
3899540	TDD108Z03175	3,175	.1250	1/8	—	.1575	4.52	4.17	.03	1.26	6.50	TDS501A03175
3899541	TDD108Z03500	3,500	.1378	—	—	.1575	4.75	4.39	.03	1.26	6.50	TDS501A03500
3899542	TDD108Z03571	3,571	.1406	9/64	—	.1575	4.80	4.44	.03	1.26	6.50	TDS501A03571
3899573	TDD108Z03800	3,800	.1496	—	—	.1575	4.96	4.59	.03	1.26	6.50	TDS501A03800
3899574	TDD108Z03970	3,970	.1563	5/32	—	.1575	5.08	4.70	.03	1.26	6.50	TDS501A03970
3899575	TDD108Z04000	4,000	.1575	—	—	.1575	5.10	4.72	.03	1.26	6.50	TDS501A04000
3899576	TDD108Z04039	4,039	.1590	—	21	.1969	5.69	5.26	.03	1.34	7.83	TDS501A04039
3899577	TDD108Z04300	4,300	.1693	—	—	.1969	5.87	5.44	.03	1.34	7.83	TDS501A04300
3899578	TDD108Z04500	4,500	.1772	—	—	.1969	6.01	5.57	.04	1.34	7.83	TDS501A04500
3899579	TDD108Z04623	4,623	.1820	—	14	.1969	6.10	5.65	.04	1.34	7.83	TDS501A04623
3899580	TDD108Z04763	4,763	.1875	3/16	—	.1969	6.20	5.75	.04	1.34	7.83	TDS501A04763
3899581	TDD108Z05000	5,000	.1969	—	—	.1969	6.37	5.91	.04	1.34	7.83	TDS501A05000
3899582	TDD108Z05159	5,159	.2031	13/64	—	.2362	7.10	6.52	.04	1.42	9.17	TDS501A05160
3899583	TDD108Z05410	5,410	.2130	—	3	.2362	7.21	6.69	.04	1.42	9.17	TDS501A05410
3899584	TDD108Z05500	5,500	.2165	—	—	.2362	7.27	6.75	.04	1.42	9.17	TDS501A05500
3899585	TDD108Z05558	5,558	.2188	7/32	—	.2362	7.32	6.79	.05	1.42	9.17	TDS501A05558
3899586	TDD108Z05800	5,800	.2283	—	—	.2362	7.48	6.95	.05	1.42	9.17	TDS501A05800
3899587	TDD108Z06000	6,000	.2362	—	—	.2362	7.63	7.09	.05	1.42	9.17	TDS501A06000
3899588	TDD108Z06200	6,200	.2441	—	—	.2756	8.32	7.73	.05	1.50	10.51	TDS501A06200
3899589	TDD108Z06350	6,350	.2500	1/4	E	.2756	8.43	7.83	.05	1.50	10.51	TDS501A06350
3899590	TDD108Z06500	6,500	.2559	—	—	.2756	8.54	7.93	.05	1.50	10.51	TDS501A06500
3899591	TDD108Z06528	6,528	.2570	—	—	.2756	8.56	7.95	.05	1.50	10.51	TDS501A06528
3899592	TDD108Z06746	6,746	.2656	17/64	—	.2756	8.71	8.10	.06	1.50	10.51	TDS501A06746

(continued)

Solid Carbide Drills

(Deep-Hole Drills for Steel and Cast Iron • 2 Flute • WU20PD™ • 30 x D • Z Shank • Inch — continued)


 ● first choice  
 ○ alternate choice

grade WU20PD TiAlN		D1 diameter										pilot drill
order #	catalog #	mm	in	fraction	wire size	D	L3	L4 max	L5	LS	L	
3899593	TDD108Z06800	6,800	.2677	—	—	.2756	8.75	8.13	.06	1.50	10.51	TDS501A06800
3899594	TDD108Z06909	6,909	.2720	—	—	.2756	8.82	8.21	.06	1.50	10.51	TDS501A06909
3899595	TDD108Z07000	7,000	.2756	—	—	.2756	8.89	8.27	.06	1.50	10.51	TDS501A07000
3899600	TDD108Z07145	7,145	.2813	9/32	—	.3150	9.54	8.88	.06	1.57	11.85	TDS501A07145
3899601	TDD108Z07500	7,500	.2953	—	—	.3150	9.80	9.11	.06	1.57	11.85	TDS501A07500
3899653	TDD108Z07938	7,938	.3125	5/16	—	.3150	10.11	9.41	.07	1.57	11.85	TDS501A07938
3899654	TDD108Z08000	8,000	.3150	—	—	.3150	10.15	9.45	.07	1.57	11.85	TDS501A08000
3899655	TDD108Z08334	8,334	.3281	21/64	—	.3543	10.94	10.18	.07	1.65	13.19	TDS501A08334
3899657	TDD108Z08500	8,500	.3346	—	—	.3543	11.06	10.30	.07	1.65	13.19	TDS501A08500
3899658	TDD108Z08733	8,733	.3438	11/32	—	.3543	11.22	10.45	.07	1.65	13.19	TDS501A08733
3899659	TDD108Z09000	9,000	.3543	—	—	.3543	11.41	10.63	.07	1.65	13.19	TDS501A09000
3899661	TDD108Z09500	9,500	.3740	—	—	.3937	12.32	11.48	.08	1.73	14.53	TDS501A09500
3899662	TDD108Z09525	9,525	.3750	3/8	—	.3937	12.33	11.49	.08	1.73	14.53	TDS501A09525
3899663	TDD108Z09750	9,750	.3839	—	—	.3937	12.49	11.64	.08	1.73	14.53	TDS501A09750
3899665	TDD108Z10000	10,000	.3937	—	—	.3937	12.67	11.81	.08	1.73	14.53	TDS501A10000
3899666	TDD108Z10200	10,200	.4016	—	—	.4331	13.36	12.46	.08	1.81	15.87	TDS501A10200
3899667	TDD108Z10320	10,317	.4062	13/32	—	.4331	13.44	12.54	.09	1.81	15.87	TDS501A10317
3899668	TDD108Z10500	10,500	.4134	—	—	.4331	13.57	12.66	.09	1.81	15.87	TDS501A10500
3899670	TDD108Z11000	11,000	.4331	—	—	.4331	14.48	13.50	.09	1.81	17.20	TDS501A11000
3899671	TDD108Z11113	11,113	.4375	7/16	—	.4724	14.56	13.58	.09	1.89	17.20	TDS501A11113
3899672	TDD108Z11500	11,500	.4528	—	—	.4724	14.83	13.84	.10	1.89	17.20	TDS501A11500
3899674	TDD108Z12000	12,000	.4724	—	—	.4724	15.19	14.17	.10	1.89	17.20	TDS501A12000
3899675	TDD108Z12304	12,304	.4844	31/64	—	.5118	15.95	14.89	.10	1.97	18.54	TDS501A12304
3899676	TDD108Z12500	12,500	.4921	—	—	.5118	16.09	15.02	.10	1.97	18.54	TDS501A12500
3899677	TDD108Z12700	12,700	.5000	1/2	—	.5118	16.23	15.15	.11	1.97	18.54	TDS501A12700
3899678	TDD108Z13000	13,000	.5118	—	—	.5118	16.44	15.35	.11	1.97	18.54	TDS501A13000

■ Series TDD • Deep-Hole SC Drills • Through Coolant Applications • Metric

		Cutting Speed – vc Range – m/min		Recommended Feed Rate (f) by Diameter									
Material Group	min	–	max	Tool Diameter (mm)	3,0	4,0	6,0	8,0	10,0	12,0	16,0	20,0	
P	1	90	–	130	mm/r	0,08–0,12	0,12–0,18	0,18–0,20	0,20–0,22	0,22–0,25	0,25–0,28	0,28–0,30	0,30–0,34
	2	80	–	115	mm/r	0,08–0,12	0,12–0,18	0,18–0,20	0,20–0,22	0,22–0,25	0,25–0,28	0,28–0,30	0,30–0,34
	3	70	–	110	mm/r	0,05–0,10	0,10–0,16	0,16–0,18	0,18–0,20	0,20–0,22	0,22–0,24	0,24–0,26	0,26–0,28
	4	65	–	95	mm/r	0,05–0,10	0,10–0,16	0,16–0,18	0,18–0,20	0,20–0,22	0,22–0,24	0,24–0,26	0,26–0,28
K	1	105	–	145	mm/r	0,10–0,15	0,15–0,20	0,20–0,25	0,25–0,28	0,28–0,30	0,30–0,33	0,33–0,36	0,36–0,38
	2	85	–	120	mm/r	0,10–0,15	0,15–0,20	0,20–0,25	0,25–0,28	0,28–0,30	0,30–0,33	0,33–0,36	0,36–0,38
	3	100	–	140	mm/r	0,10–0,15	0,15–0,20	0,20–0,25	0,25–0,28	0,28–0,30	0,30–0,33	0,33–0,36	0,36–0,38

■ Series TDD • Deep-Hole SC Drills • Through Coolant Applications • Inch

		Cutting Speed – vc Range – SFM		Recommended Feed Rate (f) by Diameter									
Material Group	min	–	max	Tool Diameter (inch)	0.125–1/8	0.188–3/16	0.250–1/4	0.313–5/16	0.375–3/8	0.500–1/2	0.625–5/8	0.750–3/4	
P	1	295	–	425	IPR	0.003–0.005	0.005–0.007	0.007–0.008	0.008–0.009	0.009–0.010	0.010–0.011	0.011–0.012	0.012–0.013
	2	260	–	375	IPR	0.003–0.005	0.005–0.007	0.007–0.008	0.008–0.009	0.009–0.010	0.010–0.011	0.011–0.012	0.012–0.013
	3	230	–	360	IPR	0.002–0.004	0.004–0.006	0.006–0.007	0.007–0.008	0.008–0.009	0.009	0.009–0.010	0.010–0.011
	4	215	–	310	IPR	0.002–0.004	0.004–0.006	0.006–0.007	0.007–0.008	0.008–0.009	0.009	0.009–0.010	0.010–0.011
K	1	345	–	475	IPR	0.004–0.006	0.006–0.008	0.008–0.010	0.010–0.011	0.011–0.012	0.012–0.013	0.013–0.014	0.014–0.015
	2	280	–	390	IPR	0.004–0.006	0.006–0.008	0.008–0.010	0.010–0.011	0.011–0.012	0.012–0.013	0.013–0.014	0.014–0.015
	3	325	–	460	IPR	0.004–0.006	0.006–0.008	0.008–0.010	0.010–0.011	0.011–0.012	0.012–0.013	0.013–0.014	0.014–0.015

Solid Carbide Drills

Inch tolerance				Metric tolerance			
D1	D1 tolerance m7	D	D tolerance h6	nominal size range	D1 tolerance	D1 tolerance	D tolerance h6
> .1181–.2362	.0000/-.0005	> .1181–.2362	.0000/-.0003	>3–6	0,000/-0,012	>3–6	0,000/-0,008
> .2362–.3937	.0000/-.0006	> .2362–.3937	.0000/-.0004	>6–10	0,000/-0,015	>6–10	0,000/-0,009
> .3937–.5118	.0000/-.0007	> .3937–.5118	.0000/-.0004	>10–13	0,000/-0,018	>10–13	0,000/-0,011

# WIDIA™ TOP DRILL™ Deep-Hole Drills Customization



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

#### Diameters

- Intermediate sizes, even up to .6299" (16mm) diameter, available as semi-standards.

#### Lengths

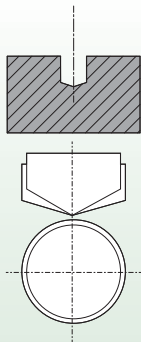
- Length variations, including longer versions up to 21.65" (550mm) depending on diameter, available as custom solutions.

#### Material-Specific

- For drilling non-ferrous materials, sharp and uncoated versions are recommended and available as custom solutions.

Consult the custom solutions department for specific applications.

**WIDIA** 

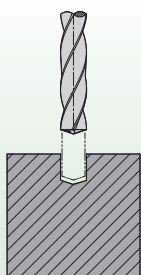


### 1) Pilot Drill Hole — IMPORTANT!

- The point angle of the pilot drill must be greater than one of the following deep-hole drills to protect its cutting corners.
- The diameter size of the pilot drill must be greater than one of the deep-hole drills to enable easy fit and protect margin lands. The required difference in diameter is covered by design with the different position of tolerance.
- Drill  $\varnothing$  = nominal  $\varnothing$  up to nominal  $+.0004"$  ( $+0,010\text{mm}$ ).
- Depth of pilot hole: minimum  $2 \times D$ .
- Deeper pilot holes are preferable.

#### Recommendations:

- Use a conical (TDS\*) or split-point drill to pilot (do not use a TDG, VariDrill™, or TDS 12 x D or any competitive drill).
- Check the pilot drill for wear, which can lead to premature wear on the TDD10\* cutting edge and possibly catastrophic failure.
- TOP DRILL S™ for steel or cast iron (TDS4\* series) and TOP DRILL S +™ for multiple applications (TDS501\* series 3 x D and TD502\* series 5 x D) with a 140° point angle are recommended.
- TDS503\* series 8 x D and TDS504\* series 12 x D is not recommended as the point angle is 132°!

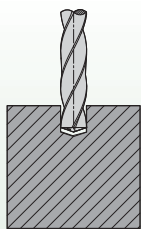


### 2) Feed TDD10\* into Pilot Hole

- Max 500 RPM and recommended feed rate; no rapid traverse.
- Run counter-clockwise, especially in horizontal applications to protect the cutting edge, when entering the pilot hole.
- Depth:  $.039"$  (1mm) above the bottom of pilot hole.
- Feed TDD10\* into pilot hole

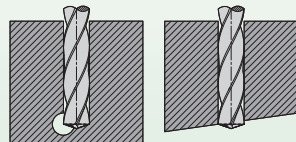
#### Recommendations:

- Reduce cutting speed to minimize imbalances in machine spindle/adapter!



### 3) Drill Hole

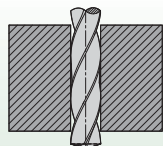
Cutting Parameters: Start recommended speed and feed rate at  $.039"$  (1mm) from the bottom of the pilot hole, clockwise.



#### Recommendations:

- DO NOT PECK OR DWELL up to  $30 \times D$ !
- With long-chipping steel materials, it may be necessary to increase feed rate by 10–20% to provide optimal chip control.
- For long-chipping aluminum materials, it may be necessary to decrease feed rate and increase speed.
- Reduce feed rate on angled exits and crossholes by 50–60%.

*HP feed recommendations are usually higher than with competitive SC drills!*



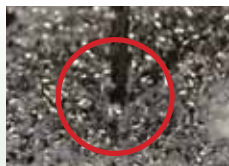
### 4) Drill Retraction

Cutting Parameters: 50–500 RPM and feed rate 2–6 m/min.

#### Recommendations:

To achieve the best tool performance, we recommend using the deep-hole drill with a hydraulic chuck.

*Reduce cutting speed to minimize imbalances in machine spindle/adapter!*



### 5) Vertical Applications

- If the pilot holes are close to each other, chips can fall into the neighboring hole.
- Do not enter a pilot hole that might contain chips with a deep hole drill to avoid chip jamming, wear, or breakage.
- If required holes are close to each other, use smart drilling strategies, make sure the pilot holes are getting properly cleaned, or switch to horizontal drilling.

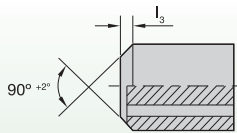
*Horizontal drilling process preferred for optimum chip evacuation.*





### 6) Coolant

- For increased stability, the coolant channels of the TDD10\* are smaller than on typical WIDIA™ drills.
- Steady supply of coolant delivered to the cutting edges necessary. If coolant supply is not steady or is unequal through both channels, check:
  - Coolant filtering system.
  - Sealing of adapter/spindle.
  - Chips blocking the coolant hole on the drill shank.
- Make sure that the coolant supply reaches the cutting edge before drilling begins.
- Pressure by diameter: <5mm 40–50 bar maximum; >5mm 25 bar minimum.



MQL back end according to DIN 69090-3

### 7) Minimal Quantity Lubrication

- On MQL applications, make sure that the coolant is directly supplied from the chuck into the back end of the drill shank (without gap) to avoid leakage.
- Pressure should be between 1–10 bar depending on coolant hole size.
- Spray contains an amount of oil less than 50 ml/h.
- If required, the shank can be evenly optimized for MQL applications with enlarged 90° chamfer instead of 40°.



### 8) Shanks

- Other than normal SC Drills, TDD10\* series have a “Z” shank, increasing with 1mm-steps.
- For drills with uneven shank size, use reduction sleeves to adapt the shank to the customer’s toolholder.
- The clamping force is better with increasing diameter.
- If required, DIN-shanks (even, 2mm steps) are available as custom solutions.

*Achieve the best tool performance with hydraulic chucks.*

D1	12mm hydraulic reducer sleeve		20mm hydraulic reducer sleeve		25mm hydraulic reducer sleeve		32mm hydraulic reducer sleeve		.500" hydraulic reducer sleeve		.750" hydraulic reducer sleeve	
	order number	catalog number	order number	catalog number	order number	catalog number	order number	catalog number	order number	catalog number	order number	catalog number
3	3026450	12MHC030M	3026648	20MHC030M	3026662	25MHC030M	–	–	2248993	50HC030M	2248995	75HC030M
4	3026451	12MHC040M	3026649	20MHC040M	3026663	25MHC040M	–	–	1606050	50HC040M	2248996	75HC040M
5	3026452	12MHC050M	3026650	20MHC050M	3026664	25MHC050M	–	–	2248994	50HC050M	2248997	75HC050M
6	3026643	12MHC060M	3026651	20MHC060M	3026665	25MHC060M	3026675	32MHC060M	1606061	50HC060M	1093271	75HC060M
7	3026644	12MHC070M	3026652	20MHC070M	3026666	25MHC070M	3026676	32MHC070M	–	–	–	–
8	3026645	12MHC080M	3026653	20MHC080M	3026667	25MHC080M	3026677	32MHC080M	1606062	50HC080M	1093272	75HC080M
9	3026646	12MHC090M	3026654	20MHC090M	3026668	25MHC090M	3026678	32MHC090M	–	–	–	–
10	3026647	12MHC100M	3026655	20MHC100M	3026669	25MHC100M	3026679	32MHC100M	1606064	50HC100M	1093273	75HC100M
11	–	–	3026656	20MHC110M	–	–	3026680	32MHC110M	–	–	–	–
12	–	–	3026657	20MHC120M	3026669	25MHC120M	3026681	32MHC120M	–	–	1093524	75HC120M
13	–	–	3026658	20MHC130M	–	–	3026682	32MHC130M	–	–	–	–
14	–	–	3026659	20MHC140M	3026671	25MHC140M	3026683	32MHC140M	–	–	1093525	75HC140M
15	–	–	3026660	20MHC150M	–	–	3026684	32MHC150M	–	–	–	–
16	–	–	3026661	20MHC160M	3026672	25MHC160M	3026685	32MHC160M	–	–	1093526	75HC160M

Difficult Drilling Applications •

**WIDIA™ TOP DRILL G™ for Non-Ferrous Materials**

# TOP DRILL G



TOP DRILL G is the WIDIA solution for difficult drilling applications. Designed specifically for non-ferrous materials, TDG can be used on challenging applications with tighter hole tolerance, inclined planes, intersecting holes, and cored holes. The design of these drills also makes them appropriate for drilling custom aluminum applications.

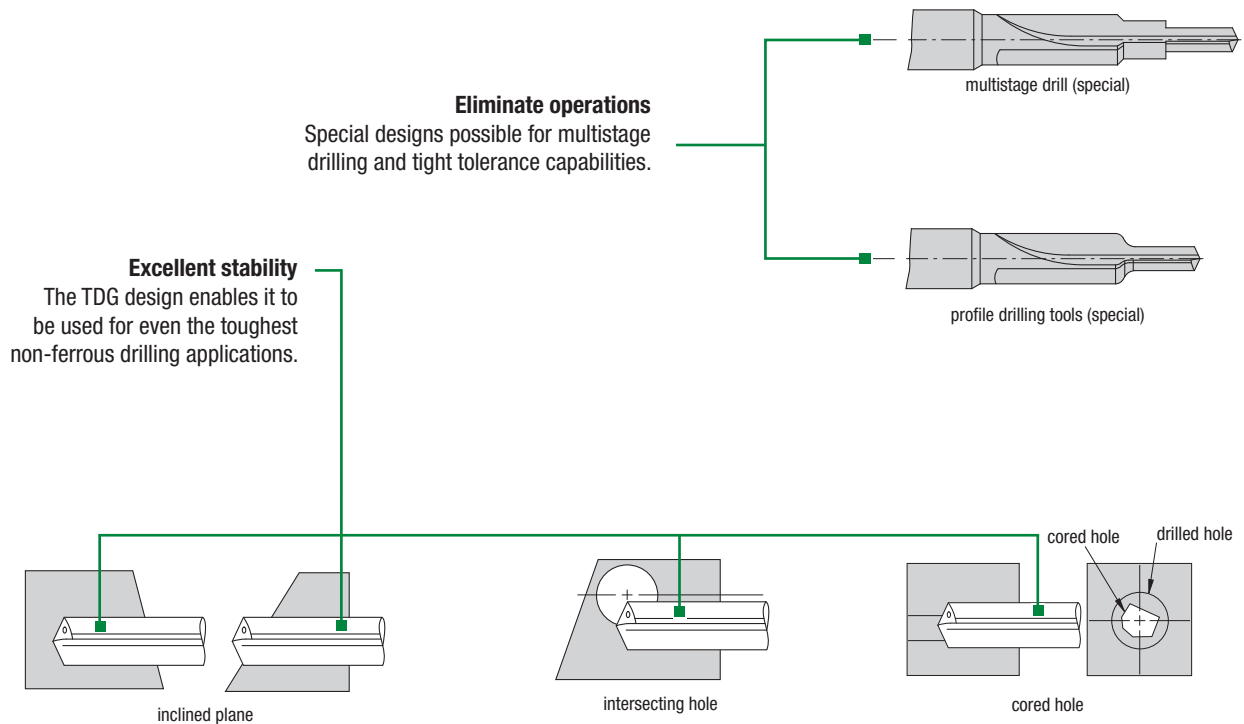
- Next generation of GGX WIDIA-Rübig™ series.
- Targeted for aluminum and non-ferrous materials.
- Can be used in challenging conditions.
- Good for multi-step drills.

## TOP DRILL G™ Design

TDG is designed to handle the toughest non-ferrous drilling applications. The WN10HD™ grade is the latest in application-specific technology. This advanced grade, combined with the TDG's optimal concentricity and safe transmission of torque, gives it long tool life and extreme repeatability. The design of TDG is optimized to evacuate "sticky" chips that result from drilling non-ferrous materials. Easily evacuating these difficult-to-remove chips results in better hole quality due to less heat and friction while drilling.

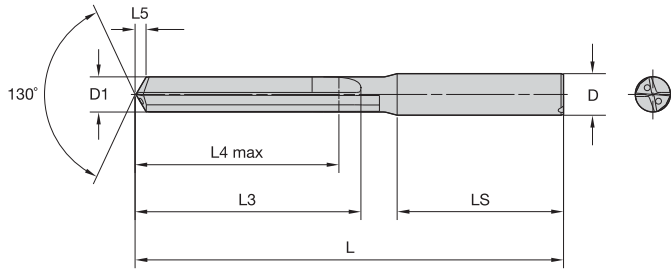
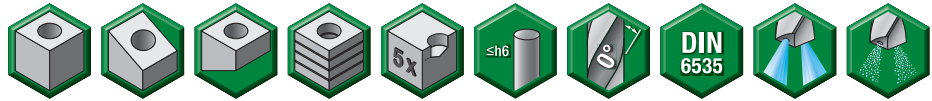
## WIDIA™ Advantage

- Lower cost-per-hole due to high MRR and long tool life.
- Consistent performance from internally controlled supply chain:  
Powder > Rod > Grinding > Coating
- Part of the complete WIDIA holemaking solution.
- Get more predictable results from local regrind services using OEM standards to recondition, ensuring value throughout the entire life of the drill.
- Broad range of standard lengths, diameters, and coolant options in one line. Includes extensive intermediate metric, inch, fraction, and wire sizes, including tap drill sizes.



# Solid Carbide Drills

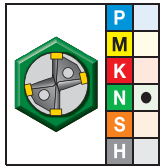
TOP DRILL G™ • Non-Ferrous Materials • 5 x D



For information on L, L3, and L4 max, see page R133.



## TDG532A • 5 x D



grade WN10HD

- first choice
- alternate choice

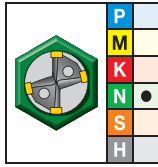
D1 diameter

order #	catalog #	mm	in	fraction	wire size	L	L4 max	L3	L5	LS	D
4157950	TDG532A03000	3,000	.1181	—	—	66	23	28	0,7	36	6
4157951	TDG532A03048	3,048	.1200	—	31	66	23	28	0,7	36	6
4157952	TDG532A03100	3,100	.1220	—	—	66	23	28	0,7	36	6
4157973	TDG532A03175	3,175	.1250	1/8	—	66	23	28	0,7	36	6
4157974	TDG532A03200	3,200	.1260	—	—	66	23	28	0,7	36	6
4157975	TDG532A03264	3,264	.1285	—	30	66	23	28	0,8	36	6
4157976	TDG532A03300	3,300	.1299	—	—	66	23	28	0,8	36	6
4157977	TDG532A03400	3,400	.1339	—	—	66	23	28	0,8	36	6
4157978	TDG532A03455	3,455	.1360	—	29	66	23	28	0,8	36	6
4157979	TDG532A03500	3,500	.1378	—	—	66	23	28	0,8	36	6
4157980	TDG532A03571	3,571	.1406	9/64	—	66	23	28	0,8	36	6
4157981	TDG532A03600	3,600	.1417	—	—	66	23	28	0,8	36	6
4157982	TDG532A03658	3,658	.1440	—	27	66	23	28	0,9	36	6
4157983	TDG532A03700	3,700	.1457	—	—	66	23	28	0,9	36	6
4157984	TDG532A03734	3,734	.1470	—	26	66	23	28	0,9	36	6
4157985	TDG532A03800	3,800	.1496	—	—	74	29	36	0,9	36	6
4157986	TDG532A03900	3,900	.1535	—	—	74	29	36	0,9	36	6
4157987	TDG532A03970	3,970	.1563	5/32	—	74	29	36	0,9	36	6
4157988	TDG532A04000	4,000	.1575	—	—	74	29	36	0,9	36	6
4157989	TDG532A04039	4,039	.1590	—	21	74	29	36	0,9	36	6
4157990	TDG532A04090	4,090	.1610	—	20	74	29	36	1,0	36	6
4157991	TDG532A04100	4,100	.1614	—	—	74	29	36	1,0	36	6
4157992	TDG532A04200	4,200	.1654	—	—	74	29	36	1,0	36	6
4157993	TDG532A04217	4,217	.1660	—	19	74	29	36	1,0	36	6

(continued)

Solid Carbide Drills

(TDG532A • 5 x D – continued)



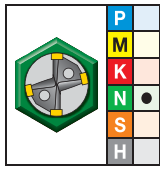
● first choice  
○ alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4157994	TDG532A04300	4,300	.1693	—	—	74	29	36	1,0	36	6
4157995	TDG532A04366	4,366	.1719	11/64	—	74	29	36	1,0	36	6
4157996	TDG532A04400	4,400	.1732	—	—	74	29	36	1,0	36	6
4157997	TDG532A04500	4,500	.1772	—	—	74	29	36	1,0	36	6
4157998	TDG532A04600	4,600	.1811	—	—	74	29	36	1,1	36	6
4157999	TDG532A04623	4,623	.1820	—	14	74	29	36	1,1	36	6
4158000	TDG532A04700	4,700	.1850	—	13	74	29	36	1,1	36	6
4158001	TDG532A04763	4,763	.1875	3/16	—	82	35	44	1,1	36	6
4158002	TDG532A04800	4,800	.1890	—	12	82	35	44	1,1	36	6
4158003	TDG532A04852	4,852	.1910	—	11	82	35	44	1,1	36	6
4158004	TDG532A04900	4,900	.1929	—	—	82	35	44	1,1	36	6
4158005	TDG532A05000	5,000	.1969	—	—	82	35	44	1,2	36	6
4158006	TDG532A05100	5,100	.2008	—	—	82	35	44	1,2	36	6
4158007	TDG532A05106	5,106	.2010	—	7	82	35	44	1,2	36	6
4158008	TDG532A05159	5,159	.2031	13/64	—	82	35	44	1,2	36	6
4158009	TDG532A05200	5,200	.2047	—	—	82	35	44	1,2	36	6
4158010	TDG532A05300	5,300	.2087	—	—	82	35	44	1,2	36	6
4158011	TDG532A05400	5,400	.2126	—	—	82	35	44	1,3	36	6
4158012	TDG532A05410	5,410	.2130	—	3	82	35	44	1,3	36	6
4158013	TDG532A05500	5,500	.2165	—	—	82	35	44	1,3	36	6
4158014	TDG532A05558	5,558	.2188	7/32	—	82	35	44	1,3	36	6
4158015	TDG532A05600	5,600	.2205	—	—	82	35	44	1,3	36	6
4158016	TDG532A05616	5,616	.2211	—	2	82	35	44	1,3	36	6
4158017	TDG532A05700	5,700	.2244	—	—	82	35	44	1,3	36	6
4158018	TDG532A05800	5,800	.2283	—	—	82	35	44	1,4	36	6
4158019	TDG532A05900	5,900	.2323	—	—	82	35	44	1,4	36	6
4158020	TDG532A05954	5,954	.2344	15/64	—	82	35	44	1,4	36	6
4158021	TDG532A06000	6,000	.2362	—	—	82	35	44	1,4	36	6
4158022	TDG532A06100	6,100	.2402	—	—	91	43	53	1,4	36	8
4158023	TDG532A06200	6,200	.2441	—	—	91	43	53	1,4	36	8
4158024	TDG532A06300	6,300	.2480	—	—	91	43	53	1,5	36	8
4158025	TDG532A06350	6,350	.2500	1/4	E	91	43	53	1,5	36	8
4158026	TDG532A06400	6,400	.2520	—	—	91	43	53	1,5	36	8
4158027	TDG532A06500	6,500	.2559	—	—	91	43	53	1,5	36	8
4158028	TDG532A06528	6,528	.2570	—	F	91	43	53	1,5	36	8
4158029	TDG532A06600	6,600	.2598	—	—	91	43	53	1,5	36	8
4158030	TDG532A06630	6,630	.2610	—	G	91	43	53	1,5	36	8
4158031	TDG532A06700	6,700	.2638	—	—	91	43	53	1,6	36	8
4158032	TDG532A06746	6,746	.2656	17/64	—	91	43	53	1,6	36	8
4158033	TDG532A06800	6,800	.2677	—	—	91	43	53	1,6	36	8

(continued)

Solid Carbide Drills

(TDG532A • 5 x D — continued)



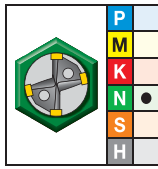
- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4158034	TDG532A06900	6,900	.2717	—	—	91	43	53	1,6	36	8
4158035	TDG532A07000	7,000	.2756	—	—	91	43	53	1,6	36	8
4158036	TDG532A07100	7,100	.2795	—	—	91	43	53	1,7	36	8
4158037	TDG532A07145	7,145	.2813	9/32	—	91	43	53	1,7	36	8
4158038	TDG532A07200	7,200	.2835	—	—	91	43	53	1,7	36	8
4158039	TDG532A07300	7,300	.2874	—	—	91	43	53	1,7	36	8
4158040	TDG532A07400	7,400	.2913	—	—	91	43	53	1,7	36	8
4158041	TDG532A07500	7,500	.2953	—	—	91	43	53	1,7	36	8
4158042	TDG532A07541	7,541	.2969	19/64	—	91	43	53	1,8	36	8
4158043	TDG532A07600	7,600	.2992	—	—	91	43	53	1,8	36	8
4158044	TDG532A07700	7,700	.3031	—	—	91	43	53	1,8	36	8
4158045	TDG532A07800	7,800	.3071	—	—	91	43	53	1,8	36	8
4158046	TDG532A07900	7,900	.3110	—	—	91	43	53	1,8	36	8
4158047	TDG532A07938	7,938	.3125	5/16	—	91	43	53	1,9	36	8
4158048	TDG532A08000	8,000	.3150	—	—	91	43	53	1,9	36	8
4158049	TDG532A08100	8,100	.3189	—	—	103	49	61	1,9	40	10
4158050	TDG532A08200	8,200	.3228	—	—	103	49	61	1,9	40	10
4158051	TDG532A08300	8,300	.3268	—	—	103	49	61	1,9	40	10
4158052	TDG532A08334	8,334	.3281	21/64	—	103	49	61	1,9	40	10
4158053	TDG532A08400	8,400	.3307	—	—	103	49	61	2,0	40	10
4158054	TDG532A08433	8,433	.3320	—	Q	103	49	61	2,0	40	10
4158055	TDG532A08500	8,500	.3346	—	—	103	49	61	2,0	40	10
4158056	TDG532A08600	8,600	.3386	—	—	103	49	61	2,0	40	10
4158057	TDG532A08700	8,700	.3425	—	—	103	49	61	2,0	40	10
4158058	TDG532A08733	8,733	.3438	11/32	—	103	49	61	2,0	40	10
4158059	TDG532A08800	8,800	.3465	—	—	103	49	61	2,1	40	10
4158060	TDG532A08900	8,900	.3504	—	—	103	49	61	2,1	40	10
4158061	TDG532A09000	9,000	.3543	—	—	103	49	61	2,1	40	10
4158062	TDG532A09100	9,100	.3583	—	—	103	49	61	2,1	40	10
4158063	TDG532A09129	9,129	.3594	23/64	—	103	49	61	2,1	40	10
4158064	TDG532A09200	9,200	.3622	—	—	103	49	61	2,1	40	10
4158065	TDG532A09300	9,300	.3661	—	—	103	49	61	2,2	40	10
4158066	TDG532A09347	9,347	.3680	—	U	103	49	61	2,2	40	10
4158067	TDG532A09400	9,400	.3701	—	—	103	49	61	2,2	40	10
4158068	TDG532A09500	9,500	.3740	—	—	103	49	61	2,2	40	10
4158069	TDG532A09525	9,525	.3750	3/8	—	103	49	61	2,2	40	10
4158070	TDG532A09600	9,600	.3780	—	—	103	49	61	2,2	40	10
4158071	TDG532A09700	9,700	.3819	—	—	103	49	61	2,3	40	10
4158072	TDG532A09800	9,800	.3858	—	—	103	49	61	2,3	40	10
4158073	TDG532A09900	9,900	.3898	—	—	103	49	61	2,3	40	10

(continued)

Solid Carbide Drills

(TDG532A • 5 x D – continued)

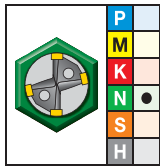


- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4158074	TDG532A09921	9,921	.3906	25/64	—	103	49	61	2,3	40	10
4158081	TDG532A10000	10,000	.3937	—	—	103	49	61	2,3	40	10
4158082	TDG532A10100	10,100	.3976	—	—	118	56	71	2,4	45	12
4158353	TDG532A10200	10,200	.4016	—	—	118	56	71	2,4	45	12
4158354	TDG532A10300	10,300	.4055	—	—	118	56	71	2,4	45	12
4158355	TDG532A10320	10,320	.4063	13/32	—	118	56	71	2,4	45	12
4158356	TDG532A10400	10,400	.4094	—	—	118	56	71	2,4	45	12
4158357	TDG532A10500	10,500	.4134	—	—	118	56	71	2,4	45	12
4158358	TDG532A10600	10,600	.4173	—	—	118	56	71	2,5	45	12
4158359	TDG532A10700	10,700	.4213	—	—	118	56	71	2,5	45	12
4158360	TDG532A10716	10,716	.4219	27/64	—	118	56	71	2,5	45	12
4158361	TDG532A10800	10,800	.4252	—	—	118	56	71	2,5	45	12
4158362	TDG532A10900	10,900	.4291	—	—	118	56	71	2,5	45	12
4158363	TDG532A11000	11,000	.4331	—	—	118	56	71	2,6	45	12
4158364	TDG532A11100	11,100	.4370	—	—	118	56	71	2,6	45	12
4158365	TDG532A11113	11,113	.4375	7/16	—	118	56	71	2,6	45	12
4158366	TDG532A11200	11,200	.4409	—	—	118	56	71	2,6	45	12
4158367	TDG532A11300	11,300	.4449	—	—	118	56	71	2,6	45	12
4158368	TDG532A11400	11,400	.4488	—	—	118	56	71	2,7	45	12
4158369	TDG532A11500	11,500	.4528	—	—	118	56	71	2,7	45	12
4158370	TDG532A11509	11,509	.4531	29/64	—	118	56	71	2,7	45	12
4158371	TDG532A11600	11,600	.4567	—	—	118	56	71	2,7	45	12
4158372	TDG532A11700	11,700	.4606	—	—	118	56	71	2,7	45	12
4158373	TDG532A11800	11,800	.4646	—	—	118	56	71	2,8	45	12
4158374	TDG532A11900	11,900	.4685	—	—	118	56	71	2,8	45	12
4158375	TDG532A11908	11,908	.4688	15/32	—	118	56	71	2,8	45	12
4158376	TDG532A12000	12,000	.4724	—	—	118	56	71	2,8	45	12
4158377	TDG532A12100	12,100	.4764	—	—	124	60	77	2,8	45	14
4158378	TDG532A12200	12,200	.4803	—	—	124	60	77	2,8	45	14
4158379	TDG532A12300	12,300	.4843	—	—	124	60	77	2,9	45	14
4158380	TDG532A12304	12,304	.4844	31/64	—	124	60	77	2,9	45	14
4158381	TDG532A12400	12,400	.4882	—	—	124	60	77	2,9	45	14
4158382	TDG532A12500	12,500	.4921	—	—	124	60	77	2,9	45	14
4158383	TDG532A12600	12,600	.4961	—	—	124	60	77	2,9	45	14
4158384	TDG532A12700	12,700	.5000	1/2	—	124	60	77	3,0	45	14
4158385	TDG532A12800	12,800	.5039	—	—	124	60	77	3,0	45	14
4158386	TDG532A12900	12,900	.5079	—	—	124	60	77	3,0	45	14
4158387	TDG532A13000	13,000	.5118	—	—	124	60	77	3,0	45	14
4158388	TDG532A13096	13,096	.5156	33/64	—	124	60	77	3,1	45	14
4158389	TDG532A13100	13,100	.5157	—	—	124	60	77	3,1	45	14

(continued)

(TDG532A • 5 x D – continued)



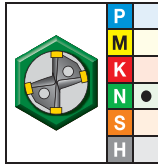
- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4158390	TDG532A13200	13,200	.5197	—	—	124	60	77	3,1	45	14
4158391	TDG532A13300	13,300	.5236	—	—	124	60	77	3,1	45	14
4158392	TDG532A13400	13,400	.5276	—	—	124	60	77	3,1	45	14
4158448	TDG532A13490	13,490	.5311	—	—	124	60	77	3,1	45	14
4158393	TDG532A13500	13,500	.5315	—	—	124	60	77	3,1	45	14
4158394	TDG532A13600	13,600	.5354	—	—	124	60	77	3,2	45	14
4158395	TDG532A13700	13,700	.5394	—	—	124	60	77	3,2	45	14
4158396	TDG532A13800	13,800	.5433	—	—	124	60	77	3,2	45	14
4158397	TDG532A13891	13,891	.5469	35/64	—	124	60	77	3,2	45	14
4158398	TDG532A13900	13,900	.5472	—	—	124	60	77	3,2	45	14
4158399	TDG532A14000	14,000	.5512	—	—	124	60	77	3,3	45	14
4158400	TDG532A14100	14,100	.5551	—	—	133	63	83	3,3	48	16
4158401	TDG532A14200	14,200	.5591	—	—	133	63	83	3,3	48	16
4158402	TDG532A14288	14,288	.5625	9/16	—	133	63	83	3,3	48	16
4158403	TDG532A14300	14,300	.5630	—	—	133	63	83	3,3	48	16
4158404	TDG532A14400	14,400	.5669	—	—	133	63	83	3,4	48	16
4158405	TDG532A14500	14,500	.5709	—	—	133	63	83	3,4	48	16
4158406	TDG532A14600	14,600	.5748	—	—	133	63	83	3,4	48	16
4158407	TDG532A14684	14,684	.5781	37/64	—	133	63	83	3,4	48	16
4158408	TDG532A14700	14,700	.5787	—	—	133	63	83	3,4	48	16
4158409	TDG532A14800	14,800	.5827	—	—	133	63	83	3,5	48	16
4158410	TDG532A14900	14,900	.5866	—	—	133	63	83	3,5	48	16
4158411	TDG532A15000	15,000	.5906	—	—	133	63	83	3,5	48	16
4158412	TDG532A15083	15,083	.5938	19/32	—	133	63	83	3,5	48	16
4158413	TDG532A15100	15,100	.5945	—	—	133	63	83	3,5	48	16
4158414	TDG532A15200	15,200	.5984	—	—	133	63	83	3,5	48	16
4158415	TDG532A15300	15,300	.6024	—	—	133	63	83	3,6	48	16
4158416	TDG532A15400	15,400	.6063	—	—	133	63	83	3,6	48	16
4158417	TDG532A15479	15,479	.6094	39/64	—	133	63	83	3,6	48	16
4158418	TDG532A15500	15,500	.6102	—	—	133	63	83	3,6	48	16
4158419	TDG532A15600	15,600	.6142	—	—	133	63	83	3,6	48	16
4158420	TDG532A15700	15,700	.6181	—	—	133	63	83	3,7	48	16
4158421	TDG532A15800	15,800	.6220	—	—	133	63	83	3,7	48	16
4158422	TDG532A15875	15,875	.6250	5/8	—	133	63	83	3,7	48	16
4158423	TDG532A15900	15,900	.6260	—	—	133	63	83	3,7	48	16
4158424	TDG532A16000	16,000	.6299	—	—	133	63	83	3,7	48	16
4158425	TDG532A16100	16,100	.6339	—	—	143	71	93	3,8	48	18
4158426	TDG532A16200	16,200	.6378	—	—	143	71	93	3,8	48	18
4158427	TDG532A16271	16,271	.6406	41/64	—	143	71	93	3,8	48	18
4158428	TDG532A16300	16,300	.6417	—	—	143	71	93	3,8	48	18

(continued)



(TDG532A • 5 x D – continued)

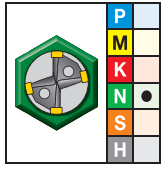


- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4158429	TDG532A16400	16,400	.6457	—	—	143	71	93	3,8	48	18
4158430	TDG532A16500	16,500	.6496	—	—	143	71	93	3,8	48	18
4158431	TDG532A16600	16,600	.6535	—	—	143	71	93	3,9	48	18
4158432	TDG532A16670	16,670	.6563	21/32	—	143	71	93	3,9	48	18
4158433	TDG532A16700	16,700	.6575	—	—	143	71	93	3,9	48	18
4158434	TDG532A16800	16,800	.6614	—	—	143	71	93	3,9	48	18
4158435	TDG532A16900	16,900	.6654	—	—	143	71	93	3,9	48	18
4158436	TDG532A17000	17,000	.6693	—	—	143	71	93	4,0	48	18
4158437	TDG532A17100	17,100	.6732	—	—	143	71	93	4,0	48	18
4158438	TDG532A17200	17,200	.6772	—	—	143	71	93	4,0	48	18
4158439	TDG532A17300	17,300	.6811	—	—	143	71	93	4,0	48	18
4158440	TDG532A17400	17,400	.6850	—	—	143	71	93	4,1	48	18
4158441	TDG532A17463	17,463	.6875	11/16	—	143	71	93	4,1	48	18
4158442	TDG532A17500	17,500	.6890	—	—	143	71	93	4,1	48	18
4158443	TDG532A17600	17,600	.6929	—	—	143	71	93	4,1	48	18
4158444	TDG532A17700	17,700	.6969	—	—	143	71	93	4,1	48	18
4158445	TDG532A17800	17,800	.7008	—	—	143	71	93	4,2	48	18
4158446	TDG532A17859	17,859	.7031	45/64	—	143	71	93	4,2	48	18
4158447	TDG532A17900	17,900	.7047	—	—	143	71	93	4,2	48	18
4158555	TDG532A18000	18,000	.7087	—	—	143	71	93	4,2	48	18
4158557	TDG532A18100	18,100	.7126	—	—	153	77	101	4,2	50	20
4158559	TDG532A18200	18,200	.7165	—	—	153	77	101	4,2	50	20
4158561	TDG532A18258	18,258	.7188	23/32	—	153	77	101	4,3	50	20
4158573	TDG532A18300	18,300	.7205	—	—	153	77	101	4,3	50	20
4158575	TDG532A18400	18,400	.7244	—	—	153	77	101	4,3	50	20
4158577	TDG532A18500	18,500	.7283	—	—	153	77	101	4,3	50	20
4158579	TDG532A18600	18,600	.7323	—	—	153	77	101	4,3	50	20
4158581	TDG532A18654	18,654	.7344	47/64	—	153	77	101	4,3	50	20
4158584	TDG532A18700	18,700	.7362	—	—	153	77	101	4,4	50	20
4158585	TDG532A18800	18,800	.7402	—	—	153	77	101	4,4	50	20
4158587	TDG532A18900	18,900	.7441	—	—	153	77	101	4,4	50	20
4158589	TDG532A19000	19,000	.7480	—	—	153	77	101	4,4	50	20
4158591	TDG532A19050	19,050	.7500	3/4	—	153	77	101	4,4	50	20
4158603	TDG532A19100	19,100	.7520	—	—	153	77	101	4,5	50	20
4158605	TDG532A19200	19,200	.7559	—	—	153	77	101	4,5	50	20
4158607	TDG532A19300	19,300	.7598	—	—	153	77	101	4,5	50	20
4158609	TDG532A19400	19,400	.7638	—	—	153	77	101	4,5	50	20
4158611	TDG532A19500	19,500	.7677	—	—	153	77	101	4,5	50	20
4158613	TDG532A19600	19,600	.7717	—	—	153	77	101	4,6	50	20
4158616	TDG532A19700	19,700	.7756	—	—	153	77	101	4,6	50	20

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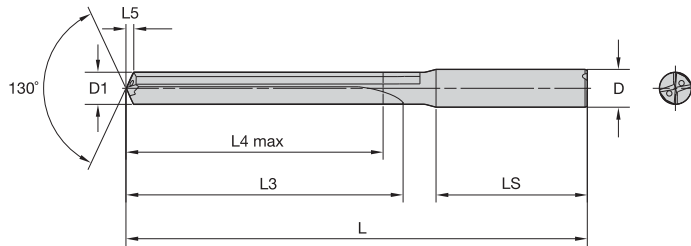
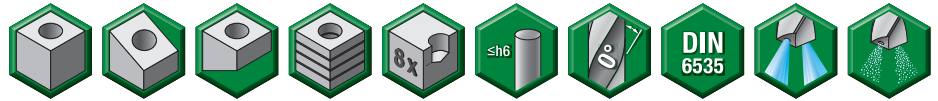
(TDG532A • 5 x D — continued)



- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4158618	TDG532A19800	19,800	.7795	—	—	153	77	101	4,6	50	20
4158620	TDG532A19900	19,900	.7835	—	—	153	77	101	4,6	50	20
4158622	TDG532A20000	20,000	.7874	—	—	153	77	101	4,7	50	20
4158634	TDG532A21000	21,000	.8268	—	—	167	85	114	4,9	50	20
4158636	TDG532A22000	22,000	.8661	—	—	167	85	114	5,1	50	20
4158637	TDG532A23000	23,000	.9055	—	—	184	98	126	5,4	56	25

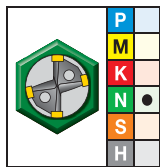




For information on L, L3, and L4 max, see page R133.



■ TDG533A • 8 x D



grade WN10HD

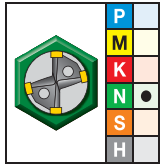
- first choice
- alternate choice

order #	catalog #	D1 diameter				L	L4 max	L3	L5	LS	D
		mm	in	fraction	wire size						
4158475	TDG533A03000	3,000	.1181	—	—	78	33	40	0,7	36	6
4158476	TDG533A03048	3,048	.1200	—	31	78	33	40	0,7	36	6
4158477	TDG533A03100	3,100	.1220	—	—	78	33	40	0,7	36	6
4158478	TDG533A03175	3,175	.1250	1/8	—	78	33	40	0,7	36	6
4158479	TDG533A03200	3,200	.1260	—	—	78	33	40	0,7	36	6
4158480	TDG533A03264	3,264	.1285	—	30	78	33	40	0,8	36	6
4158481	TDG533A03300	3,300	.1299	—	—	78	33	40	0,8	36	6
4158482	TDG533A03400	3,400	.1339	—	—	78	33	40	0,8	36	6
4158553	TDG533A03455	3,455	.1360	—	29	78	33	40	0,8	36	6
4158554	TDG533A03500	3,500	.1378	—	—	78	33	40	0,8	36	6
4158556	TDG533A03571	3,571	.1406	9/64	—	78	33	40	0,8	36	6
4158558	TDG533A03600	3,600	.1417	—	—	78	33	40	0,8	36	6
4158560	TDG533A03658	3,658	.1440	—	27	78	33	40	0,9	36	6
4158562	TDG533A03700	3,700	.1457	—	—	78	33	40	0,9	36	6
4158574	TDG533A03734	3,734	.1470	—	26	78	33	40	0,9	36	6
4158576	TDG533A03800	3,800	.1496	—	—	87	41	49	0,9	36	6
4158578	TDG533A03900	3,900	.1535	—	—	87	41	49	0,9	36	6
4158580	TDG533A03970	3,970	.1563	5/32	—	87	41	49	0,9	36	6
4158582	TDG533A04000	4,000	.1575	—	—	87	41	49	0,9	36	6
4158583	TDG533A04039	4,039	.1590	—	21	87	41	49	0,9	36	6
4158586	TDG533A04090	4,090	.1610	—	20	87	41	49	1,0	36	6
4158588	TDG533A04100	4,100	.1614	—	—	87	41	49	1,0	36	6
4158590	TDG533A04200	4,200	.1654	—	—	87	41	49	1,0	36	6
4158592	TDG533A04217	4,217	.1660	—	19	87	41	49	1,0	36	6

(continued)

Solid Carbide Drills

(TDG533A • 8 x D — continued)



● first choice  
○ alternate choice

grade WN10HD

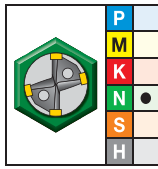
D1 diameter

order #	catalog #	mm	in	fraction	wire size	L	L4 max	L3	L5	LS	D
4158604	TDG533A04300	4,300	.1693	—	—	87	41	49	1,0	36	6
4158606	TDG533A04366	4,366	.1719	11/64	—	87	41	49	1,0	36	6
4158608	TDG533A04400	4,400	.1732	—	—	87	41	49	1,0	36	6
4158610	TDG533A04500	4,500	.1772	—	—	87	41	49	1,0	36	6
4158612	TDG533A04600	4,600	.1811	—	—	87	41	49	1,1	36	6
4158614	TDG533A04623	4,623	.1820	—	14	87	41	49	1,1	36	6
4158615	TDG533A04700	4,700	.1850	—	13	87	41	49	1,1	36	6
4158617	TDG533A04763	4,763	.1875	3/16	—	94	48	56	1,1	36	6
4158619	TDG533A04800	4,800	.1890	—	12	94	48	56	1,1	36	6
4158621	TDG533A04852	4,852	.1910	—	11	94	48	56	1,1	36	6
4158633	TDG533A04900	4,900	.1929	—	—	94	48	56	1,1	36	6
4158635	TDG533A05000	5,000	.1969	—	—	94	48	56	1,2	36	6
4158638	TDG533A05100	5,100	.2008	—	—	94	48	56	1,2	36	6
4158639	TDG533A05106	5,106	.2010	—	7	94	48	56	1,2	36	6
4158640	TDG533A05159	5,159	.2031	13/64	—	94	48	56	1,2	36	6
4158641	TDG533A05200	5,200	.2047	—	—	94	48	56	1,2	36	6
4158642	TDG533A05300	5,300	.2087	—	—	94	48	56	1,2	36	6
4158653	TDG533A05400	5,400	.2126	—	—	94	48	56	1,3	36	6
4158654	TDG533A05410	5,410	.2130	—	3	94	48	56	1,3	36	6
4158655	TDG533A05500	5,500	.2165	—	—	94	48	56	1,3	36	6
4158656	TDG533A05558	5,558	.2188	7/32	—	94	48	56	1,3	36	6
4158657	TDG533A05600	5,600	.2205	—	—	94	48	56	1,3	36	6
4158658	TDG533A05616	5,616	.2211	—	2	94	48	56	1,3	36	6
4158659	TDG533A05700	5,700	.2244	—	—	94	48	56	1,3	36	6
4158660	TDG533A05800	5,800	.2283	—	—	94	48	56	1,4	36	6
4158661	TDG533A05900	5,900	.2323	—	—	94	48	56	1,4	36	6
4158662	TDG533A05954	5,954	.2344	15/64	—	94	48	56	1,4	36	6
4158673	TDG533A06000	6,000	.2362	—	—	94	48	56	1,4	36	6
4158674	TDG533A06100	6,100	.2402	—	—	105	57	67	1,4	36	8
4158675	TDG533A06200	6,200	.2441	—	—	105	57	67	1,4	36	8
4158676	TDG533A06300	6,300	.2480	—	—	105	57	67	1,5	36	8
4158677	TDG533A06350	6,350	.2500	1/4	E	105	57	67	1,5	36	8
4158678	TDG533A06400	6,400	.2520	—	—	105	57	67	1,5	36	8
4158679	TDG533A06500	6,500	.2559	—	—	105	57	67	1,5	36	8
4158680	TDG533A06528	6,528	.2570	—	F	105	57	67	1,5	36	8
4158681	TDG533A06600	6,600	.2598	—	—	105	57	67	1,5	36	8
4158682	TDG533A06630	6,630	.2610	—	G	105	57	67	1,5	36	8
4158693	TDG533A06700	6,700	.2638	—	—	105	57	67	1,6	36	8
4158694	TDG533A06746	6,746	.2656	17/64	—	105	57	67	1,6	36	8
4158695	TDG533A06800	6,800	.2677	—	—	105	57	67	1,6	36	8

(continued)

Solid Carbide Drills

(TDG533A • 8 x D – continued)



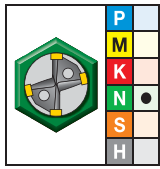
- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4158696	TDG533A06900	6,900	.2717	—	—	105	57	67	1,6	36	8
4158697	TDG533A07000	7,000	.2756	—	—	105	57	67	1,6	36	8
4158698	TDG533A07100	7,100	.2795	—	—	110	61	72	1,7	36	8
4158699	TDG533A07145	7,145	.2813	9/32	—	110	61	72	1,7	36	8
4158700	TDG533A07200	7,200	.2835	—	—	110	61	72	1,7	36	8
4158701	TDG533A07300	7,300	.2874	—	—	110	61	72	1,7	36	8
4158702	TDG533A07400	7,400	.2913	—	—	110	61	72	1,7	36	8
4158713	TDG533A07500	7,500	.2953	—	—	110	61	72	1,7	36	8
4158714	TDG533A07541	7,541	.2969	19/64	—	110	61	72	1,8	36	8
4158715	TDG533A07600	7,600	.2992	—	—	110	61	72	1,8	36	8
4158716	TDG533A07700	7,700	.3031	—	—	110	61	72	1,8	36	8
4158717	TDG533A07800	7,800	.3071	—	—	110	61	72	1,8	36	8
4158718	TDG533A07900	7,900	.3110	—	—	110	61	72	1,8	36	8
4158719	TDG533A07938	7,938	.3125	5/16	—	110	61	72	1,9	36	8
4158720	TDG533A08000	8,000	.3150	—	—	110	61	72	1,9	36	8
4158721	TDG533A08100	8,100	.3189	—	—	122	68	80	1,9	40	10
4158722	TDG533A08200	8,200	.3228	—	—	122	68	80	1,9	40	10
4158733	TDG533A08300	8,300	.3268	—	—	122	68	80	1,9	40	10
4158734	TDG533A08334	8,334	.3281	21/64	—	122	68	80	1,9	40	10
4158735	TDG533A08400	8,400	.3307	—	—	122	68	80	2,0	40	10
4158736	TDG533A08433	8,433	.3320	—	Q	122	68	80	2,0	40	10
4158737	TDG533A08500	8,500	.3346	—	—	122	68	80	2,0	40	10
4158738	TDG533A08600	8,600	.3386	—	—	122	68	80	2,0	40	10
4158739	TDG533A08700	8,700	.3425	—	—	122	68	80	2,0	40	10
4158740	TDG533A08733	8,733	.3438	11/32	—	122	68	80	2,0	40	10
4158741	TDG533A08800	8,800	.3465	—	—	122	68	80	2,1	40	10
4158742	TDG533A08900	8,900	.3504	—	—	122	68	80	2,1	40	10
4158743	TDG533A09000	9,000	.3543	—	—	122	68	80	2,1	40	10
4158744	TDG533A09100	9,100	.3583	—	—	122	68	80	2,1	40	10
4158745	TDG533A09129	9,129	.3594	23/64	—	122	68	80	2,1	40	10
4158746	TDG533A09200	9,200	.3622	—	—	122	68	80	2,1	40	10
4158747	TDG533A09300	9,300	.3661	—	—	122	68	80	2,2	40	10
4158748	TDG533A09347	9,347	.3680	—	U	122	68	80	2,2	40	10
4158749	TDG533A09400	9,400	.3701	—	—	122	68	80	2,2	40	10
4158750	TDG533A09500	9,500	.3740	—	—	122	68	80	2,2	40	10
4158751	TDG533A09525	9,525	.3750	3/8	—	122	68	80	2,2	40	10
4158752	TDG533A09600	9,600	.3780	—	—	122	68	80	2,2	40	10
4158753	TDG533A09700	9,700	.3819	—	—	122	68	80	2,3	40	10
4158754	TDG533A09800	9,800	.3858	—	—	122	68	80	2,3	40	10
4158755	TDG533A09900	9,900	.3898	—	—	122	68	80	2,3	40	10

(continued)

Solid Carbide Drills

(TDG533A • 8 x D — continued)



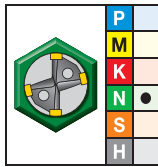
- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4158756	TDG533A09921	9,921	.3906	25/64	—	122	68	80	2,3	40	10
4158520	TDG533A10000	10,000	.3937	—	—	122	68	80	2,3	40	10
4158521	TDG533A10100	10,100	.3976	—	—	141	79	94	2,4	45	12
4158522	TDG533A10200	10,200	.4016	—	—	141	79	94	2,4	45	12
4158533	TDG533A10300	10,300	.4055	—	—	141	79	94	2,4	45	12
4158534	TDG533A10320	10,320	.4063	13/32	—	141	79	94	2,4	45	12
4158535	TDG533A10400	10,400	.4094	—	—	141	79	94	2,4	45	12
4158536	TDG533A10500	10,500	.4134	—	—	141	79	94	2,4	45	12
4158537	TDG533A10600	10,600	.4173	—	—	141	79	94	2,5	45	12
4158538	TDG533A10700	10,700	.4213	—	—	141	79	94	2,5	45	12
4158539	TDG533A10716	10,716	.4219	27/64	—	141	79	94	2,5	45	12
4158540	TDG533A10800	10,800	.4252	—	—	141	79	94	2,5	45	12
4158541	TDG533A10900	10,900	.4291	—	—	141	79	94	2,5	45	12
4158542	TDG533A11000	11,000	.4331	—	—	141	79	94	2,6	45	12
4158543	TDG533A11100	11,100	.4370	—	—	141	79	94	2,6	45	12
4158544	TDG533A11113	11,113	.4375	7/16	—	141	79	94	2,6	45	12
4158545	TDG533A11200	11,200	.4409	—	—	141	79	94	2,6	45	12
4158546	TDG533A11300	11,300	.4449	—	—	141	79	94	2,6	45	12
4158547	TDG533A11400	11,400	.4488	—	—	141	79	94	2,7	45	12
4158548	TDG533A11500	11,500	.4528	—	—	141	79	94	2,7	45	12
4158549	TDG533A11509	11,509	.4531	29/64	—	141	79	94	2,7	45	12
4158550	TDG533A11600	11,600	.4567	—	—	141	79	94	2,7	45	12
4158551	TDG533A11700	11,700	.4606	—	—	141	79	94	2,7	45	12
4158552	TDG533A11800	11,800	.4646	—	—	141	79	94	2,8	45	12
4158563	TDG533A11900	11,900	.4685	—	—	141	79	94	2,8	45	12
4158564	TDG533A11908	11,908	.4688	15/32	—	141	79	94	2,8	45	12
4158565	TDG533A12000	12,000	.4724	—	—	141	79	94	2,8	45	12
4158566	TDG533A12100	12,100	.4764	—	—	155	91	108	2,8	45	14
4158567	TDG533A12200	12,200	.4803	—	—	155	91	108	2,8	45	14
4158568	TDG533A12300	12,300	.4843	—	—	155	91	108	2,9	45	14
4158569	TDG533A12304	12,304	.4844	31/64	—	155	91	108	2,9	45	14
4158570	TDG533A12400	12,400	.4882	—	—	155	91	108	2,9	45	14
4158571	TDG533A12500	12,500	.4921	—	—	155	91	108	2,9	45	14
4158572	TDG533A12600	12,600	.4961	—	—	155	91	108	2,9	45	14
4158593	TDG533A12700	12,700	.5000	1/2	—	155	91	108	3,0	45	14
4158594	TDG533A12800	12,800	.5039	—	—	155	91	108	3,0	45	14
4158595	TDG533A12900	12,900	.5079	—	—	155	91	108	3,0	45	14
4158596	TDG533A13000	13,000	.5118	—	—	155	91	108	3,0	45	14
4158597	TDG533A13096	13,096	.5156	33/64	—	155	91	108	3,1	45	14
4158598	TDG533A13100	13,100	.5157	—	—	155	91	108	3,1	45	14

(continued)

Solid Carbide Drills

(TDG533A • 8 x D – continued)

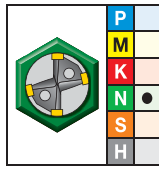


- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4158599	TDG533A13200	13,200	.5197	—	—	155	91	108	3,1	45	14
4158600	TDG533A13300	13,300	.5236	—	—	155	91	108	3,1	45	14
4158601	TDG533A13400	13,400	.5276	—	—	155	91	108	3,1	45	14
4158727	TDG533A13490	13,490	.5311	—	—	155	91	108	3,1	45	14
4158602	TDG533A13500	13,500	.5315	—	—	155	91	108	3,1	45	14
4158623	TDG533A13600	13,600	.5354	—	—	155	91	108	3,2	45	14
4158624	TDG533A13700	13,700	.5394	—	—	155	91	108	3,2	45	14
4158625	TDG533A13800	13,800	.5433	—	—	155	91	108	3,2	45	14
4158626	TDG533A13891	13,891	.5469	35/64	—	155	91	108	3,2	45	14
4158627	TDG533A13900	13,900	.5472	—	—	155	91	108	3,2	45	14
4158628	TDG533A14000	14,000	.5512	—	—	155	91	108	3,3	45	14
4158629	TDG533A14100	14,100	.5551	—	—	171	101	121	3,3	48	16
4158630	TDG533A14200	14,200	.5591	—	—	171	101	121	3,3	48	16
4158631	TDG533A14288	14,288	.5625	9/16	—	171	101	121	3,3	48	16
4158632	TDG533A14300	14,300	.5630	—	—	171	101	121	3,3	48	16
4158643	TDG533A14400	14,400	.5669	—	—	171	101	121	3,4	48	16
4158644	TDG533A14500	14,500	.5709	—	—	171	101	121	3,4	48	16
4158645	TDG533A14600	14,600	.5748	—	—	171	101	121	3,4	48	16
4158646	TDG533A14684	14,684	.5781	37/64	—	171	101	121	3,4	48	16
4158647	TDG533A14700	14,700	.5787	—	—	171	101	121	3,4	48	16
4158648	TDG533A14800	14,800	.5827	—	—	171	101	121	3,5	48	16
4158649	TDG533A14900	14,900	.5866	—	—	171	101	121	3,5	48	16
4158650	TDG533A15000	15,000	.5906	—	—	171	101	121	3,5	48	16
4158651	TDG533A15083	15,083	.5938	19/32	—	171	101	121	3,5	48	16
4158652	TDG533A15100	15,100	.5945	—	—	171	101	121	3,5	48	16
4158663	TDG533A15200	15,200	.5984	—	—	171	101	121	3,5	48	16
4158664	TDG533A15300	15,300	.6024	—	—	171	101	121	3,6	48	16
4158665	TDG533A15400	15,400	.6063	—	—	171	101	121	3,6	48	16
4158666	TDG533A15479	15,479	.6094	39/64	—	171	101	121	3,6	48	16
4158667	TDG533A15500	15,500	.6102	—	—	171	101	121	3,6	48	16
4158668	TDG533A15600	15,600	.6142	—	—	171	101	121	3,6	48	16
4158669	TDG533A15700	15,700	.6181	—	—	171	101	121	3,7	48	16
4158670	TDG533A15800	15,800	.6220	—	—	171	101	121	3,7	48	16
4158671	TDG533A15875	15,875	.6250	5/8	—	171	101	121	3,7	48	16
4158672	TDG533A15900	15,900	.6260	—	—	171	101	121	3,7	48	16
4158683	TDG533A16000	16,000	.6299	—	—	171	101	121	3,7	48	16
4158684	TDG533A16100	16,100	.6339	—	—	185	113	135	3,8	48	18
4158685	TDG533A16200	16,200	.6378	—	—	185	113	135	3,8	48	18
4158686	TDG533A16271	16,271	.6406	41/64	—	185	113	135	3,8	48	18
4158687	TDG533A16300	16,300	.6417	—	—	185	113	135	3,8	48	18

(continued)

(TDG533A • 8 x D — continued)

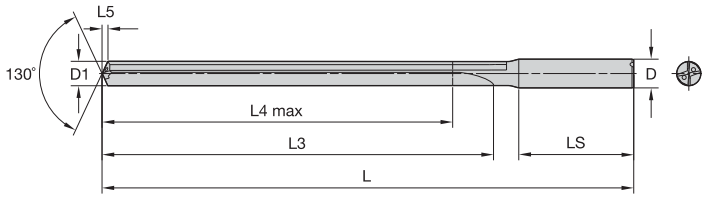
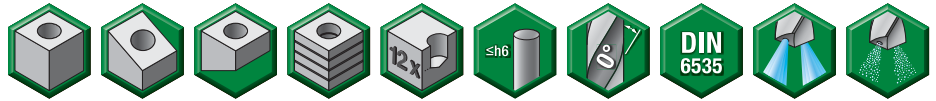


- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4158688	TDG533A16400	16,400	.6457	—	—	185	113	135	3,8	48	18
4158689	TDG533A16500	16,500	.6496	—	—	185	113	135	3,8	48	18
4158690	TDG533A16600	16,600	.6535	—	—	185	113	135	3,9	48	18
4158691	TDG533A16670	16,670	.6563	21/32	—	185	113	135	3,9	48	18
4158692	TDG533A16700	16,700	.6575	—	—	185	113	135	3,9	48	18
4158703	TDG533A16800	16,800	.6614	—	—	185	113	135	3,9	48	18
4158704	TDG533A16900	16,900	.6654	—	—	185	113	135	3,9	48	18
4158705	TDG533A17000	17,000	.6693	—	—	185	113	135	4,0	48	18
4158706	TDG533A17100	17,100	.6732	—	—	185	113	135	4,0	48	18
4158707	TDG533A17200	17,200	.6772	—	—	185	113	135	4,0	48	18
4158708	TDG533A17300	17,300	.6811	—	—	185	113	135	4,0	48	18
4158709	TDG533A17400	17,400	.6850	—	—	185	113	135	4,1	48	18
4158710	TDG533A17463	17,463	.6875	11/16	—	185	113	135	4,1	48	18
4158711	TDG533A17500	17,500	.6890	—	—	185	113	135	4,1	48	18
4158712	TDG533A17600	17,600	.6929	—	—	185	113	135	4,1	48	18
4158723	TDG533A17700	17,700	.6969	—	—	185	113	135	4,1	48	18
4158724	TDG533A17800	17,800	.7008	—	—	185	113	135	4,2	48	18
4158725	TDG533A17859	17,859	.7031	45/64	—	185	113	135	4,2	48	18
4158726	TDG533A17900	17,900	.7047	—	—	185	113	135	4,2	48	18
4157333	TDG533A18000	18,000	.7087	—	—	185	113	135	4,2	48	18
4157334	TDG533A18100	18,100	.7126	—	—	200	124	148	4,2	50	20
4157335	TDG533A18200	18,200	.7165	—	—	200	124	148	4,2	50	20
4157336	TDG533A18258	18,258	.7188	23/32	—	200	124	148	4,3	50	20
4157337	TDG533A18300	18,300	.7205	—	—	200	124	148	4,3	50	20
4157338	TDG533A18400	18,400	.7244	—	—	200	124	148	4,3	50	20
4157339	TDG533A18500	18,500	.7283	—	—	200	124	148	4,3	50	20
4157340	TDG533A18600	18,600	.7323	—	—	200	124	148	4,3	50	20
4157341	TDG533A18654	18,654	.7344	47/64	—	200	124	148	4,3	50	20
4157342	TDG533A18700	18,700	.7362	—	—	200	124	148	4,4	50	20
4157343	TDG533A18800	18,800	.7402	—	—	200	124	148	4,4	50	20
4157344	TDG533A18900	18,900	.7441	—	—	200	124	148	4,4	50	20
4157345	TDG533A19000	19,000	.7480	—	—	200	124	148	4,4	50	20
4157346	TDG533A19050	19,050	.7500	3/4	—	200	124	148	4,4	50	20
4157347	TDG533A19100	19,100	.7520	—	—	200	124	148	4,5	50	20
4157348	TDG533A19200	19,200	.7559	—	—	200	124	148	4,5	50	20
4157349	TDG533A19300	19,300	.7598	—	—	200	124	148	4,5	50	20
4157350	TDG533A19400	19,400	.7638	—	—	200	124	148	4,5	50	20
4157351	TDG533A19500	19,500	.7677	—	—	200	124	148	4,5	50	20
4157352	TDG533A19600	19,600	.7717	—	—	200	124	148	4,6	50	20
4157353	TDG533A19700	19,700	.7756	—	—	200	124	148	4,6	50	20
4157354	TDG533A19800	19,800	.7795	—	—	200	124	148	4,6	50	20
4157355	TDG533A19900	19,900	.7835	—	—	200	124	148	4,6	50	20
4157356	TDG533A20000	20,000	.7874	—	—	200	124	148	4,7	50	20

Solid Carbide Drills

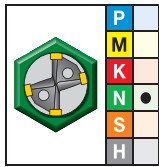




For information on L, L3, and L4 max, see page R133.



■ TDG534A • 12 x D



grade WN10HD

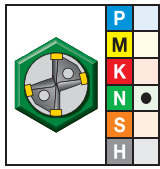
- first choice
- alternate choice

order #	catalog #	D1 diameter				L	L4 max	L3	L5	LS	D
		mm	in	fraction	wire size						
4157357	TDG534A03000	3,000	.1181	—	—	93	44	55	0,7	36	6
4157358	TDG534A03048	3,048	.1200	—	31	93	44	55	0,7	36	6
4157359	TDG534A03100	3,100	.1220	—	—	93	44	55	0,7	36	6
4157360	TDG534A03175	3,175	.1250	1/8	—	93	44	55	0,7	36	6
4157361	TDG534A03200	3,200	.1260	—	—	93	43	55	0,7	36	6
4157362	TDG534A03264	3,264	.1285	—	30	93	44	55	0,8	36	6
4157363	TDG534A03300	3,300	.1299	—	—	93	44	55	0,8	36	6
4157364	TDG534A03400	3,400	.1339	—	—	93	44	55	0,8	36	6
4157365	TDG534A03455	3,455	.1360	—	29	93	44	55	0,8	36	6
4157366	TDG534A03500	3,500	.1378	—	—	93	44	55	0,8	36	6
4157367	TDG534A03571	3,571	.1406	9/64	—	93	45	55	0,8	36	6
4157368	TDG534A03600	3,600	.1417	—	—	93	45	55	0,8	36	6
4157369	TDG534A03658	3,658	.1440	—	27	93	45	55	0,9	36	6
4157370	TDG534A03700	3,700	.1457	—	—	93	45	55	0,9	36	6
4157371	TDG534A03734	3,734	.1470	—	26	93	45	55	0,9	36	6
4157372	TDG534A03800	3,800	.1496	—	—	107	55	69	0,9	36	6
4157373	TDG534A03900	3,900	.1535	—	—	107	56	69	0,9	36	6
4157374	TDG534A03970	3,970	.1563	5/32	—	107	56	69	0,9	36	6
4157375	TDG534A04000	4,000	.1575	—	—	107	56	69	0,9	36	6
4157376	TDG534A04039	4,039	.1590	—	21	107	56	69	0,9	36	6
4157377	TDG534A04090	4,090	.1610	—	20	107	55	69	1,0	36	6
4157378	TDG534A04100	4,100	.1614	—	—	107	55	69	1,0	36	6
4157379	TDG534A04200	4,200	.1654	—	—	107	56	69	1,0	36	6
4157380	TDG534A04217	4,217	.1660	—	19	107	56	69	1,0	36	6

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Solid Carbide Drills

(TDG534A • 12 x D — continued)



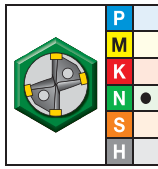
- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4157381	TDG534A04300	4,300	.1693	—	—	107	56	69	1,0	36	6
4157382	TDG534A04366	4,366	.1719	11/64	—	107	56	69	1,0	36	6
4157383	TDG534A04400	4,400	.1732	—	—	107	56	69	1,0	36	6
4157384	TDG534A04500	4,500	.1772	—	—	107	56	69	1,0	36	6
4157385	TDG534A04600	4,600	.1811	—	—	107	57	69	1,1	36	6
4157386	TDG534A04623	4,623	.1820	—	14	107	57	69	1,1	36	6
4157387	TDG534A04700	4,700	.1850	—	13	107	57	69	1,1	36	6
4157388	TDG534A04763	4,763	.1875	3/16	—	125	69	87	1,1	36	6
4157389	TDG534A04800	4,800	.1890	—	12	125	69	87	1,1	36	6
4157390	TDG534A04852	4,852	.1910	—	11	125	69	87	1,1	36	6
4157391	TDG534A04900	4,900	.1929	—	—	125	69	87	1,1	36	6
4157392	TDG534A05000	5,000	.1969	—	—	125	70	87	1,2	36	6
4157393	TDG534A05100	5,100	.2008	—	—	125	70	87	1,2	36	6
4157394	TDG534A05106	5,106	.2010	—	7	125	70	87	1,2	36	6
4157395	TDG534A05159	5,159	.2031	13/64	—	125	70	87	1,2	36	6
4157396	TDG534A05200	5,200	.2047	—	—	125	70	87	1,2	36	6
4157397	TDG534A05300	5,300	.2087	—	—	125	71	87	1,2	36	6
4157398	TDG534A05400	5,400	.2126	—	—	125	71	87	1,3	36	6
4157399	TDG534A05410	5,410	.2130	—	3	125	71	87	1,3	36	6
4157400	TDG534A05500	5,500	.2165	—	—	125	71	87	1,3	36	6
4157401	TDG534A05558	5,558	.2188	7/32	—	125	71	87	1,3	36	6
4157402	TDG534A05600	5,600	.2205	—	—	125	72	87	1,3	36	6
4157403	TDG534A05616	5,616	.2211	—	2	125	72	87	1,3	36	6
4157404	TDG534A05700	5,700	.2244	—	—	125	72	87	1,3	36	6
4157405	TDG534A05800	5,800	.2283	—	—	125	71	87	1,4	36	6
4157406	TDG534A05900	5,900	.2323	—	—	125	71	87	1,4	36	6
4157407	TDG534A05954	5,954	.2344	15/64	—	125	72	87	1,4	36	6
4157408	TDG534A06000	6,000	.2362	—	—	125	72	87	1,4	36	6
4157409	TDG534A06100	6,100	.2402	—	—	139	82	101	1,4	36	8
4157410	TDG534A06200	6,200	.2441	—	—	139	82	101	1,4	36	8
4157411	TDG534A06300	6,300	.2480	—	—	139	83	101	1,5	36	8
4157412	TDG534A06350	6,350	.2500	1/4	E	139	83	101	1,5	36	8
4157413	TDG534A06400	6,400	.2520	—	—	139	83	101	1,5	36	8
4157414	TDG534A06500	6,500	.2559	—	—	139	83	101	1,5	36	8
4157415	TDG534A06528	6,528	.2570	—	F	139	83	101	1,5	36	8
4157416	TDG534A06600	6,600	.2598	—	—	139	84	101	1,5	36	8
4157417	TDG534A06630	6,630	.2610	—	G	139	84	101	1,5	36	8
4157418	TDG534A06700	6,700	.2638	—	—	139	84	101	1,6	36	8
4157419	TDG534A06746	6,746	.2656	17/64	—	139	83	101	1,6	36	8
4157420	TDG534A06800	6,800	.2677	—	—	139	83	101	1,6	36	8

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Solid Carbide Drills

(TDG534A • 12 x D — continued)



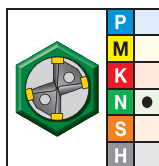
- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4157421	TDG534A06900	6,900	.2717	—	—	139	83	101	1,6	36	8
4157422	TDG534A07000	7,000	.2756	—	—	139	84	101	1,6	36	8
4157423	TDG534A07100	7,100	.2795	—	—	153	94	115	1,7	36	8
4157424	TDG534A07145	7,145	.2813	9/32	—	153	94	115	1,7	36	8
4157425	TDG534A07200	7,200	.2835	—	—	153	94	115	1,7	36	8
4157426	TDG534A07300	7,300	.2874	—	—	153	95	115	1,7	36	8
4157427	TDG534A07400	7,400	.2913	—	—	153	95	115	1,7	36	8
4157428	TDG534A07500	7,500	.2953	—	—	153	95	115	1,7	36	8
4157429	TDG534A07541	7,541	.2969	19/64	—	153	95	115	1,8	36	8
4157430	TDG534A07600	7,600	.2992	—	—	153	96	115	1,8	36	8
4157431	TDG534A07700	7,700	.3031	—	—	153	96	115	1,8	36	8
4157432	TDG534A07800	7,800	.3071	—	—	153	95	115	1,8	36	8
4157433	TDG534A07900	7,900	.3110	—	—	153	95	115	1,8	36	8
4157434	TDG534A07938	7,938	.3125	5/16	—	153	96	115	1,9	36	8
4157435	TDG534A08000	8,000	.3150	—	—	153	96	115	1,9	36	8
4157436	TDG534A08100	8,100	.3189	—	—	185	116	143	1,9	40	10
4157437	TDG534A08200	8,200	.3228	—	—	185	116	143	1,9	40	10
4157438	TDG534A08300	8,300	.3268	—	—	185	117	143	1,9	40	10
4157439	TDG534A08334	8,334	.3281	21/64	—	185	117	143	1,9	40	10
4157440	TDG534A08400	8,400	.3307	—	—	185	117	143	2,0	40	10
4157441	TDG534A08433	8,433	.3320	—	Q	185	117	143	2,0	40	10
4157442	TDG534A08500	8,500	.3346	—	—	185	117	143	2,0	40	10
4157443	TDG534A08600	8,600	.3386	—	—	185	118	143	2,0	40	10
4157444	TDG534A08700	8,700	.3425	—	—	185	118	143	2,0	40	10
4157445	TDG534A08733	8,733	.3438	11/32	—	185	117	143	2,0	40	10
4157446	TDG534A08800	8,800	.3465	—	—	185	117	143	2,1	40	10
4157447	TDG534A08900	8,900	.3504	—	—	185	117	143	2,1	40	10
4157448	TDG534A09000	9,000	.3543	—	—	185	118	143	2,1	40	10
4157449	TDG534A09100	9,100	.3583	—	—	185	118	143	2,1	40	10
4157450	TDG534A09129	9,129	.3594	23/64	—	185	118	143	2,1	40	10
4157451	TDG534A09200	9,200	.3622	—	—	185	118	143	2,1	40	10
4157452	TDG534A09300	9,300	.3661	—	—	185	119	143	2,2	40	10
4157453	TDG534A09347	9,347	.3680	—	U	185	119	143	2,2	40	10
4157454	TDG534A09400	9,400	.3701	—	—	185	119	143	2,2	40	10
4157455	TDG534A09500	9,500	.3740	—	—	185	119	143	2,2	40	10
4157456	TDG534A09525	9,525	.3750	3/8	—	185	119	143	2,2	40	10
4157457	TDG534A09600	9,600	.3780	—	—	185	120	143	2,2	40	10
4157458	TDG534A09700	9,700	.3819	—	—	185	120	143	2,3	40	10
4157459	TDG534A09800	9,800	.3858	—	—	185	119	143	2,3	40	10
4157460	TDG534A09900	9,900	.3898	—	—	185	119	143	2,3	40	10

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Solid Carbide Drills

(TDG534A • 12 x D — continued)



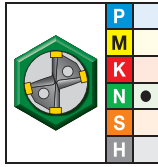
- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4157461	TDG534A09921	9,921	.3906	25/64	—	185	120	143	2,3	40	10
4157476	TDG534A10000	10,000	.3937	—	—	185	120	143	2,3	40	10
4157555	TDG534A10100	10,100	.3976	—	—	218	140	171	2,4	45	12
4157556	TDG534A10200	10,200	.4016	—	—	218	140	171	2,4	45	12
4157557	TDG534A10300	10,300	.4055	—	—	218	141	171	2,4	45	12
4157558	TDG534A10320	10,320	.4063	13/32	—	218	141	171	2,4	45	12
4157559	TDG534A10400	10,400	.4094	—	—	218	141	171	2,4	45	12
4157560	TDG534A10500	10,500	.4134	—	—	218	141	171	2,4	45	12
4157561	TDG534A10600	10,600	.4173	—	—	218	142	171	2,5	45	12
4157562	TDG534A10700	10,700	.4213	—	—	218	142	171	2,5	45	12
4157583	TDG534A10716	10,716	.4219	27/64	—	218	142	171	2,5	45	12
4157584	TDG534A10800	10,800	.4252	—	—	218	141	171	2,5	45	12
4157585	TDG534A10900	10,900	.4291	—	—	218	141	171	2,5	45	12
4157586	TDG534A11000	11,000	.4331	—	—	218	142	171	2,6	45	12
4157587	TDG534A11100	11,100	.4370	—	—	218	142	171	2,6	45	12
4157588	TDG534A11113	11,113	.4375	7/16	—	218	142	171	2,6	45	12
4157589	TDG534A11200	11,200	.4409	—	—	218	142	171	2,6	45	12
4157590	TDG534A11300	11,300	.4449	—	—	218	143	171	2,6	45	12
4157591	TDG534A11400	11,400	.4488	—	—	218	143	171	2,7	45	12
4157592	TDG534A11500	11,500	.4528	—	—	218	143	171	2,7	45	12
4157593	TDG534A11509	11,509	.4531	29/64	—	218	143	171	2,7	45	12
4157594	TDG534A11600	11,600	.4567	—	—	218	144	171	2,7	45	12
4157595	TDG534A11700	11,700	.4606	—	—	218	144	171	2,7	45	12
4157596	TDG534A11800	11,800	.4646	—	—	218	143	171	2,8	45	12
4157597	TDG534A11900	11,900	.4685	—	—	218	143	171	2,8	45	12
4157598	TDG534A11908	11,908	.4688	15/32	—	218	143	171	2,8	45	12
4157599	TDG534A12000	12,000	.4724	—	—	218	144	171	2,8	45	12
4157600	TDG534A12100	12,100	.4764	—	—	246	164	199	2,8	45	14
4157601	TDG534A12200	12,200	.4803	—	—	246	164	199	2,8	45	14
4157602	TDG534A12300	12,300	.4843	—	—	246	165	199	2,9	45	14
4157603	TDG534A12304	12,304	.4844	31/64	—	246	165	199	2,9	45	14
4157604	TDG534A12400	12,400	.4882	—	—	246	165	199	2,9	45	14
4157605	TDG534A12500	12,500	.4921	—	—	246	165	199	2,9	45	14
4157606	TDG534A12600	12,600	.4961	—	—	246	165	199	2,9	45	14
4157607	TDG534A12700	12,700	.5000	1/2	—	246	166	199	3,0	45	14
4157608	TDG534A12800	12,800	.5039	—	—	246	166	199	3,0	45	14
4157609	TDG534A12900	12,900	.5079	—	—	246	165	199	3,0	45	14
4157610	TDG534A13000	13,000	.5118	—	—	246	166	199	3,0	45	14
4157611	TDG534A13096	13,096	.5156	33/64	—	246	166	199	3,1	45	14
4157612	TDG534A13100	13,100	.5157	—	—	246	166	199	3,1	45	14

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Solid Carbide Drills

(TDG534A • 12 x D — continued)



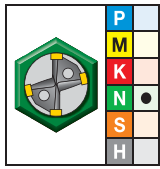
- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4157613	TDG534A13200	13,200	.5197	—	—	246	166	199	3,1	45	14
4157614	TDG534A13300	13,300	.5236	—	—	246	167	199	3,1	45	14
4157615	TDG534A13400	13,400	.5276	—	—	246	167	199	3,1	45	14
4157671	TDG534A13490	13,490	.5311	—	—	246	167	199	3,1	45	14
4157616	TDG534A13500	13,500	.5315	—	—	246	167	199	3,1	45	14
4157617	TDG534A13600	13,600	.5354	—	—	246	167	199	3,2	45	14
4157618	TDG534A13700	13,700	.5394	—	—	246	168	199	3,2	45	14
4157619	TDG534A13800	13,800	.5433	—	—	246	168	199	3,2	45	14
4157620	TDG534A13891	13,891	.5469	35/64	—	246	167	199	3,2	45	14
4157621	TDG534A13900	13,900	.5472	—	—	246	167	199	3,2	45	14
4157622	TDG534A14000	14,000	.5512	—	—	246	168	199	3,3	45	14
4157623	TDG534A14100	14,100	.5551	—	—	277	188	227	3,3	48	16
4157624	TDG534A14200	14,200	.5591	—	—	277	188	227	3,3	48	16
4157625	TDG534A14288	14,288	.5625	9/16	—	277	188	227	3,3	48	16
4157626	TDG534A14300	14,300	.5630	—	—	277	188	227	3,3	48	16
4157627	TDG534A14400	14,400	.5669	—	—	277	189	227	3,4	48	16
4157628	TDG534A14500	14,500	.5709	—	—	277	189	227	3,4	48	16
4157629	TDG534A14600	14,600	.5748	—	—	277	189	227	3,4	48	16
4157630	TDG534A14684	14,684	.5781	37/64	—	277	190	227	3,4	48	16
4157631	TDG534A14700	14,700	.5787	—	—	277	190	227	3,4	48	16
4157632	TDG534A14800	14,800	.5827	—	—	277	190	227	3,5	48	16
4157633	TDG534A14900	14,900	.5866	—	—	277	190	227	3,5	48	16
4157634	TDG534A15000	15,000	.5906	—	—	277	190	227	3,5	48	16
4157635	TDG534A15083	15,083	.5938	19/32	—	277	190	227	3,5	48	16
4157636	TDG534A15100	15,100	.5945	—	—	277	190	227	3,5	48	16
4157637	TDG534A15200	15,200	.5984	—	—	277	190	227	3,5	48	16
4157638	TDG534A15300	15,300	.6024	—	—	277	191	227	3,6	48	16
4157639	TDG534A15400	15,400	.6063	—	—	277	191	227	3,6	48	16
4157640	TDG534A15479	15,479	.6094	39/64	—	277	191	227	3,6	48	16
4157641	TDG534A15500	15,500	.6102	—	—	277	191	227	3,6	48	16
4157642	TDG534A15600	15,600	.6142	—	—	277	191	227	3,6	48	16
4157643	TDG534A15700	15,700	.6181	—	—	277	192	227	3,7	48	16
4157644	TDG534A15800	15,800	.6220	—	—	277	192	227	3,7	48	16
4157645	TDG534A15875	15,875	.6250	5/8	—	277	192	227	3,7	48	16
4157646	TDG534A15900	15,900	.6260	—	—	277	192	227	3,7	48	16
4157647	TDG534A16000	16,000	.6299	—	—	277	192	227	3,7	48	16
4157648	TDG534A16100	16,100	.6339	—	—	305	212	255	3,8	48	18
4157649	TDG534A16200	16,200	.6378	—	—	305	212	255	3,8	48	18
4157650	TDG534A16271	16,271	.6406	41/64	—	305	212	255	3,8	48	18
4157651	TDG534A16300	16,300	.6417	—	—	305	212	255	3,8	48	18

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Solid Carbide Drills

(TDG534A • 12 x D — continued)



- first choice
- alternate choice

grade WN10HD		D1 diameter				L	L4 max	L3	L5	LS	D
order #	catalog #	mm	in	fraction	wire size						
4157652	TDG534A16400	16,400	.6457	—	—	305	213	255	3,8	48	18
4157653	TDG534A16500	16,500	.6496	—	—	305	213	255	3,8	48	18
4157654	TDG534A16600	16,600	.6535	—	—	305	213	255	3,9	48	18
4157655	TDG534A16670	16,670	.6563	21/32	—	305	214	255	3,9	48	18
4157656	TDG534A16700	16,700	.6575	—	—	305	214	255	3,9	48	18
4157657	TDG534A16800	16,800	.6614	—	—	305	214	255	3,9	48	18
4157658	TDG534A16900	16,900	.6654	—	—	305	214	255	3,9	48	18
4157659	TDG534A17000	17,000	.6693	—	—	305	214	255	4,0	48	18
4157660	TDG534A17100	17,100	.6732	—	—	305	214	255	4,0	48	18
4157661	TDG534A17200	17,200	.6772	—	—	305	214	255	4,0	48	18
4157662	TDG534A17300	17,300	.6811	—	—	305	214	255	4,0	48	18
4157663	TDG534A17400	17,400	.6850	—	—	305	215	255	4,1	48	18
4157664	TDG534A17463	17,463	.6875	11/16	—	305	215	255	4,1	48	18
4157665	TDG534A17500	17,500	.6890	—	—	305	215	255	4,1	48	18
4157666	TDG534A17600	17,600	.6929	—	—	305	215	255	4,1	48	18
4157667	TDG534A17700	17,700	.6969	—	—	305	216	255	4,1	48	18
4157668	TDG534A17800	17,800	.7008	—	—	305	216	255	4,2	48	18
4157669	TDG534A17859	17,859	.7031	45/64	—	305	216	255	4,2	48	18
4157670	TDG534A17900	17,900	.7047	—	—	305	216	255	4,2	48	18
4156877	TDG534A18000	18,000	.7087	—	—	305	216	255	4,2	48	18
4156878	TDG534A18100	18,100	.7126	—	—	334	237	282	4,2	50	20
4156879	TDG534A18200	18,200	.7165	—	—	334	236	282	4,2	50	20
4156880	TDG534A18258	18,258	.7188	23/32	—	334	236	282	4,3	50	20
4156881	TDG534A18300	18,300	.7205	—	—	334	236	282	4,3	50	20
4156882	TDG534A18400	18,400	.7244	—	—	334	237	282	4,3	50	20
4156973	TDG534A18500	18,500	.7283	—	—	334	237	282	4,3	50	20
4156974	TDG534A18600	18,600	.7323	—	—	334	237	282	4,3	50	20
4156975	TDG534A18654	18,654	.7344	47/64	—	334	237	282	4,3	50	20
4156976	TDG534A18700	18,700	.7362	—	—	334	237	282	4,4	50	20
4156977	TDG534A18800	18,800	.7402	—	—	334	238	282	4,4	50	20
4156978	TDG534A18900	18,900	.7441	—	—	334	238	282	4,4	50	20
4156979	TDG534A19000	19,000	.7480	—	—	334	238	282	4,4	50	20
4156980	TDG534A19050	19,050	.7500	3/4	—	334	239	282	4,4	50	20
4156981	TDG534A19100	19,100	.7520	—	—	334	239	282	4,5	50	20
4156982	TDG534A19200	19,200	.7559	—	—	334	238	282	4,5	50	20
4156983	TDG534A19300	19,300	.7598	—	—	334	238	282	4,5	50	20
4156984	TDG534A19400	19,400	.7638	—	—	334	239	282	4,5	50	20
4156985	TDG534A19500	19,500	.7677	—	—	334	239	282	4,5	50	20
4156986	TDG534A19600	19,600	.7717	—	—	334	239	282	4,6	50	20
4156987	TDG534A19700	19,700	.7756	—	—	334	239	282	4,6	50	20
4156988	TDG534A19800	19,800	.7795	—	—	334	240	282	4,6	50	20
4156989	TDG534A19900	19,900	.7835	—	—	334	240	282	4,6	50	20
4156990	TDG534A20000	20,000	.7874	—	—	334	240	282	4,7	50	20

Solid Carbide Drills

**TOP DRILL G • TDG532/TDG533/TDG534 • WN10HD™ • Through Coolant • Inch**

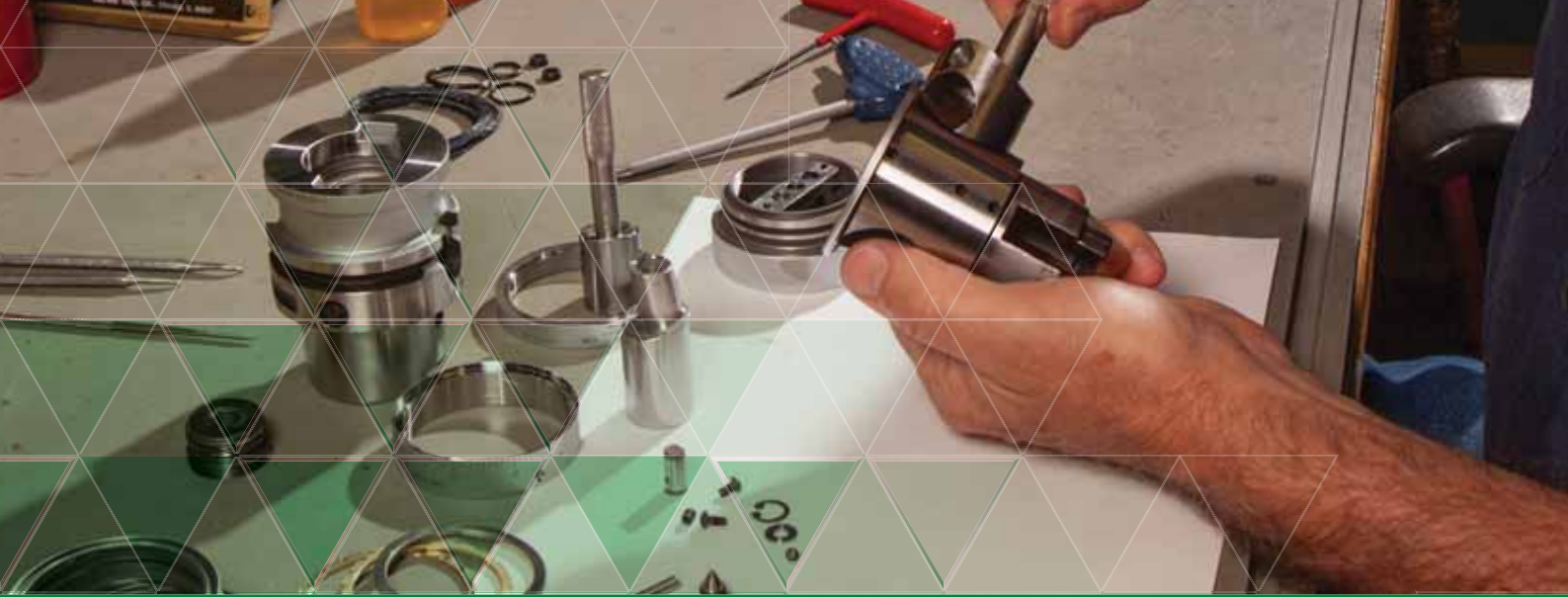
		<b>Cutting Speed – vc</b>	<b>Recommended Feed Rate (f) by Diameter</b>								
		<b>Range – SFM</b>									
<b>Material Group</b>		<b>min – max</b>	<b>Tool Diameter (inch)</b>	<b>.125–1/8</b>	<b>.188–3/16</b>	<b>.250–1/4</b>	<b>.313–5/16</b>	<b>.375–3/8</b>	<b>.500–1/2</b>	<b>.625–5/8</b>	<b>.750–3/4</b>
<b>N</b>	<b>21</b>	330 – 1480	IPR	.006–.010	.007–.011	.009–.014	.011–.017	.012–.020	.014–.022	.017–.027	.020–.032
	<b>22, 23, 24</b>	330 – 980	IPR	.006–.009	.007–.011	.008–.013	.010–.015	.012–.018	.013–.021	.017–.026	.020–.032
	<b>26</b>	330 – 820	IPR	.006–.011	.006–.013	.007–.014	.009–.016	.010–.017	.011–.019	.013–.022	.014–.025

**TOP DRILL G • TDG532/TDG533/TDG534 • WN10HD • Through Coolant • Metric**

		<b>Cutting Speed – vc</b>	<b>Recommended Feed Rate (f) by Diameter</b>								
		<b>Range – m/min</b>									
<b>Material Group</b>		<b>min – min</b>	<b>Tool Diameter (mm)</b>	<b>3,0</b>	<b>4,0</b>	<b>6,0</b>	<b>8,0</b>	<b>10,0</b>	<b>12,0</b>	<b>16,0</b>	<b>20,0</b>
<b>N</b>	<b>21</b>	100 – 450	mm/r	0,16–0,25	0,19–0,29	0,23–0,35	0,27–0,42	0,31–0,50	0,36–0,57	0,44–0,69	0,52–0,82
	<b>22, 23, 24</b>	100 – 300	mm/r	0,15–0,23	0,17–0,28	0,21–0,34	0,25–0,39	0,30–0,46	0,34–0,54	0,42–0,67	0,52–0,82
	<b>26</b>	100 – 250	mm/r	0,16–0,28	0,15–0,32	0,19–0,36	0,23–0,40	0,25–0,44	0,28–0,48	0,32–0,56	0,35–0,63

nominal size range	Inch tolerance	
	D1 tolerance m7	D tolerance h6
>.1181–.2362	.0000/.0005	.0000/-0.0003
>.2360–.3937	.0000/.0006	.0000/-0.0004
>.3937–.7087	.0000/.0007	.0000/-0.0004
>.7078–1.0000	.0000/.0009	.0000/-0.0005

nominal size range	Metric tolerance	
	D1 tolerance m7	D tolerance h6
>3–6	0,004/0,016	0,000/-0,008
>6–10	0,006/0,021	0,000/-0,009
>10–18	0,007/0,025	0,000/-0,011
>18–25,4	0,008/0,029	0,000/-0,013



# WIDIA™ Solid Carbide Drills — Reconditioning

Anyone can regrind your tools — only we can recondition them.

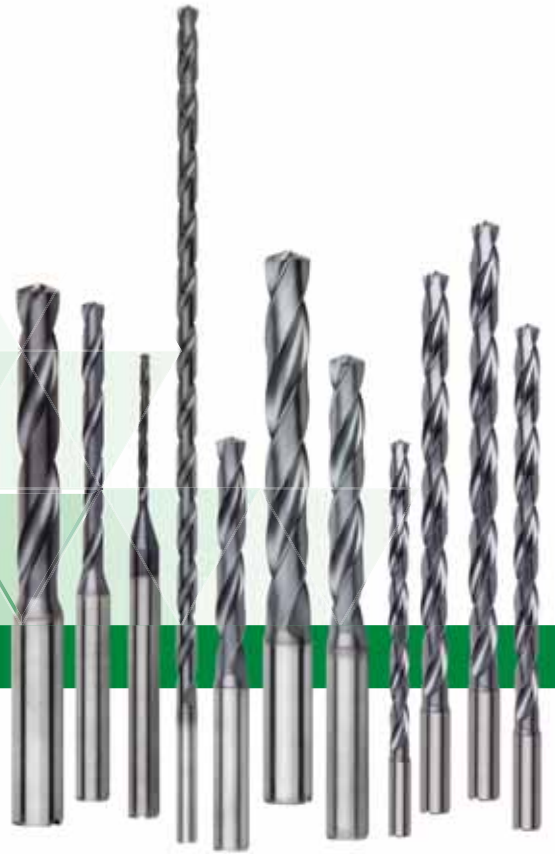
WIDIA Reconditioning Services optimize the value of metalcutting tools throughout their entire lifecycle by giving like-new performance — with rapid turnaround time — so tools are always on hand and perform just like new.

## How Does WIDIA Do It?

- Reconditioned tooling undergoes the same process as new tools — the same drill point (WIDIA proprietary geometry) and coating are applied back on the tool.
- Tooling is returned to like-new condition, with WIDIA proprietary geometry providing a longer tooling lifecycle and increased performance.
- With current lead-time less than 10 days, customers get tools back quickly — lowering cost-per-tool usage.



# Protect your investment by using the WIDIA™ Reconditioning Program.



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

To use WIDIA™ tool reconditioning services, contact your authorized WIDIA distributor to get started.

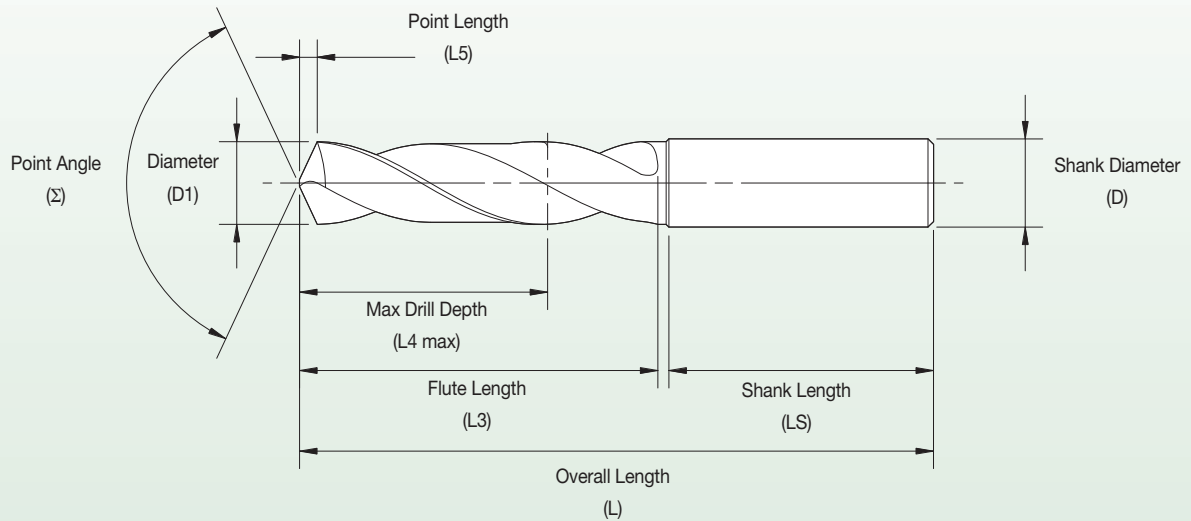
## **WIDIA Solid Carbide Drills Reconditioning Product Lines**

- VariDrill™
- TOP DRILL S™ for Steel
- TOP DRILL S™ for Cast Iron
- TOP DRILL S+™
- TOP DRILL G™

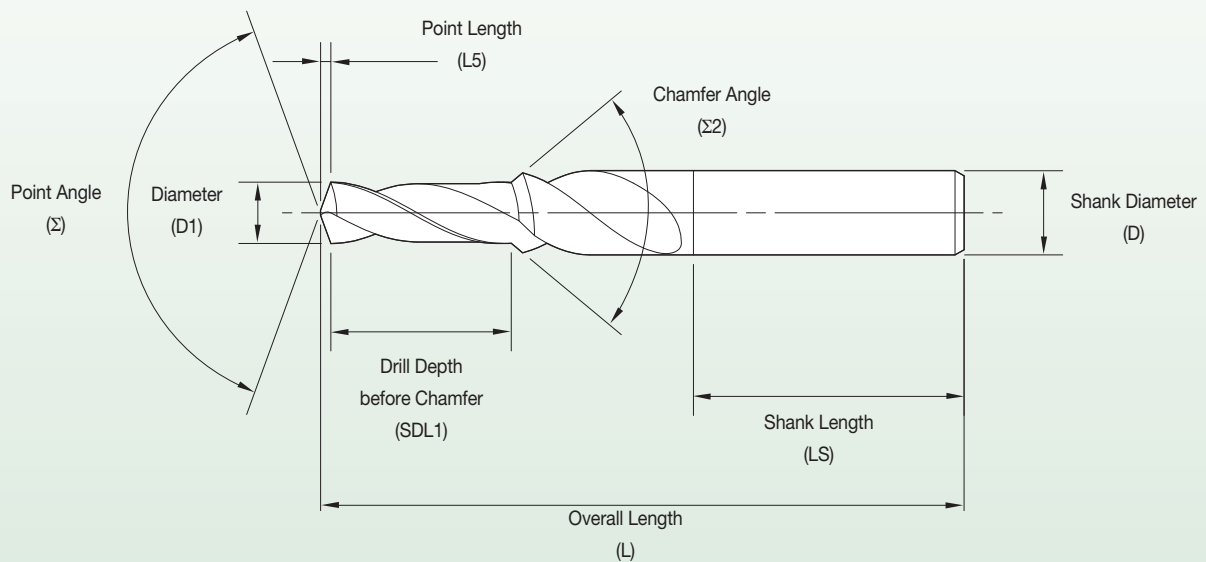
**WIDIA** 

## The Anatomy of a Drill

Use this diagram when describing features of a solid carbide drill.



Use this diagram when describing features of a solid carbide step drill.



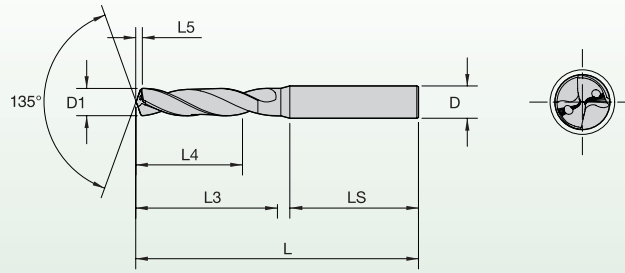
## Shank Designs to DIN 6535



Form HE,  
2° angle  
Design F



Form HA,  
straight  
design A



## Dimensions for WIDIA™ High-Performance Solid Carbide Drills

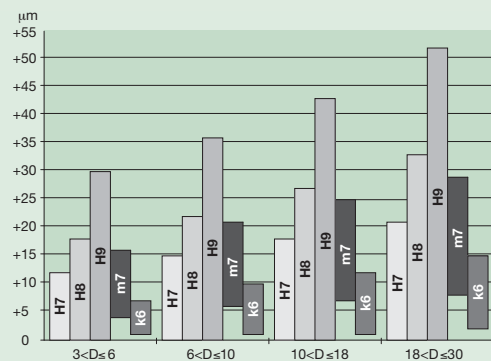
inch Ø		DIN 6535		SHORT* ~3 x D			LONG* ~5 x D			EXTRA LONG** ~8 x D		
D1 min	D1 max	D	LS	L	L3	L4 max	L	L3	L4 max	L	L3	L4 max
.0394	.0551	.1575	1.10	2.28	.28	.20	2.28	.35	.24	2.28	.47	.35
.0552	.0748	.1575	1.10	2.28	.35	.24	2.28	.47	.35	2.28	.71	.59
.0748	.0906	.1575	1.10	2.28	.51	.35	2.28	.71	.55	2.60	1.02	.87
.0906	.1177	.1575	1.10	2.28	.67	.47	2.28	.87	.67	2.60	1.18	.98
.1181	.1476	.2362	1.42	2.44	.79	.55	2.60	1.10	.91	3.07	1.57	1.30
.1477	.1870	.2362	1.42	2.60	.94	.67	2.91	1.42	1.14	3.43	1.93	1.61
.1870	.2362	.2362	1.42	2.60	1.10	.79	3.23	1.73	1.38	3.70	2.20	1.89
.2363	.2756	.3150	1.42	3.11	1.34	.94	3.58	2.09	1.69	4.13	2.64	2.24
.2756	.3150	.3150	1.42	3.11	1.61	1.14	3.58	2.09	1.69	4.33	2.83	2.40
.3150	.3937	.3937	1.57	3.50	1.85	1.38	4.06	2.40	1.93	4.80	3.15	2.68
.3937	.4724	.4724	1.77	4.02	2.17	1.57	4.65	2.80	2.20	5.55	3.70	3.11
.4725	.5512	.5512	1.77	4.21	2.36	1.69	4.88	3.03	2.36	6.10	4.25	3.58
.5512	.6299	.6299	1.89	4.53	2.56	1.77	5.24	3.27	2.48	6.73	4.76	3.98
.6300	.7087	.7087	1.89	4.84	2.87	2.01	5.63	3.66	2.80	7.28	5.32	4.45
.7087	.7874	.7874	1.97	5.16	3.11	2.17	6.02	3.98	3.03	7.87	5.83	4.88
.7874	.8661	.7874	1.97	5.55	3.39	2.36	6.57	4.41	3.35	8.54	6.38	5.35
.8662	.9843	.9843	2.20	6.02	3.74	2.56	7.24	4.96	3.86	9.37	7.09	5.91

\* D1 < 20mm to DIN 6537K  
D1 > 20mm to factory standard  
\*\* To factory standard

## Tolerances of Drills and Holes

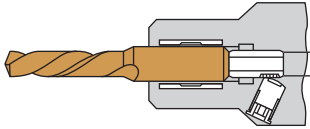
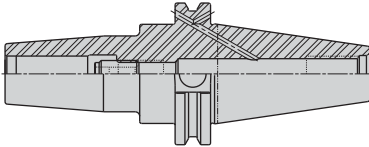
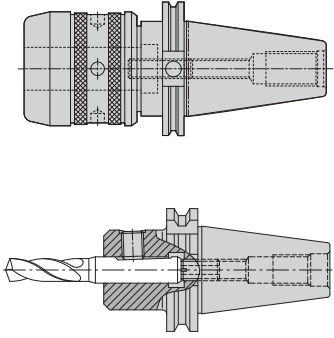
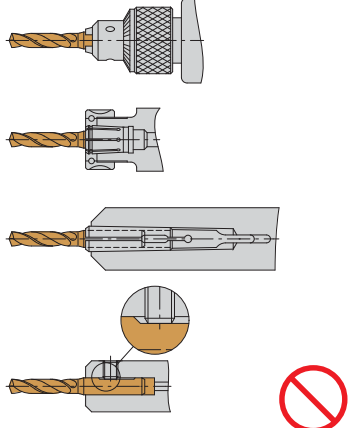
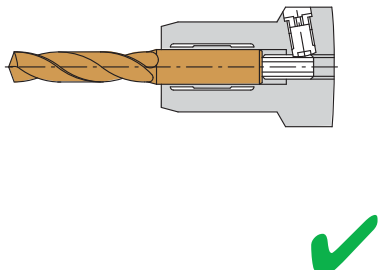
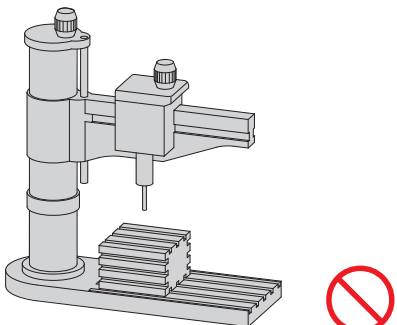
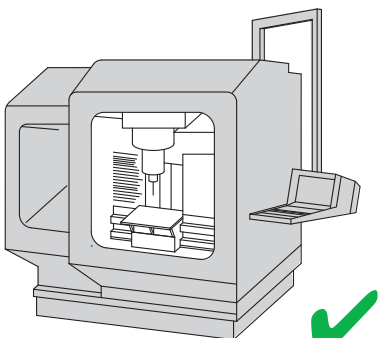
High-performance solid carbide drills with tolerances of m7 create holes with tolerances of H9. H8 can be achieved in very good conditions. The drill should be used for holes in H8, and in favorable conditions, H7 can be achieved. Solid carbide drills with H7 create holes in K9-11. Other drilling tolerances require special solid carbide drill versions.

Tolerances of diameter D1 on:  
Spiral Flute  
TDG Drill



## Toolholding Systems

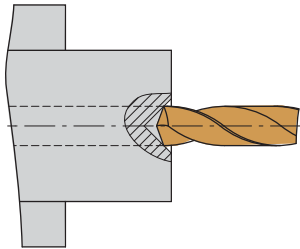
As with any drilling system, components of the entire system contribute to the quality of the machined hole, not just the drill itself. For maximum efficiency and accuracy, the following toolholding systems are your best choices:

<p><b>First Choice</b> Hydraulic chucks</p> 	<p><b>Second Choice</b> Shrink Fit</p> 	<p><b>Third Choice</b> High-performance milling chucks with reduction sleeves</p> 
<p><b>Not Recommended</b></p> 	<p><b>Clamping Chuck</b> Use of all-purpose drilling chuck collets, clamping sleeves, and Weldon® clamping chucks should be avoided because they do not absorb cutting forces reliably and provide insufficient precision of concentricity.</p>	<p><b>Highly Recommended</b> Hydraulic chucks ensure a secure torque transmission with excellent concentricity.</p> 
<p><b>Not Recommended</b></p> 	<p><b>Machine</b> Solid carbide drills have a much higher rigidity than conventional high-speed steel drills. This enables the machining of close-tolerance holes with a position accuracy of <math>\pm 0.001</math>". However, it also means that drills require rigid machine tools with good spindles.</p>	<p><b>Rigid Machine Tool Recommended</b></p> 

(continued)

(continued)

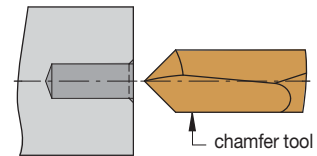
**Wrong**



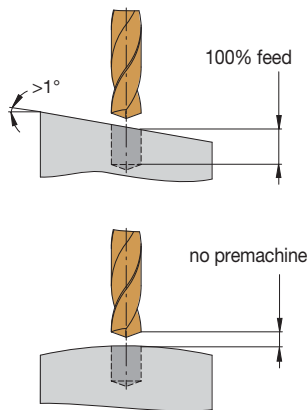
**Drilling and Chamfering**

Drill into the solid first, then chamfer.

**Correct**



**Wrong**



**Drilling on Inclined or Rounded Surfaces**

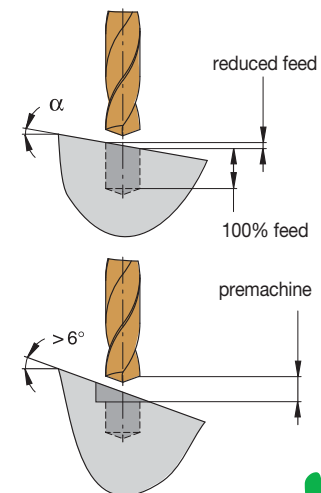
When drilling on inclined or curved surfaces, use a lower feed than the standard value. The reduction of feed required is dependent on the inclination angle of the workpiece surface and the drill type (see table).

reduced feed (% of standard value)

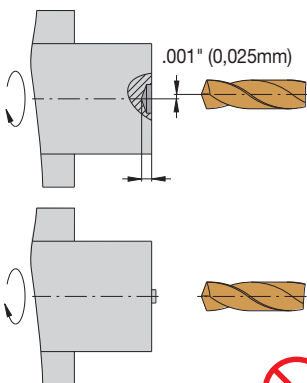
inclination $\alpha$	3 x D	5 x D Long	<5 x D
1°	100%	80%	premachine
2°	80-50%	80-50%	premachine
3°	65%	50%	premachine
4°	50%	premachine	premachine
6°	30%	premachine	premachine

Premachining is usually done with an end mill operation.

**Correct**



**Wrong**



**Drilling on Turning Machines**

When drilling on turning machines, the drill must be on center. The tolerance range of the center position should not exceed  $\pm 0.001$ ". On bar-turning lathes, do not drill into center stub or bur. Cut-off tools must be mounted precisely to eliminate center stub or bur. Do not drill into pre-existing holes.

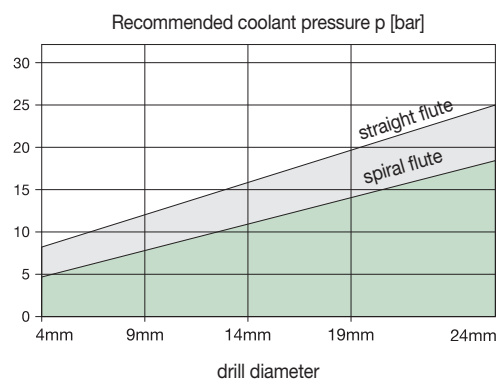
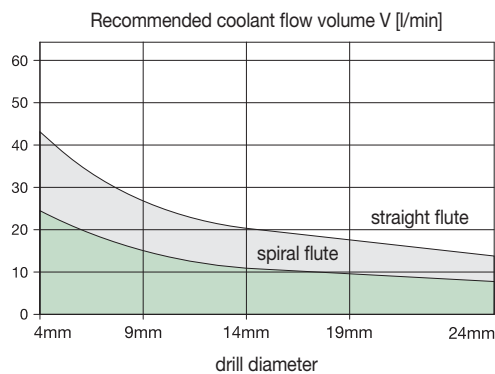
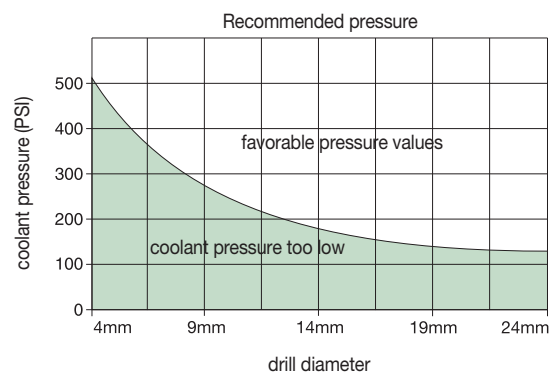
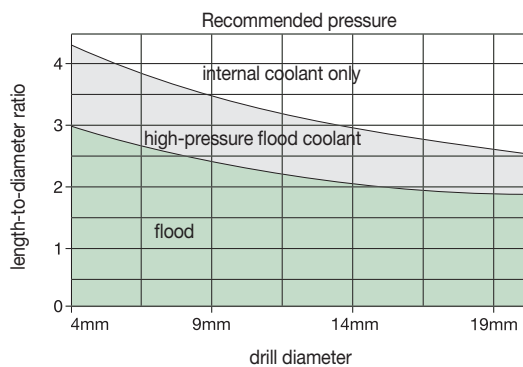
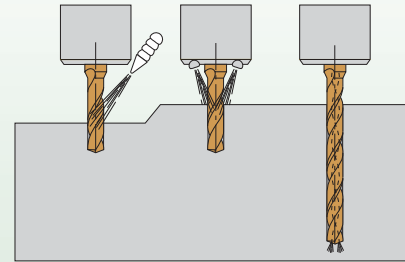
**Hole Depths Greater than 3 x D**

Hole depths that are deeper than three times the drill diameter may require a speed reduction. A 15% lower speed is suggested.

## Coolant

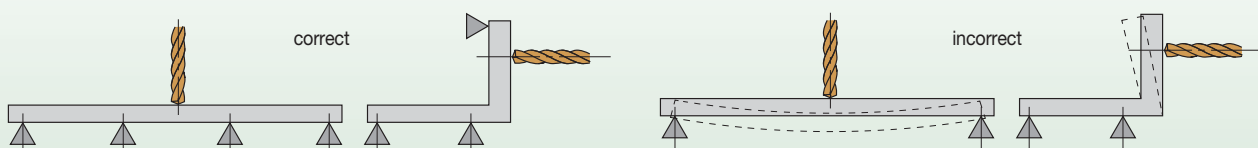
- To optimize their performance, drills must be adequately cooled. With the proper coolant flow, better tool life and higher maximum effective cutting speeds can be achieved.
- If not properly cooled, the drill will heat up rapidly. This causes the drill diameter to expand, which in turn may cause the drill to seize inside the hole.
- Solid carbide drills with internal coolant channels require deeper drilling depths to be effective. The higher the coolant pressure, the better the drilling results. Drill life and hole quality improve with ample coolant flow.
- When using drills without internal coolant flow, try to get at least one coolant jet as parallel to the drill as possible.
- For short-hole applications, drills without internal coolant may often provide better tool life. The tool is more solid, and it does not suffer from thermal shock at the cutting edge.
- It is important to use high coolant concentration to provide lubricity, which will aid in tool life, chip evacuation, and finer surface finishes.
- High-pressure coolant, either through the tool or through a line adjacent and parallel to the tool, should always be considered for increased tool life and production.
- Do not use multi-coolant lines. Use one line with 100% of the flow capacity to evacuate the chips from the hole.

Coolant requirement for carbide drills

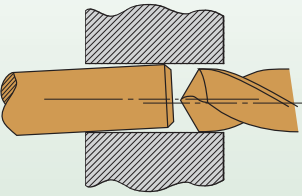
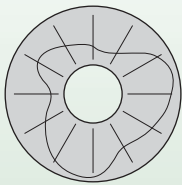
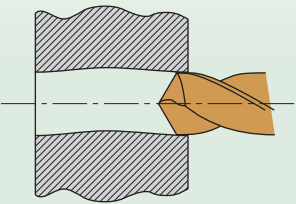


## Workpiece Rigidity


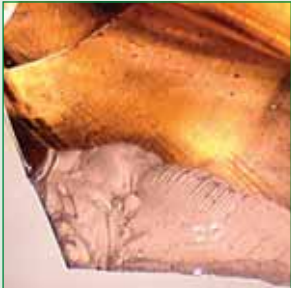
Because solid carbide drills have much higher penetration rates, it is important that the workpiece has adequate support.



problem	source	solution
<b>heavy wear on the cutting corners</b> 	<b>insufficient coolant</b>	<ul style="list-style-type: none"> <li>• Check cooling lubricant. In the case of internal coolant supply, increase coolant pressure. In the case of external coolant supply, adjust positioning of coolant jet. Cool from both sides.</li> </ul>
	<b>workpiece movement</b>	<ul style="list-style-type: none"> <li>• Stabilize workpiece chucking and check stability of machine tool.</li> </ul>
	<b>wrong drill</b>	<ul style="list-style-type: none"> <li>• Check drill type, drilling depth, cooling system, and workpiece material.</li> </ul>
	<b>cutting conditions</b>	<ul style="list-style-type: none"> <li>• Reduce cutting speed; increase feed.</li> </ul>
<b>splintering on the chisel edge</b> 	<b>clamping chuck</b>	<ul style="list-style-type: none"> <li>• Check clamping accuracy. Use hydraulic clamping chuck or high-precision chucking system.</li> </ul>
	<b>cutting conditions</b>	<ul style="list-style-type: none"> <li>• Decrease feed; increase speed.</li> </ul>
<b>built-up edge</b> 	<b>insufficient coolant</b>	<ul style="list-style-type: none"> <li>• Check cooling lubricant. In the case of internal coolant supply, increase coolant pressure. In the case of external coolant supply, adjust positioning of coolant jet. Cool from both sides.</li> </ul>
	<b>cutting conditions</b>	<ul style="list-style-type: none"> <li>• Increase speed 20–30%.</li> </ul>
<b>splintering on the cutting edges</b> 	<b>clamping chuck</b>	<ul style="list-style-type: none"> <li>• Check clamping accuracy and torque transmission. Use hydraulic clamping chuck or high-precision chucking system.</li> </ul>
	<b>cutting conditions caused by built-up edge</b>	<ul style="list-style-type: none"> <li>• Check cutting values, and possibly increase cutting speed.</li> </ul>
		<ul style="list-style-type: none"> <li>• Examine regularly for built-up edge.</li> </ul>
<b>thermal checking/comb cracking</b> 	<b>cutting conditions</b>	<ul style="list-style-type: none"> <li>• Adapt coolant and cutting conditions to reduce thermal shock.</li> </ul>


problem	source	solution
<p><b>hole too big</b></p> 	<b>cutting conditions</b>	<ul style="list-style-type: none"> <li>• Check cutting values, increase cutting speed, or reduce feed.</li> </ul>
	<b>clamping chuck</b>	<ul style="list-style-type: none"> <li>• Check clamping accuracy and torque transmission. Use hydraulic clamping chuck or high-precision chucking system.</li> </ul>
	<b>wrong drill</b>	<ul style="list-style-type: none"> <li>• Check drill diameter. Please note that drills are ground to a positive tolerance. Check concentric running.</li> </ul>
<p><b>hole too small</b></p> 	<b>insufficient coolant</b>	<ul style="list-style-type: none"> <li>• Check cooling lubricant. In the case of internal coolant supply, increase coolant pressure. In the case of external coolant supply, adjust positioning of coolant jet. Cool from both sides.</li> </ul>
	<b>cutting conditions</b>	<ul style="list-style-type: none"> <li>• Decrease feed; increase speed.</li> </ul>
	<b>wrong drill</b>	<ul style="list-style-type: none"> <li>• Check cutting-edge diameter.</li> </ul>
<p><b>hole not cylindrical</b></p> 	<b>clamping chuck</b>	<ul style="list-style-type: none"> <li>• Check clamping accuracy and torque transmission. Use hydraulic clamping chuck or high-precision chucking system.</li> </ul>
	<b>workpiece movement</b>	<ul style="list-style-type: none"> <li>• Stabilize workpiece chucking and check stability of machine tool.</li> </ul>
	<b>wrong drill</b>	<ul style="list-style-type: none"> <li>• Check drill type and drilling depth. Use longer drills.</li> </ul>
	<b>cutting conditions</b>	<ul style="list-style-type: none"> <li>• Reduce feed at entry.</li> </ul>



problem	source	solution
<p><b>drill breakage</b></p> 	<p><b>clamping chuck</b></p>	<ul style="list-style-type: none"> <li>• Check clamping accuracy and torque transmission. Use hydraulic clamping chuck or high-precision chucking system.</li> </ul>
	<p><b>workpiece movement</b></p>	<ul style="list-style-type: none"> <li>• Stabilize workpiece chucking and check stability of machine tool.</li> </ul>
	<p><b>wrong drill</b></p>	<ul style="list-style-type: none"> <li>• Check drill type, drilling depth, cooling system, and workpiece material.</li> </ul>
	<p><b>insufficient coolant</b></p>	<ul style="list-style-type: none"> <li>• Check cooling lubricant. In the case of internal coolant supply, increase coolant pressure. In the case of external coolant supply, adjust positioning of coolant jet. Cool from both sides.</li> </ul>
	<p><b>cutting conditions</b></p>	<ul style="list-style-type: none"> <li>• Check cutting values, and possibly reduce feed.</li> </ul>
	<p><b>clamping chuck</b></p>	<ul style="list-style-type: none"> <li>• Check torque transmission. Use hydraulic clamping chuck or high-precision chucking system.</li> </ul>
<p><b>splintering on the cutting corners</b></p> 	<p><b>workpiece movement</b></p>	<ul style="list-style-type: none"> <li>• Stabilize workpiece chucking and check stability of machine tool.</li> </ul>
	<p><b>wrong drill</b></p>	<ul style="list-style-type: none"> <li>• Check drill type, drilling depth, cooling system, and workpiece material. Possibly use longer drill.</li> </ul>
	<p><b>insufficient coolant</b></p>	<ul style="list-style-type: none"> <li>• Check cooling lubricant. In the case of internal coolant supply, increase coolant pressure. In the case of external coolant supply, adjust positioning of coolant jet. Cool from both sides.</li> </ul>
	<p><b>cutting conditions</b></p>	<ul style="list-style-type: none"> <li>• Check cutting values, and possibly reduce feed.</li> </ul>

# NOVO KNOWS

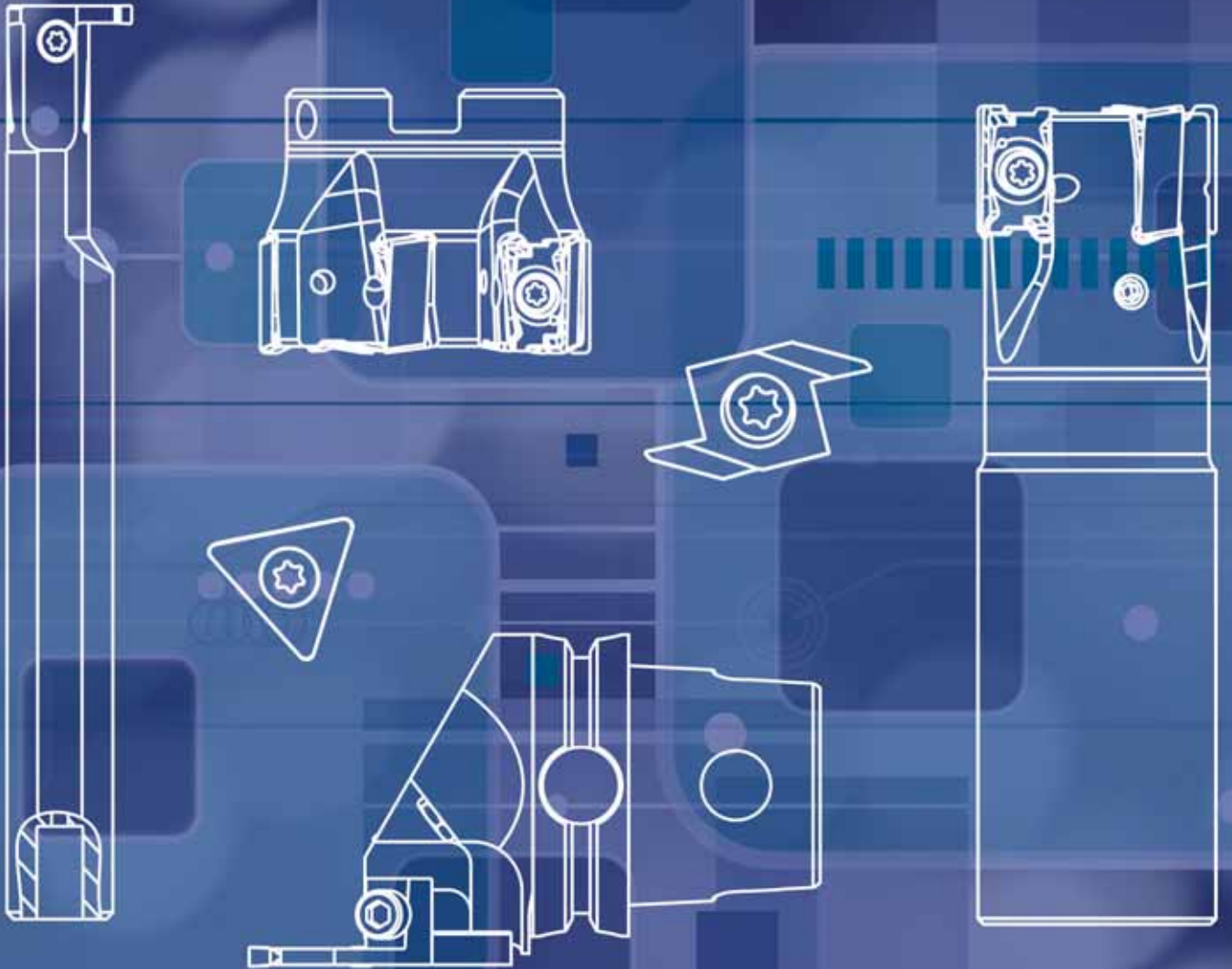
## ART TO PART TO PROFIT



Being as productive and profitable as possible is your fundamental goal. With the addition of NOVO™ to your team, your goal can be achieved. NOVO possesses powerful digital tools that link together process planning, inventory availability and purchase, cost-per-part management, and productivity improvements.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift.

[widia.com/novo](http://widia.com/novo)



**01**

THE DIGITAL SOURCE FOR DELIVERING  
SMART MACHINING SOLUTIONS

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**NOVO**  <sup>TM</sup>



## Modular Drills

Introduction..... S2-S3  
TOP DRILL M1 ..... S4-S30  
Spade Blades..... S32-S51



modular drills with internal coolant channel		grade/series	standard*						hole tolerance	standard range			
			● first choice ○ alternate choice							diameter range			
			P	M	K	N	S	H		D1 mm min-max	D1 inch min-max	drilling depth L/D1	
TOP DRILL M1™ with front clamping mechanism													
	TOP DRILL M1 inserts	WU25PD**	●	○	●				IT9-IT11	7,94-25,99	.3125-1.1023	—	
	chamfering inserts	TopSTEP SH-WP20PH	●	○	○	●	○		—	12,50-36,01	.4921-1.4177	—	
		TopSTEP VG-WP20PH	●	○	○	○	○		—				
	TOP DRILL M1 bodies	—							—	7,94≤Ø<9,50	.3125≤Ø<.3740	max 3-8 x D	
										9,50≤Ø<11,00	.3740≤Ø<.4331		
											11,00≤Ø<12,50		.4331≤Ø<.4921
											12,50≤Ø<14,00		.4921≤Ø<.5512
											14,00≤Ø<15,50		.5512≤Ø<.6102
											15,50≤Ø<16,50		.6102≤Ø<.6496
											16,50≤Ø<20,50		.6496≤Ø<.8071
											20,50≤Ø<21,00		.8071≤Ø<.8268
								21,00≤Ø<25,99	.8268≤Ø<1.023				

\* Apart from our standard drills, we can offer you a wide variety of special coating solutions and edge preparations to fulfill all your needs.  
 If a specific drill is not suitable for your workpiece material, please contact your WIDIA™ distributor for available options.  
 \*\* Grade WU25PD™ was previously named K20FTiAIN.

- Standard Product
- Engineered Solutions

engineered solution range			coolant	drilling	inclined exit	counter-sinking	counter-boring	2 flute, 2 margin cooled	corner chamfer	plain shank $\leq$ H6	SCF Shanks	page(s)
diameter range												
D1 mm min-max	D1 inch min-max	max drilling depth										
TOP DRILL M1™ with front clamping mechanism (continued)												
7,94–27,99	.3125–1.1020	–		●	●			●	●			S16–S21
12,50–36,01	.4921–1.4177	–				●						S22–S23
		–				●	●					
7,94 ≤ Ø < 9,50	.3125 ≤ Ø < .3740	12 x D	●	●	●	○	○			●	●	S6–S14
9,50 ≤ Ø < 11,00	.3740 ≤ Ø < .4331	13 x D	●	●	●	○	○			●	●	
11,00 ≤ Ø < 12,50	.5424 ≤ Ø < .4921	14 x D	●	●	●	○	○			●	●	
12,50 ≤ Ø < 14,00	.4921 ≤ Ø < .5512	15 x D	●	●	●	○	○			●	●	
14,00 ≤ Ø < 15,00	.5512 ≤ Ø < .6102	16 x D	●	●	●	○	○			●	●	
15,50 ≤ Ø < 16,50	.6102 ≤ Ø < .6496	17 x D	●	●	●	○	○			●	●	
16,50 ≤ Ø < 20,50	.6496 ≤ Ø < .8070	18 x D	●	●	●	○	○			●	●	
20,50 ≤ Ø < 21,00	.8070 ≤ Ø < .8267	20 x D	●	●	●	○	○			●	●	
21,00 ≤ Ø < 27,99	.8267 ≤ Ø < 1.1010	500,0mm	●	●	●	○	○			●	●	

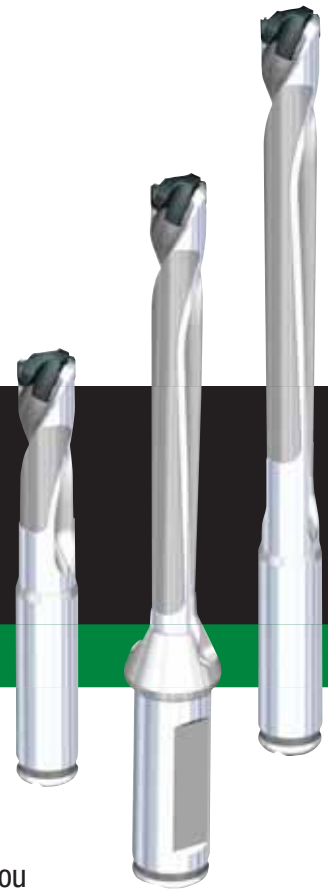
## TOP DRILL M1™ Modular Drill System

# TOP DRILL M1

With performance levels and metal removal rates comparable to that of solid carbide drills, WIDIA™ TOP DRILL M1 offers all the quality and performance you need in one versatile, economical package. The unique front clamping system enables inserts to be changed quickly, even inside the machine tool, saving setup time and manufacturing costs.

The TDM1 platform offers UP(M) drill-point design in WU25PD™ grade — a wide application range geometry, specially developed for cost-efficient drilling of steel, cast iron, and stainless steel. It covers diameter ranges from .3159–1.0232" (8–25.99mm) within the standard offering in L/D ratios of 3, 5, and 8 x D.

With its high level of performance, wide application range, and proven point geometry, TDM1 combines all of the economic benefits of a modular drilling system with the machining performance and hole quality to tackle even your most challenging operations.





## UP Point Design — Versatility and Productivity

- One insert style for all your work in steel, cast iron, and even stainless steels.
- Low cutting forces and excellent centering capabilities.
- Universal point style for consistent performance and excellent hole quality.

## Easy Insert Change

- No screws or clamps required.
- Insert blades can be changed with a simple wrench that comes with each holder.

## Disposable

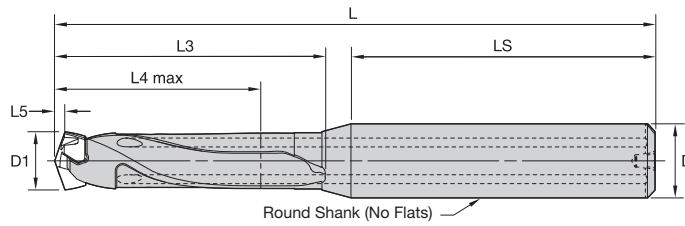
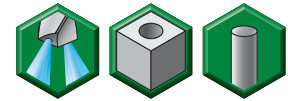
- No reconditioning costs.
- Consistent performance from tip to tip.
- Eliminates number of tools waiting for reconditioning, thus avoiding hidden costs.

## Customization

- All intermediate diameters are quickly available as semi-standards.
- Multiple step drills available as customized solutions.
- New TopSTEP range of inserts offer extended chamfering and counterboring to your one-shot drilling solution.



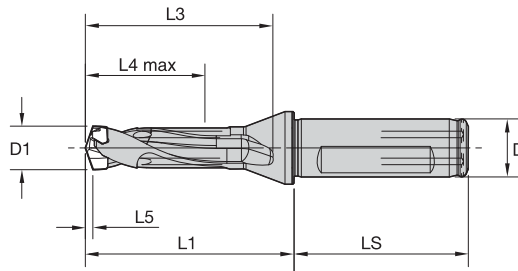
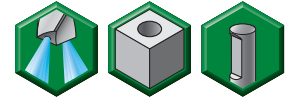
- Tool body shipped with insert wrench.



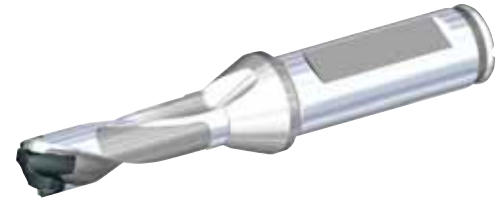
■ TOP DRILL M1 • 3 x D • Straight • Inch

order number	catalog number	D1	D1 max	D	L	L3	L4 max	L5	LS	insert blade seat size
3851478	TDM0313R3SS038	.313	.3343	.3750	3.13	1.42	1.00	.060	1.59	W10
3851480	TDM0335R3SS038	.335	.3539	.3750	3.25	1.54	1.06	.065	1.59	W11
3851482	TDM0354R3SS038	.354	.3736	.3750	3.38	1.67	1.12	.069	1.59	W12
3851544	TDM0374R3SS038	.374	.3933	.3750	3.38	1.67	1.18	.072	1.59	W13
3851545	TDM0374R3SS044	.374	.3933	.4375	3.38	1.59	1.18	.072	1.67	W13
3851548	TDM0394R3SS044	.394	.4130	.4375	3.63	1.84	1.24	.076	1.67	W14
3851550	TDM0413R3SS044	.413	.4327	.4375	3.75	1.96	1.30	.081	1.67	W15
3851552	TDM0433R3SS044	.433	.4524	.4375	3.88	2.09	1.36	.084	1.67	W16
3851554	TDM0453R3SS050	.453	.4720	.5000	3.88	1.97	1.42	.086	1.79	W17
3851556	TDM0472R3SS050	.472	.4917	.5000	4.00	2.88	1.48	.092	1.79	W18
3851558	TDM0492R3SS050	.492	.5114	.5000	4.13	2.22	1.54	.095	1.79	W19
3851559	TDM0492R3SS056	.492	.5114	.5625	4.13	2.22	1.54	.095	1.79	W19
3851562	TDM0512R3SS056	.512	.5311	.5625	4.25	2.34	1.60	.098	1.79	W20
3851564	TDM0532R3SS056	.532	.5508	.5625	4.25	2.34	1.65	.104	1.79	W21
3851566	TDM0551R3SS056	.551	.5705	.5625	4.50	2.59	1.71	.107	1.79	W22
3851568	TDM0571R3SS063	.571	.5902	.6250	4.50	2.47	1.77	.109	1.91	W23
3851570	TDM0591R3SS063	.591	.6295	.6250	4.75	2.72	1.89	.113	1.91	W24
3851572	TDM0630R3SS069	.630	.6689	.6875	4.88	2.85	2.01	.119	1.91	W25
3851574	TDM0669R3SS069	.669	.7083	.6875	5.00	2.97	2.12	.127	1.91	W26
3851576	TDM0709R3SS075	.709	.7476	.7500	5.25	3.13	2.24	.136	2.00	W27
3851578	TDM0748R3SS075	.748	.7870	.7500	5.50	3.38	2.36	.142	2.00	W28
3851580	TDM0787R3SS081	.787	.8264	.8125	5.75	3.63	2.48	.150	2.00	W29
3992477	TDM0827R3SS088	.827	.8657	.8750	5.87	3.69	2.60	.150	2.07	W30
3992478	TDM0866R3SS088	.866	.9051	.8750	6.00	3.81	2.72	.154	2.07	W31
3992479	TDM0906R3SS094	.906	.9445	.9375	6.25	3.98	2.83	.165	2.15	W32
3992480	TDM0945R3SS100	.945	.9839	1.0000	7.25	4.13	2.95	.169	3.00	W33
3992481	TDM0984R3SS100	.984	1.0232	1.0000	7.37	4.26	3.07	.177	3.00	W34

- Tool body shipped with insert wrench.



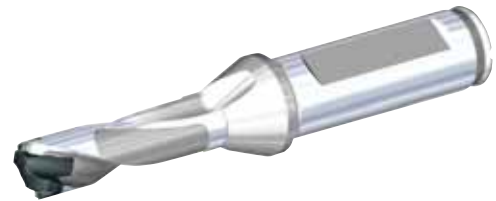
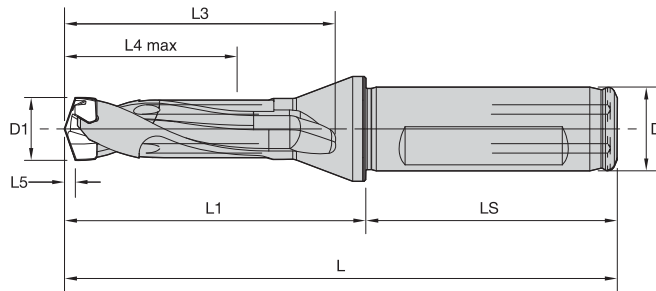
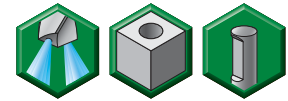
Flanged Shank with Flats (SCF)



■ TOP DRILL M1 • 3 x D • Flanged • Inch

order number	catalog number	D1	D1 max	D	L1	L3	L4 max	L5	LS	insert blade seat size
4098937	TDM0313R3SCF050	.313	.3343	.5000	1.63	1.41	1.00	.057	1.77	W10
4098938	TDM0335R3SCF050	.335	.3539	.5000	1.75	1.53	1.06	.062	1.77	W11
4098939	TDM0354R3SCF050	.354	.3736	.5000	1.88	1.66	1.12	.065	1.77	W12
4098940	TDM0374R3SCF050	.374	.3933	.5000	1.88	1.66	1.18	.068	1.77	W13
4098941	TDM0394R3SCF063	.394	.4130	.6250	2.00	1.78	1.24	.072	1.89	W14
4098942	TDM0413R3SCF063	.413	.4327	.6250	2.00	1.78	1.30	.076	1.89	W15
4099013	TDM0433R3SCF063	.433	.4524	.6250	2.13	1.91	1.36	.079	1.89	W16
4099014	TDM0453R3SCF063	.453	.4720	.6250	2.25	2.03	1.42	.082	1.89	W17
4099015	TDM0472R3SCF063	.472	.4917	.6250	2.38	2.16	1.48	.087	1.89	W18
4099016	TDM0492R3SCF063	.492	.5114	.6250	2.38	2.16	1.54	.090	1.89	W19
4099017	TDM0512R3SCF063	.512	.5311	.6250	2.50	2.28	1.59	.093	1.89	W20
4099018	TDM0532R3SCF063	.532	.5508	.6250	2.50	2.28	1.65	.098	1.89	W21
4099019	TDM0551R3SCF063	.551	.5705	.6250	2.63	2.41	1.71	.101	1.89	W22
4099020	TDM0571R3SCF063	.571	.5902	.6250	2.75	2.53	1.77	.104	1.89	W23
4099021	TDM0591R3SCF075	.591	.6295	.7500	2.88	2.66	1.89	.107	1.97	W24
4099022	TDM0630R3SCF075	.630	.6689	.7500	3.00	2.78	2.01	.113	1.97	W25
4099023	TDM0669R3SCF075	.669	.7083	.7500	3.25	3.03	2.13	.121	1.97	W26
4099024	TDM0709R3SCF075	.709	.7476	.7500	3.38	3.16	2.24	.129	1.97	W27
4099025	TDM0748R3SCF075	.748	.7870	.7500	3.50	3.28	2.36	.134	1.97	W28
4099026	TDM0787R3SCF100	.787	.8264	1.0000	3.75	3.53	2.48	.143	2.20	W29
4099027	TDM0827R3SCF100	.827	.8657	1.0000	3.88	3.66	2.60	.151	2.20	W30
4099028	TDM0866R3SCF100	.866	.9051	1.0000	4.00	3.78	2.72	.156	2.20	W31
4099029	TDM0906R3SCF100	.906	.9445	1.0000	4.25	4.03	2.84	.167	2.20	W32
4099030	TDM0945R3SCF100	.945	.9839	1.0000	4.38	4.16	2.95	.173	2.20	W33
4099031	TDM0984R3SCF100	.984	1.0232	1.0000	4.50	4.28	3.07	.178	2.20	W34

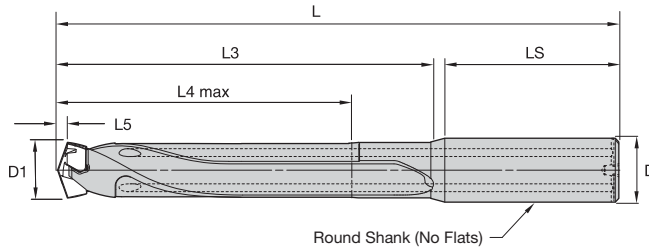
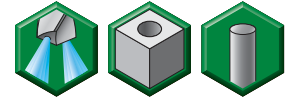
- Tool body shipped with insert wrench.



■ TOP DRILL M1 • 3 x D • Flanged • Metric

order number	catalog number	D1	D1 max	D	L	L1	L3	L4 max	L5	LS	insert blade seat size
3850904	TDM080R3SCF12M	7,94	8,49	12	86	41	35	26	1,5	45	W10
3850906	TDM085R3SCF12M	8,50	8,99	12	88	43	37	27	1,6	45	W11
3850908	TDM090R3SCF12M	9,00	9,49	12	90	45	39	29	1,7	45	W12
3850910	TDM095R3SCF12M	9,50	9,99	12	92	47	41	30	1,8	45	W13
3850912	TDM100R3SCF16M	10,00	10,49	16	97	49	43	32	1,9	48	W14
3850924	TDM105R3SCF16M	10,50	10,99	16	99	51	45	33	2,0	48	W15
3850926	TDM110R3SCF16M	11,00	11,49	16	101	53	47	35	2,1	48	W16
3850928	TDM115R3SCF16M	11,50	11,99	16	103	55	49	36	2,2	48	W17
3850930	TDM120R3SCF16M	12,00	12,49	16	106	58	52	38	2,3	48	W18
3850932	TDM125R3SCF16M	12,50	12,99	16	108	60	54	39	2,4	48	W19
3850934	TDM130R3SCF16M	13,00	13,49	16	110	62	56	41	2,5	48	W20
3850936	TDM135R3SCF16M	13,50	13,99	16	112	64	58	42	2,6	48	W21
3850938	TDM140R3SCF16M	14,00	14,49	16	114	66	60	44	2,7	48	W22
3850940	TDM145R3SCF16M	14,50	14,99	16	116	68	62	45	2,8	48	W23
3850942	TDM150R3SCF20M	15,00	15,99	20	122	72	66	48	2,8	50	W24
3850944	TDM160R3SCF20M	16,00	16,99	20	126	76	70	51	3,0	50	W25
3850946	TDM170R3SCF20M	17,00	17,99	20	131	81	75	54	3,2	50	W26
3850948	TDM180R3SCF25M	18,00	18,99	25	141	85	79	57	3,4	56	W27
3850950	TDM190R3SCF25M	19,00	19,99	25	144	89	83	60	3,6	56	W28
3850952	TDM200R3SCF25M	20,00	20,99	25	149	93	87	63	3,8	56	W29
3992070	TDM210R3SCF25M	21,00	21,99	25	153	97	91	66	3,7	56	W30
3992071	TDM220R3SCF25M	22,00	22,99	25	158	102	96	69	3,9	56	W31
3992072	TDM230R3SCF25M	23,00	23,99	25	162	106	100	72	4,1	56	W32
3992483	TDM240R3SCF25M	24,00	24,99	25	166	110	104	75	4,2	56	W33
3992484	TDM250R3SCF25M	25,00	25,99	25	170	114	108	78	4,4	56	W34

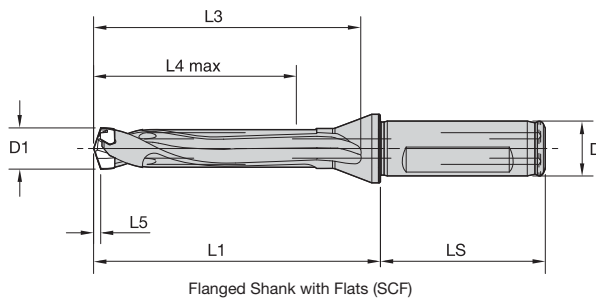
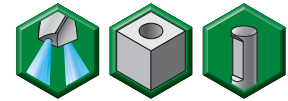
- Tool body shipped with insert wrench.



■ TOP DRILL M1 • 5 x D • Straight • Inch

order number	catalog number	D1	D1 max	D	L	L3	L4 max	L5	LS	insert blade seat size
3851479	TDM0313R5SS038	.313	.3343	.3750	3.88	2.17	1.67	.060	1.59	W10
3851481	TDM0335R5SS038	.335	.3539	.3750	4.00	2.29	1.77	.065	1.59	W11
3851543	TDM0354R5SS038	.354	.3736	.3750	4.13	2.42	1.87	.069	1.59	W12
3851546	TDM0374R5SS038	.374	.3933	.3750	4.25	2.54	1.97	.072	1.59	W13
3851547	TDM0374R5SS044	.374	.3933	.4375	4.38	2.59	1.97	.072	1.67	W13
3851549	TDM0394R5SS044	.394	.4130	.4375	4.63	2.84	2.07	.076	1.67	W14
3851551	TDM0413R5SS044	.413	.4327	.4375	4.75	2.96	2.16	.081	1.67	W15
3851553	TDM0433R5SS044	.433	.4524	.4375	4.88	3.09	2.26	.084	1.67	W16
3851555	TDM0453R5SS050	.453	.4720	.5000	5.00	3.09	2.36	.086	1.79	W17
3851557	TDM0472R5SS050	.472	.4917	.5000	5.00	3.09	2.46	.092	1.79	W18
3851560	TDM0492R5SS050	.492	.5114	.5000	5.13	3.22	2.56	.095	1.79	W19
3851561	TDM0492R5SS056	.492	.5114	.5625	5.13	3.22	2.56	.095	1.79	W19
3851563	TDM0512R5SS056	.512	.5311	.5625	5.25	3.34	2.66	.098	1.79	W20
3851565	TDM0532R5SS056	.532	.5508	.5625	5.50	3.59	2.75	.104	1.79	W21
3851567	TDM0551R5SS056	.551	.5705	.5625	5.75	3.84	2.85	.107	1.79	W22
3851569	TDM0571R5SS063	.571	.5902	.6250	5.75	3.72	2.95	.109	1.91	W23
3851571	TDM0591R5SS063	.591	.6295	.6250	6.00	3.97	3.15	.113	1.91	W24
3851573	TDM0630R5SS069	.630	.6689	.6875	6.25	4.22	3.34	.119	1.91	W25
3851575	TDM0669R5SS069	.669	.7083	.6875	6.50	4.47	3.54	.127	1.91	W26
3851577	TDM0709R5SS075	.709	.7476	.7500	6.88	4.76	3.74	.136	2.00	W27
3851579	TDM0748R5SS075	.748	.7870	.7500	7.13	5.01	3.94	.142	2.00	W28
3851581	TDM0787R5SS081	.787	.8264	.8125	7.50	5.38	4.13	.150	2.00	W29
3992503	TDM0827R5SS088	.827	.8657	.8750	7.63	5.44	4.33	.150	2.07	W30
3992504	TDM0866R5SS088	.866	.9051	.8750	7.87	5.69	4.53	.154	2.07	W31
3992505	TDM0906R5SS094	.906	.9445	.9375	8.25	5.98	4.72	.165	2.15	W32
3992506	TDM0945R5SS100	.945	.9839	1.0000	9.37	6.26	4.92	.169	3.00	W33
3992507	TDM0984R5SS100	.984	1.0232	1.0000	9.63	6.51	5.12	.177	3.00	W34

- Tool body shipped with insert wrench.

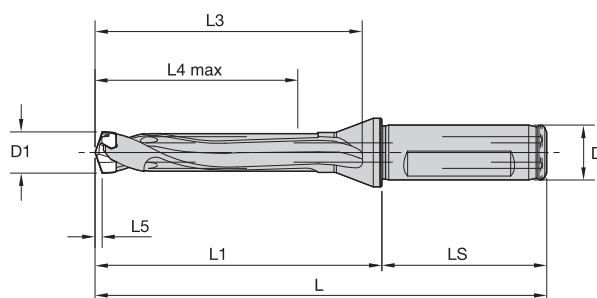
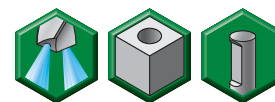


■ TOP DRILL M1 • 5 x D • Flanged • Inch

order number	catalog number	D1	D1 max	D	L1	L3	L4 max	L5	LS	insert blade seat size
4099032	TDM0313R5SCF050	.313	.3343	.5000	2.38	2.16	1.67	.057	1.77	W10
4099033	TDM0335R5SCF050	.335	.3539	.5000	2.50	2.28	1.77	.062	1.77	W11
4099034	TDM0354R5SCF050	.354	.3736	.5000	2.63	2.41	1.87	.065	1.77	W12
4099035	TDM0374R5SCF050	.374	.3933	.5000	2.75	2.53	1.97	.068	1.77	W13
4099036	TDM0394R5SCF063	.394	.4130	.6250	2.88	2.66	2.07	.072	1.89	W14
4099037	TDM0413R5SCF063	.413	.4327	.6250	3.00	2.78	2.17	.076	1.89	W15
4099038	TDM0433R5SCF063	.433	.4524	.6250	3.13	2.91	2.26	.079	1.89	W16
4099039	TDM0453R5SCF063	.453	.4720	.6250	3.25	3.03	2.36	.082	1.89	W17
4099040	TDM0472R5SCF063	.472	.4917	.6250	3.38	3.16	2.46	.087	1.89	W18
4099041	TDM0492R5SCF063	.492	.5114	.6250	3.50	3.28	2.56	.090	1.89	W19
4099042	TDM0512R5SCF063	.512	.5311	.6250	3.63	3.41	2.66	.093	1.89	W20
4099043	TDM0532R5SCF063	.532	.5508	.6250	3.75	3.53	2.76	.098	1.89	W21
4099044	TDM0551R5SCF063	.551	.5705	.6250	3.88	3.66	2.85	.101	1.89	W22
4099045	TDM0571R5SCF063	.571	.5902	.6250	4.00	3.78	2.95	.104	1.89	W23
4099046	TDM0591R5SCF075	.591	.6295	.7500	4.25	4.03	3.15	.107	1.97	W24
4099047	TDM0630R5SCF075	.630	.6689	.7500	4.50	4.28	3.35	.113	1.97	W25
4099048	TDM0669R5SCF075	.669	.7083	.7500	4.75	4.53	3.54	.121	1.97	W26
4099049	TDM0709R5SCF075	.709	.7476	.7500	5.00	4.78	3.74	.129	1.97	W27
4099050	TDM0748R5SCF075	.748	.7870	.7500	5.25	5.03	3.94	.134	1.97	W28
4099051	TDM0787R5SCF100	.787	.8264	1.0000	5.38	5.16	4.13	.143	2.20	W29
4099052	TDM0827R5SCF100	.827	.8657	1.0000	5.75	5.53	4.33	.151	2.20	W30
4099053	TDM0866R5SCF100	.866	.9051	1.0000	6.00	5.78	4.53	.156	2.20	W31
4099054	TDM0906R5SCF100	.906	.9445	1.0000	6.13	5.91	4.72	.167	2.20	W32
4099055	TDM0945R5SCF100	.945	.9839	1.0000	6.38	6.16	4.92	.173	2.20	W33
4099056	TDM0984R5SCF100	.984	1.0232	1.0000	6.75	6.53	5.12	.178	2.20	W34

Modular Drills

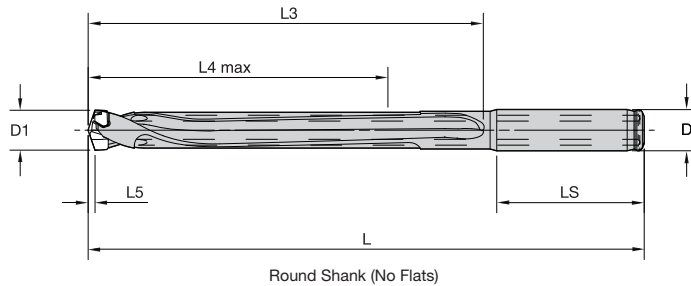
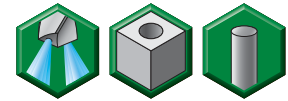
- Tool body shipped with insert wrench.



■ TOP DRILL M1 • 5 x D • Flanged • Metric

order number	catalog number	D1	D1 max	D	L	L1	L3	L4 max	L5	LS	insert blade seat size
3850905	TDM080R5SCF12M	7,94	8,49	12	104	59	53	43	1,5	45	W10
3850907	TDM085R5SCF12M	8,50	8,99	12	107	62	56	45	1,6	45	W11
3850909	TDM090R5SCF12M	9,00	9,49	12	110	65	59	48	1,7	45	W12
3850911	TDM095R5SCF12M	9,50	9,99	12	114	69	63	50	1,8	45	W13
3850923	TDM100R5SCF16M	10,00	10,49	16	120	72	66	53	1,9	48	W14
3850925	TDM105R5SCF16M	10,50	10,99	16	123	75	69	55	2,0	48	W15
3850927	TDM110R5SCF16M	11,00	11,49	16	126	78	72	58	2,1	48	W16
3850929	TDM115R5SCF16M	11,50	11,99	16	129	81	75	60	2,2	48	W17
3850931	TDM120R5SCF16M	12,00	12,49	16	132	84	78	63	2,3	48	W18
3850933	TDM125R5SCF16M	12,50	12,99	16	135	87	81	65	2,4	48	W19
3850935	TDM130R5SCF16M	13,00	13,49	16	138	90	84	68	2,5	48	W20
3850937	TDM135R5SCF16M	13,50	13,99	16	142	94	88	70	2,6	48	W21
3850939	TDM140R5SCF16M	14,00	14,49	16	145	97	91	73	2,7	48	W22
3850941	TDM145R5SCF16M	14,50	14,99	16	148	100	94	75	2,8	48	W23
3850943	TDM150R5SCF20M	15,00	15,99	20	156	106	100	80	2,8	50	W24
3850945	TDM160R5SCF20M	16,00	16,99	20	162	112	106	85	3,0	50	W25
3850947	TDM170R5SCF20M	17,00	17,99	20	169	119	113	90	3,2	50	W26
3850949	TDM180R5SCF25M	18,00	18,99	25	181	125	119	95	3,4	56	W27
3850951	TDM190R5SCF25M	19,00	19,99	25	187	131	125	100	3,6	56	W28
3850953	TDM200R5SCF25M	20,00	20,99	25	193	137	131	105	3,8	56	W29
3992485	TDM210R5SCF25M	21,00	21,99	25	200	144	138	110	3,7	56	W30
3992486	TDM220R5SCF25M	22,00	22,99	25	206	150	144	115	3,9	56	W31
3992487	TDM230R5SCF25M	23,00	23,99	25	212	156	150	120	4,1	56	W32
3992488	TDM240R5SCF25M	24,00	24,99	25	218	162	156	125	4,2	56	W33
3992489	TDM250R5SCF25M	25,00	25,99	25	225	169	163	130	4,4	56	W34

- Tool body shipped with insert wrench.

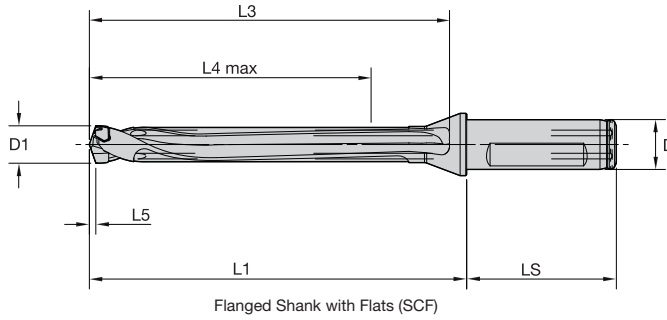
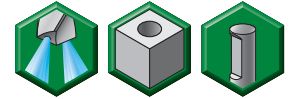


■ TOP DRILL M1 • 8 x D • Straight • Inch

order number	catalog number	D1	D1 max	D	L	L3	L4 max	L5	LS	insert blade seat size
3992536	TDM0313R8SS038	.313	.3343	.3750	4.87	3.17	2.68	.055	1.59	W10
3992537	TDM0335R8SS038	.335	.3539	.3750	5.13	3.42	2.83	.063	1.59	W11
3992538	TDM0354R8SS038	.354	.3736	.3750	5.25	3.55	2.99	.063	1.59	W12
3992539	TDM0374R8SS038	.374	.3933	.3750	5.37	3.67	3.15	.067	1.59	W13
3992540	TDM0374R8SS044	.374	.3933	.4375	5.37	3.59	3.15	.067	1.67	W13
3992541	TDM0394R8SS044	.394	.4130	.4375	5.75	3.96	3.31	.071	1.67	W14
3992542	TDM0413R8SS044	.413	.4327	.4375	6.00	4.21	3.46	.075	1.67	W15
3992543	TDM0433R8SS044	.433	.4524	.4375	6.25	4.46	3.62	.079	1.67	W16
3992544	TDM0453R8SS050	.453	.4720	.5000	6.50	4.56	3.78	.083	1.79	W17
3992545	TDM0472R8SS050	.472	.4917	.5000	6.75	4.84	3.94	.087	1.79	W18
3992546	TDM0492R8SS050	.492	.5114	.5000	7.00	5.08	4.09	.091	1.79	W19
3992547	TDM0492R8SS056	.492	.5114	.5625	7.00	5.08	4.09	.091	1.79	W19
3992548	TDM0512R8SS056	.512	.5311	.5625	7.13	5.22	4.25	.091	1.79	W20
3992549	TDM0532R8SS056	.532	.5508	.5625	7.25	5.34	4.41	.098	1.79	W21
3992550	TDM0551R8SS056	.551	.5705	.5625	7.37	5.47	4.57	.098	1.79	W22
3992551	TDM0571R8SS063	.571	.5902	.6250	7.50	5.47	4.72	.102	1.91	W23
3992552	TDM0591R8SS063	.591	.6295	.6250	7.75	5.72	5.04	.106	1.91	W24
3992553	TDM0630R8SS069	.630	.6689	.6875	8.00	5.97	5.35	.114	1.91	W25
3992554	TDM0669R8SS069	.669	.7083	.6875	8.75	6.72	5.67	.118	1.91	W26
3992555	TDM0709R8SS075	.709	.7476	.7500	9.25	7.13	5.98	.126	2.00	W27
3992556	TDM0748R8SS075	.748	.7870	.7500	9.63	7.51	6.30	.134	2.00	W28
3992557	TDM0787R8SS081	.787	.8264	.8125	10.00	7.88	6.61	.142	2.00	W29
3992558	TDM0827R8SS088	.827	.8657	.8750	10.25	8.06	6.93	.150	2.07	W30
3992559	TDM0866R8SS088	.866	.9051	.8750	10.63	8.44	7.24	.154	2.07	W31
3992560	TDM0906R8SS094	.906	.9445	.9375	11.13	8.86	7.56	.165	2.15	W32
3992561	TDM0945R8SS100	.945	.9839	1.0000	12.25	9.13	7.87	.169	3.00	W33
3992562	TDM0984R8SS100	.984	1.0232	1.0000	12.63	9.51	8.19	.177	3.00	W34



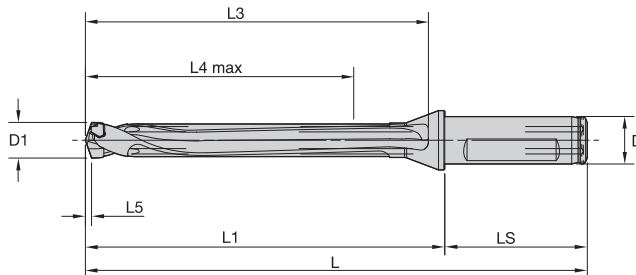
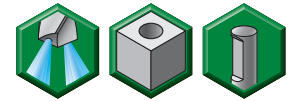
- Tool body shipped with insert wrench.



■ TOP DRILL M1 • 8 x D • Flanged • Inch

order number	catalog number	D1	D1 max	D	L1	L3	L4 max	L5	LS	insert blade seat size
4099057	TDM0313R8SCF050	.313	.3343	.5000	3.38	3.16	2.68	.057	1.77	W10
4099058	TDM0335R8SCF050	.335	.3539	.5000	3.50	3.28	2.83	.062	1.77	W11
4099059	TDM0354R8SCF050	.354	.3736	.5000	3.75	3.53	2.99	.065	1.77	W12
4099060	TDM0374R8SCF050	.374	.3933	.5000	4.00	3.78	3.15	.068	1.77	W13
4099061	TDM0394R8SCF063	.394	.4130	.6250	4.13	3.91	3.31	.072	1.89	W14
4099062	TDM0413R8SCF063	.413	.4327	.6250	4.25	4.03	3.46	.076	1.89	W15
4099063	TDM0433R8SCF063	.433	.4524	.6250	4.50	4.28	3.62	.079	1.89	W16
4099064	TDM0453R8SCF063	.453	.4720	.6250	4.63	4.41	3.78	.082	1.89	W17
4099065	TDM0472R8SCF063	.472	.4917	.6250	4.88	4.66	3.94	.087	1.89	W18
4099066	TDM0492R8SCF063	.492	.5114	.6250	5.00	4.78	4.09	.090	1.89	W19
4099067	TDM0512R8SCF063	.512	.5311	.6250	5.13	4.91	4.25	.093	1.89	W20
4099068	TDM0532R8SCF063	.532	.5508	.6250	5.38	5.16	4.41	.098	1.89	W21
4099069	TDM0551R8SCF063	.551	.5705	.6250	5.63	5.41	4.57	.101	1.89	W22
4099070	TDM0571R8SCF063	.571	.5902	.6250	5.75	5.53	4.72	.104	1.89	W23
4099071	TDM0591R8SCF075	.591	.6295	.7500	6.13	5.91	5.04	.107	1.97	W24
4099072	TDM0630R8SCF075	.630	.6689	.7500	6.50	6.28	5.35	.113	1.97	W25
4099073	TDM0669R8SCF075	.669	.7083	.7500	6.88	6.66	5.67	.121	1.97	W26
4099074	TDM0709R8SCF075	.709	.7476	.7500	7.25	7.03	5.98	.129	1.97	W27
4099075	TDM0748R8SCF075	.748	.7870	.7500	7.50	7.28	6.30	.134	1.97	W28
4099076	TDM0787R8SCF100	.787	.8264	1.0000	7.88	7.66	6.61	.143	2.20	W29
4099077	TDM0827R8SCF100	.827	.8657	1.0000	8.25	8.03	6.93	.151	2.20	W30
4099078	TDM0866R8SCF100	.866	.9051	1.0000	8.63	8.41	7.24	.156	2.20	W31
4099079	TDM0906R8SCF100	.906	.9445	1.0000	9.00	8.78	7.56	.167	2.20	W32
4099080	TDM0945R8SCF100	.945	.9839	1.0000	9.38	9.16	7.87	.173	2.20	W33
4099081	TDM0984R8SCF100	.984	1.0232	1.0000	9.75	9.53	8.19	.178	2.20	W34

- Tool body shipped with insert wrench.



■ TOP DRILL M1 • 8 x D • Flanged • Metric

order number	catalog number	D1	D1 max	D	L	L1	L3	L4 max	L5	LS	insert blade seat size
3992141	TDM080R8SCF12M	7,94	8,49	12	129	84	79	68	1,4	45	W10
3992142	TDM085R8SCF12M	8,50	8,99	12	134	89	83	72	1,5	45	W11
3992213	TDM090R8SCF12M	9,00	9,49	12	138	93	88	76	1,6	45	W12
3992214	TDM095R8SCF12M	9,50	9,99	12	144	99	93	80	1,7	45	W13
3992215	TDM100R8SCF16M	10,00	10,49	16	151	103	98	84	1,8	48	W14
3992216	TDM105R8SCF16M	10,50	10,99	16	156	108	102	88	1,9	48	W15
3992217	TDM110R8SCF16M	11,00	11,49	16	160	112	107	92	2,0	48	W16
3992218	TDM115R8SCF16M	11,50	11,99	16	165	117	111	96	2,1	48	W17
3992219	TDM120R8SCF16M	12,00	12,49	16	169	121	116	100	2,1	48	W18
3992220	TDM125R8SCF16M	12,50	12,99	16	174	126	120	104	2,2	48	W19
3992221	TDM130R8SCF16M	13,00	13,49	16	178	130	125	108	2,3	48	W20
3992222	TDM135R8SCF16M	13,50	13,99	16	184	136	130	112	2,4	48	W21
3992223	TDM140R8SCF16M	14,00	14,49	16	188	140	135	116	2,5	48	W22
3992224	TDM145R8SCF16M	14,50	14,99	16	193	145	139	120	2,6	48	W23
3992225	TDM150R8SCF20M	15,00	15,99	20	204	154	148	128	2,7	50	W24
3992226	TDM160R8SCF20M	16,00	16,99	20	213	163	157	136	2,8	50	W25
3992227	TDM170R8SCF20M	17,00	17,99	20	223	173	167	144	3,0	50	W26
3992228	TDM180R8SCF25M	18,00	18,99	25	238	182	176	152	3,2	56	W27
3992229	TDM190R8SCF25M	19,00	19,99	25	247	191	185	160	3,4	56	W28
3992230	TDM200R8SCF25M	20,00	20,99	25	256	200	194	168	3,6	56	W29
3992231	TDM210R8SCF25M	21,00	21,99	25	266	210	204	176	3,7	56	W30
3992232	TDM220R8SCF25M	22,00	22,99	25	275	219	213	184	3,9	56	W31
3992233	TDM230R8SCF25M	23,00	23,99	25	284	228	222	192	4,1	56	W32
3992234	TDM240R8SCF25M	24,00	24,99	25	293	237	231	200	4,2	56	W33
3992235	TDM250R8SCF25M	25,00	25,99	25	303	247	241	208	4,4	56	W34

# ToolBOSS™

## ToolBOSS Vending Solutions

ToolBOSS vending solutions help to reduce costs and improve efficiencies to give you a competitive edge.

- Cut tooling inventory by 50% or more.
- Decrease spending on tooling by up to 30%.
- Reduce administrative costs by as much as 90%.

## Customer Offering

### Shared Rewards

Free use of ToolBOSS vending machine combined with a comprehensive maintenance and service package based on agreed sales targets for specified contract terms.

### Direct Purchase of Equipment

ToolBOSS vending machines are available for purchase. Maintenance and service packages available with annual agreements.

For more information, please contact us at:

Tel: 888 281 8080

[na-help.desk@toolboss.com](mailto:na-help.desk@toolboss.com)

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You can also use our NOVO app to guide you to the correct choice!

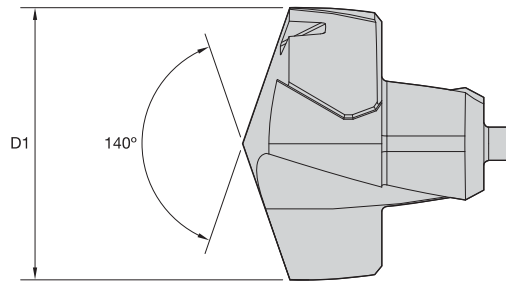
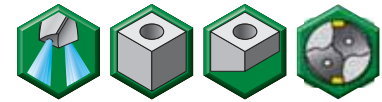
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TOP DRILL M1 • UP(M)

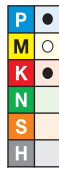
P	●
M	○
K	●
N	○
S	○
H	○

● first choice  
○ alternate choice

grade WU25PD TiAlN		D1		seat size/series
order #	catalog #	mm	in	
3850959	TDM0794UPM	7,94	.313	W10
3848984	TDM0800UPM	8,00	.315	W10
3848985	TDM0810UPM	8,10	.319	W10
3850960	TDM0816UPM	8,16	.321	W10
3850961	TDM0820UPM	8,20	.323	W10
3848986	TDM0830UPM	8,30	.327	W10
3850962	TDM0833UPM	8,33	.328	W10
3848987	TDM0840UPM	8,40	.331	W10
3850963	TDM0843UPM	8,43	.332	W10
3848988	TDM0850UPM	8,50	.335	W11
3848989	TDM0860UPM	8,60	.339	W11
3850964	TDM0861UPM	8,61	.339	W11
3848990	TDM0870UPM	8,70	.343	W11
3850965	TDM0873UPM	8,73	.344	W11
3848991	TDM0880UPM	8,80	.347	W11
3850966	TDM0884UPM	8,84	.348	W11
3848992	TDM0890UPM	8,90	.350	W11
3849043	TDM0900UPM	9,00	.354	W12
3850967	TDM0909UPM	9,09	.358	W12
3849044	TDM0910UPM	9,10	.358	W12
3850968	TDM0913UPM	9,13	.359	W12
3849045	TDM0920UPM	9,20	.362	W12
3849046	TDM0930UPM	9,30	.366	W12
3850969	TDM0935UPM	9,35	.368	W12

(continued)

(TOP DRILL M1 • UP(M) – continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1		
order #	catalog #	mm	in	seat size/series
3849047	TDM0940UPM	9,40	.370	W12
3849048	TDM0950UPM	9,50	.374	W13
3850970	TDM0953UPM	9,53	.375	W13
3850971	TDM0956UPM	9,56	.376	W13
3850972	TDM0958UPM	9,58	.377	W13
3849049	TDM0960UPM	9,60	.378	W13
3850973	TDM0970UPM	9,70	.382	W13
3850974	TDM0980UPM	9,80	.386	W13
3849050	TDM0990UPM	9,90	.390	W13
3850975	TDM0992UPM	9,92	.391	W13
3849051	TDM1000UPM	10,00	.394	W14
3850976	TDM1002UPM	10,02	.395	W14
3850977	TDM1008UPM	10,08	.397	W14
3849052	TDM1010UPM	10,10	.398	W14
3849053	TDM1020UPM	10,20	.402	W14
3850978	TDM1026UPM	10,26	.404	W14
3849054	TDM1030UPM	10,30	.406	W14
3850979	TDM1032UPM	10,32	.406	W14
3849055	TDM1040UPM	10,40	.409	W14
3850980	TDM1049UPM	10,49	.413	W14
3849056	TDM1050UPM	10,50	.413	W15
3849057	TDM1060UPM	10,60	.417	W15
3849058	TDM1070UPM	10,70	.421	W15
3850981	TDM1072UPM	10,72	.422	W15
3849059	TDM1080UPM	10,80	.425	W15
3849060	TDM1090UPM	10,90	.429	W15
3849061	TDM1100UPM	11,00	.433	W16
3849062	TDM1110UPM	11,10	.437	W16
3850982	TDM1111UPM	11,11	.438	W16
3849063	TDM1120UPM	11,20	.441	W16
3849064	TDM1130UPM	11,30	.445	W16
3849065	TDM1140UPM	11,40	.449	W16
3849066	TDM1150UPM	11,50	.453	W17
3850983	TDM1151UPM	11,51	.453	W17
3849067	TDM1160UPM	11,60	.457	W17
3850984	TDM1161UPM	11,61	.457	W17
3849068	TDM1170UPM	11,70	.461	W17
3849069	TDM1180UPM	11,80	.465	W17
3849070	TDM1190UPM	11,90	.469	W17
3850985	TDM1191UPM	11,91	.469	W17

(continued)

(TOP DRILL M1 • UP(M) – continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1		
order #	catalog #	mm	in	seat size/series
3849071	TDM1200UPM	12,00	.473	W18
3849072	TDM1210UPM	12,10	.476	W18
3849073	TDM1220UPM	12,20	.480	W18
3850986	TDM1230UPM	12,30	.484	W18
3849074	TDM1240UPM	12,40	.488	W18
3850987	TDM1247UPM	12,47	.491	W18
3849075	TDM1250UPM	12,50	.492	W19
3849076	TDM1260UPM	12,60	.496	W19
3850988	TDM1270UPM	12,70	.500	W19
3849077	TDM1280UPM	12,80	.504	W19
3850989	TDM1290UPM	12,90	.508	W19
3849078	TDM1300UPM	13,00	.512	W20
3850990	TDM1310UPM	13,10	.516	W20
3849079	TDM1320UPM	13,20	.520	W20
3849080	TDM1330UPM	13,30	.524	W20
3849081	TDM1340UPM	13,40	.528	W20
3850991	TDM1349UPM	13,49	.531	W20
3849082	TDM1350UPM	13,50	.532	W21
3849083	TDM1360UPM	13,60	.535	W21
3849084	TDM1370UPM	13,70	.539	W21
3849085	TDM1380UPM	13,80	.543	W21
3850992	TDM1389UPM	13,89	.547	W21
3850993	TDM1390UPM	13,90	.547	W21
3849086	TDM1400UPM	14,00	.551	W22
3849087	TDM1410UPM	14,10	.555	W22
3849088	TDM1420UPM	14,20	.559	W22
3850994	TDM1429UPM	14,29	.563	W22
3849089	TDM1430UPM	14,30	.563	W22
3849090	TDM1440UPM	14,40	.567	W22
3849091	TDM1450UPM	14,50	.571	W23
3849092	TDM1460UPM	14,60	.575	W23
3850995	TDM1467UPM	14,67	.577	W23
3850996	TDM1468UPM	14,68	.578	W23
3849093	TDM1470UPM	14,70	.579	W23
3849094	TDM1480UPM	14,80	.583	W23
3849095	TDM1490UPM	14,90	.587	W23
3849096	TDM1500UPM	15,00	.591	W24
3850997	TDM1508UPM	15,08	.594	W24
3849097	TDM1510UPM	15,10	.595	W24
3849098	TDM1520UPM	15,20	.598	W24

(continued)

(TOP DRILL M1 • UP(M) – continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1		
order #	catalog #	mm	in	seat size/series
3849099	TDM1530UPM	15,30	.602	W24
3849100	TDM1540UPM	15,40	.606	W24
3850998	TDM1548UPM	15,48	.609	W24
3849101	TDM1550UPM	15,50	.610	W24
3849102	TDM1560UPM	15,60	.614	W24
3849103	TDM1570UPM	15,70	.618	W24
3849104	TDM1580UPM	15,80	.622	W24
3850999	TDM1588UPM	15,88	.625	W24
3849105	TDM1600UPM	16,00	.630	W25
3851000	TDM1603UPM	16,03	.631	W25
3851001	TDM1608UPM	16,08	.633	W25
3849106	TDM1610UPM	16,10	.634	W25
4010625	TDM1618UPM	16,18	.637	W25
3849107	TDM1620UPM	16,20	.638	W25
3851002	TDM1627UPM	16,27	.641	W25
3849108	TDM1630UPM	16,30	.642	W25
3849109	TDM1640UPM	16,40	.646	W25
3849110	TDM1650UPM	16,50	.650	W25
3849111	TDM1660UPM	16,60	.654	W25
3851003	TDM1667UPM	16,67	.656	W25
3849112	TDM1670UPM	16,70	.658	W25
3849113	TDM1680UPM	16,80	.661	W25
3851004	TDM1687UPM	16,87	.664	W25
3849114	TDM1690UPM	16,90	.665	W25
3849119	TDM1700UPM	17,00	.669	W26
3851005	TDM1707UPM	17,07	.672	W26
3849120	TDM1710UPM	17,10	.673	W26
3849121	TDM1720UPM	17,20	.677	W26
3849122	TDM1730UPM	17,30	.681	W26
3849193	TDM1740UPM	17,40	.685	W26
3851006	TDM1746UPM	17,46	.688	W26
3849194	TDM1750UPM	17,50	.689	W26
3849195	TDM1760UPM	17,60	.693	W26
3849196	TDM1770UPM	17,70	.697	W26
3849197	TDM1780UPM	17,80	.701	W26
3851007	TDM1786UPM	17,86	.703	W26
3849198	TDM1790UPM	17,90	.705	W26
3849199	TDM1800UPM	18,00	.709	W27
3849200	TDM1810UPM	18,10	.713	W27
3849201	TDM1820UPM	18,20	.717	W27

(continued)

(TOP DRILL M1 • UP(M) – continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1		
order #	catalog #	mm	in	seat size/series
3851008	TDM1826UPM	18,26	.719	W27
3849202	TDM1830UPM	18,30	.721	W27
3849203	TDM1840UPM	18,40	.724	W27
3849204	TDM1850UPM	18,50	.728	W27
3849205	TDM1860UPM	18,60	.732	W27
3851009	TDM1865UPM	18,65	.734	W27
3849206	TDM1870UPM	18,70	.736	W27
3849207	TDM1880UPM	18,80	.740	W27
3849208	TDM1890UPM	18,90	.744	W27
3849209	TDM1900UPM	19,00	.748	W28
3851010	TDM1905UPM	19,05	.750	W28
3849210	TDM1910UPM	19,10	.752	W28
3849211	TDM1920UPM	19,20	.756	W28
3851011	TDM1923UPM	19,23	.757	W28
3851012	TDM1925UPM	19,25	.758	W28
3851013	TDM1928UPM	19,28	.759	W28
3849212	TDM1930UPM	19,30	.760	W28
3851014	TDM1935UPM	19,35	.762	W28
3849213	TDM1940UPM	19,40	.764	W28
3851015	TDM1945UPM	19,45	.766	W28
3849214	TDM1950UPM	19,50	.768	W28
3849215	TDM1960UPM	19,60	.772	W28
3849216	TDM1970UPM	19,70	.776	W28
3849217	TDM1980UPM	19,80	.780	W28
3851016	TDM1984UPM	19,84	.781	W28
3849218	TDM1990UPM	19,90	.784	W28
3849219	TDM2000UPM	20,00	.788	W29
3849220	TDM2010UPM	20,10	.791	W29
3849221	TDM2020UPM	20,20	.795	W29
3851017	TDM2024UPM	20,24	.797	W29
3849222	TDM2030UPM	20,30	.799	W29
3849223	TDM2040UPM	20,40	.803	W29
3849224	TDM2050UPM	20,50	.807	W29
3849225	TDM2060UPM	20,60	.811	W29
3851018	TDM2064UPM	20,64	.813	W29
3849226	TDM2070UPM	20,70	.815	W29
3849227	TDM2080UPM	20,80	.819	W29
3849228	TDM2090UPM	20,90	.823	W29
3849229	TDM2099UPM	20,99	.826	W29
4003225	TDM2100UPM	21,00	.827	W30

(continued)



(TOP DRILL M1 • UP(M) – continued)



● first choice  
○ alternate choice

grade WU25PD TiAlN		D1			
order #	catalog #	mm	in	seat size/series	
4003203	TDM2144UPM	21,44	.844	W30	
3969291	TDM2150UPM	21,50	.846	W30	
4003226	TDM2200UPM	22,00	.866	W31	
4003204	TDM2223UPM	22,23	.875	W31	
4003205	TDM2245UPM	22,45	.884	W31	
4003227	TDM2250UPM	22,50	.887	W31	
4003228	TDM2300UPM	23,00	.906	W32	
4003229	TDM2350UPM	23,50	.925	W32	
4003206	TDM2381UPM	23,81	.938	W32	
4003230	TDM2400UPM	24,00	.945	W33	
4003231	TDM2450UPM	24,50	.965	W33	
4003207	TDM2461UPM	24,61	.969	W33	
4003232	TDM2500UPM	25,00	.984	W34	
4003208	TDM2540UPM	25,40	1.000	W34	
4002444	TDM2550UPM	25,50	1.004	W34	
4003209	TDM2568UPM	25,68	1.011	W34	
4003210	TDM2581UPM	25,81	1.016	W34	
3992013	TDM2599UPM	25,99	1.023	W34	

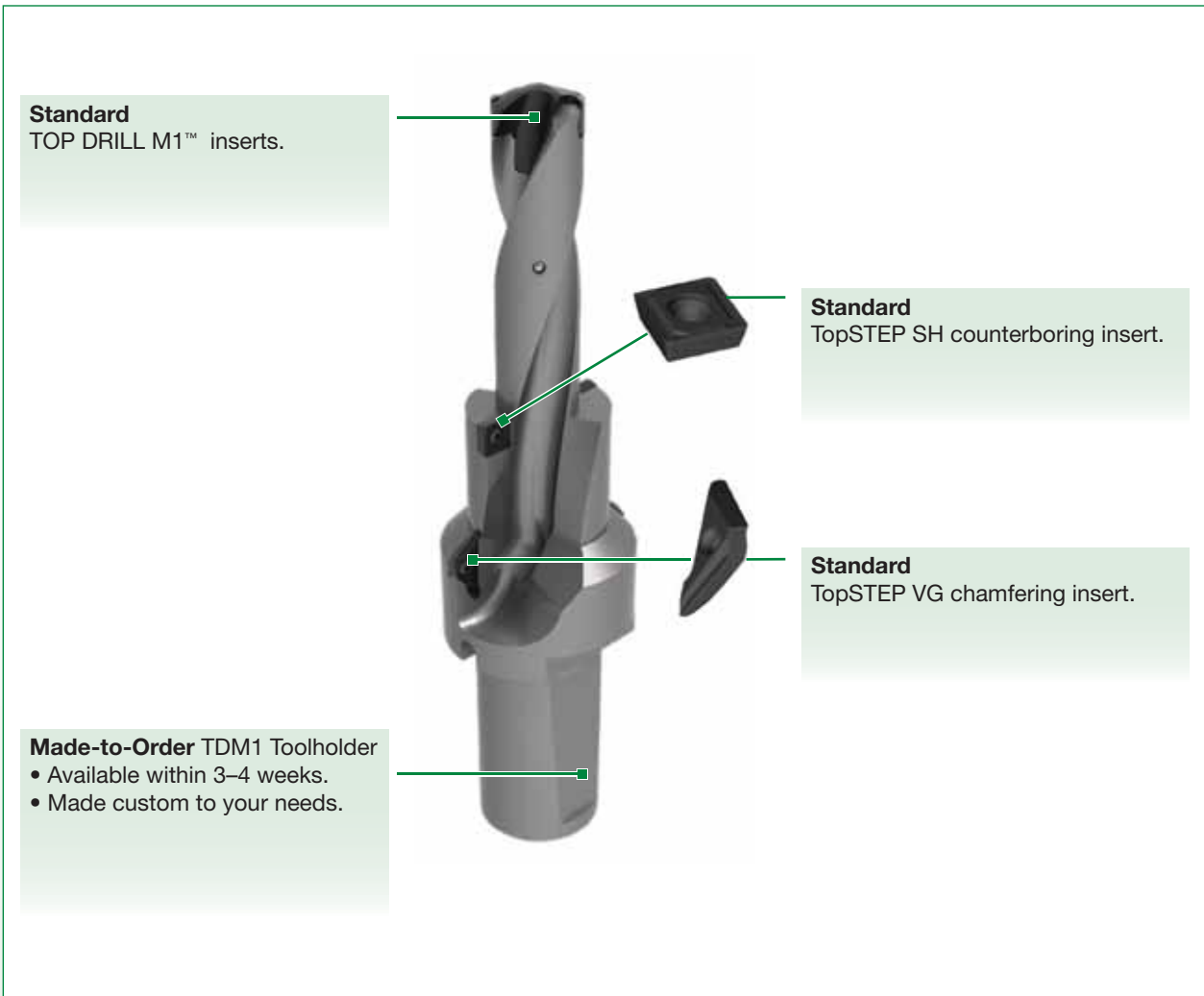
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D1	tolerance k8	D1	tolerance k8
.3125-.3906	.000/+0.0009	8-10	0,000/+0,022
>.3906-.6250	.000/+0.0011	>10-17	0,000/+0,027
>.6692-.7090	.000/+0.0010	>17-18	0,000/+0,027
>.7090-.8228	.000/+0.0013	>18-21	0,000/+0,033

Modular Drills

### Modular TOP DRILL M1 Step Drill

Provides high productivity through high-feed, one-shot operations, and excellent tool life.

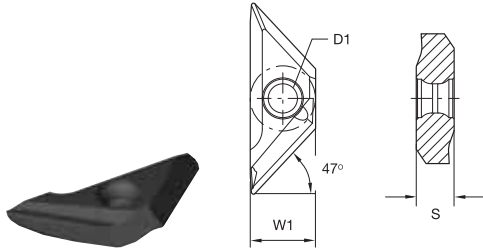
- Use TopSTEP VG and SH chamfer and counterboring inserts to create your specific TDM1 modular step drill.
- Create complex holes with countersinks, chamfers, or even both operations in one shot.
- Save time, achieve better cost, and run your complex drilling process with higher stability.



Let your WIDIA™ representative know about your specific needs. Use the Chamfer and Counterboring Order Planning pages to create and send us your request – available online as well.

TopSTEP VG Chamfering Inserts

- 45° chamfer angle with broad cutting edge.
- Hassle-free usage.
- Very stable and accurate positioning in pocket.
- Two times indexable.
- One universal insert size for a lot of applications.



● first choice  
○ alternate choice

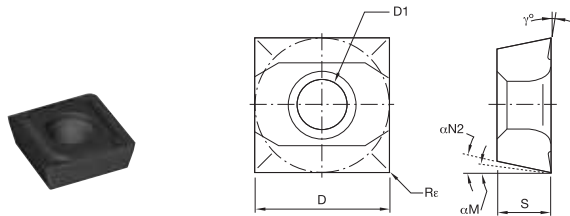
P	●
M	○
K	●
N	○
S	○
H	

■ TopSTEP VG Chamfering Inserts

catalog number	W1		D1		S		WP20PH
	mm	in	mm	in	mm	in	
VXGX10030234	6,35	.250	2,85	.112	3,48	.137	5983706

TopSTEP SH Counterboring Inserts

- 90° insert can be positioned in alternative angles.
- Very good chip forming and surface quality.
- Two times indexable.
- Stocked standards in six insert sizes.



● first choice  
○ alternate choice

P	●
M	○
K	○
N	○
S	○
H	

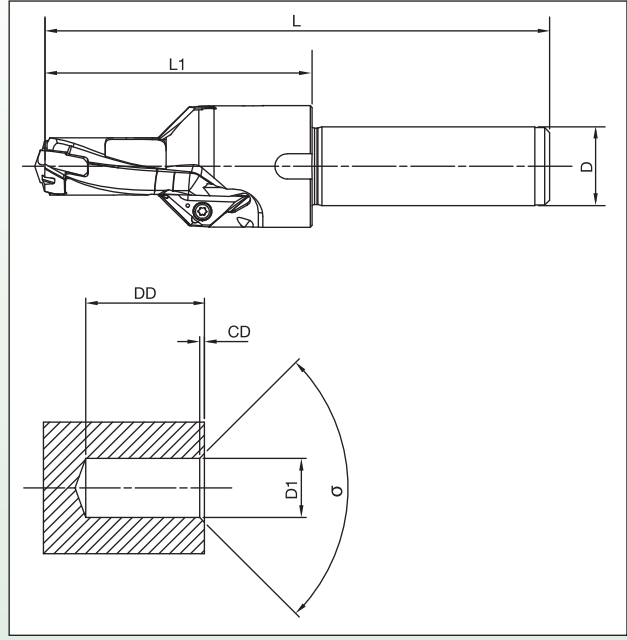
■ TopSTEP SH Counterboring Inserts

catalog number	D		D1		S		Rε		αN	αN M	WP20PH
	mm	in	mm	in	mm	in	mm	in			
SXHX060204R20	6,35	.250	2,85	.112	2,38	.094	0,40	.016	11	7	5983390
SXHX070304R20	6,35	.250	2,85	.112	2,38	.094	0,40	.016	11	7	5983702
SXHX060208R20	6,35	.250	2,85	.112	2,38	.094	0,80	.031	11	7	5983701
SXHX070308R20	6,35	.250	2,85	.112	2,38	.094	0,80	.031	11	7	5983703
SXHX090304R20	9,52	.375	3,50	.138	3,18	.125	0,40	.016	11	7	5983704
SXHX090308R20	9,52	.375	3,50	.138	3,18	.125	0,80	.031	11	7	5983705

Please utilize guide below to plan your TOP DRILL M1™ modular step drill based on your needs and requirements. Please contact your distributor for a quote.

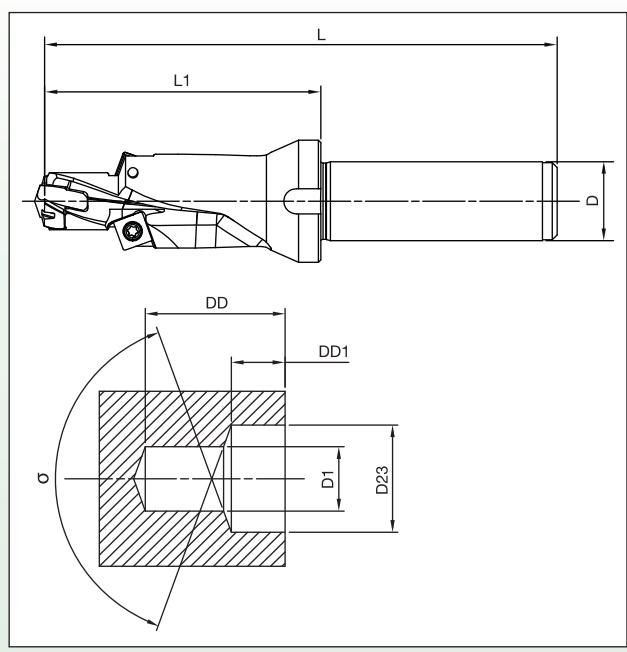
**Option 1 TOP DRILL M1 Drilling and Chamfering**

Overall Length	[L]	<input type="text"/>
Drill Length	[L1]	<input type="text"/>
Shank Diameter	[D]	<input type="text"/>
Drill Diameter Min	[D1]	<input type="text"/>
Drilling Depth	[DD]	<input type="text"/>
Cutting Diameter 2 Angle	$\sigma$	<input type="text"/>
Chamfering Depth	[CD]	<input type="text"/>



**Option 2 TOP DRILL M1 Drilling and Countersinking**

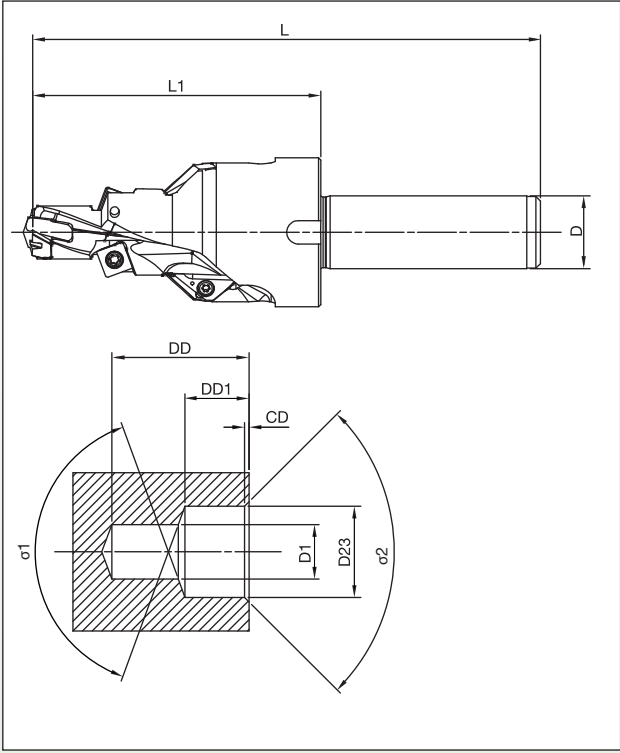
Overall Length	[L]	<input type="text"/>
Drill Length	[L1]	<input type="text"/>
Shank Diameter	[D]	<input type="text"/>
Drill Diameter Min	[D1]	<input type="text"/>
Drilling Depth	[DD]	<input type="text"/>
Cut Diameter 23	[D23]	<input type="text"/>
Countersinking Depth	[DD1]	<input type="text"/>
Cutting Diameter 2 Angle	$\sigma$	<input type="text"/>



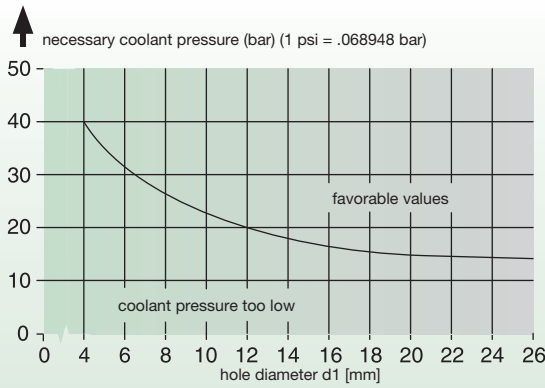
Please utilize guide below to plan your TOP DRILL M1™ modular step drill based on your needs and requirements. Please contact your distributor for a quote.

**Option 3 TOP DRILL M1 Drilling and Countersinking and Chamfering**

Overall Length	[L]	<input type="text"/>
Drill Length	[L1]	<input type="text"/>
Shank Diameter	[D]	<input type="text"/>
Drill Diameter Min	[D1]	<input type="text"/>
Drilling Depth	[DD]	<input type="text"/>
Cut Diameter 23	[D23]	<input type="text"/>
Countersinking Depth	[DD1]	<input type="text"/>
Cutting Diameter 2 Angle	$\sigma 1$	<input type="text"/>
Cutting Diameter 3 Angle	$\sigma 2$	<input type="text"/>
Chamfering depth	[CD]	<input type="text"/>



If a more complex tool is required, we need your individual information to serve your specific needs. Please contact your WIDIA™ distributor for further guidance.



**Coolant Pressure**

The diagram at left shows the coolant pressure as a function of the hole diameter. The higher the coolant pressure, the better the drilling result. Tool life and hole quality improve with increased coolant flow.

**Drilling on Inclined Surfaces**

When drilling on inclined or curved surfaces, use a 50% lower feed than the standard value. After the drill margins are fully engaged in the workpiece, increase the feed to the standard value (100%). Premachining is required on surfaces with inclination greater than 3°.

■ TOP DRILL M1 • UP(M) • WU25PD™ • Speed and Feed Chart • Metric

Material Group		Cutting Speed – vc Range – m/min			Recommended Feed Rate							
		min	Starting Value	max	Tool Diameter (mm)	8,0	10,0	12,0	14,0	16,0	20,0	25,0
		P	1	90	125	170	mm/r	0,11–0,20	0,13–0,25	0,14–0,31	0,17–0,39	0,19–0,45
2	105		140	180	mm/r	0,11–0,28	0,12–0,35	0,16–0,37	0,21–0,46	0,23–0,46	0,28–0,50	0,30–0,52
3	50		75	100	mm/r	0,11–0,28	0,12–0,35	0,16–0,37	0,21–0,46	0,23–0,46	0,28–0,50	0,30–0,52
4	50		75	100	mm/r	0,11–0,28	0,12–0,35	0,16–0,37	0,17–0,36	0,19–0,45	0,22–0,48	0,25–0,50
5	50		65	80	mm/r	0,10–0,20	0,10–0,23	0,10–0,25	0,14–0,29	0,16–0,32	0,18–0,36	0,22–0,42
6	50		65	80	mm/r	0,10–0,20	0,10–0,23	0,10–0,25	0,14–0,29	0,16–0,32	0,18–0,36	0,22–0,42
M	1	40	80	110	mm/r	0,06–0,22	0,08–0,23	0,09–0,24	0,10–0,25	0,11–0,26	0,13–0,28	0,13–0,32
	2	35	55	75	mm/r	0,06–0,22	0,08–0,23	0,09–0,24	0,10–0,25	0,11–0,26	0,13–0,28	0,13–0,32
	3	20	35	50	mm/r	0,06–0,22	0,08–0,23	0,09–0,24	0,10–0,25	0,11–0,26	0,13–0,28	0,13–0,32
K	1	60	95	170	mm/r	0,15–0,29	0,16–0,32	0,17–0,35	0,21–0,42	0,25–0,48	0,28–0,52	0,32–0,56
	2	60	75	90	mm/r	0,15–0,29	0,16–0,30	0,17–0,33	0,21–0,41	0,25–0,48	0,28–0,52	0,32–0,56
	3	40	65	90	mm/r	0,16–0,30	0,17–0,33	0,18–0,36	0,20–0,41	0,21–0,44	0,23–0,48	0,25–0,50

NOTE: Through coolant recommended for greater than 3 x D applications.

■ TOP DRILL M1 • UP(M) • WU25PD • Speed and Feed Chart • Inch

Material Group		Cutting Speed – vc Range – SFM			Recommended Feed Rate							
		min	Starting Value	max	Tool Diameter (inch)	.315	.394	.472	.551	.630	.787	1.000
		P	1	262	410	558	IPR	.004–.008	.005–.010	.006–.012	.007–.015	.007–.018
2	345		459	591	IPR	.004–.011	.005–.014	.006–.015	.008–.018	.009–.018	.011–.020	.012–.020
3	164		246	328	IPR	.004–.011	.005–.014	.006–.015	.008–.018	.009–.018	.011–.020	.012–.020
4	164		246	328	IPR	.004–.011	.005–.014	.006–.015	.007–.018	.007–.018	.009–.019	.010–.020
5	160		210	260	IPR	.004–.008	.004–.009	.004–.010	.006–.011	.006–.013	.007–.014	.009–.017
6	160		210	260	IPR	.004–.008	.004–.009	.004–.010	.006–.011	.006–.013	.007–.014	.009–.017
M	1	130	260	360	IPR	.002–.009	.003–.009	.004–.010	.004–.010	.004–.010	.005–.012	.006–.013
	2	110	180	250	IPR	.002–.009	.003–.009	.004–.010	.004–.010	.004–.010	.005–.012	.006–.013
	3	70	110	160	IPR	.002–.009	.003–.009	.004–.010	.004–.010	.004–.010	.005–.012	.006–.013
K	1	197	312	558	IPR	.006–.011	.006–.013	.007–.014	.008–.017	.010–.019	.011–.020	.013–.022
	2	197	246	295	IPR	.006–.011	.006–.012	.007–.013	.008–.016	.010–.019	.011–.020	.013–.022
	3	131	213	295	IPR	.006–.012	.007–.013	.007–.014	.008–.016	.008–.017	.009–.019	.010–.020

NOTE: Through coolant recommended for greater than 3 x D applications.

**How to attach inserts**



1) Fix drill holder on arbor. For insert exchange, fix arbor on the machine or set on tool presetter.



2) Remove dust using air blast.



3) Put insert into drill holder. (Use gloves to protect your hands.)



4) Turn lightly in a clockwise direction. (Use gloves to protect your hands.)



5) Set the wrench properly.\*



6) Make sure the wrench fits with the insert slot for the wrench. (Is the wrench unfixated from the slot?)



7) Slowly turn the wrench in a clockwise direction.



8) Complete.

**How to detach inserts**



1) Remove dust from insert using air blast.



2) Set the wrench properly.\*



3) Fit the wrench to insert slot.



4) Turn the wrench in a counterclockwise direction.



5) Once lock is released, insert can be turned with fingers. (Use gloves to protect your hands.)



6) Remove insert. (Use gloves to protect your hands.)

*\*To order the TDM1 Wrench, please use order number 3861623 and catalog number 170.315.*

**Cautions**

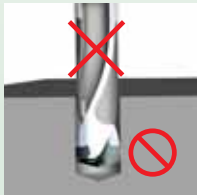
**Coolant**



1) Internal coolant is recommended.



2) In case of external coolant, cutting depth must be 3 x D or less.

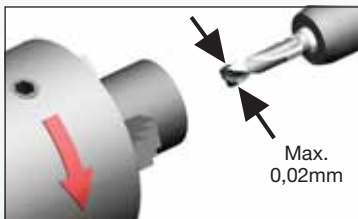


3) Dry cutting is not recommended. Limited applicability in cast iron materials, MQL strongly recommended.

**Usage Precautions**

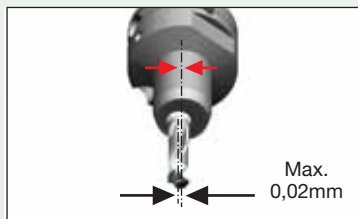
**Core deviation**

1) For Turning Machines



Set deviation amount under 0,02mm between workpiece and drill.

2) For Machining Centers

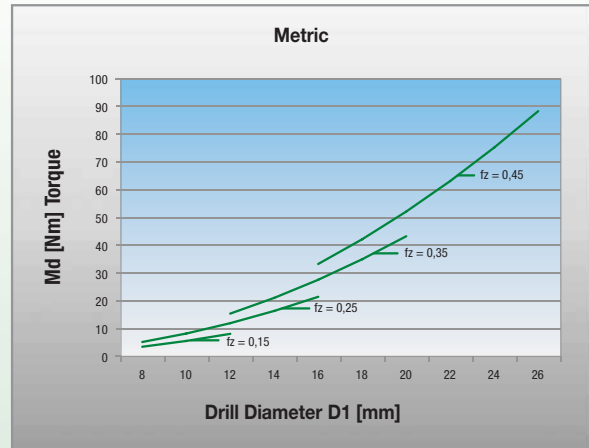
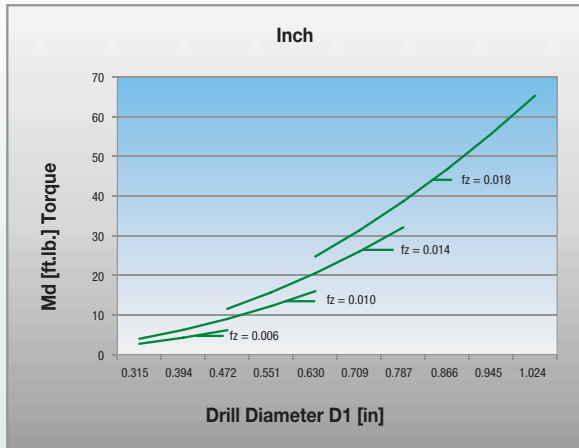


Do not use any arbor with a damaged attachment surface. Center of arbor deviation must be within 0,02mm.

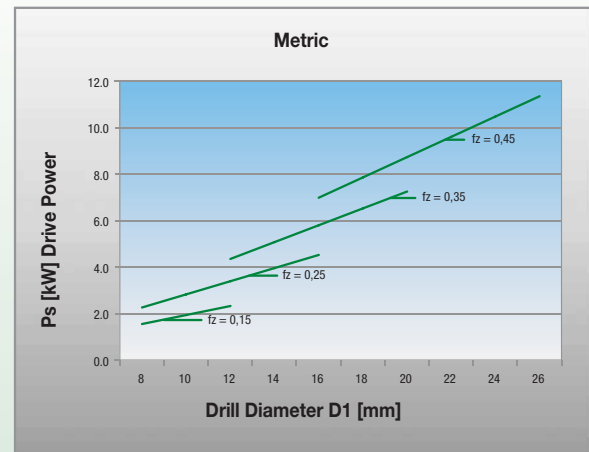
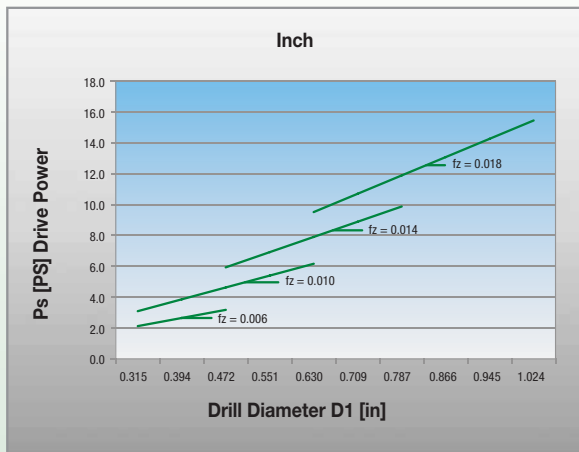
Application Recommendation	Workpiece Shape
Flat Face <b>Recommended</b>	
Stacked Plates <b>Recommended</b>	
Inclined Surface >3° <b>Not Recommended</b>	
Half Cylindrical <b>Not Recommended</b>	
Hole Expansion <b>Not Recommended</b>	
Concave Surface <b>Not Recommended</b>	
Pipe Material <b>Not Recommended</b>	
Cored Hole <b>Not Recommended</b>	



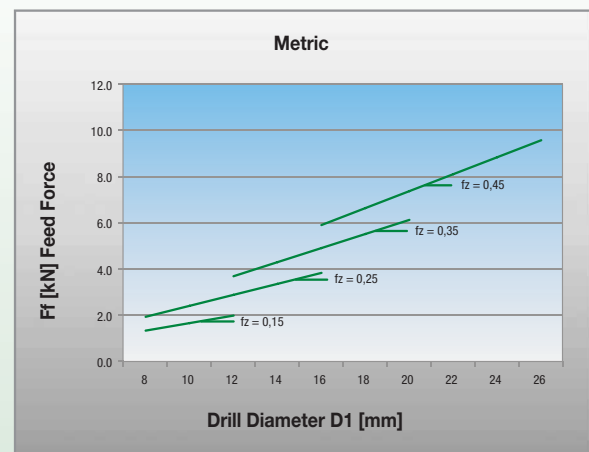
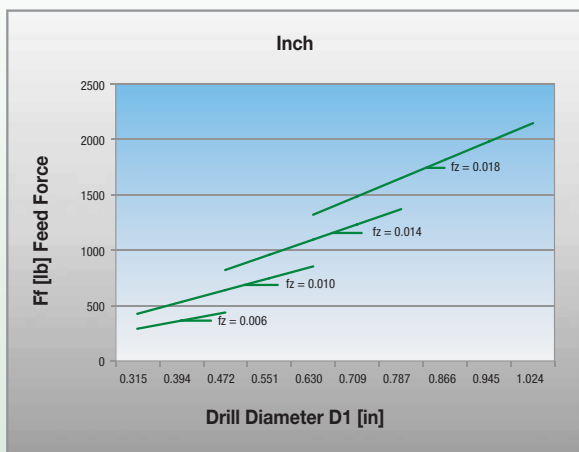
■ Torque



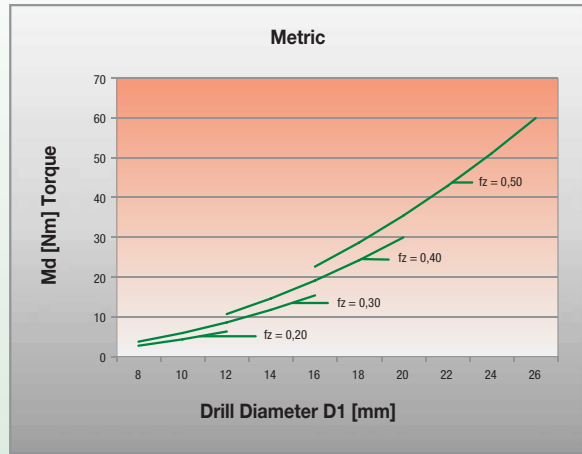
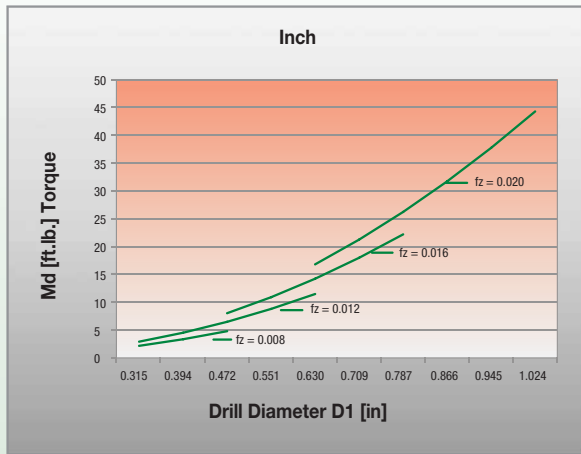
■ Power



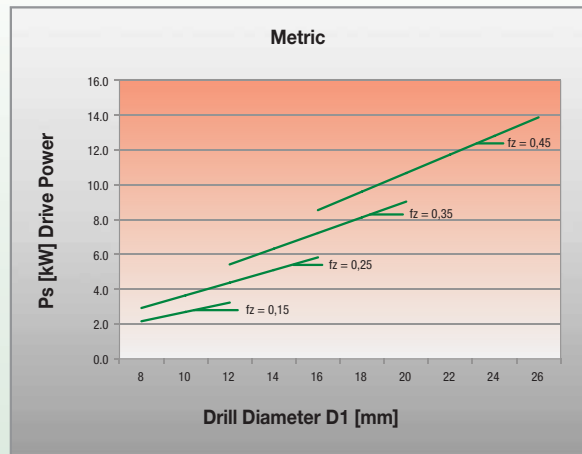
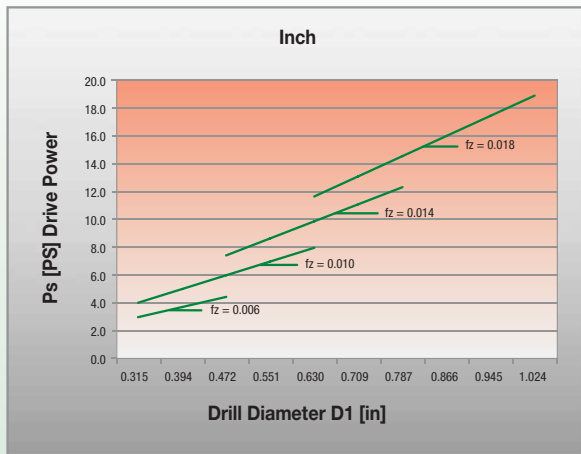
■ Feed Force



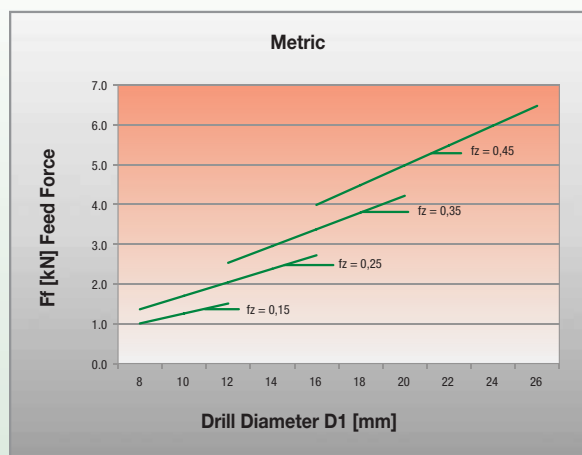
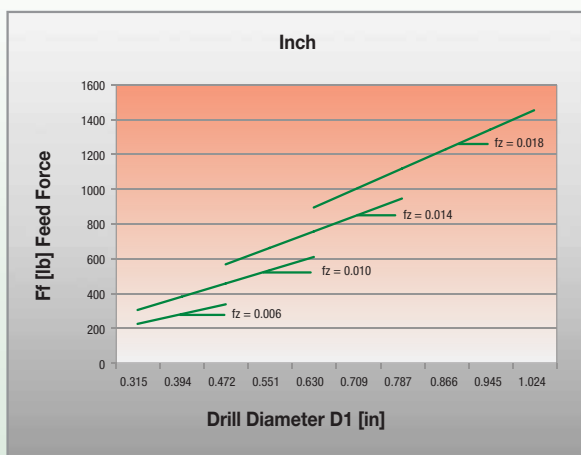
■ Torque



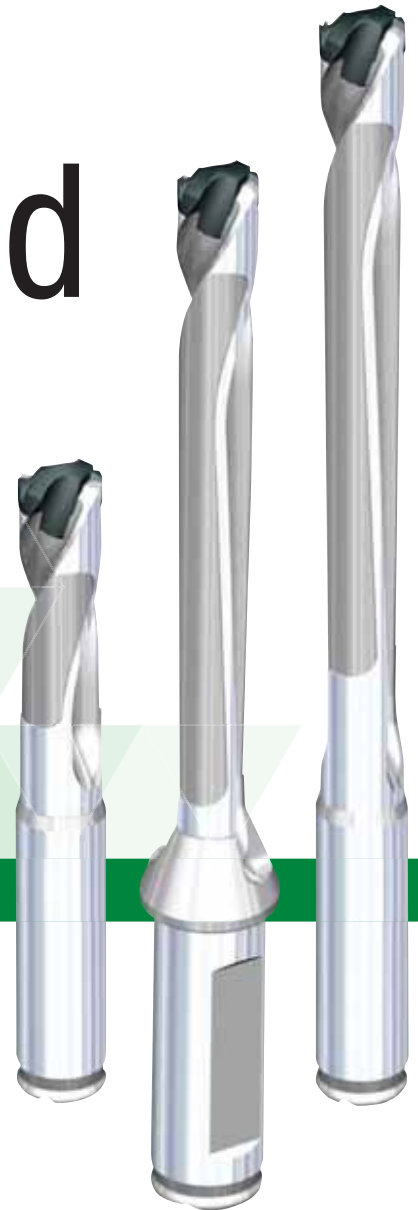
■ Power



■ Feed Force



# Cut Time and Costs, Not Quality and Performance



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## TOP DRILL M1™

The TDM1 modular drill system offers performance levels and Metal Removal Rates (MRR) comparable to that of solid carbide drills. The unique front clamping system enables inserts to be changed quickly, even inside the machine tool, saving setup time and manufacturing costs.

- UP(M) drill point design in WU25PD™.
- Diameter ranges from .3159–1.023" (8–25.99mm) in L/D ratios of 3, 5, and 8 x D.
- Disposable — eliminates number of tools waiting for reconditioning, avoiding hidden costs.
- All intermediate diameters available as semi-standards. Multiple step drills available as customized solutions. New TopSTEP range of inserts offer extended chamfering and counterboring.

To learn more about the benefits of **WIDIA™ TOP DRILL M1**, contact your local distributor.

**WIDIA** 

## WIDIA-Metcut™ Spade Blades •

A complement to TOP DRILL M1™

# Spade Blades

WIDIA™ provides a comprehensive line of spade blades from .315–4.5" (8–114mm) to cover a wide range of machining environments and materials.

- Fast penetration rates, less downtime, and lower variability.
- Interchangeable with other conventional spade blade holders.
- Improved surface finish — eliminates subsequent hole finishing operations.
- Standard and special drill body/holder offering, including step drill and porting tool configurations.
- Intermediate diameters and specific toolholder length quickly available upon request.

### WIDIA-Metcut spade blades are great choices for:

- Universal application for most plain and alloyed steel applications as well as for cast iron and stainless steels.
- Machining environments where rigidity, coolant supply, or speed and feed rates are limiting factors.
- Short run manufacturing and prototyping environments.
- Especially when dealing with larger diameters and deeper holes.



## Application Information

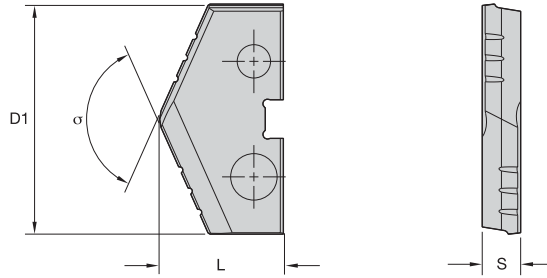
T-15 HSS spade blades are recommended:

- For providing straighter and more consistent holes with superior surface finishes than can be produced using either HSS twist drills or carbide indexable drills.
- When rigidity of the machine or the fixture requires a more forgiving, durable, and tougher tool; T-15 steel possesses a higher transverse rupture strength and is more impact-resistant than comparable carbide spade blades and/or carbide indexable drills.
- In applications requiring hole depths up through 15x to 20x diameter; pecking may be required for depths above 7x diameter for some materials.
- As a cost-effective alternative to carbide indexable drills since T-15 steel spade blades operate at comparable penetration rates to single-effective indexable drills in materials <35 Rc, and one spade blade holder accommodates multiple diameter blades.



## Spade Blade Holders

Generally can accommodate a range of blade sizes up to 1.30–1.35 times the smallest blade size. It is therefore possible to cover the entire range of hole sizes with just a few spade drill holders. Contrast this with the inventories required for indexable drills and steel taper shank drills.



■ Seat Size Z

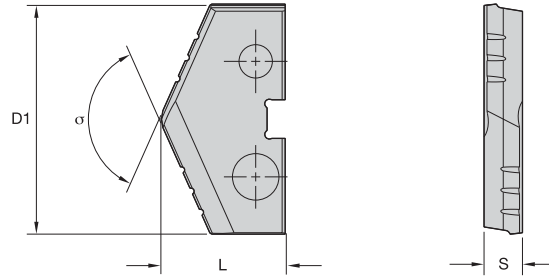


● first choice  
○ alternate choice

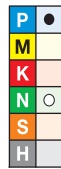
TiAlN		TiN		D1		L		S		$\sigma$
order #	catalog #	order #	catalog #	mm	in	mm	in	mm	in	
2759621	7FZ-0438A	—	—	11,11	.438	9,19	.362	2,39	.094	132°
2759599	7FZ-0472A	—	—	12,00	.472	9,19	.362	2,39	.094	132°
2759592	7FZ-0484A	—	—	12,30	.484	9,19	.362	2,39	.094	132°
2759588	7FZ-0492A	—	—	12,50	.492	9,19	.362	2,39	.094	132°
2891175	7FZ-0500A	2759581	7FZ-0500T	12,70	.500	9,19	.362	2,39	.094	132°

NOTE: Toolholders available upon request as an Engineered Solution.





■ Seat Size 0



● first choice  
○ alternate choice

TiAlN		TiN		D1		L		S		$\sigma$
order #	catalog #	order #	catalog #	mm	in	mm	in	mm	in	
2907270	7F0-0509A	—	—	12,93	.509	10,80	.425	3,18	.125	132°
—	—	2760494	7F0-0512T	13,00	.512	10,80	.425	3,18	.125	132°
2760492	7F0-0516A	—	—	13,10	.516	10,80	.425	3,18	.125	132°
2760489	7F0-0531A	2760485	7F0-0531T	13,50	.531	10,80	.425	3,18	.125	132°
2760481	7F0-0547A	2760478	7F0-0547T	13,89	.547	10,80	.425	3,18	.125	132°
2760477	7F0-0551A	2760473	7F0-0551T	14,00	.551	10,80	.425	3,18	.125	132°
2760472	7F0-0563A	2760466	7F0-0563T	14,29	.563	10,80	.425	3,18	.125	132°
2760463	7F0-0571A	—	—	14,50	.571	10,80	.425	3,18	.125	132°
2760460	7F0-0578A	2760458	7F0-0578T	14,68	.578	10,80	.425	3,18	.125	132°
2760454	7F0-0591A	2760453	7F0-0591T	15,00	.591	10,80	.425	3,18	.125	132°
2760452	7F0-0594A	2760449	7F0-0594T	15,08	.594	10,80	.425	3,18	.125	132°
2760444	7F0-0609A	2760441	7F0-0609T	15,48	.609	10,80	.425	3,18	.125	132°
2760440	7F0-0610A	—	—	15,50	.610	10,80	.425	3,18	.125	132°
3053979	7F0-0625A	2760430	7F0-0625T	15,88	.625	10,80	.425	3,18	.125	132°
2891178	7F0-0630A	2760424	7F0-0630T	16,00	.630	10,80	.425	3,18	.125	132°
2760420	7F0-0641A	2760418	7F0-0641T	16,27	.641	10,80	.425	3,18	.125	132°
—	—	2760415	7F0-0650T	16,50	.650	10,80	.425	3,18	.125	132°
2760413	7F0-0656A	1988432	7F0-0656T	16,67	.656	10,80	.425	3,18	.125	132°
2760404	7F0-0669A	—	—	17,00	.669	10,80	.425	3,18	.125	132°
2760399	7F0-0672A	2760397	7F0-0672T	17,07	.672	10,80	.425	3,18	.125	132°
2760393	7F0-0688A	2760390	7F0-0688T	17,46	.688	10,80	.425	3,18	.125	132°
3083635	7F0-0689A	2760386	7F0-0689T	17,50	.689	10,80	.425	3,18	.125	132°

NOTE: Toolholders available upon request as an Engineered Solution.

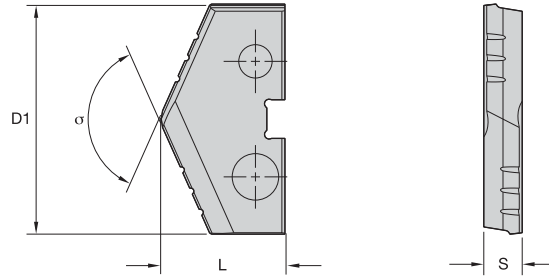
Modular Drills



TiAlN



TiN



■ Seat Size 1



TiAlN



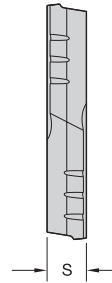
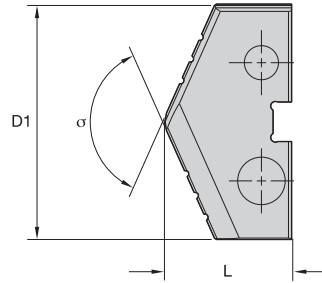
TiN

● first choice  
○ alternate choice

order #	catalog #	order #	catalog #	D1		L		S		σ
				mm	in	mm	in	mm	in	
2760383	7F1-0703A	2760381	7F1-0703T	17,86	.703	13,84	.545	3,96	.156	132°
2760380	7F1-0709A	2760377	7F1-0709T	18,00	.709	13,84	.545	3,96	.156	132°
—	—	2760371	7F1-0719T	18,26	.719	13,84	.545	3,96	.156	132°
2760365	7F1-0734A	2760362	7F1-0734T	18,65	.734	13,84	.545	3,96	.156	132°
2760361	7F1-0748A	2760359	7F1-0748T	19,00	.748	13,84	.545	3,96	.156	132°
3114699	7F1-0750A	2387228	7F1-0750T	19,05	.750	13,84	.545	3,96	.156	132°
—	—	2604191	7F1-0756T	19,20	.756	13,84	.545	3,96	.156	132°
2760344	7F1-0766A	2760341	7F1-0766T	19,45	.766	13,84	.545	3,96	.156	132°
—	—	2760338	7F1-0768T	19,50	.768	13,84	.545	3,96	.156	132°
2760335	7F1-0781A	2760331	7F1-0781T	19,85	.781	13,84	.545	3,96	.156	132°
2760330	7F1-0787A	2760328	7F1-0787T	20,00	.787	13,84	.545	3,96	.156	132°
—	—	2760323	7F1-0797T	20,24	.797	13,84	.545	3,96	.156	132°
2255810	7F1-0806A	—	—	20,47	.806	13,84	.545	3,96	.156	132°
2760319	7F1-0807A	2760316	7F1-0807T	20,50	.807	13,84	.545	3,96	.156	132°
2760315	7F1-0813A	2760310	7F1-0813T	20,64	.813	13,84	.545	3,96	.156	132°
2760305	7F1-0827A	2760303	7F1-0827T	21,00	.827	13,84	.545	3,96	.156	132°
2760302	7F1-0828A	2760300	7F1-0828T	21,03	.828	13,84	.545	3,96	.156	132°
—	—	2760296	7F1-0844T	21,43	.844	13,84	.545	3,96	.156	132°
2760292	7F1-0859A	2760290	7F1-0859T	21,83	.859	13,84	.545	3,96	.156	132°
2940716	7F1-0866A	2760287	7F1-0866T	22,00	.866	13,84	.545	3,96	.156	132°
1926120	7F1-0875A	2760282	7F1-0875T	22,23	.875	13,84	.545	3,96	.156	132°
2760280	7F1-0891A	2760278	7F1-0891T	22,62	.891	13,84	.545	3,96	.156	132°
2760276	7F1-0906A	2760273	7F1-0906T	23,02	.906	13,84	.545	3,96	.156	132°
3099442	7F1-0922A	2760268	7F1-0922T	23,42	.922	13,84	.545	3,96	.156	132°
2760265	7F1-0938A	2760262	7F1-0938T	23,81	.938	13,84	.545	3,96	.156	132°
2891181	7F1-0945A	2760257	7F1-0945T	24,00	.945	13,84	.545	3,96	.156	132°
2760256	7F1-0953A	2760253	7F1-0953T	24,21	.953	13,84	.545	3,96	.156	132°
—	—	3339713	7F1-0960T	24,38	.960	13,84	.545	3,96	.156	132°

NOTE: Toolholders available upon request as an Engineered Solution.





■ Seat Size 2



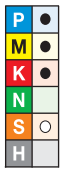
● first choice  
○ alternate choice

TiAlN		TiN		D1		L		S		σ
order #	catalog #	order #	catalog #	mm	in	mm	in	mm	in	
—	—	2760247	7F2-0969T	24,61	.969	16,13	.635	4,76	.188	132°
2760243	7F2-0984A	2760240	7F2-0984T	25,00	.984	16,13	.635	4,76	.188	132°
2760239	7F2-1000A	2760235	7F2-1000T	25,40	1.000	16,13	.635	4,76	.188	132°
2760234	7F2-1003A	—	—	25,48	1.003	16,13	.635	4,76	.188	132°
3088200	7F2-1016A	2760226	7F2-1016T	25,80	1.016	16,13	.635	4,76	.188	132°
3096208	7F2-1024A	2760223	7F2-1024T	26,00	1.024	16,13	.635	4,76	.188	132°
2760222	7F2-1031A	2760219	7F2-1031T	26,20	1.031	16,13	.635	4,76	.188	132°
2760216	7F2-1047A	2760214	7F2-1047T	26,59	1.047	16,13	.635	4,76	.188	132°
3096207	7F2-1063A	2760207	7F2-1063T	26,99	1.063	16,13	.635	4,76	.188	132°
2261849	7F2-1078A	2760203	7F2-1078T	27,61	1.078	16,13	.635	4,76	.188	132°
2760199	7F2-1094A	2760196	7F2-1094T	27,78	1.094	16,13	.635	4,76	.188	132°
2760195	7F2-1102A	2760194	7F2-1102T	28,00	1.102	16,13	.635	4,76	.188	132°
—	—	2760189	7F2-1109T	28,17	1.109	16,13	.635	4,76	.188	132°
2760188	7F2-1125A	2760184	7F2-1125T	28,58	1.125	16,13	.635	4,76	.188	132°
3024915	7F2-1141A	—	—	28,97	1.141	16,13	.635	4,76	.188	132°
2760181	7F2-1142A	—	—	29,00	1.142	16,13	.635	4,76	.188	132°
3088746	7F2-1156A	2760174	7F2-1156T	29,37	1.156	16,13	.635	4,76	.188	132°
—	—	2760169	7F2-1172T	29,77	1.172	16,13	.635	4,76	.188	132°
2760167	7F2-1181A	2760164	7F2-1181T	30,00	1.181	16,13	.635	4,76	.188	132°
2760162	7F2-1188A	2760159	7F2-1188T	30,16	1.188	16,13	.635	4,76	.188	132°
—	—	2760152	7F2-1203T	30,56	1.203	16,13	.635	4,76	.188	132°
2760150	7F2-1219A	2760148	7F2-1219T	30,96	1.219	16,13	.635	4,76	.188	132°
2760147	7F2-1221A	—	—	31,00	1.221	16,13	.635	4,76	.188	132°
2907272	7F2-1231A	—	—	31,27	1.231	16,13	.635	4,76	.188	132°
—	—	2760141	7F2-1234T	31,35	1.234	16,13	.635	4,76	.188	132°
2760137	7F2-1250A	2760134	7F2-1250T	31,75	1.250	16,13	.635	4,76	.188	132°
—	—	2895976	7F2-1254T	31,85	1.254	16,13	.635	4,76	.188	132°
2760131	7F2-1260A	2760128	7F2-1260T	32,00	1.260	16,13	.635	4,76	.188	132°

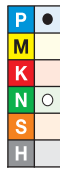
NOTE: Toolholders available upon request as an Engineered Solution.

(continued)

(Seat Size 2 – continued)



TiAlN



TiN

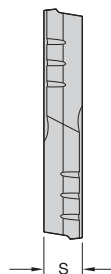
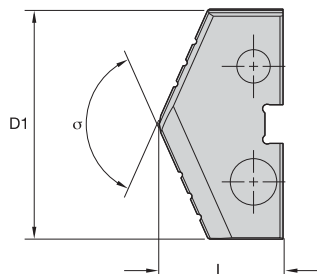
● first choice  
○ alternate choice

TiAlN		TiN		D1		L		S		σ
order #	catalog #	order #	catalog #	mm	in	mm	in	mm	in	
3032539	7F2-1266A	2967699	7F2-1266T	32,15	1.266	16,13	.635	4,76	.188	132°
—	—	2760121	7F2-1281T	32,55	1.281	16,13	.635	4,76	.188	132°
2760118	7F2-1299A	—	—	33,00	1.299	16,13	.635	4,76	.188	132°
2760112	7F2-1313A	2760109	7F2-1313T	33,34	1.313	16,13	.635	4,76	.188	132°
—	—	2760106	7F2-1328T	33,73	1.328	16,13	.635	4,76	.188	132°
2760105	7F2-1339A	—	—	34,00	1.339	16,13	.635	4,76	.188	132°
2760101	7F2-1344A	2760098	7F2-1344T	34,13	1.344	16,13	.635	4,76	.188	132°
—	—	2760094	7F2-1359T	34,53	1.359	16,13	.635	4,76	.188	132°
1926121	7F2-1375A	2760090	7F2-1375T	34,93	1.375	16,13	.635	4,76	.188	132°
2760089	7F2-1378A	—	—	35,00	1.378	16,13	.635	4,76	.188	132°
2759880	7F4-2166A	—	—	55,02	2.166	23,62	.930	7,94	.313	132°

NOTE: Toolholders available upon request as an Engineered Solution.



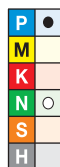
Modular Drills



■ Seat Size 3



TiAlN



TiN

● first choice  
○ alternate choice

TiAlN		TiN		D1		L		S		σ
order #	catalog #	order #	catalog #	mm	in	mm	in	mm	in	
—	—	2760079	7F3-1391T	35,32	1.391	20,45	.805	6,35	.250	132°
2760078	7F3-1406A	2760076	7F3-1406T	35,72	1.406	20,45	.805	6,35	.250	132°
2760072	7F3-1417A	2760069	7F3-1417T	36,00	1.417	20,45	.805	6,35	.250	132°
2760066	7F3-1438A	2760063	7F3-1438T	36,51	1.438	20,45	.805	6,35	.250	132°
2760060	7F3-1457A	2760059	7F3-1457T	37,00	1.457	20,45	.805	6,35	.250	132°
2760058	7F3-1469A	2760056	7F3-1469T	37,31	1.469	20,45	.805	6,35	.250	132°
—	—	2760053	7F3-1484T	37,70	1.484	20,45	.805	6,35	.250	132°
2760051	7F3-1496A	—	—	38,00	1.496	20,45	.805	6,35	.250	132°
2760048	7F3-1500A	2760045	7F3-1500T	38,10	1.500	20,45	.805	6,35	.250	132°
—	—	2760038	7F3-1516T	38,50	1.516	20,45	.805	6,35	.250	132°
—	—	2760035	7F3-1531T	38,90	1.531	20,45	.805	6,35	.250	132°
2760034	7F3-1535A	—	—	39,00	1.535	20,45	.805	6,35	.250	132°
2760027	7F3-1563A	2760024	7F3-1563T	39,69	1.563	20,45	.805	6,35	.250	132°
2760023	7F3-1575A	2760021	7F3-1575T	40,00	1.575	20,45	.805	6,35	.250	132°
—	—	2760015	7F3-1594T	40,48	1.594	20,45	.805	6,35	.250	132°
2760011	7F3-1614A	—	—	41,00	1.614	20,45	.805	6,35	.250	132°
2760008	7F3-1625A	2760004	7F3-1625T	41,28	1.625	20,45	.805	6,35	.250	132°
2760001	7F3-1654A	—	—	42,00	1.654	20,45	.805	6,35	.250	132°
—	—	2759996	7F3-1656T	42,07	1.656	20,45	.805	6,35	.250	132°
2759993	7F3-1688A	2759991	7F3-1688T	42,86	1.688	20,45	.805	6,35	.250	132°
—	—	2759989	7F3-1693T	43,00	1.693	20,45	.805	6,35	.250	132°
2759987	7F3-1719A	2759985	7F3-1719T	43,66	1.719	20,45	.805	6,35	.250	132°
2759984	7F3-1732A	—	—	44,00	1.732	20,45	.805	6,35	.250	132°
2759977	7F3-1750A	2759974	7F3-1750T	44,45	1.750	20,45	.805	6,35	.250	132°
—	—	2759970	7F3-1766T	44,85	1.766	20,45	.805	6,35	.250	132°
2759969	7F3-1772A	2759967	7F3-1772T	45,00	1.772	20,45	.805	6,35	.250	132°
—	—	2759963	7F3-1781T	45,25	1.781	20,45	.805	6,35	.250	132°
2759960	7F3-1811A	—	—	46,00	1.811	20,45	.805	6,35	.250	132°
2759958	7F3-1813A	2759956	7F3-1813T	46,04	1.813	20,45	.805	6,35	.250	132°
—	—	2759951	7F3-1844T	46,83	1.844	20,45	.805	6,35	.250	132°
—	—	2759949	7F3-1850T	47,00	1.850	20,45	.805	6,35	.250	132°
2759945	7F3-1875A	2759942	7F3-1875T	47,63	1.875	20,45	.805	6,35	.250	132°

NOTE: Toolholders available upon request as an Engineered Solution.

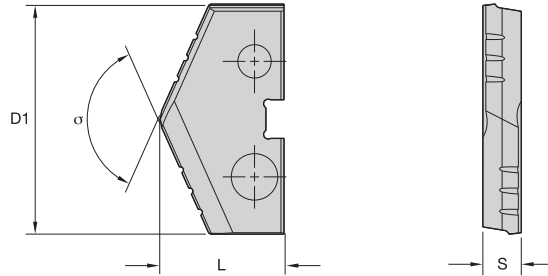
Modular Drills



TiAlN



TiN



■ Seat Size 4



TiAlN



TiN

● first choice  
○ alternate choice

order #	catalog #	order #	catalog #	D1		L		S		σ
				mm	in	mm	in	mm	in	
—	—	2759937	7F4-1880T	47,75	1.880	23,62	.930	7,95	.313	132°
2759936	7F4-1890A	2759935	7F4-1890T	48,00	1.890	23,62	.930	7,95	.313	132°
2759934	7F4-1906A	2759932	7F4-1906T	48,42	1.906	23,62	.930	7,95	.313	132°
2759930	7F4-1929A	—	—	49,00	1.929	23,62	.930	7,95	.313	132°
2759927	7F4-1938A	2759925	7F4-1938T	49,21	1.938	23,62	.930	7,95	.313	132°
2759921	7F4-1969A	2759919	7F4-1969T	50,00	1.969	23,62	.930	7,95	.313	132°
2759916	7F4-2000A	2759913	7F4-2000T	50,80	2.000	23,62	.930	7,95	.313	132°
—	—	2759911	7F4-2008T	51,00	2.008	23,62	.930	7,95	.313	132°
—	—	2952747	7F4-2016T	51,20	2.016	23,62	.930	7,95	.313	132°
2759904	7F4-2031A	2759902	7F4-2031T	51,60	2.031	23,62	.930	7,95	.313	132°
2759901	7F4-2047A	2759900	7F4-2047T	52,00	2.047	23,62	.930	7,95	.313	132°
2759899	7F4-2063A	2759896	7F4-2063T	52,39	2.063	23,62	.930	7,95	.313	132°
2895971	7F4-2087A	—	—	53,00	2.087	23,62	.930	7,95	.313	132°
—	—	2759892	7F4-2094T	53,18	2.094	23,62	.930	7,95	.313	132°
2759891	7F4-2125A	2759888	7F4-2125T	53,98	2.125	23,62	.930	7,95	.313	132°
2759887	7F4-2126A	—	—	54,00	2.126	23,62	.930	7,95	.313	132°
—	—	2759882	7F4-2156T	54,77	2.156	23,62	.930	7,95	.313	132°
—	—	2759876	7F4-2188T	55,56	2.188	23,62	.930	7,95	.313	132°
2759874	7F4-2205A	—	—	56,00	2.205	23,62	.930	7,95	.313	132°
2759872	7F4-2219A	2759870	7F4-2219T	56,36	2.219	23,62	.930	7,95	.313	132°
2759868	7F4-2244A	—	—	57,00	2.244	23,62	.930	7,95	.313	132°
2759865	7F4-2250A	2759862	7F4-2250T	57,15	2.250	23,62	.930	7,95	.313	132°
—	—	2759858	7F4-2281T	57,95	2.281	23,62	.930	7,95	.313	132°
2759857	7F4-2284A	—	—	58,00	2.284	23,62	.930	7,95	.313	132°
2759854	7F4-2313A	2759852	7F4-2313T	58,74	2.313	23,62	.930	7,95	.313	132°
2759851	7F4-2323A	—	—	59,00	2.323	23,62	.930	7,95	.313	132°
—	—	2759848	7F4-2344T	59,53	2.344	23,62	.930	7,95	.313	132°
—	—	2759845	7F4-2362T	60,00	2.362	23,62	.930	7,95	.313	132°

(continued)

(Seat Size 4 – continued)



TiAlN



TiN

● first choice  
○ alternate choice

TiAlN		TiN		D1		L		S		σ
order #	catalog #	order #	catalog #	mm	in	mm	in	mm	in	
2759843	7F4-2375A	2759840	7F4-2375T	60,33	2.375	23,62	.930	7,95	.313	132°
2759833	7F4-2438A	2759831	7F4-2438T	61,91	2.438	23,62	.930	7,95	.313	132°
2759830	7F4-2441A	—	—	62,00	2.441	23,62	.930	7,95	.313	132°
2759828	7F4-2469A	—	—	62,71	2.469	23,62	.930	7,95	.313	132°
—	—	2759823	7F4-2480T	63,00	2.480	23,62	.930	7,95	.313	132°
2759822	7F4-2500A	2759820	7F4-2500T	63,50	2.500	23,62	.930	7,95	.313	132°
—	—	2759816	7F4-2531T	64,30	2.531	23,62	.930	7,95	.313	132°
3027222	7F4-2559A	—	—	65,00	2.559	23,62	.930	7,95	.313	132°
2759813	7F4-2563A	2759811	7F4-2563T	65,09	2.563	23,62	.930	7,95	.313	132°

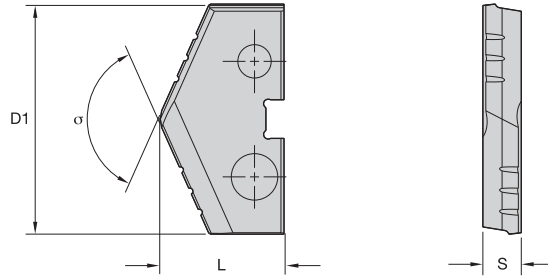
NOTE: Toolholders available upon request as an Engineered Solution.



TiAlN



TiN



■ Seat Size 5



TiAlN



TiN

● first choice  
○ alternate choice

order #	catalog #	order #	catalog #	D1		L		S		σ
				mm	in	mm	in	mm	in	
—	—	2759808	7F5-2500T	63,50	2.500	31,50	1.240	11,11	.437	144°
2759802	7F5-2563A	2759801	7F5-2563T	65,09	2.563	31,50	1.240	11,11	.437	144°
—	—	2759791	7F5-2625T	66,68	2.625	31,50	1.240	11,11	.437	144°
—	—	2759789	7F5-2656T	67,47	2.656	31,50	1.240	11,11	.437	144°
2759788	7F5-2677A	—	—	68,00	2.677	31,50	1.240	11,11	.437	144°
—	—	2759781	7F5-2719T	69,06	2.719	31,50	1.240	11,11	.437	144°
2759780	7F5-2750A	2759778	7F5-2750T	69,85	2.750	31,50	1.240	11,11	.437	144°
2961641	7F5-2756A	—	—	70,00	2.756	31,50	1.240	11,11	.437	144°
2759773	7F5-2813A	—	—	71,44	2.813	31,50	1.240	11,11	.437	144°
2759766	7F5-2875A	2759764	7F5-2875T	73,03	2.875	31,50	1.240	11,11	.437	144°
—	—	2759756	7F5-2938T	74,61	2.938	31,50	1.240	11,11	.437	144°
2759755	7F5-2969A	2759753	7F5-2969T	75,41	2.969	31,50	1.240	11,11	.437	144°
2759751	7F5-3000A	2759748	7F5-3000T	76,20	3.000	31,50	1.240	11,11	.437	144°

NOTE: Toolholders available upon request as an Engineered Solution.

■ Seat Size 6



TiAlN

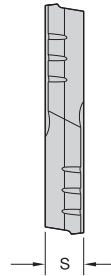
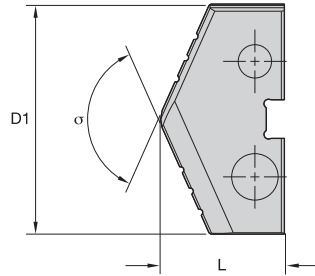


TiN

● first choice  
○ alternate choice

order #	catalog #	order #	catalog #	D1		L		S		σ
				mm	in	mm	in	mm	in	
2759745	7F6-3063A	2759743	7F6-3063T	77,79	3.063	31,50	1.240	11,11	.437	144°
2759742	7F6-3071A	—	—	78,00	3.071	31,50	1.240	11,11	.437	144°
2759739	7F6-3125A	—	—	79,38	3.125	31,50	1.240	11,11	.437	144°
2759736	7F6-3150A	—	—	80,00	3.150	31,50	1.240	11,11	.437	144°
—	—	2759731	7F6-3188T	80,96	3.188	31,50	1.240	11,11	.437	144°
—	—	2759726	7F6-3250T	82,55	3.250	31,50	1.240	11,11	.437	144°
—	—	2759718	7F6-3375T	85,73	3.375	31,50	1.240	11,13	.438	144°
—	—	2759715	7F6-3438T	87,31	3.438	31,50	1.240	11,13	.438	144°
—	—	2759709	7F6-3500T	88,90	3.500	31,50	1.240	11,13	.438	144°

NOTE: Toolholders available upon request as an Engineered Solution.



■ Seat Size 7

P	●
M	●
K	●
N	○
S	○
H	

TiAlN

P	●
M	
K	
N	○
S	
H	

TiN

● first choice  
○ alternate choice

order #	catalog #	order #	catalog #	D1		L		S		σ
				mm	in	mm	in	mm	in	
—	—	3279755	7F7-3543T	90,00	3.543	31,50	1.240	11,13	.438	144°
—	—	2759703	7F7-3563T	90,49	3.563	31,50	1.240	11,13	.438	144°
—	—	2759698	7F7-3688T	93,66	3.688	31,50	1.240	11,13	.438	144°
—	—	2759688	7F7-3938T	96,00	3.938	31,50	1.240	11,13	.438	144°
2972689	7F7-3813A	—	—	96,84	3.813	31,50	1.240	11,13	.438	144°
2759684	7F7-4000A	—	—	101,60	4.000	31,50	1.240	11,13	.438	144°

NOTE: Toolholders available upon request as an Engineered Solution.

■ HSS Spade Blades • Speed and Feed Chart • Inch

Material Group	Hardness BHN	Grade		Feed (mm/rev)								
		TiN	TiAlN	Y & Z (9.5 to 12.7)	0 (13 to 17.5)	1 (17.86 – 24)	2 (24.61 – 35)	3 (35.72– 47.63)	4 (48 – 65.09)	5 (63.5 – 76.2)	6-7-8- (76.99 – 114.3)	
P	0	85 – 125	175	–	0.007	0.009	0.012	0.015	0.019	0.023	0.025	0.027
		125–175	165	–	0.006	0.009	0.012	0.015	0.019	0.023	0.024	0.026
		175 – 225	155	–	0.005	0.008	0.010	0.014	0.018	0.021	0.023	0.025
		225 – 275	145	–	0.005	0.008	0.010	0.014	0.018	0.021	0.023	0.025
	1	100 – 150	200	–	0.008	0.011	0.014	0.017	0.021	0.025	0.026	0.028
		150 – 200	180	–	0.007	0.010	0.013	0.016	0.020	0.023	0.024	0.026
		200 – 250	160	–	0.006	0.010	0.013	0.016	0.020	0.023	0.024	0.026
		125–175	165	–	0.006	0.009	0.012	0.015	0.019	0.023	0.025	0.027
	2	175 – 225	155	–	0.005	0.008	0.010	0.014	0.018	0.021	0.023	0.025
		225 – 275	145	215	0.005	0.008	0.010	0.014	0.018	0.021	0.022	0.024
		275 – 325	135	200	0.004	0.007	0.009	0.012	0.016	0.019	0.021	0.023
		125–175	150	–	0.007	0.009	0.011	0.014	0.018	0.021	0.023	0.025
	3	175 – 225	140	–	0.006	0.008	0.010	0.014	0.017	0.019	0.021	0.023
		225 – 275	130	185	0.005	0.007	0.010	0.013	0.017	0.019	0.020	0.021
		275 – 325	120	175	0.004	0.006	0.009	0.012	0.015	0.017	0.018	0.019
		325–375	110	160	0.003	0.006	0.009	0.012	0.015	0.017	0.018	0.019
	4	225 – 300	85	120	0.005	0.007	0.009	0.010	0.014	0.016	0.018	0.020
		300–350	65	90	0.004	0.007	0.009	0.010	0.014	0.016	0.018	0.020
		350 – 400	55	75	0.003	0.006	0.008	0.009	0.012	0.014	0.016	0.018
	5	100 – 150	150	–	0.006	0.010	0.012	0.014	0.018	0.021	0.022	0.024
		150 – 250	125	190	0.005	0.009	0.010	0.012	0.016	0.019	0.020	0.022
		250 – 350	100	160	0.004	0.008	0.009	0.010	0.014	0.017	0.018	0.020
	6	150 – 200	85	–	0.005	0.006	0.008	0.010	0.012	0.015	0.016	0.017
		200 – 250	65	–	0.004	0.006	0.008	0.010	0.012	0.015	0.016	0.017
250 – 300		45	70	0.004	0.005	0.007	0.008	0.010	0.013	0.014	0.015	
300 – 350		–	55	0.003	0.004	0.006	0.007	0.009	0.012	0.013	0.014	
M	135 – 185	80	110	0.006	0.008	0.009	0.011	0.014	0.016	0.018	0.020	
	185 – 275	65	100	0.005	0.007	0.008	0.010	0.012	0.014	0.016	0.018	
	275 – 350	–	90	0.005	0.006	0.007	0.009	0.011	0.013	0.015	0.017	
K	1,2	120 – 150	180	270	0.008	0.012	0.016	0.020	0.024	0.027	0.029	0.031
		150 – 200	160	240	0.007	0.011	0.014	0.018	0.022	0.025	0.027	0.029
		200 – 220	140	210	0.006	0.009	0.012	0.016	0.018	0.021	0.023	0.025
		220 – 260	120	180	0.005	0.007	0.009	0.012	0.014	0.017	0.019	0.021
		260 – 320	100	150	0.004	0.006	0.007	0.009	0.012	0.014	0.016	0.018
N	1	–	600	–	0.007	0.012	0.015	0.019	0.021	0.024	0.025	0.026
		–	300	–	0.008	0.013	0.016	0.020	0.022	0.025	0.026	0.027
S	1	140 – 210	–	45	0.005	0.007	0.008	0.010	0.012	0.015	0.016	0.017
		210 – 280	–	40	0.004	0.006	0.007	0.008	0.010	0.012	0.013	0.014
		280 – 340	–	35	0.004	0.005	0.006	0.007	0.009	0.011	0.012	0.013

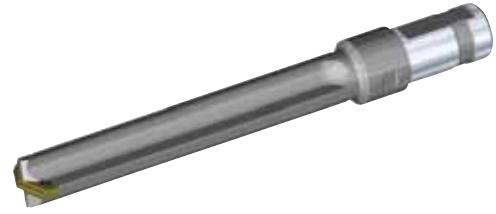
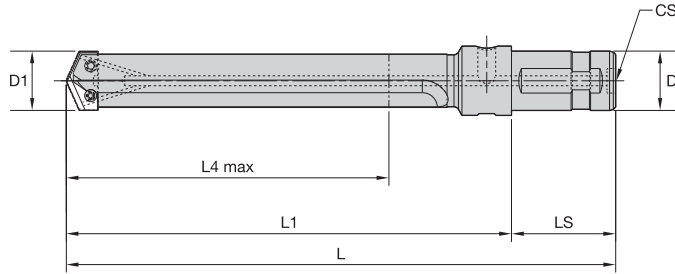
Modular Drills



■ HSS Spade Blades • Speed and Feed Chart • Metric

Material Group	Hardness BHN	Grade		Feed (mm/rev)								
		TiN	TiAlN	Y & Z (9.5 to 12.7)	0 (13 to 17.5)	1 (17.86 – 24)	2 (24.61 – 35)	3 (35.72– 47.63)	4 (48 – 65.09)	5 (63.5 – 76.2)	6-7-8- (76.99 – 114.3)	
<b>P</b>	0	85-125	55	-	0,18	0,23	0,30	0,38	0,48	0,58	0,64	0,69
		125-175	50	-	0,15	0,23	0,30	0,38	0,48	0,58	0,61	0,66
		175-225	45	-	0,13	0,20	0,25	0,36	0,46	0,53	0,58	0,64
		225-275	45	-	0,13	0,20	0,25	0,36	0,46	0,53	0,58	0,64
	1	100-150	60	-	0,20	0,28	0,36	0,43	0,53	0,64	0,66	0,71
		150-200	55	-	0,18	0,25	0,33	0,41	0,51	0,58	0,61	0,66
		200-250	50	-	0,15	0,25	0,33	0,41	0,51	0,58	0,61	0,66
	2	125-175	50	-	0,15	0,23	0,30	0,38	0,48	0,58	0,64	0,69
		175-225	45	-	0,13	0,20	0,25	0,36	0,46	0,53	0,58	0,64
		225-275	45	65	0,13	0,20	0,25	0,36	0,46	0,53	0,56	0,61
		275-325	40	60	0,10	0,18	0,23	0,30	0,41	0,48	0,53	0,58
	3	125-175	45	-	0,18	0,23	0,28	0,36	0,46	0,53	0,58	0,64
		175-225	45	-	0,15	0,20	0,25	0,36	0,43	0,48	0,53	0,58
		225-275	40	55	0,13	0,18	0,25	0,33	0,43	0,48	0,51	0,53
		275-325	35	50	0,10	0,15	0,23	0,30	0,38	0,43	0,46	0,48
		325-375	35	50	0,08	0,15	0,23	0,30	0,38	0,43	0,46	0,48
	4	225-300	25	35	0,13	0,18	0,23	0,25	0,36	0,41	0,46	0,51
		300-350	20	30	0,10	0,18	0,23	0,25	0,36	0,41	0,46	0,51
		350-400	15	25	0,08	0,15	0,20	0,23	0,30	0,36	0,41	0,46
	5	100-150	45	-	0,15	0,25	0,30	0,36	0,46	0,53	0,56	0,61
150-250		40	60	0,13	0,23	0,25	0,30	0,41	0,48	0,51	0,56	
250-350		30	50	0,10	0,20	0,23	0,25	0,36	0,43	0,46	0,51	
6	150-200	25	-	0,13	0,15	0,20	0,25	0,30	0,38	0,41	0,43	
	200-250	20	-	0,10	0,15	0,20	0,25	0,30	0,38	0,41	0,43	
	250-300	15	20	0,10	0,13	0,18	0,20	0,25	0,33	0,36	0,38	
	300-350	-	15	0,08	0,10	0,15	0,18	0,23	0,30	0,33	0,36	
<b>M</b>	1	135-185	25	35	0,15	0,20	0,23	0,28	0,36	0,41	0,46	0,51
		185-275	30	30	0,13	0,18	0,20	0,25	0,30	0,36	0,41	0,46
		275-350	-	25	0,13	0,15	0,18	0,23	0,28	0,33	0,38	0,43
<b>K</b>	1,2	120-150	55	80	0,20	0,30	0,41	0,51	0,61	0,69	0,74	0,79
		150-200	45	75	0,18	0,28	0,36	0,46	0,56	0,64	0,69	0,74
		200-220	40	65	0,15	0,23	0,30	0,41	0,46	0,53	0,58	0,64
		220-260	35	55	0,13	0,18	0,23	0,30	0,36	0,43	0,48	0,53
		260-320	30	45	0,10	0,15	0,18	0,23	0,30	0,36	0,41	0,46
<b>N</b>	1	-	180	-	0,18	0,30	0,38	0,48	0,53	0,61	0,64	0,66
		-	90	-	0,20	0,33	0,41	0,51	0,56	0,64	0,66	0,69
<b>S</b>	1	140-210	-	15	0,13	0,18	0,20	0,25	0,30	0,38	0,41	0,43
		210-280	-	10	0,10	0,15	0,18	0,20	0,25	0,30	0,33	0,36
		280-340	-	10	0,10	0,13	0,15	0,18	0,23	0,28	0,30	0,33

Modular Drills



■ Straight Flute Holders • Inch • Short

short	D1		D1 max		L	L1	L4 max	LS	D	seat size	CS	insert screw	Torx wrench
	mm	in	mm	in									
7SZSS	11,10	.437	12,90	.508	5.75	3.37	1.09	2.38	.750	Z	1/8 - 27 NPT	56-1015	56-2026
7S0SS	12,93	.509	17,65	.695	6.35	3.97	1.85	2.38	.750	0	1/8 - 27 NPT	56-1014	56-2017
7S0.5SS	15,47	.609	17,65	.695	6.35	3.97	1.76	2.38	.750	—	1/8 - 27 NPT	56-1014	56-2017
7S1SS	17,53	.690	24,38	.960	7.23	4.85	2.25	2.38	1.000	1	1/4 - 18 NPT	56-1020	56-2028
7S1.5SS	21,82	.859	24,38	.960	7.23	4.85	2.17	2.38	1.000	1.5	1/4 - 18 NPT	56-1020	56-2028
7S2SS	24,41	.961	35,05	1.380	8.00	5.56	2.77	2.44	1.250	2	1/4 - 18 NPT	56-1018	56-2015
7S2.5SS	30,15	1.187	35,05	1.380	8.00	5.56	3.59	2.44	1.250	2.5	1/4 - 18 NPT	56-1018	56-2015
7S3SS	35,08	1.381	47,73	1.879	9.88	7.25	3.76	2.63	1.500	3	1/4 - 18 NPT	56-1585	56-2020
7S4SS	47,75	1.880	65,28	2.570	11.38	8.75	6.21	2.63	1.500	4	1/4 - 18 NPT	56-1585	56-2020
7S5SS	63,50	2.500	88,90	3.500	12.50	9.25	5.36	3.25	2.000	5	1/4 - 18 NPT	56-1025	56-2125

■ Straight Flute Holders • Inch • Medium

medium	D1		D1 max		L	L1	L4 max	LS	D	seat size	CS	insert screw	Torx wrench
	mm	in	mm	in									
7SZSM	11,10	.437	12,90	.508	6.76	4.38	2.08	2.38	.750	Z	1/8 - 27 NPT	56-1015	56-2026
7S0SM	12,93	.509	17,65	.695	7.71	5.33	2.93	2.38	.750	0	1/8 - 27 NPT	56-1014	56-2017
7S0.5SM	15,47	.609	17,65	.695	7.71	5.33	2.90	2.38	.750	—	1/8 - 27 NPT	56-1014	56-2017
7S1SM	17,53	.690	24,38	.960	9.18	6.80	4.20	2.38	1.000	1	1/4 - 18 NPT	56-1020	56-2028
7S1.5SM	21,82	.859	24,38	.960	9.18	6.80	4.12	2.38	1.000	1.5	1/4 - 18 NPT	56-1020	56-2028
7S2SM	24,41	.961	35,05	1.380	10.38	7.94	5.15	2.44	1.250	2	1/4 - 18 NPT	56-1018	56-2015
7S2.5SM	30,15	1.187	35,05	1.380	10.38	7.94	5.03	2.44	1.250	2.5	1/4 - 18 NPT	56-1020	56-2028
7S3SM	35,08	1.381	47,73	1.879	13.88	11.25	7.89	2.63	1.500	3	1/4 - 18 NPT	56-1585	56-2020
7S4SM	47,75	1.880	65,28	2.570	15.38	12.75	9.57	2.63	1.500	4	1/4 - 18 NPT	56-1585	56-2020
7S5SM	63,50	2.500	88,90	3.500	18.25	15.00	11.38	3.25	2.000	5	1/4 - 18 NPT	56-1025	56-2125
7S7SM	88,93	3.501	114,30	4.500	21.25	14.62	11.50	6.63	3.000	7	1/4 - 18 NPT	56-1025	56-2125

Modular Drills

■ Straight Flute Holders • Inch • Long

long	D1		D1 max		L	L1	L4 max	LS	D	seat size	CS	insert screw	Torx wrench
	mm	in	mm	in									
7SZSL	11,10	.437	12,90	.508	7.76	5.38	3.10	2.38	.750	Z	1/8 - 27 NPT	56-1015	56-2026
7S0SL	12,93	.509	17,65	.695	9.13	6.75	4.60	2.38	.750	0	1/8 - 27 NPT	56-1014	56-2017
7S0.5SL	15,47	.609	17,65	.695	9.13	6.75	7.36	2.38	.750	—	1/8 - 27 NPT	56-1014	56-2017
7S1SL	17,53	.690	24,38	.960	11.10	8.72	6.34	2.38	1.000	1	1/4 - 18 NPT	56-1020	56-2028
7S2SL	24,41	.961	35,05	1.380	12.75	10.31	7.86	2.44	1.250	2	1/4 - 18 NPT	56-1018	56-2015
7S3SL	35,08	1.381	47,73	1.879	18.63	16.00	13.28	2.63	1.500	3	1/4 - 18 NPT	56-1585	56-2020
7S4SL	47,75	1.880	65,28	2.570	21.50	18.87	15.89	2.63	1.500	4	1/4 - 18 NPT	56-1585	56-2020
7S7SL	88,93	3.501	114,30	4.500	29.50	22.88	19.25	6.63	3.000	7	1/4 - 18 NPT	56-1025	56-2125

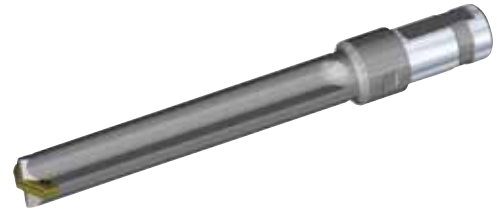
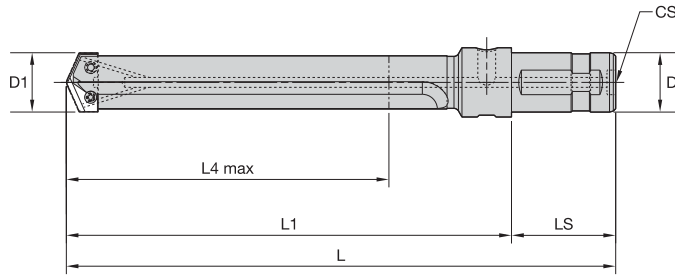


■ Straight Flute Holders • Inch • Extra Long

extra long	D1		D1 max		L	L1	L4 max	LS	D	seat size	CS	insert screw	Torx wrench
	mm	in	mm	in									
7S0SE	12,93	.509	17,65	.695	12.17	9.80	7.44	2.38	.750	0	1/8 - 27 NPT	56-1014	56-2017
7S0.5SE	15,47	.609	17,65	.695	12.17	9.80	7.60	2.38	.750	—	1/8 - 27 NPT	56-1014	56-2017
7S1SE	17,53	.690	24,38	.960	15.12	12.75	5.67	2.38	1.000	1	1/4 - 18 NPT	56-1020	56-2028
7S1.5SE	21,82	.859	24,38	.960	15.13	12.75	10.29	2.38	1.000	1.5	1/4 - 18 NPT	56-1020	56-2028
7S2SE	24,41	.961	35,05	1.380	15.82	13.38	11.07	2.44	1.250	2	1/4 - 18 NPT	56-1018	56-2015
7S3SE	35,08	1.381	47,73	1.879	25.51	22.88	20.16	2.63	1.500	3	1/4 - 18 NPT	56-1585	56-2020
7S4SE	47,75	1.880	65,28	2.570	—	—	15.89	2.63	1.500	4	1/4 - 18 NPT	56-1585	56-2020



Modular Drills



■ Straight Flute Holders • Metric • Short

short	D1		D1 max		L	L1	L4 max	LS	D	seat size	insert screw	Torx wrench
	mm	in	mm	in								
8S0SS	13,00	.512	17,50	.689	4.88	2.88	1.91	2.01	.787	0	56-1014	FT7
8S1SS	17,86	.703	24,00	.945	6.53	4.33	2.16	2.24	.984	1	56-1020	FT8
8S2SS	24,61	.969	35,00	1.378	7.49	5.13	2.72	2.40	1.260	2	56-1585	FT15
8S4SS	48,00	1.890	65,09	2.563	10.08	7.32	3.97	2.80	1.575	4	56-1585	FT20

■ Straight Flute Holders • Metric • Medium

medium	D1		D1 max		L	L1	L4 max	LS	D	seat size	insert screw	Torx wrench
	mm	in	mm	in								
8S0SM	13,00	.512	17,50	.689	6.01	4.00	2.76	2.01	.787	0	56-1014	FT7
8S1SM	17,86	.703	24,00	.945	8.58	6.33	4.16	2.24	.984	1	56-1020	FT8
8S2SM	24,61	.969	35,00	1.378	9.53	7.13	4.72	2.40	1.260	2	56-1018	FT15
8S3SM	35,72	1.406	47,63	1.875	11.11	8.31	5.32	2.80	1.575	3	56-1585	FT20

■ Straight Flute Holders • Metric • Long

long	D1		D1 max		L	L1	L4 max	LS	D	seat size	CS	insert screw	Torx wrench
	mm	in	mm	in									
<b>8S0SL</b>	12,93	.509	17,53	.690	8.01	6.00	4.13	2.01	.787	0	R1/8	<b>56-1014</b>	<b>FT7</b>
<b>8S1SL</b>	17,86	.703	24,00	.945	10.53	8.33	6.16	2.24	.984	1	—	<b>56-1020</b>	<b>FT8</b>
<b>8S2SL</b>	24,61	.969	35,00	1.378	11.53	9.13	6.72	2.40	1.260	2	—	<b>56-1018</b>	<b>FT15</b>

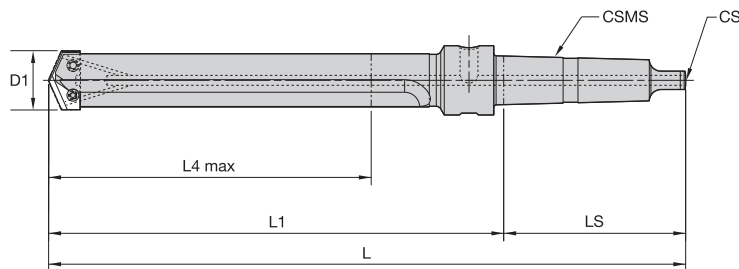


■ Straight Flute Holders • Metric • Extra Long

extra long	D1		D1 max		L	L1	L4 max	LS	D	seat size	insert screw	Torx wrench
	mm	in	mm	in								
<b>8S2SE</b>	24,61	.969	35,00	1.378	18.17	15.76	14.27	2.40	1.260	2	<b>56-1018</b>	<b>FT15</b>



- Through coolant must be used with spade drills depths greater than 1 x D.
- Direct spindle cooling is preferable when using WIDIA™ Spade Blades.
- If spindle cooling is unavailable, then coolant glands or inducers should be used to provide through coolant capability.
- Our holders provide both options; please find available coolant glands below.



### ■ Straight Flute Holders • Short

short	D1		D1 max		L	L1	L4 max	LS	CSMS system size	seat size	CS	insert screw	Torx wrench
	mm	in	mm	in									
7SZTS	11,10	.437	12,90	.508	6.50	3.56	1.50	3.13	2	Z	8 - 32	56-1015	56-2026
7S1TS	17,53	.690	24,38	.960	8.73	5.04	2.85	3.88	3	1	1/4 - 20	56-1020	56-2028
7S2TS	24,41	.961	35,05	1.380	9.44	5.75	3.56	3.88	3	2	1/4 - 20	56-1018	56-2015
7S2.5TS	30,15	1.187	35,05	1.380	9.44	5.56	2.88	3.88	3	2.5	1/4 - 20	56-1018	56-2015
7S3TS	35,08	1.381	47,73	1.879	12.13	7.50	5.00	4.88	4	3	5/16-18	56-1585	56-2020
7S4TS	47,75	1.880	65,28	2.570	13.62	9.00	6.50	4.88	4	4	5/16-18	56-1585	56-2020
7S5TS	63,50	2.500	88,90	3.500	15.38	9.50	6.75	6.13	5	5	1/2 - 13	56-1025	56-2125

NOTE: CSMS = Morse taper size.

### ■ Straight Flute Holders • Medium

medium	D1		D1 max		L	L1	L4 max	LS	CSMS system size	seat size	CS	insert screw	Torx wrench
	mm	in	mm	in									
7S0TM	12,93	.509	17,65	.695	8.46	5.52	3.45	3.13	2	0	8 - 32	56-1014	56-2017
7S1TM	17,53	.690	24,38	.960	10.68	6.99	4.80	3.88	3	1	1/4 - 20	56-1020	56-2028
7S1.5TM	21,82	.859	24,38	.960	10.68	6.80	4.80	3.88	3	1.5	1/4 - 20	56-1020	56-2028
7S2TM	24,41	.961	35,05	1.380	11.82	8.13	5.94	3.88	3	2	1/4 - 20	56-1018	56-2015
7S2.5TM-4MT	30,15	1.187	35,05	1.380	12.82	8.19	5.26	4.88	4	2.5	5/16-18	56-1018	56-2015
7S3TM	35,08	1.381	47,73	1.879	16.13	11.50	9.00	4.88	4	3	5/16-18	56-1585	56-2020
7S4TM	47,75	1.880	65,28	2.570	17.63	13.00	10.50	4.88	4	4	5/16-18	56-1585	56-2020
7S5TM	63,50	2.500	88,90	3.500	21.13	15.25	12.50	6.13	5	5	1/2 - 13	56-1025	56-2125
7S7TM	88,93	3.501	114,30	4.500	22.28	16.40	12.25	6.13	5	7	1/2 - 13	56-1025	56-2125

NOTE: CSMS = Morse taper size.

■ Straight Flute Holders • Long

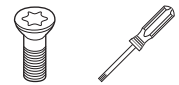
long	D1		D1 max		L	L1	L4 max	LS	CSMS system size	seat size	CS	insert screw	Torx wrench
	mm	in	mm	in									
7SZTL	11,10	.437	12,90	.508	8.51	5.57	3.50	3.13	2	Z	8 - 32	56-1015	56-2026
7S0TL	12,93	.509	17,65	.695	9.88	6.94	4.87	3.13	2	0	8 - 32	56-1014	56-2017
7S1TL	17,53	.690	24,38	.960	12.60	8.91	6.72	3.88	3	1	1/4 - 20	56-1020	56-2028
7S2TL	24,41	.961	35,05	1.380	14.19	10.50	8.31	3.88	3	2	1/4 - 20	56-1018	56-2015
7S3TL	35,08	1.381	47,73	1.879	20.88	16.25	13.75	4.88	4	3	5/16-18	56-1585	56-2020
7S4TL	47,75	1.880	65,28	2.570	23.75	19.12	16.62	4.88	4	4	5/16-18	56-1585	56-2020
7S5TL	63,50	2.500	88,90	3.500	26.88	21.00	18.25	6.13	5	5	1/2 - 13	56-1025	56-2125
7S7TL	88,93	3.501	114,30	4.500	30.53	24.65	19.45	6.13	5	7	1/2 - 13	56-1025	56-2125

NOTE: CSMS = Morse taper size.

■ Straight Flute Holders • Extra Long

extra long	D1		D1 max		L	L1	L4 max	LS	CSMS system size	seat size	CS	insert screw	Torx wrench
	mm	in	mm	in									
7S0TE	12,93	.509	17,65	.695	12.93	10.00	7.80	3.13	2	0	8 - 32	56-1014	56-2017
7S0.5TE	15,47	.609	17,65	.695	12.93	9.80	7.80	3.13	2	—	8 - 32	56-1014	56-2017
7S2TE	24,41	.961	35,05	1.380	17.26	13.57	11.38	3.88	3	2	1/4 - 20	56-1018	56-2015

NOTE: CSMS = Morse taper size.



# On the Web

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# HydroForce™ HT Chuck



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

HydroForce™ HT Chuck High Torque for High Metal  
Removal Rates (MRR) and Superior Surface Finish

- HydroForce gives you an unmatched combination of accuracy and clamping forces.
- Compact and stable design.
- Advanced hydraulic clamping with lowest runout and superior vibration dampening.
- Balanced quality to lower vibration, especially at high speeds.
- Focused and flexible product offering.

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Authorized Distributor or visit [widia.com](http://widia.com).


**WIDIA** 



## Indexable Drills

Introduction..... T2-T3  
Top Cut 4..... T4-T60



		standard						hole tolerance	standard range			customized solution range		
		● first choice ○ alternate choice							diameter range		drilling depth L/D1	diameter range		drilling depth
		P	M	K	N	S	H		D1 mm	D1 in		D1 mm	D1 inch	
		min-max		min-max		min-max			min-max			min-max		
	<b>Top Cut 4™</b> Indexable Drill Body Short Hole Drilling	●	●	●				IT9-11	12-68	.473-2.5	2 x D 3 x D 4 x D 5 x D	12-110	.473-4.33	2-5 x D <sup>2)</sup>

In regard to insert and drill coatings, anything is possible. If a specific insert or drill is not suitable for your workpiece material, please contact our Engineered Solutions Department for an offer about special coatings and edge preparations.

\*Except for L/D 5 x D.

1) Other shank styles available as customized solution.

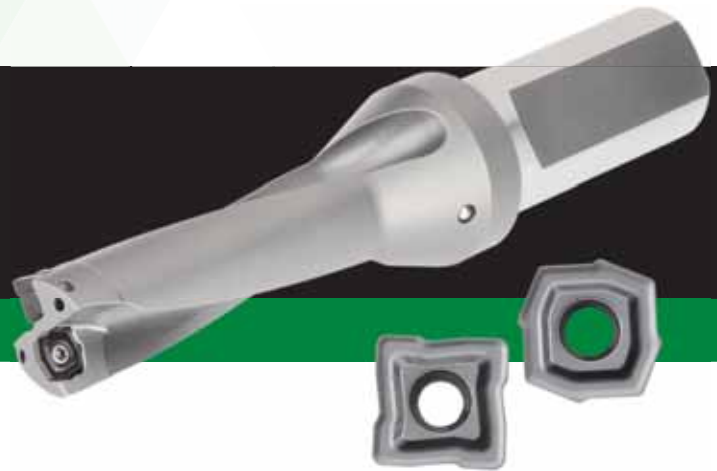
2) Dependent on the application, up to 6 x D is possible.

● standard capabilities <sup>1)</sup>			● standard ○ customized solution capabilities											page(s)
Coolant														
	●	●●	●	●	●	●	●	●	●*	●	●	●	●	T8-T31

## WIDIA™ Top Cut 4™ •

New Generation Indexable Drilling System

# Top Cut 4



The new WIDIA Top Cut 4 (TC4) portfolio is a broad offering for customers looking for a versatile indexable drilling platform.

The newly developed TC4 features improved centering capabilities and inserts with four cutting edges for both pocket seats (central and periphery). This, in combination with the renowned WIDIA grade technology, leads to outstanding flexibility and efficiency.

The TC4 platform offers three easy-to-select grades and two geometries applicable for steel, cast iron, and stainless steel materials. It covers the diameter range from .473–2.5" (12–68mm) within the standard offering in L/D ratios of 2–5 x D.

## One Comprehensive Platform

- Standard diameter range covering .473–2.500" (12–68mm) in 2 x D, 3 x D, 4 x D, and 5 x D.
- Four real cutting edges each for entire platform.
- Eight insert sizes to cover complete diameter range.

## Easy to Apply

- No risk of mixing up inner and outer insert due to clear visual differences.
- Easy-to-change inserts, laser marked with geometries and grades.
- Easy-to-use nomenclature guide enabling the tool body and the related insert selection to avoid order failures.

## Highly Versatile

- Breadth of application capabilities include through and cross holes, inclined entry and exit opportunity, 45° corner, half cylindrical, concave, or chain drilling.
- Various geometries and grades available.

## Highest Performance

- 2x four true cutting edges.
- Cutting edge profile of central and periphery insert work together, leading to high stabilization of the drill, preventing drifting of the tool even on irregular surfaces.
- X-offset design to adjust diameter size on turning machines and optimize tolerances on machining centers.
- Apply where speed and economy are prime considerations.
- Three grades to achieve higher tool life at accelerated speeds:
  - WU25CH grade for highest metal removal rate in general applications.
  - WU40PH grade for high toughness demands.
  - WPK10CH grade for high-speed applications.



The guide below provides an example of how to select the Top Cut 4 tool body and accompanying inserts for a stable steel drilling application.

**Metric Body**

<b>TCF</b>	<b>250</b>	<b>R</b>	<b>3</b>	<b>SL</b>	<b>32</b>	<b>M</b>	<b>D</b>
Tool Family Top Cut 4	Diameter Metric = 3 digits (e.g. 250 = 25mm) Inch = 4 digits (e.g. 2500 = 2.5")	Right-Hand Cutting	Length Diameter Ratio L/D = 3 x D	Shank Style SL = Side Lock Adapter	Shank Size	Metric	Insert Size

**Inch Body**

<b>TCF</b>	<b>1000</b>	<b>R</b>	<b>3</b>	<b>SSF</b>	<b>100</b>	<b>D</b>
Tool Family Top Cut 4	Diameter Metric = 3 digits (e.g. 250 = 25mm) Inch = 4 digits (e.g. 2500 = 2.5")	Right-Hand Cutting	Length Diameter Ratio L/D = 3 x D	Shank Style SSF = Straight Shank Flange	Shank Size	Insert Size

**Periphery Insert**

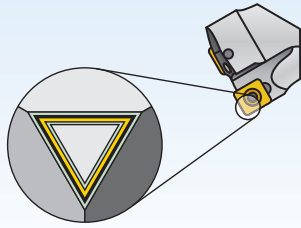
<b>TCF</b>	<b>08</b>	<b>03</b>	<b>08</b>	<b>D</b>	<b>P</b>	<b>V34</b>	<b>WU25CH</b>
Tool Family Top Cut 4	Size In-Circle D1	Insert Thickness	Insert Corner Radius	Insert Size	Insert Positioning C = Central P = Periphery	Insert Geometry	Grade

Insert Geometry – V34 for steel or cast iron or V36 for stainless steel and long chipping steel.

**Insert Guide for Grades**

<b>W</b>	<b>U</b>	<b>25</b>	<b>C</b>	<b>H</b>
<b>W</b>	<b>U</b>	<b>40</b>	<b>P</b>	<b>H</b>
<b>W</b>	<b>PK</b>	<b>10</b>	<b>C</b>	<b>H</b>
WIDIA™	Material Range U = Universal P = Steel K = Cast Iron	Toughness Range Choose high numbers for toughness in stable conditions, low numbers for high wear resistance at continuous cuts.	Coating P = PVD C = CVD	Application H = Holemaking



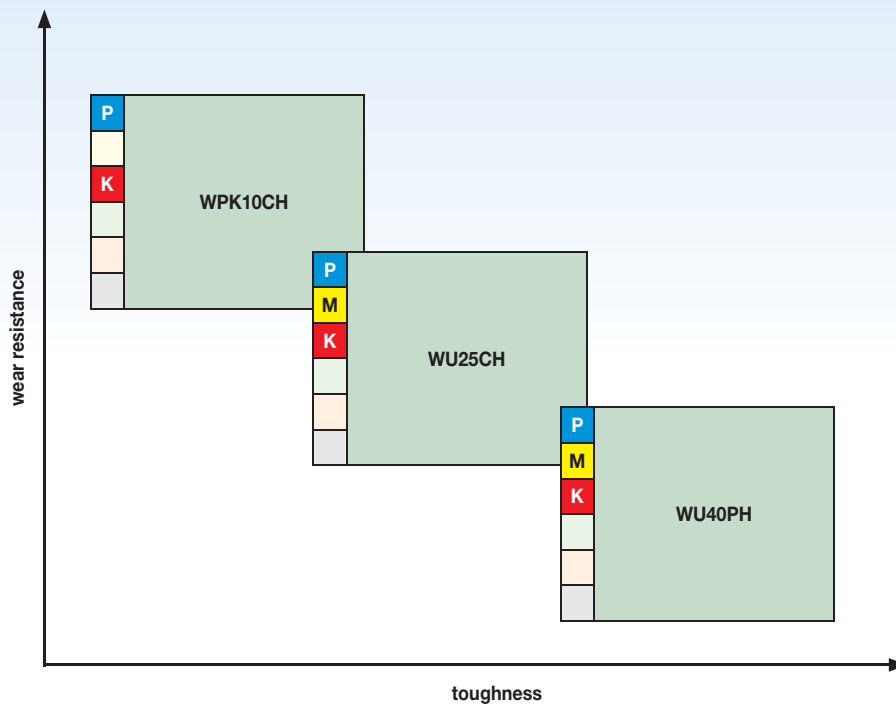


Coatings provide high-speed capability and are engineered for finishing to light roughing.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

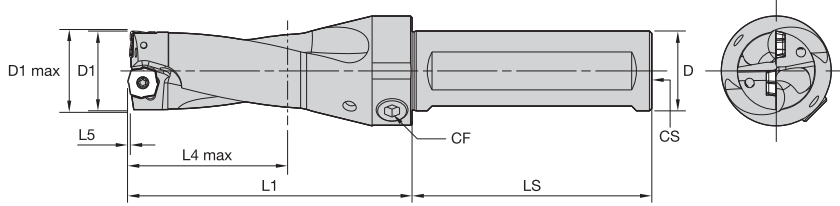
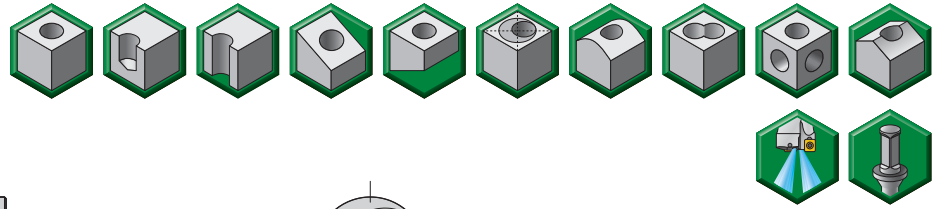
Coating		Grade Description		05	10	15	20	25	30	35	40	45	
Grade	WPK10CH  TiCN-Al <sub>2</sub> O <sub>3</sub>	<p><b>Composition:</b> With an advanced CVD TiCN-Al<sub>2</sub>O<sub>3</sub> coating combined with a cobalt-enriched carbide substrate, this grade offers a balanced combination of deformation-resistance and edge toughness.</p> <p><b>Application:</b> Offers outstanding abrasion and crater wear resistance for high-speed machining of steels and cast irons. Use for very high cutting speeds with low to medium feed rates.</p>	P										
			M										
			K										
WU25CH  TiCN-Al <sub>2</sub> O <sub>3</sub>	<p><b>Composition:</b> Advanced CVD TiCN-Al<sub>2</sub>O<sub>3</sub> coating together with a newly engineered tough carbide substrate. Ensures adequate deformation resistance and excellent edge strength and offers very good wear resistance over a wide range of machining conditions.</p> <p><b>Application:</b> A high productivity grade with high speeds and feeds. First choice for high productivity with very good reliability in steels, stainless steels, and cast iron rates.</p>	P											
		M											
		K											
WU40PH  TiCN-Al <sub>2</sub> O <sub>3</sub>	<p><b>Composition:</b> With a multilayered PVD TiN-TiAlN coating and a tough substrate, this grade withstands interruptions and provides high wear resistance for long tool life.</p> <p><b>Application:</b> First choice for high reliability in most materials. This grade should be used at medium speeds and high feeds due to sharper edges and as a grade for high-toughness applications. It covers steel, stainless steel, cast iron, and high-temp alloys under certain conditions.</p>	P											
		M											
		K											



**WPK10CH:**  
High-Speed Grade

**WU25CH:**  
High Metal Removal Rate Grade

**WU40PH:**  
High Toughness Grade



For information on CF, LS, and CS, see the table on page T9.



■ Top Cut 4 Drill • Inch • 2 x D • SSF Shanks

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537879	TCF0473R2SSF075A	.473	.493	.75	2.309	.946	.017	A	TCF040204AP	TCF040203AC
5537880	TCF0500R2SSF075A	.500	.520	.75	2.372	1.000	.020	A	TCF040204AP	TCF040203AC
5537881	TCF0531R2SSF075A	.531	.551	.75	2.444	1.062	.025	A	TCF040204AP	TCF040203AC
5578226	TCF0563R2SSF075B	.563	.583	.75	2.499	1.126	.017	B	TCF050204BP	TCF060203BC
5578227	TCF0594R2SSF075B	.594	.614	.75	2.571	1.188	.020	B	TCF050204BP	TCF060203BC
5578228	TCF0625R2SSF075B	.625	.645	.75	2.643	1.250	.023	B	TCF050204BP	TCF060203BC
5578229	TCF0656R2SSF075B	.656	.676	.75	2.715	1.312	.028	B	TCF050204BP	TCF060203BC
5578300	TCF0688R2SSF075B	.688	.708	.75	2.856	1.367	.032	B	TCF050204BP	TCF060203BC
5578301	TCF0703R2SSF075B	.703	.723	.75	2.891	1.406	.034	B	TCF050204BP	TCF060203BC
5578302	TCF0719R2SSF075B	.719	.739	.75	2.928	1.438	.036	B	TCF050204BP	TCF060203BC
5578303	TCF0734R2SSF075B	.734	.754	.75	2.963	1.468	.038	B	TCF050204BP	TCF060203BC
5578379	TCF0750R2SSF100C	.750	.770	1.00	3.037	1.500	.024	C	TCF070306CP	TCF070304CC
5578400	TCF0781R2SSF100C	.781	.801	1.00	3.109	1.562	.027	C	TCF070306CP	TCF070304CC
5578401	TCF0813R2SSF100C	.813	.833	1.00	3.183	1.626	.030	C	TCF070306CP	TCF070304CC
5578402	TCF0844R2SSF100C	.844	.864	1.00	3.255	1.688	.034	C	TCF070306CP	TCF070304CC
5578403	TCF0875R2SSF100C	.875	.895	1.00	3.328	1.750	.040	C	TCF070306CP	TCF070304CC
5578404	TCF0906R2SSF100C	.906	.926	1.00	3.400	1.812	.045	C	TCF070306CP	TCF070304CC
5578405	TCF0938R2SSF100C	.938	.958	1.00	3.473	1.876	.037	C	TCF070306CP	TCF070304CC
5537845	TCF0969R2SSF100D	.969	1.008	1.00	3.490	1.938	.032	D	TCF080308DP	TCF090305DC
5537846	TCF0984R2SSF100D	.984	1.023	1.00	3.525	1.968	.034	D	TCF080308DP	TCF090305DC
5537847	TCF1000R2SSF100D	1.000	1.039	1.00	3.562	2.000	.036	D	TCF080308DP	TCF090305DC
5537848	TCF1031R2SSF125D	1.031	1.070	1.25	3.634	2.062	.039	D	TCF080308DP	TCF090305DC
5537849	TCF1063R2SSF125D	1.063	1.102	1.25	3.708	2.126	.045	D	TCF080308DP	TCF090305DC
5537910	TCF1094R2SSF125D	1.094	1.133	1.25	3.780	2.188	.050	D	TCF080308DP	TCF090305DC
5537911	TCF1125R2SSF125D	1.125	1.164	1.25	3.852	2.250	.054	D	TCF080308DP	TCF090305DC
5537912	TCF1156R2SSF125D	1.156	1.195	1.25	3.924	2.312	.059	D	TCF080308DP	TCF090305DC
5537965	TCF1188R2SSF125E	1.188	1.227	1.25	4.077	2.376	.026	E	TCF100408EP	TCF120405EC
5537966	TCF1210R2SSF125E	1.210	1.249	1.25	4.128	2.420	.027	E	TCF100408EP	TCF120405EC
5537967	TCF1219R2SSF125E	1.219	1.258	1.25	4.149	2.438	.028	E	TCF100408EP	TCF120405EC
5537968	TCF1250R2SSF125E	1.250	1.289	1.25	4.221	2.500	.031	E	TCF100408EP	TCF120405EC
5537969	TCF1280R2SSF125E	1.280	1.319	1.25	4.291	2.560	.035	E	TCF100408EP	TCF120405EC
5538060	TCF1313R2SSF125E	1.313	1.352	1.25	4.367	2.626	.040	E	TCF100408EP	TCF120405EC
5538061	TCF1375R2SSF125E	1.375	1.414	1.25	4.511	2.750	.050	E	TCF100408EP	TCF120405EC
5538062	TCF1406R2SSF150E	1.406	1.445	1.50	4.583	2.812	.055	E	TCF100408EP	TCF120405EC
5538063	TCF1438R2SSF150E	1.438	1.477	1.50	4.657	2.876	.059	E	TCF100408EP	TCF120405EC
5578651	TCF1469R2SSF150F	1.469	1.508	1.50	4.681	2.938	.048	F	TCF120412FP	TCF150406FC

(continued)

(Top Cut 4 Drill • Inch • 2 x D • SSF Shanks — continued)

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5578652	TCF1500R2SSF150F	1.500	1.539	1.50	4.752	3.000	.050	F	TCF120412FP	TCF150406FC
5578653	TCF1531R2SSF150F	1.531	1.570	1.50	4.824	3.062	.053	F	TCF120412FP	TCF150406FC
5578654	TCF1563R2SSF150F	1.563	1.602	1.50	4.898	3.126	.056	F	TCF120412FP	TCF150406FC
5578655	TCF1625R2SSF150F	1.625	1.664	1.50	5.042	3.250	.065	F	TCF120412FP	TCF150406FC
5578656	TCF1656R2SSF150F	1.656	1.695	1.50	5.114	3.312	.070	F	TCF120412FP	TCF150406FC
5578657	TCF1688R2SSF150F	1.688	1.727	1.50	5.188	3.376	.077	F	TCF120412FP	TCF150406FC
5578658	TCF1750R2SSF150F	1.750	1.789	1.50	5.332	3.500	.085	F	TCF120412FP	TCF150406FC
5578765	TCF1813R2SSF150G	1.813	1.852	1.50	5.478	3.626	.057	G	TCF150512GP	TCF180508GC
5578766	TCF1875R2SSF150G	1.875	1.914	1.50	5.622	3.750	.063	G	TCF150512GP	TCF180508GC
5578767	TCF1938R2SSF150G	1.938	1.977	1.50	5.768	3.876	.069	G	TCF150512GP	TCF180508GC
5578768	TCF2000R2SSF150G	2.000	2.039	1.50	5.971	4.000	.078	G	TCF150512GP	TCF180508GC
5578769	TCF2125R2SSF200G	2.125	2.164	2.00	6.261	4.250	.100	G	TCF150512GP	TCF180508GC
5578790	TCF2219R2SSF200G	2.219	2.258	2.00	6.479	4.438	.085	G	TCF150512GP	TCF180508GC
5538500	TCF2250R2SSF200H	2.250	2.289	2.00	6.531	4.500	.070	H	TCF180614HP	TCF210608HC
5538501	TCF2375R2SSF200H	2.375	2.414	2.00	6.821	4.750	.084	H	TCF180614HP	TCF210608HC
5538502	TCF2500R2SSF200H	2.500	2.539	2.00	7.111	5.000	.110	H	TCF180614HP	TCF210608HC

**■ Spare Parts**

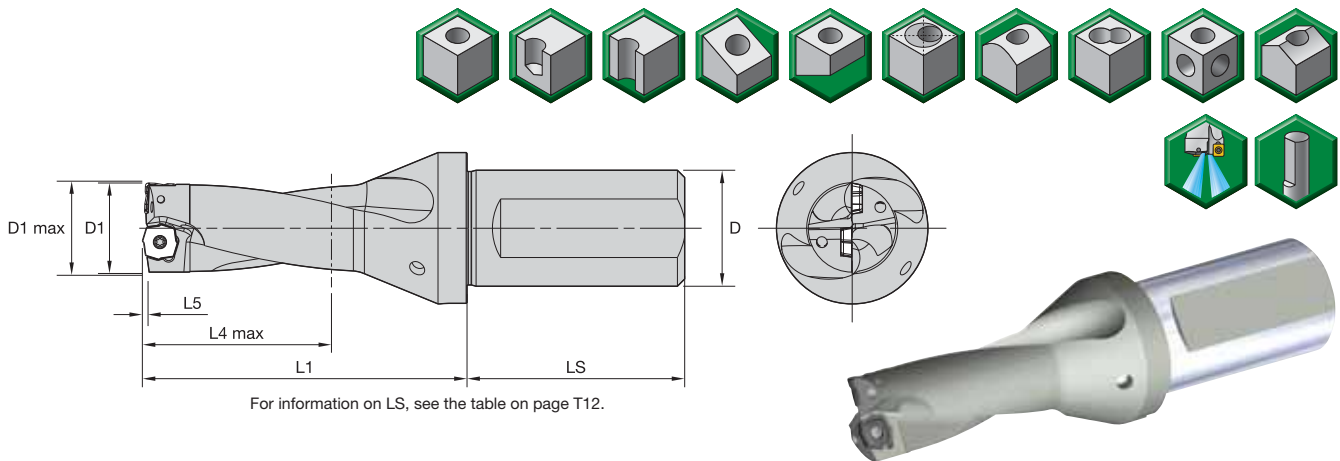

insert size	periphery insert	center insert	insert screw order number	Torx size	Torx driver order number	tightening torque Nm	tightening torque ft. lbs
A	TCF040204AP	TCF040203AC	<b>2025073</b>	T5	<b>2029221</b>	0,40	.295
B	TCF050204BP	TCF060203BC	<b>1175225</b>	T6	<b>1138455</b>	0,53	.390
C	TCF070306CP	TCF070304CC	<b>1021337</b>	T7	<b>2029266</b>	0,90	.663
D	TCF080308DP	TCF090305DC	<b>1134385</b>	T8	<b>2029598</b>	1,10	.811
E	TCF100408EP	TCF120405EC	<b>2018194</b>	T9	<b>1138430</b>	2,00	1.475
F	TCF120412FP	TCF150406FC	<b>1756815</b>	T15	<b>2029596</b>	4,00	2.950
G	TCF150512GP	TCF180508GC	<b>1099645</b>	T20	<b>2029488</b>	6,30	4.646
H	TCF180614HP	TCF210608HC	<b>1823871</b>	T25	<b>2585812</b>	8,80	6.490

D	LS		CF	CS
	mm	in		
.750	50,8	2.000	1/8 - 27 NPT	1/8 - 27 NPT
1.000	76,2	3.000	1/8 - 27 NPT	1/4 - 18 NPT
1.250	82,6	3.250	1/8 - 27 NPT	1/4 - 18 NPT
1.500	95,3	3.750	1/8 - 27 NPT	1/4 - 18 NPT
2.000	101,6	4.000	1/8 - 27 NPT	1/4 - 18 NPT

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.  
 Drill shipped with insert screws and Torx wrench.  
 See pages T28–T31 for inserts.  
 SSF = Straight Shank Flange  
 D1 max is an achievable diameter using x-offset.



**WARNING**  
 During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.



■ Top Cut 4 Drill • Metric • 2 x D • SL Shanks

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537778	TCF120R2SL20MA	12,00	12,50	20	54,6	24,0	0,41	A	TCF040204AP	TCF040203AC
5537779	TCF125R2SL20MA	12,50	13,00	20	55,8	25,0	0,48	A	TCF040204AP	TCF040203AC
5537860	TCF127R2SL20MA	12,70	13,20	20	56,2	26,0	0,51	A	TCF040204AP	TCF040203AC
5537861	TCF130R2SL20MA	13,00	13,50	20	56,9	26,0	0,56	A	TCF040204AP	TCF040203AC
5537862	TCF135R2SL20MA	13,50	14,00	20	58,1	27,0	0,64	A	TCF040204AP	TCF040203AC
5577828	TCF140R2SL25MB	14,00	14,50	25	59,8	28,0	0,42	B	TCF050204BP	TCF060203BC
5577829	TCF145R2SL25MB	14,50	15,00	25	60,9	29,0	0,45	B	TCF050204BP	TCF060203BC
5577920	TCF150R2SL25MB	15,00	15,50	25	62,1	30,0	0,49	B	TCF050204BP	TCF060203BC
5577921	TCF155R2SL25MB	15,50	16,00	25	63,3	31,0	0,54	B	TCF050204BP	TCF060203BC
5577922	TCF160R2SL25MB	16,00	16,50	25	64,4	32,0	0,60	B	TCF050204BP	TCF060203BC
5577923	TCF165R2SL25MB	16,50	17,00	25	65,6	33,0	0,68	B	TCF050204BP	TCF060203BC
5577924	TCF170R2SL25MB	17,00	17,50	25	68,4	34,0	0,74	B	TCF050204BP	TCF060203BC
5577925	TCF175R2SL25MB	17,50	18,00	25	69,6	35,0	0,79	B	TCF050204BP	TCF060203BC
5577926	TCF180R2SL25MB	18,00	18,50	25	70,8	36,0	0,86	B	TCF050204BP	TCF060203BC
5577927	TCF185R2SL25MB	18,50	19,00	25	71,9	37,0	0,83	B	TCF050204BP	TCF060203BC
5578820	TCF190R2SL25MC	19,00	19,50	25	72,1	38,0	0,60	C	TCF070306CP	TCF070304CC
5578821	TCF195R2SL25MC	19,50	20,00	25	73,2	39,0	0,70	C	TCF070306CP	TCF070304CC
5578822	TCF200R2SL25MC	20,00	20,50	25	74,4	40,0	0,70	C	TCF070306CP	TCF070304CC
5578823	TCF205R2SL25MC	20,50	21,00	25	75,6	41,0	0,70	C	TCF070306CP	TCF070304CC
5578824	TCF210R2SL25MC	21,00	21,50	25	76,7	42,0	0,80	C	TCF070306CP	TCF070304CC
5578825	TCF220R2SL25MC	22,00	22,50	25	79,0	44,0	1,00	C	TCF070306CP	TCF070304CC
5578826	TCF225R2SL25MC	22,50	23,00	25	80,2	45,0	1,10	C	TCF070306CP	TCF070304CC
5578827	TCF230R2SL25MC	23,00	23,50	25	81,4	46,0	1,10	C	TCF070306CP	TCF070304CC
5537167	TCF240R2SL25MD	24,00	25,00	25	87,2	48,0	0,78	D	TCF080308DP	TCF090305DC
5537168	TCF250R2SL32MD	25,00	26,00	32	89,6	50,0	0,86	D	TCF080308DP	TCF090305DC
5537169	TCF260R2SL32MD	26,00	27,00	32	91,9	52,0	0,97	D	TCF080308DP	TCF090305DC
5537820	TCF265R2SL32MD	26,50	27,50	32	93,0	53,0	1,05	D	TCF080308DP	TCF090305DC
5537821	TCF270R2SL32MD	27,00	28,00	32	94,2	54,0	1,15	D	TCF080308DP	TCF090305DC
5537822	TCF280R2SL32MD	28,00	29,00	32	96,5	56,0	1,30	D	TCF080308DP	TCF090305DC
5537823	TCF290R2SL32MD	29,00	30,00	32	98,8	58,0	1,45	D	TCF080308DP	TCF090305DC
5537937	TCF300R2SL32ME	30,00	31,00	32	100,2	60,0	0,63	E	TCF100408EP	TCF120405EC
5537938	TCF310R2SL32ME	31,00	32,00	32	102,5	62,0	0,72	E	TCF100408EP	TCF120405EC

(continued)

(Top Cut 4 Drill • Metric • 2 x D • SL Shanks — continued)

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537939	TCF320R2SL32ME	32,00	33,00	32	104,8	64,0	0,82	E	TCF100408EP	TCF120405EC
5537940	TCF330R2SL40ME	33,00	34,00	40	107,1	66,0	0,95	E	TCF100408EP	TCF120405EC
5537941	TCF340R2SL40ME	34,00	35,00	40	109,4	68,0	1,14	E	TCF100408EP	TCF120405EC
5537942	TCF350R2SL40ME	35,00	36,00	40	111,8	70,0	1,30	E	TCF100408EP	TCF120405EC
5537943	TCF360R2SL40ME	36,00	37,00	40	114,1	72,0	1,45	E	TCF100408EP	TCF120405EC
5578539	TCF370R2SL40MF	37,00	38,00	40	118,1	74,0	1,19	F	TCF120412FP	TCF150406FC
5578600	TCF375R2SL40MF	37,50	38,50	40	119,3	75,0	1,23	F	TCF120412FP	TCF150406FC
5578601	TCF380R2SL40MF	38,00	39,00	40	120,5	76,0	1,27	F	TCF120412FP	TCF150406FC
5578602	TCF390R2SL40MF	39,00	40,00	40	122,8	78,0	1,36	F	TCF120412FP	TCF150406FC
5578603	TCF400R2SL40MF	40,00	41,00	40	125,1	80,0	1,47	F	TCF120412FP	TCF150406FC
5578604	TCF410R2SL40MF	41,00	42,00	40	127,4	82,0	1,60	F	TCF120412FP	TCF150406FC
5578605	TCF420R2SL40MF	42,00	43,00	40	129,7	84,0	1,77	F	TCF120412FP	TCF150406FC
5578606	TCF430R2SL40MF	43,00	44,00	40	132,1	86,0	1,99	F	TCF120412FP	TCF150406FC
5578607	TCF440R2SL40MF	44,00	45,00	40	134,4	88,0	2,10	F	TCF120412FP	TCF150406FC
5578608	TCF450R2SL50MF	45,00	46,00	50	136,7	90,0	2,21	F	TCF120412FP	TCF150406FC
5578694	TCF460R2SL50MG	46,00	47,00	50	139,0	92,0	1,45	G	TCF150512GP	TCF180508GC
5578695	TCF470R2SL50MG	47,00	48,00	50	141,3	94,0	1,53	G	TCF150512GP	TCF180508GC
5578696	TCF480R2SL50MG	48,00	49,00	50	143,7	96,0	1,63	G	TCF150512GP	TCF180508GC
5578697	TCF490R2SL50MG	49,00	50,00	50	146,0	98,0	1,74	G	TCF150512GP	TCF180508GC
5578698	TCF500R2SL50MG	50,00	51,00	50	149,8	100,0	1,87	G	TCF150512GP	TCF180508GC
5578699	TCF505R2SL50MG	50,50	51,50	50	151,0	101,0	1,94	G	TCF150512GP	TCF180508GC
5578710	TCF510R2SL50MG	51,00	52,00	50	152,1	102,0	2,02	G	TCF150512GP	TCF180508GC
5578711	TCF520R2SL50MG	52,00	53,00	50	154,4	104,0	2,22	G	TCF150512GP	TCF180508GC
5578712	TCF530R2SL50MG	53,00	54,00	50	156,8	106,0	2,46	G	TCF150512GP	TCF180508GC
5578713	TCF540R2SL50MG	54,00	55,00	50	159,1	108,0	2,53	G	TCF150512GP	TCF180508GC
5578714	TCF550R2SL50MG	55,00	56,00	50	161,4	110,0	2,73	G	TCF150512GP	TCF180508GC
5578715	TCF560R2SL50MG	56,00	57,00	50	163,7	112,0	2,37	G	TCF150512GP	TCF180508GC
5538613	TCF570R2SL50MH	57,00	58,00	50	165,5	114,0	1,76	H	TCF180614HP	TCF210608HC
5538614	TCF580R2SL50MH	58,00	59,00	50	167,9	116,0	1,85	H	TCF180614HP	TCF210608HC
5538615	TCF590R2SL50MH	59,00	60,00	50	170,2	118,0	1,96	H	TCF180614HP	TCF210608HC
5538616	TCF600R2SL50MH	60,00	61,00	50	172,5	120,0	1,42	H	TCF180614HP	TCF210608HC
5538617	TCF610R2SL50MH	61,00	62,00	50	174,8	122,0	2,23	H	TCF180614HP	TCF210608HC
5538618	TCF620R2SL50MH	62,00	63,00	50	177,1	124,0	2,41	H	TCF180614HP	TCF210608HC
5538619	TCF630R2SL50MH	63,00	64,00	50	179,5	126,0	2,64	H	TCF180614HP	TCF210608HC
5538630	TCF640R2SL50MH	64,00	65,00	50	181,8	128,0	2,94	H	TCF180614HP	TCF210608HC
5538631	TCF650R2SL50MH	65,00	66,00	50	184,1	130,0	3,06	H	TCF180614HP	TCF210608HC
5538632	TCF660R2SL50MH	66,00	67,00	50	186,4	132,0	3,18	H	TCF180614HP	TCF210608HC
5538633	TCF670R2SL50MH	67,00	68,00	50	188,7	134,0	3,30	H	TCF180614HP	TCF210608HC
5538634	TCF680R2SL50MH	68,00	69,00	50	191,1	136,0	2,93	H	TCF180614HP	TCF210608HC

(continued)

(Top Cut 4 Drill • Metric • 2 x D • SL Shanks — continued)

■ Spare Parts



insert size	periphery insert	center insert	insert screw order number	Torx size	Torx driver order number	tightening torque Nm	tightening torque ft. lbs
A	TCF040204AP	TCF040203AC	<b>2025073</b>	T5	<b>2029221</b>	0,40	.295
B	TCF050204BP	TCF060203BC	<b>1175225</b>	T6	<b>1138455</b>	0,53	.390
C	TCF070306CP	TCF070304CC	<b>1021337</b>	T7	<b>2029266</b>	0,90	.663
D	TCF080308DP	TCF090305DC	<b>1134385</b>	T8	<b>2029598</b>	1,10	.811
E	TCF100408EP	TCF120405EC	<b>2018194</b>	T9	<b>1138430</b>	2,00	1.475
F	TCF120412FP	TCF150406FC	<b>1756815</b>	T15	<b>2029596</b>	4,00	2.950
G	TCF150512GP	TCF180508GC	<b>1099645</b>	T20	<b>2029488</b>	6,30	4.646
H	TCF180614HP	TCF210608HC	<b>1823871</b>	T25	<b>1022519</b>	8,80	6.490

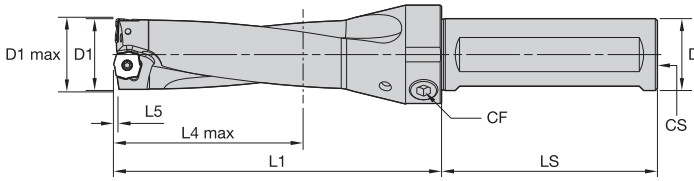
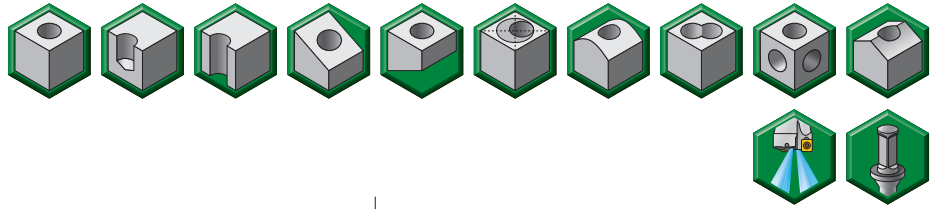
D	LS	
	mm	in
20,00	50	1.969
25,00	56	2.205
32,00	60	2.362
40,00	70	2.756
50,00	80	3.150

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.  
 Drill shipped with insert screws and Torx wrench.  
 See pages T28–T31 for inserts.  
 SL = Side Lock  
 D1 max is an achievable diameter using x-offset.



**WARNING**

During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.



For information on CF, LS, and CS, see the table on page T14.



■ **Top Cut 4 Drill • Inch • 3 x D • SSF Shanks**

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537882	TCF0473R3SSF075A	.473	.493	.75	2.782	1.431	.017	A	TCF040204AP	TCF040203AC
5537883	TCF0500R3SSF075A	.500	.520	.75	2.872	1.500	.020	A	TCF040204AP	TCF040203AC
5537884	TCF0531R3SSF075A	.531	.551	.75	2.975	1.593	.025	A	TCF040204AP	TCF040203AC
5578304	TCF0563R3SSF075B	.563	.583	.75	3.062	1.689	.017	B	TCF050204BP	TCF060203BC
5578305	TCF0594R3SSF075B	.594	.614	.75	3.165	1.782	.020	B	TCF050204BP	TCF060203BC
5578306	TCF0625R3SSF075B	.625	.645	.75	3.268	1.875	.023	B	TCF050204BP	TCF060203BC
5578307	TCF0656R3SSF075B	.656	.676	.75	3.371	1.968	.028	B	TCF050204BP	TCF060203BC
5578308	TCF0688R3SSF075B	.688	.708	.75	3.544	2.064	.032	B	TCF050204BP	TCF060203BC
5578309	TCF0703R3SSF075B	.703	.723	.75	3.594	2.109	.034	B	TCF050204BP	TCF060203BC
5578310	TCF0719R3SSF075B	.719	.739	.75	3.647	2.157	.036	B	TCF050204BP	TCF060203BC
5578311	TCF0734R3SSF075B	.734	.754	.75	3.697	2.202	.038	B	TCF050204BP	TCF060203BC
5578406	TCF0750R3SSF100C	.750	.770	1.00	3.787	2.250	.024	C	TCF070306CP	TCF070304CC
5578407	TCF0781R3SSF100C	.781	.801	1.00	3.890	2.343	.027	C	TCF070306CP	TCF070304CC
5578408	TCF0813R3SSF100C	.813	.833	1.00	3.996	2.439	.030	C	TCF070306CP	TCF070304CC
5578409	TCF0844R3SSF100C	.844	.864	1.00	4.099	2.532	.034	C	TCF070306CP	TCF070304CC
5578410	TCF0875R3SSF100C	.875	.895	1.00	4.203	2.625	.040	C	TCF070306CP	TCF070304CC
5578411	TCF0906R3SSF100C	.906	.926	1.00	4.306	2.718	.045	C	TCF070306CP	TCF070304CC
5578412	TCF0938R3SSF100C	.938	.958	1.00	4.411	2.814	.037	C	TCF070306CP	TCF070304CC
5537913	TCF0969R3SSF100D	.969	1.008	1.00	4.459	2.907	.032	D	TCF080308DP	TCF090305DC
5537914	TCF0984R3SSF100D	.984	1.023	1.00	4.509	2.952	.034	D	TCF080308DP	TCF090305DC
5537915	TCF1000R3SSF100D	1.000	1.039	1.00	4.562	3.000	.036	D	TCF080308DP	TCF090305DC
5537916	TCF1031R3SSF125D	1.031	1.070	1.25	4.665	3.093	.039	D	TCF080308DP	TCF090305DC
5537917	TCF1063R3SSF125D	1.063	1.102	1.25	4.771	3.189	.045	D	TCF080308DP	TCF090305DC
5537918	TCF1094R3SSF125D	1.094	1.133	1.25	4.874	3.282	.050	D	TCF080308DP	TCF090305DC
5537919	TCF1125R3SSF125D	1.125	1.164	1.25	4.977	3.375	.054	D	TCF080308DP	TCF090305DC
5537920	TCF1156R3SSF125D	1.156	1.195	1.25	5.080	3.468	.059	D	TCF080308DP	TCF090305DC
5538064	TCF1188R3SSF125E	1.188	1.227	1.25	5.265	3.564	.026	E	TCF100408EP	TCF120405EC
5538065	TCF1210R3SSF125E	1.210	1.249	1.25	5.338	3.630	.027	E	TCF100408EP	TCF120405EC
5538066	TCF1219R3SSF125E	1.219	1.258	1.25	5.368	3.657	.028	E	TCF100408EP	TCF120405EC
5538067	TCF1250R3SSF125E	1.250	1.289	1.25	5.471	3.750	.031	E	TCF100408EP	TCF120405EC
5538068	TCF1280R3SSF125E	1.280	1.319	1.25	5.571	3.840	.035	E	TCF100408EP	TCF120405EC
5538069	TCF1313R3SSF125E	1.313	1.352	1.25	5.680	3.939	.040	E	TCF100408EP	TCF120405EC
5538080	TCF1375R3SSF125E	1.375	1.414	1.25	5.886	4.125	.050	E	TCF100408EP	TCF120405EC
5538081	TCF1406R3SSF150E	1.406	1.445	1.50	5.989	4.218	.055	E	TCF100408EP	TCF120405EC
5538082	TCF1438R3SSF150E	1.438	1.477	1.50	6.095	4.314	.059	E	TCF100408EP	TCF120405EC
5578659	TCF1469R3SSF150F	1.469	1.508	1.50	6.149	4.407	.048	F	TCF120412FP	TCF150406FC

(continued)

(Top Cut 4 Drill • Inch • 3 x D • SSF Shanks — continued)

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5578670	TCF1500R3SSF150F	1.500	1.539	1.50	6.252	4.500	.050	F	TCF120412FP	TCF150406FC
5578671	TCF1531R3SSF150F	1.531	1.570	1.50	6.355	4.593	.053	F	TCF120412FP	TCF150406FC
5578672	TCF1563R3SSF150F	1.563	1.602	1.50	6.461	4.689	.056	F	TCF120412FP	TCF150406FC
5578673	TCF1625R3SSF150F	1.625	1.664	1.50	6.667	4.875	.065	F	TCF120412FP	TCF150406FC
5578674	TCF1656R3SSF150F	1.656	1.695	1.50	6.770	4.968	.070	F	TCF120412FP	TCF150406FC
5578675	TCF1688R3SSF150F	1.688	1.727	1.50	6.876	5.064	.077	F	TCF120412FP	TCF150406FC
5578676	TCF1750R3SSF150F	1.750	1.789	1.50	7.082	5.250	.085	F	TCF120412FP	TCF150406FC
5578791	TCF1813R3SSF150G	1.813	1.852	1.50	7.291	5.439	.057	G	TCF150512GP	TCF180508GC
5578792	TCF1875R3SSF150G	1.875	1.914	1.50	7.497	5.625	.063	G	TCF150512GP	TCF180508GC
5578793	TCF1938R3SSF150G	1.938	1.977	1.50	7.706	5.814	.069	G	TCF150512GP	TCF180508GC
5578794	TCF2000R3SSF150G	2.000	2.039	1.50	7.971	6.000	.078	G	TCF150512GP	TCF180508GC
5578795	TCF2125R3SSF200G	2.125	2.164	2.00	8.386	6.375	.100	G	TCF150512GP	TCF180508GC
5578796	TCF2219R3SSF200G	2.219	2.258	2.00	8.698	6.657	.085	G	TCF150512GP	TCF180508GC
5538503	TCF2250R3SSF200H	2.250	2.289	2.00	8.781	6.750	.070	H	TCF180614HP	TCF210608HC
5538504	TCF2375R3SSF200H	2.375	2.414	2.00	9.196	7.125	.084	H	TCF180614HP	TCF210608HC
5538505	TCF2500R3SSF200H	2.500	2.539	2.00	9.611	7.500	.110	H	TCF180614HP	TCF210608HC

■ Spare Parts



insert size	periphery insert	center insert	insert screw order number	Torx size	Torx driver order number	tightening torque Nm	tightening torque ft. lbs
A	TCF040204AP	TCF040203AC	2025073	T5	2029221	0,40	.295
B	TCF050204BP	TCF060203BC	1175225	T6	1138455	0,53	.390
C	TCF070306CP	TCF070304CC	1021337	T7	2029266	0,90	.663
D	TCF080308DP	TCF090305DC	1134385	T8	2029598	1,10	.811
E	TCF100408EP	TCF120405EC	2018194	T9	1138430	2,00	1.475
F	TCF120412FP	TCF150406FC	1756815	T15	2029596	4,00	2.950
G	TCF150512GP	TCF180508GC	1099645	T20	2029488	6,30	4.646
H	TCF180614HP	TCF210608HC	1823871	T25	2585812	8,80	6.490

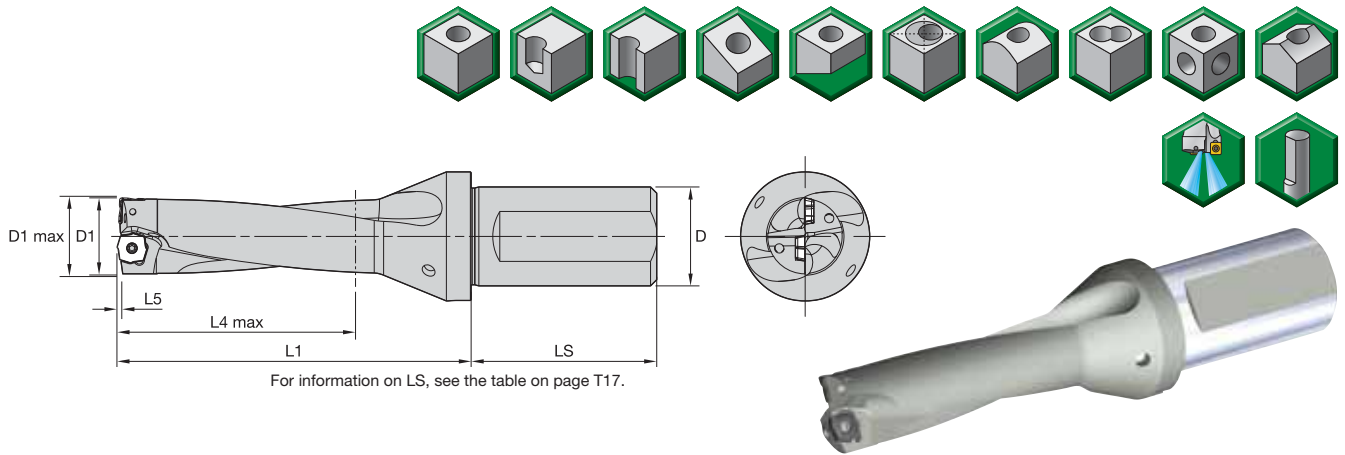
D	LS		CF	CS
	mm	in		
.750	50,8	2.000	1/8 - 27 NPT	1/8 - 27 NPT
1.000	76,2	3.000	1/8 - 27 NPT	1/4 - 18 NPT
1.250	82,6	3.250	1/8 - 27 NPT	1/4 - 18 NPT
1.500	95,3	3.750	1/8 - 27 NPT	1/4 - 18 NPT
2.000	101,6	4.000	1/8 - 27 NPT	1/4 - 18 NPT

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.  
Drill shipped with insert screws and Torx wrench.  
See pages T28–T31 for inserts.  
SSF = Straight Shank Flange  
D1 max is an achievable diameter using x-offset.



**WARNING**  
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.





For information on LS, see the table on page T17.

■ Top Cut 4 Drill • Metric • 3 x D • SL Shanks

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537863	TCF120R3SL20MA	12,00	12,50	20	66,6	36,0	0,41	A	TCF040204AP	TCF040203AC
5537864	TCF125R3SL20MA	12,50	13,00	20	68,3	37,5	0,48	A	TCF040204AP	TCF040203AC
5537866	TCF127R3SL20MA	12,70	13,20	20	68,9	38,1	0,51	A	TCF040204AP	TCF040203AC
5537867	TCF130R3SL20MA	13,00	13,50	20	69,9	39,0	0,56	A	TCF040204AP	TCF040203AC
5537868	TCF135R3SL20MA	13,50	14,00	20	71,6	41,0	0,64	A	TCF040204AP	TCF040203AC
5577928	TCF140R3SL25MB	14,00	14,50	25	73,8	42,0	0,42	B	TCF050204BP	TCF060203BC
5577929	TCF145R3SL25MB	14,50	15,00	25	75,4	43,5	0,45	B	TCF050204BP	TCF060203BC
5577930	TCF150R3SL25MB	15,00	15,50	25	77,1	45,0	0,49	B	TCF050204BP	TCF060203BC
5577931	TCF155R3SL25MB	15,50	16,00	25	78,8	46,5	0,54	B	TCF050204BP	TCF060203BC
5577932	TCF160R3SL25MB	16,00	16,50	25	80,4	48,0	0,60	B	TCF050204BP	TCF060203BC
5577933	TCF165R3SL25MB	16,50	17,00	25	82,1	49,5	0,68	B	TCF050204BP	TCF060203BC
5577934	TCF170R3SL25MB	17,00	17,50	25	85,4	51,0	0,74	B	TCF050204BP	TCF060203BC
5577935	TCF175R3SL25MB	17,50	18,00	25	87,1	52,5	0,79	B	TCF050204BP	TCF060203BC
5577936	TCF180R3SL25MB	18,00	18,50	25	88,8	54,0	0,86	B	TCF050204BP	TCF060203BC
5577937	TCF185R3SL25MB	18,50	19,00	25	90,4	55,5	0,83	B	TCF050204BP	TCF060203BC
5578828	TCF190R3SL25MC	19,00	19,50	25	91,1	57,0	0,60	C	TCF070306CP	TCF070304CC
5578829	TCF195R3SL25MC	19,50	20,00	25	92,7	58,5	0,70	C	TCF070306CP	TCF070304CC
5578830	TCF200R3SL25MC	20,00	20,50	25	94,4	60,0	0,70	C	TCF070306CP	TCF070304CC
5578831	TCF205R3SL25MC	20,50	21,00	25	96,1	61,5	0,70	C	TCF070306CP	TCF070304CC
5578832	TCF210R3SL25MC	21,00	21,50	25	97,7	63,0	0,80	C	TCF070306CP	TCF070304CC
5578833	TCF220R3SL25MC	22,00	22,50	25	101,0	66,0	1,00	C	TCF070306CP	TCF070304CC
5578834	TCF225R3SL25MC	22,50	23,00	25	102,7	67,5	1,10	C	TCF070306CP	TCF070304CC
5578835	TCF230R3SL25MC	23,00	23,50	25	104,4	69,0	1,10	C	TCF070306CP	TCF070304CC
5537824	TCF240R3SL25MD	24,00	25,00	25	111,2	72,0	0,78	D	TCF080308DP	TCF090305DC
5537825	TCF250R3SL32MD	25,00	26,00	32	114,6	75,0	0,86	D	TCF080308DP	TCF090305DC
5537826	TCF260R3SL32MD	26,00	27,00	32	117,9	78,0	0,97	D	TCF080308DP	TCF090305DC
5537827	TCF265R3SL32MD	26,50	27,50	32	119,5	79,5	1,05	D	TCF080308DP	TCF090305DC
5537828	TCF270R3SL32MD	27,00	28,00	32	121,2	81,0	1,15	D	TCF080308DP	TCF090305DC
5537829	TCF280R3SL32MD	28,00	29,00	32	124,5	84,0	1,30	D	TCF080308DP	TCF090305DC
5537830	TCF290R3SL32MD	29,00	30,00	32	127,8	87,0	1,45	D	TCF080308DP	TCF090305DC
5537944	TCF300R3SL32ME	30,00	31,00	32	130,2	90,0	0,63	E	TCF100408EP	TCF120405EC
5537945	TCF310R3SL32ME	31,00	32,00	32	133,5	93,0	0,72	E	TCF100408EP	TCF120405EC

(continued)

(Top Cut 4 Drill • Metric • 3 x D • SL Shanks — continued)

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537946	TCF320R3SL32ME	32,00	33,00	32	136,8	96,0	0,82	E	TCF100408EP	TCF120405EC
5537947	TCF330R3SL40ME	33,00	34,00	40	140,1	99,0	0,95	E	TCF100408EP	TCF120405EC
5537948	TCF340R3SL40ME	34,00	35,00	40	143,4	102,0	1,14	E	TCF100408EP	TCF120405EC
5537949	TCF350R3SL40ME	35,00	36,00	40	146,8	105,0	1,30	E	TCF100408EP	TCF120405EC
5537950	TCF360R3SL40ME	36,00	37,00	40	150,1	108,0	1,45	E	TCF100408EP	TCF120405EC
5578609	TCF370R3SL40MF	37,00	38,00	40	155,1	111,0	1,19	F	TCF120412FP	TCF150406FC
5578610	TCF375R3SL40MF	37,50	38,50	40	156,8	113,0	1,23	F	TCF120412FP	TCF150406FC
5578611	TCF380R3SL40MF	38,00	39,00	40	158,5	114,0	1,27	F	TCF120412FP	TCF150406FC
5578612	TCF390R3SL40MF	39,00	40,00	40	161,8	117,0	1,36	F	TCF120412FP	TCF150406FC
5578613	TCF400R3SL40MF	40,00	41,00	40	165,1	120,0	1,47	F	TCF120412FP	TCF150406FC
5578614	TCF410R3SL40MF	41,00	42,00	40	168,4	123,0	1,60	F	TCF120412FP	TCF150406FC
5578615	TCF420R3SL40MF	42,00	43,00	40	171,7	126,0	1,77	F	TCF120412FP	TCF150406FC
5578616	TCF430R3SL40MF	43,00	44,00	40	175,1	129,0	1,99	F	TCF120412FP	TCF150406FC
5578617	TCF440R3SL40MF	44,00	45,00	40	178,4	132,0	2,10	F	TCF120412FP	TCF150406FC
5578618	TCF450R3SL50MF	45,00	46,00	50	181,7	135,0	2,21	F	TCF120412FP	TCF150406FC
5578716	TCF460R3SL50MG	46,00	47,00	50	185,0	138,0	1,45	G	TCF150512GP	TCF180508GC
5578717	TCF470R3SL50MG	47,00	48,00	50	188,3	141,0	1,53	G	TCF150512GP	TCF180508GC
5578718	TCF480R3SL50MG	48,00	49,00	50	191,7	144,0	1,63	G	TCF150512GP	TCF180508GC
5578719	TCF490R3SL50MG	49,00	50,00	50	195,0	147,0	1,74	G	TCF150512GP	TCF180508GC
5578720	TCF500R3SL50MG	50,00	51,00	50	199,8	150,0	1,87	G	TCF150512GP	TCF180508GC
5578721	TCF505R3SL50MG	50,50	51,50	50	201,5	152,0	1,94	G	TCF150512GP	TCF180508GC
5578722	TCF510R3SL50MG	51,00	52,00	50	203,1	153,0	2,02	G	TCF150512GP	TCF180508GC
5578723	TCF520R3SL50MG	52,00	53,00	50	206,4	156,0	2,22	G	TCF150512GP	TCF180508GC
5578724	TCF530R3SL50MG	53,00	54,00	50	209,8	159,0	2,46	G	TCF150512GP	TCF180508GC
5578726	TCF540R3SL50MG	54,00	55,00	50	213,1	162,0	2,53	G	TCF150512GP	TCF180508GC
5578727	TCF550R3SL50MG	55,00	56,00	50	216,4	165,0	2,73	G	TCF150512GP	TCF180508GC
5578728	TCF560R3SL50MG	56,00	57,00	50	219,7	168,0	2,37	G	TCF150512GP	TCF180508GC
5538635	TCF570R3SL50MH	57,00	58,00	50	222,5	171,0	1,76	H	TCF180614HP	TCF210608HC
5538636	TCF580R3SL50MH	58,00	59,00	50	225,9	174,0	1,85	H	TCF180614HP	TCF210608HC
5538637	TCF590R3SL50MH	59,00	60,00	50	229,2	177,0	1,96	H	TCF180614HP	TCF210608HC
5538638	TCF600R3SL50MH	60,00	61,00	50	232,5	180,0	1,42	H	TCF180614HP	TCF210608HC
5538639	TCF610R3SL50MH	61,00	62,00	50	235,8	183,0	2,23	H	TCF180614HP	TCF210608HC
5538640	TCF620R3SL50MH	62,00	63,00	50	239,1	186,0	2,41	H	TCF180614HP	TCF210608HC
5538641	TCF630R3SL50MH	63,00	64,00	50	242,5	189,0	2,64	H	TCF180614HP	TCF210608HC
5538642	TCF640R3SL50MH	64,00	65,00	50	245,8	192,0	2,94	H	TCF180614HP	TCF210608HC
5538643	TCF650R3SL50MH	65,00	66,00	50	249,1	195,0	3,06	H	TCF180614HP	TCF210608HC
5538644	TCF660R3SL50MH	66,00	67,00	50	252,4	198,0	3,18	H	TCF180614HP	TCF210608HC
5538645	TCF670R3SL50MH	67,00	68,00	50	255,7	201,0	3,30	H	TCF180614HP	TCF210608HC
5538646	TCF680R3SL50MH	68,00	69,00	50	259,1	204,0	2,93	H	TCF180614HP	TCF210608HC

(continued)

(Top Cut 4 Drill • Metric • 3 x D • SL Shanks — continued)

■ Spare Parts



insert size	periphery insert	center insert	insert screw order number	Torx size	Torx driver order number	tightening torque Nm	tightening torque ft. lbs
A	TCF040204AP	TCF040203AC	<b>2025073</b>	T5	<b>2029221</b>	0,40	.295
B	TCF050204BP	TCF060203BC	<b>1175225</b>	T6	<b>1138455</b>	0,53	.390
C	TCF070306CP	TCF070304CC	<b>1021337</b>	T7	<b>2029266</b>	0,90	.663
D	TCF080308DP	TCF090305DC	<b>1134385</b>	T8	<b>2029598</b>	1,10	.811
E	TCF100408EP	TCF120405EC	<b>2018194</b>	T9	<b>1138430</b>	2,00	1.475
F	TCF120412FP	TCF150406FC	<b>1756815</b>	T15	<b>2029596</b>	4,00	2.950
G	TCF150512GP	TCF180508GC	<b>1099645</b>	T20	<b>2029488</b>	6,30	4.646
H	TCF180614HP	TCF210608HC	<b>1823871</b>	T25	<b>1022519</b>	8,80	6.490

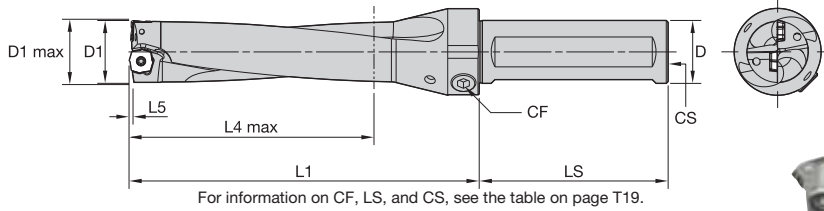
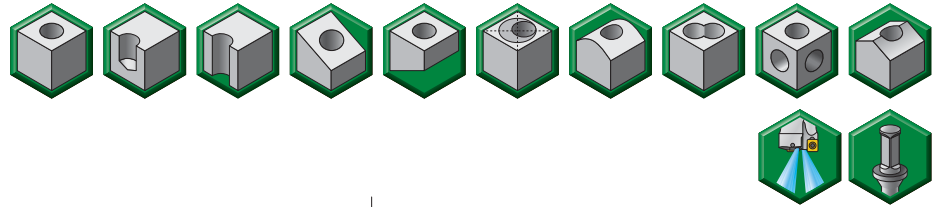
D	LS	
	mm	in
20,00	50	1.969
25,00	56	2.205
32,00	60	2.362
40,00	70	2.756
50,00	80	3.150

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.  
 Drill shipped with insert screws and Torx wrench.  
 See pages T28–T31 for inserts.  
 SL = Side Lock  
 D1 max is an achievable diameter using x-offset.



**WARNING**

During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.



■ **Top Cut 4 Drill • Inch • 4 x D • SSF Shanks**

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537885	TCF0473R4SSF075A	.473	.493	.75	3.255	1.891	.017	A	TCF040204AP	TCF040203AC
5537886	TCF0500R4SSF075A	.500	.520	.75	3.372	2.000	.020	A	TCF040204AP	TCF040203AC
5537887	TCF0531R4SSF075A	.531	.551	.75	3.506	2.124	.025	A	TCF040204AP	TCF040203AC
5578312	TCF0563R4SSF075B	.563	.583	.75	3.625	2.252	.017	B	TCF050204BP	TCF060203BC
5578313	TCF0594R4SSF075B	.594	.614	.75	3.759	2.376	.020	B	TCF050204BP	TCF060203BC
5578314	TCF0625R4SSF075B	.625	.645	.75	3.893	2.500	.023	B	TCF050204BP	TCF060203BC
5578315	TCF0656R4SSF075B	.656	.676	.75	4.027	2.624	.028	B	TCF050204BP	TCF060203BC
5578316	TCF0688R4SSF075B	.688	.708	.75	4.232	2.752	.032	B	TCF050204BP	TCF060203BC
5578317	TCF0703R4SSF075B	.703	.723	.75	4.297	2.812	.034	B	TCF050204BP	TCF060203BC
5578318	TCF0719R4SSF075B	.719	.739	.75	4.366	2.876	.036	B	TCF050204BP	TCF060203BC
5578319	TCF0734R4SSF075B	.734	.754	.75	4.431	2.936	.038	B	TCF050204BP	TCF060203BC
5578413	TCF0750R4SSF100C	.750	.770	1.00	4.537	3.000	.024	C	TCF070306CP	TCF070304CC
5578414	TCF0781R4SSF100C	.781	.801	1.00	4.671	3.124	.027	C	TCF070306CP	TCF070304CC
5578415	TCF0813R4SSF100C	.813	.833	1.00	4.809	3.252	.030	C	TCF070306CP	TCF070304CC
5578416	TCF0844R4SSF100C	.844	.864	1.00	4.943	3.376	.034	C	TCF070306CP	TCF070304CC
5578417	TCF0875R4SSF100C	.875	.895	1.00	5.078	3.500	.040	C	TCF070306CP	TCF070304CC
5578418	TCF0906R4SSF100C	.906	.926	1.00	5.212	3.624	.045	C	TCF070306CP	TCF070304CC
5578419	TCF0938R4SSF100C	.938	.958	1.00	5.349	3.752	.037	C	TCF070306CP	TCF070304CC
5537921	TCF0969R4SSF100D	.969	1.008	1.00	5.428	3.876	.032	D	TCF080308DP	TCF090305DC
5537922	TCF0984R4SSF100D	.984	1.023	1.00	5.493	3.936	.034	D	TCF080308DP	TCF090305DC
5537923	TCF1000R4SSF100D	1.000	1.039	1.00	5.562	4.000	.036	D	TCF080308DP	TCF090305DC
5537924	TCF1031R4SSF125D	1.031	1.070	1.25	5.696	4.124	.039	D	TCF080308DP	TCF090305DC
5537925	TCF1063R4SSF125D	1.063	1.102	1.25	5.834	4.252	.045	D	TCF080308DP	TCF090305DC
5537926	TCF1094R4SSF125D	1.094	1.133	1.25	5.968	4.376	.050	D	TCF080308DP	TCF090305DC
5537927	TCF1125R4SSF125D	1.125	1.164	1.25	6.102	4.500	.054	D	TCF080308DP	TCF090305DC
5537928	TCF1156R4SSF125D	1.156	1.195	1.25	6.236	4.624	.059	D	TCF080308DP	TCF090305DC
5538083	TCF1188R4SSF125E	1.188	1.227	1.25	6.453	4.752	.026	E	TCF100408EP	TCF120405EC
5538084	TCF1210R4SSF125E	1.210	1.249	1.25	6.548	4.840	.027	E	TCF100408EP	TCF120405EC
5538085	TCF1219R4SSF125E	1.219	1.258	1.25	6.587	4.876	.028	E	TCF100408EP	TCF120405EC
5538086	TCF1250R4SSF125E	1.250	1.289	1.25	6.721	5.000	.031	E	TCF100408EP	TCF120405EC
5538087	TCF1280R4SSF125E	1.280	1.319	1.25	6.851	5.120	.035	E	TCF100408EP	TCF120405EC
5538088	TCF1313R4SSF125E	1.313	1.352	1.25	6.993	5.252	.040	E	TCF100408EP	TCF120405EC
5538089	TCF1375R4SSF125E	1.375	1.414	1.25	7.261	5.500	.050	E	TCF100408EP	TCF120405EC
5538090	TCF1406R4SSF150E	1.406	1.445	1.50	7.395	5.624	.055	E	TCF100408EP	TCF120405EC
5538091	TCF1438R4SSF150E	1.438	1.477	1.50	7.533	5.752	.059	E	TCF100408EP	TCF120405EC
5578677	TCF1469R4SSF150F	1.469	1.508	1.50	7.618	5.876	.048	F	TCF120412FP	TCF150406FC

(continued)

(Top Cut 4 Drill • Inch • 4 x D • SSF Shanks — continued)

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5578678	TCF1500R4SSF150F	1.500	1.539	1.50	7.752	6.000	.050	F	TCF120412FP	TCF150406FC
5578679	TCF1531R4SSF150F	1.531	1.570	1.50	7.886	6.124	.053	F	TCF120412FP	TCF150406FC
5578680	TCF1563R4SSF150F	1.563	1.602	1.50	8.024	6.252	.056	F	TCF120412FP	TCF150406FC
5578681	TCF1625R4SSF150F	1.625	1.664	1.50	8.292	6.500	.065	F	TCF120412FP	TCF150406FC
5578682	TCF1656R4SSF150F	1.656	1.695	1.50	8.426	6.624	.070	F	TCF120412FP	TCF150406FC
5578683	TCF1688R4SSF150F	1.688	1.727	1.50	8.564	6.752	.077	F	TCF120412FP	TCF150406FC
5578684	TCF1750R4SSF150F	1.750	1.789	1.50	8.832	7.000	.085	F	TCF120412FP	TCF150406FC
5578797	TCF1813R4SSF150G	1.813	1.852	1.50	9.104	7.252	.057	G	TCF150512GP	TCF180508GC
5578798	TCF1875R4SSF150G	1.875	1.914	1.50	9.372	7.500	.063	G	TCF150512GP	TCF180508GC
5578799	TCF1938R4SSF150G	1.938	1.977	1.50	9.644	7.752	.069	G	TCF150512GP	TCF180508GC
5578800	TCF2000R4SSF150G	2.000	2.039	1.50	9.971	8.000	.078	G	TCF150512GP	TCF180508GC
5578801	TCF2125R4SSF200G	2.125	2.164	2.00	10.511	8.500	.100	G	TCF150512GP	TCF180508GC
5578802	TCF2219R4SSF200G	2.219	2.258	2.00	10.917	8.876	.085	G	TCF150512GP	TCF180508GC
5538506	TCF2250R4SSF200H	2.250	2.289	2.00	11.031	9.000	.070	H	TCF180614HP	TCF210608HC
5538507	TCF2375R4SSF200H	2.375	2.414	2.00	11.571	9.500	.084	H	TCF180614HP	TCF210608HC
5538508	TCF2500R4SSF200H	2.500	2.539	2.00	12.111	10.000	.110	H	TCF180614HP	TCF210608HC

**■ Spare Parts**


insert size	periphery insert	center insert	insert screw order number	Torx size	Torx driver order number	tightening torque Nm	tightening torque ft. lbs
A	TCF040204AP	TCF040203AC	<b>2025073</b>	T5	<b>2029221</b>	0,40	.295
B	TCF050204BP	TCF060203BC	<b>1175225</b>	T6	<b>1138455</b>	0,53	.390
C	TCF070306CP	TCF070304CC	<b>1021337</b>	T7	<b>2029266</b>	0,90	.663
D	TCF080308DP	TCF090305DC	<b>1134385</b>	T8	<b>2029598</b>	1,10	.811
E	TCF100408EP	TCF120405EC	<b>2018194</b>	T9	<b>1138430</b>	2,00	1.475
F	TCF120412FP	TCF150406FC	<b>1756815</b>	T15	<b>2029596</b>	4,00	2.950
G	TCF150512GP	TCF180508GC	<b>1099645</b>	T20	<b>2029488</b>	6,30	4.646
H	TCF180614HP	TCF210608HC	<b>1823871</b>	T25	<b>2585812</b>	8,80	6.490

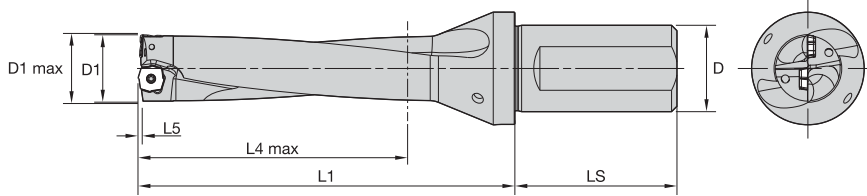
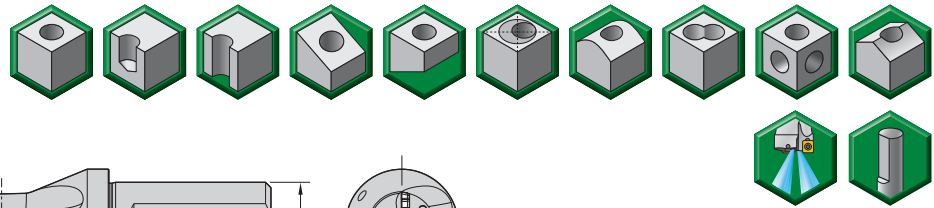
D	LS		CF	CS
	mm	in		
.750	50,8	2.000	1/8 - 27 NPT	1/8 - 27 NPT
1.000	76,2	3.000	1/8 - 27 NPT	1/4 - 18 NPT
1.250	82,6	3.250	1/8 - 27 NPT	1/4 - 18 NPT
1.500	95,3	3.750	1/8 - 27 NPT	1/4 - 18 NPT
2.000	101,6	4.000	1/8 - 27 NPT	1/4 - 18 NPT

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.  
 Drill shipped with insert screws and Torx wrench.  
 See pages T28–T31 for inserts.  
 SSF = Straight Shank Flange  
 D1 max is an achievable diameter using x-offset.



**WARNING**

During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.



For information on LS, see the table on page T22.



■ Top Cut 4 Drill • Metric • 4 x D • SL Shanks

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537869	TCF120R4SL20MA	12,00	12,50	20	78,6	48,0	0,41	A	TCF040204AP	TCF040203AC
5537870	TCF125R4SL20MA	12,50	13,00	20	80,8	50,0	0,48	A	TCF040204AP	TCF040203AC
5537871	TCF127R4SL20MA	12,70	13,20	20	81,6	50,8	0,51	A	TCF040204AP	TCF040203AC
5537872	TCF130R4SL20MA	13,00	13,50	20	82,9	52,0	0,56	A	TCF040204AP	TCF040203AC
5537873	TCF135R4SL20MA	13,50	14,00	20	85,1	54,0	0,64	A	TCF040204AP	TCF040203AC
5577938	TCF140R4SL25MB	14,00	14,50	25	87,8	56,0	0,42	B	TCF050204BP	TCF060203BC
5577939	TCF145R4SL25MB	14,50	15,00	25	89,9	58,0	0,45	B	TCF050204BP	TCF060203BC
5577940	TCF150R4SL25MB	15,00	15,50	25	92,1	60,0	0,49	B	TCF050204BP	TCF060203BC
5577941	TCF155R4SL25MB	15,50	16,00	25	94,3	62,0	0,54	B	TCF050204BP	TCF060203BC
5577942	TCF160R4SL25MB	16,00	16,50	25	96,4	64,0	0,60	B	TCF050204BP	TCF060203BC
5577943	TCF165R4SL25MB	16,50	17,00	25	98,6	66,0	0,68	B	TCF050204BP	TCF060203BC
5577944	TCF170R4SL25MB	17,00	17,50	25	102,4	68,0	0,74	B	TCF050204BP	TCF060203BC
5577945	TCF175R4SL25MB	17,50	18,00	25	104,6	70,0	0,79	B	TCF050204BP	TCF060203BC
5577946	TCF180R4SL25MB	18,00	18,50	25	106,8	72,0	0,86	B	TCF050204BP	TCF060203BC
5577947	TCF185R4SL25MB	18,50	19,00	25	108,9	74,0	0,83	B	TCF050204BP	TCF060203BC
5578836	TCF190R4SL25MC	19,00	19,50	25	110,1	76,0	0,60	C	TCF070306CP	TCF070304CC
5578837	TCF195R4SL25MC	19,50	20,00	25	112,2	78,0	0,70	C	TCF070306CP	TCF070304CC
5578838	TCF200R4SL25MC	20,00	20,50	25	114,4	80,0	0,70	C	TCF070306CP	TCF070304CC
5578839	TCF205R4SL25MC	20,50	21,00	25	116,6	82,0	0,70	C	TCF070306CP	TCF070304CC
5578840	TCF210R4SL25MC	21,00	21,50	25	118,7	84,0	0,80	C	TCF070306CP	TCF070304CC
5578841	TCF220R4SL25MC	22,00	22,50	25	123,0	88,0	1,00	C	TCF070306CP	TCF070304CC
5578842	TCF225R4SL25MC	22,50	23,00	25	125,2	90,0	1,10	C	TCF070306CP	TCF070304CC
5578843	TCF230R4SL25MC	23,00	23,50	25	127,4	92,0	1,10	C	TCF070306CP	TCF070304CC
5537831	TCF240R4SL25MD	24,00	25,00	25	135,2	96,0	0,78	D	TCF080308DP	TCF090305DC
5537832	TCF250R4SL32MD	25,00	26,00	32	139,6	100,0	0,86	D	TCF080308DP	TCF090305DC
5537833	TCF260R4SL32MD	26,00	27,00	32	143,9	104,0	0,97	D	TCF080308DP	TCF090305DC
5537834	TCF265R4SL32MD	26,50	27,50	32	146,0	106,0	1,05	D	TCF080308DP	TCF090305DC
5537835	TCF270R4SL32MD	27,00	28,00	32	148,2	108,0	1,15	D	TCF080308DP	TCF090305DC
5537836	TCF280R4SL32MD	28,00	29,00	32	152,5	112,0	1,30	D	TCF080308DP	TCF090305DC
5537837	TCF290R4SL32MD	29,00	30,00	32	156,8	116,0	1,45	D	TCF080308DP	TCF090305DC
5537951	TCF300R4SL32ME	30,00	31,00	32	160,2	120,0	0,63	E	TCF100408EP	TCF120405EC
5537952	TCF310R4SL32ME	31,00	32,00	32	164,5	124,0	0,72	E	TCF100408EP	TCF120405EC

(continued)

(Top Cut 4 Drill • Metric • 4 x D • SL Shanks — continued)

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537953	TCF320R4SL32ME	32,00	33,00	32	168,8	128,0	0,82	E	TCF100408EP	TCF120405EC
5537954	TCF330R4SL40ME	33,00	34,00	40	173,1	132,0	0,95	E	TCF100408EP	TCF120405EC
5537955	TCF340R4SL40ME	34,00	35,00	40	177,4	136,0	1,14	E	TCF100408EP	TCF120405EC
5537956	TCF350R4SL40ME	35,00	36,00	40	181,8	140,0	1,30	E	TCF100408EP	TCF120405EC
5537957	TCF360R4SL40ME	36,00	37,00	40	186,1	144,0	1,45	E	TCF100408EP	TCF120405EC
5578619	TCF370R4SL40MF	37,00	38,00	40	192,1	148,0	1,19	F	TCF120412FP	TCF150406FC
5578620	TCF375R4SL40MF	37,50	38,50	40	194,3	150,0	1,23	F	TCF120412FP	TCF150406FC
5578621	TCF380R4SL40MF	38,00	39,00	40	196,5	152,0	1,27	F	TCF120412FP	TCF150406FC
5578622	TCF390R4SL40MF	39,00	40,00	40	200,8	156,0	1,36	F	TCF120412FP	TCF150406FC
5578623	TCF400R4SL40MF	40,00	41,00	40	205,1	160,0	1,47	F	TCF120412FP	TCF150406FC
5578624	TCF410R4SL40MF	41,00	42,00	40	209,4	164,0	1,60	F	TCF120412FP	TCF150406FC
5578625	TCF420R4SL40MF	42,00	43,00	40	213,7	168,0	1,77	F	TCF120412FP	TCF150406FC
5578626	TCF430R4SL40MF	43,00	44,00	40	218,1	172,0	1,99	F	TCF120412FP	TCF150406FC
5578627	TCF440R4SL40MF	44,00	45,00	40	222,4	176,0	2,10	F	TCF120412FP	TCF150406FC
5578628	TCF450R4SL50MF	45,00	46,00	50	226,7	180,0	2,21	F	TCF120412FP	TCF150406FC
5578729	TCF460R4SL50MG	46,00	47,00	50	231,0	184,0	1,45	G	TCF150512GP	TCF180508GC
5578730	TCF470R4SL50MG	47,00	48,00	50	235,3	188,0	1,53	G	TCF150512GP	TCF180508GC
5578731	TCF480R4SL50MG	48,00	49,00	50	239,7	192,0	1,63	G	TCF150512GP	TCF180508GC
5578732	TCF490R4SL50MG	49,00	50,00	50	244,0	196,0	1,74	G	TCF150512GP	TCF180508GC
5578733	TCF500R4SL50MG	50,00	51,00	50	249,8	200,0	1,87	G	TCF150512GP	TCF180508GC
5578734	TCF505R4SL50MG	50,50	51,50	50	252,0	202,0	1,94	G	TCF150512GP	TCF180508GC
5578735	TCF510R4SL50MG	51,00	52,00	50	254,1	204,0	2,02	G	TCF150512GP	TCF180508GC
5578736	TCF520R4SL50MG	52,00	53,00	50	258,4	208,0	2,22	G	TCF150512GP	TCF180508GC
5578737	TCF530R4SL50MG	53,00	54,00	50	262,8	212,0	2,46	G	TCF150512GP	TCF180508GC
5578738	TCF540R4SL50MG	54,00	55,00	50	267,1	216,0	2,53	G	TCF150512GP	TCF180508GC
5578739	TCF550R4SL50MG	55,00	56,00	50	271,4	220,0	2,73	G	TCF150512GP	TCF180508GC
5578750	TCF560R4SL50MG	56,00	57,00	50	275,7	224,0	2,37	G	TCF150512GP	TCF180508GC
5538647	TCF570R4SL50MH	57,00	58,00	50	279,5	228,0	1,76	H	TCF180614HP	TCF210608HC
5538648	TCF580R4SL50MH	58,00	59,00	50	283,9	232,0	1,85	H	TCF180614HP	TCF210608HC
5538649	TCF590R4SL50MH	59,00	60,00	50	288,2	236,0	1,96	H	TCF180614HP	TCF210608HC
5538650	TCF600R4SL50MH	60,00	61,00	50	292,5	240,0	1,42	H	TCF180614HP	TCF210608HC
5538651	TCF610R4SL50MH	61,00	62,00	50	296,8	244,0	2,23	H	TCF180614HP	TCF210608HC
5538652	TCF620R4SL50MH	62,00	63,00	50	301,1	248,0	2,41	H	TCF180614HP	TCF210608HC
5538653	TCF630R4SL50MH	63,00	64,00	50	305,5	252,0	2,64	H	TCF180614HP	TCF210608HC
5538654	TCF640R4SL50MH	64,00	65,00	50	309,8	256,0	2,94	H	TCF180614HP	TCF210608HC
5538655	TCF650R4SL50MH	65,00	66,00	50	314,1	260,0	3,06	H	TCF180614HP	TCF210608HC
5538656	TCF660R4SL50MH	66,00	67,00	50	318,4	264,0	3,18	H	TCF180614HP	TCF210608HC
5538657	TCF670R4SL50MH	67,00	68,00	50	322,7	268,0	3,30	H	TCF180614HP	TCF210608HC
5538658	TCF680R4SL50MH	68,00	69,00	50	327,1	272,0	2,93	H	TCF180614HP	TCF210608HC

(continued)

(Top Cut 4 Drill • Metric • 4 x D • SL Shanks — continued)

■ Spare Parts



insert size	periphery insert	center insert	insert screw order number	Torx size	Torx driver order number	tightening torque Nm	tightening torque ft. lbs
A	TCF040204AP	TCF040203AC	<b>2025073</b>	T5	<b>2029221</b>	0,40	.295
B	TCF050204BP	TCF060203BC	<b>1175225</b>	T6	<b>1138455</b>	0,53	.390
C	TCF070306CP	TCF070304CC	<b>1021337</b>	T7	<b>2029266</b>	0,90	.663
D	TCF080308DP	TCF090305DC	<b>1134385</b>	T8	<b>2029598</b>	1,10	.811
E	TCF100408EP	TCF120405EC	<b>2018194</b>	T9	<b>1138430</b>	2,00	1.475
F	TCF120412FP	TCF150406FC	<b>1756815</b>	T15	<b>2029596</b>	4,00	2.950
G	TCF150512GP	TCF180508GC	<b>1099645</b>	T20	<b>2029488</b>	6,30	4.646
H	TCF180614HP	TCF210608HC	<b>1823871</b>	T25	<b>1022519</b>	8,80	6.490

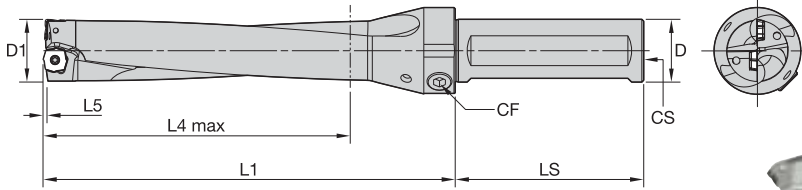
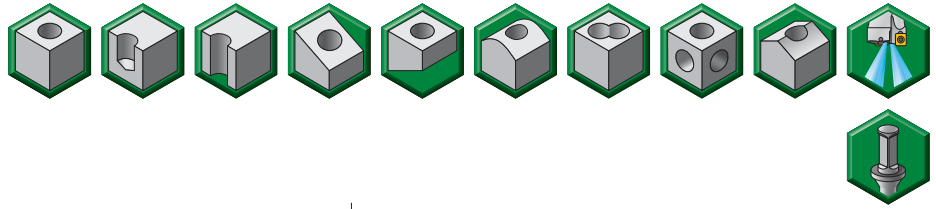
D	LS	
	mm	in
20,00	50	1.969
25,00	56	2.205
32,00	60	2.362
40,00	70	2.756
50,00	80	3.150

NOTE: Drilling in stacked plates possible in certain applications. Ask for technical support.  
 Drill shipped with insert screws and Torx wrench.  
 See pages T28–T31 for inserts.  
 SL = Side Lock  
 D1 max is an achievable diameter using x-offset.



**WARNING**  
 During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.





For information on CF, LS, and CS, see the table on page T24.



■ Top Cut 4 Drill • Inch • 5 x D • SSF Shanks

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537888	TCF0473R5SSF075A	.473	.493	.75	3.543	2.364	.017	A	TCF040204AP	TCF040203AC
5537889	TCF0500R5SSF075A	.500	.520	.75	3.703	2.500	.020	A	TCF040204AP	TCF040203AC
5537890	TCF0531R5SSF075A	.531	.551	.75	3.860	2.655	.025	A	TCF040204AP	TCF040203AC
5578320	TCF0563R5SSF075B	.563	—	.75	4.054	2.815	.017	B	TCF050204BP	TCF060203BC
5578321	TCF0594R5SSF075B	.594	—	.75	4.172	2.970	.020	B	TCF050204BP	TCF060203BC
5578322	TCF0625R5SSF075B	.625	—	.75	4.408	3.125	.023	B	TCF050204BP	TCF060203BC
5578323	TCF0656R5SSF075B	.656	—	.75	4.529	3.280	.028	B	TCF050204BP	TCF060203BC
5578324	TCF0688R5SSF075B	.688	—	.75	4.802	3.440	.032	B	TCF050204BP	TCF060203BC
5578325	TCF0703R5SSF075B	.703	—	.75	4.764	3.515	.034	B	TCF050204BP	TCF060203BC
5578326	TCF0719R5SSF075B	.719	—	.75	4.920	3.590	.036	B	TCF050204BP	TCF060203BC
5578327	TCF0734R5SSF075B	.734	—	.75	4.921	3.670	.038	B	TCF050204BP	TCF060203BC
5578420	TCF0750R5SSF100C	.750	—	1.00	5.169	3.750	.024	C	TCF070306CP	TCF070304CC
5578421	TCF0781R5SSF100C	.781	—	1.00	5.334	3.905	.027	C	TCF070306CP	TCF070304CC
5578422	TCF0813R5SSF100C	.813	—	1.00	5.504	4.065	.030	C	TCF070306CP	TCF070304CC
5578423	TCF0844R5SSF100C	.844	—	1.00	5.669	4.220	.034	C	TCF070306CP	TCF070304CC
5578424	TCF0875R5SSF100C	.875	—	1.00	5.846	4.375	.040	C	TCF070306CP	TCF070304CC
5578425	TCF0906R5SSF100C	.906	—	1.00	5.999	4.530	.045	C	TCF070306CP	TCF070304CC
5578426	TCF0938R5SSF100C	.938	—	1.00	6.169	4.690	.037	C	TCF070306CP	TCF070304CC
5537929	TCF0969R5SSF100D	.969	—	1.00	6.319	4.845	.032	D	TCF080308DP	TCF090305DC
5537930	TCF0984R5SSF100D	.984	—	1.00	6.398	4.920	.034	D	TCF080308DP	TCF090305DC
5537931	TCF1000R5SSF100D	1.000	—	1.00	6.484	5.000	.036	D	TCF080308DP	TCF090305DC
5537932	TCF1031R5SSF125D	1.031	—	1.25	6.649	5.155	.039	D	TCF080308DP	TCF090305DC
5537933	TCF1063R5SSF125D	1.063	—	1.25	6.779	5.315	.045	D	TCF080308DP	TCF090305DC
5537934	TCF1094R5SSF125D	1.094	—	1.25	6.944	5.470	.050	D	TCF080308DP	TCF090305DC
5537935	TCF1125R5SSF125D	1.125	—	1.25	7.109	5.625	.054	D	TCF080308DP	TCF090305DC
5537936	TCF1156R5SSF125D	1.156	—	1.25	7.274	5.780	.059	D	TCF080308DP	TCF090305DC
5538092	TCF1188R5SSF125E	1.188	—	1.25	7.440	5.940	.026	E	TCF100408EP	TCF120405EC
5538093	TCF1210R5SSF125E	1.210	—	1.25	7.597	6.050	.027	E	TCF100408EP	TCF120405EC
5538094	TCF1219R5SSF125E	1.219	—	1.25	7.597	6.095	.028	E	TCF100408EP	TCF120405EC
5538095	TCF1250R5SSF125E	1.250	—	1.25	7.814	6.250	.031	E	TCF100408EP	TCF120405EC
5538096	TCF1280R5SSF125E	1.280	—	1.25	7.934	6.400	.035	E	TCF100408EP	TCF120405EC
5538097	TCF1313R5SSF125E	1.313	—	1.25	8.109	6.565	.040	E	TCF100408EP	TCF120405EC
5538098	TCF1375R5SSF125E	1.375	—	1.25	8.423	6.875	.050	E	TCF100408EP	TCF120405EC
5538099	TCF1406R5SSF150E	1.406	—	1.50	8.584	7.030	.055	E	TCF100408EP	TCF120405EC
5538100	TCF1438R5SSF150E	1.438	—	1.50	8.971	7.190	.059	E	TCF100408EP	TCF120405EC
5578685	TCF1469R5SSF150F	1.469	—	1.50	9.087	7.345	.048	F	TCF120412FP	TCF150406FC

(continued)

(Top Cut 4 Drill • Inch • 5 x D • SSF Shanks — continued)

order number	catalog number	D1	D1 max	D	L1	L4 max	L5	insert size	periphery insert	center insert
5578686	TCF1500R5SSF150F	1.500	—	1.50	9.252	7.500	.050	F	TCF120412FP	TCF150406FC
5578687	TCF1531R5SSF150F	1.531	—	1.50	9.417	7.655	.053	F	TCF120412FP	TCF150406FC
5578688	TCF1563R5SSF150F	1.563	—	1.50	9.587	7.815	.056	F	TCF120412FP	TCF150406FC
5578689	TCF1625R5SSF150F	1.625	—	1.50	9.917	8.125	.065	F	TCF120412FP	TCF150406FC
5578690	TCF1656R5SSF150F	1.656	—	1.50	10.082	8.280	.070	F	TCF120412FP	TCF150406FC
5578691	TCF1688R5SSF150F	1.688	—	1.50	10.252	8.440	.077	F	TCF120412FP	TCF150406FC
5578693	TCF1750R5SSF150F	1.750	—	1.50	10.582	8.750	.085	F	TCF120412FP	TCF150406FC
5578803	TCF1813R5SSF150G	1.813	—	1.50	10.917	9.065	.057	G	TCF150512GP	TCF180508GC
5578804	TCF1875R5SSF150G	1.875	—	1.50	11.247	9.375	.063	G	TCF150512GP	TCF180508GC
5578805	TCF1938R5SSF150G	1.938	—	1.50	11.582	9.690	.069	G	TCF150512GP	TCF180508GC
5578806	TCF2000R5SSF150G	2.000	—	1.50	11.971	10.000	.078	G	TCF150512GP	TCF180508GC
5578807	TCF2125R5SSF200G	2.125	—	2.00	12.748	10.625	.100	G	TCF150512GP	TCF180508GC
5578808	TCF2219R5SSF200G	2.219	—	2.00	13.293	11.095	.085	G	TCF150512GP	TCF180508GC
5538509	TCF2250R5SSF200H	2.250	—	2.00	13.191	11.250	.070	H	TCF180614HP	TCF210608HC
5538510	TCF2375R5SSF200H	2.375	—	2.00	13.781	11.875	.084	H	TCF180614HP	TCF210608HC
5538511	TCF2500R5SSF200H	2.500	—	2.00	14.218	12.500	.110	H	TCF180614HP	TCF210608HC

■ Spare Parts



insert size	periphery insert	center insert	insert screw order number	Torx size	Torx driver order number	tightening torque Nm	tightening torque ft. lbs
A	TCF040204AP	TCF040203AC	2025073	T5	2029221	0,40	.295
B	TCF050204BP	TCF060203BC	1175225	T6	1138455	0,53	.390
C	TCF070306CP	TCF070304CC	1021337	T7	2029266	0,90	.663
D	TCF080308DP	TCF090305DC	1134385	T8	2029598	1,10	.811
E	TCF100408EP	TCF120405EC	2018194	T9	1138430	2,00	1.475
F	TCF120412FP	TCF150406FC	1756815	T15	2029596	4,00	2.950
G	TCF150512GP	TCF180508GC	1099645	T20	2029488	6,30	4.646
H	TCF180614HP	TCF210608HC	1823871	T25	2585812	8,80	6.490

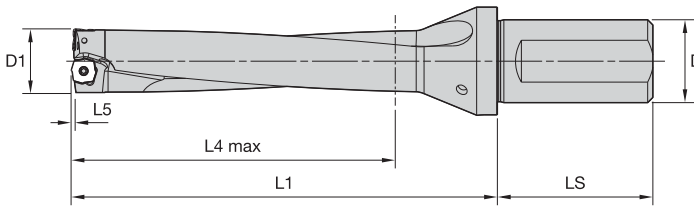
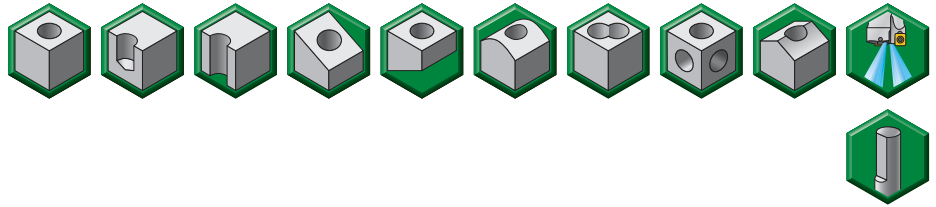
Indexable Drills

D	LS		CF	CS
	mm	in		
.750	50,8	2.000	1/8 - 27 NPT	1/8 - 27 NPT
1.000	76,2	3.000	1/8 - 27 NPT	1/4 - 18 NPT
1.250	82,6	3.250	1/8 - 27 NPT	1/4 - 18 NPT
1.500	95,3	3.750	1/8 - 27 NPT	1/4 - 18 NPT
2.000	101,6	4.000	1/8 - 27 NPT	1/4 - 18 NPT

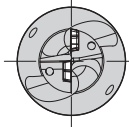
NOTE: Drill shipped with insert screws and Torx wrench.  
See pages T28–T31 for inserts.  
SSF = Straight Shank Flange



**WARNING**  
During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.



For information on LS, see the table on page T27.



■ Top Cut 4 Drill • Metric • 5 x D • SL Shanks

order number	catalog number	D1	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537874	TCF120R5SL20MA	12,00	20	86,0	60,0	0,41	A	TCF040204AP	TCF040203AC
5537875	TCF125R5SL20MA	12,50	20	89,0	63,0	0,48	A	TCF040204AP	TCF040203AC
5537876	TCF127R5SL20MA	12,70	20	90,0	63,5	0,51	A	TCF040204AP	TCF040203AC
5537877	TCF130R5SL20MA	13,00	20	90,0	65,0	0,56	A	TCF040204AP	TCF040203AC
5537878	TCF135R5SL20MA	13,50	20	94,0	68,0	0,64	A	TCF040204AP	TCF040203AC
5577948	TCF140R5SL25MB	14,00	25	99,0	70,0	0,42	B	TCF050204BP	TCF060203BC
5577949	TCF145R5SL25MB	14,50	25	100,0	72,5	0,45	B	TCF050204BP	TCF060203BC
5577950	TCF150R5SL25MB	15,00	25	103,0	75,0	0,49	B	TCF050204BP	TCF060203BC
5577951	TCF155R5SL25MB	15,50	25	104,8	77,5	0,54	B	TCF050204BP	TCF060203BC
5577952	TCF160R5SL25MB	16,00	25	108,4	80,0	0,60	B	TCF050204BP	TCF060203BC
5577953	TCF165R5SL25MB	16,50	25	111,1	82,5	0,68	B	TCF050204BP	TCF060203BC
5577954	TCF170R5SL25MB	17,00	25	115,4	85,0	0,74	B	TCF050204BP	TCF060203BC
5577955	TCF175R5SL25MB	17,50	25	118,1	87,5	0,79	B	TCF050204BP	TCF060203BC
5577956	TCF180R5SL25MB	18,00	25	120,8	90,0	0,86	B	TCF050204BP	TCF060203BC
5577957	TCF185R5SL25MB	18,50	25	122,4	92,5	0,83	B	TCF050204BP	TCF060203BC
5578844	TCF190R5SL25MC	19,00	25	129,1	95,0	0,60	C	TCF070306CP	TCF070304CC
5578845	TCF195R5SL25MC	19,50	25	131,7	97,5	0,70	C	TCF070306CP	TCF070304CC
5578846	TCF200R5SL25MC	20,00	25	132,0	100,0	0,70	C	TCF070306CP	TCF070304CC
5578847	TCF205R5SL25MC	20,50	25	134,1	102,5	0,70	C	TCF070306CP	TCF070304CC
5578848	TCF210R5SL25MC	21,00	25	137,0	105,0	0,80	C	TCF070306CP	TCF070304CC
5578849	TCF220R5SL25MC	22,00	25	142,0	110,0	1,00	C	TCF070306CP	TCF070304CC
5578850	TCF225R5SL25MC	22,50	25	144,7	112,5	1,10	C	TCF070306CP	TCF070304CC
5578851	TCF230R5SL25MC	23,00	25	147,0	115,0	1,10	C	TCF070306CP	TCF070304CC
5537838	TCF240R5SL25MD	24,00	25	152,0	120,0	0,78	D	TCF080308DP	TCF090305DC
5537839	TCF250R5SL32MD	25,00	32	158,0	125,0	0,86	D	TCF080308DP	TCF090305DC
5537840	TCF260R5SL32MD	26,00	32	164,0	130,0	0,97	D	TCF080308DP	TCF090305DC
5537841	TCF265R5SL32MD	26,50	32	166,5	132,5	1,05	D	TCF080308DP	TCF090305DC
5537842	TCF270R5SL32MD	27,00	32	170,0	135,0	1,15	D	TCF080308DP	TCF090305DC
5537843	TCF280R5SL32MD	28,00	32	176,5	140,0	1,30	D	TCF080308DP	TCF090305DC
5537844	TCF290R5SL32MD	29,00	32	181,0	145,0	1,45	D	TCF080308DP	TCF090305DC
5537958	TCF300R5SL32ME	30,00	32	186,0	150,0	0,63	E	TCF100408EP	TCF120405EC
5537959	TCF310R5SL32ME	31,00	32	193,0	155,0	0,72	E	TCF100408EP	TCF120405EC

(continued)

(Top Cut 4 Drill • Metric • 5 x D • SL Shanks — continued)

order number	catalog number	D1	D	L1	L4 max	L5	insert size	periphery insert	center insert
5537960	TCF320R5SL32ME	32,00	32	199,0	160,0	0,82	E	TCF100408EP	TCF120405EC
5537961	TCF330R5SL40ME	33,00	40	204,0	165,0	0,95	E	TCF100408EP	TCF120405EC
5537962	TCF340R5SL40ME	34,00	40	210,0	170,0	1,14	E	TCF100408EP	TCF120405EC
5537963	TCF350R5SL40ME	35,00	40	216,8	175,0	1,30	E	TCF100408EP	TCF120405EC
5537964	TCF360R5SL40ME	36,00	40	222,0	180,0	1,45	E	TCF100408EP	TCF120405EC
5578629	TCF370R5SL40MF	37,00	40	228,0	185,0	1,19	F	TCF120412FP	TCF150406FC
5578640	TCF375R5SL40MF	37,50	40	231,8	188,0	1,23	F	TCF120412FP	TCF150406FC
5578641	TCF380R5SL40MF	38,00	40	234,5	190,0	1,27	F	TCF120412FP	TCF150406FC
5578642	TCF390R5SL40MF	39,00	40	239,8	195,0	1,36	F	TCF120412FP	TCF150406FC
5578643	TCF400R5SL40MF	40,00	40	245,1	200,0	1,47	F	TCF120412FP	TCF150406FC
5578644	TCF410R5SL40MF	41,00	40	250,4	205,0	1,60	F	TCF120412FP	TCF150406FC
5578645	TCF420R5SL40MF	42,00	40	255,7	210,0	1,77	F	TCF120412FP	TCF150406FC
5578646	TCF430R5SL40MF	43,00	40	261,1	215,0	1,99	F	TCF120412FP	TCF150406FC
5578647	TCF440R5SL40MF	44,00	40	266,4	220,0	2,10	F	TCF120412FP	TCF150406FC
5578648	TCF450R5SL50MF	45,00	50	271,7	225,0	2,21	F	TCF120412FP	TCF150406FC
5578751	TCF460R5SL50MG	46,00	50	277,0	230,0	1,45	G	TCF150512GP	TCF180508GC
5578752	TCF470R5SL50MG	47,00	50	282,3	235,0	1,53	G	TCF150512GP	TCF180508GC
5578753	TCF480R5SL50MG	48,00	50	287,7	240,0	1,63	G	TCF150512GP	TCF180508GC
5578754	TCF490R5SL50MG	49,00	50	293,0	245,0	1,74	G	TCF150512GP	TCF180508GC
5578755	TCF500R5SL50MG	50,00	50	299,8	250,0	1,87	G	TCF150512GP	TCF180508GC
5578756	TCF505R5SL50MG	50,50	50	302,5	253,0	1,94	G	TCF150512GP	TCF180508GC
5578757	TCF510R5SL50MG	51,00	50	305,1	255,0	2,02	G	TCF150512GP	TCF180508GC
5578758	TCF520R5SL50MG	52,00	50	310,4	260,0	2,22	G	TCF150512GP	TCF180508GC
5578759	TCF530R5SL50MG	53,00	50	315,8	265,0	2,46	G	TCF150512GP	TCF180508GC
5578760	TCF540R5SL50MG	54,00	50	321,1	270,0	2,53	G	TCF150512GP	TCF180508GC
5578761	TCF550R5SL50MG	55,00	50	326,4	275,0	2,73	G	TCF150512GP	TCF180508GC
5578762	TCF560R5SL50MG	56,00	50	331,7	280,0	2,37	G	TCF150512GP	TCF180508GC
5538659	TCF570R5SL50MH	57,00	50	330,0	285,0	1,76	H	TCF180614HP	TCF210608HC
5538680	TCF580R5SL50MH	58,00	50	336,0	290,0	1,85	H	TCF180614HP	TCF210608HC
5538681	TCF590R5SL50MH	59,00	50	339,2	295,0	1,96	H	TCF180614HP	TCF210608HC
5538682	TCF600R5SL50MH	60,00	50	345,5	300,0	1,42	H	TCF180614HP	TCF210608HC
5538683	TCF610R5SL50MH	61,00	50	347,8	305,0	2,23	H	TCF180614HP	TCF210608HC
5538684	TCF620R5SL50MH	62,00	50	358,0	310,0	2,41	H	TCF180614HP	TCF210608HC
5538685	TCF630R5SL50MH	63,00	50	365,0	315,0	2,64	H	TCF180614HP	TCF210608HC
5538686	TCF640R5SL50MH	64,00	50	363,8	320,0	2,94	H	TCF180614HP	TCF210608HC
5538687	TCF650R5SL50MH	65,00	50	375,0	325,0	3,06	H	TCF180614HP	TCF210608HC
5538688	TCF660R5SL50MH	66,00	50	376,4	330,0	3,18	H	TCF180614HP	TCF210608HC
5538689	TCF670R5SL50MH	67,00	50	385,0	335,0	3,30	H	TCF180614HP	TCF210608HC
5538700	TCF680R5SL50MH	68,00	50	390,0	340,0	2,93	H	TCF180614HP	TCF210608HC

(continued)

(Top Cut 4 Drill • Metric • 5 x D • SL Shanks – continued)

■ Spare Parts



insert size	periphery insert	center insert	insert screw order number	Torx size	Torx driver order number	tightening torque Nm	tightening torque ft. lbs
A	TCF040204AP	TCF040203AC	<b>2025073</b>	T5	<b>2029221</b>	0,40	.295
B	TCF050204BP	TCF060203BC	<b>1175225</b>	T6	<b>1138455</b>	0,53	.390
C	TCF070306CP	TCF070304CC	<b>1021337</b>	T7	<b>2029266</b>	0,90	.663
D	TCF080308DP	TCF090305DC	<b>1134385</b>	T8	<b>2029598</b>	1,10	.811
E	TCF100408EP	TCF120405EC	<b>2018194</b>	T9	<b>1138430</b>	2,00	1.475
F	TCF120412FP	TCF150406FC	<b>1756815</b>	T15	<b>2029596</b>	4,00	2.950
G	TCF150512GP	TCF180508GC	<b>1099645</b>	T20	<b>2029488</b>	6,30	4.646
H	TCF180614HP	TCF210608HC	<b>1823871</b>	T25	<b>1022519</b>	8,80	6.490

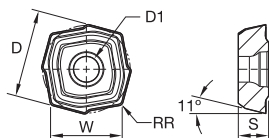
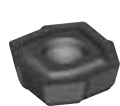
D	LS	
	mm	in
20,00	50	1.969
25,00	56	2.205
32,00	60	2.362
40,00	70	2.756
50,00	80	3.150

NOTE: Drill shipped with insert screws and Torx wrench.  
See pages T28–T31 for inserts.  
SL = Side Lock



**WARNING**

During through-hole operations, a slug or disc is produced as the tool breaks through the workpiece. When the drill is stationary and the workpiece is rotating, this slug may be hurled from the chuck by centrifugal force. Provide adequate shielding to protect bystanders.



● first choice  
○ alternate choice

P	●	○	○	○
M	○	○	○	○
K	○	○	○	○
N	○	○	○	○
S	○	○	○	○
H	○	○	○	○

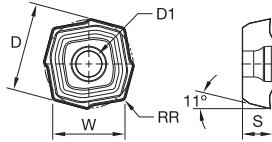
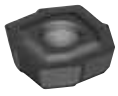
■ Top Cut 4 Drill • Center Inserts • V34

catalog number	D		D1		W		S		RR		insert size	WPK10CH	WU25CH	WU40PH
	mm	in	mm	in	mm	in	mm	in	mm	in				
TCF040203ACV34	4,47	.176	2,10	.083	3,65	.144	2,00	.079	0,300	.011	A		5541817	5541818
TCF060203BCV34	6,00	.236	2,40	.094	4,90	.193	2,40	.095	0,300	.011	B		5542602	5542604
TCF070304CCV34	7,59	.299	2,60	.102	6,20	.244	2,80	.110	0,400	.015	C		5542642	5542643
TCF090305DCV34	9,55	.376	2,80	.110	7,80	.307	3,00	.118	0,500	.019	D		5538554	5538555
TCF120405ECV34	12,00	.473	3,40	.134	9,80	.386	3,60	.142	0,500	.019	E		5538603	5538604
TCF150406FCV34	14,94	.588	4,80	.189	12,20	.480	4,20	.165	0,600	.023	F		5542623	5542624
TCF180508GCV34	17,88	.704	6,00	.236	14,60	.575	5,40	.213	0,800	.031	G		5542475	5542476
TCF210608HCV34	21,68	.853	7,50	.295	17,70	.697	6,50	.256	0,800	.031	H		5542002	5542003

NOTE: For application-specific insert selection, please refer to the application data on pages T32–T55.

Indexable Drills

Geometry	Application
V34	First choice for machining steel, cast iron, and short chipping materials. Suitable for severe cutting conditions.
V36	First choice for stainless steel. Suitable for long chipping steel and where low power consumption is required.



● first choice  
○ alternate choice

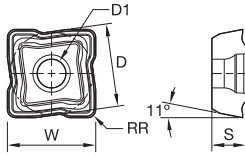
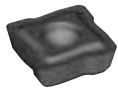
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N	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

■ Top Cut 4 Drill • Center Inserts • V36

catalog number	D		D1		W		S		RR		insert size	WPK10CH	WU25CH	WU40PH
	mm	in	mm	in	mm	in	mm	in	mm	in				
<b>TCF040203ACV36</b>	4,47	.176	2,10	.083	3,65	.144	2,00	.079	0,300	.011	A		5541819	5541840
<b>TCF060203BCV36</b>	6,00	.236	2,40	.094	4,90	.193	2,40	.094	0,300	.011	B		5542606	5542607
<b>TCF070304CCV36</b>	7,59	.299	2,60	.102	6,20	.244	2,80	.110	0,400	.015	C		5542644	5542645
<b>TCF090305DCV36</b>	9,55	.376	2,80	.110	7,80	.307	3,00	.118	0,500	.019	D		5538556	5538557
<b>TCF120405ECV36</b>	12,00	.473	3,40	.134	9,80	.386	3,60	.142	0,500	.019	E		5538606	5538607
<b>TCF150406FCV36</b>	14,94	.588	4,80	.189	12,20	.480	4,20	.165	0,600	.023	F		5542625	5542626
<b>TCF180508GCV36</b>	17,88	.704	6,00	.236	14,60	.575	5,40	.213	0,800	.031	G		5542477	5542478
<b>TCF210608HCV36</b>	21,68	.853	7,50	.295	17,70	.697	6,50	.256	0,800	.031	H		5542004	5542005

NOTE: For application-specific insert selection, please refer to the application data on pages T32–T55.

Geometry	Application
V34	First choice for machining steel, cast iron, and short chipping materials. Suitable for severe cutting conditions.
V36	First choice for stainless steel. Suitable for long chipping steel and where low power consumption is required.



● first choice  
○ alternate choice

P	●	○	○	○
M	○	○	○	○
K	○	○	○	○
N	○	○	○	○
S	○	○	○	○
H	○	○	○	○

■ Top Cut 4 Drill • Periphery Inserts • V34

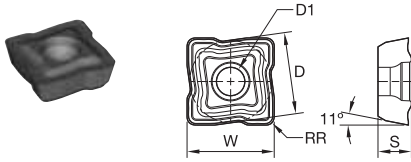
catalog number	D		D1		W		S		RR		insert size	WPK10CH	WU25CH	WU40PH
	mm	in	mm	in	mm	in	mm	in	mm	in				
TCF040204APV34	4,14	.163	2,10	.083	4,40	.173	2,00	.079	0,400	.015	A	5541843	5541841	5541842
TCF050204BPV34	5,07	.200	2,40	.094	5,40	.213	2,40	.094	0,400	.015	B	5542620	5542608	5542609
TCF070306CPV34	6,67	.263	2,60	.102	7,10	.280	2,80	.110	0,600	.023	C	5542648	5542646	5542647
TCF080308DPV34	8,08	.318	2,80	.110	8,60	.339	3,00	.118	0,800	.031	D	5538600	5538558	5538559
TCF100408EPV34	9,96	.392	3,40	.134	10,60	.417	3,60	.142	0,800	.031	E	5538610	5538608	5538609
TCF120412FPV34	12,59	.496	4,80	.189	13,40	.528	4,20	.165	1,200	.046	F	5542629	5542627	5542628
TCF150512GPV34	15,13	.596	6,00	.236	16,10	.634	5,40	.213	1,200	.046	G	5542601	5542479	5542600
TCF180614HPV34	18,04	.710	7,50	.295	19,20	.756	6,50	.256	1,400	.054	H	5542008	5542006	5542007

NOTE: For application-specific insert selection, please refer to the application data on pages T32–T55.

Indexable Drills

Geometry	Application
V34	First choice for machining steel, cast iron, and short chipping materials. Suitable for severe cutting conditions.
V36	First choice for stainless steel. Suitable for long chipping steel and where low power consumption is required.





● first choice  
○ alternate choice

P	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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N	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
S	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

■ Top Cut 4 Drill • Periphery Inserts • V36

catalog number	D		D1		W		S		RR		insert size	WPK10CH	WU25CH	WU40PH
	mm	in	mm	in	mm	in	mm	in	mm	in				
<b>TCF040204APV36</b>	4,14	.163	2,10	.083	4,40	.173	2,00	.079	0,400	.015	A		5541844	5541845
<b>TCF050204BPV36</b>	5,07	.200	2,40	.094	5,40	.213	2,40	.094	0,400	.015	B		5542621	5542622
<b>TCF070306CPV36</b>	6,67	.263	2,60	.102	7,10	.280	2,80	.110	0,600	.023	C		5542649	5542650
<b>TCF080308DPV36</b>	8,08	.318	2,80	.110	8,60	.339	3,00	.118	0,800	.031	D		5538601	5538602
<b>TCF100408EPV36</b>	9,96	.392	3,40	.134	10,60	.417	3,60	.142	0,800	.031	E		5538611	5538612
<b>TCF120412FPV36</b>	12,59	.496	4,80	.189	13,40	.528	4,20	.165	1,200	.046	F		5542640	5542641
<b>TCF150512GPV36</b>	15,13	.596	6,00	.236	16,10	.634	5,40	.213	1,200	.046	G		5542603	5542605
<b>TCF180614HPV36</b>	18,04	.710	7,50	.295	19,20	.756	6,50	.256	1,400	.054	H		5542009	5542020

NOTE: For application-specific insert selection, please refer to the application data on pages T32–T55.

Geometry	Application
V34	First choice for machining steel, cast iron, and short chipping materials. Suitable for severe cutting conditions.
V36	First choice for stainless steel. Suitable for long chipping steel and where low power consumption is required.

■ Top Cut 4 • Steel • 2 x D/3 x D • Feed Chart • Inch

Top Cut 4					Recommended Feed Rate by Diameter (IPR)												
					Insert Size A			Insert Size B			Insert Size C			Insert Size D			
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
P	1	S	P	V36	WU25CH	0.0024	0.0031	0.0039	0.0031	0.0039	0.0051	0.0039	0.0047	0.0059	0.0043	0.0051	0.0063
			C	V36	WU40PH												
		U	P	V36	WU40PH	0.0024	0.0031	0.0039	0.0031	0.0039	0.0051	0.0039	0.0047	0.0059	0.0043	0.0051	0.0063
			C	V36	WU40PH												
		I	P	V36	WU40PH	0.0024	0.0031	0.0039	0.0031	0.0039	0.0051	0.0039	0.0047	0.0059	0.0043	0.0051	0.0063
			C	V36	WU40PH												
	2	S	P	V34	WPK10CH	0.0024	0.0031	0.0039	0.0031	0.0047	0.0059	0.0039	0.0051	0.0063	0.0043	0.0055	0.0067
			C	V34	WU40PH												
		U	P	V34	WU25CH	0.0024	0.0031	0.0039	0.0031	0.0047	0.0059	0.0039	0.0051	0.0063	0.0043	0.0055	0.0067
			C	V34	WU40PH												
		I	P	V34	WU40PH	0.0024	0.0031	0.0039	0.0031	0.0047	0.0059	0.0039	0.0051	0.0063	0.0043	0.0055	0.0067
			C	V34	WU40PH												
	3	S	P	V34	WPK10CH	0.0031	0.0043	0.0059	0.0039	0.0047	0.0063	0.0043	0.0055	0.0071	0.0047	0.0059	0.0079
			C	V34	WU40PH												
		U	P	V34	WU25CH	0.0031	0.0043	0.0055	0.0039	0.0047	0.0059	0.0043	0.0055	0.0063	0.0047	0.0059	0.0071
			C	V34	WU40PH												
		I	P	V34	WU40PH	0.0031	0.0043	0.0055	0.0039	0.0047	0.0059	0.0043	0.0055	0.0063	0.0047	0.0059	0.0071
			C	V34	WU40PH												
	4	S	P	V34	WPK10CH	0.0031	0.0043	0.0059	0.0039	0.0047	0.0063	0.0043	0.0055	0.0071	0.0047	0.0059	0.0079
			C	V34	WU40PH												
		U	P	V34	WU25CH	0.0031	0.0043	0.0055	0.0039	0.0047	0.0059	0.0043	0.0055	0.0063	0.0047	0.0059	0.0071
			C	V34	WU40PH												
		I	P	V34	WU40PH	0.0031	0.0043	0.0055	0.0039	0.0047	0.0059	0.0043	0.0055	0.0063	0.0047	0.0059	0.0071
			C	V34	WU40PH												
5	S	P	V36	WU25CH	0.0024	0.0031	0.0039	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059	0.0043	0.0051	0.0063	
		C	V36	WU40PH													
	U	P	V36	WU40PH	0.0024	0.0031	0.0039	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059	0.0043	0.0051	0.0063	
		C	V36	WU40PH													
	I	P	V36	WU40PH	0.0024	0.0031	0.0039	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059	0.0043	0.0051	0.0063	
		C	V36	WU40PH													
6	S	P	V36	WU25CH	0.0024	0.0031	0.0039	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059	0.0043	0.0051	0.0063	
		C	V36	WU40PH													
	U	P	V36	WU40PH	0.0024	0.0031	0.0039	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059	0.0043	0.0051	0.0063	
		C	V36	WU40PH													
	I	P	V36	WU40PH	0.0024	0.0031	0.0039	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059	0.0043	0.0051	0.0063	
		C	V36	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions;  
 U = unstable cutting conditions;  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert;  
 C = center insert

Indexable Drills

■ Top Cut 4 • Steel • 2 x D/3 x D • Speed Chart • Inch

Top Cut 4					Recommended Cutting Speed by Diameter (SFM)													
					Insert Size A			Insert Size B			Insert Size C			Insert Size D				
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"				
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max		
<b>P</b>	<b>1</b>	<b>S</b>	<b>P</b>	<b>V36</b>	<b>WU25CH</b>	394	<b>459</b>	525	459	<b>525</b>	787	492	<b>590</b>	853	525	<b>590</b>	853	
			<b>C</b>	<b>V36</b>	<b>WU40PH</b>													
		<b>U</b>	<b>P</b>	<b>V36</b>	<b>WU40PH</b>	361	<b>394</b>	459	426	<b>492</b>	722	426	<b>558</b>	820	459	<b>558</b>	820	
			<b>C</b>	<b>V36</b>	<b>WU40PH</b>													
		<b>I</b>	<b>P</b>	<b>V36</b>	<b>WU40PH</b>	295	<b>328</b>	394	426	<b>492</b>	689	426	<b>558</b>	787	459	<b>558</b>	787	
			<b>C</b>	<b>V36</b>	<b>WU40PH</b>													
	<b>2</b>	<b>S</b>	<b>P</b>	<b>V34</b>	<b>WPK10CH</b>	394	<b>459</b>	525	459	<b>558</b>	853	492	<b>623</b>	918	525	<b>623</b>	918	
			<b>C</b>	<b>V34</b>	<b>WU40PH</b>													
		<b>U</b>	<b>P</b>	<b>V34</b>	<b>WU25CH</b>	361	<b>394</b>	459	426	<b>558</b>	787	459	<b>590</b>	853	492	<b>590</b>	853	
			<b>C</b>	<b>V34</b>	<b>WU40PH</b>													
		<b>I</b>	<b>P</b>	<b>V34</b>	<b>WU40PH</b>	295	<b>328</b>	394	426	<b>558</b>	754	426	<b>558</b>	787	459	<b>558</b>	787	
			<b>C</b>	<b>V34</b>	<b>WU40PH</b>													
	<b>3</b>	<b>S</b>	<b>P</b>	<b>V34</b>	<b>WPK10CH</b>	394	<b>459</b>	590	459	<b>558</b>	886	492	<b>656</b>	951	525	<b>656</b>	1017	
			<b>C</b>	<b>V34</b>	<b>WU40PH</b>													
		<b>U</b>	<b>P</b>	<b>V34</b>	<b>WU25CH</b>	361	<b>394</b>	525	426	<b>525</b>	853	459	<b>656</b>	918	492	<b>656</b>	918	
			<b>C</b>	<b>V34</b>	<b>WU40PH</b>													
		<b>I</b>	<b>P</b>	<b>V34</b>	<b>WU40PH</b>	328	<b>361</b>	459	394	<b>492</b>	820	426	<b>590</b>	853	459	<b>590</b>	853	
			<b>C</b>	<b>V34</b>	<b>WU40PH</b>													
	<b>4</b>	<b>S</b>	<b>P</b>	<b>V34</b>	<b>WPK10CH</b>	394	<b>459</b>	590	459	<b>558</b>	886	492	<b>656</b>	951	525	<b>656</b>	1017	
			<b>C</b>	<b>V34</b>	<b>WU40PH</b>													
		<b>U</b>	<b>P</b>	<b>V34</b>	<b>WU25CH</b>	361	<b>394</b>	525	426	<b>525</b>	853	459	<b>656</b>	918	492	<b>656</b>	918	
			<b>C</b>	<b>V34</b>	<b>WU40PH</b>													
		<b>I</b>	<b>P</b>	<b>V34</b>	<b>WU40PH</b>	328	<b>361</b>	459	394	<b>492</b>	820	426	<b>590</b>	853	459	<b>590</b>	853	
			<b>C</b>	<b>V34</b>	<b>WU40PH</b>													
<b>5</b>	<b>S</b>	<b>P</b>	<b>V36</b>	<b>WU25CH</b>	394	<b>459</b>	525	459	<b>558</b>	787	492	<b>590</b>	820	525	<b>590</b>	820		
		<b>C</b>	<b>V36</b>	<b>WU40PH</b>														
	<b>U</b>	<b>P</b>	<b>V36</b>	<b>WU40PH</b>	361	<b>394</b>	459	426	<b>525</b>	754	459	<b>558</b>	787	492	<b>558</b>	787		
		<b>C</b>	<b>V36</b>	<b>WU40PH</b>														
	<b>I</b>	<b>P</b>	<b>V36</b>	<b>WU40PH</b>	295	<b>328</b>	394	426	<b>525</b>	754	426	<b>525</b>	722	459	<b>525</b>	722		
		<b>C</b>	<b>V36</b>	<b>WU40PH</b>														
<b>6</b>	<b>S</b>	<b>P</b>	<b>V36</b>	<b>WU25CH</b>	394	<b>459</b>	525	459	<b>558</b>	656	459	<b>558</b>	689	492	<b>558</b>	689		
		<b>C</b>	<b>V36</b>	<b>WU40PH</b>														
	<b>U</b>	<b>P</b>	<b>V36</b>	<b>WU40PH</b>	361	<b>394</b>	459	394	<b>492</b>	623	426	<b>525</b>	656	459	<b>525</b>	656		
		<b>C</b>	<b>V36</b>	<b>WU40PH</b>														
	<b>I</b>	<b>P</b>	<b>V36</b>	<b>WU40PH</b>	295	<b>328</b>	394	361	<b>426</b>	590	394	<b>459</b>	623	394	<b>459</b>	623		
		<b>C</b>	<b>V36</b>	<b>WU40PH</b>														

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions;  
 U = unstable cutting conditions;  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert;  
 C = center insert

■ Top Cut 4 • Steel • 2 x D/3 x D • Feed Chart • Inch

Top Cut 4					Recommended Feed Rate by Diameter (IPR)												
					Insert Size E			Insert Size F			Insert Size G			Insert Size H			
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
P	1	S	P	V36	WU25CH	0.0051	0.0055	0.0071	0.0059	0.0067	0.0079	0.0063	0.0091	0.0106	0.0067	0.0094	0.0114
			C	V36	WU40PH												
		U	P	V36	WU40PH	0.0051	0.0055	0.0071	0.0059	0.0067	0.0079	0.0063	0.0091	0.0106	0.0067	0.0094	0.0114
			C	V36	WU40PH												
		I	P	V36	WU40PH	0.0051	0.0055	0.0071	0.0059	0.0067	0.0079	0.0063	0.0091	0.0106	0.0067	0.0094	0.0114
			C	V36	WU40PH												
	2	S	P	V34	WPK10CH	0.0051	0.0059	0.0079	0.0059	0.0071	0.0083	0.0063	0.0094	0.0110	0.0067	0.0098	0.0118
			C	V34	WU40PH												
		U	P	V34	WU25CH	0.0051	0.0059	0.0079	0.0059	0.0071	0.0083	0.0063	0.0094	0.0110	0.0067	0.0098	0.0118
			C	V34	WU40PH												
		I	P	V34	WU40PH	0.0051	0.0059	0.0079	0.0059	0.0071	0.0083	0.0063	0.0094	0.0110	0.0067	0.0098	0.0118
			C	V34	WU40PH												
	3	S	P	V34	WPK10CH	0.0055	0.0063	0.0087	0.0063	0.0079	0.0094	0.0071	0.0098	0.0118	0.0075	0.0102	0.0126
			C	V34	WU40PH												
		U	P	V34	WU25CH	0.0055	0.0063	0.0079	0.0063	0.0079	0.0091	0.0071	0.0098	0.0110	0.0075	0.0102	0.0118
			C	V34	WU40PH												
		I	P	V34	WU40PH	0.0055	0.0063	0.0079	0.0063	0.0079	0.0087	0.0071	0.0098	0.0110	0.0075	0.0102	0.0118
			C	V34	WU40PH												
	4	S	P	V34	WPK10CH	0.0055	0.0063	0.0087	0.0063	0.0079	0.0094	0.0071	0.0098	0.0118	0.0075	0.0102	0.0126
			C	V34	WU40PH												
		U	P	V34	WU25CH	0.0055	0.0063	0.0079	0.0063	0.0079	0.0087	0.0071	0.0098	0.0110	0.0075	0.0102	0.0118
			C	V34	WU40PH												
		I	P	V34	WU40PH	0.0055	0.0063	0.0079	0.0063	0.0079	0.0087	0.0071	0.0098	0.0110	0.0075	0.0102	0.0118
			C	V34	WU40PH												
5	S	P	V36	WU25CH	0.0051	0.0059	0.0071	0.0059	0.0071	0.0079	0.0063	0.0094	0.0110	0.0067	0.0098	0.0118	
		C	V36	WU40PH													
	U	P	V36	WU40PH	0.0051	0.0059	0.0071	0.0059	0.0071	0.0079	0.0063	0.0094	0.0110	0.0067	0.0098	0.0118	
		C	V36	WU40PH													
	I	P	V36	WU40PH	0.0051	0.0059	0.0071	0.0059	0.0071	0.0079	0.0063	0.0094	0.0110	0.0067	0.0098	0.0118	
		C	V36	WU40PH													
6	S	P	V36	WU25CH	0.0051	0.0059	0.0071	0.0059	0.0067	0.0079	0.0063	0.0091	0.0110	0.0067	0.0094	0.0114	
		C	V36	WU40PH													
	U	P	V36	WU40PH	0.0051	0.0059	0.0071	0.0059	0.0067	0.0079	0.0063	0.0091	0.0110	0.0067	0.0094	0.0114	
		C	V36	WU40PH													
	I	P	V36	WU40PH	0.0051	0.0059	0.0071	0.0059	0.0067	0.0079	0.0063	0.0091	0.0110	0.0067	0.0094	0.0114	
		C	V36	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions;  
 U = unstable cutting conditions;  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert;  
 C = center insert

Indexable Drills

■ Top Cut 4 • Steel • 2 x D/3 x D • Speed Chart • Inch

Top Cut 4					Recommended Cutting Speed by Diameter (SFM)													
					Insert Size E			Insert Size F			Insert Size G			Insert Size H				
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"				
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max		
P	1	S	P	V36	WU25CH	525	590	853	525	590	853	525	590	853	525	590	853	
			C	V36	WU40PH													
		U	P	V36	WU40PH	459	558	820	459	558	820	459	558	820	459	558	820	
			C	V36	WU40PH													
		I	P	V36	WU40PH	459	558	787	459	558	787	459	558	787	459	558	787	
			C	V36	WU40PH													
	2	S	P	V34	WPK10CH	525	623	918	525	623	918	525	623	918	525	623	918	
			C	V34	WU40PH													
		U	P	V34	WU25CH	492	590	853	492	590	853	492	590	853	492	590	853	
			C	V34	WU40PH													
		I	P	V34	WU40PH	459	558	787	459	558	787	459	558	787	459	558	787	
			C	V34	WU40PH													
	3	S	P	V34	WPK10CH	525	656	1017	525	656	1017	525	656	1017	525	656	1017	
			C	V34	WU40PH													
		U	P	V34	WU25CH	492	656	918	492	656	918	492	656	918	492	656	918	
			C	V34	WU40PH													
		I	P	V34	WU40PH	459	590	853	459	590	853	459	590	853	459	590	853	
			C	V34	WU40PH													
	4	S	P	V34	WPK10CH	525	656	1017	525	656	1017	525	656	1017	525	656	1017	
			C	V34	WU40PH													
		U	P	V34	WU25CH	492	656	918	492	656	918	492	656	918	492	656	918	
			C	V34	WU40PH													
		I	P	V34	WU40PH	459	590	853	459	590	853	459	590	853	459	590	853	
			C	V34	WU40PH													
5	S	P	V36	WU25CH	525	590	820	525	590	820	525	590	820	525	590	820		
		C	V36	WU40PH														
	U	P	V36	WU40PH	492	558	787	492	558	787	492	558	787	492	558	787		
		C	V36	WU40PH														
	I	P	V36	WU40PH	459	525	722	459	525	722	459	525	722	459	525	722		
		C	V36	WU40PH														
6	S	P	V36	WU25CH	492	558	689	492	558	689	492	558	689	492	558	689		
		C	V36	WU40PH														
	U	P	V36	WU40PH	459	525	656	459	525	656	459	525	656	459	525	656		
		C	V36	WU40PH														
	I	P	V36	WU40PH	394	459	623	394	459	623	394	459	623	394	459	623		
		C	V36	WU40PH														

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions;  
 U = unstable cutting conditions;  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert;  
 C = center insert

■ Top Cut 4 • Steel • 2 x D/3 x D • Feed Chart • Metric

Top Cut 4					Recommended Feed Rate by Diameter (mm/r)												
					Insert Size A			Insert Size B			Insert Size C			Insert Size D			
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
P	1	S	P	V36	WU25CH	0,06	0,08	0,10	0,08	0,10	0,13	0,10	0,12	0,15	0,11	0,13	0,16
			C	V36	WU40PH												
		U	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,13	0,10	0,12	0,15	0,11	0,13	0,16
			C	V36	WU40PH												
		I	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,13	0,10	0,12	0,15	0,11	0,13	0,16
			C	V36	WU40PH												
	2	S	P	V34	WPK10CH	0,06	0,08	0,10	0,08	0,12	0,15	0,10	0,13	0,16	0,11	0,14	0,17
			C	V34	WU40PH												
		U	P	V34	WU25CH	0,06	0,08	0,10	0,08	0,12	0,15	0,10	0,13	0,16	0,11	0,14	0,17
			C	V34	WU40PH												
		I	P	V34	WU40PH	0,06	0,08	0,10	0,08	0,12	0,15	0,10	0,13	0,16	0,11	0,14	0,17
			C	V34	WU40PH												
	3	S	P	V34	WPK10CH	0,08	0,11	0,15	0,10	0,12	0,16	0,11	0,14	0,18	0,12	0,15	0,20
			C	V34	WU40PH												
		U	P	V34	WU25CH	0,08	0,11	0,14	0,10	0,12	0,15	0,11	0,14	0,16	0,12	0,15	0,18
			C	V34	WU40PH												
		I	P	V34	WU40PH	0,08	0,11	0,14	0,10	0,12	0,15	0,11	0,14	0,16	0,12	0,15	0,18
			C	V34	WU40PH												
	4	S	P	V34	WPK10CH	0,08	0,11	0,15	0,10	0,12	0,16	0,11	0,14	0,18	0,12	0,15	0,20
			C	V34	WU40PH												
		U	P	V34	WU25CH	0,08	0,11	0,14	0,10	0,12	0,15	0,11	0,14	0,16	0,12	0,15	0,18
			C	V34	WU40PH												
		I	P	V34	WU40PH	0,08	0,11	0,14	0,10	0,12	0,15	0,11	0,14	0,16	0,12	0,15	0,18
			C	V34	WU40PH												
5	S	P	V36	WU25CH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16	
		C	V36	WU40PH													
	U	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16	
		C	V36	WU40PH													
	I	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16	
		C	V36	WU40PH													
6	S	P	V36	WU25CH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16	
		C	V36	WU40PH													
	U	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16	
		C	V36	WU40PH													
	I	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16	
		C	V36	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

Indexable Drills

■ Top Cut 4 • Steel • 2 x D/3 x D • Speed Chart • Metric

Top Cut 4					Recommended Cutting Speed by Diameter (m/min)												
					Insert Size A			Insert Size B			Insert Size C			Insert Size D			
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
P	1	S	P	V36	WU25CH	120	140	160	140	160	240	150	180	260	160	180	260
			C	V36	WU40PH												
		U	P	V36	WU40PH	110	120	140	130	150	220	130	170	250	140	170	250
			C	V36	WU40PH												
		I	P	V36	WU40PH	90	100	120	130	150	210	130	170	240	140	170	240
			C	V36	WU40PH												
	2	S	P	V34	WPK10CH	120	140	160	140	170	260	150	190	280	160	190	280
			C	V34	WU40PH												
		U	P	V34	WU25CH	110	120	140	130	170	240	140	180	260	150	180	260
			C	V34	WU40PH												
		I	P	V34	WU40PH	90	100	120	130	170	230	130	170	240	140	170	240
			C	V34	WU40PH												
	3	S	P	V34	WPK10CH	120	140	180	140	170	270	150	200	290	160	200	310
			C	V34	WU40PH												
		U	P	V34	WU25CH	110	120	160	130	160	260	140	200	280	150	200	280
			C	V34	WU40PH												
		I	P	V34	WU40PH	100	110	140	120	150	250	130	180	260	140	180	260
			C	V34	WU40PH												
	4	S	P	V34	WPK10CH	120	140	180	140	170	270	150	200	290	160	200	310
			C	V34	WU40PH												
		U	P	V34	WU25CH	110	120	160	130	160	260	140	200	280	150	200	280
			C	V34	WU40PH												
		I	P	V34	WU40PH	100	110	140	120	150	250	130	180	260	140	180	260
			C	V34	WU40PH												
5	S	P	V36	WU25CH	120	140	160	140	170	240	150	180	250	160	180	250	
		C	V36	WU40PH													
	U	P	V36	WU40PH	110	120	140	130	160	230	140	170	240	150	170	240	
		C	V36	WU40PH													
	I	P	V36	WU40PH	90	100	120	130	160	230	130	160	220	140	160	220	
		C	V36	WU40PH													
6	S	P	V36	WU25CH	120	140	160	140	170	200	140	170	210	150	170	210	
		C	V36	WU40PH													
	U	P	V36	WU40PH	110	120	140	120	150	190	130	160	200	140	160	200	
		C	V36	WU40PH													
	I	P	V36	WU40PH	90	100	120	110	130	180	120	140	190	120	140	190	
		C	V36	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

■ Top Cut 4 • Steel • 2 x D/3 x D • Feed Chart • Metric

Top Cut 4					Recommended Feed Rate by Diameter (mm/r)													
					Insert Size E			Insert Size F			Insert Size G			Insert Size H				
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"				
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max		
P	1	S	P	V36	WU25CH	0,13	0,14	0,18	0,15	0,17	0,20	0,16	0,23	0,27	0,17	0,24	0,29	
			C	V36	WU40PH													
		U	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,13	0,10	0,12	0,15	0,11	0,13	0,16	
			C	V36	WU40PH													
		I	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,13	0,10	0,12	0,15	0,11	0,13	0,16	
			C	V36	WU40PH													
	2	S	P	V34	WPK10CH	0,06	0,08	0,10	0,08	0,12	0,15	0,10	0,13	0,16	0,11	0,14	0,17	
			C	V34	WU40PH													
		U	P	V34	WU25CH	0,06	0,08	0,10	0,08	0,12	0,15	0,10	0,13	0,16	0,11	0,14	0,17	
			C	V34	WU40PH													
		I	P	V34	WU40PH	0,06	0,08	0,10	0,08	0,12	0,15	0,10	0,13	0,16	0,11	0,14	0,17	
			C	V34	WU40PH													
	3	S	P	V34	WPK10CH	0,08	0,11	0,15	0,10	0,12	0,16	0,11	0,14	0,18	0,12	0,15	0,20	
			C	V34	WU40PH													
		U	P	V34	WU25CH	0,08	0,11	0,14	0,10	0,12	0,15	0,11	0,14	0,16	0,12	0,15	0,18	
			C	V34	WU40PH													
		I	P	V34	WU40PH	0,08	0,11	0,14	0,10	0,12	0,15	0,11	0,14	0,16	0,12	0,15	0,18	
			C	V34	WU40PH													
	4	S	P	V34	WPK10CH	0,08	0,11	0,15	0,10	0,12	0,16	0,11	0,14	0,18	0,12	0,15	0,20	
			C	V34	WU40PH													
		U	P	V34	WU25CH	0,08	0,11	0,14	0,10	0,12	0,15	0,11	0,14	0,16	0,12	0,15	0,18	
			C	V34	WU40PH													
		I	P	V34	WU40PH	0,08	0,11	0,14	0,10	0,12	0,15	0,11	0,14	0,16	0,12	0,15	0,18	
			C	V34	WU40PH													
5	S	P	V36	WU25CH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16		
		C	V36	WU40PH														
	U	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16		
		C	V36	WU40PH														
	I	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16		
		C	V36	WU40PH														
6	S	P	V36	WU25CH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16		
		C	V36	WU40PH														
	U	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16		
		C	V36	WU40PH														
	I	P	V36	WU40PH	0,06	0,08	0,10	0,08	0,10	0,14	0,10	0,12	0,15	0,11	0,13	0,16		
		C	V36	WU40PH														

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

Indexable Drills



■ Top Cut 4 • Steel • 2 x D/3 x D • Speed Chart • Metric

Top Cut 4					Recommended Cutting Speed by Diameter (m/min)													
					Insert Size E			Insert Size F			Insert Size G			Insert Size H				
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"				
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max		
P	1	S	P	V36	WU25CH	160	180	260	160	180	260	160	180	260	160	180	260	
			C	V36	WU40PH													
		U	P	V36	WU40PH	140	170	250	140	170	250	140	170	250	140	170	250	
			C	V36	WU40PH													
		I	P	V36	WU40PH	140	170	240	140	170	240	140	170	240	140	170	240	
			C	V36	WU40PH													
	2	S	P	V34	WPK10CH	160	190	280	160	190	280	160	190	280	160	190	280	
			C	V34	WU40PH													
		U	P	V34	WU25CH	150	180	260	150	180	260	150	180	260	150	180	260	
			C	V34	WU40PH													
		I	P	V34	WU40PH	140	170	240	140	170	240	140	170	240	140	170	240	
			C	V34	WU40PH													
	3	S	P	V34	WPK10CH	160	200	310	160	200	310	160	200	310	160	200	310	
			C	V34	WU40PH													
		U	P	V34	WU25CH	150	200	280	150	200	280	150	200	280	150	200	280	
			C	V34	WU40PH													
		I	P	V34	WU40PH	140	180	260	140	180	260	140	180	260	140	180	260	
			C	V34	WU40PH													
	4	S	P	V34	WPK10CH	160	200	310	160	200	310	160	200	310	160	200	310	
			C	V34	WU40PH													
		U	P	V34	WU25CH	150	200	280	150	200	280	150	200	280	150	200	280	
			C	V34	WU40PH													
		I	P	V34	WU40PH	140	180	260	140	180	260	140	180	260	140	180	260	
			C	V34	WU40PH													
5	S	P	V36	WU25CH	160	180	250	160	180	250	160	180	250	160	180	250		
		C	V36	WU40PH														
	U	P	V36	WU40PH	150	170	240	150	170	240	150	170	240	150	170	240		
		C	V36	WU40PH														
	I	P	V36	WU40PH	140	160	220	140	160	220	140	160	220	140	160	220		
		C	V36	WU40PH														
6	S	P	V36	WU25CH	150	170	210	150	170	210	150	170	210	150	170	210		
		C	V36	WU40PH														
	U	P	V36	WU40PH	140	160	200	140	160	200	140	160	200	140	160	200		
		C	V36	WU40PH														
	I	P	V36	WU40PH	120	140	190	120	140	190	120	140	190	120	140	190		
		C	V36	WU40PH														

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

■ Top Cut 4 • Stainless Steel • 2 x D/3 x D • Feed Chart • Inch

Top Cut 4					Recommended Feed Rate by Diameter (IPR)												
					Insert Size A			Insert Size B			Insert Size C			Insert Size D			
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
M	1	S	P	V36	WU40PH	0.0024	0.0031	0.0047	0.0028	0.0039	0.0051	0.0031	0.0039	0.0059	0.0039	0.0047	0.0063
			C	V36	WU40PH												
		U	P	V36	WU40PH	0.0024	0.0031	0.0047	0.0028	0.0039	0.0047	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059
			C	V36	WU40PH												
		I	P	V36	WU40PH	0.0024	0.0031	0.0043	0.0028	0.0039	0.0043	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059
			C	V36	WU40PH												
	2	S	P	V36	WU40PH	0.0024	0.0031	0.0047	0.0028	0.0039	0.0051	0.0031	0.0039	0.0059	0.0039	0.0047	0.0063
			C	V36	WU40PH												
		U	P	V36	WU40PH	0.0024	0.0031	0.0047	0.0028	0.0039	0.0047	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059
			C	V36	WU40PH												
		I	P	V36	WU40PH	0.0024	0.0031	0.0043	0.0028	0.0039	0.0043	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059
			C	V36	WU40PH												
3	S	P	V36	WU40PH	0.0024	0.0031	0.0047	0.0028	0.0039	0.0051	0.0031	0.0039	0.0059	0.0039	0.0047	0.0063	
		C	V36	WU40PH													
	U	P	V36	WU40PH	0.0024	0.0031	0.0047	0.0028	0.0039	0.0047	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059	
		C	V36	WU40PH													
	I	P	V36	WU40PH	0.0024	0.0031	0.0043	0.0028	0.0039	0.0043	0.0031	0.0039	0.0055	0.0039	0.0047	0.0059	
		C	V36	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

Indexable Drills

■ Top Cut 4 • Stainless Steel • 2 x D/3 x D • Speed Chart • Inch

Top Cut 4					Recommended Cutting Speed by Diameter (SFM)													
					Insert Size A			Insert Size B			Insert Size C			Insert Size D				
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"				
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max		
M	1	S	P	V36	WU40PH	394	459	525	459	525	754	492	558	787	492	558	787	
			C	V36	WU40PH													
		U	P	V36	WU40PH	361	394	459	426	492	689	426	525	689	426	525	689	
			C	V36	WU40PH													
		I	P	V36	WU40PH	295	328	394	426	492	656	426	525	656	426	525	656	
			C	V36	WU40PH													
	2	S	P	V36	WU40PH	394	459	525	459	525	656	492	558	689	492	558	689	
			C	V36	WU40PH													
		U	P	V36	WU40PH	361	394	459	426	492	590	426	525	656	426	525	656	
			C	V36	WU40PH													
		I	P	V36	WU40PH	295	328	394	394	459	558	426	492	590	426	492	590	
			C	V36	WU40PH													
	3	S	P	V36	WU40PH	361	394	459	426	492	590	459	525	656	459	525	656	
			C	V36	WU40PH													
		U	P	V36	WU40PH	295	361	394	394	426	525	426	459	590	426	459	590	
C			V36	WU40PH														
I		P	V36	WU40PH	262	328	361	328	394	492	361	426	525	361	426	525		
		C	V36	WU40PH														

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

■ Top Cut 4 • Stainless Steel • 2 x D/3 x D • Feed Chart • Inch

Top Cut 4					Recommended Feed Rate by Diameter (IPR)													
					Insert Size E			Insert Size F			Insert Size G			Insert Size H				
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"				
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max		
M	1	S	P	V36	WU40PH	0.0047	0.0055	0.0079	0.0055	0.0063	0.0098	0.0063	0.0071	0.0110	0.0063	0.0079	0.0118	
			C	V36	WU40PH													
		U	P	V36	WU40PH	0.0043	0.0051	0.0071	0.0047	0.0055	0.0087	0.0055	0.0063	0.0098	0.0055	0.0071	0.0102	
			C	V36	WU40PH													
		I	P	V36	WU40PH	0.0043	0.0051	0.0071	0.0047	0.0055	0.0087	0.0055	0.0063	0.0098	0.0055	0.0071	0.0102	
			C	V36	WU40PH													
	2	S	P	V36	WU40PH	0.0047	0.0055	0.0079	0.0055	0.0063	0.0098	0.0063	0.0071	0.0110	0.0063	0.0079	0.0118	
			C	V36	WU40PH													
		U	P	V36	WU40PH	0.0043	0.0051	0.0071	0.0047	0.0055	0.0087	0.0055	0.0063	0.0098	0.0055	0.0071	0.0102	
			C	V36	WU40PH													
		I	P	V36	WU40PH	0.0043	0.0051	0.0071	0.0047	0.0055	0.0087	0.0055	0.0063	0.0098	0.0055	0.0071	0.0102	
			C	V36	WU40PH													
3	S	P	V36	WU40PH	0.0047	0.0055	0.0079	0.0055	0.0063	0.0098	0.0063	0.0071	0.0110	0.0063	0.0079	0.0118		
		C	V36	WU40PH														
	U	P	V36	WU40PH	0.0043	0.0051	0.0071	0.0047	0.0055	0.0087	0.0055	0.0063	0.0098	0.0055	0.0071	0.0102		
		C	V36	WU40PH														
	I	P	V36	WU40PH	0.0043	0.0051	0.0071	0.0047	0.0055	0.0087	0.0055	0.0063	0.0098	0.0055	0.0071	0.0102		
		C	V36	WU40PH														

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

Indexable Drills

■ Top Cut 4 • Stainless Steel • 2 x D/3 x D • Speed Chart • Inch

Top Cut 4					Recommended Cutting Speed by Diameter (SFM)															
					Insert Size E			Insert Size F			Insert Size G			Insert Size H						
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"						
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max				
M	1	S	P	V36	WU40PH	492	558	787	492	558	787	492	558	787	492	558	787			
			C	V36	WU40PH															
		U	P	V36	WU40PH	426	525	689	426	525	689	426	525	689	426	525	689	426	525	689
			C	V36	WU40PH															
		I	P	V36	WU40PH	426	525	656	426	525	656	426	525	656	426	525	656	426	525	656
			C	V36	WU40PH															
	2	S	P	V36	WU40PH	492	558	689	492	558	689	492	558	689	492	558	689	492	558	689
			C	V36	WU40PH															
		U	P	V36	WU40PH	426	525	656	426	525	656	426	525	656	426	525	656	426	525	656
			C	V36	WU40PH															
		I	P	V36	WU40PH	426	492	590	426	492	590	426	492	590	426	492	590	426	492	590
			C	V36	WU40PH															
	3	S	P	V36	WU40PH	459	525	656	459	525	656	459	525	656	459	525	656	459	525	656
			C	V36	WU40PH															
		U	P	V36	WU40PH	426	459	590	426	459	590	426	459	590	426	459	590	426	459	590
C			V36	WU40PH																
I		P	V36	WU40PH	361	426	525	361	426	525	361	426	525	361	426	525	361	426	525	
		C	V36	WU40PH																

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

■ Top Cut 4 • Stainless Steel • 2 x D/3 x D • Feed Chart • Metric

Top Cut 4					Recommended Feed Rate by Diameter (mm/r)												
					Insert Size A			Insert Size B			Insert Size C			Insert Size D			
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
M	1	S	P	V36	WU40PH	0,06	0,08	0,12	0,07	0,10	0,13	0,08	0,10	0,15	0,10	0,12	0,16
			C	V36	WU40PH												
		U	P	V36	WU40PH	0,06	0,08	0,12	0,07	0,10	0,12	0,08	0,10	0,14	0,10	0,12	0,15
			C	V36	WU40PH												
		I	P	V36	WU40PH	0,06	0,08	0,11	0,07	0,10	0,11	0,08	0,10	0,14	0,10	0,12	0,15
			C	V36	WU40PH												
	2	S	P	V36	WU40PH	0,06	0,08	0,12	0,07	0,10	0,13	0,08	0,10	0,15	0,10	0,12	0,16
			C	V36	WU40PH												
		U	P	V36	WU40PH	0,06	0,08	0,12	0,07	0,10	0,12	0,08	0,10	0,14	0,10	0,12	0,15
			C	V36	WU40PH												
		I	P	V36	WU40PH	0,06	0,08	0,11	0,07	0,10	0,11	0,08	0,10	0,14	0,10	0,12	0,15
			C	V36	WU40PH												
3	S	P	V36	WU40PH	0,06	0,08	0,12	0,07	0,10	0,13	0,08	0,10	0,15	0,10	0,12	0,16	
		C	V36	WU40PH													
	U	P	V36	WU40PH	0,06	0,08	0,12	0,07	0,10	0,12	0,08	0,10	0,14	0,10	0,12	0,15	
		C	V36	WU40PH													
	I	P	V36	WU40PH	0,06	0,08	0,11	0,07	0,10	0,11	0,08	0,10	0,14	0,10	0,12	0,15	
		C	V36	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

Indexable Drills

■ Top Cut 4 • Stainless Steel • 2 x D/3 x D • Speed Chart • Metric

Top Cut 4					Recommended Cutting Speed by Diameter (m/min)												
					Insert Size A			Insert Size B			Insert Size C			Insert Size D			
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
M	1	S	P	V36	WU40PH	120	140	160	140	160	230	150	170	240	150	170	240
			C	V36	WU40PH												
		U	P	V36	WU40PH	110	120	140	130	150	210	130	160	210	130	160	210
			C	V36	WU40PH												
		I	P	V36	WU40PH	90	100	120	130	150	200	130	160	200	130	160	200
			C	V36	WU40PH												
	2	S	P	V36	WU40PH	120	140	160	140	160	200	150	170	210	150	170	210
			C	V36	WU40PH												
		U	P	V36	WU40PH	110	120	140	130	150	180	130	160	200	130	160	200
			C	V36	WU40PH												
		I	P	V36	WU40PH	90	100	120	120	140	170	130	150	180	130	150	180
			C	V36	WU40PH												
3	S	P	V36	WU40PH	110	120	140	130	150	180	140	160	200	140	160	200	
		C	V36	WU40PH													
	U	P	V36	WU40PH	90	110	120	120	130	160	130	140	180	130	140	180	
		C	V36	WU40PH													
	I	P	V36	WU40PH	80	100	110	100	120	150	110	130	160	110	130	160	
		C	V36	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

■ **Top Cut 4 • Stainless Steel • 2 x D/3 x D • Feed Chart • Metric**

Top Cut 4					Recommended Feed Rate by Diameter (mm/r)												
					Insert Size E			Insert Size F			Insert Size G			Insert Size H			
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
M	1	S	P	V36	WU40PH	0,12	0,14	0,20	0,14	0,16	0,25	0,16	0,18	0,28	0,16	0,20	0,30
			C	V36	WU40PH												
		U	P	V36	WU40PH	0,11	0,13	0,18	0,12	0,14	0,22	0,14	0,16	0,25	0,14	0,18	0,26
			C	V36	WU40PH												
		I	P	V36	WU40PH	0,11	0,13	0,18	0,12	0,14	0,22	0,14	0,16	0,25	0,14	0,18	0,26
			C	V36	WU40PH												
	2	S	P	V36	WU40PH	0,12	0,14	0,20	0,14	0,16	0,25	0,16	0,18	0,28	0,16	0,20	0,30
			C	V36	WU40PH												
		U	P	V36	WU40PH	0,11	0,13	0,18	0,12	0,14	0,22	0,14	0,16	0,25	0,14	0,18	0,26
			C	V36	WU40PH												
		I	P	V36	WU40PH	0,11	0,13	0,18	0,12	0,14	0,22	0,14	0,16	0,25	0,14	0,18	0,26
			C	V36	WU40PH												
3	S	P	V36	WU40PH	0,12	0,14	0,20	0,14	0,16	0,25	0,16	0,18	0,28	0,16	0,20	0,30	
		C	V36	WU40PH													
	U	P	V36	WU40PH	0,11	0,13	0,18	0,12	0,14	0,22	0,14	0,16	0,25	0,14	0,18	0,26	
		C	V36	WU40PH													
	I	P	V36	WU40PH	0,11	0,13	0,18	0,12	0,14	0,22	0,14	0,16	0,25	0,14	0,18	0,26	
		C	V36	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert





■ Top Cut 4 • Stainless Steel • 2 x D/3 x D • Speed Chart • Metric

Top Cut 4					Recommended Cutting Speed by Diameter (m/min)												
					Insert Size E			Insert Size F			Insert Size G			Insert Size H			
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
M	1	S	P	V36	WU40PH	150	170	240	150	170	240	150	170	240	150	170	240
			C	V36	WU40PH												
		U	P	V36	WU40PH	130	160	210	130	160	210	130	160	210	130	160	210
			C	V36	WU40PH												
		I	P	V36	WU40PH	130	160	200	130	160	200	130	160	200	130	160	200
			C	V36	WU40PH												
	2	S	P	V36	WU40PH	150	170	210	150	170	210	150	170	210	150	170	210
			C	V36	WU40PH												
		U	P	V36	WU40PH	130	160	200	130	160	200	130	160	200	130	160	200
			C	V36	WU40PH												
		I	P	V36	WU40PH	130	150	180	130	150	180	130	150	180	130	150	180
			C	V36	WU40PH												
	3	S	P	V36	WU40PH	140	160	200	140	160	200	140	160	200	140	160	200
			C	V36	WU40PH												
		U	P	V36	WU40PH	130	140	180	130	140	180	130	140	180	130	140	180
			C	V36	WU40PH												
		I	P	V36	WU40PH	110	130	160	110	130	160	110	130	160	110	130	160
			C	V36	WU40PH												

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

■ Top Cut 4 • Cast Iron • 2 x D/3 x D • Feed Chart • Inch

Top Cut 4					Recommended Feed Rate by Diameter (IPR)												
					Insert Size A			Insert Size B			Insert Size C			Insert Size D			
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
K	1	S	P	V34	WPK10CH	0.0031	0.0039	0.0055	0.0031	0.0039	0.0063	0.0039	0.0051	0.0071	0.0047	0.0063	0.0094
			C	V34	WU25CH												
		U	P	V34	WU25CH	0.0031	0.0039	0.0055	0.0031	0.0039	0.0063	0.0039	0.0051	0.0071	0.0047	0.0063	0.0094
			C	V34	WU40PH												
		I	P	V34	WU40PH	0.0031	0.0039	0.0055	0.0031	0.0039	0.0063	0.0039	0.0051	0.0071	0.0047	0.0063	0.0094
			C	V34	WU40PH												
	2	S	P	V34	WPK10CH	0.0031	0.0039	0.0055	0.0031	0.0039	0.0063	0.0039	0.0051	0.0071	0.0047	0.0063	0.0094
			C	V34	WU25CH												
		U	P	V34	WU25CH	0.0031	0.0039	0.0055	0.0031	0.0039	0.0063	0.0039	0.0051	0.0071	0.0047	0.0063	0.0094
			C	V34	WU40PH												
		I	P	V34	WU40PH	0.0031	0.0039	0.0055	0.0031	0.0039	0.0063	0.0039	0.0051	0.0071	0.0047	0.0063	0.0094
			C	V34	WU40PH												
3	S	P	V34	WPK10CH	0.0031	0.0039	0.0055	0.0031	0.0039	0.0063	0.0039	0.0051	0.0071	0.0047	0.0063	0.0094	
		C	V34	WU25CH													
	U	P	V34	WU25CH	0.0031	0.0039	0.0055	0.0031	0.0039	0.0063	0.0039	0.0051	0.0071	0.0047	0.0063	0.0094	
		C	V34	WU40PH													
	I	P	V34	WU40PH	0.0031	0.0039	0.0055	0.0031	0.0039	0.0063	0.0039	0.0051	0.0071	0.0047	0.0063	0.0094	
		C	V34	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.

For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.

For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.

For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
U = unstable cutting conditions,  
I = interrupted cutting conditions

Pocket Seat: P = periphery insert,  
C = center insert



■ Top Cut 4 • Cast Iron • 2 x D/3 x D • Speed Chart • Inch

Top Cut 4					Recommended Cutting Speed by Diameter (SFM)													
					Insert Size A			Insert Size B			Insert Size C			Insert Size D				
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"				
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max		
K	1	S	P	V34	WPK10CH	394	459	590	459	558	820	492	590	853	525	656	918	
			C	V34	WU25CH													
		U	P	V34	WU25CH	361	394	525	426	525	787	459	558	820	492	590	853	
			C	V34	WU40PH													
		I	P	V34	WU40PH	328	361	459	394	492	754	426	525	787	459	558	853	
			C	V34	WU40PH													
	2	S	P	V34	WPK10CH	394	459	590	426	525	787	459	590	820	492	590	853	
			C	V34	WU25CH													
		U	P	V34	WU25CH	361	394	525	394	492	754	426	525	787	459	525	820	
			C	V34	WU40PH													
		I	P	V34	WU40PH	328	361	459	394	492	722	426	525	787	459	525	820	
			C	V34	WU40PH													
	3	S	P	V34	WPK10CH	394	459	525	426	525	787	459	558	787	492	558	820	
			C	V34	WU25CH													
		U	P	V34	WU25CH	361	394	459	394	492	754	426	525	754	459	525	787	
C			V34	WU40PH														
I		P	V34	WU40PH	295	328	394	394	492	754	426	525	754	459	525	722		
		C	V34	WU40PH														

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

■ Top Cut 4 • Cast Iron • 2 x D/3 x D • Feed Chart • Inch

Top Cut 4					Recommended Feed Rate by Diameter (IPR)												
					Insert Size E			Insert Size F			Insert Size G			Insert Size H			
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
K	1	S	P	V34	WPK10CH	0.0055	0.0063	0.0102	0.0063	0.0079	0.0118	0.0071	0.0087	0.0126	0.0079	0.0094	0.0142
			C	V34	WU25CH												
		U	P	V34	WU25CH	0.0055	0.0063	0.0102	0.0063	0.0079	0.0118	0.0071	0.0087	0.0126	0.0079	0.0094	0.0142
			C	V34	WU40PH												
		I	P	V34	WU40PH	0.0055	0.0063	0.0102	0.0063	0.0079	0.0118	0.0071	0.0087	0.0126	0.0079	0.0094	0.0142
			C	V34	WU40PH												
	2	S	P	V34	WPK10CH	0.0055	0.0063	0.0102	0.0063	0.0079	0.0118	0.0071	0.0087	0.0126	0.0079	0.0094	0.0142
			C	V34	WU25CH												
		U	P	V34	WU25CH	0.0055	0.0063	0.0102	0.0063	0.0079	0.0118	0.0071	0.0087	0.0126	0.0079	0.0094	0.0142
			C	V34	WU40PH												
		I	P	V34	WU40PH	0.0055	0.0063	0.0102	0.0063	0.0079	0.0118	0.0071	0.0087	0.0126	0.0079	0.0094	0.0142
			C	V34	WU40PH												
3	S	P	V34	WPK10CH	0.0055	0.0063	0.0102	0.0063	0.0079	0.0118	0.0071	0.0087	0.0126	0.0079	0.0094	0.0142	
		C	V34	WU25CH													
	U	P	V34	WU25CH	0.0055	0.0063	0.0102	0.0063	0.0079	0.0118	0.0071	0.0087	0.0126	0.0079	0.0094	0.0142	
		C	V34	WU40PH													
	I	P	V34	WU40PH	0.0055	0.0063	0.0102	0.0063	0.0079	0.0118	0.0071	0.0087	0.0126	0.0079	0.0094	0.0142	
		C	V34	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert



■ Top Cut 4 • Cast Iron • 2 x D/3 x D • Speed Chart • Inch

Top Cut 4					Recommended Cutting Speed by Diameter (SFM)												
					Insert Size E			Insert Size F			Insert Size G			Insert Size H			
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
K	1	S	P	V34	WPK10CH	525	656	918	525	656	918	525	656	918	525	656	918
			C	V34	WU25CH												
		U	P	V34	WU25CH	492	590	853	492	590	853	492	590	853	492	590	853
			C	V34	WU40PH												
		I	P	V34	WU40PH	459	558	853	459	558	853	459	558	853	459	558	853
			C	V34	WU40PH												
	2	S	P	V34	WPK10CH	492	590	853	492	590	853	492	590	853	492	590	853
			C	V34	WU25CH												
		U	P	V34	WU25CH	459	525	820	459	525	820	459	525	820	459	525	820
			C	V34	WU40PH												
		I	P	V34	WU40PH	459	525	820	459	525	820	459	525	820	459	525	820
			C	V34	WU40PH												
	3	S	P	V34	WPK10CH	492	558	820	492	558	820	492	558	820	492	558	820
			C	V34	WU25CH												
		U	P	V34	WU25CH	459	525	787	459	525	787	459	525	787	459	525	787
C			V34	WU40PH													
I		P	V34	WU40PH	459	525	722	459	525	722	459	525	722	459	525	722	
		C	V34	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

■ Top Cut 4 • Cast Iron • 2 x D/3 x D • Feed Chart • Metric

Top Cut 4					Recommended Feed Rate by Diameter (mm/r)												
					Insert Size A			Insert Size B			Insert Size C			Insert Size D			
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
K	1	S	P	V34	WPK10CH	0,08	0,10	0,14	0,08	0,10	0,16	0,10	0,13	0,18	0,12	0,16	0,24
			C	V34	WU25CH												
		U	P	V34	WU25CH	0,08	0,10	0,14	0,08	0,10	0,16	0,10	0,13	0,18	0,12	0,16	0,24
			C	V34	WU40PH												
		I	P	V34	WU40PH	0,08	0,10	0,14	0,08	0,10	0,16	0,10	0,13	0,18	0,12	0,16	0,24
			C	V34	WU40PH												
	2	S	P	V34	WPK10CH	0,08	0,10	0,14	0,08	0,10	0,16	0,10	0,13	0,18	0,12	0,16	0,24
			C	V34	WU25CH												
		U	P	V34	WU25CH	0,08	0,10	0,14	0,08	0,10	0,16	0,10	0,13	0,18	0,12	0,16	0,24
			C	V34	WU40PH												
		I	P	V34	WU40PH	0,08	0,10	0,14	0,08	0,10	0,16	0,10	0,13	0,18	0,12	0,16	0,24
			C	V34	WU40PH												
3	S	P	V34	WPK10CH	0,08	0,10	0,14	0,08	0,10	0,16	0,10	0,13	0,18	0,12	0,16	0,24	
		C	V34	WU25CH													
	U	P	V34	WU25CH	0,08	0,10	0,14	0,08	0,10	0,16	0,10	0,13	0,18	0,12	0,16	0,24	
		C	V34	WU40PH													
	I	P	V34	WU40PH	0,08	0,10	0,14	0,08	0,10	0,16	0,10	0,13	0,18	0,12	0,16	0,24	
		C	V34	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert



■ Top Cut 4 • Cast Iron • 2 x D/3 x D • Speed Chart • Metric

Top Cut 4					Recommended Cutting Speed by Diameter (m/min)												
					Insert Size A			Insert Size B			Insert Size C			Insert Size D			
					TCF040203AC TCF040204AP 12,00–13,99mm .473–.531"			TCF060203BC TCF050204BP 14,00–18,99mm .563–.734"			TCF070304CC TCF070306CP 19,00–23,99mm .750–.938"			TCF090305DC TCF080308DP 24,00–29,99mm .969–1.156"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
K	1	S	P	V34	WPK10CH	120	140	180	140	170	250	150	180	260	160	200	280
			C	V34	WU25CH												
		U	P	V34	WU25CH	110	120	160	130	160	240	140	170	250	150	180	260
			C	V34	WU40PH												
		I	P	V34	WU40PH	100	110	140	120	150	230	130	160	240	140	170	260
			C	V34	WU40PH												
	2	S	P	V34	WPK10CH	120	140	180	130	160	240	140	180	250	150	180	260
			C	V34	WU25CH												
		U	P	V34	WU25CH	110	120	160	120	150	230	130	160	240	140	160	250
			C	V34	WU40PH												
		I	P	V34	WU40PH	100	110	140	120	150	220	130	160	240	140	160	250
			C	V34	WU40PH												
	3	S	P	V34	WPK10CH	120	140	160	130	160	240	140	170	240	150	170	250
			C	V34	WU25CH												
		U	P	V34	WU25CH	110	120	140	120	150	230	130	160	230	140	160	240
C			V34	WU40PH													
I		P	V34	WU40PH	90	100	120	120	150	230	130	160	230	140	160	220	
		C	V34	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

■ Top Cut 4 • Cast Iron • 2 x D/3 x D • Feed Chart • Metric

Top Cut 4					Recommended Feed Rate by Diameter (mm/r)												
					Insert Size E			Insert Size F			Insert Size G			Insert Size H			
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
K	1	S	P	V34	WPK10CH	0,14	0,16	0,26	0,16	0,20	0,3	0,18	0,22	0,32	0,20	0,24	0,36
			C	V34	WU25CH												
		U	P	V34	WU25CH	0,14	0,16	0,26	0,16	0,20	0,3	0,18	0,22	0,32	0,20	0,24	0,36
			C	V34	WU40PH												
		I	P	V34	WU40PH	0,14	0,16	0,26	0,16	0,20	0,3	0,18	0,22	0,32	0,20	0,24	0,36
			C	V34	WU40PH												
	2	S	P	V34	WPK10CH	0,14	0,16	0,26	0,16	0,20	0,3	0,18	0,22	0,32	0,20	0,24	0,36
			C	V34	WU25CH												
		U	P	V34	WU25CH	0,14	0,16	0,26	0,16	0,20	0,3	0,18	0,22	0,32	0,20	0,24	0,36
			C	V34	WU40PH												
		I	P	V34	WU40PH	0,14	0,16	0,26	0,16	0,20	0,3	0,18	0,22	0,32	0,20	0,24	0,36
			C	V34	WU40PH												
3	S	P	V34	WPK10CH	0,14	0,16	0,26	0,16	0,20	0,3	0,18	0,22	0,32	0,20	0,24	0,36	
		C	V34	WU25CH													
	U	P	V34	WU25CH	0,14	0,16	0,26	0,16	0,20	0,3	0,18	0,22	0,32	0,20	0,24	0,36	
		C	V34	WU40PH													
	I	P	V34	WU40PH	0,14	0,16	0,26	0,16	0,20	0,3	0,18	0,22	0,32	0,20	0,24	0,36	
		C	V34	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

Indexable Drills



■ Top Cut 4 • Cast Iron • 2 x D/3 x D • Speed Chart • Metric

Top Cut 4					Recommended Cutting Speed by Diameter (m/min)												
					Insert Size E			Insert Size F			Insert Size G			Insert Size H			
					TCF120405EC TCF100408EP 30,00–36,99mm 1.188–1.438"			TCF150406FC TCF120412FP 37,00–45,99mm 1.469–1.750"			TCF180508GC TCF150512GP 46,00–56,99mm 1.813–2.219"			TCF210608HC TCF180614HP 57,00–68,00mm 2.250–2.500"			
Material Group	Condition	Pocket Seat	Geometry	Grade	min	Start	max	min	Start	max	min	Start	max	min	Start	max	
K	1	S	P	V34	WPK10CH	160	200	280	160	200	280	160	200	280	160	200	280
			C	V34	WU25CH												
		U	P	V34	WU25CH	150	180	260	150	180	260	150	180	260	150	180	260
			C	V34	WU40PH												
		I	P	V34	WU40PH	140	170	260	140	170	260	140	170	260	140	170	260
			C	V34	WU40PH												
	2	S	P	V34	WPK10CH	150	180	260	150	180	260	150	180	260	150	180	260
			C	V34	WU25CH												
		U	P	V34	WU25CH	140	160	250	140	160	250	140	160	250	140	160	250
			C	V34	WU40PH												
		I	P	V34	WU40PH	140	160	250	140	160	250	140	160	250	140	160	250
			C	V34	WU40PH												
	3	S	P	V34	WPK10CH	150	170	250	150	170	250	150	170	250	150	170	250
			C	V34	WU25CH												
		U	P	V34	WU25CH	140	160	240	140	160	240	140	160	240	140	160	240
C			V34	WU40PH													
I		P	V34	WU40PH	140	160	220	140	160	220	140	160	220	140	160	220	
		C	V34	WU40PH													

NOTE: For 4 x D, it is highly recommended to start with feed and speed values reduced by 10% less than above recommendations.  
 For 5 x D, diameter range .473–.938" (12–23,99mm) (insert sizes A to C), it is highly recommended to start with feed and speed values reduced by 20% less than above recommendations.  
 For 5 x D, diameter range .969–2.5" (24–68mm) (insert sizes D to H), it is highly recommended to start with feed and speed values reduced by 15% less than above recommendations.  
 For 4 x D and 5 x D, it is recommended to reduce the feed rate during entry and exit by 30–50%.

Condition: S = stable conditions,  
 U = unstable cutting conditions,  
 I = interrupted cutting conditions  
 Pocket Seat: P = periphery insert,  
 C = center insert

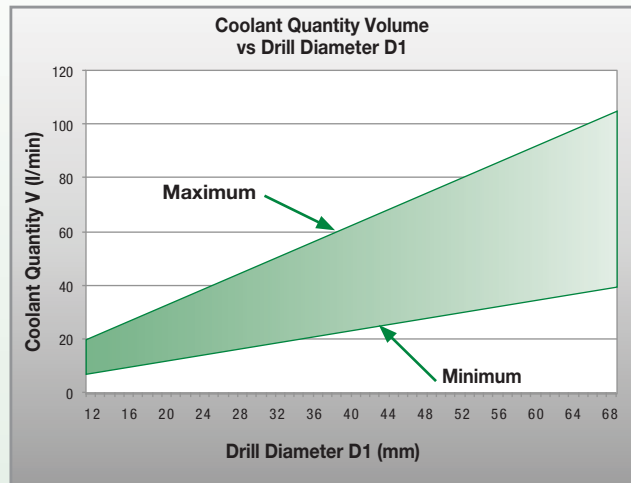
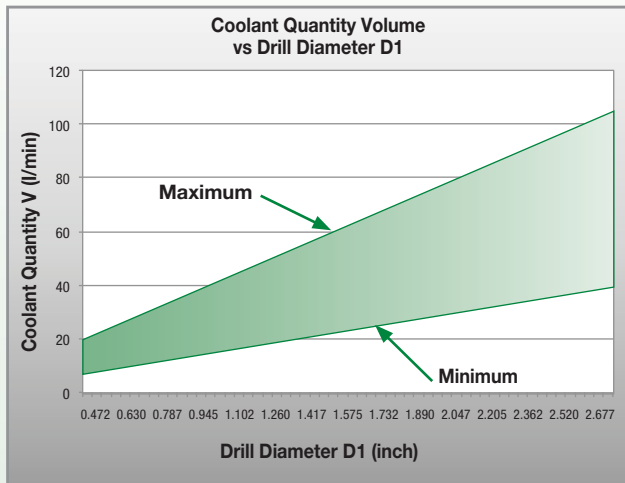
■ **Top Cut 4 • Drill Depth • 2 x D/3 x D • Hole Tolerance Table**

Insert size	Diameter Range (mm)	Diameter Range (inch)	Hole Tolerance (mm)	Hole Tolerance (inch)
A	12,00–13,99	.473–.531"	+/- 0,20	+/- 0.008
B	14,00–18,99	.563–.734"	+/- 0,20	+/- 0.008
C	19,00–23,99	.750–.938"	+/- 0,20	+/- 0.008
D	24,00–29,99	.969–1.156"	+/- 0,20	+/- 0.008
E	30,00–36,99	1.188–1.438"	+/- 0,20	+/- 0.008
F	37,00–45,99	1.469–1.750"	+/- 0,25	+/- 0.010
G	46,00–56,99	1.813–2.219"	+/- 0,25	+/- 0.010
H	57,00–68,00	2.250–2.500"	+/- 0,28	+/- 0.011

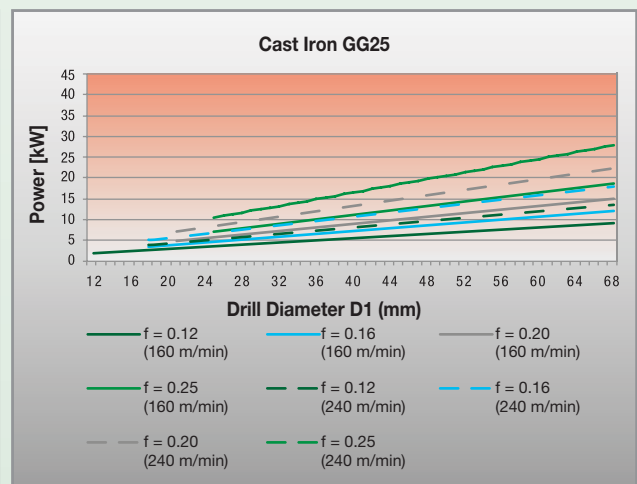
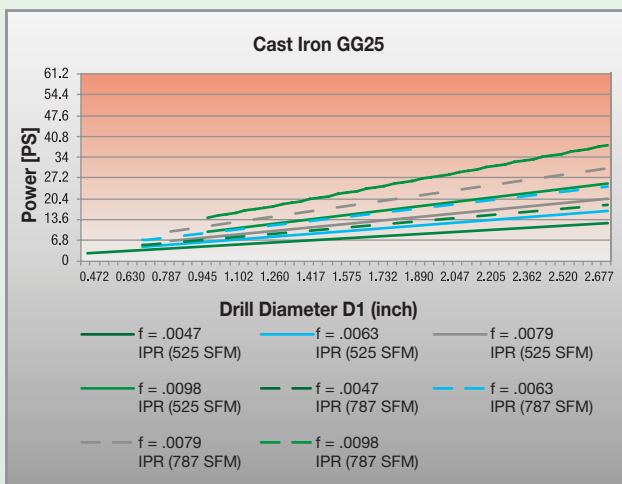
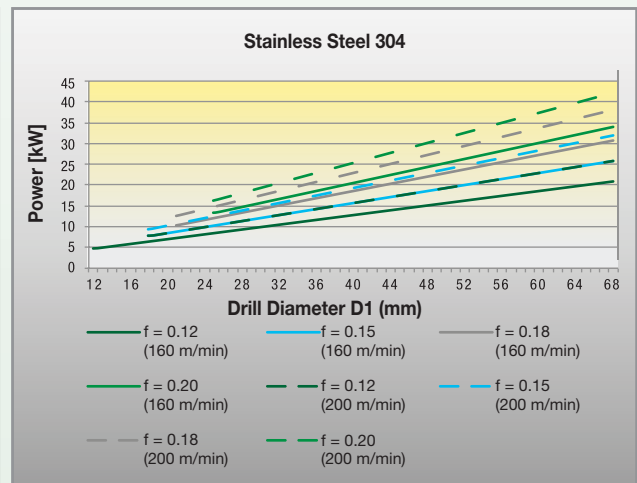
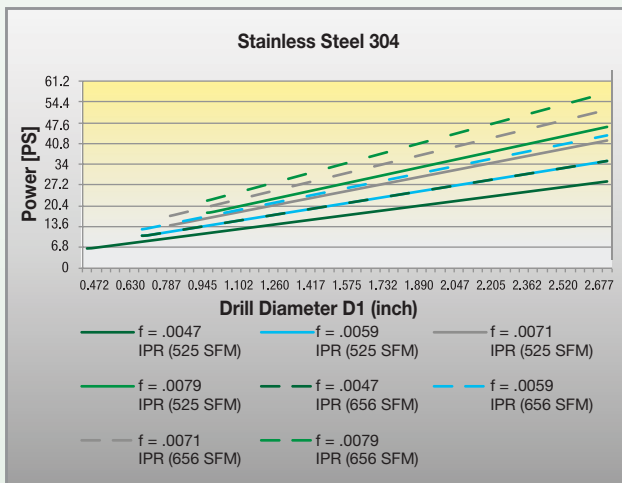
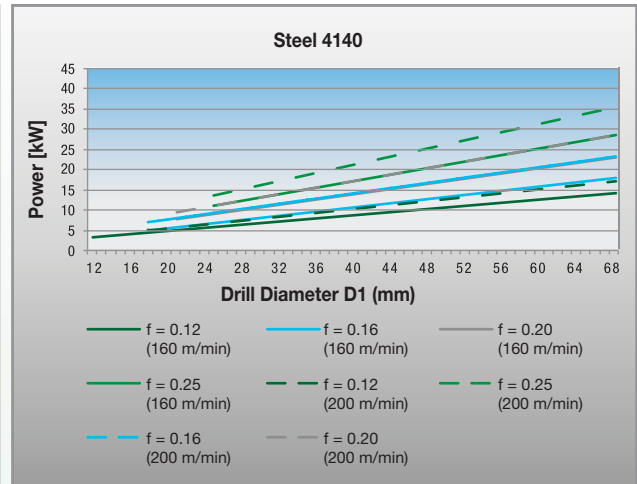
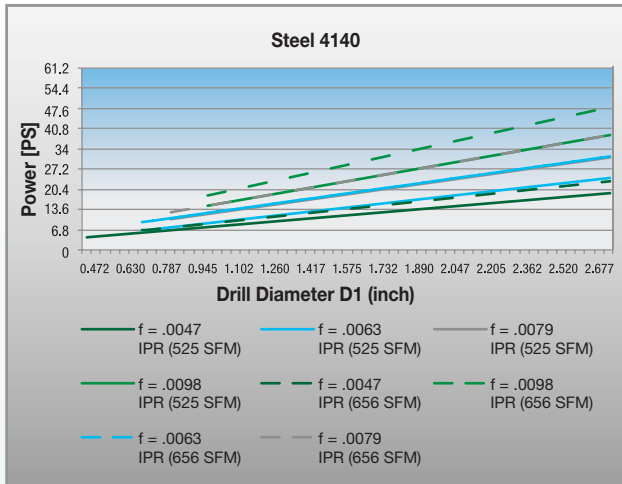
■ **Top Cut 4 • Drill Depth • 4 x D/5 x D • Hole Tolerance Table**

Insert size	Diameter Range (mm)	Diameter Range (inch)	Hole Tolerance (mm)	Hole Tolerance (inch)
A	12,00–13,99	.473–.531"	+/- 0,35	+/- 0.014
B	14,00–18,99	.563–.734"	+/- 0,35	+/- 0.014
C	19,00–23,99	.750–.938"	+/- 0,35	+/- 0.014
D	24,00–29,99	.969–1.156"	+/- 0,35	+/- 0.014
E	30,00–36,99	1.188–1.438"	+/- 0,35	+/- 0.014
F	37,00–45,99	1.469–1.750"	+/- 0,38	+/- 0.015
G	46,00–56,99	1.813–2.219"	+/- 0,38	+/- 0.015
H	57,00–68,00	2.250–2.500"	+/- 0,42	+/- 0.017

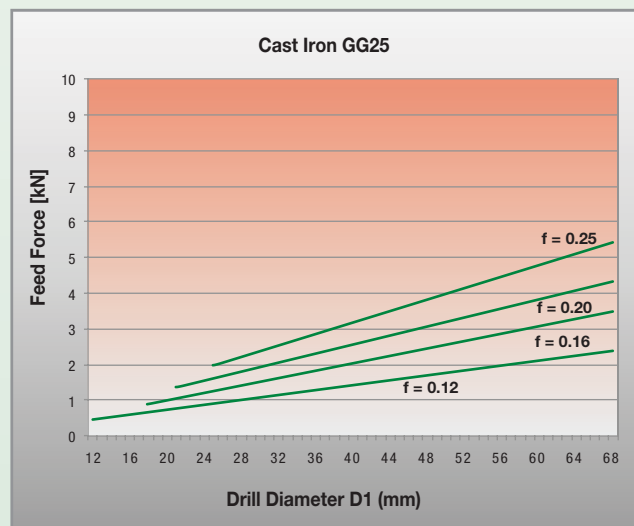
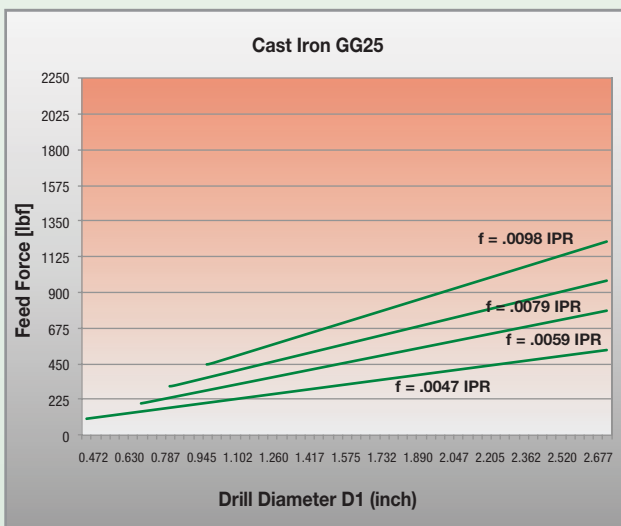
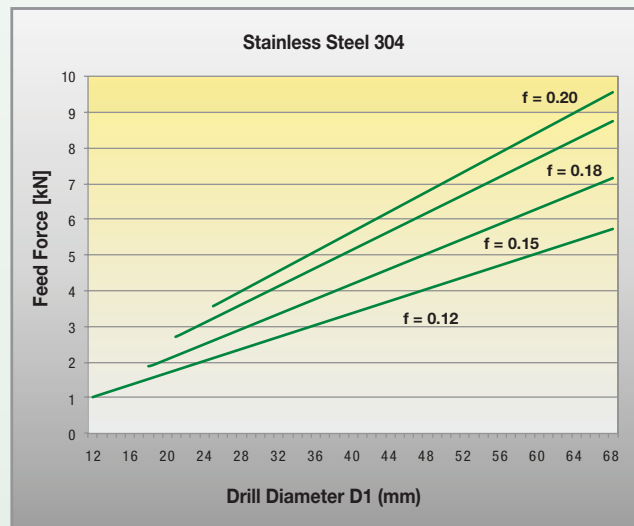
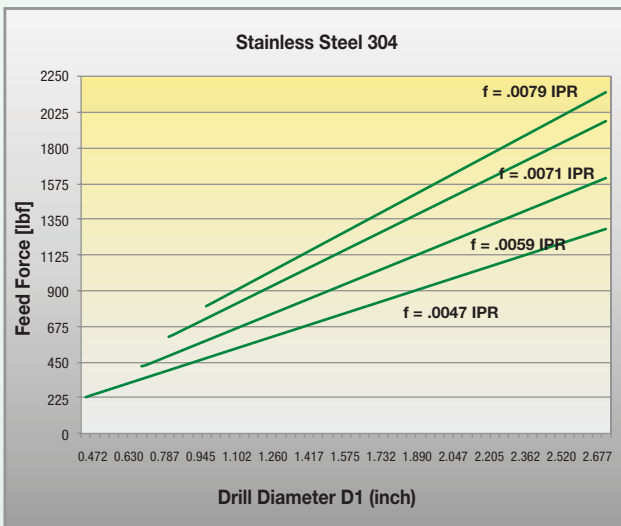
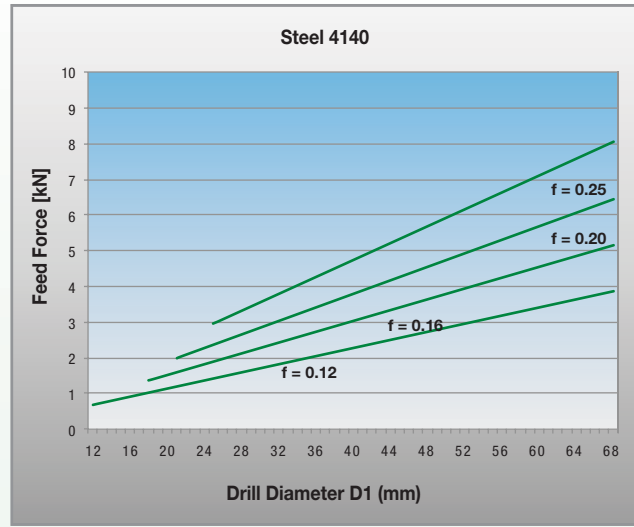
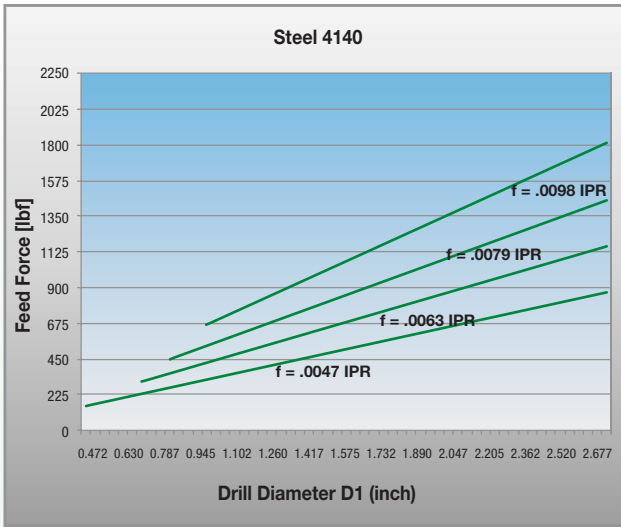
■ **Coolant Requirement/Recommendation**



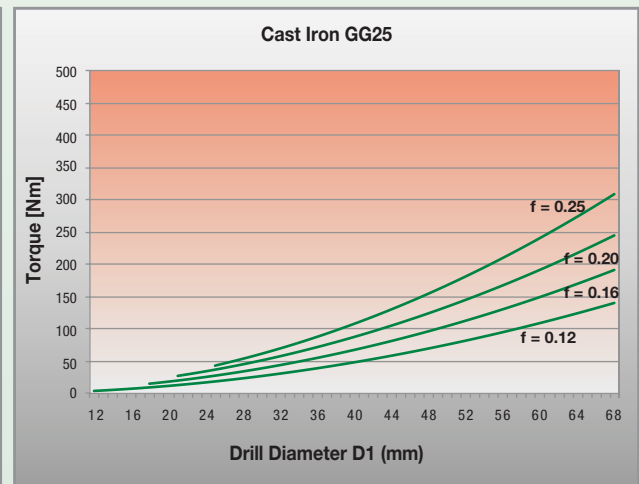
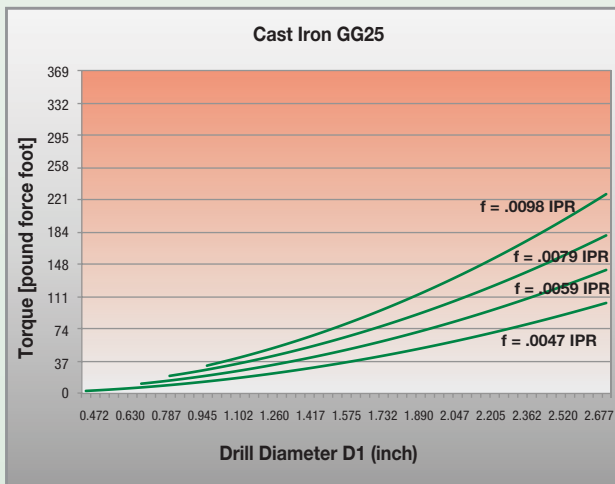
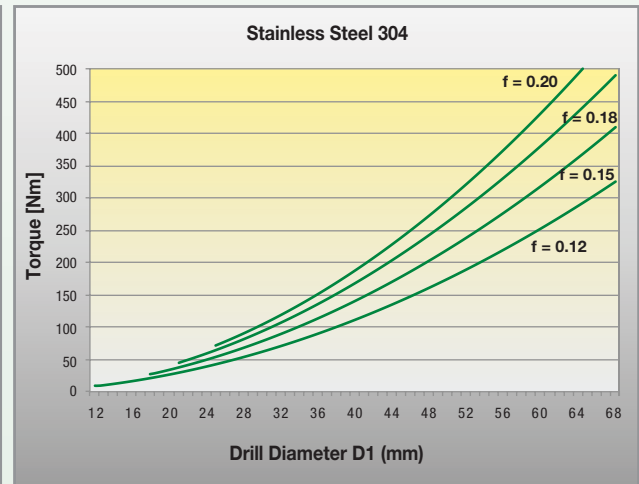
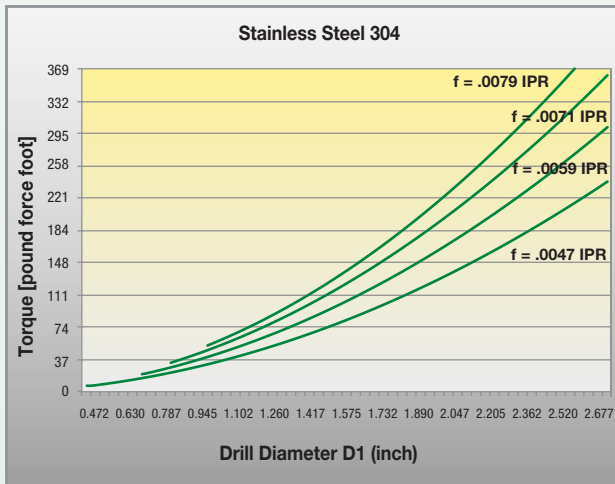
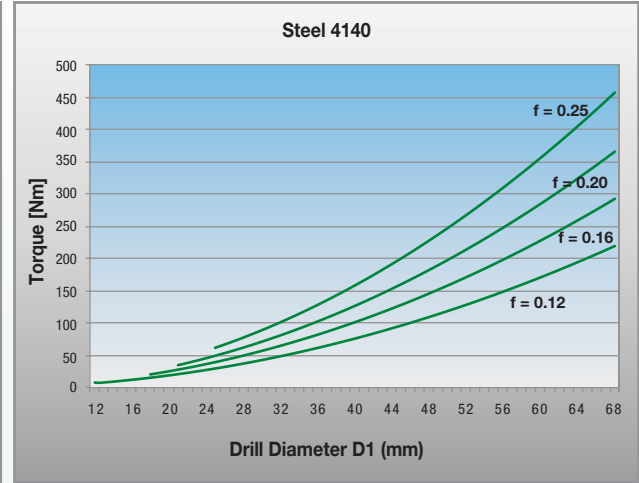
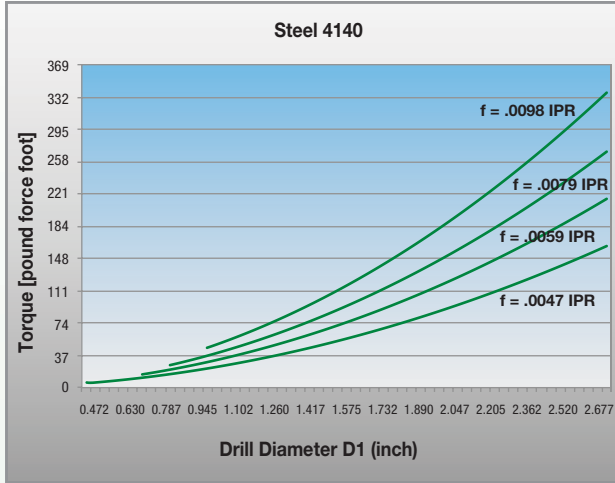
■ Power Requirement



**Feed Force Requirement**



■ Torque Requirement



■ X-Offset Capabilities • Inch

Insert size	Diameter Range (inch)	2 x D and 3 x D		4 x D		5 x D	
		X-offset value max. in Inch	D1 max value	X-offset value max. in Inch	D1 max value	X-offset value max.	D1 max value
A	.473–.531	0.020	D1 + 0.039"	0.020	D1 + 0.039"	—	—
B	.563–.734	0.020	D1 + 0.039"	0.020	D1 + 0.039"	—	—
C	.750–.938	0.020	D1 + 0.039"	0.020	D1 + 0.039"	—	—
D	.969–1.156	0.031	D1 + 0.063"	0.031	D1 + 0.039"	—	—
E	1.188–1.438	0.031	D1 + 0.063"	0.031	D1 + 0.039"	—	—
F	1.469–1.750	0.031	D1 + 0.063"	0.031	D1 + 0.039"	—	—
G	1.813–2.219	0.039	D1 + 0.079"	0.031	D1 + 0.039"	—	—
H	2.250–2.500	0.039	D1 + 0.079"	0.031	D1 + 0.039"	—	—

■ X-Offset Capabilities • Metric

Insert size	Diameter Range (mm)	2 x D and 3 x D		4 x D		5 x D	
		X-offset value max. in mm	D1 max value	X-offset value max. in mm	D1 max value	X-offset value max.	D1 max value
A	12,00–13,99	0,5	D1 + 1mm	0,5	D1 + 1mm	—	—
B	14,00–18,99	0,5	D1 + 1mm	0,5	D1 + 1mm	—	—
C	19,00–23,99	0,5	D1 + 1mm	0,5	D1 + 1mm	—	—
D	24,00–29,99	0,8	D1 + 1,6mm	0,8	D1 + 1mm	—	—
E	30,00–36,99	0,8	D1 + 1,6mm	0,8	D1 + 1mm	—	—
F	37,00–45,99	0,8	D1 + 1,6mm	0,8	D1 + 1mm	—	—
G	46,00–56,99	1	D1 + 2mm	0,8	D1 + 1mm	—	—
H	57,00–68,00	1	D1 + 2mm	0,8	D1 + 1mm	—	—

# Unmatched Versatility Meets Powerful Performance



EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

## Top Cut 4™

Specifically designed for versatility — Top Cut 4 offers outstanding flexibility, increased productivity, and is the one tool to apply to a variety of drilling applications and different workpiece materials.

- High tool life at accelerated speeds.
- Efficient chip evacuation.
- Increased coolant supply.
- Up to 5 x D.

To learn more about the benefits of **WIDIA™ Top Cut 4**, contact your local distributor.

**WIDIA** 



# Reconditioning Services

## **WIDIA™ Reconditioning Services Optimize the Total Value of Metalcutting Tools Throughout Their Entire Life**

WIDIA Reconditioning Services optimize the value of metalcutting tools throughout their entire lifecycle by giving like-new performance — with rapid turnaround time — so tools are always on hand and perform just like new.

- Local support you can trust.
- Rapid turnaround to minimize inventory.
- Like-new performance continues delivering productivity.
- Application support throughout the tool lifecycle.
- WIDIA proprietary geometry specifications after each regrind.
- WIDIA certified coatings.
- Easy logistics through the reconditioning process.

### **Simple Logistics**

Our unique reconditioning program simplifies sending and receiving reconditioned tools to reduce shipping time and increase on-hand inventory.

To use WIDIA tool reconditioning services, contact your authorized WIDIA distributor to get started.







## Global Reconditioning Network



To locate a reconditioning center near you, visit [widia.com/services](http://widia.com/services).





## Hole Finishing

Introduction.....	U2-U5
HSR Reaming Tools .....	U6-U43
WIDIA TRM.....	U44-U47
ROTAFLEX .....	U48-U85
Custom Solutions.....	U86-U95



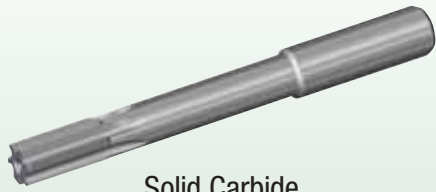
# Hole Finishing with WIDIA™



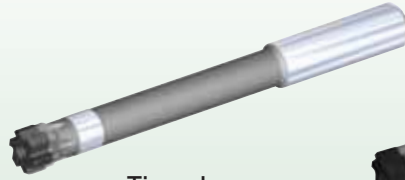
## Hole Finishing with WIDIA

WIDIA is one of the only sources in the metalworking industry that offers all types of hole finishing tooling — from reaming and fine boring to motion tooling. By owning the entire process chain — from raw materials to reconditioning — WIDIA offers customized solutions to meet any imaging challenge, regardless of portfolio or capacity.

## REAMING



Solid Carbide



Tipped



Modular

## BORING



Roughing



Finishing

## COUNTERSINKING



Countersinkers



Porting  
*Fluid Power*

## PCD ROUND TOOLS



Steel-based



Carbide-based

			● first choice ○ alternate choice	P	M	K	N	S	H	standard diameter		engineered solution diameter			
										range	accuracy	range	accuracy		
reaming tools		<b>HSR™ – Solid Carbide</b> High-Speed Reamer Carbide	●	●	●	●	○			.196–.551" 5–14mm	IT7	.056–1.00" 1,4–25,4mm	IT6 >.39" >10mm	.0004" 10 μm	.0003" 7 μm
		<b>HSR – Carbide Tipped</b> High-Speed Reamer Carbide/Cermet	●	●	●	●	○			.551–1.26" 14–32mm	IT7	.551–2.55" 14–65mm	IT6	.0004" 10 μm	.0003" 7 μm
boring/fine-boring tools		<b>ROTAFLEX™ FBHBB</b> Fine-Boring Carbide/Cermet/PCD/CBN	●	●	●	●	○			.236–.866" 6–22mm	IT7	–	–	.0002" 5 μm	.0002– .0004" 5–10 μm
		<b>ROTAFLEX FBH</b> Fine-Boring Carbide/Cermet/PCD/CBN	●	●	●	●	○			.866–4.25" 22–115mm	IT7	–	–	.0002" 5 μm	.0002– .0004" 5–10 μm
		<b>ROTAFLEX TCHS</b> Roughing Carbide/Cermet/PCD/CBN	●	●	●	●				.886–4.52" 22,5–115mm	IT7	–	–	.0004" 10 μm	>.0008" >20 μm
		<b>ROTAFLEX Small Bridge Tools</b> Roughing Carbide/Cermet/PCD/CBN	●	●	●	●				3.425–7.87" 87–200mm	IT7	–	–	.0004" 10 μm	>.0008" >20 μm
		<b>ROTAFLEX Large Bridge Tools</b> Roughing Carbide/Cermet/PCD/CBN	●	●	●	●				7.87–20.47" 200–520mm	IT7	–	–	.0004" 10 μm	>.0008" >20 μm
		<b>Fine-Boring Cartridges</b> Fine-Boring Carbide/Cermet/PCD/CBN	●	○	●	●	○			3.425–20.47" 87–520mm	IT7	–	–	.0002" 5 μm	.0002– .0004" 5–10 μm
countersinking		<b>Countersinking</b> Round Tools Steel Base				●				–	–	–	IT7	.0004" 10 μm	.0004" 10 μm
		<b>Port Cutters</b> Carbide/Cermet Steel Base				●				for standard ports SAE, BSPP, ISO	–	–	IT7	.0004" 10 μm	.0004" 10 μm
PCD		<b>PCD</b> Round Tools Steel Base CBN				●				–	–	.394–4.00" 10–100mm	IT6	.0004" 10 μm	.0004" 10 μm
		<b>PCD</b> Round Tools Carbide Base				●				–	–	.197–1.00" 5–25mm	IT6	.0002" 5 μm	.0003" 7 μm



**Cylindricity**  
NOTE: Process- and application-dependent.  
Highly dependent on the pre-machine hole accuracy.  
Use of high-performance drilling/pre-machining tools  
mandatory to reach values.



**Position**  
NOTE: Process- and application-dependent.  
Highly dependent on the pre-machine hole accuracy.  
Use of high-performance drilling/pre-machining tools  
mandatory to reach values.

achievable surface quality Ra						capability				cost/part	cycle time	required operator experience	page(s)
P	M	K	N	S	H								
20-40 μ-in 0,5-1,0 μm	20-40 μ-in 0,5-1,0 μm	20-60 μ-in 0,5-1,5 μm	-	20-40 μ-in 0,5-1,0 μm	-					moderate	low	low	U8-U10, U13-U14
20-40 μ-in 0,5-1,0 μm	20-40 μ-in 0,5-1,0 μm	20-60 μ-in 0,5-1,5 μm	-	20-40 μ-in 0,5-1,0 μm	-			carbide only	carbide only	moderate	low	low	U11-U12, U15-U16
32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	<48 μ-in <1,2 μm					low	moderate	low- moderate	U63-U65
32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	<48 μ-in <1,2 μm					low	moderate	low- moderate	U66-U67
40-200 μ-in 1,0-5,0 μm	40-200 μ-in 1,0-5,0 μm	40-200 μ-in 1,0-5,0 μm	40-80 μ-in 1,0-2,0 μm	40-200 μ-in 1,0-5,0 μm	-					low	moderate	low- moderate	U50-U51
40-200 μ-in 1,0-5,0 μm	40-200 μ-in 1,0-5,0 μm	40-200 μ-in 1,0-5,0 μm	40-80 μ-in 1,0-2,0 μm	40-200 μ-in 1,0-5,0 μm	-					low	low	low- moderate	U52-U53
40-200 μ-in 1,0-5,0 μm	40-200 μ-in 1,0-5,0 μm	40-200 μ-in 1,0-5,0 μm	40-80 μ-in 1,0-2,0 μm	40-200 μ-in 1,0-5,0 μm	-					low	moderate	low- moderate	U54-U59
32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	32-80 μ-in 0,8-2,0 μm	-					low	moderate	low- moderate	U60-U62
32-80 μ-in -2,0 μm	32-80 μ-in -2,0 μm	32-80 μ-in -2,0 μm	32-80 μ-in 0,8-2,0 μm	-	-					very low	very low	moderate	U90-U91
32-80 μ-in -2,0 μm	32-80 μ-in -2,0 μm	32-80 μ-in -2,0 μm	32-80 μ-in 0,8-2,0 μm	-	-					very low	very low	moderate	U88-U89
-	-	-	4-32 μ-in 0,1-0,8 μm	-	-					low	very low	moderate	U94-U95
-	-	-	4-32 μ-in 0,1-0,8 μm	-	-					low	very low	moderate	U94-U95

**Ra** Surface roughness

NOTE: Surface roughness values are guidelines and depend on the application, coolant situation, machine, and cutting data applied.

HSR™ Reaming Tools combine high-performance micrograin substrates, specific coatings, and extremely unequal flutes for outstanding machining results. Increase your productivity with the HSR leads and lapped grinding surface of rake, clearance, and relief angle.



# HSR Reaming Tools

## HSR Solid Carbide Reaming Tools

- Diameters starting at .055" (1,40mm) with internal coolant supply available as standard.
- Ground to H7 tolerance class for use in most applications.
- Specific coatings and lead configurations available for high-speed machining of steel, stainless steel, and cast iron.
- Uncoated micrograin substrates for machining stainless steel and non-ferrous materials at accelerated speeds.

## Features and Benefits

- Lapped ground leads for high-speed cutting.
- Long tool life with increased hole and surface quality.
- High Metal Removal Rates (MRR) at increased speeds and feeds.
- Radial coolant supply for through hole applications and axial coolant supply for blind holes to achieve higher feed rates.
- Decreased runout and improved straightness due to unequal flutes.

## Customization

- Diameters starting at .055" (1,40mm) up to .557" (14,15mm) available with and without internal coolant in 0,001mm steps.
- Solid cermet reaming tools and tooling for heat-resistant materials are available on request.



## HSR™ Carbide- and Cermet-Tipped Reaming Tools

- Achieve solid carbide and solid cermet metal removal rates from .551–1.26" (14–32mm) with no customization required.
- Ground to H7 tolerance class to accommodate most applications.
- Specific coatings and lead configuration for high-speed machining of steel, stainless steel, cast iron, and non-ferrous materials at accelerated speeds.
- Coated and uncoated micrograin substrate carbide and coated cermet specifically engineered for reaming.

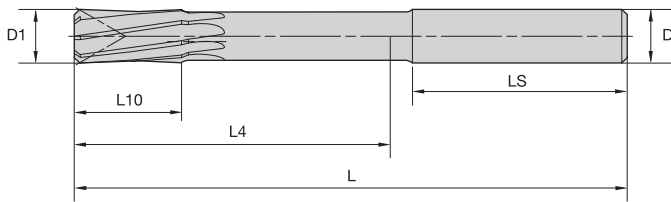
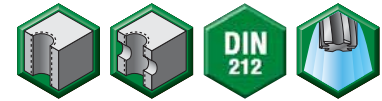
### Features and Benefits

- Lapped ground leads for high-speed cutting.
- Long tool life with increased hole and surface quality.
- High metal removal rates at higher speeds and feeds.
- Decreased runout and improved straightness due to unequal flutes.
- Adjustment screw at straight-fluted HSR reamers to change internal coolant supply from axial to radial.
- Optimized coolant options for blind holes and blind hole applications with interrupted cut.

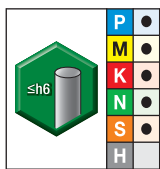
### Customization

- Diameters up to 1.968" (50mm) available with and without internal coolant in 0,001mm steps.
- HSR tooling for machining heat-resistant materials is available on request.





■ HSR Reamers with Helical Flutes for Through Holes • K10™ • .055–.394" (1,4–10mm)



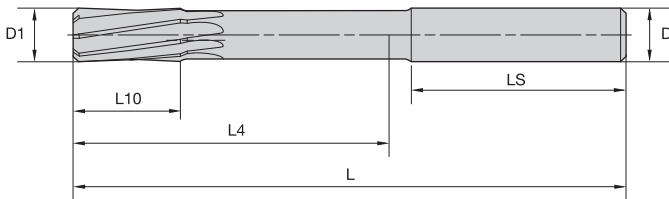
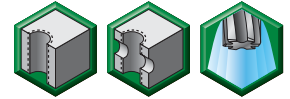
grade K10  
uncoated

● first choice  
○ alternate choice

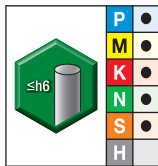
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2293637	050221-000015	1,50	.059	1,50	.059	1.575	.708	.315	.866	3
2293638	050221-000016	1,60	.063	1,60	.063	1.693	.787	.354	.906	3
2283423	050221-000020	2,00	.079	2,00	.079	1.929	.944	.433	.984	4
2283424	050221-000022	2,20	.087	2,20	.087	2.087	1.023	.472	1.063	4
2283426	050221-000025	2,50	.098	2,50	.098	2.244	1.102	.551	1.142	4
2283427	050221-000028	2,80	.110	2,80	.110	2.402	1.259	.591	1.142	4
2283428	050221-000030	3,00	.118	3,00	.118	2.402	1.259	.591	1.142	6
2283429	050221-000032	3,20	.126	3,20	.126	2.559	1.377	.630	1.181	6
2283430	050221-000035	3,50	.138	3,50	.138	2.756	1.574	.709	1.181	6
2283431	050221-000040	4,00	.157	4,00	.158	2.953	1.614	.748	1.260	6
2293640	050221-000045	4,50	.177	4,50	.177	3.150	1.732	.827	1.299	6
2283445	050221-000050	5,00	.197	5,00	.197	3.386	2.007	.906	1.339	6
2293641	050221-000055	5,50	.217	5,60	.221	3.661	2.244	1.024	1.417	6
2293642	050221-000060	6,00	.236	5,60	.221	3.661	2.086	1.024	1.417	6
2293643	050221-000065	6,50	.256	6,30	.248	3.976	2.480	1.102	1.496	6
2293644	050221-000070	7,00	.276	7,10	.280	4.291	2.716	1.221	1.575	6
2283450	050221-000075	7,50	.295	7,10	.280	4.291	2.716	1.221	1.575	6
2283451	050221-000080	8,00	.315	8,00	.315	4.606	2.952	1.299	1.654	6
2283463	050221-000085	8,50	.335	8,00	.315	4.606	2.952	1.299	1.654	6
2283464	050221-000090	9,00	.354	9,00	.354	4.921	3.188	1.417	1.732	6
2283465	050221-000095	9,50	.374	9,00	.354	4.921	3.188	1.417	1.732	6
2283466	050221-000100	10,00	.394	10,00	.394	5.236	3.425	1.496	1.811	6

Hole Finishing

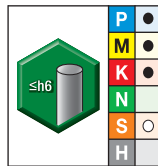
- Standard reamers listed are ground to achieve an H7 tolerance hole. IT6 hole tolerance capability starting at diameter .394" (10mm) is available as a Custom Solution. Additional diameters and lengths made to order.



■ HSR Reamers with Helical Flutes for Through Holes • K10F™/K10F-DCFD™ • .079-.551" (2-114mm)



grade K10F  
uncoated

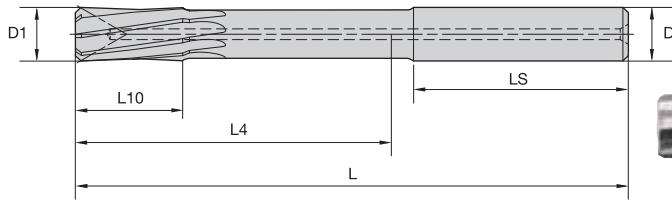
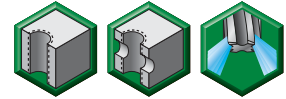


grade K10F-DCFD  
TiAlN

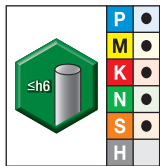
- first choice
- alternate choice

				D1		D						
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2436871	050227-000300	2441253	450227-000300	3,00	.118	3,00	.118	1.890	.591	.236	1.102	4
2436872	050227-000400	2441254	450227-000400	4,00	.158	4,00	.158	2.126	.827	.315	1.102	4
2436913	050227-000500	2441256	450227-000500	5,00	.197	6,00	.236	2.913	1.260	.472	1.417	4
2436914	050227-000600	2441257	450227-000600	6,00	.236	6,00	.236	2.913	1.299	.472	1.417	4
2436916	050227-000800	2441260	450227-000800	8,00	.315	8,00	.315	3.583	1.969	.630	1.417	6
2436919	050227-001000	2441261	450227-001000	10,00	.394	10,00	.394	4.055	2.284	.787	1.575	6
2436922	050227-001200	2441284	450227-001200	12,00	.472	12,00	.472	4.646	2.677	.945	1.772	6
2436946	050227-001400	2441285	450227-001400	14,00	.551	14,00	.551	5.197	3.189	1.102	1.772	6

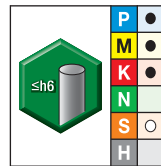
- Standard reamers listed are ground to achieve an H7 tolerance hole. IT6 hole tolerance capability starting at diameter .394" (10mm) is available as a Custom Solution. Additional diameters and lengths made to order.



### ■ HSR Reamers with Helical Flutes for Through Holes • K10F™/K10F-DCFD™ • .197–.551" (5–14mm)



grade K10F  
uncoated

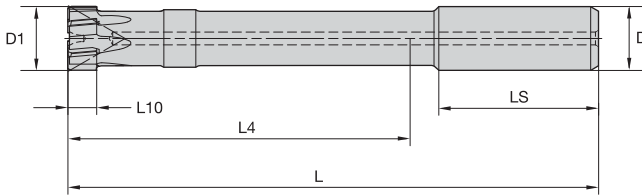
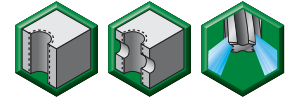


grade K10F-DCFD  
TiAlN

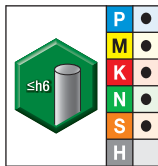
- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1		D		L	L4	L10	LS	Z
				mm	in	mm	in					
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2437426	050271-000600	2441381	450271-000600	6,00	.236	6,00	.236	2.913	1.299	.472	1.417	4
2437428	050271-000800	2441453	450271-000800	8,00	.315	8,00	.315	3.583	1.969	.630	1.417	6
2437430	050271-001000	2441455	450271-001000	10,00	.394	10,00	.394	4.055	2.284	.787	1.575	6
2437432	050271-001200	2441457	450271-001200	12,00	.472	12,00	.472	4.646	2.677	.945	1.772	6
2437468	050271-001400	2441494	450271-001400	14,00	.551	14,00	.551	5.197	3.189	1.102	1.772	6

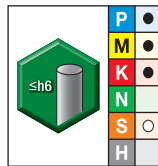
- Standard reamers listed are ground to achieve an H7 tolerance hole. IT6 capability is available. Additional diameters and lengths made to order.



■ HSR Reamers with Helical Flutes for Through Holes • K10F™/K10F-DCFD™ • .551–1.259" (14–32mm)



grade K10F uncoated

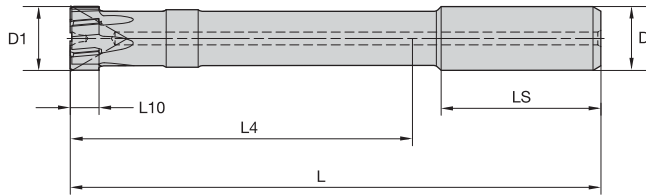
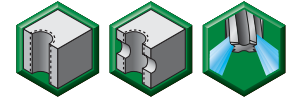


grade K10F-DCFD TiAlN

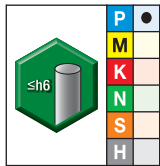
- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1		D		L	L4	L10	LS	Z
				mm	in	mm	in					
3084978	050281-001400	3084312	450281-001400	14,00	.551	16,00	.630	5.709	3.543	.354	1.890	6
3084983	050281-001600	3084317	450281-001600	16,00	.630	20,00	.787	6.181	3.937	.354	1.969	6
3084992	050281-001800	3084321	450281-001800	18,00	.709	20,00	.787	6.732	4.488	.354	1.969	6
3085083	050281-002000	3084319	450281-002000	20,00	.787	20,00	.787	7.874	5.630	.354	1.969	6
3085084	050281-002200	3084322	450281-002200	22,00	.866	20,00	.787	8.268	6.024	.433	1.969	6
3085087	050281-002400	3084323	450281-002400	24,00	.945	20,00	.787	8.268	6.024	.433	1.969	6
3085089	050281-002500	3084324	450281-002500	25,00	.984	20,00	.787	8.268	6.024	.433	1.969	6
3085090	050281-002600	3084325	450281-002600	26,00	1.024	25,00	.984	9.449	6.969	.433	2.205	8
3085092	050281-002800	3084327	450281-002800	28,00	1.102	25,00	.984	9.449	6.969	.433	2.205	8
3085104	050281-003000	3084320	450281-003000	30,00	1.181	25,00	.984	10.630	8.150	.433	2.205	8
3085106	050281-003200	3084328	450281-003200	32,00	1.260	25,00	.984	10.630	8.150	.433	2.205	8

- Standard reamers listed are ground to achieve an H7 tolerance hole. IT6 capability is available. Additional diameters and lengths made to order.



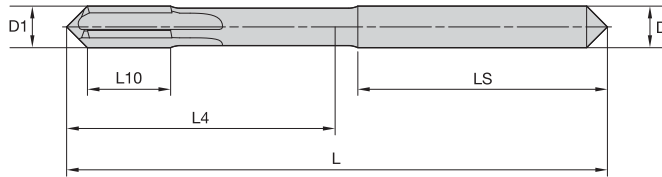
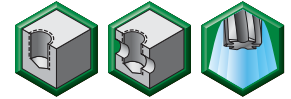
### ■ HSR Reamers with Helical Flutes for Through Holes • CERMET-DCFD™ • .551–.787" (14–20mm)



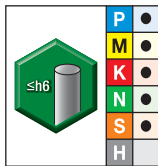
- first choice
- alternate choice

grade CERMET-DCFD TiAlN		D1		D		L	L4	L10	LS	Z
order #	catalog #	mm	in	mm	in					
3888130	456681-001400	14,00	.551	16,00	.630	5.710	2.992	.315	1.929	6
3888131	456681-001500	15,00	.591	16,00	.630	5.710	2.992	.315	1.929	6
3888132	456681-001600	16,00	.630	20,00	.787	6.180	3.386	.315	2.008	6
3888403	456681-001700	17,00	.669	20,00	.787	6.180	3.386	.394	2.008	6
3888404	456681-001800	18,00	.709	20,00	.787	6.730	3.937	.394	2.008	6
3888405	456681-001900	19,00	.748	20,00	.787	6.730	3.937	.394	2.008	6
3888406	456681-002000	20,00	.787	20,00	.787	7.870	5.079	.394	2.008	6

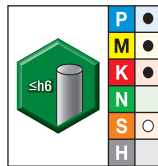
- Standard reamers listed are ground to achieve an H7 tolerance hole.  
Additional diameters and lengths made to order.



■ HSR Reamers with Straight Flutes for Blind Holes • K10F™/K10F-DCFD™ • .079-.158" (2-4mm)



grade K10F  
uncoated



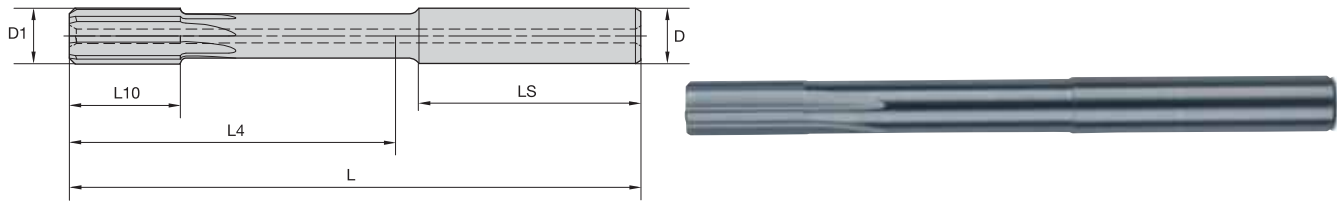
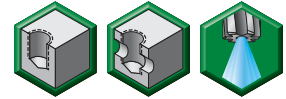
grade K10F-DCFD  
TiAlN

- first choice
- alternate choice

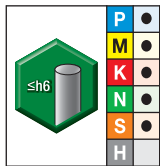
				D1		D						
order #	catalog #	order #	catalog #	mm	in	mm	in	L	L4	L10	LS	Z
2446025	050222-000200	2446371	450222-000200	2,00	.079	3,00	.118	1.890	.591	.236	1.102	4
2446029	050222-000300	2446372	450222-000300	3,00	.118	3,00	.118	1.890	.591	.315	1.102	4
2446031	050222-000400	2446415	450222-000400	4,00	.158	4,00	.158	2.126	.827	.315	1.102	4



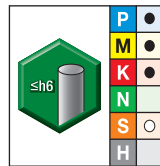
- Standard reamers listed are ground to achieve an H7 tolerance hole. IT6 hole tolerance capability starting at diameter .394" (10mm) is available as a Custom Solution. Additional diameters and lengths made to order.



### ■ HSR Reamers with Straight Flutes for Blind Holes • K10F™/K10F-DCFD™ • .197–.551" (5–14mm)



grade K10F  
uncoated



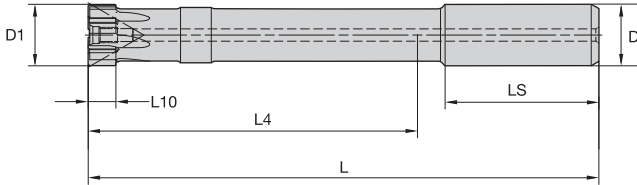
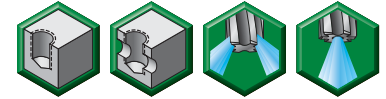
grade K10F-DCFD  
TiAlN

- first choice
- alternate choice

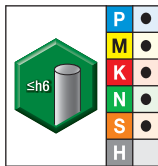
order #	catalog #	order #	catalog #	D1		D		L	L4	L10	LS	Z
				mm	in	mm	in					
2437472	050270-000500	2441337	450270-000500	5,00	.197	6,00	.236	2.913	1.260	.472	1.417	4
2437523	050270-000600	2441339	450270-000600	6,00	.236	6,00	.236	2.913	1.299	.472	1.417	4
2437525	050270-000800	2441341	450270-000800	8,00	.315	8,00	.315	3.583	1.969	.630	1.417	6
2437526	050270-001000	2441342	450270-001000	10,00	.394	10,00	.394	4.055	2.284	.787	1.575	6
2437527	050270-001200	2441353	450270-001200	12,00	.472	12,00	.472	4.646	2.677	.945	1.772	6
2437529	050270-001400	2441354	450270-001400	14,00	.551	14,00	.551	5.197	3.189	1.102	1.772	6



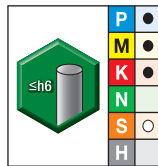
- Standard reamers listed are ground to achieve an H7 tolerance hole. IT6 capability is available. Additional diameters and lengths made to order.
- Coolant direction can be altered between axial and radial by using the set screw (included).



■ HSR Reamers with Straight Flutes for Blind Holes • K10F™/K10F-DCFD™ • .551–1.259" (14–32mm)



grade K10F uncoated

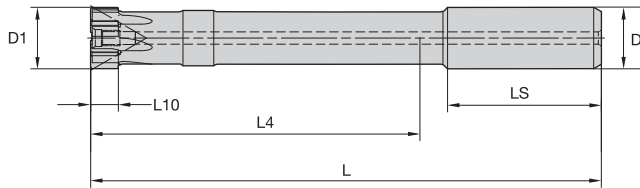


grade K10F-DCFD TiAlN

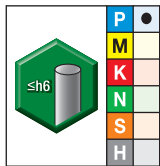
● first choice  
○ alternate choice

				D1		D						
order #	catalog #	order #	catalog #	mm	in	mm	in	L	L4	L10	LS	Z
3055655	050280-001400	3084512	450280-001400	14,00	.551	16,00	.630	5.709	3.543	.354	1.890	6
3055656	050280-001600	3084526	450280-001600	16,00	.630	20,00	.787	6.181	3.937	.354	1.969	6
3055657	050280-001800	3084528	450280-001800	18,00	.709	20,00	.787	6.732	4.488	.354	1.969	6
3056095	050280-002000	3077292	450280-002000	20,00	.787	20,00	.787	7.874	5.630	.354	1.969	6
3056096	050280-002200	3084529	450280-002200	22,00	.866	20,00	.787	8.268	6.024	.433	1.969	6
3056097	050280-002400	3084530	450280-002400	24,00	.945	20,00	.787	8.268	6.024	.433	1.969	6
3056098	050280-002500	3084531	450280-002500	25,00	.984	20,00	.787	8.268	6.024	.433	1.969	6
3056099	050280-002600	3084532	450280-002600	26,00	1.024	25,00	.984	9.449	6.969	.433	2.205	8
3056100	050280-002800	3084593	450280-002800	28,00	1.102	25,00	.984	9.449	6.969	.433	2.205	8
3056102	050280-003000	3084594	450280-003000	30,00	1.181	25,00	.984	10.630	8.150	.433	2.205	8
3056273	050280-003200	3084595	450280-003200	32,00	1.260	25,00	.984	10.630	8.150	.433	2.205	8

- Standard reamers listed are ground to achieve an H7 tolerance hole. IT6 capability is available. Additional diameters and lengths made to order.
- Coolant direction can be altered between axial and radial by using the set screw (included).



### ■ HSR Reamers with Straight Flutes for Blind Holes • CERMET-DCFD™ • .551-.787" (14-20mm)



grade CERMET-DCFD  
TiAIN

- first choice
- alternate choice

order #	catalog #	D1		D		L	L4	L10	LS	Z
		mm	in	mm	in					
3888407	456680-001400	14,00	.551	16,00	.630	5.710	2.992	.315	1.929	6
3888408	456680-001500	15,00	.591	16,00	.630	5.710	2.992	.315	1.929	6
3888409	456680-001600	16,00	.630	20,00	.787	6.180	3.386	.315	2.008	6
3888410	456680-001700	17,00	.669	20,00	.787	6.180	3.386	.394	2.008	6
3888411	456680-001800	18,00	.709	20,00	.787	6.730	3.937	.394	2.008	6
3888412	456680-001900	19,00	.748	20,00	.787	6.730	3.937	.394	2.008	6
3888413	456680-002000	20,00	.787	20,00	.787	7.870	5.079	.394	2.008	6



■ Series 050221 • Solid Carbide • Helical Flute • Grade K10™ • Inch

Material Group										
		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev					
		min		max	Tool Diameter	0.055–0.124	0.124–0.189	0.189–0.281	0.282–0.378	0.378–0.5
P	1	50	–	80	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010
	2	50	–	70	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010
	3	30	–	70	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010
	4	20	–	30	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010
	5	20	–	30	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010
	6	10	–	30	IPR	0.002–0.004	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009
M	1	10	–	30	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010
	2	10	–	30	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010
	3	10	–	30	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010
K	1	30	–	50	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018
	2	30	–	50	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018
	3	20	–	50	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018
N	1	80	–	100	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018
	2	80	–	110	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018
	3	80	–	110	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018
	4	80	–	100	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018
	5	70	–	80	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018
	6	80	–	110	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018
S	1	10	–	30	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010
	2	10	–	20	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010
	3	20	–	50	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010
	4	20	–	50	IPR	0.002–0.004	0.004–0.007	0.004–0.008	0.004–0.009	0.006–0.010

■ Series 050221 • Solid Carbide • Helical Flute • Grade K10™ • Metric

Material Group											
		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev						
		min		max	Tool Diameter	1,40–3,15	3,16–4,80	4,81–7,15	7,16–9,59	9,60–12,70	
P	1	20	–	30	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	
	2	20	–	20	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	
	3	10	–	20	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	
	4	10	–	10	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	
	5	10	–	10	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	
	6	10	–	10	mm/r	0,06–0,10	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	
M	1	10	–	10	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	
	2	10	–	10	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	
	3	10	–	10	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	
K	1	10	–	20	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	
	2	10	–	20	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	
	3	10	–	20	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	
N	1	30	–	30	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	
	2	30	–	40	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	
	3	30	–	40	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	
	4	30	–	30	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	
	5	20	–	30	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	
	6	30	–	40	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	
S	1	10	–	10	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	
	2	10	–	10	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	
	3	10	–	20	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	
	4	10	–	20	mm/r	0,07–0,13	0,08–0,16	0,10–0,20	0,13–0,23	0,15–0,25	

■ Series 050227 • Solid Carbide • Helical Flute Grade K10F™ • Inch

Material Group		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev								
		min	–	max	Tool Diameter	0.055–0.124	0.124–0.189	0.189 – 0.281	0.282–0.378	0.378–0.5	0.5–0.590		
		 											
P	1			100	–	130	IPR	0.008–0.013	0.008–0.016	0.011–0.021	0.016–0.028	0.016–0.031	0.020–0.035
	2			80	–	110	IPR	0.008–0.013	0.008–0.016	0.011–0.021	0.016–0.028	0.016–0.031	0.020–0.035
	3			80	–	100	IPR	0.008–0.013	0.008–0.016	0.011–0.021	0.016–0.028	0.016–0.031	0.020–0.035
	4			50	–	80	IPR	0.008–0.013	0.008–0.016	0.011–0.021	0.016–0.028	0.016–0.031	0.020–0.035
	5			30	–	70	IPR	0.008–0.013	0.008–0.016	0.011–0.021	0.016–0.028	0.016–0.031	0.020–0.035
	6			30	–	50	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
M	1			20	–	50	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	2			20	–	50	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	3			20	–	30	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
K	1			70	–	100	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	2			70	–	80	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	3			230	–	290	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
N	1			260	–	330	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	2			260	–	330	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	3			230	–	290	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	4			200	–	260	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	5			280	–	340	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	6			30	–	50	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
S	1			20	–	30	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020
	2			50	–	80	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020
	3			50	–	80	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	4			20	–	50	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026

■ Series 050227 • Solid Carbide • Helical Flute • Grade K10F™ • Metric

Material Group											
		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev						
		min		max	Tool Diameter	1,40–3,15	3,16–4,80	4,81–7,15	7,16–9,59	9,60–12,70	12,70–15,00
P	1	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,40–0,70	0,40–0,80	0,50–0,90
	2	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,40–0,70	0,40–0,80	0,50–0,90
	3	30	–	30	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,40–0,70	0,40–0,80	0,50–0,90
	4	20	–	30	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,40–0,70	0,40–0,80	0,50–0,90
	5	10	–	20	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,40–0,70	0,40–0,80	0,50–0,90
	6	10	–	20	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
M	1	10	–	20	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
	2	10	–	20	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
	3	10	–	10	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
K	1	20	–	30	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	2	20	–	30	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	3	20	–	30	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
N	1	70	–	90	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	2	80	–	100	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	3	80	–	100	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	4	70	–	90	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	5	60	–	80	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	6	90	–	110	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
S	1	10	–	20	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50
	2	10	–	10	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50
	3	20	–	30	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
	4	20	–	30	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65

■ Series 450227 • Solid Carbide • Helical Flute • Grade K10F-DCFD™ • Inch



Material Group											
		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev						
		min		max	Tool Diameter	0.055–0.124	0.124–0.189	0.189–0.281	0.282–0.378	0.378–0.5	0.5–0.590
P	1	200	–	260	IPR	0.008–0.013	0.008–0.016	0.011–0.021	0.016–0.028	0.016–0.031	0.020–0.035
	2	180	–	250	IPR	0.008–0.013	0.008–0.016	0.011–0.021	0.016–0.028	0.016–0.031	0.020–0.035
	3	180	–	230	IPR	0.008–0.013	0.008–0.016	0.011–0.021	0.016–0.028	0.016–0.031	0.020–0.035
	4	130	–	200	IPR	0.008–0.013	0.008–0.016	0.011–0.021	0.016–0.028	0.016–0.031	0.020–0.035
	5	70	–	100	IPR	0.008–0.013	0.008–0.016	0.011–0.021	0.016–0.028	0.016–0.031	0.020–0.035
	6	50	–	80	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
M	1	30	–	70	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	2	30	–	70	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	3	30	–	50	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
K	1	160	–	250	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	2	150	–	210	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	3	150	–	210	IPR	0.010–0.018	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
S	1	20	–	30	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020
	2	50	–	80	IPR	0.004–0.008	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020

■ Series 450227 • Solid Carbide • Helical Flute • Grade K10F-DCFD™ • Metric

Material Group											
		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev						
		min		max	Tool Diameter	1,40–3,15	3,16–4,80	4,81–7,15	7,16–9,59	9,60–12,70	12,70–15,00
P	1	60	–	80	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,40–0,70	0,40–0,80	0,50–0,90
	2	60	–	80	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,40–0,70	0,40–0,80	0,50–0,90
	3	60	–	70	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,40–0,70	0,40–0,80	0,50–0,90
	4	40	–	60	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,40–0,70	0,40–0,80	0,50–0,90
	5	20	–	30	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,40–0,70	0,40–0,80	0,50–0,90
	6	20	–	30	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
M	1	10	–	20	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
	2	10	–	20	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
	3	10	–	20	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
K	1	50	–	70	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	2	50	–	70	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	3	50	–	70	mm/r	0,25–0,45	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
S	1	10	–	20	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50
	2	10	–	20	mm/r	0,10–0,20	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50





■ Series 050271 • Solid Carbide • Helical Flute • Grade K10F™ • Inch

Material Group											
		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev						
		min		max	Tool Diameter	0.124–0.189	0.189–0.281	0.282–0.378	0.378–0.5	0.5–0.590	
P	1	150	–	210	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035	
	2	130	–	200	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035	
	3	110	–	180	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035	
	4	80	–	110	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035	
	5	50	–	80	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035	
	6	30	–	70	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026	
M	1	30	–	70	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026	
	2	30	–	70	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026	
	3	20	–	50	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026	
K	1	100	–	160	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047	
	2	100	–	160	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047	
	3	80	–	150	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047	
N	1	420	–	470	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047	
	2	460	–	520	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047	
	3	460	–	520	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047	
	4	420	–	490	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047	
	5	390	–	460	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047	
	6	470	–	540	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047	
S	1	30	–	70	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020	
	2	20	–	50	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020	
	3	80	–	110	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026	
	4	80	–	110	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026	

■ Series 050271 • Solid Carbide • Helical Flute • Grade K10F™ • Metric

Material Group											
		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev						
		min		max	Tool Diameter	3,16–4,80	4,81–7,15	7,16–9,59	9,60–12,70	12,70–15,00	
P	1	50	–	70	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90	
	2	40	–	60	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90	
	3	40	–	60	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90	
	4	30	–	40	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90	
	5	20	–	30	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90	
	6	10	–	20	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65	
M	1	10	–	20	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65	
	2	10	–	20	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65	
	3	10	–	20	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65	
K	1	30	–	50	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
	2	30	–	50	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
	3	30	–	50	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
N	1	130	–	150	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
	2	140	–	160	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
	3	140	–	160	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
	4	130	–	150	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
	5	120	–	140	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
	6	150	–	170	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
S	1	10	–	20	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50	
	2	10	–	20	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50	
	3	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65	
	4	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65	

■ Series 450271 • Solid Carbide • Helical Flute • Grade K10F-DCFD™ • Inch

Material Group										
		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev					
		min		max	Tool Diameter	0.124–0.189	0.189–0.281	0.282–0.378	0.378–0.5	0.5–0.590
<b>P</b>	1	360	–	420	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	2	340	–	410	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	3	310	–	380	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	4	200	–	260	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	5	100	–	160	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	6	100	–	130	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
<b>M</b>	1	100	–	130	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	2	100	–	130	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	3	70	–	100	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
<b>K</b>	1	250	–	310	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	2	250	–	310	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	3	230	–	290	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
<b>S</b>	1	100	–	130	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020
	2	70	–	100	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020

■ Series 450271 • Solid Carbide • Helical Flute • Grade K10F-DCFD™ • Metric

Material Group											
		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev						
		min		max	Tool Diameter	3,16–4,80	4,81–7,15	7,16–9,59	9,60–12,70	12,70–15,00	
P	1	110	–	130	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90	
	2	110	–	130	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90	
	3	100	–	120	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90	
	4	60	–	80	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90	
	5	30	–	50	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90	
	6	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65	
M	1	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65	
	2	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65	
	3	20	–	30	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65	
K	1	80	–	100	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
	2	80	–	100	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
	3	70	–	90	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20	
S	1	30	–	40	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50	
	2	20	–	30	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50	

■ Series 050281 • Uncoated • Carbide-Tipped • Helical Flute • Grade K10F™ • Inch

Material Group								
		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev			
		min		max	Tool Diameter	0.5–0.590	0.590–0.787	0.787–1.181
P	1	150	–	210	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	2	130	–	200	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	3	110	–	180	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	4	80	–	110	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	5	50	–	80	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	6	30	–	70	IPR	0.014–0.026	0.016–0.031	0.020–0.035
M	1	30	–	70	IPR	0.014–0.026	0.016–0.031	0.020–0.035
	2	30	–	70	IPR	0.014–0.026	0.016–0.031	0.020–0.035
	3	20	–	50	IPR	0.014–0.026	0.016–0.031	0.020–0.035
K	1	100	–	160	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	2	100	–	160	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	3	100	–	130	IPR	0.024–0.047	0.028–0.051	0.031–0.055
N	1	420	–	490	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	2	460	–	520	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	3	460	–	520	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	4	420	–	490	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	5	390	–	460	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	6	470	–	540	IPR	0.024–0.047	0.028–0.051	0.031–0.055
S	1	30	–	70	IPR	0.012–0.020	0.012–0.024	0.014–0.026
	2	20	–	50	IPR	0.012–0.020	0.012–0.024	0.014–0.026
	3	80	–	110	IPR	0.014–0.026	0.016–0.031	0.020–0.035
	4	80	–	110	IPR	0.014–0.026	0.016–0.031	0.020–0.035

■ Series 050281 • Uncoated • Carbide-Tipped • Helical Flute • Grade K10F™ • Metric

Material Group								
		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev			
		min		max	Tool Diameter	12,70–15,00	15,00–20,00	20,00–32,00
P	1	50	–	70	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	2	40	–	60	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	3	40	–	60	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	4	30	–	40	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	5	20	–	30	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	6	10	–	20	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
M	1	10	–	20	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
	2	10	–	20	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
	3	10	–	20	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
K	1	30	–	50	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	2	30	–	50	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	3	30	–	40	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
N	1	130	–	150	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	2	140	–	160	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	3	140	–	160	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	4	130	–	150	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	5	120	–	140	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	6	150	–	170	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
S	1	10	–	20	mm/r	0,30–0,50	0,30–0,60	0,35–0,65
	2	10	–	20	mm/r	0,30–0,50	0,30–0,60	0,35–0,65
	3	30	–	40	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
	4	30	–	40	mm/r	0,35–0,65	0,40–0,80	0,50–0,90

■ Series 450281 • Coated • Carbide-Tipped • Helical Flute • Grade K10F-DCFD™ • Inch




Material Group								
		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev			
		min		max	Tool Diameter	0.5–0.590	0.590–0.787	0.787–1.181
P	1	360	–	420	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	2	340	–	410	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	3	310	–	380	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	4	200	–	260	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	5	100	–	160	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	6	100	–	130	IPR	0.014–0.026	0.016–0.031	0.020–0.035
M	1	100	–	130	IPR	0.014–0.026	0.016–0.031	0.020–0.035
	2	100	–	130	IPR	0.014–0.026	0.016–0.031	0.020–0.035
	3	70	–	100	IPR	0.014–0.026	0.016–0.031	0.020–0.035
K	1	250	–	310	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	2	250	–	310	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	3	230	–	290	IPR	0.024–0.047	0.028–0.051	0.031–0.055
S	1	100	–	130	IPR	0.012–0.020	0.012–0.024	0.014–0.026
	2	70	–	100	IPR	0.012–0.020	0.012–0.024	0.014–0.026

■ Series 450281 • Coated • Carbide-Tipped • Helical Flute • Grade K10F-DCFD™ • Metric




Material Group								
		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev			
		min		max	Tool Diameter	12,70–15,00	15,00–20,00	20,00–32,00
P	1	110	–	130	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	2	110	–	130	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	3	100	–	120	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	4	60	–	80	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	5	30	–	50	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	6	30	–	40	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
M	1	30	–	40	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
	2	30	–	40	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
	3	20	–	30	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
K	1	80	–	100	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	2	80	–	100	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	3	70	–	90	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
S	1	30	–	40	mm/r	0,30–0,50	0,30–0,60	0,35–0,65
	2	20	–	30	mm/r	0,30–0,50	0,30–0,60	0,35–0,65



■ Series 456681 • Cermet-Tipped • Helical Flute • Grade CERMET-DCFD™ • Inch

Material Group		 					
		Cutting Speed – vc Range – SFM		Recommended Feed Rate per Rev			
		min	max	Tool Diameter	0.5–0.590	0.590–0.787	
P	1	360	–	420	IPR	0.020–0.035	0.024–0.041
	2	340	–	410	IPR	0.020–0.035	0.024–0.041
	3	310	–	380	IPR	0.020–0.035	0.024–0.041
	4	200	–	260	IPR	0.020–0.035	0.024–0.041
	5	100	–	160	IPR	0.020–0.035	0.024–0.041
	6	100	–	130	IPR	0.014–0.026	0.016–0.031

■ Series 456681 • Cermet-Tipped • Helical Flute • Grade CERMET-DCFD™ • Metric

Material Group		 					
		Cutting Speed – vc Range – m/min		Recommended Feed Rate per Rev			
		min	max	Tool Diameter	12,70–15,00	15,00–20,00	
P	1	110	–	130	mm/r	0,50–0,90	0,60–1,05
	2	110	–	130	mm/r	0,50–0,90	0,60–1,05
	3	100	–	120	mm/r	0,50–0,90	0,60–1,05
	4	60	–	80	mm/r	0,50–0,90	0,60–1,05
	5	30	–	50	mm/r	0,50–0,90	0,60–1,05
	6	30	–	40	mm/r	0,35–0,65	0,40–0,80

Hole Finishing

■ Series 050222 • Solid Carbide • Straight Flute • Grade K10F™ • Inch

Material Group							
		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev		
		min	–	max	Tool Diameter	0.055–0.124	0.124–0.189
P	1	100	–	130	IPR	0.008–0.013	0.008–0.016
	2	80	–	110	IPR	0.008–0.013	0.008–0.016
	3	80	–	100	IPR	0.008–0.013	0.008–0.016
	4	50	–	80	IPR	0.008–0.013	0.008–0.016
	5	30	–	70	IPR	0.008–0.013	0.008–0.016
	6	30	–	50	IPR	0.006–0.012	0.008–0.012
M	1	20	–	50	IPR	0.006–0.012	0.008–0.012
	2	20	–	50	IPR	0.006–0.012	0.008–0.012
	3	20	–	30	IPR	0.006–0.012	0.008–0.012
K	1	70	–	100	IPR	0.010–0.018	0.014–0.026
	2	70	–	80	IPR	0.010–0.018	0.014–0.026
	3	70	–	80	IPR	0.010–0.018	0.014–0.026
N	1	230	–	290	IPR	0.010–0.018	0.014–0.026
	2	260	–	330	IPR	0.010–0.018	0.014–0.026
	3	260	–	330	IPR	0.010–0.018	0.014–0.026
	4	230	–	290	IPR	0.010–0.018	0.014–0.026
	5	200	–	260	IPR	0.010–0.018	0.014–0.026
	6	280	–	340	IPR	0.010–0.018	0.014–0.026
S	1	30	–	50	IPR	0.004–0.008	0.006–0.012
	2	20	–	30	IPR	0.004–0.008	0.006–0.012
	3	50	–	80	IPR	0.006–0.012	0.008–0.012
	4	50	–	80	IPR	0.006–0.012	0.008–0.012

■ Series 050222 • Solid Carbide • Straight Flute • Grade K10F™ • Metric

Material Group							
		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev		
		min	–	max	Tool Diameter	1,40–3,15	3,16–4,80
P	1	30	–	40	mm/r	0,20–0,30	0,20–0,40
	2	30	–	40	mm/r	0,20–0,30	0,20–0,40
	3	30	–	30	mm/r	0,20–0,30	0,20–0,40
	4	20	–	30	mm/r	0,20–0,30	0,20–0,40
	5	10	–	20	mm/r	0,20–0,30	0,20–0,40
	6	10	–	20	mm/r	0,15–0,30	0,20–0,30
M	1	10	–	20	mm/r	0,15–0,30	0,20–0,30
	2	10	–	20	mm/r	0,15–0,30	0,20–0,30
	3	10	–	10	mm/r	0,15–0,30	0,20–0,30
K	1	20	–	30	mm/r	0,25–0,45	0,35–0,65
	2	20	–	30	mm/r	0,25–0,45	0,35–0,65
	3	20	–	30	mm/r	0,25–0,45	0,35–0,65
N	1	70	–	90	mm/r	0,25–0,45	0,35–0,65
	2	80	–	100	mm/r	0,25–0,45	0,35–0,65
	3	80	–	100	mm/r	0,25–0,45	0,35–0,65
	4	70	–	90	mm/r	0,25–0,45	0,35–0,65
	5	60	–	80	mm/r	0,25–0,45	0,35–0,65
	6	90	–	110	mm/r	0,25–0,45	0,35–0,65
S	1	10	–	20	mm/r	0,10–0,20	0,15–0,30
	2	10	–	10	mm/r	0,10–0,20	0,15–0,30
	3	20	–	30	mm/r	0,15–0,30	0,20–0,30
	4	20	–	30	mm/r	0,15–0,30	0,20–0,30

■ Series 450222 • Solid Carbide • Straight Flute • Grade K10F-DCFD™ • Inch

Material Group							
		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev		
		min		max	Tool Diameter	0.055–0.124	0.124–0.189
P	1	200	–	260	IPR	0.008–0.013	0.008–0.016
	2	180	–	250	IPR	0.008–0.013	0.008–0.016
	3	160	–	230	IPR	0.008–0.013	0.008–0.016
	4	130	–	200	IPR	0.008–0.013	0.008–0.016
	5	70	–	100	IPR	0.008–0.013	0.008–0.016
	6	50	–	80	IPR	0.006–0.012	0.008–0.012
M	1	30	–	70	IPR	0.006–0.012	0.008–0.012
	2	30	–	70	IPR	0.006–0.012	0.008–0.012
	3	30	–	50	IPR	0.006–0.012	0.008–0.012
K	1	160	–	230	IPR	0.010–0.018	0.014–0.026
	2	150	–	210	IPR	0.010–0.018	0.014–0.026
	3	150	–	210	IPR	0.010–0.018	0.014–0.026
S	1	30	–	70	IPR	0.004–0.008	0.006–0.012
	2	30	–	50	IPR	0.004–0.008	0.006–0.012

■ Series 450222 • Solid Carbide • Straight Flute • Grade K10F-DCFD™ • Metric

Material Group							
		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev		
		min	–	max	Tool Diameter	1,40–3,15	3,16–4,80
P	1	60	–	80	mm/r	0,20–0,30	0,20–0,40
	2	60	–	80	mm/r	0,20–0,30	0,20–0,40
	3	50	–	70	mm/r	0,20–0,30	0,20–0,40
	4	40	–	60	mm/r	0,20–0,30	0,20–0,40
	5	20	–	30	mm/r	0,20–0,30	0,20–0,40
	6	20	–	30	mm/r	0,15–0,30	0,20–0,30
M	1	10	–	20	mm/r	0,15–0,30	0,20–0,30
	2	10	–	20	mm/r	0,15–0,30	0,20–0,30
	3	10	–	20	mm/r	0,15–0,30	0,20–0,30
K	1	50	–	70	mm/r	0,25–0,45	0,35–0,65
	2	50	–	70	mm/r	0,25–0,45	0,35–0,65
	3	50	–	70	mm/r	0,25–0,45	0,35–0,65
S	1	10	–	20	mm/r	0,10–0,20	0,15–0,30
	2	10	–	20	mm/r	0,10–0,20	0,15–0,30

■ Series 050270 • Solid Carbide • Straight Flute • Grade K10F™ • Inch

Material Group										
		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev					
		min		max	Tool Diameter	0.124–0.189	0.189–0.281	0.282–0.378	0.378–0.5	0.5–0.590
P	1	150	–	210	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	2	130	–	200	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	3	110	–	180	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	4	80	–	110	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	5	50	–	80	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	6	30	–	70	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
M	1	30	–	70	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	2	30	–	70	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	3	20	–	50	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
K	1	100	–	160	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	2	100	–	160	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	3	80	–	150	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
N	1	420	–	470	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	2	460	–	520	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	3	460	–	520	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	4	420	–	490	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	5	390	–	460	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	6	470	–	540	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
S	1	30	–	70	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020
	2	20	–	50	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020
	3	80	–	110	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	4	80	–	110	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026

■ Series 050270 • Solid Carbide • Straight Flute • Grade K10F™ • Metric

Material Group										
		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev					
		min		max	Tool Diameter	3,16–4,80	4,81–7,15	7,16–9,59	9,60–12,70	12,70–15,00
P	1	50	–	70	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90
	2	40	–	60	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90
	3	40	–	60	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90
	4	30	–	40	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90
	5	20	–	30	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90
	6	10	–	20	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
M	1	10	–	20	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
	2	10	–	20	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
	3	10	–	20	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
K	1	30	–	50	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	2	30	–	50	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	3	30	–	50	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
N	1	130	–	150	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	2	140	–	160	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	3	140	–	160	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	4	130	–	150	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	5	120	–	140	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	6	150	–	170	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
S	1	10	–	20	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50
	2	10	–	20	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50
	3	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
	4	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65

■ Series 450270 • Solid Carbide • Straight Flute • Grade K10F-DCFD™ • Inch

Material Group										
		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev					
		min		max	Tool Diameter	0.124–0.189	0.189–0.281	0.282–0.378	0.378–0.5	0.5–0.590
P	1	360	–	420	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	2	340	–	410	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	3	310	–	380	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	4	200	–	260	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	5	100	–	160	IPR	0.008–0.016	0.011–0.021	0.014–0.026	0.016–0.031	0.020–0.035
	6	100	–	130	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
M	1	100	–	130	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	2	100	–	130	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
	3	70	–	100	IPR	0.008–0.012	0.008–0.016	0.012–0.020	0.012–0.024	0.014–0.026
K	1	250	–	310	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	2	250	–	310	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
	3	230	–	290	IPR	0.014–0.026	0.016–0.031	0.020–0.035	0.024–0.041	0.024–0.047
S	1	30	–	70	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020
	2	20	–	50	IPR	0.006–0.012	0.008–0.012	0.008–0.016	0.010–0.018	0.012–0.020



■ Series 450270 • Solid Carbide • Straight Flute • Grade K10F-DCFD™ • Metric

Material Group										
		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev					
		min		max	Tool Diameter	3,16–4,80	4,81–7,15	7,16–9,59	9,60–12,70	12,70–15,00
P	1	110	–	130	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90
	2	110	–	130	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90
	3	100	–	120	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90
	4	60	–	80	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90
	5	30	–	50	mm/r	0,20–0,40	0,30–0,50	0,35–0,65	0,40–0,80	0,50–0,90
	6	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
M	1	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
	2	30	–	40	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
	3	20	–	30	mm/r	0,20–0,30	0,20–0,40	0,30–0,50	0,30–0,60	0,35–0,65
K	1	80	–	100	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	2	80	–	100	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
	3	70	–	90	mm/r	0,35–0,65	0,40–0,80	0,50–0,90	0,60–1,05	0,60–1,20
S	1	30	–	40	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50
	2	20	–	30	mm/r	0,15–0,30	0,20–0,30	0,20–0,40	0,25–0,45	0,30–0,50

■ Series 050280 • Uncoated • Carbide-Tipped • Straight Flute • Grade K10F™ • Inch

Material Group								
	Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev				
	min		max	Tool Diameter	0.5–0.590	0.590–0.787	0.787–1.181	
P	1	150	–	210	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	2	130	–	200	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	3	110	–	180	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	4	80	–	110	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	5	50	–	80	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	6	30	–	70	IPR	0.014–0.026	0.016–0.031	0.020–0.035
M	1	30	–	70	IPR	0.014–0.026	0.016–0.031	0.020–0.035
	2	30	–	70	IPR	0.014–0.026	0.016–0.031	0.020–0.035
	3	20	–	50	IPR	0.014–0.026	0.016–0.031	0.020–0.035
K	1	100	–	160	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	2	100	–	160	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	3	100	–	130	IPR	0.024–0.047	0.028–0.051	0.031–0.055
N	1	420	–	490	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	2	460	–	520	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	3	460	–	520	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	4	420	–	490	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	5	390	–	460	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	6	470	–	540	IPR	0.024–0.047	0.028–0.051	0.031–0.055
S	1	30	–	70	IPR	0.012–0.020	0.012–0.024	0.014–0.026
	2	20	–	50	IPR	0.012–0.020	0.012–0.024	0.014–0.026
	3	80	–	110	IPR	0.014–0.026	0.016–0.031	0.020–0.035
	4	80	–	110	IPR	0.014–0.026	0.016–0.031	0.020–0.035

■ Series 050280 • Uncoated • Carbide-Tipped • Straight Flute • Grade K10F™ • Metric

Material Group								
	Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev				
	min		max	Tool Diameter	12,70–15,00	15,00–20,00	20,00–32,00	
P	1	50	–	70	mm/r	0,50–0,90	0,60–1,05	0,60–1,20
	2	40	–	60	mm/r	0,50–0,90	0,60–1,05	0,60–1,20
	3	40	–	60	mm/r	0,50–0,90	0,60–1,05	0,60–1,20
	4	30	–	40	mm/r	0,50–0,90	0,60–1,05	0,60–1,20
	5	20	–	30	mm/r	0,50–0,90	0,60–1,05	0,60–1,20
	6	10	–	20	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
M	1	10	–	20	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
	2	10	–	20	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
	3	10	–	20	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
K	1	30	–	50	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	2	30	–	50	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	3	30	–	40	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
N	1	130	–	150	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	2	140	–	160	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	3	140	–	160	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	4	130	–	150	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	5	120	–	140	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	6	150	–	170	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
S	1	10	–	20	mm/r	0,30–0,50	0,30–0,60	0,35–0,65
	2	10	–	20	mm/r	0,30–0,50	0,30–0,60	0,35–0,65
	3	30	–	40	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
	4	30	–	40	mm/r	0,35–0,65	0,40–0,80	0,50–0,90

■ Series 450280 • Coated • Carbide-Tipped • Straight Flute • Grade K10F-DCFD™ • Inch




Material Group		Cutting Speed – vc Range – SFM		Recommended Feed Rate per Rev				
		min	max	Tool Diameter	0.5–0.590	0.590–0.787	0.787–1.181	
P	1	360	–	420	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	2	340	–	410	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	3	310	–	380	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	4	200	–	260	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	5	100	–	160	IPR	0.020–0.035	0.024–0.041	0.024–0.043
	6	100	–	130	IPR	0.014–0.026	0.016–0.031	0.020–0.035
M	1	100	–	130	IPR	0.014–0.026	0.016–0.031	0.020–0.035
	2	100	–	130	IPR	0.014–0.026	0.016–0.031	0.020–0.035
	3	70	–	100	IPR	0.014–0.026	0.016–0.031	0.020–0.035
K	1	250	–	310	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	2	250	–	310	IPR	0.024–0.047	0.028–0.051	0.031–0.055
	3	230	–	290	IPR	0.024–0.047	0.028–0.051	0.031–0.055
S	1	100	–	130	IPR	0.012–0.020	0.012–0.024	0.014–0.026
	2	70	–	100	IPR	0.012–0.020	0.012–0.024	0.014–0.026

■ Series 450280 • Coated • Carbide-Tipped • Straight Flute • Grade K10F-DCFD™ • Metric




Material Group		Cutting Speed – vc Range – m/min		Recommended Feed Rate per Rev				
		min	max	Tool Diameter	12,70–15,00	15,00–20,00	20,00–32,00	
P	1	110	–	130	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	2	110	–	130	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	3	100	–	120	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	4	60	–	80	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	5	30	–	50	mm/r	0,50–0,90	0,60–1,05	0,60–1,10
	6	30	–	40	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
M	1	30	–	40	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
	2	30	–	40	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
	3	20	–	30	mm/r	0,35–0,65	0,40–0,80	0,50–0,90
K	1	80	–	100	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	2	80	–	100	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
	3	70	–	90	mm/r	0,60–1,20	0,70–1,30	0,80–1,40
S	1	30	–	40	mm/r	0,30–0,50	0,30–0,60	0,35–0,65
	2	20	–	30	mm/r	0,30–0,50	0,30–0,60	0,35–0,65

Hole Finishing

■ Series 456680 • Cermet-Tipped • Straight Flute • Grade CERMET-DCFD™ • Inch

Material Group		Cutting Speed – vc Range – SFM			Recommended Feed Rate per Rev		
		min		max	Tool Diameter	0.5–0.590	0.590–0.787
							
P	1	360	–	420	IPR	0.020–0.035	0.024–0.041
	2	340	–	410	IPR	0.020–0.035	0.024–0.041
	3	310	–	380	IPR	0.020–0.035	0.024–0.041
	4	200	–	260	IPR	0.020–0.035	0.024–0.041
	5	100	–	160	IPR	0.020–0.035	0.024–0.041
	6	100	–	130	IPR	0.014–0.026	0.016–0.031

■ Series 456680 • Cermet-Tipped • Straight Flute • Grade CERMET-DCFD™ • Metric

Material Group		Cutting Speed – vc Range – m/min			Recommended Feed Rate per Rev		
		min		max	Tool Diameter	12,70–15,00	15,00–20,00
							
P	1	110	–	130	mm/r	0,50–0,90	0,60–1,05
	2	110	–	130	mm/r	0,50–0,90	0,60–1,05
	3	100	–	120	mm/r	0,50–0,90	0,60–1,05
	4	60	–	80	mm/r	0,50–0,90	0,60–1,05
	5	30	–	50	mm/r	0,50–0,90	0,60–1,05
	6	30	–	40	mm/r	0,35–0,65	0,40–0,80

## WIDIA™ TRM •

Top Ream Modular (Available as Semi-Standards)



# WIDIA TRM

## Primary Application

- Achieve solid carbide metal removal rates.
- Five sizes of standard straight shank bodies available to couple reaming heads from .787–1.653" (20–42mm).

## Features and Benefits

- High-speed and high-performance ready.
- Unique proprietary coupling system enables same runout accuracy as monoblock systems (<3 microns).
- Comfortable radial clamping for quick exchanging even in narrow situations in the machine.
- No fixture for clamping or dismounting necessary.

## Customization

- Heads fully customizable as simple specials with different lead geometries, grades, coatings, and edge hones.
- Semi-finished heads on stock for shorter lead times.

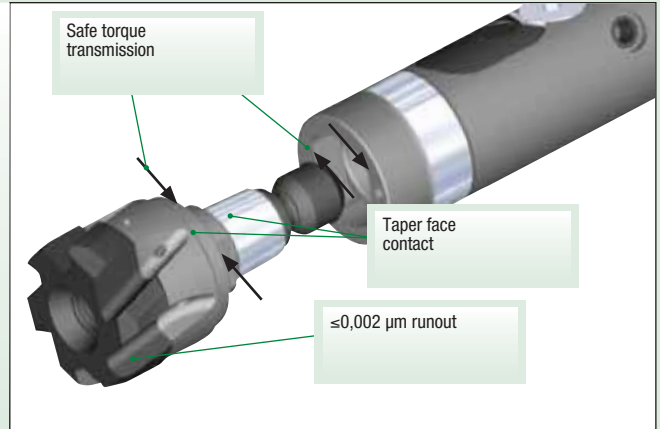
## Ordering Process

- Please contact your local Authorized Distributor for a quote.

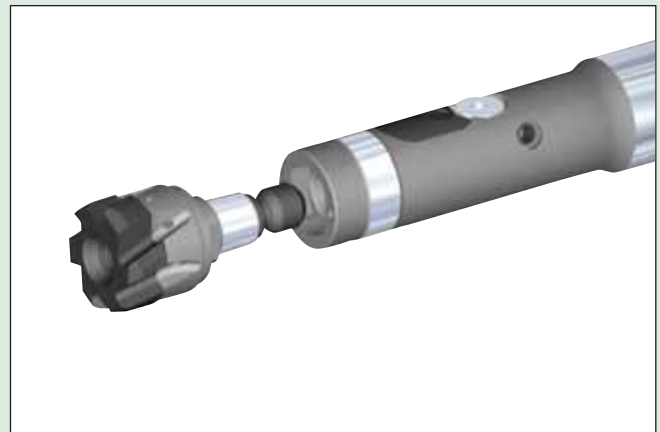
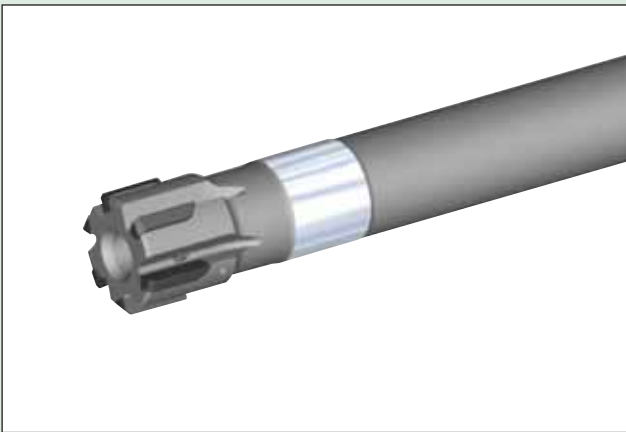


**WST™ — WIDIA™ Short Taper**

- Easy to handle.
- Fewer vibrations due to safe torque transmission.
- No head-to-body orientation adjustment necessary.
- Higher hole quality due to minimal runout and taper face contact.
- Easy to disassemble due to push out effect of head.



**Special Design — Top Ream Tipped Tools**



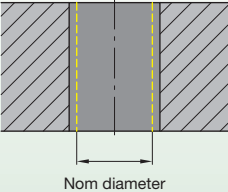
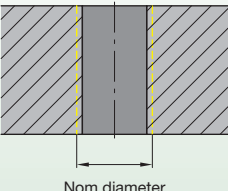
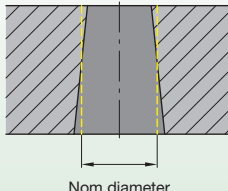
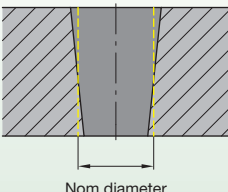
**Regular Tipped**

- 4–8 brazing joints depending on diameter (number of teeth).
- Less stiffness.
- More vibrations.
- Higher runout after thermal influence (e.g., coating, reconditioning, etc.).

**WIDIA Top Ream**

- Min 4x reconditionable.
- New reaming grade WU05PR™ holds bore surface finish more than 2x longer.
- Stronger brazing joint than conventional tipped reamers.
- Less influence of coating process on runout.

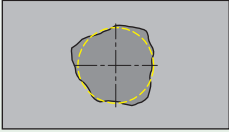

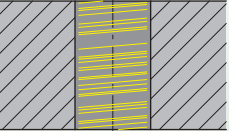
## Reamer Troubleshooting

Problem	Cause	Possible Remedy
<p>Hole diameter too large</p>  <p>Nom diameter</p>	<ol style="list-style-type: none"> <li>1. Reaming tool running out of center.</li> <li>2. Concentricity of pilot hole and ream machining unsatisfactory.</li> <li>3. Built-up edge.</li> <li>4. Unsuitable cooling lubricant.</li> <li>5. Reaming tool diameter too large.</li> </ol>	<ul style="list-style-type: none"> <li>• Use equalizing adapter.</li> <li>• Re-align, use floating head.</li> <li>• Change cooling lubricant.</li> <li>• Change cutting speed.</li> <li>• Measure reamers and send for repairs.</li> </ul>
<p>Hole diameter too small</p>  <p>Nom diameter</p>	<ol style="list-style-type: none"> <li>1. Reamer worn.</li> <li>2. Unsuitable cooling lubricant.</li> <li>3. Reaming allowance too small.</li> </ol>	<ul style="list-style-type: none"> <li>• Replace and refit tool.</li> <li>• Change cooling lubricant.</li> <li>• Increase reaming allowance.</li> </ul>
<p>Conical hole profile wider towards drill runout</p>  <p>Nom diameter</p>	<ol style="list-style-type: none"> <li>1. Concentricity of pilot hole and reaming unsatisfactory.</li> <li>2. Positioning accuracy of pilot hole to reaming.</li> </ol>	<ul style="list-style-type: none"> <li>• Re-align, use equalizing adapter.</li> <li>• Correct positioning accuracy.</li> </ul>
<p>Conical hole profile wider at drill entry point</p>  <p>Nom diameter</p>	<ol style="list-style-type: none"> <li>1. Concentricity of pilot hole and reaming unsatisfactory.</li> <li>2. Reaming tool skim cutting with ledger.</li> </ol>	<ul style="list-style-type: none"> <li>• Re-align, use floating head.</li> <li>• Securely clamp reaming tool axially.</li> </ul>

(continued)



**Reamer Troubleshooting** *(continued)*

Problem	Cause	Possible Remedy
<p>Conical hole profile wider at drill entry point</p> 	<ol style="list-style-type: none"> <li>1. Reaming tool running out of center.</li> <li>2. Slanted cutting surface/ asymmetrical cutting.</li> <li>3. Workpiece twisted.</li> </ol>	<ul style="list-style-type: none"> <li>• Use equalizing adapter.</li> <li>• Spot face as drilling preparation.</li> <li>• Take the direction of impact into account when clamping the workpiece.</li> </ul>
<p>Surface quality does not meet specification</p> 	<ol style="list-style-type: none"> <li>1. Tool cutters worn.</li> <li>2. Reaming tool running out of center.</li> <li>3. Incorrect technology data (cutting parameters).</li> <li>4. Inadequate chip evacuation.</li> </ol>	<ul style="list-style-type: none"> <li>• Use equalizing adapter.</li> <li>• Re-align, use floating head.</li> <li>• Change cooling lubricant.</li> <li>• Change cutting speed.</li> <li>• Measure reamers and send for repairs.</li> </ul>
<p>Feed grooves</p> 	<ol style="list-style-type: none"> <li>1. Built-up edge.</li> </ol>	<ul style="list-style-type: none"> <li>• Change cooling lubricant.</li> <li>• Change cutting speed.</li> </ul>

Precision Hole Finishing •  
**ROTAFLEX™**

# ROTAFLEX



The WIDIA™ line of Precision Hole Finishing ensures decreased vibration, increased productivity, and reduced calls for scheduled maintenance. You can count on consistent hole diameters, high speed and feed rates, and good surface quality at a great price.

- Easy adjustments and low initial investment.
- Roughing and precision finishing heads available.
- For roughing and fine finishing operations over a broad diameter range.

## **The newly developed RFX coupling eases assembly and disassembly and enhances stability**

- Increased machine tool productivity and less vibration.
- Standard micro-adjustable cartridges for fine finishing operations.
- Internal coolant and spacious chip flutes.



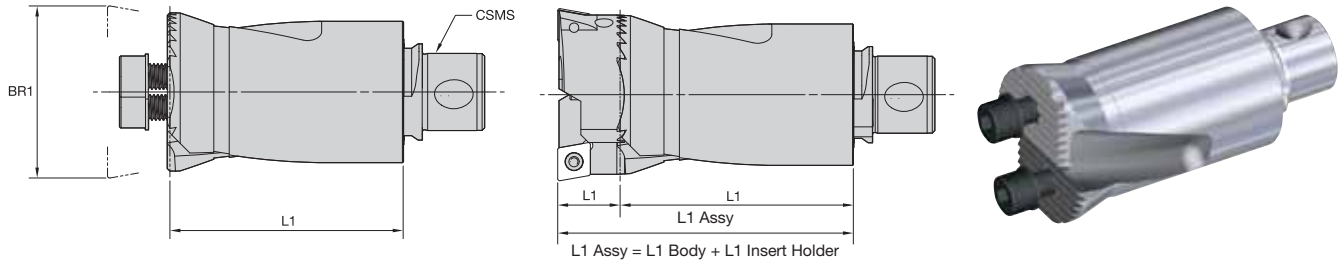
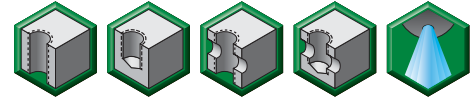
## EXTREME **CHALLENGES.** EXTREME **RESULTS.**

**Advanced system uses the progressive RFX coupling and the latest technology WIDIA™ Victory™ ISO turning inserts**

- High feed rates due to the proprietary front serration of the TCHS twin cutters.
- Internal coolant and spacious chip flutes ensure secure chip evacuation.
- High-precision adjustment of FBH and FBHBB Fine-Boring Heads with the axial and radial pre-loaded eccentric bushing instead of a threaded spindle.
- Higher rigidity with the new RFX bayonet-type coupling.
- Achieve unmatched tool life with WIDIA Victory grades.

**WIDIA** 



- Basic body shipped without insert holders.
- Order insert holder, slides, or micro-adjustable cartridges separately.



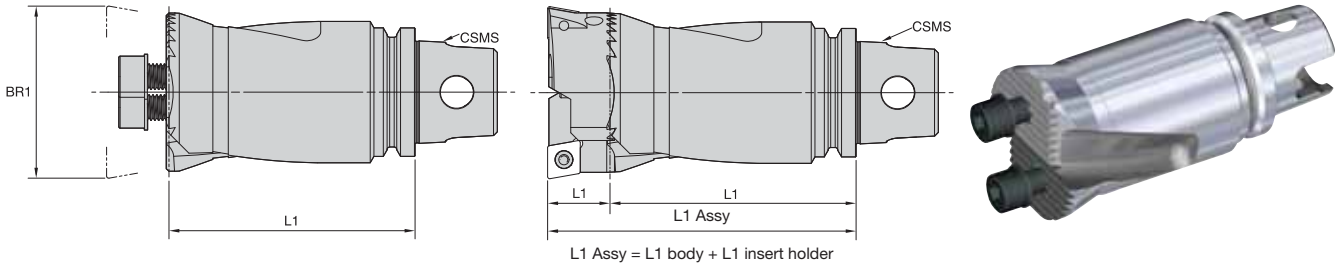
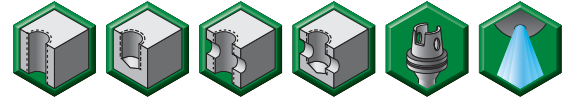
### ■ TCHS • RFX Shank Series

order number	catalog number	BR1 bore range		L1		CSMS system size	kg	lbs
		mm	in	mm	in			
3861179	RFX185TCHS022030	22,500-30,000	0.8858-1.1811	27,7	1.089	RFX185	0,20	.40
3861180	RFX245TCHS030039	30,000-39,000	1.1811-1.5354	37,7	1.482	RFX245	0,20	.40
3861181	RFX320TCHS039050	39,000-50,000	1.5354-1.9685	48,7	1.917	RFX320	0,50	1.10
3861182	RFX420TCHS050067	50,000-67,000	1.9685-2.6378	68,2	2.685	RFX420	1,00	2.20
3861183	RFX550TCHS067088	67,000-88,000	2.6378-3.4646	90,7	3.571	RFX550	2,00	4.40
3861184	RFX720TCHS088115	88,000-115,000	3.4646-4.5276	113,7	4.476	RFX720	4,00	8.80

### ■ Spare Parts

catalog number	 fixing screw	 disc washer
RFX185TCHS022030	12147602700	12147600100
RFX245TCHS030039	12147602300	12147603900
RFX320TCHS039050	12147602400	12147600200
RFX420TCHS050067	12147602500	12147604000
RFX550TCHS067088	12147602600	12147600300
RFX720TCHS088115	12147602800	12147600400

- Basic body shipped without insert holders.
- Order insert holder, slides, or micro-adjustable cartridges separately.



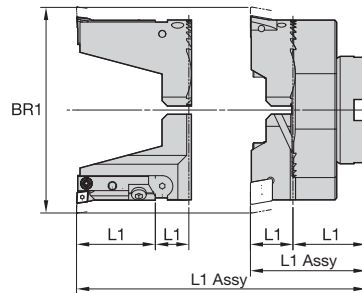
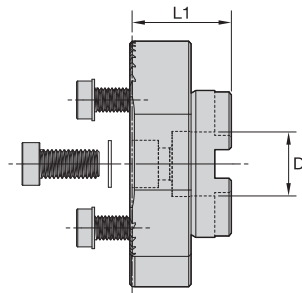
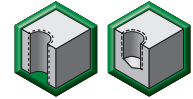
■ TCHS • KM-TS™ Shank Series

order number	catalog number	BR1 bore range		L1		CSMS system size	kg	lbs
		mm	in	mm	in			
3861149	KM32TSTCHS022030	22,000-30,000	0.8661-1.1811	52,7	2.073	KM32TS	0,30	.70
3861150	KM32TSTCHS030039	30,000-39,000	1.1811-1.5354	67,7	2.663	KM32TS	0,50	1.10
3861151	KM32TSTCHS039050	39,000-50,000	1.5354-1.9685	63,7	2.508	KM32TS	0,70	1.50
3861152	KM40TSTCHS030039	30,000-39,000	1.1811-1.5354	87,7	3.451	KM40TS	0,60	1.30
3861173	KM40TSTCHS039050	39,000-50,000	1.5354-1.9685	83,7	3.295	KM40TS	1,00	2.20
3861174	KM40TSTCHS050067	50,000-67,000	1.9685-2.6378	78,2	3.079	KM40TS	1,10	2.40
3861175	KM50TSTCHS050067	50,000-67,000	1.9685-2.6378	88,2	3.472	KM50TS	1,20	2.60
3861176	KM50TSTCHS067088	67,000-88,000	2.6378-3.4646	95,7	3.768	KM50TS	1,40	3.10
3861177	KM63TSTCHS067088	67,000-88,000	2.6378-3.4646	95,7	3.768	KM63TS	1,80	4.00
3861178	KM63TSTCHS088115	88,000-115,000	3.4646-4.5276	93,7	3.689	KM63TS	2,40	5.30

■ Spare Parts

catalog number	fixing screw	disc washer
KM32TSTCHS022030	12147602700	12147600100
KM32TSTCHS030039	12147602300	12147603900
KM32TSTCHS039050	12147602400	12147600200
KM40TSTCHS030039	12147602300	12147603900
KM40TSTCHS039050	12147602400	12147600200
KM40TSTCHS050067	12147602500	12147604000
KM50TSTCHS050067	12147602500	12147604000
KM50TSTCHS067088	12147602600	12147600300
KM63TSTCHS067088	12147602600	12147600300
KM63TSTCHS088115	12147602800	12147600400

- For use with shell mill adapters; please order separately.
- Bridge body shipped without insert holder, slides, or micro-adjustable cartridges.
- Order insert holder separately for rough boring and slides for fine boring.
- Order micro-adjustable cartridges separately for fine boring.



L1 Assy = L1 bridge + L1 insert holder  
 L1 Assy = L1 bridge + L1 slide + L1 cartridge



### ■ Bridge Tool • Small

order number	catalog number	BR1 bore range		D		L1		kg	lbs
		mm	in	mm	in	mm	in		
2006019	12600208800	87,000-110,000	3.4252-4.3307	27,0	1.063	40,3	1.587	1,70	3.7
2005500	12600210900	109,000-133,000	4.2913-5.2362	27,0	1.063	40,3	1.587	1,90	4.2
2005553	12600213200	132,000-156,000	5.1969-6.1417	27,0	1.063	40,3	1.587	2,10	4.6
2005556	12600215500	155,000-179,000	6.1024-7.0472	27,0	1.063	40,3	1.587	2,30	5.1
2005560	12600217800	178,000-202,000	7.0079-7.9528	27,0	1.063	40,3	1.587	2,50	5.5

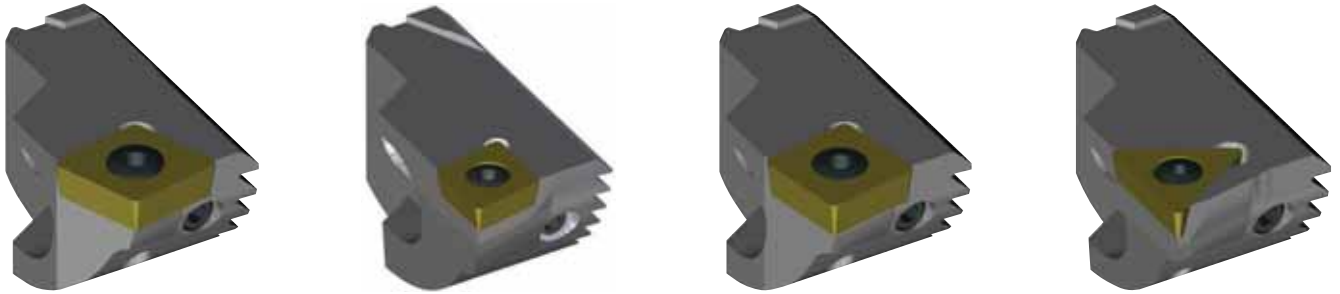
NOTE: Use of ISO cartridges SCLCL12CA12, STGCL12CA16, or SSRCL12CA12 are recommended.

### ■ Spare Parts

catalog number	fixing screw	fixing screw	fixing screw	disc washer	disc washer
12600208800	—	12346233000	12147519100	12147600300	—
12600210900	12147613500	—	12147519100	12147600300	12147740200
12600213200	12147613500	—	12147519100	12147600300	12147740200
12600215500	12147613500	—	12147519100	12147600300	12147740200
12600217800	12147613500	—	12147519100	12147600300	12147740200

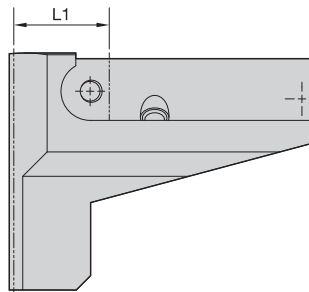
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

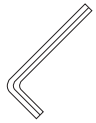


■ **Insert Holder Reference Chart**

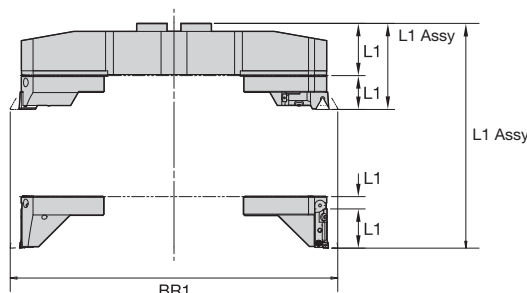
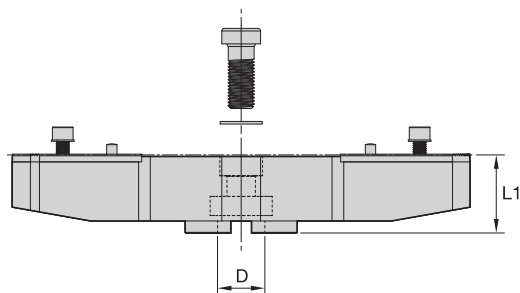
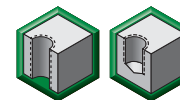
C-Style 70°	C-Style 90°	S-Style 80°	T-Style 90°
12625906700	12625706700	12626006700	12625806800



■ **Slide for Micro-Adjustable Cartridges**

order number	catalog number	L1		 adjusting screw	 fixing screw	 hex wrench
		mm	in			
3864647	SMAC087	19,2	.8	12147665000	12147519100	12148041100

- For use with shell mill adapters; please order separately.
- Bridge body shipped without ISO cartridges, slides, or micro-adjustable cartridges.
- Order ISO cartridges separately for rough boring.
- Order micro-adjustable cartridges separately for fine boring.



L1 Assy = L1 Bridge + L1 Insert Holder  
L1 Assy = L1 Bridge + L1 Slide + L1 Cartridge

### ■ Bridge Tool • Large

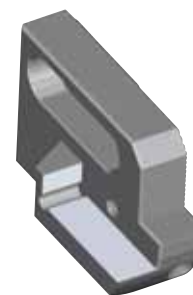
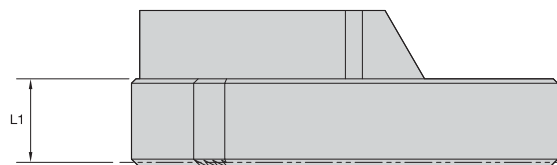
order number	catalog number	BR1 bore range		D		L1		kg	lbs
		mm	in	mm	in	mm	in		
2005574	12600020000	200,000-280,000	7.8740-11.0236	40,0	1.575	50,6	1.992	2,0	4.40
2005602	12600027800	278,000-360,000	10.9449-14.1732	40,0	1.575	50,6	1.992	2,8	6.20
2005656	12600035800	358,000-440,000	14.0945-17.3228	40,0	1.575	61,6	2.425	2,5	5.50
2005722	12600043800	438,000-520,000	17.2441-20.4724	40,0	1.575	61,6	2.425	3,5	7.70

NOTE: Use of ISO cartridges SCLCL12CA12, STGCL12CA16, or SSRCL12CA12 is recommended.





### ■ Spare Parts

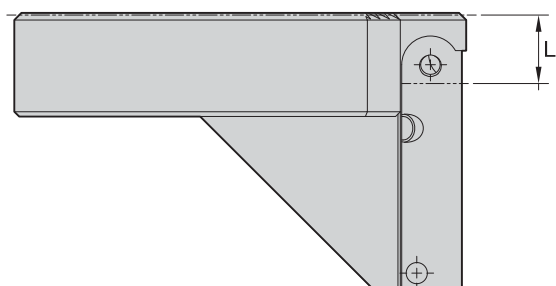
catalog number	fixing screw	fixing screw	disc washer	hex wrench
12600020000	12147739900	12147625400	12147600300	12147666700
12600027800	12147739900	12147625400	12147600300	12147666700
12600035800	12147739900	12147625400	12147600300	12147666700
12600043800	12147739900	12147625400	12147600300	12147666700








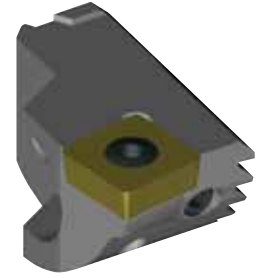
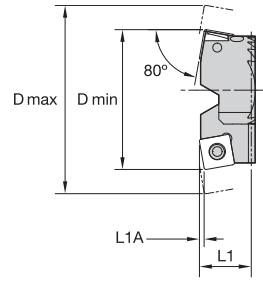
■ Slide for ISO Cartridges

order number	catalog number	L1		 fixing screw	 adjusting screw	 hex wrench	 hex wrench
		mm	in				
2005576	12614020100	19,4	.764	12147625200	12147739800	12148041300	12148041200



■ Slide for Micro-Adjustable Cartridges

order number	catalog number	L1		 fixing screw	 adjusting screw	 hex wrench
		mm	in			
3860905	SMAC200	13,9	.547	12147519100	12147739800	12148041200





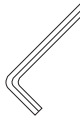


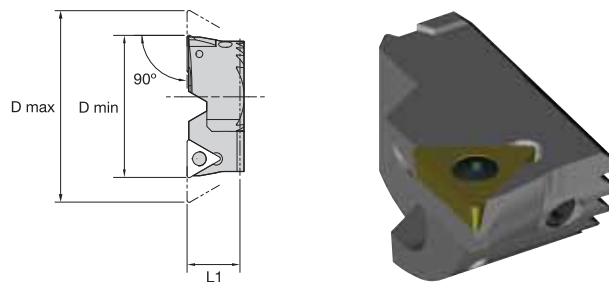
■ 80° Lead Insert Holder • S-Style

order number	catalog number	D min		D max		L1		L1A		gage insert
		mm	in	mm	in	mm	in	mm	in	
2005620	12626003000	30,00	1.181	39,00	1.535	12,4	.486	1,30	.051	SP..0703..
2005676	12626004000	39,00	1.535	50,00	1.969	16,3	.642	1,50	.059	SC../SP..09T3..
2005814	12626005000	50,00	1.969	67,00	2.638	21,8	.858	2,10	.083	SC../SP..1204..
2005941	12626006700	67,00	2.638	88,00	3.465	24,3	.957	2,10	.083	SC../SP..1204..

NOTE: Order two for a complete set.

■ Spare Parts

catalog number	 clamping screw	 adjusting screw	 adjusting screw			 Torx wrench	 hex wrench
				Nm	ft. lbs.		
12626003000	12148067200	12148069600	—	1,0	.74	12148086600	12148040900
12626004000	12148038800	12148069600	—	3,0	2.20	12148082400	12148040900
12626005000	12148007200	12147602200	—	3,5	2.58	12148099400	12148041000
12626006700	12148007200	—	12147665000	3,5	2.58	12148099400	12148041100








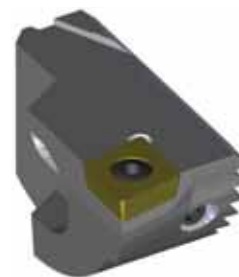
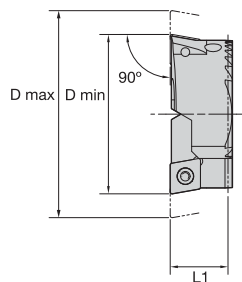
■ 90° Lead Insert Holder • T-Style

order number	catalog number	D min		D max		L1		gage insert
		mm	in	mm	in	mm	in	
2005674	12625804000	39,00	1.535	50,00	1.969	16,3	.642	TC../TP..1102..
2005802	12625805100	50,00	1.969	67,00	2.638	21,8	.858	TC../TP..16T3..
2005939	12625806800	67,00	2.638	88,00	3.465	24,3	.957	TC../TP..16T3..

NOTE: Order two for a complete set.

■ Spare Parts

catalog number	 clamping screw	 adjusting screw	 adjusting screw	Nm	ft. lbs.	 Torx wrench	 hex wrench
12625804000	12148068700	12148069600	—	1,0	.74	12148086600	12148040900
12625805100	12148038800	12147602200	—	3,0	2.21	12148099400	12148041000
12625806800	12148038800	—	12147665000	3,5	2.58	12148099400	12148041100



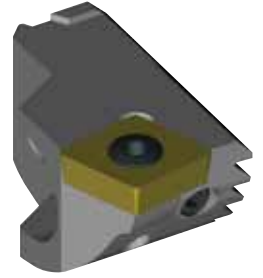
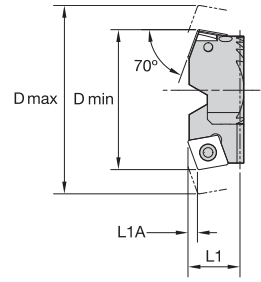
■ 90° Lead Insert Holder • C-Style

order number	catalog number	D min		D max		L1		gage insert
		mm	in	mm	in	mm	in	
2005580	12625702200	22,50	.886	30,00	1.181	12,1	.474	CC../CP..0602..
2005618	12625703000	30,00	1.181	39,00	1.535	12,4	.486	CC../CP..0602..
2005673	12625704000	39,00	1.535	50,00	1.969	16,3	.642	CC../CP..09T3..
2005801	12625705000	50,00	1.969	67,00	2.638	21,8	.858	CC../CP..1204..
2005938	12625706700	67,00	2.638	88,00	3.465	24,3	.957	CC../CP..1204..
2006041	12625708986	88,00	3.465	115,00	4.528	36,3	1.429	CC../CP..1204..

NOTE: Order two for a complete set.

■ Spare Parts

catalog number	clamping screw	adjusting screw	adjusting screw			Torx wrench	hex wrench
				Nm	ft. lbs.		
12625702200	12148086600	12147579300	—	1,0	.74	12148086600	12148046000
12625703000	12148086600	12148069600	—	1,0	.74	12148086600	12148040900
12625704000	12148082400	12148069600	—	3,0	2.21	12148082400	12148040900
12625705000	12148099400	12147602200	—	3,5	2.58	12148099400	12148041000
12625706700	12148099400	—	12147665000	3,5	2.58	12148099400	12148041100
12625708900	12148099400	12148541600	—	3,5	2.58	12148099400	12148041100





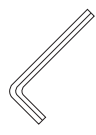


■ 70° Lead Insert Holder • C-Style

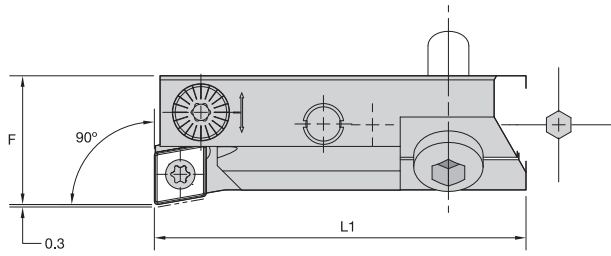
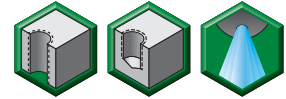
order number	catalog number	D min		D max		L1		L1A		gage insert
		mm	in	mm	in	mm	in	mm	in	
2005581	12625902200	22,50	.886	30,00	1.181	12,4	.486	1,60	.063	CC../CP..0602..
2005619	12625903000	30,00	1.181	39,00	1.535	12,4	.486	1,60	.063	CC../CP..0602..
2005675	12625904000	39,00	1.535	50,00	1.969	16,3	.642	2,30	.091	CC../CP..09T3..
2005813	12625905000	50,00	1.969	67,00	2.638	21,8	.858	3,10	.122	CC../CP..1204..
2005940	12625906700	67,00	2.638	88,00	3.465	24,3	.957	3,10	.122	CC../CP..1204..
2006054	12625908986	88,00	3.465	115,00	4.528	36,3	1.429	3,10	.122	CC../CP..1204..

NOTE: Order two for a complete set.

■ Spare Parts

catalog number	 clamping screw	 adjusting screw	 adjusting screw	Torque		 Torx wrench	 hex wrench
				Nm	ft. lbs.		
12625902200	12148086600	12147579300	—	1,0	.74	12148086600	12148046000
12625903000	12148086600	12148069600	—	1,0	.74	12148086600	12148040900
12625904000	12148082400	12148069600	—	3,0	2.21	12148082400	12148040900
12625905000	12148099400	12147602200	—	3,5	2.58	12148099400	12148041000
12625906700	12148099400	—	12147665000	3,5	2.58	12148099400	12148041100
12625908900	12148099400	12147602200	—	3,5	2.58	12148099400	12148041100

- All cartridges have internal coolant supply directed to the cutting edge.
- .0004" (0,01mm) diameter adjustment within a range of .0118" (0,3mm).
- Radial adjustment without influence on axial position.
- Axial adjustment range of .039" (1mm).

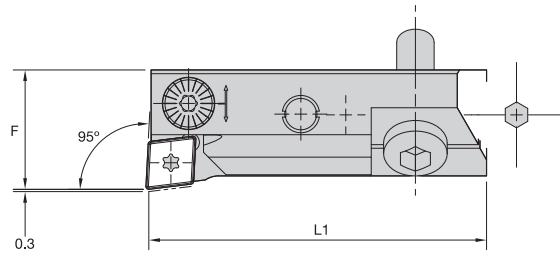
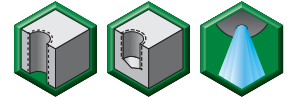


■ 90° Lead Micro-Adjustable Cartridge • C-Style

order number	catalog number	F		L1		gage insert	insert clamping screw	Torx wrench	Nm	ft. lbs.
		mm	in	mm	in					
3860908	MASCFCR09CA06F	16,00	.630	45,50	1.791	CC..0602..	12148068700	12148086600	1,0	.74



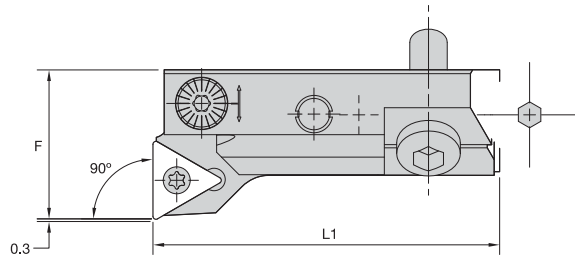
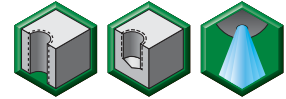
- All cartridges have internal coolant supply directed to the cutting edge.
- .0004" (0,01mm) diameter adjustment within a range of .0118" (0,3mm).
- Radial adjustment without influence on axial position.
- Axial adjustment range of .039" (1mm).



■ 95° Lead Micro-Adjustable Cartridge • C-Style

order number	catalog number	F		L1		gage insert	insert clamping screw	Torx wrench	Nm	ft. lbs.
		mm	in	mm	in					
3860909	MASCLCR09CA06F	16,00	.630	45,50	1.791	CC..0602..	12148068700	12148086600	1,0	.74

- All cartridges have internal coolant supply directed to the cutting edge.
- .0004" (0,01mm) diameter adjustment within a range of .0118" (0,3mm).
- Radial adjustment without influence on axial position.
- Axial adjustment range of .039" (1mm).



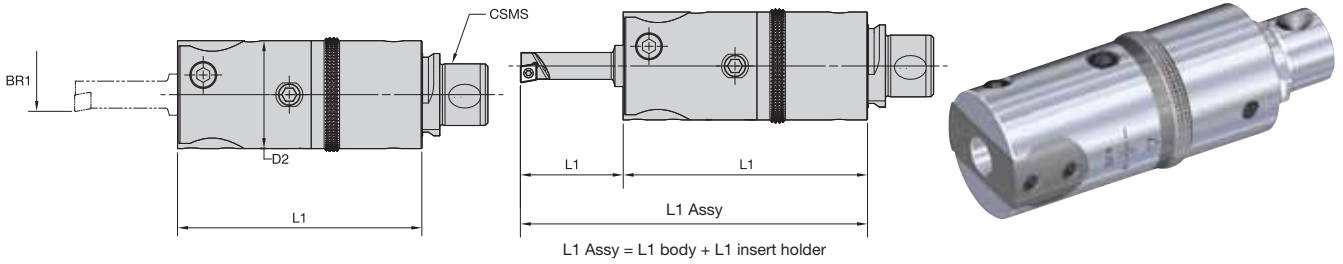
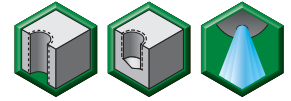
■ 90° Lead Micro-Adjustable Cartridge • T-Style

order number	catalog number	F		L1		gage insert	insert clamping screw	Torx wrench	Nm	ft. lbs.
		mm	in	mm	in					
3860910	MASTFCR09CA11F	20,00	.787	45,50	1.791	TC..1102..	12148068700	12148086600	1,0	.74








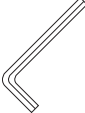
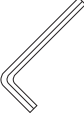
- .0004" (0,01mm) diameter adjustment.
- Basic body shipped without boring bars.



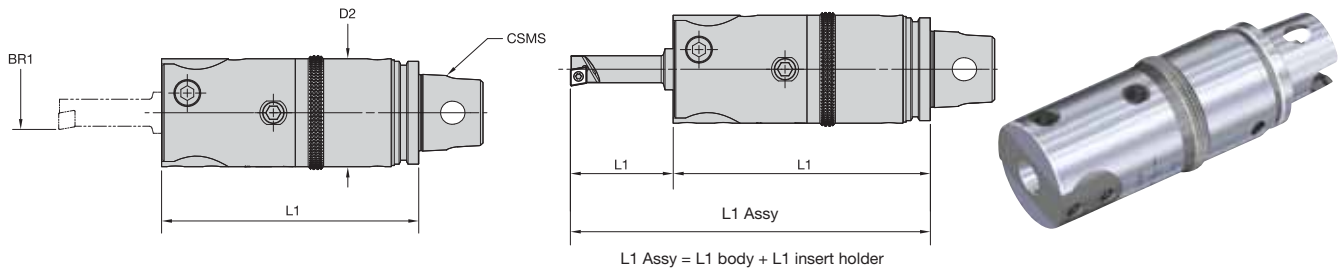
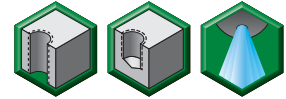
■ **FBHBB • RFX Series Shank**

order number	catalog number	BR1 bore range		D2		L1		CSMS system size	kg	lbs
		mm	in	mm	in	mm	in			
3860906	RFX420FBHBB006022	6,000-22,000	0.2362-0.8661	42,00	1.654	95,00	3.740	RFX420	1,10	2.40

■ **Spare Parts**

catalog number					
	front clamping screw 1	front clamping screw 2	adjustment locking screw	hex wrench	hex wrench
RFX420FBHBB006022	12148068700	12148042400	12147680500	12148041100	12148041300




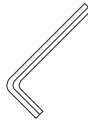
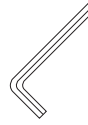
- .0004" (0,01mm) diameter adjustment.
- Basic body shipped without boring bars.



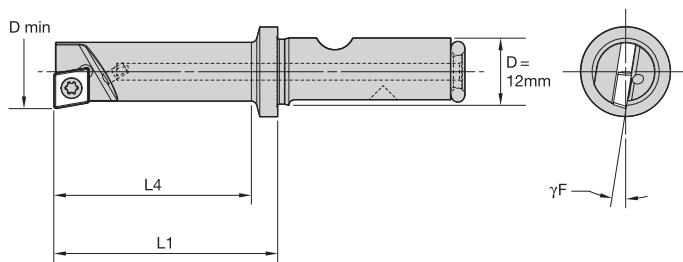
### ■ FBHBB KM-TS™ Series Shank

order number	catalog number	BR1 bore range		D2		L1		CSMS system size	kg	lbs
		mm	in	mm	in	mm	in			
3860907	KM40TSFBHBB006022	6,000-22,000	0.2362-0.8661	42,00	1.654	105,00	4.134	KM40TS	1,10	2.40

### ■ Spare Parts

catalog number					
	front clamping screw 1	front clamping screw 2	adjustment locking screw	hex wrench	hex wrench
KM40TSFBHBB006022	12147617400	12148042400	12147680500	12148041100	12148041300

- All boring bars have internal coolant supply directed to the cutting edge.



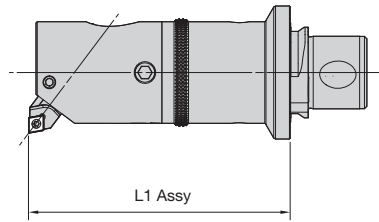
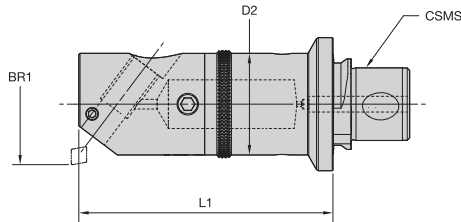
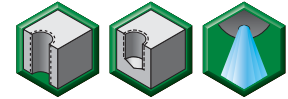
■ Boring Bars for Precision Fine Boring Heads (FBHBB)

order number	catalog number	D min		D max		L1		L4		γF°	kg	lbs
		mm	in	mm	in	mm	in	mm	in			
2005954	12627006200	6,00	.236	8,00	.315	30,00	1.181	24,00	.945	-5.0°	0,1	.22
2006015	12627008200	8,00	.315	10,00	.394	30,00	1.181	25,00	.984	-3.0°	0,1	.22
2005499	12627010200	10,00	.394	13,00	.512	35,00	1.378	30,00	1.181	-11.0°	0,1	.22
2005542	12627013200	13,00	.512	16,00	.630	40,00	1.575	35,00	1.378	-9.0°	0,1	.22
2005558	12627016200	16,00	.630	19,00	.748	45,00	1.772	40,00	1.575	-6.0°	0,1	.22
2005573	12627019300	19,00	.748	22,00	.866	55,00	2.165	55,00	2.165	-6.0°	0,2	.44

■ Spare Parts

catalog number	gage insert	clamping screw	Torx wrench	Nm
12627006200	CP..04T1..	12148005800	12148005900	0,3
12627008200	CP..04T1..	12148005800	12148005900	0,3
12627010200	CC../CP..0602..	12148068700	12148086600	1,0
12627013200	CC../CP..0602..	12148068700	12148086600	1,0
12627016200	CC../CP..0602..	12148068700	12148086600	1,0
12627019300	CC../CP..0602..	12148068700	12148086600	1,0

- .0004" (0,01mm) diameter adjustment.
- Basic body shipped without boring bars.



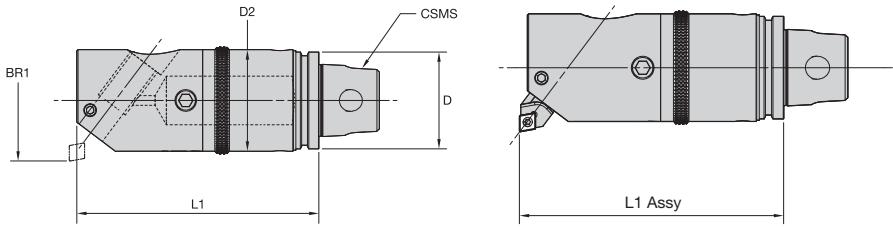
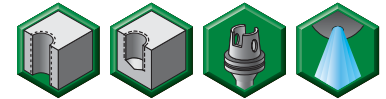
### ■ FBH • RFX Series Shank

order number	catalog number	BR1 bore range		D2		L1		L1 Assy		CSMS system size	kg	lbs
		mm	in	mm	in	mm	in	mm	in			
3861143	RFX185FBH022029	22,000-29,000	0.8661-1.1417	18,50	.728	55,00	2.165	56,00	2.200	RFX185	0,20	.40
3861144	RFX245FBH029038	29,000-38,000	1.1417-1.4961	24,50	.965	60,00	2.362	62,00	2.440	RFX245	0,20	.40
3861145	RFX320FBH038050	38,000-50,000	1.4961-1.9385	32,00	1.260	75,00	2.953	77,00	3.030	RFX320	0,50	1.10
3861146	RFX420FBH050065	50,000-65,000	1.9685-2.5591	42,00	1.654	95,00	3.740	98,00	3.860	RFX420	1,10	2.40
3861147	RFX550FBH065088	65,000-88,000	2.5591-3.4646	55,00	2.165	115,00	4.528	120,00	4.720	RFX550	2,10	4.60
3861148	RFX720FBH088115	88,000-115,000	3.4646-4.5276	72,00	2.835	155,00	6.102	160,00	6.300	RFX720	4,90	10.80

### ■ Spare Parts

catalog number	adjusting screw	adjustment locking screw	fixing screw	wedge	hex wrench	hex wrench
RFX185FBH022029	12147620000	12147680200	12346292100	12147621100	12148041100	12148040900
RFX245FBH029038	12147620000	12147680300	12346292200	12147621200	12148041100	12148040900
RFX320FBH038050	12147620300	12147680400	12147622300	12147621300	12148041200	12148041000
RFX420FBH050065	12147620400	12147680500	12148575900	12147621400	12148041300	12148041100
RFX550FBH065088	12147620500	12147680600	12148087100	12147621500	12148041400	12148041100
RFX720FBH088115	12147620600	12147680700	12148087100	12147621600	12148079000	—

- .0004" (0,01mm) diameter adjustment.
- Basic body shipped without boring bars.

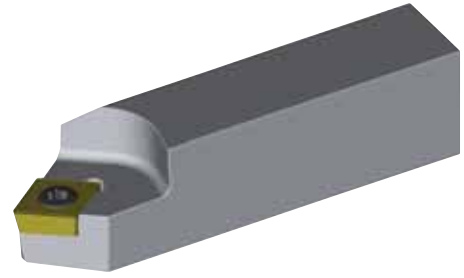
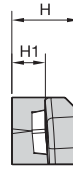
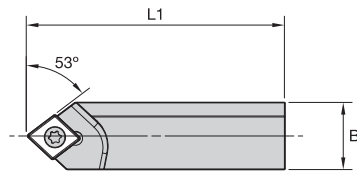


■ FBH • KM™ Series Shank

order number	catalog number	BR1 bore range		D2		L1		L1 Assy		CSMS system size	kg	lbs
		mm	in	mm	in	mm	in	mm	in			
3861123	KM32TSFBH022029	22,000-29,000	0.8661-1.1417	18,50	.728	60,00	2.362	62,00	2.440	KM32TS	0,20	.40
3861124	KM32TSFBH029038	29,000-38,000	1.1417-1.4961	24,50	.965	70,00	2.756	72,00	2.830	KM32TS	0,20	.40
3861125	KM32TSFBH038050	38,000-50,000	1.4961-1.9385	32,00	1.260	80,00	3.150	82,00	3.230	KM32TS	0,50	1.10
3861126	KM40TSFBH029038	29,000-38,000	1.1417-1.4961	24,50	.965	90,00	3.543	92,00	3.620	KM40TS	0,50	1.10
3861127	KM40TSFBH038050	38,000-50,000	1.4961-1.9385	32,00	1.260	100,00	3.937	103,00	4.060	KM40TS	0,90	2.00
3861128	KM40TSFBH050065	50,000-65,000	1.9685-2.5591	42,00	1.654	105,00	4.134	108,00	4.252	KM40TS	1,10	2.40
3861129	KM50TSFBH050065	50,000-65,000	1.9685-2.5591	42,00	1.654	110,00	4.331	115,00	4.530	KM50TS	1,20	2.60
3861130	KM50TSFBH065088	65,000-88,000	2.5591-3.4646	55,00	2.165	125,00	4.920	130,00	5.118	KM50TS	1,70	3.70
3861131	KM63TSFBH065088	65,000-88,000	2.5591-3.4646	55,00	2.165	130,00	5.118	135,00	5.310	KM63TS	2,50	5.50
3861132	KM63TSFBH088115	88,000-115,000	3.4646-4.5276	63,00	2.480	130,00	5.118	135,00	5.310	KM63TS	2,00	4.40

■ Spare Parts

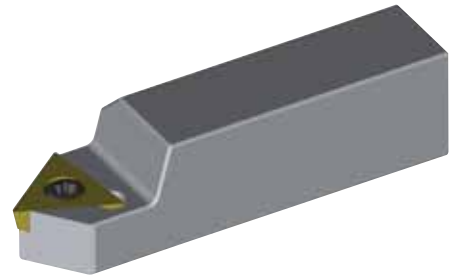
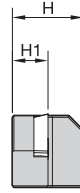
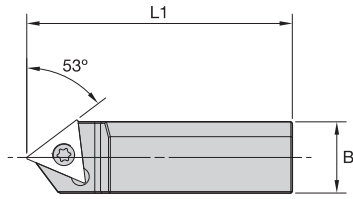
catalog number	adjusting screw	adjustment locking screw	fixing screw	wedge	hex wrench	hex wrench
KM32TSFBH022029	12147620000	12147680200	12346292100	12147621100	12148041100	12148040900
KM32TSFBH029038	12147620000	12147680300	12346292200	12147621200	12148041100	12148040900
KM32TSFBH038050	12147620300	12147680400	12147622300	12147621300	12148041200	12148041000
KM40TSFBH029038	12147620000	12147680300	12346292200	12147621200	12148041100	12148040900
KM40TSFBH038050	12147620300	12147680400	12147622300	12147621300	12148041200	12148041000
KM40TSFBH050065	12147620400	12147680500	12148575900	12147621400	12148041100	12148041300
KM50TSFBH050065	12147620400	12147680500	12148575900	12147621400	12148041100	12148041300
KM50TSFBH065088	12147620500	12147680600	12148087100	12147621500	12148041200	12148041400
KM63TSFBH065088	12147620500	12147680600	12148087100	12147621500	12148041200	12148041400
KM63TSFBH088115	12147620600	12147680700	12148087100	12147621600	12148041200	12148079000



■ Precision Head Insert Holder • C-Style

order number	catalog number	D min		D max		L1	H	H1	B	gage insert	clamping screw	Torx wrench	Nm	ft. lbs.
		mm	in	mm	in									
2004781	12627270300	22,00	.866	29,00	1.142	.748	.315	.177	.315	CC../CP../0602..	12148068700	12148086600	1,0	.74
2004782	12627275300	29,00	1.142	38,00	1.496	1.063	.315	.177	.315	CC../CP../0602..	12148068700	12148086600	1,0	.74
2004133	12627270700	38,00	1.496	50,00	1.969	1.378	.394	.217	.394	CC../CP../0602..	12148068700	12148086600	1,0	.74
2004140	12627276500	50,00	1.969	65,00	2.559	1.811	.472	.256	.472	CC../CP../0602..	12148068700	12148086600	1,0	.74
2004161	12627277700	65,00	2.559	88,00	3.465	2.362	.630	.315	.630	CC../CP../09T3..	12148038800	12148082400	3,0	2.21
2004177	12627278700	88,00	3.465	115,00	4.528	3.307	.630	.315	.630	CC../CP../09T3..	12148038800	12148082400	3,0	2.21

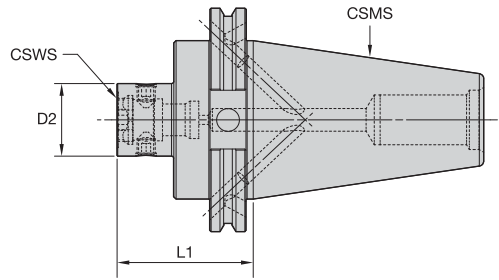




■ Precision Head Insert Holder • T-Style

order number	catalog number	D min		D max		L1	H	H1	B	gage insert	clamping screw	Torx wrench	Nm	ft. lbs.
		mm	in	mm	in									
2004134	12627270800	38,00	1.496	50,00	1.969	1.378	.394	.217	.394	TC../TP../1102..	12148068700	12148086600	1,0	.74
2004141	12627276800	50,00	1.969	65,00	2.559	1.811	.472	.256	.472	TC../TP../1102..	12148068700	12148086600	1,0	.74
2004162	12627277800	65,00	2.559	88,00	3.465	2.362	.630	.315	.630	TC../TP../1102..	12148038800	12148082400	3,0	2.21
2004178	12627278800	86,00	3.386	115,00	4.528	3.307	.630	.315	.630	TC../TP../1102..	12148038800	12148082400	3,0	2.21

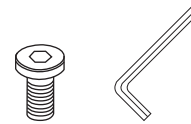




■ RFX • CV40 Taper Shank Form B/AD

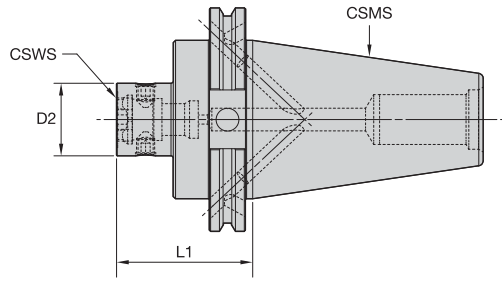
order number	catalog number	CSMS system size	CSWS system size	D2		L1		kg	lbs	lock screw	hex wrench	Nm	ft. lbs.
				mm	in	mm	in						
3860896	CV40BRFX185236	CV40	RFX185	18,5	.728	60,0	2.362	1,1	2.40	RFX185LS	12148041100	6,0	4.43
3860897	CV40BRFX245236	CV40	RFX245	24,5	.965	60,0	2.362	1,1	2.40	RFX245LS	12148041100	8,0	5.90
3860898	CV40BRFX320236	CV40	RFX320	32,0	1.260	60,0	2.362	1,1	2.40	RFX320LS	12148041200	14,0	10.33
3860899	CV40BRFX420236	CV40	RFX420	42,0	1.654	60,0	2.362	1,1	2.40	RFX420LS	12148041300	16,0	11.80
3860900	CV40BRFX550256	CV40	RFX550	55,0	2.165	65,0	2.559	1,2	2.60	RFX550LS	12148041400	20,0	14.75

NOTE: Lock screws included. Order retention knobs separately.



	Form AD				
	Form B			40	(2x) MS2221S
				50	(2x) MS1296S
					2,5mm
					3mm

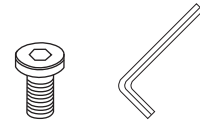


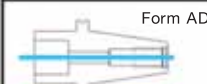










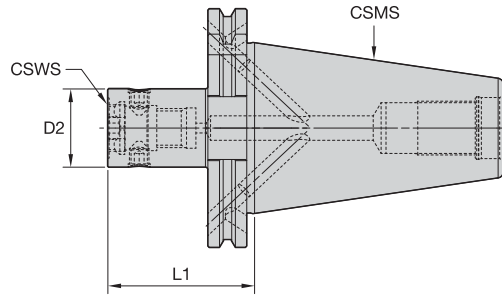
■ **RFX • CV50 Taper Shank Form B/AD**

order number	catalog number	CSMS system size	CSWS system size	D2		L1		kg	lbs	lock screw	hex wrench	Nm	ft. lbs.
				mm	in	mm	in						
3860901	CV50BRFX320236	CV50	RFX320	32,0	1.260	60,0	2.362	3,1	6.80	RFX320LS	12148041200	12,0	10.33
3860902	CV50BRFX420236	CV50	RFX420	42,0	1.654	60,0	2.362	3,2	7.00	RFX420LS	12148041300	20,0	11.80
3860903	CV50BRFX550236	CV50	RFX550	55,0	2.165	60,0	2.362	3,4	7.50	RFX550LS	12148041400	25,0	14.75
3860904	CV50BRFX720276	CV50	RFX720	72,0	2.835	70,0	2.756	3,6	7.90	RFX720LS	12148041400	25,0	14.75

NOTE: Lock screws included. Order retention knobs separately.



	Form AD					
	Form B			40	(2x) MS2221S	2,5mm
				50	(2x) MS1296S	3mm

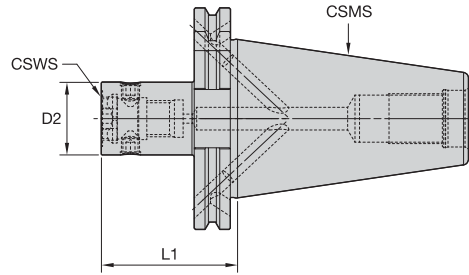


■ RFX • DV40 Taper Shank Form B/AD

order number	catalog number	CSMS system size	CSWS system size	D2		L1		kg	lbs	lock screw	hex wrench	Nm	ft. lbs.
				mm	in	mm	in						
3860696	DV40BRFX185060M	DV40	RFX185	18,5	.728	60,0	2.362	1,1	2.40	RFX185LS	12148041100	6,0	4.43
3860697	DV40BRFX245060M	DV40	RFX245	24,5	.965	60,0	2.362	1,1	2.40	RFX245LS	12148041100	8,0	5.90
3860698	DV40BRFX320060M	DV40	RFX320	32,0	1.260	60,0	2.362	1,1	2.40	RFX320LS	12148041200	14,0	10.33
3860699	DV40BRFX420060M	DV40	RFX420	42,0	1.654	60,0	2.362	1,1	2.40	RFX420LS	12148041300	16,0	11.80
3860700	DV40BRFX550065M	DV40	RFX550	55,0	2.165	65,0	2.559	1,2	2.60	RFX550LS	12148041400	20,0	14.75

NOTE: Lock screws included. Order retention knobs separately.

	Form AD				
	Form B			40	(2x) MS2221S
				50	(2x) MS1296S
					2,5mm
					3mm






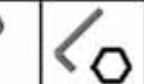





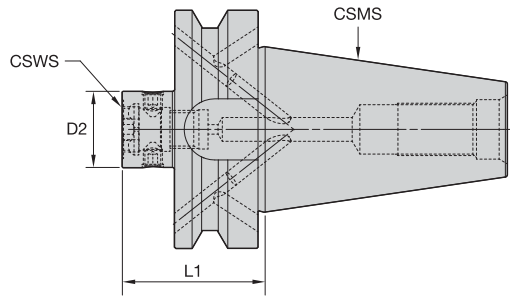
■ RFX • DV50 Taper Shank Form B/AD

order number	catalog number	CSMS system size	CSWS system size	D2		L1		kg	lbs	lock screw	hex wrench	Nm	ft. lbs.
				mm	in	mm	in						
3860701	DV50BRFX320060M	DV50	RFX320	32,0	1.260	60,0	2.362	3,1	6.80	RFX320LS	12148041200	14,0	10.33
3860702	DV50BRFX420060M	DV50	RFX420	42,0	1.654	60,0	2.362	3,2	7.00	RFX420LS	12148041300	16,0	11.80
3860853	DV50BRFX550060M	DV50	RFX550	55,0	2.165	60,0	2.362	3,4	7.50	RFX550LS	12148041400	20,0	14.75
3860854	DV50BRFX720065M	DV50	RFX720	72,0	2.835	65,0	2.559	3,6	7.90	RFX720LS	12148041400	20,0	14.75

NOTE: Lock screws included. Order retention knobs separately.

Hole Finishing

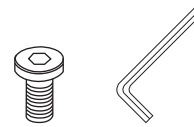
 Form AD					
 Form B			40	(2x) MS2221S	2,5mm
			50	(2x) MS1296S	3mm



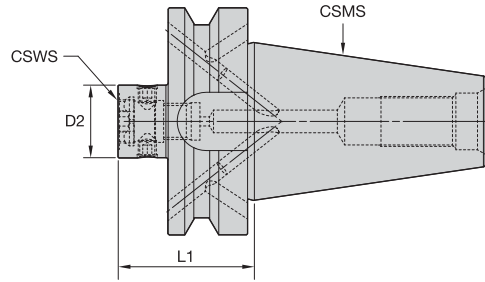
■ RFX • BT40 Taper Shank Form B/AD

order number	catalog number	CSMS system size	CSWS system size	D2		L1		kg	lbs	lock screw	hex wrench	Nm	ft. lbs.
				mm	in	mm	in						
3860676	BT40BRFX185060M	BT40	RFX185	18,5	.728	60,0	2.362	1,0	2.20	RFX185LS	12148041100	8,0	4.43
3860677	BT40BRFX245060M	BT40	RFX245	24,5	.965	60,0	2.362	1,1	2.40	RFX245LS	12148041100	8,0	5.90
3860678	BT40BRFX320060M	BT40	RFX320	32,0	1.260	60,0	2.362	1,1	2.40	RFX320LS	12148041200	12,0	10.33
3860679	BT40BRFX420060M	BT40	RFX420	42,0	1.654	60,0	2.362	1,2	2.60	RFX420LS	12148041300	20,0	11.80
3860680	BT40BRFX550065M	BT40	RFX550	55,0	2.165	65,0	2.559	1,3	2.90	RFX550LS	12148041400	25,0	14.75

NOTE: Lock screws included. Order retention knobs separately.



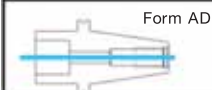







	Form AD					
	Form B			40	(2x) MS2221S	2,5mm
				50	(2x) MS1296S	3mm

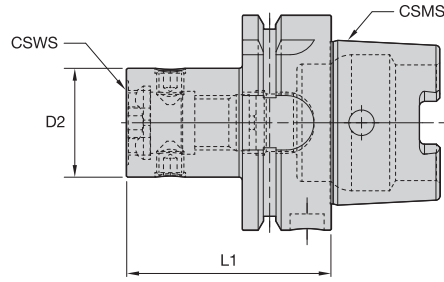


■ RFX • BT50 Taper Shank Form B/AD

order number	catalog number	CSMS system size	CSWS system size	D2		L1		kg	lbs	lock screw	hex wrench	Nm	ft. lbs.
				mm	in	mm	in						
3860681	BT50BRFX320060M	BT50	RFX320	32,0	1.260	60,0	2.362	3,5	7.70	RFX320LS	12148041200	14,0	10.33
3860682	BT50BRFX420060M	BT50	RFX420	42,0	1.654	60,0	2.362	3,9	8.60	RFX420LS	12148041300	16,0	11.80
3860693	BT50BRFX550065M	BT50	RFX550	55,0	2.165	65,0	2.559	4,2	9.50	RFX550LS	12148041400	25,0	18.44
3860694	BT50BRFX720070M	BT50	RFX720	72,0	2.835	70,0	2.756	4,5	9.90	RFX720LS	12148041400	25,0	18.44

NOTE: Lock screws included. Order retention knobs separately.

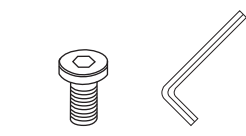
	Form AD				
	Form B			40	(2x) MS2221S
				50	(2x) MS1296S
					2,5mm
					3mm

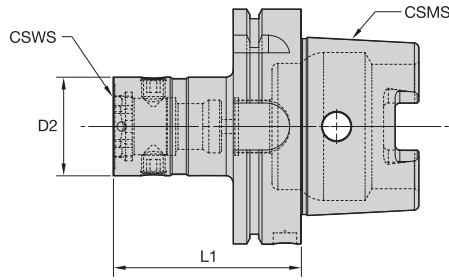


■ RFX • HSK63 Form A

order number	catalog number	CSMS system size	CSWS system size	D2		L1		kg	lbs	lock screw	hex wrench	Nm	ft. lbs.
				mm	in	mm	in						
3860549	HSK63ARFX185060M	HSK63A	RFX185	18,5	.728	60,0	2.362	0,7	1.50	RFX185LS	12148041100	6,0	4.43
3860550	HSK63ARFX245060M	HSK63A	RFX245	24,5	.965	60,0	2.362	0,7	1.50	RFX245LS	12148041100	8,0	5.90
3860551	HSK63ARFX320060M	HSK63A	RFX320	32,0	1.260	60,0	2.362	0,8	1.80	RFX320LS	12148041200	14,0	10.33
3860552	HSK63ARFX420070M	HSK63A	RFX420	42,0	1.654	70,0	2.756	1,0	2.20	RFX420LS	12148041300	16,0	11.80
3860623	HSK63ARFX550080M	HSK63A	RFX550	55,0	2.165	80,0	3.150	1,4	3.10	RFX550LS	12148041400	20,0	14.75
3860624	HSK63ARFX720095M	HSK63A	RFX720	72,0	2.835	95,0	3.740	2,0	4.40	RFX720LS	12148041400	20,0	14.75

NOTE: Lock screws included. HSK coolant unit and wrench are available but must be ordered separately.

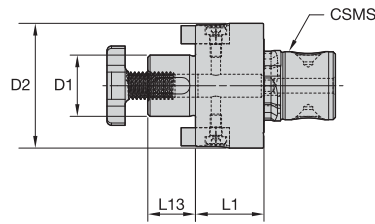




■ **RFX • HSK100 Form A**

order number	catalog number	CSMS system size	CSWS system size	D2		L1		kg	lbs	lock screw	hex wrench	Nm	ft. lbs.
				mm	in	mm	in						
3881208	HSK100ARFX420080M	HSK100A	RFX420	42,0	1.654	80,0	3.150	1,0	2.20	RFX420LS	12148041300	20,0	17.75
3881209	HSK100ARFX550090M	HSK100A	RFX550	55,0	2.165	90,0	3.543	2,2	4.85	RFX550LS	12148041400	25,0	18.44
3881210	HSK100ARFX720105M	HSK100A	RFX720	72,0	2.835	105,0	4.134	2,5	5.51	RFX720LS	12148041400	25,0	18.44

NOTE: Lock screws included. HSK coolant unit and wrench are available but must be ordered separately.



■ CS-RFX Adapter • Lock Screw Design

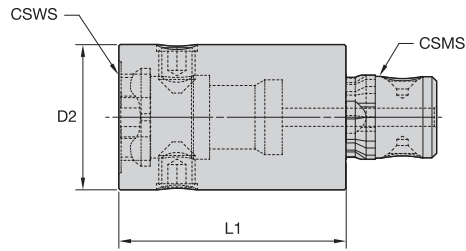
order number	catalog number	CSMS system size	D1		D2		L1		L13		kg	lbs
			mm	in	mm	in	mm	in	mm	in		
3860547	RFX550CS27030M	RFX550	27,0	1.060	55,0	2.165	30,0	1.181	21,0	.827	0,9	2.00
3860548	RFX720CS40035M	RFX720	40,0	1.570	72,0	2.835	35,0	1.378	27,0	1.063	1,8	4.00

■ Spare Parts

catalog number	lock screw
RFX550CS27030M	12147522400
RFX720CS40035M	KLS40M



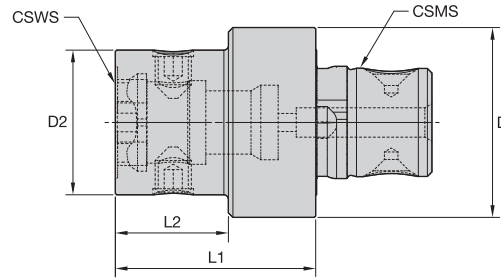




■ RFX Extensions

order number	catalog number	CSMS system size	CSWS system size	D2		L1		kg	lbs	lock screw	hex wrench	Nm	ft. lbs.
				mm	in	mm	in						
3860450	RFX185RFX185030M	RFX185	RFX185	18,5	.728	30,0	1.181	0,1	.20	RFX185LS	12148041100	6,0	4.43
3860451	RFX245RFX245035M	RFX245	RFX245	24,5	.965	35,0	1.378	0,2	.40	RFX245LS	12148041100	8,0	5.90
3860452	RFX320RFX320050M	RFX320	RFX320	32,0	1.260	50,0	1.969	0,3	.70	RFX320LS	12148041200	14,0	10.33
3860473	RFX420RFX420060M	RFX420	RFX420	42,0	1.654	60,0	2.362	0,8	1.80	RFX420LS	12148041300	16,0	11.80
3860474	RFX550RFX550090M	RFX550	RFX550	55,0	2.165	90,0	3.543	1,6	3.50	RFX550LS	12148041400	20,0	14.75
3860475	RFX720RFX720100M	RFX720	RFX720	72,0	2.835	100,0	3.937	3,1	6.80	RFX720LS	12148041400	25,0	18.44

NOTE: Lock screws included. HSK coolant unit and wrench are available but must be ordered separately.



■ RFX Reducers

order number	catalog number	CSMS system size	CSWS system size	D		D2		L1		L2		kg	lbs	lock screw	hex wrench	Nm ft. lbs.	
				mm	in	mm	in	mm	in	mm	in						
3860419	RFX320RFX185030M	RFX320	RFX185	32,0	1.260	18,5	.728	30,0	1.181	15,0	.591	0,2	.40	RFX185LS	12148041100	6,0	4.43
3860420	RFX320RFX245040M	RFX320	RFX245	32,0	1.260	24,5	.965	40,0	1.575	25,0	.984	0,2	.40	RFX245LS	12148041100	8,0	5.90
3860421	RFX420RFX185035M	RFX420	RFX185	42,0	1.654	18,5	.728	35,0	1.378	15,0	.591	0,4	.90	RFX185LS	12148041100	6,0	4.43
3860422	RFX420RFX245045M	RFX420	RFX245	42,0	1.654	24,5	.965	45,0	1.772	25,0	.984	0,4	.90	RFX245LS	12148041100	8,0	5.90
3860443	RFX420RFX320045M	RFX420	RFX320	42,0	1.654	32,0	1.260	45,0	1.772	25,0	.984	0,6	1.30	RFX320LS	12148041200	14,0	10.33
3860444	RFX550RFX185040M	RFX550	RFX185	55,0	2.165	18,5	.728	40,0	1.575	15,0	.591	0,7	1.50	RFX185LS	12148041100	6,0	4.43
3860445	RFX550RFX245050M	RFX550	RFX245	55,0	2.165	24,5	.965	50,0	1.969	25,0	.984	0,8	1.80	RFX245LS	12148041100	8,0	5.90
3860446	RFX550RFX320050M	RFX550	RFX320	55,0	2.165	32,0	1.260	50,0	1.969	25,0	.984	0,8	1.80	RFX320LS	12148041200	14,0	10.33
3860447	RFX550RFX420055M	RFX550	RFX420	55,0	2.165	42,0	1.654	55,0	2.165	30,0	1.181	0,9	2.00	RFX420LS	12148041300	16,0	11.80
3860448	RFX720RFX420060M	RFX720	RFX420	72,0	2.835	42,0	1.654	60,0	2.362	30,0	1.181	1,6	3.50	RFX420LS	12148041300	16,0	11.80
3860449	RFX720RFX550060M	RFX720	RFX550	72,0	2.835	55,0	2.165	60,0	2.362	30,0	1.181	1,8	4.00	RFX550LS	12148041400	20,0	14.75

NOTE: Lock screws included. HSK coolant unit and wrench are available but must be ordered separately.

## Easy Access to Proven Metalworking Expertise!

WIDIA™ Customer Application Engineers assist customers and engineering groups throughout the world with expert tool selection and application recommendations for the entire range of WIDIA tooling.

# Customer Application Support (CAS)

EXTREME **CHALLENGES.**  
EXTREME **RESULTS.**

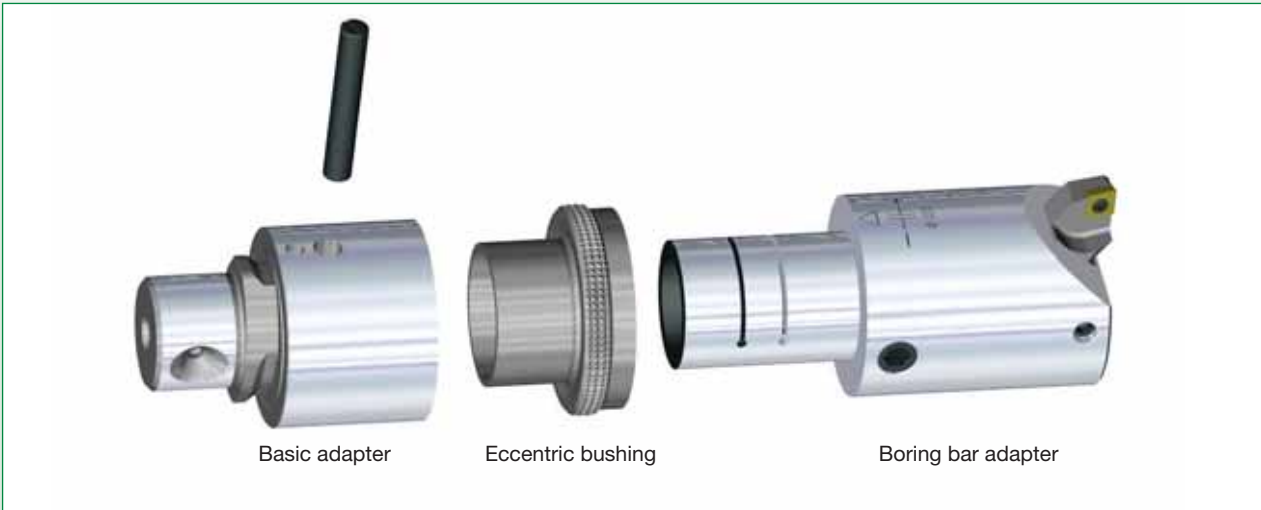
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**WIDIA** 

Design Principle



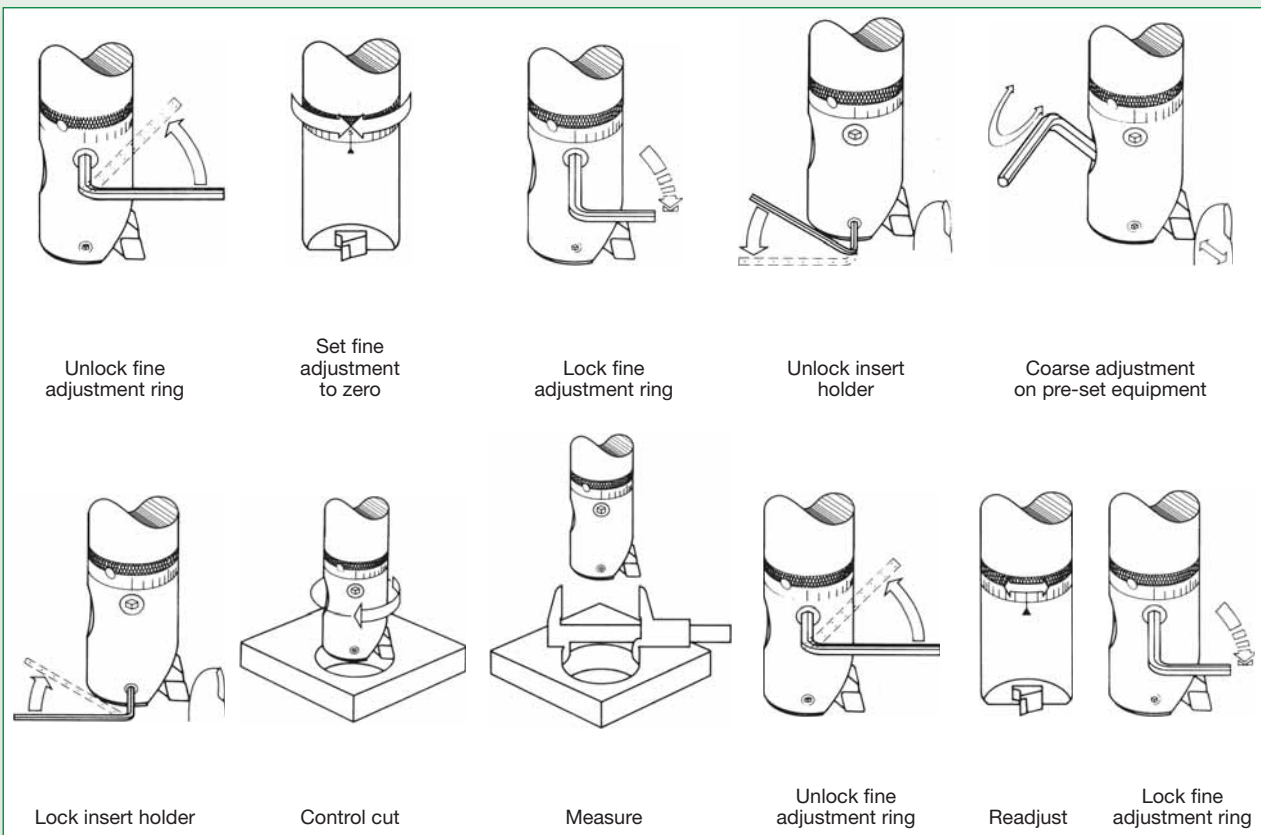
Eccentric bushing for fine adjustment

Regular fine boring heads have a threaded spindle as an adjustment mechanism. In this situation, spindle inaccuracy can cause backlash and require extra effort during setup. The ROTAFLEX eccentric bushing is easy to use, and machining forces are transmitted via a larger surface, ensuring a consistent diameter during machining.

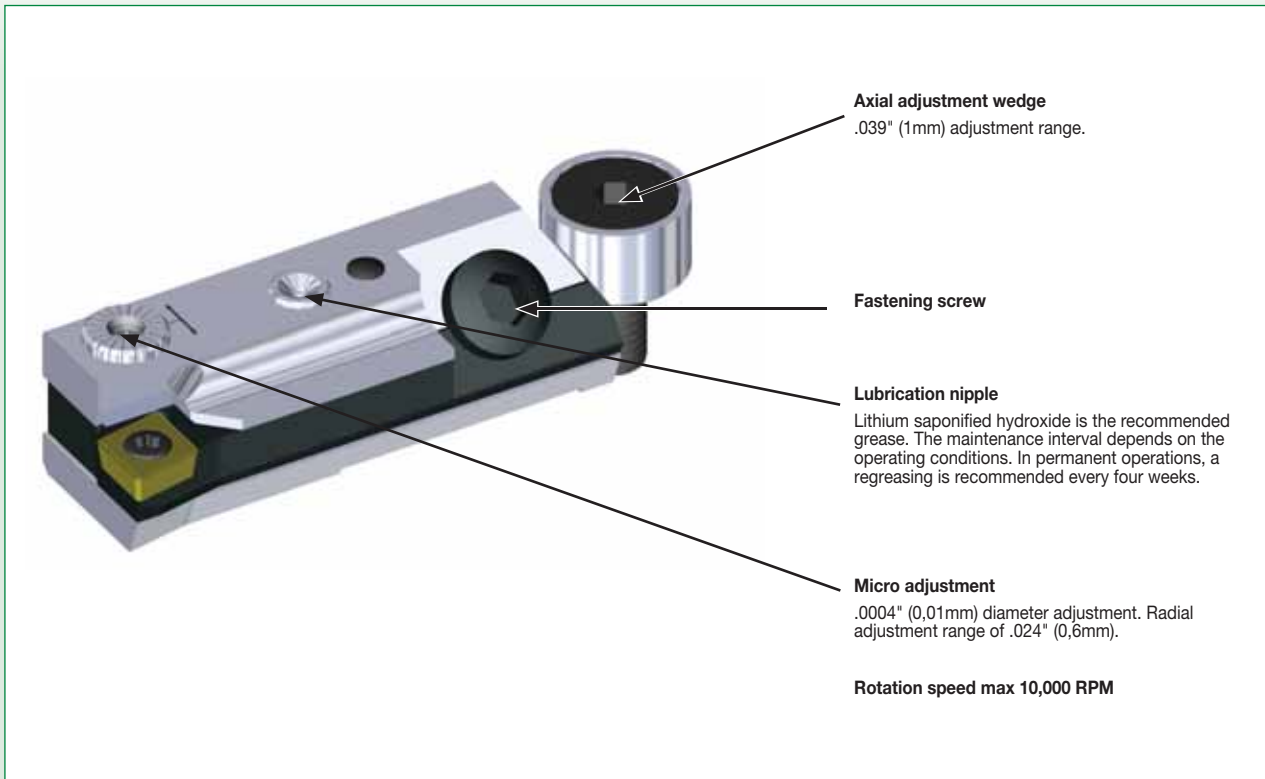


After rough adjustment of the insert holder, the easy-to-read scale enables fine adjustment to reach precisely the diameter needed. Here, no parallax errors occur when reading the scale.

Adjustment

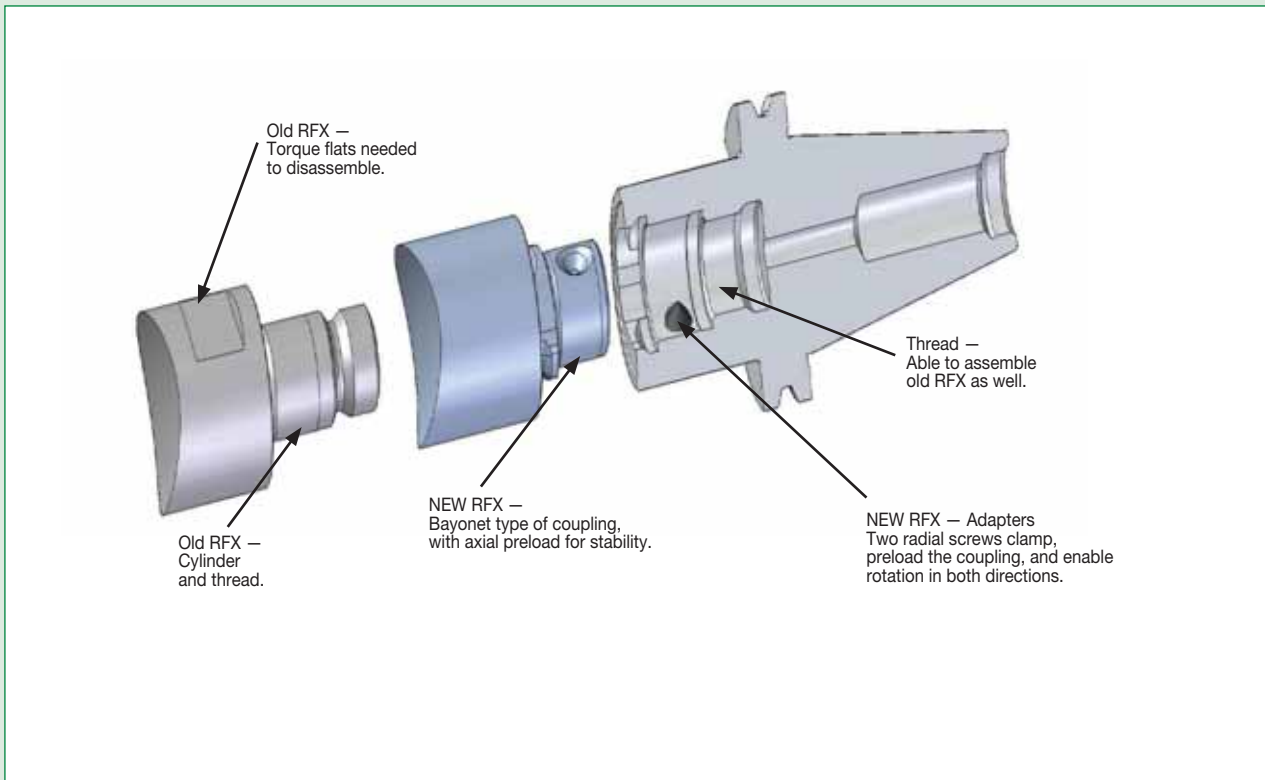


**Application Hints • Micro-Adjustable Cartridges**



**Application Hints • RFX Coupling**

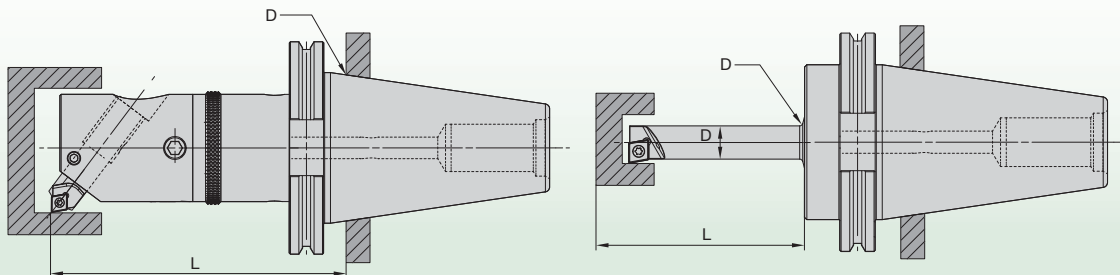
Old RFX screw-type coupling can be mounted into new RFX bayonet-type adapters as well.



### General Application Hints

- Identify your critical diameter (D).
- Identify the maximum distance cutting edge (L) to critical diameter.

Here are some examples:



Refer to this table for first investigation of application:

Type of Tooling	Stable	Unstable	Tests Necessary
Twin Cutter Solid Tools	<3,5 x D	3,5–6,5 x D	>6,5 x D
Twin Cutter Bridge Tools	<3,5 x D	3,5–6,5 x D	>6,5 x D
Fine-Boring Heads with Boring Bar (FBHBB)	<3,5 x D	3,5–5,0 x D	>5,0 x D
Fine-Boring Heads (FBH)	<3,5 x D	3,5–5,0 x D	>5,0 x D
Fine-Boring Bridge Tools	<3,5 x D	3,5–5,0 x D	>5,0 x D
	Function of the tool is expected without issues within recommended cutting data.	Application may require reduced feeds and/or speeds compared to stable conditions.	Machining test may be required to identify cutting data.

### Causes of and remedies for rough and fine boring problems

It is generally assumed that the tools have been properly mounted as per the technical recommendations in this catalog.

Problem	Cause	Possible Remedy
Vibration tendency	<ol style="list-style-type: none"> <li>1. Overhang</li> <li>2. Choice of insert</li> <li>3. Cutting data</li> </ol>	<ul style="list-style-type: none"> <li>• Adjust L/D ratio</li> <li>• Select 90° lead angle on rough boring tools</li> <li>• Select inserts with positive geometry</li> <li>• Select inserts with smaller corner radius</li> <li>• Reduce depth of cut</li> <li>• Increase feed</li> </ul>
Slight chatter marks on surface	<ol style="list-style-type: none"> <li>1. Choice of insert</li> <li>2. Cutting data</li> <li>3. Machining environment</li> </ol>	<ul style="list-style-type: none"> <li>• Select 90° lead angle</li> <li>• Select ground inserts with small edge preparation</li> <li>• Select inserts with smaller corner radius</li> <li>• Increase feed</li> <li>• Increase coolant</li> </ul>
Conical bores	<ol style="list-style-type: none"> <li>1. Choice of insert</li> <li>2. Cutting data</li> <li>3. Machining environment</li> </ol>	<ul style="list-style-type: none"> <li>• Select a more wear-resistant insert grade</li> <li>• Increase cutting speed</li> <li>• Check whether all screws have been tightened to recommended torque</li> </ul>

**Inserts Overview**

Geometry	Application	ANSI catalog number	ISO catalog number	P			M		K		S	
				WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WK05CT	WK20CT	WS10PT	WS25PT
	CCMT-FP • Fine Finishing	CCMT2151FP	CCMT060204FP	•	•		•	•		•	•	•
		CCMT3251FP	CCMT09T304FP	•	•		•	•		•	•	•
	CCMT-MU • Medium to Finishing	CCMT2152MU	CCMT060208MU					•		•		
		CCMT3251MU	CCMT09T304MU	•	•			•	•	•	•	•
		CCMT3252MU	CCMT09T308MU	•	•	•		•		•	•	•
		CCMT432MU	CCMT120408MU	•	•			•		•		•
	CCMT-MP • Roughing to Medium	CCMT2151MP	CCMT060204MP	•	•		•	•		•	•	
		CCMT3251MP	CCMT09T304MP	•	•		•	•		•	•	
		CCMT3252MP	CCMT09T308MP	•	•		•	•		•	•	
		CCMT432MP	CCMT120408MP	•	•		•	•		•	•	
		CCMT433MP	CCMT120412MP		•			•	•		•	

# Hole Finishing Capabilities and Custom Solutions



With our state-of-the-art CNC equipment and engineering processes, we can design complex geometries for reaming and countersinking. Special countersinks for pre-working and finishing operations minimize machine time and rationalize production. Our custom solution reamers deliver proven performance in applications that demand high surface qualities, narrow fit, alignment tolerances, and long tool life.

## Hole Finishing Custom Solution Tool Styles:

- Reaming
- Boring
- Countersinking
- PCD Round Tools



## Hole Finishing Capabilities and Custom Solution Services

- Development, design, and production of different types of cutting tools for reaming, boring, and countersinking.
- Services provided by one engineering department fully integrated with all WIDIA™ focused factories.
- Capabilities with all common cutting materials such as high-speed steel (HSS-E), powdered metal, solid carbide, carbide-tipped, cermet, and PCD, with or without internal coolant.
- Complete tool competence from one source, from construction, application engineering, development, and production through tool reconditioning services.

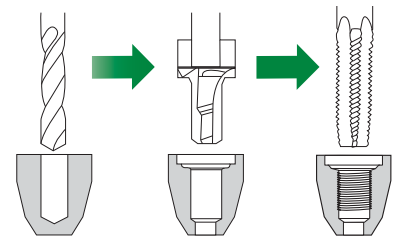


**Port Contour Cutters •**  
For Fluid-Powered Standard Ports

# Port Contour Cutters



- Each component has entry and exit points for the fluid involved called ports.
- Port shapes and forms are standardized.
- WIDIA™ offers porting tools to finish these ports in one-shot operations.



Standard Port	Available Cutters
JDS-G173.1	169-0XXX WITH GROOVE & 169-1XXX WITHOUT GROOVE & 269-0XXX WITH GROOVE & 269-1XXX WITHOUT GROOVE
AS5202	169-0XXX WITH GROOVE & 169-1XXX WITHOUT GROOVE & 269-0XXX WITH GROOVE & 269-1XXX WITHOUT GROOVE
ISO-6149-1	169-0XXX WITH GROOVE & 169-1XXX WITHOUT GROOVE & 269-0XXX WITH GROOVE & 269-1XXX WITHOUT GROOVE
SAE J2241/1	169-0XXX WITH GROOVE & 169-1XXX WITHOUT GROOVE & 269-0XXX WITH GROOVE & 269-1XXX WITHOUT GROOVE
NPTF/NPT	186, 187 & 287
MS 16142	163, 253, 263, 267, 367 & 467
CAT.IE2554	163, 253, 263, 267, 367 & 467
SAE J1926-1	163, 253, 263, 267, 367 & 467
BSPP/BSPPF	265
AS1300	RCT SERIES/CUSTOM SOLUTION
MS33659	164, 264 & 268
AND10050	164, 264 & 268
ISO-1179-1	255 STD. LGHT. & 265 EXT. LGTH. REAMER
DIN-3852-2	225 SMALL, 235 LARGE & 245 EXT. LGTH. REAMER

**Port Contour Cutters**

- Dura-bar 65-45-12.
- Component: General cavity.
- Ream SAE#8.
- Surface finish below Ra 32 (inch).

**CHALLENGE**

- Cermet-tipped port cutting tool.

**SOLUTION**

- 2100 RPM–20 IPM.
- Flood coolant.
- Machining center.

**CUTTING DATA**

- Surface finish of 7–15 RA (inch).

**RESULT**

- Increase productivity by one-shot finishing of port.

**BENEFIT**



**Custom Solutions •**  
Countersinking and Reaming

# Reamer Custom Solutions



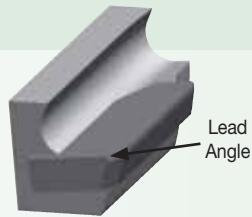
With our state-of-the-art equipment and engineering processes, we can design complex geometries for reaming and countersinking. Special countersinks for pre-working and finishing operations minimize machining time and rationalize production. Our custom solution reamers deliver proven performance in applications that demand high surface qualities, narrow fit, alignment tolerances, and long tool life.



## Diameter

- .055–1.968" (1,4–50mm).
- Up to tolerance IT6 depending on application.
- Diameter steps.

## Leads

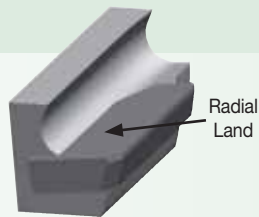


- 25–90° leads for smoother cutting or better positioning.
- Double leads for better surface quality.
- Radius leads for optimal CI machining.

## Grades

- Various grades available tailored to your specific application.

## Radial Land



- Cylindrical for better guiding and form.
- Upsharp (no land) for best surface finishes and less passive forces.
- Narrow land to reduce forces.

## TRM — TOP REAM MODULAR

- Tube holes  $\varnothing$  .994" (25,25mm).
- Tolerance range 100  $\mu$ m.
- Alloy steel, long-chipping.
- Machining center with internal coolant.

### CHALLENGE

- Six cutting edges.
- Coated cermet.
- Standard 5 x D body clamped into hydraulic chuck.

### SOLUTION

- $vc = 295$  SFM (90 m/min).
- $f = .019$  IPR (0,48 mm/rev).

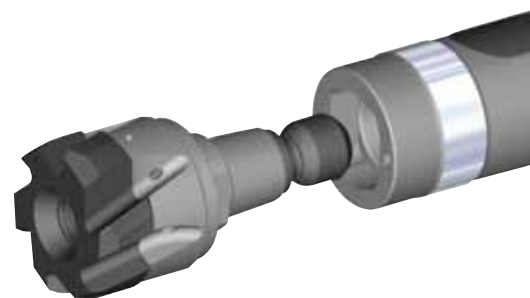
### CUTTING DATA

- After more than 30 minutes only minor wear visible.

### RESULT

- Reduction of machining time in total to less than 60 minutes per plate with 180 holes.
- Predictable tool life as only 2  $\mu$ m diameter deviation after 30 minutes tool life.

### BENEFIT



**PCD STEP REAMER**

- Bearing bore Ø 130mm.
- Tolerance range 25 µm S6.
- Aluminum AlSi8Cu3.
- Varying depth of cut ca. 0,5–5mm.
- Machining center with internal coolant.

**CHALLENGE**

- PCD tipped, steel-based tool with HSK interface and internal coolant.
- Six effective cutting and chamfering teeth in positive cutting position.

**SOLUTION**

- $vc = 1.148$  SFM (350 m/min).
- $f = .024$  IPR (0,60 mm/rev).

**CUTTING DATA**

- Tool life increase versus previous solution.
- Surface finish Ra 0.2 µm.

**RESULT**

- Secure process.
- Most productive solution at large diameter.
- Very long tool life.
- Reconditionable.

**BENEFIT**

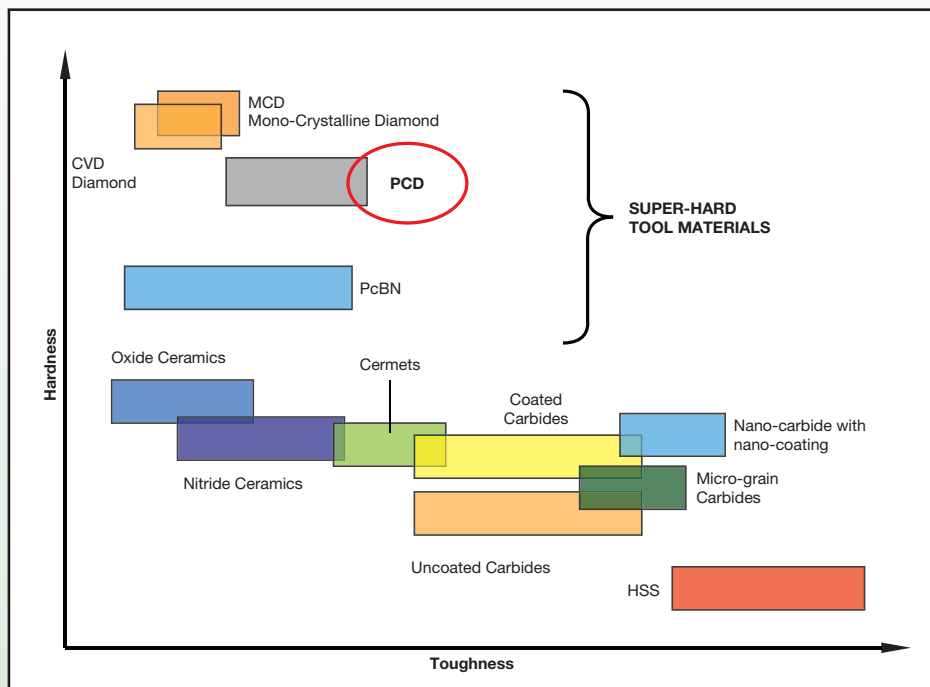


Highly uneven flute design reduces vibrations.



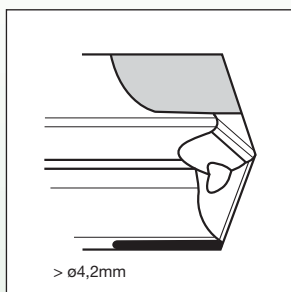
## PCD • Round Tools for Holemaking

### Cutting Materials • Hardness vs. Toughness



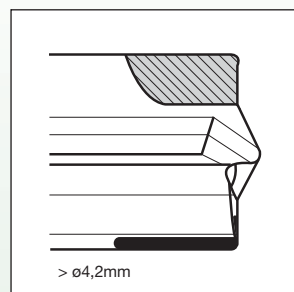
### WIDIA™ PCD Drill-Pointed Geometries

Type: **CT**  
Corner tipped



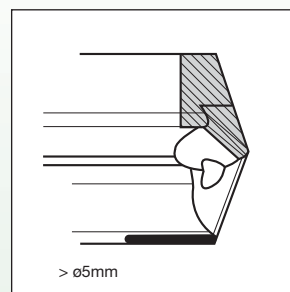
For general applications.

Type: **CTE**  
Corner tipped with center point



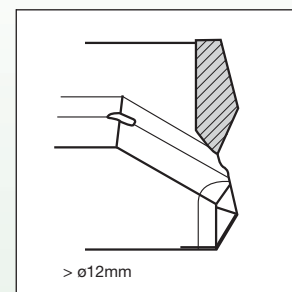
For precasted bores.

Type: **SW**  
Sandwich



For highly abrasive materials.

Type: **MT**  
For body = steel



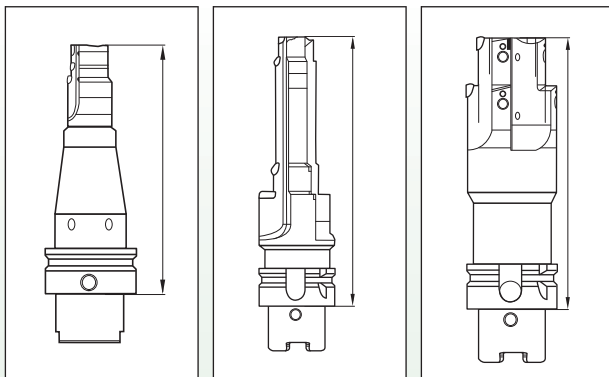
For breaking through the casting skin.



**Non-Ferrous Materials**

N2	Low-Silicon Aluminum Alloys (Hypoeutectic <12.2% Si) and Magnesium Alloys
N3	High-Silicon Aluminum Alloys (Hypereutectic >12.2% Si) and Magnesium Alloys
N4	Copper, Brass, Zinc-Based Materials
N5	Nylon, Plastics, Rubber, Phenolics, Resins, Fiberglass, Glass
N6	Carbon and Graphite Composites: Brush Alloys, Kevlar, Graphite
N7	MMCs — Aluminum-Based Metal Matrix Composites

**WIDIA™ PCD Styles for Reamers/CS**



**PKD ST** —  
Steel Shank

**PKD STM** —  
Monoblock

**PKD STMJ** —  
Adjustable  
Cutting Edges

**PKD SC** —  
Solid Carbide  
Shank

Material	Coolant Style Grade	Coolant Style Grade	Coolant Style Grade
Al <7%	MQL, Emulsion	PCD SC PCD STM PCD STMU	WBK45U
Al <12%	MQL, Emulsion		WBK45U
Al <12%	Emulsion	PCD SC	WBK45U
Mg Alloys	Emulsion	PCD SC	WBK45U
CFK	Dry	PCD SC	WBK45U



# WIDIA™ Repair Services

WIDIA tooling products are produced to the highest specifications and manufactured from premium materials. However, like all mechanical devices, they wear and require repair.

Milling cutters

Boring bars — standard, tunable, and de-vibe

Indexable drills

Line boring bars

Feed-out heads

Motion tools

Standard indexable tooling

Eccentric toolholders

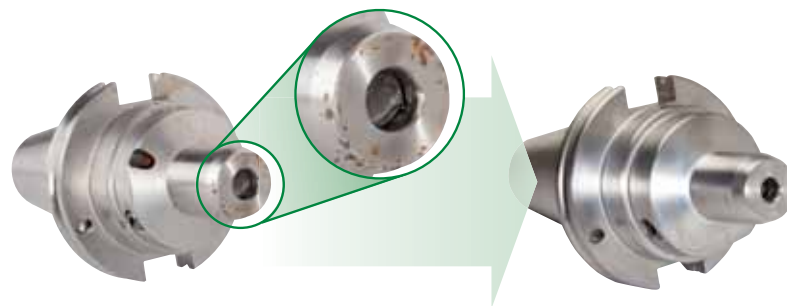
Floating toolholders

Hydraulic chucks

KM™ clamping units (manual and spring packs)

KM-LOC™ and KM-LOC II™ clamping units

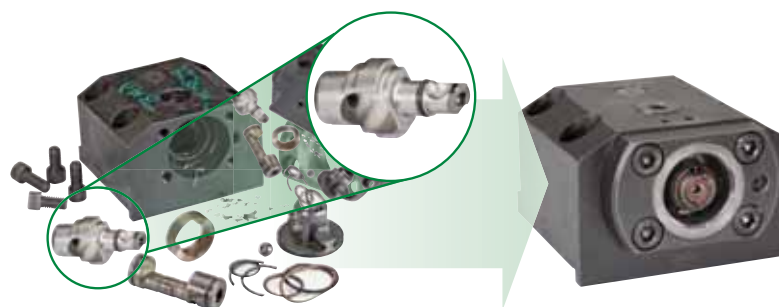
## Hydraulic Chucks



Damaged WIDIA Tools

Repaired WIDIA Tools

## KM-LOC™



Damaged WIDIA Tools

Repaired WIDIA Tools

# Tools Are Valuable. Protect Them and Get the Most from Your Investment.



## EXTREME CHALLENGES. EXTREME RESULTS.

### Live/driven tooling

When your WIDIA™ advanced tooling products need to be serviced, the WIDIA Service and Repair Department has the highly trained staff to provide expert assistance.

### Milling chucks

For about half the cost of a new WIDIA tool purchase, your existing damaged WIDIA tools can be repaired to like-new condition. In certain circumstances, it is not cost effective to repair some tooling. Contact the WIDIA Service and Repair Department with any questions about your requirements.

### Right-angle heads

### Tapping holders (excluding tap adapters)

### Integral tapping tools (excluding tap adapters)

### Tuned tooling units













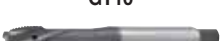
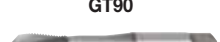






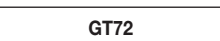



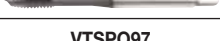
For more information, contact your local WIDIA  
Authorized Distributor or visit [widia.com/services](http://widia.com/services).

**WIDIA** 

















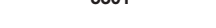
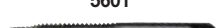
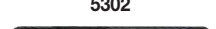
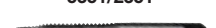



## Tapping

Taps Introduction .....	V2-V21
Spiral-Point/Left-Hand Spiral-Flute Taps.....	W2-W50
Spiral-Flute Taps .....	W52-W114
Straight-Flute Taps.....	W116-W156
Forming Taps.....	W158-W182
Pipe Taps.....	W184-W193
Thread Mills.....	W194-W215
High-Performance Taps Application Data .....	W216-W220
Technical Information .....	W221-W249
Lightning Service.....	W250-W297










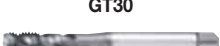


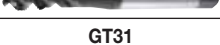
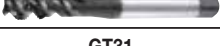








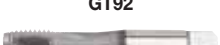


series	hole		thread		coolant		size range min-max	grade/ coating	material				chamfer		helix angle	dimension
	through	blind	cutting	forming	flood	through			carbide	HSS-E-PM	HSS-E	HSS	type	form		
																
 GT20	X		X		X		#2-3/4"	GP6520, GM6515	X				plug	D	L15°	ANSI 302A
 GT20	X		X		X		#6-1/2"	GP6520	X				plug	D	L15°	DIN/ANSI
 GT20	X		X		X		M3-M12	GP6520, GM6515	X				plug	D	L15°	ANSI 302A
 GT20	X		X		X		M3-M42	GP6520, GM6515	X				plug	D	L15°	DIN 371, 374, 376
 GT20	X		X		X		M24-M42	GP6520	X				plug	D	L15°	DIN 376, XL
 GT21	X		X			X	M5-M14	GP6520, GM6515	X				plug	D	L15°	DIN 371, 376
 GT10	X		X		X		M3-M20	WS32MG	X				plug	D	L8°	DIN 371, 376
 GT90	X		X		X		#2-3/4"	WU32MG, WS39MG	X				plug	D	L15°	ANSI 302A
 GT90	X		X		X		M2.5-M12	WU32MG, WS39MG	X				plug	D	L15°	ANSI 302A
 GT14	X		X		X		M3-M12	WN35MG	X				plug	B	0°	DIN 371, 376
 GT60	X		X		X		#2-1"	WS30MG, WS34MG	X				plug	D	L15°	ANSI 302A
 GT60	X		X		X		M2.5-M12	WS30MG, WS34MG	X				plug	D	L15°	ANSI 302A
 GT70	X		X	X			M3-M16	WN48EG		X			plug	B	0°	DIN 371, 376
 GT72	X		X		X		#2-1/2"	WN44EG		X			plug	D	L15°	DIN/ANSI
 GT72	X		X		X		M3-M12	WN44EG		X			plug	D	L15°	DIN/ANSI
 GT00	X		X		X		M3-M20	WP31MG	X				plug	B	0°	DIN 371, 374, 376
 VTSP050	X		X		X		#2-2"	WP42EG, WP49EG, WU41EG, WU40EG		X			plug	B	0°	ANSI 302A
 VTSP090	X		X		X		#4-3/4"	WP42EG, WP49EG		X			plug	B	0°	DIN/ANSI
 VTSP097	X		X			X	1/4-1"	WP42EG		X			plug	B	0°	DIN/ANSI

		P				M	K		N			S				H		page(s)	recommended cutting parameters
		1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
		Steel < 35 HRC	Steel > 36-48 HRC	PH and Ferritic Stainless Steel < 35 HRC	PH and Ferritic Stainless Steel > 35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49-55 HRC	Hardened Steels 56-68 HRC		
<b>Spiral-Point and Left-Hand Spiral-Flute Taps (continued)</b>																			
	★★★		★★★		★★★		★★	★	★		★★						W4	W218	
	★★★		★★★		★★★		★★	★	★		★★						W6	W218	
	★★★		★★★		★★★		★★	★	★		★★						W7	W217	
	★★★		★★★		★★★		★★	★	★		★★						W8	W217	
	★★★		★★★		★★★		★★	★	★		★★						W9	W217	
	★★★		★★★		★★★		★★	★	★		★★						W10	W217	
												★★★	★★★				W11	W217	
												★★★	★★★				W12	W218	
												★★★	★★★				W14	W217	
														★★★			W15	W217	
														★★★			W16	W218	
														★★★			W18	W217	
								★★★	★	★							W19	W217	
								★★★	★★								W20	W218	
								★★★	★★								W21	W217	
		★★★		★★★	★	★	★					★					W22	W217	
	★★	★	★		★★	★	★★	★	★★	★★	★						W23	W220	
	★★	★	★		★★	★	★★	★	★★	★★	★						W27	W220	
	★★	★	★		★★	★	★★	★	★★	★★	★						W28	W220	










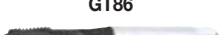

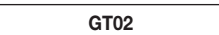
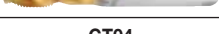





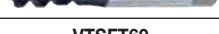


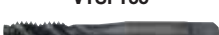



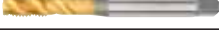
series	hole		thread		coolant		size range	grade/ coating	material			chamfer		helix angle	dimension	
	through	blind	cutting	forming	flood	through			carbide	HSS-E-PM	HSS-E	HSS	type			form
																
<b>Spiral-Point and Left-Hand Spiral-Flute Taps (continued)</b>																
 VTSP060	X		X		X		#4-1"	WU41EG, WP49EG		X		plug	B	0°	DIN 371, 376	
 VTSP055	X		X		X		M3-M30	WP42EG, WP49EG, WU41EG, WU40EG		X		plug	B	0°	ANSI 302A	
 VTSP095	X		X		X		M3-M20	WP42EG, WP49EG		X		plug	B	0°	DIN/ANSI	
 VTSP099	X		X			X	M6-M20	WP42EG		X		plug	B	0°	DIN/ANSI	
 VTSP065	X		X		X		M2-M36	WP42EG, WP49EG, WU41EG, WU40EG		X		plug	B	0°	DIN 371, 374, 376	
 VTSP075	X		X		X		M3-M20	WU41EG, WU40EG		X		plug	B	0°	JIS	
 VTSP054	X		X		X		#4-5/8"	WP49EG		X		plug	—	0°	Extend 6"	
 VTSP054	X		X		X		#4-1/4"	WP49EG		X		plug	—	0°	Extend 4"	
 5301/2301	X		X		X		#0-3/4"	TiCN, TiN, Oxide, Uncoated			X	plug	—	0°	ANSI 302	
 5301F	X		X		X		1/4-1"	Uncoated			X	plug	—	0°	ANSI 302	
 5301	X		X		X		#6-3/8"	Uncoated			X	plug	—	0°	Extend 6"	
 5601	X		X		X		#6-3/4"	Oxide/ Nitride			X	plug	—	0°	ANSI 302	
 5302		X	X		X		#0-5/16"	Uncoated			X	bottoming	—	0°	ANSI 302	
 5351/2351	X		X		X		M2-M18	TiCN, TiN, Uncoated			X	plug	—	0°	ANSI 302	
 7301	X		X		X		#4-3/4"	Uncoated			X	plug	—	0°	ANSI 302	













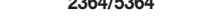

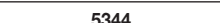

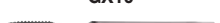











	P				M	K		N			S				H		page(s)	recommended cutting parameters
	1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
	Steel <35 HRC	Steel >36-48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49-55 HRC	Hardened Steels 56-68 HRC		
<b>Spiral-Point and Left-Hand Spiral-Flute Taps (continued)</b>																		
	★★	★	★		★★	★	★★	★	★★	★★	★						W29	W220
	★★	★	★		★★	★	★★	★	★★	★★	★						W32	W219
	★★	★	★		★★	★	★★	★	★★	★★	★						W34	W219
	★★	★	★		★★	★	★★	★	★★	★★	★						W35	W219
	★★	★	★		★★	★	★★	★	★★	★★	★						W36	W219
	★★	★	★		★★	★	★★	★	★★	★★	★						W39	W219
	★★	★	★		★★	★	★★	★	★★	★★	★						W41	W220
	★★	★	★		★★	★	★★	★	★★	★★	★						W40	W220
	★		★		★		★	★	★	★							W42	—
	★		★		★		★	★	★	★							W45	—
	★		★		★		★	★	★	★							W46	—
	★		★		★		★	★	★	★							W47	—
	★		★		★		★	★	★	★							W48	—
	★		★		★		★	★	★	★							W49	—
	★	★	★	★	★	★	★	★	★	★							W50	—

series	hole		thread		coolant		size range	grade/ coating	material				chamfer		helix angle	dimension	
	through	blind	cutting	forming	flood	through			carbide	HSS-E-PM	HSS-E	HSS	type	form			
																	
<b>Spiral-Flute Taps</b>																	
 GT30		X	X		X		#2-1"	GP6520, GM6515, GP6505		X				semi-bottom	C	45°	ANSI 302A
 GT30		X	X		X		#6-1/2"	GP6520		X				semi-bottom	C	45°	DIN/ANSI
 GT30		X	X		X		M3-M42	GP6520, GM6515, GP6505		X				semi-bottom	C	45°	DIN 371, 374, 376
 GT30		X	X		X		M24-M42	GP6520		X				semi-bottom	C	45°	DIN 376, XL
 GT30		X	X		X		M3-M16	GP6520, GM6515		X				semi-bottom	C	45°	ANSI 302A
 GT31		X	X			X	1/4-1/2"	GP6520		X				semi-bottom	C	45°	DIN/ANSI
 GT31		X	X			X	M5-M42	GP6520, GM6515		X				semi-bottom	C	45°	DIN 371, 376
 GT31		X	X			X	M24-M42	GP6520		X				semi-bottom	C	45°	DIN 376, XL
 GT32		X	X		X		M5-M16	GP6520		X				bottoming	E	45°	DIN 371, 374, 376
 GT33		X	X			X	M5-M16	GP6520		X				bottoming	E	45°	DIN 371, 374, 376
 GT50		X	X		X		M24-M42	GP6520		X				semi-bottom	C	15°	DIN 376, XL
 GT51		X	X			X	M24-M42	GP6520		X				semi-bottom	C	15°	DIN 376, XL
 GT12		X	X		X		M3-M20	WS32MG		X				semi-bottom	C	10°	DIN 371, 376
 GT92		X	X		X		#2-3/4"	WU32MG, WS39MG		X				3-4 pitches	—	11°	ANSI 302A
 GT92		X	X		X		M2.5-M12	WU32MG, WS39MG		X				3-4 pitches	—	11°	ANSI 302A
 GT94		X	X		X		#4-5/8"	WU32MG, WS39MG		X				bottom	E	11°	ANSI 302A
 GT16		X	X		X		M3-M12	WN35MG		X				semi-bottom	C	30°	DIN 371
 GT62		X	X		X		#2-1"	WS30MG, WS34MG		X				semi-bottom	C	10°	ANSI 302A
 GT62		X	X		X		M2.5-M12	WS30MG, WS34MG		X				semi-bottom	C	10°	ANSI 302A









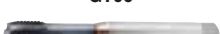
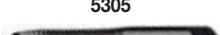
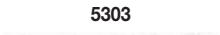
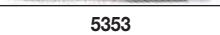
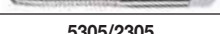



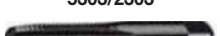
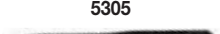

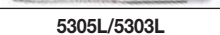
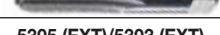





P		M	K		N			S				H		page(s)	recommended cutting parameters	
1, 2, 3, 4, 6, 7	5, 9, 10, 11	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2			
Steel <35 HRC	Steel >36-48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49-55 HRC	Hardened Steels 56-68 HRC	
<b>Spiral-Flute Taps (continued)</b>																
***		***		***		**	*	*		**					W54	W218
***		***		***		**	*	*		**					W56	W218
***		***		***		**	*	*		**					W58	W217
***		***		***		**	*	*		**					W59	W217
***		***		***		**	*	*		**					W57	W217
***		***		***		**	*	*		**					W60	W218
***		***		***		**	*	*		**					W61	W217
***		***		***		**	*	*		**					W62	W217
***		***		***		**	*	*		**					W63	W217
***		***		***		**	*	*		**					W64	W217
***		***				**									W65	W217
***		***				**									W67	W217
											***	***			W69	W217
											***	***			W70	W218
											***	***			W72	W217
											***	***			W73	W218
												***			W75	W217
												***			W76	W218
												***			W78	W217

series	hole		thread		coolant		size range	grade/ coating	material			chamfer		helix angle	dimension	
	through	blind	cutting	forming	flood	through			carbide	HSS-E-PM	HSS-E	HSS	type			form
																
<b>Spiral-Flute Taps (continued)</b>																
 GT80		X	X		X		M3-M20	WN48EG			X		semi-bottom	C	45°	DIN 371, 376
 GT82		X	X		X		#2-1/2"	WN44EG			X		semi-bottom	C	45°	DIN/ANSI
 GT82		X	X		X		M3-M12	WN44EG			X		semi-bottom	C	45°	DIN/ANSI
 GT86		X	X		X		#2-1/2"	WN44EG			X		semi-bottom	C	25°	DIN/ANSI
 GT86		X	X		X		M3-M12	WN44EG			X		semi-bottom	C	25°	DIN/ANSI
 GT02		X	X		X		M3-M20	WP31MG		X			semi-bottom	C	25°	DIN 371, 374, 376
 GT04		X	X		X		M3-M20	WH36MG		X			semi-bottom	C	42°	DIN 371, 374, 376
 VTSFT50		X	X		X		#2-2"	WP42EG, WP49EG, WU41EG, WU40EG			X		semi-bottom	C	45°	ANSI 302A
 VTSFT51		X	X		X		#4-3/4"	WP49EG			X		bottoming	E	45°	ANSI 302A
 VTSFT90		X	X		X		#4-3/4"	WP42EG, WP49EG			X		semi-bottom	C	45°	DIN/ANSI
 VTSFT97		X	X			X	1/4-1"	WP42EG			X		semi-bottom	C	45°	DIN/ANSI
 VTSFT60		X	X		X		#4-1"	WU41EG, WP49EG			X		semi-bottom	C	45°	DIN 371, 376
 VTSFT55		X	X		X		M3-M30	WP42EG, WP49EG, WU41EG, WU40EG			X		semi-bottom	C	45°	ANSI 302A
 VTSFT55		X	X		X		M3-M18	WP49EG			X		bottoming	E	45°	ANSI 302A
 VTSFT65		X	X		X		M2-M33	WP42EG, WP49EG, WU41EG, WU40EG			X		semi-bottom	C	45°	DIN 371, 374, 376
 VTSFT65		X	X		X		M3-M20	WP42EG, WP49EG			X		bottoming	E	45°	DIN 371, 374, 376
 VTSFT95		X	X		X		M3-M20	WP42EG, WP49EG			X		semi-bottom	C	45°	DIN/ANSI
 VTSFT99		X	X			X	M6-M20	WP42EG			X		semi-bottom	C	45°	DIN/ANSI
 VTSFT75		X	X		X		M3-M20	WU41EG, WU40EG			X		semi-bottom	C	45°	JIS
 VTSFT54		X	X		X		#4-5/8"	WP49EG			X		semi-bottom	C	45°	Extend 6"

P				M	K		N			S				H		page(s)	recommended cutting parameters
1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
Steel < 35 HRC	Steel > 36-48 HRC	PH and Ferritic Stainless Steel < 35 HRC	PH and Ferritic Stainless Steel > 35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49-55 HRC	Hardened Steels 56-68 HRC		
<b>Spiral-Flute Taps (continued)</b>																	
							***									W79	W217
							***	**								W80	W218
							***	**								W81	W217
							***	**								W82	W218
							***	**								W83	W217
	**	**	**	*	*	*					*					W84	W217
	**	**	**											***		W85	W217
**	*	*		**	*	**	*	**	**	*						W86	W220
**	*	*		**	*	**	*	**	**	*						W90	W220
**	*	*		**	*	**	*	**	**	*						W92	W220
**	*	*		**	*	**	*	**	**	*						W93	W220
**	*	*		**	*	**	*	**	**	*						W94	W220
**	*	*		**	*	**	*	**	**	*						W97	W219
**	*	*		**	*	**	*	**	**	*						W99	W219
**	*	*		**	*	**	*	**	**	*						W100	W219
**	*	*		**	*	**	*	**	**	*						W102	W219
**	*	*		**	*	**	*	**	**	*						W103	W219
**	*	*		**	*	**	*	**	**	*						W104	W219
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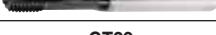

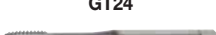
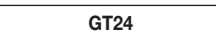







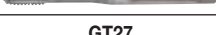

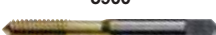

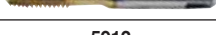

series	hole		thread		coolant		size range min-max	grade/ coating	material			chamfer		helix angle	dimension	
	through	blind	cutting	forming	flood	through			carbide	HSS-E-PM	HSS-E	HSS	type			form
																
<b>Spiral-Flute Taps (continued)</b>																
 VTSFT54		X	X			X	#4-1/4"	WP49EG			X		semi-bottom	C	45°	Extend 4"
 VTSFT54		X	X			X	#4-7/16"	WP49EG			X		bottom	E	45°	Extend 6"
 2314/5314	X		X			X	#4-3/4"	TiN, Uncoated				X	plug	—	45°	ANSI 302A
 2314/5314		X	X			X	#4-3/4"	TiN, Uncoated				X	bottoming	—	45°	ANSI 302A
 2364/5364	X		X			X	M3-M12	TiN, Uncoated				X	plug	—	45°	ANSI 302A
 2364/5364		X	X			X	M3-M12	TiN, Uncoated				X	bottom	—	45°	ANSI 302A
 5344	X		X			X	#10-3/4"	Oxide				X	plug	—	45°	ANSI 302A
 5344		X	X			X	#6-3/4"	Oxide				X	bottom	—	45°	ANSI 302A
<b>Straight-Flute Taps</b>																
 GX10	X	X	X			X	M3-M16	WH16PG	X				semi-bottom	C	0°	DIN 371, 374, 376
 GX35		X	X			X	M6-M16	WK12PG	X				bottoming	E	0°	HA6535
 GX35		X	X			X	M6-M14	WK12PG	X				bottoming	E	0°	DIN 371, 374, 376
 GX47		X	X			X	M6-M10	WN14PG	X				bottoming	E	0°	DIN 371
 GX47		X	X			X	M6-M16	WN14PG	X				bottoming	E	0°	HA6535
 GX50		X	X			X	M4-M14	WK12PG	X				semi-bottom	C	0°	DIN 371, DIN 376
 GT40	X	X	X			X	#10-3/4"	GP6520		X			semi-bottom	C	0°	ANSI 302A
 GT40	X	X	X			X	#6-1/2"	GP6520		X			semi-bottom	C	0°	DIN/ANSI
 GT40	X	X	X			X	M3-M16	GP6520		X			semi-bottom	C	0°	ANSI 302A
 GT40	X	X	X			X	M4-M22	GP6520		X			semi-bottom	C	0°	DIN 371, 376
 GT41	X	X	X			X	1/4-1/2"	GP6520		X			semi-bottom	C	0°	DIN/ANSI
 GT41	X	X	X			X	M4-M20	GP6520		X			semi-bottom	C	0°	DIN 371, 374, 376

P				M	K		N			S				H		page(s)	recommended cutting parameters
1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
Steel < 35 HRC	Steel > 36-48 HRC	PH and Ferritic Stainless Steel < 35 HRC	PH and Ferritic Stainless Steel > 35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49-55 HRC	Hardened Steels 56-68 HRC		
<b>Spiral-Flute Taps (continued)</b>																	
★★	★	★		★★	★	★★	★	★★	★★	★						W107	W220
★★	★	★		★★	★	★★	★	★★	★★	★						W108	W220
★		★		★		★	★	★	★							W109	—
★		★		★		★	★	★	★							W110	—
★		★		★		★	★	★	★							W111	—
★		★		★		★	★	★	★							W112	—
★		★		★		★	★	★	★							W113	—
★		★		★		★	★	★	★							W114	—
<b>Straight-Flute Taps (continued)</b>																	
														★★★		W118	W216
					★★★	★★★										W119	W216
					★★★	★★★										W120	W216
								★★★								W121	W216
								★★★								W122	W216
					★★★	★★★										W123	W216
					★★★	★★★		★★★	★★							W124	W218
					★★★	★★★		★★★	★★							W125	W218
					★★★	★★★		★★★	★★							W126	W217
					★★★	★★★		★★★	★★							W127	W217
					★★★	★★★		★★★	★★							W128	W218
					★★★	★★★		★★★	★★							W129	W217















series	hole		thread		coolant		size range min-max	grade/ coating	material			chamfer		helix angle	dimension	
	through	blind	cutting	forming	flood	through			carbide	HSS-E-PM	HSS-E	HSS	type			form
																
<b>Straight-Flute Taps (continued)</b>																
 GT42		X	X		X		M5-M20	GP6520		X			bottoming	E	0°	DIN 371, 374, 376
 GT43		X	X			X	M5-M20	GP6520		X			bottoming	E	0°	DIN 371, 374, 376
 GT06	X	X	X		X		M6-M16	WS32MG		X			semi-bottom	C	0°	DIN 371, 374, 376
 5305	X		X		X		#0-12	Oxide, Uncoated				X	taper	—	0°	ANSI 302
 5303	X		X		X		1/4-1-1/2"	Oxide, Uncoated				X	taper	—	0°	ANSI 302
 5353	X		X		X		M2-M36	Uncoated				X	taper	—	0°	ANSI 302
 5305/2305	X		X		X		#0-12	TiCN, TiN, Oxide, Uncoated				X	plug	—	0°	ANSI 302
 5303/2303	X		X		X		1/4-1-1/2"	TiCN, TiN, Oxide, Uncoated				X	plug	—	0°	ANSI 302
 5305/2305		X	X		X		#0-12	TiCN, TiN, Oxide, Uncoated				X	bottom	—	0°	ANSI 302
 5303/2303		X	X		X		1/4-1-1/2"	TiCN, TiN, Oxide, Uncoated				X	bottom	—	0°	ANSI 302
 5305	X	X	X		X		#0-12	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302
 5303	X	X	X		X		1/4-1-1/2"	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302
 5305L/5303L	X	X	X		X		1/4-3/4"	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302
 5305 (EXT)/5303 (EXT)	X	X	X		X		#6-3/8"	Uncoated				X	bottoming	—	0°	ANSI 302
 5353	X		X		X		M1.6-M36	TiCN, TiN, Uncoated				X	plug	—	0°	ANSI 302
 5353	X	X	X		X		M3-M20	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302
 5353		X	X		X		M3-M36	TiCN, TiN, Uncoated				X	bottoming	—	0°	ANSI 302
 7305	X	X	X		X		#4-12	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302
 7303	X	X	X		X		1/4-1-1/2"	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302
 7353	X	X	X		X		M6-M24	Uncoated				X	taper, plug, & bottoming	—	0°	ANSI 302



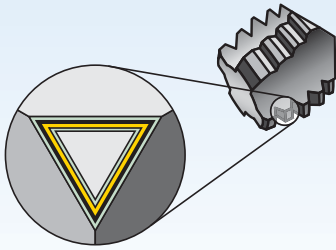
P				M	K		N			S				H		page(s)	recommended cutting parameters
1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
Steel < 35 HRC	Steel > 36-48 HRC	PH and Ferritic Stainless Steel < 35 HRC	PH and Ferritic Stainless Steel > 35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49-55 HRC	Hardened Steels 56-68 HRC		
<b>Straight-Flute Taps (continued)</b>																	
					★ ★ ★	★ ★ ★		★ ★ ★	★ ★							W130	W217
					★ ★ ★	★ ★ ★		★ ★ ★	★ ★							W131	W217
														★ ★ ★		W132	W217
★		★		★	★	★	★	★	★							W133	—
★		★		★	★	★	★	★	★							W134	—
★		★		★	★	★	★	★	★							W136	—
★		★		★	★	★	★	★	★							W137	—
★		★		★	★	★	★	★	★							W139	—
★		★		★	★	★	★	★	★							W142	—
★		★		★	★	★	★	★	★							W144	—
★		★		★	★	★	★	★	★							W146	—
★		★		★	★	★	★	★	★							W147	—
★	★	★	★	★	★	★	★	★	★							W149	—
★	★	★	★	★	★	★	★	★	★							W150	—
★		★		★	★	★	★	★	★							W151	—
★		★		★	★	★	★	★	★							W153	—
★		★		★	★	★	★	★	★							W152	—
★	★	★	★	★	★	★	★	★	★							W154	—
★	★	★	★	★	★	★	★	★	★							W155	—
★	★	★	★	★	★	★	★	★	★							W156	—

series	hole		thread		coolant		size range	grade/ coating	material			chamfer		helix angle	dimension	
	through	blind	cutting	forming	flood	through			carbide	HSS-E-PM	HSS-E	HSS	type			form
																
<b>Form Taps</b>																
 GX49		X		X		X	M6-M10	WN14PG	X				bottoming	E	—	DIN 374
 GX49		X		X		X	M6-M12	WN14PG	X				bottoming	E	—	HA6535
 GT22	X	X		X	X		M3-M16	WP31MG, WN38MG	X				semi-bottom	C	—	DIN 2174
 GT23	X	X		X		X	M5-M16	WP31MG, WN38MG	X				semi-bottom	C	—	DIN 2174
 GT24	X	X		X	X		#6-3/4"	WU32MG	X				semi-bottom	C	—	DIN/ANSI
 GT24	X	X		X	X		M3-M16	WU32MG	X				semi-bottom	C	—	DIN/ANSI
 GT25	X	X		X		X	1/4-3/4"	WU32MG	X				semi-bottom	C	—	DIN/ANSI
 GT25	X	X		X		X	M6-M16	WU32MG	X				semi-bottom	C	—	DIN/ANSI
 GT26		X		X	X		#0-3/4"	WU32MG	X				bottom	E	—	DIN/ANSI
 GT26		X		X	X		M3-M16	WU32MG	X				bottom	E	—	DIN/ANSI
 GT27		X		X		X	1/4-3/4"	WU32MG	X				bottom	E	—	DIN/ANSI
 GT27		X		X		X	M6-M16	WU32MG	X				bottom	E	—	DIN/ANSI
 5900	X			X	X		#6-1/2"	TiCN, TiN, Uncoated			X		plug	D	—	ANSI 302A
 5910	X			X	X		M6-M10	TiCN, TiN, Uncoated			X		plug	D	—	ANSI 302A
 5912		X		X	X		M4-M12	TiCN, TiN, Uncoated			X		bottoming	E	—	ANSI 302A
 5902		X		X	X		#6-1/2"	TiCN, TiN, Uncoated			X		bottoming	E	—	ANSI 302A
 2500/5500	X			X	X		#4-3/4"	TiN, Uncoated			X		plug	D	—	ANSI 302A
 2502/5502		X		X	X		#0-5/8"	TiCN, TiN, Uncoated			X		bottoming	E	—	ANSI 302A
 2510/5510	X			X	X		M3-M12	TiN, Uncoated			X		plug	D	—	ANSI 302A
 2512/5512		X		X	X		M3-M12	TiCN, TiN, Uncoated			X		bottoming	E	—	ANSI 302A

P				M	K		N			S				H		page(s)	recommended cutting parameters
1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
Steel < 35 HRC	Steel > 36-48 HRC	PH and Ferritic Stainless Steel < 35 HRC	PH and Ferritic Stainless Steel > 35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49-55 HRC	Hardened Steels 56-68 HRC		
<b>Form Taps (continued)</b>																	
							★★★	★★								W160	W216
							★★★	★★								W161	W216
	★★★						★★★	★★								W162	W217
	★★★						★★★	★★								W163	W217
	★★★			★★												W164	W218
	★★★			★★												W166	W217
	★★★			★★												W167	W218
	★★★			★★												W168	W217
	★★★			★★												W169	W218
	★★★			★★												W171	W217
	★★★			★★												W172	W218
	★★★			★★												W173	W217
	★			★			★	★	★							W174	—
	★			★			★	★	★							W175	—
	★			★			★	★	★							W176	—
	★			★			★	★	★							W177	—
	★			★			★	★	★							W178	—
	★			★			★	★	★							W179	—
	★			★			★	★	★							W181	—
	★			★			★	★	★							W182	—

series	hole		thread		coolant		size range min-max	grade/ coating	material			chamfer		helix angle	dimension	
	through	blind	cutting	forming	flood	through			carbide	HSS-E-PM	HSS-E	HSS	type			form
																
<b>VTSFT80</b> 	X	X	X		X		1/16-1"	WU40EG, WP49EG, WU41EG		X		standard	—	—	ANSI	
<b>VTSTR</b> 	X	X	X		X		1/8-3/4"	WU40EG		X		standard	—	—	ANSI	
<b>2320/5320</b> 	X	X	X		X		1/16-2"	TiN, Oxide, Uncoated			X	standard	—	—	ANSI	
<b>5319</b> 	X	X	X		X		#1/8-2"	Oxide, Uncoated			X	standard	—	—	ANSI	
<b>5321</b> 	X	X	X		X		1/8-1/2"	Uncoated			X	standard	—	—	ANSI	
<b>5820</b> 	X	X	X		X		1/4-1"	Uncoated			X	standard	—	—	ANSI	
<b>5323</b> 	X	X	X		X		1/8-1"	Uncoated			X	standard	—	—	ANSI	
<b>7320</b> 	X	X	X		X		1/8-2"	Uncoated			X	standard	—	—	ANSI	

	P				M	K		N			S				H		page(s)	recommended cutting parameters
	1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16	17, 18, 19, 20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
	Steel < 35 HRC	Steel > 36-48 HRC	PH and Ferritic Stainless Steel < 35 HRC	PH and Ferritic Stainless Steel > 35 HRC	Stainless Steel	Gray Cast Iron	Ductile Cast Iron	Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49-55 HRC	Hardened Steels 56-68 HRC		
<b>Pipe Taps (continued)</b>																		
	★★	★	★		★★	★	★★	★	★★	★★	★						W186	W220
	★★					★											W187	W220
	★					★	★	★	★	★							W188	—
	★					★	★	★	★	★							W189	—
	★					★	★	★	★	★							W190	—
	★							★	★	★							W191	—
	★				★	★	★	★	★	★							W192	—
	★	★	★	★	★	★	★	★	★	★							W193	—

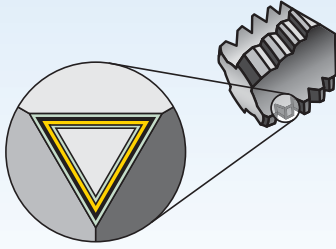


Coatings are designed for optimized tapping performance in specific materials.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Grade	Coating	Grade Description	Material Hardness (HRC)																				
			05	10	15	20	25	30	35	40	45												
WK12PG		PVD coated TiCN and fine grain carbide. Extraordinary wear resistance when tapping cast iron. High-temperature hardness allows long life at up to 4x faster speed than HSS-E-PM taps.																					
			<b>K</b>																				
WN14PG		Coated carbide, PVD two-layer coating over fine-grain carbide. Coating consists of low friction CrC/C over wear-resistant TiN. CrC/C resists galling of non-ferrous materials to the tap. Provides superior performance for tapping cast aluminum and other non-ferrous materials.																					
			<b>N</b>																				
WH16PG		Coated carbide, PVD two-layer coating with heat-resistant TiAlN base layer and low-friction MoS <sub>2</sub> top layer over carbide substrate. Use in hardened steel 55–63 HRC.																					
			<b>H</b>																				
GP6520		Coated HSS-E-PM, PVD heat- and wear-resistant high-vanadium cobalt powder metal HSS substrate coated with wear-resistant TiCN base layer. Use in steel, cast iron, and cast aluminum with silicon.																					
			<b>P</b>																				
			<b>K</b>																				
GM6515		HSS-E-PM, PVD heat- and wear-resistant high-vanadium cobalt powder metal HSS substrate. Coating consists of low-friction CrC/C over wear-resistant TiN base layer. Use for tapping stainless steel and non-ferrous materials.																					
			<b>M</b>																				
			<b>N</b>																				

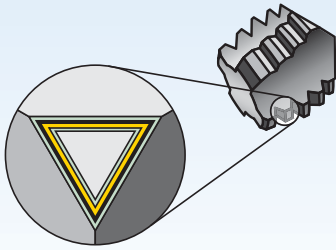


Coatings are designed for optimized tapping performance in specific materials.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← → toughness

Grade	Coating	Grade Description	Performance Chart																				
			05	10	15	20	25	30	35	40	45												
Grade	WS34MG	Coated HSS-E-PM, PVD heat- and wear-resistant high-vanadium, high-cobalt powder metal HSS-E-PM substrate. Coating consists of low-friction CrC/C over wear-resistant TiN base layer. Use for tapping titanium and titanium alloys.								S													
	WS30MG	Surface treated HSS-E-PM: powder metal HSS-E-PM substrate with nitride surface treatment that provides wear resistance in non-ferrous materials including titanium. Limited use. Use for tapping titanium and titanium alloys.																			S		
	WU32MG	Coated HSS-E-PM, PVD heat- and wear-resistant high-vanadium cobalt powder metal HSS substrate coated with wear-resistant TiCN base layer.									S												
	WS39MG	Surface treated HSS-E-PM powder metal HSS-E substrate with oxide/nitride surface treatment that provides wear resistance in nickel alloys.																				S	
	WP31MG	Coated HSS-E-PM, PVD powder metal HSS-E substrate with TiN coating. Use for tapping steel 32–44 HRC and for forming threads in steel up to 32 HRC.																				P	



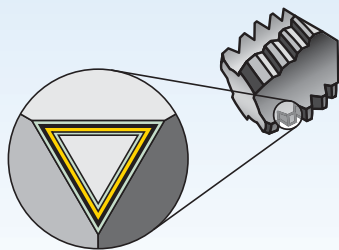
Coatings are designed for optimized tapping performance in specific materials.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

wear resistance ← → toughness

Grade	Coating	Grade Description	Material Hardness (HRC)																						
			05	10	15	20	25	30	35	40	45														
WN32MG		Coated HSS-E-PM, PVD heat- and wear-resistant high-vanadium cobalt powder metal HSS substrate with high-hardness TiCN coating. Use when tapping heat-treated steel 44-55 HRC and cobalt- or nickel-based heat-resistant alloys.																							
WN35MG		Coated HSS-E-PM, PVD powder metal HSS-E substrate with two-layer coating. TiN base layer and DLC top layer that resists galling of non-ferrous materials to the tap. Use for tapping titanium. Not recommended for steel.																							
WN38MG		Coated HSS-E-PM, PVD powder metal HSS-E substrate with DLC coating. Use for form tapping aluminum. Not recommended for steel.																							
WN44EG		High vanadium HSS-E substrate with a coating consists of low friction CrC/C over wear-resistant TiN base layer. Use for tapping stainless steel and non-ferrous materials.																							
WP42EG		Coated HSS-E substrate with TiCN PVD layer. Use in multiple applications, including steel, stainless steel, ductile cast iron, and cast aluminum. WP42EG is more abrasion-resistant than WU41EG.																							





Coatings are designed for optimized tapping performance in specific materials.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

wear resistance ← toughness

Grade	Coating	Grade Description		wear resistance ← toughness																				
				05	10	15	20	25	30	35	40	45												
WU41EG		Coated HSS-E substrate with TiN PVD layer. Use in multiple applications, including steel, stainless steel, ductile cast iron, and cast aluminum.	P																					
			M																					
			K																					
			N																					
			H																					
WP49EG		HSS-E substrate with black oxide surface treatment. Use in a variety of materials, including steel, stainless steel, and ductile iron. Not recommended for non-ferrous materials.	P																					
			M																					
			K																					
			N																					
			H																					
WU40EG		Uncoated HSS-E grade with bright surface. Use in easy-to-machine, general-purpose applications.	P																					
			M																					
			K																					
			N																					
			H																					
WN48EG		Coated HSS-E, PVD lower vanadium HSS-E substrate with DLC coating. Use for tapping non-ferrous materials with low cutting temperatures like wrought aluminum. Not recommended for steel.	P																					
			M																					
			K																					
			N																					
			H																					



## Tapping Portfolio

<b>Spiral-Point and Left-Hand Spiral-Flute Taps .....</b>	<b>W2–W50</b>
High-Performance Victory HSS-E-PM Taps .....	W4–W22
Multipurpose VariTap .....	W23–W41
Production GUN Taps .....	W42–W50
<b>Spiral-Flute Taps .....</b>	<b>W52–W114</b>
High-Performance Victory HSS-E-PM Taps .....	W54–W85
Multipurpose VariTap .....	W86–W105
High-Performance VariTap .....	W106–W108
General Purpose Production Taps .....	W109–W114
<b>Straight-Flute Taps.....</b>	<b>W116–W156</b>
High-Performance Victory Solid Carbide Taps .....	W118–W123
High-Performance Victory HSS-E-PM Taps .....	W124–W132
Hand Taps/Hand Taps Sets .....	W133–W156
<b>Forming Taps.....</b>	<b>W158–W182</b>
High-Performance Victory Solid Carbide Taps .....	W160–W161
High-Performance Victory HSS-E-PM Taps .....	W162–W173
General Purpose Production Taps .....	W174–W182
<b>Pipe Taps.....</b>	<b>W184–W193</b>
Multipurpose VariTap .....	W186–W187
General Purpose Production Taps .....	W188–W193
<b>Thread Mills.....</b>	<b>W194–W215</b>
<b>High-Performance Taps Application Data .....</b>	<b>W216–W220</b>
<b>Technical Information .....</b>	<b>W221–W249</b>
<b>Lightning Service.....</b>	<b>W250–W297</b>

Solutions for Through Hole Applications •

**WIDIA-GTD™**

# Spiral-Point and Left-Hand Spiral-Flute



WIDIA-GTD™ offers a wide range of options for tapping through holes in:

- Steel and steel alloys.
- Stainless steel.
- Cast iron.
- Wrought and cast aluminum.
- Nickel-based alloys.
- Titanium alloys.

## High-Performance Victory™ HSS-E-PM Taps

- Left-hand spiral flutes to push chips ahead in through holes.
- Offer performance advantages over conventional high-speed steel taps.
- Long tap life at up to 50% higher tapping speed than HSS taps.

## Multipurpose VariTap™

- Unique spiral-point geometry provides low tapping torque while pushing chips ahead of the tap in through holes.
- Manufactured from high-vanadium HSS-E to provide long and consistent tool life.
- Ideal for customers who have a variety of materials to machine.

## General Purpose Production Taps

- Spiral point GUN™ taps shoot chips ahead of the cutting action to reduce overloading and clogging in flutes, protecting the workpiece.
- Extended life in ductile materials.
- Advanced steam oxide finish and PVD coatings available.



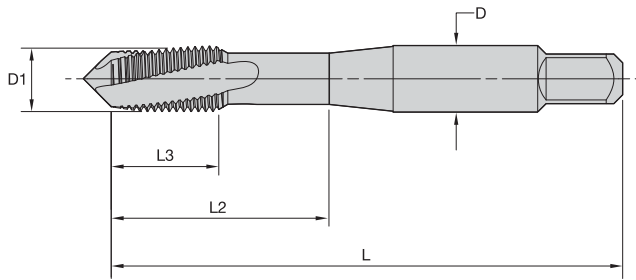
**WIDIA**  
**VICTORY**

# High-Performance Taps

Victory™ Left-Hand Spiral-Flute HSS-E-PM Taps • Through Holes



- GM6515 TiN + CrC/C for stainless steel.
- GP6520 TiCN for steel.

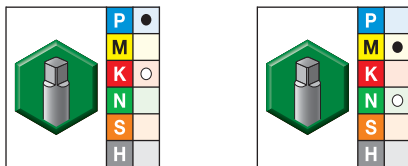


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



## ■ GT20 • Machine Screw and Fractional • Form D Plug Chamfer • ANSI • For Steel and Stainless Steel



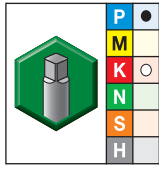
- first choice
- alternate choice

grade GP6520 TiCN		grade GM6515 TiN+CrC/C		inch dimensions					number of flutes	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
3954966	GT205031	3955273	GT205001	2 - 56	1.75	.44	.49	.141	2	2BX
3954967	GT205032	3955274	GT205002	2 - 56	1.75	.44	.49	.141	2	3BX
3954968	GT205033	3955275	GT205003	4 - 40	1.88	.56	.68	.141	2	2BX
3954969	GT205034	3955276	GT205004	4 - 40	1.88	.56	.68	.141	2	3BX
-	-	3955277	GT205005	5 - 40	1.94	.63	.75	.141	2	3BX
3954970	GT205035	-	-	5 - 40	2.37	.63	.75	.141	2	3BX
3954983	GT205037	3955279	GT205007	6 - 32	2.00	.36	.71	.141	2	3BX
3954971	GT205036	3955278	GT205006	6 - 32	2.00	.36	.71	.141	2	2BX
3954985	GT205039	3955281	GT205009	8 - 32	2.13	.31	.76	.168	2	3BX
3954984	GT205038	3955280	GT205008	8 - 32	2.13	.31	.76	.168	2	2BX
3954998	GT205052	3955294	GT205022	8 - 36	2.13	.31	.76	.168	2	3BX
3954986	GT205040	3955282	GT205010	10 - 24	2.38	.47	.91	.194	3	3BX
3954999	GT205053	3955295	GT205023	10 - 32	2.38	.47	.91	.194	3	2BX
3955000	GT205054	3955296	GT205024	10 - 32	2.38	.47	.91	.194	3	3BX
3954987	GT205041	3955283	GT205011	12 - 24	2.38	.42	.96	.220	3	3BX
3954989	GT205043	3955285	GT205013	1/4 - 20	2.50	.44	1.00	.255	3	3BX
3954988	GT205042	3955284	GT205012	1/4 - 20	2.50	.44	1.00	.255	3	2BX
3955001	GT205055	3955297	GT205025	1/4 - 28	2.50	.44	1.00	.255	3	2BX
3955002	GT205056	3955298	GT205026	1/4 - 28	2.50	.44	1.00	.255	3	3BX
3954991	GT205045	3955287	GT205015	5/16 - 18	2.72	.49	1.13	.318	3	3BX
3954990	GT205044	3955286	GT205014	5/16 - 18	2.72	.49	1.13	.318	3	2BX
3955003	GT205057	3955299	GT205027	5/16 - 24	2.72	.49	1.13	.318	3	3BX
3954992	GT205046	3955288	GT205016	3/8 - 16	2.94	.60	1.27	.381	3	2BX
3954993	GT205047	3955289	GT205017	3/8 - 16	2.94	.60	1.27	.381	3	3BX

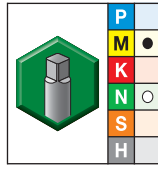
(continued)



(GT20 • Machine Screw and Fractional • Form D Plug Chamfer • ANSI • For Steel and Stainless Steel — continued)



grade GP6520  
TiCN



grade GM6515  
TiN+CrC/C

● first choice  
○ alternate choice

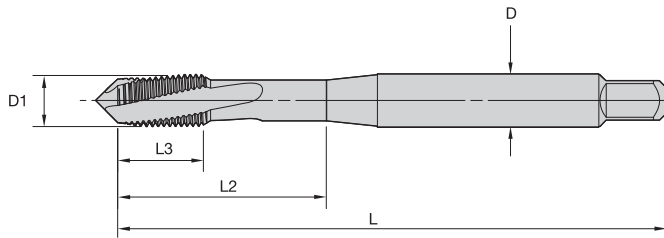
grade GP6520 TiCN		grade GM6515 TiN+CrC/C		inch dimensions					number of flutes	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
3955004	GT205058	3955300	GT205028	3/8 - 24	2.94	.60	1.27	.381	3	3BX
3954994	GT205048	3955290	GT205018	7/16 - 14	3.16	.71	1.49	.323	3	3BX
3955005	GT205059	3955301	GT205029	7/16 - 20	3.16	.71	1.49	.323	3	3BX
3954995	GT205049	3955291	GT205019	1/2 - 13	3.38	.77	1.74	.367	3	3BX
3955006	GT205060	3955302	GT205030	1/2 - 20	3.38	.77	1.74	.367	3	3BX
3954996	GT205050	3955292	GT205020	5/8 - 11	3.81	.91	1.89	.480	4	3BX
3954997	GT205051	3955293	GT205021	3/4 - 10	4.25	1.00	2.08	.590	4	3BX

# High-Performance Taps

Victory™ Left-Hand Spiral-Flute HSS-E-PM Taps • Through Holes



- GP6520 TiCN for steel.

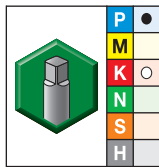


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



■ GT20 • Machine Screw and Fractional • Form D Plug Chamfer • DIN Length ANSI Shank • For Steel



- first choice
- alternate choice

grade GP6520  
TiCN

inch dimensions

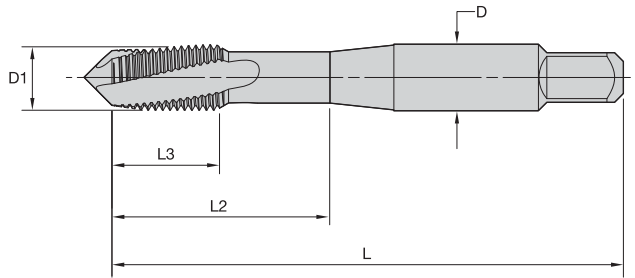
order #	catalog #	D1 TPI	L	L3	L2	D	number of flutes	class of fit
4176835	GT205131	6 - 32	2.20	.40	.79	.141	2	2BX
4176854	GT205140	6 - 40	2.20	.39	.79	.141	2	2BX
4176836	GT205132	8 - 32	2.48	.39	.83	.168	2	2BX
4176837	GT205133	10 - 24	2.76	.39	.98	.194	3	2BX
4176856	GT205142	10 - 32	2.76	.40	.98	.194	3	2BX
4176839	GT205135	1/4 - 20	3.15	.51	1.18	.255	3	3BX
4176858	GT205144	1/4 - 28	3.15	.51	1.18	.255	3	3BX
4176840	GT205136	5/16 - 18	3.54	.55	1.38	.318	3	3BX
4176859	GT205145	5/16 - 24	3.54	.55	1.38	.318	3	3BX
4176841	GT205137	3/8 - 16	3.94	.63	1.53	.381	3	3BX
4176860	GT205146	3/8 - 24	3.94	.63	1.53	.381	3	3BX
4176842	GT205138	7/16 - 14	3.94	.71	1.61	.323	3	3BX
4176861	GT205147	7/16 - 20	3.94	.71	1.61	.323	3	3BX
4176853	GT205139	1/2 - 13	4.33	.79	1.85	.367	3	3BX
4176862	GT205148	1/2 - 20	4.33	.79	1.85	.367	3	3BX

High-Performance Taps





- GM6515 TiN + CrC/C for stainless steel.
- GP6520 TiCN for steel.

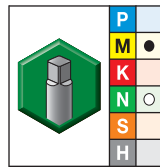
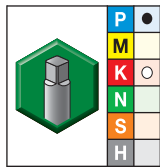


Shank Tolerance

D inch	tolerance h6
0.118–0.236	+0, -.0003
>0.236–0.394	+0, -.0004
>0.394–0.709	+0, -.0004
>0.709–1.181	+0, -.0005
>1.181–1.969	+0, -.0006



■ GT20 • Form D Plug Chamfer • Metric ANSI • For Steel and Stainless Steel



- first choice
- alternate choice

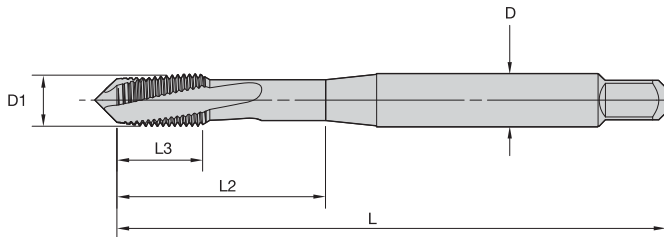
grade GP6520 TiCN		grade GM6515 TiN+CrC/C		inch dimensions					number of flutes	class of fit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
3955018	GT205069	3955010	GT205061	M3 X 0,5	1.94	.63	.75	.141	2	6HX
3955019	GT205070	3955011	GT205062	M4 X 0,7	2.13	.32	.76	.168	2	6HX
3955020	GT205071	3955012	GT205063	M5 X 0,8	2.38	.47	.91	.194	2	6HX
3955021	GT205072	3955013	GT205064	M6 X 1	2.50	.46	1.01	.255	3	6HX
3955043	GT205073	3955014	GT205065	M8 X 1	2.72	.48	1.12	.318	3	6HX
3955044	GT205074	3955015	GT205066	M8 X 1,25	2.72	.48	1.12	.318	3	6HX
3955045	GT205075	3955016	GT205067	M10 X 1,5	2.94	.53	1.26	.381	3	6HX
3955046	GT205076	3955017	GT205068	M12 X 1,75	3.38	.77	1.74	.367	3	6HX

# High-Performance Taps

Victory™ Left-Hand Spiral-Flute HSS-E-PM Taps • Through Holes



- GM6515 TiN + CrC/C for stainless steel.
- GP6520 TiCN for steel.

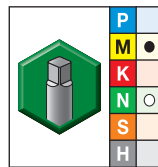
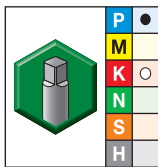


Shank Tolerance

D mm	tolerance h6
>3-6	+0, -0,008
>6-10	+0, -0,009
>10-18	+0, -0,011
>18-30	+0, -0,013
>30-50	+0, -0,016



## GT20 • Form D Plug Chamfer • Metric DIN 371, 374, and 376 • For Steel and Stainless Steel



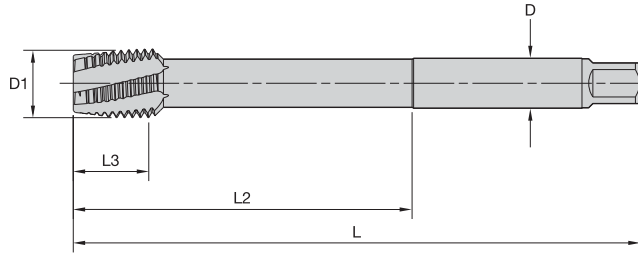
- first choice
- alternate choice

grade GP6520 TiCN		grade GM6515 TiN+CrC/C		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
3955084	GT205094	3955047	GT205077	M3 X 0,5	56	8	18	3,5	2	DIN 371	6HX
3955085	GT205095	3955048	GT205078	M4 X 0,7	63	10	21	4,5	2	DIN 371	6HX
3955086	GT205096	3955049	GT205079	M5 X 0,8	70	10	25	6,0	2	DIN 371	6HX
3955087	GT205097	3955050	GT205080	M6 X 1	80	10	30	6,0	3	DIN 371	6HX
3955124	GT205104	3955077	GT205087	M8 X 1	90	13	35	6,0	3	DIN 374	6HX
3955088	GT205098	3955051	GT205081	M8 X 1,25	90	13	35	8,0	3	DIN 371	6HX
3955125	GT205105	3955078	GT205088	M10 X 1	90	10	35	7,0	3	DIN 374	6HX
3955126	GT205106	3955079	GT205089	M10 X 1,25	100	15	39	7,0	3	DIN 374	6HX
3955089	GT205099	3955052	GT205082	M10 X 1,5	100	15	39	10,0	3	DIN 371	6HX
3955127	GT205107	3955080	GT205090	M12 X 1,5	100	15	39	9,0	3	DIN 374	6HX
3955090	GT205100	3955073	GT205083	M12 X 1,75	110	18	44	9,0	3	DIN 376	6HX
3955128	GT205108	3955081	GT205091	M14 X 1,5	100	15	47	11,0	4	DIN 374	6HX
3955091	GT205101	3955074	GT205084	M14 X 2	110	20	52	11,0	4	DIN 376	6HX
3955129	GT205109	3955082	GT205092	M16 X 1,5	100	15	46	12,0	4	DIN 374	6HX
3955092	GT205102	3955075	GT205085	M16 X 2	110	20	51	12,0	4	DIN 376	6HX
3955130	GT205110	3955083	GT205093	M18 X 1,5	110	15	50	14,0	4	DIN 374	6HX
3955123	GT205103	3955076	GT205086	M20 X 2,5	140	25	64	16,0	4	DIN 376	6HX
4033723	GT205111	-	-	M24 X 3	160	30	77	18,0	5	DIN 376	6HX
4033725	GT205113	-	-	M30 X 3,5	180	35	91	22,0	5	DIN 376	6HX
4033726	GT205114	-	-	M33 X 3,5	180	35	100	25,0	5	DIN 376	6HX
4033728	GT205116	-	-	M36 X 4	200	40	110	28,0	6	DIN 376	6HX
4033730	GT205118	-	-	M42 X 4,5	200	45	120	32,0	6	DIN 376	6HX

High-Performance Taps



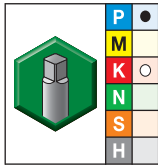
- GP6520 TiCN for steel and cast iron.



Shank Tolerance	
D mm	tolerance h6
12-18	+0, -0,011
20-30	+0, -0,013
32-36	+0, -0,016



- GT20 • Form D Plug Chamfer • Larger Sizes • Metric Extra Long • For Steel and Cast Iron



- first choice
- alternate choice

grade GP6520 TiCN		metric dimensions					number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	D		
4033765	GT205122	M24 X 3	200	30	120	18,0	5	6HX
4033767	GT205124	M30 X 3,5	250	35	150	22,0	5	6HX
4033768	GT205125	M33 X 3,5	250	35	150	25,0	5	6HX
4033770	GT205127	M36 X 4	250	40	150	28,0	6	6HX
4033772	GT205129	M42 X 4,5	300	45	180	32,0	6	6HX

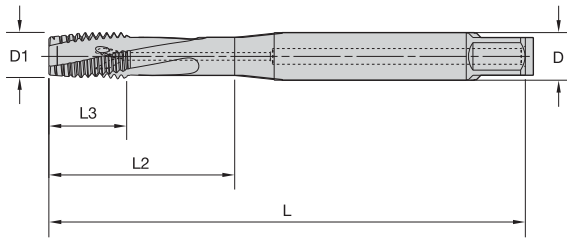
High-Performance Taps

# High-Performance Taps

Victory™ Left-Hand Spiral-Flute HSS-E-PM Taps • Through Holes



- GM6515 TiN + CrC/C for stainless steel.
- GP6520 TiCN for steel.

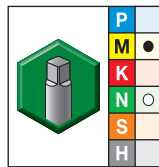
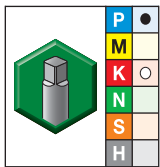


Shank Tolerance

D mm	tolerance h6
>3-6	+0, -0,008
>6-10	+0, -0,009
>10-18	+0, -0,011
>18-30	+0, -0,013
>30-50	+0, -0,016



■ GT21 • Form D Plug Chamfer • Through Coolant • Metric DIN 371 and 376 • For Steel and Stainless Steel



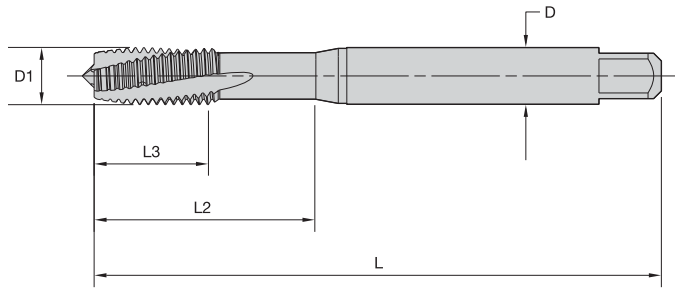
- first choice
- alternate choice

grade GP6520 TiCN		grade GM6515 TiN+CrC/C		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
3955054	GT215007	3955038	GT215001	M5 X 0,8	70	10	25	6,0	2	DIN 371	6HX
3955055	GT215008	3955039	GT215002	M6 X 1	80	10	30	6,0	3	DIN 371	6HX
3955056	GT215009	3955040	GT215003	M8 X 1,25	90	13	35	8,0	3	DIN 371	6HX
3955057	GT215010	3955041	GT215004	M10 X 1,5	100	15	39	10,0	3	DIN 371	6HX
3955058	GT215011	3955042	GT215005	M12 X 1,75	110	18	44	9,0	3	DIN 376	6HX
3955059	GT215012	3955053	GT215006	M14 X 2	110	20	52	11,0	4	DIN 376	6HX

High-Performance Taps



- WS32MG TiCN for nickel and nickel alloys.

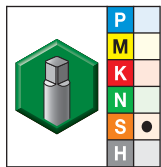


Shank Tolerance

D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052



■ GT10 • Form D Plug Chamfer • Metric DIN 371 and 376 • For Nickel and Nickel Alloys



- first choice
- alternate choice

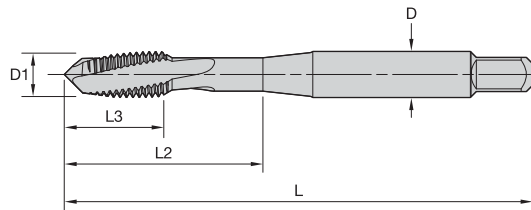
order #	catalog #	grade WS32MG TiCN	metric dimensions				number of flutes	dimension standard	class of fit
			D1 size	L	L3	L2			
4160100	GT105001	M3 X 0,5	56	11	18	3,5	2	DIN 371	6HX
4160101	GT105002	M4 X 0,7	63	13	21	4,5	3	DIN 371	6HX
4160102	GT105003	M5 X 0,8	70	15	25	6,0	3	DIN 371	6HX
4160103	GT105004	M6 X 1	80	17	30	6,0	3	DIN 371	6HX
4160104	GT105005	M8 X 1,25	90	20	35	8,0	3	DIN 371	6HX
4160105	GT105006	M10 X 1,5	100	22	39	10,0	3	DIN 371	6HX
4160106	GT105007	M12 X 1,75	110	24	—	9,0	3	DIN 376	6HX
4160107	GT105008	M14 X 2	110	26	—	11,0	3	DIN 376	6HX
4160108	GT105009	M16 X 2	110	27	—	12,0	3	DIN 376	6HX
4160109	GT105010	M20 X 2,5	140	32	—	16,0	3	DIN 376	6HX

# High-Performance Taps

Victory™ Left-Hand Spiral-Flute HSS-E-PM • Through Holes



- WS39MG oxide/nitride for nickel- and cobalt-based alloys.
- WU32MG TiCN for nickel- and cobalt-based alloys.

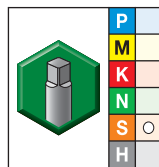
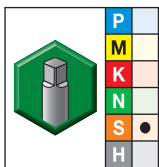


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



## ■ GT90 • Machine Screw and Fractional • Form D Plug Chamfer • For Nickel- and Cobalt-Based Alloys



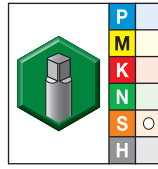
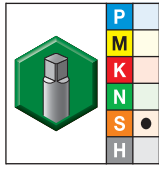
- first choice
- alternate choice

grade WU32MG TiCN		grade WS39MG Nitride/Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5705547	GT905067	5705546	GT905001	2 - 56	1.75	.44	.50	.141	2	H2
5705055	GT905068	5705548	GT905002	4 - 40	1.88	.56	.69	.141	2	H2
5705550	GT905069	5705549	GT905003	4 - 40	1.88	.56	.69	.141	2	H3
5705552	GT905070	5705551	GT905004	4 - 40	1.88	.56	.69	.141	2	H4
5705554	GT905071	5705553	GT905005	4 - 48	1.88	.56	.69	.141	2	H2
5705556	GT905072	5705555	GT905006	5 - 40	1.94	.63	.75	.141	3	H2
5705558	GT905073	5705557	GT905007	6 - 32	2.00	.36	.72	.141	3	H2
5705025	GT905074	5705559	GT905008	6 - 32	2.00	.36	.72	.141	3	H3
-		5705560	GT905009	6 - 32	2.00	.36	.72	.141	3	H4
5705562	GT905076	5705561	GT905010	6 - 32	2.00	.36	.72	.141	3	H5
-		5705563	GT905011	6 - 32	2.00	.36	.72	.141	3	H7
5705565	GT905078	5705564	GT905012	6 - 40	2.00	.36	.72	.141	3	H2
5705567	GT905079	5705566	GT905013	8 - 32	2.13	.31	.77	.168	3	H2
5705024	GT905080	5705568	GT905014	8 - 32	2.13	.31	.77	.168	3	H3
5705570	GT905081	5705569	GT905015	8 - 32	2.13	.31	.77	.168	3	H4
5705572	GT905082	5705571	GT905016	8 - 32	2.13	.31	.77	.168	3	H5
-		5705573	GT905017	8 - 32	2.13	.31	.77	.168	3	H6
-		5705574	GT905018	8 - 32	2.13	.31	.77	.168	3	H7
5705501	GT905085	5705059	GT905019	10 - 24	2.38	.47	.92	.194	3	H3
5705503	GT905086	5705502	GT905020	10 - 24	2.38	.47	.92	.194	3	H5
-		5705504	GT905021	10 - 24	2.38	.47	.92	.194	3	H7
5705506	GT905088	5705505	GT905022	10 - 32	2.38	.47	.92	.194	3	H2
5705058	GT905089	5705507	GT905023	10 - 32	2.38	.47	.92	.194	3	H3
5705509	GT905090	5705508	GT905024	10 - 32	2.38	.47	.92	.194	3	H4

(continued)



(GT90 • Machine Screw and Fractional • Form D Plug Chamfer • For Nickel- and Cobalt-Based Alloys — continued)



- first choice
- alternate choice

grade WU32MG TiCN		grade WS39MG Nitride/Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5705541	GT905091	5705540	GT905025	10 - 32	2.38	.47	.92	.194	3	H5
5705543	GT905092	5705542	GT905026	10 - 32	2.38	.47	.92	.194	3	H6
5705545	GT905093	5705544	GT905027	10 - 32	2.38	.47	.92	.194	3	H7
5705062	GT905094	5705584	GT905028	1/4 - 20	2.51	.44	1.02	.255	3	H3
5705586	GT905095	5705585	GT905029	1/4 - 20	2.51	.44	1.02	.255	3	H5
5705588	GT905096	5705587	GT905030	1/4 - 20	2.51	.44	1.02	.255	3	H7
5705061	GT905097	5705060	GT905031	1/4 - 28	2.51	.44	1.02	.255	3	H3
5705591	GT905098	5705589	GT905032	1/4 - 28	2.51	.44	1.02	.255	3	H4
5705594	GT905099	5705593	GT905033	1/4 - 28	2.49	.44	1.02	.255	3	H5
5705596	GT905100	5705595	GT905034	1/4 - 28	2.51	.44	1.02	.255	3	H6
5705598	GT905101	5705597	GT905035	1/4 - 28	2.51	.44	1.02	.255	3	H7
5705054	GT905102	5705629	GT905036	5/16 - 18	2.73	.49	1.15	.318	3	H3
5705631	GT905103	5705630	GT905037	5/16 - 18	2.73	.49	1.15	.318	3	H5
5705633	GT905104	5705632	GT905038	5/16 - 18	2.73	.49	1.15	.318	3	H7
5705053	GT905105	5705634	GT905039	5/16 - 24	2.73	.49	1.15	.318	3	H3
5705636	GT905106	5705635	GT905040	5/16 - 24	2.73	.49	1.15	.318	3	H4
5705638	GT905107	5705637	GT905041	5/16 - 24	2.73	.49	1.15	.318	3	H5
5705640	GT905108	5705639	GT905042	5/16 - 24	2.73	.49	1.15	.318	3	H6
5705642	GT905109	5705641	GT905043	5/16 - 24	2.73	.49	1.15	.318	3	H7
5705615	GT905110	5705057	GT905044	3/8 - 16	2.95	.60	1.28	.381	3	H3
5705617	GT905111	5705616	GT905045	3/8 - 16	2.95	.60	1.28	.381	3	H5
5705619	GT905112	5705618	GT905046	3/8 - 16	2.95	.60	1.28	.381	3	H7
5705056	GT905113	5705620	GT905047	3/8 - 24	2.95	.60	1.28	.381	3	H3
5705622	GT905114	5705621	GT905048	3/8 - 24	2.95	.60	1.28	.381	3	H4
5705624	GT905115	5705623	GT905049	3/8 - 24	2.95	.60	1.28	.381	3	H5
5705626	GT905116	5705625	GT905050	3/8 - 24	2.95	.60	1.28	.381	3	H6
5705628	GT905117	5705627	GT905051	3/8 - 24	2.95	.60	1.28	.381	3	H7
5705647	GT905118	5705646	GT905052	7/16 - 14	3.16	.71	1.49	.323	3	H3
-		5705648	GT905053	7/16 - 14	3.16	.71	1.49	.323	3	H5
5705650	GT905120	5705649	GT905054	7/16 - 20	3.16	.71	1.49	.323	3	H3
5705652	GT905121	5705651	GT905055	7/16 - 20	3.16	.71	1.49	.323	3	H5
5705065	GT905122	5705575	GT905056	1/2 - 13	3.38	.77	1.74	.367	3	H3
5705577	GT905123	5705576	GT905057	1/2 - 13	3.38	.77	1.74	.367	3	H5
5705579	GT905124	5705578	GT905058	1/2 - 13	3.38	.77	1.74	.367	3	H7
5705064	GT905125	5705580	GT905059	1/2 - 20	3.38	.77	1.74	.367	3	H3
5705581	GT905126	5705063	GT905060	1/2 - 20	3.38	.77	1.74	.367	3	H5
5705583	GT905127	5705582	GT905061	1/2 - 20	3.38	.77	1.74	.367	3	H7
5705643	GT905128	5705026	GT905062	5/8 - 11	3.81	.91	1.89	.480	3	H3
5705645	GT905129	5705644	GT905063	5/8 - 18	3.81	.91	1.89	.480	3	H3
5705610	GT905130	5705599	GT905064	3/4 - 10	4.25	1.00	2.08	.590	3	H3
5705612	GT905131	5705611	GT905065	3/4 - 10	4.25	1.00	2.08	.590	3	H5
5705614	GT905132	5705613	GT905066	3/4 - 16	4.25	1.00	2.08	.590	3	H3

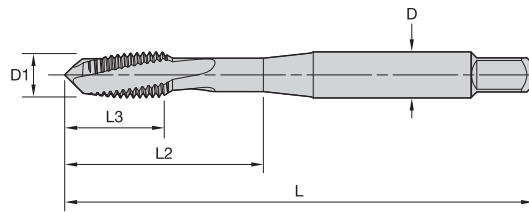
High-Performance Taps

# High-Performance Taps

Victory™ Left-Hand Spiral-Flute HSS-E-PM • Through Holes



- WS39MG oxide/nitride for nickel- and cobalt-based alloys.
- WU32MG TiCN for nickel- and cobalt-based alloys.

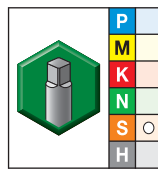
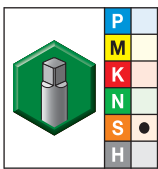


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



## ■ GT90 • Form D Plug Chamfer • Metric ANSI • For Nickel- and Cobalt-Based Alloys



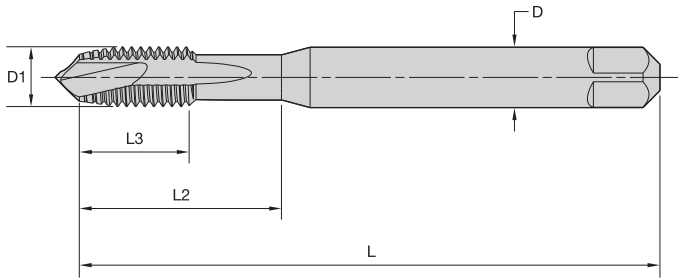
- first choice
- alternate choice

grade WU32MG TiCN		grade WS39MG Nitride/Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5705660	GT905146	5705073	GT905133	M2,5 X 0,45	1.81	.50	.56	.141	2	D3
5705071	GT905147	5705662	GT905134	M3 X 0,5	1.94	.63	.75	.141	3	D3
5705661	GT905148	5705072	GT905135	M3,5 X 0,6	1.99	.36	.72	.141	3	D4
-		5705663	GT905136	M4 X 0,7	2.12	.32	.77	.168	3	D4
5705070	GT905149	-		M4 X 0,7	2.12	.36	.77	.168	3	D4
5705068	GT905150	5705069	GT905137	M5 X 0,8	2.38	.47	.92	.194	3	D4
5705067	GT905151	5705664	GT905138	M6 X 1	2.51	.46	1.01	.255	3	D5
-		5705665	GT905139	M7 X 1	2.73	.52	1.16	.318	3	D5
5705667	GT905153	5705666	GT905140	M8 X 1	2.72	.48	1.14	.318	3	D5
5705066	GT905154	5705668	GT905141	M8 X 1,25	2.72	.48	1.14	.318	3	D5
5705654	GT905155	5705653	GT905142	M10 X 1,25	2.94	.53	1.27	.381	3	D5
5705655	GT905156	5705656	GT905143	M10 X 1,5	2.94	.53	1.27	.381	3	D6
5705658	GT905157	5705657	GT905144	M12 X 1,25	3.38	.77	1.74	.367	3	D5
5705074	GT905158	5705659	GT905145	M12 X 1,75	3.38	.77	1.74	.367	3	D6

High-Performance Taps



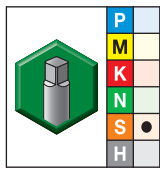
- WN35MG TiN/DLC for titanium and titanium alloys.



Shank Tolerance	
D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052



■ GT14 • Form B Plug Chamfer • Metric DIN 371 and 376 • For Titanium and Titanium Alloys



- first choice
- alternate choice

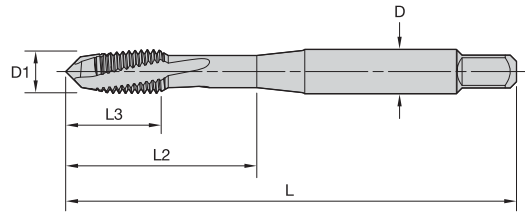
grade WN35MG TiN/DLC		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4160093	GT145001	M3 X 0,5	56	11	18	3,5	3	DIN 371	6HX
4160094	GT145002	M4 X 0,7	63	13	21	4,5	3	DIN 371	6HX
4160095	GT145003	M5 X 0,8	70	15	25	6,0	3	DIN 371	6HX
4160096	GT145004	M6 X 1	80	17	30	6,0	3	DIN 371	6HX
4160097	GT145005	M8 X 1,25	90	20	35	8,0	3	DIN 371	6HX
4160098	GT145006	M10 X 1,5	100	22	39	10,0	3	DIN 371	6HX
4160099	GT145007	M12 X 1,75	110	24	—	9,0	3	DIN 376	6HX

# High-Performance Taps

Victory™ Left-Hand Spiral-Flute HSS-E-PM Taps • Through Holes



- WS30MG nitride for titanium and titanium alloys.
- WS34MG TiN + CrC/C for titanium and titanium alloys.

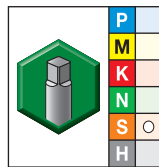
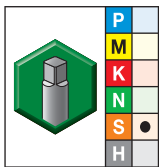


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



■ GT60 • Machine Screw and Fractional • Form D Plug Chamfer • ANSI • For Titanium and Titanium Alloys



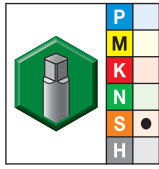
- first choice
- alternate choice

grade WS34MG TiN+CrC/C		grade WS30MG Nitride		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5562739	GT605006	5562738	GT605005	2 - 56	1.75	.44	.50	.141	2	H2
5562941	GT605008	5562940	GT605007	4 - 40	1.88	.56	.69	.141	2	H2
5562943	GT605010	5562942	GT605009	6 - 32	1.99	.36	.71	.141	3	H2
5562945	GT605012	5562944	GT605011	6 - 32	1.99	.36	.71	.141	3	H3
5562947	GT605014	5562946	GT605013	6 - 40	1.99	.36	.71	.141	3	H2
5562949	GT605016	5562948	GT605015	8 - 32	2.12	.31	.76	.168	3	H2
5562951	GT605018	5562950	GT605017	8 - 32	2.12	.31	.76	.168	3	H3
5562953	GT605020	5562952	GT605019	8 - 36	2.12	.31	.76	.168	3	H2
5562955	GT605022	5562954	GT605021	10 - 24	2.37	.47	.91	.194	3	H3
5562957	GT605024	5562956	GT605023	10 - 32	2.37	.47	.91	.194	3	H2
5562959	GT605026	5562958	GT605025	10 - 32	2.37	.47	.91	.194	3	H3
5562961	GT605028	5562960	GT605027	1/4 - 20	2.50	.44	1.00	.255	3	H3
5562963	GT605030	5562962	GT605029	1/4 - 20	2.50	.44	1.00	.255	3	H5
5562965	GT605032	5562964	GT605031	1/4 - 28	2.50	.44	1.00	.255	3	H3
5562967	GT605034	5562966	GT605033	1/4 - 28	2.50	.44	1.00	.255	3	H4
5562969	GT605036	5562968	GT605035	5/16 - 18	2.72	.49	1.13	.318	3	H3
5562981	GT605038	5562980	GT605037	5/16 - 18	2.72	.49	1.13	.318	3	H5
5562983	GT605040	5562982	GT605039	5/16 - 24	2.72	.49	1.13	.318	3	H3
5562985	GT605042	5562984	GT605041	5/16 - 24	2.72	.49	1.13	.318	3	H4
5562987	GT605044	5562986	GT605043	3/8 - 16	2.93	.59	1.26	.381	3	H3
5562989	GT605046	5562988	GT605045	3/8 - 16	2.93	.59	1.26	.381	3	H5
5562991	GT605048	5562990	GT605047	3/8 - 24	2.93	.59	1.26	.381	3	H3
5562993	GT605050	5562992	GT605049	3/8 - 24	2.93	.59	1.26	.381	3	H4
5562995	GT605052	5562994	GT605051	7/16 - 14	3.16	.71	1.49	.323	3	H3

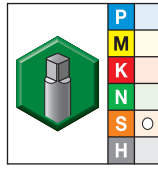
(continued)

High-Performance Taps

(GT60 • Maching Screw and Fractional • Form D Plug Chamfer • ANSI • For Titanium and Titanium Alloys — continued)



grade WS34MG  
TiN+CrC/C



grade WS30MG  
Nitride

- first choice
- alternate choice

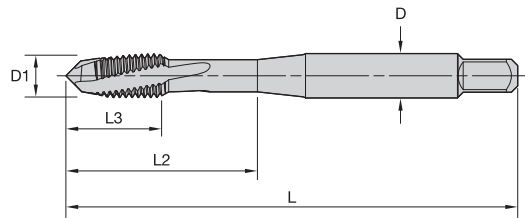
grade WS34MG TiN+CrC/C		grade WS30MG Nitride		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5562997	GT605054	5562996	GT605053	7/16 - 20	3.16	.71	1.49	.323	3	H3
5562999	GT605056	5562998	GT605055	1/2 - 13	3.38	.77	1.74	.367	3	H3
5563011	GT605058	5563010	GT605057	1/2 - 20	3.38	.77	1.74	.367	3	H3
5563012	GT605059	-	-	9/16 - 18	3.59	.83	1.74	.429	4	H3
5563013	GT605060	-	-	9/16 - 18	3.59	.83	1.74	.429	4	H5
5563014	GT605061	-	-	5/8 - 11	3.81	.91	1.89	.480	4	H3
5563015	GT605062	-	-	5/8 - 18	3.81	.91	1.89	.480	4	H3
5563016	GT605063	-	-	5/8 - 18	3.81	.91	1.89	.480	4	H5
5563017	GT605064	-	-	3/4 - 10	4.25	1.00	2.08	.590	4	H5
5563018	GT605065	-	-	3/4 - 16	4.25	1.00	2.08	.590	4	H3
5563019	GT605066	-	-	3/4 - 16	4.25	1.00	2.08	.590	4	H5
5563020	GT605067	-	-	1 - 8	5.13	1.25	2.58	.800	5	H5

# High-Performance Taps

Victory™ Left-Hand Spiral-Flute HSS-E-PM Taps • Through Holes



- WS30MG nitride for titanium and titanium alloys.
- WS34MG TiN + CrC/C for titanium and titanium alloys.

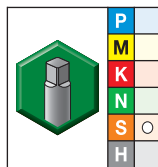
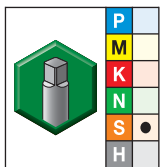


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



■ GT60 • Form D Plug Chamfer • Metric ANSI • For Titanium and Titanium Alloys



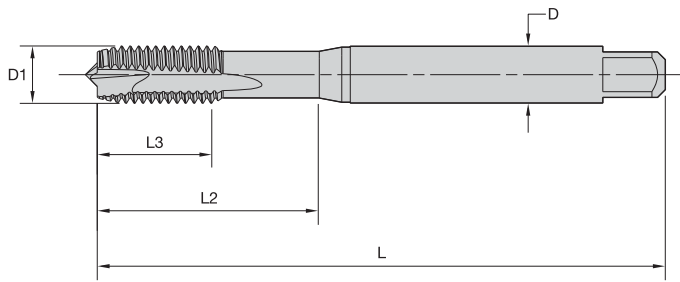
- first choice
- alternate choice

grade WS34MG TiN+CrC/C		grade WS30MG Nitride		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5563022	GT605504	5563021	GT605503	M2,5 X 0,45	1.81	.49	.56	.141	3	D3
5563024	GT605506	5563023	GT605505	M3 X 0,5	1.94	.63	.75	.141	3	D3
5563026	GT605508	5563025	GT605507	M4 X 0,7	2.12	.32	.76	.168	3	D4
5563028	GT605510	5563027	GT605509	M5 X 0,8	2.37	.47	.91	.194	3	D4
5563040	GT605512	5563029	GT605511	M6 X 1	2.50	.16	1.00	.255	3	D5
5563042	GT605514	5563041	GT605513	M7 X 1	2.73	.52	1.15	.318	3	D5
5563044	GT605516	5563043	GT605515	M8 X 1,25	2.71	.48	1.12	.318	3	D5
5563046	GT605518	5563045	GT605517	M10 X 1,25	2.92	.53	1.26	.381	3	D5
5583927	GT605520	5583926	GT605519	M10 X 1,5	2.92	.53	1.26	.381	3	D6
5583929	GT605522	5583928	GT605521	M12 X 1,75	3.38	.77	1.74	.367	3	D6

High-Performance Taps



- WN48EG DLC for aluminum.

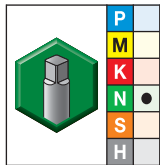


Shank Tolerance

D mm	tolerance h9
1-3	+0, -0,025
3,5-6	+0, -0,030
7-10	+0, -0,036
11-18	+0, -0,043



■ GT70 • Form B Plug Chamfer • Metric DIN 371 and 376 • For Aluminum



- first choice
- alternate choice

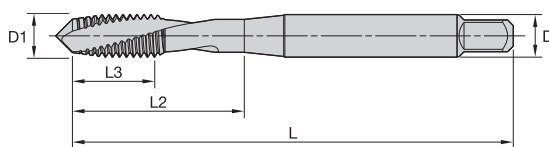
grade WN48EG DLC		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4160036	GT705001	M3 X 0,5	56	11	18	3,5	2	DIN 371	6H
4160037	GT705002	M4 X 0,7	63	13	21	4,5	2	DIN 371	6H
4160038	GT705003	M5 X 0,8	70	15	25	6,0	2	DIN 371	6H
4160039	GT705004	M6 X 1	80	17	30	6,0	2	DIN 371	6H
4160040	GT705005	M8 X 1,25	90	20	35	8,0	2	DIN 371	6H
4160041	GT705006	M10 X 1,5	100	22	39	10,0	2	DIN 371	6H
4160042	GT705007	M12 X 1,75	110	24	—	9,0	3	DIN 376	6H
4160063	GT705008	M16 X 2	110	27	—	12,0	3	DIN 376	6H

# High-Performance Taps

Victory™ Left-Hand Spiral-Flute HSS-E Taps • Through Holes



- WN44EG TiN + CrC/C for aluminum.

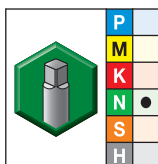


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



■ GT72 • Machine Screw and Fractional • Form D Plug Chamfer • DIN Length ANSI Shank • For Aluminum

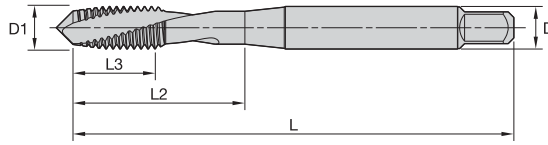


- first choice
- alternate choice

grade WN44EG TiN+CrC/C		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5690893	GT725010	2 - 56	1.77	.31	.71	.141	2	H2
5690894	GT725011	4 - 40	2.20	.31	.71	.141	2	H2
5690896	GT725012	5 - 40	2.20	.31	.71	.141	2	H2
5690897	GT725013	6 - 32	2.20	.35	.79	.141	2	H3
5690898	GT725014	8 - 32	2.48	.43	.83	.168	2	H3
5690899	GT725015	10 - 24	2.76	.47	.98	.194	2	H3
5690910	GT725016	10 - 32	2.76	.47	.98	.194	2	H3
5690911	GT725017	1/4 - 20	3.15	.59	1.18	.255	2	H3
5690912	GT725018	1/4 - 20	3.15	.59	1.18	.255	2	H5
5690913	GT725019	1/4 - 28	3.15	.59	1.18	.255	2	H3
5690914	GT725020	1/4 - 28	3.15	.59	1.18	.255	2	H4
5690915	GT725021	5/16 - 18	3.54	.59	1.38	.318	2	H3
5690917	GT725022	5/16 - 18	3.54	.59	1.38	.318	2	H5
5690918	GT725023	5/16 - 24	3.54	.59	1.38	.318	2	H3
5690919	GT725024	5/16 - 24	3.54	.59	1.38	.318	2	H4
5690920	GT725025	3/8 - 16	3.94	.75	1.54	.381	2	H3
5690921	GT725026	3/8 - 16	3.94	.75	1.54	.381	2	H5
5690922	GT725027	3/8 - 24	3.94	.75	1.54	.381	2	H3
5690923	GT725028	3/8 - 24	3.94	.75	1.54	.381	2	H4
5690924	GT725029	7/16 - 14	3.94	.71	1.61	.323	3	H3
5690925	GT725030	7/16 - 14	3.94	.71	1.61	.323	3	H5
5690926	GT725031	7/16 - 20	3.94	.71	1.61	.323	3	H3
5690927	GT725032	7/16 - 20	3.94	.71	1.61	.323	3	H5
5690928	GT725033	1/2 - 13	4.33	.91	1.85	.367	3	H4
5690929	GT725034	1/2 - 13	4.33	.91	1.85	.367	3	H5
5690930	GT725035	1/2 - 20	4.33	.91	1.85	.367	3	H3
5690931	GT725036	1/2 - 20	4.33	.91	1.85	.367	3	H5

High-Performance Taps

- WN44EG TiN + CrC/C for aluminum.

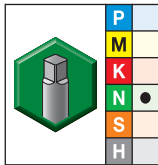


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



■ GT72 • Form D Plug Chamfer • Metric • DIN Length ANSI Shank • For Aluminum

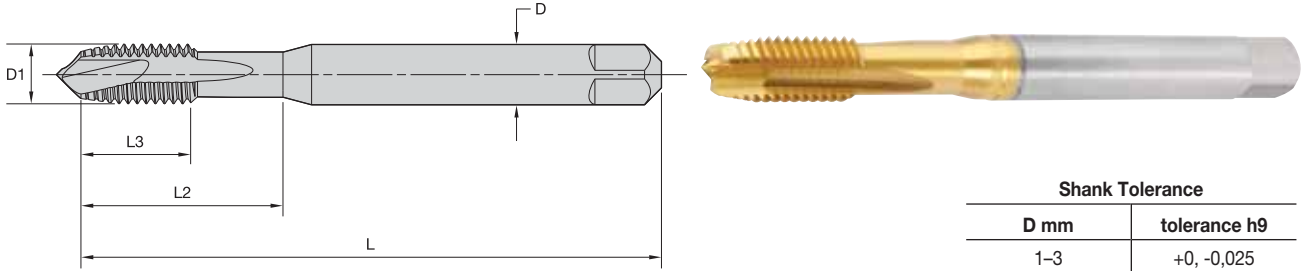


- first choice
- alternate choice

grade WN44EG TiN+CrC/C		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5690933	GT725037	M3 X 0,5	2.20	.31	.71	.141	2	D3
5690934	GT725038	M3,5 X 0,6	2.20	.35	.79	.141	2	D4
5690935	GT725039	M4 X 0,7	2.48	.43	.83	.168	2	D4
5690936	GT725040	M5 X 0,8	2.76	.47	.98	.194	2	D4
5690937	GT725041	M6 X 1	3.15	.47	1.18	.255	2	D5
5690938	GT725042	M7 X 1	3.54	.59	1.38	.318	2	D5
5690939	GT725043	M8 X 1	3.54	.59	1.38	.318	2	D5
5690940	GT725044	M8 X 1,25	3.54	.59	1.38	.318	2	D5
5690941	GT725045	M10 X 1,25	3.94	.71	1.54	.381	2	D5
5690942	GT725046	M10 X 1,5	3.94	.71	1.54	.381	2	D6
5690943	GT725047	M12 X 1,25	4.33	.83	1.73	.367	3	D6
5690944	GT725048	M12 X 1,5	4.33	.83	1.73	.367	3	D6
5690945	GT725049	M12 X 1,75	4.33	.83	1.73	.367	3	D6

High-Performance Taps

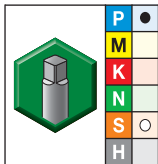
- WP31MG TiN for steel  
32–44 HRC.



Shank Tolerance	
D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052



■ GT00 • Form B Plug Chamfer • Metric DIN 371, 374, and 376 • For Hard Steel

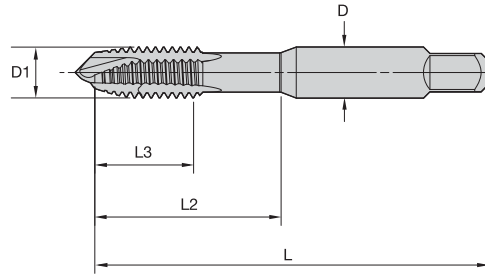


- first choice
- alternate choice

grade WP31MG TiN		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4153679	GT005001	M3 X 0,5	56	11	18	3,5	2	DIN 371	6HX
4153680	GT005002	M4 X 0,7	63	13	21	4,5	2	DIN 371	6HX
4153681	GT005003	M5 X 0,8	70	15	25	6,0	2	DIN 371	6HX
4153682	GT005004	M6 X 1	80	17	30	6,0	3	DIN 371	6HX
4153760	GT005012	M8 X 1	90	17	—	6,0	3	DIN 374	6HX
4153753	GT005005	M8 X 1,25	90	20	35	8,0	3	DIN 371	6HX
4153761	GT005013	M10 X 1	90	18	—	7,0	3	DIN 374	6HX
4153762	GT005014	M10 X 1,25	100	22	—	7,0	3	DIN 374	6HX
4153754	GT005006	M10 X 1,5	100	22	39	10,0	3	DIN 371	6HX
4153763	GT005015	M12 X 1,25	100	22	—	9,0	3	DIN 374	6HX
4153764	GT005016	M12 X 1,5	100	22	—	9,0	3	DIN 374	6HX
4153755	GT005007	M12 X 1,75	110	24	—	9,0	3	DIN 376	6HX
4153765	GT005017	M14 X 1,5	100	22	—	11,0	3	DIN 374	6HX
4153756	GT005008	M14 X 2	110	26	—	11,0	3	DIN 376	6HX
4153766	GT005018	M16 X 1,5	100	22	—	12,0	4	DIN 374	6HX
4153757	GT005009	M16 X 2	110	27	—	12,0	4	DIN 376	6HX
4153758	GT005010	M18 X 2	125	30	—	14,0	4	DIN 376	6HX
4153759	GT005011	M20 X 2,5	140	32	—	16,0	4	DIN 376	6HX

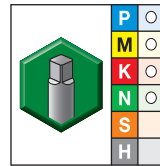
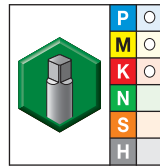
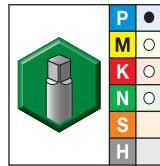
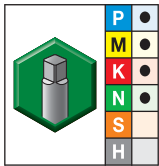


- WP42EG TiCN
- WU41EG TiN
- WP49EG oxide
- WU40EG bright



Shank Tolerance	
D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

■ VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • ANSI



- first choice
- alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions				number of flutes	pitch diameter limit	
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	TPI	L	L3			L2
5357242	VTSP05001	-	-	5357241	VTSP05001	5357243	VTSP05001	2 - 56	1.75	.39	.50	.141	2	H2
-	-	-	-	5357244	VTSP05002	-	-	2 - 56	1.75	.39	.50	.141	2	H3
-	-	-	-	5357245	VTSP05003	-	-	2 - 56	1.75	.39	.50	.141	2	H4
5357247	VTSP05004	-	-	5357246	VTSP05004	5357248	VTSP05004	3 - 48	1.82	.45	.57	.141	2	H2
5357260	VTSP05005	5357261	VTSP05005	5357249	VTSP05005	5357262	VTSP05005	4 - 40	1.88	.51	.69	.141	2	H2
5357264	VTSP05006	-	-	5357263	VTSP05006	5357265	VTSP05006	4 - 40	1.88	.51	.69	.141	2	H3
5357267	VTSP05007	-	-	5357266	VTSP05007	5357268	VTSP05007	4 - 40	1.88	.51	.69	.141	2	H4
5357272	VTSP05008	-	-	5357271	VTSP05008	5357273	VTSP05008	4 - 40	1.88	.51	.69	.141	2	H5
-	-	-	-	5357274	VTSP05009	-	-	4 - 40	1.88	.51	.69	.141	2	H6
5357276	VTSP05010	-	-	5357275	VTSP05010	5357277	VTSP05010	4 - 48	1.88	.51	.69	.141	2	H2
-	-	-	-	5357278	VTSP05011	-	-	4 - 48	1.88	.51	.69	.141	2	H4
5357280	VTSP05012	-	-	5357279	VTSP05012	5357281	VTSP05012	5 - 40	1.94	.58	.75	.141	2	H2
5357283	VTSP05013	-	-	5357282	VTSP05013	5357284	VTSP05013	6 - 32	1.99	.38	.71	.141	2	H2
5357286	VTSP05014	5357287	VTSP05014	5357285	VTSP05014	5357288	VTSP05014	6 - 32	1.99	.38	.71	.141	2	H3
5357290	VTSP05015	-	-	5357289	VTSP05015	5357291	VTSP05015	6 - 32	1.99	.38	.71	.141	2	H4
5357293	VTSP05016	-	-	5357292	VTSP05016	5357294	VTSP05016	6 - 32	1.99	.38	.71	.141	2	H5
5357296	VTSP05017	-	-	5357295	VTSP05017	5357297	VTSP05017	6 - 32	1.99	.38	.71	.141	2	H6
5357299	VTSP05018	-	-	5357298	VTSP05018	5357300	VTSP05018	6 - 32	1.99	.38	.71	.141	2	H7
5365704	VTSP05019	-	-	5365703	VTSP05019	5365705	VTSP05019	6 - 32	1.99	.38	.71	.141	2	H11
5365707	VTSP05020	-	-	5365706	VTSP05020	5365708	VTSP05020	6 - 40	1.99	.38	.71	.141	2	H2
-	-	-	-	5365709	VTSP05021	-	-	6 - 40	1.99	.38	.71	.141	2	H3
5365741	VTSP05022	-	-	5365740	VTSP05022	5365742	VTSP05022	8 - 32	2.12	.38	.76	.168	2	H2
5365744	VTSP05023	5365745	VTSP05023	5365743	VTSP05023	5365746	VTSP05023	8 - 32	2.12	.38	.76	.168	2	H3
5365748	VTSP05024	-	-	5365747	VTSP05024	5365749	VTSP05024	8 - 32	2.12	.38	.76	.168	2	H4

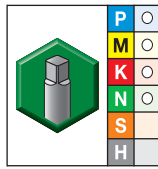
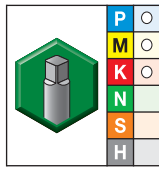
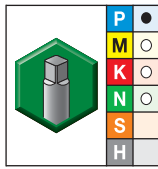
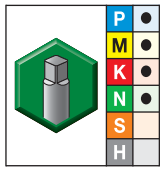
(continued)

# Multipurpose Taps

VariTap™ Spiral-Point HSS-E Taps • Through Holes



(VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • ANSI — continued)



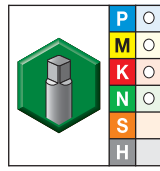
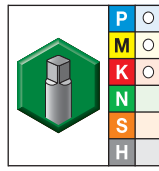
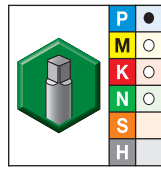
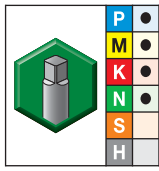
● first choice  
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5365751	VTSP05025	-	-	5365750	VTSP05025	5365752	VTSP05025	8 - 32	2.12	.38	.76	.168	2	H5
5365754	VTSP05026	-	-	5365753	VTSP05026	5365755	VTSP05026	8 - 32	2.12	.38	.76	.168	2	H6
5365758	VTSP05027	-	-	5365757	VTSP05027	5365760	VTSP05027	8 - 32	2.12	.38	.76	.168	2	H7
5365765	VTSP05028	-	-	5365762	VTSP05028	5365767	VTSP05028	8 - 32	2.12	.38	.76	.168	2	H11
5365771	VTSP05029	-	-	5365769	VTSP05029	5365773	VTSP05029	8 - 36	2.11	.38	.76	.168	2	H2
5365776	VTSP05030	5365778	VTSP05030	5365774	VTSP05030	5365780	VTSP05030	10 - 24	2.37	.50	.91	.194	2	H3
-	-	-	-	5365782	VTSP05031	-	-	10 - 24	2.37	.50	.91	.194	2	H4
5365786	VTSP05032	-	-	5365784	VTSP05032	5365788	VTSP05032	10 - 24	2.37	.50	.91	.194	2	H5
-	-	-	-	5365790	VTSP05033	-	-	10 - 24	2.37	.50	.91	.194	2	H6
-	-	-	-	5365792	VTSP05034	-	-	10 - 24	2.37	.50	.91	.194	2	H7
5365796	VTSP05035	-	-	5365794	VTSP05035	5365798	VTSP05035	10 - 24	2.37	.50	.91	.194	2	H11
5365759	VTSP05036	-	-	5365756	VTSP05036	5365761	VTSP05036	10 - 32	2.36	.50	.91	.194	2	H2
5365764	VTSP05037	5365766	VTSP05037	5365763	VTSP05037	5365768	VTSP05037	10 - 32	2.36	.50	.91	.194	2	H3
5365772	VTSP05038	-	-	5365770	VTSP05038	5365775	VTSP05038	10 - 32	2.36	.50	.91	.194	2	H4
5365779	VTSP05039	-	-	5365777	VTSP05039	5365781	VTSP05039	10 - 32	2.36	.50	.91	.194	2	H5
5365785	VTSP05040	-	-	5365783	VTSP05040	5365787	VTSP05040	10 - 32	2.36	.50	.91	.194	2	H6
5365791	VTSP05041	-	-	5365789	VTSP05041	5365793	VTSP05041	10 - 32	2.36	.50	.91	.194	2	H7
5365797	VTSP05042	-	-	5365795	VTSP05042	5365799	VTSP05042	10 - 32	2.36	.50	.91	.194	2	H11
5365801	VTSP05043	-	-	5365800	VTSP05043	5365802	VTSP05043	12 - 24	2.37	.50	.96	.220	2	H3
5365804	VTSP05044	-	-	5365803	VTSP05044	5365805	VTSP05044	12 - 28	2.37	.50	.96	.220	2	H3
5365807	VTSP05045	5365808	VTSP05045	5365806	VTSP05045	5365809	VTSP05045	1/4 - 20	2.50	.63	1.00	.255	3	H3
5365821	VTSP05046	-	-	5365820	VTSP05046	5365822	VTSP05046	1/4 - 20	2.50	.63	1.00	.255	3	H5
5365825	VTSP05047	-	-	5365823	VTSP05047	5365824	VTSP05047	1/4 - 20	2.50	.63	1.00	.255	3	H7
5365827	VTSP05048	-	-	5365826	VTSP05048	5365828	VTSP05048	1/4 - 20	2.50	.63	1.00	.255	3	H11
5365840	VTSP05049	5365841	VTSP05049	5365829	VTSP05049	5365842	VTSP05049	1/4 - 28	2.50	.63	1.00	.255	3	H3
5365844	VTSP05050	-	-	5365843	VTSP05050	5365845	VTSP05050	1/4 - 28	2.50	.63	1.00	.255	3	H4
5365849	VTSP05051	-	-	5365848	VTSP05051	5365920	VTSP05051	1/4 - 28	2.50	.63	1.01	.255	3	H5
5365922	VTSP05052	-	-	5365921	VTSP05052	5365923	VTSP05052	1/4 - 28	2.50	.63	1.01	.255	3	H6
5365925	VTSP05053	-	-	5365924	VTSP05053	5365927	VTSP05053	1/4 - 28	2.50	.63	1.01	.255	3	H7
5365929	VTSP05054	-	-	5365928	VTSP05054	5365930	VTSP05054	1/4 - 28	2.50	.63	1.01	.255	3	H11
5365932	VTSP05055	5365933	VTSP05055	5365931	VTSP05055	5365934	VTSP05055	5/16 - 18	2.72	.69	1.14	.318	3	H3
5365936	VTSP05056	-	-	5365935	VTSP05056	5365937	VTSP05056	5/16 - 18	2.72	.69	1.14	.318	3	H5
5365939	VTSP05057	-	-	5365938	VTSP05057	5365940	VTSP05057	5/16 - 18	2.72	.69	1.14	.318	3	H7
5365942	VTSP05058	-	-	5365941	VTSP05058	5365943	VTSP05058	5/16 - 18	2.72	.69	1.14	.318	3	H11
5365946	VTSP05059	5365947	VTSP05059	5365945	VTSP05059	5365948	VTSP05059	5/16 - 24	2.72	.69	1.14	.318	3	H3
5365960	VTSP05060	-	-	5365949	VTSP05060	5365961	VTSP05060	5/16 - 24	2.72	.69	1.14	.318	3	H4
5365963	VTSP05061	-	-	5365962	VTSP05061	5365964	VTSP05061	5/16 - 24	2.72	.69	1.14	.318	3	H5
5365966	VTSP05062	-	-	5365965	VTSP05062	5365967	VTSP05062	5/16 - 24	2.72	.69	1.14	.318	3	H6
5365969	VTSP05063	-	-	5365968	VTSP05063	5365970	VTSP05063	5/16 - 24	2.72	.69	1.14	.318	3	H7
5365972	VTSP05064	-	-	5365971	VTSP05064	5365973	VTSP05064	5/16 - 24	2.72	.69	1.14	.318	3	H11

(continued)

Multipurpose Taps

(VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • ANSI — continued)



● first choice  
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5365975	VTSP05065	5365976	VTSP05065	5365974	VTSP05065	5365977	VTSP05065	3/8 - 16	2.94	.75	1.27	.381	3	H3
5366898	VTSP05066	-	-	5366897	VTSP05066	5366899	VTSP05066	3/8 - 16	2.94	.75	1.27	.381	3	H5
5366941	VTSP05067	-	-	5366940	VTSP05067	5366942	VTSP05067	3/8 - 16	2.94	.75	1.27	.381	3	H7
5366944	VTSP05068	-	-	5366943	VTSP05068	5366945	VTSP05068	3/8 - 16	2.94	.75	1.27	.381	3	H11
5366947	VTSP05069	5366948	VTSP05069	5366946	VTSP05069	5366949	VTSP05069	3/8 - 24	2.94	.75	1.27	.381	3	H3
5366951	VTSP05070	-	-	5366950	VTSP05070	5366952	VTSP05070	3/8 - 24	2.94	.75	1.27	.381	3	H4
5366954	VTSP05071	-	-	5366953	VTSP05071	5366955	VTSP05071	3/8 - 24	2.94	.75	1.27	.381	3	H5
5366957	VTSP05072	-	-	5366956	VTSP05072	5366958	VTSP05072	3/8 - 24	2.94	.75	1.27	.381	3	H6
5366960	VTSP05073	-	-	5366959	VTSP05073	5366961	VTSP05073	3/8 - 24	2.94	.75	1.27	.381	3	H7
5366963	VTSP05074	-	-	5366962	VTSP05074	5366964	VTSP05074	3/8 - 24	2.94	.75	1.27	.381	3	H11
5366966	VTSP05075	5366967	VTSP05075	5366965	VTSP05075	5366968	VTSP05075	7/16 - 14	3.16	.88	1.49	.323	3	H3
5366970	VTSP05076	-	-	5366969	VTSP05076	5366971	VTSP05076	7/16 - 14	3.16	.88	1.49	.323	3	H5
5366973	VTSP05077	-	-	5366972	VTSP05077	5366974	VTSP05077	7/16 - 14	3.16	.88	1.49	.323	3	H7
5366976	VTSP05078	-	-	5366975	VTSP05078	5366977	VTSP05078	7/16 - 14	3.16	.88	1.49	.323	3	H11
5366979	VTSP05079	5366980	VTSP05079	5366978	VTSP05079	5366981	VTSP05079	7/16 - 20	3.16	.88	1.49	.323	3	H3
5366983	VTSP05080	-	-	5366982	VTSP05080	5366984	VTSP05080	7/16 - 20	3.16	.88	1.49	.323	3	H5
-	-	-	-	5366036	VTSP05081	-	-	7/16 - 20	3.16	.88	1.49	.323	3	H6
5366038	VTSP05082	-	-	5366037	VTSP05082	5366039	VTSP05082	7/16 - 20	3.16	.88	1.49	.323	3	H7
5366071	VTSP05083	-	-	5366070	VTSP05083	5366073	VTSP05083	7/16 - 20	3.16	.88	1.49	.323	3	H11
5366075	VTSP05084	5366076	VTSP05084	5366074	VTSP05084	5366077	VTSP05084	1/2 - 13	3.38	.94	1.74	.367	3	H3
5366079	VTSP05085	-	-	5366078	VTSP05085	5366080	VTSP05085	1/2 - 13	3.38	.94	1.74	.367	3	H5
5366083	VTSP05086	-	-	5366081	VTSP05086	5366084	VTSP05086	1/2 - 13	3.38	.94	1.74	.367	3	H7
5366086	VTSP05087	-	-	5366085	VTSP05087	5366087	VTSP05087	1/2 - 13	3.38	.94	1.74	.367	3	H11
5366089	VTSP05088	5366110	VTSP05088	5366088	VTSP05088	5366111	VTSP05088	1/2 - 20	3.38	.94	1.74	.367	3	H3
5366113	VTSP05089	-	-	5366112	VTSP05089	5366114	VTSP05089	1/2 - 20	3.38	.94	1.74	.367	3	H5
-	-	-	-	5366115	VTSP05090	-	-	1/2 - 20	3.38	.94	1.74	.367	3	H6
5366117	VTSP05091	-	-	5366116	VTSP05091	5366118	VTSP05091	1/2 - 20	3.38	.94	1.74	.367	3	H7
5366130	VTSP05092	-	-	5366119	VTSP05092	5366131	VTSP05092	1/2 - 20	3.38	.94	1.74	.367	3	H11
5366133	VTSP05093	5366134	VTSP05093	5366132	VTSP05093	5366135	VTSP05093	9/16 - 12	3.59	1.00	1.74	.429	3	H3
5366137	VTSP05094	5366138	VTSP05094	5366136	VTSP05094	5366139	VTSP05094	9/16 - 18	3.59	1.00	1.74	.429	3	H3
5366141	VTSP05095	5366142	VTSP05095	5366140	VTSP05095	5366143	VTSP05095	5/8 - 11	3.81	1.09	1.89	.480	3	H3
5366145	VTSP05096	-	-	5366144	VTSP05096	5366146	VTSP05096	5/8 - 11	3.81	1.09	1.89	.480	3	H5
-	-	-	-	5367003	VTSP05097	-	-	5/8 - 11	3.81	1.09	1.89	.480	3	H7
5367005	VTSP05098	-	-	5367004	VTSP05098	5367006	VTSP05098	5/8 - 18	3.81	1.09	1.89	.480	3	H3
5367008	VTSP05099	-	-	5367007	VTSP05099	5367009	VTSP05099	5/8 - 18	3.81	1.09	1.89	.480	3	H5
-	-	-	-	5367030	VTSP05100	-	-	5/8 - 18	3.81	1.09	1.89	.480	3	H6
5367032	VTSP05101	-	-	5367031	VTSP05101	5367033	VTSP05101	5/8 - 18	3.81	1.09	1.89	.480	3	H7
5367035	VTSP05102	5367036	VTSP05102	5367034	VTSP05102	5367037	VTSP05102	3/4 - 10	4.25	1.22	2.08	.590	3	H3
5367039	VTSP05103	-	-	5367038	VTSP05103	5367060	VTSP05103	3/4 - 10	4.25	1.22	2.08	.590	3	H5
5367062	VTSP05104	5367063	VTSP05104	5367061	VTSP05104	5367064	VTSP05104	3/4 - 16	4.25	1.22	2.08	.590	3	H3

(continued)

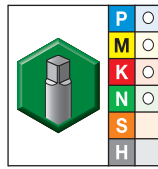
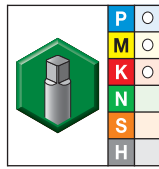
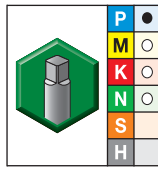
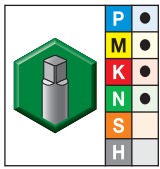
Multipurpose Taps

# Multipurpose Taps

VariTap™ Spiral-Point HSS-E Taps • Through Holes



(VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • ANSI — continued)



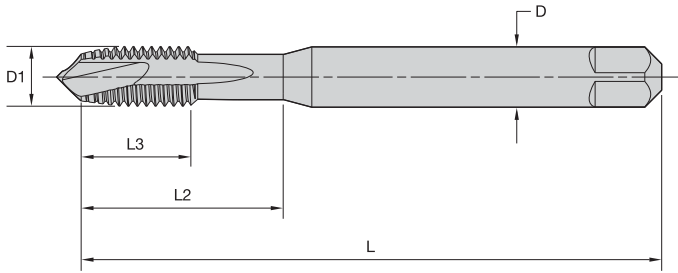
● first choice  
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5367066	VTSP05105	-		5367065	VTSP05105	5367067	VTSP05105	3/4 - 16	4.25	1.22	2.08	.590	3	H5
5367069	VTSP05106	5367070	VTSP05106	5367068	VTSP05106	5367071	VTSP05106	7/8 - 9	4.69	1.34	2.30	.697	3	H4
5367073	VTSP05107	-		5367072	VTSP05107	5367074	VTSP05107	7/8 - 9	4.69	1.34	2.30	.697	3	H5
5367076	VTSP05108	-		5367075	VTSP05108	5367078	VTSP05108	7/8 - 14	4.69	1.34	2.30	.697	3	H4
5366406	VTSP05109	5366407	VTSP05109	5366404	VTSP05109	5366408	VTSP05109	1 - 8	5.13	1.50	2.58	.800	3	H5
5366440	VTSP05110	-		5366409	VTSP05110	5366441	VTSP05110	1 - 12	5.13	1.50	2.58	.800	3	H4
-	-	-		5366442	VTSP05111	-		1 1/8 - 7	5.44	1.71	2.56	.896	4	H6
-	-	-		5366443	VTSP05112	-		1 1/8 - 8	5.44	1.71	2.56	.896	4	H6
-	-	-		5366444	VTSP05113	-		1 1/8 - 12	5.44	1.71	2.56	.896	4	H5
-	-	-		5366445	VTSP05114	-		1 1/4 - 7	5.75	1.71	2.56	1.021	4	H6
-	-	-		5366446	VTSP05115	-		1 1/4 - 8	5.75	1.71	2.56	1.020	4	H6
-	-	-		5366447	VTSP05116	-		1 1/4 - 12	5.75	1.71	2.56	1.021	4	H5
-	-	-		5366448	VTSP05117	-		1 3/8 - 6	6.07	2.00	3.00	1.108	4	H6
-	-	-		5366449	VTSP05118	-		1 3/8 - 8	6.07	2.00	3.00	1.108	4	H6
-	-	-		5366450	VTSP05119	-		1 3/8 - 12	6.07	2.00	3.00	1.108	4	H5
-	-	-		5366451	VTSP05120	-		1 1/2 - 6	6.38	2.00	3.00	1.233	4	H6
-	-	-		5366452	VTSP05121	-		1 1/2 - 8	6.38	2.00	3.00	1.233	4	H6
-	-	-		5366453	VTSP05122	-		1 1/2 - 12	6.38	2.00	3.00	1.233	4	H5
-	-	-		5366454	VTSP05123	-		2 - 4 1/2	7.63	2.67	3.56	1.643	4	H7

NOTE: Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.  
VariTap™ for 3B class of fit is suitable for UNJ aerospace internal threading applications.

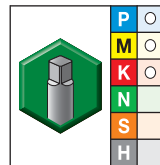
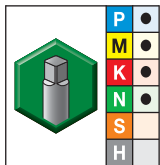


- WP42EG TiCN
- WP49EG oxide



Shank Tolerance	
D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

■ VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • DIN Length ANSI Shank

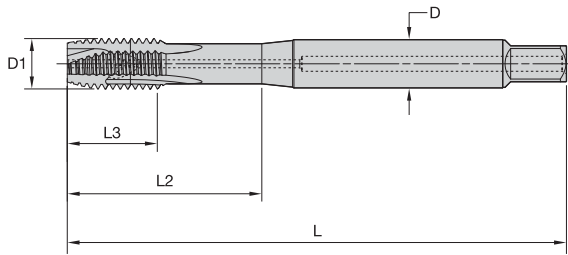


- first choice
- alternate choice

grade WP42EG TiCN		grade WP49EG Oxide		inch dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D			
5366572	VTSP09004	5366571	VTSP09004	4 - 40	2.20	.31	.71	.141	2	DIN-ANSI	2B
5366574	VTSP09005	5366573	VTSP09005	6 - 32	2.20	.35	.79	.141	2	DIN-ANSI	2B
5366576	VTSP09006	5366575	VTSP09006	8 - 32	2.48	.43	.83	.168	2	DIN-ANSI	2B
5366578	VTSP09007	5366577	VTSP09007	10 - 24	2.76	.47	.98	.194	2	DIN-ANSI	2B
5366580	VTSP09008	5366579	VTSP09008	10 - 32	2.75	.47	.98	.194	2	DIN-ANSI	2B
5366582	VTSP09009	5366581	VTSP09009	1/4 - 20	3.15	.59	1.18	.255	3	DIN-ANSI	2B
5366584	VTSP09010	5366583	VTSP09010	1/4 - 28	3.14	.58	1.17	.255	3	DIN-ANSI	2B
5366586	VTSP09011	5366585	VTSP09011	5/16 - 18	3.54	.59	1.38	.318	3	DIN-ANSI	2B
5366588	VTSP09012	5366587	VTSP09012	5/16 - 24	3.54	.59	1.38	.318	3	DIN-ANSI	2B
5366590	VTSP09013	5366589	VTSP09013	3/8 - 16	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5366592	VTSP09014	5366591	VTSP09014	3/8 - 24	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5366594	VTSP09015	5366593	VTSP09015	7/16 - 14	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5366596	VTSP09016	5366595	VTSP09016	7/16 - 20	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5366598	VTSP09017	5366597	VTSP09017	1/2 - 13	4.33	.91	1.85	.367	3	DIN-ANSI	2B
5366600	VTSP09018	5366599	VTSP09018	1/2 - 20	4.33	.91	1.85	.367	3	DIN-ANSI	2B
5366602	VTSP09019	5366601	VTSP09019	5/8 - 11	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5366604	VTSP09020	5366603	VTSP09020	5/8 - 18	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5366606	VTSP09021	5366605	VTSP09021	3/4 - 10	4.92	1.18	2.52	.590	3	DIN-ANSI	2B
5366608	VTSP09022	5366607	VTSP09022	3/4 - 16	4.92	1.18	2.52	.590	3	DIN-ANSI	2B

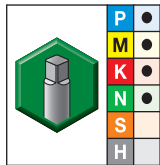
Multipurpose Taps

• WP42EG TiCN



Shank Tolerance	
D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

■ VT-SPO • Form B Plug Chamfer • Through Coolant • Fractional • DIN Length ANSI Shank

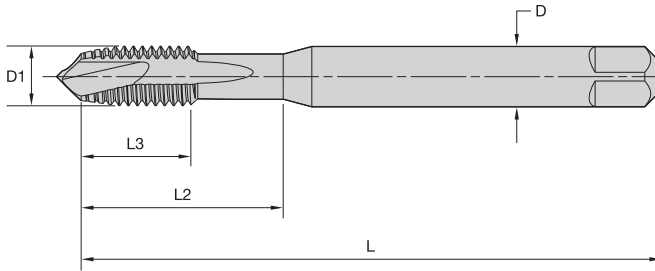


- first choice
- alternate choice

grade WP42EG TiCN		inch dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 TPI	L	L3	L2	D			
5368492	VTSP09705	1/4 - 20	3.15	.59	1.18	.255	3	DIN-ANSI	2B
5368493	VTSP09706	1/4 - 28	3.15	.59	1.18	.255	3	DIN-ANSI	2B
5368494	VTSP09707	5/16 - 18	3.54	.59	1.38	.318	3	DIN-ANSI	2B
5368495	VTSP09708	5/16 - 24	3.54	.59	1.38	.318	3	DIN-ANSI	2B
5368496	VTSP09709	3/8 - 16	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5368497	VTSP09710	3/8 - 24	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5368499	VTSP09711	7/16 - 14	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5368500	VTSP09712	7/16 - 20	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5368501	VTSP09713	1/2 - 13	4.33	.91	1.85	.367	3	DIN-ANSI	2B
5368502	VTSP09714	1/2 - 20	4.33	.91	1.85	.367	3	DIN-ANSI	2B
5368503	VTSP09715	9/16 - 18	4.33	.98	2.09	.429	3	DIN-ANSI	2B
5368504	VTSP09716	5/8 - 11	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5368505	VTSP09717	5/8 - 18	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5368506	VTSP09718	3/4 - 10	4.92	1.18	2.52	.590	3	DIN-ANSI	2B
5368508	VTSP09719	3/4 - 16	4.92	1.18	2.52	.590	3	DIN-ANSI	2B
5368509	VTSP09720	7/8 - 9	5.51	1.34	2.80	.697	3	DIN-ANSI	2B
5368510	VTSP09721	7/8 - 14	5.51	1.34	2.80	.697	3	DIN-ANSI	2B
5368511	VTSP09722	1 - 8	6.30	1.50	3.19	.800	3	DIN-ANSI	2B

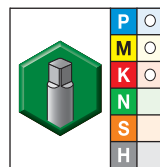
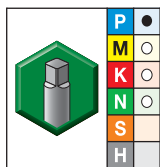
Multipurpose Taps

- WU41EG TiN
- WP49EG oxide



Shank Tolerance	
D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052

■ VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • DIN 371 and 376



- first choice
- alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5472633	VTSP06005	5387704	VTSP06005	4 - 40	56	8	18	3,5	2	DIN 371	2B
5472635	VTSP06007	5387707	VTSP06007	5 - 40	56	9	20	4,0	2	DIN 371	2B
5472636	VTSP06008	5387708	VTSP06008	6 - 32	56	9	20	4,0	2	DIN 371	2B
5472638	VTSP06010	5387760	VTSP06010	6 - 40	56	9	20	4,0	2	DIN 371	2B
5472639	VTSP06011	5387761	VTSP06011	8 - 32	63	11	21	4,5	2	DIN 371	2B
5472641	VTSP06013	5387763	VTSP06013	10 - 24	70	12	25	6,0	2	DIN 371	2B
5472644	VTSP06014	5387764	VTSP06014	10 - 32	70	12	25	6,0	2	DIN 371	2B
5472646	VTSP06016	5387766	VTSP06016	1/4 - 20	80	15	30	7,0	3	DIN 371	2B
5472647	VTSP06017	5387767	VTSP06017	1/4 - 28	80	15	30	7,0	3	DIN 371	2B
5472649	VTSP06019	5387769	VTSP06019	5/16 - 18	90	15	35	8,0	3	DIN 371	2B
5472650	VTSP06020	5387770	VTSP06020	5/16 - 24	90	15	35	8,0	3	DIN 371	2B
5472652	VTSP06022	5387772	VTSP06022	3/8 - 16	100	19	39	10,0	3	DIN 371	2B
5472653	VTSP06023	5387773	VTSP06023	3/8 - 24	100	19	39	10,0	3	DIN 371	2B
5472655	VTSP06025	5387776	VTSP06025	7/16 - 14	100	18	41	8,0	3	DIN 376	2B
5472656	VTSP06026	5387777	VTSP06026	7/16 - 20	100	18	41	8,0	3	DIN 376	2B
5472658	VTSP06028	5387779	VTSP06028	1/2 - 13	110	23	47	9,0	3	DIN 376	2B
5472659	VTSP06029	5387780	VTSP06029	1/2 - 20	110	23	47	9,0	3	DIN 376	2B
5472661	VTSP06031	5387782	VTSP06031	9/16 - 12	110	25	53	11,0	3	DIN 376	2B
5472662	VTSP06032	5387783	VTSP06032	9/16 - 18	110	25	53	11,0	3	DIN 376	2B
5472663	VTSP06033	5387784	VTSP06033	5/8 - 11	110	24	51	12,0	3	DIN 376	2B

(continued)

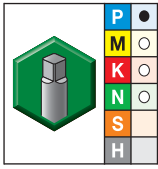
Multipurpose Taps

# Multipurpose Taps

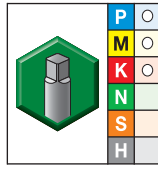
VariTap™ Spiral-Point HSS-E Taps • Through Holes



(VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • DIN 371 and 376 — continued)



grade WU41EG  
TiN



grade WP49EG  
Oxide

- first choice
- alternate choice

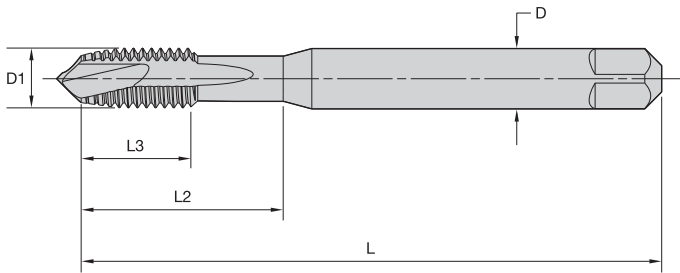
grade WU41EG TiN		grade WP49EG Oxide		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5472664	VTSP06034	5387785	VTSP06034	5/8 - 18	110	24	51	12,0	3	DIN 376	2B
5472665	VTSP06035	5387786	VTSP06035	3/4 - 10	140	30	64	16,0	3	DIN 376	2B
5472666	VTSP06036	5387787	VTSP06036	3/4 - 16	140	30	64	16,0	3	DIN 376	2B
5472667	VTSP06037	5387788	VTSP06037	7/8 - 9	140	34	71	18,0	3	DIN 376	2B
5472668	VTSP06038	5387789	VTSP06038	7/8 - 14	140	34	71	18,0	3	DIN 376	2B
5472669	VTSP06039	5387790	VTSP06039	1 - 8	160	38	81	18,0	3	DIN 376	2B
5472670	VTSP06040	5387791	VTSP06040	1 - 12	160	38	81	18,0	3	DIN 376	2B

Multipurpose Taps





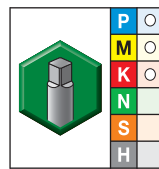
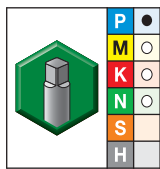
- WU41EG TiN
- WP49EG oxide



Shank Tolerance

D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052

■ VT-SPO • Form B Plug Chamfer • UNJC/UNJF • Inch DIN 371 and 376



- first choice
- alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5472634	VTSP06006	5387705	VTSP06006	4 - 40	56	8	18	3,5	2	DIN 371	3B
5472637	VTSP06009	5387709	VTSP06009	6 - 32	56	9	20	4,0	2	DIN 371	3B
5472640	VTSP06012	5387762	VTSP06012	8 - 32	63	11	21	4,5	2	DIN 371	3B
5472645	VTSP06015	5387765	VTSP06015	10 - 32	70	12	25	6,0	2	DIN 371	3B
5472648	VTSP06018	5387768	VTSP06018	1/4 - 28	80	15	30	7,0	3	DIN 371	3B
5472651	VTSP06021	5387771	VTSP06021	5/16 - 24	90	15	35	8,0	3	DIN 371	3B
5472654	VTSP06024	5387774	VTSP06024	3/8 - 24	100	19	39	10,0	3	DIN 371	3B
5472657	VTSP06027	5387778	VTSP06027	7/16 - 20	100	18	41	8,0	3	DIN 376	3B
5472660	VTSP06030	5387781	VTSP06030	1/2 - 20	110	23	47	9,0	3	DIN 376	3B

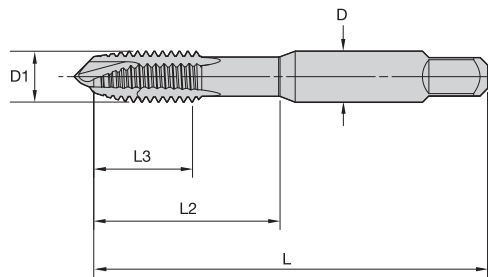
Multipurpose Taps

# Multipurpose Taps

VariTap™ Spiral-Point HSS-E Taps • Through Holes

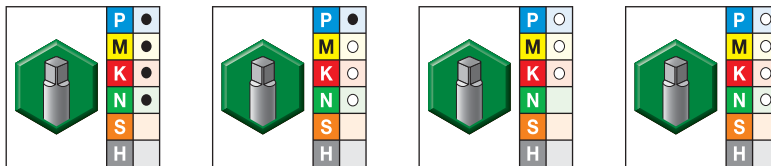


- WP42EG TiCN
- WU41EG TiN
- WP49EG oxide
- WU40EG bright



Shank Tolerance	
D inch	tolerance
0.141–0.635	+0, -.0015
>0.635–1.51	+0, -.0020
>1.51–2.01	+0, -.0030

## ■ VT-SPO • Form B Plug Chamfer • Metric • ANSI



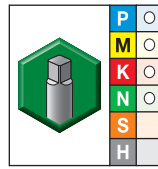
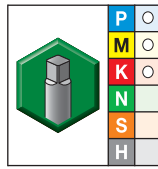
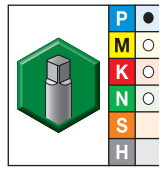
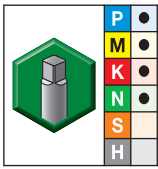
- first choice
- alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions				number of flutes	pitch diameter limit	
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2			D
5362670	VTSP05505	5362671	VTSP05505	5362589	VTSP05505	5362672	VTSP05505	M3 X 0,5	1.94	.58	.75	.141	2	D3
5362674	VTSP05506	-	-	5362673	VTSP05506	-	-	M3 X 0,5	1.94	.58	.75	.141	2	D11
5631641	VTSP05613	5631642	VTSP05613	5631640	VTSP05613	5631643	VTSP05613	M3 X 0,5	1.94	.58	.75	.141	3	D3
5631645	VTSP05614	-	-	5631644	VTSP05614	-	-	M3 X 0,5	1.94	.58	.75	.141	3	D11
5362677	VTSP05507	-	-	5362676	VTSP05507	5362678	VTSP05507	M3,5 X 0,6	1.99	.38	.71	.141	2	D4
5362690	VTSP05508	-	-	5362679	VTSP05508	-	-	M3,5 X 0,6	1.99	.38	.71	.141	2	D11
5631647	VTSP05615	-	-	5631646	VTSP05615	5631648	VTSP05615	M3,5 X 0,6	1.99	.38	.71	.141	3	D4
5631650	VTSP05616	-	-	5631649	VTSP05616	-	-	M3,5 X 0,6	1.99	.38	.71	.141	3	D11
5362692	VTSP05509	5362693	VTSP05509	5362691	VTSP05509	5362694	VTSP05509	M4 X 0,7	2.12	.38	.76	.168	2	D4
5362696	VTSP05510	-	-	5362695	VTSP05510	-	-	M4 X 0,7	2.12	.38	.76	.168	2	D11
5631652	VTSP05617	5631653	VTSP05617	5631651	VTSP05617	5631654	VTSP05617	M4 X 0,7	2.12	.38	.76	.168	3	D4
5631656	VTSP05618	-	-	5631655	VTSP05618	-	-	M4 X 0,7	2.12	.38	.76	.168	3	D11
5362698	VTSP05511	5362699	VTSP05511	5362697	VTSP05511	5362700	VTSP05511	M5 X 0,8	2.37	.50	.91	.194	2	D4
5362702	VTSP05512	-	-	5362701	VTSP05512	-	-	M5 X 0,8	2.37	.50	.91	.194	2	D11
5631659	VTSP05619	5631670	VTSP05619	5631658	VTSP05619	5631671	VTSP05619	M5 X 0,8	2.37	.50	.91	.194	3	D4
5631673	VTSP05620	-	-	5631672	VTSP05620	-	-	M5 X 0,8	2.37	.50	.91	.194	3	D11
5362704	VTSP05513	5362705	VTSP05513	5362703	VTSP05513	5362706	VTSP05513	M6 X 1	2.50	.63	1.00	.255	3	D5
5362708	VTSP05514	-	-	5362707	VTSP05514	-	-	M6 X 1	2.50	.63	1.00	.255	3	D11
5362710	VTSP05515	-	-	5362709	VTSP05515	5362711	VTSP05515	M7 X 1	2.72	.69	1.15	.318	3	D5
5362713	VTSP05516	-	-	5362712	VTSP05516	-	-	M7 X 1	2.72	.69	1.15	.318	3	D11
5362715	VTSP05517	-	-	5362714	VTSP05517	5362716	VTSP05517	M8 X 1	2.71	.69	1.12	.318	3	D5
5362718	VTSP05518	-	-	5362717	VTSP05518	-	-	M8 X 1	2.71	.69	1.12	.318	3	D11
5362722	VTSP05519	5362723	VTSP05519	5362720	VTSP05519	5362724	VTSP05519	M8 X 1,25	2.71	.69	1.13	.318	3	D5
5362728	VTSP05520	-	-	5362727	VTSP05520	-	-	M8 X 1,25	2.71	.69	1.13	.318	3	D11

(continued)

Multipurpose Taps

(VT-SPO • Form B Plug Chamfer • Metric • ANSI — continued)



● first choice  
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
5362730	VTSP05521	-	-	5362729	VTSP05521	5362731	VTSP05521	M10 X 1	2.91	.75	1.24	.381	3	D5
5362733	VTSP05522	-	-	5362732	VTSP05522	-	-	M10 X 1	2.91	.75	1.24	.381	3	D11
5367305	VTSP05523	-	-	5367304	VTSP05523	5367306	VTSP05523	M10 X 1,25	2.92	.74	1.25	.381	3	D5
5367308	VTSP05524	-	-	5367307	VTSP05524	-	-	M10 X 1,25	2.92	.74	1.25	.381	3	D11
5367340	VTSP05525	5367341	VTSP05525	5367309	VTSP05525	5367342	VTSP05525	M10 X 1,5	2.92	.75	1.26	.381	3	D6
5367344	VTSP05526	-	-	5367343	VTSP05526	-	-	M10 X 1,5	2.92	.75	1.26	.381	3	D11
5367346	VTSP05527	-	-	5367345	VTSP05527	5367347	VTSP05527	M12 X 1,25	3.38	.94	1.74	.367	3	D6
5367349	VTSP05528	-	-	5367348	VTSP05528	-	-	M12 X 1,25	3.38	.94	1.74	.367	3	D11
5367351	VTSP05529	-	-	5367350	VTSP05529	5367352	VTSP05529	M12 X 1,5	3.38	.94	1.74	.367	3	D6
5367354	VTSP05530	-	-	5367353	VTSP05530	-	-	M12 X 1,5	3.38	.94	1.74	.367	3	D11
5367356	VTSP05531	5367357	VTSP05531	5367355	VTSP05531	5367358	VTSP05531	M12 X 1,75	3.38	.94	1.74	.367	3	D6
5367360	VTSP05532	-	-	5367359	VTSP05532	-	-	M12 X 1,75	3.38	.94	1.74	.367	3	D11
5367362	VTSP05533	-	-	5367361	VTSP05533	5367363	VTSP05533	M14 X 1,5	3.59	1.00	1.74	.429	3	D6
5367365	VTSP05534	-	-	5367364	VTSP05534	5367366	VTSP05534	M14 X 2	3.59	1.00	1.74	.429	3	D7
5366476	VTSP05535	5366477	VTSP05535	5366475	VTSP05535	5366478	VTSP05535	M16 X 1,5	3.81	1.09	1.89	.480	3	D6
5366480	VTSP05536	5366481	VTSP05536	5366479	VTSP05536	5366482	VTSP05536	M16 X 2	3.81	1.09	1.89	.480	3	D7
5366485	VTSP05537	-	-	5366483	VTSP05537	5366486	VTSP05537	M18 X 1,5	4.03	1.09	1.89	.542	3	D6
5366488	VTSP05538	-	-	5366487	VTSP05538	5366489	VTSP05538	M18 X 2,5	4.03	1.22	1.89	.542	3	D7
5366491	VTSP05539	-	-	5366490	VTSP05539	-	-	M20 X 1,5	4.47	1.22	2.08	.652	3	D6
5366493	VTSP05540	-	-	5366492	VTSP05540	-	-	M20 X 2,5	4.47	1.22	2.08	.652	3	D7
-	-	-	-	5366494	VTSP05541	-	-	M22 X 1,5	4.69	1.22	2.30	.697	3	D6
-	-	-	-	5366495	VTSP05542	-	-	M22 X 2,5	4.69	1.22	2.30	.697	3	D7
-	-	-	-	5366496	VTSP05543	-	-	M24 X 2	4.91	1.22	2.30	.760	3	D7
-	-	-	-	5366497	VTSP05544	-	-	M24 X 3	4.91	1.22	2.30	.760	3	D8
-	-	-	-	5366498	VTSP05545	-	-	M27 X 1,5	5.13	1.22	2.50	.896	4	D7
-	-	-	-	5366499	VTSP05546	-	-	M27 X 3	5.13	1.22	2.50	.896	4	0
-	-	-	-	5366510	VTSP05547	-	-	M30 X 1,5	5.44	1.22	2.56	1.021	4	D6
-	-	-	-	5366511	VTSP05548	-	-	M30 X 3,5	5.44	1.22	2.56	1.021	4	D9

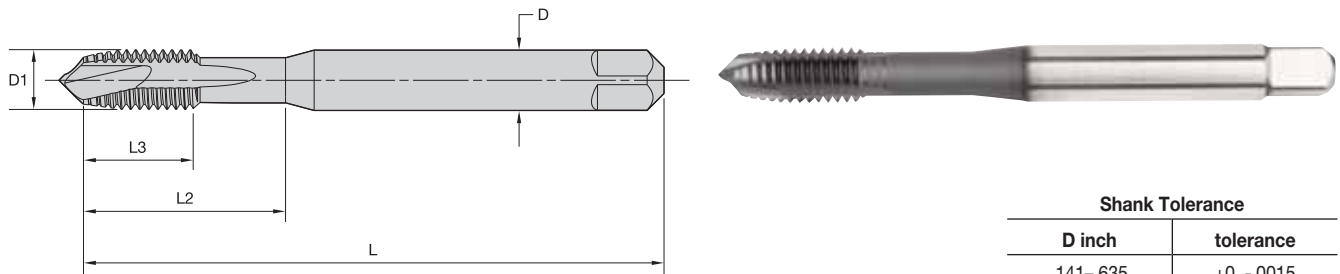
Multipurpose Taps

# Multipurpose Taps

VariTap™ Spiral-Point HSS-E Taps • Through Holes

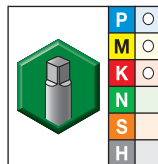
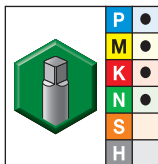


- WP42EG TiCN
- WP49EG oxide



Shank Tolerance	
D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

## ■ VT-SPO • Form B Plug Chamfer • Metric • DIN Length ANSI Shank

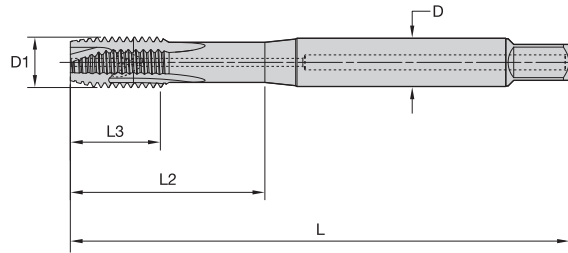


- first choice
- alternate choice

grade WP42EG TiCN		grade WP49EG Oxide		inch dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5368172	VTSP09506	5368171	VTSP09506	M3 X 0,5	2.20	.31	.71	.141	2	DIN-ANSI	6H
5368174	VTSP09507	5368173	VTSP09507	M4 X 0,7	2.48	.43	.83	.168	2	DIN-ANSI	6H
5368176	VTSP09508	5368175	VTSP09508	M5 X 0,8	2.75	.47	.97	.194	2	DIN-ANSI	6H
5368178	VTSP09509	5368177	VTSP09509	M6 X 1	3.15	.47	1.18	.255	3	DIN-ANSI	6H
5368180	VTSP09510	5368179	VTSP09510	M8 X 1,25	3.54	.59	1.37	.318	3	DIN-ANSI	6H
5368182	VTSP09511	5368181	VTSP09511	M10 X 1,25	3.93	.71	1.53	.381	3	DIN-ANSI	6H
5368184	VTSP09512	5368183	VTSP09512	M10 X 1,5	3.94	.71	1.53	.381	3	DIN-ANSI	6H
5368186	VTSP09513	5368185	VTSP09513	M12 X 1,25	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5368188	VTSP09514	5368187	VTSP09514	M12 X 1,5	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5368190	VTSP09515	5368189	VTSP09515	M12 X 1,75	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5368192	VTSP09516	5368191	VTSP09516	M14 X 1,5	4.33	.94	2.05	.429	3	DIN-ANSI	6H
5368195	VTSP09517	5368193	VTSP09517	M14 X 2	4.33	.94	2.05	.429	3	DIN-ANSI	6H
5368197	VTSP09518	5368196	VTSP09518	M16 X 1,5	4.33	.94	2.01	.480	3	DIN-ANSI	6H
5368199	VTSP09519	5368198	VTSP09519	M16 X 2	4.33	.94	2.01	.480	3	DIN-ANSI	6H
5368201	VTSP09520	5368200	VTSP09520	M18 X 1,5	4.92	1.18	2.28	.542	3	DIN-ANSI	6H
5368203	VTSP09521	5368202	VTSP09521	M18 X 2,5	4.92	1.18	2.28	.542	3	DIN-ANSI	6H
5368205	VTSP09522	5368204	VTSP09522	M20 X 1,5	5.51	1.18	2.52	.652	3	DIN-ANSI	6H
5368207	VTSP09523	5368206	VTSP09523	M20 X 2,5	5.51	1.18	2.52	.652	3	DIN-ANSI	6H

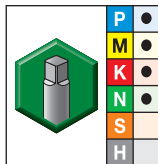
Multipurpose Taps

• WP42EG TiCN



Shank Tolerance	
D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

■ VT-SPO • Form B Plug Chamfer • Through Coolant • Metric • DIN Length ANSI Shank



● first choice  
○ alternate choice

grade WP42EG TiCN		inch dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
5368457	VTSP09905	M6 X 1	3.15	.47	1.18	.255	3	DIN-ANSI	6H
5368458	VTSP09906	M8 X 1,25	3.54	.59	1.38	.318	3	DIN-ANSI	6H
5368459	VTSP09907	M10 X 1,25	3.94	.71	1.54	.381	3	DIN-ANSI	6H
5368480	VTSP09908	M10 X 1,5	3.94	.71	1.54	.381	3	DIN-ANSI	6H
5368481	VTSP09909	M12 X 1,25	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5368482	VTSP09910	M12 X 1,5	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5368483	VTSP09911	M12 X 1,75	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5368484	VTSP09912	M14 X 1,5	4.33	.94	2.05	.429	3	DIN-ANSI	6H
5368485	VTSP09913	M14 X 2	4.33	.94	2.05	.429	3	DIN-ANSI	6H
5368486	VTSP09914	M16 X 1,5	4.33	.94	2.01	.480	3	DIN-ANSI	6H
5368487	VTSP09915	M16 X 2	4.33	.94	2.01	.480	3	DIN-ANSI	6H
5368488	VTSP09916	M18 X 1,5	4.92	1.18	2.28	.542	3	DIN-ANSI	6H
5368489	VTSP09917	M18 X 2,5	4.92	1.18	2.28	.542	3	DIN-ANSI	6H
5368490	VTSP09918	M20 X 1,5	5.51	1.18	2.52	.652	3	DIN-ANSI	6H
5368491	VTSP09919	M20 X 2,5	5.51	1.18	2.52	.652	3	DIN-ANSI	6H

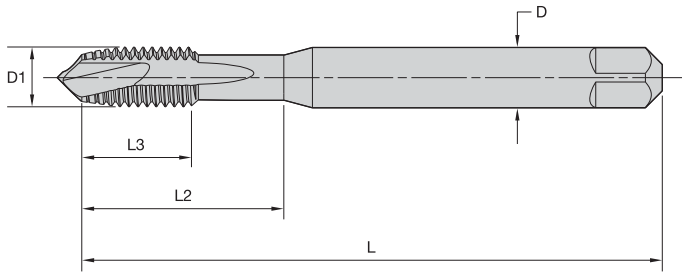
Multipurpose Taps

# Multipurpose Taps

VariTap™ Spiral-Point HSS-E Taps • Through Holes

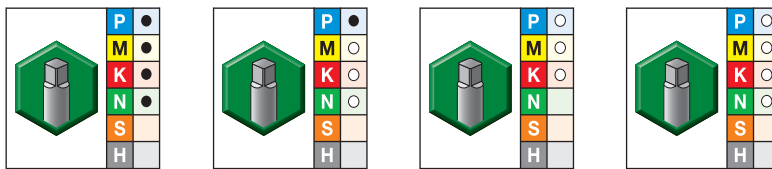


- WU40EG bright
- WU41EG TiN
- WP42EG TiCN
- WP49EG oxide



Shank Tolerance	
D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052

## ■ VT-SPO • Form B Plug Chamfer • Metric DIN 371, 374, and 376



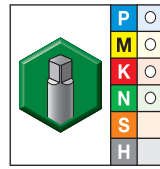
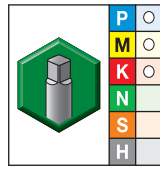
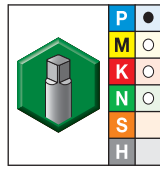
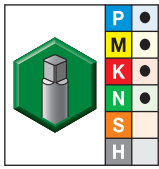
- first choice
- alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		metric dimensions				number of flutes	dimension standard	class of fit	
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2				D
5366647	VTSP06505	5366646	VTSP06505	5366648	VTSP06505	5366649	VTSP06505	M2 X 0,4	45	7	13	2,8	2	DIN 371	6H
-	-	-	-	5366660	VTSP06506	-	-	M2 X 0,4	45	7	13	2,8	2	DIN 371	6G
-	-	-	-	5366661	VTSP06507	-	-	M2,2 X 0,45	45	7	13	2,8	2	DIN 371	6H
-	-	5366662	VTSP06508	5366663	VTSP06508	5366664	VTSP06508	M2,5 X 0,45	50	7	15	2,8	2	DIN 371	6H
-	-	-	-	5366665	VTSP06509	-	-	M2,5 X 0,45	50	7	15	2,8	2	DIN 371	6G
-	-	-	-	5368602	VTSP06545	5368603	VTSP06545	M3 X 0,35	56	8	-	2,2	2	DIN 374	6H
-	-	5368514	VTSP06525	5368515	VTSP06525	5368516	VTSP06525	M3 X 0,5	56	8	-	2,2	2	DIN 376	6H
-	-	-	-	5366670	VTSP06511	-	-	M3 X 0,5	56	8	18	3,5	2	DIN 371	6G
5366667	VTSP06510	5366666	VTSP06510	5366668	VTSP06510	5366669	VTSP06510	M3 X 0,5	56	8	18	3,5	2	DIN 371	6H
-	-	5366671	VTSP06512	5366673	VTSP06512	5366674	VTSP06512	M3,5 X 0,6	56	9	20	4,0	2	DIN 371	6H
-	-	-	-	5368604	VTSP06546	5368605	VTSP06546	M4 X 0,5	63	10	21	2,8	2	DIN 374	6H
-	-	5368517	VTSP06526	5368518	VTSP06526	5368519	VTSP06526	M4 X 0,7	63	10	21	2,8	2	DIN 376	6H
-	-	-	-	5366679	VTSP06514	-	-	M4 X 0,7	63	11	21	4,5	2	DIN 371	6G
5366676	VTSP06513	5366675	VTSP06513	5366677	VTSP06513	5366678	VTSP06513	M4 X 0,7	63	11	21	4,5	2	DIN 371	6H
-	-	-	-	5368606	VTSP06547	5368607	VTSP06547	M5 X 0,5	70	12	25	3,5	2	DIN 374	6H
-	-	5368540	VTSP06527	5368541	VTSP06527	5368542	VTSP06527	M5 X 0,8	70	12	25	3,5	2	DIN 376	6H
-	-	-	-	5366685	VTSP06516	-	-	M5 X 0,8	70	12	25	6,0	2	DIN 371	6G
5366681	VTSP06515	5366680	VTSP06515	5366682	VTSP06515	5366684	VTSP06515	M5 X 0,8	70	12	25	6,0	2	DIN 371	6H
-	-	-	-	5368608	VTSP06548	5368609	VTSP06548	M6 X 0,5	80	12	30	4,5	3	DIN 374	6H
-	-	-	-	5368610	VTSP06549	5368611	VTSP06549	M6 X 0,75	80	12	30	4,5	3	DIN 374	6H
-	-	5368543	VTSP06528	5368544	VTSP06528	5368545	VTSP06528	M6 X 1	80	12	30	4,5	3	DIN 376	6H
5366687	VTSP06517	5366686	VTSP06517	5366688	VTSP06517	5366689	VTSP06517	M6 X 1	80	12	30	6,0	3	DIN 371	6H
-	-	-	-	5366690	VTSP06518	-	-	M6 X 1	80	12	30	6,0	3	DIN 371	6G
-	-	-	-	5368612	VTSP06550	5368613	VTSP06550	M7 X 0,75	80	12	30	5,5	3	DIN 374	6H

(continued)

Multipurpose Taps

(VT-SPO • Form B Plug Chamfer • Metric DIN 371, 374, and 376 – continued)



● first choice  
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5366693	VTSP06519	5366692	VTSP06519	5366695	VTSP06519	5366696	VTSP06519	M7 X 1	80	12	30	7,0	3	DIN 371	6H
-	-	-	-	5366697	VTSP06520	-	-	M7 X 1	80	12	30	7,0	3	DIN 371	6G
-	-	-	-	5368614	VTSP06551	5368615	VTSP06551	M8 X 0,75	80	12	30	6,0	3	DIN 374	6H
-	-	-	-	5368616	VTSP06552	5368617	VTSP06552	M8 X 1	90	15	35	6,0	3	DIN 374	6H
-	-	5368546	VTSP06529	5368547	VTSP06529	5368548	VTSP06529	M8 X 1,25	90	15	35	6,0	3	DIN 376	6H
5366700	VTSP06521	5366698	VTSP06521	5366701	VTSP06521	5366703	VTSP06521	M8 X 1,25	90	15	35	8,0	3	DIN 371	6H
-	-	-	-	5366704	VTSP06522	-	-	M8 X 1,25	90	15	35	8,0	3	DIN 371	6G
-	-	-	-	5368618	VTSP06553	5368619	VTSP06553	M10 X 0,75	90	15	35	7,0	3	DIN 374	6H
-	-	-	-	5368620	VTSP06554	5368621	VTSP06554	M10 X 1	90	15	35	7,0	3	DIN 374	6H
-	-	-	-	5368622	VTSP06555	5368623	VTSP06555	M10 X 1,25	100	18	39	7,0	3	DIN 374	6H
-	-	-	-	5366709	VTSP06524	-	-	M10 X 1,5	100	18	39	10,0	3	DIN 371	6G
5366706	VTSP06523	5366705	VTSP06523	5366707	VTSP06523	5366708	VTSP06523	M10 X 1,5	100	18	39	10,0	3	DIN 371	6H
-	-	5368549	VTSP06530	5368550	VTSP06530	5368551	VTSP06530	M10 X 1,5	100	18	39	7,0	3	DIN 376	6H
-	-	-	-	5368624	VTSP06556	5368625	VTSP06556	M11 X 1	90	15	36	8,0	3	DIN 374	6H
-	-	-	-	5368626	VTSP06557	5368627	VTSP06557	M12 X 1	100	21	39	9,0	3	DIN 374	6H
-	-	-	-	5368628	VTSP06558	5368629	VTSP06558	M12 X 1,25	100	21	39	9,0	3	DIN 374	6H
-	-	-	-	5368630	VTSP06559	5368631	VTSP06559	M12 X 1,5	100	21	39	9,0	3	DIN 374	6H
-	-	-	-	5368556	VTSP06532	-	-	M12 X 1,75	110	21	44	9,0	3	DIN 376	6G
5368553	VTSP06531	5368552	VTSP06531	5368554	VTSP06531	5368555	VTSP06531	M12 X 1,75	110	21	44	9,0	3	DIN 376	6H
-	-	-	-	5368632	VTSP06560	5368633	VTSP06560	M14 X 1	100	21	47	11,0	3	DIN 374	6H
-	-	-	-	5368634	VTSP06561	5368635	VTSP06561	M14 X 1,25	100	21	47	11,0	3	DIN 374	6H
-	-	-	-	5368636	VTSP06562	5368637	VTSP06562	M14 X 1,5	100	21	47	11,0	3	DIN 374	6H
5368558	VTSP06533	5368557	VTSP06533	5368559	VTSP06533	5368560	VTSP06533	M14 X 2	110	24	52	11,0	3	DIN 376	6H
-	-	-	-	5368561	VTSP06534	-	-	M14 X 2	110	24	52	11,0	3	DIN 376	6G
-	-	-	-	5368638	VTSP06563	5368639	VTSP06563	M16 X 1	100	21	46	12,0	3	DIN 374	6H
-	-	-	-	5368640	VTSP06564	5368641	VTSP06564	M16 X 1,5	100	21	46	12,0	3	DIN 374	6H
5368563	VTSP06535	5368562	VTSP06535	5368565	VTSP06535	5368566	VTSP06535	M16 X 2	110	24	51	12,0	3	DIN 376	6H
-	-	-	-	5368567	VTSP06536	-	-	M16 X 2	110	24	51	12,0	3	DIN 376	6G
-	-	-	-	5368642	VTSP06565	5368643	VTSP06565	M18 X 1	110	21	50	14,0	3	DIN 374	6H
-	-	-	-	5368683	VTSP06566	5368684	VTSP06566	M18 X 1,5	110	21	50	14,0	3	DIN 374	6H
-	-	-	-	5368685	VTSP06567	5368686	VTSP06567	M18 X 2	125	30	58	14,0	3	DIN 374	6H
5368569	VTSP06537	5368568	VTSP06537	5368570	VTSP06537	5368571	VTSP06537	M18 X 2,5	125	30	58	14,0	3	DIN 376	6H
-	-	-	-	5368687	VTSP06568	5368688	VTSP06568	M20 X 1	125	24	56	16,0	3	DIN 374	6H
-	-	-	-	5368689	VTSP06569	5368690	VTSP06569	M20 X 1,5	125	24	56	16,0	3	DIN 374	6H
-	-	-	-	5368691	VTSP06570	5368692	VTSP06570	M20 X 2	140	30	64	16,0	3	DIN 374	6H
5368573	VTSP06538	5368572	VTSP06538	5368574	VTSP06538	5368575	VTSP06538	M20 X 2,5	140	30	64	16,0	3	DIN 376	6H
-	-	-	-	5368693	VTSP06571	5368694	VTSP06571	M22 X 1,5	125	24	62	18,0	3	DIN 374	6H
-	-	-	-	-	-	5368695	VTSP06572	M22 X 2	140	30	70	18,0	3	DIN 374	6H
5368577	VTSP06539	5368576	VTSP06539	5368578	VTSP06539	5368579	VTSP06539	M22 X 2,5	140	30	70	18,0	3	DIN 376	6H
-	-	-	-	5368696	VTSP06573	5368697	VTSP06573	M24 X 1,5	140	28	67	18,0	3	DIN 374	6H

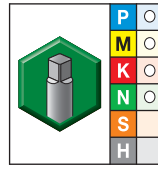
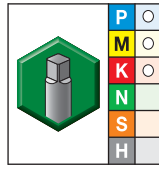
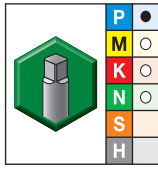
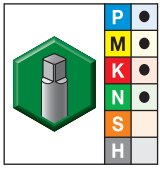
(continued)

Multipurpose Taps

# Multipurpose Taps

VariTap™ Spiral-Point HSS-E Taps • Through Holes

(VT-SPO • Form B Plug Chamfer • Metric DIN 371, 374, and 376 – continued)

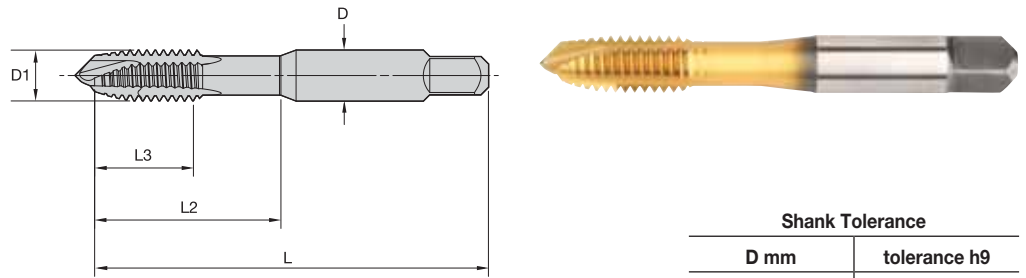


● first choice  
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
-	-	-	-	-	-	5368698	VTSP06574	M24 X 2	140	30	67	18,0	3	DIN 374	6H
5368581	VTSP06540	5368580	VTSP06540	5368582	VTSP06540	5368583	VTSP06540	M24 X 3	160	36	77	18,0	3	DIN 376	6H
-	-	5368584	VTSP06541	5368585	VTSP06541	5368586	VTSP06541	M27 X 3	160	36	82	20,0	4	DIN 376	6H
-	-	-	-	-	-	5368699	VTSP06575	M30 X 2	150	28	80	22,0	4	DIN 374	6H
-	-	5368587	VTSP06542	5368588	VTSP06542	5368589	VTSP06542	M30 X 3,5	180	42	91	22,0	4	DIN 376	6H
-	-	-	-	5368600	VTSP06543	-	-	M33 X 3,5	180	42	100	25,0	4	DIN 376	6H
-	-	-	-	5368601	VTSP06544	-	-	M36 X 4	200	48	110	28,0	4	DIN 376	6H

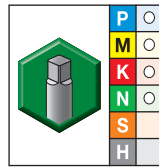
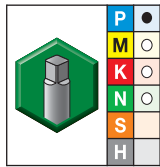


- WU40EG bright
- WU41EG TiN



Shank Tolerance	
D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052

■ VT-SPO • Form B Plug Chamfer • Metric • JIS



- first choice
- alternate choice

grade WU41EG TiN		grade WU40EG Bright		metric dimensions					number of flutes	dimension standard	tap class
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5387861	VTSP07505	5387859	VTSP07505	M3 X 0,5	46	11	19	4,0	2	JIS	ISO 2
5387865	VTSP07506	5387863	VTSP07506	M4 X 0,7	52	13	21	5,0	2	JIS	ISO 2
5387869	VTSP07507	5387867	VTSP07507	M5 X 0,8	60	16	24	5,5	2	JIS	ISO 2
5387873	VTSP07508	5387871	VTSP07508	M6 X 1	62	19	29	6,0	3	JIS	ISO 2
5387877	VTSP07509	5387875	VTSP07509	M8 X 1,25	70	22	37	6,2	3	JIS	ISO 2
5387881	VTSP07510	5387879	VTSP07510	M10 X 1,5	75	24	41	7,0	3	JIS	ISO 2
-		5387883	VTSP07511	M12 X 1,25	82	29	48	8,5	3	JIS	ISO 2
-		5387887	VTSP07513	M12 X 1,5	82	29	48	8,5	3	JIS	ISO 2
-		5387885	VTSP07512	M12 X 1,75	82	29	48	8,5	3	JIS	ISO 2
-		5387891	VTSP07515	M14 X 1,5	88	30	48	10,5	3	JIS	ISO 2
-		5387889	VTSP07514	M14 X 2	88	30	48	10,5	3	JIS	ISO 2
-		5387895	VTSP07517	M16 X 1,5	95	32	52	12,5	3	JIS	ISO 2
-		5387893	VTSP07516	M16 X 2	95	32	52	12,5	3	JIS	ISO 2
-		5387898	VTSP07518	M18 X 2,5	100	37	55	14,0	3	JIS	ISO 2
-		5387900	VTSP07519	M20 X 2,5	105	37	60	15,0	3	JIS	ISO 2

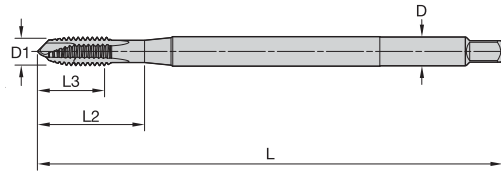
Multipurpose Taps

# Multipurpose Taps

VariTap™ Spiral-Point HSS-E Extension Taps • Through Holes • 4" Length



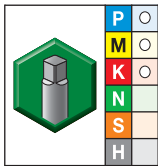
- WP49EG oxide



Shank Tolerance

D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

## ■ VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • 4" Length • ANSI



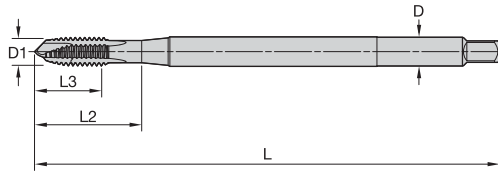
- first choice
- alternate choice

grade WP49EG  
Oxide

order #	catalog #	D1 TPI	L	inch dimensions			number of flutes	pitch diameter limit
				L3	L2	D		
5608578	VTSP05419	4 - 40	4.00	.56	.87	.141	2	H2
5608579	VTSP05420	6 - 32	4.00	.38	.71	.141	2	H3
5608580	VTSP05421	8 - 32	4.00	.38	.76	.168	2	H3
5608582	VTSP05422	10 - 24	4.00	.50	.91	.194	2	H3
5608584	VTSP05423	10 - 32	4.00	.50	.91	.194	2	H3
5608585	VTSP05424	1/4 - 20	4.00	.63	1.01	.255	3	H3

Multipurpose Taps

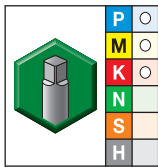
• WP49EG oxide



Shank Tolerance

D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

■ VT-SPO • Form B Plug Chamfer • Machine Screw and Fractional • 6" Length • ANSI

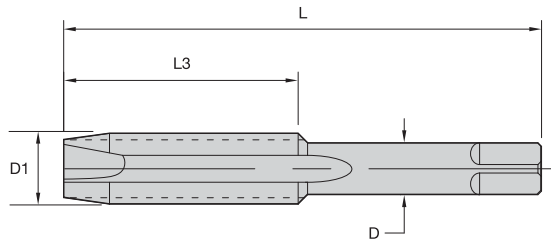


● first choice  
○ alternate choice

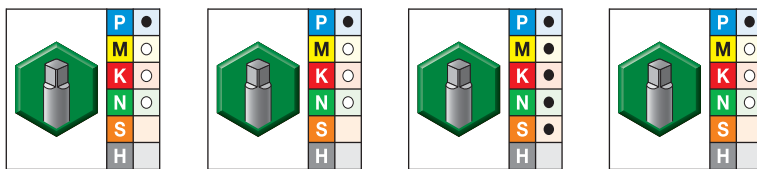
grade WP49EG Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5608551	VTSP05403	4 - 40	6.00	.56	.87	.141	2	H2
5608552	VTSP05404	6 - 32	6.00	.38	.71	.168	2	H3
5608553	VTSP05405	8 - 32	6.00	.38	.76	.168	2	H3
5608554	VTSP05406	10 - 24	6.00	.50	.91	.194	2	H3
5608555	VTSP05407	10 - 32	6.00	.50	.91	.194	2	H3
5608556	VTSP05408	1/4 - 20	6.00	.63	1.01	.255	3	H3
5608557	VTSP05409	1/4 - 28	6.00	.63	1.01	.255	3	H3
5608558	VTSP05410	5/16 - 18	6.00	.69	1.13	.318	3	H3
5608559	VTSP05411	5/16 - 24	6.00	.69	1.13	.318	3	H3
5608570	VTSP05412	3/8 - 16	6.00	.75	1.27	.381	3	H3
5608571	VTSP05413	3/8 - 24	6.00	.75	1.27	.381	3	H3
5608572	VTSP05414	7/16 - 14	6.00	.88	1.49	.323	3	H3
5608573	VTSP05415	7/16 - 20	6.00	.88	1.49	.323	3	H3
5608575	VTSP05416	1/2 - 13	6.00	.94	1.74	.367	3	H3
5608576	VTSP05417	1/2 - 20	6.00	.94	1.74	.367	3	H3
5608577	VTSP05418	5/8 - 11	6.00	1.09	1.89	.480	3	H3

Multipurpose Taps

- Series 5301TC • TiCN Coated
- Series 2301 • TiN Coated
- Series 5301S • SH50 Steam Oxide
- Series 5301 • Uncoated



■ Series 5301/2301 • Machine Screw and Fractional Sizes • Plug Chamfer

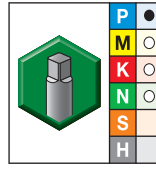
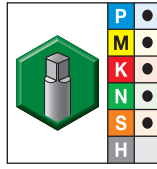
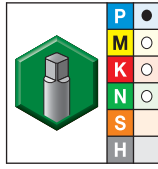
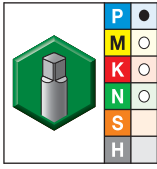


● first choice  
○ alternate choice

TiCN		TiN		oxide		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		
2746991	19011	2747016	19001	2750325	13111	2750249	13202	0 - 80	1.63	.31	.141	2	H2
-	-	-	-	-	-	2750251	13201	0 - 80	1.63	.31	.141	2	H1
2972885	19442	-	-	-	-	2750246	13204	1 - 64	1.69	.38	.141	2	H2
3171104	19446	-	-	2750324	13115	2750241	13206	1 - 72	1.69	.38	.141	2	H2
-	-	-	-	-	-	2750243	13205	1 - 72	1.69	.38	.141	2	H1
2746990	19012	2747001	19006	2750321	13117	2867063	13208	2 - 56	1.75	.44	.141	2	H2
-	-	-	-	-	-	2867066	13207	2 - 56	1.75	.44	.141	2	H1
3171107	19449	-	-	-	-	2750238	13211	2 - 64	1.75	.44	.141	2	H2
3171109	19452	2746999	19007	2750319	13119	2750236	13213	3 - 48	1.81	.50	.141	2	H2
3171113	19459	-	-	-	-	2750231	13215	3 - 56	1.81	.50	.141	2	H2
-	-	-	-	2750313	13126	2750230	13217	4 - 36	1.88	.56	.141	2	H2
2746988	19013	2746982	19016	2750316	13123	2750228	13219	4 - 40	1.88	.56	.141	2	H2
3171115	19462	-	-	-	-	2750225	13223	4 - 48	1.88	.56	.141	2	H2
2746986	19014	2746972	19021	2750312	13128	2750220	13225	5 - 40	1.94	.63	.141	2	H2
3171117	19464	-	-	-	-	2750218	13229	5 - 44	1.94	.63	.141	2	H2
-	-	2746946	19036	2750306	13132	2750210	13232	6 - 32	2.00	.69	.141	2	H3
3171119	19467	2746954	19031	2750309	13131	2750212	13231	6 - 32	2.00	.69	.141	2	H2
-	-	-	-	-	-	2750209	13235	6 - 32	2.00	.69	.141	2	H7
2746944	19037	2746942	19038	-	-	2750206	13237	6 - 40	2.00	.69	.141	2	H2
-	-	2746928	19046	2750300	13137	2750199	13242	8 - 32	2.13	.75	.168	2	H3
-	-	2746941	19039	2750302	13136	2750202	13241	8 - 32	2.13	.75	.168	2	H2
-	-	-	-	-	-	2750204	13240	8 - 32	2.13	.75	.168	2	H1
-	-	-	-	-	-	2750195	13244	8 - 32	2.13	.75	.168	2	H7
-	-	-	-	3047408	13139	2750193	13246	8 - 36	2.13	.75	.168	2	H2
2746984	19015	2746913	19056	2750293	13142	2409831	13251	10 - 24	2.38	.88	.194	2	H3
-	-	-	-	2750294	13141	2750190	13250	10 - 24	2.38	.88	.194	2	H2
-	-	-	-	-	-	2750192	13249	10 - 24	2.38	.88	.194	2	H1
-	-	2746897	19071	2750290	13146	2750175	13257	10 - 32	2.38	.88	.194	2	H3

(continued)

(Series 5301/2301 • Machine Screw and Fractional Sizes • Plug Chamfer – continued)

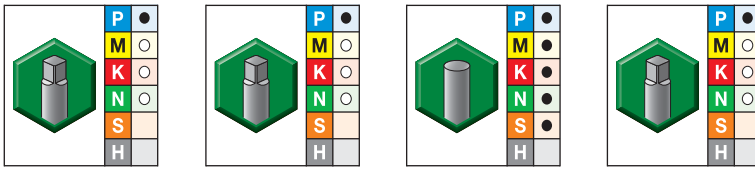


● first choice  
○ alternate choice

TICN		TiN		oxide		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		
-	-	2746899	19069	2750291	13145	2750177	13256	10 - 32	2.38	.88	.194	2	H2
-	-	-	-	-	-	2750179	13255	10 - 32	2.38	.88	.194	2	H1
-	-	-	-	-	-	2750165	13260	10 - 32	2.38	.88	.194	2	H7
2746980	19017	2746889	19076	2750287	13148	2750160	13262	12 - 24	2.38	.94	.220	2	H3
3171130	19482	-	-	2750286	13149	2750159	13264	12 - 28	2.38	.94	.220	2	H3
3171133	19485	2746879	19086	2750282	13152	2750152	13270	1/4 - 20	2.50	1.00	.255	2	H3
-	-	2746877	19088	2750280	13154	2750148	13272	1/4 - 20	2.50	1.00	.255	3	H3
-	-	2863790	19079	2750284	13151	2750154	13269	1/4 - 20	2.50	1.00	.255	2	H2
3171132	19484	-	-	-	-	2750156	13268	1/4 - 20	2.50	1.00	.255	2	H1
-	-	2746869	19096	-	-	2750143	13273	1/4 - 20	2.50	1.00	.255	2	H5
-	-	-	-	-	-	2750141	13274	1/4 - 20	2.50	1.00	.255	3	H5
-	-	-	-	2750278	13157	2750132	13278	1/4 - 28	2.50	1.00	.255	2	H2
3171139	19492	2746865	19101	2750277	13158	2750128	13280	1/4 - 28	2.50	1.00	.255	2	H3
-	-	-	-	-	-	2750135	13277	1/4 - 28	2.50	1.00	.255	2	H1
2746978	19018	-	-	-	-	2750129	13279	1/4 - 28	2.50	1.00	.255	3	H2
-	-	-	-	-	-	2750119	13282	1/4 - 28	2.50	1.00	.255	2	H4
-	-	-	-	-	-	2750118	13283	1/4 - 28	2.50	1.00	.255	3	H4
3171138	19490	-	-	-	-	-	-	1/4 - 28	2.50	1.00	.255	3	H2
3171144	19498	1916977	19106	2750276	13164	2750111	13291	5/16 - 18	2.72	1.13	.318	2	H3
2746976	19019	3171095	19384	1830468	13166	2750109	13293	5/16 - 18	2.72	1.13	.318	3	H3
-	-	-	-	-	-	2750115	13289	5/16 - 18	2.72	1.13	.318	2	H1
-	-	-	-	-	-	2750112	13290	5/16 - 18	2.72	1.13	.318	2	H2
-	-	-	-	-	-	2750105	13294	5/16 - 18	2.72	1.13	.318	2	H5
-	-	-	-	-	-	2750103	13295	5/16 - 18	2.72	1.13	.318	3	H5
-	-	2746861	19103	-	-	-	-	5/16 - 18	2.72	1.13	.318	3	H2
3171148	19504	2746857	19108	2750271	13170	2750088	13300	5/16 - 24	2.72	1.13	.318	2	H3
-	-	-	-	-	-	2750094	13298	5/16 - 24	2.72	1.13	.318	2	H2
-	-	-	-	-	-	2750086	13302	5/16 - 24	2.72	1.13	.318	2	H4
2746974	19020	-	-	-	-	2750084	13303	5/16 - 24	2.72	1.13	.318	3	H4
-	-	-	-	-	-	2750082	13305	3/8 - 16	2.94	1.25	.381	3	H1
-	-	-	-	-	-	2750080	13306	3/8 - 16	2.94	1.25	.381	3	H2
3171152	19509	-	-	-	-	2750075	13309	3/8 - 16	2.94	1.25	.381	3	H5
2746970	19022	2746855	19111	2750268	13176	2750078	13307	3/8 - 16	2.94	1.25	.381	3	H3
2746968	19023	2746853	19112	2750266	13180	2750067	13313	3/8 - 24	2.94	1.25	.381	3	H3
-	-	-	-	-	-	2866897	13312	3/8 - 24	2.94	1.25	.381	3	H2
-	-	-	-	-	-	2750066	13315	3/8 - 24	2.94	1.25	.381	3	H4
2746966	19024	1893987	19113	2750264	13183	2750060	13319	7/16 - 14	3.16	1.44	.323	3	H3
-	-	-	-	-	-	2750062	13318	7/16 - 14	3.16	1.44	.323	3	H2
-	-	-	-	-	-	2750058	13320	7/16 - 14	3.16	1.44	.323	3	H5
2746964	19025	2746849	19114	2750262	13185	2750055	13324	7/16 - 20	3.16	1.44	.323	3	H3

Production Taps

(Series 5301/2301 • Machine Screw and Fractional Sizes • Plug Chamfer – continued)

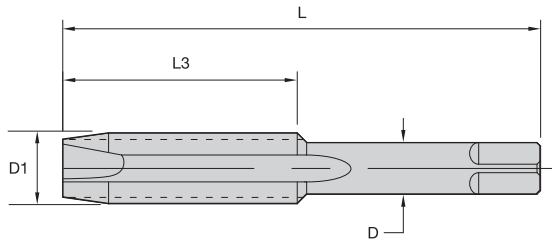
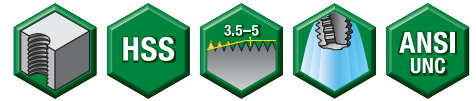


● first choice  
○ alternate choice

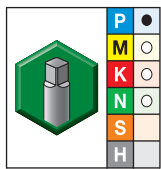
TiCN		TiN		oxide		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		
-	-	-	-	-	-	2750054	13325	7/16 - 20	3.16	1.44	.323	3	H5
2746962	19026	2746847	19116	2750261	13189	2750052	13328	1/2 - 13	3.38	1.66	.367	3	H3
-	-	-	-	-	-	2750053	13327	1/2 - 13	3.38	1.66	.367	3	H2
3171159	19520	-	-	-	-	2750047	13330	1/2 - 13	3.38	1.66	.367	3	H5
3171161	19524	-	-	-	-	2750041	13333	1/2 - 20	3.38	1.66	.367	3	H2
3171162	19525	-	-	-	-	2750039	13336	1/2 - 20	3.38	1.66	.367	3	H5
2746960	19027	2746845	19117	2750259	13193	2750040	13334	1/2 - 20	3.38	1.66	.367	3	H3
2746958	19028	2746843	19118	2750257	13195	2750036	13339	5/8 - 11	3.81	1.81	.480	3	H3
-	-	-	-	-	-	2750032	13340	5/8 - 11	3.81	1.81	.480	3	H5
-	-	-	-	2750255	13199	2750028	13342	5/8 - 18	3.81	1.81	.480	3	H3
-	-	-	-	-	-	2750023	13344	3/4 - 10	4.25	2.00	.590	3	H5
2746956	19029	2746841	19119	2750256	13197	2750024	13343	3/4 - 10	4.25	2.00	.590	3	H3

NOTE: GUN™ taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.





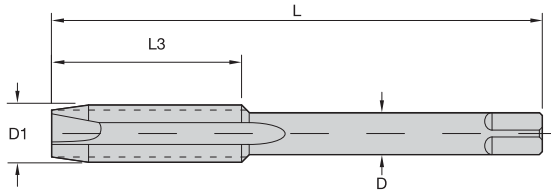
■ Series 5301F • Fractional Sizes • Spiral Point, Plug Chamfer



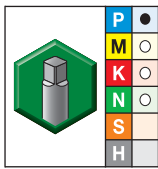
● first choice  
○ alternate choice

uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	D		
2750139	13275	1/4 - 20	2.50	1.00	.255	2	H11
2750101	13296	5/16 - 18	2.72	1.13	.318	2	H11
2750074	13310	3/8 - 16	2.94	1.25	.381	3	H11
2750046	13331	1/2 - 13	3.38	1.66	.367	3	H11
2750029	13341	5/8 - 11	3.81	1.81	.480	3	H11

NOTE: Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.



■ Series 5301 • Fractional Sizes • Spiral Point, Plug Chamfer

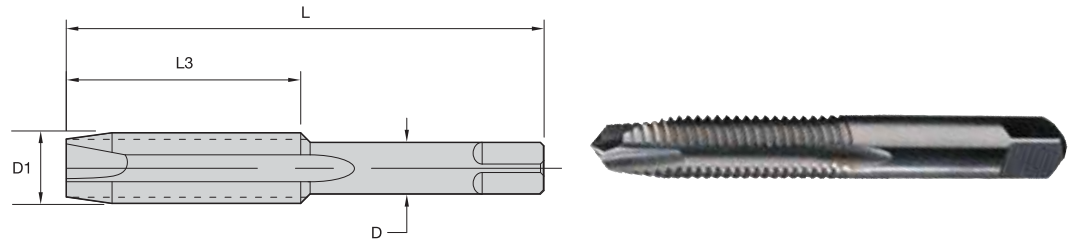


- first choice
- alternate choice

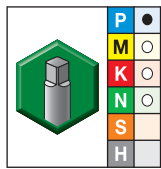
uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	D		
2747035	18930	6 - 32	6.00	.69	.141	2	H3
2747033	18932	8 - 32	6.00	.75	.168	2	H3
2747031	18934	10 - 24	6.00	.88	.194	2	H3
2747029	18935	10 - 32	6.00	.88	.194	2	H3
2747028	18936	1/4 - 20	6.00	1.00	.255	2	H3
2747026	18937	1/4 - 28	6.00	1.00	.255	2	H3
2747024	18938	5/16 - 18	6.00	1.13	.318	2	H3
2747022	18939	5/16 - 24	6.00	1.13	.318	2	H3
2747020	18940	3/8 - 16	6.00	1.25	.381	3	H3
2747018	18941	3/8 - 24	6.00	1.25	.381	3	H3

NOTE: Also available in Hand Tap Series 5305 and 5303.  
 GUN™ taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.  
 Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.





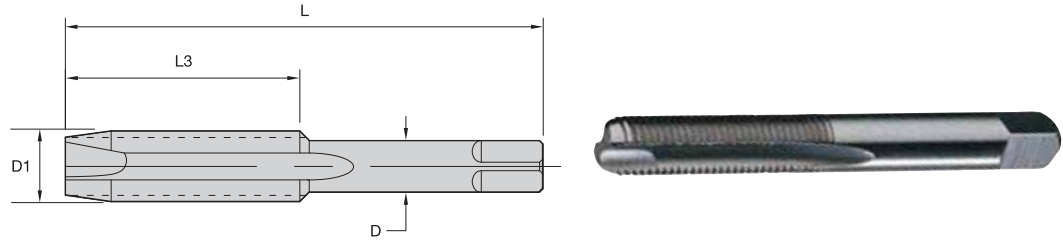
■ Series 5601 • Machine Screw and Fractional • Spiral Point, Plug Chamfer



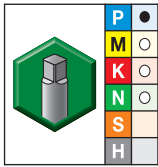
● first choice  
○ alternate choice

oxide/nitride		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	D		
2864368	16802	6 - 32	2.00	.69	.141	3	H3
2747975	16805	8 - 32	2.13	.75	.168	3	H3
2864362	16807	10 - 24	2.38	.88	.194	3	H3
2864359	16809	10 - 32	2.38	.88	.194	3	H3
2864356	16810	1/4 - 20	2.50	1.00	.255	3	H3
2747973	16812	1/4 - 28	2.50	1.00	.255	3	H3
2747971	16814	5/16 - 18	2.72	1.13	.318	3	H3
2747967	16818	3/8 - 16	2.94	1.25	.381	3	H3
2747965	16820	3/8 - 24	2.94	1.25	.381	3	H3
2747959	16826	1/2 - 13	3.38	1.66	.367	3	H3
2747955	16830	5/8 - 11	3.81	1.81	.480	3	H3
2747954	16832	3/4 - 10	4.25	2.00	.590	3	H3

NOTE: GUN™ taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.



■ Series 5302 • Machine Screw and Fractional • Spiral Point, Bottoming Chamfer



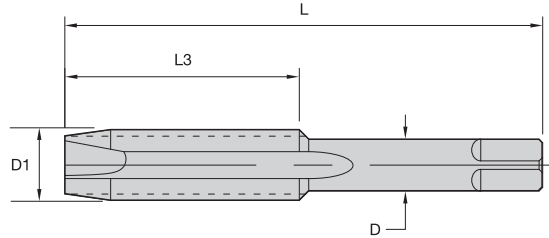
● first choice  
○ alternate choice

uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	D		
2749944	13602	0 - 80	1.63	.31	.141	2	H2
2749943	13606	2 - 56	1.75	.44	.141	2	H2
2749939	13614	4 - 40	1.88	.56	.141	2	H2
2749936	13617	5 - 40	1.94	.63	.141	2	H2
2749935	13619	6 - 32	2.00	.69	.141	2	H2
2749932	13620	6 - 32	2.00	.69	.141	2	H3
2749931	13623	6 - 40	2.00	.69	.141	2	H2
2749926	13625	8 - 32	2.13	.75	.168	2	H2
2749924	13626	8 - 32	2.13	.75	.168	2	H3
2866734	13629	10 - 24	2.38	.88	.194	2	H2
2749920	13630	10 - 24	2.38	.88	.194	2	H3
2749919	13633	10 - 32	2.38	.88	.194	2	H2
2866726	13634	10 - 32	2.38	.88	.194	2	H3
2749916	13636	12 - 24	2.38	.94	.220	2	H3
2749915	13638	1/4 - 20	2.50	1.00	.255	2	H3
2749914	13639	1/4 - 28	2.50	1.00	.255	2	H3
2749912	13641	5/16 - 18	2.72	1.13	.318	2	H3
2749909	13642	5/16 - 24	2.72	1.13	.318	2	H3

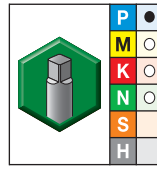
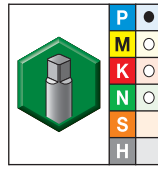
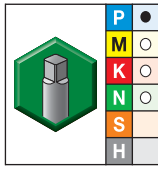
NOTE: Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.

Production Taps

- Series 5351TC • TiCN Coated
- Series 2351 • TiN Coated
- Series 5351 • Uncoated



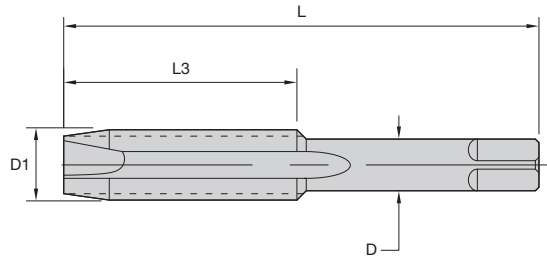
■ Series 5351/2351 • Spiral Point, Plug Chamfer • Metric ANSI



- first choice
- alternate choice

TiCN		TiN		uncoated		inch dimensions			number of flutes	pitch diameter limit	
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3			D
-	-	-	-	2750018	13367	M2 X 0,4	1.75	.44	.141	2	D3
-	-	-	-	2750017	13369	M2,5 X 0,45	1.81	.50	.141	2	D3
2747014	19002	2746278	19920	2750015	13371	M3 X 0,5	1.94	.63	.141	2	D3
-	-	-	-	2750013	13373	M3,5 X 0,6	2.00	.69	.141	2	D4
-	-	2746276	19921	2750012	13375	M4 X 0,7	2.13	.75	.168	2	D4
-	-	-	-	2750010	13377	M4,5 X 0,75	2.38	.88	.194	2	D4
2747010	19004	2746274	19922	2750009	13379	M5 X 0,8	2.38	.88	.194	2	D4
-	-	2746272	19923	2750005	13381	M6 X 1	2.50	1.00	.255	2	D5
-	-	-	-	2750002	13382	M6,3 X 1	2.50	1.00	.255	2	D5
-	-	-	-	2750000	13383	M7 X 1	2.72	1.13	.318	2	D5
2746997	19008	2746270	19924	2749995	13385	M8 X 1,25	2.72	1.13	.318	2	D5
2746995	19009	2746268	19925	2749991	13389	M10 X 1,5	2.94	1.25	.381	3	D6
-	-	-	-	2749977	13405	M18 X 2,5	4.03	1.81	.542	3	D7
2746993	19010	2746266	19926	-	-	M12 X 1,75	3.38	1.66	.367	3	D6

NOTE: Metric taps for 6H class of fit are suitable for MJ aerospace internal threading applications.  
 Metric taps are manufactured to USCTI specifications and dimensions.  
 Metric tap blank dimensions are equivalent to inch taps.  
 Metric D limits suitable for ISO 6H tolerance class.  
 Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 6H class of fit.



■ Series 7301 • Plug Chamfer

uncoated		inch dimensions				class of fit
order #	catalog #	D1 size	L	L3	D	
2750393	12027	4 - 40	1.88	.56	.141	2B
2750391	12030	5 - 40	1.94	.63	.141	2B
2750387	12032	6 - 32	2.00	.69	.141	2B
2750384	12034	8 - 32	2.15	.75	.168	2B
2750381	12036	10 - 24	2.38	.88	.194	2B
2750379	12037	10 - 32	2.38	.88	.194	2B
2750377	12038	12 - 24	2.38	.94	.220	2B
2750375	12040	1/4 - 20	2.50	1.00	.255	2B
2750374	12041	1/4 - 28	2.50	1.00	.255	2B
2750373	12042	5/16 - 18	2.72	1.13	.318	2B
2750371	12043	5/16 - 24	2.72	1.13	.318	2B
2750370	12044	3/8 - 16	2.94	1.25	.381	2B
2750369	12045	3/8 - 24	2.94	1.25	.381	2B
2750367	12046	7/16 - 14	3.16	1.44	.323	2B
2750364	12047	7/16 - 20	3.16	1.44	.323	2B
2750363	12048	1/2 - 13	3.38	1.66	.367	2B
2750360	12049	1/2 - 20	3.38	1.66	.367	2B
2750359	12050	5/8 - 11	3.81	1.81	.480	2B
2750357	12051	5/8 - 18	3.81	1.81	.480	2B
2750356	12052	3/4 - 10	4.25	1.81	.590	2B

# Tap into the power of the original.



## WIDIA™ VariTap™

**A heritage of hard work, innovation, and excellence. That's what makes an original.**

Built on a 140-year legacy of providing the industry with the highest quality performance in taps, dies, and gages. Our history propels us to keep delivering the most advanced solutions.

The WIDIA VariTap is the next application of our commitment to innovation.

- Extensive range of sizes, fits, styles, and coatings, equipped with optimized geometry, offering the largest portfolio solution of multipurpose taps available.
- Capable of working with a wide variety of materials.
- Long and consistent tool life leading to lower inventory costs.
- Unique spiral-point geometry provides low tapping torque, while pushing chips ahead of the tap in through holes.
- Superior thread finish.

To learn more about the unmatched benefits of WIDIA VariTap, call 800 979 4342, contact your local Authorized Distributor, or visit [widia.com/varitap](http://widia.com/varitap).

**WIDIA** 

Solutions for Blind Hole Applications •

**WIDIA-GTD™**

# Spiral Flute



WIDIA-GTD™ offers a wide range of options for tapping blind holes in:

- Steel and steel alloys.
- Stainless steel.
- Cast iron.
- Wrought and cast aluminum.
- Nickel-based alloys.
- Titanium alloys.

## High-Performance Victory™ HSS-E-PM Taps

- Optimized spiral-flute design enables deep blind holes to be threaded.
- Offer performance advantages over conventional high-speed steel taps.
- Long tap life at up to 50% higher tapping speed than HSS taps.

## Multipurpose VariTap™

- Spiral-flute geometry optimized to provide efficient chip ejection in blind holes.
- Manufactured from high-vanadium HSS-E to provide long and consistent tool life.
- Geometry designed to allow tapping of a wide variety of ductile materials: carbon and alloy steels, stainless steels, ductile iron, and cast aluminum.
- Ideal for customers who have a variety of materials to machine.

## General Purpose Production Taps

- Versatile spiral-flute design for pulling chips out of the hole.
- Can be used in general machinery or CNC tapping applications.
- Advanced steam oxide finish and high-performance TiN and TiCN coatings with alternate tap coatings available as stock modifications.

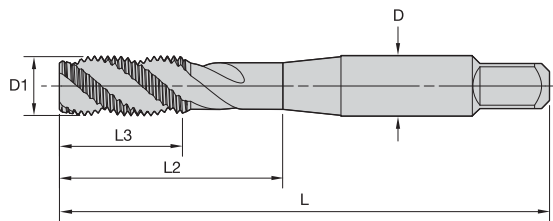


# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes



- GM6515 TiN + Cr/C for stainless steel.
- GP6520 TiCN for steel.
- GP6505 oxide for steel.

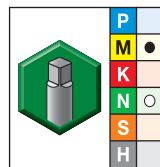
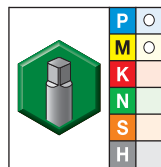
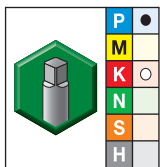


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



## ■ GT30 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • ANSI • For Steel and Stainless Steel



- first choice
- alternate choice

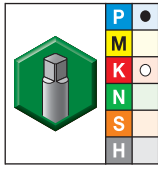
grade GP6520 TiCN		grade GP6505 Oxide		grade GM6515 TiN+CrC/C		inch dimensions					number of flutes	class of fit
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
3955161	GT305031	-	-	3955131	GT305001	2 - 56	1.75	.44	.49	.141	2	3BX
3955162	GT305032	-	-	3955132	GT305002	4 - 40	1.88	.56	.68	.141	2	2BX
3955163	GT305033	4035106	GT305125	3955133	GT305003	4 - 40	1.88	.56	.68	.141	2	3BX
3955164	GT305034	-	-	3955134	GT305004	6 - 32	1.99	.36	.71	.141	3	2BX
3955165	GT305035	4035107	GT305126	3955135	GT305005	6 - 32	1.99	.36	.71	.141	3	3BX
3955166	GT305036	4035108	GT305127	3955136	GT305006	8 - 32	2.12	.31	.76	.168	3	3BX
3955167	GT305037	4035109	GT305128	3955137	GT305007	10 - 24	2.37	.47	.91	.194	3	3BX
3955192	GT305052	-	-	3955152	GT305022	10 - 32	2.37	.47	.91	.194	3	2BX
3955193	GT305053	4035131	GT305140	3955153	GT305023	10 - 32	2.37	.47	.91	.194	3	3BX
3955168	GT305038	4035110	GT305129	3955138	GT305008	1/4 - 20	2.50	.44	1.01	.255	3	2BX
3955169	GT305039	4035111	GT305130	3955139	GT305009	1/4 - 20	2.50	.44	1.01	.255	3	3BX
3955194	GT305054	4035132	GT305141	3955154	GT305024	1/4 - 28	2.50	.44	1.00	.255	3	2BX
3955195	GT305055	4035133	GT305142	3955155	GT305025	1/4 - 28	2.50	.44	1.00	.255	3	3BX
3955170	GT305040	4035112	GT305131	3955140	GT305010	5/16 - 18	2.72	.49	1.13	.318	3	2BX
3955171	GT305041	4035123	GT305132	3955141	GT305011	5/16 - 18	2.72	.49	1.13	.318	3	3BX
3955196	GT305056	4035134	GT305143	3955156	GT305026	5/16 - 24	2.72	.49	1.13	.318	3	2BX
3955197	GT305057	-	-	3955157	GT305027	5/16 - 24	2.72	.49	1.13	.318	3	3BX
3955172	GT305042	4035124	GT305133	3955142	GT305012	3/8 - 16	2.94	.60	1.27	.381	3	2BX
3955183	GT305043	4035125	GT305134	3955143	GT305013	3/8 - 16	2.94	.60	1.27	.381	3	3BX
3955198	GT305058	-	-	3955158	GT305028	3/8 - 24	2.93	.59	1.26	.381	3	3BX
3955184	GT305044	4035126	GT305135	3955144	GT305014	7/16 - 14	3.16	.71	1.49	.323	5	3BX
3955199	GT305059	4035136	GT305145	3955159	GT305029	7/16 - 20	3.16	.71	1.49	.323	5	3BX
3955185	GT305045	4035127	GT305136	3955145	GT305015	1/2 - 13	3.38	.77	1.74	.367	4	2BX
3955186	GT305046	4035128	GT305137	3955146	GT305016	1/2 - 13	3.38	.77	1.74	.367	4	3BX

(continued)

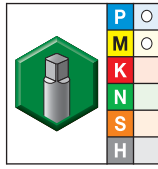
High-Performance Taps



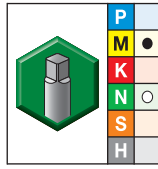
(GT30 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • ANSI • For Steel and Stainless Steel — continued)



grade GP6520  
TiCN



grade GP6505  
Oxide



grade GM6515  
TiN+CrC/C

● first choice  
○ alternate choice

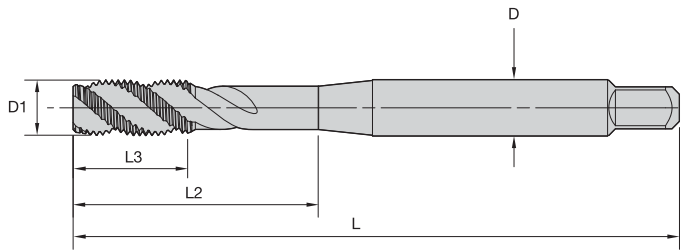
grade GP6520 TiCN		grade GP6505 Oxide		grade GM6515 TiN+CrC/C		inch dimensions					number of flutes	class of fit
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
3955200	GT305060	4035138	GT305147	3955160	GT305030	1/2 - 20	3.38	.77	1.74	.367	4	3BX
3955188	GT305048	4035129	GT305138	3955148	GT305018	5/8 - 11	3.81	.91	1.89	.480	5	3BX
3955187	GT305047	-		3955147	GT305017	5/8 - 11	3.81	.91	1.89	.480	4	2BX
3955190	GT305050	4035130	GT305139	3955150	GT305020	3/4 - 10	4.25	1.00	2.08	.590	4	3BX
3955189	GT305049	-		3955149	GT305019	3/4 - 10	4.25	1.00	2.08	.590	4	2BX
3955191	GT305051	-		3955151	GT305021	1 - 8	5.13	1.25	2.58	.800	5	3BX

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes



- GP6520 TiCN for steel.

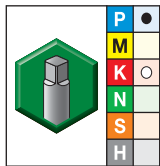


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



- GT30 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • DIN Length ANSI Shank
- For Steel

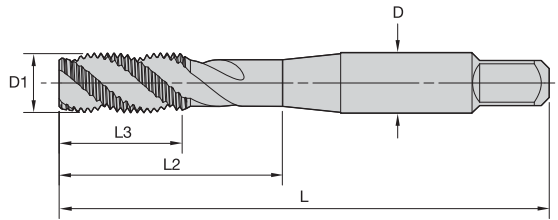


- first choice
- alternate choice

grade GP6520 TiCN		inch dimensions					number of flutes	class of fit
order #	catalog #	D1 TPI	L	L3	L2	D		
4176798	GT305169	6 - 32	2.20	.39	.79	.141	3	2BX
4176877	GT305178	6 - 40	2.20	.39	.79	.141	3	2BX
4176799	GT305170	8 - 32	2.48	.39	.83	.168	3	2BX
4176800	GT305171	10 - 24	2.76	.39	.98	.194	3	2BX
4176879	GT305180	10 - 32	2.76	.40	.99	.194	3	2BX
4176802	GT305173	1/4 - 20	3.15	.51	1.18	.255	3	3BX
4176881	GT305182	1/4 - 28	3.15	.51	1.18	.255	3	3BX
4176873	GT305174	5/16 - 18	3.54	.55	1.38	.318	3	3BX
4176882	GT305183	5/16 - 24	3.54	.55	1.38	.318	3	3BX
4176874	GT305175	3/8 - 16	3.94	.63	1.53	.381	3	3BX
4176883	GT305184	3/8 - 24	3.94	.63	1.53	.381	3	3BX
4176875	GT305176	7/16 - 14	3.94	.71	1.61	.323	4	3BX
4176884	GT305185	7/16 - 20	3.94	.71	1.61	.323	4	3BX
4176876	GT305177	1/2 - 13	4.33	.79	1.85	.367	4	3BX
4176885	GT305186	1/2 - 20	4.33	.79	1.85	.367	4	3BX

High-Performance Taps

- GM6515 TiN + CrC/C for stainless steel.
- GP6520 TiCN for steel.

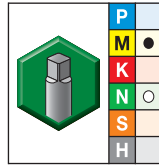
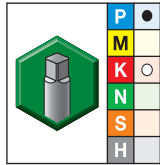


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



■ GT30 • Form C Semi-Bottoming Chamfer • Metric ANSI • For Steel and Stainless Steel



- first choice
- alternate choice

grade GP6520 TiCN		grade GM6515 TiN+CrC/C		inch dimensions					number of flutes	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
3955069	GT305070	3955060	GT305061	M3 X 0,5	1.94	.63	.75	.141	2	6HX
3955070	GT305071	3955061	GT305062	M4 X 0,7	2.12	.32	.76	.168	3	6HX
3955071	GT305072	3955062	GT305063	M5 X 0,8	2.37	.47	.91	.194	3	6HX
3955072	GT305073	3955063	GT305064	M6 X 1	2.50	.46	1.01	.255	3	6HX
3955093	GT305074	3955064	GT305065	M8 X 1,25	2.71	.48	1.12	.318	3	6HX
3955094	GT305075	3955065	GT305066	M10 X 1,5	2.92	.53	1.26	.381	3	6HX
3955095	GT305076	3955066	GT305067	M12 X 1,75	3.38	.77	1.74	.367	5	6HX
3955096	GT305077	3955067	GT305068	M14 X 2	3.59	.83	1.74	.429	5	6HX
3955097	GT305078	3955068	GT305069	M16 X 2	3.81	.91	1.89	.480	5	6HX

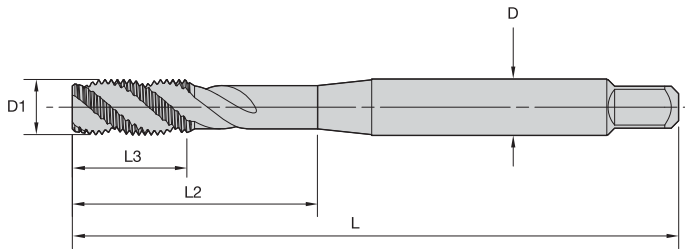
High-Performance Taps

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes



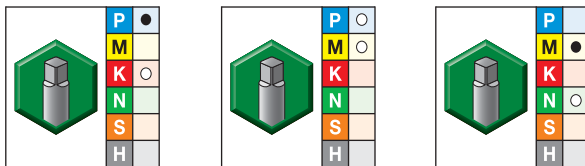
- GM6515 TiN + CrC/C for stainless steel.
- GP6520 TiCN for steel.
- GP6505 oxide for steel.



Shank Tolerance	
D mm	tolerance h6
>3-6	+0, -0,008
>6-10	+0, -0,009
>10-18	+0, -0,011
>18-30	+0, -0,013
>30-50	+0, -0,016



## ■ GT30 • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 • For Steel and Stainless Steel

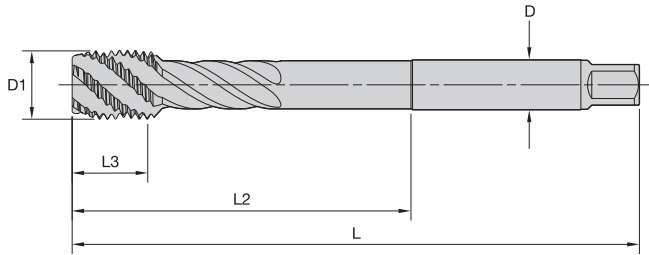


- first choice
- alternate choice

grade GP6520 TiCN		grade GP6505 Oxide		grade GM6515 TiN+CrC/C		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
3954929	GT305097	4035066	GT305116	3955098	GT305148	M3 X 0,5	56	8	18	3,5	3	DIN 371	6HX
3954930	GT305098	4035067	GT305117	3955099	GT305079	M4 X 0,7	63	10	21	4,5	3	DIN 371	6HX
3954931	GT305099	4035068	GT305118	3955100	GT305080	M5 X 0,8	70	10	25	6,0	3	DIN 371	6HX
3954932	GT305100	4035069	GT305119	3955101	GT305081	M6 X 1	80	10	30	6,0	3	DIN 371	6HX
3955031	GT305109	-	-	3955110	GT305090	M8 X 1	90	13	35	6,0	3	DIN 374	6HX
3955023	GT305101	4035070	GT305120	3955102	GT305082	M8 X 1,25	90	13	35	8,0	3	DIN 371	6HX
3955032	GT305110	-	-	3955111	GT305091	M10 X 1	90	10	35	7,0	3	DIN 374	6HX
3955033	GT305111	-	-	3955112	GT305092	M10 X 1,25	100	15	39	7,0	3	DIN 374	6HX
3955024	GT305102	4035071	GT305121	3955103	GT305083	M10 X 1,5	100	15	39	10,0	3	DIN 371	6HX
3955034	GT305112	-	-	3955113	GT305093	M12 X 1,5	100	15	39	9,0	4	DIN 374	6HX
3955025	GT305103	4035072	GT305122	3955104	GT305084	M12 X 1,75	110	18	44	9,0	4	DIN 376	6HX
3955035	GT305113	-	-	3955114	GT305094	M14 X 1,5	100	15	47	11,0	4	DIN 374	6HX
3955026	GT305104	4035073	GT305123	3955105	GT305085	M14 X 2	110	20	52	11,0	4	DIN 376	6HX
3955036	GT305114	-	-	3955115	GT305095	M16 X 1,5	100	15	46	12,0	4	DIN 374	6HX
3955027	GT305105	4035074	GT305124	3955106	GT305086	M16 X 2	110	20	51	12,0	4	DIN 376	6HX
3955037	GT305115	-	-	3955116	GT305096	M18 X 1,5	110	15	50	14,0	4	DIN 374	6HX
3955028	GT305106	-	-	3955107	GT305087	M18 X 2,5	125	25	58	14,0	4	DIN 376	6HX
3955029	GT305107	-	-	3955108	GT305088	M22 X 2,5	140	25	70	18,0	4	DIN 376	6HX
3955030	GT305108	-	-	3955109	GT305089	M24 X 3	160	30	77	18,0	5	DIN 376	6HX
4033733	GT305161	-	-	-	-	M24 X 3	160	30	77	18,0	5	DIN 376	6HX
4033735	GT305163	-	-	-	-	M30 X 3,5	180	35	91	22,0	5	DIN 376	6HX
4033736	GT305164	-	-	-	-	M33 X 3,5	180	35	100	25,0	5	DIN 376	6HX
4033738	GT305166	-	-	-	-	M36 X 4	200	40	110	28,0	5	DIN 376	6HX
4033740	GT305168	-	-	-	-	M42 X 4,5	200	45	120	32,0	5	DIN 376	6HX

High-Performance Taps

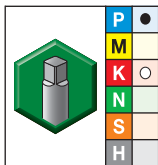
- GP6520 TiCN for steel and cast iron.



Shank Tolerance	
D mm	tolerance h6
12-18	+0, -0,011
20-30	+0, -0,013
32-36	+0, -0,016



■ GT30 • Form C Semi-Bottoming Chamfer • Larger Sizes • Metric Extra Long • For Steel and Cast Iron



- first choice
- alternate choice

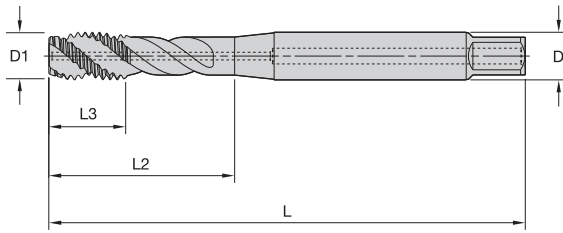
grade GP6520 TiCN		metric dimensions					number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	D		
4033776	GT305151	M24 X 3	200	30	120	18,0	5	6HX
4033778	GT305153	M30 X 3,5	250	35	150	22,0	5	6HX
4033779	GT305154	M33 X 3,5	250	35	150	25,0	5	6HX
4033781	GT305156	M36 X 4	250	40	150	28,0	5	6HX
4033783	GT305158	M42 X 4,5	300	45	180	32,0	5	6HX

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes



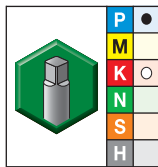
- GP6520 TiCN for steel.



Shank Tolerance	
D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



- GT31 • Fractional • Form C Semi-Bottoming Chamfer • Through Coolant • DIN Length ANSI Shank
- For Steel



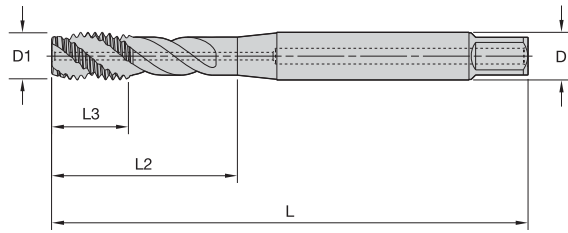
- first choice
- alternate choice

grade GP6520 TiCN		inch dimensions					number of flutes	class of fit
order #	catalog #	D1 TPI	L	L3	L2	D		
4176886	GT315045	1/4 - 20	3.15	.51	1.18	.255	3	3BX
4176891	GT315040	1/4 - 28	3.15	.51	1.18	.255	3	3BX
4176887	GT315036	5/16 - 18	3.54	.55	1.38	.318	3	3BX
4176892	GT315041	5/16 - 24	3.54	.55	1.38	.318	3	3BX
4176888	GT315037	3/8 - 16	3.94	.63	1.53	.381	3	3BX
4176893	GT315042	3/8 - 24	3.94	.63	1.53	.381	3	3BX
4176889	GT315038	7/16 - 14	3.94	.71	1.61	.323	4	3BX
4176894	GT315043	7/16 - 20	3.94	.71	1.61	.323	4	3BX
4176890	GT315039	1/2 - 13	4.33	.79	1.85	.367	4	3BX
4176895	GT315044	1/2 - 20	4.33	.79	1.85	.367	4	3BX

High-Performance Taps



- GM6515 TiN + CrC/C for stainless steel.
- GP6520 TiCN for steel.

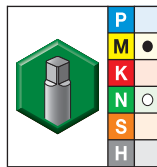
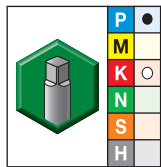


Shank Tolerance

D mm	tolerance h6
>3-6	+0, -0,008
>6-10	+0, -0,009
>10-18	+0, -0,011
>18-30	+0, -0,013
>30-50	+0, -0,016



■ GT31 • Form C Semi-Bottoming Chamfer • Through Coolant • Metric DIN 371 and 376 • For Steel and Stainless Steel



- first choice
- alternate choice

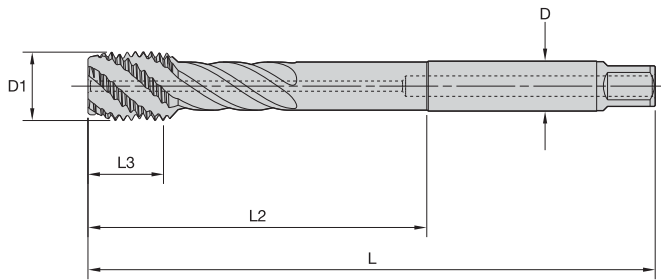
grade GP6520 TiCN		grade GM6515 TiN+CrC/C		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
3955349	GT315007	3955343	GT315001	M5 X 0,8	70	10	25	6,0	3	DIN 371	6HX
3955350	GT315008	3955344	GT315002	M6 X 1	80	10	30	6,0	3	DIN 371	6HX
3955351	GT315009	3955345	GT315003	M8 X 1,25	90	13	35	8,0	3	DIN 371	6HX
3955352	GT315010	3955346	GT315004	M10 X 1,5	100	15	39	10,0	3	DIN 371	6HX
3955373	GT315011	3955347	GT315005	M12 X 1,75	110	18	44	9,0	4	DIN 376	6HX
3955374	GT315012	3955348	GT315006	M14 X 2	110	20	52	11,0	4	DIN 376	6HX
5143530	GT315033	-	-	M16 X 2	110	20	51	12,0	4	DIN 376	6HX
5143531	GT315034	-	-	M18 X 2,5	125	25	58	14,0	4	DIN 376	6HX
5143532	GT315035	-	-	M20 X 2,5	140	25	64	16,0	4	DIN 376	6HX
4033744	GT315025	-	-	M24 X 3	160	30	77	18,0	5	DIN 376	6HX
4033746	GT315027	-	-	M30 X 3,5	180	35	91	22,0	5	DIN 376	6HX
4033747	GT315028	-	-	M33 X 3,5	180	35	100	25,0	5	DIN 376	6HX
4033749	GT315030	-	-	M36 X 4	200	40	110	28,0	5	DIN 376	6HX
4033751	GT315032	-	-	M42 X 4,5	200	45	120	32,0	5	DIN 376	6HX

High-Performance Taps

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes

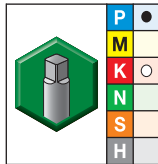
- GP6520 TiCN for steel and cast iron.



Shank Tolerance	
D mm	tolerance h6
12-18	+0, -0,011
20-30	+0, -0,013
32-36	+0, -0,016



- GT31 • Form C Semi-Bottoming Chamfer • Through Coolant • Larger Sizes • Metric Extra Long
- For Steel and Cast Iron

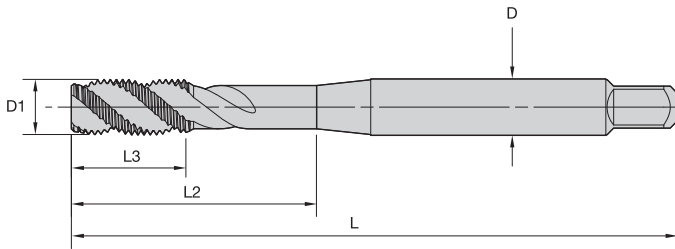


- first choice
- alternate choice

grade GP6520 TiCN		metric dimensions					number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	D		
4033787	GT315014	M24 X 3	200	30	120	18,0	5	6HX
4033789	GT315016	M30 X 3,5	250	35	150	22,0	5	6HX
4033790	GT315017	M33 X 3,5	250	35	150	25,0	5	6HX
4033792	GT315019	M36 X 4	250	40	150	28,0	5	6HX
4033794	GT315021	M42 X 4,5	300	45	180	32,0	5	6HX



- GP6520 TiCN for steel.

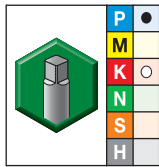


Shank Tolerance

D mm	tolerance h6
>3-6	+0, -0,008
>6-10	+0, -0,009
>10-18	+0, -0,011
>18-30	+0, -0,013
>30-50	+0, -0,016



■ GT32 • Form E Bottoming Chamfer • Metric DIN 371, 374, and 376 • For Steel



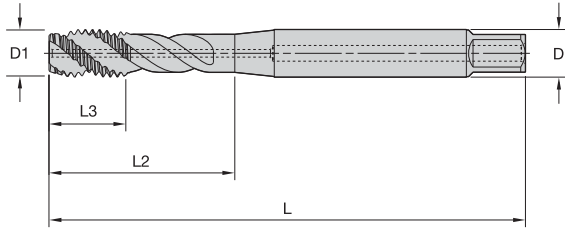
- first choice
- alternate choice

grade GP6520 TiCN		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4153906	GT325001	M5 X 0,8	70	10	25	6,0	3	DIN 371	6HX
4153907	GT325002	M6 X 1	80	10	30	6,0	3	DIN 371	6HX
4153908	GT325003	M8 X 1,25	90	13	35	8,0	3	DIN 371	6HX
4153909	GT325004	M10 X 1,5	100	15	39	10,0	3	DIN 371	6HX
4153912	GT325007	M12 X 1,5	100	15	39	9,0	4	DIN 374	6HX
4153910	GT325005	M12 X 1,75	110	18	44	9,0	4	DIN 376	6HX
4153953	GT325008	M14 X 1,5	100	15	47	11,0	4	DIN 374	6HX
4153911	GT325006	M14 X 2	110	20	52	11,0	4	DIN 376	6HX
4153954	GT325009	M16 X 1,5	100	15	46	12,0	4	DIN 374	6HX

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Threading Close to the Bottom in a Blind Hole

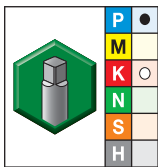
- GP6520 TiCN for steel.



Shank Tolerance	
D mm	tolerance h6
>3-6	+0, -0,008
>6-10	+0, -0,009
>10-18	+0, -0,011
>18-30	+0, -0,013
>30-50	+0, -0,016



- GT33 • Form E Bottoming Chamfer • Through Coolant • Metric DIN 371, 374, and 376 • For Steel

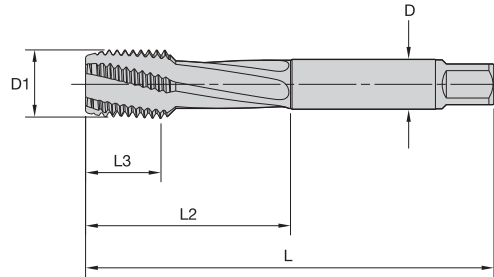


- first choice
- alternate choice

grade GP6520 TiCN		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4153955	GT335001	M5 X 0,8	70	10	25	6,0	3	DIN 371	6HX
4153956	GT335002	M6 X 1	80	10	30	6,0	3	DIN 371	6HX
4153957	GT335003	M8 X 1,25	90	13	35	8,0	3	DIN 371	6HX
4153958	GT335004	M10 X 1,5	100	15	39	10,0	3	DIN 371	6HX
4153961	GT335007	M12 X 1,5	100	15	39	9,0	4	DIN 374	6HX
4153959	GT335005	M12 X 1,75	110	18	44	9,0	4	DIN 376	6HX
4153962	GT335008	M14 X 1,5	100	15	47	11,0	4	DIN 374	6HX
4153960	GT335006	M14 X 2	110	20	52	11,0	4	DIN 376	6HX
4153963	GT335009	M16 X 1,5	100	15	46	12,0	4	DIN 374	6HX

High-Performance Taps

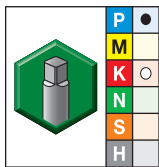
- GP6520 TiCN for steel and cast iron.



Shank Tolerance	
D mm	tolerance h6
12-18	+0, -0,011
20-30	+0, -0,013
32-36	+0, -0,016



- GT50 • Form C Semi-Bottoming Chamfer • Larger Sizes • Metric DIN 376 • For Steel and Cast Iron



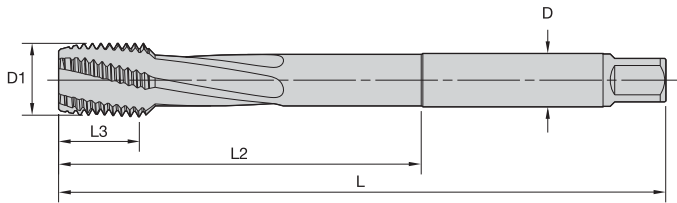
- first choice
- alternate choice

grade GP6520 TiCN		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4154254	GT505001	M24 X 3	160	30	77	18,0	4	DIN 376	6HX
4154255	GT505002	M30 X 3,5	180	35	91	22,0	5	DIN 376	6HX
4154256	GT505003	M33 X 3,5	180	35	100	25,0	5	DIN 376	6HX
4154257	GT505004	M36 X 4	200	40	110	28,0	5	DIN 376	6HX
4154258	GT505005	M42 X 4,5	200	45	120	32,0	6	DIN 376	6HX

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes

- GP6520 TiCN for steel and cast iron.

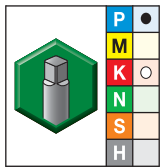


Shank Tolerance

D mm	tolerance h6
12-18	+0, -0,011
20-30	+0, -0,013
32-36	+0, -0,016



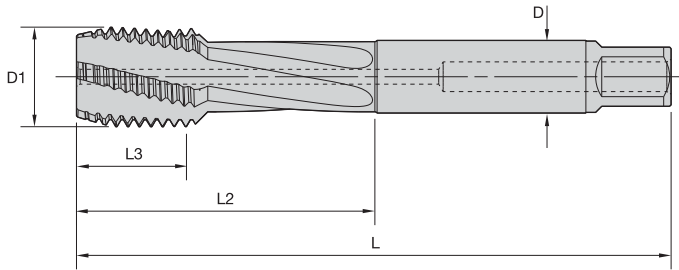
- GT50 • Form C Semi-Bottoming Chamfer • Larger Sizes • Metric Extra Long • For Steel and Cast Iron



- first choice
- alternate choice

grade GP6520 TiCN		metric dimensions					number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	D		
4154259	GT505006	M24 X 3	200	30	120	18,0	4	6HX
4154260	GT505007	M30 X 3,5	250	35	150	22,0	5	6HX
4154261	GT505008	M33 X 3,5	250	35	150	25,0	5	6HX
4154262	GT505009	M36 X 4	250	40	150	28,0	5	6HX
4154263	GT505010	M42 X 4,5	300	45	180	32,0	6	6HX

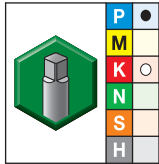
- GP6520 TiCN for steel and cast iron.



Shank Tolerance	
D mm	tolerance h6
12-18	+0, -0,011
20-30	+0, -0,013
32-36	+0, -0,016



- GT51 • Form C Semi-Bottoming Chamfer • Through Coolant • Larger Sizes • Metric DIN 376 • For Steel and Cast Iron



- first choice
- alternate choice

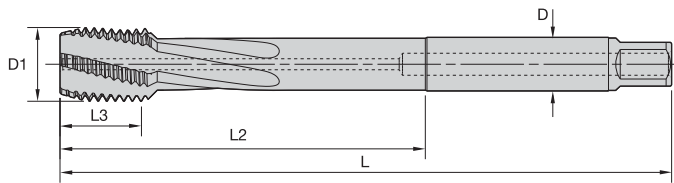
grade GP6520 TiCN		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4154264	GT515001	M24 X 3	160	30	77	18,0	4	DIN 376	6HX
4154265	GT515002	M30 X 3,5	180	35	91	22,0	5	DIN 376	6HX
4154266	GT515003	M33 X 3,5	180	35	100	25,0	5	DIN 376	6HX
4154267	GT515004	M36 X 4	200	40	110	28,0	5	DIN 376	6HX
4154268	GT515005	M42 X 4,5	200	45	120	32,0	6	DIN 376	6HX

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes



- GP6520 TiCN for tapping steel and cast iron.

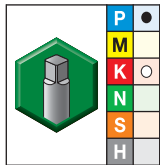


Shank Tolerance

D mm	tolerance h6
12-18	+0, -0,011
20-30	+0, -0,013
32-36	+0, -0,016



- GT51 • Form C Semi-Bottoming Chamfer • Through Coolant • Larger Sizes • Metric Extra Long • For Steel and Cast Iron



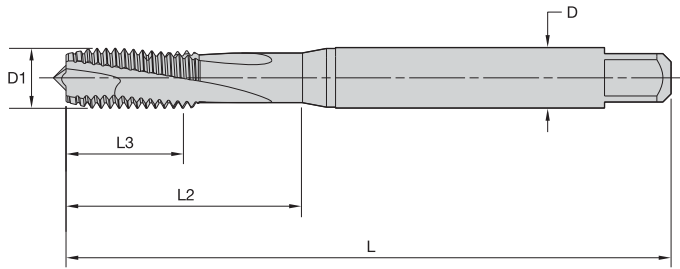
- first choice
- alternate choice

grade GP6520 TiCN		metric dimensions					number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	D		
4154269	GT515006	M24 X 3	200	30	120	18,0	4	6HX
4154270	GT515007	M30 X 3,5	250	35	150	22,0	5	6HX
4154271	GT515008	M33 X 3,5	250	35	150	25,0	5	6HX
4154272	GT515009	M36 X 4	250	40	150	28,0	5	6HX
4154273	GT515010	M42 X 4,5	300	45	180	32,0	6	6HX

High-Performance Taps



- WS32MG TiCN for nickel and nickel alloys.

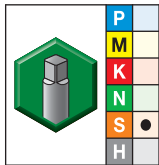


Shank Tolerance

D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052



■ GT12 • Form C Semi-Bottoming Chamfer • Metric DIN 371 and 376 • For Nickel and Nickel Alloys



grade WS32MG  
TiCN

- first choice
- alternate choice

order #	catalog #	D1 size	metric dimensions				number of flutes	dimension standard	class of fit
			L	L3	L2	D			
4159636	GT125001	M3 X 0,5	56	11	18	3,5	2	DIN 371	6HX
4159637	GT125002	M4 X 0,7	63	13	21	4,5	3	DIN 371	6HX
4159638	GT125003	M5 X 0,8	70	15	25	6,0	3	DIN 371	6HX
4159639	GT125004	M6 X 1	80	17	30	6,0	3	DIN 371	6HX
4159640	GT125005	M8 X 1,25	90	20	35	8,0	3	DIN 371	6HX
4159641	GT125006	M10 X 1,5	100	22	39	10,0	3	DIN 371	6HX
4159642	GT125007	M12 X 1,75	110	24	—	9,0	3	DIN 376	6HX
4159663	GT125008	M14 X 2	110	26	—	11,0	3	DIN 376	6HX
4159664	GT125009	M16 X 2	110	27	—	12,0	3	DIN 376	6HX
4159665	GT125010	M20 X 2,5	140	32	—	16,0	3	DIN 376	6HX

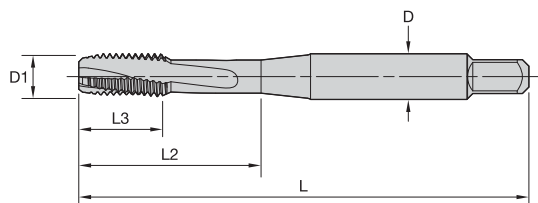
High-Performance Taps

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes



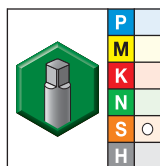
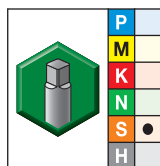
- WS39MG oxide/nitride for nickel- and cobalt-based alloys.
- WU32MG TiCN for nickel- and cobalt-based alloys.



Shank Tolerance	
D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



## ■ GT92 • Machine Screw and Fractional • 3-4 Pitches Chamfer • For Nickel- and Cobalt-Based Alloys



- first choice
- alternate choice

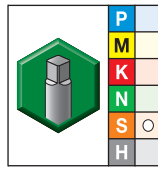
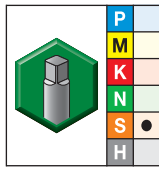
grade WU32MG TiCN		grade WS39MG Nitride/Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5708145	GT925069	5708144	GT925001	2 - 56	1.75	.44	.50	.141	3	H2
5708147	GT925070	5708146	GT925002	3 - 48	1.81	.50	.56	.141	3	H2
5705280	GT925071	5708148	GT925003	4 - 40	1.88	.56	.69	.141	3	H2
5708149	GT925072	5705219	GT925004	4 - 40	1.88	.56	.69	.141	3	H3
-		5708160	GT925005	4 - 40	1.88	.56	.69	.141	3	H5
5708162	GT925074	5708161	GT925006	4 - 48	1.88	.56	.69	.141	3	H2
-		5708163	GT925007	5 - 40	1.95	.63	.76	.141	3	H2
5708165	GT925076	5708164	GT925008	6 - 32	1.99	.36	.71	.141	3	H2
5705279	GT925077	5708166	GT925009	6 - 32	1.99	.36	.71	.141	3	H3
5708168	GT925078	5708167	GT925010	6 - 32	2.03	.36	.71	.141	3	H4
-		5708169	GT925011	6 - 32	2.03	.36	.71	.141	3	H5
5708171	GT925080	5708170	GT925012	6 - 32	2.03	.36	.71	.141	3	H7
-		5708172	GT925013	6 - 40	2.03	.36	.71	.141	3	H2
5708174	GT925082	5708173	GT925014	8 - 32	2.16	.31	.76	.168	3	H2
5705278	GT925083	5708175	GT925015	8 - 32	2.12	.31	.76	.168	3	H3
-		5708176	GT925016	8 - 32	2.16	.31	.76	.168	3	H4
-		5708177	GT925017	8 - 32	2.16	.31	.76	.168	3	H5
-		5708178	GT925018	8 - 32	2.16	.31	.76	.168	3	H6
-		5708179	GT925019	8 - 32	2.16	.31	.76	.168	3	H7
5705277	GT925088	5708014	GT925020	10 - 24	2.37	.47	.91	.194	3	H3
-		5708015	GT925021	10 - 24	2.42	.47	.91	.194	3	H7
5708017	GT925090	5708016	GT925022	10 - 32	2.37	.47	.91	.194	3	H2
5705276	GT925091	5708018	GT925023	10 - 32	2.37	.47	.91	.194	3	H3
5708140	GT925092	5708019	GT925024	10 - 32	2.42	.47	.91	.194	3	H4

(continued)

High-Performance Taps



(GT92 • Machine Screw and Fractional • 3-4 Pitches Chamfer • For Nickel- and Cobalt-Based Alloys — continued)



- first choice
- alternate choice

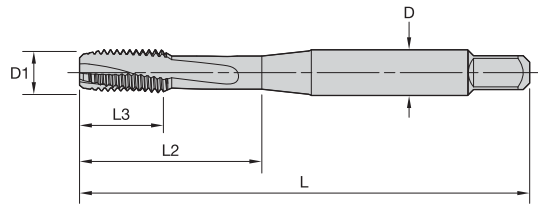
grade WU32MG TiCN		grade WS39MG Nitride/Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
-		5708141	GT925025	10 - 32	2.42	.47	.91	.194	3	H5
-		5708142	GT925026	10 - 32	2.42	.47	.91	.194	3	H6
-		5708143	GT925027	10 - 32	2.42	.47	.91	.194	3	H7
5705275	GT925096	5708201	GT925028	1/4 - 20	2.50	.44	1.00	.255	3	H3
5708205	GT925097	5708203	GT925029	1/4 - 20	2.50	.44	1.00	.255	3	H5
-		5708207	GT925030	1/4 - 20	2.50	.44	1.00	.255	3	H7
5705274	GT925099	5708209	GT925031	1/4 - 28	2.50	.44	1.00	.255	3	H3
-		5708211	GT925032	1/4 - 28	2.50	.44	1.00	.255	3	H4
-		5708213	GT925033	1/4 - 28	2.50	.44	1.00	.255	3	H5
-		5708215	GT925034	1/4 - 28	2.50	.44	1.00	.255	3	H6
-		5705217	GT925035	1/4 - 28	2.50	.44	1.00	.255	3	H7
5705273	GT925104	5708261	GT925036	5/16 - 18	2.72	.49	1.13	.318	3	H3
5708265	GT925105	5708263	GT925037	5/16 - 18	2.72	.49	1.13	.318	3	H5
-		5708267	GT925038	5/16 - 18	2.72	.49	1.13	.318	3	H7
5708271	GT925107	5708269	GT925039	5/16 - 24	2.72	.49	1.13	.318	3	H3
5708275	GT925108	5708273	GT925040	5/16 - 24	2.72	.49	1.13	.318	3	H4
-		5708277	GT925041	5/16 - 24	2.72	.49	1.13	.318	3	H5
-		5708279	GT925042	5/16 - 24	2.72	.49	1.13	.318	3	H6
-		5708281	GT925043	5/16 - 24	2.72	.49	1.13	.318	3	H7
5705272	GT925112	5708227	GT925044	3/8 - 16	2.94	.60	1.27	.381	3	H3
5708241	GT925113	5708229	GT925045	3/8 - 16	2.94	.60	1.27	.381	3	H5
5708245	GT925114	5708243	GT925046	3/8 - 16	2.94	.60	1.27	.381	3	H7
5705270	GT925115	5705218	GT925047	3/8 - 24	2.40	.60	1.27	.381	3	H3
5708249	GT925116	5708247	GT925048	3/8 - 24	2.94	.60	1.27	.381	3	H4
5708253	GT925117	5708251	GT925049	3/8 - 24	2.94	.60	1.27	.381	3	H5
-		5708255	GT925050	3/8 - 24	2.94	.60	1.27	.381	3	H6
5708259	GT925119	5708257	GT925051	3/8 - 24	2.94	.60	1.27	.381	3	H7
5708307	GT925120	5708305	GT925052	7/16 - 14	3.16	.71	1.49	.323	3	H3
-		5708309	GT925053	7/16 - 14	3.16	.71	1.49	.323	3	H5
5708313	GT925122	5708311	GT925054	7/16 - 20	3.16	.71	1.49	.323	3	H3
5708317	GT925123	5708315	GT925055	7/16 - 20	3.16	.71	1.49	.323	3	H5
5705282	GT925124	5708190	GT925056	1/2 - 13	3.38	.77	1.74	.367	3	H3
5708192	GT925125	5708191	GT925057	1/2 - 13	3.38	.77	1.74	.367	3	H5
-		5708193	GT925058	1/2 - 13	3.38	.77	1.74	.367	3	H7
5705281	GT925127	5708194	GT925059	1/2 - 20	3.38	.77	1.74	.367	3	H3
5708197	GT925128	5708196	GT925060	1/2 - 20	3.38	.77	1.74	.367	3	H5
5708199	GT925129	5708198	GT925061	1/2 - 20	3.38	.77	1.74	.367	3	H7
5708285	GT925130	5708283	GT925062	5/8 - 11	3.81	.91	1.89	.480	3	H3
5708289	GT925131	5708287	GT925063	5/8 - 11	3.81	1.31	1.89	.480	3	H5
5708303	GT925132	5708301	GT925064	5/8 - 18	3.81	1.31	1.89	.480	3	H3
5708219	GT925133	5708217	GT925065	3/4 - 10	4.25	1.59	2.08	.590	3	H3
-		5708221	GT925066	3/4 - 10	4.25	1.00	2.08	.590	3	H5
-		5708223	GT925067	3/4 - 16	4.25	1.00	2.08	.590	3	H3
-		5708225	GT925068	3/4 - 16	4.25	1.00	2.08	.590	3	H5

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes



- WS39MG oxide/nitride for nickel- and cobalt-based alloys.
- WU32MG TiCN for nickel- and cobalt-based alloys.

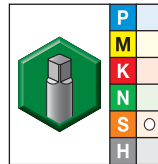
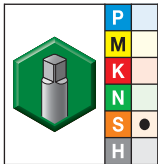


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



■ GT92 • 3-4 Pitches Chamfer • Metric ANSI • For Nickel- and Cobalt-Based Alloys

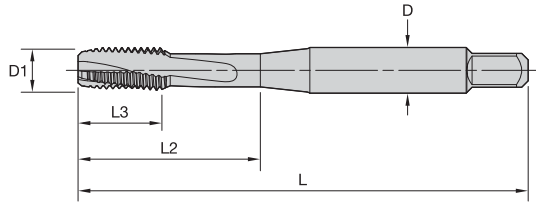


- first choice
- alternate choice

grade WU32MG TiCN		grade WS39MG Nitride/Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5708331	GT925150	5708329	GT925137	M2,5 X 0,45	1.81	.50	.56	.141	3	D3
5705285	GT925151	5708335	GT925138	M3 X 0,5	1.94	.63	.75	.141	3	D3
-	-	5708333	GT925139	M3,5 X 0,6	1.99	.36	.71	.141	3	D4
-	-	5708337	GT925140	M4 X 0,7	2.12	.32	.76	.168	3	D4
-	-	5708339	GT925141	M5 X 0,8	2.37	.47	.91	.194	3	D4
5705286	GT925155	5708341	GT925142	M6 X 1	2.50	.46	1.00	.255	3	D5
5708345	GT925156	5708343	GT925143	M7 X 1	2.72	.52	1.15	.318	3	D5
-	-	5708347	GT925144	M8 X 1	2.70	.48	1.12	.318	3	D5
5708361	GT925158	5708349	GT925145	M8 X 1,25	2.70	.48	1.12	.318	3	D5
5708321	GT925159	5708319	GT925146	M10 X 1,25	2.92	.53	1.26	.381	3	D5
5705283	GT925160	5708323	GT925147	M10 X 1,5	2.92	.53	1.26	.381	3	D6
-	-	5708325	GT925148	M12 X 1,25	3.38	.77	1.74	.367	3	D5
5705284	GT925162	5708327	GT925149	M12 X 1,75	3.38	.77	1.74	.367	3	D6

High-Performance Taps

- WS39MG oxide/nitride for nickel- and cobalt-based alloys.
- WU32MG TiCN for nickel- and cobalt-based alloys.

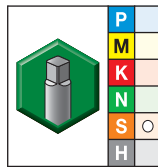
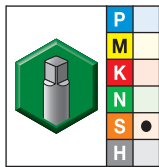


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



■ GT94 • Machine Screw and Fractional • Form E Bottoming Chamfer • For Nickel- and Cobalt-Based Alloys



- first choice
- alternate choice

grade WU32MG TiCN		grade WS39MG Nitride/Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5705939	GT945037	5705938	GT945001	4 - 40	1.88	.56	.70	.141	3	H2
5705981	GT945038	5705980	GT945002	4 - 40	1.88	.56	.69	.141	3	H3
-		5705982	GT945003	5 - 40	1.95	.63	.76	.141	3	H2
-		5705983	GT945004	6 - 32	2.03	.36	.71	.141	3	H2
5705985	GT945041	5705984	GT945005	6 - 32	1.99	.36	.71	.141	3	H3
-		5705986	GT945006	6 - 32	2.03	.36	.71	.141	3	H4
-		5705987	GT945007	6 - 32	2.03	.36	.71	.141	3	H5
5705989	GT945044	5705988	GT945008	8 - 32	2.12	.31	.76	.168	3	H3
5705992	GT945045	5705991	GT945009	8 - 32	2.16	.31	.76	.168	3	H5
5705933	GT945046	5705932	GT945010	10 - 24	2.42	.47	.91	.194	3	H3
-		5705934	GT945011	10 - 24	2.42	.47	.91	.194	3	H5
5705936	GT945048	5705935	GT945012	10 - 32	2.37	.47	.91	.194	3	H3
-		5705937	GT945013	10 - 32	2.42	.47	.91	.194	3	H5
5705996	GT945050	5705995	GT945014	1/4 - 20	2.50	.44	1.00	.255	3	H3
5705997	GT945051	5703872	GT945015	1/4 - 20	2.50	.44	1.00	.255	3	H5
5705998	GT945052	5703871	GT945016	1/4 - 28	2.50	.44	1.00	.255	3	H3
5705999	GT945053	5703873	GT945017	1/4 - 28	2.50	.44	1.00	.255	3	H4
5706011	GT945054	5706010	GT945018	1/4 - 28	2.50	.44	1.00	.255	3	H5
5706020	GT945055	5706019	GT945019	5/16 - 18	2.72	.49	1.13	.318	3	H3
5706022	GT945056	5706021	GT945020	5/16 - 18	2.72	.49	1.13	.318	3	H5
5706024	GT945057	5706023	GT945021	5/16 - 24	2.72	.49	1.13	.318	3	H3
5706026	GT945058	5706025	GT945022	5/16 - 24	2.72	.49	1.13	.318	3	H4
-		5706027	GT945023	5/16 - 24	2.72	.49	1.13	.318	3	H5
5706013	GT945060	5706012	GT945024	3/8 - 16	2.94	.60	1.27	.381	3	H3

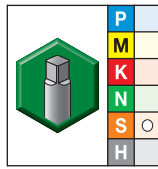
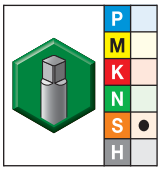
(continued)

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes



(GT94 • Machine Screw and Fractional • Form E Bottoming Chamfer • For Nickel- and Cobalt-Based Alloys — continued)



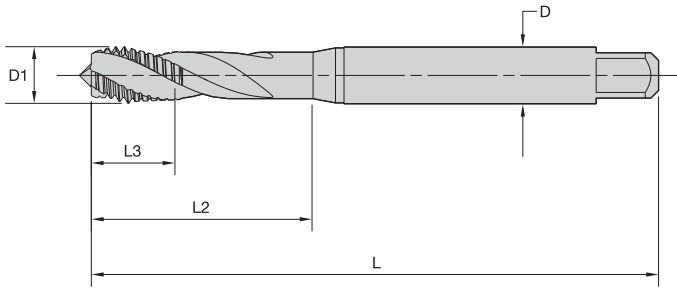
- first choice
- alternate choice

grade WU32MG TiCN		grade WS39MG Nitride/Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5706015	GT945061	5706014	GT945025	3/8 - 16	2.94	.60	1.27	.381	3	H5
5706017	GT945062	5706016	GT945026	3/8 - 24	2.94	.60	1.27	.381	3	H3
-		5706018	GT945027	3/8 - 24	2.94	.60	1.27	.381	3	H4
-		5706034	GT945028	7/16 - 14	3.16	.71	1.49	.323	3	H3
-		5706035	GT945029	7/16 - 14	3.16	.71	1.49	.323	3	H5
5706037	GT945066	5706036	GT945030	7/16 - 20	3.16	.71	1.49	.323	3	H3
5706039	GT945067	5706038	GT945031	7/16 - 20	3.16	.71	1.49	.323	3	H5
-		5705993	GT945032	1/2 - 13	3.38	.77	1.74	.367	3	H5
-		5705994	GT945033	1/2 - 20	3.38	.77	1.74	.367	3	H3
5706029	GT945070	5706028	GT945034	5/8 - 11	3.81	.91	1.89	.480	3	H3
5706031	GT945071	5706030	GT945035	5/8 - 11	3.81	.91	1.89	.480	3	H5
5706033	GT945072	5706032	GT945036	5/8 - 18	3.81	.91	1.89	.480	3	H3

High-Performance Taps



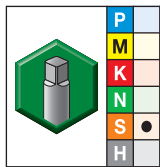
- WN35MG TiN/DLC for titanium and titanium alloys.



Shank Tolerance	
D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052



■ GT16 • Form C Semi-Bottoming Chamfer • Metric DIN 371 • For Titanium and Titanium Alloys



- first choice
- alternate choice

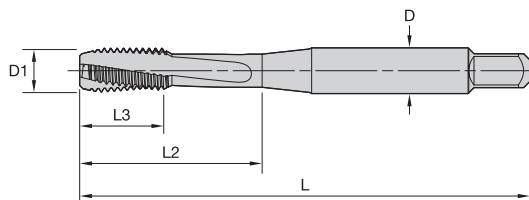
grade WN35MG TiN/DLC		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4160437	GT165001	M3 X 0,5	56	6	18	3,5	3	DIN 371	6HX
4160438	GT165002	M4 X 0,7	63	7	21	4,5	3	DIN 371	6HX
4160439	GT165003	M5 X 0,8	70	8	25	6,0	3	DIN 371	6HX
4160440	GT165004	M6 X 1	80	10	30	6,0	3	DIN 371	6HX
4160441	GT165005	M8 X 1,25	90	14	35	8,0	3	DIN 371	6HX
4160442	GT165006	M10 X 1,5	100	16	39	10,0	3	DIN 371	6HX
4160523	GT165007	M12 X 1,75	110	18	44	12,0	3	DIN 371	6HX

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes



- WS30MG nitride for titanium and titanium alloys.
- WS34MG TiN + CrC/C for titanium and titanium alloys.

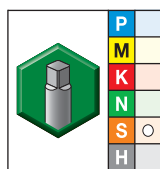
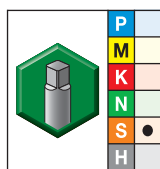


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



## ■ GT62 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • ANSI • For Titanium and Titanium Alloys



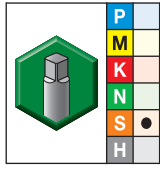
- first choice
- alternate choice

grade WS34MG TiN+CrC/C		grade WS30MG Nitride		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5565064	GT625006	5565063	GT625005	2 - 56	1.75	.44	.50	.141	3	H2
5565067	GT625008	5565065	GT625007	4 - 40	1.88	.56	.69	.142	3	H2
5565069	GT625010	5565068	GT625009	6 - 32	1.99	.36	.71	.141	3	H2
5565131	GT625012	5565130	GT625011	6 - 32	1.99	.36	.71	.141	3	H3
5565133	GT625014	5565132	GT625013	6 - 40	1.99	.36	.71	.141	3	H2
5565135	GT625016	5565134	GT625015	8 - 32	2.12	.31	.77	.168	3	H2
5565138	GT625018	5565137	GT625017	8 - 32	2.12	.31	.77	.168	3	H3
5565140	GT625020	5565139	GT625019	8 - 36	2.12	.31	.77	.168	3	H2
5565142	GT625022	5565141	GT625021	10 - 24	2.37	.47	.92	.194	3	H3
5565144	GT625024	5565143	GT625023	10 - 32	2.37	.47	.91	.194	3	H2
5565146	GT625026	5565145	GT625025	10 - 32	2.37	.47	.91	.194	3	H3
5565148	GT625028	5565147	GT625027	1/4 - 20	2.50	.44	1.01	.255	3	H3
5565150	GT625030	5565149	GT625029	1/4 - 20	2.50	.44	1.00	.255	3	H5
5565152	GT625032	5565151	GT625031	1/4 - 28	2.50	.44	1.01	.255	3	H3
5565154	GT625034	5565153	GT625033	1/4 - 28	2.50	.44	1.01	.255	3	H4
5565156	GT625036	5565155	GT625035	1/4 - 28	2.50	.44	1.01	.255	3	H5
5565158	GT625038	5565157	GT625037	5/16 - 18	2.72	.49	1.13	.318	3	H3
5565160	GT625040	5565159	GT625039	5/16 - 18	2.72	.49	1.13	.318	3	H5
5565163	GT625042	5565161	GT625041	5/16 - 24	2.72	.49	1.13	.318	3	H3
5565165	GT625044	5565164	GT625043	5/16 - 24	2.72	.49	1.13	.318	3	H4
5565167	GT625046	5565166	GT625045	3/8 - 16	2.93	.59	1.26	.381	3	H3
5565169	GT625048	5565168	GT625047	3/8 - 16	2.93	.59	1.26	.381	3	H5
5565191	GT625050	5565190	GT625049	3/8 - 24	2.93	.59	1.26	.381	3	H3
5565193	GT625052	5565192	GT625051	3/8 - 24	2.93	.59	1.26	.381	3	H4

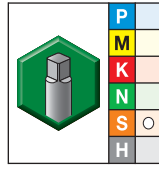
(continued)



(GT62 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • ANSI • For Titanium and Titanium Alloys — continued)



grade WS34MG  
TiN+CrC/C



grade WS30MG  
Nitride

- first choice
- alternate choice

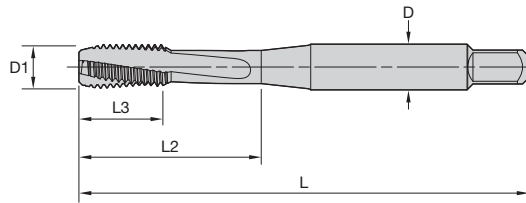
grade WS34MG TiN+CrC/C		grade WS30MG Nitride		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5565195	GT625054	5565194	GT625053	7/16 - 14	3.16	.71	1.49	.323	3	H3
5565197	GT625056	5565196	GT625055	7/16 - 14	3.16	.71	1.49	.323	3	H5
5565199	GT625058	5565198	GT625057	7/16 - 20	3.16	.71	1.49	.323	3	H3
5565201	GT625060	5565200	GT625059	7/16 - 20	3.16	.71	1.49	.323	3	H5
5565203	GT625062	5565202	GT625061	1/2 - 13	3.38	.77	1.74	.367	3	H3
5565205	GT625064	5565204	GT625063	1/2 - 13	3.38	.77	1.74	.367	3	H5
5565207	GT625066	5565206	GT625065	1/2 - 20	3.38	.77	1.74	.367	3	H3
5565209	GT625068	5565208	GT625067	1/2 - 20	3.38	.77	1.74	.367	3	H5
5565210	GT625069	-		9/16 - 18	3.59	.83	1.74	.429	4	H3
5565211	GT625070	-		9/16 - 18	3.59	.83	1.74	.429	4	H5
5565212	GT625071	-		5/8 - 11	3.81	.91	1.89	.480	4	H3
5565213	GT625072	-		5/8 - 18	3.81	.91	1.89	.480	4	H3
5565214	GT625073	-		5/8 - 18	3.81	.91	1.89	.480	4	H5
5565215	GT625074	-		3/4 - 10	4.25	1.00	2.08	.590	4	H5
5565216	GT625075	-		3/4 - 16	4.25	1.00	2.08	.590	4	H3
5565217	GT625076	-		3/4 - 16	4.25	1.00	2.08	.590	4	H5
5565218	GT625077	-		1 - 8	5.12	1.25	2.58	.800	4	H5

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes



- WS30MG nitride for titanium and titanium alloys.
- WS34MG TiN + CrC/C for titanium and titanium alloys.

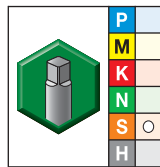
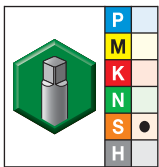


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



## ■ GT62 • Form C Semi-Bottoming Chamfer • Metric ANSI • For Titanium and Titanium Alloys



- first choice
- alternate choice

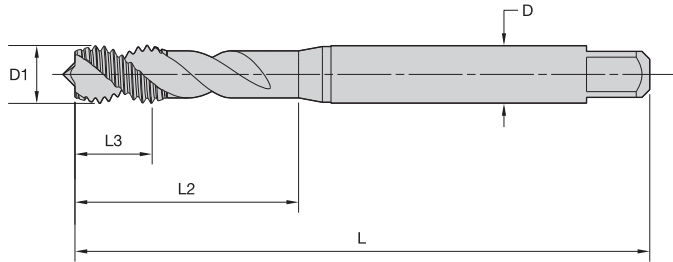
grade WS34MG TiN+CrC/C		grade WS30MG Nitride		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
5565220	GT625504	5565219	GT625503	M2,5 X 0,45	1.81	.50	.56	.141	3	D3
5565222	GT625506	5565221	GT625505	M3 X 0,5	1.94	.63	.75	.141	3	D3
5565224	GT625508	5565223	GT625507	M4 X 0,7	2.12	.32	.76	.168	3	D4
5565226	GT625510	5565225	GT625509	M5 X 0,8	2.37	.46	.91	.194	3	D4
5565228	GT625512	5565227	GT625511	M6 X 1	2.50	.46	1.00	.255	3	D5
5565230	GT625514	5565229	GT625513	M7 X 1	2.72	.52	1.15	.318	3	D5
5565232	GT625516	5565231	GT625515	M8 X 1,25	2.70	.48	1.12	.318	3	D5
5565234	GT625518	5565233	GT625517	M10 X 1,25	2.93	.53	1.26	.381	3	D5
5565236	GT625520	5565235	GT625519	M10 X 1,5	2.93	.53	1.26	.381	3	D6
5565238	GT625522	5565237	GT625521	M12 X 1,75	3.38	.77	1.74	.367	3	D6

High-Performance Taps





- WN48EG DLC for aluminum.

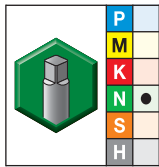


Shank Tolerance

D mm	tolerance h9
1-3	+0, -0,025
3,5-6	+0, -0,030
7-10	+0, -0,036
11-18	+0, -0,043



■ GT80 • Form C Semi-Bottoming Chamfer • Metric DIN 371 and 376 • For Aluminum



- first choice
- alternate choice

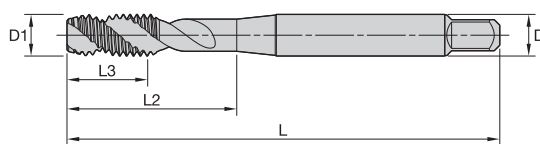
grade WN48EG DLC		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4160054	GT805001	M3 X 0,5	56	6	18	3,5	2	DIN 371	6H
4160055	GT805002	M4 X 0,7	63	7	21	4,5	2	DIN 371	6H
4160056	GT805003	M5 X 0,8	70	8	25	6,0	2	DIN 371	6H
4160057	GT805004	M6 X 1	80	10	30	6,0	2	DIN 371	6H
4160058	GT805005	M8 X 1,25	90	14	35	8,0	2	DIN 371	6H
4160059	GT805006	M10 X 1,5	100	16	39	10,0	2	DIN 371	6H
4160060	GT805007	M12 X 1,75	110	18	—	9,0	3	DIN 376	6H
4160061	GT805008	M16 X 2	110	22	—	12,0	3	DIN 376	6H
4160062	GT805009	M20 X 2,5	140	25	—	16,0	3	DIN 376	6H

# High-Performance Taps

Victory™ Spiral-Flute HSS-E Taps • Blind Holes



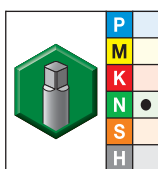
- WN44EG TiN + CrC/C for aluminum.



Shank Tolerance	
D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030



- GT82 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • DIN Length ANSI Shank
- For Aluminum

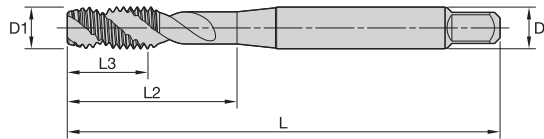


- first choice
- alternate choice

grade WN44EG TiN+CrC/C		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5690761	GT825010	2 - 56	1.77	.31	.71	.141	2	H2
5690762	GT825011	4 - 40	2.20	.31	.71	.141	2	H2
5690765	GT825012	5 - 40	2.20	.31	.71	.141	2	H2
5690766	GT825013	6 - 32	2.20	.35	.79	.141	2	H3
5690767	GT825014	8 - 32	2.48	.43	.83	.168	2	H3
5690768	GT825015	10 - 24	2.76	.47	.98	.194	2	H3
5690769	GT825016	10 - 32	2.76	.47	.98	.194	2	H3
5690780	GT825017	1/4 - 20	3.15	.59	1.18	.255	2	H3
5690781	GT825018	1/4 - 20	3.15	.59	1.18	.255	2	H5
5690782	GT825019	1/4 - 28	3.15	.59	1.18	.255	2	H3
5690783	GT825020	1/4 - 28	3.15	.59	1.18	.255	2	H4
5690784	GT825021	5/16 - 18	3.54	.59	1.38	.318	2	H3
5690785	GT825022	5/16 - 18	3.54	.59	1.38	.318	2	H5
5690786	GT825023	5/16 - 24	3.54	.59	1.38	.318	2	H3
5690787	GT825024	5/16 - 24	3.54	.59	1.38	.318	2	H4
5690788	GT825025	3/8 - 16	3.94	.75	1.54	.381	2	H3
5690789	GT825026	3/8 - 16	3.94	.75	1.54	.381	2	H5
5690790	GT825027	3/8 - 24	3.94	.75	1.54	.381	2	H3
5690791	GT825028	3/8 - 24	3.94	.75	1.54	.381	2	H4
5690792	GT825029	7/16 - 14	3.94	.71	1.61	.323	3	H3
5690793	GT825030	7/16 - 14	3.94	.71	1.61	.323	3	H5
5690795	GT825031	7/16 - 20	3.94	.71	1.61	.323	3	H3
5690796	GT825032	7/16 - 20	3.94	.71	1.61	.323	3	H5
5690797	GT825033	1/2 - 13	4.33	.91	1.85	.367	3	H4
5690798	GT825034	1/2 - 13	4.33	.91	1.85	.367	3	H5
5690799	GT825035	1/2 - 20	4.33	.91	1.85	.367	3	H3
5690800	GT825036	1/2 - 20	4.33	.91	1.85	.367	3	H5

High-Performance Taps

- WN44EG TiN + CrC/C for aluminum.

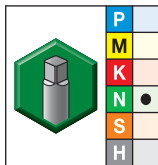


Shank Tolerance

D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030



- GT82 • Form C Semi-Bottoming Chamfer • Metric • DIN Length ANSI Shank • For Aluminum



- first choice
- alternate choice

grade WN44EG TiN+CrC/C		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5690801	GT825037	M3 X 0,5	2.20	.31	.71	.141	2	D3
5690802	GT825038	M3,5 X 0,6	2.20	.35	.79	.141	2	D4
5690803	GT825039	M4 X 0,7	2.48	.43	.83	.168	2	D4
5690804	GT825040	M5 X 0,8	2.76	.47	.98	.194	2	D4
5690805	GT825041	M6 X 1	3.15	.47	1.18	.255	2	D5
5690806	GT825042	M7 X 1	3.54	.59	1.38	.318	2	D5
5690807	GT825043	M8 X 1	3.54	.59	1.38	.318	2	D5
5690808	GT825044	M8 X 1,25	3.54	.59	1.38	.318	2	D5
5690809	GT825045	M10 X 1,25	3.94	.71	1.54	.381	2	D5
5690810	GT825046	M10 X 1,5	3.94	.71	1.54	.381	2	D6
5690811	GT825047	M12 X 1,25	4.33	.83	1.73	.367	3	D6
5690812	GT825048	M12 X 1,5	4.33	.83	1.73	.367	3	D6
5690813	GT825049	M12 X 1,75	4.33	.83	1.73	.367	3	D6

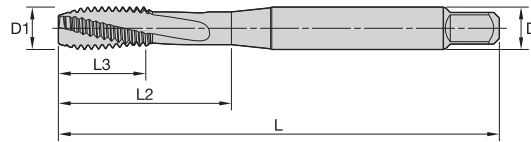
High-Performance Taps

# High-Performance Taps

Victory™ Spiral-Flute HSS-E Taps • Blind Holes



- WN44EG TiN + CrC/C for aluminum.

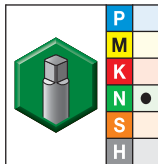


Shank Tolerance

D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030



- GT86 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • DIN Length ANSI Shank
- For Aluminum

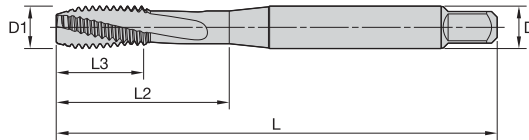


- first choice
- alternate choice

grade WN44EG TiN+CrC/C		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5690817	GT865010	2 - 56	1.77	.31	.71	.141	3	H2
5690818	GT865011	4 - 40	2.20	.31	.71	.141	3	H2
5690819	GT865012	5 - 40	2.20	.31	.71	.141	3	H2
5690840	GT865013	6 - 32	2.20	.35	.79	.141	3	H3
5690841	GT865014	8 - 32	2.48	.43	.83	.168	3	H3
5690842	GT865015	10 - 24	2.76	.47	.98	.194	3	H3
5690843	GT865016	10 - 32	2.76	.47	.98	.194	3	H3
5690844	GT865017	1/4 - 20	3.15	.59	1.18	.255	3	H3
5690845	GT865018	1/4 - 20	3.15	.59	1.18	.255	3	H5
5690846	GT865019	1/4 - 28	3.15	.59	1.18	.255	3	H3
5690847	GT865020	1/4 - 28	3.15	.59	1.18	.255	3	H4
5690849	GT865021	5/16 - 18	3.54	.59	1.38	.318	3	H3
5690850	GT865022	5/16 - 18	3.54	.59	1.38	.318	3	H5
5690851	GT865023	5/16 - 24	3.54	.59	1.38	.318	3	H3
5690852	GT865024	5/16 - 24	3.54	.59	1.38	.318	3	H4
5690853	GT865025	3/8 - 16	3.94	.75	1.54	.381	3	H3
5690854	GT865026	3/8 - 16	3.94	.75	1.54	.381	3	H5
5690855	GT865027	3/8 - 24	3.94	.75	1.54	.381	3	H3
5690856	GT865028	3/8 - 24	3.94	.75	1.54	.381	3	H4
5690857	GT865029	7/16 - 14	3.94	.71	1.61	.323	3	H3
5690858	GT865030	7/16 - 14	3.94	.71	1.61	.323	3	H5
5690859	GT865031	7/16 - 20	3.94	.71	1.61	.323	3	H3
5690860	GT865032	7/16 - 20	3.94	.71	1.61	.323	3	H5
5690861	GT865033	1/2 - 13	4.33	.91	1.85	.367	3	H4
5690862	GT865034	1/2 - 13	4.33	.91	1.85	.367	3	H5
5690863	GT865035	1/2 - 20	4.33	.91	1.85	.367	3	H3
5690864	GT865036	1/2 - 20	4.33	.91	1.85	.367	3	H5

High-Performance Taps

- WN44EG TiN + CrC/C for aluminum.

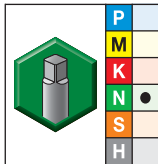


Shank Tolerance

D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030



■ GT86 • Form C Semi-Bottoming Chamfer • Metric • DIN Length ANSI Shank • For Aluminum



- first choice
- alternate choice

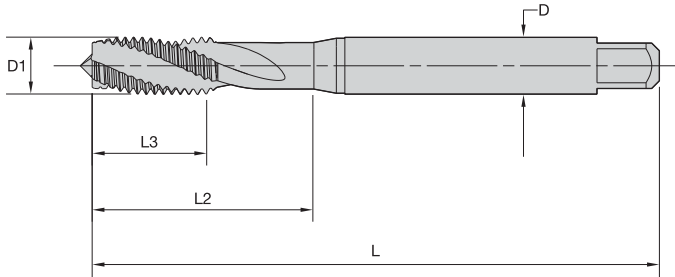
grade WN44EG TiN+CrC/C		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5690865	GT865037	M3 X 0,5	2.20	.31	.71	.141	3	D3
5690866	GT865038	M3,5 X 0,6	2.20	.35	.79	.141	3	D4
5690867	GT865039	M4 X 0,7	2.48	.43	.83	.168	3	D4
5690868	GT865040	M5 X 0,8	2.76	.47	.98	.194	3	D4
5690869	GT865041	M6 X 1	3.15	.47	1.18	.255	3	D5
5690880	GT865042	M7 X 1	3.54	.59	1.38	.318	3	D5
5690881	GT865043	M8 X 1	3.54	.59	1.38	.318	3	D5
5690882	GT865044	M8 X 1,25	3.54	.59	1.38	.318	3	D5
5690883	GT865045	M10 X 1,25	3.94	.71	1.54	.381	3	D5
5690884	GT865046	M10 X 1,5	3.94	.71	1.54	.381	3	D6
5690885	GT865047	M12 X 1,25	4.33	.83	1.73	.367	3	D6
5690886	GT865048	M12 X 1,5	4.33	.83	1.73	.367	3	D6
5690887	GT865049	M12 X 1,75	4.33	.83	1.73	.367	3	D6

High-Performance Taps

# High-Performance Taps

Victory™ Spiral-Flute HSS-E-PM Taps • Blind Holes

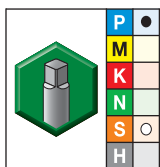
- WP31MG TiN for steel  
32–44 HRC.



Shank Tolerance	
D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052



■ GT02 • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 • For Hard Steel

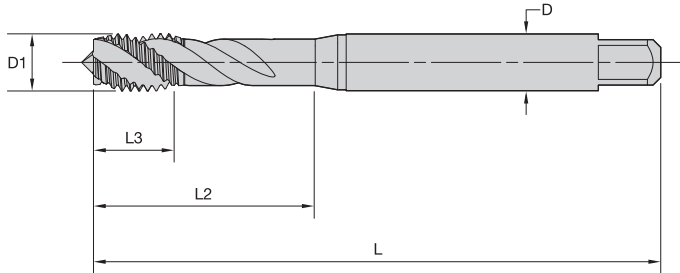


- first choice
- alternate choice

grade WP31MG TiN		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4152638	GT025001	M3 X 0,5	56	11	18	3,5	3	DIN 371	6H
4152639	GT025002	M4 X 0,7	63	13	21	4,5	3	DIN 371	6H
4152640	GT025003	M5 X 0,8	70	15	25	6,0	3	DIN 371	6H
4152641	GT025004	M6 X 1	80	17	30	6,0	3	DIN 371	6H
4152709	GT025012	M8 X 1	90	17	—	6,0	3	DIN 374	6H
4152642	GT025005	M8 X 1,25	90	20	35	8,0	3	DIN 371	6H
4152710	GT025013	M10 X 1	90	18	—	7,0	3	DIN 374	6H
4152711	GT025014	M10 X 1,25	100	22	—	7,0	3	DIN 374	6H
4152703	GT025006	M10 X 1,5	100	22	39	10,0	3	DIN 371	6H
4152712	GT025015	M12 X 1,25	100	22	—	9,0	3	DIN 374	6H
4152713	GT025016	M12 X 1,5	100	22	—	9,0	3	DIN 374	6H
4152704	GT025007	M12 X 1,75	110	24	44	12,0	3	DIN 376	6H
4152714	GT025017	M14 X 1,5	100	22	—	11,0	3	DIN 374	6H
4152705	GT025008	M14 X 2	110	26	52	11,0	3	DIN 376	6H
4152715	GT025018	M16 X 1,5	100	22	—	12,0	3	DIN 374	6H
4152706	GT025009	M16 X 2	110	27	—	12,0	3	DIN 376	6H
4152707	GT025010	M18 X 2	125	30	—	14,0	4	DIN 376	6H
4152708	GT025011	M20 X 2,5	140	32	—	16,0	4	DIN 376	6H

High-Performance Taps

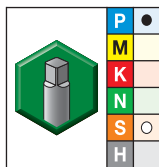
- WH36MG TiAlN/MoS<sub>2</sub> for steel 32–44 HRC (3 x D).



Shank Tolerance	
D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052



■ GT04 • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 • For Hard Steel



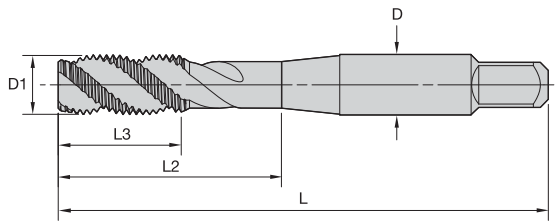
- first choice
- alternate choice

grade WH36MG TiN+MoS <sub>2</sub>		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4158471	GT045001	M3 X 0,5	56	6	18	3,5	3	DIN 371	6H
4158472	GT045002	M4 X 0,7	63	7	21	4,5	3	DIN 371	6H
4158763	GT045003	M5 X 0,8	70	8	25	6,0	3	DIN 371	6H
4158764	GT045004	M6 X 1	80	10	30	6,0	3	DIN 371	6H
4158772	GT045012	M8 X 1	90	10	—	6,0	3	DIN 374	6H
4158765	GT045005	M8 X 1,25	90	14	35	8,0	3	DIN 371	6H
4158773	GT045013	M10 X 1	90	10	—	7,0	3	DIN 374	6H
4158774	GT045014	M10 X 1,25	100	16	—	7,0	3	DIN 374	6H
4158766	GT045006	M10 X 1,5	100	16	39	10,0	3	DIN 371	6H
4158775	GT045015	M12 X 1,25	100	15	—	9,0	4	DIN 374	6H
4158776	GT045016	M12 X 1,5	100	15	—	9,0	4	DIN 374	6H
4158767	GT045007	M12 X 1,75	110	18	—	9,0	4	DIN 376	6H
4158777	GT045017	M14 X 1,5	100	15	—	11,0	4	DIN 374	6H
4158768	GT045008	M14 X 2	110	20	—	11,0	4	DIN 376	6H
4158778	GT045018	M16 X 1,5	100	15	—	12,0	4	DIN 374	6H
4158769	GT045009	M16 X 2	110	22	—	12,0	4	DIN 376	6H
4158770	GT045010	M18 X 2,5	125	25	—	14,0	4	DIN 376	6H
4158771	GT045011	M20 X 2,5	140	25	—	16,0	4	DIN 376	6H

# Multipurpose Taps

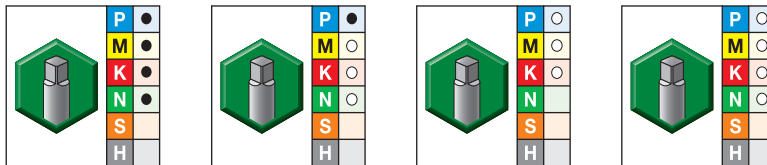
VariTap™ Spiral-Flute HSS-E Taps • Blind Holes

- WP42EG TiCN
- WU41EG TiN
- WP49EG oxide
- WU40EG bright



Shank Tolerance	
D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

## ■ VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • ANSI



- first choice
- alternate choice

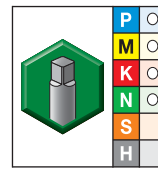
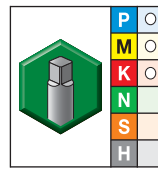
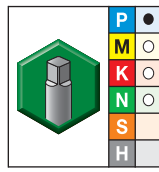
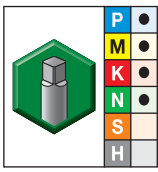
grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5356669	VTSFT5001	-	-	5356668	VTSFT5001	5356730	VTSFT5001	2 - 56	1.76	.40	.50	.141	2	H2
5356732	VTSFT5002	-	-	5356731	VTSFT5002	5356733	VTSFT5002	3 - 48	1.82	.46	.57	.141	2	H2
5356736	VTSFT5003	5356735	VTSFT5003	5356734	VTSFT5003	5356737	VTSFT5003	4 - 40	1.88	.52	.70	.141	2	H2
5356739	VTSFT5004	-	-	5356738	VTSFT5004	5356740	VTSFT5004	4 - 40	1.88	.52	.70	.141	2	H3
5356742	VTSFT5005	-	-	5356741	VTSFT5005	5356743	VTSFT5005	4 - 40	1.88	.52	.70	.141	2	H4
5356745	VTSFT5006	-	-	5356744	VTSFT5006	5356746	VTSFT5006	4 - 40	1.88	.52	.70	.141	2	H5
-	-	-	-	5356747	VTSFT5007	-	-	4 - 40	1.88	.52	.70	.141	2	H6
5356749	VTSFT5008	-	-	5356748	VTSFT5008	5356750	VTSFT5008	4 - 48	1.88	.53	.70	.141	2	H2
5356753	VTSFT5009	5356752	VTSFT5009	5356751	VTSFT5009	5356754	VTSFT5009	5 - 40	1.95	.59	.76	.141	2	H2
5356756	VTSFT5010	-	-	5356755	VTSFT5010	5356757	VTSFT5010	6 - 32	2.00	.39	.72	.141	2	H2
5356760	VTSFT5011	5356759	VTSFT5011	5356758	VTSFT5011	5356761	VTSFT5011	6 - 32	2.00	.39	.72	.141	2	H3
-	-	-	-	5356762	VTSFT5012	-	-	6 - 32	2.00	.39	.72	.141	2	H4
5356764	VTSFT5013	-	-	5356763	VTSFT5013	5356765	VTSFT5013	6 - 32	2.00	.39	.72	.141	2	H5
5356767	VTSFT5014	-	-	5356766	VTSFT5014	5356768	VTSFT5014	6 - 32	2.00	.39	.72	.141	2	H7
5356770	VTSFT5015	-	-	5356769	VTSFT5015	5356771	VTSFT5015	6 - 32	2.00	.39	.72	.141	2	H11
5356773	VTSFT5016	-	-	5356772	VTSFT5016	5356774	VTSFT5016	6 - 40	2.00	.39	.72	.141	2	H2
-	-	-	-	5356775	VTSFT5017	-	-	6 - 40	2.00	.39	.72	.141	2	H3
5357304	VTSFT5018	-	-	5357303	VTSFT5018	5357305	VTSFT5018	8 - 32	2.13	.38	.77	.168	3	H2
5357308	VTSFT5019	5357307	VTSFT5019	5357306	VTSFT5019	5357309	VTSFT5019	8 - 32	2.13	.38	.77	.168	3	H3
-	-	-	-	5357370	VTSFT5020	-	-	8 - 32	2.13	.38	.77	.168	3	H4
5357372	VTSFT5021	-	-	5357371	VTSFT5021	5357373	VTSFT5021	8 - 32	2.13	.38	.77	.168	3	H5
-	-	-	-	5357374	VTSFT5022	-	-	8 - 32	2.13	.38	.77	.168	3	H6
5357376	VTSFT5023	-	-	5357375	VTSFT5023	5357377	VTSFT5023	8 - 32	2.13	.38	.77	.168	3	H7
5357379	VTSFT5024	-	-	5357378	VTSFT5024	5357380	VTSFT5024	8 - 32	2.13	.38	.77	.168	3	H11

(continued)

Multipurpose Taps



(VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • ANSI — continued)



● first choice  
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
-	-	-	-	5357381	VTSFT5025	-	-	8 - 36	2.13	.38	.77	.168	3	H3
-	-	-	-	5357382	VTSFT5026	-	-	10 - 24	2.38	.50	.92	.194	3	H2
5357385	VTSFT5027	5357384	VTSFT5027	5357383	VTSFT5027	5357386	VTSFT5027	10 - 24	2.38	.50	.92	.194	3	H3
-	-	-	-	5357387	VTSFT5028	-	-	10 - 24	2.38	.50	.92	.194	3	H4
5357389	VTSFT5029	-	-	5357388	VTSFT5029	5357390	VTSFT5029	10 - 24	2.38	.50	.92	.194	3	H5
-	-	-	-	5357391	VTSFT5030	-	-	10 - 24	2.38	.50	.92	.194	3	H7
5357393	VTSFT5031	-	-	5357392	VTSFT5031	5357394	VTSFT5031	10 - 24	2.38	.50	.92	.194	3	H11
5357396	VTSFT5032	-	-	5357395	VTSFT5032	5357397	VTSFT5032	10 - 32	2.38	.50	.92	.194	3	H2
5357400	VTSFT5033	5357399	VTSFT5033	5357398	VTSFT5033	5357401	VTSFT5033	10 - 32	2.38	.50	.92	.194	3	H3
-	-	-	-	5357402	VTSFT5034	-	-	10 - 32	2.38	.50	.92	.194	3	H4
5357404	VTSFT5035	-	-	5357403	VTSFT5035	5357405	VTSFT5035	10 - 32	2.37	.50	.91	.194	3	H5
-	-	-	-	5357406	VTSFT5036	-	-	10 - 32	2.38	.50	.92	.194	3	H6
5357408	VTSFT5037	-	-	5357407	VTSFT5037	5357409	VTSFT5037	10 - 32	2.38	.50	.92	.194	3	H7
5357431	VTSFT5038	-	-	5357430	VTSFT5038	5357432	VTSFT5038	10 - 32	2.38	.50	.92	.194	3	H11
5364106	VTSFT5039	-	-	5364105	VTSFT5039	5364107	VTSFT5039	12 - 24	2.43	.50	.96	.220	3	H3
5364109	VTSFT5040	-	-	5364108	VTSFT5040	5364450	VTSFT5040	12 - 28	2.43	.50	.96	.220	3	H3
5364453	VTSFT5041	5364452	VTSFT5041	5364451	VTSFT5041	5364454	VTSFT5041	1/4 - 20	2.50	.63	1.00	.255	3	H3
5364456	VTSFT5042	-	-	5364455	VTSFT5042	5364457	VTSFT5042	1/4 - 20	2.50	.63	1.00	.255	3	H5
5364459	VTSFT5043	-	-	5364458	VTSFT5043	5364480	VTSFT5043	1/4 - 20	2.50	.63	1.00	.255	3	H7
5364482	VTSFT5044	-	-	5364481	VTSFT5044	5364483	VTSFT5044	1/4 - 20	2.50	.63	1.00	.255	3	H11
5364486	VTSFT5045	5364485	VTSFT5045	5364484	VTSFT5045	5364487	VTSFT5045	1/4 - 28	2.49	.62	1.00	.255	3	H3
5364489	VTSFT5046	-	-	5364488	VTSFT5046	5364490	VTSFT5046	1/4 - 28	2.49	.62	1.00	.255	3	H4
5364492	VTSFT5047	-	-	5364491	VTSFT5047	5364493	VTSFT5047	1/4 - 28	2.49	.62	1.00	.255	3	H5
-	-	-	-	5364494	VTSFT5048	-	-	1/4 - 28	2.49	.62	1.00	.255	3	H6
5364496	VTSFT5049	-	-	5364495	VTSFT5049	5364498	VTSFT5049	1/4 - 28	2.49	.62	1.00	.255	3	H7
5364500	VTSFT5050	-	-	5364499	VTSFT5050	5364501	VTSFT5050	1/4 - 28	2.49	.62	1.00	.255	3	H11
5364504	VTSFT5051	5364503	VTSFT5051	5364502	VTSFT5051	5364505	VTSFT5051	5/16 - 18	2.72	.69	1.13	.318	3	H3
5364507	VTSFT5052	-	-	5364506	VTSFT5052	5364508	VTSFT5052	5/16 - 18	2.72	.69	1.13	.318	3	H5
5364510	VTSFT5053	-	-	5364509	VTSFT5053	5364511	VTSFT5053	5/16 - 18	2.72	.69	1.13	.318	3	H7
5364513	VTSFT5054	-	-	5364512	VTSFT5054	5364514	VTSFT5054	5/16 - 18	2.72	.69	1.13	.318	3	H11
5364517	VTSFT5055	5364516	VTSFT5055	5364515	VTSFT5055	5364518	VTSFT5055	5/16 - 24	2.71	.68	1.13	.318	3	H3
5364530	VTSFT5056	-	-	5364519	VTSFT5056	5364531	VTSFT5056	5/16 - 24	2.71	.68	1.13	.318	3	H4
5364533	VTSFT5057	-	-	5364532	VTSFT5057	5364534	VTSFT5057	5/16 - 24	2.71	.68	1.13	.318	3	H5
5364536	VTSFT5058	-	-	5364535	VTSFT5058	5364537	VTSFT5058	5/16 - 24	2.71	.68	1.12	.318	3	H6
5364539	VTSFT5059	-	-	5364538	VTSFT5059	5364540	VTSFT5059	5/16 - 24	2.71	.68	1.12	.318	3	H7
5364542	VTSFT5060	-	-	5364541	VTSFT5060	5364543	VTSFT5060	5/16 - 24	2.71	.68	1.12	.318	3	H11
5364546	VTSFT5061	5364545	VTSFT5061	5364544	VTSFT5061	5364548	VTSFT5061	3/8 - 16	2.94	.75	1.27	.381	3	H3
5364550	VTSFT5062	-	-	5364549	VTSFT5062	5364551	VTSFT5062	3/8 - 16	2.94	.75	1.27	.381	3	H5
5364554	VTSFT5063	-	-	5364553	VTSFT5063	5364555	VTSFT5063	3/8 - 16	2.94	.75	1.27	.381	3	H7
5364557	VTSFT5064	-	-	5364556	VTSFT5064	5364558	VTSFT5064	3/8 - 16	2.93	.75	1.27	.381	3	H11

(continued)

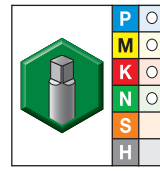
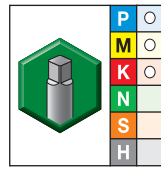
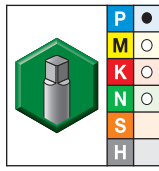
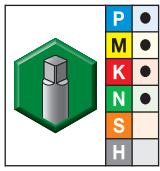
Multipurpose Taps

# Multipurpose Taps

VariTap™ Spiral-Flute HSS-E Taps • Blind Holes



(VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • ANSI — continued)



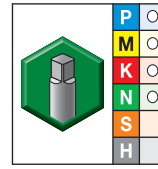
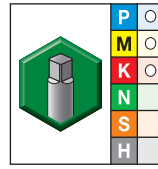
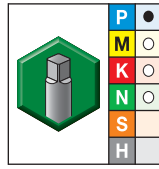
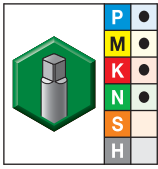
● first choice  
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5364561	VTSFT5065	5364560	VTSFT5065	5364559	VTSFT5065	5364562	VTSFT5065	3/8 - 24	2.92	.74	1.25	.381	3	H3
5364564	VTSFT5066	-	-	5364563	VTSFT5066	5364565	VTSFT5066	3/8 - 24	2.92	.74	1.25	.381	3	H4
5364567	VTSFT5067	-	-	5364566	VTSFT5067	5364568	VTSFT5067	3/8 - 24	2.92	.74	1.25	.381	3	H5
-	-	-	-	5364569	VTSFT5068	-	-	3/8 - 24	2.92	.74	1.25	.381	3	H6
5364571	VTSFT5069	-	-	5364570	VTSFT5069	5364572	VTSFT5069	3/8 - 24	2.92	.74	1.25	.381	3	H7
5364574	VTSFT5070	-	-	5364573	VTSFT5070	5364575	VTSFT5070	3/8 - 24	2.92	.74	1.25	.381	3	H11
5364579	VTSFT5071	5364578	VTSFT5071	5364577	VTSFT5071	5364600	VTSFT5071	7/16 - 14	3.16	.88	1.42	.323	3	H3
5364602	VTSFT5072	-	-	5364601	VTSFT5072	5364603	VTSFT5072	7/16 - 14	3.16	.88	1.42	.323	3	H5
5364605	VTSFT5073	-	-	5364604	VTSFT5073	5364606	VTSFT5073	7/16 - 14	3.16	.88	1.42	.323	3	H7
5364608	VTSFT5074	-	-	5364607	VTSFT5074	5364609	VTSFT5074	7/16 - 14	3.16	.88	1.42	.323	3	H11
5364612	VTSFT5075	5364611	VTSFT5075	5364610	VTSFT5075	5364613	VTSFT5075	7/16 - 20	3.16	.88	1.42	.323	3	H3
5364615	VTSFT5076	-	-	5364614	VTSFT5076	5364616	VTSFT5076	7/16 - 20	3.16	.88	1.42	.323	3	H5
-	-	-	-	5364617	VTSFT5077	-	-	7/16 - 20	3.16	.88	1.42	.323	3	H6
5364619	VTSFT5078	-	-	5364618	VTSFT5078	5364620	VTSFT5078	7/16 - 20	3.16	.88	1.42	.323	3	H7
5364622	VTSFT5079	-	-	5364621	VTSFT5079	5364623	VTSFT5079	7/16 - 20	3.16	.88	1.42	.323	3	H11
5364626	VTSFT5080	5364625	VTSFT5080	5364624	VTSFT5080	5364627	VTSFT5080	1/2 - 13	3.38	.94	1.65	.367	3	H3
5364629	VTSFT5081	-	-	5364628	VTSFT5081	5364630	VTSFT5081	1/2 - 13	3.38	.94	1.65	.367	3	H5
5364632	VTSFT5082	-	-	5364631	VTSFT5082	5364633	VTSFT5082	1/2 - 13	3.38	.94	1.65	.367	3	H7
5364635	VTSFT5083	-	-	5364634	VTSFT5083	5364636	VTSFT5083	1/2 - 13	3.38	.94	1.65	.367	3	H11
5364639	VTSFT5084	5364638	VTSFT5084	5364637	VTSFT5084	5364640	VTSFT5084	1/2 - 20	3.38	.94	1.65	.367	3	H3
5364642	VTSFT5085	-	-	5364641	VTSFT5085	5364643	VTSFT5085	1/2 - 20	3.38	.94	1.65	.367	3	H5
-	-	-	-	5364644	VTSFT5086	-	-	1/2 - 20	3.38	.94	1.65	.367	3	H6
5364646	VTSFT5087	-	-	5364645	VTSFT5087	5364647	VTSFT5087	1/2 - 20	3.38	.94	1.74	.367	3	H7
5364649	VTSFT5088	-	-	5364648	VTSFT5088	5364670	VTSFT5088	1/2 - 20	3.38	.94	1.74	.367	3	H11
5364673	VTSFT5089	5364672	VTSFT5089	5364671	VTSFT5089	5364674	VTSFT5089	9/16 - 12	3.59	1.00	1.74	.429	3	H3
-	-	-	-	5364675	VTSFT5090	5364676	VTSFT5090	9/16 - 12	3.59	1.00	1.74	.429	3	H5
5364679	VTSFT5091	5364678	VTSFT5091	5364677	VTSFT5091	5364680	VTSFT5091	9/16 - 18	3.59	1.00	1.74	.429	3	H3
-	-	-	-	5364681	VTSFT5092	5364682	VTSFT5092	9/16 - 18	3.59	1.00	1.74	.429	3	H5
5364685	VTSFT5093	5364684	VTSFT5093	5364683	VTSFT5093	5364686	VTSFT5093	5/8 - 11	3.81	2.00	1.89	.480	3	H3
5364688	VTSFT5094	-	-	5364687	VTSFT5094	5364689	VTSFT5094	5/8 - 11	3.81	1.09	1.89	.480	3	H5
-	-	-	-	5364690	VTSFT5095	-	-	5/8 - 11	3.81	1.09	1.89	.480	3	H7
5364693	VTSFT5096	5364692	VTSFT5096	5364691	VTSFT5096	5364694	VTSFT5096	5/8 - 18	3.81	1.09	1.89	.480	3	H3
-	-	-	-	5364695	VTSFT5097	5364696	VTSFT5097	5/8 - 18	3.81	1.09	1.89	.480	3	H5
-	-	-	-	5364697	VTSFT5098	-	-	5/8 - 18	3.81	1.09	1.89	.480	3	H6
-	-	-	-	5364698	VTSFT5099	-	-	5/8 - 18	3.81	1.09	1.89	.480	3	H7
5364701	VTSFT5100	5364700	VTSFT5100	5364699	VTSFT5100	5364702	VTSFT5100	3/4 - 10	4.25	1.22	2.08	.590	4	H3
5364704	VTSFT5101	-	-	5364703	VTSFT5101	5364705	VTSFT5101	3/4 - 10	4.25	1.22	2.08	.590	4	H5
5364708	VTSFT5102	5364707	VTSFT5102	5364706	VTSFT5102	5364709	VTSFT5102	3/4 - 16	4.25	1.22	2.08	.590	4	H3
5364711	VTSFT5103	-	-	5364710	VTSFT5103	5364712	VTSFT5103	3/4 - 16	4.25	1.22	2.08	.590	4	H5
-	-	-	-	5364713	VTSFT5104	-	-	3/4 - 16	4.25	1.22	2.08	.590	4	H7

(continued)

Multipurpose Taps

(VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • ANSI — continued)

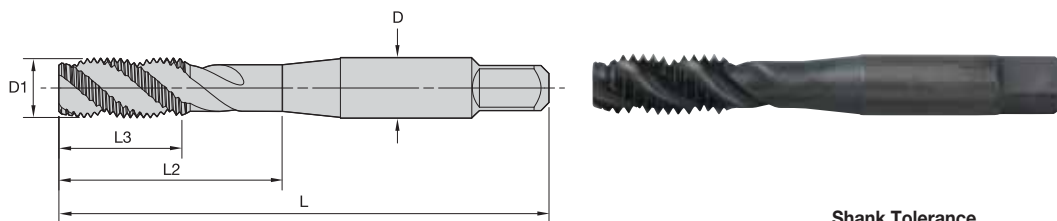


● first choice  
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	L2	D		
5364716	VTSFT5105	5364715	VTSFT5105	5364714	VTSFT5105	5364717	VTSFT5105	7/8 - 9	4.69	1.34	2.30	.697	4	H4
5364719	VTSFT5106	-	-	5364718	VTSFT5106	5364720	VTSFT5106	7/8 - 9	4.69	1.34	2.30	.697	4	H5
5364723	VTSFT5107	5364722	VTSFT5107	5364721	VTSFT5107	5364724	VTSFT5107	7/8 - 14	4.69	1.34	2.30	.697	4	H4
5364727	VTSFT5108	5364725	VTSFT5108	5364726	VTSFT5108	5364728	VTSFT5108	1 - 8	5.13	1.50	2.58	.800	4	H5
5364740	VTSFT5109	-	-	5364729	VTSFT5109	5364741	VTSFT5109	1 - 12	5.13	1.50	2.58	.800	4	H4
-	-	-	-	5364742	VTSFT5110	-	-	1 1/8 - 7	5.44	1.71	2.56	.896	4	H6
-	-	-	-	5364744	VTSFT5111	-	-	1 1/8 - 8	5.44	1.71	2.56	.896	4	H6
-	-	-	-	5364743	VTSFT5112	-	-	1 1/8 - 12	5.44	1.71	2.56	.896	4	H5
-	-	-	-	5364746	VTSFT5113	5364745	VTSFT5113	1 1/4 - 7	5.75	1.71	2.56	1.021	4	H6
-	-	-	-	5364747	VTSFT5114	-	-	1 1/4 - 12	5.75	1.71	2.56	1.021	4	H5
-	-	-	-	5364748	VTSFT5115	-	-	1 1/4 - 8	5.75	1.71	2.56	1.021	4	H6
-	-	-	-	5364749	VTSFT5116	-	-	1 3/8 - 6	6.06	2.00	3.00	1.108	5	H6
-	-	-	-	5364750	VTSFT5117	-	-	1 3/8 - 12	6.06	2.00	3.00	1.108	5	H5
-	-	-	-	5364751	VTSFT5118	-	-	1 3/8 - 8	6.06	2.00	3.00	1.108	5	H6
-	-	-	-	5364752	VTSFT5119	-	-	1 1/2 - 6	6.38	2.00	3.00	1.233	5	H6
-	-	-	-	5364754	VTSFT5120	-	-	1 1/2 - 8	6.38	2.00	3.00	1.233	5	H6
-	-	-	-	5364753	VTSFT5121	-	-	1 1/2 - 12	6.38	2.00	3.00	1.233	5	H5
-	-	-	-	5364755	VTSFT5122	-	-	1 3/4 - 5	7.00	2.40	3.19	1.429	5	H7
-	-	-	-	-	-	5364756	VTSFT5123	2 - 4 1/2	7.63	2.67	3.56	1.643	5	H7

NOTE: Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.  
VariTap for 3B class of fit is suitable for UNJ aerospace internal threading applications.

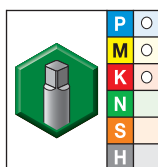
• WP49EG oxide



Shank Tolerance

D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

■ VT-SFT • Form E Bottoming Chamfer • Machine Screw and Fractional • ANSI



● first choice  
○ alternate choice

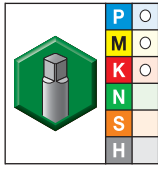
grade WP49EG  
Oxide

order #	catalog #	D1 TPI	inch dimensions				number of flutes	pitch diameter limit
			L	L3	L2	D		
5390145	VTSFT5130	4 - 40	1.88	.51	.69	.141	2	H2
5390146	VTSFT5131	4 - 40	1.88	.51	.69	.141	2	H3
5390147	VTSFT5132	4 - 40	1.88	.51	.69	.141	2	H5
5390148	VTSFT5133	5 - 40	1.94	.58	.75	.141	2	H2
5390149	VTSFT5134	6 - 32	1.99	.38	.71	.141	2	H2
5390220	VTSFT5135	6 - 32	1.99	.38	.71	.141	2	H3
5390221	VTSFT5136	6 - 32	1.99	.38	.71	.141	2	H5
5390222	VTSFT5137	6 - 40	1.99	.37	.71	.141	2	H2
5390223	VTSFT5138	6 - 40	1.99	.37	.71	.141	2	H3
5390224	VTSFT5139	8 - 32	2.12	.38	.76	.168	3	H2
5390225	VTSFT5140	8 - 32	2.12	.38	.76	.168	3	H3
5390226	VTSFT5141	8 - 32	2.12	.38	.76	.168	3	H5
5390227	VTSFT5142	10 - 24	2.37	.50	.91	.194	3	H3
5390228	VTSFT5143	10 - 24	2.37	.50	.91	.194	3	H5
5390229	VTSFT5144	10 - 32	2.36	.49	.91	.194	3	H3
5390230	VTSFT5145	10 - 32	2.36	.49	.91	.194	3	H5
5390231	VTSFT5146	1/4 - 20	2.50	.63	1.00	.255	3	H3
5390232	VTSFT5147	1/4 - 20	2.50	.63	1.00	.255	3	H5
5390233	VTSFT5148	1/4 - 28	2.49	.62	1.00	.255	3	H3
5390234	VTSFT5149	1/4 - 28	2.49	.62	1.00	.255	3	H5
5390235	VTSFT5150	5/16 - 18	2.72	.69	1.13	.318	3	H3
5390236	VTSFT5151	5/16 - 18	2.72	.69	1.13	.318	3	H5
5390237	VTSFT5152	5/16 - 24	2.71	.68	1.13	.318	3	H3
5390238	VTSFT5153	5/16 - 24	2.71	.68	1.12	.318	3	H5

(continued)

Multipurpose Taps

(VT-SFT • Form E Bottoming Chamfer • Machine Screw and Fractional • ANSI — continued)



● first choice  
○ alternate choice

grade WP49EG Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5390239	VTSFT5154	3/8 - 16	2.94	.75	1.27	.381	3	H3
5390240	VTSFT5155	3/8 - 16	2.94	.75	1.27	.381	3	H5
5390241	VTSFT5156	3/8 - 24	2.92	.74	1.25	.381	3	H3
5390242	VTSFT5157	3/8 - 24	2.92	.74	1.25	.381	3	H4
5390243	VTSFT5158	3/8 - 24	2.92	.74	1.25	.381	3	H5
5390244	VTSFT5159	7/16 - 14	3.16	.88	1.49	.323	3	H3
5390245	VTSFT5160	7/16 - 14	3.16	.88	1.49	.323	3	H5
5390246	VTSFT5161	7/16 - 20	3.16	.88	1.49	.323	3	H3
5390247	VTSFT5162	7/16 - 20	3.16	.88	1.49	.323	3	H5
5390248	VTSFT5163	1/2 - 13	3.38	.94	1.74	.367	3	H3
5390249	VTSFT5164	1/2 - 13	3.38	.94	1.74	.367	3	H5
5390260	VTSFT5165	1/2 - 20	3.38	.94	1.74	.367	3	H3
5390261	VTSFT5166	9/16 - 12	3.59	1.00	1.74	.429	3	H3
5390262	VTSFT5167	9/16 - 18	3.59	1.00	1.74	.429	3	H3
5390263	VTSFT5168	5/8 - 11	3.81	1.09	1.89	.480	3	H3
5390264	VTSFT5169	5/8 - 11	3.81	1.09	1.89	.480	3	H5
5390265	VTSFT5170	5/8 - 18	3.81	1.09	1.89	.480	3	H3
5390266	VTSFT5171	5/8 - 18	3.81	1.09	1.89	.480	3	H5
5390267	VTSFT5172	3/4 - 10	4.25	1.22	2.08	.590	4	H3
5390268	VTSFT5173	3/4 - 16	4.25	1.22	2.08	.590	4	H3

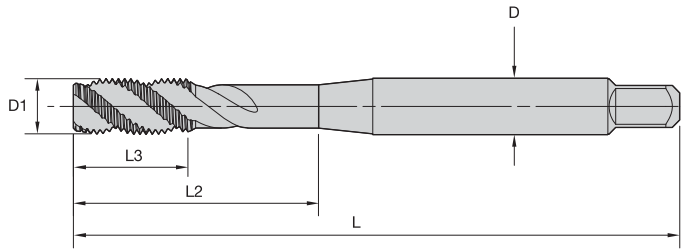
NOTE: Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit. VariTap for 3B class of fit is suitable for UNJ aerospace internal threading applications.

# Multipurpose Taps

VariTap™ Spiral-Flute HSS-E Taps • Blind Holes

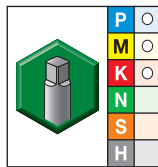
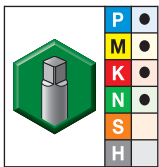


- WP42EG TiCN
- WP49EG oxide



Shank Tolerance	
D inch	tolerance
0.141–0.635	+0, -.0015
>0.635–1.51	+0, -.0020
>1.51–2.01	+0, -.0030

## ■ VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • DIN Length ANSI Shank

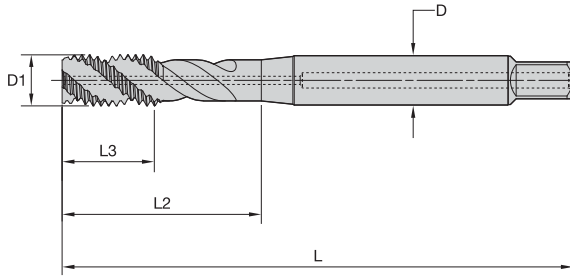


- first choice
- alternate choice

grade WP42EG TiCN		grade WP49EG Oxide		inch dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5436673	VTSFT9008	5436672	VTSFT9008	4 - 40	2.20	.31	.71	.141	2	DIN-ANSI	2B
5436675	VTSFT9009	5436674	VTSFT9009	6 - 32	2.20	.35	.79	.141	2	DIN-ANSI	2B
5436677	VTSFT9010	5436676	VTSFT9010	8 - 32	2.48	.43	.83	.168	3	DIN-ANSI	2B
5436679	VTSFT9011	5436678	VTSFT9011	10 - 24	2.76	.47	.99	.194	3	DIN-ANSI	2B
5436701	VTSFT9012	5436700	VTSFT9012	10 - 32	2.75	.47	.98	.194	3	DIN-ANSI	2B
5436703	VTSFT9013	5436702	VTSFT9013	1/4 - 20	3.15	.59	1.18	.255	3	DIN-ANSI	2B
5436705	VTSFT9014	5436704	VTSFT9014	1/4 - 28	3.14	.58	1.17	.255	3	DIN-ANSI	2B
5436707	VTSFT9015	5436706	VTSFT9015	5/16 - 18	3.54	.59	1.38	.318	3	DIN-ANSI	2B
5436709	VTSFT9016	5436708	VTSFT9016	5/16 - 24	3.53	.58	1.37	.318	3	DIN-ANSI	2B
5436721	VTSFT9017	5436720	VTSFT9017	3/8 - 16	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5436723	VTSFT9018	5436722	VTSFT9018	3/8 - 24	3.92	.73	1.52	.381	3	DIN-ANSI	2B
5436725	VTSFT9019	5436724	VTSFT9019	7/16 - 14	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5436727	VTSFT9020	5436726	VTSFT9020	7/16 - 20	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5436729	VTSFT9021	5436728	VTSFT9021	1/2 - 13	4.33	.91	1.85	.367	3	DIN-ANSI	2B
5436731	VTSFT9022	5436730	VTSFT9022	1/2 - 20	4.33	.91	1.85	.367	3	DIN-ANSI	2B
5436733	VTSFT9023	5436732	VTSFT9023	5/8 - 11	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5436735	VTSFT9024	5436734	VTSFT9024	5/8 - 18	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5436737	VTSFT9025	5436736	VTSFT9025	3/4 - 10	4.92	1.18	2.52	.590	3	DIN-ANSI	2B
5436739	VTSFT9026	5436738	VTSFT9026	3/4 - 16	4.92	1.18	2.52	.590	3	DIN-ANSI	2B

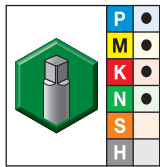
Multipurpose Taps

• WP42EG TiCN



Shank Tolerance	
D inch	tolerance
0.141-0.635	+0, -.0015
>0.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

■ VT-SFT • Form C Semi-Bottoming Chamfer • Through Coolant • Fractional • DIN Length ANSI Shank

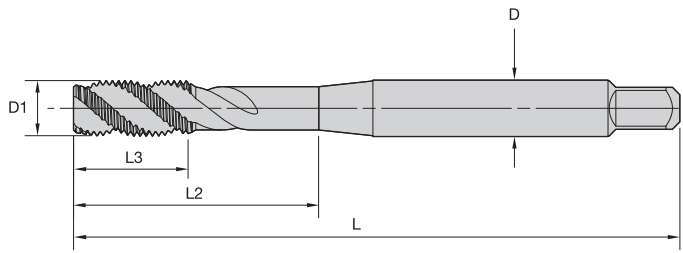


● first choice  
○ alternate choice

grade WP42EG TiCN		inch dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 TPI	L	L3	L2	D			
5436357	VTSFT9762	1/4 - 20	3.15	.59	1.18	.255	3	DIN-ANSI	2B
5436358	VTSFT9763	1/4 - 28	3.15	.59	1.18	.255	3	DIN-ANSI	2B
5436359	VTSFT9764	5/16 - 18	3.54	.59	1.38	.318	3	DIN-ANSI	2B
5436460	VTSFT9765	5/16 - 24	3.54	.59	1.38	.318	3	DIN-ANSI	2B
5436461	VTSFT9766	3/8 - 16	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5436462	VTSFT9767	3/8 - 24	3.94	.75	1.54	.381	3	DIN-ANSI	2B
5436463	VTSFT9768	7/16 - 14	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5436464	VTSFT9769	7/16 - 20	3.94	.71	1.61	.323	3	DIN-ANSI	2B
5436465	VTSFT9770	1/2 - 13	3.94	.91	1.85	.367	3	DIN-ANSI	2B
5436466	VTSFT9771	1/2 - 20	4.33	.91	1.85	.367	3	DIN-ANSI	2B
5436467	VTSFT9772	9/16 - 18	4.33	.98	2.09	.429	3	DIN-ANSI	2B
5436468	VTSFT9773	5/8 - 11	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5436469	VTSFT9774	5/8 - 18	4.33	.94	2.01	.480	3	DIN-ANSI	2B
5436470	VTSFT9775	3/4 - 10	4.92	1.18	2.52	.590	4	DIN-ANSI	2B
5436471	VTSFT9776	3/4 - 16	4.92	1.18	2.52	.590	4	DIN-ANSI	2B
5436472	VTSFT9777	7/8 - 9	5.51	1.34	2.80	.697	4	DIN-ANSI	2B
5436473	VTSFT9778	7/8 - 14	5.51	1.34	2.80	.697	4	DIN-ANSI	2B
5436474	VTSFT9779	1 - 8	6.30	1.50	3.19	.800	4	DIN-ANSI	2B

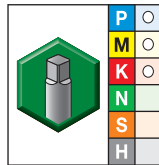
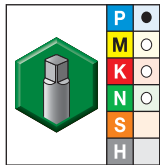
Multipurpose Taps

- WU41EG TiN
- WP49EG oxide



Shank Tolerance	
D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052

■ VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • DIN 371 and 376



- first choice
- alternate choice

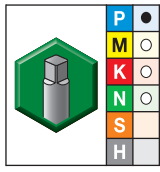
grade WU41EG TiN		grade WP49EG Oxide		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5472587	VTSFT6005	5387487	VTSFT6005	4 - 40	56	8	18	3,5	2	DIN 371	2B
5472589	VTSFT6007	5387489	VTSFT6007	5 - 40	56	9	20	4,0	2	DIN 371	2B
5472600	VTSFT6008	5387640	VTSFT6008	6 - 32	56	9	20	4,0	2	DIN 371	2B
5472602	VTSFT6010	5387642	VTSFT6010	6 - 40	56	9	20	4,0	2	DIN 371	2B
5472603	VTSFT6011	5387643	VTSFT6011	8 - 32	63	11	21	4,5	3	DIN 371	2B
5472605	VTSFT6013	5387645	VTSFT6013	10 - 24	70	12	25	6,0	3	DIN 371	2B
5472606	VTSFT6014	5387646	VTSFT6014	10 - 32	70	12	25	6,0	3	DIN 371	2B
5472608	VTSFT6016	5387648	VTSFT6016	1/4 - 20	80	15	30	7,0	3	DIN 371	2B
5472609	VTSFT6017	5387649	VTSFT6017	1/4 - 28	80	15	30	7,0	3	DIN 371	2B
5472611	VTSFT6019	5387651	VTSFT6019	5/16 - 18	90	15	35	8,0	3	DIN 371	2B
5472612	VTSFT6020	5387652	VTSFT6020	5/16 - 24	90	15	35	8,0	3	DIN 371	2B
5472614	VTSFT6022	5387654	VTSFT6022	3/8 - 16	100	19	39	10,0	3	DIN 371	2B
5472615	VTSFT6023	5387655	VTSFT6023	3/8 - 24	100	19	39	10,0	3	DIN 371	2B
5472617	VTSFT6025	5387657	VTSFT6025	7/16 - 14	100	18	41	8,0	3	DIN 376	2B
5472618	VTSFT6026	5387658	VTSFT6026	7/16 - 20	100	18	41	8,0	3	DIN 376	2B
5472620	VTSFT6028	5387670	VTSFT6028	1/2 - 13	110	23	40	9,0	3	DIN 376	2B
5472621	VTSFT6029	5387671	VTSFT6029	1/2 - 20	110	23	40	9,0	3	DIN 376	2B
5472623	VTSFT6031	5387673	VTSFT6031	9/16 - 12	110	25	32	11,0	3	DIN 376	2B
5472624	VTSFT6032	5387674	VTSFT6032	9/16 - 18	110	25	32	11,0	3	DIN 376	2B
5472625	VTSFT6033	5387675	VTSFT6033	5/8 - 11	110	24	35	12,0	3	DIN 376	2B

(continued)

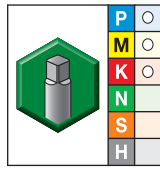
Multipurpose Taps



(VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • DIN 371 and 376 — continued)



grade WU41EG  
TiN

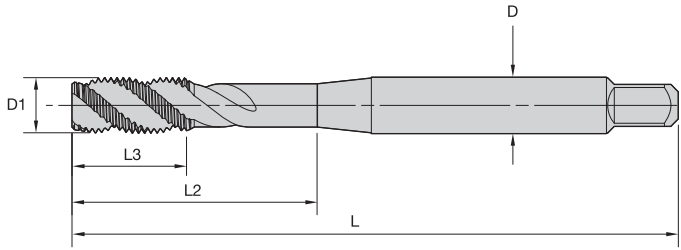


grade WP49EG  
Oxide

- first choice
- alternate choice

grade WU41EG TiN		grade WP49EG Oxide		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5472626	VTSFT6034	5387676	VTSFT6034	5/8 - 18	110	24	35	12,0	3	DIN 376	2B
5472627	VTSFT6035	5387677	VTSFT6035	3/4 - 10	140	30	46	16,0	4	DIN 376	2B
5472628	VTSFT6036	5387678	VTSFT6036	3/4 - 16	140	30	46	16,0	4	DIN 376	2B
5472629	VTSFT6037	5387679	VTSFT6037	7/8 - 9	140	34	35	18,0	4	DIN 376	2B
5472630	VTSFT6038	5387700	VTSFT6038	7/8 - 14	140	34	35	18,0	4	DIN 376	2B
5472631	VTSFT6039	5387701	VTSFT6039	1 - 8	160	38	41	18,0	4	DIN 376	2B
5472632	VTSFT6040	5387702	VTSFT6040	1 - 12	160	38	41	18,0	4	DIN 376	2B

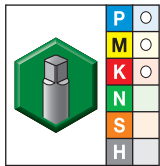
- WP49EG oxide



Shank Tolerance

D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052

■ VT-SFT • Form C Semi-Bottoming Chamfer • UNJC/UNJF • Inch DIN 371 and 376

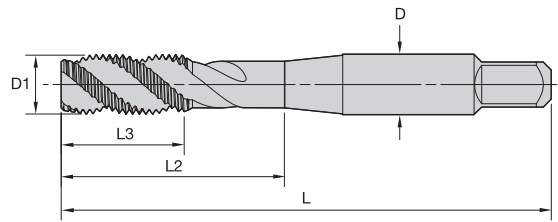


- first choice
- alternate choice

grade WP49EG Oxide		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
5387488	VTSFT6006	4 - 40	56	8	18	3,5	2	DIN 371	3B
5387641	VTSFT6009	6 - 32	56	9	20	4,0	2	DIN 371	3B
5387644	VTSFT6012	8 - 32	63	11	21	4,5	3	DIN 371	3B
5387647	VTSFT6015	10 - 32	70	12	25	6,0	3	DIN 371	3B
5387650	VTSFT6018	1/4 - 28	80	15	30	7,0	3	DIN 371	3B
5387653	VTSFT6021	5/16 - 24	90	15	35	8,0	3	DIN 371	3B
5387656	VTSFT6024	3/8 - 24	100	19	39	10,0	3	DIN 371	3B
5387659	VTSFT6027	7/16 - 20	100	18	41	8,0	3	DIN 376	3B
5387672	VTSFT6030	1/2 - 20	110	23	40	9,0	3	DIN 376	3B

Multipurpose Taps

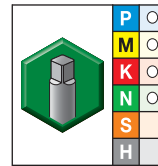
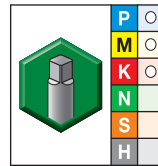
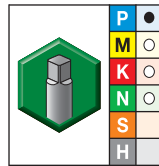
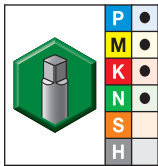
- WP42EG TiCN
- WU41EG TiN
- WP49EG oxide
- WU40EG bright



Shank Tolerance

D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

■ VT-SFT • Form C Semi-Bottoming Chamfer • Metric • ANSI

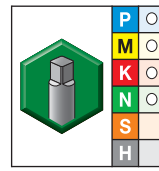
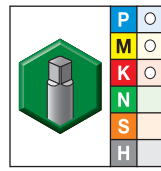
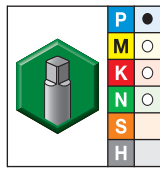
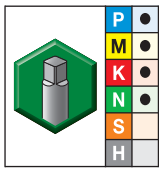


- first choice
- alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
5357033	VTSFT5505	5357034	VTSFT5505	5357031	VTSFT5505	5357035	VTSFT5505	M3 X 0,5	1.94	.58	.75	.141	2	D3
5357037	VTSFT5506	-	-	5357036	VTSFT5506	-	-	M3 X 0,5	1.94	.58	.75	.141	2	D11
5357039	VTSFT5507	5357050	VTSFT5507	5357038	VTSFT5507	5357051	VTSFT5507	M3,5 X 0,6	1.99	.38	.71	.141	2	D4
5357053	VTSFT5508	-	-	5357052	VTSFT5508	-	-	M3,5 X 0,6	1.99	.38	.71	.141	2	D11
5357055	VTSFT5509	5357056	VTSFT5509	5357054	VTSFT5509	5357057	VTSFT5509	M4 X 0,7	2.12	.38	.76	.168	3	D4
5357059	VTSFT5510	-	-	5357058	VTSFT5510	-	-	M4 X 0,7	2.12	.38	.76	.168	3	D11
5357061	VTSFT5511	5357062	VTSFT5511	5357060	VTSFT5511	5357063	VTSFT5511	M5 X 0,8	2.37	.50	.91	.194	3	D4
5357066	VTSFT5512	-	-	5357064	VTSFT5512	-	-	M5 X 0,8	2.37	.50	.91	.194	3	D11
5357068	VTSFT5513	5357069	VTSFT5513	5357067	VTSFT5513	5357080	VTSFT5513	M6 X 1	2.50	.63	1.01	.255	3	D5
5357083	VTSFT5514	-	-	5357082	VTSFT5514	-	-	M6 X 1	2.50	.63	1.01	.255	3	D11
5357085	VTSFT5515	5357086	VTSFT5515	5357084	VTSFT5515	5357087	VTSFT5515	M7 X 1	2.73	.69	1.15	.318	3	D5
5357089	VTSFT5516	-	-	5357088	VTSFT5516	-	-	M7 X 1	2.73	.69	1.15	.318	3	D11
5357101	VTSFT5517	5357102	VTSFT5517	5357100	VTSFT5517	5357103	VTSFT5517	M8 X 1	2.71	.69	1.12	.318	3	D5
5357105	VTSFT5518	-	-	5357104	VTSFT5518	-	-	M8 X 1	2.71	.69	1.12	.318	3	D11
5357107	VTSFT5519	5357108	VTSFT5519	5357106	VTSFT5519	5357120	VTSFT5519	M8 X 1,25	2.71	.69	1.12	.318	3	D5
5357123	VTSFT5520	-	-	5357121	VTSFT5520	-	-	M8 X 1,25	2.71	.69	1.12	.318	3	D11
5365567	VTSFT5521	-	-	5365566	VTSFT5521	5365568	VTSFT5521	M10 X 1	2.91	.74	1.24	.381	3	D5
5365590	VTSFT5522	-	-	5365569	VTSFT5522	-	-	M10 X 1	2.91	.74	1.24	.381	3	D11
5365592	VTSFT5523	5365593	VTSFT5523	5365591	VTSFT5523	5365594	VTSFT5523	M10 X 1,25	2.92	.74	1.25	.381	3	D5
5365596	VTSFT5524	-	-	5365595	VTSFT5524	-	-	M10 X 1,25	2.92	.74	1.25	.381	3	D11
5365598	VTSFT5525	5365599	VTSFT5525	5365597	VTSFT5525	5365610	VTSFT5525	M10 X 1,5	2.92	.75	1.26	.381	3	D6
5365612	VTSFT5526	-	-	5365611	VTSFT5526	-	-	M10 X 1,5	2.92	.75	1.25	.381	3	D11
5365614	VTSFT5527	5365615	VTSFT5527	5365613	VTSFT5527	5365616	VTSFT5527	M12 X 1,25	3.38	.94	1.74	.367	3	D5
5365618	VTSFT5528	-	-	5365617	VTSFT5528	-	-	M12 X 1,25	3.38	.94	1.74	.367	3	D11

(continued)

(VT-SFT • Form C Semi-Bottoming Chamfer • Metric • ANSI – continued)

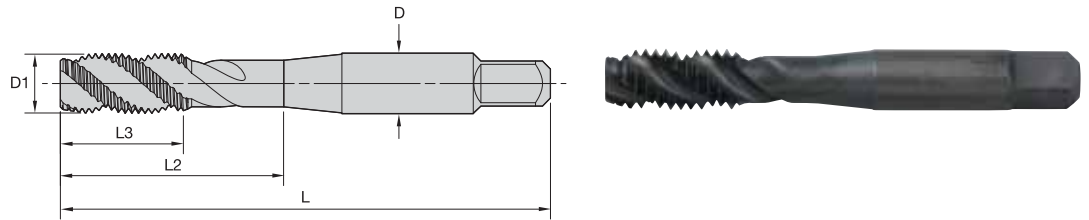


● first choice  
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
5365621	VTSFT5529	-	-	5365619	VTSFT5529	5365622	VTSFT5529	M12 X 1,5	3.38	.94	1.74	.367	3	D6
5365624	VTSFT5530	-	-	5365623	VTSFT5530	-	-	M12 X 1,5	3.38	.94	1.74	.367	3	D11
5365626	VTSFT5531	5365627	VTSFT5531	5365625	VTSFT5531	5365628	VTSFT5531	M12 X 1,75	3.38	.94	1.74	.367	3	D6
5365630	VTSFT5532	-	-	5365629	VTSFT5532	-	-	M12 X 1,75	3.38	.94	1.74	.367	3	D11
5365632	VTSFT5533	-	-	5365631	VTSFT5533	5365633	VTSFT5533	M14 X 1,5	3.59	1.00	1.74	.429	3	D6
-	-	-	-	-	-	5365634	VTSFT5534	M14 X 1,5	3.59	1.00	1.74	.429	3	D7
5365636	VTSFT5535	-	-	5365635	VTSFT5535	-	-	M14 X 2	3.59	1.00	1.74	.429	3	D7
5365638	VTSFT5536	-	-	5365637	VTSFT5536	5365639	VTSFT5536	M16 X 1,5	3.81	1.09	1.89	.480	3	D6
5365641	VTSFT5537	-	-	5365640	VTSFT5537	5365642	VTSFT5537	M16 X 2	3.81	1.09	1.89	.480	3	D7
5365644	VTSFT5538	-	-	5365643	VTSFT5538	5365645	VTSFT5538	M18 X 1,5	4.03	1.09	1.89	.542	4	D6
5365647	VTSFT5539	-	-	5365646	VTSFT5539	5365648	VTSFT5539	M18 X 2,5	4.03	1.09	1.89	.542	4	D7
5365650	VTSFT5540	-	-	5365649	VTSFT5540	-	-	M20 X 1,5	4.47	1.22	2.08	.652	4	D6
5365652	VTSFT5541	-	-	5365651	VTSFT5541	-	-	M20 X 2,5	4.47	1.22	2.08	.652	4	D7
-	-	-	-	5365653	VTSFT5542	-	-	M22 X 1,5	4.69	1.34	2.30	.697	4	D6
-	-	-	-	5365654	VTSFT5543	-	-	M22 X 2,5	4.69	1.34	2.30	.697	4	D7
-	-	-	-	5365655	VTSFT5544	-	-	M24 X 1,5	4.91	1.34	2.30	.760	4	D6
-	-	-	-	5365656	VTSFT5545	-	-	M24 X 3	4.91	1.34	2.30	.760	4	D8
-	-	-	-	5365657	VTSFT5546	-	-	M27 X 1,5	5.13	1.50	2.50	.896	4	D7
-	-	-	-	5365658	VTSFT5547	-	-	M27 X 3	5.13	1.50	2.50	.896	4	D8
-	-	-	-	5365659	VTSFT5548	-	-	M30 X 1,5	5.44	1.71	2.56	1.021	4	D6
-	-	-	-	5365660	VTSFT5549	-	-	M30 X 3,5	5.44	1.71	2.56	1.021	4	D9

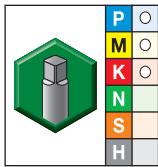
NOTE: Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 6H class of fit. VariTap for 6H class of fit is suitable for MJ aerospace internal threading applications.

• WP49EG oxide



Shank Tolerance	
D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

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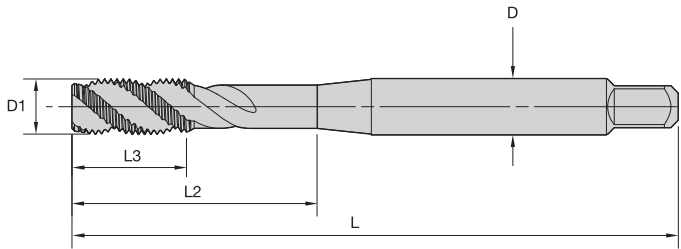
● first choice  
○ alternate choice

grade WP49EG Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	L2	D		
5400155	VTSFT5550	M3 X 0,5	1.94	.58	.75	.141	2	D3
5400156	VTSFT5551	M3,5 X 0,6	2.00	.38	.71	.141	2	D4
5400157	VTSFT5552	M4 X 0,7	2.13	.38	.76	.168	3	D4
5400158	VTSFT5553	M5 X 0,8	2.38	.50	.91	.194	3	D4
5400159	VTSFT5554	M6 X 1	2.50	.63	1.00	.255	3	D5
5400230	VTSFT5555	M7 X 1	2.72	.69	1.15	.318	3	D5
5400232	VTSFT5557	M8 X 1	2.72	.69	1.12	.318	3	D5
5400231	VTSFT5556	M8 X 1,25	2.72	.69	1.12	.318	3	D5
5400234	VTSFT5559	M10 X 1,25	2.94	.75	1.26	.381	3	D5
5400233	VTSFT5558	M10 X 1,5	2.94	.75	1.26	.381	3	D6
5400237	VTSFT5562	M12 X 1,25	3.38	.94	1.74	.367	3	D5
5400236	VTSFT5561	M12 X 1,5	3.38	.94	1.74	.367	3	D6
5400235	VTSFT5560	M12 X 1,75	3.38	.94	1.74	.367	3	D6
5400239	VTSFT5564	M14 X 1,5	3.59	1.00	1.74	.429	3	D6
5400238	VTSFT5563	M14 X 2	3.59	1.00	1.74	.429	3	D7
5400241	VTSFT5566	M16 X 1,5	3.81	1.09	1.89	.480	3	D6
5400240	VTSFT5565	M16 X 2	3.81	1.09	1.89	.480	3	D7
5400242	VTSFT5567	M18 X 1,5	4.03	1.09	1.89	.542	4	D6

NOTE: Refer to tables on pages W231-W232 for the recommended pitch diameter limit for 6H class of fit. VariTap for 6H class of fit is suitable for MJ aerospace internal threading applications.

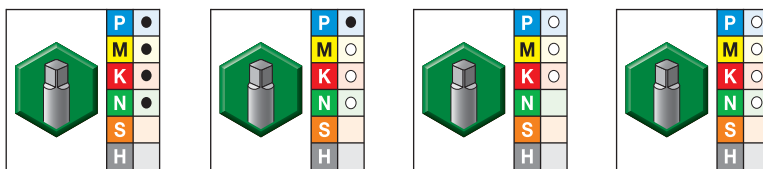
Multipurpose Taps

- WP42EG TiCN
- WU41EG TiN
- WP49EG oxide
- WU40EG bright



Shank Tolerance	
D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052

■ VT-SFT • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376



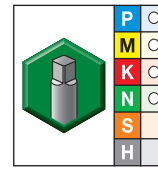
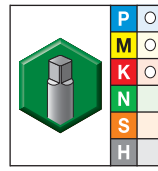
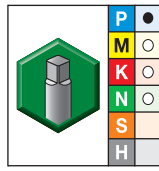
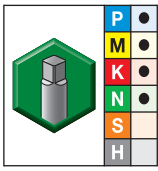
- first choice
- alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		metric dimensions				number of flutes	dimension standard	class of fit	
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2				D
5368703	VTSFT6506	5368702	VTSFT6506	5368704	VTSFT6506	5368705	VTSFT6506	M2 X 0,4	45	7	13	2,8	2	DIN 371	6H
-	-	-	-	5368706	VTSFT6507	-	-	M2 X 0,4	45	7	13	2,8	2	DIN 371	6G
-	-	-	-	5368707	VTSFT6508	-	-	M2,2 X 0,45	45	7	13	2,8	2	DIN 371	6H
-	-	5368708	VTSFT6509	5368709	VTSFT6509	5368720	VTSFT6509	M2,5 X 0,45	50	7	15	2,8	2	DIN 371	6H
-	-	-	-	5368721	VTSFT6510	-	-	M2,5 X 0,45	50	7	15	2,8	2	DIN 371	6G
-	-	-	-	5402138	VTSFT6545	-	-	M3 X 0,35	56	8	-	2,2	2	DIN 374	6H
-	-	-	-	5368726	VTSFT6512	-	-	M3 X 0,5	56	8	18	3,5	2	DIN 371	6G
-	-	-	-	5402227	VTSFT6525	5402228	VTSFT6525	M3 X 0,5	56	8	-	2,2	2	DIN 376	6H
5368723	VTSFT6511	5368722	VTSFT6511	5368724	VTSFT6511	5368725	VTSFT6511	M3 X 0,5	56	8	18	3,5	2	DIN 371	6H
-	-	5368727	VTSFT6513	5368728	VTSFT6513	5368729	VTSFT6513	M3,5 X 0,6	56	9	20	4,0	2	DIN 371	6H
-	-	-	-	5402139	VTSFT6546	5402180	VTSFT6546	M4 X 0,5	63	10	21	2,8	3	DIN 374	6H
-	-	-	-	5368734	VTSFT6515	-	-	M4 X 0,7	63	11	21	4,5	3	DIN 371	6G
-	-	-	-	5402229	VTSFT6526	5402250	VTSFT6526	M4 X 0,7	63	10	21	2,8	3	DIN 376	6H
5368731	VTSFT6514	5368730	VTSFT6514	5368732	VTSFT6514	5368733	VTSFT6514	M4 X 0,7	63	11	21	4,5	3	DIN 371	6H
-	-	-	-	5402181	VTSFT6547	5402182	VTSFT6547	M5 X 0,5	70	12	25	3,5	3	DIN 374	6H
-	-	-	-	5368739	VTSFT6517	-	-	M5 X 0,8	70	12	25	6,0	3	DIN 371	6G
-	-	-	-	5402251	VTSFT6527	5402252	VTSFT6527	M5 X 0,8	70	12	25	3,5	3	DIN 376	6H
5368736	VTSFT6516	5368735	VTSFT6516	5368737	VTSFT6516	5368738	VTSFT6516	M5 X 0,8	70	12	25	6,0	3	DIN 371	6H
-	-	-	-	5402183	VTSFT6548	-	-	M6 X 0,5	80	12	30	4,5	3	DIN 374	6H
-	-	-	-	5402185	VTSFT6549	5402184	VTSFT6549	M6 X 0,75	80	12	30	4,5	3	DIN 374	6H
5368741	VTSFT6518	5368740	VTSFT6518	5368742	VTSFT6518	5368743	VTSFT6518	M6 X 1	80	12	30	6,0	3	DIN 371	6H
-	-	-	-	5402253	VTSFT6528	5402254	VTSFT6528	M6 X 1	80	12	30	4,5	3	DIN 376	6H
-	-	-	-	5368744	VTSFT6519	-	-	M6 X 1	80	12	30	6,0	3	DIN 371	6G
-	-	-	-	5368745	VTSFT6520	5368746	VTSFT6520	M7 X 1	80	12	30	7,0	3	DIN 371	6H

(continued)

Multipurpose Taps

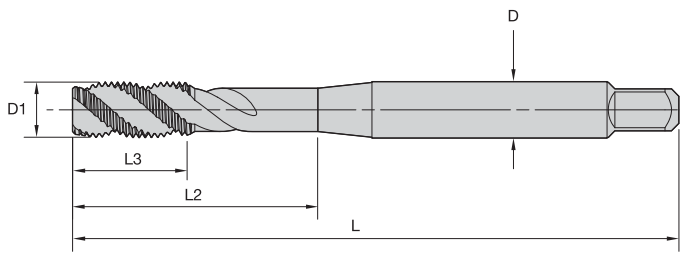
(VT-SFT • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 — continued)



● first choice  
○ alternate choice

grade WP42EG TiCN		grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
-	-	-	-	5402186	VTSFT6550	5402187	VTSFT6550	M8 X 0,75	80	12	30	6,0	3	DIN 374	6H
5402188	VTSFT6551	-	-	5402189	VTSFT6551	5402190	VTSFT6551	M8 X 1	90	15	35	6,0	3	DIN 374	6H
-	-	-	-	5368752	VTSFT6522	-	-	M8 X 1,25	90	15	35	8,0	3	DIN 371	6G
-	-	-	-	5402255	VTSFT6529	5402256	VTSFT6529	M8 X 1,25	90	15	35	6,0	3	DIN 376	6H
5368749	VTSFT6521	5368748	VTSFT6521	5368750	VTSFT6521	5368751	VTSFT6521	M8 X 1,25	90	15	35	8,0	3	DIN 371	6H
-	-	-	-	-	-	5402191	VTSFT6552	M10 X 0,75	90	15	35	7,0	3	DIN 374	6H
-	-	-	-	5402192	VTSFT6553	5402193	VTSFT6553	M10 X 1	90	15	35	7,0	3	DIN 374	6H
5402194	VTSFT6554	-	-	5402195	VTSFT6554	5402196	VTSFT6554	M10 X 1,25	100	18	39	7,0	3	DIN 374	6H
5368754	VTSFT6523	5368753	VTSFT6523	5368755	VTSFT6523	5368756	VTSFT6523	M10 X 1,5	100	18	39	10,0	3	DIN 371	6H
-	-	-	-	5368757	VTSFT6524	-	-	M10 X 1,5	100	18	39	10,0	3	DIN 371	6G
-	-	-	-	5402257	VTSFT6530	5402258	VTSFT6530	M10 X 1,5	100	18	39	7,0	3	DIN 376	6H
-	-	-	-	5402197	VTSFT6555	5402198	VTSFT6555	M12 X 1	100	21	39	9,0	3	DIN 374	6H
-	-	-	-	5402199	VTSFT6556	5402200	VTSFT6556	M12 X 1,25	100	21	39	9,0	3	DIN 374	6H
5402201	VTSFT6557	-	-	5402202	VTSFT6557	5402203	VTSFT6557	M12 X 1,5	100	21	39	9,0	3	DIN 374	6H
-	-	-	-	5402263	VTSFT6532	-	-	M12 X 1,75	110	21	44	9,0	3	DIN 376	6G
5402260	VTSFT6531	5402259	VTSFT6531	5402261	VTSFT6531	5402262	VTSFT6531	M12 X 1,75	110	21	44	9,0	3	DIN 376	6H
-	-	-	-	-	-	5402204	VTSFT6558	M14 X 1	100	21	47	11,0	3	DIN 374	6H
-	-	-	-	-	-	5402205	VTSFT6559	M14 X 1,25	100	21	47	11,0	3	DIN 374	6H
5402206	VTSFT6560	-	-	5402207	VTSFT6560	5402208	VTSFT6560	M14 X 1,5	100	21	47	11,0	3	DIN 374	6H
-	-	-	-	5402268	VTSFT6534	-	-	M14 X 2	110	24	52	11,0	3	DIN 376	6G
5402265	VTSFT6533	5402264	VTSFT6533	5402266	VTSFT6533	5402267	VTSFT6533	M14 X 2	110	24	52	11,0	3	DIN 376	6H
-	-	-	-	-	-	5402209	VTSFT6561	M16 X 1	100	21	46	12,0	3	DIN 374	6H
-	-	-	-	5402210	VTSFT6562	5402211	VTSFT6562	M16 X 1,5	100	21	46	12,0	3	DIN 374	6H
-	-	-	-	5402272	VTSFT6536	-	-	M16 X 2	110	24	51	12,0	3	DIN 376	6G
-	-	5402269	VTSFT6535	5402270	VTSFT6535	5402271	VTSFT6535	M16 X 2	110	24	51	12,0	3	DIN 376	6H
-	-	-	-	-	-	5402212	VTSFT6563	M18 X 1	110	21	50	14,0	4	DIN 374	6H
-	-	-	-	5402214	VTSFT6564	5402213	VTSFT6564	M18 X 1,5	110	21	50	14,0	4	DIN 374	6H
-	-	-	-	-	-	5402215	VTSFT6565	M18 X 2	125	30	58	14,0	4	DIN 374	6H
-	-	5402273	VTSFT6537	5402274	VTSFT6537	5402275	VTSFT6537	M18 X 2,5	125	30	58	14,0	4	DIN 376	6H
-	-	-	-	-	-	5402216	VTSFT6566	M20 X 1	125	24	56	16,0	4	DIN 374	6H
-	-	-	-	5402217	VTSFT6567	5402218	VTSFT6567	M20 X 1,5	125	24	56	16,0	4	DIN 374	6H
-	-	-	-	-	-	5402219	VTSFT6568	M20 X 2	140	30	64	16,0	4	DIN 374	6H
-	-	5402276	VTSFT6538	5402277	VTSFT6538	5402278	VTSFT6538	M20 X 2,5	140	30	64	16,0	4	DIN 376	6H
-	-	-	-	5402220	VTSFT6569	5402221	VTSFT6569	M22 X 1,5	125	24	62	18,0	4	DIN 374	6H
-	-	-	-	-	-	5402222	VTSFT6570	M22 X 2	140	30	70	18,0	4	DIN 374	6H
-	-	5402279	VTSFT6539	5402280	VTSFT6539	5402281	VTSFT6539	M22 X 2,5	140	30	70	18,0	4	DIN 376	6H
-	-	-	-	5402223	VTSFT6571	5402224	VTSFT6571	M24 X 1,5	140	28	67	18,0	4	DIN 374	6H
-	-	-	-	-	-	5402225	VTSFT6572	M24 X 2	140	28	67	18,0	4	DIN 374	6H
-	-	5402282	VTSFT6540	5402283	VTSFT6540	5402284	VTSFT6540	M24 X 3	160	36	77	18,0	4	DIN 376	6H
-	-	5402285	VTSFT6541	5402286	VTSFT6541	5402287	VTSFT6541	M27 X 3	160	36	82	20,0	4	DIN 376	6H
-	-	-	-	-	-	5402226	VTSFT6573	M30 X 2	150	28	80	22,0	2	DIN 374	6H
-	-	5402288	VTSFT6542	5402289	VTSFT6542	5402290	VTSFT6542	M30 X 3,5	180	42	91	22,0	4	DIN 376	6H
-	-	-	-	5402291	VTSFT6543	5402292	VTSFT6543	M33 X 3,5	180	42	100	25,0	4	DIN 376	6H
-	-	-	-	5402293	VTSFT6544	5402294	VTSFT6544	M36 X 4	200	48	110	28,0	5	DIN 376	6H

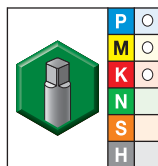
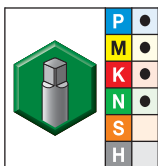
- WP42EG TiCN
- WP49EG oxide



Shank Tolerance

D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052

### ■ VT-SFT • Form E Bottoming Chamfer • Metric DIN 371, 374, and 376



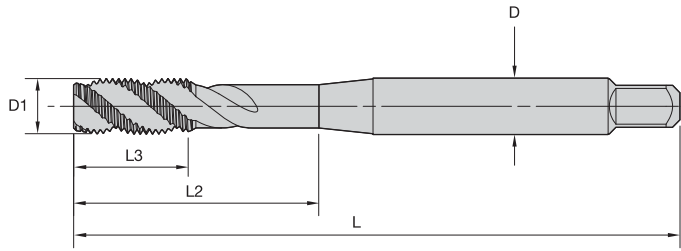
- first choice
- alternate choice

grade WP42EG TiCN		grade WP49EG Oxide		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5387434	VTSFT6574	5387435	VTSFT6574	M3 X 0,5	56	8	18	3,5	2	DIN 371	6H
5387436	VTSFT6575	5387437	VTSFT6575	M4 X 0,7	63	11	21	4,5	3	DIN 371	6H
5387438	VTSFT6576	5387439	VTSFT6576	M5 X 0,8	70	12	25	6,0	3	DIN 371	6H
5387460	VTSFT6577	5387461	VTSFT6577	M6 X 1	80	12	30	6,0	3	DIN 371	6H
5387475	VTSFT6585	5387476	VTSFT6585	M8 X 1	90	15	35	6,0	3	DIN 374	6H
5387462	VTSFT6578	5387463	VTSFT6578	M8 X 1,25	90	15	35	8,0	3	DIN 371	6H
5387477	VTSFT6586	5387478	VTSFT6586	M10 X 1,25	100	18	39	7,0	3	DIN 374	6H
5387464	VTSFT6579	5387465	VTSFT6579	M10 X 1,5	100	18	39	10,0	3	DIN 371	6H
5387479	VTSFT6587	5387481	VTSFT6587	M12 X 1,5	100	21	39	9,0	3	DIN 374	6H
5387466	VTSFT6580	5387467	VTSFT6580	M12 X 1,75	110	21	44	9,0	3	DIN 376	6H
5387482	VTSFT6588	5387483	VTSFT6588	M14 X 1,5	100	21	47	11,0	3	DIN 374	6H
5387468	VTSFT6581	5387469	VTSFT6581	M14 X 2	110	24	52	11,0	3	DIN 376	6H
-		5387470	VTSFT6582	M16 X 2	110	24	51	12,0	3	DIN 376	6H
5387471	VTSFT6583	5387472	VTSFT6583	M18 X 2,5	125	30	58	14,0	4	DIN 376	6H
5387473	VTSFT6584	5387474	VTSFT6584	M20 X 2,5	140	30	64	16,0	4	DIN 376	6H

Multipurpose Taps

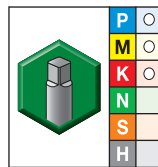
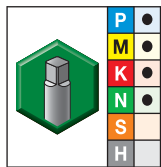


- WP42EG TiCN
- WP49EG oxide



Shank Tolerance	
D inch	tolerance
.141-.635	+0, -.0015
>.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

■ VT-SFT • Form C Semi-Bottoming Chamfer • Metric • DIN Length ANSI Shank

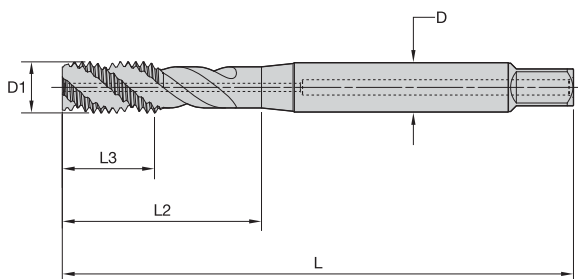


- first choice
- alternate choice

grade WP42EG TiCN		grade WP49EG Oxide		inch dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5436522	VTSFT9504	5436521	VTSFT9504	M3 X 0,5	2.20	.31	.71	.141	2	DIN-ANSI	6H
5436524	VTSFT9505	5436523	VTSFT9505	M4 X 0,7	2.48	.43	.83	.168	3	DIN-ANSI	6H
5436526	VTSFT9506	5436525	VTSFT9506	M5 X 0,8	2.75	.47	.97	.194	3	DIN-ANSI	6H
5436528	VTSFT9507	5436527	VTSFT9507	M6 X 1	3.15	.47	1.18	.255	3	DIN-ANSI	6H
5436540	VTSFT9508	5436529	VTSFT9508	M8 X 1,25	3.54	.58	1.37	.318	3	DIN-ANSI	6H
5436542	VTSFT9509	5436541	VTSFT9509	M10 X 1,25	3.93	.70	1.53	.381	3	DIN-ANSI	6H
5436544	VTSFT9510	5436543	VTSFT9510	M10 X 1,5	3.94	.71	1.53	.381	3	DIN-ANSI	6H
5436546	VTSFT9511	5436545	VTSFT9511	M12 X 1,25	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5436548	VTSFT9512	5436547	VTSFT9512	M12 X 1,5	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5436550	VTSFT9513	5436549	VTSFT9513	M12 X 1,75	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5436552	VTSFT9514	5436551	VTSFT9514	M14 X 1,5	4.33	.94	2.05	.429	3	DIN-ANSI	6H
5436554	VTSFT9515	5436553	VTSFT9515	M14 X 2	4.33	.94	2.05	.429	3	DIN-ANSI	6H
5436556	VTSFT9516	5436555	VTSFT9516	M16 X 1,5	4.33	.94	2.01	.480	3	DIN-ANSI	6H
5436558	VTSFT9517	5436557	VTSFT9517	M16 X 2	4.33	.94	2.01	.480	3	DIN-ANSI	6H
5436560	VTSFT9518	5436559	VTSFT9518	M18 X 1,5	4.92	1.18	2.28	.542	4	DIN-ANSI	6H
5436562	VTSFT9519	5436561	VTSFT9519	M18 X 2,5	4.92	1.18	2.28	.542	4	DIN-ANSI	6H
5436564	VTSFT9520	5436563	VTSFT9520	M20 X 1,5	5.51	1.18	2.52	.652	4	DIN-ANSI	6H
5436566	VTSFT9521	5436565	VTSFT9521	M20 X 2,5	5.51	1.18	2.52	.652	4	DIN-ANSI	6H

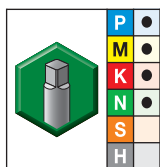
Multipurpose Taps

• WP42EG TiCN



Shank Tolerance	
D inch	tolerance
0.141-0.635	+0, -.0015
>0.635-1.51	+0, -.0020
>1.51-2.01	+0, -.0030

■ VT-SFT • Form C Semi-Bottoming Chamfer • Through Coolant • Metric • DIN Length ANSI Shank

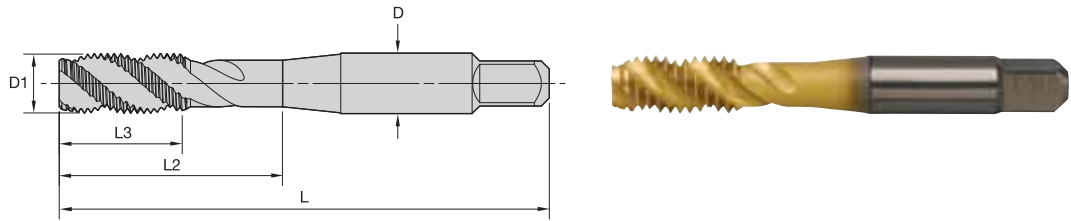


● first choice  
○ alternate choice

grade WP42EG TiCN		inch dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
5436475	VTSFT9925	M6 X 1	3.15	.47	1.18	.255	3	DIN-ANSI	6H
5436476	VTSFT9926	M8 X 1,25	3.54	.59	1.38	.318	3	DIN-ANSI	6H
5436477	VTSFT9927	M10 X 1,25	3.94	.71	1.54	.381	3	DIN-ANSI	6H
5436478	VTSFT9928	M10 X 1,5	3.94	.71	1.53	.381	3	DIN-ANSI	6H
5436479	VTSFT9929	M12 X 1,25	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5436480	VTSFT9930	M12 X 1,5	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5436481	VTSFT9931	M12 X 1,75	4.33	.83	1.73	.367	3	DIN-ANSI	6H
5436482	VTSFT9932	M14 X 1,5	4.33	.94	2.05	.429	3	DIN-ANSI	6H
5436483	VTSFT9933	M14 X 2	4.33	.94	2.05	.429	3	DIN-ANSI	6H
5436484	VTSFT9934	M16 X 1,5	4.33	.94	2.01	.480	3	DIN-ANSI	6H
5436485	VTSFT9935	M16 X 2	4.33	.94	2.01	.480	3	DIN-ANSI	6H
5436486	VTSFT9936	M18 X 1,5	4.92	1.18	2.28	.542	4	DIN-ANSI	6H
5436487	VTSFT9937	M18 X 2,5	4.92	1.18	2.28	.542	4	DIN-ANSI	6H
5436488	VTSFT9938	M20 X 1,5	5.51	1.18	2.52	.652	4	DIN-ANSI	6H
5436489	VTSFT9939	M20 X 2,5	5.51	1.18	2.52	.652	4	DIN-ANSI	6H

Multipurpose Taps

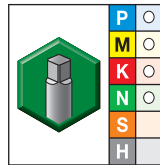
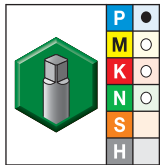
- WU41EG TiN
- WU40EG bright



Shank Tolerance

D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052

■ VT-SFT • Form C Semi-Bottoming Chamfer • Metric • JIS



- first choice
- alternate choice

grade WU41EG TiN		grade WU40EG Bright		metric dimensions					number of flutes	dimension standard	tap class
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D			
5398709	VTSFT7505	5398708	VTSFT7505	M3 X 0,5	46	11	19	4,0	2	JIS	ISO 2
5398791	VTSFT7506	5398790	VTSFT7506	M4 X 0,7	52	13	21	5,0	3	JIS	ISO 2
5398793	VTSFT7507	5398792	VTSFT7507	M5 X 0,8	60	16	24	5,5	3	JIS	ISO 2
5398795	VTSFT7508	5398794	VTSFT7508	M6 X 1	62	19	29	6,0	3	JIS	ISO 2
5398797	VTSFT7509	5398796	VTSFT7509	M8 X 1,25	70	22	37	6,2	3	JIS	ISO 2
5398799	VTSFT7510	5398798	VTSFT7510	M10 X 1,5	75	24	41	7,0	3	JIS	ISO 2
-		5398800	VTSFT7511	M12 X 1,25	82	29	48	8,5	3	JIS	ISO 2
-		5398802	VTSFT7513	M12 X 1,5	82	29	48	8,5	3	JIS	ISO 2
-		5398801	VTSFT7512	M12 X 1,75	82	29	48	8,5	3	JIS	ISO 2
-		5398804	VTSFT7515	M14 X 1,5	88	30	48	10,5	3	JIS	ISO 2
-		5398803	VTSFT7514	M14 X 2	88	30	48	10,5	3	JIS	ISO 2
-		5398806	VTSFT7517	M16 X 1,5	95	32	52	12,5	3	JIS	ISO 2
-		5398805	VTSFT7516	M16 X 2	95	32	52	12,5	3	JIS	ISO 2
-		5398807	VTSFT7518	M18 X 2,5	100	37	55	14,0	4	JIS	ISO 2
-		5398808	VTSFT7519	M20 X 2,5	105	37	60	15,0	4	JIS	ISO 2

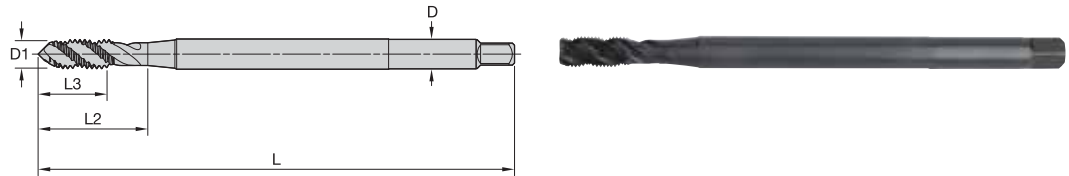
Multipurpose Taps

# High-Performance Taps

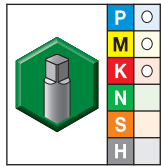
VariTap™ Spiral-Flute HSS-E Extension Taps • Blind Holes • 6" Length



• WP49EG oxide



## ■ VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • 6" Length • ANSI



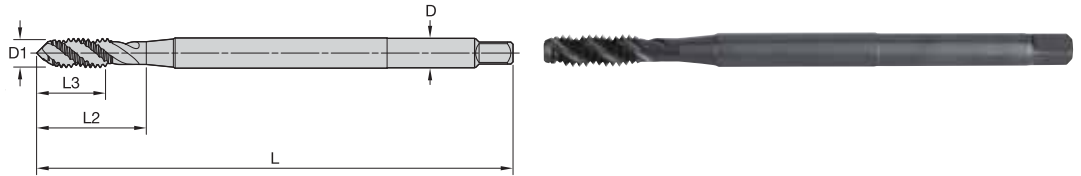
● first choice  
○ alternate choice

grade WP49EG Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5601929	VTSFT-TC5403	4 - 40	6.00	.56	.87	.141	2	H2
5602110	VTSFT-TC5404	6 - 32	6.00	.38	.71	.141	2	H3
5602111	VTSFT-TC5405	8 - 32	6.00	.38	.76	.168	3	H3
5602112	VTSFT-TC5406	10 - 24	6.00	.50	.91	.194	3	H3
5602113	VTSFT-TC5407	10 - 32	6.00	.50	.91	.194	3	H3
5602114	VTSFT-TC5408	1/4 20	6.00	.63	1.00	.255	3	H3
5602115	VTSFT-TC5409	1/4 - 28	6.00	.63	1.01	.255	3	H3
5602116	VTSFT-TC5410	5/16 - 18	6.00	.69	1.13	.318	3	H3
5602117	VTSFT-TC5411	5/16 - 24	6.00	.69	1.13	.318	3	H3
5602118	VTSFT-TC5412	3/8 - 16	6.00	.75	1.27	.381	3	H3
5602119	VTSFT-TC5413	3/8 - 24	6.00	.75	1.26	.381	3	H3
5602120	VTSFT-TC5414	7/16 - 14	6.00	.88	1.49	.323	3	H3
5602121	VTSFT-TC5415	7/16 - 20	6.00	.88	1.49	.323	3	H3
5602122	VTSFT-TC5416	1/2 - 13	6.00	.94	1.74	.367	3	H3
5602123	VTSFT-TC5417	1/2 - 20	6.00	.94	1.74	.367	3	H3
5602124	VTSFT-TC5418	5/8 - 11	6.00	1.09	1.89	.480	3	H3

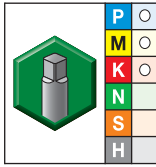
High-Performance Taps



• WP49EG oxide



■ VT-SFT • Form C Semi-Bottoming Chamfer • Machine Screw and Fractional • 4" Length • ANSI



● first choice  
○ alternate choice

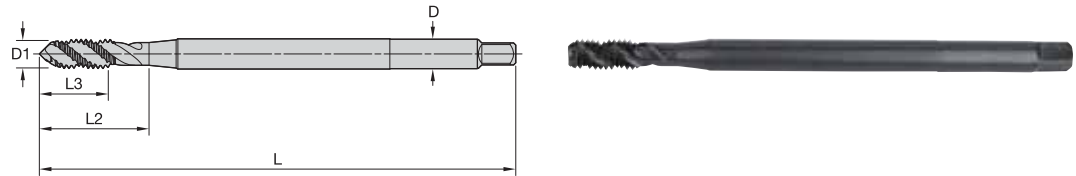
grade WP49EG Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5602125	VTSFT-TC5419	4 - 40	4.00	.56	.87	.141	2	H2
5602126	VTSFT-TC5420	6 - 32	4.00	.38	.71	.141	2	H3
5602127	VTSFT-TC5421	8 - 32	4.00	.38	.76	.168	3	H3
5602128	VTSFT-TC5422	10 - 24	4.00	.50	.91	.194	3	H3
5602129	VTSFT-TC5423	10 - 32	4.00	.50	.91	.194	3	H3
5602130	VTSFT-TC5424	1/4 20	4.00	.63	1.00	.255	3	H3

# High-Performance Taps

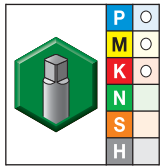
VariTap™ Spiral-Flute HSS-E Extension Taps • Blind Holes • 6" Length



- WP49EG oxide



## ■ VT-SFT • Form E Bottoming Chamfer • Machine Screw and Fractional • 6" Length • ANSI



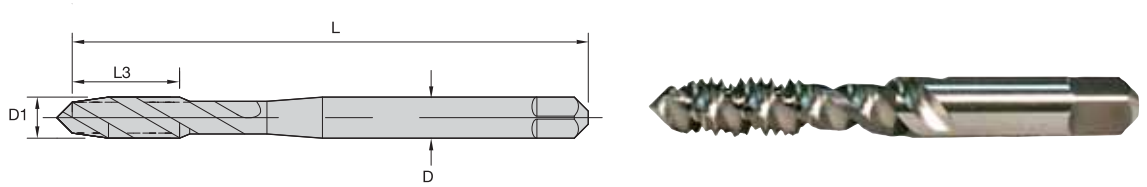
- first choice
- alternate choice

grade WP49EG Oxide		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5602131	VTSFT-TC5425	4 - 40	6.00	.56	.87	.141	2	H2
5602132	VTSFT-TC5426	6 - 32	6.00	.38	.71	.141	2	H3
5602133	VTSFT-TC5427	8 - 32	6.00	.38	.76	.168	3	H3
5602134	VTSFT-TC5428	10 - 32	6.00	.50	.91	.194	3	H3
5602135	VTSFT-TC5429	1/4 - 20	6.00	.63	1.00	.255	3	H3
5602136	VTSFT-TC5430	1/4 - 28	6.00	.63	1.01	.255	3	H3
5602137	VTSFT-TC5431	5/16 - 18	6.00	.69	1.13	.318	3	H3
5602138	VTSFT-TC5432	3/8 - 16	6.00	.75	1.27	.381	3	H3
5602139	VTSFT-TC5433	3/8 - 24	6.00	.75	1.26	.381	3	H3
5602140	VTSFT-TC5434	7/16 - 14	6.00	.88	1.49	.323	3	H3

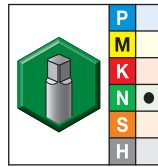
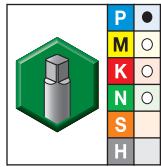
High-Performance Taps



- Series 5314TC • TiCN Coated
- Series 2314 • TiN Coated
- Series 5314 • Uncoated



■ Series 2314/5314 • Machine Screw and Fractional • Plug Chamfer

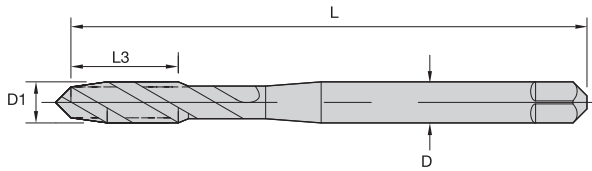


- first choice
- alternate choice

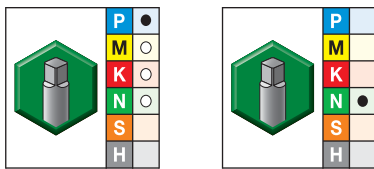
TiN		uncoated		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
2746484	19619	2748377	16003	4 - 40	1.88	.56	—	.141	2	H2
—	—	2748372	16005	5 - 40	1.94	.63	—	.141	2	H2
2746480	19622	2748369	16007	6 - 32	2.00	.38	.69	.141	2	H3
2746474	19626	2748366	16009	8 - 32	2.13	.38	.75	.168	3	H3
2746470	19628	2748363	16011	10 - 24	2.38	.50	.88	.194	3	H3
2746476	19624	2748360	16013	10 - 32	2.38	.50	.88	.194	3	H3
—	—	2748355	16015	12 - 24	2.38	.50	.94	.220	3	H3
2746464	19632	2748352	16017	1/4 - 20	2.50	.63	1.00	.255	3	H3
2746460	19634	2748348	16021	1/4 - 28	2.50	.63	1.00	.255	3	H3
2746458	19636	2748342	16023	5/16 - 18	2.72	.69	1.12	.318	3	H3
2746454	19638	2748336	16027	5/16 - 24	2.72	.69	1.12	.318	3	H3
2746450	19641	2748335	16029	3/8 - 16	2.94	.75	1.25	.381	3	H3
2746447	19643	2748332	16033	3/8 - 24	2.94	.75	1.25	.381	3	H3
2746437	19646	2748328	16035	7/16 - 14	3.16	.88	—	.323	3	H3
—	—	2748323	16037	7/16 - 20	3.16	.88	—	.323	3	H3
2746433	19648	2748318	16039	1/2 - 13	3.38	.94	—	.367	3	H3
—	—	2748315	16041	1/2 - 20	3.38	.94	—	.367	3	H3
—	—	2748311	16047	5/8 - 11	3.81	1.09	—	.480	4	H3
—	—	2748307	16051	3/4 - 10	4.25	1.22	—	.590	4	H3

NOTE: Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.

- Series 5314TC • TiCN Coated
- Series 2314 • TiN Coated
- Series 5314 • Uncoated



■ Series 2314/5314 • Machine Screw and Fractional • Bottoming Chamfer



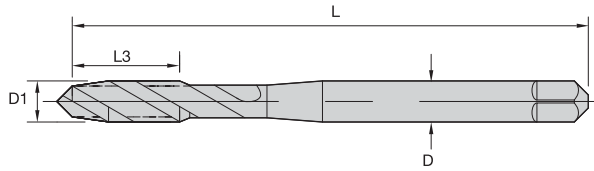
- first choice
- alternate choice

TiN		uncoated		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
2746482	19621	2748375	16004	4 - 40	1.88	.56	—	.141	2	H2
—	—	2748370	16006	5 - 40	1.94	.56	—	.141	2	H2
2746478	19623	2748367	16008	6 - 32	2.00	.38	.69	.141	2	H3
2746472	19627	3083563	16010	8 - 32	2.13	.38	.75	.168	3	H3
2746468	19629	2748361	16012	10 - 24	2.38	.50	.88	.194	3	H3
2746466	19631	2748356	16014	10 - 32	2.38	.50	.88	.194	3	H3
—	—	2748353	16016	12 - 24	2.38	.50	.94	.220	3	H3
2746462	19633	2748351	16018	1/4 - 20	2.50	.63	1.00	.255	3	H3
2746427	19651	1775500	16022	1/4 - 28	2.50	.63	1.00	.255	3	H3
2746456	19637	2748339	16024	5/16 - 18	2.72	.69	1.12	.318	3	H3
2746452	19639	3012779	16028	5/16 - 24	2.72	.69	1.12	.318	3	H3
2746448	19642	3083460	16030	3/8 - 16	2.94	.75	1.25	.381	3	H3
2746439	19644	2748329	16034	3/8 - 24	2.94	.75	1.25	.381	3	H3
2746435	19647	2748325	16036	7/16 - 14	3.16	.88	—	.323	3	H3
—	—	2748321	16038	7/16 - 20	3.16	.88	—	.323	3	H3
2746431	19649	2748317	16040	1/2 - 13	3.38	.94	—	.367	3	H3
—	—	2748314	16042	1/2 - 20	3.38	.94	—	.367	3	H3
—	—	2748309	16048	5/8 - 11	3.81	1.09	—	.480	4	H3
—	—	3083458	16052	3/4 - 10	4.25	1.22	—	.590	4	H3

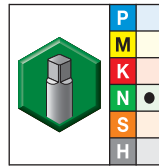
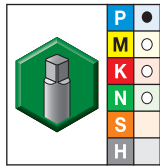
NOTE: Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.



- Series 5364TC • TiCN Coated
- Series 2364 • TiN Coated
- Series 5364 • Uncoated



■ Series 2364/5364 • Plug Chamfer • Metric ANSI



- first choice
- alternate choice

TiN		uncoated		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 size	L	L2	L3	D		
2746264	19927	2748302	16053	M3 X 0,5	1.94	—	.31	.141	2	D3
2746260	19929	2748297	16057	M4 X 0,7	2.13	.75	.38	.168	3	D4
—	—	2748295	16061	M5 X 0,8	2.38	.88	.50	.194	3	D4
2746252	19933	2748291	16063	M6 X 1	2.50	1.00	.63	.255	3	D5
2746248	19935	2748285	16069	M8 X 1,25	2.72	1.12	.69	.318	3	D5
—	—	2746915	19054	M8 X 1,25	2.72	1.12	.69	.318	3	D5
2746244	19937	2748281	16071	M10 X 1,5	2.94	1.25	.75	.381	3	D6
2746240	19939	2748273	16073	M12 X 1,75	3.38	—	.94	.367	3	D6

NOTE: Metric D limits are suitable for ISO 6H tolerance class.  
Metric taps are manufactured to USCTI specifications and dimensions.  
Metric tap blank dimensions are equivalent to inch taps.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 6H class of fit.

# Production Taps

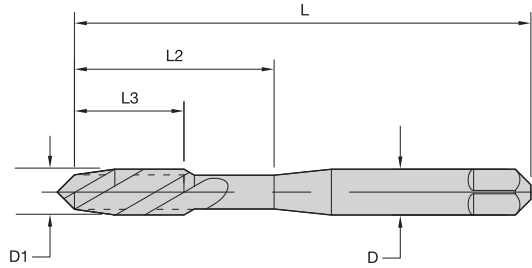
Spiral-Flute Taps • Blind Holes in General Machining Applications



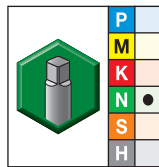
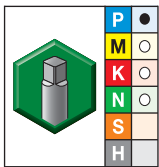
Series 5364TC • TiCN Coated

Series 2364 • TiN Coated

Series 5364 • Uncoated



## Series 2364/5364 • Bottoming Chamfer • Metric ANSI



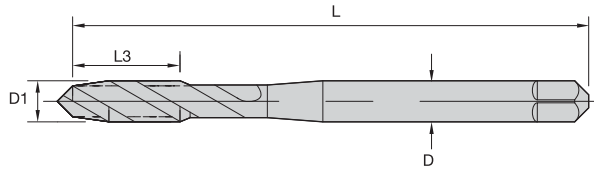
● first choice  
○ alternate choice

TiN		uncoated		inch dimensions					number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 size	L	L2	L3	D		
2746262	19928	2748300	16054	M3 X 0,5	1.94	—	.31	.141	2	D3
2746258	19930	2748296	16058	M4 X 0,7	2.13	.75	.38	.168	3	D4
2746254	19932	2748293	16062	M5 X 0,8	2.38	.88	.50	.194	3	D4
2746250	19934	2748288	16064	M6 X 1	2.50	.75	.38	.255	3	D5
2746246	19936	2748284	16070	M8 X 1,25	2.72	1.12	.69	.318	3	D5
2746242	19938	2748275	16072	M10 X 1,5	2.94	1.25	.75	.381	3	D6
2746238	19940	2748271	16074	M12 X 1,75	3.38	—	.94	.367	3	D6

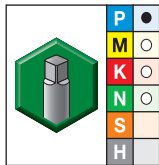
NOTE: Metric D limits are suitable for ISO 6H tolerance class.  
Metric taps are manufactured to USCTI specifications and dimensions.  
Metric tap blank dimensions are equivalent to inch taps.

Production Taps





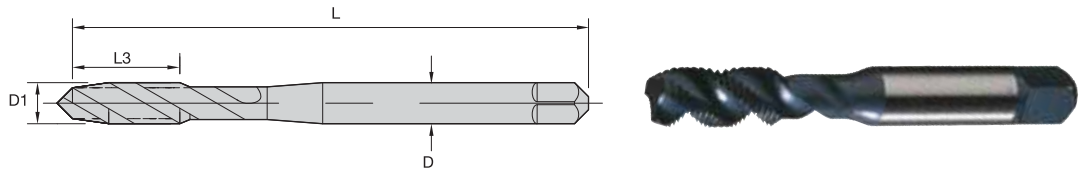
■ Series 5344 • Machine Screw and Fractional • Plug Chamfer



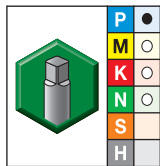
- first choice
- alternate choice

oxide		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	D		
2748044	16507	10 - 32	2.38	.50	.194	3	H3
2748040	16509	1/4 - 20	2.50	.63	.255	3	H3
2748037	16511	1/4 - 28	2.50	.63	.255	3	H3
2748032	16513	5/16 - 18	2.72	.69	.318	3	H3
2748024	16517	3/8 - 16	2.94	.75	.381	3	H3
2748012	16523	7/16 - 20	3.17	1.44	.323	3	H3
2748008	16525	1/2 - 13	3.38	.94	.367	3	H3
2748000	16533	5/8 - 11	3.81	1.09	.480	4	H3
2747997	16537	3/4 - 10	4.25	1.22	.590	4	H3

NOTE: Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.



■ **Series 5344 • Machine Screw and Fractional • Bottoming Chamfer**

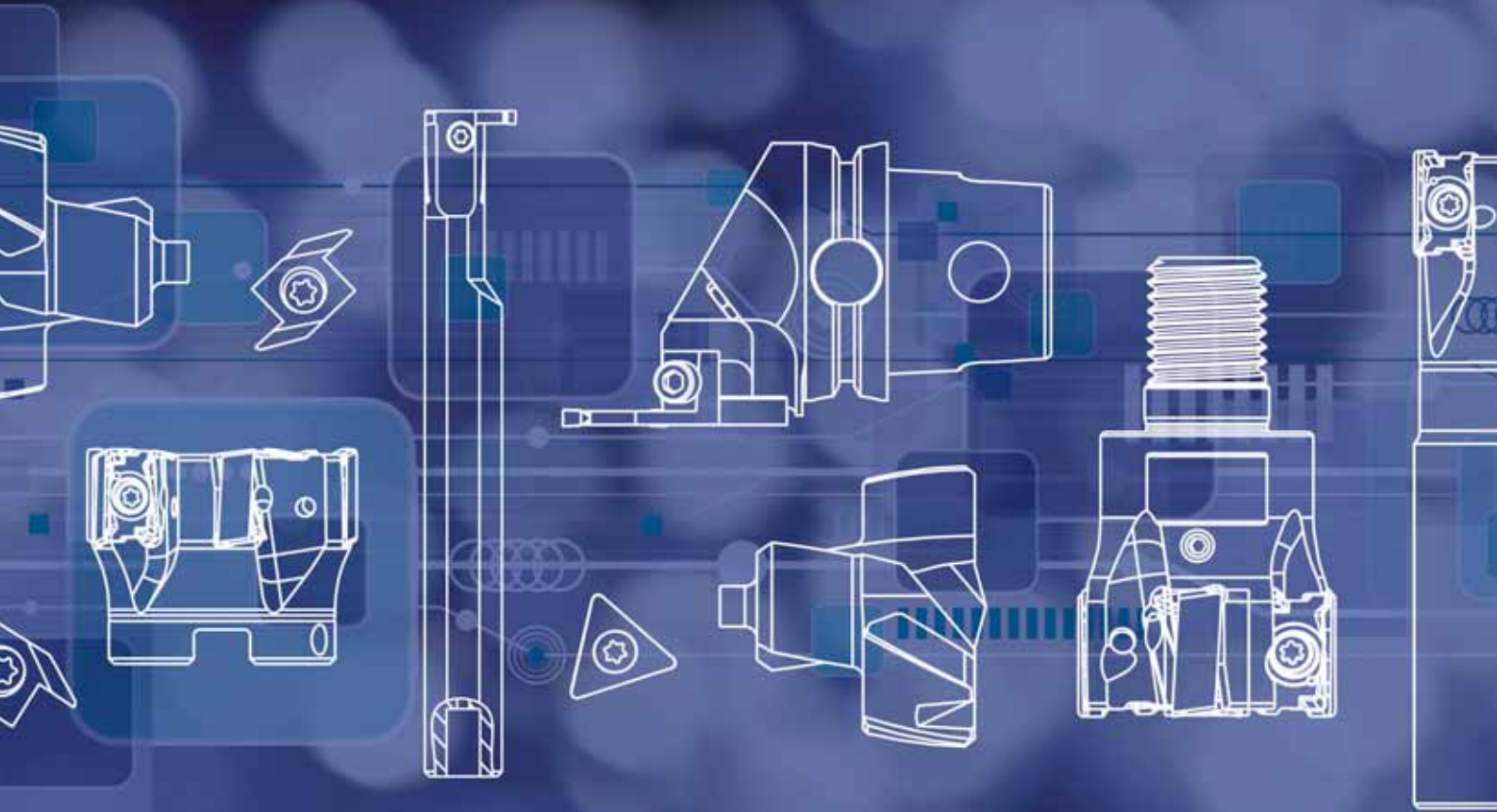


● first choice  
○ alternate choice

oxide		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	D		
2748054	16502	6 - 32	2.00	.38	.141	3	H3
2748050	16504	8 - 32	2.13	.38	.168	3	H3
2748046	16506	10 - 24	2.38	.50	.194	3	H3
2748042	16508	10 - 32	2.38	.50	.194	3	H3
2748038	16510	1/4 - 20	2.50	.63	.255	3	H3
2748030	16514	5/16 - 18	2.72	.69	.318	3	H3
2748026	16516	5/16 - 24	2.72	.69	.318	3	H3
2748022	16518	3/8 - 16	2.94	.75	.381	3	H3
2748018	16520	3/8 - 24	2.94	.75	.381	3	H3
2748014	16522	7/16 - 14	3.16	.88	.323	3	H3
2748011	16524	7/16 - 20	3.17	1.44	.232	3	H3
2748006	16526	1/2 - 13	3.38	.94	.367	3	H3
2748002	16528	1/2 - 20	3.38	1.66	.367	3	H3
2747998	16534	5/8 - 11	3.81	1.09	.480	4	H3
2747995	16538	3/4 - 10	4.25	1.22	.590	4	H3

NOTE: Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.

Production Taps



## NOVO KNOWS ART TO PART TO PROFIT

Being as productive and profitable as possible is your fundamental goal. With the addition of NOVO™ to your team, your goal can be achieved. NOVO possesses powerful digital tools that link together process planning, inventory availability and purchase, cost-per-part management, and productivity improvements.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift. [widia.com/novo](http://widia.com/novo)

**01**

THE DIGITAL SOURCE FOR DELIVERING SMART MACHINING SOLUTIONS

[widia.com/novo](http://widia.com/novo)**NOVO**™ 

Solutions for Through and Blind Hole Applications •

**WIDIA-GTD™**

# Straight Flute



WIDIA-GTD™ offers a wide range of straight-flute options for tapping through and blind holes in:

- Steel and steel alloys.
- Stainless steel.
- Cast iron.
- Aluminum.

## High-Performance Victory™ Solid Carbide Taps

- Straight flute designed for outstanding tool life in cast iron, aluminum, and hardened materials.
- Manufactured with fine-grain micrograin carbide for exceptional wear life.
- Ideal for long production runs where fewer tool changes mean greater productivity.
- Runs up to 4x faster and lasts up to 4x longer than conventional high-speed steel taps.
- Excellent thread quality and tap performance.

## High-Performance Victory™ HSS-E-PM Taps

- Straight-flute taps store chips in hole or are flushed out with internal coolant.
- Manufactured from powdered metal high-speed steel coated for thread cutting in cast iron and aluminum.
- Offer performance advantages over conventional high-speed steel taps.
- Long tap life at up to 50% higher tapping speed than HSS taps.

## General Purpose Production Taps

- Straight-flute taps manufactured with HSS for use in through and blind hole applications.
- Multiple chamfer options.
- Can be used in general machinery or CNC tapping applications.
- Store chips in their flutes during threading, which protects the workpiece.

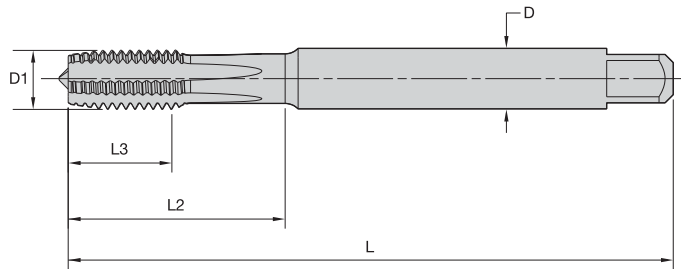


# High-Performance Taps

Victory™ Straight-Flute Carbide Taps • Blind and Through Holes



- WH16PG TiAlN/MoS<sub>2</sub> for steel 55–63 HRC.

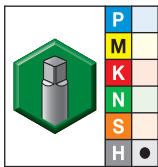


Shank Tolerance

D mm	tolerance h6
1–3	+0, -0,025
3,5–6	+0, -0,030
7–10	+0, -0,036
11–18	+0, -0,043



■ GX10 • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 • For Hard Steel



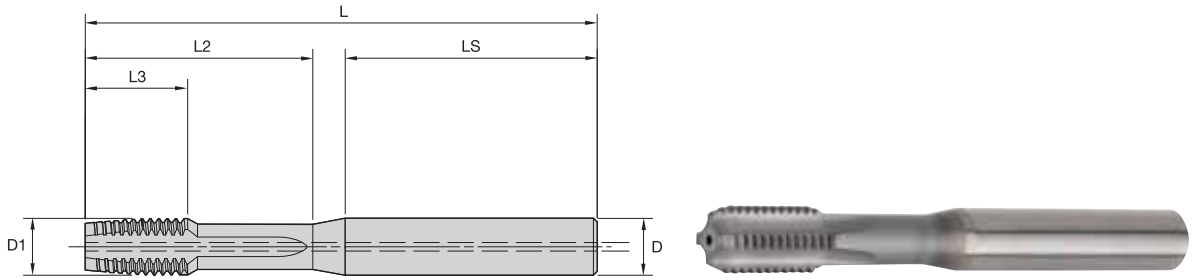
- first choice
- alternate choice

grade WH16PG TiAlN+MoS <sub>2</sub>		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4158323	GX105001	M3 X 0,5	63	6	18	4,5	4	DIN 371	6HX
4158324	GX105002	M4 X 0,7	63	8	20	4,5	4	DIN 371	6HX
4158325	GX105003	M5 X 0,8	70	10	26	6,0	4	DIN 371	6HX
4158326	GX105004	M6 X 1	80	12	28	6,0	4	DIN 371	6HX
4158331	GX105009	M8 X 1	90	15	35	8,0	5	DIN 374	6HX
4158327	GX105005	M8 X 1,25	90	15	35	8,0	5	DIN 371	6HX
4158332	GX105010	M10 X 1	100	18	38	10,0	5	DIN 374	6HX
4158328	GX105006	M10 X 1,5	100	18	38	10,0	5	DIN 371	6HX
4158333	GX105011	M12 X 1,5	110	21	41	12,0	5	DIN 374	6HX
4158329	GX105007	M12 X 1,75	110	21	41	12,0	5	DIN 376	6HX
4158334	GX105012	M14 X 1,5	110	24	44	14,0	5	DIN 374	6HX
4158330	GX105008	M14 X 2	110	24	44	14,0	6	DIN 376	6HX
4158335	GX105013	M16 X 1,5	110	24	44	16,0	5	DIN 374	6HX

High-Performance Taps



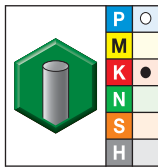
• WK12PG TiCN for cast iron.



Shank Tolerance	
D	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-16	+0, -0,011



■ GX35 • Form E Bottoming Chamfer • Through Coolant M6 and Larger • Metric • For Cast Iron



● first choice  
○ alternate choice

grade WK12PG TiCN		metric dimensions						number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	LS	D		
5551152	GX352733	M6 X 1	70	12	24	42	6,0	4	6HX
5551153	GX352734	M8 X 1,25	80	15	32	43	8,0	4	6HX
5551154	GX352735	M10 X 1,5	90	18	40	44	10,0	4	6HX
5551156	GX352738	M12 X 1,5	100	21	48	46	12,0	4	6HX
5551155	GX352737	M12 X 1,75	100	21	48	46	12,0	4	6HX
5551159	GX352740	M14 X 1,5	110	24	56	52	12,0	4	6HX
5551157	GX352739	M14 X 2	110	24	56	52	12,0	4	6HX
5551160	GX352741	M16 X 2	110	24	64	44	14,0	4	6HX

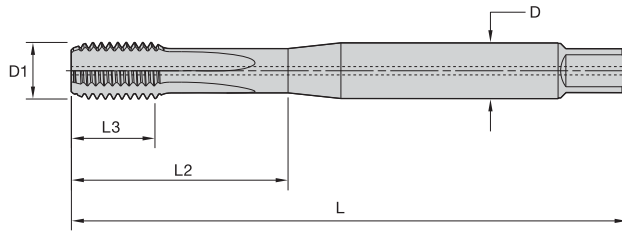
High-Performance Taps

# High-Performance Taps

Victory™ Solid Carbide Straight-Flute Taps • Blind Holes



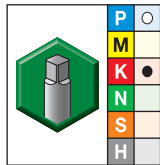
- WK12PG TiCN for cast iron.



Shank Tolerance	
D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-16	+0, -0,011



- GX35 • Form E Bottoming Chamfer • Through Coolant • Metric • For Cast Iron

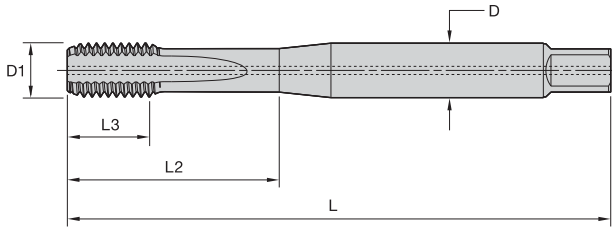


- first choice
- alternate choice

grade WK12PG TiCN		metric dimensions					number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	D		
5520825	GX355006	M6 X 1	80	10	30	6,0	4	6HX
5520826	GX355007	M7 X 1	80	10	30	7,0	4	6HX
5520827	GX355008	M8 X 1,25	90	13	35	8,0	4	6HX
5520828	GX355009	M9 X 1,25	90	13	35	9,0	4	6HX
5520830	GX355101	M10 X 1	90	10	35	7,0	4	6HX
5520831	GX355102	M10 X 1,25	100	15	39	7,0	4	6HX
5520829	GX355010	M10 X 1,5	100	15	39	10,0	4	6HX
5520834	GX355121	M12 X 1,25	100	15	39	9,0	4	6HX
5520835	GX355122	M12 X 1,50	100	15	39	9,0	4	6HX
5520833	GX355012	M12 X 1,75	110	18	44	9,0	4	6HX
5520837	GX355141	M14 X 1,25	100	15	47	11,0	4	6HX
5520838	GX355142	M14 X 1,5	100	15	47	11,0	4	6HX
5520836	GX355014	M14 X 2	110	20	52	11,0	4	6HX

High-Performance Taps

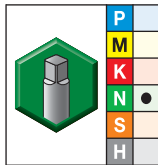
• WN14PG TiN + Cr/C for aluminum.



Shank Tolerance	
D	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-16	+0, -0,011



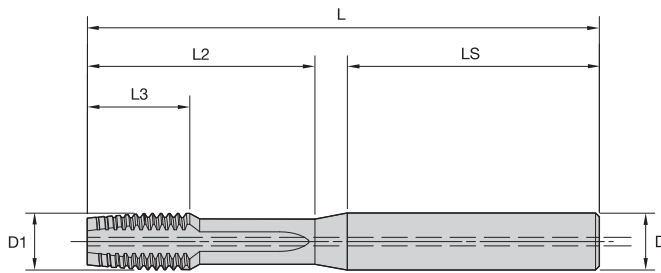
■ GX47 • Form E Bottoming Chamfer • Through Coolant • Metric • For Aluminum



- first choice
- alternate choice

grade WN14PG TiN+Cr/C		metric dimensions					number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	D		
5520839	GX475006	M6 X 1	80	10	30	6,0	3	6HX
5520840	GX475008	M8 X 1,25	90	10	35	8,0	3	6HX
5520841	GX475010	M10 X 1,5	100	15	39	10,0	3	6HX

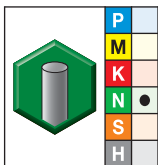
- WN14PG TiN + CrC/C for aluminum.



Shank Tolerance	
D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-16	+0, -0,011



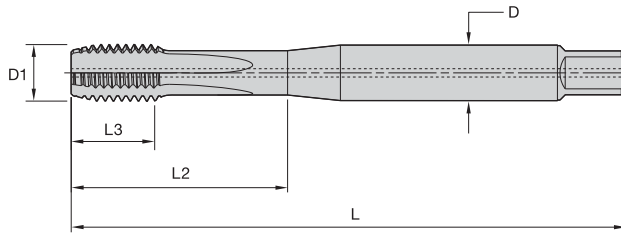
- GX47 • Form E Bottoming Chamfer • Through Coolant • Metric • For Aluminum



- first choice
- alternate choice

grade WN14PG TiN+CrC/C		metric dimensions						number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	LS	D		
5551161	GX472866	M6 X 1	70	12	24	42	6,0	3	6HX
5551162	GX472867	M8 X 1,25	80	15	32	43	8,0	3	6HX
5551163	GX472868	M10 X 1,5	90	18	40	44	10,0	3	6HX
5551164	GX472872	M12 X 1,5	100	21	48	46	12,0	3	6HX
5551165	GX472870	M12 X 1,75	100	21	48	46	12,0	3	6HX
5551166	GX472874	M14 X 1,5	110	24	56	52	12,0	4	6HX
5551167	GX472873	M14 X 2	110	24	56	52	12,0	4	6HX
5551168	GX472875	M16 X 2	110	24	64	44	14,0	4	6HX

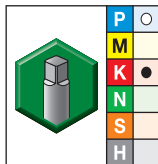
- WK12PG TiCN for cast iron.



Shank Tolerance	
D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-16	+0, -0,011



- GX50 • Form C Semi-Bottoming Chamfer • Through Coolant M6 and Larger • Metric • For Cast Iron



- first choice
- alternate choice

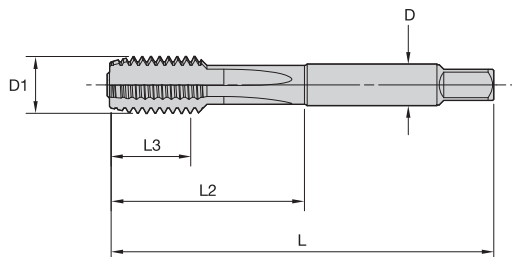
grade WK12PG TiCN		metric dimensions					number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	D		
5520817	GX505004	M4 X 0,7	63	10	21	4,5	3	6HX
5520818	GX505005	M5 X 0,8	70	10	25	6,0	3	6HX
5520819	GX505006	M6 X 1	80	10	30	6,0	4	6HX
5520820	GX505008	M8 X 1,25	90	13	35	8,0	4	6HX
5520822	GX505010	M10 X 1,5	100	15	39	10,0	4	6HX
5520823	GX505012	M12 X 1,75	110	18	44	9,0	4	6HX
5520824	GX505014	M14 X 2	110	20	52	11,0	4	6HX

# High-Performance Taps

Victory™ Straight-Flute HSS-E-PM Taps • Through and Blind Holes



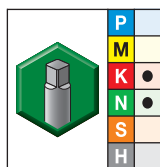
- GP6520 TiCN for cast iron and cast aluminum.



Shank Tolerance	
D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



- GT40 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • ANSI • For Cast Iron and Cast Aluminum

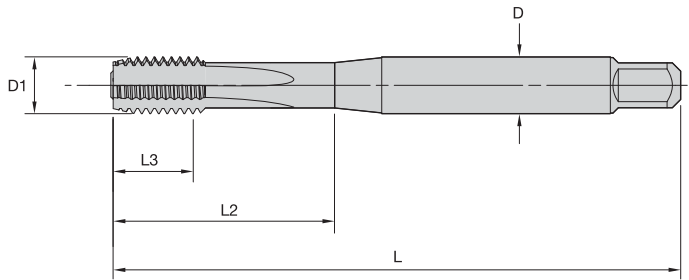


- first choice
- alternate choice

grade GP6520 TiCN		inch dimensions					number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	D		
4035535	GT405012	10 - 24	2.37	.47	.91	.194	4	3BX
4035536	GT405013	10 - 32	2.36	.47	.91	.194	4	3BX
4035537	GT405014	1/4 - 20	2.50	.44	1.01	.255	4	2BX
4035538	GT405015	1/4 - 20	2.50	.44	1.01	.255	4	3BX
4035539	GT405016	1/4 - 28	2.49	.43	1.00	.255	4	2BX
4035540	GT405017	1/4 - 28	2.49	.43	1.00	.255	4	3BX
4035541	GT405018	5/16 - 18	2.72	.49	1.13	.318	4	2BX
4035542	GT405019	5/16 - 18	2.72	.49	1.13	.318	4	3BX
4035563	GT405020	5/16 - 24	2.71	.48	1.13	.318	4	3BX
4035564	GT405021	3/8 - 16	2.94	.60	1.27	.381	4	2BX
4035565	GT405022	3/8 - 16	2.94	.60	1.27	.381	4	3BX
4035566	GT405023	3/8 - 24	2.92	.58	1.25	.381	4	3BX
4035567	GT405024	7/16 - 14	3.16	.71	1.49	.323	4	3BX
4035568	GT405025	7/16 - 20	3.16	.71	1.49	.323	4	3BX
4035569	GT405026	1/2 - 13	3.38	.77	1.74	.367	4	3BX
4035570	GT405027	1/2 - 20	3.38	.77	1.74	.367	4	3BX
4035571	GT405028	5/8 - 11	3.81	.91	1.89	.480	4	3BX
4035572	GT405029	3/4 - 10	4.25	1.00	2.08	.590	4	3BX

High-Performance Taps

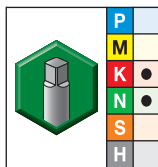
- GP6520 TiCN for cast iron and cast aluminum.



Shank Tolerance	
D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



- GT40 • Machine Screw and Fractional • Form C Semi-Bottoming Chamfer • DIN Length ANSI Shank
- For Cast Iron and Cast Aluminum



- first choice
- alternate choice

grade GP6520 TiCN		inch dimensions					number of flutes	class of fit
order #	catalog #	D1 TPI	L	L3	L2	D		
4157922	GT405039	6 - 32	2.20	.39	.79	.141	3	2BX
4157931	GT405048	6 - 40	2.20	.40	.79	.141	3	2BX
4157923	GT405040	8 - 32	2.48	.39	.83	.168	3	2BX
4157924	GT405041	10 - 24	2.76	.39	.98	.194	3	2BX
4157933	GT405050	10 - 32	2.76	.40	.98	.194	3	2BX
4157926	GT405043	1/4 - 20	3.15	.51	1.18	.255	3	3BX
4157935	GT405052	1/4 - 28	3.15	.51	1.18	.255	3	3BX
4157927	GT405044	5/16 - 18	3.54	.55	1.38	.318	4	3BX
4157936	GT405053	5/16 - 24	3.54	.55	1.38	.318	4	3BX
4157928	GT405045	3/8 - 16	3.94	.63	1.53	.381	4	3BX
4157937	GT405054	3/8 - 24	3.94	.63	1.53	.381	4	3BX
4157929	GT405046	7/16 - 14	3.94	.71	1.61	.323	4	3BX
4157938	GT405055	7/16 - 20	3.94	.71	1.61	.323	4	3BX
4157930	GT405047	1/2 - 13	4.33	.79	1.85	.367	4	3BX
4157939	GT405056	1/2 - 20	4.33	.79	1.85	.367	4	3BX

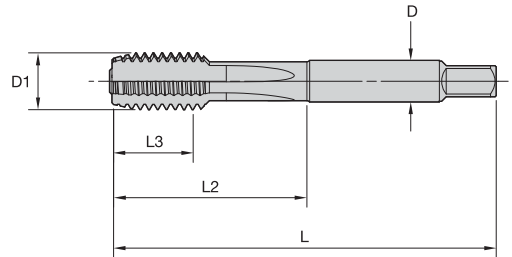
High-Performance Taps

# High-Performance Taps

Victory™ Straight-Flute HSS-E-PM Taps • Through and Blind Holes



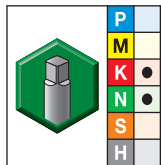
- GP6520 TiCN for cast iron and cast aluminum.



Shank Tolerance	
D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



■ GT40 • Form C Semi-Bottoming Chamfer • Metric ANSI • For Cast Iron and Cast Aluminum



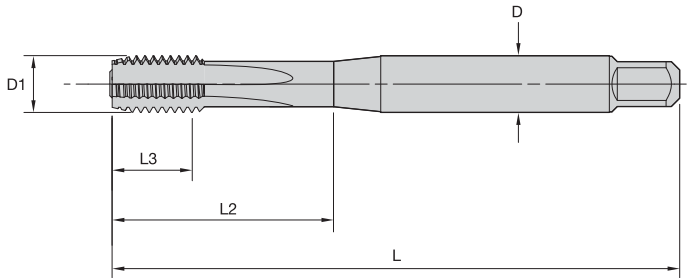
- first choice
- alternate choice

grade GP6520 TiCN		inch dimensions					number of flutes	class of fit
order #	catalog #	D1 size	L	L3	L2	D		
4035576	GT405030	M3 X 0,5	1.94	.63	.75	.141	3	6HX
4035577	GT405031	M4 X 0,7	2.12	.32	.76	.168	3	6HX
4035578	GT405032	M5 X 0,8	2.37	.47	.91	.194	3	6HX
4035579	GT405033	M6 X 1	2.50	.46	1.01	.255	4	6HX
4035580	GT405034	M8 X 1,25	2.71	.48	1.13	.318	4	6HX
4035581	GT405035	M10 X 1,5	2.92	.53	1.26	.381	4	6HX
4035582	GT405036	M12 X 1,75	3.38	.77	1.74	.367	4	6HX
4035583	GT405037	M14 X 2	3.59	.83	1.74	.429	4	6HX
4035584	GT405038	M16 X 2	3.81	.91	1.89	.480	4	6HX

High-Performance Taps



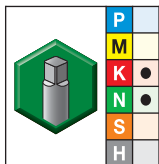
- GP6520 TiCN for cast iron and cast aluminum.



Shank Tolerance	
D mm	tolerance h6
>3-6	+0, -0,008
>6-10	+0, -0,009
>10-18	+0, -0,011
>18-30	+0, -0,013
>30-50	+0, -0,016



- GT40 • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 • For Cast Iron and Cast Aluminum



- first choice
- alternate choice

grade GP6520 TiCN		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4033699	GT405001	M4 X 0,7	63	10	21	4,5	3	DIN 371	6HX
4033700	GT405002	M5 X 0,8	70	10	25	6,0	3	DIN 371	6HX
4033701	GT405003	M6 X 1	80	10	30	6,0	4	DIN 371	6HX
4033702	GT405004	M8 X 1,25	90	13	35	8,0	4	DIN 371	6HX
4033753	GT405005	M10 X 1,5	100	15	39	10,0	4	DIN 371	6HX
5408066	GT405057	M12 X 1,5	100	15	39	9,0	4	DIN 374	6HX
4033754	GT405006	M12 X 1,75	110	18	44	9,0	4	DIN 376	6HX
5408067	GT405058	M14 X 1,5	100	15	47	11,0	4	DIN 374	6HX
4033755	GT405007	M14 X 2	110	20	52	11,0	4	DIN 376	6HX
5408068	GT405059	M16 X 1,5	100	15	46	12,0	4	DIN 374	6HX
4033756	GT405008	M16 X 2	110	20	51	12,0	4	DIN 376	6HX
4033757	GT405009	M18 X 2,5	125	25	58	14,0	4	DIN 376	6HX
4033758	GT405010	M20 X 2,5	140	25	64	16,0	4	DIN 376	6HX
4033759	GT405011	M22 X 2,5	140	25	70	18,0	4	DIN 376	6HX

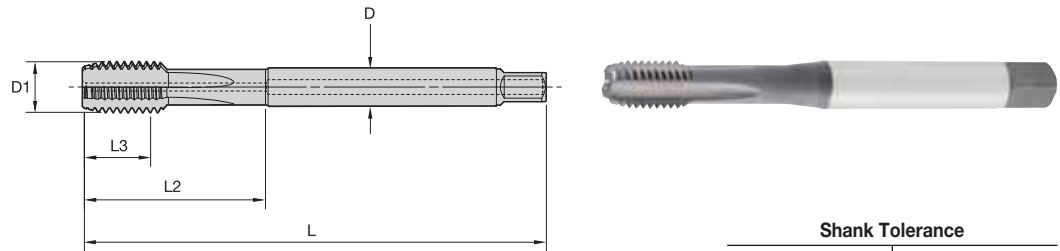
High-Performance Taps

# High-Performance Taps

Victory™ Straight-Flute HSS-E-PM Taps • Through and Blind Holes



- GP6520 TiCN for cast iron and cast aluminum.

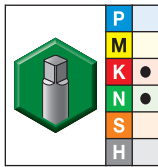


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



- GT41 • Fractional • Form C Semi-Bottoming Chamfer • DIN Length ANSI Shank • Through Coolant
- For Cast Iron and Cast Aluminum

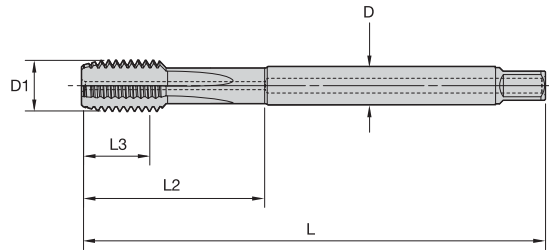


- first choice
- alternate choice

grade GP6520 TiCN		inch dimensions					number of flutes	class of fit
order #	catalog #	D1 TPI	L	L3	L2	D		
4157940	GT415011	1/4 - 20	3.15	.51	1.18	.255	4	3BX
4157945	GT415016	1/4 - 28	3.15	.51	1.18	.255	4	3BX
4157941	GT415012	5/16 - 18	3.54	.55	1.38	.318	4	3BX
4157946	GT415017	5/16 - 24	3.54	.55	1.38	.318	4	3BX
4157942	GT415013	3/8 - 16	3.94	.63	1.53	.381	4	3BX
4157947	GT415018	3/8 - 24	3.94	.63	1.53	.381	4	3BX
4157943	GT415014	7/16 - 14	3.94	.71	1.61	.323	4	3BX
4157948	GT415019	7/16 - 20	3.94	.71	1.61	.323	4	3BX
4157944	GT415015	1/2 - 13	4.33	.79	1.85	.367	4	3BX
4157949	GT415020	1/2 - 20	4.33	.79	1.85	.367	4	3BX

High-Performance Taps

- GP6520 TiCN for cast iron and cast aluminum.

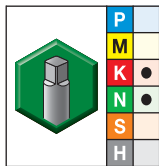


Shank Tolerance

D mm	tolerance h6
>3-6	+0, -0,008
>6-10	+0, -0,009
>10-18	+0, -0,011
>18-30	+0, -0,013
>30-50	+0, -0,016



- GT41 • Form C Semi-Bottoming Chamfer • Through Coolant • Metric DIN 371, 374, and 376 • For Cast Iron and Cast Aluminum



- first choice
- alternate choice

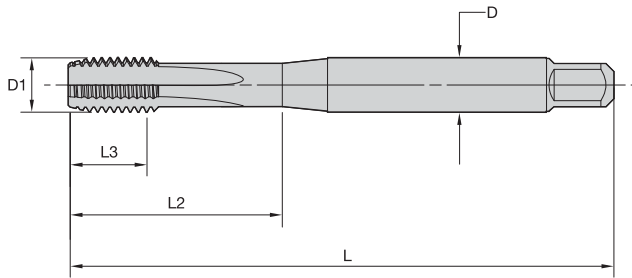
grade GP6520 TiCN		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4033659	GT415001	M4 X 0,7	63	10	21	4,5	3	DIN 371	6HX
4033660	GT415002	M5 X 0,8	70	10	25	6,0	3	DIN 371	6HX
4033661	GT415003	M6 X 1	80	10	30	6,0	4	DIN 371	6HX
4033662	GT415004	M8 X 1,25	90	13	35	8,0	4	DIN 371	6HX
4033813	GT415005	M10 X 1,5	100	15	39	10,0	4	DIN 371	6HX
5408069	GT415021	M12 X 1,5	100	15	39	9,0	4	DIN 374	6HX
4033814	GT415006	M12 X 1,75	110	18	44	9,0	4	DIN 376	6HX
5408400	GT415022	M14 X 1,5	100	15	47	11,0	4	DIN 374	6HX
4033815	GT415007	M14 X 2	110	20	52	11,0	4	DIN 376	6HX
5408401	GT415023	M16 X 1,5	100	15	46	12,0	4	DIN 374	6HX
4033816	GT415008	M16 X 2	110	20	51	12,0	4	DIN 376	6HX
4033817	GT415009	M18 X 2,5	125	25	58	14,0	4	DIN 376	6HX
4033818	GT415010	M20 X 2,5	140	25	64	16,0	4	DIN 376	6HX

High-Performance Taps

# High-Performance Taps

Victory™ Straight-Flute HSS-E-PM Taps • Threading Close to the Bottom in Blind Holes

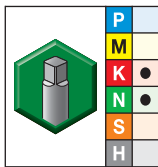
- GP6520 TiCN for cast iron and cast aluminum.



Shank Tolerance	
D mm	tolerance h6
>3-6	+0, -0,008
>6-10	+0, -0,009
>10-18	+0, -0,011
>18-30	+0, -0,013
>30-50	+0, -0,016



■ GT42 • Form E Bottoming Chamfer • Metric DIN 371, 374, and 376 • For Cast Iron and Cast Aluminum

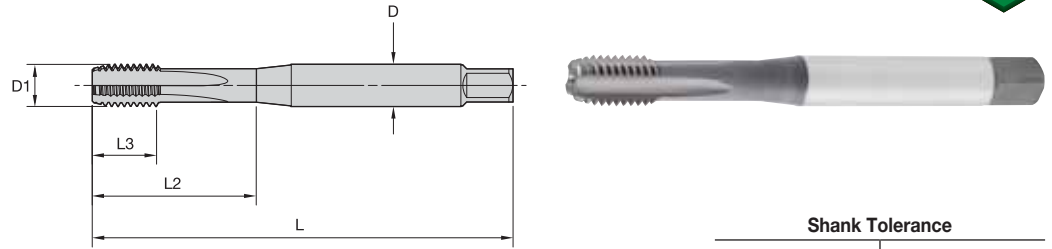


- first choice
- alternate choice

grade GP6520 TiCN		metric dimensions					number of flutes	dimension standard	class of fit
order #	catalog #	D1 size	L	L3	L2	D			
4154274	GT425001	M5 X 0,8	70	10	25	6,0	3	DIN 371	6HX
4154275	GT425002	M6 X 1	80	10	30	6,0	4	DIN 371	6HX
4154276	GT425003	M8 X 1,25	90	13	35	8,0	4	DIN 371	6HX
4154277	GT425004	M10 X 1,5	100	15	39	10,0	4	DIN 371	6HX
4154280	GT425007	M12 X 1,5	100	15	39	9,0	4	DIN 374	6HX
4154278	GT425005	M12 X 1,75	110	18	44	9,0	4	DIN 376	6HX
4154281	GT425008	M14 X 1,5	100	15	47	11,0	4	DIN 374	6HX
4154279	GT425006	M14 X 2	110	20	52	11,0	4	DIN 376	6HX
4154282	GT425009	M16 X 1,5	100	15	46	12,0	4	DIN 374	6HX
5408402	GT425010	M16 X 2	110	20	51	12,0	4	DIN 376	6HX
5408403	GT425011	M18 X 2,5	125	25	58	14,0	4	DIN 376	6HX
5408404	GT425012	M20 X 2,5	140	25	64	16,0	4	DIN 376	6HX

High-Performance Taps

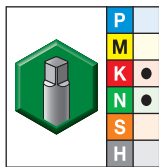
- GP6520 TiCN for cast iron and cast aluminum.



Shank Tolerance	
D mm	tolerance h6
>3-6	+0, -0,008
>6-10	+0, -0,009
>10-18	+0, -0,011
>18-30	+0, -0,013
>30-50	+0, -0,016



- GT43 • Form E Bottoming Chamfer • Through Coolant • Metric DIN 371, 374, and 376 • For Cast Iron and Cast Aluminum



- first choice
- alternate choice

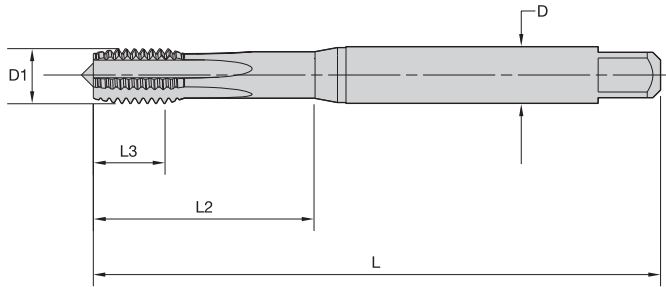
order #	catalog #	D1 size	metric dimensions				D	number of flutes	dimension standard	class of fit
			L	L3	L2					
4154283	GT435001	M5 X 0,8	70	10	25	6,0	3	DIN 371	6HX	
4154284	GT435002	M6 X 1	80	10	30	6,0	4	DIN 371	6HX	
4154285	GT435003	M8 X 1,25	90	13	35	8,0	4	DIN 371	6HX	
4154286	GT435004	M10 X 1,5	100	15	39	10,0	4	DIN 371	6HX	
4154289	GT435007	M12 X 1,5	100	15	39	9,0	4	DIN 374	6HX	
4154287	GT435005	M12 X 1,75	110	18	44	9,0	4	DIN 376	6HX	
4154290	GT435008	M14 X 1,5	100	15	47	11,0	4	DIN 374	6HX	
4154288	GT435006	M14 X 2	110	20	52	11,0	4	DIN 376	6HX	
4154291	GT435009	M16 X 1,5	100	15	46	12,0	4	DIN 374	6HX	
5408405	GT435010	M16 X 2	110	20	51	12,0	4	DIN 376	6HX	
5408406	GT435011	M18 X 2,5	125	25	58	14,0	4	DIN 376	6HX	
5408407	GT435012	M20 X 2,5	140	25	64	16,0	4	DIN 376	6HX	

High-Performance Taps

# High-Performance Taps

Victory™ Straight-Flute HSS-E-PM Taps • Blind and Through Holes

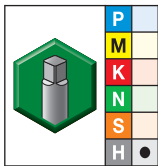
- WS32MG TiCN for steel 44–55 HRC.



Shank Tolerance	
D mm	tolerance h9
1–3	+0, -0,025
>3–6	+0, -0,030
>6–10	+0, -0,036
>10–18	+0, -0,043
>18–30	+0, -0,052



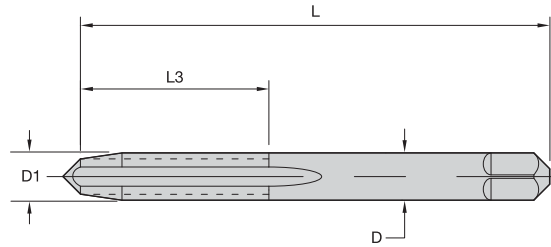
■ GT06 • Form C Semi-Bottoming Chamfer • Metric DIN 371, 374, and 376 • For Hard Steel



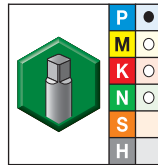
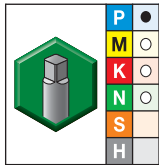
- first choice
- alternate choice

order #	catalog #	grade WS32MG TiCN	metric dimensions				D	number of flutes	dimension standard	class of fit
			D1 size	L	L3	L2				
4159915	GT065003	M6 X 1	80	10	30	6,0	4	DIN 371	6HX	
4159918	GT065006	M8 X 1	90	10	35	8,0	5	DIN 374	6HX	
4159913	GT065001	M8 X 1,25	90	14	35	8,0	5	DIN 371	6HX	
4159919	GT065007	M10 X 1	90	10	35	10,0	5	DIN 374	6HX	
4159914	GT065002	M10 X 1,5	100	16	39	10,0	5	DIN 371	6HX	
4159920	GT065008	M12 X 1,5	100	15	—	9,0	5	DIN 374	6HX	
4159916	GT065004	M12 X 1,75	110	18	—	9,0	5	DIN 376	6HX	
4159921	GT065009	M14 X 1,5	100	15	—	11,0	6	DIN 374	6HX	
4159922	GT065010	M16 X 1,5	100	15	—	12,0	6	DIN 374	6HX	
4159917	GT065005	M16 X 2	110	22	—	12,0	6	DIN 376	6HX	

High-Performance Taps



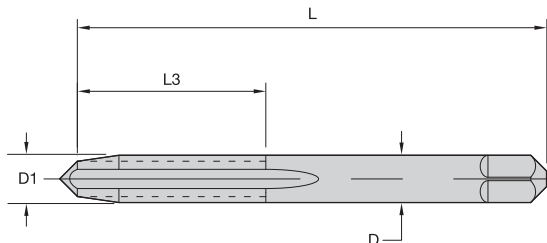
■ Series 5305 • Machine Screw Sizes • Taper Chamfer



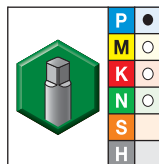
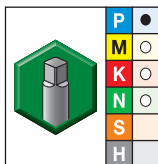
● first choice  
○ alternate choice

oxide		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 size	L	L3	D		
-		2748991	15102	0 - 80	1.63	.31	.141	2	H1
-		2748975	15114	1 - 64	1.69	.38	.141	2	H1
-		2748964	15120	1 - 72	1.69	.38	.141	2	H1
-		2748956	15128	2 - 56	1.75	.44	.141	3	H1
-		2748951	15134	2 - 56	1.75	.44	.141	3	H2
-		2748935	15144	2 - 64	1.75	.44	.141	3	H2
-		2748925	15156	3 - 48	1.81	.50	.141	3	H2
-		2748913	15166	3 - 56	1.81	.50	.141	3	H2
2709836	19563	2748887	15184	4 - 40	1.88	.56	.141	3	H2
-		2748869	15196	4 - 48	1.88	.56	.141	3	H2
-		2865323	15209	5 - 40	1.94	.63	.141	3	H2
-		2748858	15220	5 - 44	1.94	.63	.141	3	H2
-		2865295	15225	6 - 32	2.00	.69	.141	3	H1
-		2748845	15231	6 - 32	2.00	.69	.141	3	H2
-		2748827	15257	6 - 40	2.00	.69	.141	3	H2
2709816	19573	2865268	15237	6 - 32	2.00	.69	.141	3	H3
-		2748806	15275	8 - 32	2.13	.75	.168	4	H2
-		2748764	15301	8 - 36	2.13	.75	.168	4	H2
2709810	19583	2748787	15283	8 - 32	2.13	.75	.168	4	H3
-		2748708	15344	10 - 32	2.38	.88	.194	4	H1
-		2748747	15320	10 - 24	2.38	.88	.194	4	H2
-		2748694	15352	10 - 32	2.38	.88	.194	4	H2
2709804	19597	2748738	15327	10 - 24	2.38	.88	.194	4	H3
2709796	19613	2748679	15360	10 - 32	2.38	.88	.194	4	H3
-		2748645	15383	12 - 24	2.38	.94	.220	4	H3
-		2748631	15390	12 - 28	2.38	.94	.220	4	H3

NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.  
Refer to tables on pages W231-232 for the recommended pitch diameter limit for 2B or 3B class of fit.



■ Series 5303 • Fractional Sizes • Taper Chamfer



● first choice  
○ alternate choice

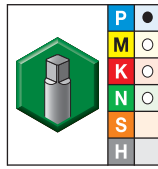
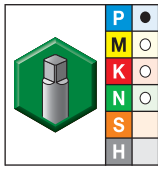
oxide		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 size	L	L3	D		
-		2749838	14010	1/4 - 20	2.50	1.00	.255	4	H1
-		2749832	14015	1/4 - 20	2.50	1.00	.255	4	H2
2709949	19167	3139335	14022	1/4 - 20	2.50	1.00	.255	4	H3
2709942	19208	2749775	14055	1/4 - 28	2.50	1.00	.255	4	H3
2709937	19237	2749737	14092	5/16 - 18	2.72	1.13	.318	4	H3
-		2749689	14122	5/16 - 24	2.72	1.13	.318	4	H3
2709923	19278	2749651	14157	3/8 - 16	2.94	1.25	.381	4	H3
3177076	19304	2749611	14190	3/8 - 24	2.94	1.25	.381	4	H3
-		2749586	14221	7/16 - 14	3.16	1.44	.323	4	H3
-		2749568	14246	7/16 - 20	3.16	1.44	.323	4	H3
2709916	19354	2749543	14281	1/2 - 13	3.38	1.66	.367	4	H3
2709909	19377	2749514	14308	1/2 - 20	3.38	1.66	.367	4	H3
-		3139336	14338	9/16 - 12	3.59	1.66	.429	4	H3
-		2749476	14356	9/16 - 18	3.59	1.66	.429	4	H3
2709902	19407	2749460	14379	5/8 - 11	3.81	1.81	.480	4	H3
-		2749432	14402	5/8 - 18	3.81	1.81	.480	4	H3
-		2749406	14423	11/16 - 11	4.03	1.06	.542	4	H3
-		2749400	14427	11/16 - 16	4.03	1.06	.542	4	H3
2709895	19443	2749394	14448	3/4 - 10	4.25	2.00	.590	4	H3
-		2749374	14471	3/4 - 16	4.25	2.00	.590	4	H3
-		2749356	14499	7/8 - 9	4.69	2.22	.697	4	H4
-		2749340	14516	7/8 - 14	4.69	2.22	.697	4	H4
-		2749327	14544	1 - 8	5.13	2.50	.800	4	H4
-		2749308	14557	1 - 12	5.13	2.50	.800	4	H4

(continued)

Production Taps



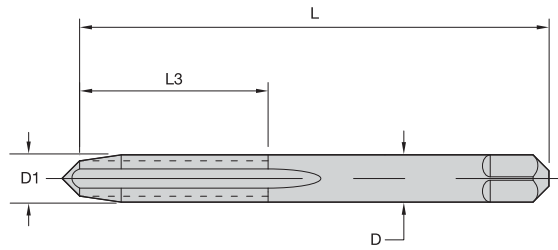
(Series 5303 • Fractional Sizes • Taper Chamfer — continued)



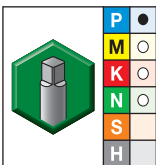
- first choice
- alternate choice

oxide		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	D1 size	L	L3	D		
-		2749294	14568	1 - 14	5.13	2.50	.800	4	H4
-		2749281	14594	1 1/8 - 7	5.44	2.56	.896	4	H4
-		2749274	14603	1 1/8 - 12	5.44	2.56	.896	4	H4
-		2749265	14612	1 1/4 - 7	5.75	2.56	1.021	4	H4
-		3171056	14620	1 1/4 - 12	5.75	2.56	1.021	6	H4
-		3012774	14632	1 3/8 - 6	6.06	3.00	1.108	4	H4
-		3171057	14640	1 3/8 - 12	6.06	3.00	1.108	6	H4
-		2749241	14645	1 1/2 - 6	6.38	3.00	1.233	4	H4
-		3012776	14653	1 1/2 - 12	6.38	3.00	1.233	6	H4

NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.



■ Series 5353 • Taper Chamfer • Metric ANSI



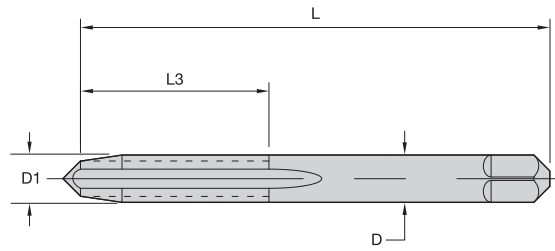
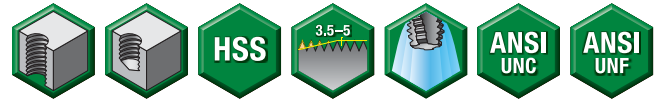
● first choice  
○ alternate choice

uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	D		
2749221	14725	M2 X 0,4	1.75	.44	.141	3	D3
2749207	14741	M3 X 0,5	1.94	.63	.141	3	D3
2749197	14757	M4 X 0,7	2.13	.75	.168	4	D4
2749189	14773	M5 X 0,8	2.38	.88	.194	4	D4
2749161	14797	M8 X 1,25	2.72	1.13	.318	4	D5
2749152	14813	M10 X 1,5	2.94	1.25	.381	4	D6
2749144	14829	M12 X 1,75	3.38	1.66	.367	4	D6
2749134	14845	M14 X 2	3.59	1.66	.429	4	D7
2749123	14861	M16 X 2	3.81	1.81	.480	4	D7
2749117	14877	M18 X 2,5	4.03	1.06	.542	4	D7
2749106	14893	M20 X 2,5	4.47	2.00	.652	4	D7
2749096	14909	M24 X 3	4.91	2.22	.760	4	D8
2749086	14925	M30 X 3,5	5.44	2.56	1.021	4	D9
2749077	14941	M36 X 4	6.06	3.00	1.233	4	D9

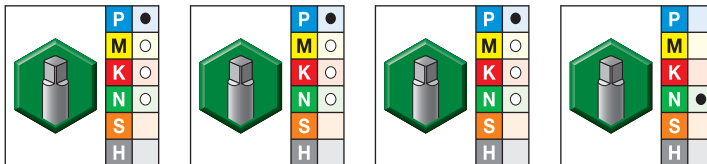
NOTE: Metric taps for 6H class of fit are suitable for MJ aerospace internal threading applications.  
Metric taps are manufactured to USCT1 specifications and dimensions.  
Metric tap blank dimensions are equivalent to inch taps.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 6H class of fit.

Production Taps

- Series 5305TC • TiCN Coated
- Series 2305 • TiN Coated
- Series 5305S • SH50 Steam Oxide
- Series 5305 • Uncoated



■ Series 5305/2305 • Machine Screw Sizes • Plug Chamfer

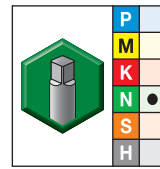
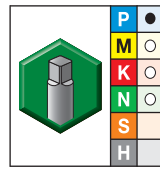
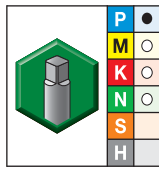
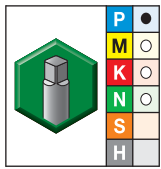


● first choice  
○ alternate choice

TiCN		TiN		oxide		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		
-	-	-	-	-	-	2748988	15103	0 - 80	1.63	.31	.141	2	H1
2746839	19121	2746715	19202	-	-	2748979	15107	0 - 80	1.63	.31	.141	2	H2
-	-	-	-	-	-	2748972	15115	1 - 64	1.69	.38	.141	2	H1
-	-	-	-	-	-	2748966	15118	1 - 64	1.69	.38	.141	2	H2
-	-	-	-	-	-	2748963	15121	1 - 72	1.69	.38	.141	2	H1
-	-	-	-	-	-	2748959	15125	1 - 72	1.69	.38	.141	2	H2
-	-	-	-	-	-	2865450	15129	2 - 56	1.75	.44	.141	3	H1
2746837	19122	2040972	19207	-	-	2748950	15135	2 - 56	1.75	.44	.141	3	H2
-	-	-	-	-	-	2748943	15138	2 - 56	1.75	.44	.141	2	H2
-	-	-	-	-	-	2748933	15145	2 - 64	1.75	.44	.141	3	H2
-	-	-	-	-	-	2748924	15157	3 - 48	1.81	.50	.141	3	H2
-	-	2748614	15433	-	-	2748916	15160	3 - 48	1.81	.50	.141	2	H2
-	-	-	-	-	-	2748911	15167	3 - 56	1.81	.50	.141	3	H2
2746835	19123	2041049	19211	2709830	19565	2748885	15185	4 - 40	1.88	.56	.141	3	H2
-	-	-	-	-	-	2748878	15189	4 - 40	1.88	.56	.141	2	H2
-	-	-	-	-	-	2748867	15197	4 - 48	1.88	.56	.141	3	H2
2746833	19124	2746697	19216	-	-	2865319	15210	5 - 40	1.94	.63	.141	3	H2
-	-	2748606	15437	-	-	2865310	15214	5 - 40	1.94	.63	.141	2	H2
-	-	-	-	-	-	2748855	15221	5 - 44	1.94	.63	.141	3	H2
2748850	15224	-	-	2746500	19575	2748843	15238	6 - 32	2.00	.69	.141	3	H3
-	-	-	-	-	-	2865292	15226	6 - 32	2.00	.69	.141	3	H1
-	-	2041051	19221	-	-	2865279	15232	6 - 32	2.00	.69	.141	3	H2
-	-	-	-	-	-	2865271	15235	6 - 32	2.00	.69	.141	2	H2
-	-	-	-	-	-	2748836	15245	6 - 32	2.00	.69	.141	2	H3

(continued)

(Series 5305/2305 • Machine Screw Sizes • Plug Chamfer — continued)

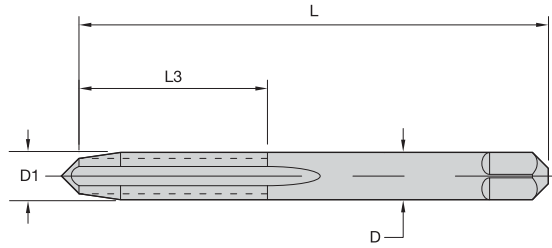


● first choice  
○ alternate choice

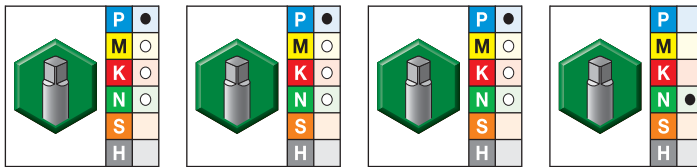
TiCN		TiN		oxide		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		
-	-	-	-	-	-	2748825	15258	6 - 40	2.00	.69	.141	3	H2
-	-	-	-	-	-	2748816	15262	6 - 40	2.00	.69	.141	2	H2
-	-	-	-	-	-	2748813	15268	8 - 32	2.13	.75	.168	4	H1
2748810	15270	-	-	2746492	19585	2748785	15284	8 - 32	2.13	.75	.168	4	H3
-	-	2463623	19226	-	-	2748804	15276	8 - 32	2.13	.75	.168	4	H2
-	-	-	-	-	-	2748800	15279	8 - 32	2.13	.75	.168	2	H2
-	-	-	-	-	-	2748792	15281	8 - 32	2.13	.75	.168	3	H2
-	-	-	-	-	-	2748774	15291	8 - 32	2.13	.75	.168	2	H3
-	-	2748598	15442	-	-	2748768	15293	8 - 32	2.13	.75	.168	3	H3
-	-	-	-	-	-	2748766	15295	8 - 32	2.13	.75	.168	4	H7
-	-	-	-	-	-	2748761	15302	8 - 36	2.13	.75	.168	4	H2
-	-	-	-	-	-	2748749	15314	10 - 24	2.38	.88	.194	4	H1
-	-	-	-	-	-	2748746	15321	10 - 24	2.38	.88	.194	4	H2
-	-	-	-	-	-	2748740	15324	10 - 24	2.38	.88	.194	2	H2
2746831	19126	2603956	19231	2746490	19600	2748736	15328	10 - 24	2.38	.88	.194	4	H3
-	-	-	-	-	-	2748730	15335	10 - 24	2.38	.88	.194	2	H3
-	-	2748595	15444	-	-	2748726	15337	10 - 24	2.38	.88	.194	3	H3
-	-	-	-	-	-	2748706	15345	10 - 32	2.38	.88	.194	4	H1
2748697	15348	2622811	19236	2746486	19615	2748678	15361	10 - 32	2.38	.88	.194	4	H3
-	-	-	-	-	-	2748692	15353	10 - 32	2.38	.88	.194	4	H2
-	-	-	-	-	-	2748684	15356	10 - 32	2.38	.88	.194	2	H2
-	-	-	-	-	-	2748681	15358	10 - 32	2.38	.88	.194	3	H2
-	-	-	-	-	-	2748666	15368	10 - 32	2.38	.88	.194	2	H3
-	-	2748585	15450	-	-	2748662	15370	10 - 32	2.38	.88	.194	3	H3
2746830	19127	2746663	19241	-	-	2748643	15384	12 - 24	2.38	.94	.220	4	H3
-	-	-	-	-	-	2748628	15391	12 - 28	2.38	.94	.220	4	H3

NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.

Production Taps



■ Series 5303/2303 • Fractional Sizes • Plug Chamfer



● first choice  
○ alternate choice

TiCN		TiN		oxide		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		
2749839	14009	2463627	19247	2863727	19170	2957247	14023	1/4 - 20	2.50	1.00	.255	4	H3
-	-	-	-	-	-	2749837	14011	1/4 - 20	2.50	1.00	.255	4	H1
-	-	-	-	-	-	2749830	14016	1/4 - 20	2.50	1.00	.255	4	H2
-	-	-	-	-	-	3180806	14020	1/4 - 20	2.50	1.00	.255	3	H2
-	-	2748577	15453	-	-	3102009	14030	1/4 - 20	2.50	1.00	.255	2	H3
-	-	3171060	15454	-	-	2749802	14032	1/4 - 20	2.50	1.00	.255	3	H3
-	-	-	-	-	-	2749795	14036	1/4 - 20	2.50	1.00	.255	4	H5
-	-	-	-	-	-	2749791	14039	1/4 - 20	2.50	1.00	.255	3	H5
-	-	-	-	-	-	2749787	14041	1/4 - 20	2.50	1.00	.255	4	H11
-	-	-	-	-	-	2749780	14052	1/4 - 28	2.50	1.00	.255	4	H2
-	-	-	-	-	-	2749777	14053	1/4 - 28	2.50	1.00	.255	4	H2
-	-	-	-	-	-	2749772	14056	1/4 - 28	2.50	1.00	.255	4	H3
2746827	19128	2463629	19253	2746703	19210	-	-	1/4 - 28	2.50	1.00	.255	4	H3
-	-	-	-	-	-	2749759	14063	1/4 - 28	2.50	1.00	.255	2	H3
-	-	2748574	15456	-	-	2749757	14065	1/4 - 28	2.50	1.00	.255	3	H3
-	-	-	-	-	-	2749751	14067	1/4 - 28	2.50	1.00	.255	4	H4
-	-	-	-	-	-	2749744	14082	5/16 - 18	2.72	1.13	.318	4	H1
-	-	-	-	-	-	2435312	14087	5/16 - 18	2.72	1.13	.318	4	H2
2746826	19129	2746637	19258	2746665	19240	2749734	14093	5/16 - 18	2.72	1.13	.318	4	H3
-	-	-	-	-	-	3102021	14100	5/16 - 18	2.72	1.13	.318	2	H3
-	-	2748569	15459	-	-	-	-	5/16 - 18	2.72	1.13	.318	2	H3
-	-	2710689	15460	-	-	-	-	5/16 - 18	2.72	1.13	.318	3	H3
-	-	-	-	-	-	2749714	14102	5/16 - 18	2.72	1.13	.318	3	H3
-	-	-	-	-	-	2749709	14104	5/16 - 18	2.72	1.13	.318	4	H5
-	-	-	-	-	-	2749695	14109	5/16 - 18	2.72	1.13	.318	4	H11
-	-	-	-	-	-	2749694	14113	5/16 - 24	2.72	1.13	.318	4	H1
-	-	-	-	-	-	2749691	14118	5/16 - 24	2.72	1.13	.318	4	H2
2746824	19131	2746631	19263	2746635	19260	2749686	14123	5/16 - 24	2.72	1.13	.318	4	H3

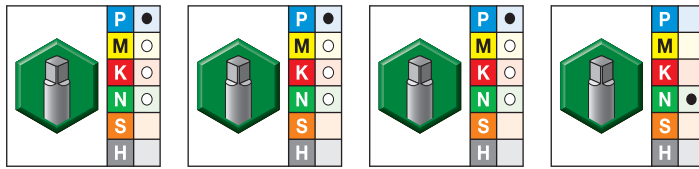
(continued)

# Production Taps

Hand Taps • Through or Blind Holes in General Machining Applications



(Series 5303/2303 • Fractional Sizes • Plug Chamfer — continued)



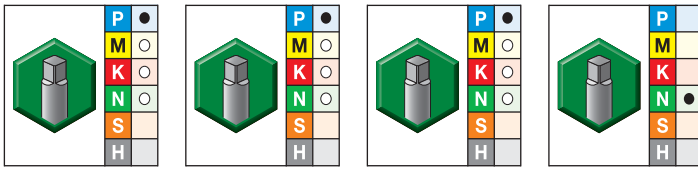
● first choice  
○ alternate choice

TiCN		TiN		oxide		uncoated		inch dimensions			number of flutes	pitch diameter limit	
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3			D
-	-	2748566	15462	-	-	1295391	14130	5/16 - 24	2.72	1.13	.318	3	H3
-	-	-	-	-	-	2749666	14133	5/16 - 24	2.72	1.13	.318	4	H4
-	-	2746625	19268	2746615	19280	2749649	14158	3/8 - 16	2.94	1.25	.381	4	H3
2746822	19132	-	-	-	-	-	-	3/8 - 16	2.94	1.25	.381	4	H3
-	-	2748563	15464	-	-	2749635	14165	3/8 - 16	2.94	1.25	.381	3	H3
-	-	-	-	-	-	2749629	14169	3/8 - 16	2.94	1.25	.381	4	H5
-	-	-	-	-	-	2749617	14174	3/8 - 16	2.94	1.25	.381	4	H11
-	-	-	-	-	-	2749659	14147	3/8 - 16	2.94	1.25	.381	4	H1
-	-	-	-	-	-	2749655	14152	3/8 - 16	2.94	1.25	.381	4	H2
-	-	2748560	15466	-	-	2749595	14198	3/8 - 24	2.94	1.25	.381	3	H3
-	-	-	-	-	-	2749591	14201	3/8 - 24	2.94	1.25	.381	4	H4
-	-	-	-	-	-	2749613	14185	3/8 - 24	2.94	1.25	.381	4	H2
-	-	2746621	19273	-	-	2749609	14191	3/8 - 24	2.94	1.25	.381	4	H3
2746820	19134	-	-	3177077	19305	-	-	3/8 - 24	2.94	1.25	.381	4	H3
-	-	-	-	-	-	2749572	14232	7/16 - 14	3.16	1.44	.323	4	H5
-	-	2746617	19277	-	-	2749584	14222	7/16 - 14	3.16	1.44	.323	4	H3
2746818	19135	-	-	-	-	-	-	7/16 - 14	3.16	1.44	.323	4	H3
-	-	2748558	15467	-	-	-	-	7/16 - 14	3.16	1.44	.323	3	H3
-	-	-	-	-	-	2749573	14229	7/16 - 14	3.16	1.44	.323	3	H3
-	-	2746611	19283	-	-	1951473	14247	7/16 - 20	3.16	1.44	.323	4	H3
2746816	19136	-	-	-	-	-	-	7/16 - 20	3.16	1.44	.323	4	H3
-	-	-	-	-	-	2749550	14256	7/16 - 20	3.16	1.44	.323	4	H5
-	-	2748552	15469	-	-	2749530	14289	1/2 - 13	3.38	1.66	.367	3	H3
-	-	-	-	-	-	2957246	14293	1/2 - 13	3.38	1.66	.367	4	H5
-	-	-	-	-	-	2749519	14297	1/2 - 13	3.38	1.66	.367	4	H11
-	-	-	-	-	-	2866262	14274	1/2 - 13	3.38	1.66	.367	4	H1
2746814	19137	2746605	19291	2746576	19360	2415661	14282	1/2 - 13	3.38	1.66	.367	4	H3
-	-	2748550	15470	-	-	2749493	14316	1/2 - 20	3.38	1.66	.367	3	H3
-	-	-	-	-	-	2749491	14319	1/2 - 20	3.38	1.66	.367	4	H5
-	-	-	-	-	-	2749517	14301	1/2 - 20	3.38	1.66	.367	4	H1
-	-	-	-	-	-	2749513	14309	1/2 - 20	3.38	1.66	.367	4	H3
2746812	19138	2746595	19297	2746568	19375	-	-	1/2 - 20	3.38	1.66	.367	4	H3
-	-	-	-	-	-	2866187	14339	9/16 - 12	3.59	1.66	.429	4	H3
-	-	-	-	-	-	2749481	14346	9/16 - 12	3.59	1.66	.429	4	H5
-	-	-	-	-	-	2749463	14364	9/16 - 18	3.59	1.66	.429	4	H5
-	-	-	-	-	-	2749478	14353	9/16 - 18	3.59	1.66	.429	4	H2
-	-	-	-	-	-	2749475	14357	9/16 - 18	3.59	1.66	.429	4	H3
-	-	-	-	-	-	2749444	14388	5/8 - 11	3.81	1.81	.480	4	H5
-	-	-	-	-	-	2749461	14378	5/8 - 11	3.81	1.81	.480	4	H2
2746810	19139	2863589	19307	2746564	19410	2749458	14380	5/8 - 11	3.81	1.81	.480	4	H3

(continued)

Production Taps

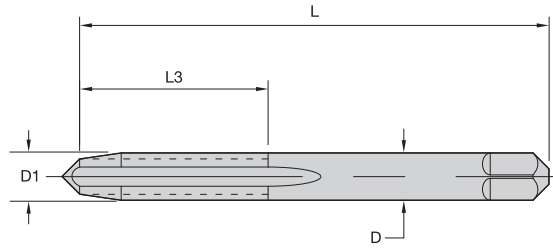
(Series 5303/2303 • Fractional Sizes • Plug Chamfer — continued)



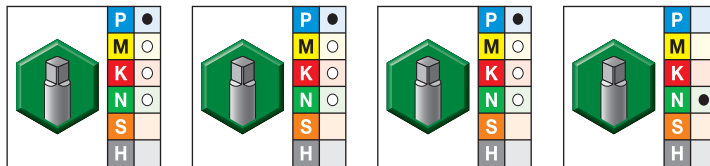
● first choice  
○ alternate choice

TiCN		TiN		oxide		uncoated		inch dimensions			number of flutes	pitch diameter limit	
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3			D
-	-	-	-	-	-	2749414	14411	5/8 - 18	3.81	1.81	.480	4	H5
-	-	-	-	-	-	2749434	14400	5/8 - 18	3.81	1.81	.480	4	H2
-	-	2746592	19317	-	-	2749431	14403	5/8 - 18	3.81	1.81	.480	4	H3
2746808	19140	-	-	-	-	-	-	5/8 - 18	3.81	1.81	.480	4	H3
-	-	-	-	-	-	2749405	14424	11/16 - 11	4.03	1.06	.542	4	H3
-	-	-	-	-	-	2749397	14428	11/16 - 16	4.03	1.06	.542	4	H3
-	-	-	-	2746560	19445	-	-	3/4 - 10	4.25	2.00	.590	4	H3
-	-	2746588	19327	-	-	-	-	3/4 - 10	4.25	2.00	.590	4	H3
2746806	19141	-	-	-	-	-	-	3/4 - 10	4.25	2.00	.590	4	H3
-	-	-	-	-	-	2749379	14457	3/4 - 10	4.25	2.00	.590	4	H5
-	-	-	-	-	-	2749392	14449	3/4 - 10	4.25	2.00	.590	4	H3
-	-	-	-	-	-	1825322	14472	3/4 - 16	4.25	2.00	.590	4	H3
-	-	-	-	-	-	2710849	14479	3/4 - 16	4.25	2.00	.590	4	H4
-	-	-	-	2746556	19455	-	-	3/4 - 16	4.25	2.00	.590	4	H3
-	-	2746584	19337	-	-	-	-	3/4 - 16	4.25	2.00	.590	4	H3
2746804	19142	-	-	-	-	-	-	3/4 - 16	4.25	2.00	.590	4	H3
-	-	-	-	-	-	2749359	14482	3/4 - 16	4.25	2.00	.590	4	H5
-	-	-	-	2709889	19465	-	-	7/8 - 9	4.69	2.22	.697	4	H4
-	-	-	-	-	-	2749342	14508	7/8 - 9	4.69	2.22	.697	4	H6
-	-	-	-	-	-	2749354	14500	7/8 - 9	4.69	2.22	.697	4	H4
-	-	2863567	19347	-	-	-	-	7/8 - 9	4.69	2.22	.697	4	H4
-	-	2746578	19357	-	-	-	-	7/8 - 14	4.69	2.22	.697	4	H4
-	-	-	-	-	-	2749329	14524	7/8 - 14	4.69	2.22	.697	4	H6
-	-	-	-	-	-	2749338	14517	7/8 - 14	4.69	2.22	.697	4	H4
-	-	-	-	2709874	19475	-	-	1 - 8	5.13	2.50	.800	4	H4
-	-	2746572	19367	-	-	-	-	1 - 8	5.13	2.50	.800	4	H4
-	-	-	-	-	-	2749311	14553	1 - 8	5.13	2.50	.800	4	H6
-	-	-	-	-	-	2749326	14545	1 - 8	5.13	2.50	.800	4	H4
-	-	-	-	-	-	2749305	14558	1 - 12	5.13	2.50	.800	4	H4
-	-	-	-	-	-	2749292	14569	1 - 14	5.13	2.50	.800	4	H4
-	-	-	-	-	-	2749297	14567	1 - 14	5.13	2.50	.800	4	H2
-	-	-	-	-	-	2749280	14595	1 1/8 - 7	5.44	2.56	.896	4	H4
-	-	-	-	-	-	2749271	14604	1 1/8 - 12	5.44	2.56	.896	4	H4
-	-	-	-	-	-	2749263	14613	1 1/4 - 7	5.75	2.56	1.021	4	H4
-	-	-	-	-	-	2749258	14621	1 1/4 - 12	5.75	2.56	1.021	6	H4
-	-	-	-	-	-	2749252	14633	1 3/8 - 6	6.06	3.00	1.108	4	H4
-	-	-	-	-	-	2749247	14641	1 3/8 - 12	6.06	3.00	1.108	6	H4
-	-	-	-	-	-	3012775	14646	1 1/2 - 6	6.38	3.00	1.233	4	H4
-	-	-	-	-	-	2749234	14654	1 1/2 - 12	6.38	3.00	1.233	6	H4

- Series 5305TC • TiCN Coated
- Series 2305 • TiN Coated
- Series 5305S • SH50 Steam Oxide
- Series 5305 • Uncoated



■ Series 5305/2305 • Machine Screw Sizes • Bottoming Chamfer



● first choice  
○ alternate choice

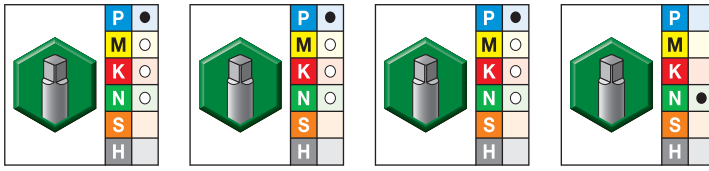
TiCN		TiN		oxide		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		
-	-	-	-	-	-	2748985	15104	0 - 80	1.63	.31	.141	2	H1
2863721	19174	2746711	19204	-	-	2748977	15108	0 - 80	1.63	.31	.141	2	H2
-	-	-	-	-	-	2748970	15116	1 - 64	1.69	.38	.141	2	H1
-	-	-	-	-	-	2748962	15122	1 - 72	1.69	.38	.141	2	H1
-	-	-	-	-	-	3049563	15126	1 - 72	1.69	.38	.141	2	H2
-	-	-	-	-	-	2748955	15130	2 - 56	1.75	.44	.141	3	H1
3171079	19175	-	-	-	-	2748947	15136	2 - 56	1.75	.44	.141	3	H2
-	-	-	-	-	-	2748942	15139	2 - 56	1.75	.44	.141	2	H2
-	-	-	-	-	-	2748930	15146	2 - 64	1.75	.44	.141	3	H2
-	-	-	-	-	-	2748920	15158	3 - 48	1.81	.50	.141	3	H2
-	-	2748616	15432	-	-	2748914	15161	3 - 48	1.81	.50	.141	2	H2
-	-	-	-	-	-	2748906	15168	3 - 56	1.81	.50	.141	3	H2
2746756	19176	2041050	19213	2709823	19570	2748882	15186	4 - 40	1.88	.56	.141	3	H2
-	-	2748612	15434	-	-	2748876	15190	4 - 40	1.88	.56	.141	2	H2
-	-	-	-	-	-	2748864	15198	4 - 48	1.88	.56	.141	3	H2
2746754	19177	2746695	19218	-	-	2865316	15211	5 - 40	1.94	.63	.141	3	H2
-	-	2748607	15436	-	-	3177073	15215	5 - 40	1.94	.63	.141	2	H2
-	-	-	-	-	-	2748852	15222	5 - 44	1.94	.63	.141	3	H2
-	-	-	-	-	-	2865289	15227	6 - 32	2.00	.69	.141	3	H1
-	-	2041052	19223	-	-	2865277	15233	6 - 32	2.00	.69	.141	3	H2
-	-	-	-	-	-	2891496	15236	6 - 32	2.00	.69	.141	2	H2
2746752	19178	-	-	2746494	19580	2748840	15239	6 - 32	2.00	.69	.141	3	H3
-	-	2748604	15438	-	-	2748835	15246	6 - 32	2.00	.69	.141	2	H3
-	-	-	-	-	-	2748820	15259	6 - 40	2.00	.69	.141	3	H2

(continued)

Production Taps



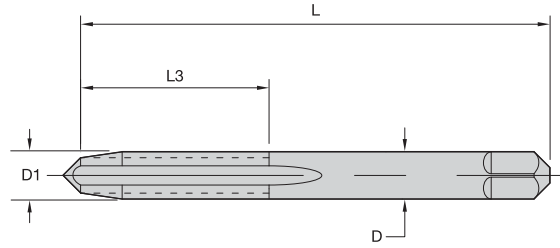
(Series 5305/2305 • Machine Screw Sizes • Bottoming Chamfer — continued)



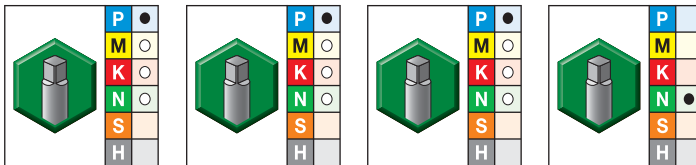
● first choice  
○ alternate choice

TiCN		TiN		oxide		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		
-	-	-	-	-	-	2748811	15269	8 - 32	2.13	.75	.168	4	H1
-	-	1773455	19228	-	-	2748803	15277	8 - 32	2.13	.75	.168	4	H2
-	-	-	-	-	-	2748795	15280	8 - 32	2.13	.75	.168	2	H2
-	-	-	-	-	-	2748791	15282	8 - 32	2.13	.75	.168	3	H2
2746750	19179	-	-	2863495	19590	2748781	15285	8 - 32	2.13	.75	.168	4	H3
-	-	-	-	-	-	2748773	15292	8 - 32	2.13	.75	.168	2	H3
-	-	-	-	-	-	2969917	15294	8 - 32	2.13	.75	.168	3	H3
2709451	19860	-	-	-	-	-	-	8 - 32	2.13	.75	.168	4	H3
-	-	-	-	-	-	2748758	15303	8 - 36	2.13	.75	.168	4	H2
2746747	19181	2603957	19233	2746488	19605	2748733	15329	10 - 24	2.38	.88	.194	4	H3
-	-	-	-	-	-	2748728	15336	10 - 24	2.38	.88	.194	2	H3
-	-	2748597	15443	-	-	2748722	15338	10 - 24	2.38	.88	.194	3	H3
-	-	-	-	-	-	2748744	15322	10 - 24	2.38	.88	.194	4	H2
-	-	-	-	-	-	2748689	15354	10 - 32	2.38	.88	.194	4	H2
-	-	-	-	-	-	2748682	15357	10 - 32	2.38	.88	.194	2	H2
-	-	2748592	15446	-	-	2748680	15359	10 - 32	2.38	.88	.194	3	H2
2746745	19182	2622812	19238	2863477	19620	2748675	15362	10 - 32	2.38	.88	.194	4	H3
-	-	2748593	15445	-	-	2748663	15369	10 - 32	2.38	.88	.194	2	H3
-	-	2748590	15447	-	-	2748661	15371	10 - 32	2.38	.88	.194	3	H3
-	-	-	-	-	-	2748702	15346	10 - 32	2.38	.88	.194	4	H1
2746743	19183	2746661	19243	-	-	2748641	15385	12 - 24	2.38	.94	.220	4	H3
-	-	-	-	-	-	2748624	15392	12 - 28	2.38	.94	.220	4	H3

NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.



■ Series 5303/2303 • Fractional Sizes • Bottoming Chamfer



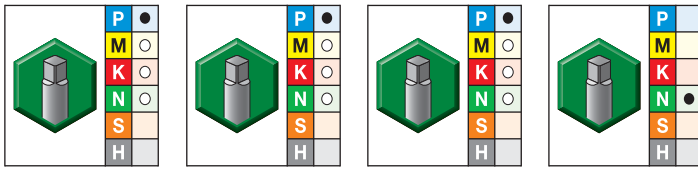
● first choice  
○ alternate choice

TiCN		TiN		oxide		uncoated		inch dimensions			number of flutes	pitch diameter limit	
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3			D
-	-	-	-	-	-	2749836	14012	1/4 - 20	2.50	1.00	.255	4	H1
-	-	-	-	-	-	2749826	14017	1/4 - 20	2.50	1.00	.255	4	H2
2746741	19184	2463628	19251	2746748	19180	2749818	14024	1/4 - 20	2.50	1.00	.255	4	H3
-	-	-	-	-	-	2749805	14031	1/4 - 20	2.50	1.00	.255	2	H3
-	-	-	-	-	-	2749800	14033	1/4 - 20	2.50	1.00	.255	3	H3
-	-	-	-	-	-	2749793	14037	1/4 - 20	2.50	1.00	.255	4	H5
2746739	19185	2463630	19256	2746691	19220	2749766	14057	1/4 - 28	2.50	1.00	.255	4	H3
-	-	-	-	-	-	2749758	14064	1/4 - 28	2.50	1.00	.255	2	H3
-	-	2748576	15455	-	-	2749755	14066	1/4 - 28	2.50	1.00	.255	3	H3
-	-	-	-	-	-	1854370	14068	1/4 - 28	2.50	1.00	.255	4	H4
-	-	-	-	-	-	2749742	14083	5/16 - 18	2.72	1.13	.318	4	H1
-	-	-	-	-	-	2749739	14088	5/16 - 18	2.72	1.13	.318	4	H2
2746737	19186	2746633	19261	2746657	19245	2749732	14094	5/16 - 18	2.72	1.13	.318	4	H3
-	-	2748573	15457	-	-	2749716	14101	5/16 - 18	2.72	1.13	.318	2	H3
-	-	2748571	15458	-	-	2749712	14103	5/16 - 18	2.72	1.13	.318	3	H3
-	-	-	-	-	-	2749706	14105	5/16 - 18	2.72	1.13	.318	4	H5
2746735	19187	2746627	19266	2746629	19265	2038474	14124	5/16 - 24	2.72	1.13	.318	4	H3
-	-	2748568	15461	-	-	2749669	14131	5/16 - 24	2.72	1.13	.318	3	H3
-	-	-	-	-	-	2749662	14134	5/16 - 24	2.72	1.13	.318	4	H4
-	-	-	-	-	-	2749656	14148	3/8 - 16	2.94	1.25	.381	4	H1
-	-	-	-	-	-	2749652	14153	3/8 - 16	2.94	1.25	.381	4	H2
2746733	19188	2746623	19271	2746609	19285	2749647	14159	3/8 - 16	2.94	1.25	.381	4	H3
-	-	2748565	15463	-	-	2749633	14166	3/8 - 16	2.94	1.25	.381	3	H3
-	-	-	-	-	-	2749625	14170	3/8 - 16	2.94	1.25	.381	4	H5
2746731	19189	2746619	19275	2746593	19310	1951472	14192	3/8 - 24	2.94	1.25	.381	4	H3
-	-	2748561	15465	-	-	2749593	14199	3/8 - 24	2.94	1.25	.381	3	H3
-	-	-	-	-	-	2749589	14202	3/8 - 24	2.94	1.25	.381	4	H4
2746729	19191	2746613	19281	-	-	2749582	14223	7/16 - 14	3.16	1.44	.323	4	H3

(continued)

Production Taps

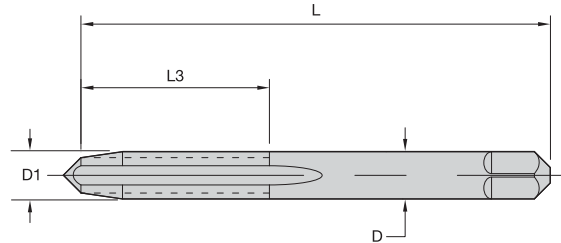
(Series 5303/2303 • Fractional Sizes • Bottoming Chamfer — continued)



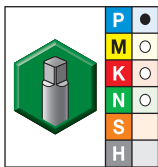
● first choice  
○ alternate choice

TiCN		TiN		oxide		uncoated		inch dimensions			number of flutes	pitch diameter limit	
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3			D
-	-	-	-	-	-	2749570	14233	7/16 - 14	3.16	1.44	.323	4	H5
2746727	19192	2746607	19287	-	-	2038865	14248	7/16 - 20	3.16	1.44	.323	4	H3
-	-	-	-	-	-	2749548	14257	7/16 - 20	3.16	1.44	.323	4	H5
-	-	-	-	-	-	2749545	14275	1/2 - 13	3.38	1.66	.367	4	H1
2746725	19193	2746601	19293	2746580	19355	2749540	14283	1/2 - 13	3.38	1.66	.367	4	H3
-	-	2748556	15468	-	-	2749526	14290	1/2 - 13	3.38	1.66	.367	3	H3
-	-	-	-	-	-	2749520	14294	1/2 - 13	3.38	1.66	.367	4	H5
2746723	19194	3113801	19303	2746566	19380	1951476	14310	1/2 - 20	3.38	1.66	.367	4	H3
-	-	-	-	-	-	2866184	14340	9/16 - 12	3.59	1.66	.429	4	H3
-	-	-	-	-	-	2749474	14358	9/16 - 18	3.59	1.66	.429	4	H3
2746721	19197	2863585	19313	2746562	19415	2749456	14381	5/8 - 11	3.81	1.81	.480	4	H3
-	-	-	-	-	-	2749441	14389	5/8 - 11	3.81	1.81	.480	4	H5
2746719	19198	2746590	19323	-	-	2749428	14404	5/8 - 18	3.81	1.81	.480	4	H3
-	-	-	-	-	-	2749411	14412	5/8 - 18	3.81	1.81	.480	4	H5
-	-	-	-	-	-	2749403	14425	11/16 - 11	4.03	1.06	.542	4	H3
-	-	-	-	-	-	2749396	14429	11/16 - 16	4.03	1.06	.542	4	H3
2746717	19199	2746586	19333	2746558	19450	3180808	14450	3/4 - 10	4.25	2.00	.590	4	H3
-	-	-	-	-	-	2749376	14458	3/4 - 10	4.25	2.00	.590	4	H5
-	-	2863572	19343	2746553	19460	2749370	14473	3/4 - 16	4.25	2.00	.590	4	H3
-	-	-	-	-	-	2749358	14483	3/4 - 16	4.25	2.00	.590	4	H5
-	-	2746582	19353	2709881	19470	2749352	14501	7/8 - 9	4.69	2.22	.697	4	H4
-	-	2746574	19363	-	-	2749336	14518	7/8 - 14	4.69	2.22	.697	4	H4
-	-	2746570	19373	2709867	19480	2749324	14546	1 - 8	5.13	2.50	.800	4	H4
-	-	-	-	-	-	3006761	14559	1 - 12	5.13	2.50	.800	4	H4
-	-	-	-	-	-	3180807	14570	1 - 14	5.13	2.50	.800	4	H4
-	-	-	-	-	-	2749278	14596	1 1/8 - 7	5.44	2.56	.896	4	H4
-	-	-	-	-	-	2749269	14605	1 1/8 - 12	5.44	2.56	.896	4	H4
-	-	-	-	-	-	2749261	14614	1 1/4 - 7	5.75	2.56	1.021	4	H4
-	-	-	-	-	-	2749256	14622	1 1/4 - 12	5.75	2.56	1.021	6	H4
-	-	-	-	-	-	2749251	14634	1 3/8 - 6	6.06	3.00	1.108	4	H4
-	-	-	-	-	-	2749246	14642	1 3/8 - 12	6.06	3.00	1.108	6	H4
-	-	-	-	-	-	2749240	14647	1 1/2 - 6	6.38	3.00	1.233	4	H4
-	-	-	-	-	-	2749233	14655	1 1/2 - 12	6.38	3.00	1.233	6	H4

NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.  
Refer to tables on pages W231-W232 for the recommended pitch diameter limit for 2B or 3B class of fit.



■ Series 5305 • Machine Screw Sizes • Sets of One Each Taper, Plug, and Bottoming Chamfer

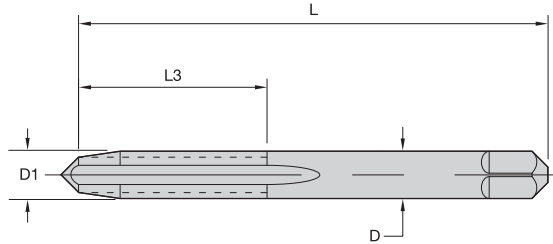


● first choice  
○ alternate choice

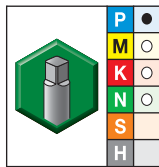
uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	D		
2748981	15105	0 - 80	1.63	.31	.141	2	H1
2748968	15117	1 - 64	1.69	.38	.141	2	H1
2748961	15123	1 - 72	1.69	.38	.141	2	H1
2748945	15137	2 - 56	1.75	.44	.141	3	H2
2748928	15147	2 - 64	1.75	.44	.141	3	H2
2748918	15159	3 - 48	1.81	.50	.141	3	H2
2748902	15169	3 - 56	1.81	.50	.141	3	H2
2748880	15187	4 - 40	1.88	.56	.141	3	H2
2748863	15199	4 - 48	1.88	.56	.141	3	H2
2865313	15212	5 - 40	1.94	.63	.141	3	H2
2748851	15223	5 - 44	1.94	.63	.141	3	H2
2865286	15228	6 - 32	2.00	.69	.141	3	H1
2865274	15234	6 - 32	2.00	.69	.141	3	H2
2748838	15240	6 - 32	2.00	.69	.141	3	H3
2748818	15260	6 - 40	2.00	.69	.141	3	H2
2748801	15278	8 - 32	2.13	.75	.168	4	H2
2865185	15286	8 - 32	2.13	.75	.168	4	H3
2748756	15304	8 - 36	2.13	.75	.168	4	H2
2748743	15323	10 - 24	2.38	.88	.194	4	H2
2748731	15330	10 - 24	2.38	.88	.194	4	H3
2748685	15355	10 - 32	2.38	.88	.194	4	H2
2748670	15363	10 - 32	2.38	.88	.194	4	H3
2748637	15386	12 - 24	2.38	.94	.220	4	H3
2748623	15393	12 - 28	2.38	.94	.220	4	H3

NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.  
Tap sets include one of each: taper, plug, and bottoming chamfer.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.

Production Taps



■ Series 5303 • Fractional Sizes • Sets of One Each Taper, Plug, and Bottoming Chamfer

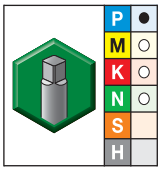


● first choice  
○ alternate choice

uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	D		
2749834	14013	1/4 - 20	2.50	1.00	.255	4	H1
2749824	14018	1/4 - 20	2.50	1.00	.255	4	H2
2749815	14025	1/4 - 20	2.50	1.00	.255	4	H3
2749764	14058	1/4 - 28	2.50	1.00	.255	4	H3
2749729	14095	5/16 - 18	2.72	1.13	.318	4	H3
2749680	14125	5/16 - 24	2.72	1.13	.318	4	H3
2749644	14160	3/8 - 16	2.94	1.25	.381	4	H3
2749605	14193	3/8 - 24	2.94	1.25	.381	4	H3
2749581	14224	7/16 - 14	3.16	1.44	.323	4	H3
2749560	14249	7/16 - 20	3.16	1.44	.323	4	H3
2749538	14284	1/2 - 13	3.38	1.66	.367	4	H3
2749503	14311	1/2 - 20	3.38	1.66	.367	4	H3
2749488	14341	9/16 - 12	3.59	1.66	.429	4	H3
2749472	14359	9/16 - 18	3.59	1.66	.429	4	H3
2749454	14382	5/8 - 11	3.81	1.81	.480	4	H3
2749426	14405	5/8 - 18	3.81	1.81	.480	4	H3
2749402	14426	11/16 - 11	4.03	1.06	.542	4	H3
2749388	14451	3/4 - 10	4.25	2.00	.590	4	H3
2749368	14474	3/4 - 16	4.25	2.00	.590	4	H3
2749350	14502	7/8 - 9	4.69	2.22	.697	4	H4
2749335	14519	7/8 - 14	4.69	2.22	.697	4	H4
2749320	14547	1 - 8	5.13	2.50	.800	4	H4
3303777	14560	1 - 12	5.13	2.50	.800	4	H4
2749288	14571	1 - 14	5.13	2.50	.800	4	H4

(continued)

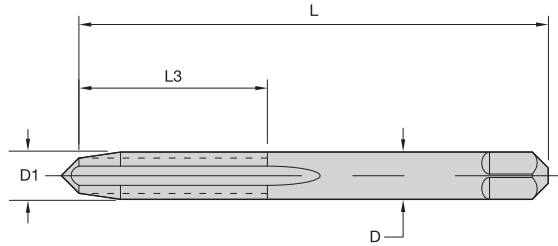
(Series 5303 • Fractional Sizes • Sets of One Each Taper, Plug, and Bottoming Chamfer — continued)



● first choice  
○ alternate choice

uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	D		
2749275	14597	1 1/8 - 7	5.44	2.56	.896	4	H4
2749267	14606	1 1/8 - 12	5.44	2.56	.896	4	H4
2749260	14615	1 1/4 - 7	5.75	2.56	1.021	4	H4
2749254	14623	1 1/4 - 12	5.75	2.56	1.021	6	H4
2749249	14635	1 3/8 - 6	6.06	3.00	1.108	4	H4
2749243	14643	1 3/8 - 12	6.06	3.00	1.108	6	H4
2749237	14648	1 1/2 - 6	6.38	3.00	1.233	4	H4
2749231	14656	1 1/2 - 12	6.38	3.00	1.233	6	H4

NOTE: Hand taps for 3B class of fit are suitable for UNJ aerospace internal threading applications.  
Tap sets include one of each: taper, plug, and bottoming chamfer.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.

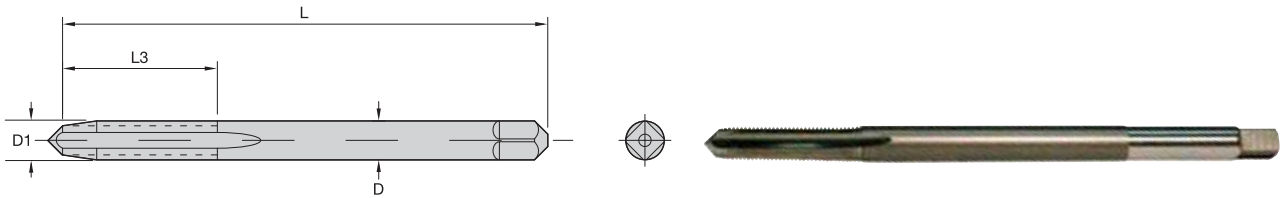


- first choice
- alternate choice

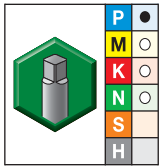
■ Series 5305L/5303L • Fractional Sizes • Sets of One Each Taper, Plug, and Bottoming Chamfer and Sets

taper chamfer 7-10 pitch		plug chamfer 3-5 pitch		full bottom 1-2 pitch		taper and plug bottoming set		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 TPI	L	L3	D		
2749814	14026	2749813	14027	2749811	14028	2749810	14029	1/4 - 20	2.50	1.00	.255	4	H3
-	-	3171054	14060	-	-	-	-	1/4 - 28	2.50	1.00	.255	4	H3
2749727	14096	2749724	14097	2749721	14098	2749719	14099	5/16 - 18	2.72	1.13	.318	4	H3
2749679	14126	2749677	14127	2749675	14128	2749674	14129	5/16 - 24	2.72	1.13	.318	4	H3
2749642	14161	2749639	14162	2749637	14163	2749636	14164	3/8 - 16	2.94	1.25	.381	4	H3
2749603	14194	2749601	14195	2749599	14196	2749597	14197	3/8 - 24	2.94	1.25	.381	4	H3
2749580	14225	-	-	-	-	-	-	7/16 - 14	3.16	1.44	.323	4	H3
3171055	14250	2749557	14251	2749554	14252	-	-	7/16 - 20	3.16	1.44	.323	4	H3
2866246	14285	2749535	14286	2749533	14287	2749531	14288	1/2 - 13	3.38	1.66	.367	4	H3
2749502	14312	2749499	14313	2749497	14314	2749495	14315	1/2 - 20	3.38	1.66	.367	4	H3
2749470	14360	-	-	-	-	-	-	9/16 - 18	3.59	1.66	.429	4	H3
2749451	14383	2749449	14384	2749447	14385	-	-	5/8 - 11	3.81	1.81	.480	4	H3
2749424	14406	2749421	14407	2749420	14408	-	-	5/8 - 18	3.81	1.81	.480	4	H3
2749386	14452	2749384	14453	2749382	14454	-	-	3/4 - 10	4.25	2.00	.590	4	H3
2749367	14475	2749365	14476	2749363	14477	-	-	3/4 - 16	4.25	2.00	.590	4	H3

Production Taps



■ Series 5305(EXT)/5303(EXT) • Machine Screw and Fractional • Bottoming Chamfer



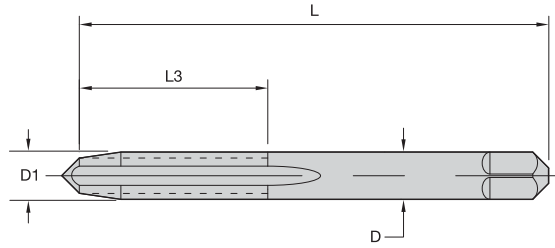
● first choice  
○ alternate choice

uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	D		
2747076	18828	6 - 32	6.00	.69	.141	3	H3
2747037	18892	8 - 32	6.00	.75	.168	4	H3
2747072	18834	10 - 24	6.00	.88	.194	4	H3
2747069	18837	10 - 32	6.00	.88	.194	4	H3
2747065	18840	1/4 - 20	6.00	1.00	.255	4	H3
2747061	18843	1/4 - 28	6.00	1.00	.255	4	H3
2747057	18846	5/16 - 18	6.00	.67	.318	4	H3
1779890	18849	5/16 - 24	6.00	.59	.318	4	H3
2747049	18852	3/8 - 16	6.00	1.25	.381	4	H3
2747047	18855	3/8 - 24	6.00	1.25	.381	4	H3

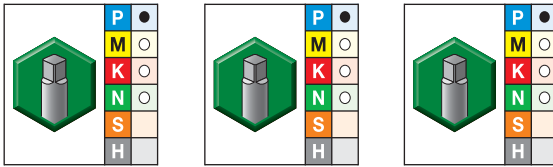
NOTE: Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.







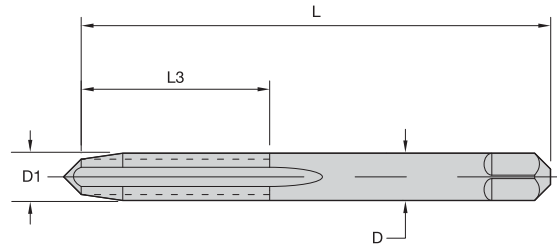
■ Series 5353 • Plug Chamfer • Metric ANSI



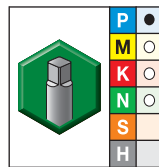
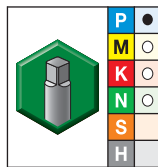
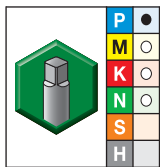
● first choice  
○ alternate choice

TICN		TiN		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		
-	-	-	-	2749224	14718	M1,6 X 0,35	1.63	.31	.141	2	D3
-	-	-	-	2749219	14726	M2 X 0,4	1.75	.44	.141	3	D3
-	-	-	-	2749210	14734	M2,5 X 0,45	1.81	.50	.141	3	D3
3171081	19217	3111251	15471	2749205	14742	M3 X 0,5	1.94	.63	.141	3	D3
-	-	-	-	2749199	14750	M3,5 X 0,6	2.00	.69	.141	3	D4
2746693	19219	2748549	15473	2749194	14758	M4 X 0,7	2.13	.75	.168	4	D4
-	-	-	-	2749191	14766	M4,5 X 0,75	2.38	.88	.194	4	D4
2746687	19222	2863245	19906	2749186	14774	M5 X 0,8	2.38	.88	.194	4	D4
2746683	19224	-	-	2749177	14782	M6 X 1	2.50	1.00	.255	4	D5
-	-	-	-	2749167	14790	M7 X 1	2.72	1.13	.318	4	D5
2746681	19225	2746288	19912	2749160	14798	M8 X 1,25	2.72	1.13	.318	4	D5
2746677	19227	2746284	19915	2749151	14814	M10 X 1,5	2.94	1.25	.381	4	D6
3005011	19229	2746209	19955	2749141	14830	M12 X 1,75	3.38	1.66	.367	4	D6
-	-	-	-	2749284	14586	M14 X 1,25	3.59	1.66	.429	4	H4
-	-	-	-	2749131	14846	M14 X 2	3.59	1.66	.429	4	D7
-	-	-	-	3012777	14862	M16 X 2	3.81	1.81	.480	4	D7
-	-	-	-	2749282	14590	M18 X 1,5	4.03	1.81	.542	4	H4
-	-	-	-	2749113	14878	M18 X 2,5	4.03	1.06	.542	4	D7
-	-	-	-	2749104	14894	M20 X 2,5	4.47	2.00	.652	4	D7
-	-	-	-	2749094	14910	M24 X 3	4.91	2.22	.760	4	D8
-	-	-	-	2749084	14926	M30 X 3,5	5.44	2.56	1.021	4	D9
-	-	-	-	2749076	14942	M36 X 4	6.06	3.00	1.233	4	D9

NOTE: Metric taps for 6H class of fit are suitable for MJ aerospace internal threading applications.  
Metric taps are manufactured to USCTI specifications and dimensions.  
Metric tap blank dimensions are equivalent to inch taps.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 6H class of fit.



■ Series 5353 • Bottoming Chamfer • Metric ANSI

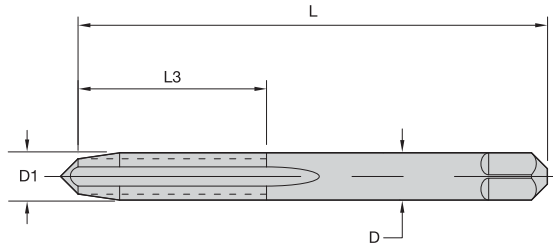


● first choice  
○ alternate choice

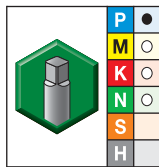
TiCN		TiN		uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		
2896313	19201	3044179	15472	2749204	14743	M3 X 0,5	1.94	.63	.141	3	D3
2746713	19203	2978979	15474	-	-	M4 X 0,7	2.13	.75	.168	4	D4
2746709	19205	2746294	19907	2749182	14775	M5 X 0,8	2.38	.88	.194	4	D4
2746707	19206	-	-	-	-	M6 X 1	2.50	1.00	.255	4	D5
2746701	19212	-	-	-	-	M8 X 1,25	2.72	1.13	.318	4	D5
2746699	19214	2746282	19916	-	-	M10 X 1,5	2.94	1.25	.381	4	D6
3171080	19215	-	-	-	-	M12 X 1,75	3.38	1.66	.367	4	D6
-	-	-	-	2749127	14847	M14 X 2	3.59	1.66	.429	4	D7
-	-	-	-	2749122	14863	M16 X 2	3.81	1.81	.480	4	D7
-	-	-	-	2749102	14895	M20 X 2,5	4.47	2.00	.652	4	D7
-	-	-	-	2749093	14911	M24 X 3	4.91	2.22	.760	4	D8
-	-	-	-	2749081	14927	M30 X 3,5	5.44	2.56	1.021	4	D9
-	-	-	-	2749073	14943	M36 X 4	6.06	3.00	1.233	4	D9

NOTE: Metric taps for 6H class of fit are suitable for MJ aerospace internal threading applications.  
Metric taps are manufactured to USCTI specifications and dimensions.  
Metric tap blank dimensions are equivalent to inch taps.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 6H class of fit.

Production Taps



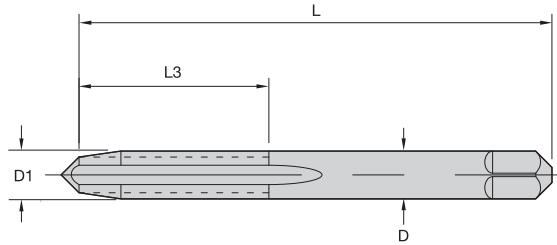
■ Series 5353 • Sets of One Each, Taper, Plug, Bottoming Chamfer • Metric ANSI



● first choice  
○ alternate choice

uncoated		inch dimensions				number of flutes	pitch diameter limit
order #	catalog #	D1 size	L	L3	D		
2749202	14744	M3 X 0,5	1.94	.63	.141	3	D3
2749192	14760	M4 X 0,7	2.13	.75	.168	4	D4
2749181	14777	M5 X 0,8	2.38	.88	.194	4	D4
2749171	14784	M6 X 1	2.50	1.00	.255	4	D5
2749153	14800	M8 X 1,25	2.72	1.13	.318	4	D5
2749145	14816	M10 X 1,5	2.94	1.25	.381	4	D6
2749136	14832	M12 X 1,75	3.38	1.66	.367	4	D6
2749125	14848	M14 X 2	3.59	1.66	.429	4	D7
2749119	14864	M16 X 2	3.81	1.81	.480	4	D7
2749099	14896	M20 X 2,5	4.47	2.00	.652	4	D7

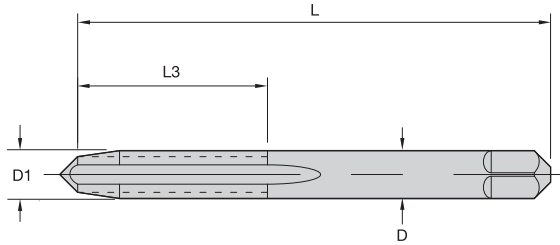
NOTE: Metric taps for 6H class of fit are suitable for MJ aerospace internal threading applications.  
Metric taps are manufactured to USCT1 specifications and dimensions.  
Metric tap blank dimensions are equivalent to inch taps.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 6H class of fit.



- first choice
- alternate choice

■ Series 7305 • Machine Screw • Taper, Plug, Bottoming Chamfer, and Sets

taper chamfer 7-10 pitch		plug chamfer 3-5 pitch		full bottom 1-2 pitch		taper and plug bottoming set		D1 size	L	L3	D	class of fit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #					
2751095	11516	2751092	11517	2751090	11518	2751086	11519	4 - 40	2	.56	.141	2B
2751081	11524	2751080	11525	2751079	11526	2751077	11527	5 - 40	2	.63	.141	2B
2751075	11528	2751073	11529	2751071	11530	2751070	11531	6 - 32	2	.69	.141	2B
-	-	2751068	11537	-	-	-	-	6 - 40	2	.69	.141	2B
2751066	11540	2751064	11541	2751060	11542	2751058	11543	8 - 32	2	.75	.168	2B
-	-	2751056	11545	-	-	-	-	8 - 36	2	.75	.168	2B
2751055	11548	2751053	11549	2751051	11550	2751048	11551	10 - 24	2	.88	.194	2B
2751047	11552	2751045	11553	2751043	11554	2885052	11555	10 - 32	2	.88	.194	2B
2751041	11556	2751040	11557	2751037	11558	2751036	11559	12 - 24	2	.94	.220	2B
-	-	2751034	11561	-	-	-	-	12 - 28	2	.94	.220	2B

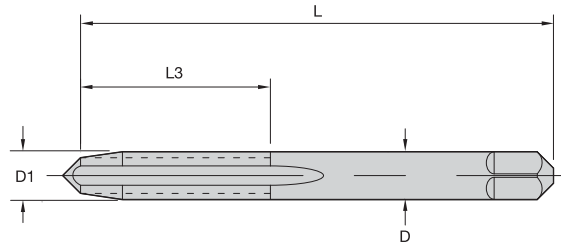


- first choice
- alternate choice

■ Series 7303 • Fractional • Taper, Plug, Bottoming Chamfer, and Sets

taper chamfer 7-10 pitch		plug chamfer 3-5 pitch		full bottom 1-2 pitch		taper and plug bottoming set		inch dimensions				class of fit
order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D	
2751033	11584	2867820	11585	2751031	11586	2751030	11587	3/16 - 24	2	.88	.194	2B
2751027	11596	2751025	11597	2751023	11598	2751020	11599	1/4 - 20	3	1.00	.255	2B
2751019	11600	2751015	11601	2751013	11602	2751011	11603	1/4 - 28	3	1.00	.255	2B
2751010	11604	2751008	11605	2751007	11606	2751004	11607	5/16 - 18	3	1.13	.318	2B
2751002	11608	2751001	11609	2750999	11610	2750998	11611	5/16 - 24	3	1.13	.318	2B
2750996	11612	2750995	11613	2750993	11614	2750991	11615	3/8 - 16	3	1.25	.381	2B
2750990	11616	2750988	11617	2750986	11618	2750985	11619	3/8 - 24	3	1.25	.381	2B
2750984	11620	2750983	11621	2750980	11622	2750975	11623	7/16 - 14	3	1.44	.323	2B
2750972	11624	2750969	11625	2750967	11626	2750965	11627	7/16 - 20	3	1.44	.323	2B
2750962	11628	2750959	11629	2750957	11630	2750953	11631	1/2 - 13	3	1.66	.367	2B
2750951	11632	2750948	11633	2750946	11634	2750945	11635	1/2 - 20	3	1.66	.367	2B
2750943	11636	2750941	11637	2750940	11638	2750939	11639	9/16 - 12	4	1.66	.429	2B
2750937	11640	2750935	11641	2750933	11642	2750932	11643	9/16 - 18	4	1.66	.429	2B
2750928	11644	2750926	11645	2750923	11646	2750920	11647	5/8 - 11	4	1.81	.480	2B
2750918	11648	2750917	11649	2750916	11650	-	-	5/8 - 18	3	1.25	.381	2B
-	-	-	-	-	-	2750915	11651	5/8 - 18	4	1.81	.480	2B
2750912	11652	2750910	11653	2750907	11654	2750906	11655	3/4 - 10	4	2.00	.590	2B
2750904	11656	2750902	11657	2750901	11658	2750900	11659	3/4 - 16	4	2.00	.590	2B
2750898	11660	2750896	11661	2750895	11662	2750893	11663	7/8 - 9	5	2.22	.697	2B
2750892	11664	2750888	11665	2750886	11666	2750885	11667	7/8 - 14	5	2.22	.697	2B
2750883	11668	2750882	11669	2750880	11670	2750879	11671	1 - 8	5	2.50	.800	2B
2750878	11672	-	-	2750875	11674	2750873	11675	1 - 12	5	2.50	.800	2B
2750871	11676	2750868	11677	2750867	11678	2750865	11679	1 - 14	5	2.50	.800	2B
2750862	11680	2750857	11681	2750856	11682	2750854	11683	1 1/8 - 7	5	2.56	.896	2B
-	-	2750852	11685	2750848	11686	-	-	1 1/8 - 8	5	2.56	.896	2B
2750843	11688	2750841	11689	2750838	11690	-	-	1 1/8 - 12	5	2.56	.896	2B
2750835	11692	2750834	11693	2750832	11694	2750831	11695	1 1/4 - 7	6	2.56	1.021	2B
2750827	11696	2750824	11697	2750822	11698	-	-	1 1/4 - 8	6	2.56	1.021	2B
2750812	11700	2750809	11701	2750807	11702	-	-	1 1/4 - 12	6	2.56	1.021	2B
2750780	11716	2750778	11717	2750777	11718	2750776	11719	1 1/2 - 6	6	3.00	1.233	2B
-	-	2750770	11721	2750667	11722	-	-	1 1/2 - 8	6	3.00	1.233	2B
2750621	11724	-	-	2750617	11726	-	-	1 1/2 - 12	6	3.00	1.233	2B

- Constructed from select high-speed steel.
- Ground thread straight-flute design for sharp cutting action.
- Ideal for hand and power tapping for through or blind holes.
- 6H class of fit maintenance pitch diameter tolerances for longer life.
- Industrial-quality taps at maintenance prices.



- first choice
- alternate choice

■ Series 7353 • Plug Chamfer • Metric ANSI

uncoated		inch dimensions				number of flutes
order #	catalog #	D1 size	L	L3	D	
2750421	11900	M6 X 1	2.50	1.00	.255	6H
2750420	11901	M8 X 1,25	2.72	1.13	.318	6H
2750418	11902	M10 X 1,5	2.94	1.25	.381	6H
2750415	11903	M12 X 1,75	3.38	1.66	.367	6H
2750412	11904	M14 X 1,25	3.59	1.66	.429	6H
2750410	11905	M14 X 2	3.59	1.66	.429	6H
2750409	11906	M16 X 2	3.81	1.81	.480	6H
2750407	11907	M18 X 1,5	4.03	1.59	.542	6H
2750406	11908	M18 X 2,5	4.03	1.59	.542	6H
2750402	11909	M20 X 2,5	4.47	2.00	.652	6H
2750400	11910	M22 X 2,5	4.69	2.22	.697	6H
2750397	11911	M24 X 3	4.91	2.22	.760	6H

NOTE: Metric taps are manufactured to USCTI specifications and dimensions.  
Metric tap blank dimensions are equivalent to inch taps.

# Reconditioning Services

## Anyone can regrind our tools — but only we can recondition them

WIDIA™ Reconditioning Services optimize the value of metalcutting tools throughout their entire lifecycle by giving like-new performance — with rapid turnaround time — so tools are always on hand and perform just like new.

To use WIDIA tool reconditioning services, contact your authorized WIDIA distributor to get started.

### Global Reconditioning Network



To locate a reconditioning center near you, visit [widia.com/services](http://widia.com/services).



Solutions for Forming Threads in Through and Blind Hole Applications •

**WIDIA-GTD™**

# Forming Taps



WIDIA-GTD™ offers a wide range of forming tap options for tapping through and blind holes in:

- Steel and steel alloys.
- Stainless steel.
- Aluminum.



## High-Performance Victory™ Solid Carbide Taps

- Advanced forming geometries designed for superior tap performance in aluminum.
- Manufactured with fine-grain micrograin carbide for exceptional wear life.
- Ideal for long production runs where fewer tool changes mean greater productivity.
- Runs up to 4x faster and lasts up to 4x longer than conventional high-speed steel taps.
- Excellent thread quality and tap performance.

## High-Performance Victory™ HSS-E-PM Taps

- Manufactured from powdered metal high-speed steel coated for thread forming in steel, stainless steel, and aluminum.
- High hardness provides superior wear resistance.
- Offer performance advantages over conventional high-speed steel taps.
- Long tap life at up to 50% higher tapping speed than HSS taps.
- Standard coolant-fed options for longer tool life.

## General Purpose Production Taps

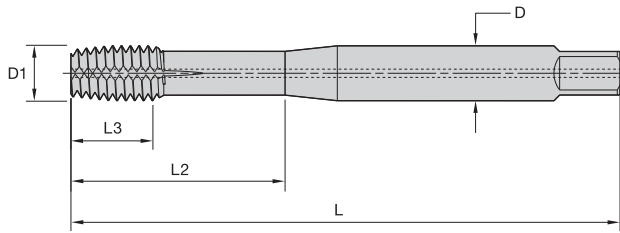
- TRU-LEDE™ Fe taps made from vanadium high-speed steel for extending wear life and better part finish in ductile materials.
- TRU-LEDE™ tap made from HSS for use in general machining applications.
- Plug and bottoming entry tapers for form tapping without troublesome chips that clog and break taps.



# High-Performance Taps

Victory™ Solid Carbide Forming Taps • Blind Holes

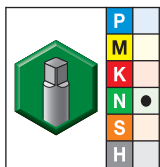
- WN14PG TiN + CrC/C for aluminum.



Shank Tolerance	
D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-16	+0, -0,011



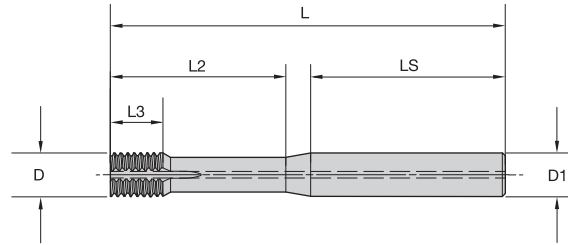
■ GX49 • Form E Bottoming Entry Taper • Through Coolant • Metric • For Aluminum



- first choice
- alternate choice

grade WN14PG TiN+CrC/C		metric dimensions					number of lube grooves	class of fit
order #	catalog #	D1 size	L	L3	L2	D		
5520842	GX495006	M6 X 1	80	10	30	6,0	2	6HX
5520843	GX495008	M8 X 1,25	90	13	35	8,0	2	6HX
5520844	GX495010	M10 X 1,5	100	15	39	10,0	3	6HX

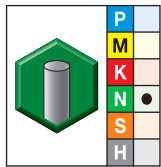
• WN14PG TiN + CrC/C for aluminum.



Shank Tolerance	
D	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-16	+0, -0,011



■ GX49 • Form E Bottoming Entry Taper • Through Coolant • Metric • For Aluminum



● first choice  
○ alternate choice

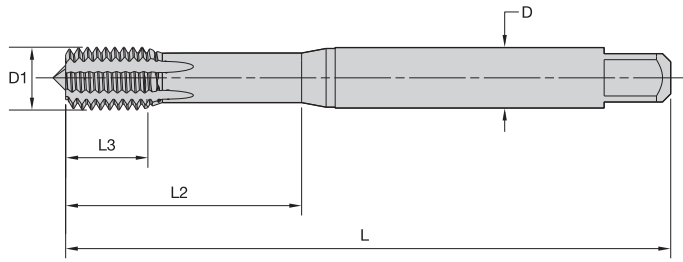
grade WN14PG TiN+CrC/C		metric dimensions						number of lube grooves	class of fit
order #	catalog #	D1 size	L	L3	L2	LS	D		
5551169	GX492908	M6 X 1	70	8	24	42	6,0	2	6HX
5551170	GX492909	M8 X 1,25	80	10	32	43	8,0	2	6HX
5551171	GX492911	M10 X 1,5	90	12	40	44	10,0	3	6HX
5551173	GX492915	M12 X 1,5	100	14	48	46	12,0	3	6HX
5551172	GX492914	M12 X 1,75	100	14	48	46	12,0	3	6HX

# High-Performance Taps

Victory™ Forming Taps HSS-E-PM • Blind and Through Holes



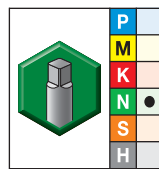
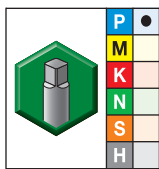
- WP31MG TiN for steel.
- WN38MG DLC for aluminum.



Shank Tolerance	
D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052



## ■ GT22 • Form C Semi-Bottoming Entry Taper • Metric DIN 2174 • For Steel and Aluminum

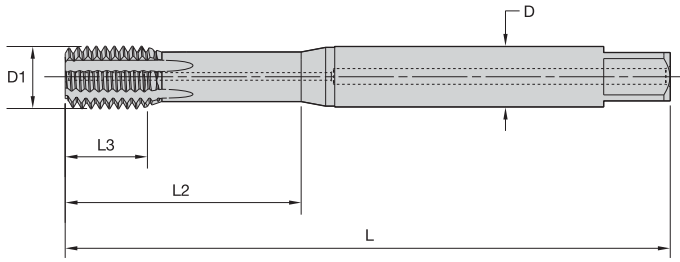


- first choice
- alternate choice

grade WP31MG TiN		grade WN38MG DLC		metric dimensions					dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
4158495	GT225016	4154671	GT225001	M3 X 0,5	56	6	18	3,5	DIN 2174	6HX
4158496	GT225017	4154672	GT225002	M4 X 0,7	63	7	21	4,5	DIN 2174	6HX
4158497	GT225018	4154673	GT225003	M5 X 0,8	70	8	25	6,0	DIN 2174	6HX
4158498	GT225019	4154674	GT225004	M6 X 1	80	10	30	6,0	DIN 2174	6HX
4158513	GT225024	4154679	GT225009	M8 X 1	90	10	35	8,0	DIN 2174	6HX
4158499	GT225020	4154675	GT225005	M8 X 1,25	90	14	35	8,0	DIN 2174	6HX
4158514	GT225025	4154680	GT225010	M10 X 1	90	10	35	10,0	DIN 2174	6HX
4158515	GT225026	4154681	GT225011	M10 X 1,25	100	16	39	10,0	DIN 2174	6HX
4158500	GT225021	4154676	GT225006	M10 X 1,5	100	16	39	10,0	DIN 2174	6HX
4158516	GT225027	4154682	GT225012	M12 X 1,25	100	15	—	9,0	DIN 2174	6HX
4158517	GT225028	4154683	GT225013	M12 X 1,5	100	15	—	9,0	DIN 2174	6HX
4158501	GT225022	4154677	GT225007	M12 X 1,75	110	18	—	9,0	DIN 2174	6HX
4158518	GT225029	4154684	GT225014	M14 X 1,5	100	15	—	11,0	DIN 2174	6HX
4158519	GT225030	4154685	GT225015	M16 X 1,5	100	15	—	12,0	DIN 2174	6HX
4158502	GT225023	4154678	GT225008	M16 X 2	110	22	—	12,0	DIN 2174	6HX

High-Performance Taps

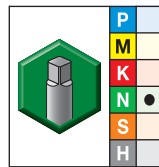
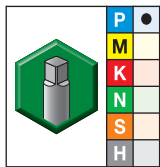
- WP31MG TiN for steel.
- WN38MG DLC for aluminum.



Shank Tolerance	
D mm	tolerance h9
1-3	+0, -0,025
>3-6	+0, -0,030
>6-10	+0, -0,036
>10-18	+0, -0,043
>18-30	+0, -0,052



■ GT23 • Form C Semi-Bottoming Entry Taper • Through Coolant • Metric DIN 2174 • For Steel and Aluminum



- first choice
- alternate choice

grade WP31MG TiN		grade WN38MG DLC		metric dimensions					dimension standard	class of fit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
4159965	GT235012	4159522	GT235001	M5 X 0,8	70	8	25	6,0	DIN 2174	6HX
4159966	GT235013	4159644	GT235002	M6 X 1	80	10	30	6,0	DIN 2174	6HX
4159971	GT235018	4159649	GT235007	M8 X 1	90	10	35	8,0	DIN 2174	6HX
4159967	GT235014	4159645	GT235003	M8 X 1,25	90	14	35	8,0	DIN 2174	6HX
4159972	GT235019	4159650	GT235008	M10 X 1	90	10	35	10,0	DIN 2174	6HX
4159968	GT235015	4159646	GT235004	M10 X 1,5	100	16	39	10,0	DIN 2174	6HX
4159993	GT235020	4159651	GT235009	M12 X 1,5	100	15	—	9,0	DIN 2174	6HX
4159969	GT235016	4159647	GT235005	M12 X 1,75	110	18	—	9,0	DIN 2174	6HX
4159994	GT235021	4159652	GT235010	M14 X 1,5	100	15	—	11,0	DIN 2174	6HX
4159995	GT235022	4159653	GT235011	M16 X 1,5	100	15	—	12,0	DIN 2174	6HX
4159970	GT235017	4159648	GT235006	M16 X 2	110	22	—	12,0	DIN 2174	6HX

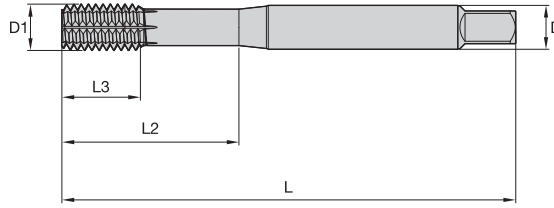
High-Performance Taps

# High-Performance Taps

Victory™ Forming Taps HSS-E-PM • Blind and Through Holes



- WU32MG TiCN for steel and stainless steel.

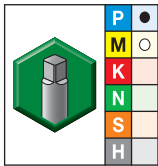


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



- GT24 • Form C Semi-Bottoming Entry Taper • Machine Screw and Fractional • DIN Length ANSI Shank
- For Steel and Stainless Steel



- first choice
- alternate choice

grade WU32MG  
TiCN

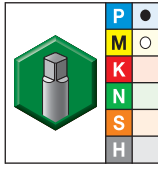
inch dimensions

order #	catalog #	D1 TPI	L	L3	L2	D	number of lube grooves	pitch diameter limit
5944876	GT245001	6 - 32	2.22	.41	.81	.141	2	H3
5944877	GT245002	6 - 32	2.22	.41	.81	.141	2	H5
5944878	GT245003	8 - 32	2.48	.39	.83	.168	4	H3
5944879	GT245004	8 - 32	2.48	.39	.83	.168	4	H5
5944880	GT245005	10 - 24	2.78	.39	1.01	.194	4	H4
5944971	GT245006	10 - 24	2.78	.39	1.01	.194	4	H6
5944972	GT245007	10 - 32	2.77	.39	1.00	.194	4	H4
5944973	GT245008	10 - 32	2.77	.39	1.00	.194	4	H6
5944974	GT245009	1/4 - 20	3.18	.51	1.22	.255	4	H4
5944975	GT245010	1/4 - 20	3.18	.51	1.21	.255	4	H6
5944976	GT245011	1/4 - 28	3.16	.51	1.20	.255	4	H4
5944977	GT245012	1/4 - 28	3.16	.51	1.20	.255	4	H6
5944978	GT245013	5/16 - 18	3.58	.55	1.42	.318	4	H5
5944979	GT245014	5/16 - 18	3.58	.55	1.42	.318	4	H7
5944980	GT245015	5/16 - 24	3.56	.55	1.40	.318	4	H5
5944981	GT245016	5/16 - 24	3.56	.55	1.38	.318	4	H7
5944982	GT245017	3/8 - 16	3.98	.63	1.54	.381	6	H5
5944983	GT245018	3/8 - 16	3.98	.63	1.54	.381	6	H7
5944984	GT245019	3/8 - 24	3.95	.63	1.54	.381	6	H5
5944985	GT245020	3/8 - 24	3.94	.63	1.54	.381	6	H7
5944986	GT245021	7/16 - 14	3.94	.71	1.61	.323	6	H5
5944987	GT245022	7/16 - 14	3.94	.71	1.61	.323	6	H7
5944988	GT245023	7/16 - 20	3.94	.71	1.61	.323	6	H5
5944989	GT245024	7/16 - 20	3.94	.71	1.61	.323	6	H7

(continued)

High-Performance Taps

(GT24 • Form C Semi-Bottoming Entry Taper • Machine Screw and Fractional • DIN Length ANSI Shank • For Steel and Stainless Steel — continued)



● first choice  
○ alternate choice

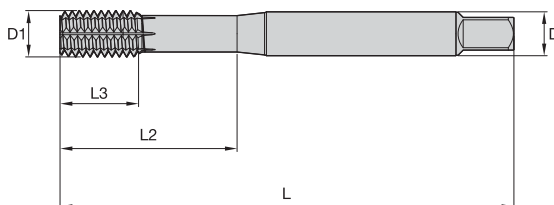
grade WU32MG TiCN		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5944990	GT245025	1/2 - 13	4.33	.79	1.85	.367	6	H5
5945001	GT245026	1/2 - 13	4.33	.79	1.85	.367	6	H7
5945002	GT245027	1/2 - 20	4.33	.79	1.85	.367	6	H5
5945003	GT245028	1/2 - 20	4.33	.79	1.85	.367	6	H7
5945004	GT245029	5/8 - 11	4.33	.91	2.01	.480	6	H7
5945005	GT245030	5/8 - 11	4.33	.91	2.01	.480	6	H10
5945006	GT245031	5/8 - 18	4.33	.91	2.01	.480	6	H7
5945007	GT245032	5/8 - 18	4.33	.91	2.01	.480	6	H10
5945008	GT245033	3/4 - 10	4.92	.98	2.52	.590	6	H7
5945009	GT245034	3/4 - 10	4.92	.98	2.52	.590	6	H10
5945010	GT245035	3/4 - 16	4.92	.98	2.52	.590	6	H7
5945011	GT245036	3/4 - 16	4.92	.98	2.52	.590	6	H10

# High-Performance Taps

Victory™ Forming Taps HSS-E-PM • Blind and Through Holes



- WU32MG TiCN for steel and stainless steel.

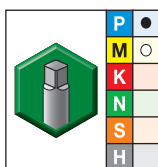


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
>.236-.394	+0, -.0004
>.394-.709	+0, -.0004
>.709-1.181	+0, -.0005
>1.181-1.969	+0, -.0006



- GT24 • Form C Semi-Bottoming Entry Taper • Metric • DIN Length ANSI Shank • For Steel and Stainless Steel



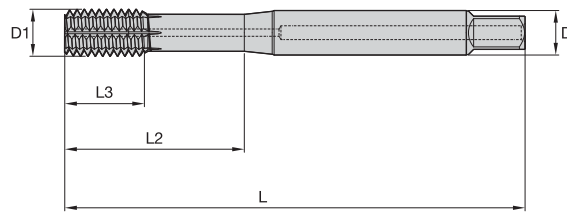
- first choice
- alternate choice

grade WU32MG TiCN		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5945012	GT245037	M3 X 0,5	2.20	.39	.79	.141	2	D5
5945013	GT245038	M3,5 X 0,6	2.20	.39	.79	.141	2	D6
5945014	GT245039	M4 X 0,7	2.48	.39	.83	.168	4	D6
5945015	GT245040	M5 X 0,8	2.76	.39	.98	.194	4	D7
5945016	GT245041	M6 X 1	3.15	.51	1.18	.255	4	D8
5945017	GT245042	M7 X 1	3.15	.51	1.18	.318	4	D9
5945018	GT245043	M8 X 1	3.54	.55	1.38	.318	6	D9
5945019	GT245044	M8 X 1,25	3.54	.55	1.38	.318	6	D9
5945020	GT245045	M10 X 1,25	3.94	.63	1.53	.381	6	D9
5945021	GT245046	M10 X 1,5	3.94	.63	1.54	.381	6	D10
5945022	GT245047	M12 X 1,25	4.33	.71	1.73	.367	6	D9
5945023	GT245048	M12 X 1,5	4.33	.71	1.73	.367	6	D9
5945024	GT245049	M12 X 1,75	4.33	.71	1.73	.367	6	D11
5945025	GT245050	M14 X 1,5	4.33	.79	2.05	.429	6	D11
5945026	GT245051	M14 X 2	4.33	.79	2.05	.429	6	D12
5945027	GT245052	M16 X 1,5	4.33	.79	2.01	.480	6	D11
5945028	GT245053	M16 X 2	4.33	.79	2.01	.480	6	D12

High-Performance Taps



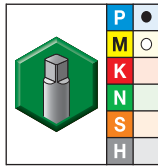
- WU32MG TiCN for steel and stainless steel.



Shank Tolerance	
D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



- GT25 • Form C Semi-Bottoming Entry Taper • Through Coolant • Fractional • DIN Length ANSI Shank
- For Steel and Stainless Steel



- first choice
- alternate choice

grade WU32MG TiCN		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5945029	GT255001	1/4 - 20	3.15	.51	1.18	.255	4	H4
5945030	GT255002	1/4 - 20	3.15	.51	1.18	.255	4	H6
5945031	GT255003	1/4 - 28	3.15	.51	1.18	.255	4	H4
5945032	GT255004	1/4 - 28	3.15	.51	1.18	.255	4	H6
5945033	GT255005	5/16 - 18	3.54	.55	1.38	.318	6	H5
5945034	GT255006	5/16 - 18	3.54	.55	1.38	.318	6	H7
5945035	GT255007	5/16 - 24	3.54	.55	1.38	.318	6	H5
5945036	GT255008	5/16 - 24	3.54	.55	1.38	.318	6	H7
5945037	GT255009	3/8 - 16	3.94	.63	1.54	.381	6	H5
5945038	GT255010	3/8 - 16	3.94	.63	1.54	.381	6	H7
5945039	GT255011	3/8 - 24	3.94	.63	1.54	.381	6	H5
5945040	GT255012	3/8 - 24	3.94	.63	1.54	.381	6	H7
5945041	GT255013	7/16 - 14	3.94	.71	1.61	.323	6	H5
5945042	GT255014	7/16 - 14	3.94	.71	1.61	.323	6	H7
5945043	GT255015	7/16 - 20	3.94	.71	1.61	.323	6	H5
5945044	GT255016	7/16 - 20	3.94	.71	1.61	.323	6	H7
5945045	GT255017	1/2 - 13	4.33	.79	1.85	.367	6	H5
5945046	GT255018	1/2 - 13	4.33	.79	1.85	.367	6	H7
5945047	GT255019	1/2 - 20	4.33	.79	1.85	.367	6	H5
5945048	GT255020	1/2 - 20	4.33	.79	1.85	.367	6	H7
5945049	GT255021	5/8 - 11	4.33	.79	2.01	.480	6	H7
5945050	GT255022	5/8 - 11	4.33	.79	2.01	.480	6	H10
5945051	GT255023	5/8 - 18	4.33	.79	2.01	.480	6	H7
5945052	GT255024	5/8 - 18	4.33	.79	2.01	.480	6	H10
5945053	GT255025	3/4 - 10	4.92	.98	2.52	.590	6	H7
5945054	GT255026	3/4 - 10	4.92	.98	2.52	.590	6	H10
5945055	GT255027	3/4 - 16	4.92	.98	2.52	.590	6	H7
5945056	GT255028	3/4 - 16	4.92	.98	2.52	.590	6	H10

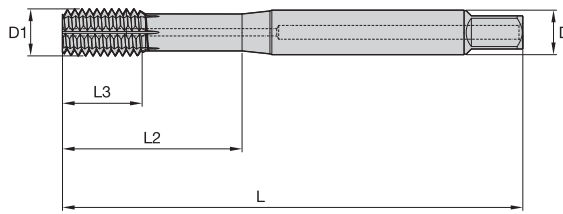
High-Performance Taps

# High-Performance Taps

Victory™ Forming Taps HSS-E-PM • Blind and Through Holes



- WU32MG TiCN for steel and stainless steel.

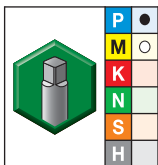


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
>.236-.394	+0, -.0004
>.394-.709	+0, -.0004
>.709-1.181	+0, -.0005
>1.181-1.969	+0, -.0006



- GT25 • Form C Semi-Bottoming Entry Taper • Through Coolant • Metric • DIN Length ANSI Shank
- For Steel and Stainless Steel

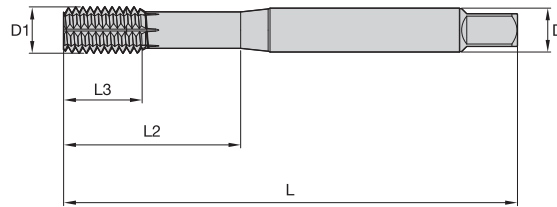


- first choice
- alternate choice

grade WU32MG TiCN		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5945057	GT255029	M6 X 1	3.15	.51	1.18	.255	4	D8
5945058	GT255030	M7 X 1	3.15	.51	1.18	.318	4	D9
5945059	GT255031	M8 X 1	3.54	.55	1.38	.318	6	D9
5945060	GT255032	M8 X 1,25	3.54	.55	1.38	.318	6	D9
5945071	GT255033	M10 X 1,25	3.94	.63	1.54	.381	6	D9
5945072	GT255034	M10 X 1,5	3.94	.63	1.54	.381	6	D10
5945073	GT255035	M12 X 1,25	4.33	.71	1.73	.367	6	D9
5945074	GT255036	M12 X 1,5	4.33	.71	1.73	.367	6	D9
5945075	GT255037	M12 X 1,75	4.33	.71	1.73	.367	6	D11
5945076	GT255038	M14 X 1,5	4.33	.79	2.05	.429	6	D11
5945077	GT255039	M14 X 2	4.33	.79	2.05	.429	6	D12
5945078	GT255040	M16 X 1,5	4.33	.79	2.01	.480	6	D11
5945079	GT255041	M16 X 2	4.33	.79	2.01	.480	6	D12

High-Performance Taps

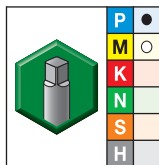
- WU32MG TiCN for steel and stainless steel.



Shank Tolerance	
D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



- GT26 • Form E Bottoming Entry Taper • Machine Screw and Fractional • DIN Length ANSI Shank
- For Steel and Stainless Steel



- first choice
- alternate choice

grade WU32MG TiCN		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5945080	GT265001	0 - 80	1.63	.31	.37	.141	0	H2
5945091	GT265002	2 - 56	1.75	.44	.50	.141	0	H3
5945092	GT265003	3 - 48	1.97	.39	.71	.141	0	H3
5945093	GT265004	3 - 56	1.97	.39	.71	.141	0	H3
5945094	GT265005	4 - 40	2.20	.39	.71	.141	0	H3
5945095	GT265006	4 - 40	2.20	.39	.71	.141	0	H5
5945096	GT265007	4 - 48	2.20	.39	.71	.141	0	H3
5945097	GT265008	4 - 48	2.20	.39	.71	.141	0	H5
5945098	GT265009	5 - 40	2.20	.39	.79	.141	2	H5
5945099	GT265010	6 - 32	2.21	.39	.79	.141	2	H3
5945100	GT265011	6 - 32	2.21	.39	.79	.141	2	H5
5945101	GT265012	8 - 32	2.48	.39	.83	.168	4	H3
5945102	GT265013	8 - 32	2.48	.39	.83	.168	4	H5
5945103	GT265014	10 - 24	2.76	.39	.98	.194	4	H4
5945104	GT265015	10 - 24	2.76	.39	.98	.194	4	H6
5945105	GT265016	10 - 32	2.76	.39	.98	.194	4	H4
5945106	GT265017	10 - 32	2.76	.39	.98	.194	4	H6
5945107	GT265018	1/4 - 20	3.15	.51	1.18	.255	4	H4
5945108	GT265019	1/4 - 20	3.15	.51	1.18	.255	4	H6
5945109	GT265020	1/4 - 28	3.15	.51	1.18	.255	4	H4
5945110	GT265021	1/4 - 28	3.15	.51	1.18	.255	4	H6
5945111	GT265022	5/16 - 18	3.54	.55	1.38	.318	6	H5
5945112	GT265023	5/16 - 18	3.54	.55	1.38	.318	6	H7
5945113	GT265024	5/16 - 24	3.54	.55	1.38	.318	6	H5

(continued)

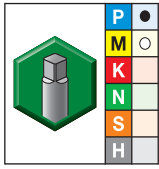
High-Performance Taps

# High-Performance Taps

Victory™ Forming Taps HSS-E-PM • Blind Holes



(GT26 • Form E Bottoming Entry Taper • Machine Screw and Fractional • DIN Length ANSI Shank • For Steel and Stainless Steel — continued)

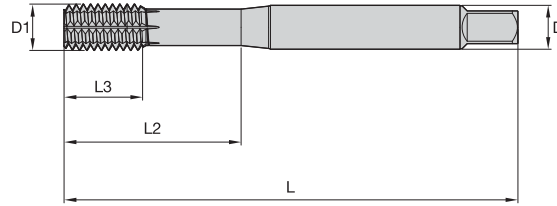


● first choice  
○ alternate choice

grade WU32MG TiCN		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5945114	GT265025	5/16 - 24	3.54	.55	1.38	.318	6	H7
5945115	GT265026	3/8 - 16	3.94	.63	1.54	.381	6	H5
5945116	GT265027	3/8 - 16	3.94	.63	1.54	.381	6	H7
5945117	GT265028	3/8 - 24	3.94	.63	1.54	.381	6	H5
5945118	GT265029	3/8 - 24	3.94	.63	1.54	.381	6	H7
5945119	GT265030	7/16 - 14	3.94	.71	1.61	.323	6	H5
5945120	GT265031	7/16 - 14	3.94	.71	1.61	.323	6	H7
5945121	GT265032	7/16 - 20	3.94	.71	1.61	.323	6	H5
5945122	GT265033	7/16 - 20	3.94	.71	1.61	.323	6	H7
5945123	GT265034	1/2 - 13	4.33	.79	1.85	.367	6	H5
5945124	GT265035	1/2 - 13	4.33	.79	1.85	.367	6	H7
5945125	GT265036	1/2 - 20	4.33	.79	1.85	.367	6	H5
5945126	GT265037	1/2 - 20	4.33	.79	1.85	.367	6	H7
5945127	GT265038	5/8 - 11	4.33	.79	2.01	.480	6	H7
5945128	GT265039	5/8 - 11	4.33	.79	2.01	.480	6	H10
5945129	GT265040	5/8 - 18	4.33	.79	2.01	.480	6	H7
5945130	GT265041	5/8 - 18	4.33	.79	2.01	.480	6	H10
5945131	GT265042	3/4 - 10	4.92	.98	2.52	.590	6	H7
5945132	GT265043	3/4 - 10	4.92	.98	2.52	.590	6	H10
5945133	GT265044	3/4 - 16	4.92	.98	2.52	.590	6	H7
5945134	GT265045	3/4 - 16	4.92	.98	2.52	.590	6	H10

High-Performance Taps

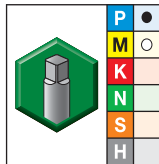
- WU32MG TiCN for steel and stainless steel.



Shank Tolerance	
D inch	tolerance h6
.118-.236	+0, -.0003
>.236-.394	+0, -.0004
>.394-.709	+0, -.0004
>.709-1.181	+0, -.0005
>1.181-1.969	+0, -.0006



■ GT26 • Form E Bottoming Entry Taper • Metric • DIN Length ANSI Shank • For Steel and Stainless Steel



- first choice
- alternate choice

order #	catalog #	grade WU32MG TiCN	D1 TPI	inch dimensions			number of lube grooves	pitch diameter limit	
				L	L3	L2			D
5945135	GT265046		M3 X 0,5	2.20	.39	.79	.141	2	D5
5945136	GT265047		M3,5 X 0,6	2.20	.39	.79	.141	2	D6
5945137	GT265048		M4 X 0,7	2.48	.39	.83	.168	4	D6
5945138	GT265049		M5 X 0,8	2.76	.39	.98	.194	4	D7
5945139	GT265050		M6 X 1	3.15	.51	1.18	.255	4	D8
5945140	GT265051		M7 X 1	3.15	.51	1.18	.318	4	D9
5945141	GT265052		M8 X 1	3.54	.55	1.38	.318	6	D9
5945142	GT265053		M8 X 1,25	3.54	.55	1.38	.318	6	D9
5945143	GT265054		M10 X 1,25	3.94	.63	1.53	.381	6	D9
5945144	GT265055		M10 X 1,5	3.94	.63	1.54	.381	6	D10
5945145	GT265056		M12 X 1,25	4.33	.71	1.73	.367	6	D9
5945146	GT265057		M12 X 1,5	4.33	.71	1.73	.367	6	D9
5945147	GT265058		M12 X 1,75	4.33	.71	1.73	.367	6	D11
5945148	GT265059		M14 X 1,5	4.33	.79	2.05	.429	6	D11
5945149	GT265060		M14 X 2	4.33	.79	2.05	.429	6	D12
5945150	GT265061		M16 X 1,5	4.33	.79	2.01	.480	6	D11
5945151	GT265062		M16 X 2	4.33	.79	2.01	.480	6	D12

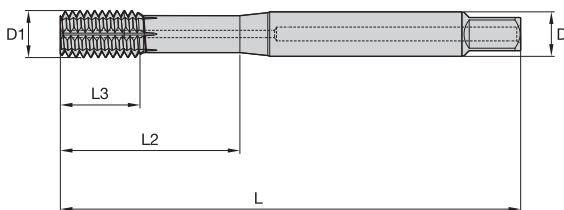
High-Performance Taps

# High-Performance Taps

Victory™ Forming Taps HSS-E-PM • Blind Holes



- WU32MG TiCN for steel and stainless steel.

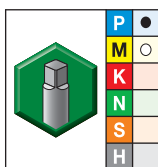


Shank Tolerance

D inch	tolerance h6
.118-.236	+0, -.0003
.236-.394	+0, -.0004
.394-.709	+0, -.0004
.709-1.181	+0, -.0005
1.181-1.969	+0, -.0006



- GT27 • Form E Bottoming Entry Taper • Through Coolant • Fractional • DIN Length ANSI Shank
- For Steel and Stainless Steel

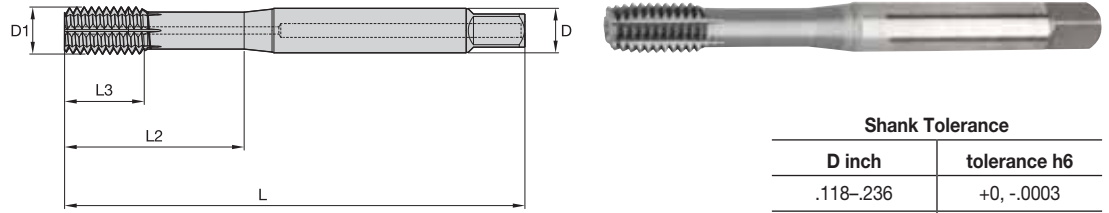


- first choice
- alternate choice

grade WU32MG TiCN		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	D1 TPI	L	L3	L2	D		
5944922	GT275001	1/4 - 20	3.15	.51	1.18	.255	4	H4
5944923	GT275002	1/4 - 20	3.15	.51	1.18	.255	4	H6
5944924	GT275003	1/4 - 28	3.15	.51	1.18	.255	4	H4
5944925	GT275004	1/4 - 28	3.15	.51	1.18	.255	4	H6
5944926	GT275005	5/16 - 18	3.54	.55	1.38	.318	6	H5
5944927	GT275006	5/16 - 18	3.54	.55	1.38	.318	6	H7
5944928	GT275007	5/16 - 24	3.54	.55	1.38	.318	6	H5
5944929	GT275008	5/16 - 24	3.54	.55	1.38	.318	6	H7
5944930	GT275009	3/8 - 16	3.94	.63	1.54	.381	6	H5
5945171	GT275010	3/8 - 16	3.94	.63	1.54	.381	6	H7
5945172	GT275011	3/8 - 24	3.94	.63	1.54	.381	6	H5
5945173	GT275012	3/8 - 24	3.94	.63	1.54	.381	6	H7
5945174	GT275013	7/16 - 14	3.94	.71	1.61	.323	6	H5
5945175	GT275014	7/16 - 14	3.94	.71	1.61	.323	6	H7
5945176	GT275015	7/16 - 20	3.94	.71	1.61	.323	6	H5
5945177	GT275016	7/16 - 20	3.94	.71	1.61	.323	6	H7
5945178	GT275017	1/2 - 13	4.33	.79	1.85	.367	6	H5
5945179	GT275018	1/2 - 13	4.33	.79	1.85	.367	6	H7
5945180	GT275019	1/2 - 20	4.33	.79	1.85	.367	6	H5
5945181	GT275020	1/2 - 20	4.33	.79	1.85	.367	6	H7
5945182	GT275021	5/8 - 11	4.33	.79	2.01	.480	6	H7
5945183	GT275022	5/8 - 11	4.33	.79	2.01	.480	6	H10
5945184	GT275023	5/8 - 18	4.33	.79	2.01	.480	6	H7
5945185	GT275024	5/8 - 18	4.33	.79	2.01	.480	6	H10
5945186	GT275025	3/4 - 10	4.92	.98	2.52	.590	6	H7
5945187	GT275026	3/4 - 10	4.92	.98	2.52	.590	6	H10
5945188	GT275027	3/4 - 16	4.92	.98	2.52	.590	6	H7
5945189	GT275028	3/4 - 16	4.92	.98	2.52	.590	6	H10

High-Performance Taps

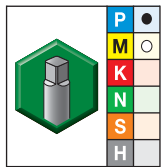
- WU32MG TiCN for steel and stainless steel.



Shank Tolerance	
D inch	tolerance h6
.118-.236	+0, -.0003
>.236-.394	+0, -.0004
>.394-.709	+0, -.0004
>.709-1.181	+0, -.0005
>1.181-1.969	+0, -.0006



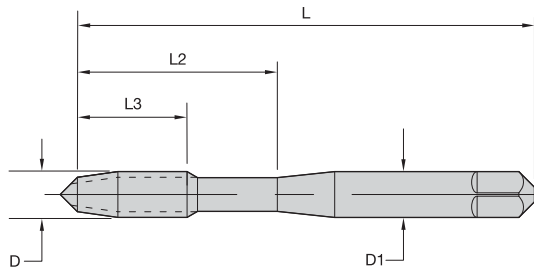
■ **GT27 • Form E Bottoming Entry Taper • Through Coolant • Metric • DIN Length ANSI Shank • For Steel and Stainless Steel**



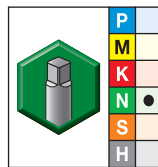
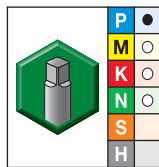
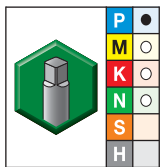
- first choice
- alternate choice

order #	catalog #	grade WU32MG TiCN	inch dimensions				D	number of lube grooves	pitch diameter limit
			D1 TPI	L	L3	L2			
5945190	GT275029	●	M6 X 1	3.15	.51	1.18	.255	4	D8
5945191	GT275030	○	M7 X 1	3.15	.51	1.18	.318	4	D9
5945192	GT275031	●	M8 X 1	3.54	.55	1.38	.318	6	D9
5945193	GT275032	○	M8 X 1,25	3.54	.55	1.38	.318	6	D9
5945194	GT275033	●	M10 X 1,25	3.94	.63	1.54	.381	6	D9
5945195	GT275034	○	M10 X 1,5	3.94	.63	1.54	.381	6	D10
5945196	GT275035	●	M12 X 1,25	4.33	.71	1.73	.367	6	D9
5945197	GT275036	○	M12 X 1,5	4.33	.71	1.73	.367	6	D9
5945198	GT275037	●	M12 X 1,75	4.33	.71	1.73	.367	6	D11
5945199	GT275038	○	M14 X 1,5	4.33	.79	2.05	.429	6	D11
5945200	GT275039	●	M14 X 2	4.33	.79	2.05	.429	6	D12
5945211	GT275040	○	M16 X 1,5	4.33	.79	2.01	.480	6	D11
5945212	GT275041	●	M16 X 2	4.33	.79	2.01	.480	6	D12

High-Performance Taps



■ Series 5900 • Machine Screw and Fractional • Plug Entry Taper



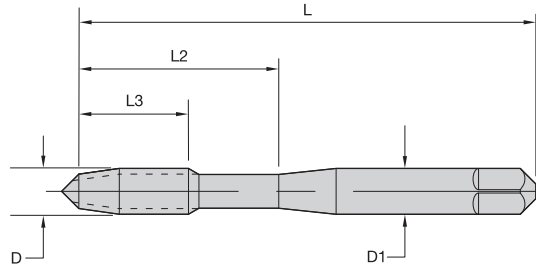
● first choice  
○ alternate choice

TiCN		TiN		uncoated		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
—	—	—	—	2747479	18202	6 - 32	2.00	.38	.69	.141	4	H5
2747215	18703	2747338	18303	2747477	18203	6 - 32	2.00	.38	.69	.141	4	H3
2747210	18706	—	—	2747471	18206	6 - 40	2.00	.38	.69	.141	4	H3
—	—	—	—	2747461	18210	8 - 32	2.13	.38	.75	.168	4	H5
—	—	2747322	18311	2747459	18211	8 - 32	2.13	.38	.75	.168	4	H3
2747188	18717	2747311	18317	2747447	18217	10 - 24	2.38	.50	.88	.194	4	H4
—	—	2747306	18320	2747441	18220	10 - 32	2.38	.50	.88	.194	4	H6
2747180	18721	3171069	18321	2747439	18221	10 - 32	2.38	.50	.88	.194	4	H4
—	—	—	—	2747437	18224	12 - 24	2.38	.50	.94	.220	4	H4
2747174	18728	2747296	18328	2747427	18228	1/4 - 20	2.50	.63	1.00	.255	4	H6
—	—	2747293	18329	2747425	18229	1/4 - 20	2.50	.63	1.00	.255	4	H4
—	—	2747288	18332	2747419	18232	1/4 - 28	2.50	.63	1.00	.255	4	H6
2747165	18733	—	—	2747417	18233	1/4 - 28	2.50	.63	1.00	.255	4	H4
2747156	18737	2747277	18337	2747409	18237	5/16 - 18	2.72	.69	1.13	.318	4	H5
—	—	2747273	18341	2747401	18241	5/16 - 24	2.72	.69	1.13	.318	4	H5
2747141	18745	2747265	18345	2747391	18245	3/8 - 16	2.94	.75	1.25	.381	4	H5
—	—	—	—	2747378	18252	1/2 - 13	3.38	.94	—	.367	4	H5

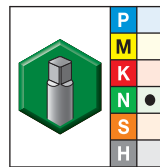
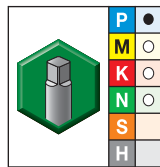
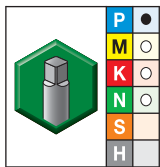
NOTE: Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.

Production Taps





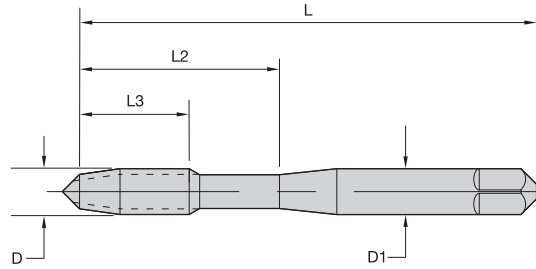
■ Series 5910 • Plug Entry Taper • Metric ANSI



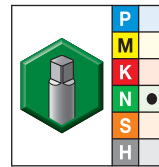
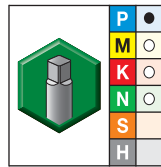
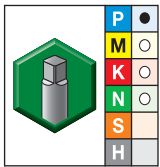
● first choice  
○ alternate choice

TiCN		TiN		uncoated		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
2747101	18760	2747236	18360	2747360	18260	M6 X 1	64	16	25	6,5	4	D8
2747096	18762	2747232	18362	2747355	18262	M8 X 1,25	69	17	29	8,1	4	D9
2747092	18764	2747228	18364	2747351	18264	M10 X 1,5	75	19	32	9,7	4	D10

NOTE: Metric taps are manufactured to USCTI specifications and dimensions.  
Metric tap blank dimensions are equivalent to inch taps.  
Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.



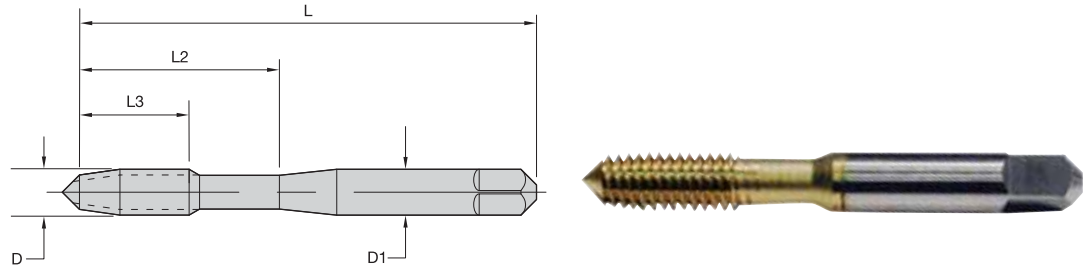
■ Series 5912 • Bottom Entry Taper • Metric ANSI



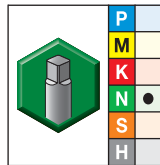
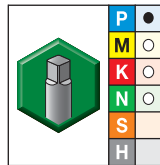
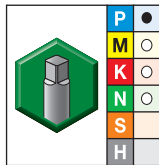
● first choice  
○ alternate choice

TiCN		TiN		uncoated		inch dimensions				number of lube grooves	pitch diameter limit	
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2			D
2747120	18755	2747246	18355	—	—	M4 X 0,7	54	10	19	4,3	4	D6
2747117	18757	2747241	18357	2747367	18257	M5 X 0,8	60	13	22	4,9	4	D7
2747113	18759	2747238	18359	2747364	18259	M6 X 1	64	16	25	6,5	4	D8
—	—	—	—	2747357	18261	M8 X 1,25	69	17	28	8,1	4	D9
2747099	18761	2747233	18361	—	—	M8 X 1,25	69	17	29	8,1	4	D9
2747090	18765	—	—	2747347	18265	M12 X 1,75	86	24	—	9,3	4	D11

NOTE: Metric taps are manufactured to USCTI specifications and dimensions.  
Metric tap blank dimensions are equivalent to inch taps.  
Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.



■ Series 5902 • Machine Screw and Fractional • Bottom Entry Taper



● first choice  
○ alternate choice

TiCN		TiN		uncoated		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
2747222	18700	2747344	18300	2747485	18200	6 - 32	2.00	.38	.69	.141	4	H3
2747220	18701	2747342	18301	2747483	18201	6 - 32	2.00	.38	.69	.141	4	H5
—		2747328	18308	2747467	18208	8 - 32	2.13	.38	.75	.168	4	H5
2747204	18709	2747326	18309	2747463	18209	8 - 32	2.13	.38	.75	.168	4	H3
2747198	18712	—		2747457	18212	8 - 36	2.13	.38	.75	.168	4	H3
2747194	18714	—		2747453	18214	10 - 24	2.38	.50	.88	.194	4	H6
2747192	18715	3171068	18315	2747451	18215	10 - 24	2.38	.50	.88	.194	4	H4
2747186	18718	2747310	18318	2747445	18218	10 - 32	2.38	.50	.88	.194	4	H6
2747184	18719	2747308	18319	2747443	18219	10 - 32	2.38	.50	.88	.194	4	H4
3171071	18723	—		3324580	18223	12 - 24	2.38	.50	.94	.220	4	H4
2747179	18726	2747300	18326	2747433	18226	1/4 - 20	2.50	.63	1.00	.255	4	H4
2747177	18727	2747298	18327	2747431	18227	1/4 - 20	2.50	.63	1.00	.255	4	H6
2747170	18730	2747291	18330	2747423	18230	1/4 - 28	2.50	.63	1.00	.255	4	H6
2747169	18731	2747289	18331	2747421	18231	1/4 - 28	2.50	.63	1.00	.255	4	H4
2747162	18734	—		2747415	18234	5/16 - 18	2.72	.69	1.13	.318	4	H5
2747160	18735	—		2747413	18235	5/16 - 18	2.72	.69	1.13	.318	4	H7
—		2747271	18342	2747399	18242	3/8 - 16	2.94	.75	1.25	.381	4	H5
2747145	18743	2747269	18343	2747397	18243	3/8 - 16	2.94	.75	1.25	.381	4	H7
2747133	18749	2747257	18349	2747383	18249	1/2 - 13	3.38	.94	—	.367	4	H7
2747131	18750	—		2747381	18250	1/2 - 13	3.38	.94	—	.367	4	H5

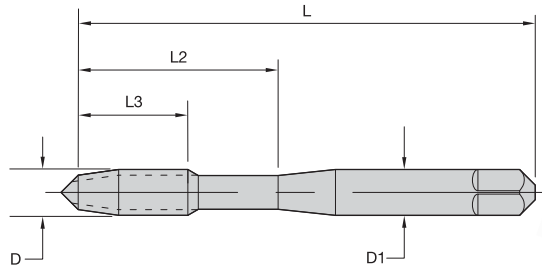
NOTE: Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.

# Production Taps

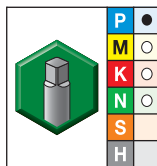
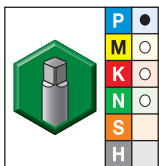
TRU-LEDE™ Forming Taps • Through Holes in General Machining Applications



- Series 2500TiN • TiN Coated
- Series 5500 • Uncoated



## Series 2500/5500 • Machine Screw and Fractional • Plug Entry Taper



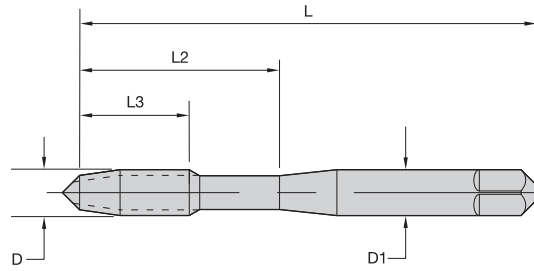
- first choice
- alternate choice

TiN		uncoated		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
2746344	19821	2864322	17000	4 - 40	1.88	.31	.56	.141	—	H3
—	—	2864319	17001	4 - 40	1.88	.31	.56	.141	—	H5
—	—	2864313	17004	5 - 40	1.94	.31	.63	.141	4	H3
2746342	19822	2864310	17008	6 - 32	2.00	.38	.69	.141	4	H3
—	—	2864307	17009	6 - 32	2.00	.38	.69	.141	4	H5
2746338	19824	2864298	17013	8 - 32	2.13	.38	.75	.168	4	H3
2746336	19826	—	—	8 - 32	2.13	.38	.75	.168	4	H5
2746333	19827	1295731	17018	10 - 24	2.38	.50	.88	.194	4	H4
2746331	19828	1295732	17020	10 - 32	2.38	.50	.88	.194	4	H4
2746327	19841	2747916	17027	1/4 - 20	2.50	.63	1.00	.255	4	H4
2746325	19842	2747910	17030	1/4 - 28	2.50	.63	1.00	.255	4	H4
2746324	19846	—	—	5/16 - 18	2.72	.69	1.13	.318	4	H5
—	—	2747904	17033	5/16 - 18	2.72	.69	1.13	.318	4	H5
—	—	2747898	17036	5/16 - 24	2.72	.69	1.13	.318	4	H5
2746322	19847	2747892	17039	3/8 - 16	2.94	.75	1.25	.381	4	H5
—	—	2747886	17042	3/8 - 24	2.94	.75	—	.323	4	H8
—	—	2747882	17049	1/2 - 13	3.38	.94	—	.367	4	H5
—	—	2747878	17051	1/2 - 20	3.38	.94	—	.367	4	H5
—	—	2747876	17053	5/8 - 11	3.81	1.09	—	.480	6	H7
—	—	2747872	17057	3/4 - 10	4.25	1.22	—	.590	6	H7

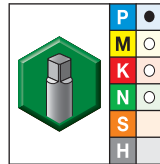
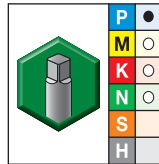
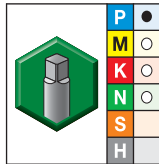
NOTE: Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.

Production Taps

- Series 2502TiN • TiN Coated
- Series 5502 • Uncoated
- Series 5502TC • TiCN Coated



■ Series 2502/5502 • Machine Screw and Fractional • Bottoming Entry Taper

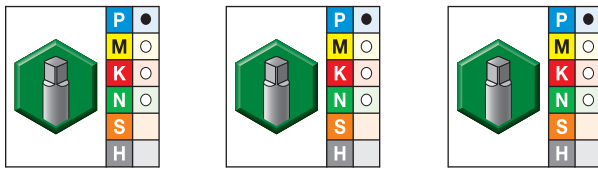


- first choice
- alternate choice

TiCN		TiN		uncoated		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
2746547	19500	2746349	19816	2747635	17200	0 - 80	1.63	.31	—	.141	0	H2
—	—	—	—	2747633	17201	0 - 80	1.63	.31	—	.141	0	H3
2746541	19506	2746347	19817	2747623	17206	2 - 56	1.75	.44	—	.141	0	H2
—	—	—	—	2747621	17207	2 - 56	1.75	.44	—	.141	0	H3
—	—	—	—	2747615	17210	3 - 48	1.81	.50	—	.141	0	H2
2746539	19514	2746320	19849	2747609	17214	4 - 40	1.88	.31	.56	.141	0	H3
—	—	—	—	2747607	17215	4 - 40	1.88	.31	.56	.141	0	H5
—	—	2746318	19851	2747601	17218	5 - 40	1.94	.31	.63	.141	4	H3
—	—	—	—	2747600	17219	5 - 40	1.94	.31	.63	.141	4	H5
2746535	19522	2746315	19852	2747598	17222	6 - 32	2.00	.38	.69	.141	4	H3
2746533	19523	2746313	19856	2747595	17223	6 - 32	2.00	.38	.69	.141	4	H5
2746531	19527	2746311	19857	2747588	17227	8 - 32	2.13	.38	.75	.168	4	H3
2746530	19528	2746309	19861	2747584	17228	8 - 32	2.13	.38	.75	.168	4	H5
2746528	19532	2746307	19862	2747576	17232	10 - 24	2.38	.50	.88	.194	4	H4
—	—	—	—	2747574	17233	10 - 24	2.38	.50	.88	.194	4	H6
2746526	19535	2746305	19866	2747569	17235	10 - 32	2.38	.50	.88	.194	4	H4
—	—	—	—	2747568	17236	10 - 32	2.38	.50	.88	.194	4	H6
—	—	—	—	2747566	17238	12 - 24	2.38	.50	.94	.220	4	H4
2746524	19542	2746304	19869	2747561	17242	1/4 - 20	2.50	.63	1.00	.255	4	H4
—	—	—	—	2747559	17243	1/4 - 20	2.50	.63	1.00	.255	4	H6
2746522	19545	2746302	19871	2747554	17245	1/4 - 28	2.50	.63	1.00	.255	4	H4
—	—	2746300	19872	—	—	5/16 - 18	2.72	.69	1.13	.318	4	H5
—	—	—	—	2747547	17249	5/16 - 18	2.72	.69	1.13	.318	4	H7
—	—	—	—	2747549	17248	5/16 - 18	2.72	.69	1.13	.318	4	H5

(continued)

(Series 2502/5502 • Machine Screw and Fractional • Bottoming Entry Taper — continued)

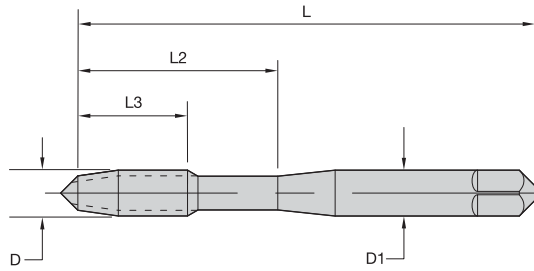
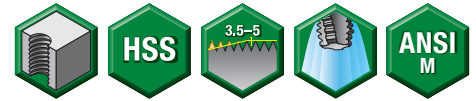


● first choice  
○ alternate choice

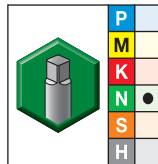
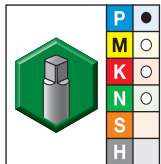
TiCN		TiN		uncoated		inch dimensions				number of lube grooves	pitch diameter limit	
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2			D
-	-	-	-	2747535	17255	3/8 - 16	2.94	.75	1.25	.381	4	H7
2746516	19554	2746298	19873	2747537	17254	3/8 - 16	2.94	.75	1.25	.381	4	H5
-	-	2746296	19874	2747534	17257	3/8 - 24	2.94	.75	1.25	.381	4	H5
-	-	-	-	2747528	17265	1/2 - 13	3.38	.94	-	.367	4	H8
-	-	2896309	19875	2747530	17264	1/2 - 13	3.38	.94	-	.367	4	H5
-	-	-	-	2747524	17266	1/2 - 20	3.38	.94	-	.367	4	H5
-	-	-	-	2747499	17280	5/8 - 11	3.81	1.09	-	.480	6	H7

NOTE: Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.  
Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 2B or 3B class of fit.

- Series 2510 • TiN Coated
- Series 5510 • Uncoated



■ Series 2510/5510 • Plug Entry Taper • Metric ANSI

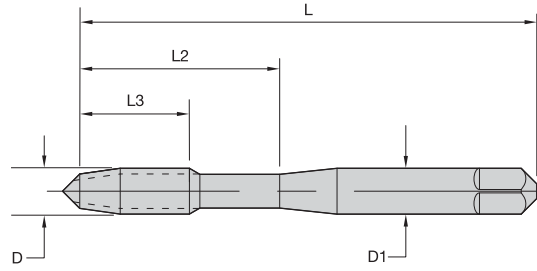


- first choice
- alternate choice

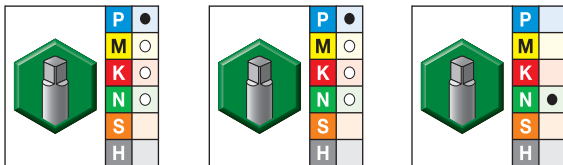
TiN		uncoated		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
2746236	19941	2747866	17082	M3 X 0,5	1.94	.31	.63	.141	4	D5
2746234	19942	2747864	17084	M4 X 0,7	2.13	.38	.75	.168	4	D6
2746232	19943	2747862	17086	M5 X 0,8	2.38	.50	.88	.194	4	D7
2746231	19944	2747860	17087	M6 X 1	2.50	.63	1.00	.255	4	D8
2746229	19945	2747858	17090	M8 X 1,25	2.72	.69	1.13	.318	4	D9
2746227	19946	-	-	M10 X 1,5	2.94	.75	1.25	.381	4	D10
2746225	19947	-	-	M12 X 1,75	3.38	.94	-	.367	4	D11

NOTE: Metric taps are manufactured to USCTI specifications and dimensions.  
 Metric tap blank dimensions are equivalent to inch taps.  
 Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.  
 Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 6H class of fit.

- Series 2512 • TiN Coated
- Series 5512TC • TiCN Coated
- Series 5512 • Uncoated



■ Series 2512/5512 • Bottom Entry Taper • Metric ANSI



- first choice
- alternate choice

TiCN		TiN		uncoated		inch dimensions					number of lube grooves	pitch diameter limit
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	L2	D		
2746510	19567	2746223	19948	2747522	17267	M3 X 0,5	1.94	.31	.63	.141	4	D5
2746508	19569	2746221	19949	2747518	17269	M4 X 0,7	2.13	.38	.75	.168	4	D6
2746506	19571	2746219	19950	2747515	17271	M5 X 0,8	2.38	.50	.88	.194	4	D7
2746504	19572	2746217	19951	2747513	17272	M6 X 1	2.50	.63	1.00	.255	4	D8
2746502	19574	2746215	19952	2747509	17275	M8 X 1,25	2.72	.69	1.13	.318	4	D9
2746498	19576	2746213	19953	2747505	17276	M10 X 1,5	2.94	.75	1.25	.381	4	D10
-		2746211	19954	2747501	17277	M12 X 1,75	3.38	.94	-	.367	4	D11

NOTE: Metric taps are manufactured to USCTI specifications and dimensions.  
 Metric tap blank dimensions are equivalent to inch taps.  
 Form taps require a larger drilled hole size prior to tapping than corresponding cutting taps.  
 Refer to tables on pages W231–W232 for the recommended pitch diameter limit for 6H class of fit.



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**WIDIA** 

Solutions for Pipe Thread Applications •  
**WIDIA-GTD<sup>™</sup>**



# Pipe Taps

WIDIA-GTD<sup>™</sup> options for tapping pipe threads in:

- Steel and steel alloys.
- Stainless steel.
- Cast iron.
- Aluminum.

## Multipurpose VariTap™

- Slow helix spiral-flute design for tapping steel and stainless steel.
- Straight-flute design for tapping mold steels and cast iron.
- NPT and NPTF thread forms with standard projections and chamfers.
- Manufactured from high-vanadium HSS-E to provide long and consistent life.
- Ideal for customers who have a variety of materials to machine.

## General Purpose Production Taps

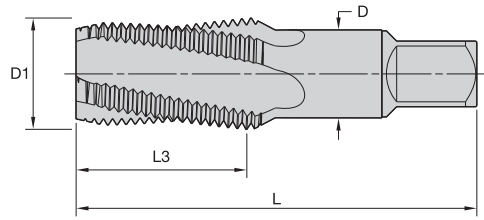
- Manufactured from select high-speed steel.
- NPT/ANPT and NPTF taper pipe taps with standard projections available with straight and slow helix spiral-flute designs for tapping ductile materials.
- Standard interrupted thread design to reduce drag while taper pipe threading.
- NPS and NPSF straight pipe taps available with straight-flute design for tapping ductile materials.



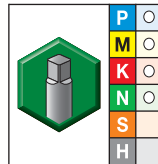
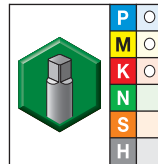
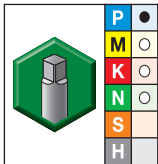
# Multipurpose Taps

VariTap™ Spiral-Flute HSS-E Pipe Taps

- WU41EG TiN
- WP49EG oxide
- WU40EG bright



## ■ VT-SFT • Standard Chamfer • Standard Projection

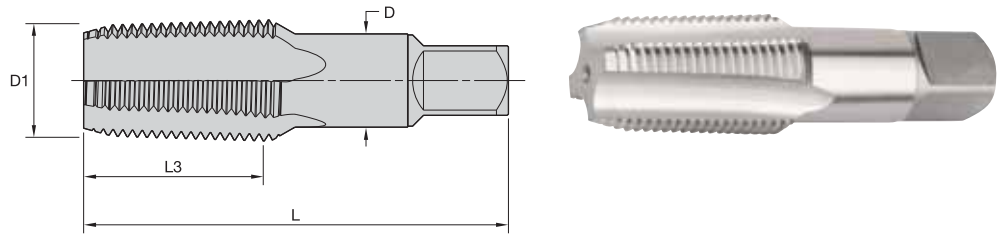


- first choice
- alternate choice

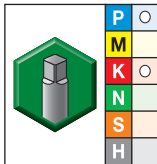
grade WU41EG TiN		grade WP49EG Oxide		grade WU40EG Bright		D1 TPI	L	L3	D	number of flutes	thread series
order #	catalog #	order #	catalog #	order #	catalog #						
5629600	VTSFT8001	5629359	VTSFT8001	5629601	VTSFT8001	1/16 - 27	2.13	.69	.313	4	NPT
5629618	VTSFT8501	5629617	VTSFT8501	5629619	VTSFT8501	1/16 - 27	2.13	.69	.313	4	NPTF
5629603	VTSFT8002	5629602	VTSFT8002	5629604	VTSFT8002	1/8 - 27	2.13	.75	.313	4	NPT
5629621	VTSFT8502	5629620	VTSFT8502	5629622	VTSFT8502	1/8 - 27	2.13	.75	.313	4	NPTF
5629606	VTSFT8003	5629605	VTSFT8003	5629607	VTSFT8003	1/8 - 27	2.13	.75	.438	4	NPT
5629624	VTSFT8503	5629623	VTSFT8503	5629625	VTSFT8503	1/8 - 27	2.13	.75	.438	4	NPTF
5629609	VTSFT8004	5629608	VTSFT8004	5629610	VTSFT8004	1/4 - 18	2.44	1.03	.563	4	NPT
5629627	VTSFT8504	5629626	VTSFT8504	5629628	VTSFT8504	1/4 - 18	2.44	1.03	.563	4	NPTF
5629612	VTSFT8005	5629611	VTSFT8005	5629613	VTSFT8005	3/8 - 18	2.56	1.03	.700	4	NPT
5629640	VTSFT8505	5629629	VTSFT8505	5629641	VTSFT8505	3/8 - 18	2.56	1.03	.700	4	NPTF
5629615	VTSFT8006	5629614	VTSFT8006	5629616	VTSFT8006	1/2 - 14	3.13	1.38	.688	4	NPT
5629643	VTSFT8506	5629642	VTSFT8506	5629644	VTSFT8506	1/2 - 14	3.13	1.38	.688	4	NPTF
5629836	VTSFT8007	5629835	VTSFT8007	5629837	VTSFT8007	3/4 - 14	3.25	1.38	.906	4	NPT
5629871	VTSFT8507	5629861	VTSFT8507	5629881	VTSFT8507	3/4 - 14	3.25	1.38	.906	4	NPTF
5629839	VTSFT8008	5629838	VTSFT8008	5629860	VTSFT8008	1 - 11 1/2	3.75	1.75	1.125	4	NPT
5629890	VTSFT8508	5629889	VTSFT8508	5629891	VTSFT8508	1 - 11 1/2	3.75	1.75	1.125	4	NPTF

Multipurpose Taps

- WU40EG bright



■ VT-STR • Standard Chamfer • Standard Projection



grade WU40EG  
Bright

- first choice
- alternate choice

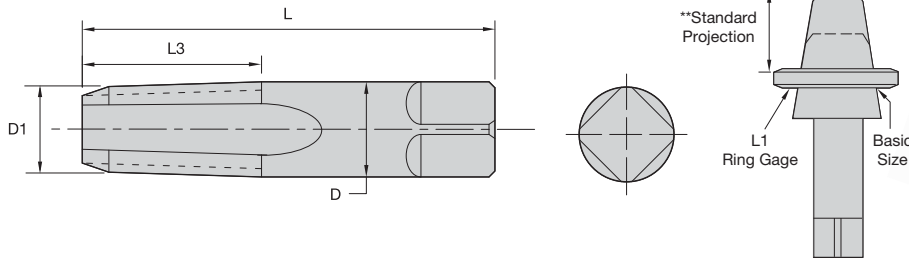
order #	catalog #	D1 TPI	L	L3	D	number of flutes	thread series
5629646	VTSTR8001	1/8 - 27	2.13	.75	.313	4	NPT
5629647	VTSTR8002	1/4 - 18	2.44	1.03	.563	4	NPT
5629648	VTSTR8003	3/8 - 18	2.56	1.03	.700	4	NPT
5629649	VTSTR8004	1/2 - 14	3.13	1.38	.688	4	NPT
5629904	VTSTR8005	3/4 - 14	3.25	1.38	.906	5	NPT

# Production Taps

NPT/ANPT and NPTF Production Taper Pipe Taps



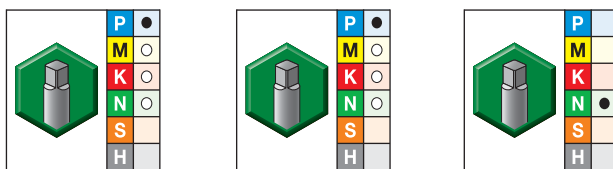
- Series 2320 • TiN Coated
- Series 5320S • SH50 Steam Oxide
- Series 5320 • Uncoated



## Features and Benefits:

- Manufactured from select high-speed steel.
- Ground thread pipe taps are standard in American Standard Pipe Form (NPT) and American Standard Dryseal Pipe Thread Form (NPTF).
- NPT threads require the use of a sealer, such as Teflon® tape or pipe compound.
- NPTF dryseal threads give a pressure-tight joint without the use of a sealer.
- The nominal size of a pipe tap is that of the pipe fitting to be tapped, not the actual size of the tap; thread taper is 3/4" per foot.
- Alternate tap coatings are available as stock modifications.

## ■ Series 2320/5320 • Standard Chamfer • Standard Projection

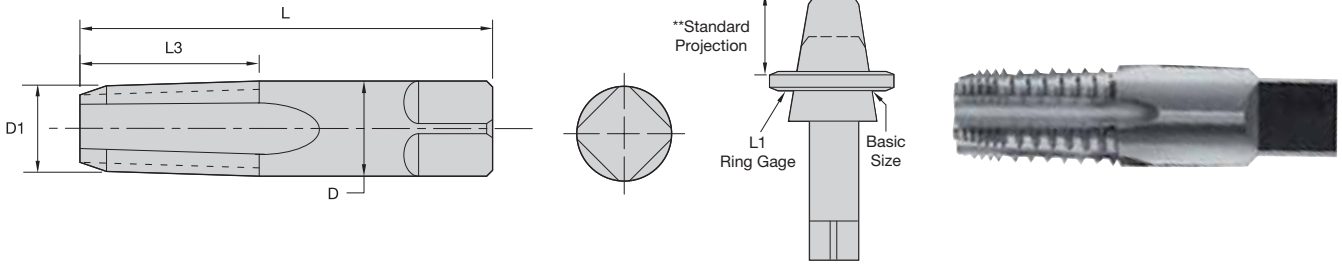


- first choice
- alternate choice

TiN		oxide		uncoated		inch dimensions				number of flutes	thread series
order #	catalog #	order #	catalog #	order #	catalog #	D1 size	L	L3	D		
2746411	19698	2746417	19690	3139338	16201	1/16 - 27	2.13	.69	.313	4	NPT/ANPT
2746415	19691	-	-	2748216	16203	1/16 - 27	2.13	.69	.313	4	NPTF
2603958	19707	-	-	2873746	16204	1/8 - 27	2.13	.75	.313	4	NPT/ANPT
2746397	19712	2746413	19695	2748210	16205	1/8 - 27	2.13	.75	.438	4	NPT/ANPT
2746407	19701	-	-	2748206	16209	1/8 - 27	2.13	.75	.313	4	NPTF
2746405	19702	-	-	2748203	16210	1/8 - 27	2.13	.75	.438	4	NPTF
2622810	19728	2746399	19710	2748199	16212	1/4 - 18	2.44	1.06	.563	4	NPT/ANPT
2746393	19721	-	-	2748193	16215	1/4 - 18	2.44	1.06	.563	4	NPTF
2746380	19738	2746386	19730	2748189	16217	3/8 - 18	2.56	1.06	.700	4	NPT/ANPT
-	-	-	-	2748185	16220	3/8 - 18	2.56	1.06	.700	4	NPTF
2746382	19736	-	-	-	-	3/8 - 18	2.56	1.25	.700	4	NPTF
2746373	19746	-	-	2748177	16225	1/2 - 14	3.13	1.66	.687	4	NPTF
2603959	19748	2746378	19740	2748181	16222	1/2 - 14	3.13	1.66	.687	4	NPT/ANPT
2746361	19766	-	-	2748169	16230	3/4 - 14	3.25	1.38	.906	5	NPTF
2746359	19768	2746366	19760	2748173	16227	3/4 - 14	3.25	1.38	.906	5	NPT/ANPT
2746357	19776	-	-	2748159	16235	1 - 11 1/2	3.75	1.75	1.125	5	NPTF
2746355	19778	-	-	2748165	16232	1 - 11 1/2	3.75	1.75	1.125	5	NPT/ANPT
-	-	-	-	2748153	16239	1 1/4 - 11 1/2	4.00	1.75	1.313	5	NPTF
-	-	-	-	2748155	16237	1 1/4 - 11 1/2	4.00	1.75	1.313	5	NPT/ANPT
-	-	-	-	2748147	16242	1 1/2 - 11 1/2	4.25	3.00	1.500	7	NPTF
-	-	-	-	2748151	16240	1 1/2 - 11 1/2	4.25	3.00	1.500	7	NPT/ANPT
-	-	-	-	2748143	16245	2 - 11 1/2	4.25	1.75	1.875	7	NPTF
-	-	-	-	2748145	16243	2 - 11 1/2	4.25	1.75	1.875	7	NPT/ANPT

\*\* Pipe tap projection is the distance the small end of the tap projects through an American National Standard NPTF Thin Ring Gage.  
 NOTE: ANPT Taps marked NPT may be used for NPT and ANPT applications.  
 For gage measurement projection, see technical page W226.

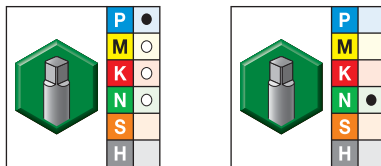
- Series 5319S • SH50 Steam Oxide
- Series 5319 • Uncoated



**Features and Benefits:**

- Manufactured from select high-speed steel.
- Interrupted threads to reduce drag while taper pipe threading.
- Use where chip disposal is a concern.
- Odd number of flutes standard.
- NPT threads require the use of a sealer, such as Teflon® tape or pipe compound.
- NPTF dryseal threads give a pressure-tight joint without the use of a sealer.

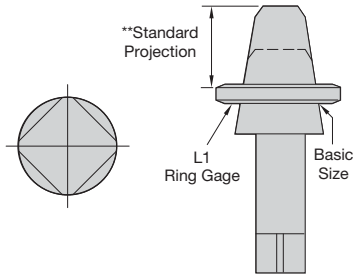
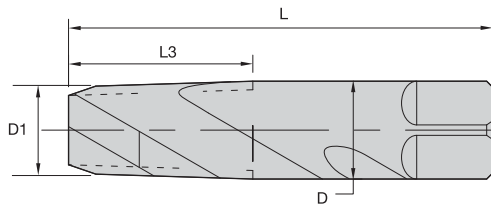
■ **Series 5319 • Standard Pipe Chamfer • Standard Projection**



- first choice
- alternate choice

oxide		uncoated		inch dimensions				number of flutes	thread series
order #	catalog #	order #	catalog #	D1 size	L	L3	D		
-	-	2748270	16101	1/8 - 27	2.13	.75	.313	5	NPT/ANPT
2746429	19650	1854963	16102	1/8 - 27	2.13	.75	.438	5	NPT/ANPT
-	-	2748264	16103	1/8 - 27	2.13	.75	.313	5	NPTF
-	-	2748262	16104	1/8 - 27	2.13	.75	.438	5	NPTF
2746425	19655	2748259	16105	1/4 - 18	2.44	1.06	.563	5	NPT/ANPT
-	-	2748257	16106	1/4 - 18	2.44	1.06	.563	5	NPTF
2746423	19656	2748255	16107	3/8 - 18	2.56	1.06	.700	5	NPT/ANPT
-	-	3175997	16108	3/8 - 18	2.56	1.06	.700	5	NPTF
2746421	19665	2748250	16109	1/2 - 14	3.13	1.66	.688	5	NPT/ANPT
-	-	2748247	16110	1/2 - 14	3.13	1.66	.688	5	NPTF
2746419	19675	2748244	16111	3/4 - 14	3.25	1.38	.906	5	NPT/ANPT
-	-	2748238	16112	3/4 - 14	3.25	1.38	.906	5	NPTF
-	-	2748237	16113	1 - 11 1/2	3.75	1.75	1.125	5	NPT/ANPT
-	-	2748234	16114	1 - 11 1/2	3.75	1.75	1.125	5	NPTF
-	-	2864744	16115	1 1/4 - 11 1/2	4.00	1.75	1.313	5	NPT/ANPT
-	-	2748230	16117	1 1/2 - 11 1/2	4.25	3.00	1.500	7	NPT/ANPT
-	-	2748225	16118	2 - 11 1/2	4.25	1.75	1.875	7	NPT/ANPT

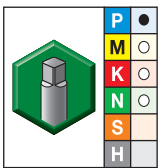
\*\* Pipe tap projection is the distance the small end of the tap projects through an American National Standard NPTF Thin Ring Gage.  
NOTE: NPT taps may be used for ANPT applications.  
For gage measurement projection, see technical page W226.



**Features and Benefits:**

- Manufactured from select tap high-speed steel.
- Ground threads standard in American Standard Pipe Form (NPT) and American Standard Dryseal Pipe Form (NPTF).
- NPT threads require the use of a sealer, such as Teflon® tape or pipe compound.
- NPTF dryseal threads give a pressure-tight joint without the use of a sealer.
- Uncoated taps standard; coatings available as a stock modification.
- Spiral flutes lift chips out of the tapped hole reducing stop lines.
- Most effective in materials that produce long, stringy chips.

■ Series 5321 • Standard Pipe Chamfer • Standard Projection

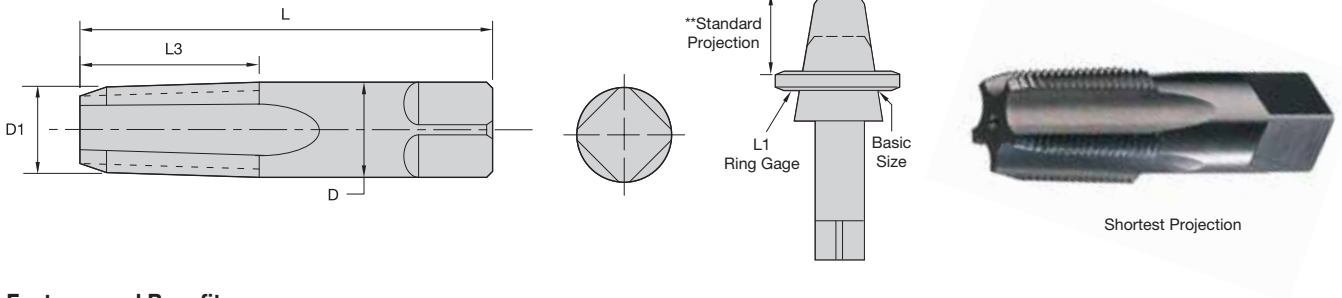


- first choice
- alternate choice

uncoated		inch dimensions				number of flutes	thread series
order #	catalog #	D1 size	L	L3	D		
2748109	16281	1/8 - 27	2.13	.75	.438	4	NPT/ANPT
2956027	16283	1/4 - 18	2.44	1.06	.563	4	NPT/ANPT
2748101	16284	1/4 - 18	2.44	1.06	.563	4	NPTF
2864545	16285	3/8 - 18	2.56	1.06	.700	4	NPT/ANPT
2748099	16286	3/8 - 18	2.56	1.06	.700	4	NPTF
2956026	16287	1/2 - 14	3.13	1.66	.688	4	NPT/ANPT

\*\* Pipe tap projection is the distance the small end of the tap projects through an American National Standard NPTF Thin Ring Gage.  
NOTE: NPT taps may be used for ANPT applications.  
For gage measurement projection, see technical page W226.

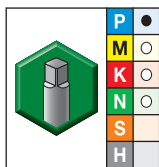




**Features and Benefits:**

- Manufactured from select high-speed steel.
- Ground thread pipe taps are standard in American Standard Pipe Form (NPT) and American Standard Dryseal Pipe Thread Form (NPTF).
- NPT threads require the use of a sealer, such as Teflon® tape or pipe compound.
- NPTF dryseal threads give a pressure-tight joint without the use of a sealer.
- Uncoated taps standard; coatings available as specials.
- Hook designed for use in ductile materials that produce long, continuous chips.

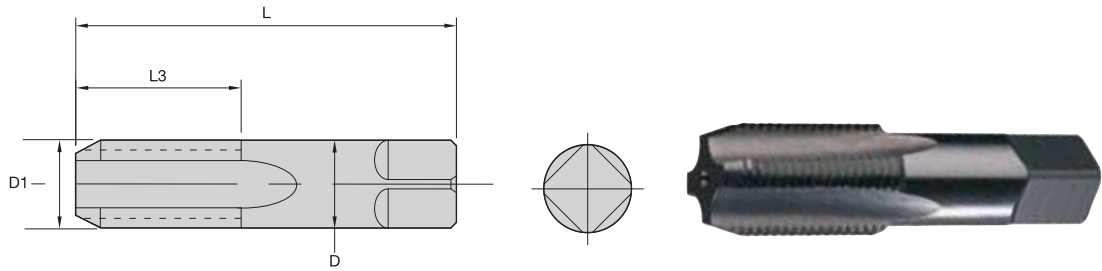
■ **Series 5820 • Standard Pipe Chamfer • Standard Projection**



- first choice
- alternate choice

uncoated		inch dimensions				number of flutes	thread series
order #	catalog #	D1 size	L	L3	D		
2748196	16213	1/4 - 18	2.44	1.06	.563	4	NPT/ANPT
2748187	16218	3/8 - 18	2.56	1.06	.700	4	NPT/ANPT
2748179	16223	1/2 - 14	3.13	1.66	.688	4	NPT/ANPT
2748171	16228	3/4 - 14	3.25	1.38	.906	5	NPT/ANPT
2748163	16233	1 - 11 1/2	3.75	1.75	1.125	5	NPT/ANPT

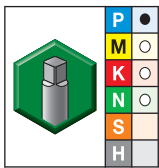
\*\* Pipe tap projection is the distance the small end of the tap projects through an American National Standard NPTF Thin Ring Gage.  
NOTE: NPT taps may be used for ANPT applications.  
For gage measurement projection, see technical page W226.



**Features and Benefits:**

- Manufactured from select tap high-speed steel.
- Ground thread pipe taps are standard in American National Standard Straight Pipe (NPS) thread form and American National Standard Dryseal Straight Pipe (NPSF) thread form.
- NPS threads are suitable for tapping holes or couplings for low pressure work when used with a sealer; also suitable for NPSC and NPSM work.
- NPSF dryseal taps are intended for low pressure work, such as fuel and oil lines where a sealer is not used.
- Dryseal threads give a low-pressure, pressure-tight joint without the use of a sealer.

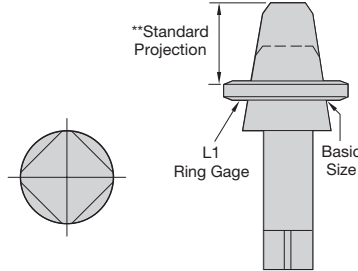
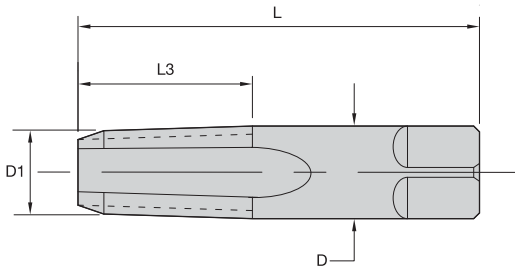
■ **Series 5323 • Modified Bottoming Chamfer**



- first choice
- alternate choice

uncoated		inch dimensions				number of flutes	thread series
order #	catalog #	D1 size	L	L3	D		
2748090	16351	1/8 - 27	2.13	.75	.313	4	NPS
2748088	16352	1/8 - 27	2.13	.75	.438	4	NPS
2748086	16353	1/8 - 27	2.13	.75	.313	4	NPSF
2748084	16354	1/8 - 27	2.13	.75	.438	4	NPSF
2748082	16355	1/4 - 18	2.44	1.06	.563	4	NPS
2748080	16356	1/4 - 18	2.44	1.06	.563	4	NPSF
2748078	16357	3/8 - 18	2.56	1.06	.700	4	NPS
2748076	16358	3/8 - 18	2.56	1.06	.700	4	NPSF
2748074	16359	1/2 - 14	3.13	1.66	.688	4	NPS
2748072	16360	1/2 - 14	3.13	1.66	.688	4	NPSF
2748070	16361	3/4 - 14	3.25	1.38	.906	5	NPS
2748068	16362	3/4 - 14	3.25	1.38	.906	5	NPSF
2748066	16363	1 - 11 1/2	3.75	1.75	1.125	5	NPS

Production Taps



**Features and Benefits:**

- Manufactured from select high-speed steel.
- American Standard Pipe Tap (NPT) thread form with a taper of 3/4" per foot.
- Made for the most difficult maintenance applications.
- Use for hand tapping or tapping under power.
- Furnished with 2-1/2-3-1/2 pitches chamfered.
- Standard projection.

- first choice
- alternate choice

■ Series 7320 • Standard Chamfer 2-1/2-3-1/2 Pitches

uncoated		inch dimensions				thread series
order #	catalog #	D1 size	L	L3	D	
2750443	11800	1/8 - 27	2.13	.75	.313	NPT
2750441	11801	1/8 - 27	2.13	.75	.438	NPT
2750437	11802	1/4 - 18	2.44	1.06	.563	NPT
2750435	11803	3/8 - 18	2.56	1.06	.700	NPT
2750431	11804	1/2 - 14	3.13	1.38	.688	NPT
2750430	11805	3/4 - 14	3.25	1.38	.906	NPT
2750428	11806	1 - 11 1/2	3.75	1.75	1.125	NPT
2750426	11807	1 1/4 - 11 1/2	4.00	1.75	1.313	NPT
2750425	11808	1 1/2 - 11 1/2	4.25	1.75	1.500	NPT
2750423	11809	2 - 11 1/2	4.50	1.75	1.875	NPT

Maintenance Pipe Taps

Thread Mills •  
**WIDIA-GTD™**



# Thread Mills

Our solid thread mills are designed to be the highest quality thread milling solution.

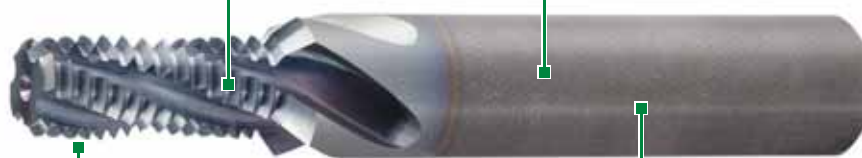
- Cut up to 63 HRC.
- Improved overall thread quality.

**Optimized flute design**

Better chip evacuation.

**Carbide substrate**

Higher heat resistance,  
higher speed.



**Various multilayer coatings**

Extremely high wear resistance,  
longer tool life.

**Cylindrical h6 shank**

Low runout, higher  
quality threads.

## Unmatched Capabilities

- Capable of easily cutting most difficult materials.
- Carbide grades make threading easier and reduce machining times.
- High-quality internal and external threading on 3-axis CNC machines.
- Thread mills make interrupted cuts and short chips.
- Design offers a range of benefits to improve overall thread quality.
- Short, easily evacuated chips generate less heat and friction, so there is a lower risk of damage to threading.





















## Choose WIDIA-GTD™ Thread Mills

- Greater versatility than competitive products.
- Optimum surface quality for an excellent end product.
- Designed to eliminate chipping issues.
- No need to reverse the spindle.
- Fewer machining problems means more production safety.















**Victory™ GTM Series HP Solid Carbide Thread Mills • Metric**

- ★ Good
- ★★ Better
- ★★★ Best

GTM Series Solid Thread Milling • Metric	series	size range	hole	operation	coolant	grade	shank
		(inch and metric)					
	GTM11	M3–M20				WU13PV	6535 HA
	GTM21	M5–M16				WU12PV	6535 HA
	GTM31	M4–M16				WU12PV	6535 HA
	GTM41	M6–M24				WU16PV	6535 HA
	GTM41LH	M6–M12				WU16PV	6535 HA

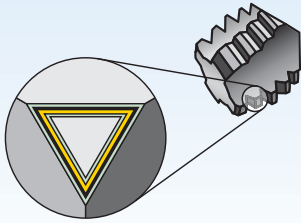
**Victory GTM Series HP Solid Carbide Thread Mills • Inch**

- ★ Good
- ★★ Better
- ★★★ Best

GTM Series Solid Thread Milling • Inch	series	size range	hole	operation	coolant	grade	shank
		(inch and metric)					
	GTM21	#10–5/8"				WU12PV	6535 HA
	GTM31	1/4–5/8"				WU12PV	6535 HA
	GTM41	1/4–3/4"				WU16PV	6535 HA

P				M	K		N			S				H		page(s)	recommended cutting parameters
1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16, 17, 18, 19	20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
Steel <35 HRC	Steel 36-48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Cast Iron		Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49-55 HRC	Hardened Steels 56-68 HRC		
★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★	★	★	★			W199	W208
★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★			W201	W208
					★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★							W203	W209
★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★					★ ★ ★	★ ★ ★	W205	W210
										★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	W206	W210

P				M	K		N			S				H		page(s)	recommended cutting parameters
1, 2, 3, 4, 6, 7	5, 9, 10, 11	12, 13.1	13.2	14.1, 14.2, 14.3, 14.4	15, 16, 17, 18, 19	20	21	22, 23, 24, 25	26, 27, 28	31, 32	33, 34, 35	36	37	38.1, 38.2, 40.1, 40.2, 41.1	39.1, 41.2		
Steel <35 HRC	Steel 36-48 HRC	PH and Ferritic Stainless Steel <35 HRC	PH and Ferritic Stainless Steel >35 HRC	Stainless Steel	Cast Iron		Wrought Aluminum	Cast Aluminum	Copper, Copper Alloys	Iron Based	Cobalt Based	Nickel Based	Titanium Alloys	Hardened Steels 49-55 HRC	Hardened Steels 56-68 HRC		
★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★			W200	W207
					★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★							W202	W208
★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★					★ ★ ★	★ ★ ★	W204	W209

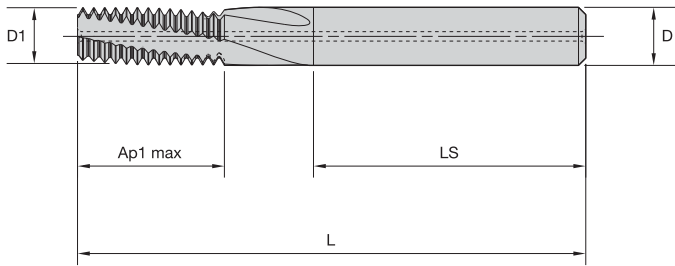


Coatings are designed for optimized tapping performance in specific materials.

<b>P</b>	Steel
<b>M</b>	Stainless Steel
<b>K</b>	Cast Iron
<b>N</b>	Non-Ferrous
<b>S</b>	High-Temp Alloys
<b>H</b>	Hardened Materials

Grade	Coating	Grade Description	wear resistance ← → toughness																				
				05	10	15	20	25	30	35	40	45											
WU12PV		Coated carbide. PVD fine-grain carbide substrate with high-hardness TiCN coating. Universal grade for thread milling most materials.	P																				
			M																				
			K																				
			N																				
			S																				
			H																				
WU13PV		Coated carbide. PVD carbide substrate with heat-resistant TiAlN coating. Universal grade for thread milling most materials.	P																				
			M																				
			K																				
			N																				
			S																				
			H																				
WU16PV		Coated carbide. PVD two-layer coating with heat-resistant TiAlN base layer and low-friction MoS <sub>2</sub> top layer over carbide substrate. Use for thread milling most materials, including high-hardness materials.	P																				
			M																				
			K																				
			N																				
			S																				
			H																				



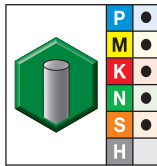


Shank Tolerance

D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-18	+0, -0,011
20-30	+0, -0,013



■ GTM11 • Through Coolant • Metric and Metric Fine



grade WU13PV  
TiAlN

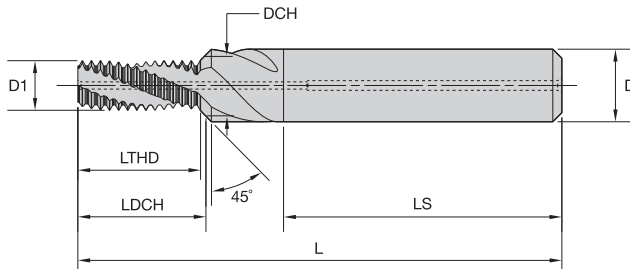
- first choice
- alternate choice

order #	catalog #	metric dimensions						cutting edges
		D1 size	D1	Ap1 max	L	LS	D	
4138391	GTM115001	M3X0.5	2,4	6	42	28	4,0	3
4138502	GTM115012	M4X0.5	3,4	8	55	36	6,0	3
4138392	GTM115002	M4X0.7	3,2	9	55	36	6,0	3
4138503	GTM115013	M5X0.5	4,3	10	55	36	6,0	3
4138493	GTM115003	M5X0.8	4,0	11	55	36	6,0	3
4138504	GTM115014	M6X0.75	5,0	12	55	36	6,0	3
4138494	GTM115004	M6X1	4,8	12	55	36	6,0	3
4138505	GTM115015	M8X0.75	5,9	17	63	36	6,0	3
4138506	GTM115016	M8X1	5,9	16	63	36	6,0	3
4138495	GTM115005	M8X1.25	5,9	17	63	36	6,0	3
4138507	GTM115017	M10X1	7,9	20	70	36	8,0	3
4138496	GTM115006	M10X1.5	7,9	20	70	36	8,0	3
4138508	GTM115018	M12X1	9,9	24	80	40	10,0	4
4138509	GTM115019	M12X1.5	9,9	25	80	40	10,0	4
4138497	GTM115007	M12X1.75	9,9	25	80	40	10,0	4
4138510	GTM115020	M14X1.5	9,9	29	80	40	10,0	4
4138498	GTM115008	M14X2	11,6	29	90	45	12,0	4
4138511	GTM115021	M16X1.5	11,9	32	90	45	12,0	4
4138499	GTM115009	M16X2	11,9	33	90	45	12,0	4
4138512	GTM115022	M18X1.5	13,9	37	90	45	14,0	4
4138500	GTM115010	M18X2.5	13,9	39	90	45	14,0	4
4138513	GTM115023	M20X1.5	13,9	41	90	45	14,0	4
4138501	GTM115011	M20X2.5	13,9	41	90	45	14,0	4

High-Performance Thread Mills

# High-Performance Thread Mills

Victory™ Solid Carbide Thread Mills • Blind and Through Holes

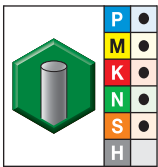


Shank Tolerance

D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-18	+0, -0,011
20-30	+0, -0,013



■ GTM21 • Through Coolant • Inch UNC and UNF



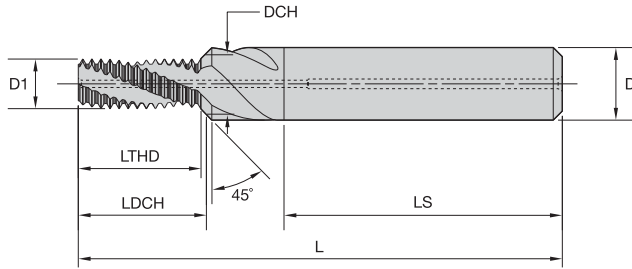
● first choice  
○ alternate choice

grade WU12PV  
TiCN

metric dimensions

order #	catalog #	D1 TPI	D1	DCH	LTHD	LDCH	L	LS	D	cutting edges
4138537	GTM215024	#10-32	3,8	5,13	9,95	10,53	55	36	6,0	3
4138530	GTM215017	1/4-20	4,7	6,65	13,36	14,23	62	36	8,0	3
4138538	GTM215025	1/4-28	5,2	6,65	13,19	13,84	62	36	8,0	3
4138531	GTM215018	5/16-18	6,2	8,25	16,26	17,19	74	40	10,0	3
4138539	GTM215026	5/16-24	6,6	8,25	16,44	17,15	74	40	10,0	3
4138532	GTM215019	3/8-16	7,7	9,83	19,89	20,85	80	45	12,0	3
4138540	GTM215027	3/8-24	8,2	9,83	19,62	20,31	80	45	12,0	3
4138533	GTM215020	7/16-14	9,0	11,43	22,72	23,79	80	45	12,0	3
4138541	GTM215028	7/16-20	9,6	11,43	22,28	23,08	80	45	12,0	3
4138534	GTM215021	1/2-13	10,4	13,00	26,43	27,60	90	45	14,0	4
4138542	GTM215029	1/2-20	11,1	13,00	26,10	26,89	90	45	14,0	4
4138535	GTM215022	9/16-12	11,8	14,61	30,75	31,99	100	48	16,0	4
4138543	GTM215030	9/16-18	12,5	14,61	28,99	29,88	100	48	16,0	4
4138536	GTM215023	5/8-11	13,1	16,18	33,54	34,89	102	48	18,0	4
4138544	GTM215031	5/8-18	14,1	16,18	33,24	34,09	102	48	18,0	4

High-Performance Thread Mills

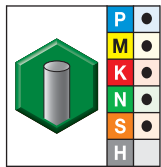


Shank Tolerance

D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-18	+0, -0,011
20-30	+0, -0,013



■ GTM21 • Through Coolant • Metric and Metric Fine



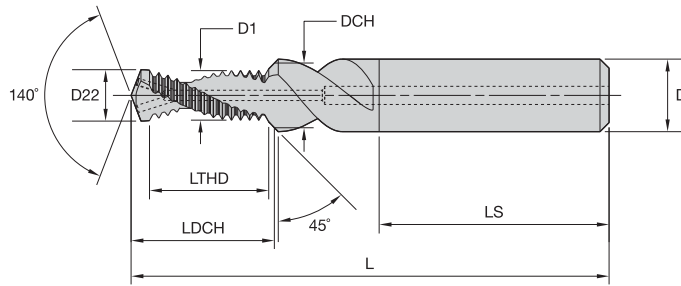
- first choice
- alternate choice

grade WU12PV TiCN		metric dimensions								cutting edges
order #	catalog #	D1 size	D1	DCH	LTHD	LDCH	L	LS	D	
4138514	GTM215001	M5X0.8	4,0	5,30	10,82	11,40	55	36	6,0	3
4138521	GTM215008	M6X0.75	5,0	6,30	12,40	12,97	62	36	8,0	3
4138515	GTM215002	M6X1	4,8	6,30	12,52	13,19	62	36	8,0	3
4138522	GTM215009	M8X1	6,7	8,30	16,53	17,23	74	40	10,0	3
4138516	GTM215003	M8X1.25	6,5	8,30	16,91	17,71	74	40	10,0	3
4138523	GTM215010	M10X1	8,7	10,30	20,55	21,23	80	45	12,0	3
4138524	GTM215011	M10X1.25	8,4	10,30	20,67	21,50	80	45	12,0	3
4138517	GTM215004	M10X1.5	8,2	10,30	20,29	21,22	80	45	12,0	3
4138525	GTM215012	M12X1	10,6	12,30	24,56	25,27	90	45	14,0	4
4138526	GTM215013	M12X1.25	10,4	12,30	24,43	25,24	90	45	14,0	4
4138527	GTM215014	M12X1.5	10,1	12,30	24,80	25,76	90	45	14,0	4
4138518	GTM215005	M12X1.75	9,9	12,30	25,42	26,48	90	45	14,0	4
4138528	GTM215015	M14X1.5	12,1	14,30	29,31	30,25	100	48	16,0	4
4138519	GTM215006	M14X2	11,6	14,30	29,05	30,24	100	48	16,0	4
4138529	GTM215016	M16X1.5	14,0	16,30	32,31	33,30	102	48	18,0	4
4138520	GTM215007	M16X2	13,6	16,30	33,05	34,24	102	48	18,0	4

High-Performance Thread Mills

# High-Performance Thread Mills

Victory™ Solid Carbide Thread Mills • Blind and Through Holes

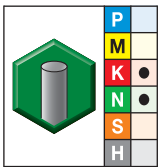


Shank Tolerance

D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-18	+0, -0,011
20-30	+0, -0,013



■ GTM31 • Through Coolant • Inch UNC and UNF



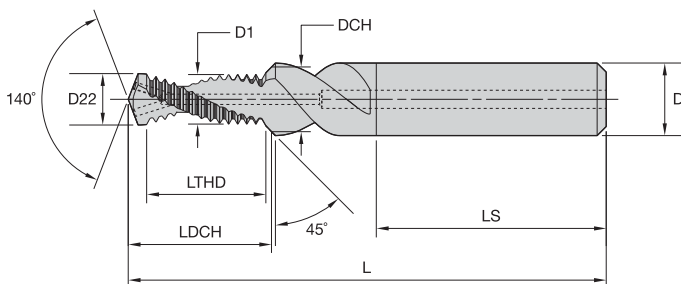
- first choice
- alternate choice

grade WU12PV  
TiCN

metric dimensions

order #	catalog #	D1 TPI	D1	D22	DCH	LTHD	LDCH	L	LS	D	cutting edges
4138561	GTM315021	1/4-20	4,9	5,2	6,65	12,80	15,87	62	36	8,0	2
4138568	GTM315028	1/4-28	5,3	5,5	6,65	12,79	15,35	62	36	8,0	2
4138562	GTM315023	5/16-18	6,3	6,6	8,25	15,63	19,19	74	40	10,0	2
4138569	GTM315030	5/16-24	6,6	6,9	8,25	15,98	19,07	74	40	10,0	2
4138563	GTM315017	3/8-16	7,7	8,0	9,83	19,16	23,25	79	45	12,0	2
4138570	GTM315024	3/8-24	8,2	8,5	9,83	19,16	22,54	79	45	12,0	2
4138564	GTM315018	7/16-14	9,0	9,4	11,43	21,89	26,58	79	45	12,0	2
4138571	GTM315025	7/16-20	9,6	9,9	11,43	21,72	25,69	79	45	12,0	2
4138565	GTM315019	1/2-13	10,4	10,8	13,00	25,52	30,71	89	45	14,0	2
4138572	GTM315026	1/2-20	11,1	11,5	13,00	25,55	29,82	89	45	14,0	2
4138566	GTM315020	9/16-12	11,8	12,3	14,61	27,66	33,37	102	48	16,0	2
4138573	GTM315027	9/16-18	12,5	12,9	14,61	28,37	33,15	102	48	16,0	2
4138567	GTM315022	5/8-11	13,1	13,5	16,18	30,14	36,40	102	48	18,0	2
4138574	GTM315029	5/8-18	14,1	14,5	16,18	31,21	36,25	102	48	18,0	2

High-Performance Thread Mills

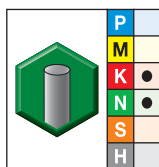


Shank Tolerance

D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-18	+0, -0,011
20-30	+0, -0,013



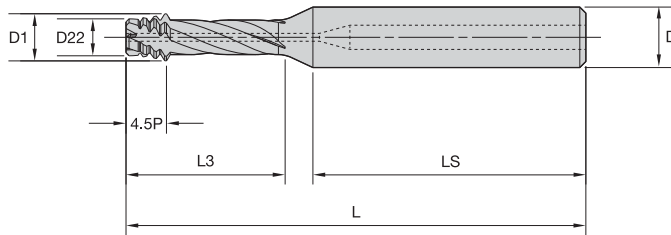
■ GTM31 • Through Coolant • Metric and Metric Fine



- first choice
- alternate choice

grade WU12PV TICN		metric dimensions									cutting edges
order #	catalog #	D1 size	D1	D22	DCH	LTHD	LDCH	L	LS	D	
4138545	GTM315001	M4X0.7	3,2	3,3	4,30	7,74	9,59	49	36	6,0	2
4138546	GTM315002	M5X0.8	4,0	4,2	5,30	9,65	11,82	55	36	6,0	2
4138553	GTM315009	M6X0.75	5,1	5,3	6,30	12,07	14,37	62	36	8,0	2
4138547	GTM315003	M6X1	4,8	5,0	6,30	12,06	14,69	62	36	8,0	2
4138554	GTM315010	M8X1	6,8	7,0	8,30	16,09	19,10	74	40	10,0	2
4138548	GTM315004	M8X1.25	6,5	6,8	8,30	15,08	18,42	74	40	10,0	2
4138555	GTM315011	M10X1	8,7	9,0	10,30	20,11	23,52	79	45	12,0	2
4138556	GTM315012	M10X1.25	8,4	8,8	10,30	20,11	23,87	79	45	12,0	2
4138549	GTM315005	M10X1.5	8,2	8,5	10,30	19,59	23,65	79	45	12,0	2
4138557	GTM315013	M12X1.25	10,4	10,8	12,30	23,88	28,00	89	45	14,0	2
4138558	GTM315014	M12X1.5	10,2	10,5	12,30	24,12	28,57	89	45	14,0	2
4138550	GTM315006	M12X1.75	9,9	10,3	12,30	22,86	27,63	89	45	14,0	2
4138559	GTM315015	M14X1.5	12,1	12,5	14,30	27,14	31,98	102	48	16,0	2
4138551	GTM315007	M14X2	11,6	12,0	14,30	28,12	33,62	102	48	16,0	2
4138560	GTM315016	M16X1.5	14,1	14,5	16,30	31,65	36,87	102	48	18,0	2
4138552	GTM315008	M16X2	13,6	14,0	16,30	32,13	38,00	102	48	18,0	2

High-Performance Thread Mills

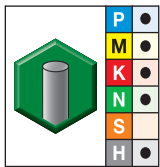


Shank Tolerance

D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-18	+0, -0,011
20-30	+0, -0,013



■ GTM41 • Through Coolant • Right Hand • Inch UNC and UNF



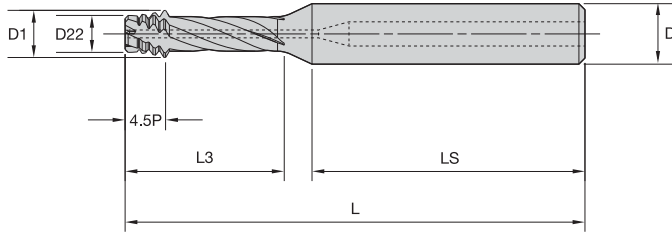
● first choice  
○ alternate choice

grade WU16PV  
TiAlN+MoS<sub>2</sub>

metric dimensions

order #	catalog #	D1 TPI	D1	D22	L3	L	LS	D	cutting edges
4138610	GTM415025	1/4-20	4,64	3,34	17,00	60	36	8,0	3
4138617	GTM415033	1/4-28	4,66	3,62	17,00	60	36	8,0	3
4138611	GTM415026	5/16-18	5,64	4,12	21,90	76	40	10,0	4
4138618	GTM415034	5/16-24	5,64	4,48	21,90	76	40	10,0	4
4138612	GTM415027	3/8-16	7,16	5,42	26,30	76	40	10,0	4
4138619	GTM415035	3/8-24	7,14	6,00	26,30	76	40	10,0	4
4138613	GTM415028	7/16-14	8,47	6,49	31,00	86	45	12,0	4
4138620	GTM415036	7/16-20	8,45	7,06	33,00	86	45	12,0	4
4138606	GTM415029	1/2-13	10,08	7,95	33,40	86	45	12,0	4
4138615	GTM415037	1/2-20	8,45	7,06	33,00	86	45	12,0	4
4138614	GTM415030	9/16-12	11,28	8,98	41,00	98	48	16,0	4
4138621	GTM415038	9/16-18	11,27	9,72	41,00	98	48	16,0	4
4138607	GTM415031	5/8-11	12,89	10,40	42,00	98	48	16,0	4
4138616	GTM415039	5/8-18	12,38	10,83	42,00	98	48	16,0	4
4138608	GTM415032	3/4-10	15,50	12,77	51,30	111	50	20,0	5
4138609	GTM415040	3/4-16	15,38	13,65	51,30	111	50	20,0	5

High-Performance Thread Mills

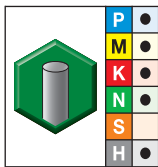


Shank Tolerance

D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-18	+0, -0,011
20-30	+0, -0,013



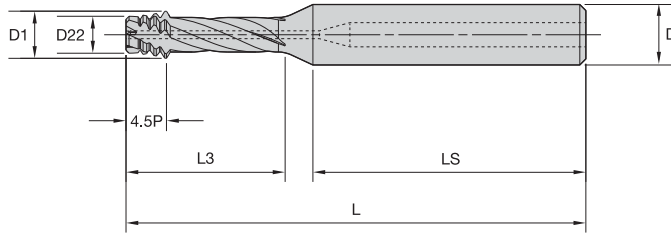
■ GTM41 • Through Coolant • Right Hand • Metric and Metric Fine



● first choice  
○ alternate choice

grade WU16PV TiAlN+MoS <sub>2</sub>		metric dimensions							cutting edges
order #	catalog #	D1 size	D1	D22	L3	L	LS	D	
4138576	GTM415001	M6X1	4,51	3,41	16,5	60	36	8,0	3
4138578	GTM415002	M7X1	4,51	3,41	16,5	60	36	8,0	3
4138592	GTM415014	M8X1	6,23	5,13	21,9	71	40	10,0	4
4138580	GTM415003	M8X1.25	6,23	4,91	21,9	71	40	10,0	4
4138593	GTM415015	M9X1	6,23	5,13	21,9	71	40	10,0	4
4138582	GTM415004	M9X1.25	6,23	4,91	21,9	71	40	10,0	4
4138594	GTM415016	M10X1	6,23	5,13	21,9	71	40	10,0	4
4138595	GTM415013	M10X1.25	6,23	4,91	21,9	71	40	10,0	4
4138584	GTM415005	M10X1.5	7,75	6,11	26,3	76	40	10,0	4
4138586	GTM415006	M11X1.5	7,75	6,11	26,3	76	40	10,0	4
4138596	GTM415017	M12X1	9,15	8,06	30,0	86	45	12,0	4
4138598	GTM415007	M12X1.5	7,75	6,11	26,3	76	40	10,0	4
4138587	GTM415008	M12X1.75	9,16	7,21	32,4	86	45	12,0	4
4138599	GTM415018	M14X1	9,15	8,06	30,0	86	45	12,0	4
4138600	GTM415019	M14X1.5	10,83	9,15	37,4	98	48	16,0	4
4138588	GTM415009	M14X2	11,08	8,91	41,0	98	48	16,0	4
4138601	GTM415020	M16X1.5	10,83	9,15	37,4	98	48	16,0	4
4138589	GTM415010	M16X2	11,08	8,91	41,0	98	48	16,0	4
4138602	GTM415021	M18X1.5	14,83	13,15	47,0	98	48	16,0	4
4138590	GTM415011	M18X2.5	14,38	11,71	51,3	111	50	20,0	5
4138603	GTM415022	M20X1.5	14,83	13,15	47,0	98	48	16,0	4
4138591	GTM415012	M20X2.5	14,38	11,71	51,3	111	50	20,0	5
4138604	GTM415023	M22X1.5	18,23	16,55	56,0	111	50	20,0	5
4138605	GTM415024	M24X1.5	18,23	16,55	56,0	111	50	20,0	5

High-Performance Thread Mills

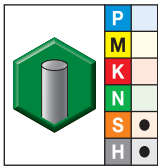


Shank Tolerance

D mm	tolerance h6
6	+0, -0,008
8-10	+0, -0,009
12-18	+0, -0,011
20-30	+0, -0,013



■ GTM41 • Through Coolant • Left Hand • Metric and Metric Fine





- first choice
- alternate choice

grade WU16PV  
TiAlN+MoS<sub>2</sub>

order #	catalog #	D1 size	metric dimensions						cutting edges
			D1	D22	L3	L	LS	D	
4138575	GTM415041	M6X1	4,51	3,41	16,5	60	36	8,0	3
4138577	GTM415042	M7X1	4,51	3,41	16,5	60	36	8,0	3
4138579	GTM415043	M8X1.25	6,23	4,91	21,9	71	40	10,0	4
4138581	GTM415044	M9X1.25	6,23	4,91	21,9	71	40	10,0	4
4138583	GTM415045	M10X1.5	7,75	6,11	26,3	76	40	10,0	4
4138585	GTM415046	M11X1.5	7,75	6,11	26,3	76	40	10,0	4
4138597	GTM415047	M12X1.5	9,17	7,21	32,4	86	45	12,0	4



■ GTM11 and GTM21 • Inch

		 Thread Mill GTM11						 Thread Mill • Chamfer GTM21					
		Cutting Speed – vc Range – SFM			Feed/Tooth by Diameter			Cutting Speed – vc Range – SFM			Feed/Tooth by Diameter		
Material Group		min	Starting Value	max		<.375	>.375	min	Starting Value	max		<.375	>.375
P	1	300	380	490	inch	.002	.003	460	610	790	inch	.002	.004
	2	300	380	490	inch	.002	.003	460	610	790	inch	.002	.004
	3	130	160	230	inch	.001	.001	230	300	390	inch	.001	.001
	4	–	–	–	–	–	–	230	300	390	inch	.001	.001
	5	200	260	330	inch	.002	.002	230	300	390	inch	.002	.003
	6	–	–	–	–	–	–	–	–	–	–	–	–
M	1	200	260	330	inch	.002	.002	230	300	390	inch	.002	.003
	2	200	260	330	inch	.002	.002	230	300	390	inch	.002	.003
	3	–	–	–	–	–	–	–	–	–	–	–	–
K	1	390	490	660	inch	.002	.004	430	560	720	inch	.002	.004
	2	390	490	660	inch	.002	.004	430	560	720	inch	.002	.004
	3	300	380	490	inch	.002	.003	360	460	590	inch	.002	.003
N	1	660	740	820	inch	.002	.002	890	980	1080	inch	.003	.006
	2	560	620	690	inch	.002	.002	520	570	620	inch	.003	.006
	3	820	900	980	inch	.003	.004	890	980	1080	inch	.003	.006
	4	820	900	980	inch	.003	.004	890	980	1080	inch	.003	.006
	5	890	980	1080	inch	.005	.005	820	900	980	inch	.004	.008
	6	560	620	690	inch	.002	.002	300	330	360	inch	.004	.008
S	1	200	260	330	inch	.002	.002	230	300	390	inch	.002	.003
	2	160	210	260	inch	.001	.002	160	200	260	inch	.001	.002
	3	160	210	260	inch	.001	.002	160	200	260	inch	.001	.002
	4	160	210	260	inch	.001	.002	160	200	260	inch	.001	.002

■ GTM11 and GTM21 • Metric


Material Group		Thread Mill GTM11						Thread Mill • Chamfer GTM21					
		Cutting Speed – vc Range – m/min			Feed/Tooth by Diameter			Cutting Speed – vc Range – m/min			Feed/Tooth by Diameter		
		min	Starting Value	max		<10mm	>10mm	min	Starting Value	max		<10mm	>10mm
P	1	90	115	150	mm	0,05	0,08	140	185	240	mm	0,06	0,10
	2	90	115	150	mm	0,05	0,08	140	185	240	mm	0,06	0,10
	3	40	50	70	mm	0,02	0,03	70	90	120	mm	0,03	0,04
	4	–	–	–	–	–	–	70	90	120	mm	0,03	0,04
	5	60	80	100	mm	0,04	0,06	70	90	120	mm	0,05	0,08
	6	–	–	–	–	–	–	–	–	–	–	–	–
M	1	60	80	100	mm	0,04	0,06	70	90	120	mm	0,05	0,08
	2	60	80	100	mm	0,04	0,06	70	90	120	mm	0,05	0,08
	3	–	–	–	–	–	–	–	–	–	–	–	–
K	1	120	150	200	mm	0,06	0,10	130	170	220	mm	0,06	0,11
	2	120	150	200	mm	0,06	0,10	130	170	220	mm	0,06	0,11
	3	90	115	150	mm	0,05	0,07	110	140	180	mm	0,05	0,07
N	1	200	225	250	mm	0,05	0,06	270	300	330	mm	0,08	0,16
	2	170	190	210	mm	0,04	0,05	160	175	190	mm	0,08	0,16
	3	250	275	300	mm	0,07	0,09	270	300	330	mm	0,08	0,16
	4	250	275	300	mm	0,07	0,09	270	300	330	mm	0,08	0,16
	5	270	300	330	mm	0,12	0,13	250	275	300	mm	0,11	0,20
	6	170	190	210	mm	0,05	0,06	90	100	110	mm	0,11	0,20
S	1	60	80	100	mm	0,04	0,06	70	90	120	mm	0,05	0,08
	2	50	65	80	mm	0,03	0,04	50	60	80	mm	0,03	0,05
	3	50	65	80	mm	0,03	0,04	50	60	80	mm	0,03	0,05
	4	50	65	80	mm	0,03	0,04	50	60	80	mm	0,03	0,05

■ GTM31 • Inch

Material Group		Drill • Chamfer • Thread Mill GTM31												
		Cutting Speed – vc Range – SFM			Drilling			Milling						
		min	Starting Value	max	Recommended Feed by Diameter			Feed/Tooth by Diameter						
				<.250	.250–.375	.375–.625		<.250	.250–.375	.375–.625				
K	1	430	570	750	IPR	.004	.006	.012	inch	.002	.003	.004		
N	1	890	980	1080	IPR	.006	.010	.013	inch	.002	.003	.005		
	2	460	490	560	IPR	.006	.010	.013	inch	.002	.003	.005		
	4	890	980	1080	IPR	.006	.010	.013	inch	.002	.003	.005		
	5	360	390	430	IPR	.005	.008	.013	inch	.002	.003	.005		

High-Performance Thread Mills

■ **GTM31 • Metric**




**Drill • Chamfer • Thread Mill GTM31**

Material Group		Cutting Speed – vc Range – m/min			Drilling			Milling				
					Recommended Feed by Diameter			Feed/Tooth by Diameter				
		min	Starting Value	max		<6mm	6–10mm	10–16mm		<6mm	6–10mm	10–16mm
K	1	130	175	230	mm/r	0,10	0,16	0,30	mm	0,05	0,07	0,10
N	1	270	300	330	mm/r	0,15	0,25	0,34	mm	0,06	0,08	0,12
	2	140	150	170	mm/r	0,15	0,25	0,34	mm	0,06	0,08	0,12
	4	270	300	330	mm/r	0,15	0,25	0,34	mm	0,06	0,08	0,12
	5	110	120	130	mm/r	0,12	0,20	0,32	mm	0,06	0,08	0,12

NOTE: For thread depths over 2 x D up to 3 x D, reduce speed and feed by 25%.

■ **Universal Thread Mills • GTM41 • Inch**



**Mill • Chamfer • Thread Mill GTM41**

Material Group		TM Style	Grade	Cutting Speed – vc Range – SFM			Feed/Tooth by Diameter		
				min	Starting Value	max		< .375	> .375
P	1	GTM41 R	KCU36	560	740	950	inch	.002	.003
	2	GTM41 R	KCU36	560	740	950	inch	.002	.003
	3	GTM41 R	KCU36	390	490	660	inch	.001	.002
	4	GTM41 R	KCU36	330	410	520	inch	.001	.002
	5	GTM41 R	KCU36	390	490	660	inch	.001	.002
	6	GTM41 R	KCU36	200	260	330	inch	.001	.002
M	1	GTM41 R	KCU36	390	490	660	inch	.001	.002
	2	GTM41 R	KCU36	390	490	660	inch	.001	.002
	3	GTM41 R	KCU36	390	490	660	inch	.001	.002
K	1	GTM41 R	KCU36	620	820	1080	inch	.002	.004
	2	GTM41 R	KCU36	620	820	1080	inch	.002	.004
	3	GTM41 R	KCU36	460	610	790	inch	.002	.003
N	1	-	-	-	-	-	-	-	-
	2	GTM41 R	KCU36	590	750	980	inch	.002	.003
	3	-	-	-	-	-	-	-	-
	4	GTM41 R	KCU36	690	900	1180	inch	.002	.003
	5	-	-	-	-	-	-	-	-
	6	GTM41 R	KCU36	690	900	1180	inch	.002	.003
S	1	GTM41 L	KCU36	390	490	660	inch	.001	.002
	2	GTM41 L	KCU36	160	200	260	inch	.001	.001
	3	GTM41 L	KCU36	160	200	260	inch	.001	.001
	4	GTM41 L	KCU36	230	300	390	inch	.001	.001
H	1	GTM41	KCU36	260	330	430	inch	.001	.002
	2	GTM41	KCU36	260	330	430	inch	.001	.002
	3	GTM41	KCU36	160	210	260	inch	.001	.001
	4	GTM41	KCU36	160	210	260	inch	.001	.001

NOTE: For thread depths over 2 x D up to 3 x D, reduce speed and feed by 25%.

### ■ Universal Thread Mills • GTM41 • Metric



Mill • Chamfer • Thread Mill GTM41

Material Group		TM Style	Grade	Cutting Speed – vc Range – m/min			Feed/Tooth by Diameter		
				min	Starting Value	max		< 10mm	>10mm
P	1	GTM41 R	WU16PV	170	225	290	mm	0,05	0,08
	2	GTM41 R	WU16PV	170	225	290	mm	0,05	0,08
	3	GTM41 R	WU16PV	120	150	200	mm	0,03	0,05
	4	GTM41 R	WU16PV	100	125	160	mm	0,03	0,05
	5	GTM41 R	WU16PV	120	150	200	mm	0,03	0,04
	6	GTM41 R	WU16PV	60	80	100	mm	0,03	0,04
M	1	GTM41 R	WU16PV	120	150	200	mm	0,03	0,04
	2	GTM41 R	WU16PV	120	150	200	mm	0,03	0,04
	3	GTM41 R	WU16PV	120	150	200	mm	0,03	0,04
K	1	GTM41 R	WU16PV	190	250	330	mm	0,06	0,10
	2	GTM41 R	WU16PV	190	250	330	mm	0,06	0,10
	3	GTM41 R	WU16PV	140	185	240	mm	0,04	0,07
N	1	–	–	–	–	–	–	–	–
	2	GTM41 R	WU16PV	180	230	300	mm	0,06	0,07
	3	–	–	–	–	–	–	–	–
	4	GTM41 R	WU16PV	210	275	360	mm	0,06	0,07
	5	–	–	–	–	–	–	–	–
	6	GTM41 R	WU16PV	210	275	360	mm	0,06	0,07
S	1	GTM41 L	WU16PV	120	150	200	mm	0,025	0,045
	2	GTM41 L	WU16PV	50	60	80	mm	0,015	0,025
	3	GTM41 L	WU16PV	50	60	80	mm	0,015	0,025
	4	GTM41 L	WU16PV	70	90	120	mm	0,025	0,035
H	1	GTM41	WU16PV	80	100	130	mm	0,030	0,050
	2	GTM41	WU16PV	80	100	130	mm	0,030	0,050
	3	GTM41	WU16PV	50	65	80	mm	0,020	0,030
	4	GTM41	WU16PV	50	65	80	mm	0,020	0,030

NOTE: For thread depths over 2 x D up to 3 x D, reduce speed and feed by 25%.

# Thread Milling Methods

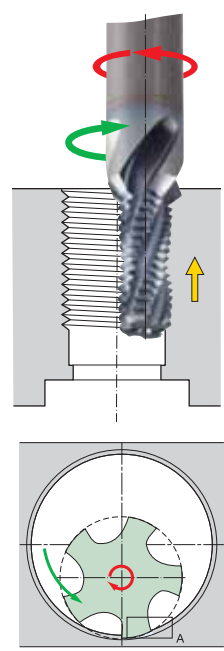
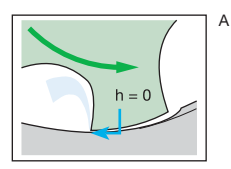
## Climb Milling

**Properties:**

- Tool rotation direction clockwise
- Tool moves counterclockwise
- Pitch upwards

Right-hand thread

Climb milling is always when the cutting edge goes out of the material with a chip thickness  $h = 0$



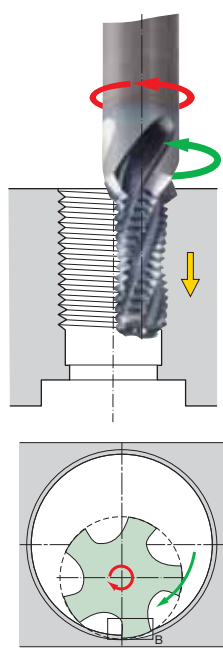
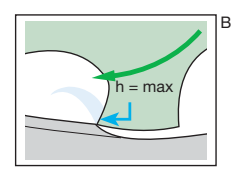
## Conventional Milling

**Properties:**

- Tool rotation direction clockwise
- Tool moves clockwise
- Pitch downwards

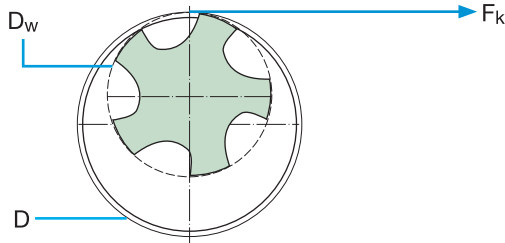
Right-hand thread

Conventional milling is always when the cutting edge goes out of the material with a chip thickness  $h = \text{max}$



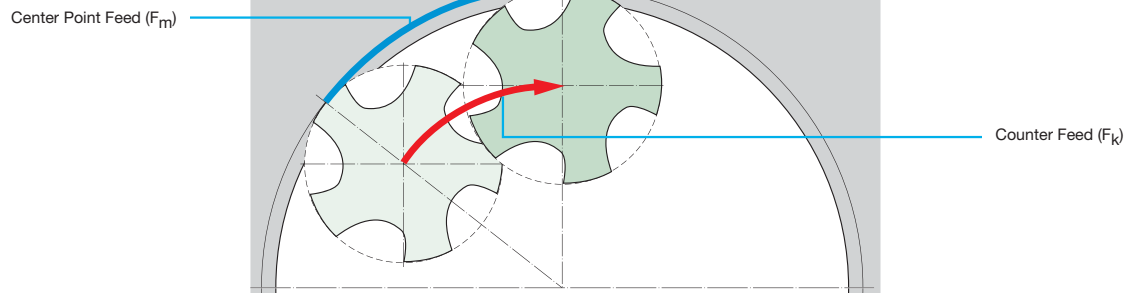
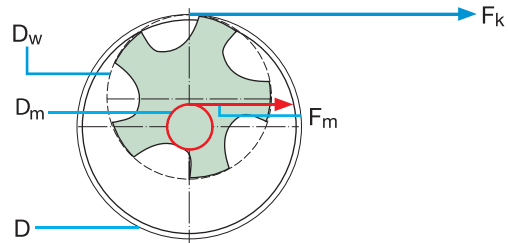
## Counter Feed $F_k$

$$F_k = n \cdot f_z \cdot Z \text{ [mm/min]}$$



## Center Point Feed $F_m$

$$F_m = \frac{F_k \cdot (D - D_w)}{D} \text{ [mm/min]}$$



- $D_w$  = Tool diameter [mm]
- $n$  = RPM [ $\text{min}^{-1}$ ]
- $f_z$  = Feed per tooth [mm]
- $Z$  = Number of teeth on tool (radial)
- $D$  = Nominal diameter of thread = Diameter of external contour [mm]
- $D_m$  = Diameter of the center point ( $D - D_w$ ) [mm]

# Thread Mill GTM21

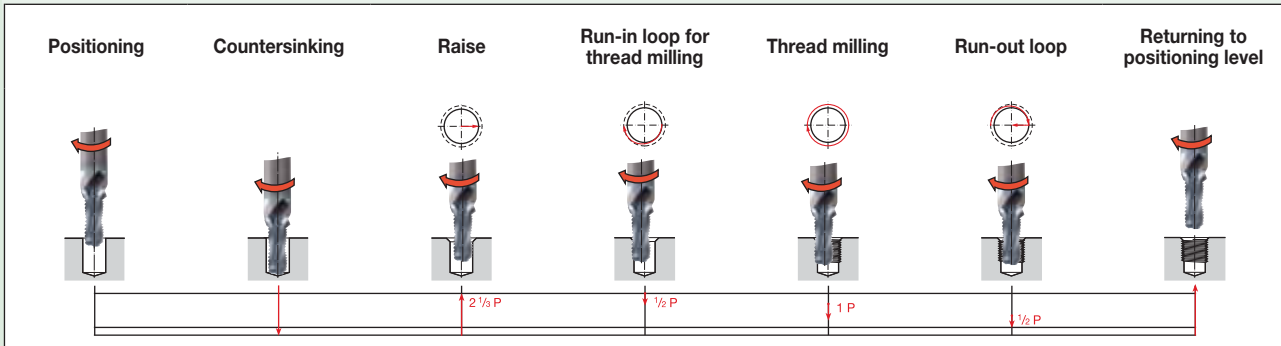
## Preparation

Drilling of thread hole

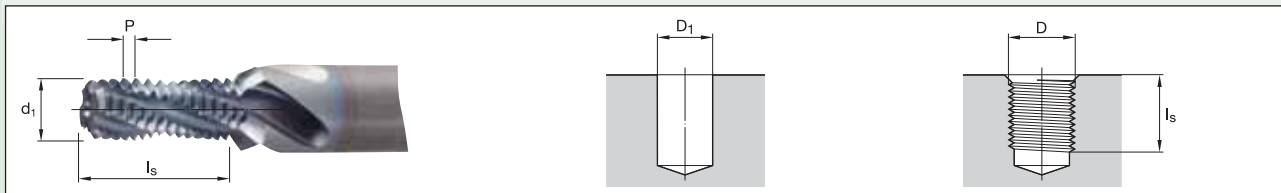
## Process Principle

Countersinking, thread milling (conventional milling)

## Cycle



## Required Specification Values



## Example

<b>Size — M10-6H</b> Thread diameter D ..... 10mm Pitch ..... 1,5mm Core hole diameter D <sub>1</sub> ..... 8,5mm <b>Material — Cast aluminum</b> <b>Grade — WU12PV</b>	<b>Tool — GTM21</b> Catalog number ..... GTM215004 Number of teeth Z ..... 3 Tool diameter d <sub>1</sub> ..... 8,2mm* Tool radius compensation k <sup>1</sup> ..... 0,1mm** Tool radius to be programmed <sup>2</sup> ..... 4mm*** Countersink depth l <sub>s</sub> ..... 21,2mm Cutting speed v <sub>c</sub> ..... 250 m/min Feed (countersinking) f <sub>s</sub> ..... 0,3 mm/U Feed (milling) f <sub>z</sub> ..... 0,09 mm/tooth	$N = \frac{v_c \cdot 1000}{d_1 \cdot \pi} \quad S = 9709$
		$v_s = f_s \cdot n \quad F = 2913 \text{ (countersinking)}$
		$v_f = f_z \cdot Z \cdot n \quad F = 2622 \text{ (contour)}$
		$v_f = \frac{v_f \text{ contour} \cdot (D - d_1)}{D} \quad F = 472 \text{ (center point)}$

\*(measured on the cutting part)

\*\* (0.01 x D)

\*\*\* (1/2 d<sub>1</sub> - k)

## Program to DIN 66025 (conventional milling, on the contour, incremental)

Positioning the tool	N 10 G 54 G 90 G 00 X... Y... Z 2 S 9709 T01 <sup>2</sup> M03
Advancing tool to full thread depth	N 20 G 91 Z-21.200
Countersinking	N 30 G 01 Z-2 F 2913 (countersink)
Raise	N 40 G 00 Z 3.450
Moving sideways to the starting point	N 50 G 42 G01 X 4.250 F 1311 (milling, 1/2 contour) [F 236] <sup>3</sup> (milling, 1/2 center point)
Run-in loop in arc	N 60 G 02 X-9.25 Y 0.000 Z-0.750 I-4.625 J 0
Thread milling	N 70 G 02 X 0 Y 0 Z-1.500 I 5 J 0.000 F2622 [F 472] <sup>3</sup> (center point)
Run-out loop in arc	N 80 G 02 X 9.25 Y 0.000 Z-0.750 I 4.625 J 0
Exit	N 90 G 40 G 01 X-4.25
Retracting tool to positioning level	N 100 G 90 G 00 Z 2

## Cutting time t<sub>H</sub>

1.4 seconds

### NOTES:

- The cutter radius measured over the tooth crests of the threaded part must be reduced by the amount of the cutter radius compensation. This is necessary to achieve a depth of cut to the middle of the 6H/ISO2 nut tolerance. Please note, however, that this also depends on the radial deflection of the tool (tensile strength of the material, projecting length of the tool).
- The cutter radius to be programmed is normally included in the tool memory.
- The feed values in brackets must be used for controllers, which do not calculate the center point feed themselves.

## Drill Thread Mill GTM41 • Right Hand

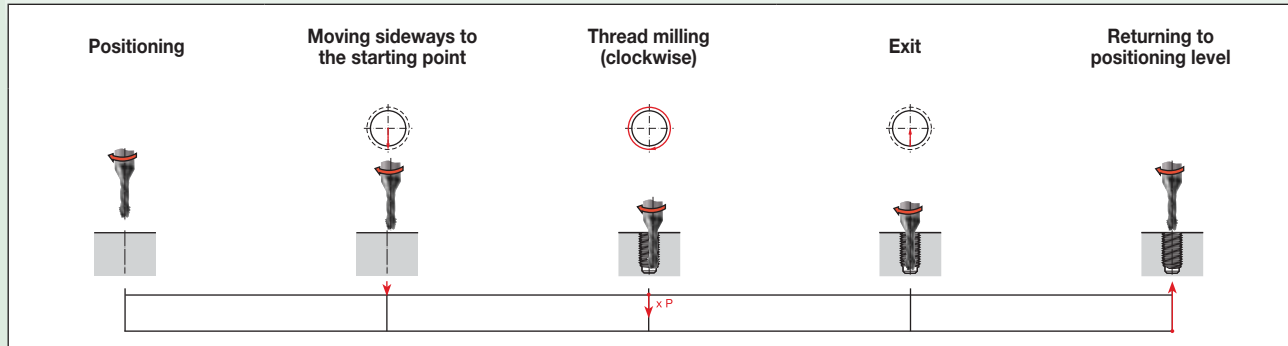
**Preparation**

None

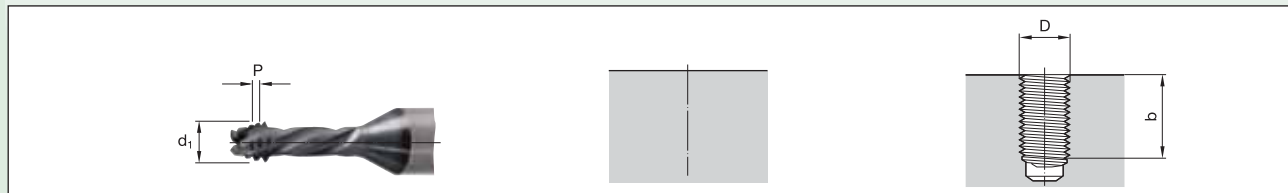
**Process Principle**

Milling thread and core hole, countersinking (conventional milling)

**Cycle**



**Required Specification Values**



**Example**

<p><b>Size — M10-6H</b></p> <p>Thread diameter <math>D</math> ..... 10mm</p> <p>Pitch ..... 1,5mm</p> <p>Core hole diameter <math>D_1</math> ..... 8,5mm</p> <p><b>Material — Hard steel, 50 HRC</b></p> <p><b>Grade — WU16PV</b></p>	<p><b>Tool — GTM41 Right Hand</b></p> <p>Catalog number ..... GTM415005</p> <p>Number of teeth <math>Z</math> ..... 4</p> <p>Tool diameter <math>d_1</math> ..... 7,75mm*</p> <p>Tool radius compensation <math>k^1</math> ..... 0,08mm**</p> <p>Tool radius to be programmed<sup>2</sup> ..... 3,795mm***</p> <p>Thread depth <math>b</math> ..... 20mm</p> <p>Cutting speed <math>v_c</math> ..... 100 m/min</p> <p>Feed (milling) <math>f_z</math> ..... 0,04 mm/tooth</p> <p>Number of turns<sup>5</sup> ..... 17</p>	$N = \frac{V_c \cdot 1000}{d_1 \cdot \pi} \quad S = 4109$ $v_f = f_z \cdot Z \cdot n \quad F = \frac{657}{(\text{contour})}$ $N = \frac{v_f \text{ contour} \cdot (D - d_1)}{D} \quad F = \frac{148}{(\text{center point})}$
<p>*(measured on the cutting part)</p>	<p>**<math>(0.01 \times D)</math>; adjust to application</p>	<p>***<math>(1/2 d_1 - k)</math></p>

**Program to DIN 66025 (conventional milling, on the contour, incremental)**

<b>Positioning the tool</b>	N 10 G 54 G 90 G 00 X... Y... Z 1.500 S 4109 T01 <sup>2</sup> M03 <sup>6</sup>
<b>Incremental programming</b>	N 20 G 91
<b>Moving sideways to the starting point</b>	N 30 G 42 G 01 X 0 Y-5 F 657 (contour) [F 148] <sup>4</sup> (center point)
<b>Thread milling</b>	N 40 G 02 X 0 Y 0 Z-1.500 I 0 J 5.000
<b>Repeat thread milling</b>	... <sup>5</sup>
<b>Exit</b>	N 50 G 40 G 01 X 0 Y 5
<b>Retracting tool to positioning level</b>	N 70 G 90 G 00 Z 2

**Cutting time  $t_h$**

51.6 seconds

**NOTES:**

- The cutter radius measured over the tooth crests of the threaded part must be reduced by the amount of the cutter radius compensation. This is necessary to achieve a depth of cut to the middle of the 6H/ISO2 nut tolerance. Please note, however, that this also depends on the radial deflection of the tool (tensile strength of the material, projecting length of the tool).
- The cutter radius to be programmed is normally included in the tool memory.
- The thread depth  $b$  must be divisible by the thread pitch  $P$ .
- The feed values in brackets must be used for controllers, which do not calculate the center point feed themselves.
- Set N40 must be repeated with the number of threads. Repetitions  $N = \text{thread depth } b / \text{pitch } P$  (rounded up to the nearest integer).

## Drill Thread Mill GTM41 • Left Hand

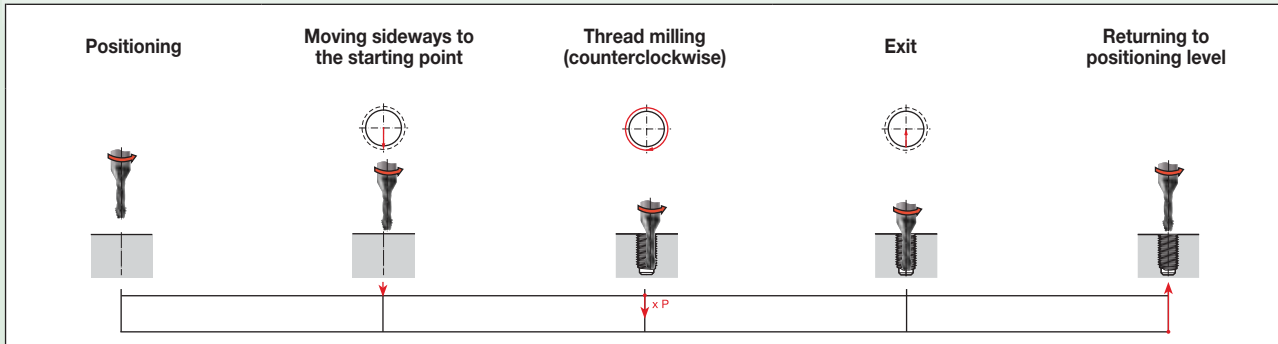
### Preparation

None

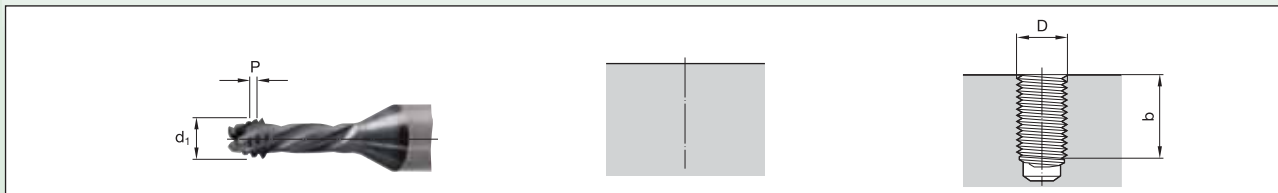
### Process Principle

Milling thread and core hole, countersinking (climb milling)

### Cycle



### Required Specification Values



### Example

#### Size — M10-6H

Thread diameter D ..... 10mm  
Pitch ..... 1,5mm  
Core hole diameter D<sub>1</sub> ..... 8,5mm

**Material — TiAl6V4 titanium**  
**Grade — WU16PV**

#### Tool — GTM41 Left Hand

Catalog number ..... GTM415005  
Number of teeth Z ..... 4  
Tool diameter d<sub>1</sub> ..... 7,75mm\*  
Tool radius compensation k<sup>1</sup> ..... 0,08mm\*\*  
Tool radius to be programmed<sup>2</sup> ..... 3,795mm\*\*\*  
Thread depth b ..... 20mm  
Cutting speed v<sub>c</sub> ..... 100 m/min  
Feed (milling) f<sub>z</sub> ..... 0,03 mm/tooth  
Number of turns<sup>5</sup> ..... 17

$$N = \frac{v_c \cdot 1000}{d_1 \cdot \pi} \quad S = 4109$$

$$v_f = f_z \cdot Z \cdot n \quad F = \frac{493}{(\text{contour})}$$

$$N = \frac{v_f \text{ contour} \cdot (D - d_1)}{D} \quad F = 111 \quad (\text{center point})$$

\*(measured on the cutting part)

\*\* (0.01 x D)

\*\*\* (1/2 d<sub>1</sub> - k)

### Program to DIN 66025 (climb milling, on the contour, incremental)

Positioning the tool	N 10 G 54 G 90 G 00 X... Y... Z 1.500 S 4109 T01 <sup>2</sup> M04
Incremental programming	N 20 G 91
Moving sideways to the starting point	N 30 G 42 G 01 X 0 Y-5 F 493 (contour) [F 111] <sup>4</sup> (center point)
Thread milling	N 40 G 02 X 0 Y 0 Z-1.500 I 0 J 5.000
Repeat thread milling	... <sup>5</sup>
Exit	N 50 G 40 G 01 X 0 Y 5
Retracting tool to positioning level	N 70 G 90 G 00 Z 2

### Cutting time t<sub>h</sub>

68.8 seconds

#### NOTES:

- The cutter radius measured over the tooth crests of the threaded part must be reduced by the amount of the cutter radius compensation. This is necessary to achieve a depth of cut to the middle of the 6H/ISO2 nut tolerance. Please note, however, that this also depends on the radial deflection of the tool (tensile strength of the material, projecting length of the tool).
- The cutter radius to be programmed is normally included in the tool memory.
- The thread depth b must be divisible by the thread pitch P.
- The feed values in brackets must be used for controllers, which do not calculate the center point feed themselves.
- Set N40 must be repeated with the number of threads. Repetitions N = thread depth b/pitch P (rounded up to the nearest integer).



# Drill Thread Mill GTM31

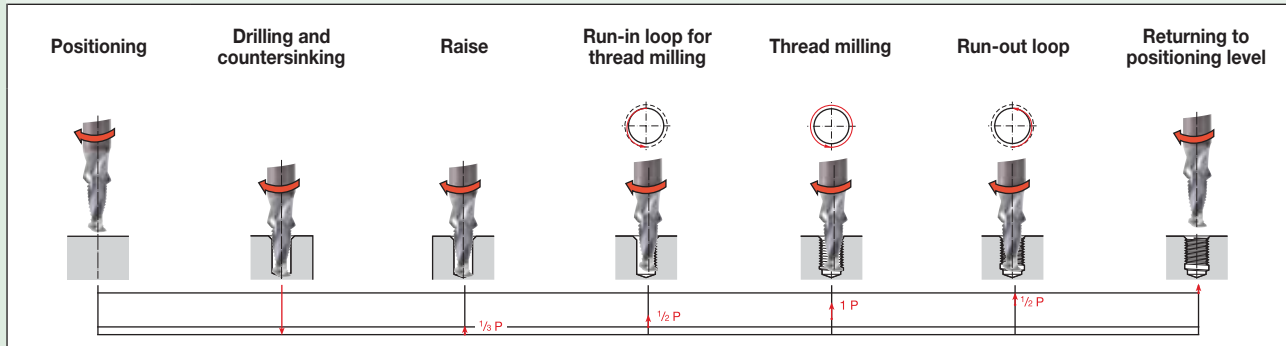
## Preparation

Drilling of thread hole

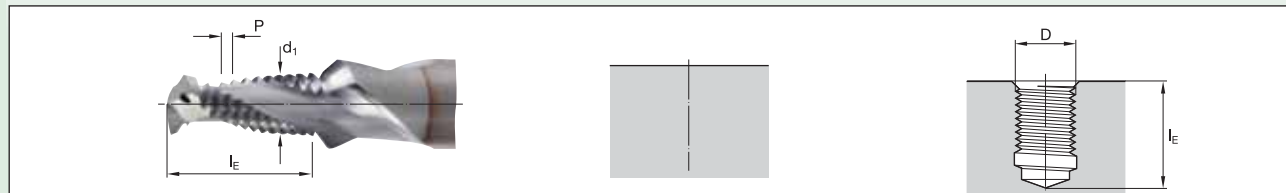
## Process Principle

Drilling, countersinking, thread milling (climb milling)

## Cycle



## Required Specification Values



## Example

<b>Size — M10-6H</b> Thread diameter D ..... 10mm Pitch ..... 1,5mm Core hole diameter D <sub>1</sub> ..... 8,5mm <b>Material — Gray cast iron</b> <b>Grade — WU12PV</b>	<b>Tool — GTM31</b> Catalog number ..... GTM315005 Number of teeth Z ..... 2 Tool diameter d <sub>1</sub> ..... 8,2mm* Tool radius compensation k <sup>1</sup> ..... 0,1mm** Tool radius to be programmed <sup>2</sup> ..... 4mm*** Countersink depth l <sub>S</sub> ..... 19,11mm Cutting speed v <sub>C</sub> ..... 250 m/min Feed (countersinking) f <sub>S</sub> ..... 0,25 mm/U Feed (milling) f <sub>Z</sub> ..... 0,1 mm/tooth	$N = \frac{v_c \cdot 1000}{d_1 \cdot \pi} \quad S = 9709$ $v_s = f_s \cdot n \quad F = 2427 \text{ (drilling, countersinking)}$ $v_f = f_z \cdot Z \cdot n \quad F = 1942 \text{ (contour)}$ $v_f = \frac{v_f \text{ contour} \cdot (D - d_1)}{D} \quad F = 350 \text{ (center point)}$
*(measured on the cutting part)	** (0.01 x D)	*** (1/2 d <sub>1</sub> - k)

## Program to DIN 66025 (climb milling, on the contour, incremental)

<b>Positioning the tool</b>	N 10 G 54 G 90 G 00 X... Y... Z 2 S 9709 T01 <sup>2</sup> M03
<b>Drilling and countersinking</b>	N 20 G 91 G 01 Z-21.110 F 2427 (drill, countersink)
<b>Raise</b>	N 30 G 01 Z 0.500
<b>Moving sideways to the starting point</b>	N 40 G 41 Y-4.250 F 971 (milling, 1/2 contour) [F 175] <sup>3</sup> (1/2 center point)
<b>Run-in loop in arc</b>	N 50 G 03 X 0 Y 9.250 Z 0.750 I 0 J 4.625
<b>Thread milling</b>	N 60 G 03 X 0 Y 0 Z 1.500 I 0 J -5.000
<b>Run-out loop in arc</b>	N 70 G 03 X 0 Y-9.250 Z 0.750 I 0 J- 4.625 F1942 [F 350] <sup>3</sup> (center point)
<b>Exit</b>	N 80 G 00 G 40 X 0 Y 4.250
<b>Retracting tool to positioning level</b>	N 90 G 90 Z 2

## Cutting time t<sub>h</sub>

2.3 seconds

### NOTES:

- <sup>1</sup> The cutter radius measured over the tooth crests of the threaded part must be reduced by the amount of the cutter radius compensation. This is necessary to achieve a depth of cut to the middle of the 6H/ISO2 nut tolerance. Please note, however, that this also depends on the radial deflection of the tool (tensile strength of the material, projecting length of the tool).
- <sup>2</sup> The cutter radius to be programmed is normally included in the tool memory.
- <sup>3</sup> The feed values in brackets must be used for controllers, which do not calculate the center point feed themselves.

■ Carbide Taps • Metric



Material Group	Through Holes						Blind Holes				
	Tap Style	Grade	Range – m/min			Tap Style	Grade	Range – m/min			
			min	Starting Value	max			min	Starting Value	max	
P	P0	GX32, GX38	GP4535	60	100	130	GX33, GX39	GP4535	50	70	90
	P1	GX32, GX38	GP4535	60	90	120	GX33, GX39	GP4535	40	60	80
	P2	GX32, GX38	GP4535	50	85	110	GX33, GX39	GP4535	40	60	80
	P3	GX32, GX38	GP4535	50	80	100	GX33, GX39	GP4535	40	60	80
K	K1	GX34, GX50	WK12PG	70	105	140	GX35, GX50	WK12PG	50	70	90
	K2	GX34, GX50	WK12PG	60	100	130	GX35, GX50	WK12PG	50	70	90
	K3	GX34, GX50	WK12PG	60	90	120	GX35, GX50	WK12PG	40	60	80
N	N2	GX46, GX48	WN14PG	80	120	160	GX47, GX49	WN14PG	60	80	100
	N3	GX46, GX48	WN14PG	60	100	130	GX47, GX49	WN14PG	50	70	90
	N4	GX46, GX48	WN14PG	60	90	120	GX47, GX49	WN14PG	40	60	80
H	H3	GX10	WH16PG	1,2	1,5	2,0	GX10	WH16PG	0,8	1,1	1,4
	H4	GX10	WH16PG	0,6	0,8	1,0	GX10	WH16PG	0,4	0,5	0,7

■ Carbide Taps • Inch

Material Group	Through Holes						Blind Holes				
	Tap Style	Grade	Range – SFM			Tap Style	Grade	Range – SFM			
			min	Starting Value	max			min	Starting Value	max	
P	P0	GX32, GX38	GP4535	200	330	430	GX33, GX39	GP4535	160	230	300
	P1	GX32, GX38	GP4535	200	300	390	GX33, GX39	GP4535	130	200	260
	P2	GX32, GX38	GP4535	160	280	360	GX33, GX39	GP4535	130	200	260
	P3	GX32, GX38	GP4535	160	260	330	GX33, GX39	GP4535	130	200	260
K	K1	GX34, GX50	WK12PG	230	340	460	GX35, GX50	WK12PG	160	230	300
	K2	GX34, GX50	WK12PG	200	330	430	GX35, GX50	WK12PG	160	230	300
	K3	GX34, GX50	WK12PG	200	300	390	GX35, GX50	WK12PG	130	200	260
N	N2	GX46, GX48	WN14PG	260	390	520	GX47, GX49	WN14PG	200	260	330
	N3	GX46, GX48	WN14PG	200	330	430	GX47, GX49	WN14PG	160	230	300
	N4	GX46, GX48	WN14PG	200	300	390	GX47, GX49	WN14PG	130	200	260
H	H3	GX10	WH16PG	3.8	4.9	6.4	GX10	WH16PG	2.6	3.4	4.5
	H4	GX10	WH16PG	1.9	2.5	3.2	GX10	WH16PG	1.3	1.7	2.2

High-Performance Taps

■ HSS-E-PM Taps • Metric

Material Group		 Through Holes					 Blind Holes				
				Range – m/min					Range – m/min		
		Tap Style	Grade	min	Starting Value	max	Tap Style	Grade	min	Starting Value	max
P	P1	GT20	GP6520	20	30	45	GT30, GT32, GT50	GP6520	14	21	32
		GT24	WU32MG	20	30	45	GT24, GT26	WU32MG	14	21	32
	P2	GT20	GP6520	17	25	38	GT30, GT32, GT50	GP6520	12	18	26
		GT24	WU32MG	17	25	38	GT24, GT26	WU32MG	12	18	26
	P3	GT20	GP6520	12	15	20	GT30, GT32, GT50	GP6520	8	11	14
	P4	GT00	WP31MG	5	6	8	GT02, GT04	WP31MG	3	4	5
	P5	GT20	GP6520	12	15	20	GT30, GT32, GT50	GP6520	8	11	14
P6	GT00	WP31MG	6	8	10	GT02, GT04	WP31MG	4	6	7	
M	M1	GT20	GM6515	12	15	20	GT30, GT32, GT50	GM6515	8	11	14
		GT24	WU32MG	5	8	12	GT24, GT26	WU32MG	4	6	8
	M2	GT20	GM6515	9	12	16	GT30, GT32, GT50	GM6515	6	8	11
M3	GT00	WP31MG	4	5	7	GT02, GT04	WP31MG	3	4	5	
K	K1	GT40	GP6520	27	35	46	GT40, GT42	GP6520	19	25	32
	K2	GT40	GP6520	23	30	39	GT40, GT42	GP6520	16	21	27
N	N1	GT72	WN44EG	33	50	65	GT82, GT86	WN44EG	23	35	46
		GT22	WN48EG	37	55	72	GT22	WN48EG	26	39	50
	N2	GT40	GP6520	30	45	59	GT40, GT42	GP6520	21	32	41
		GT72	WN44EG	30	45	59	GT82, GT86	WN44EG	21	32	41
	N4	GT40	GP6520	7	10	15	GT40, GT42	GP6520	5	7	11
S	S1	GT20	GP6520	8	12	18	GT30, GT32	GP6520	6	8	13
	S2, S3	GT90	WU32MG	3,3	5,0	7,5	GT92, GT94	WU32MG	2,3	3,5	5,3
		GT90	WS39MG	1,7	2,5	3,8	GT92, GT94	WS39MG	1,2	1,8	2,6
	S4	GT60	WS34MG	2,7	4,0	6,0	GT62	WS34MG	1,9	2,8	4,2
GT60		WS30MG	1,3	2,0	3,0	GT62	WS30MG	0,9	1,4	2,1	
H	H1	GT06	WN35MG	1,3	2,0	3,0	GT06	WN35MG	0,9	1,4	2,1
	H2	GT06	WN35MG	1,0	1,5	2,3	GT06	WN35MG	0,7	1,1	1,6

NOTE: Increase speed by up to 25% when using coolant taps (GT21, GT23, GT31, GT33, GT41, GT43, and GT51). Use grade GP6505™ in steels. Use 50% of the recommended speed listed for grade GP6520™.



■ HSS-E-PM Taps • Inch

Material Group		 Through Holes					 Blind Holes				
		Tap Style	Grade	Range – SFM			Tap Style	Grade	Range – SFM		
				min	Starting Value	max			min	Starting Value	max
P	P1	GT20	GP6520	70	100	150	GT30, GT32, GT50	GP6520	50	70	100
		GT24	WU32MG	70	100	150	GT24, GT26	WU32MG	50	70	100
	P2	GT20	GP6520	50	80	120	GT30, GT32, GT50	GP6520	40	60	90
		GT24	WU32MG	50	80	120	GT24, GT26	WU32MG	40	60	90
	P3	GT20	GP6520	40	50	60	GT30, GT32, GT50	GP6520	30	30	40
	P4	GT00	WP31MG	15	20	26	GT02, GT04	WP31MG	11	14	18
	P5	GT20	GP6520	40	50	60	GT30, GT32, GT50	GP6520	30	30	40
P6	GT00	WP31MG	20	30	30	GT02, GT04	WP31MG	10	20	20	
M	M1	GT20	GM6515	40	50	60	GT30, GT32, GT50	GM6515	30	30	40
		GT24	WU32MG	20	30	40	GT24, GT26	WU32MG	10	20	30
	M2	GT20	GM6515	30	40	50	GT30, GT32, GT50	GM6515	20	30	40
M3	GT00	WP31MG	10	20	20	GT02, GT04	WP31MG	10	10	10	
K	K1	GT40	GP6520	90	110	150	GT40, GT42	GP6520	60	80	100
	K2	GT40	GP6520	80	100	130	GT40, GT42	GP6520	50	70	90
N	N1	GT72	WN44EG	110	160	210	GT82, GT86	WN44EG	80	110	150
		GT22	WN48EG	120	180	230	GT22	WN48EG	80	130	160
	N2	GT40	GP6520	100	150	190	GT40, GT42	GP6520	70	100	130
		GT72	WN44EG	100	150	190	GT82, GT86	WN44EG	70	100	130
		GT22	WN38MG	110	160	210	GT22	WN38MG	80	110	150
N4	GT40	GP6520	22	30	49	GT40, GT42	GP6520	15	23	34	
S	S1	GT20	GP6520	30	40	60	GT30, GT32	GP6520	18	28	41
	S2, S3	GT90	WU32MG	11	16	25	GT92, GT94	WU32MG	8	11	17
		GT90	WS39MG	5	10	12	GT92, GT94	WS39MG	4	6	9
	S4	GT60	WS34MG	9	13	20	GT62	WS34MG	6	9	14
GT60		WS30MG	4	7	10	GT62	WS30MG	3	5	7	
H	H1	GT06	WN35MG	4.4	6.6	9.8	GT06	WN35MG	3.1	4.6	6.9
	H2	GT06	WN35MG	3.3	4.9	7.4	GT06	WN35MG	2.3	3.4	5.2

NOTE: Increase speed by up to 25% when using coolant taps (GT21, GT23, GT31, GT33, GT41, GT43, and GT51). Use grade GP6505™ in steels. Use 50% of the recommended speed listed for grade GP6520™.

High-Performance Taps

■ VariTap • HSS-E • Metric

Material Group		 Through Holes					 Blind Holes				
		Tap Style	Grade	Range – m/min			Tap Style	Grade	Range – m/min		
				min	Starting Value	max			min	Starting Value	max
P	P1	VT-SPO	WP42EG, WU41EG	21	<b>27</b>	34	VT-SFT	WP42EG, WU41EG	13	<b>18</b>	26
		VT-SPO	WP49EG, WU40EG	10	<b>14</b>	17	VT-SFT	WP49EG, WU40EG	6	<b>9</b>	13
	P2	VT-SPO	WP42EG, WU41EG	16	<b>21</b>	27	VT-SFT	WP42EG, WU41EG	11	<b>15</b>	22
		VT-SPO	WP49EG, WU40EG	8	<b>11</b>	13	VT-SFT	WP49EG, WU40EG	4	<b>6</b>	9
	P3	VT-SPO	WP42EG, WU41EG	9	<b>12</b>	15	VT-SFT	WP42EG, WU41EG	6	<b>9</b>	13
		VT-SPO	WP49EG, WU40EG	5	<b>6</b>	8	VT-SFT	WP49EG, WU40EG	2	<b>3</b>	4
		VT-STR NPT	WU41EG	5	<b>6</b>	8	VT-STR NPT	WU41EG	5	<b>6</b>	8
	VT-STR NPT	WU40EG	2	<b>3</b>	4	VT-STR NPT	WU40EG	2	<b>3</b>	4	
M	M1	VT-SPO	WP42EG, WU41EG	9	<b>12</b>	15	VT-SFT	WP42EG, WU41EG	6	<b>9</b>	13
		VT-SPO	WP49EG, WU40EG	5	<b>6</b>	8	VT-SFT	WP49EG, WU40EG	2	<b>3</b>	4
		VT-SFT NPT	WU41EG	5	<b>6</b>	8	VT-SFT NPT	WU41EG	5	<b>6</b>	8
		VT-SFT NPT	WP49EG, WU40EG	2	<b>3</b>	4	VT-SFT NPT	WP49EG, WU40EG	2	<b>3</b>	4
	M3	VT-SPO	WP42EG, WU41EG	7	<b>9</b>	11	VT-SFT	WP42EG, WU41EG	4	<b>6</b>	9
		VT-SPO	WP49EG, WU40EG	3	<b>5</b>	6	VT-SFT	WP49EG, WU40EG	2	<b>3</b>	4
K	K1	VT-STR NPT	WU41EG	10	<b>14</b>	17	VT-STR NPT	WU41EG	10	<b>14</b>	17
		VT-STR NPT	WU40EG	6	<b>8</b>	10	VT-STR NPT	WU40EG	6	<b>8</b>	10
	K2	VT-SPO	WP42EG, WU41EG	21	<b>27</b>	34	VT-SFT	WP42EG, WU41EG	13	<b>18</b>	26
		VT-SPO	WP49EG, WU40EG	10	<b>14</b>	17	VT-SFT	WP49EG, WU40EG	6	<b>9</b>	13
N	N1	VT-SPO	WP42EG, WU41EG	34	<b>46</b>	57	VT-SFT	WP42EG, WU41EG	23	<b>34</b>	48
		VT-SPO	WU40EG	17	<b>23</b>	29	VT-SFT	WU40EG	11	<b>15</b>	22
	N2	VT-SPO	WP42EG, WU41EG	30	<b>40</b>	50	VT-SFT	WP42EG, WU41EG	19	<b>27</b>	39
		VT-SPO	WU40EG	15	<b>20</b>	25	VT-SFT	WU40EG	11	<b>15</b>	22
	N4	VT-SPO	WP42EG, WU41EG	7	<b>9</b>	11	VT-SFT	WP42EG, WU41EG	4	<b>6</b>	9
		VT-SPO	WU40EG	3	<b>5</b>	6	VT-SFT	WU40EG	2	<b>3</b>	4

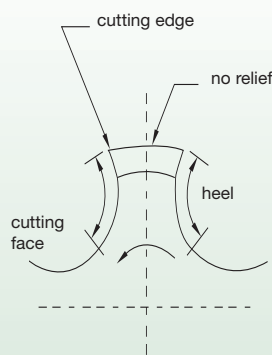
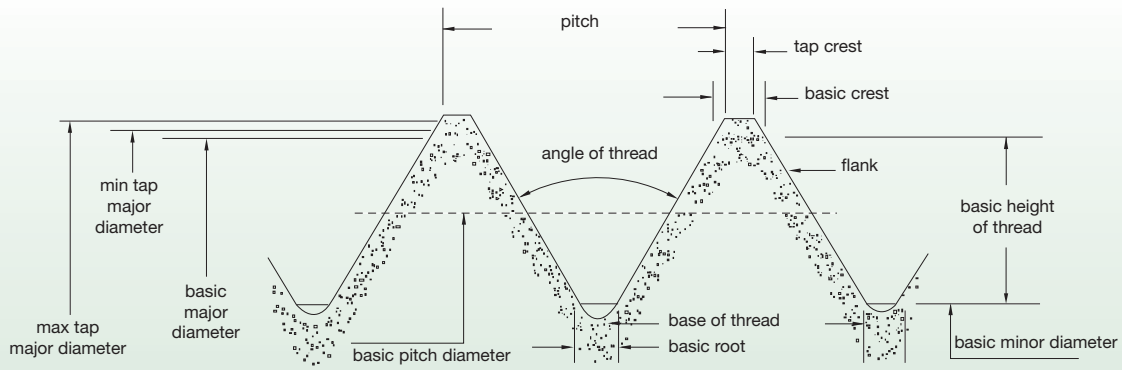
\* Grades: WP42EG = TiCN  
WU41EG = TiN  
WP49EG = oxide  
WU40EG = bright

■ VariTap • HSS-E • Inch

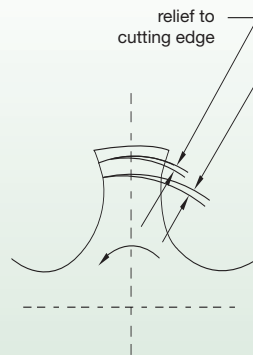
Material Group		 Through Holes					 Blind Holes				
		Tap Style	Grade	Range – SFM			Tap Style	Grade	Range – SFM		
				min	Starting Value	max			min	Starting Value	max
P	1	VT-SPO	WP42EG, WU41EG	70	90	110	VT-SFT	WP42EG, WU41EG	40	60	90
		VT-SPO	WP49EG, WU40EG	30	45	60	VT-SFT	WP49EG, WU40EG	20	30	40
	2,3,4,5	VT-SPO	WP42EG, WU41EG	50	70	90	VT-SFT	WP42EG, WU41EG	40	50	70
		VT-SPO	WP49EG, WU40EG	30	35	40	VT-SFT	WP49EG, WU40EG	10	20	30
	6,7,8,10	VT-SPO	WP42EG, WU41EG	30	40	50	VT-SFT	WP42EG, WU41EG	20	30	40
		VT-SPO	WP49EG, WU40EG	20	20	30	VT-SFT	WP49EG, WU40EG	10	10	10
		VT-STR NPT	WU41EG	20	20	30	VT-STR NPT	WU41EG	20	20	30
	VT-STR NPT	WU40EG	10	10	10	VT-STR NPT	WU40EG	10	10	10	
M	14.1, 14.3	VT-SPO	WP42EG, WU41EG	30	40	50	VT-SFT	WP42EG, WU41EG	20	30	40
		VT-SPO	WP49EG, WU40EG	20	20	30	VT-SFT	WP49EG, WU40EG	10	10	10
		VT-SFT NPT	WU41EG	20	20	30	VT-SFT NPT	WU41EG	20	20	30
		VT-SFT NPT	WP49EG, WU40EG	10	10	10	VT-SFT NPT	WP49EG, WU40EG	10	10	10
	14.2	VT-SPO	WP42EG, WU41EG	20	30	40	VT-SFT	WP42EG, WU41EG	10	20	30
		VT-SPO	WP49EG, WU40EG	10	15	20	VT-SFT	WP49EG, WU40EG	7	10	10
K	15,16	VT-STR NPT	WU41EG	30	45	60	VT-STR NPT	WU41EG	30	45	60
		VT-STR NPT	WU40EG	20	25	30	VT-STR NPT	WU40EG	20	25	30
	17,18,19	VT-SPO	WP42EG, WU41EG	70	90	110	VT-SFT	WP42EG, WU41EG	40	60	90
		VT-SPO	WP49EG, WU40EG	30	45	60	VT-SFT	WP49EG, WU40EG	20	30	40
N	21,22	VT-SPO	WP42EG, WU41EG	110	150	190	VT-SFT	WP42EG, WU41EG	80	110	160
		VT-SPO	WU40EG	60	75	90	VT-SFT	WU40EG	40	50	72
	23,24	VT-SPO	WP42EG, WU41EG	100	130	160	VT-SFT	WP42EG, WU41EG	60	90	130
		VT-SPO	WU40EG	50	65	80	VT-SFT	WU40EG	40	50	70
	26,27,28	VT-SPO	WP42EG, WU41EG	23	30	40	VT-SFT	WP42EG, WU41EG	10	20	30
		VT-SPO	WU40EG	10	15	20	VT-SFT	WU40EG	10	10	10

\* Grades: WP42EG = TiCN  
 WU41EG = TiN  
 WP49EG = oxide  
 WU40EG = bright

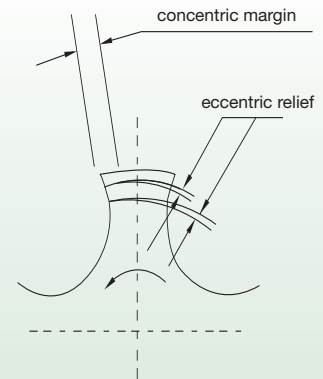




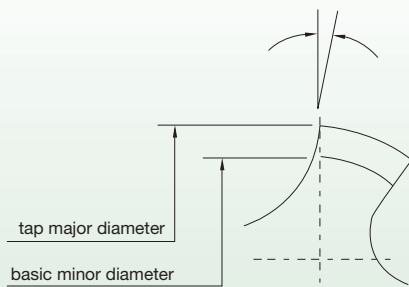
**Concentric**



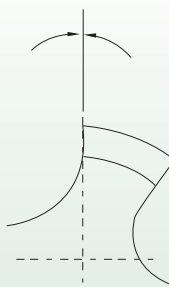
**Eccentric Relief**



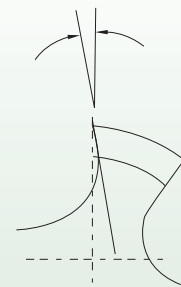
**Con-Eccentric Relief**



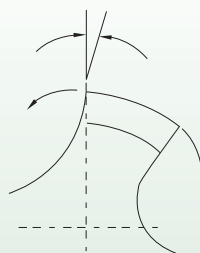
**Negative Hook**



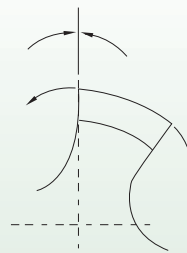
**0° Hook**



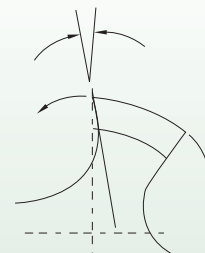
**Positive Hook**



**Negative Rake**



**Radial Rake**

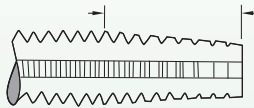


**Positive Rake**

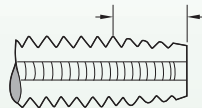
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■ Tap Chamfers • ANSI Taps

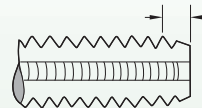
Taper Chamfer  
7-10 Pitches



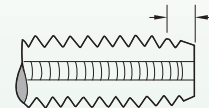
Plug Chamfer  
3-5 Pitches



Modified Bottoming Chamfer  
2-2.5 Pitches



Full Bottoming Chamfer  
1-2 Pitches



Tap Chamfers

**Taper** (7-10 pitches)

The taper chamfer has the longest standard chamfer ensuring easier starting. It requires less tapping torque because of more working teeth.

**Plug** (3-5 pitches)

The most common chamfer for use by hand or machine in through or blind holes. This chamfer is more efficient than a bottoming or modified bottoming chamfer.

**Semi-Bottom** (2-2.5 pitches)

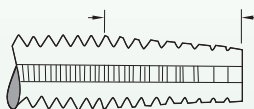
This short chamfer enables threading close to the bottom of blind holes. Due to the slightly longer chamfer and more working teeth, this chamfer is more efficient than a bottoming chamfer.

**Bottoming** (1-2 pitches)

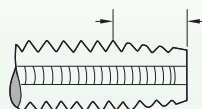
For threading close to the bottom of blind holes, the bottoming chamfer is the least efficient chamfer available.

■ Tap Chamfers • DIN Taps

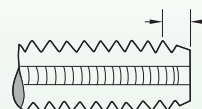
Taper Chamfer  
7-10 Pitches



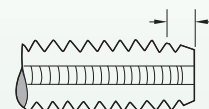
Plug Chamfer  
3-5 Pitches



Modified Bottoming Chamfer  
2-2.5 Pitches



Full Bottoming Chamfer  
1-2 Pitches



Hand Tap Chamfers

**Form A** (6-8 pitches)

The Form A chamfer has the longest standard chamfer ensuring easier starting. It requires less tapping torque because of more working teeth.

**Form B/D** (3.5-5 pitches)

The most common chamfers for use by hand or machine in through or blind holes. Form B applies to spiral-point taps and Form D applies to straight-flute and spiral-flute taps. This chamfer is more efficient than Form E or Form C chamfers.

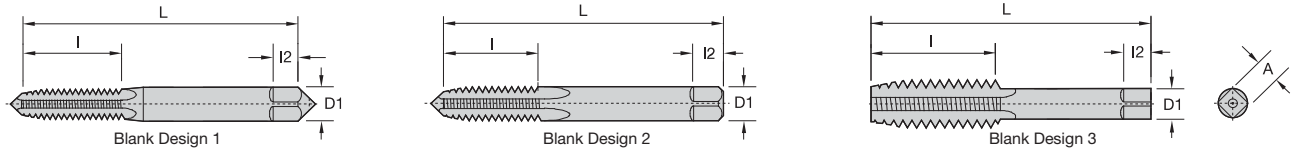
**Form C** (2-2.5 pitches)

This short chamfer enables threading close to the bottom of blind holes. Due to the slightly longer chamfer and more working teeth, this chamfer is more efficient than a Form E chamfer.

**Form E** (1.5-2 pitches)

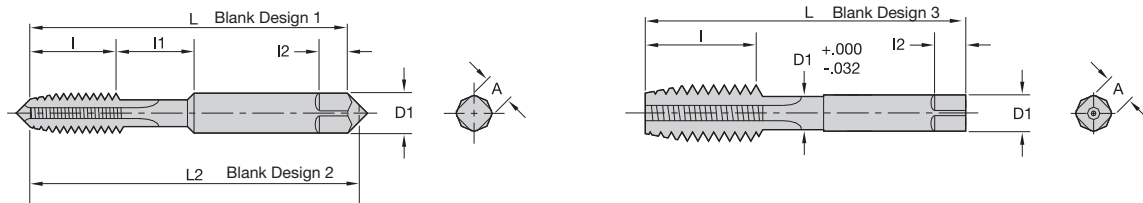
For threading close to the bottom of blind holes, the Form E chamfer is the least efficient chamfer available.





nominal diameter range (in)	machine screw size number (in)	nominal fractional diameter (in)	nominal metric diameter mm (in)	blank design number	overall length L	thread length l	square length l2	shank diameter D1	square size A
.052-.065	0 (.0600)	—	M1.6 (.0630)	1	1.63	.31	.19	.1410	.110
.065-.078	1 (.0730)	—	M1.8 (.0709)	1	1.69	.38	.19	.1410	.110
.078-.091	2 (.0860)	—	M2 (0787), M2.2 (.0866)	1	1.75	.44	.19	.1410	.110
.091-.104	3 (.0990)	—	M2.5 (.0984)	1	1.81	.50	.19	.1410	.110
.104-.117	4 (.1120)	—	—	1	1.88	.56	.19	.1410	.110
.117-.130	5 (.1250)	—	M3 (.1181)	1	1.94	.63	.19	.1410	.110
.130-.145	6 (.1380)	—	M3.5 (.1378)	1	2.00	.69	.19	.1410	.110
.145-.171	8 (.1640)	—	M4 (.1575)	1	2.13	.75	.25	.1680	.131
.171-.197	10 (.1900)	—	M4.5 (.1772), M5 (.1969)	1	2.38	.88	.25	.1940	.152
.197-.223	12 (.2160)	—	—	1	2.38	.94	.28	.2200	.165
.223-.260	—	1/4 (.2500)	M6 (.2362)	2	2.50	1.00	.31	.2550	.191
.260-.323	—	5/16 (.3125)	M7 (.2756), M8 (.3150)	2	2.72	1.13	.38	.3180	.238
.323-.395	—	3/8 (.3750)	M10 (.3937)	2	2.94	1.25	.44	.3810	.286
.395-.448	—	7/16 (.4375)	—	3	3.16	1.44	.41	.3230	.242
.448-.510	—	1/2 (.5000)	M12 (.4724)	3	3.38	1.66	.44	.3670	.275
.510-.573	—	9/16 (.5625)	M14 (.5512)	3	3.59	1.66	.50	.4290	.322
.573-.635	—	5/8 (.6250)	M16 (.6299)	3	3.81	1.81	.56	.4800	.360
.635-.709	—	11/16 (.6875)	M18 (.7087)	3	4.03	1.81	.63	.5420	.406
.709-.760	—	3/4 (.7500)	—	3	4.25	2.00	.69	.5900	.442
.760-.823	—	13/16 (.8125)	M20 (.7874)	3	4.47	2.00	.69	.6520	.489
.823-.885	—	7/8 (.8750)	M22 (.8661)	3	4.69	2.22	.75	.6970	.523
.885-.948	—	15/16 (.9375)	M24 (.9449)	3	4.91	2.22	.75	.7600	.570
.948-1.010	—	1 (1.0000)	M25 (.9843)	3	5.13	2.50	.81	.8000	.600
1.010-1.073	—	1-1/16 (1.0625)	M27 (1.0630)	3	5.13	2.50	.88	.8960	.672
1.073-1.135	—	1-1/8 (1.1250)	—	3	5.44	2.56	.88	.8960	.672
1.135-1.198	—	1-3/16 (1.1875)	M30 (1.1811)	3	5.44	2.56	1.00	1.0210	.766
1.198-1.260	—	1-1/4 (1.2500)	—	3	5.75	2.56	1.00	1.0210	.766
1.260-1.323	—	1-5/16 (1.3125)	M33 (1.2992)	3	5.75	2.56	1.06	1.1080	.831
1.323-1.385	—	1-3/8 (1.3750)	—	3	6.06	3.00	1.06	1.1080	.831
1.358-1.448	—	1-7/16 (1.4375)	M36 (1.4173)	3	6.06	3.00	1.13	1.2330	.925
1.448-1.510	—	1-1/2 (1.5000)	—	3	6.38	3.00	1.13	1.2330	.925
1.510-1.635	—	1-5/8 (1.6250)	M39 (1.5354)	3	6.69	3.19	1.13	1.3050	.979
1.635-1.760	—	1-3/4 (1.7500)	M42 (1.6535)	3	7.00	3.19	1.25	1.4300	1.072
1.760-1.885	—	1-7/8 (1.8750)	—	3	7.31	3.56	1.25	1.5190	1.139
1.885-2.010	—	2 (2.0000)	M48 (1.8898)	3	7.63	3.56	1.38	1.6440	1.233
2.010-2.135	—	2-1/8 (2.1250)	—	3	8.00	3.56	1.38	1.7690	1.327
2.135-2.260	—	2-1/4 (2.2500)	M56 (2.2047)	3	8.25	3.56	1.44	1.8940	1.420
2.260-2.385	—	2-3/8 (2.3750)	—	3	8.50	4.00	1.44	2.0190	1.514
2.385-2.510	—	2-1/2 (2.5000)	—	3	8.75	4.00	1.50	2.1000	1.575
2.510-2.635	—	2-5/8 (2.6250)	M64 (2.5197)	3	8.75	4.00	1.50	2.2250	1.669
2.635-2.760	—	2-3/4 (2.7500)	—	3	9.25	4.00	1.56	2.3500	1.762
2.760-2.885	—	2-7/8 (2.8750)	M72 (2.8346)	3	9.25	4.00	1.56	2.4750	1.856
2.885-3.010	—	3 (3.0000)	—	3	9.75	4.56	1.63	2.5430	1.907
3.010-3.135	—	3-1/8 (3.1250)	—	3	9.75	4.56	1.63	2.6680	2.001
3.135-3.260	—	3-1/4 (3.2500)	M80 (3.1496)	3	10.00	4.56	1.75	2.7930	2.095
3.260-3.385	—	3-3/8 (3.3750)	—	3	10.00	4.56	1.75	2.8830	2.162
3.385-3.510	—	3-1/2 (3.5000)	—	3	10.25	4.94	2.00	3.0080	2.256
3.510-3.635	—	3-5/8 (3.6250)	M90 (3.5433)	3	10.25	4.94	2.00	3.1330	2.350
3.635-3.760	—	3-3/4 (3.7500)	—	3	10.50	5.31	2.13	3.2170	2.413
3.760-3.885	—	3-7/8 (3.8750)	—	3	10.50	5.31	2.13	3.3420	2.506
3.885-4.010	—	4 (4.0000)	M100 (3.9370)	3	10.75	5.31	2.25	3.4670	2.600

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General Dimensions

					Tap Dimensions — Inches					
nominal diameter range (in)	machine screw size number (in)	nominal fractional diameter (in)	nominal metric diameter mm (in)	blank design number	overall length L	thread length l	neck length l1	square length l2	shank diameter D1	square size A
.104 .117	4 (.1120)	—	—	1	1.88	.31	.25	.19	.1410	.110
.117 .130	5 (.1250)	—	M3 (.1181)	1	1.94	.31	.31	.19	.1410	.110
.130 .145	6 (.1380)	—	M3.5 (.1378)	1	2.00	.38	.31	.19	.1410	.110
.145 .171	8 (.1640)	—	M4 (.1575)	1	2.13	.38	.38	.25	.1680	.131
.171 .197	10 (.1900)	—	M4.5 (.1772)	1	2.38	.50	.38	.25	.1940	.152
			M5 (.1969)	—	—	—	—	—	—	—
.197 .223	12 (.2160)	—	—	1	2.38	.50	.44	.28	.2200	.165
.223 .260	—	1/4 (.2500)	M6 (.2362)	2	2.50	.63	.38	.31	.2550	.191
.260 .323	—	5/16 (.3125)	M7, M8 (.2756), (.3150)	2	2.72	.69	.44	.38	.3180	.238
.323 .395	—	3/8 (.3750)	M10 (.3937)	2	2.94	.75	.50	.44	.3810	.286
.395 .448	—	7/16 (.4375)	—	3	3.16	.88	—	.41	.3230	.242
.448 .510	—	1/2 (.5000)	M12 (.4724)	3	3.38	.94	—	.44	.3670	.275
.510 .573	—	9/16 (.5625)	M14 (.5541)	3	3.59	1.00	—	.50	.4290	.322
.573 .635	—	5/8 (.6250)	M16 (.6299)	3	3.81	1.09	—	.56	.4800	.360
.635 .709	—	11/16 (.6875)	M18 (.7087)	3	4.03	1.09	—	.63	.5420	.406
.709 .760	—	3/4 (.7500)	—	3	4.25	1.22	—	.69	.5900	.442
.760 .823	—	13/16 (.8125)	M20 (.7874)	3	4.47	1.22	—	.69	.6520	.489
.823 .885	—	7/8 (.8750)	M22 (.8661)	3	4.69	1.34	—	.75	.3670	.523
.885 .948	—	15/16 (.9375)	M24 (.9449)	3	4.91	1.34	—	.75	.7600	.570
.948 1.010	—	1 (1.0000)	M25 (.9843)	3	5.13	1.50	—	.81	.8000	.600

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NOTE: Thread length l is based on a length of 12 pitches of the UNC thread series. Thread length "l" is a minimum value and has no tolerance. When thread length "l" is added to neck length "l1", the total shall be no less than the minimum USCTI Table 302 thread length "l". Unless otherwise specified, all tolerances are in accordance with USCTI Table 302. For eccentricity tolerances, see USCTI Table 317. Table 302 is provided for reference only. WIDIA-GTD™ tap dimensions may differ.

Tolerances

element	nominal diameter range (in)	direction	tolerance (in)
length overall — L	.0520–1.0100	plus or minus	.031
	1.0100–4.0100	plus or minus	.063
length of thread — l	.0520–.2230	plus or minus	.047
	.2230–.5100	plus or minus	.063
	.5100–1.5100	plus or minus	.094
	1.5100–4.0100	plus or minus	.125
length of square — l2	.0520–1.0100	plus or minus	.031
	1.0100–4.0100	plus or minus	.063
diameter of shank — d1	.0520–.2230	minus	.0015
	.2230–.6350	minus	.0015
	.6350–1.0100	minus	.0020
	1.0100–1.5100	minus	.0020
	1.5100–2.0100	minus	.0030
	2.0100–4.0100	minus	.0030
size of square — a	.0520–.5100	minus	.004
	.5100–1.0100	minus	.006
	1.0100–2.0100	minus	.008
	2.0100–4.0100	minus	.010

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Special Taps

Unless otherwise specified:

Special taps over 1.010–1.510" diameter inclusive, having 14 or more threads per inch or 1,75mm pitch and finer, and sizes over 1.510" diameter with 10 or more threads per inch or 2,5mm pitch and finer, are made to general dimensions shown in USCTI Table 303.

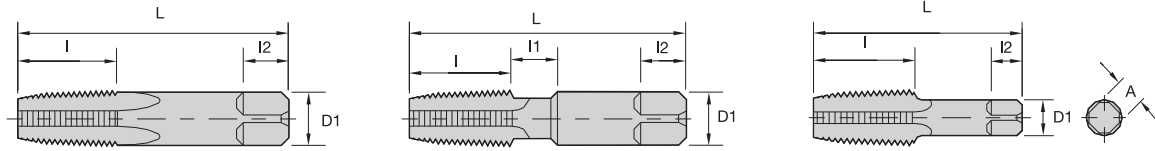
Special tap thread limits are determined using the formulas shown in USCTI Table 331 for Unified Inch Screw Threads and USCTI Table 341 for metric m-profile screw threads.

NOTE:

Tap sizes .395" and smaller have an external center on the thread end (may be removed on bottoming taps). Sizes .125" and smaller have an external center on the shank end. Sizes .224–.395" have truncated partial cone centers on the shank end (length of cone approximately 1/4 of diameter of shank). Sizes over .395" have internal centers on both the thread and shank ends.

For standard thread limits and tolerances for Unified Inch Screw Threads, see USCTI Table 327, and for metric threads, see USCTI Table 337.

For eccentricity tolerances of tap elements, see USCTI Table 317.



■ General Dimensions

nominal size (in)	dimensions (in)					
	overall length L	thread length I	square length I2	shank diameter D1	square size A	optional neck length I1
1/16	2.13	.69	.38	.3125	.234	.375
1/8	2.13	.75	.38	.3125	.234	–
1/8	2.13	.75	.38	.4375	.328	.375
1/4	2.44	1.06	.44	.5625	.421	.375
3/8	2.56	1.06	.50	.7000	.531	.375
1/2	3.13	1.38	.63	.6875	.515	–
3/4	3.25	1.38	.69	.9063	.679	–
1	3.75	1.75	.81	1.1250	.843	–
1-1/4	4.00	1.75	.94	1.3125	.984	–
1-1/2	4.25	1.75	1.00	1.5000	1.125	–
2	4.25	1.75	1.13	1.8750	1.406	–
2-1/2	5.50	2.56	1.25	2.2500	1.687	–
3	6.00	2.63	1.38	2.6250	1.968	–
3-1/2	6.50	2.69	1.50	2.8125	2.108	–
4	6.75	2.75	1.56	3.0000	2.250	–

■ Tolerances

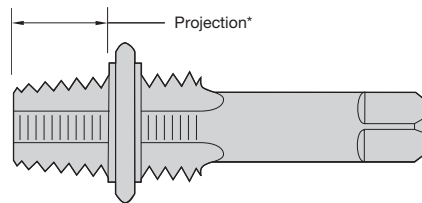
element	range	direction	tolerance
length overall – L	1/16–3/4 inc.	plus/minus	.031
	1–4 inc.	plus/minus	.063
length of thread – I	1/16–3/4 inc.	plus/minus	.063
	1–1-1/4 inc.	plus/minus	.094
length of square – I2	1-1/2–4	plus/minus	.125
	1/16–3/4 inc.	plus/minus	.031
diameter of shank – d1	1–4 inc.	plus/minus	.063
	1/16–1/8	minus	.0015
size of square – a	1/4–1 inc.	minus	.0020
	1-1/4–4 inc.	minus	.0030
size of square – a	1/16–1/8	minus	.004
	1/4–3/4 inc.	minus	.006
	1–4 inc.	minus	.008

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American National Standard Taper Pipe Thread Form (NPT)

Aeronautical National Taper Pipe Thread Form (ANPT)

Dryseal American National Standard Taper Pipe Thread Form (NPTF)



taper per foot limits

nominal size (in)	threads per inch	projection* (in)	projection tolerance + / -	taper per foot limits		length L1	tap drill size** NPT, ANPT, NPTF
				min	max		
1/16	27	.312	.063	.719	.781	.160	C
1/8	27	.312	.063	.719	.781	.1615	Q
1/4	18	.459	.063	.719	.781	.2278	7/16
3/8	18	.454	.063	.719	.781	.240	9/16
1/2	14	.579	.063	.719	.781	.320	45/64
3/4	14	.565	.063	.719	.781	.339	29/32
1	11-1/2	.678	.094	.719	.781	.400	1-9/64
1-1/4	11-1/2	.686	.094	.719	.781	.420	1-31/64
1-1/2	11-1/2	.699	.094	.719	.781	.420	1-23/32
2	11-1/2	.667	.094	.719	.781	.436	2-3/16
2-1/2	8	.925	.094	.734	.781	.682	2-39/64
3	8	.925	.094	.734	.781	.766	3-15/64
3-1/2	8	.938	.125	.734	.781	.821	—
4	8	.950	.125	.734	.781	.844	—

\*Distance from small end of tap projects through L1 taper thread ring gage.

\*\*Recommended size given permits direct tapping without reaming the hole, but only gives a full thread for approximately the L1 length. Reprinted with permission from United States Cutting Tool Institute (USCTI). Published by Kennametal Inc. © 2014. All rights reserved.

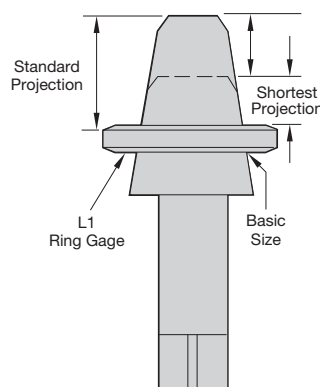
### ■ Pipe Taps

General-purpose pipe taps are appropriate for threading a wide variety of materials, both ferrous and non-ferrous.

Ground thread pipe taps are standard in American Standard Pipe Form (NPT) and American Standard Dryseal Pipe Form (NPFT). NPT threads require the use of a sealer, like Teflon® tape or pipe compound. Dryseal taps are used to tap fittings, which will give a pressure-tight joint without the use of a sealer.

The nominal size of a pipe tap is that of the pipe fitting to be tapped, not the actual size of the tap. The thread tapers 3/4" per foot.

All pipe taps are furnished with 2-1/2-3-1/2 thread chamfer.



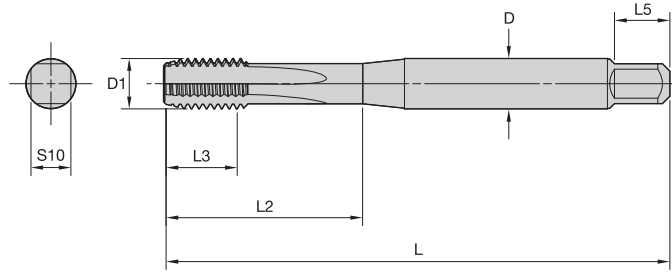
Short projection pipe taps are made with a projection shorter than standard for taper pipe tapping where the depth of tapping is limited.

Special short projection taper pipe taps can be furnished with American National Standard Taper Pipe thread (ANPT) or Dryseal American National Standard Taper Pipe thread (NPTF, PTF-SAE Short, or PTF-SPL Extra Short).

For information on short projection pipe taps and hole preparation for NPT, NPTF, and ANPT internal pipe threads, consult WIDIA-GTD™ Technical Bulletins.

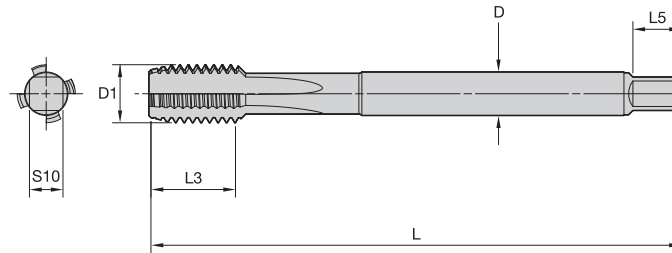
Special short projection pipe taps and left-hand pipe taps are available through Lightning™ Service.

Technical Information



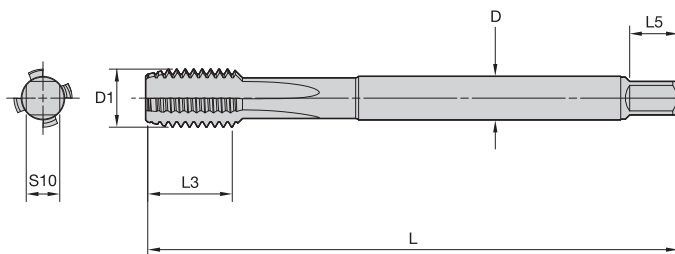
■ **DIN 371**

machine screw size number	nominal fraction diameter (in)	metric dimensions					
		D	L	L3	L2	L5	S10
4	–	3,5	56	8	18	6	2,7
5	–	4,0	56	9	20	6	3,0
6	–	4,0	56	9	20	6	3,0
8	–	4,5	63	11	21	6	3,4
10	–	6,0	70	12	25	8	4,9
–	1/4	7,0	80	15	30	8	5,5
–	5/16	8,0	90	15	35	9	6,2
–	3/8	10,0	100	19	39	11	8,0



■ **DIN 376**

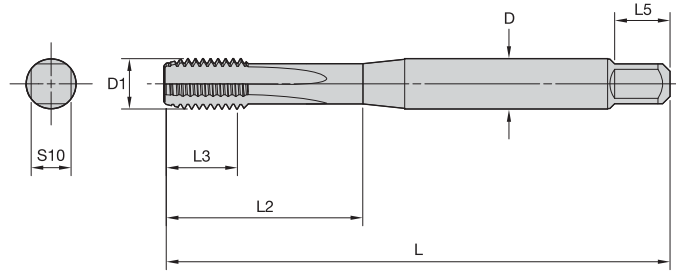
nominal fraction diameter (in)	metric dimensions					
	D	L	L3	L5	S10	
7/16	8	100	18	9	6,2	
1/2	9	110	23	10	7,0	
9/16	11	110	25	12	9,0	
5/8	12	110	24	12	9,0	
3/4	16	140	30	15	12,0	
7/8	18	140	34	17	14,5	
1	18	160	38	17	14,5	



■ DIN 374

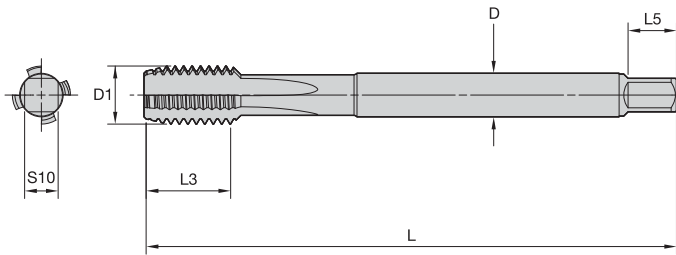
D1	pitch		D	L	metric dimensions		
	minimum	maximum			L3*	L5	S10
M8	0.2	0.75	6	80	18	8	4.9
M8	-	1	6	90	22	8	4.9
M9	0.2	0.75	7	80	18	8	5.5
M9	-	1	7	90	22	8	5.5
M10	0.2	1	7	90	20	8	5.5
M10	-	1.25	7	100	24	8	5.5
M11	0.35	1	8	90	20	9	6.2
M12	0.35	1.5	9	100	22	10	7
M14	0.35	1.5	11	100	22	12	9
M16	0.35	1.5	12	100	22	12	9
M16	-	2	12	110	32	12	9
M18	0.35	1.5	14	110	25	14	11
M18	-	2	14	125	34	14	11
M20	0.35	1.5	16	125	25	15	12
M20	-	2	16	140	34	15	12
M22	0.35	1.5	18	125	25	17	14.5
M22	-	2	18	140	34	17	14.5
M24	0.35	2	18	140	28	17	14.5
M27	0.35	2	20	140	28	19	16
M30	0.35	2	22	150	28	21	18
M30	-	3	22	180	45	21	18

\* Maximum



■ JIS Type 2 Metric Coarse

D1	pitch	metric dimensions					
		D	L	L3	L2	L5	S10
M3	0.5	4	46	11	19	6	3.2
M3.5	0.6	4	48	13	20	6	3.2
M4	0.7	5	52	13	21	7	4
M4.5	0.75	5	55	13	21	7	4
M5	0.8	5.5	60	16	24	7	4.5
M6	1	6	62	19	29	7	4.5



■ JIS Type 3 Metric Coarse

D1	pitch	metric dimensions					
		D	L	L3	L5	S10	
M8	1.25	6.2	70	22	8	5	
M9	1.25	7	72	22	8	5.5	
M10	1.5	7	75	24	8	5.5	
M11	1.5	8	80	25	9	6	
M12	1.75	8.5	82	29	9	6.5	
M14	2	10.5	88	30	11	8	
M16	2	12.5	95	32	13	10	
M18	2.5	14	100	37	14	11	
M20	2.5	15	105	37	15	12	
M22	2.5	17	115	38	16	13	
M24	3	19	120	45	18	15	

**Through Holes  
Push Chips**



GUN<sup>™</sup>



LHSF



- GUN<sup>™</sup> (spiral point) or LHSF (Left-Hand Spiral Flute).
- Ideal for materials with long chips.

**Blind Holes  
Pull Chips**



RHSF



- RHSF (Right-Hand Spiral Flute).
- Ideal for materials with long chips.

**Blind or Through Holes  
Store Chips**



STFL



- STFL (Straight Flute).
- Ideal for materials with short chips.

**Blind or Through Holes  
No Chips**



Forming Tap



- Forming.
- Ideal for ductile materials <32 HRC.



■ Unified Inch Screw Threads

thread size/pitch	recommended tap limits <sup>1</sup>		min all classes (Basic)	internal thread pitch diameter limits	
	class 2B	class 3B		max class 2B	max class 3B
0-80	H2	H2	0.0519	0.0542	0.0536
1-64	H2	H2	0.0629	0.0655	0.0648
1-72	H2	H2	0.0640	0.0665	0.0659
2-56	H2	H2	0.0744	0.0772	0.0765
2-64	H2	H2	0.0759	0.0786	0.0779
3-48	H3	H2	0.0855	0.0885	0.0877
3-56	H2	H2	0.0874	0.0902	0.0895
4-40	H3	H2	0.0958	0.0991	0.0982
4-48	H3	H2	0.0985	0.1016	0.1008
5-40	H3	H2	0.1088	0.1121	0.1113
5-44	H3	H2	0.1102	0.1134	0.1126
6-32	H3	H2	0.1177	0.1214	0.1204
6-40	H3	H2	0.1218	0.1252	0.1243
8-32	H3	H3	0.1437	0.1475	0.1465
8-36	H3	H3	0.1460	0.1496	0.1487
10-24	H3	H3	0.1629	0.1672	0.1661
10-32	H3	H3	0.1697	0.1736	0.1726
12-24	H3	H3	0.1889	0.1933	0.1922
12-28	H3	H3	0.1928	0.1970	0.1959
1/4-20	H5	H3	0.2175	0.2224	0.2211
1/4-28	H4	H3	0.2268	0.2311	0.2300
5/16-18	H5	H3	0.2764	0.2817	0.2803
5/16-24	H4	H3	0.2854	0.2902	0.2890
3/8-16	H5	H3	0.3344	0.3401	0.3387
3/8-24	H4	H3	0.3479	0.3528	0.3516
7/16-14	H5	H3	0.3911	0.3972	0.3957
7/16-20	H5	H3	0.4050	0.4104	0.4091
1/2-13	H5	H4	0.4500	0.4565	0.4548
1/2-20	H5	H3	0.4675	0.4731	0.4717
9/16-12	H5	H4	0.5084	0.5152	0.5135
9/16-18	H5	H3	0.5264	0.5323	0.5308
5/8-11	H5	H4	0.5660	0.5732	0.5714
5/8-18	H5	H3	0.5889	0.5949	0.5934
3/4-10	H5	H4	0.6850	0.6927	0.6907

<sup>1</sup>Tap H limit selected for 3B will also produce thread to 2B.

NOTE: The above recommended taps normally produce the class of thread indicated in average materials when used with reasonable care. However, if the specified tap does not provide a satisfactory gage fit, choose an alternate tap limit.

■ Unified Inch Screw Threads

thread size/pitch	recommended tap limits <sup>1</sup>		internal thread pitch diameter limits		
	class 2B	class 3B	min all classes (Basic)	max class 2B	max class 3B
3/4-16	H5	H4	0.7094	0.7159	0.7143
7/8-9	H6	H4	0.8028	0.8110	0.8089
7/8-14	H6	H4	0.8286	0.8356	0.8339
1"-8	H6	H5	0.9188	0.9276	0.9254
1"-12	H6	H4	0.9459	0.9535	0.9516
1-1/8-7	H8	H6	1.0322	1.0416	1.0393
1-1/8-8	H8	H6	1.0438	1.0528	1.0505
1-1/8-12	H6	H5	1.0709	1.0787	1.0768
1-1/4-7	H8	H6	1.1572	1.1668	1.1644
1-1/4-8	H8	H6	1.1688	1.1780	1.1757
1-1/4-12	H6	H5	1.1959	1.2039	1.2019
1-3/8-6	H8	H6	1.2667	1.2771	1.2745
1-3/8-8	H8	H6	1.2938	1.3031	1.3008
1-3/8-12	H6	H5	1.3209	1.3291	1.3270
1-1/2-6	H8	H6	1.3917	1.4022	1.3996
1-1/2-8	H8	H6	1.4188	1.4283	1.4259
1-1/2-12	H6	H5	1.4459	1.4542	1.4522
1-3/4-5	H8	H7	1.6201	1.6317	1.6288
2-4 1/2	H8	H7	1.8557	1.8681	1.8650

<sup>1</sup>Tap H limit selected for 3B will also produce thread to 2B.

■ Tap Recommendations for Class 6H Metric Screw Threads

thread size		recommended tap limit number	internal thread product limits — class 6H			
nominal diameter (mm)	pitch (mm)		pitch diameter (mm)		pitch diameter (in)	
		min	max	min	max	
1,6	0,35	D3	1,373	1,458	.05406	.05740
2	0,4	D3	1,740	1,830	.06850	.07205
2,5	0,45	D3	2,208	2,303	.08693	.09067
3	0,5	D3	2,675	2,775	.10531	.10925
3,5	0,6	D4	3,110	3,222	.12244	.12685
4	0,7	D4	3,545	3,663	.13957	.14421
4,5	0,75	D4	4,013	4,131	.15789	.16264
5	0,8	D4	4,480	4,605	.17638	.18130
6	1	D5	5,350	5,500	.21063	.21654
7	1	D5	6,350	6,500	.25000	.25591
8	1,25	D5	7,188	7,348	.28299	.28929
10	1,5	D6	9,026	9,206	.35535	.36244
12	1,75	D6	10,863	11,063	.42768	.43555
14	2	D7	12,701	12,913	.50004	.50839
16	2	D7	14,701	14,913	.57878	.58713
20	2,5	D7	18,376	18,600	.72346	.73228
24	3	D8	22,051	22,316	.86815	.87858
30	3,5	D9	27,727	28,007	1.09161	1.10264
36	4	D9	33,402	33,702	1.31504	1.32685

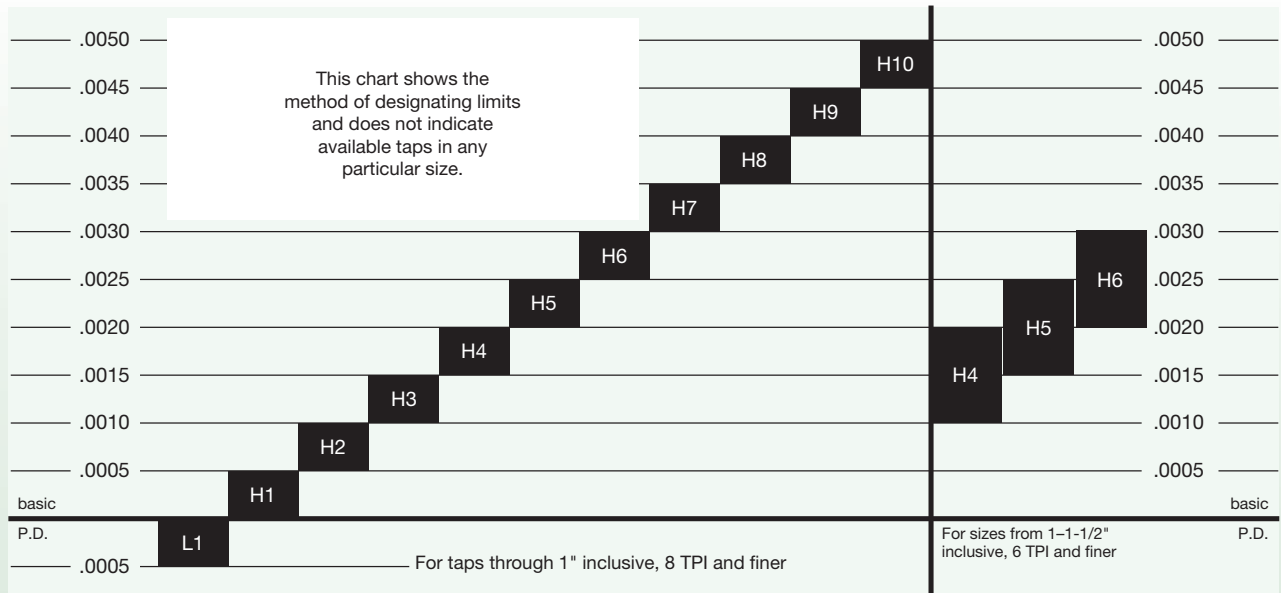
Technical Information

In addition to the nominal size and pitch of a tap, there is another important dimensional factor to be considered when selecting a ground thread tap for a given job. This factor is the pitch diameter tap limit, "H" and "L". "H" represents (high) above basic pitch diameter; "L" (low) is below basic pitch diameter. Tap limits have been established to provide a choice in the selection of the tap size best suited to produce the class of thread desired.

**Figure 1** illustrates the numbering system and the .0005" diameter increment separation between successive limits. Because the starting point is basic pitch diameter, dividing the limit number by two establishes, in thousandths of an inch, the amount the maximum tap pitch diameter is above basic in the "H" series and the amount the minimum tap pitch diameter is under basic in the "L" series.

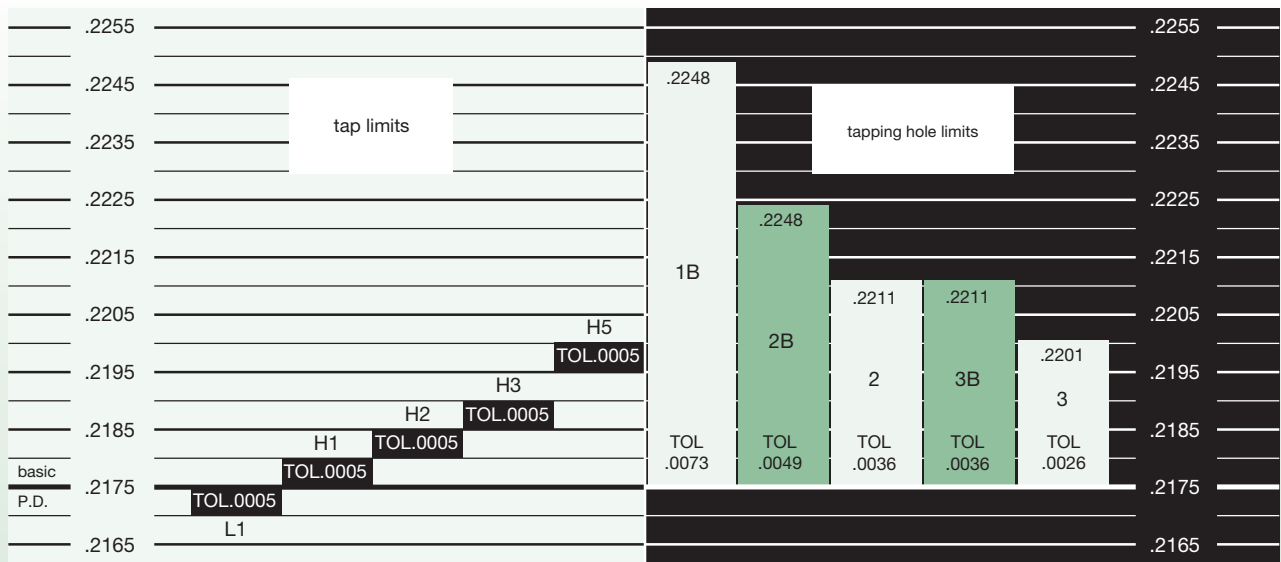
**Figure 2** illustrates the positioning of the tap limits in relation to the various classes of threads for a 1/4-20 size.

**Figure 1**

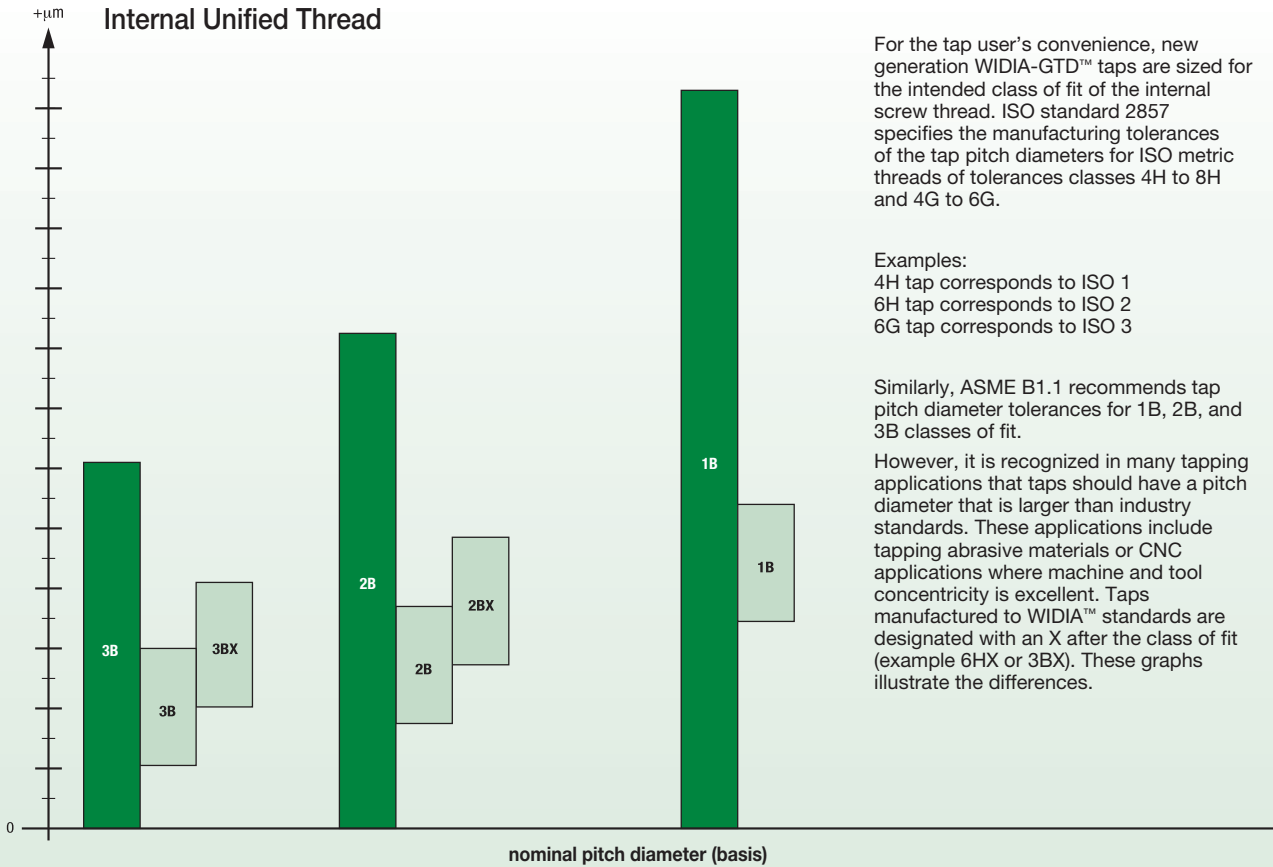


**Figure 2**

Class of Thread – 1/4-20 UNC and NC



**Internal Unified Thread**



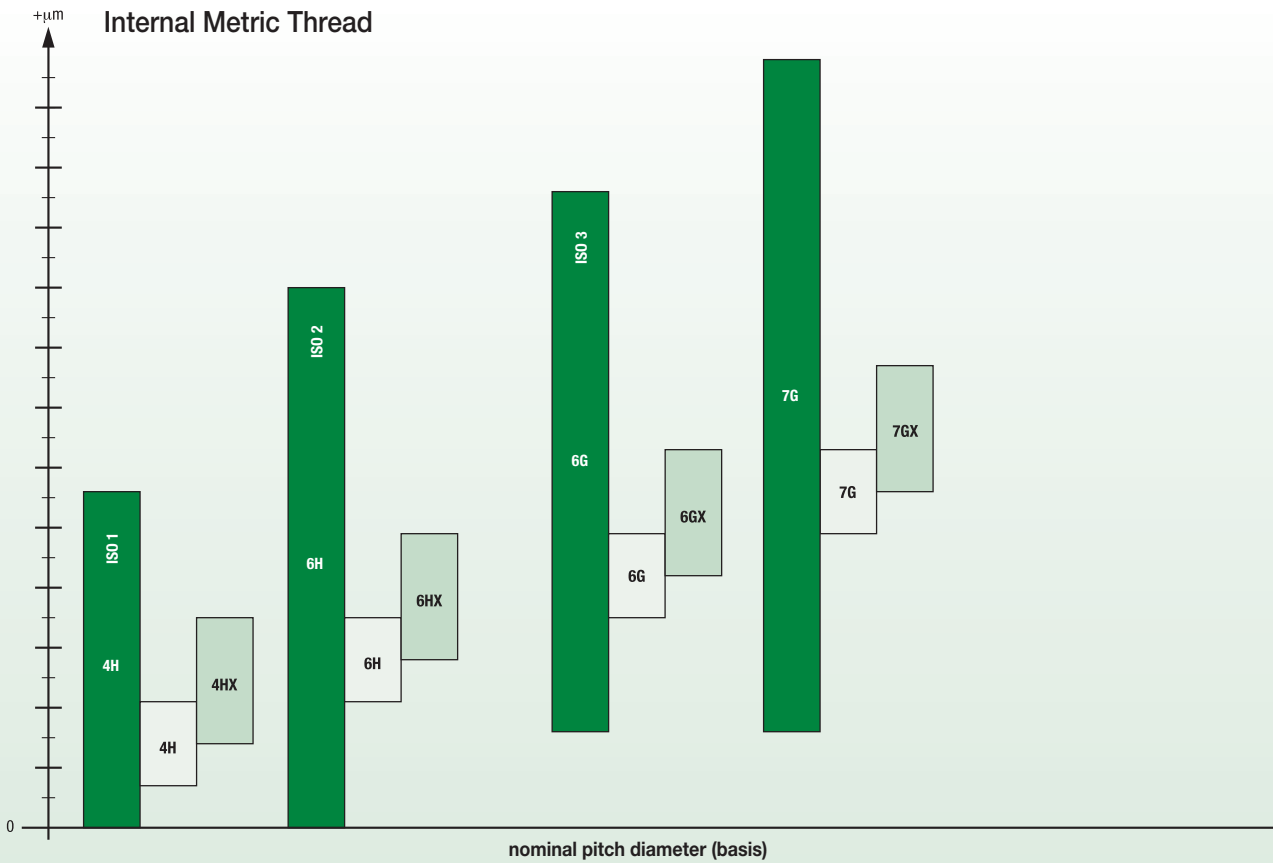
For the tap user's convenience, new generation WIDIA-GTD™ taps are sized for the intended class of fit of the internal screw thread. ISO standard 2857 specifies the manufacturing tolerances of the tap pitch diameters for ISO metric threads of tolerances classes 4H to 8H and 4G to 6G.

Examples:  
4H tap corresponds to ISO 1  
6H tap corresponds to ISO 2  
6G tap corresponds to ISO 3

Similarly, ASME B1.1 recommends tap pitch diameter tolerances for 1B, 2B, and 3B classes of fit.

However, it is recognized in many tapping applications that taps should have a pitch diameter that is larger than industry standards. These applications include tapping abrasive materials or CNC applications where machine and tool concentricity is excellent. Taps manufactured to WIDIA™ standards are designated with an X after the class of fit (example 6HX or 3BX). These graphs illustrate the differences.

**Internal Metric Thread**



Technical Information

It is generally recognized that, in mass production, it is impossible to reproduce in exact detail the theoretically perfect product as laid out on the drawing board. The allowed slight variation between the theoretically perfect product drawing and each unit of the actual product is called the tolerance.

**Allowance**

An intentional difference in correlated dimensions of mating parts. It is the minimum clearance or maximum interference between such parts.

**Angle of Thread**

The angle included between the flanks of the thread measured in an axial plane.

**Half Angle of Thread**

The angle included between a flank of the thread and the normal (90°) to the axis, measured in an axial plane.

**Lead of Thread**

The distance a screw thread advances axially in one turn. On a single-thread screw, the lead and pitch are identical. On a double thread, the lead is 2x pitch; on a triple thread, the lead is 3x pitch, etc.

**Major Diameter**

The largest diameter of a straight-screw thread.

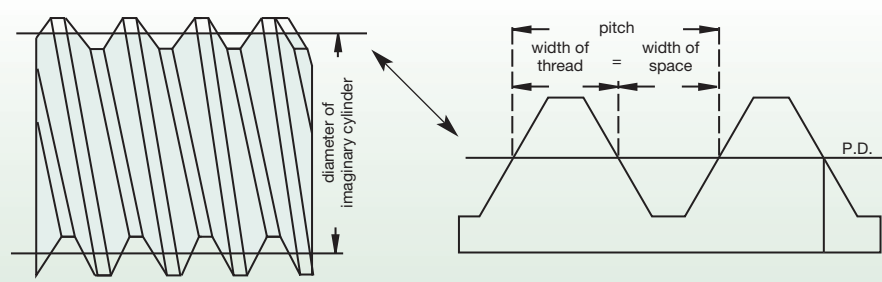
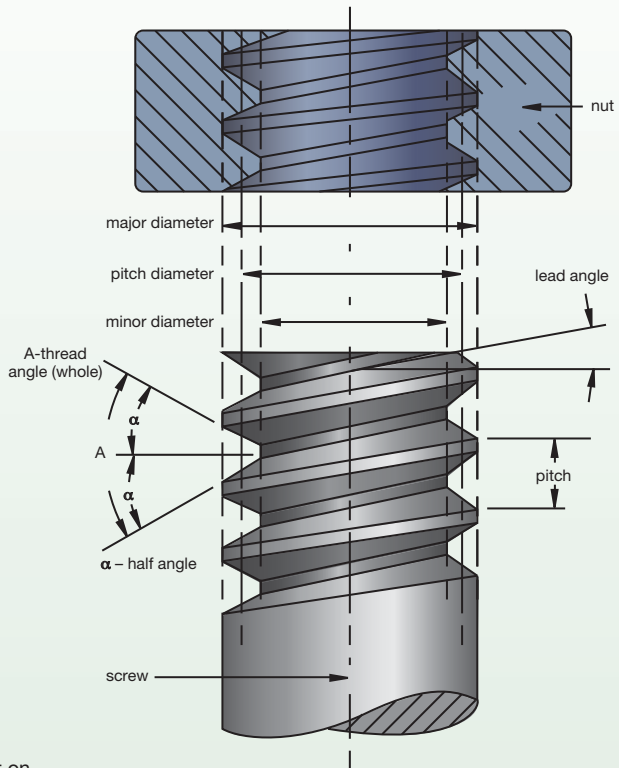
**Minor Diameter**

The smallest diameter of a straight-screw thread.

**Pitch**

The distance from a point on a screw thread to a corresponding point on the next thread measured parallel to the axis.

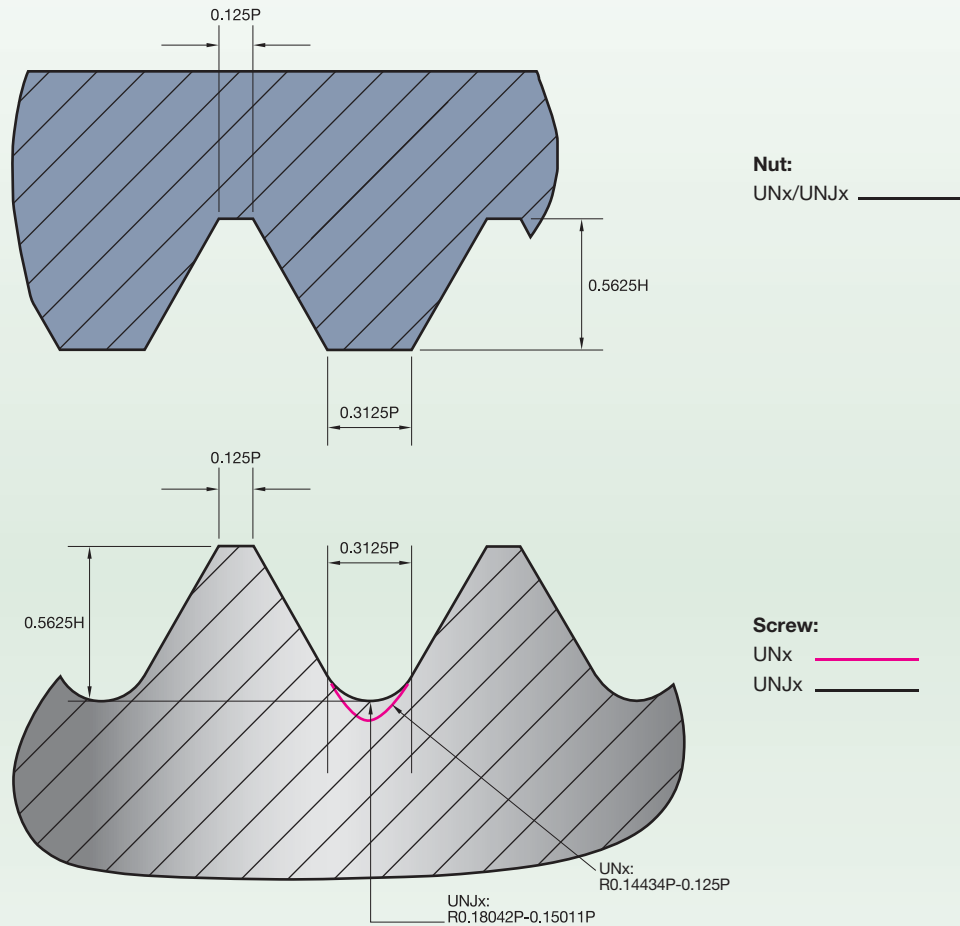
The pitch in inches =  $\frac{1}{\text{number of threads per inch}}$



**Pitch Diameter**

On a straight-screw thread, the diameter of an imaginary cylinder that would pass through the threads at such points as to make equal the width of the threads and the width of the spaces cut by the surface of the cylinder.

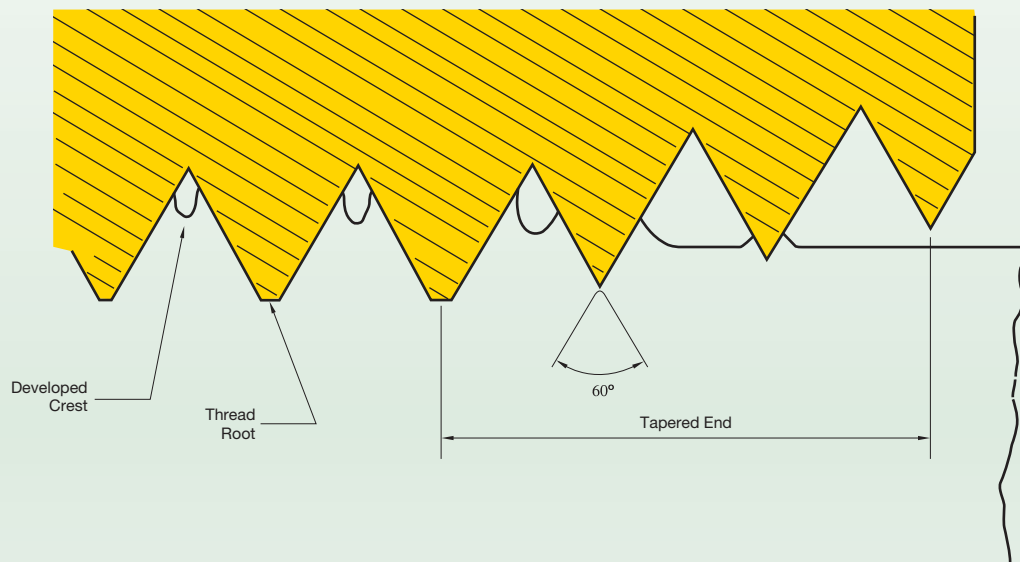
A thread system is available for aerospace and other applications where high fatigue strength is required. The UNJ thread form is defined by ASME B1.15 and is similar to Military Specification MIL-S-8879. Screw thread assemblies consist of external and internal threads. In order to minimize the stress on the external UNJ thread, a controlled root radius is required that is equal to  $0.15011P$  to  $0.18042P$ , where  $P$  is the thread pitch. Internal UNJ threads are not required to have a radius at either the major or minor diameters.



Because external UNJ threads must be produced with a defined root radius, standard UN tooling may not be used. However, internal UNF threads may be produced with ground thread UN taps sized to produce the proper class of fit. The tap does not need to be marked with a letter J. Attention must be paid to the tap drill since the minor diameter has to be specified so as to provide clearance with the root radius on the external thread.

For UNJ thread specifications, the reader is referred to ASME B1.15. Please note this standard includes Class 3 and Class 2 UNJ screw threads. However, only Class 3 UNJ threads meet the requirements of Military Specification MIL-S-8879. For Unified Inch (UN) thread specifications, refer to ASME B1.1.

Unlike cutting taps, which remove material, forming taps generate an internal screw thread by displacing material and forming it into the V-shaped thread. A common misconception is that a thread rolling action occurs. Instead, the threads are formed over the tapered entry section of the tap as the tap rotates into the hole. A succession of deeper penetrating lobes over the entry plastically displaces material radially between the tap's thread flanks until the entry length is reached. At this point, the thread is fully formed at the correct thread height.



Forming taps have numerous advantages over cutting taps. The most obvious advantage is that forming taps do not create chips. There are no chip removal problems. Bird nesting is a situation that occurs when chips wrap around the shank of spiral-fluted taps when tapping blind holes in long chipping materials. Forming taps help this to be avoided. Since forming taps avoid this problem, they are stronger and more resistant to breakage. Another misconception is that forming taps produce stronger threads. Although the forming process strain hardens the thread flanks, it has very little effect on the major diameter, the location where internal threads strip.

Forming taps can only be used in ductile materials. Due to increased friction relative to cutting, forming taps require higher torque than cutting taps. In some situations, oil-based lubrications are required, and this might not be convenient on CNC machining centers that use water soluble coolant. In this situation, the lubricant concentration should be increased.

Since forming taps displace material, larger diameter pre-tap holes are required. This is especially important when converting from cutting taps to forming taps. If a cutting tap hole size is used, the displaced material will over-fill the tap's threads and breakage will result. Please consult hole size charts for forming taps.

coating	properties and application	precautions
<b>Titanium Nitride (TiN)</b>	Proprietary TiN coating (hardness 2300 Vickers) offers significantly improved wear life and thread finish, often at higher tapping speeds, in a broad range of materials, especially steels, irons, and plastics. Golden color.	Use with caution in non-ferrous materials such as aluminum because of tendency to gall.
<b>Titanium Carbonitride (TiCN)</b>	Proprietary TiCN coating (hardness 3000 Vickers) is harder, tougher, and more wear resistant than TiN under conditions of moderate cutting temperatures. Like TiN, TiCN may be used at higher cutting speeds in a broad range of materials, especially steels and irons. Blue-gray color.	Use with caution in non-ferrous materials such as aluminum because of tendency to gall. TiAlN is a better choice when used at extreme temperatures.
<b>Titanium Nitride + Chromium Carbide Carbon (TiN + CrC/C)</b>	Proprietary coating (hardness 2300 Vickers) that combines the wear resistance of smooth TiN coating with a lubricious top layer of chromium carbide carbon. Effective in stainless steel and non-ferrous materials including aluminum and titanium. Ideal choice for 300 series stainless steels, wrought, and die cast aluminums. Black/gray color.	Effective in both ferrous and non-ferrous materials.
<b>Titanium Aluminum Nitride (TiAlN)</b>	Nanolayer TiAlN coating (hardness 3300 Vickers) offers improved wear life and thread finish, especially in conditions where high temperatures can be generated. Use for PH stainless steels and nickel-based alloys like INCONEL®. Violet/gray color.	Use with caution in non-ferrous materials because of tendency to gall.
<b>Chromium Nitride (CrN)</b>	CrN is medium hard (hardness 1800 Vickers) and has a lower wear resistance than TiN, TiCN, and TiAlN. However, unlike these coatings, CrN does not gall when used in some non-ferrous work materials. Use for brass, bronze, zinc alloys, and magnesium alloys. Silver color.	Ineffective in ferrous materials.
<b>Nitride (MAXI #1)</b>	Hardened case extends wear life in abrasive materials. Use for aluminum and other non-ferrous materials.	Avoid on taper pipe, fast spiral, and small diameter (<#6) or fine pitch taps due to tendency for thread chipping.
<b>Oxide (SH-50)</b>	Helps prevent galling in ferrous (iron-based) materials. For free machining steel. Use for steels, stainless steels, and irons.	Has a tendency to cause galling in non-ferrous materials such as aluminum.
<b>Nitride and Oxide (SH-47)</b>	Combines the benefits of nitride and oxide surface treatments. For steels, stainless steels, and nickel alloys.	See precautions for nitride and oxide surface treatments.

Technical Information



Factors when trying to determine the best tapping speeds:

- Material to be tapped
- Length of chamfer on tap
- Percentage of full thread to be cut
- Length of hole (depth of thread)
- Pitch of thread
- Cutting fluids
- Machine equipment
- Horizontal or vertical tapping

The best and most efficient operating speeds for taps cannot be calculated with the same certainty, as for many other metalcutting tools.

With other tools, the feed per revolution can be set at any desired point and can be varied as conditions demand. Taps, on the other hand, must always be advanced at a rate equal to one pitch for every revolution. The style of tap may vary the conditions.

For example, with a bottoming tap, the first thread on each land cuts the full height of thread, while, with a taper or starting tap, a number of threads do their share of the cutting before the full height of thread is reached.

The depth of thread also varies, depending on the pitch. The coarser the thread, the greater the advance of the tap per revolution and the greater the amount of material removed.

The method of feeding the tap, and the type of equipment for driving, also influences the permissible speeds. If taps are mechanically fed at the proper rate of advance, they can be operated at higher speeds than if they are required to feed themselves and pull some part of the machine along with them.

**Speeds may be modified to take into account any or all of these factors:**

- Speeds must be lowered as length of thread increases because, in deep thread holes, the accumulated chips increase friction and interfere with lubrication.
- Bottoming taps must be run slower than plug taps.
- Tapping full height of thread calls for slower speed than if the commercial 75% height only is required.
- Coarse-thread taps in the larger diameters should be run more slowly than fine-thread taps of the same diameters.
- The quantity and quality of cutting fluid may affect the permissible speeds as much as 100%.
- Taper threaded taps, such as pipe taps, should be operated from 1/2–3/4 the speed of a straight thread tap of comparable major diameter.

### ■ RPM Formulas

SFM = Surface Feet per Minute  
RPM = Revolutions per Minute  
IPM = Inches per Minute  
TPI = Threads per Inch

S m/m = Surface Meters per Minute  
 $\pi = 3.1416$   
mm/min = millimeters per minute  
P = Pitch (1/number of threads per inch)

### Inch Sizes

SFM	=	$\frac{\text{RPM} \times \text{tool diameter}}{3.82}$	or	$0.26 \times \text{RPM} \times \text{tool diameter}$
RPM	=	$\frac{3.82 \times \text{SFM}}{\text{tool diameter}}$		
IPM	=	$\frac{\text{RPM}}{\text{TPI}^*}$	or	$*P \times \text{RPM}$

### Metric Sizes

S m/m	=	$\frac{p \times \text{tool diameter} \times \text{RPM}}{1000}$
RPM	=	$\frac{\text{mm/m} \times 1000}{p \times \text{tool diameter}}$
mm/min	=	mm P x RPM

**■ UNC/UNF and NPT/NPTF**

tap size	taper pipe taps	surface feet per minute (SFM)																	
		5'	10'	15'	20'	25'	30'	40'	50'	60'	70'	80'	90'	100'	110'	120'	130'	140'	150'
		revolutions per minute (RPM)																	
0	—	318	637	955	1273	1592	1910	2546	3183	3820	4456	5093	5729	6366	7003	7639	8276	8913	9549
1	—	273	546	819	1046	1308	1570	2093	2617	3140	3663	4186	4710	5233	5756	6279	6805	7326	1849
2	—	212	424	637	888	1110	1333	1777	2221	2665	3109	3554	3999	4442	4886	5330	5774	6218	6662
3	—	191	382	573	772	964	1157	1543	1929	2315	2701	3086	3472	3858	4244	4629	5015	5401	5787
4	—	174	347	521	682	853	1023	1364	1705	2046	2387	2728	3069	3411	3751	4092	4434	4775	5115
5	—	147	294	441	611	764	917	1222	1528	1833	2139	2445	2750	3056	3361	3667	3973	4278	4584
6	—	136	273	409	553	691	829	1106	1382	1659	1935	2212	2488	2766	3042	3318	3595	3871	4148
8	—	119	239	358	466	583	699	932	1165	1398	1631	1864	2097	2330	2563	2796	3029	3262	3495
10	—	101	201	302	402	502	603	804	1005	1205	1406	1607	1808	2009	2210	2411	2612	2813	3014
12	—	87	174	260	354	442	531	707	884	1061	1238	1415	1592	1769	1945	2122	2300	2476	2653
1/4	—	76	153	229	306	382	458	611	764	917	1070	1222	1375	1528	1681	1833	1986	2139	2292
5/16	—	62	123	185	245	306	367	489	611	733	856	978	1100	1222	1345	1467	1589	1711	1833
3/8	—	50	101	151	204	255	305	407	509	611	713	815	917	1019	1120	1222	1324	1426	1528
7/16	1/8	43	87	130	175	219	262	349	437	524	611	698	786	873	960	1048	1135	1222	1310
1/2	—	38	76	115	153	191	229	305	382	458	535	611	688	764	840	917	993	1070	1146
9/16	1/4	34	68	102	137	172	206	274	342	410	478	547	616	683	752	820	888	952	1020
5/8	—	32	64	96	122	153	183	244	306	367	428	489	550	611	672	733	794	856	917
11/16	3/8	28	55	83	111	138	167	222	278	333	389	444	500	556	611	667	722	778	833
3/4	—	25	51	76	102	128	153	203	255	305	357	407	458	509	560	611	662	713	764
7/8	1/2	22	43	65	87	109	131	175	218	262	306	350	392	437	480	524	568	611	655
1	—	19	38	57	76	96	115	153	191	230	268	305	344	382	420	458	497	535	573
1-1/8	3/4	17	34	51	68	84	102	136	170	204	238	272	306	340	373	407	441	475	509
1-1/4	—	15	31	46	61	76	92	122	153	183	214	244	275	305	336	367	397	428	458
1-3/8	1	14	28	42	56	69	83	111	139	167	194	222	250	278	306	333	361	389	417
1-1/2	—	13	25	38	51	63	76	102	127	153	178	204	229	255	280	305	331	356	382
1-5/8	—	12	23	35	47	59	71	94	118	141	165	188	212	235	259	282	306	329	353
1-3/4	—	11	22	33	44	55	65	87	109	131	153	175	196	218	240	262	284	306	327
1-7/8	—	10	20	30	41	51	61	81	102	122	143	163	183	204	224	244	265	285	306
2	—	9	19	29	38	48	57	76	96	115	134	153	172	191	210	229	248	267	287

**■ Metric**

metric taps	surface feet per minute (SFM)																	
	5'	10'	15'	20'	25'	30'	40'	50'	60'	70'	80'	90'	10'	110'	120'	130'	140'	150'
	revolutions per minute (RPM)																	
M1	490	979	1469	1959	2449	2938	3918	4897	5877	6856	7836	8815	9795	10774	11754	12733	13713	14692
M2	242	484	725	967	1209	1451	1934	2418	2901	3385	3868	4352	4835	5319	5803	6286	6770	7253
M3	162	324	486	647	809	971	1295	1619	1942	2266	2590	2914	3237	3561	3885	4208	4532	4856
M3.5	138	277	415	554	692	830	1107	1384	1661	1938	2214	1491	2768	3045	3322	3599	3875	4152
M4	122	243	365	487	608	730	973	1217	1460	1703	1946	2190	2433	2676	2920	3163	3406	3650
M5	97	194	291	388	485	582	776	970	1163	1357	1551	1745	1939	2133	2327	2521	2715	2905
M6	81	162	243	324	405	486	647	809	971	1133	1295	1457	1619	1781	1942	2104	2266	2428
M7	69	138	208	277	346	415	554	692	830	969	1107	1246	1384	1522	1661	1799	1938	2076
M8	61	121	182	243	303	364	485	606	728	849	970	1091	1213	1334	1455	1577	1698	1819
M10	48	97	145	194	242	291	388	485	582	679	776	873	970	1067	1163	1260	1357	1454
M12	40	81	121	162	202	243	324	405	486	567	647	728	809	890	971	1052	1133	1214
M14	35	69	104	139	173	208	277	347	416	485	555	624	693	763	832	901	971	1040
M16	30	61	91	121	152	182	243	303	364	424	485	546	606	667	728	788	849	910
M18	27	54	81	108	135	162	216	269	323	377	431	485	539	593	647	700	754	808
M20	24	49	73	97	121	146	194	243	291	340	388	437	485	534	582	631	680	728
M22	22	44	66	88	110	132	176	221	265	309	353	397	441	485	529	573	618	662
M24	20	40	61	81	101	121	162	202	243	283	323	364	404	445	485	526	566	606
M27	18	36	54	72	90	108	144	180	216	252	287	323	359	395	431	467	503	539
M30	16	32	49	65	81	97	129	162	194	226	259	291	323	356	388	420	453	485

Technical Information

**Partial List of Solutions to Tapping Problems**

application	symptom	common cause	remedy
general	gage out of limits	tap size and gage mismatch	select tap size for gage
	oversize thread	alignment, spindle feed	correct
	oversize at top	runout or alignment	correct
	go gage binds part way	worn tool, tap cuts off lead	replace tap, synchronous holder
	thread shaving	feed error, high axial force	program, synchronous holder
	chipping	high cutting force, worn tap	tap geometry, replace tap
	breakage	chip jamming flutes	tap geometry, tapping depth
	—	worn tool, high torque	replace tap with new tool
	short life, low speed	excessive wear	SC or HSS-E-PM HP taps
steel	birdnest blind hole	long, ductile chips	GT30 GP6505 (oxide), peck feed
	chipping	high material hardness	GT00, GT02 WP31MG (TiN)
	breakage in blind holes	hole depth >2D, chip jamming	GT04 WH36MG (TiN/MoS <sub>2</sub> )
stainless steel	oversize thread, low life	galling	GT20, GT30 GM6515 (TiN-CrC/C)
	short life	work hardened core hole	replace drill
cast iron	excessive wear	abrasion	GT40 GP6520 (TiCN)
aluminum, cast	excessive wear	high silicon	GT40 GP6520 (TiCN)
aluminum, wrought	oversize thread	galling	GT70, GT80 WN48EG (DLC)
nickel, cobalt alloys	short life	high cutting temperature	GT10, GT12 WS32MG (TiCN)
titanium	short life	high cutting temperature	GT14, GT16 WN35MG (TiN-DLC)

**Thread Mills**

	vibration marks	major crest wear	edge chipping	cone-shaped thread	entry marks
cutting speed	check	reduce	—	—	—
feed per tooth	check	increase	reduce	—	—
workpiece clamping	improve	improve	improve	—	improve
machine tool stability	improve	improve	improve	—	improve
cantilever arm	shorten	shorten	—	—	shorten
helix angle	increase	reduce	—	—	—
radial runout	check	check	—	—	—
coating	—	improve	improve	—	—
milling operation	—	climb mill	climb mill	climb mill	—
line feed/entry ramp	check	check	—	—	improve
coolant pressure	—	check (>20 bar, 290 psi)	check (>20 bar, 290 psi)	—	—

drill size	decimal (in)	drill size	decimal (in)	drill size	decimal (in)	drill size	decimal (in)	drill size	decimal (in)	drill size	decimal (in)
0,30mm	.0118	54	.0550	3,10mm	.1220	5,50mm	.2165	8,50mm	.3346	9/16	.5625
0,32mm	.0126	1,40mm	.0551	1/18	.1250	7/32	.2188	8,60mm	.3386	14,50mm	.5709
80	.0135	1,45mm	.0571	3,20mm	.1260	5,60mm	.2205	R	.3390	37/64	.5781
0,35mm	.0138	1,50mm	.0591	30	.1285	2	.2210	8,70mm	.3425	14,75mm	.5807
79	.0145	53	.0595	3,30mm	.1299	5,70mm	.2244	11/32	.3438	15,00mm	.5906
0,38mm	.0150	1,55mm	.0610	3,40mm	.1339	1	.2280	8,80mm	.3465	19/32	.5938
1/64	.0156	1/16	.0625	29	.1360	5,80mm	.2283	S	.3480	15,25mm	.6004
0,40mm	.0157	1,60mm	.0630	3,50mm	.1378	5,90mm	.2323	8,90mm	.3504	39/64	.6094
78	.0160	52	.0635	28	.1405	A	.2340	9,00mm	.3543	15,50mm	.6102
0,42mm	.0165	1,65mm	.0650	9/64	.1406	15/64	.2344	T	.3580	15,75mm	.6201
0,45mm	.0177	1,70mm	.0669	3,60mm	.1417	6,00mm	.2362	9,10mm	.3583	5/8	.6250
77	.0180	51	.0670	27	.1440	B	.2380	23/64	.3594	16,00mm	.6299
0,48mm	.0189	1,75mm	.0689	3,70mm	.1457	6,10mm	.2402	9,20mm	.3622	16,25mm	.6398
0,50mm	.0197	50	.0700	26	.1470	C	.2420	9,30mm	.3661	41/64	.6406
76	.0200	1,80mm	.0709	25	.1495	6,20mm	.2441	U	.3680	16,50mm	.6496
75	.0210	1,85mm	.0728	3,80mm	.1496	D	.2460	9,40mm	.3701	21/32	.6562
0,55mm	.0217	49	.0730	24	.1520	6,30mm	.2480	9,50mm	.3740	16,75mm	.6594
74	.0225	1,90mm	.0748	3,90mm	.1535	1/4, E	.2500	3/8	.3750	17,00mm	.6693
0,60mm	.0236	48	.0760	23	.1540	6,40mm	.2520	V	.3770	43/64	.6719
73	.0240	1,95mm	.0768	5/32	.1562	6,50mm	.2559	9,60mm	.3780	17,25mm	.6791
0,62mm	.0244	5/64	.0781	22	.1570	F	.2570	9,70mm	.3819	11/16	.6875
72	.0250	47	.0785	4,00mm	.1575	6,60mm	.2598	9,80mm	.3858	17,50mm	.6890
0,65mm	.0256	2,00mm	.0787	21	.1590	G	.2610	W	.3860	45/64	.7031
71	.0260	2,05mm	.0807	20	.1610	6,70mm	.2638	9,90mm	.3898	18,00mm	.7087
0,70mm	.0276	46	.0810	4,10mm	.1614	17/64	.2656	25/64	.3906	23/32	.7188
70	.0280	45	.0820	4,20mm	.1654	H	.2660	10,00mm	.3937	18,50mm	.7283
69	.0292	2,10mm	.0827	19	.1660	6,80mm	.2677	X	.3970	47/64	.7344
0,75mm	.0295	2,15mm	.0846	4,30mm	.1693	6,90mm	.2717	10,20mm	.4016	19,00mm	.7480
68	.0310	44	.0860	18	.1695	I	.2720	Y	.4040	3/4	.7500
1/32	.0312	2,20mm	.0866	11/64	.1719	7,00mm	.2756	13/32	.4062	49/64	.7656
0,80mm	.0315	2,25mm	.0886	17	.1730	J	.2770	Z	.4130	19,50mm	.7677
67	.0320	43	.0890	4,40mm	.1732	7,10mm	.2795	10,50mm	.4134	25/32	.7812
66	.0330	2,30mm	.0906	16	.1770	K	.2810	27/64	.4219	20,00mm	.7874
0,85mm	.0335	2,35mm	.0925	4,50mm	.1772	9/32	.2812	10,80mm	.4252	51/64	.7969
65	.0350	42	.0935	15	.1800	7,20mm	.2835	11,00mm	.4331	20,50mm	.8071
0,90mm	.0354	3/32	.0938	4,60mm	.1811	7,30mm	.2874	7/16	.4375	13/16	.8125
64	.0360	2,40mm	.0945	14	.1820	L	.2900	11,20mm	.4409	21,00mm	.8268
63	.0370	41	.0960	4,70mm, 13	.1850	7,40mm	.2913	11,50mm	.4528	53/64	.8281
0,95mm	.0374	2,45mm	.0965	3/16	.1875	M	.2950	29/64	.4531	27/32	.8438
62	.0380	40	.0980	4,80mm, 12	.1890	7,50mm	.2953	11,80mm	.4646	21,50mm	.8465
61	.0390	2,50mm	.0984	11	.1910	19/64	.2969	15/32	.4688	55/64	.8594
1,00mm	.0394	39	.0995	4,90mm	.1929	7,60mm	.2992	12,00mm	.4724	22,00mm	.8661
60	.0400	38	.1015	10	.1935	N	.3020	12,20mm	.4803	7/8	.8750
59	.0410	2,60mm	.1024	9	.1960	7,70mm	.3031	31/64	.4844	22,50mm	.8858
1,05mm	.0413	37	.1040	5,00mm	.1969	7,80mm	.3071	12,50mm	.4921	57/64	.8906
58	.0420	2,70mm	.1063	8	.1990	7,90mm	.3110	1/2	.5000	23,00mm	.9055
57	.0430	36	.1065	5,10mm	.2008	5/16	.3125	12,80mm	.5039	29/32	.9062
1,10mm	.0433	7/64	.1094	7	.2010	8,00mm	.3150	13,00mm	.5118	59/64	.9219
1,15mm	.0453	35	.1100	13/64	.2031	O	.3160	33/64	.5156	23,50mm	.9252
56	.0465	2,80mm	.1102	6	.2040	8,10mm	.3189	13,20mm	.5197	15/16	.9375
3/64	.0469	34	.1110	5,20mm	.2047	8,20mm	.3228	17/32	.5312	24,00mm	.9449
1,20mm	.0472	33	.1130	5	.2055	P	.3230	13,50mm	.5315	61/64	.9531
1,25mm	.0492	2,90mm	.1142	5,30mm	.2087	8,30mm	.3268	13,80mm	.5433	24,50mm	.9646
1,30mm	.0512	32	.1160	4	.2090	21/64	.3281	35/64	.5469	31/32	.9688
55	.0520	3,00mm	.1181	5,40mm	.2126	8,40mm	.3307	14,00mm	.5512	25,00mm	.9843
1,35mm	.0531	31	.1200	3	.2130	Q	.3320	14,25mm	.5610	63/64	.9844
										1"	1.0000

■ Metric    
 ■ Fractional    
 ■ Wire gage    
 ■ Letter size

Knowing the hardness of the work material to be tapped is essential in selecting the best tap for the job.

10 mm/min ball 3000 kg	120° cone 150 kg	1/16" ball 100 kg	model C	1000 lb per sq. in.	10 mm/min ball 3000 kg	120° cone 150 kg	1/16" ball 100 kg	model C	1000 lb per sq. in.
Brinell	Rockwell C	Rockwell B	Shore Scleroscope	tensile strength	Brinell	Rockwell C	Rockwell B	Shore Scleroscope	tensile strength
800	72	–	100	–	276	30	105	42	136
780	71	–	99	–	269	29	104	41	132
760	70	–	98	–	261	28	103	40	129
745	68	–	97	367	258	27	102	39	127
725	67	–	96	357	255	26	102	39	125
712	66	–	95	350	249	25	101	38	123
682	65	–	93	337	245	24	100	37	119
668	64	–	91	326	240	23	99	36	117
652	63	–	89	318	237	23	99	35	115
626	62	–	87	306	229	22	98	34	113
614	61	–	85	299	224	21	97	33	110
601	60	–	83	292	217	20	96	33	107
590	59	–	81	290	211	19	95	32	104
576	57	–	79	281	206	18	94	32	102
552	56	–	76	270	203	17	94	31	100
545	55	–	75	268	200	16	93	31	98
529	54	–	74	259	196	15	92	30	96
514	53	120	72	254	191	14	92	30	94
502	52	119	70	247	187	13	91	29	92
495	51	119	69	244	185	12	91	29	91
477	49	118	67	233	183	11	90	28	90
461	48	117	66	227	180	10	89	28	89
451	47	117	65	223	175	9	88	27	86
444	46	116	64	219	170	7	87	27	84
427	46	115	62	209	167	6	87	27	82
415	44	115	60	204	165	5	86	26	81
401	43	114	58	196	163	4	85	26	80
388	42	114	57	191	160	3	84	25	78
375	41	113	55	184	156	2	83	25	76
370	40	112	54	182	154	1	82	25	75
362	39	111	53	179	152	–	82	24	74
351	38	111	51	173	150	–	81	24	74
346	37	110	50	170	147	–	80	24	72
341	37	110	49	168	145	–	79	23	71
331	36	109	47	163	143	–	79	23	70
323	35	109	46	158	141	–	78	23	69
311	34	108	46	153	140	–	77	22	69
301	33	107	45	148	135	–	75	22	67
293	32	106	44	144	130	–	72	22	65
285	31	105	43	140	–	–	–	–	–

Technical Information

material number	DIN EN - D	AFNOR - F	BS - UK	JIS
0.6010	GG10	—	Grade 100	FC 100
0.6015	GG15	FGL 150	Grade 150	FC 150
0.6020	GG20	FGL 200	Grade 220	FC 200
0.6025	GG25	FGL 250	Grade 250, 260	FC 250
0.6030	GG30	FGL 300	Grade 300	FC 300
0.6035	GG35	FGL 350	Grade 350	FC 350
0.6655	—	L-NUC 15 6 2	F1	—
0.6656	—	L-NUC 15 6 3	F1	—
0.6660	—	L-NC 20 2	F2	—
0.6661	—	L-NC 20 3	F2	—
0.6676	—	L-NC 30 3	F3	—
0.7040	GGG40	FGS 400-15	Grade 420/12	FCD 400
0.7043	GGG40.3	FGS 370-17	Grade 370/12	FCD 370
0.7050	GGG50	FGS 500-7	Grade 500/7	FCD 500
0.7060	GGG60	FGS 600-3	Grade 600/3	FCD 600
0.7070	GGG70	FGS 700-2	Grade 700/2	FCD 700
0.7080	GGG80	FGS 800-2	Grade 800/2	FCD 800
0.7652	—	S-NM 13 7	S 6	—
0.7660	—	S-NC 20 2	S 2	—
0.7661	—	S-NC 20 3	S 2	—
0.7670	—	S-N 22	S 2 C	—
0.7673	—	S-NM 23 4	S 2 M	—
0.7676	—	S-NC 30 3	S 3	—
0.7677	—	S-NC 30 1	S 3	—
0.8035	GTW35	MB 35-7	W 35-04	FCMW 330
0.8038	—	MB 380-12	—	—
0.8040	GTW40	MB 400-5	W 40-05	FCMW 370
0.8045	GTW45	MB 450-7	W 45-07	FCMWP 440
0.8135	GTS35	MN 350-10	B 35-12	FCMB 340
0.8145	GTS45	MP 50-5	P 45-06	—
0.8155	GTS55	MP 60-3	P 55-04	—
0.8165	GTS65	—	P 65-02	FCMP 540
0.8170	GTS70	MP 70-2	P 70-02	FCMP 690
0.9620	X 260 NiCr 4-2	—	Grade 2 A	—
0.9625	X 330 NiCr 4-2	—	Grade 2 B	—
0.9630	300 CrNiSi 9-5-2	—	Grade 2 C, D, E	—
0.9635	300 CrMo 15-3	—	Grade 3 A, B	—
0.9640	300 CrMoNi 15-2-1	—	Grade 3 A, B	—
0.9645	260 CrMoNi 20-2-1	—	Grade 3 C	—
0.9650	G-X 260 Cr 27	—	Grade 3 D	—
0.9655	300 CrMo 27-1	—	Grade 3 E	—
1.0301	C 10	XC 10	045 M 10040 A 10	S 10 C
1.0401	C 15	XC 12, XC 18	080 M 15	S 15 C
1.0402	C 22	C 22, XC 18, XC 25	1 C 22, 070 M 20	S 20 C, S 2 C
1.0406	C 25	1 C 25	070 M 26	S 25 C
1.0501	C 35	XC 38, 1 C 35	080 M 36, 1 C 35	S 35 C
1.0503	C 45	1 C 45, XC 48 H 1	1 C 45, 080 M 46	S 45 C
1.0511	C 40	1 C 40, XC 42 H 1	080 M 40, 1 C 40	S 40 C
1.0528	C 30	—	1 C 30, XC 32	S 30 C
1.0535	C 55	1 C 55, XC 55 H 1	1 C 55, 070 M 55	S 55 C
1.0540	C 50	1 C 50	1 C 50, 080 M50	S 50 C
1.0570	S355J2G3	E 36-3, E 36-4	Fe 510 D1 FF, 50/35	SM 490 , SM 520 B
1.0601	C 60	1 C 60, AF 70 C 55	1 C 60, 080 A 67	S 58 C
1.0715	9 SMn 28	S 250	080 M 15, 230 M 07	SUM 22
1.0718	9 SMnPb 28	S 250 Pb	—	SUM 22 L, SUM 23 L
1.0721	10 S 20	13 MF 4, 10 F 1	210 M 15	—
1.0722	10 SPb 20	CC 10 Pb, 10 PbF 2	—	SUM 12
1.0726	35 S 20	35 MF 6	212 M 36	SUM 41
1.0727	45 S 20	45 MF 61, 45 MF 4	212 M 36	SUM 42
1.0728	60 S 20	—	—	—
1.0736	9 SMn 36	S 300	240 M 07	SUM 25
1.0737	9 SMnPb 36	S 300 Pb	—	SUM 24 L
1.1121	Ck 10 (C 10 E)	XC 10	045 M 10, 040 A 10	S 9 Ck, S 10 C
1.1141	Ck 15 (C 15 E)	XC 12, XC 15	080 M 15, 040 A 15	S 15, S 15 Ck
1.1151	C 22 E	2 C 22, XC 18/25	055 M 15	S 20 C, S 20 Ck, S 22 C
1.1157	40 Mn 4	35 M 5, 40 M 5	150 M 36	—
1.1158	C 25 E	2 C 25, XC 25	070 M 26	S 25 C, S 28 C

UNI - I	UNE - E	AISI - US	condition	material group
G 10	FG 10	Class 20 B	U	15
G 15	FG 15	Class 25 B	U	15
G 20	FG 20	Class 30 B	U	16
G 25	FG 25	Class 40 B	U	16
G 30	FG 30	Class 45 B	U	16
G 35	FG 35	Class 50 B	U	16
—	—	—	GG/AU	17
—	—	—	GG/AU	17
—	—	—	GG/AU	17
—	—	—	GG/AU	18
—	—	—	GG/AU	31
GS 400-12	—	Grade 60-40-18	U	17
—	—	—	U	17
GS 500-7	—	Grade 65-45-12	U	17
GS 600-3	—	Grade 80-55-06	U	18
GS 700-2	—	Grade 100-70-03	U	18
GS 800-2	—	Grade 120-90-02	U	18
—	—	—	GGG/AU	17
—	—	—	GGG/AU	17
—	—	—	GGG/AU	18
—	—	—	GGG/AU	17
—	—	—	GGG/AU	17
—	—	—	GGG/AU	31
—	—	—	GGG/AU	31
—	—	—	G	20
W 38-12	—	—	G	19
W 40-05	—	—	G	19
W 45-07	—	—	G	19
B 35-10	Type A	Grade 22010, 32510	G	19
P 45-06	Type E	—	G	19
P 55-04	Type C	—	G	20
P 65-02	—	—	G	20
P 70-02	—	—	G	20
—	—	—	GO	40
—	—	—	GO	40
—	—	—	GO	40
—	—	—	GO	40
—	—	—	GO	40
—	—	—	GO	40
—	—	—	GO	40
—	—	—	GO	40
—	—	—	GO	40
C 10	F. 1511	1010	—	1
C 15, C 16	F. 111	1015	—	1
1 C 22, C 20, C 21	1 C 22, F. 112	1020, 1023	—	1
C 25, 1 C 25	—	1025	var <sup>1</sup>	2-3
C 35, 1 C 35	1 C 35, F. 113	1035	var <sup>1</sup>	2-3
C 45, 1 C 45	1 C 45, F. 114	1045	var <sup>1</sup>	2-3
1 C 40	1 C 40, F. 114.	1040	var <sup>1</sup>	2-3
1 C 30	1 C 30	1030	var <sup>1</sup>	2-3
C 55, 1 C 55	1 C 55	1055	var <sup>1</sup>	4-5
1 C 50	1 C 50	1050	var <sup>1</sup>	2-3
Fe 510 C FN	AE 355 D, Fe 510 D1 FF	—	—	2
C 60, 1 C 60	1 C 60	1060	var <sup>1</sup>	4-5
CF 9 SMn 28, CF 9 M 07	F. 2111	1213	1	—
CF 9 SMnPb 28	F. 2112	12 L 14, 12 L 13	—	1
CF 10 S 20	F. 2121	1102, 1108, 1109	—	1
CF 10 SPb 20	F. 2122	1108, 11 L 08	—	1
CF 35 SMn 10	F. 2131, F. 210.	1141, 1140	var <sup>1</sup>	2-3
CF 44 SMn 28	F. 2133	1146	var <sup>1</sup>	2-3
—	—	1151	var <sup>1</sup>	4-5
CF 9 SMn 36	F. 2113	1215	—	1
CF 9 SMnPb 36	F. 2114	12 L 14	—	1
C10, 2 C 10	F. 1510, C 10	1010	—	1
C 15, C 16	F. 1110, F. 1511	1015	—	1
C 20, C 25	F. 1120	1020, 1023	—	1
—	—	1035, 1041	var <sup>1</sup>	2-3
C 25	F. 1120	1025	var <sup>1</sup>	2-3

material number	DIN EN - D	AFNOR - F	BS - UK	JIS
1.1170	28 Mn 6	28 Mn 6, 35 M 5	28 Mn 6, 150 M 19	SMn 433
1.1178	C 30 E	—	2 C 30, XC 32	S 30 C
1.1181	C 35 E	2 C 35, XC 38 H 1	080 M 36	S 35 C
1.1183	Cf 35	XC 42 TS	080 A 35	S 35 C
1.1186	C 40 E	2 C 40, XC42 H 1	2 C 40, 080 M 40	S 40 C
1.1191	C 45 E	XC 48 H 1, 2 C 45	2 C 45, 080 M 46	S 45 C
1.1193	Cf 45	XC 42 TS	060 A 47	S 45 C
1.1203	C 55 E	2 C 55, XC 55 H 1	2 C 55, 070 M 55	S 55 C
1.1206	C 50 E	2 C 50	2 C 50, 080 M 50	S 50 C
1.1213	Cf 53	42 M 4 TS	060 A 57	S 50 C
1.1221	C 60 E	2 C 60	2 C 60, 060 A 62	S 58 C
1.2241	51 CrV 4	50 CV 4	735 A 51	SUP 10
1.2369	81 MoCrV 42-16	—	—	—
1.3505	100 Cr 6	100 C 6	535 A 99	SUJ 2
1.3520	100 CrMn 6	—	535 A 99	SUJ 3
1.3533	17 NiCrMo 14	16 NCD 13	—	—
1.3536	100 CrMo 7-3	—	—	—
1.3537	100 CrMo 7	100 CD 7	—	SUJ 4
1.3541	X 45 Cr 13	—	—	—
1.3543	X 102 CrMo 17	Z 100 CD 17	—	SUS440 C
1.3551	80 MoCrV 42-16	80 DCV 40	—	—
1.3553	X 82 WMoCrV 6-5-4	Z 85 WDCV 6	BM 2	SKH 51
1.3558	X 75 WCrV 18-4-1	—	BT 1	SKH 2
1.4000	X 6 Cr 13	Z 6 C 13	403 S 17	SUS 410 S
1.4002	X 6 CrAl 13	Z6 CA 13	405 S 17	SUS 405
1.4005	X 12 CrS 13	Z12 CF 13	416 S 21	SUS 416
1.4006	X 12 Cr 13 (X 10 Cr 13)	10 C 13, Z 12 C 13	410 S 21	SUS 410
1.4007	X 35 Cr 14	—	—	SUS 420
1.4016	X 6 Cr 17	Z 8 C 17	430 S 17	SUS 430
1.4021	X 20 Cr 13	Z 20 C 13	420 S 37	SUS 420
1.4024	X 15 Cr 13	—	403 S 17	—
1.4028	X 30 Cr 13	30 C 13, Z 33 C 13	420 S 45	SUS 420
1.4034	X 46 Cr 13	Z 40 C 14	420 S 45	SUS 420
1.4057	X 20 CrNi 17-2	Z 15 CN 16-02	431 S 29	SUS 431
1.4104	X 12 CrMoS 17	Z 10 CF 17	441 S 29	SUS 430 F
1.411	X 90 CrMoV 1	—	—	SUS 440 B
1.4113	X 6 CrMo 17-1	Z 8 CD 17-01	434 S 17	SUS 434
1.4125	X 105 CrMo 17	Z100 CD 17	—	SUS 440 C
1.4301	X 5 CrNi 18-10 (X 4 CrNi 18-10)	Z 6 CN 18-09	304 S 16	SUS 304
1.4303	X 5 CrNi 18-12 (X 4 CrNi 18-12)	Z 8 CN 18-12	305 S 19	—
1.4305	X 10 CrNiS 18-9	Z 10 CNF 18-09	303 S 21	SUS 303
1.4306	X 2 CrNi 19-11	Z 2 CN 18-10	304 S 11	SUS 304 L
1.4307	X 2 CrNi 18-9	Z 3 CN 18-10	304S11	SUS 304 L
1.4310	X 12 CrNi 17-7	Z 11 CN 18-08	301 S 21	SUS 301
1.4311	X 2 CrNiN 18-10	Z 3 CN 18-10 Az	304 S 61	SUS 304 LN
1.4362	X 2 CrNiN 23-4	Z 3 CN 23-04 Az	—	—
1.4372	X 12 CrMnNiN 17-7-5	Z 12 CMN 17-07 Az	—	—
1.4401	X 5 CrNiMo 17-12-2 (X 4 CrNiMo 17-12-2)	Z 6 CND 17-11	316 S 31	SUS 316
1.4404	X 2 CrNiMo 17-13-2 (X 2 CrNiMo 17-12-2)	Z 2 CND 17-12	316 S 11	SUS 316 L
1.4406	X 2 CrNiMoN 17-11-2 (X 2 CrNiMoN 17-11-2)	Z 2 CND 17-11 Az	316 S 62	SUS 316 LN
1.4410	X 2 CrNiMoN 25-7-4	Z 3 CND 25-06 Az	—	—
1.4418	X 4 CrNiMo 16-5	Z 6 CND 16 05 1	—	—
1.4429	X 2 CrNiMoN 17-13-3	Z 2 CND 17-13 Az	—	SUS 316 LN
1.4432	X 2 CrNiMo 17-12-3	Z 3 CND 17-12-03	316 S 13	SUS 316 L
1.4434	X 2 CrNiMoN 17-12-3	Z 3 CND 19-14 Az	—	SUS 317 LN
1.4435	X 2 CrNiMo 18-14-3	Z 2 CND 17-13	316 S 13	SUS 316 L
1.4436	X 5 CrNiMo 17-13-3 (X 4 CrNiMo 17-13-3)	Z 6 CND 17-12	316 S 33	SUS 316
1.4438	X 2 CrNiMo 18-16-4 (X 2 CrNiMo 18-15-4)	Z 2 CND 19-15	317 S 12	SUS 317 L
1.4439	X 2 CrNiMoN 17-13-5	3 CND 18-14-05 Az	—	—
1.4441	X 2 CrNiMo 18-15-3	Z 3 CND 18-14-13	316 S 13	—
1.4460	X 4 CrNiMoN 27-5-2 (X 3 CrNiMoN 27-5-2)	25 CND 27-05 A2	—	SUS 329
1.4462	X 2 CrNiMoN 22-5-3	Z2 CND 22-05 Az	—	—
1.4466	X 1 CrNiMoN 25-22-2 (X 2 CrNiMoN 25-22-2)	—	—	—
1.4504	[X 8 CrNiAl 17-7]	Z 8 CNA 17-07	316 S 111	17-7 PH
1.4510	X 6 CrTi 17 (X 3 CrTi 17)	Z 8 CT 17	—	—
1.4512	X 6 CrTi 12 (X 2 CrTi 12)	Z 3 CT 12	409 S 19	SUH 409
1.4532	X 7 CrNiMoAl 15-7 (X 8 CrNiMoAl 15-7-2)	Z 8 CNDA 15-7	—	—
1.4540	X 4 CrNiCuNb 16-4	Z 6 CNU 17-04	—	SUS 630
1.4541	X 6 CrNiTi 18-10	Z 6 CNT 18-10	321 S 12	SUS 321



UNI - I	UNE - E	AISI - US	condition	material group
28 Mn 6	28 Mn 6, 36 Mn	1330	var <sup>1</sup>	2-3
2 C 30, 080 M 30	2 C 30	—	var <sup>1</sup>	2-3
2 C 35, C 35	2 C 35, C 35 k	—	var <sup>1</sup>	2-3
C 36	C 38 k	1035	var <sup>1</sup>	2-3
2 C 40, C40	2 C 40, C 42 k	1040	var <sup>1</sup>	2-3
2 C 45, C 45	2 C 45, C 45 k	—	var <sup>1</sup>	2-3
C 43	C 42 k	1045	var <sup>1</sup>	2-3
2 C 55, C 55	2 C 55, C 55 k	—	var <sup>1</sup>	4-5
2 C 50, C 50	2 C 50, C 55 k	1050	var <sup>1</sup>	2-3
C 48	C 48 k	1050	var <sup>1</sup>	2-3
2 C 60, C 60	2 C 60	—	var <sup>1</sup>	4-5
50 CrV 4	F.1430	6150	var <sup>1</sup>	6-9
—	—	613	var <sup>1</sup>	10-11
100 Cr 6	—	52100	var <sup>1</sup>	6-9
100 CrMo 7	—	A 485/2	var <sup>1</sup>	6-9
—	—	E-3310	var <sup>1</sup>	6-9
—	—	5120	var <sup>1</sup>	6-9
100 CrMo 7	—	A 485/3	var <sup>1</sup>	6-9
X 45 Cr 13	—	—	var <sup>1</sup>	10-11
X 105 CrMo 17	—	440 C	var <sup>1</sup>	10-11
X 80 MoCrV 44	—	—	var <sup>1</sup>	10-11
X 82 WMoV 6 5	—	M2 regular C	var <sup>1</sup>	10-11
X 75 WCrV 18	—	T 1	var <sup>1</sup>	10-11
X5 Cr 13	—	410 S	FE	12
X 6 CrA 13	—	405	FE	12
X 12 CrS 13	—	416	FE	12
X 12 Cr 13	—	410	MA	12
—	—	420	MA	12
X 8 Cr 17	—	430	FE	12
X 20 Cr 13	—	420	MA	12
—	—	403	MA	12
—	—	420	MA	13.1
—	—	420	MA	13.1
X 15 CrNi 16	—	431	MA	13.1
X 10 CrS 17	—	430 F	MA	13.1
—	—	440 B	MA	13.1
X 8 CrMo 17	—	434	MA	13.1
—	—	440 C	MA	13.1
X 5 CrNi 18 10	—	304	AU	14.1
X 8 CrNi 18 12	—	305	AU	14.1
X 10 CrNiS 18 09	—	303	AU	14.1
X 2 CrNi 18 11	—	304 L	AU	14.1
—	—	304 L	AU	14.1
X 12 CrNi 17 07	—	301	AU	14.1
—	—	304 LN	AU	14.1
—	—	—	DU	14.2
—	—	201	DU	14.2
X 5 CrNiMo 17 12	—	316	AU	14.1
X 2 CrNiMo 17 12	—	316 L	AU	14.1
X 2 CrNiMoN	—	316 LN	AU	14.1
—	—	—	DU	14.2
—	—	—	MA	13.1
X 2 CrNiMoN 17 13	—	316 LN	AU	14.1
—	—	316 L	AU	14.1
—	—	317 LN	AU	14.1
X 2 CrNiMo 17 13	—	316 L	AU	14.1
X 5 CrNiMo 17 13	—	316	AU	14.1
X 2 CrNiMo 18 16	—	317 L	AU	14.1
—	—	—	AU	14.1
—	—	316 LVM	AU	14.1
—	—	329	DU	14.2
—	—	2205	DU	14.2
—	—	310 mod	S-AU	14.3
X 2 CrNiMo 17.12	—	17-7 PH	AU-PH	14.4
—	—	439, 430 Ti	FE	12
—	—	409	FE	12
—	—	632	AU	14.1
—	—	630	AU	14.1
X 6 CrNiTi 18 11	—	321	AU	14.1

material number	DIN EN - D	AFNOR - F	BS - UK	JIS
1.4542	X 5 CrNiCuNb 17-4	Z 6 CNU 17-04, Z 7 CNNb 17-07	—	SUS 630
1.4548	X 5 CrNiCuNb 17-4-4	Z 7 CNNb 17-07	—	SUS 630
1.4550	X 6 CrNiNb 18-10	Z 6 CNNb 18-10	347 S 17	SUS 347
1.4552	GX 5 CrNiNb 19-10 (G-X 5 CrNiNb 18-9)	Z 6 CNNb 18.10 M	347 C 17	SCS 21
1.4567	X 3 CrNiCu 18-9 (X 3 CrNiCu 18-9-4)	Z 3 CNU 18-09 FF	—	—
1.4568	X 7 CrNiAl 17-7	Z 8 CNA 17-7	316 S 111	17-7 PH
1.4571	X 6 CrNiMoTi 17-12-2	Z 6 CNDT 17-12	320 S 31	SUS 316 Ti
1.4573	X 10 CrNiMoTi 18-12	Z 6 CNDT 17-13	320 S 33	—
1.4580	X 6 CrNiMoNb 17-12-2	Z 6 CNDNb 17-12	—	—
1.4581	GX 5 CrNiMoNb 19-11 (G-X 5 CrNiMoNb 18-10)	Z 4 CNDNb 18.12 M	318 C 17	SCS 22
1.4583	X 10 CrNiMoNb 18-12	Z 6 CNDNb 17-13	—	—
1.4713	X 10 CrAl 7	Z 8 CA 7	—	—
1.4718	X 45 CrSi 9-3	Z 45 CS 9	401 S 45	SUH 1
1.4720	X 7 CrTi 12	Z 6 CT 12	—	SUS 409
1.4724	X 10 CrAl 13	Z 10 C 13	403 S 17	SUS 405
1.4731	X 40 CrSiMo 10-2	Z 40 CSD 10	—	SUH 3
1.4742	X 10 CrAl 18	Z 12 CAS 18, Z 10 CAS 18	430 S 17	SUS 430
1.4748	X 85 CrMoV 18-2	Z 85 CDV 18.02	—	—
1.4762	X 10 CrAl 24	Z10 CAS 24	—	SCH446
1.4821	X 20 CrNiSi 25-4	Z 20 CNS 25.04	—	—
1.4828	X 15 CrNiSi 20-12 Z	15 CN 23-13, Z 15 CNS 20-12	309 S 24	SUS 309 S
1.4833	X 7 CrNi 23-14	Z 15 CN 23.13, Z 15 CN 24.13	309 S 16	SUH 309
1.4841	X 15 CrNiSi 25-20	Z 15 CNS 25-20, Z 12 CNS 25-20	310 S 24	SUS310
1.4845	X 12 CrNi 25-21	Z 12 CN 26.21, Z 12 CN 25.20	310 S 31	SUH 310
1.4864	X 12 NiCrSi 36-16	Z 20 NCS 33.16, Z 12 NCS 35.16	—	SUH 330
1.4871	X 53 CrMnNiN 21-9	Z 53 CMN 21.09 Az	349 S 54	SUH 35
1.4873	X 45 CrNiW 18-9	Z 35 CNWS 14.14	331 S 40	SUH 31
1.4875	X 55 CrMnNiN 20-8	Z 55 CMN 20.08 Az	—	—
1.4876	X 10 NiCrAlTi 32-20	Z 8 NC 33.21, Z 8 NC 32.21	—	—
1.487	X 12 CrNiTi 18-9	Z 6 CNT 18.12, Z 6 CNT 18.10	321 S 12, 321 S 51	SUS 321
1.4948	X 6 CrNi 18-11	Z 6 CN 18-09	304 S 51	SUS304
1.5023	38 Si 7	46 S 7	—	—
1.5092	60 SiCr 7	61 SC 7	251 A 61	SUP 7
1.5919	15 CrNi 6	16 NC 6	815 M 17	SNC 15
1.5920	18 CrNi 8	20 NC 6	822 M17	SNCM 616
1.6511	36 CrNiMo 4	36 CrNiMo 4	36 CrNiMo 4, 817 A 37	SNCM 439
1.6580	30 CrNiMo 8	30 CrNiMo 8, 30 CND 8	30 CrNiMo 8	SNCM 630
1.6582	34 CrNiMo 6	34 CrNiMo 6	34 CrNiMo 6, 817 M 40	SNCM 447
1.6587	17 CrNiMo 6	18 NCD 6	820 M 17	SNCM 815
1.7003	38 Cr 2	38 Cr 2	38 Cr 2, 120 M 36	SMn 438
1.7003	46 Cr 2	46 Cr 2, 42 C 2	46 Cr 2, 605 M 36	SMn 443
1.7030	28 Cr 4	30 CD 4	530 A 30	—
1.7033	34 Cr 4	34 Cr 4, 32 C 4	34 Cr 4, 530 A 32	SCr 430
1.7034	37 Cr 4	37 Cr 4, 38 C 4	37 Cr 4, 530 A 36	SCr 435
1.7035	41 Cr 4	41 Cr 4, 42 C 4	41 Cr 4, 530 M 40	41 Cr 4SCr 440
1.7037	34 CrS 4	34 CrS 4, 32 C 4	34 CrS 4, 530 A 32	—
1.7038	37 CrS 4	37 CrS 4, 38 C 4	37 CrS 4, 530 A 36	—
1.7039	41 CrS 4	41 CrS 4, 42 C 4	41 CrS 4, 530 M 40	—
1.7102	54 SiCr 6	51 S 7	251 A 58	SKD12
1.7131	16 MnCr 5	16 MC 5	527 M 17	—
1.7147	20 MnCr 5	20 MC 5	—	SMnC 420
1.7176	55 Cr 3	55 C 3	525 A 60	SUP 9
1.7213	25 CrMoS 4	25 CrMoS 4, 25 CD 4	25 CrMoS 4, 708 A 25	—
1.7218	25 CrMo 4	25 CrMo 4, 25 CD 4	25 CrMo 4, 708 A 25	SCM 430
1.7220	34 CrMo 4	34 CrMo 4, 34 CD 4	34 CrMo 4, 708 A 37	SCM 435
1.7225	42 CrMo 4	42 CrMo 4, 42 CD 4	42 CrMo 4, 708 M 40	SCM440
1.7226	34 CrMoS 4	34 CrMoS 4, 34 CD 4	34 CrMoS 4708 A 37	—
1.7227	42 CrMoS 4	42 CrMoS 4, 42 CD 4	42 CrMoS 4, 708 M 40	—
1.7228	50 CrMo 4	50 CrMo 4	50 CrMo 4, 708 A 47	—
1.7321	20 MoCr 4	—	805 M 20	SNCM 220
1.7325	25 MoCr 4	18 CD 4	—	—
1.7361	32 CrMo 12	30 CD 12	722 M 24	—
1.7701	51 CrMoV 4	51 CDV 4	—	SUP 13
1.8159	51 CrV 4	51 CrV 4, 50 CV 4	51 CrV 4	SUP 10
1.8507	34 CrAlMo 5	—	—	—
1.8509	41 CrAlMo 7	40 CAD 6 12	905 M 39	—
1.8515	31 CrMo 12	30 CD 12	722 M 24	—
1.8523	39 CrMoV 13-9	—	897 M 39	—
1.8550	34 CrAlNi 7	—	—	—

UNI - I	UNE - E	AISI - US	condition	material group
—	—	630	AU-PH	14.4
—	—	630	AU-PH	14.4
X 8 CrNiNb 18 11	—	347	AU	14.1
—	—	—	AU	14.1
—	—	302 HQ	AU	14.1
X 2 CrNiMo 17.12	—	17-07 PH	AU-PH	14.4
X 6 CrNiMoTi 17 12	—	316 Ti	AU	14.1
X 6 CrNiMoTi 17 12	—	(316 Ti)	AU	14.1
X 6 CrNiMoNb 17 12	—	316 Cb	AU	14.1
GX 6 CrNiMoNb 20 11	—	—	AU	14.1
X 6 CrNiMoNb 17 13	—	316 Cb, (318)	AU	14.1
—	—	—	FE	10-11
X 45 CS 8	—	HNV 3	—	31-32
—	—	409	—	31-32
X 10 CrAl 12	X 10 CrAl 13	405	FE	12
—	—	—	—	12
X 8 Cr 17	X 10 CrAl 18	430	—	12
—	—	—	—	31-32
X 16 Cr 26	—	446	—	12
—	X 15 CrNiSi 25 04	—	DU	14.2
—	X 10 CrNiSi 20	309	AU	14.1
X 6 CrNi 23 14	—	309 S	AU	14.1
X 16 CrNiSi 25 20	X 15 CrNiSi 25 20	310	AU	14.1
—	—	310 S	AU	14.1
—	X 12 NiCrSi 36 16	330	—	31-32
—	—	EV 8	—	10
X 45 CrNiW 18 9	—	EV 9	—	31-32
—	—	EV 11	—	31-32
—	X 10 NiCrAlTi 32 20	—	S-AU	31-32
X 6 CrNiTi 18 11	—	321, 321 H	—	31-32
—	—	304H	AU	14.1
—	—	—	var <sup>1</sup>	6-9
60 SiCr 8	F.1442	9260	var <sup>1</sup>	6-9
—	F.1581	4320	var <sup>1</sup>	6-9
16 NiCrMo 12	F.1525	—	var <sup>1</sup>	6-9
36 CrNiMo 4, 39 NiCrMo 3 1	36 CrNiMo 4, 40 NiCrMo 4	—	var <sup>1</sup>	6-9
SNCM 630	30 CrNiMo 8, 32 NiCrMo 16	—	var <sup>1</sup>	6-9
34 CrNiMo 6	34 CrNiMo 6	4340	var <sup>1</sup>	6-9
18 NiCrMo 12	F.1560	—	var <sup>1</sup>	6-9
38 Cr 2	38 Cr 2, 38 Cr 3	—	var <sup>1</sup>	6-9
46 Cr 2	46 Cr 2	—	var <sup>1</sup>	6-9
—	—	—	var <sup>1</sup>	6-9
34 Cr 4	34 Cr 4	5132	var <sup>1</sup>	6-9
37 Cr 4	37 Cr 4, 38 Cr 4	5135	var <sup>1</sup>	6-9
41 Cr 4	41 Cr 4, 42 Cr 4	5140	var <sup>1</sup>	6-9
34 CrS 4	34 CrS 4	—	var <sup>1</sup>	6-9
37 CrS 4	37 Cr 4, 38 Cr 4-1	—	var <sup>1</sup>	6-9
41 CrS 4	41 CrS 4, 42 Cr 4-1	—	var <sup>1</sup>	6-9
48 Si 7	F.1450	9260	var <sup>1</sup>	6-9
16 MnCr 5	F.1516	—	var <sup>1</sup>	6-9
20 MnCr 5	F.1523	—	var <sup>1</sup>	6-9
55 Cr 3	—	5155	var <sup>1</sup>	6-9
25 CrMoS 4, 25 CrMo 4	25 CrMoS 4, 30 CrMo 4-1	—	var <sup>1</sup>	6-9
25 CrMo 4	25 CrMo 4, 30 CrMo 4	4130	var <sup>1</sup>	6-9
34 CrMo 4, 35 CrMo 4	34 CrMo 4, 35 CrMo 4	4137	var <sup>1</sup>	6-9
42 CrMo 4	42 CrMo 4	—	var <sup>1</sup>	6-9
34 CrMoS 4, 35 CrMo 4	34 CrMoS 4, 35 CrMo 4	—	var <sup>1</sup>	6-9
42 CrMoS 4, 42 CrMo 4	42 CrMoS 4, 40 CrMo 4-1	—	var <sup>1</sup>	6-9
50 CrMo 4	50 CrMo 4	4150	var <sup>1</sup>	6-9
16 NiCrMo 2	F.1523	8620	var <sup>1</sup>	6-9
20 NiCrMo 2	—	8625	var <sup>1</sup>	6-9
—	—	—	var <sup>1</sup>	6-9
51 CrMoV 4	—	—	var <sup>1</sup>	6-9
51 CrV 4, 50 CrV 4	51 CrV 4	6150	var <sup>1</sup>	6-9
—	35 CrAlMo 5	A 355/D	var <sup>1</sup>	6-9
41 CrAlMo 7	41 CrAlMo 7	A 355/A	var <sup>1</sup>	6-9
31 CrMo 12	31 CrMo 12	—	var <sup>1</sup>	6-9
36 CrMoV 12	—	—	var <sup>1</sup>	6-9
—	—	A 355/C	var <sup>1</sup>	6-9

## WIDIA-GTD™ Lightning™ Service

Rely on the WIDIA™ Lightning Service program to deliver the special taps you need, when and where you need them. Within minutes, we can quote, process, and release your order to the factory.

# Lightning Service



### Features and Benefits

- Non-standard tap sizes, pitches, PDs, coatings, etc.
- Special taps can be used for tapping steel, cast iron, aluminum, or brass.
- Custom-ordered taps can be designed to thread INCONEL®, titanium, and high-temp alloys.
- Always accurate thread pitch diameters and gage fits.
- Select products available for shipping within 24 hours.

LIGHTNING SERVICE  
**24** HOUR  
SHIPPING

## How to Order Special Taps

WIDIA™ leads the industry in quoting technology. Experienced quotation specialists and product engineers use in-house designed software to generate a quote from a customer inquiry and design cutting tools with the requested features, modifications, options, and surface treatments.

### Use the following outline when selecting a tap:

1. Determine the tap that meets your cutting tool needs. For assistance, consult the Tap Selection Guide on pages V2–V17.
2. If the style, size, and/or quantity is not listed, consult customer service for a factory quote. WIDIA is fully equipped and ready to design your tool to your unique specifications.

### Please use the following guidelines when placing an order:

1. Tap style and required quantity.
2. Catalog number.
3. Size and pitch (nominal diameter and threads per inch or mm pitch).
4. Chamfer (taper, plug, modified bottoming, or bottoming).
5. Surface treatments.
6. Additional features or options.

NOTE: If you do not specify the pitch, number of flutes, and/or chamfer, standard specifications will be applied and shipped uncoated.

Any additional information, such as material to be tapped, type of hole, and any general dimensions, such as overall length and shank diameter, will ensure a correct tap for your application.

## Delivery Matrix

### ■ Surface Treatments

treatment	lead time	price
TiN — Titanium Nitride	3 days	consult customer service
Steam Oxide	2 days	N/C
Nitride	2 days	N/C
Steam Oxide/Nitride	2 days	N/C
TiCN — Titanium Carbonitride	1 week	consult customer service
TiAlN — Titanium Aluminum Nitride	2 weeks	consult customer service
CrN — Chromium Nitride	2 weeks	consult customer service

NOTE: Add to lead time designated for special taps.

### ■ Common Special Taps and Special Taps from Blanks

sizes	max quantity	lead time
up to 13/16", M20	72 pcs.	1 day
7/8–1", M22–M25	24 pcs.	1 day
1-1/16–2", M27–M48	12 pcs.	1 day
2-1/8–2-1/2", M56	6 pcs.	1 day
larger than 2-1/2"	2 pcs.	1 day
Rp (BSPP), Rc (BSPT), G (BSPF)	47 pcs.	3 days

NOTE: For orders greater than specified maximum quantity, consult customer service.

### ■ Additional Features and Options

feature/option	lead time
controlled root (minor diameter ±.001")	no additional time
double lead (except form taps)	1 day
triple lead	1 day
interrupted threads, taper or straight, odd number	1 day
external centers removed	no additional time
special marking	no additional time
special VariTap, EM-NI, & EM-TI Taps	2 weeks
STI taps	1 day

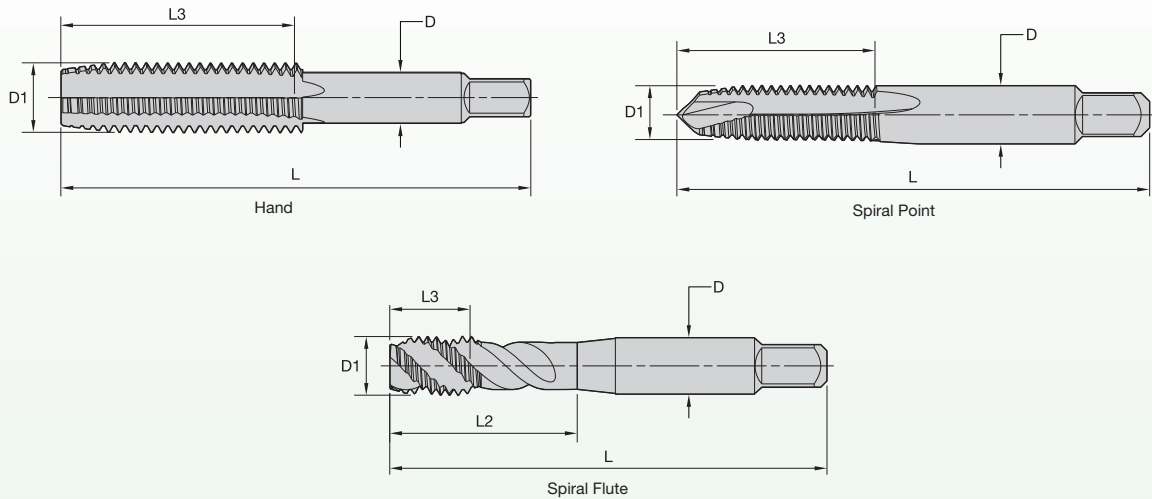
NOTE: Add to lead time designated for special taps.

### ■ Coating Recommendation Chart

- first choice
- alternate choice

material group	oxide	nitride	TiN	TiCN	TiAlN	CrN
<b>P</b>	○		○	●	○	
<b>M</b>	○		○	○	○	○
<b>K</b>	○	○	○	●	○	
<b>N</b>		○	○	○		
<b>S</b>		○	○	○	●	○
<b>H</b>						
speed (SFM) increase	0%	0%	50%	50%	100%	0%

## Common Specials • HSS



style	H-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>#2 - 56 NC</b>									
Hand	H4	2	-	26002	26003	1.75	0.38	-	0.141
Spiral-Point Gun	H3	2	-	26000	-	1.75	0.38	-	0.141
Spiral-Point Gun	H4	2	-	26004	-	1.75	0.38	-	0.141
Spiral-Point Gun	H5	2	-	26005	-	1.75	0.38	-	0.141
<b>#4 - 32 NS</b>									
Hand	H2	3	-	26008	26009	1.75	0.38	-	0.141
<b>#4 - 40 NC</b>									
Hand	H3	3	-	26017	26018	1.93	0.56	-	0.141
Spiral-Point Gun	H3	2	-	26019	-	1.93	0.56	-	0.141
+0.003 Spiral-Point Gun	H7	2	-	26020	-	1.93	0.56	-	0.141
Fast Spiral-Flute	H3	2	-	26010	-	1.93	0.56	-	0.141
<b>#5 - 40 NC</b>									
Spiral-Point Gun	H5	2	-	26029	-	1.93	0.63	-	0.141
<b>#6 - 32 NC</b>									
Hand	H3	3	-	26035	26036	2.00	0.69	-	0.141
+0.003 Hand	H7	3	-	26039	26040	2.00	0.69	-	0.141
+0.005 Hand	H11	3	-	26043	26044	2.00	0.69	-	0.141
Spiral-Point Gun	H5	2	-	26037	-	2.00	0.69	-	0.141
+0.005 Spiral-Point Gun	H11	2	-	27295	-	2.00	0.69	-	0.141
<b>#6 - 40 NF</b>									
Spiral-Point Gun	H3	2	-	27299	-	2.00	0.69	-	0.141
<b>#6 - 48 NS</b>									
Hand	H2	3	-	27301	27302	2.00	0.69	-	0.141
Spiral-Point Gun	H2	2	-	27299	-	2.00	0.69	-	0.141
<b>#8 - 24 NS</b>									
Hand	H3	4	-	27305	27306	2.13	0.75	-	0.168
<b>#8 - 32 NC</b>									
Hand	H5	4	-	27312	27313	2.13	0.75	-	0.168
+0.003 Hand	H7	4	-	-	27316	-	-	-	-
+0.005 Hand	H11	4	-	27318	27319	2.13	0.75	-	0.168
Spiral-Point Gun	H5	2	-	27314	-	2.13	0.75	-	0.168
+0.005 Spiral-Point Gun	H11	2	-	27320	-	2.13	0.75	-	0.168
<b>#8 - 40 NS</b>									
Hand	H2	4	-	27322	27323	2.13	0.75	-	0.168

(continued)

(continued)

## Common Specials • HSS

style	H-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>#10 - 24 NC</b>									
Hand	H5	4	-	27330	27331	2.38	0.94	-	0.190
+ .003 Hand	H7	4	-	27334	27335	2.38	0.94	-	0.190
+ .005 Hand	H11	4	-	27337	27338	2.38	0.94	-	0.190
Spiral-Point Gun	H5	2	-	27332	-	2.38	0.94	-	0.190
+ .005 Spiral-Point Gun	H11	2	-	27339	-	2.38	0.94	-	0.190
<b>#10 - 28 NS</b>									
Hand	H3	4	-	27341	27342	2.38	0.94	-	0.190
<b>#10 - 30 NS</b>									
Hand	H3	4	-	26045	26046	2.38	0.88	-	0.190
<b>#10 - 32 NF</b>									
Hand	H5	4	-	26050	26051	2.38	0.88	-	0.190
+ .003 Hand	H7	4	-	26054	26055	2.38	0.88	-	0.190
+ .005 Hand	H11	4	-	26057	26058	2.38	0.88	-	0.190
Spiral-Point Gun	H4	2	-	26048	-	2.38	0.88	-	0.190
Spiral-Point Gun	H5	2	-	26052	-	2.38	0.88	-	0.190
+ .005 Spiral-Point Gun	H11	2	-	26059	-	2.38	0.88	-	0.190
<b>#10 - 36 NS</b>									
Hand	H2	4	-	26061	26062	2.38	0.88	-	0.190
<b>#10 - 40 NF</b>									
Hand	H2	4	-	26064	26065	2.38	0.88	-	0.190
Spiral-Point Gun	H2	2	-	26066	-	2.38	0.88	-	0.190
<b>.210 - 36 NS</b>									
Hand	H2	4	-	-	26069	2.50	0.94	-	0.220
<b>#12 - 24 NC</b>									
+ .005 Hand	H11	4	-	27609	27610	2.38	0.94	-	0.220
<b>#12 - 28 NF</b>									
+ .005 Hand	H11	4	27612	27613	27614	2.38	0.94	-	0.220
<b>#12 - 32 NF</b>									
Hand	H3	4	26076	26077	26078	2.38	0.94	-	0.220
<b>#12 - 36 NS</b>									
Hand	H2	4	26080	26081	26082	2.38	0.94	-	0.220
<b>#14 - 20 NS</b>									
Hand	H3	4	-	26084	26085	2.50	0.94	-	0.255
<b>#14 - 24 NS</b>									
Hand	H3	4	-	26087	26088	2.50	0.94	-	0.255
<b>1/4 - 20 NC</b>									
+ .003 Hand	H7	4	-	26093	26094	2.50	1.00	-	0.255
+ .005 Hand	H11	4	27616	-	26096	2.50	1.00	-	0.255
+ .003 Spiral-Point Gun	H3	2	-	26095	-	2.50	1.00	-	0.255
Fast Spiral-Flute	H5	3	-	26089	-	2.50	0.63	1.00	0.255
<b>1/4 - 24 NS</b>									
Hand	H3	4	26097	26098	26099	2.50	1.00	-	0.255
<b>1/4 - 27 NS</b>									
Hand	H3	4	-	26102	26103	2.50	1.00	-	0.255

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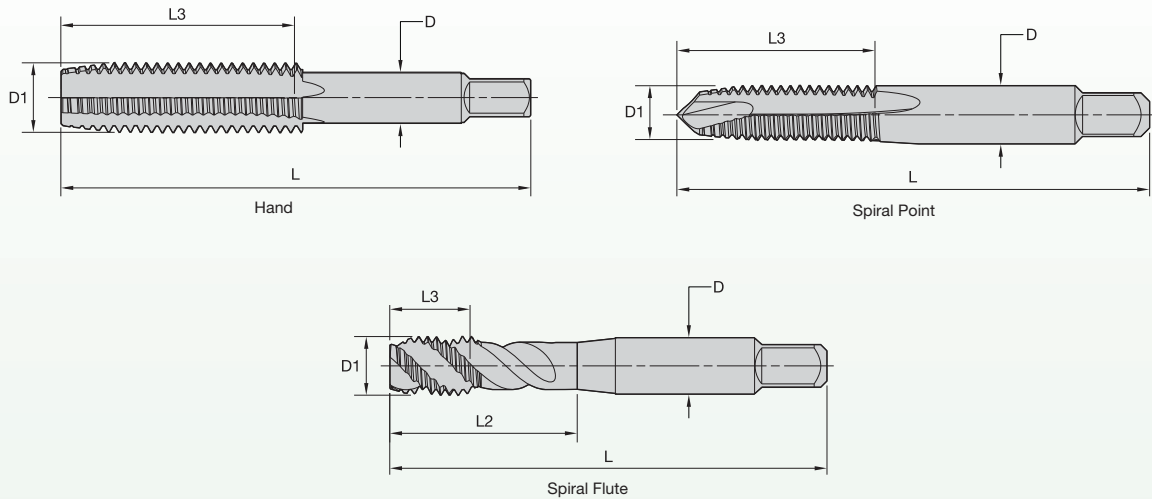
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min	max
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2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

Lightning Service

(continued)

## Common Specials • HSS



style	H-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>1/4 - 28 NF</b>									
Hand	H5	4	-	26106	26107	2.50	1.00	-	0.255
+0.003 Hand	H7	4	-	26110	26111	2.50	1.00	-	0.255
+0.005 Hand	H11	4	-	26113	26114	2.50	1.00	-	0.255
Spiral-Point Gun	H5	2	-	26108	-	2.50	1.00	-	0.255
+0.003 Spiral-Point Gun	H7	2	-	26112	-	2.50	1.00	-	0.255
+0.005 Spiral-Point Gun	H11	2	-	26115	-	2.50	1.00	-	0.255
<b>1/4 - 32 NF</b>									
Hand	H3	4	26116	26117	26118	2.50	1.00	-	0.255
Hand	H5	4	-	26124	26125	2.50	1.00	-	0.255
Spiral-Point Gun	H3	2	-	26122	-	2.50	1.00	-	0.255
<b>1/4 - 36 NS</b>									
Hand	H2	4	-	26127	26128	2.50	1.00	-	0.255
Hand	H3	4	-	26131	26132	2.50	1.00	-	0.255
<b>1/4 - 40 NS</b>									
Hand	H2	4	26134	26135	26136	2.50	1.00	-	0.255
Hand	H3	4	-	26138	26139	2.50	1.00	-	0.255
<b>1/4 - 48 NS</b>									
Hand	H2	4	28393	28394	28395	2.50	1.00	-	0.255
Hand	H3	4	-	26138	26139	2.50	1.00	-	0.255
<b>5/16 - 18 NC</b>									
+0.003 Hand	H7	4	-	26142	26143	2.72	1.13	-	0.318
+0.005 Hand	H11	4	-	-	26145	2.72	1.13	-	0.318
<b>5/16 - 20 NS</b>									
Hand	H3	4	-	26147	26148	2.72	1.13	-	0.318
<b>5/16 - 24 NF</b>									
Hand	H5	4	-	26151	26152	2.72	1.13	-	0.318
Hand	H6	4	-	26155	26156	2.72	1.13	-	0.318
+0.005 Hand	H11	4	-	26157	26158	2.72	1.13	-	0.318
Spiral-Point Gun	H5	2	-	26153	-	2.72	1.13	-	0.318
+0.005 Spiral-Point Gun	H11	2	-	26159	-	2.72	1.13	-	0.318
<b>5/16 - 27 NS</b>									
Hand	H3	4	-	26161	26162	2.72	1.13	-	0.318
<b>5/16 - 28 NS</b>									
Hand	H3	4	-	26164	26165	2.72	1.13	-	0.318

(continued)



(continued)

## Common Specials • HSS

style	H-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>5/16 - 32 NEF</b>									
Hand	H3	4	-	26167	26168	2.72	1.13	-	0.318
Hand	H5	4	-	26171	26172	2.72	1.13	-	0.318
Spiral-Point Gun	H3	2	-	26169	-	2.72	1.13	-	0.318
<b>5/16 - 40 NS</b>									
Hand	H2	4	-	26174	26175	2.72	1.13	-	0.318
<b>3/8 - 16 NC</b>									
+.003 Hand	H7	4	-	26179	26180	2.72	1.13	-	0.318
+.005 Hand	H11	4	-	-	26182	2.72	1.13	-	0.318
Spiral-Point Gun	H3	2	-	26177	-	2.72	1.13	-	0.318
<b>3/8 - 18 NS</b>									
Hand	H3	4	-	26184	26185	2.72	1.13	-	0.318
<b>3/8 - 20 NS</b>									
Hand	H3	4	-	26187	26188	2.72	1.13	-	0.318
<b>3/8 - 24 NC</b>									
Hand	H5	4	-	26193	26194	2.72	1.13	-	0.318
+.003 Hand	H7	4	-	26197	26198	2.72	1.13	-	0.318
+.005 Hand	H11	4	-	26200	26201	2.72	1.13	-	0.318
Spiral-Point Gun	H5	2	-	26195	-	2.72	1.13	-	0.318
+.005 Spiral-Point Gun	H11	2	-	26202	-	2.72	1.13	-	0.318
Fast Spiral-Flute	H5	3	-	26189	-	2.72	0.73	1.39	0.318
<b>3/8 - 27 NS</b>									
Hand	H3	4	-	26205	26206	2.72	1.13	-	0.318
<b>3/8 - 28 NS</b>									
Hand	H3	4	-	26208	26209	2.72	1.13	-	0.318
<b>3/8 - 32 NEF</b>									
Hand	H3	4	-	26211	26212	2.72	1.13	-	0.318
Hand	H5	4	-	26215	26216	2.72	1.13	-	0.318
<b>3/8 - 40 NS</b>									
Hand	H2	4	-	26218	26219	2.72	1.13	-	0.318
Hand	H3	4	-	26220	26221	2.72	1.13	-	0.318
<b>7/16 - 14 NC</b>									
+.005 Hand	H11	4	-	26223	26224	3.16	1.44	-	0.323
+.005 Spiral-Point Gun	H11	3	-	26225	-	3.16	1.44	-	1.323
<b>7/16 - 18 NS</b>									
Hand	H3	4	-	26230	26231	3.16	1.44	-	0.323
<b>7/16 - 20 NF</b>									
Hand	H6	4	-	26233	26234	3.16	1.44	-	0.323
+.005 Hand	H11	4	-	26235	26236	3.16	1.44	-	0.323
<b>7/16 - 24 NS</b>									
Hand	H3	4	-	26239	26240	3.16	1.44	-	0.323
Hand	H5	4	-	26242	26243	3.16	1.44	-	0.323
<b>7/16 - 27 NS</b>									
Hand	H3	4	-	26245	26246	3.16	1.44	-	0.323
<b>7/16 - 28 NEF</b>									
Hand	H3	4	-	26248	26249	3.16	1.44	-	0.323
Hand	H5	4	-	26251	26252	3.16	1.44	-	0.323

(continued)

**Pricing Based on Order Quantity**

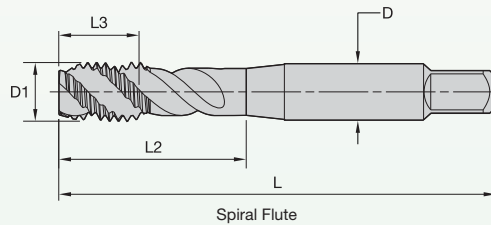
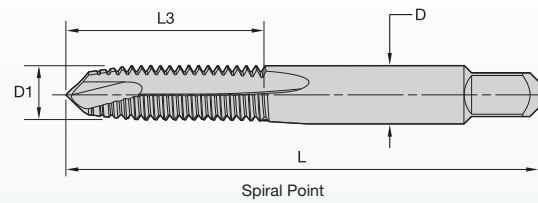
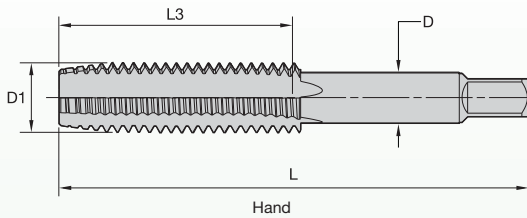
min	max
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3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

Lightning Service

(continued)

## Common Specials • HSS



style	H-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>7/16 - 32 NS</b>									
<b>Hand</b>	H3	4	-	26254	26255	3.16	1.44	-	0.323
<b>1/2 - 12 NS</b>									
<b>Hand</b>	H3	4	-	26257	26258	3.38	1.66	-	0.367
<b>1/2 - 13 NC</b>									
<b>+0.003 Hand</b>	H7	4	-	26263	26264	3.38	1.66	-	0.367
<b>+0.005 Hand</b>	H11	4	-	26265	26266	3.38	1.66	-	0.367
<b>1/2 - 14 NS</b>									
<b>Hand</b>	H3	4	-	26269	26270	3.38	1.66	-	0.367
<b>1/2 - 16 NS</b>									
<b>Hand</b>	H3	4	-	26272	26273	3.38	1.66	-	0.367
<b>1/2 - 18 NS</b>									
<b>Hand</b>	H3	4	-	26275	26276	3.38	1.66	-	0.367
<b>1/2 - 20 NF</b>									
<b>+0.003 Hand</b>	H7	4	-	26279	26280	3.38	1.66	-	0.367
<b>+0.005 Hand</b>	H11	4	-	26281	26282	3.38	1.66	-	0.367
<b>+0.005 Spiral-Point Gun</b>	H11	3	-	26283	-	3.38	1.66	-	0.367
<b>1/2 - 24 NS</b>									
<b>Hand</b>	H3	4	-	26285	26286	3.38	1.66	-	0.367
<b>1/2 - 27 NS</b>									
<b>Hand</b>	H3	4	-	26288	26289	3.38	1.66	-	0.367
<b>1/2 - 28 NEF</b>									
<b>Hand</b>	H3	4	-	26291	26292	3.38	1.66	-	0.367
<b>Hand</b>	H5	4	-	26295	26296	3.38	1.66	-	0.367
<b>1/2 - 32 NS</b>									
<b>Hand</b>	H3	6	-	26298	26299	3.38	1.66	-	0.367
<b>1/2 - 40 NS</b>									
<b>Hand</b>	H2	6	-	26301	26302	3.38	1.66	-	0.367
<b>9/16 - 12 NC</b>									
<b>Spiral-Point Gun</b>	H3	3	-	28490	-	3.59	1.66	-	0.429
<b>9/16 - 16 NS</b>									
<b>Hand</b>	H3	4	-	26304	26305	3.59	1.66	-	0.429
<b>9/16 - 18 NF</b>									
<b>Hand</b>	H5	4	-	-	26307	3.59	1.66	-	0.429
<b>+0.005 Hand</b>	H11	4	-	26310	26311	3.59	1.66	-	0.429
<b>Spiral-Point Gun</b>	H5	3	-	26306	-	3.59	1.66	-	0.429

(continued)

(continued)

**Common Specials • HSS**

style	H-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>9/16 - 20 NS</b>									
Hand	H3	4	-	26314	26315	3.59	1.66	-	0.429
<b>9/16 - 24 NEF</b>									
Hand	H3	4	-	26317	26318	3.59	1.66	-	0.429
Hand	H5	4	-	26320	26321	3.59	1.66	-	0.429
<b>9/16 - 27 NS</b>									
Hand	H3	6	-	26323	26324	3.59	1.66	-	0.429
<b>5/8 - 10 NS</b>									
Hand	H3	4	-	26356	26327	3.81	1.81	-	0.480
<b>5/8 - 11 NC</b>									
+ .005 Hand	H11	4	27627	26331	26332	3.81	1.81	-	0.480
Spiral-Flute	H3	4	-	26328	-	3.81	1.81	-	0.480
<b>5/8 - 12 NS</b>									
Hand	H3	4	-	26335	26336	3.81	1.81	-	0.480
<b>5/8 - 18 NF</b>									
+ .003 Hand	H7	4	-	26347	26348	3.81	1.81	-	0.480
+ .005 Hand	H11	4	-	26349	26350	3.81	1.81	-	0.480
Spiral-Point Gun	H5	3	-	26345	-	3.81	1.81	-	0.480
Spiral-Flute	H5	4	-	26340	-	3.81	1.81	-	0.480
<b>5/8 - 20 NS</b>									
Hand	H3	4	-	26352	26353	3.81	1.81	-	0.480
<b>5/8 - 24 NEF</b>									
Hand	H3	6	-	26355	26356	3.81	1.81	-	0.480
Hand	H5	6	-	26358	26359	3.81	1.81	-	0.480
Spiral-Point Gun	H3	3	-	27630	-	3.81	1.81	-	0.480
<b>5/8 - 28 NS</b>									
Hand	H3	6	-	26364	26365	3.81	1.81	-	0.480
<b>11/16 - 18 NS</b>									
Hand	H3	4	-	26370	26371	4.03	1.81	-	0.542
<b>11/16 - 20 NS</b>									
Hand	H3	6	-	26373	26374	4.03	1.81	-	0.542
<b>11/16 - 24 NEF</b>									
Hand	H3	4	27361	27362	27631	4.03	1.81	-	0.542
Hand	H3	6	-	26376	26377	4.03	1.81	-	0.542
<b>11/16 - 28 NS</b>									
Hand	H3	6	-	26382	26383	4.03	1.81	-	0.542
<b>3/4 - 10 NC</b>									
Hand	H1	4	-	26387	26388	4.25	2.00	-	0.590
+ .005 Hand	H11	4	-	26389	26390	4.25	2.00	-	0.590
+ .005 Spiral-Point Gun	H11	3	-	26391	-	4.25	2.00	-	0.590
Spiral-Flute	H3	4	-	26384	-	4.25	2.00	-	0.590
<b>3/4 - 12 NS</b>									
Hand	H4	4	-	26393	26394	4.25	2.00	-	0.590
<b>3/4 - 16 NF</b>									
Hand	H8	4	-	26406	26407	4.25	2.00	-	0.590
+ .003 Hand	H7	4	-	26403	26404	4.25	2.00	-	0.590
+ .005 Hand	H11	4	-	26408	26409	4.25	2.00	-	0.590
Spiral-Point Gun	H3	3	-	26397	-	4.25	2.00	-	0.590
Spiral-Point Gun	H5	3	-	26398	-	4.25	2.00	-	0.590
Spiral-Flute	H3	4	-	26395	-	4.25	2.00	-	0.590

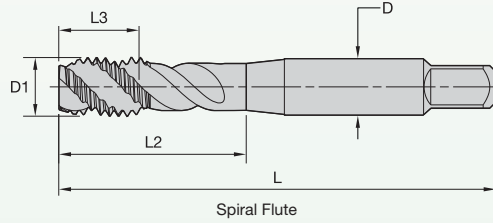
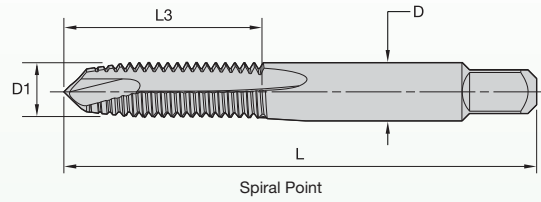
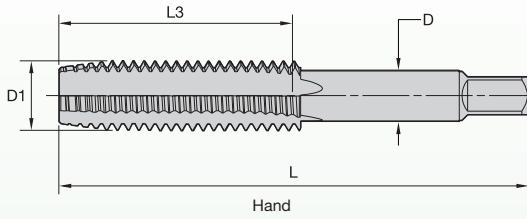
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Pricing Based on Order Quantity	
min	max
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2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

(continued)

## Common Specials • HSS



style	H-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>3/4 - 18 NS</b>									
Hand	H3	4	-	26411	26412	4.25	2.00	-	0.590
<b>3/4 - 20 NEF</b>									
Hand	H3	6	-	26414	26415	4.25	2.00	-	0.590
Hand	H5	6	-	26417	26418	4.25	2.00	-	0.590
<b>3/4 - 24 NS</b>									
Hand	H3	6	-	26420	26421	4.25	2.00	-	0.590
<b>3/4 - 27 NS</b>									
Hand	H3	6	-	26423	26424	4.25	2.00	-	0.590
<b>13/16 - 10 NS</b>									
Hand	H4	4	-	26425	26426	4.47	2.00	-	0.652
<b>13/16 - 12 NS</b>									
Hand	H4	4	-	26428	26429	4.47	2.00	-	0.652
<b>13/16 - 16 NS</b>									
Hand	H3	4	-	26431	26432	4.47	2.00	-	0.652
<b>13/16 - 18 NS</b>									
Hand	H3	4	-	26434	26435	4.47	2.00	-	0.652
<b>13/16 - 20 NEF</b>									
Hand	H3	6	-	26437	26438	4.47	2.00	-	0.652
Hand	H5	6	-	26440	26441	4.47	2.00	-	0.652
<b>13/16 - 24 NS</b>									
Hand	H3	6	-	26443	26444	4.47	2.00	-	0.652
<b>7/8 - 9 NC</b>									
+.005 Hand	H11	4	-	26448	26449	4.69	2.22	-	0.697
Spiral-Point Gun	H4	3	-	26447	-	4.69	2.22	-	0.697
Spiral-Flute	H3	4	-	26445	-	4.69	2.22	-	0.697
<b>7/8 - 10 NS</b>									
Hand	H4	4	-	26451	26452	4.69	2.22	-	0.697
<b>7/8 - 14 NF</b>									
Hand	H5	4	-	26458	26459	4.69	2.22	-	0.697
Hand	H6	4	-	26461	26462	4.69	2.22	-	0.697
+.005 Hand	H11	4	27639	26463	26464	4.69	2.22	-	0.697
Spiral-Point Gun	H4	3	-	26456	-	4.69	2.22	-	0.697
<b>7/8 - 16 NS</b>									
Hand	H3	4	-	26466	26467	4.69	2.22	-	0.697

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(continued)

**Common Specials • HSS**

style	H-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>7/8 - 18 NS</b>									
Hand	H3	4	-	26469	26470	4.69	2.22	-	0.697
<b>7/8 - 20 NEF</b>									
Hand	H3	6	-	26472	26473	4.69	2.22	-	0.697
Hand	H5	6	-	26475	26476	4.69	2.22	-	0.697
<b>7/8 - 24 NS</b>									
Hand	H3	6	-	26478	26479	4.69	2.22	-	0.697
<b>15/16 - 12 NS</b>									
Hand	H4	4	-	26481	26485	4.69	2.22	-	0.760
<b>15/16 - 16 NS</b>									
Hand	H3	6	-	26487	26488	4.69	2.22	-	0.760
<b>15/16 - 18 NS</b>									
Hand	H3	6	-	26490	26491	4.69	2.22	-	0.760
<b>15/16 - 20 NEF</b>									
Hand	H3	6	-	26493	26494	4.69	2.22	-	0.760
Hand	H5	6	-	26495	26497	4.69	2.22	-	0.760
<b>1 - 8 NC</b>									
+ .005 Hand	H11	4	-	26506	26507	5.13	2.50	-	0.800
Spiral-Point Gun	H4	3	-	26505	-	5.13	2.50	-	0.800
+ .005 Spiral-Point Gun	H11	3	-	26508	-	5.13	2.50	-	0.800
Spiral-Flute	H4	4	-	26501	-	5.13	2.50	-	0.800
<b>1 - 10 NS</b>									
Hand	H4	4	-	26510	26511	5.13	2.50	-	0.800
<b>1 - 12 NS</b>									
Hand	H6	4	-	26513	26514	5.13	2.50	-	0.800
+ .005 Hand	H11	4	-	26516	26517	5.13	2.50	-	0.800
<b>1 - 14 NS</b>									
Hand	H6	4	-	26519	26520	5.13	2.50	-	0.800
+ .005 Hand	H11	4	-	26521	26522	5.13	2.50	-	0.800
<b>1 - 16 NS</b>									
Hand	H3	6	-	26524	26525	5.13	2.50	-	0.800
<b>1 - 18 NS</b>									
Hand	H3	6	-	26527	26528	5.13	2.50	-	0.800
<b>1 - 20 NEF</b>									
Hand	H3	6	-	26530	26531	5.13	2.50	-	0.800
Hand	H5	6	-	26533	26534	5.13	2.50	-	0.800
<b>1-1/16 - 12 NS</b>									
Hand	H4	4	26535	26536	26537	5.13	2.50	-	0.896
Hand	H5	4	-	26539	26540	5.13	2.50	-	0.896
<b>1-1/8 - 8 NS</b>									
Hand	H5	4	-	26563	26564	5.44	2.56	-	0.896
<b>1-1/4 - 8 NS</b>									
Hand	H5	4	-	26629	26630	5.75	2.56	-	1.021
<b>1-1/2 - 8 NS</b>									
Hand	H5	4	-	28638	28639	6.38	3.00	-	1.233
<b>1-3/4 - 12 NS</b>									
Hand	H6	6	-	26776	26777	5.00	2.00	-	1.430

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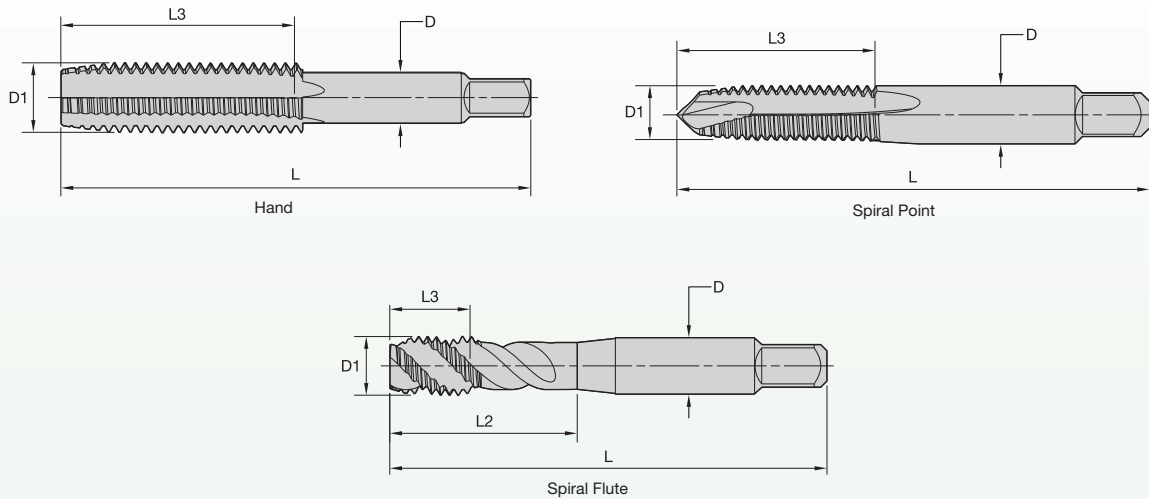
Pricing Based on Order Quantity	
min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

Lightning Service

(continued)

## Common Specials • HSS



style	D-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>M1.8 x 0.35</b>									
6H Hand	D3	2	26877	26878	26879	1.69	0.38	-	0.141
6H Spiral-Point Gun	D3	2	-	26880	-	1.69	0.38	-	0.141
<b>M2.2 x 0.45</b>									
6H Hand	D3	2	26881	26882	26883	1.75	0.44	-	0.141
6H Spiral-Point Gun	D3	2	-	26884	-	-	-	-	-
<b>M2.5 x 0.45</b>									
4H Hand	D1	3	26887	26888	26889	1.81	0.44	-	0.141
6H Hand	D3	3	26885	-	26886	1.81	0.44	-	0.141
4H Spiral-Point Gun	D1	2	-	26890	-	1.81	0.44	-	0.141
<b>M3 x 0.50</b>									
4H Hand	D1	4	26891	26892	26893	1.94	0.63	-	0.141
<b>M3.5 x 0.60</b>									
4H Hand	D1	3	26897	26898	26899	2.00	0.69	-	0.141
6H Hand	D4	3	26895	-	26896	2.00	0.69	-	0.141
+.005 Hand	D11	3	26901	26902	26903	2.00	0.69	-	0.141
<b>M4 x 0.70</b>									
4H Hand	D2	4	26908	26909	26910	2.13	0.75	-	0.168
+.005 Hand	D11	4	26915	26916	26917	2.13	0.75	-	0.168
+.005 Spiral-Point Gun	D11	2	-	26918	-	2.13	0.75	-	0.168
<b>M4.5 x 0.75</b>									
4H Hand	D2	4	26921	26922	26923	2.38	0.88	-	0.194
6H Hand	D4	4	26919	-	26920	2.38	0.88	-	0.194
+.005 Hand	D11	4	26925	26926	26927	2.38	0.88	-	0.194
<b>M5 x .050</b>									
6H Hand	D3	4	26943	26944	26945	2.38	0.94	-	0.194
6H Spiral-Point Gun	D3	2	-	26946	-	2.38	0.94	-	0.194
<b>M5 x 0.80</b>									
4H Hand	D2	4	26932	26933	26934	2.38	0.94	-	0.194
+.005 Hand	D11	4	26936	26937	26938	2.38	0.94	-	0.194
+.005 Spiral-Point Gun	D11	2	-	26942	-	2.38	0.94	-	0.194
<b>M6 x 0.5</b>									
6H Hand	D3	4	26962	26963	26964	2.50	1.00	-	0.255
<b>M6 x .75</b>									
4H Hand	D3	4	26958	26959	26960	2.50	1.00	-	0.255
4H Spiral-Point Gun	D3	2	-	26961	-	2.50	1.00	-	0.255

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## Common Specials • HSS

style	D-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>M6 x 1</b>									
4H Hand	D3	4	26947	26948	26949	2.50	1.00	-	0.255
+ .005 Hand	D11	4	26954	26955	26956	2.50	1.00	-	0.255
+ .005 Spiral-Point Gun	D11	2	-	26957	-	2.50	1.00	-	0.255
<b>M7 x 1</b>									
4H Hand	D3	4	26965	26966	26967	2.72	1.13	-	0.318
+ .005 Hand	D11	4	26972	26973	26974	2.72	1.13	-	0.318
<b>M8 x 0.75</b>									
6H Hand	D5	4	27002	27003	27004	2.72	1.13	-	0.318
<b>M8 x 1</b>									
4H Hand	D3	4	26991	26992	26993	2.72	1.13	-	0.318
6H Hand	D5	4	26987	26988	26989	2.72	1.13	-	0.318
+ .005 Hand	D11	4	26995	26996	26997	2.72	1.13	-	0.318
6H Spiral-Point Gun	D5	2	-	26990	-	2.72	1.13	-	0.318
<b>M8 x 1.25</b>									
4H Hand	D3	4	26976	26977	26978	2.72	1.13	-	0.318
+ .005 Hand	D11	4	26983	26984	26985	2.72	1.13	-	0.318
+ .005 Spiral-Point Gun	D11	2	-	26986	-	2.72	1.13	-	0.318
<b>M10 x 1.0</b>									
6H Hand	D5	4	27034	27035	27036	2.94	1.25	-	0.381
Spark Plug Hand	D3	4	27031	27032	27033	2.94	1.25	-	0.381
6H Spiral-Point Gun	D5	3	-	27040	-	2.94	1.25	-	0.381
<b>M10 x 1.25</b>									
4H Hand	D3	4	27020	27021	27022	2.94	1.25	-	0.381
6H Hand	D5	4	27016	27017	27018	2.94	1.25	-	0.381
+ .005 Hand	D11	4	27027	27028	27029	2.94	1.25	-	0.381
4H Spiral-Point Gun	D3	3	-	27023	-	2.94	1.25	-	0.381
6H Spiral-Point Gun	D5	3	-	27019	-	2.94	1.25	-	0.381
<b>M10 x 1.5</b>									
4H Hand	D3	4	27005	27006	27007	2.94	1.25	-	0.381
+ .005 Hand	D11	4	27012	27013	27041	2.94	1.25	-	0.381
+ .005 Spiral-Point Gun	D11	3	-	27015	-	2.94	1.25	-	0.381
<b>M11 x 1</b>									
6H Hand	D5	4	27045	27046	27047	3.16	1.44	-	0.323
<b>M11 x 1.5</b>									
6H Hand	D6	4	27041	27042	27043	3.16	1.44	-	0.323
6H Spiral-Point Gun	D6	3	-	27044	-	3.16	1.44	-	0.323
<b>M12 x 1</b>									
6H Hand	D	4	27076	27077	27078	3.38	1.66	-	0.367
6H Spiral-Point Gun	D	3	-	27079	-	3.38	1.66	-	0.367
<b>M12 x 1.25</b>									
4H Hand	D3	4	27066	27067	27068	3.38	1.66	-	0.367
6H Hand	D5	4	27062	27063	27064	3.38	1.66	-	0.367
+ .005 Hand	D11	4	27073	27074	27075	3.38	1.66	-	0.367
6H Spiral-Point Gun	D5	3	-	27065	-	3.38	1.66	-	0.367

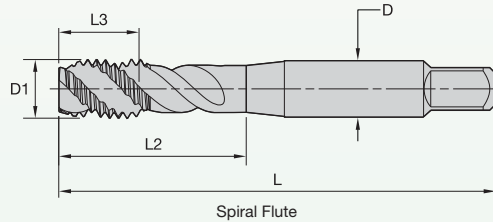
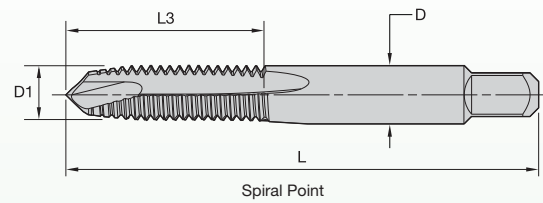
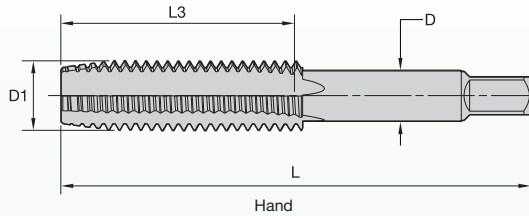
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min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

(continued)

## Common Specials • HSS



style	D-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>M12 x 1.5</b>									
6H Hand	D6	4	27059	27060	27061	3.38	1.66	-	0.367
<b>M12 x 1.75</b>									
4H Hand	D3	4	27048	27049	27050	3.38	1.66	-	0.367
+.005 Hand	D11	4	27055	27056	27057	3.38	1.66	-	0.367
+.005 Spiral-Point Gun	D11	3	-	27058	-	3.38	1.66	-	0.367
<b>M14 x 1</b>									
6H Hand	D5	4	27101	27102	27103	3.59	1.66	-	0.429
<b>M14 x 1.25</b>									
Spark Plug Hand	D4	4	27098	27099	27100	3.59	1.66	-	0.429
<b>M14 x 1.5</b>									
4H Hand	D3	4	27091	27092	27093	3.59	1.66	-	0.429
6H Hand	D6	4	27087	27088	27089	3.59	1.66	-	0.429
6H Spiral-Point Gun	D6	3	-	27090	-	3.59	1.66	-	0.429
<b>M14 x 2</b>									
4H Hand	D3	4	27080	27081	27082	3.59	1.66	-	0.429
<b>M15 x 1</b>									
6H Hand	D5	4	27104	27105	27106	3.81	1.81	-	0.480
<b>M16 x 1.5</b>									
4H Hand	D3	4	27122	27123	27124	3.81	1.81	-	0.480
6H Hand	D6	4	27118	27119	27120	3.81	1.81	-	0.480
6H Spiral-Point Gun	D6	3	-	27121	-	3.81	1.81	-	0.480
<b>M16 x 2</b>									
4H Hand	D4	4	27107	27108	27109	3.81	1.81	-	0.480
+.005 Hand	D11	4	27114	27115	27116	3.81	1.81	-	0.480
<b>M18 x 1</b>									
6H Hand	D5	4	27147	27148	27149	4.03	1.81	-	0.542
<b>M18 x 1.5</b>									
4H Hand	D3	4	27141	27142	27143	4.03	1.81	-	0.542
6H Hand	D6	4	27135	27136	27137	4.03	1.81	-	0.542
Spark Plug Hand	D4	4	27138	27139	27140	4.03	1.81	-	0.542
<b>M18 x 2.5</b>									
4H Hand	D4	4	27129	27130	27131	4.03	1.81	-	0.542
<b>M20 x 1.5</b>									
4H Hand	D3	4	27162	27163	27164	4.47	2.00	-	0.652
6H Hand	D6	4	27159	27160	27161	4.47	2.00	-	0.652
+.005 Hand	D11	4	27168	27169	27170	4.47	2.00	-	0.652

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## Common Specials • HSS

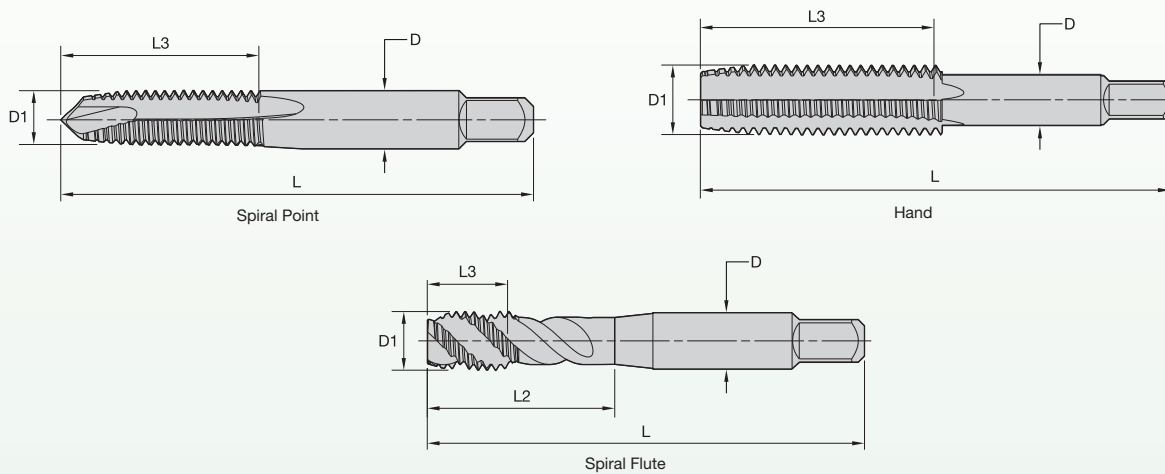
style	D-limit	flutes	uncoated taper	uncoated plug	uncoated bottom	L	L3	L2	D
<b>M20 x 2</b>									
4H Hand	D4	4	28816	28817	28818	4.47	2.00	–	0.652
<b>M22 x 1.5</b>									
4H Hand	D3	4	27183	27184	27185	4.69	2.22	–	0.697
6H Hand	D6	4	27180	27181	27182	4.69	2.22	–	0.697
±.005 Hand	D11	4	27189	27190	27191	4.69	2.22	–	0.697
<b>M22 x 2.5</b>									
4H Hand	D4	4	27174	27175	27176	4.69	2.22	–	0.697
6H Hand	D7	4	27171	27172	27173	4.69	2.22	–	0.697
<b>M24 x 1.5</b>									
6H Hand	D6	4	27210	27211	27212	4.91	2.22	–	0.760
<b>M24 x 2</b>									
4H Hand	D4	4	27204	27205	27206	4.91	2.22	–	0.760
6H Hand	D7	4	27201	27202	27203	4.91	2.22	–	0.760
<b>M24 x 3</b>									
4H Hand	D4	4	27192	27193	27194	4.91	2.22	–	0.760
<b>M30 x 1.5</b>									
6H Hand	D6	6	27243	27244	27245	4.00	1.50	–	1.021

Pricing Based on Order Quantity

min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

## Specials from Blanks • General Applications • HSS



style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	uncoated 6-flute	L	L3	L2	D	max H limit	max TPI
<b>#0</b>										
Hand — T, P, B	64250	-	-	-	1.63	0.31	-	0.141	3	100
Spiral-Point Gun — P, B	64350	-	-	-	1.63	0.31	-	0.141	3	100
<b>#1</b>										
Hand — T, P, B	64251	-	-	-	1.69	0.38	-	0.141	4	100
Spiral-Point Gun — P, B	64351	-	-	-	1.69	0.38	-	0.141	4	100
<b>#2</b>										
Hand — T, P, B	64252	64264	-	-	1.75	0.44	-	0.141	4	100
Spiral-Point Gun — P, B	64352	-	-	-	1.75	0.44	-	0.141	4	100
Spiral-Flute 30° — P, B	65160	-	-	-	1.75	0.44	-	0.141	4	100
Spiral-Flute 49° — P, B	65161	-	-	-	1.75	0.44	-	0.141	4	100
<b>#3</b>										
Hand — T, P, B	64253	64265	-	-	1.81	0.50	-	0.141	5	100
Spiral-Point Gun — P, B	64353	-	-	-	1.81	0.50	-	0.141	5	100
Spiral-Flute 30° — P, B	64455	-	-	-	1.81	0.50	-	0.141	5	100
Spiral-Flute 49° — P, B	64466	-	-	-	1.81	0.50	-	0.141	5	100
<b>#4</b>										
Hand — T, P, B	64254	64266	-	-	1.88	0.56	-	0.141	5	100
Spiral-Point Gun — P, B	64354	-	-	-	1.88	0.56	-	0.141	5	100
Spiral-Flute 30° — P, B	64456	-	-	-	1.88	0.56	-	0.141	5	100
Spiral-Flute 49° — P, B	64467	-	-	-	1.88	0.56	-	0.141	5	100
<b>Oversized</b>										
Hand — T, P, B	65730	-	-	-	1.88	0.56	-	0.141	11	100
Spiral-Point Gun — P, B	64735	-	-	-	1.88	0.56	-	0.141	11	100
<b>#5</b>										
Hand — T, P, B	64255	64267	-	-	1.94	0.63	-	0.141	5	100
Spiral-Point Gun — P, B	64355	-	-	-	1.94	0.63	-	0.141	5	100
Spiral-Flute 30° — P, B	64457	-	-	-	1.94	0.63	-	0.141	5	100
Spiral-Flute 49° — P, B	64468	-	-	-	1.94	0.63	-	0.141	5	100
<b>Oversized</b>										
Hand — T, P, B	65731	-	-	-	1.94	0.63	-	0.141	11	100
Spiral-Point Gun — P, B	64736	-	-	-	1.94	0.63	-	0.141	11	100

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**Specials from Blanks • General Applications • HSS**

style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	uncoated 6-flute	L	L3	L2	D	max H limit	max TPI
<b>#6</b>										
Hand — T, P, B	64256	64268	64836	-	2.00	0.69	-	0.141	7	100
Spiral-Point Gun — P, B	64356	64839	-	-	2.00	0.69	-	0.141	7	100
Spiral-Flute 30° — P, B	-	65167	-	-	2.00	0.38	0.69	0.141	7	100
Spiral-Flute 49° — P, B	-	65172	-	-	2.00	0.38	0.69	0.141	7	100
<b>Oversized</b>										
Hand — T, P, B	65732	65735	-	-	2.00	0.69	-	0.141	13	100
Spiral-Point Gun — P, B	64737	65182	-	-	2.00	0.69	-	0.141	13	100
<b>#8</b>										
Hand — T, P, B	64257	64269	64278	-	2.13	0.75	-	0.168	7	100
Spiral-Point Gun — P, B	64357	65193	-	-	2.13	0.75	-	0.168	7	100
Spiral-Flute 30° — P, B	-	65168	-	-	2.13	0.38	0.75	0.168	7	100
Spiral-Flute 49° — P, B	-	64476	-	-	2.13	0.38	0.75	0.168	7	100
<b>Oversized</b>										
Hand — T, P, B	65733	65736	64811	-	2.13	0.75	-	0.168	13	100
Spiral-Point Gun — P, B	64738	65183	-	-	2.13	0.75	-	0.168	-	100
<b>#10</b>										
Hand — T, P, B	64258	64270	64279	-	2.38	0.88	-	0.194	7	100
Spiral-Point Gun — P, B	64358	65142	64840	-	2.38	0.88	-	0.194	7	100
Spiral-Flute 30° — P, B	-	65169	-	-	2.38	0.50	0.88	0.194	7	100
Spiral-Flute 49° — P, B	-	64477	-	-	2.38	0.50	0.88	0.194	7	100
<b>Oversized</b>										
Hand — T, P, B	65734	65737	64812	-	2.38	0.88	-	0.194	13	100
Spiral-Point Gun — P, B	64739	65184	-	-	2.38	0.88	-	0.194	13	100
<b>#12</b>										
Hand — T, P, B	64260	65692	64281	-	2.38	0.94	-	0.220	7	100
Spiral-Point Gun — P, B	64360	65143	-	-	2.38	0.94	-	0.220	7	100
Spiral-Flute 30° — P, B	-	65171	-	-	2.38	0.50	0.94	0.220	7	100
Spiral-Flute 49° — P, B	-	64479	-	-	2.38	0.50	0.94	0.220	7	100
<b>Oversized</b>										
Hand — T, P, B	-	65738	65752	-	2.38	0.94	-	0.220	13	100
Spiral-Point Gun — P, B	64740	-	-	-	2.38	0.94	-	0.220	13	100
<b>1/4"</b>										
Hand — T, P, B	64261	64272	64282	-	2.50	1.00	-	0.255	7	80
Spiral-Point Gun — P, B	64361	64376	64832	-	2.50	1.00	-	0.255	7	80
Spiral-Flute 30° — P, B	-	64470	-	-	2.50	0.63	1.00	0.255	7	80
Spiral-Flute 49° — P, B	-	64480	-	-	2.50	0.63	1.00	0.255	7	80
<b>Oversized</b>										
Hand — T, P, B	-	65739	64813	-	2.50	1.00	-	0.255	13	80
Spiral-Point Gun — P, B	-	64741	65186	-	2.50	1.00	-	0.255	13	80
<b>5/16"</b>										
Hand — T, P, B	64262	64273	64283	-	2.72	1.13	-	0.318	7	80
Spiral-Point Gun — P, B	64362	64377	-	-	2.72	1.13	-	0.318	7	80
Spiral-Flute 30° — P, B	-	64471	-	-	2.72	0.69	1.12	0.318	7	80
Spiral-Flute 49° — P, B	-	64481	-	-	2.72	0.69	1.12	0.318	7	80
<b>Oversized</b>										
Hand — T, P, B	-	65740	64814	-	2.72	1.13	-	0.318	13	80
Spiral-Point Gun — P, B	-	64742	65187	-	2.72	1.13	-	0.318	13	80

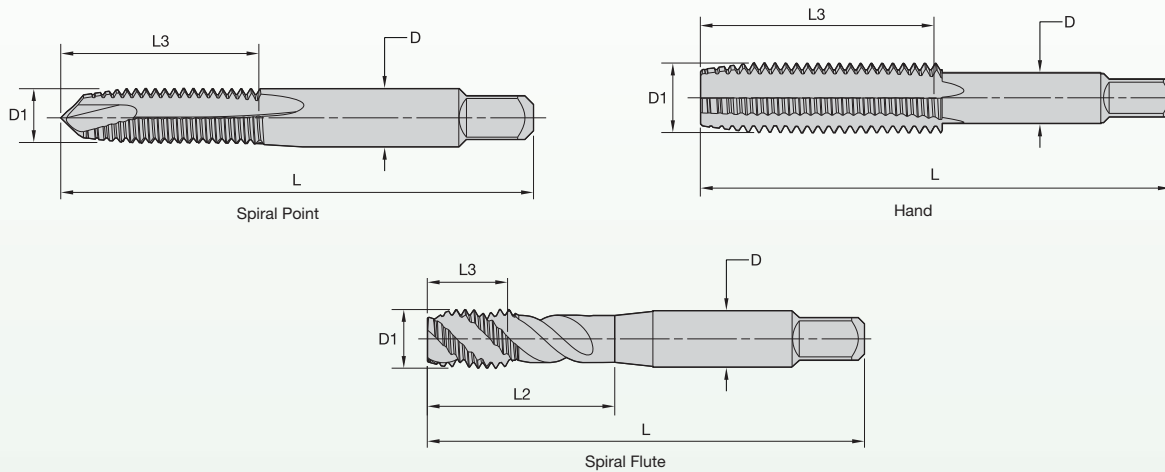
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min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

(continued)

## Specials from Blanks • General Applications • HSS



style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	uncoated 6-flute	L	L3	L2	D	max H limit	max TPI
<b>3/8"</b>										
Hand — T, P, B	64263	64274	64284	-	2.94	1.25	-	0.381	7	80
Spiral-Point Gun — P, B	64854	64378	-	-	2.94	1.25	-	0.381	7	80
Spiral-Flute 30° — P, B	-	64472	-	-	2.94	0.75	1.25	0.381	7	80
Spiral-Flute 49° — P, B	-	64482	-	-	2.94	0.75	1.25	0.381	7	80
<b>Oversized</b>										
Hand — T, P, B	-	65741	64815	-	2.94	1.25	-	0.381	13	80
Spiral-Point Gun — P, B	-	64767	-	-	2.94	1.25	-	0.381	13	80
<b>7/16"</b>										
Hand — T, P, B	-	64276	64286	-	3.16	1.44	-	0.323	15	80
Spiral-Point Gun — P, B	-	64380	-	-	3.16	1.44	-	0.323	15	80
Spiral-Flute 30° — P, B	-	64474	-	-	3.16	0.88	-	0.323	15	80
Spiral-Flute 49° — P, B	-	64484	-	-	3.16	0.88	-	0.323	15	80
<b>1/2"</b>										
Hand — T, P, B	-	64277	64287	65693	3.38	1.66	-	0.367	15	80
Spiral-Point Gun — P, B	-	64381	-	-	3.38	1.66	-	0.367	15	80
Spiral-Flute 30° — P, B	-	64475	-	-	3.38	0.94	-	0.367	15	80
Spiral-Flute 49° — P, B	-	64485	-	-	3.38	0.94	-	0.367	15	80
<b>9/16"</b>										
Hand — T, P, B	-	65100	64288	65694	3.59	1.66	-	0.429	15	64
Spiral-Point Gun — P, B	-	64382	64826	-	3.59	1.66	-	0.429	15	64
Spiral-Flute 30° — P, B	-	-	64496	-	3.59	1.00	-	0.429	15	64
Spiral-Flute 49° — P, B	-	-	64502	-	3.59	1.00	-	0.429	15	64
<b>5/8"</b>										
Hand — T, P, B	-	65101	64289	65695	3.81	1.81	-	0.480	15	64
Spiral-Point Gun — P, B	-	64383	64838	-	3.81	1.81	-	0.480	15	64
Spiral-Flute 30° — P, B	-	-	64497	-	3.81	1.09	-	0.480	15	64
Spiral-Flute 49° — P, B	-	-	64503	-	3.81	1.09	-	0.480	15	64
<b>11/16"</b>										
Hand — T, P, B	-	-	64290	65696	4.03	1.81	-	0.542	15	64
Spiral-Point Gun — P, B	-	64384	-	-	4.03	1.81	-	0.542	15	64
Spiral-Flute 30° — P, B	-	-	64498	-	4.03	1.09	-	0.542	15	64
Spiral-Flute 49° — P, B	-	-	64504	-	4.03	1.09	-	0.542	15	64

(continued)

(continued)

**Specials from Blanks • General Applications • HSS**

style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	uncoated 6-flute	L	L3	L2	D	max H limit	max TPI
<b>3/4"</b>										
Hand — T, P, B	-	65103	64291	65697	4.25	2.00	-	0.590	15	64
Spiral-Point Gun — P, B	-	64385	64829	-	4.25	2.00	-	0.590	15	64
Spiral-Flute 30° — P, B	-	-	64499	-	4.25	1.22	-	0.590	15	64
Spiral-Flute 49° — P, B	-	-	64505	-	4.25	1.22	-	0.590	15	64
<b>13/16"</b>										
Hand — T, P, B	-	-	64292	65698	4.47	2.00	-	0.652	15	64
Spiral-Point Gun — P, B	-	64386	-	-	4.47	2.00	-	0.652	15	64
Spiral-Flute 30° — P, B	-	-	65690	-	4.47	1.22	-	0.652	15	64
Spiral-Flute 49° — P, B	-	-	65691	-	4.47	1.22	-	0.652	15	64
<b>7/8"</b>										
Hand — T, P, B	-	-	64293	65699	4.69	2.22	-	0.697	15	64
Spiral-Point Gun — P, B	-	64387	-	-	4.69	2.22	-	0.697	15	64
Spiral-Flute 30° — P, B	-	-	64500	-	4.69	1.34	-	0.697	15	64
Spiral-Flute 49° — P, B	-	-	64506	-	4.69	1.34	-	0.697	15	64
<b>15/16"</b>										
Hand — T, P, B	-	-	64294	65700	4.91	2.22	-	0.760	15	64
Spiral-Point Gun — P, B	-	65144	-	-	4.91	2.22	-	0.760	15	64
Spiral-Flute 30° — P, B	-	-	65173	-	4.91	1.34	-	0.760	15	64
Spiral-Flute 49° — P, B	-	-	65174	-	4.91	1.34	-	0.760	15	64
<b>1"</b>										
Hand — T, P, B	-	-	64295	65701	5.13	2.50	-	0.800	15	64
Spiral-Point Gun — P, B	-	64388	-	-	5.13	2.50	-	0.800	15	64
Spiral-Flute 30° — P, B	-	-	64501	-	5.13	1.50	-	0.800	15	64
Spiral-Flute 49° — P, B	-	-	64507	-	5.13	1.50	-	0.800	15	64
style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	uncoated 6-flute	L	L3	L2	D	max D limit	pitch min
<b>M1.5</b>										
Hand — T, P, B	65288	-	-	-	1.63	0.31	-	0.141	3	0.30
Spiral-Point Gun — P, B	65381	-	-	-	1.63	0.31	-	0.141	3	0.30
<b>M1.6</b>										
Hand — T, P, B	65708	-	-	-	1.69	0.31	-	0.141	3	0.30
Spiral-Point Gun — P, B	65766	-	-	-	1.69	0.31	-	0.141	3	0.30
<b>M1.8</b>										
Hand — T, P, B	65289	-	-	-	1.69	0.38	-	0.141	4	0.30
Spiral-Point Gun — P, B	65382	-	-	-	1.69	0.38	-	0.141	4	0.30
<b>M2</b>										
Hand — T, P, B	65290	65301	-	-	1.75	0.44	-	0.141	4	0.30
Spiral-Point Gun — P, B	65383	-	-	-	1.75	0.44	-	0.141	4	0.30
Spiral-Flute 30° — P, B	65479	-	-	-	1.75	0.44	-	0.141	4	0.30
Spiral-Flute 49° — P, B	65506	-	-	-	1.75	0.44	-	0.141	4	0.30
<b>M2.2</b>										
Hand — T, P, B	-	65713	-	-	1.75	0.44	-	0.141	4	0.30
Spiral-Point Gun — P, B	65767	-	-	-	1.75	0.44	-	0.141	4	0.30
Spiral-Flute 49° — P, B	65773	-	-	-	1.75	0.44	-	0.141	4	0.30

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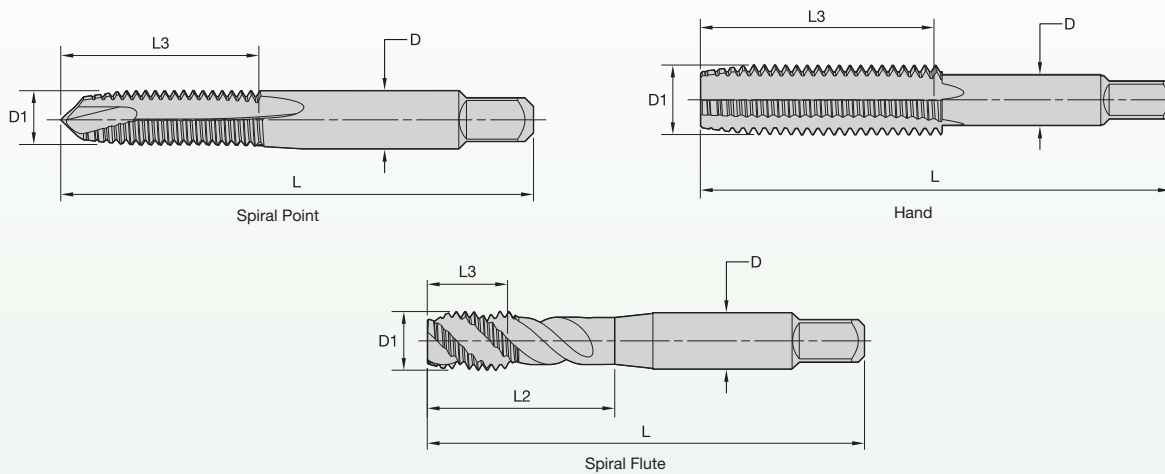
Pricing Based on Order Quantity	
min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

Lightning Service

(continued)

## Specials from Blanks • General Applications • HSS



style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	uncoated 6-flute	L	L3	L2	D	max D limit	pitch min
<b>M2.5</b>										
Hand — T, P, B	65291	65302	-	-	1.81	0.50	-	0.141	5	0.30
Spiral-Point Gun — P, B	65384	-	-	-	1.81	0.50	-	0.141	5	0.30
Spiral-Flute 30° — P, B	65498	-	-	-	1.81	0.50	-	0.141	5	0.30
Spiral-Flute 49° — P, B	65507	-	-	-	1.81	0.50	-	0.141	5	0.30
<b>M3</b>										
Hand — T, P, B	65292	65303	64852	-	1.94	0.63	-	0.141	5	0.30
Spiral-Point Gun — P, B	65385	-	-	-	1.94	0.63	-	0.141	5	0.30
Spiral-Flute 49° — P, B	65508	-	-	-	1.94	0.63	-	0.141	5	0.30
<b>M3.5</b>										
Hand — T, P, B	65293	65304	65850	-	2.00	0.69	-	0.141	7	0.30
Spiral-Point Gun — P, B	65386	64849	-	-	2.00	0.69	-	0.141	7	0.30
Spiral-Flute 30° — P, B	-	65515	-	-	2.00	0.38	0.69	0.141	7	0.30
Spiral-Flute 49° — P, B	-	65526	-	-	2.00	0.38	0.69	0.141	7	0.30
<b>Oversized</b>										
Hand — T, P, B	-	65783	-	-	2.00	0.69	-	0.141	13	0.30
Spiral-Point Gun — P, B	-	65416	-	-	2.00	0.69	-	0.141	13	0.30
<b>M4</b>										
Hand — T, P, B	65294	65305	65317	-	2.13	0.75	-	0.168	7	0.30
Spiral-Point Gun — P, B	65387	65393	-	-	2.13	0.75	-	0.168	7	0.30
Spiral-Flute 30° — P, B	-	65516	-	-	2.13	0.38	0.75	0.168	7	0.30
Spiral-Flute 49° — P, B	-	65527	-	-	2.13	0.38	0.75	0.168	7	0.30
<b>Oversized</b>										
Hand — T, P, B	-	65784	65433	-	2.13	0.75	-	0.168	13	0.30
Spiral-Point Gun — P, B	65411	-	-	-	2.13	0.75	-	0.168	13	0.30
<b>M4.5</b>										
Hand — T, P, B	-	65306	65318	-	2.38	0.88	-	0.194	7	0.30
Spiral-Point Gun — P, B	65388	65394	-	-	2.38	0.88	-	0.194	7	0.30
Spiral-Flute 30° — P, B	-	65517	-	-	2.38	0.50	0.88	0.194	7	0.30
Spiral-Flute 49° — P, B	-	65528	-	-	2.38	0.50	0.88	0.194	7	0.30
<b>Oversized</b>										
Hand — T, P, B	-	-	65434	-	2.38	0.88	-	0.194	13	0.30

(continued)

(continued)

**Specials from Blanks • General Applications • HSS**

style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	uncoated 6-flute	L	L3	L2	D	max D limit	pitch min
<b>M5</b>										
Hand — T, P, B	64259	64271	64280	—	2.38	0.88	—	0.194	7	0.30
Spiral-Point Gun — P, B	64359	65395	64827	—	2.38	0.88	—	0.194	7	0.30
Spiral-Flute 30° — P, B	—	65518	—	—	2.38	0.50	0.88	0.194	7	0.30
Spiral-Flute 49° — P, B	—	64478	—	—	2.38	0.50	0.88	0.194	7	0.30
<b>Oversized</b>										
Hand — T, P, B	—	65804	65806	—	2.38	0.88	—	0.194	13	0.30
Spiral-Point Gun — P, B	65809	65811	—	—	2.38	0.88	—	0.194	13	0.30
<b>M6</b>										
Hand — T, P, B	65298	65308	65321	—	2.50	1.00	—	0.255	7	0.30
Spiral-Point Gun — P, B	65391	65397	—	—	2.50	1.00	—	0.255	7	0.30
Spiral-Flute 30° — P, B	—	65520	—	—	2.50	0.63	1.00	0.255	7	0.30
Spiral-Flute 49° — P, B	—	65531	—	—	2.50	0.63	1.00	0.255	7	0.30
<b>Oversized</b>										
Hand — T, P, B	—	65436	65787	—	2.50	1.00	—	0.255	13	0.30
Spiral-Point Gun — P, B	—	65414	65420	—	2.50	1.00	—	0.255	13	0.30
<b>M6.3</b>										
Hand — T, P, B	—	65715	65717	—	2.50	1.00	—	0.255	7	0.30
Spiral-Point Gun — P, B	65768	65770	—	—	2.50	1.00	—	0.255	7	0.30
<b>M7</b>										
Hand — T, P, B	65299	65309	65322	—	2.72	1.13	—	0.318	7	0.30
Spiral-Point Gun — P, B	65392	65398	—	—	2.72	1.13	—	0.318	7	0.30
Spiral-Flute 30° — P, B	—	65521	—	—	2.72	0.69	1.12	0.318	7	0.30
Spiral-Flute 49° — P, B	—	65532	—	—	2.72	0.69	1.12	0.318	7	0.30
<b>Oversized</b>										
Hand — T, P, B	—	—	65437	—	2.72	1.13	—	0.318	13	0.30
Spiral-Point Gun — P, B	—	65421	—	—	2.72	1.13	—	0.318	13	0.30
<b>M8</b>										
Hand — T, P, B	65711	65716	65718	—	2.72	1.13	—	0.318	7	0.30
Spiral-Point Gun — P, B	65769	65771	64845	—	2.72	1.13	—	0.318	7	0.30
Spiral-Flute 30° — P, B	—	65775	—	—	2.72	0.69	1.13	0.318	7	0.30
Spiral-Flute 49° — P, B	—	65777	—	—	2.72	0.69	1.13	0.318	7	0.30
<b>Oversized</b>										
Hand — T, P, B	—	65789	65800	—	2.72	1.13	—	0.318	13	0.30
Spiral-Point Gun — P, B	65801	65802	—	—	2.72	1.13	—	0.318	13	0.30
<b>M9</b>										
Hand — T, P, B	65300	65310	65323	—	2.94	1.25	—	0.381	7	0.30
Spiral-Point Gun — P, B	—	65399	—	—	2.94	1.25	—	0.381	7	0.30
Spiral-Flute 30° — P, B	—	65522	—	—	2.94	0.75	1.25	0.381	7	0.30
Spiral-Flute 49° — P, B	—	65533	—	—	2.94	0.75	1.25	0.381	7	0.30
<b>Oversized</b>										
Hand — T, P, B	—	—	65438	—	2.94	1.25	—	0.381	13	0.30

(continued)

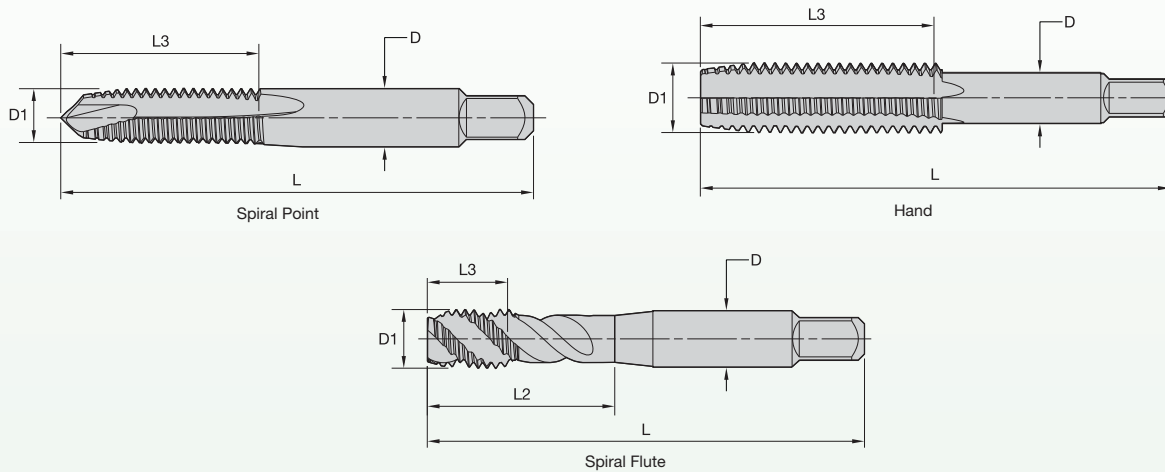
Pricing Based on Order Quantity	
min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

Lightning Service

(continued)

Specials from Blanks • General Applications • HSS



style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	uncoated 6-flute	L	L3	L2	D	max D limit	pitch min
<b>M10</b>										
Hand — T, P, B	65712	64275	64285	-	2.94	1.25	-	0.381	7	0.30
Spiral-Point Gun — P, B	64847	64379	-	-	2.94	1.25	-	0.381	7	0.30
Spiral-Flute 30° — P, B	-	64473	-	-	2.94	0.75	1.25	0.381	7	0.30
Spiral-Flute 49° — P, B	-	64483	-	-	2.94	0.75	1.25	0.381	7	0.30
<b>Oversized</b>										
Hand — T, P, B	-	-	65808	-	2.94	1.25	-	0.381	13	0.30
Spiral-Point Gun — P, B	-	65813	-	-	2.94	1.25	-	0.381	13	0.30
<b>M11</b>										
Hand — T, P, B	-	65312	65325	-	3.16	1.44	-	0.323	15	0.30
Spiral-Point Gun — P, B	-	65401	-	-	3.16	1.44	-	0.323	15	0.30
Spiral-Flute 49° — P, B	-	65535	-	-	3.16	0.94	-	0.323	15	0.30
<b>M12</b>										
Hand — T, P, B	-	65313	65326	65719	3.38	1.66	-	0.367	15	0.30
Spiral-Point Gun — P, B	-	65402	-	-	3.38	1.66	-	0.367	15	0.30
Spiral-Flute 30° — P, B	-	65525	-	-	3.38	0.94	-	0.367	15	0.30
Spiral-Flute 49° — P, B	-	65536	-	-	3.38	0.94	-	0.367	15	0.30
<b>M14</b>										
Hand — T, P, B	-	65314	65327	65720	3.59	1.66	-	0.429	15	0.40
Spiral-Point Gun — P, B	-	65403	-	-	3.59	1.66	-	0.429	15	0.40
Spiral-Flute 30° — P, B	-	-	65537	-	3.59	1.00	-	0.429	15	0.40
Spiral-Flute 49° — P, B	-	-	65543	-	3.59	1.00	-	0.429	15	0.40
<b>M15</b>										
Hand — T, P, B	-	-	64831	-	3.81	1.81	-	0.480	15	0.40
Spiral-Point Gun — P, B	-	-	-	-	3.81	1.81	-	0.480	15	0.40
<b>M16</b>										
Hand — T, P, B	-	65315	65328	65721	3.81	1.81	-	0.480	15	0.40
Spiral-Point Gun — P, B	-	65404	64828	-	3.81	1.81	-	0.480	15	0.40
Spiral-Flute 30° — P, B	-	-	65538	-	3.81	1.09	-	0.480	15	0.40
Spiral-Flute 49° — P, B	-	-	65544	-	3.81	1.09	-	0.480	15	0.40
<b>M18</b>										
Hand — T, P, B	-	65316	65329	65722	4.03	1.81	-	0.542	15	0.40
Spiral-Point Gun — P, B	-	65405	64833	-	4.03	1.81	-	0.542	15	0.40
Spiral-Flute 30° — P, B	-	-	65539	-	4.03	1.09	-	0.542	15	0.40
Spiral-Flute 49° — P, B	-	-	65545	-	4.03	1.09	-	0.542	15	0.40

(continued)



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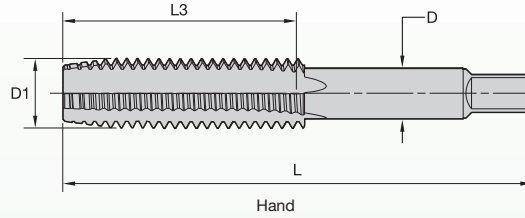
**Specials from Blanks • General Applications • HSS**

style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	uncoated 6-flute	L	L3	L2	D	max D limit	pitch min
<b>M20</b>										
Hand — T, P, B	-	-	65330	65723	4.47	2.00	-	0.652	15	0.40
Spiral-Point Gun — P, B	-	65406	-	-	4.47	2.00	-	0.652	15	0.40
Spiral-Flute 30° — P, B	-	-	65778	-	4.47	1.22	-	0.652	15	0.40
Spiral-Flute 49° — P, B	-	-	65779	-	4.47	1.22	-	0.652	15	0.40
<b>M22</b>										
Hand — T, P, B	-	-	65331	65724	4.69	2.22	-	0.697	15	0.40
Spiral-Point Gun — P, B	-	65407	-	-	4.69	2.22	-	0.697	15	0.40
Spiral-Flute 30° — P, B	-	-	65540	-	4.69	1.34	-	0.697	15	0.40
Spiral-Flute 49° — P, B	-	-	65546	-	4.69	1.34	-	0.697	15	0.40
<b>M24</b>										
Hand — T, P, B	-	-	65332	65725	4.91	2.22	-	0.760	15	0.40
Spiral-Point Gun — P, B	-	65408	-	-	4.91	2.22	-	0.760	15	0.40
Spiral-Flute 30° — P, B	-	-	65541	-	4.91	1.34	-	0.760	15	0.40
Spiral-Flute 49° — P, B	-	-	65547	-	4.91	1.34	-	0.760	15	0.40
<b>M25</b>										
Hand — T, P, B	-	-	65333	65726	5.10	2.50	-	0.800	15	0.40
Spiral-Point Gun — P, B	-	65409	-	-	5.13	2.50	-	0.800	15	0.40

min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

## Specials from Blanks • Large Sizes • HSS



style	uncoated 4-flute	uncoated 6-flute	uncoated 8-flute	uncoated 10-flute	L	L3	D	max H limit	min TPI	max TPI
<b>1-1/16"</b>										
Hand – T, P, B – Long	64296	65702	-	-	5.13	2.50	0.896	21	-	13
Hand – T, P, B – Short	-	64297	-	-	4.00	1.50	0.896	21	14	55
<b>1-1/8"</b>										
Hand – T, P, B – Long	64298	65703	-	-	5.44	2.56	0.896	21	-	13
Hand – T, P, B – Short	64835	64299	-	-	4.00	1.50	0.896	21	14	55
<b>1-3/16"</b>										
Hand – T, P, B – Long	64300	64306	-	-	5.44	2.56	1.021	21	-	13
Hand – T, P, B – Short	-	64307	-	-	4.00	1.50	1.021	21	14	55
<b>1-1/4"</b>										
Hand – T, P, B – Long	64301	64308	-	-	5.75	2.56	1.021	21	-	13
Hand – T, P, B – Short	-	64309	-	-	4.00	1.50	1.021	21	14	55
<b>1-5/16"</b>										
Hand – T, P, B – Long	64302	64310	-	-	5.75	2.56	1.108	21	-	13
Hand – T, P, B – Short	-	64311	-	-	4.00	1.50	1.108	21	14	55
<b>1-3/8"</b>										
Hand – T, P, B – Long	64303	64312	-	-	6.06	3.00	1.108	21	-	13
Hand – T, P, B – Short	-	64313	-	-	4.00	1.50	1.108	21	14	55
<b>1-7/16"</b>										
Hand – T, P, B – Long	64304	65704	-	-	6.06	3.00	1.233	21	-	13
Hand – T, P, B – Short	-	64315	-	-	4.00	1.50	1.233	21	14	55
<b>1-1/2"</b>										
Hand – T, P, B – Long	64305	64316	-	-	6.38	3.00	1.233	21	-	13
Hand – T, P, B – Short	-	64317	-	-	4.00	1.50	1.233	21	14	55
<b>1-9/16"</b>										
Hand – T, P, B – Short	-	65104	-	-	5.00	2.00	1.305	21	10	55
<b>1-5/8"</b>										
Hand – T, P, B – Long	-	64318	-	-	6.69	3.19	1.305	21	-	9
Hand – T, P, B – Short	-	64334	-	-	5.00	2.00	1.305	21	10	55
<b>1-11/16"</b>										
Hand – T, P, B – Short	-	64105	-	-	5.00	2.00	1.403	21	10	55
<b>1-3/4"</b>										
Hand – T, P, B – Long	-	64319	-	-	7.00	3.19	1.403	21	-	9
Hand – T, P, B – Short	-	64335	-	-	5.00	2.00	1.403	21	10	55
<b>1-13/16"</b>										
Hand – T, P, B – Short	-	65106	-	-	5.00	2.00	1.519	21	10	55
<b>1-7/8"</b>										
Hand – T, P, B – Long	-	64320	65107	-	7.31	3.56	1.519	21	-	9
Hand – T, P, B – Short	-	64336	65108	-	5.00	2.00	1.519	21	10	55
<b>2"</b>										
Hand – T, P, B – Long	-	64321	65109	-	7.63	3.56	1.644	21	-	9
Hand – T, P, B – Short	-	64337	64841	-	5.00	2.00	1.644	21	10	55
<b>2-1/8"</b>										
Hand – T, P, B – Long	-	64322	-	-	8.00	3.56	1.769	21	-	9
Hand – T, P, B – Short	-	64338	65112	-	5.25	2.00	1.769	21	10	47
<b>2-1/4"</b>										
Hand – T, P, B – Long	-	64323	65113	-	8.25	3.56	1.894	21	-	9
Hand – T, P, B – Short	-	64339	65114	-	5.25	2.00	1.894	21	10	47

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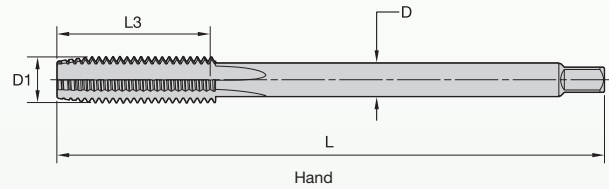
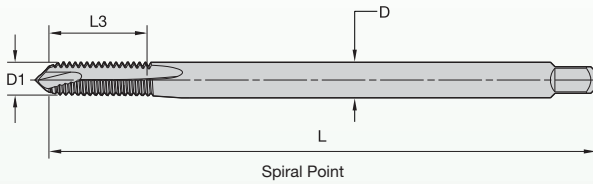
**Specials from Blanks • Large Sizes • HSS**

style	uncoated 4-flute	uncoated 6-flute	uncoated 8-flute	uncoated 10-flute	L	L3	D	max H limit	min TPI	max TPI
<b>2-3/8"</b>										
Hand – T, P, B – Long	-	64324	-	-	8.50	4.00	2.019	21	-	9
Hand – T, P, B – Short	-	64340	65116	-	5.25	2.00	2.019	21	10	47
<b>2-1/2"</b>										
Hand – T, P, B – Long	-	64325	65117	-	8.75	4.00	2.100	21	-	9
Hand – T, P, B – Short	-	64341	65118	-	5.25	2.00	2.100	21	10	47
<b>2-5/8"</b>										
Hand – T, P, B – Long	-	64326	65119	-	8.75	4.00	2.225	21	-	9
Hand – T, P, B – Short	-	63942	65120	-	5.50	2.00	2.100	21	10	47
<b>2-3/4"</b>										
Hand – T, P, B – Long	-	64327	-	65121	9.25	4.00	2.350	21	-	9
Hand – T, P, B – Short	-	64642	-	65122	5.50	2.00	2.100	21	10	47
style	uncoated 4-flute	uncoated 6-flute	uncoated 8-flute	uncoated 10-flute	L	L3	D	max D limit	pitch min	pitch max
<b>M27</b>										
Hand – T, P, B – Long	65334	65727	-	-	5.13	2.50	0.896	21	-	2
Hand – T, P, B – Short	-	65340	-	-	4.00	1.50	0.896	21	0.50	3
<b>M28</b>										
Hand – T, P, B – Long	65335	65728	-	-	5.44	2.56	0.896	21	-	2
Hand – T, P, B – Short	-	65341	-	-	4.00	1.50	0.896	21	0.50	3
<b>M30</b>										
Hand – T, P, B – Long	65336	65342	-	-	5.44	2.56	1.021	21	-	2
Hand – T, P, B – Short	-	65343	-	-	4.00	1.50	1.021	21	0.50	3
<b>M33</b>										
Hand – T, P, B – Long	65337	65344	-	-	5.75	2.56	1.108	21	-	2
Hand – T, P, B – Short	-	65345	-	-	4.00	1.50	1.108	21	0.50	3
<b>M36</b>										
Hand – T, P, B – Long	65338	65729	-	-	6.06	3.00	1.108	21	-	2
Hand – T, P, B – Short	-	65346	-	-	4.00	1.50	1.108	21	0.50	3
<b>M38</b>										
Hand – T, P, B – Long	65339	65347	-	-	6.38	3.00	1.233	21	-	2
Hand – T, P, B – Short	-	65348	-	-	4.00	1.50	1.233	21	0.50	3
<b>M39</b>										
Hand – T, P, B – Long	-	65349	-	-	6.69	3.19	1.305	21	-	3
Hand – T, P, B – Short	-	65350	-	-	5.00	2.00	1.305	21	0.50	3
<b>M42</b>										
Hand – T, P, B – Long	-	64856	-	-	7.00	3.19	1.430	21	-	3
<b>M45</b>										
Hand – T, P, B – Long	-	65351	65362	-	7.31	3.56	1.519	21	-	3
Hand – T, P, B – Short	-	65352	-	-	5.00	2.00	1.519	21	0.50	3
<b>M48</b>										
Hand – T, P, B – Long	-	65353	65364	-	7.63	3.56	1.644	21	-	3
Hand – T, P, B – Short	-	65354	-	-	5.00	2.00	1.644	21	0.50	3
<b>M56</b>										
Hand – T, P, B – Long	-	65355	65366	-	8.25	3.56	1.894	21	-	3
Hand – T, P, B – Short	-	65356	-	-	5.25	2.00	1.894	21	0.60	3
<b>M64</b>										
Hand – T, P, B – Long	-	65357	65368	-	8.75	4.00	2.250	21	-	3
Hand – T, P, B – Short	-	65358	-	-	5.50	2.00	2.100	21	0.60	3

min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

## Specials from Blanks • Extended Length • HSS



style	uncoated 4" OAL	uncoated 6" OAL	uncoated 8" OAL	uncoated 10" OAL	L3	D	max H limit	max TPI
<b>#6</b>								
Hand – T, P, B – 2FL	65814	65815	-	-	0.69	0.141	13	100
Hand – T, P, B – 3FL	65214	64575	-	-	0.69	0.141	13	100
Hand – T, P, B – 4FL	67184	-	-	-	0.69	0.141	13	100
Spiral-Point Gun – P, B – 2FL	65206	64566	-	-	0.69	0.141	13	100
<b>#8</b>								
Hand – T, P, B – 2FL	65816	65817	-	-	0.75	0.168	13	100
Hand – T, P, B – 3FL	65826	65827	-	-	0.75	0.168	13	100
Hand – T, P, B – 4FL	65215	65202	-	-	0.75	0.168	13	100
Spiral-Point Gun – P, B – 2FL	65207	64567	-	-	0.75	0.168	13	100
Spiral-Point Gun – P, B – 3FL	65211	65225	-	-	0.75	0.168	13	100
<b>#10</b>								
Hand – T, P, B – 2FL	65818	65819	-	-	0.88	0.194	13	100
Hand – T, P, B – 3FL	65828	65829	-	-	0.88	0.194	13	100
Hand – T, P, B – 4FL	65216	64577	-	-	0.88	0.194	13	100
Spiral-Point Gun – P, B – 2FL	65208	64568	-	-	0.88	0.194	13	100
Spiral-Point Gun – P, B – 3FL	65212	-	-	-	0.88	0.194	13	100
<b>1/4"</b>								
Hand – T, P, B – 2FL	-	65820	65821	-	1.00	0.255	13	80
Hand – T, P, B – 3FL	-	65830	65831	-	1.00	0.255	13	80
Hand – T, P, B – 4FL	-	65230	65254	-	1.00	0.255	13	80
Spiral-Point Gun – P, B – 2FL	-	64570	65238	65262	1.00	0.255	13	80
Spiral-Point Gun – P, B – 3FL	-	65228	65246	-	1.00	0.255	13	80
<b>Small Shank</b>								
Hand – T, P, B – 2FL	67208	67211	-	-	1.00	0.185	13	80
Hand – T, P, B – 3FL	67209	67212	-	-	1.00	0.185	13	80
Hand – T, P, B – 4FL	67210	67213	-	-	1.00	0.185	13	80
Spiral-Point Gun – P, B – 2FL	67293	67296	-	-	1.00	0.185	13	80
Spiral-Point Gun – P, B – 3FL	67294	67297	-	-	1.00	0.185	13	80
<b>5/16"</b>								
Hand – T, P, B – 2FL	-	65823	65824	-	1.13	0.318	13	80
Hand – T, P, B – 3FL	-	65833	65834	65835	1.13	0.318	13	80
Hand – T, P, B – 4FL	-	67231	65255	65279	1.13	0.318	13	80
Spiral-Point Gun – P, B – 2FL	-	64571	65239	-	1.13	0.318	13	80
Spiral-Point Gun – P, B – 3FL	-	65229	65247	-	1.13	0.318	13	80
<b>Small Shank</b>								
Hand – T, P, B – 2FL	67226	67229	-	-	1.13	0.240	13	80
Hand – T, P, B – 3FL	67227	67230	-	-	1.13	0.240	13	80
Hand – T, P, B – 4FL	67228	-	-	-	1.13	0.240	13	80
Spiral-Point Gun – P, B – 2FL	67317	67320	-	-	1.25	0.240	13	80
Spiral-Point Gun – P, B – 3FL	67318	67321	-	-	1.25	0.240	13	80

(continued)

(continued)

**Specials from Blanks • Extended Length • HSS**

style	uncoated 4" OAL	uncoated 6" OAL	uncoated 8" OAL	uncoated 10" OAL	L3	D	max H limit	max TPI
<b>3/8"</b>								
Hand — T, P, B — 2FL	-	67259	-	-	1.25	0.381	13	80
Hand — T, P, B — 3FL	-	65836	65837	-	1.25	0.381	13	80
Hand — T, P, B — 4FL	-	65232	65256	65280	1.25	0.381	13	80
Spiral-Point Gun — P, B — 3FL	-	64572	65248	65272	1.25	0.381	13	80
<b>Small Shank</b>								
Hand — T, P, B — 2FL	67253	67256	-	-	1.25	0.275	13	80
Hand — T, P, B — 3FL	67254	67257	-	-	1.25	0.275	13	80
Hand — T, P, B — 4FL	67255	67258	-	-	1.25	0.275	13	80
Spiral-Point Gun — P, B — 2FL	67358	67361	-	-	1.25	0.275	13	80
Spiral-Point Gun — P, B — 3FL	67359	67362	-	-	1.25	0.275	13	80
<b>7/16"</b>								
Hand — T, P, B — 3FL	-	65839	-	-	1.44	0.323	15	80
Hand — T, P, B — 4FL	-	65234	65258	65282	1.44	0.323	15	80
Spiral-Point Gun — P, B — 3FL	-	65269	65250	65274	1.44	0.323	15	80
<b>1/2"</b>								
Hand — T, P, B — 3FL	-	65842	65843	-	1.66	0.367	15	80
Hand — T, P, B — 4FL	-	65235	65259	65283	1.66	0.367	15	80
Spiral-Point Gun — P, B — 3FL	-	64574	65251	65275	1.66	0.367	15	80
<b>5/8"</b>								
Hand — T, P, B — 3FL	-	65845	65846	65847	1.81	0.480	15	64
Hand — T, P, B — 4FL	-	65236	65260	65284	1.81	0.480	15	64
Spiral-Point Gun — P, B — 3FL	-	65268	65252	65276	1.81	0.480	15	64
<b>3/4"</b>								
Hand — T, P, B — 3FL	-	65848	65849	65850	2.00	0.590	15	64
Hand — T, P, B — 4FL	-	65237	65261	65285	2.00	0.590	15	64
Spiral-Point Gun — P, B — 3FL	-	65267	65253	65277	2.00	0.590	15	64

(continued)

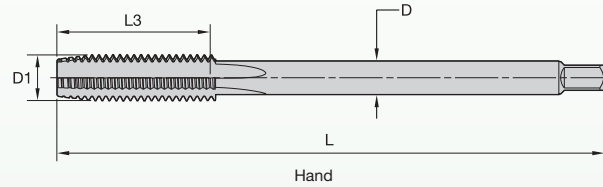
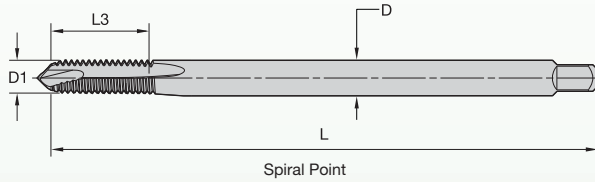
Pricing Based on Order Quantity	
min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	48

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

Lightning Service

(continued)

## Specials from Blanks • Extended Length • HSS



style	uncoated 4" OAL	uncoated 6" OAL	uncoated 8" OAL	uncoated 10" OAL	L3	D	max D limit	pitch min
<b>M3.5</b>								
Hand – T, P, B – 2FL	65871	-	-	-	0.69	0.141	13	0.30
Hand – T, P, B – 3FL	65491	-	-	-	0.69	0.141	13	0.30
Hand – T, P, B – 4FL	67188	67189	-	-	0.69	0.141	13	0.30
Spiral-Point Gun – P, B – 3FL	65470	-	-	-	0.69	0.141	13	0.30
<b>M4</b>								
Hand – T, P, B – 2FL	65873	65874	-	-	0.75	0.168	13	0.30
Hand – T, P, B – 3FL	-	65890	-	-	0.75	0.168	13	0.30
Hand – T, P, B – 4FL	-	65495	-	-	0.75	0.168	13	0.30
Spiral-Point Gun – P, B – 2FL	65450	65453	-	-	0.75	0.168	13	0.30
Spiral-Point Gun – P, B – 3FL	65471	-	-	-	0.75	0.168	13	0.30
<b>M4.5</b>								
Spiral-Point Gun – P, B – 3FL	65472	-	-	-	0.88	0.194	13	0.30
<b>M5</b>								
Hand – T, P, B – 3FL	65917	65918	-	-	0.88	0.194	13	0.30
Hand – T, P, B – 4FL	65919	65920	-	-	0.88	0.194	13	0.30
Spiral-Point Gun – P, B – 2FL	-	64569	-	-	0.88	0.194	13	0.30
Spiral-Point Gun – P, B – 3FL	65213	65227	-	-	0.88	0.194	13	0.30
<b>M6</b>								
Hand – T, P, B – 2FL	-	65877	-	65895	1.00	0.255	13	0.30
Hand – T, P, B – 3FL	-	65893	-	65581	1.00	0.255	13	0.30
Hand – T, P, B – 4FL	-	65571	-	-	1.00	0.255	13	0.30
Spiral-Point Gun – P, B – 2FL	-	65455	-	-	1.00	0.255	13	0.30
Spiral-Point Gun – P, B – 3FL	-	65476	65481	65486	1.00	0.255	13	0.30
<b>Small Shank</b>								
Hand – T, P, B – 2FL	67217	67220	-	-	1.00	0.185	13	0.30
Hand – T, P, B – 3FL	67218	67221	-	-	1.00	0.185	13	0.30
Hand – T, P, B – 4FL	67219	67222	-	-	1.00	0.185	13	0.30
Spiral-Point Gun – P, B – 2FL	67305	67308	-	-	1.00	0.185	13	0.30
Spiral-Point Gun – P, B – 3FL	67306	67309	-	-	1.00	0.185	13	0.30
<b>M6.3</b>								
Spiral-Point Gun – P, B – 3FL	-	65458	-	-	1.00	0.255	13	0.30
<b>M7</b>								
Spiral-Point Gun – P, B – 3FL	-	65477	-	-	1.13	0.318	13	0.30
<b>Small Shank</b>								
Hand – T, P, B – 2FL	67235	67238	-	-	1.13	0.240	13	0.30
Hand – T, P, B – 3FL	67236	67239	-	-	1.13	0.240	13	0.30
Hand – T, P, B – 4FL	67237	67240	-	-	1.13	0.240	13	0.30
Spiral-Point Gun – P, B – 2FL	67328	67331	-	-	1.13	0.240	13	0.30
Spiral-Point Gun – P, B – 3FL	67329	67332	-	-	1.13	0.240	13	0.30

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**Specials from Blanks • Extended Length • HSS**

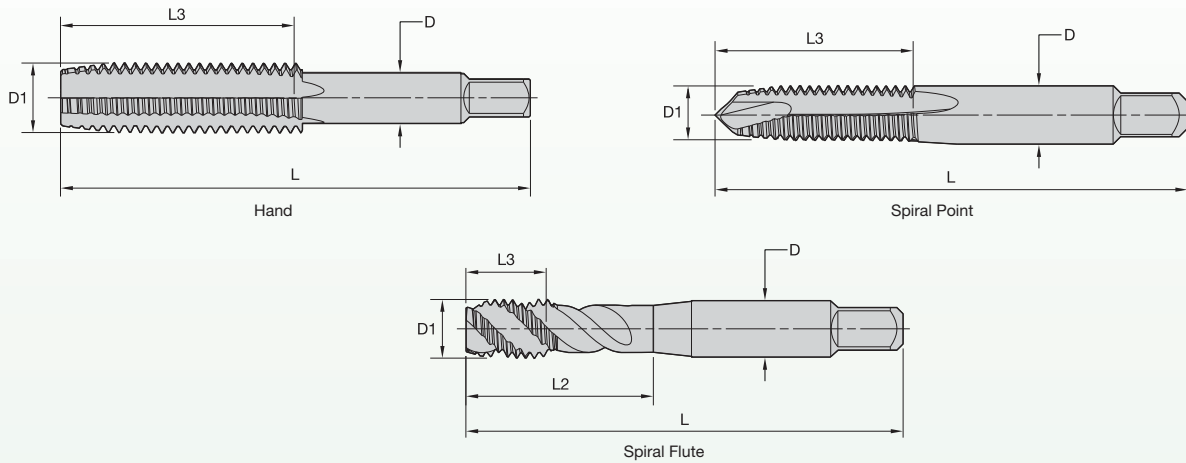
style	uncoated 4" OAL	uncoated 6" OAL	uncoated 8" OAL	uncoated 10" OAL	L3	D	max D limit	pitch min
<b>M8</b>								
Hand – T, P, B – 2FL	-	-	65887	-	1.13	0.318	13	0.30
Hand – T, P, B – 3FL	-	65902	65903	65904	1.13	0.318	13	0.30
Hand – T, P, B – 4FL	-	65859	65860	65861	1.13	0.318	13	0.30
Spiral-Point Gun – P, B – 3FL	-	65464	65466	65678	1.13	0.318	13	0.30
<b>Small Shank</b>								
Hand – T, P, B – 2FL	67244	67247	-	-	1.13	0.240	13	0.30
Hand – T, P, B – 3FL	67245	67248	-	-	1.13	0.240	13	0.30
Hand – T, P, B – 4FL	67246	67249	-	-	1.13	0.240	13	0.30
Spiral-Point Gun – P, B – 2FL	67343	67346	-	-	1.13	0.240	13	0.30
Spiral-Point Gun – P, B – 3FL	67344	67347	-	-	1.13	0.240	13	0.30
<b>M9</b>								
Hand – T, P, B – 2FL	-	67269	-	-	1.25	0.381	13	0.30
Spiral-Point Gun – P, B – 3FL	-	65457	-	-	1.25	0.381	13	0.30
<b>Small Shank</b>								
Hand – T, P, B – 2FL	67263	67266	-	-	1.25	0.275	13	0.30
Hand – T, P, B – 3FL	67264	67267	-	-	1.25	0.275	13	0.30
Hand – T, P, B – 4FL	67265	67268	-	-	1.25	0.275	13	0.30
Spiral-Point Gun – P, B – 2FL	67373	67376	-	-	1.25	0.275	13	0.30
Spiral-Point Gun – P, B – 3FL	67374	67377	-	-	1.25	0.275	13	0.30
<b>M10</b>								
Hand – T, P, B – 2FL	-	67279	-	-	1.25	0.381	13	0.30
Hand – T, P, B – 3FL	-	65905	65906	65907	1.25	0.381	13	0.30
Hand – T, P, B – 4FL	-	65233	65257	65281	1.25	0.381	13	0.30
Spiral-Point Gun – P, B – 3FL	-	64573	65249	65273	1.25	0.381	13	0.30
<b>Small Shank</b>								
Hand – T, P, B – 2FL	67273	67276	-	-	1.25	0.275	13	0.30
Hand – T, P, B – 3FL	67274	67277	-	-	1.25	0.275	13	0.30
Hand – T, P, B – 4FL	67275	67278	-	-	1.25	0.275	13	0.30
Spiral-Point Gun – P, B – 2FL	67388	67391	-	-	1.25	0.275	13	0.30
Spiral-Point Gun – P, B – 3FL	67389	67392	-	-	1.25	0.275	13	0.30
<b>M11</b>								
Hand – T, P, B – 3FL	-	65865	-	-	1.44	0.323	15	0.40
Hand – T, P, B – 4FL	-	65911	65912	65910	1.44	0.323	15	0.40
Spiral-Point Gun – P, B – 3FL	-	65681	-	-	1.44	0.323	15	0.40
<b>M12</b>								
Hand – T, P, B – 3FL	-	65908	65909	65584	1.44	0.367	15	0.40
Hand – T, P, B – 4FL	-	65574	65579	-	1.44	0.367	15	0.40
Spiral-Point Gun – P, B – 3FL	-	65468	65485	65490	1.44	0.367	15	0.40
<b>M16</b>								
Hand – T, P, B – 3FL	-	65868	65869	65870	1.81	0.480	15	0.40
Hand – T, P, B – 4FL	-	65914	65915	65916	1.81	0.480	15	0.40
Spiral-Point Gun – P, B – 3FL	-	65480	65485	65490	1.81	0.480	15	0.40

min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	48

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

Lightning Service

## Specials from Blanks • STI • HSS



style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	L	L3	L2	D	max H limit
<b>2 - 56 NC</b>								
Hand – T, P, B	67604	65286	–	1.75	0.56	–	0.141	5
Spiral-Point Gun – P, B	66291	67660	–	1.75	0.56	–	0.141	5
Spiral-Flute 30° – P, B	67701	–	–	1.75	–	–	0.141	5
Spiral-Flute 49° – P, B	68281	–	–	1.75	–	–	0.141	5
<b>3 - 48 NC</b>								
Hand – T, P, B	67605	65287	67606	2.00	0.63	–	0.141	5
Spiral-Point Gun – P, B	66292	67661	–	2.00	0.63	–	0.141	5
Spiral-Flute 30° – P, B	67702	67703	–	2.00	–	–	0.141	5
Spiral-Flute 49° – P, B	68282	68283	–	2.00	–	–	0.141	5
<b>3 - 56 NF</b>								
Hand – T, P, B	–	68376	–	–	–	–	0.141	5
Spiral-Point Gun – P, B	68333	–	–	–	–	–	0.141	5
<b>4 - 40 NC</b>								
Hand – T, P, B	67607	64616	67608	2.00	0.69	–	0.141	7
Spiral-Point Gun – P, B	66293	67662	–	2.00	0.69	–	0.141	7
Spiral-Flute 30° – P, B	67704	67705	–	2.00	–	–	0.141	7
Spiral-Flute 49° – P, B	68284	68285	–	2.00	–	–	0.141	7
<b>4 - 48 NF</b>								
Hand – T, P, B	–	68315	–	2.00	0.69	–	0.141	7
Spiral-Point Gun – P, B	72015	–	–	2.00	0.69	–	0.141	7
<b>5 - 40 NC</b>								
Hand – T, P, B	67609	64617	67610	2.13	0.75	–	0.168	7
Spiral-Point Gun – P, B	66294	67663	–	2.13	0.75	–	0.168	7
Spiral-Flute 30° – P, B	67706	67707	–	2.13	–	–	0.168	7
Spiral-Flute 49° – P, B	68286	68287	–	2.13	–	–	0.168	7
<b>6 - 32 NC</b>								
Hand – T, P, B	67611	64618	67612	2.38	0.88	–	0.194	7
Spiral-Point Gun – P, B	66295	67664	–	2.38	0.88	–	0.194	7
Spiral-Flute 30° – P, B	67708	68472	–	2.38	0.69	0.88	0.194	7
Spiral-Flute 49° – P, B	68288	68317	–	2.38	0.69	0.88	0.194	7
<b>6 - 40 NF</b>								
Hand – T, P, B	–	68316	–	2.38	0.88	–	0.194	7
Spiral-Point Gun – P, B	68323	–	–	2.38	0.88	–	0.194	7
Spiral-Flute 49° – P, B	–	68411	–	2.38	0.69	0.88	0.194	7
<b>8 - 32 NC</b>								
Hand – T, P, B	64830	65147	67613	2.38	0.94	–	0.220	7
Spiral-Point Gun – P, B	66296	67665	67666	2.38	0.94	–	0.220	7
Spiral-Flute 30° – P, B	–	67709	–	2.38	0.75	0.94	0.220	7
Spiral-Flute 49° – P, B	–	68289	–	2.38	0.75	0.94	0.220	7

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**Specials from Blanks • STI • HSS**

style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	L	L3	L2	D	max H limit
<b>8 - 36 NF</b>								
Hand — T, P, B	67614	66281	67615	2.38	0.94	-	0.220	7
Spiral-Point Gun — P, B	66297	67667	67668	2.38	0.94	-	0.220	7
Spiral-Flute 30° — P, B	-	67710	-	2.38	0.75	0.94	0.220	7
Spiral-Flute 49° — P, B	-	68290	-	2.38	0.75	0.94	0.220	7
<b>10 - 24 NC</b>								
Hand — T, P, B	67616	64619	67617	2.50	1.00	-	0.255	7
Spiral-Point Gun — P, B	64653	67669	67670	2.50	1.00	-	0.255	7
Spiral-Flute 30° — P, B	-	67711	-	2.50	0.88	1.00	0.255	7
Spiral-Flute 49° — P, B	-	68291	-	2.50	0.88	1.00	0.255	7
<b>10 - 32 NF</b>								
Hand — T, P, B	67619	66282	67620	2.50	1.00	-	0.255	7
Spiral-Point Gun — P, B	66298	67671	67672	2.50	1.00	-	0.255	7
Spiral-Flute 30° — P, B	-	67712	-	2.50	0.88	1.00	0.255	7
Spiral-Flute 49° — P, B	-	68292	-	2.50	0.88	1.00	0.255	7
<b>1/4 - 20 NC</b>								
Hand — T, P, B	67622	64621	67623	2.72	1.13	-	0.318	7
Spiral-Point Gun — P, B	64655	67673	67674	2.72	1.13	-	0.318	7
Spiral-Flute 30° — P, B	-	67713	-	2.72	0.63	1.00	0.318	7
Spiral-Flute 49° — P, B	-	68293	-	2.72	0.63	1.00	0.318	7
<b>1/4 - 28 NF</b>								
Hand — T, P, B	67625	66283	67626	2.72	1.13	-	0.318	7
Spiral-Point Gun — P, B	66299	67675	67676	2.72	1.13	-	0.318	7
Spiral-Flute 30° — P, B	-	67714	-	2.72	0.63	1.00	0.318	7
Spiral-Flute 49° — P, B	-	68294	-	2.72	0.63	1.00	0.318	7
<b>5/16 - 18 NC</b>								
Hand — T, P, B	67628	67629	64630	2.94	1.25	-	0.381	7
Spiral-Point Gun — P, B	67677	64565	67678	2.94	1.25	-	0.381	7
Spiral-Flute 30° — P, B	-	67715	-	2.94	1.12	1.25	0.381	7
Spiral-Flute 49° — P, B	-	68295	-	2.94	1.12	1.25	0.381	7
<b>5/16 - 24 NF</b>								
Hand — T, P, B	67631	67632	66284	2.94	1.25	-	0.381	7
Spiral-Point Gun — P, B	67679	66300	67680	2.94	1.25	-	0.381	7
Spiral-Flute 30° — P, B	-	67716	-	2.94	1.12	1.25	0.381	7
Spiral-Flute 49° — P, B	-	68296	-	2.94	1.12	1.25	0.381	7
<b>3/8 - 16 NC</b>								
Hand — T, P, B	-	67634	64631	3.38	1.66	-	0.367	7
Spiral-Point Gun — P, B	-	64657	67681	3.38	1.66	-	0.367	7
Spiral-Flute 30° — P, B	-	67717	-	3.38	1.25	1.66	0.367	7
Spiral-Flute 49° — P, B	-	68297	-	3.38	1.25	1.66	0.367	7
<b>3/8 - 24 NF</b>								
Hand — T, P, B	-	67636	66285	3.38	1.66	-	0.367	7
Spiral-Point Gun — P, B	-	66301	67682	3.38	1.66	-	0.367	7
Spiral-Flute 30° — P, B	-	67718	-	3.38	1.25	1.66	0.367	7
Spiral-Flute 49° — P, B	-	68298	-	3.38	1.25	1.66	0.367	7

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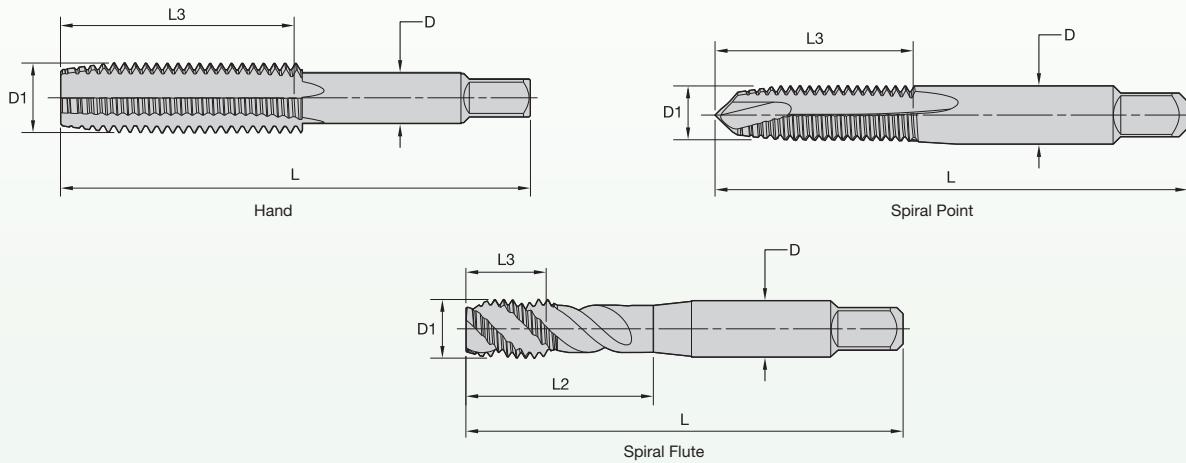
min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

Lightning Service

(continued)

## Specials from Blanks • STI • HSS



style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	L	L3	L2	D	max H limit
<b>7/16 - 14 NC</b>								
Hand – T, P, B	-	67638	64632	3.59	1.66	-	0.429	15
Spiral-Point Gun – P, B	-	64658	67683	3.59	1.66	-	0.429	15
Spiral-Flute 30° – P, B	-	67719	-	3.59	-	-	0.429	15
Spiral-Flute 49° – P, B	-	68299	-	3.59	-	-	0.429	15
<b>7/16 - 20 NF</b>								
Hand – T, P, B	-	67640	66286	3.59	1.66	-	0.429	15
Spiral-Point Gun – P, B	-	66302	67684	3.59	1.66	-	0.429	15
Spiral-Flute 30° – P, B	-	67720	-	3.59	-	-	0.429	15
Spiral-Flute 49° – P, B	-	68300	-	3.59	-	-	0.429	15
<b>1/2 - 13 NC</b>								
Hand – T, P, B	-	67642	64633	3.81	1.81	-	0.480	15
Spiral-Point Gun – P, B	-	64659	67685	3.81	1.81	-	0.480	15
Spiral-Flute 30° – P, B	-	67721	-	3.81	-	-	0.480	15
Spiral-Flute 49° – P, B	-	68301	-	3.81	-	-	0.480	15
<b>1/2 - 20 NF</b>								
Hand – T, P, B	-	67644	66287	3.81	1.81	-	0.480	15
Spiral-Point Gun – P, B	-	66309	67686	3.81	1.81	-	0.480	15
Spiral-Flute 30° – P, B	-	67722	-	3.81	-	-	0.480	15
Spiral-Flute 49° – P, B	-	68302	-	3.81	-	-	0.480	15
<b>9/16 - 12 NC</b>								
Hand – T, P, B	-	67646	-	3.81	1.81	-	0.480	15
Spiral-Point Gun – P, B	-	67687	67688	3.81	1.81	-	0.480	15
Spiral-Flute 30° – P, B	-	67723	-	3.81	-	-	0.480	15
Spiral-Flute 49° – P, B	-	68303	-	3.81	-	-	0.480	15
<b>9/16 - 18 NF</b>								
Hand – T, P, B	-	67648	66288	3.81	1.81	-	0.480	15
Spiral-Point Gun – P, B	-	67689	67690	3.81	1.81	-	0.480	15
Spiral-Flute 30° – P, B	-	67724	-	3.81	-	-	0.480	15
Spiral-Flute 49° – P, B	-	68304	-	3.81	-	-	0.480	15
<b>5/8 - 11 NC</b>								
Hand – T, P, B	-	67650	64635	4.25	2.00	-	0.590	15
Spiral-Point Gun – P, B	-	67691	67692	4.25	2.00	-	0.590	15
Spiral-Flute 30° – P, B	-	67725	-	4.25	-	-	0.590	15
Spiral-Flute 49° – P, B	-	68305	-	4.25	-	-	0.590	15

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**Specials from Blanks • STI • HSS**

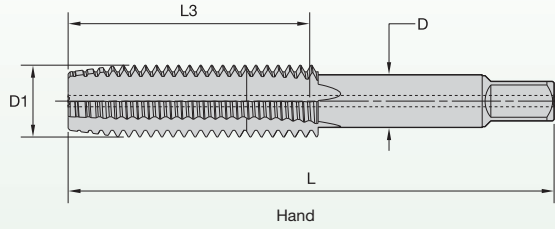
style	uncoated 2-flute	uncoated 3-flute	uncoated 4-flute	L	L3	L2	D	max H limit
<b>5/8 - 18 NF</b>								
Hand — T, P, B	-	67652	66289	4.25	2.00	-	0.590	15
Spiral-Point Gun — P, B	-	67693	67694	4.25	2.00	-	0.590	15
Spiral-Flute 30° — P, B	-	67726	-	4.25	-	-	0.590	15
Spiral-Flute 49° — P, B	-	68306	-	4.25	-	-	0.590	15
<b>3/4 - 10 NC</b>								
Hand — T, P, B	-	67654	64636	4.69	2.22	-	0.697	15
Spiral-Point Gun — P, B	-	67695	67696	4.69	2.22	-	0.697	15
Spiral-Flute 30° — P, B	-	67727	-	4.69	-	-	0.697	15
Spiral-Flute 49° — P, B	-	68307	-	4.69	-	-	0.697	15
<b>3/4 - 16 NF</b>								
Hand — T, P, B	-	67656	66290	4.69	2.22	-	0.697	15
Spiral-Point Gun — P, B	-	67697	67698	4.69	2.22	-	0.697	15
Spiral-Flute 30° — P, B	-	67728	-	4.69	-	-	0.697	15
Spiral-Flute 49° — P, B	-	68308	-	4.69	-	-	0.697	15
<b>7/8 - 9 NC</b>								
Hand — T, P, B	-	-	64638	5.13	2.50	-	0.800	15
<b>7/8 - 14</b>								
Hand — T, P, B	-	67658	-	5.13	2.50	-	0.800	15
Spiral-Point Gun — P, B	-	67699	67700	5.13	2.50	-	0.800	15
Spiral-Flute 30° — P, B	-	67729	-	5.13	2.50	-	0.800	15
Spiral-Flute 49° — P, B	-	68309	-	5.13	2.50	-	0.800	15

min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

Lightning Service

## Specials from Blanks • Internal Coolant • HSS



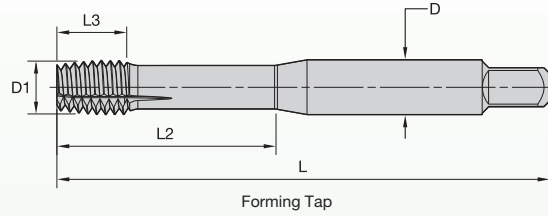
style	uncoated	flutes	L	L3	D	max H limit	max TPI
<b>3/8"</b>							
Hand – Plug or Bottom	65753	3	2.94	0.75	0.381	13	80
<b>7/16"</b>							
Hand – Plug or Bottom	65754	4	3.16	0.88	0.323	13	80
<b>1/2"</b>							
Hand – Plug or Bottom	65755	4	3.38	0.94	0.367	13	80
<b>9/16"</b>							
Hand – Plug or Bottom	65756	4	3.59	1.00	0.429	13	64
<b>5/8"</b>							
Hand – Plug or Bottom	65757	4	3.81	1.09	0.480	13	64
<b>3/4"</b>							
Hand – Plug or Bottom	65758	4	4.25	1.22	0.590	13	64
<b>1"</b>							
Hand – Plug or Bottom	65760	4	5.13	1.50	0.800	13	64

Pricing Based on Order Quantity

min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

## Specials from Blanks • Form Taps • HSS



style	uncoated	oil grooves	L	L3	L2	D	max H limit	max TPI
<b>#0</b>								
Plug or Bottom	64508	–	1.63	0.31	–	0.141	7	100
<b>#1</b>								
Plug or Bottom	64509	–	1.69	0.38	–	0.141	7	100
<b>#2</b>								
Plug or Bottom	64510	–	1.75	0.44	–	0.141	11	100
<b>#3</b>								
Plug or Bottom	64511	–	1.81	0.50	–	0.141	11	100
<b>#4</b>								
Plug or Bottom	64512	–	1.88	0.56	–	0.141	11	100
<b>#5</b>								
Plug or Bottom	64513	4	1.94	0.63	–	0.141	11	100
<b>#6</b>								
Plug or Bottom	64514	4	2.00	0.38	0.69	0.141	11	100
<b>#8</b>								
Plug or Bottom	64515	4	2.13	0.38	0.75	0.168	13	100
<b>#10</b>								
Plug or Bottom	64516	4	2.38	0.50	0.88	0.194	13	100
<b>#12</b>								
Plug or Bottom	64518	4	2.38	0.50	0.94	0.220	13	100
<b>1/4"</b>								
Plug or Bottom	64519	4	2.50	0.63	1.00	0.255	13	80
<b>5/16"</b>								
Plug or Bottom	64520	4	2.72	0.69	1.13	0.318	13	80
<b>3/8"</b>								
Plug or Bottom	64521	4	2.94	0.75	1.25	0.381	13	80
<b>7/16"</b>								
Plug or Bottom	64523	4	3.16	0.88	–	0.323	15	80
<b>1/2"</b>								
Plug or Bottom	64524	4	3.38	0.94	–	0.367	15	80
<b>9/16"</b>								
Plug or Bottom	64525	6	3.59	1.00	–	0.429	15	64
<b>5/8"</b>								
Plug or Bottom	64526	6	3.81	1.09	–	0.480	15	64
<b>3/4"</b>								
Plug or Bottom	64527	6	4.25	1.22	–	0.590	15	64
<b>7/8"</b>								
Plug or Bottom	65176	6	4.69	1.33	–	0.697	15	64
<b>1"</b>								
Plug or Bottom	65178	6	5.13	1.50	–	0.800	15	64

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## Specials from Blanks • Form Taps • HSS

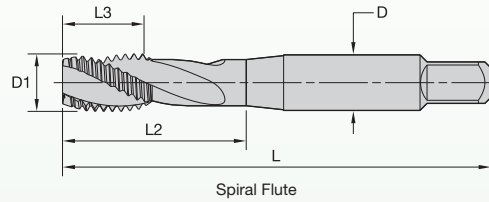
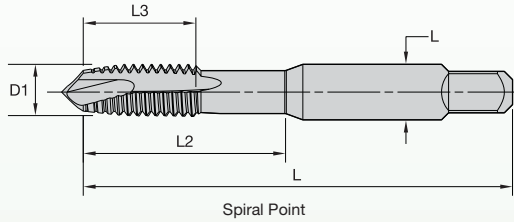
style	uncoated	oil grooves	L	L3	L2	D	max H limit	max TPI
<b>M1.6</b>								
Plug or Bottom	65549	–	1.63	0.31	–	0.141	7	0.3
<b>M1.8</b>								
Plug or Bottom	65550	–	1.69	0.38	–	0.141	7	0.3
<b>M2</b>								
Plug or Bottom	65551	–	1.75	0.44	–	0.141	11	0.3
<b>M2.5</b>								
Plug or Bottom	65552	–	1.81	0.50	–	0.141	11	0.3
<b>M3</b>								
Plug or Bottom	65553	4	1.94	0.63	–	0.141	11	0.3
<b>M3.5</b>								
Plug or Bottom	65554	4	2.00	0.38	0.69	0.141	11	0.3
<b>M4</b>								
Plug or Bottom	65555	4	2.13	0.38	0.75	0.168	13	0.3
<b>M4.5</b>								
Plug or Bottom	65556	4	2.38	0.50	0.88	0.194	13	0.3
<b>M5</b>								
Plug or Bottom	64517	4	2.38	0.50	0.88	0.194	13	0.3
<b>M6</b>								
Plug or Bottom	65559	4	2.50	0.63	1.00	0.255	13	0.3
<b>M8</b>								
Plug or Bottom	65560	4	2.72	0.69	1.13	0.318	13	0.3
<b>M9</b>								
Plug or Bottom	65561	4	2.94	0.75	1.25	0.381	13	0.3
<b>M10</b>								
Plug or Bottom	64522	4	2.94	0.75	1.25	0.381	13	0.3
<b>M11</b>								
Plug or Bottom	65563	4	3.16	0.88	–	0.323	15	0.3
<b>M12</b>								
Plug or Bottom	65564	4	3.38	0.94	–	0.367	15	0.3
<b>M14</b>								
Plug or Bottom	65565	6	3.59	1.00	–	0.429	15	0.4
<b>M16</b>								
Plug or Bottom	65566	6	3.81	1.09	–	0.480	15	0.4
<b>M20</b>								
Plug or Bottom	65567	6	4.47	1.31	–	0.652	15	0.4
<b>M22</b>								
Plug or Bottom	65568	6	4.69	1.33	–	0.697	15	0.4
<b>M24</b>								
Plug or Bottom	65569	6	4.91	1.34	–	0.760	15	0.4
<b>M25</b>								
Plug or Bottom	65570	6	5.13	1.50	–	0.800	15	0.4

Pricing Based on Order Quantity

min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

LIGHTNING SERVICE  
**24 HOUR**  
SHIPPING

**Specials from Blanks • VariTap • HSS-E**



style	oxide	flutes	L	L3	L2	D	max H limit	max TPI
<b>#2</b>								
Spiral-Point Gun – Plug	83000	2	1.750	0.440	–	0.141	13	100
<b>#3</b>								
Spiral-Point Gun – Plug	83001	2	1.810	0.500	–	0.141	13	100
<b>#4</b>								
Spiral-Point Gun – Plug	83002	2	1.880	0.340	0.560	0.141	13	100
Spiral-Flute – Modified Bottom	83016	2	1.880	0.310	0.560	0.141	13	100
<b>Extended-Length</b>								
Spiral-Point Gun – Plug	83032	2	6.000	0.340	0.560	0.141	13	100
Spiral-Flute – Modified Bottom	83043	2	6.000	0.340	0.560	0.141	13	100
<b>#5</b>								
Spiral-Point Gun – Plug	83003	3	1.940	0.370	0.620	0.141	13	100
Spiral-Flute – Modified Bottom	83017	3	1.940	0.190	0.620	0.141	13	100
<b>#6</b>								
Spiral-Point Gun – Plug	83004	3	2.000	0.390	0.810	0.141	13	100
Spiral-Flute – Modified Bottom	83018	3	2.000	0.260	0.810	0.141	13	100
<b>Extended-Length</b>								
Spiral-Point Gun – Plug	83033	3	6.000	0.390	0.810	0.141	13	100
Spiral-Flute – Modified Bottom	83044	3	6.000	0.390	0.810	0.141	13	100
<b>#8</b>								
Spiral-Point Gun – Plug	83005	3	2.000	0.430	0.870	0.168	13	100
Spiral-Flute – Modified Bottom	83019	3	2.000	0.260	0.870	0.168	13	100
<b>Extended-Length</b>								
Spiral-Point Gun – Plug	83034	3	6.000	0.430	0.870	0.168	13	100
Spiral-Flute – Modified Bottom	83045	3	6.000	0.430	0.870	0.168	13	100
<b>#10</b>								
Spiral-Point Gun – Plug	83006	3	2.380	0.510	1.060	0.194	13	100
Spiral-Flute – Modified Bottom	83020	3	2.380	0.330	1.060	0.194	13	100
<b>Extended-Length</b>								
Spiral-Point Gun – Plug	83035	3	6.000	0.510	1.060	0.194	13	100
Spiral-Flute – Modified Bottom	83046	3	6.000	0.510	1.060	0.194	13	100
<b>#12</b>								
Spiral-Point Gun – Plug	83007	3	2.380	0.550	1.120	0.220	13	100
Spiral-Flute – Modified Bottom	83021	3	2.380	0.340	1.120	0.220	13	100
<b>1/4"</b>								
Spiral-Point Gun – Plug	83008	3	2.500	0.560	1.230	0.255	13	80
Spiral-Flute – Modified Bottom	83022	3	2.500	0.400	1.230	0.255	13	80
<b>Extended-Length</b>								
Spiral-Point Gun – Plug	83036	3	6.000	0.560	1.230	0.255	13	80
Spiral-Flute – Modified Bottom	83047	3	6.000	0.560	1.230	0.255	13	80

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## Specials from Blanks • VariTap • HSS-E

style	oxide	flutes	L	L3	L2	D	max H limit	max TPI
<b>5/16"</b>								
Spiral-Point Gun – Plug	83009	3	2.720	0.630	1.390	0.318	13	80
Spiral-Flute – Modified Bottom	83023	3	2.720	0.430	1.390	0.318	13	80
<b>Extended-Length</b>								
Spiral-Point Gun – Plug	83037	3	6.000	0.630	1.390	0.318	13	80
Spiral-Flute – Modified Bottom	83048	3	6.000	0.630	1.390	0.318	13	80
<b>3/8"</b>								
Spiral-Point Gun – Plug	83010	3	2.940	0.710	1.550	0.381	13	80
Spiral-Flute – Modified Bottom	83024	3	2.940	0.510	1.550	0.381	13	80
<b>Extended-Length</b>								
Spiral-Point Gun – Plug	83038	3	6.000	0.710	1.550	0.381	13	80
Spiral-Flute – Modified Bottom	83049	3	6.000	0.710	1.550	0.381	13	80
<b>7/16"</b>								
Spiral-Point Gun – Plug	83011	3	3.160	0.880	–	0.323	15	80
Spiral-Flute – Modified Bottom	83025	3	3.160	0.500	–	0.323	15	80
<b>Extended-Length</b>								
Spiral-Point Gun – Plug	83039	3	6.000	0.880	–	0.323	15	80
Spiral-Flute – Modified Bottom	83050	3	6.000	0.880	–	0.323	15	80
<b>1/2"</b>								
Spiral-Point Gun – Plug	83012	3	3.380	0.920	–	0.367	15	80
Spiral-Flute – Modified Bottom	83026	3	3.380	0.570	–	0.367	15	80
<b>Extended-Length</b>								
Spiral-Point Gun – Plug	83040	3	6.000	0.920	–	0.367	15	80
Spiral-Flute – Modified Bottom	83051	3	6.000	0.920	–	0.367	15	80
<b>9/16"</b>								
Spiral-Point Gun – Plug	83013	3	3.590	0.980	–	0.429	15	64
Spiral-Flute – Modified Bottom	83027	3	3.590	0.630	–	0.429	15	64
<b>5/8"</b>								
Spiral-Point Gun – Plug	83014	3	3.810	1.060	–	0.480	15	64
Spiral-Flute – Modified Bottom	83028	3	3.810	0.690	–	0.480	15	64
<b>11/16"</b>								
Spiral-Point Gun – Plug	84844	3	4.031	1.250	–	0.542	15	64
Spiral-Flute – Modified Bottom	64843	3	4.031	0.610	–	0.542	15	64
<b>3/4"</b>								
Spiral-Point Gun – Plug	83015	3	4.250	1.210	–	0.590	15	64
Spiral-Flute – Modified Bottom	83029	4	4.250	0.760	–	0.590	15	64
style	oxide	flutes	L	L3	L2	D	max D limit	pitch min
<b>M2</b>								
Spiral-Point Gun – Plug	68488	2	1.750	0.440	–	0.141	11	0.30
<b>M2.5</b>								
Spiral-Point Gun – Plug	68438	2	1.810	0.500	–	0.141	11	0.30
<b>M3</b>								
Spiral-Point Gun – Plug	83052	3	1.940	0.370	0.620	0.141	13	0.30
Spiral-Flute – Modified Bottom	83070	3	1.940	0.190	0.620	0.141	13	0.30
<b>M3.5</b>								
Spiral-Point Gun – Plug	83053	3	2.000	0.390	0.810	0.141	13	0.30
Spiral-Flute – Modified Bottom	83071	3	2.000	0.260	0.810	0.141	13	0.30

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Pricing Based on Order Quantity

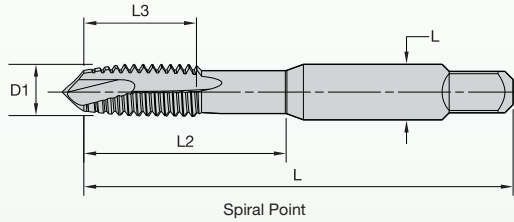
min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

Five day lead time.

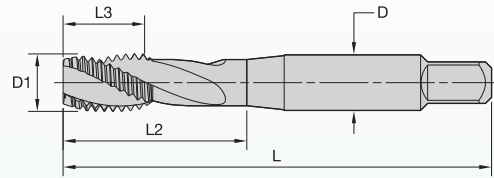


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**Specials from Blanks • VariTap • HSS-E**



Spiral Point



Spiral Flute

style	oxide	flutes	L	L3	L2	D	max D limit	pitch min
<b>M4</b>								
Spiral-Point Gun – Plug	83054	3	2.130	0.430	0.870	0.168	13	0.30
Spiral-Flute – Modified Bottom	83072	3	2.130	0.260	0.870	0.168	13	0.30
Extended-Length								
Spiral-Flute – Modified Bottom	83163	3	6.000	0.430	0.870	0.168	13	0.30
<b>M5</b>								
Spiral-Point Gun – Plug	83055	–	2.380	0.510	1.060	0.194	13	0.30
Spiral-Flute – Modified Bottom	–	–	–	–	–	–	13	0.30
Extended-Length								
Spiral-Point Gun – Plug	83040	–	6.000	0.510	1.060	0.194	13	0.30
Spiral-Flute – Modified Bottom	72159	–	6.000	0.510	1.060	0.194	13	0.30
<b>M6</b>								
Spiral-Point Gun – Plug	83056	3	2.500	0.560	1.230	0.255	13	0.30
Spiral-Flute – Modified Bottom	83074	3	2.500	0.400	1.230	0.255	13	0.30
Extended-Length								
Spiral-Point Gun – Plug	83179	3	6.000	0.560	1.230	0.255	13	0.30
Spiral-Flute – Modified Bottom	68489	3	6.000	0.560	1.230	0.255	13	0.30
<b>M7</b>								
Spiral-Point Gun – Plug	83057	3	2.720	0.630	1.390	0.318	13	0.30
Spiral-Flute – Modified Bottom	83075	3	2.720	0.430	1.390	0.318	13	0.30
Extended-Length								
Spiral-Flute – Modified Bottom	68490	3	6.000	0.630	1.390	0.318	13	0.30
<b>M8</b>								
Spiral-Point Gun – Plug	83058	3	2.720	0.630	1.390	0.318	13	0.30
Spiral-Flute – Modified Bottom	83076	3	2.720	0.430	1.390	0.318	13	0.30
Extended-Length								
Spiral-Point Gun – Plug	68312	3	6.000	0.630	1.390	0.318	13	0.30
Spiral-Flute – Modified Bottom	83149	3	6.000	0.630	1.390	0.318	13	0.30
<b>M9</b>								
Spiral-Point Gun – Plug	72214	3	2.940	0.710	1.550	0.381	13	0.30
Spiral-Flute – 2-1/2 to 3-1/2 Pitches	68480	3	2.940	0.510	1.550	0.381	13	0.30
Extended-Length								
Spiral-Flute – Modified Bottom	68491	3	6.000	0.710	1.550	0.381	13	0.30
<b>M10</b>								
Spiral-Point Gun – Plug	83060	3	2.940	0.710	1.550	0.381	13	0.30
Spiral-Flute – Modified Bottom	83078	3	2.940	0.510	1.550	0.381	13	0.30
Extended-Length								
Spiral-Point Gun – Plug	68313	3	6.000	0.710	1.550	0.381	13	0.30
Spiral-Flute – Modified Bottom	83155	3	6.000	0.710	1.550	0.381	13	0.30

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## Specials from Blanks • VariTap • HSS-E

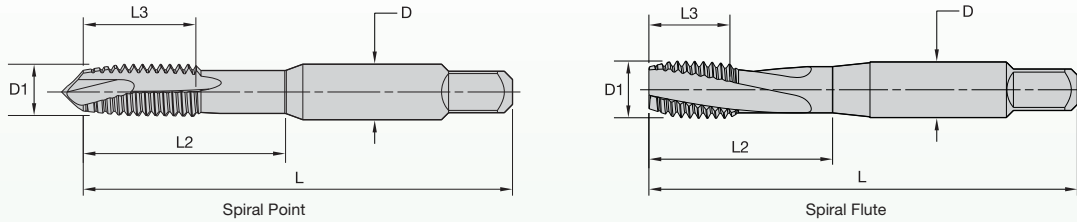
style	oxide	flutes	L	L3	L2	D	max D limit	pitch min
<b>M11</b>								
Spiral-Point Gun – Plug	72136	3	3.160	0.880	–	0.323	13	0.30
Spiral-Flute – Modified Bottom	83176	3	3.160	0.500	–	0.323	13	0.30
<b>Extended-Length</b>								
Spiral-Flute – Modified Bottom	68492	3	6.000	0.880	–	0.323	13	0.30
<b>M12</b>								
Spiral-Point Gun – Plug	83062	3	3.380	0.920	–	0.367	15	0.30
Spiral-Flute – Modified Bottom	83080	3	3.380	0.570	–	0.367	15	0.30
<b>Extended-Length</b>								
Spiral-Flute – Modified Bottom	68493	3	6.000	0.920	–	0.367	15	0.30
<b>M12.5</b>								
<b>Extended-Length</b>								
Spiral-Flute – Modified Bottom	68494	3	6.000	0.920	–	0.367	15	0.30
<b>M14</b>								
Spiral-Point Gun – Plug	83064	3	3.590	0.980	–	0.429	15	0.40
Spiral-Flute – Modified Bottom	83082	3	3.590	0.630	–	0.429	15	0.40
<b>M15</b>								
Spiral-Point Gun – Plug	83199	3	3.810	1.060	–	0.480	15	0.40
<b>M16</b>								
Spiral-Point Gun – Plug	83066	3	3.810	1.060	–	0.480	15	0.40
Spiral-Flute – Modified Bottom	83084	3	3.810	0.690	–	0.480	15	0.40
<b>M18</b>								
Spiral-Point Gun – Plug	83068	3	4.030	1.070	–	0.542	15	0.40
Spiral-Flute – Modified Bottom	83086	3	4.030	0.610	–	0.542	15	0.40

Pricing Based on Order Quantity

min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

Five day lead time.

**Specials from Blanks • EM-NI • HSS-E-PM**



style	oxide nitride	flutes	L	L3	L2	D	max H limit	max TPI
<b>#2</b>								
Spiral-Point Gun – Plug	83104	2	1.75	0.44	–	0.141	13	100
Spiral-Flute – 3 to 4 Pitches	83117	3	1.75	0.44	–	0.141	13	100
<b>#4</b>								
Spiral-Point Gun – Plug	83105	2	1.88	0.34	0.56	0.141	13	100
Spiral-Flute – 3 to 4 Pitches	83118	3	1.88	0.34	0.56	0.141	13	100
<b>#5</b>								
Spiral-Point Gun – Plug	83106	3	1.94	0.37	0.62	0.141	13	100
Spiral-Flute – 3 to 4 Pitches	83119	3	1.94	0.37	0.62	0.141	13	100
<b>#6</b>								
Spiral-Point Gun – Plug	83107	3	2.00	0.39	0.81	0.141	13	100
Spiral-Flute – 3 to 4 Pitches	83120	3	2.00	0.39	0.81	0.141	13	100
<b>#8</b>								
Spiral-Point Gun – Plug	83108	3	2.13	0.43	0.87	0.168	13	100
Spiral-Flute – 3 to 4 Pitches	83121	3	2.13	0.43	0.87	0.168	13	100
<b>#10</b>								
Spiral-Point Gun – Plug	83109	3	2.38	0.51	1.06	0.194	13	80
Spiral-Flute – 3 to 4 Pitches	83122	3	2.38	0.51	1.06	0.194	13	80
<b>1/4"</b>								
Spiral-Point Gun – Plug	83110	3	2.50	0.56	1.23	0.255	13	80
Spiral-Flute – 3 to 4 Pitches	83123	3	2.50	0.56	1.23	0.255	13	80
<b>5/16"</b>								
Spiral-Point Gun – Plug	83111	3	2.72	0.63	1.39	0.318	13	80
Spiral-Flute – 3 to 4 Pitches	83124	3	2.72	0.63	1.39	0.318	13	80
<b>3/8"</b>								
Spiral-Point Gun – Plug	83112	3	2.94	0.71	1.55	0.381	13	80
Spiral-Flute – 3 to 4 Pitches	83125	3	2.94	0.71	1.55	0.381	13	80
<b>7/16"</b>								
Spiral-Point Gun – Plug	83113	3	3.16	0.88	–	0.323	15	80
Spiral-Flute – 3 to 4 Pitches	83126	3	3.16	0.88	–	0.323	15	80
<b>1/2"</b>								
Spiral-Point Gun – Plug	83114	3	3.38	0.92	–	0.367	15	80
Spiral-Flute – 3 to 4 Pitches	83127	3	3.38	0.92	–	0.367	15	80
<b>9/16"</b>								
Spiral-Point Gun – Plug	72009	3	3.59	0.98	–	0.429	15	64
Spiral-Flute – 3 to 4 Pitches	72099	4	3.59	0.98	–	0.429	15	64
<b>5/8"</b>								
Spiral-Point Gun – Plug	83115	3	3.81	1.06	–	0.480	15	64
Spiral-Flute – 3 to 4 Pitches	83128	4	3.81	1.06	–	0.480	15	64
<b>3/4"</b>								
Spiral-Point Gun – Plug	83116	3	4.25	1.21	–	0.590	15	64
Spiral-Flute – 3 to 4 Pitches	83129	4	4.25	1.21	–	0.590	15	64

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## Specials from Blanks • EM-NI • HSS-E-PM

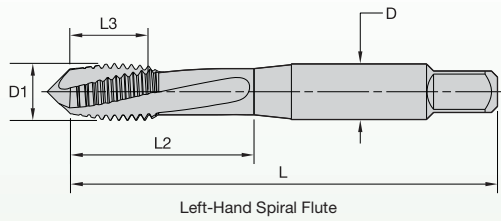
style	oxide nitride	flutes	L	L3	L2	D	max D limit	pitch min
<b>M2</b>								
Spiral-Point Gun – Plug	68479	2	1.75	0.44	–	0.141	11	0.30
Spiral-Flute – 3 to 4 Pitches	83177	2	1.75	0.44	–	0.141	13	0.30
<b>M2.2</b>								
Spiral-Point Gun – Plug	68439	2	1.75	0.44	–	0.141	11	0.30
Spiral-Flute – 3 to 4 Pitches	72055	3	1.75	0.44	–	0.141	13	0.30
<b>M2.5</b>								
Spiral-Point Gun – Plug	83200	2	1.81	0.50	–	0.141	11	0.30
<b>M3</b>								
Spiral-Point Gun – Plug	83181	2	1.94	0.37	0.62	0.141	13	0.30
Spiral-Flute – 3 to 4 Pitches	83171	3	1.94	0.37	0.62	0.141	13	0.30
<b>M3.5</b>								
Spiral-Point Gun – Plug	83166	3	2.00	0.39	0.81	0.141	13	0.30
Spiral-Flute – 3 to 4 Pitches	72144	3	2.00	0.39	0.81	0.141	13	0.30
<b>M4</b>								
Spiral-Point Gun – Plug	83180	3	2.13	0.43	0.87	0.168	13	0.30
Spiral-Flute – 3 to 4 Pitches	72119	3	2.13	0.43	0.87	0.168	13	0.30
<b>M5</b>								
Spiral-Point Gun – Plug	83470	3	2.38	0.51	1.06	0.194	13	0.30
Spiral-Flute – 3 to 4 Pitches	72108	3	2.38	0.51	1.06	0.194	13	0.30
<b>M6</b>								
Spiral-Point Gun – Plug	72067	3	2.50	0.56	1.23	0.255	13	0.30
Spiral-Flute – 3 to 4 Pitches	83157	3	2.50	0.56	1.23	0.255	13	0.30
<b>M6.3</b>								
Spiral-Point Gun – Plug	72061	3	2.50	0.56	1.23	0.255	13	0.30
<b>M7</b>								
Spiral-Point Gun – Plug	72075	3	2.72	0.63	1.39	0.318	13	0.30
Spiral-Flute – 3 to 4 Pitches	72143	3	2.72	0.63	1.39	0.318	13	0.30
<b>M8</b>								
Spiral-Point Gun – Plug	83469	3	2.72	0.63	1.39	0.318	13	0.30
Spiral-Flute – 3 to 4 Pitches	83154	3	2.72	0.63	1.39	0.318	13	0.30
<b>M9</b>								
Spiral-Point Gun – Plug	83202	3	2.94	0.71	1.55	0.381	13	0.30
Spiral-Flute – 3 to 4 Pitches	83160	3	2.94	0.71	1.55	0.381	13	0.30
<b>M10</b>								
Spiral-Point Gun – Plug	72083	3	2.94	0.71	1.55	0.381	13	0.30
Spiral-Flute – 3 to 4 Pitches	83158	3	2.94	0.71	1.55	0.381	13	0.30
<b>M11</b>								
Spiral-Point Gun – Plug	83185	3	3.16	0.88	–	0.323	15	0.30
Spiral-Flute – 3 to 4 Pitches	83167	3	3.16	0.88	–	0.323	15	0.30
<b>M12</b>								
Spiral-Point Gun – Plug	72078	3	3.38	0.92	–	0.367	15	0.30
Spiral-Flute – 3 to 4 Pitches	83159	3	3.38	0.92	–	0.367	15	0.30
<b>M14</b>								
Spiral-Point Gun – Plug	72158	3	3.59	0.98	–	0.429	15	0.40
Spiral-Flute – 3 to 4 Pitches	72211	3	3.59	0.98	–	0.429	15	0.40
<b>M16</b>								
Spiral-Point Gun – Plug	83161	3	3.81	1.06	–	0.480	15	0.40
Spiral-Flute – 3 to 4 Pitches	68461	4	3.81	1.06	–	0.480	15	0.40
<b>M18</b>								
Spiral-Flute – 3 to 4 Pitches	72212	4	4.03	1.07	–	0.541	15	0.40

Pricing Based on Order Quantity

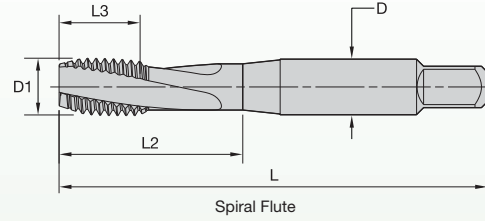
min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

Five day lead time.

**Specials from Blanks • EM-TI • HSS-E-PM**



Left-Hand Spiral Flute



Spiral Flute

style	nitride	flutes	L	L3	L2	D	max H limit	max TPI
<b>#4</b>								
LH Spiral-Flute – Plug	83130	3	1.88	0.34	0.56	0.141	13	100
RH Spiral-Flute – 3 to 4 Pitches	83140	3	1.88	0.34	0.56	0.141	13	100
<b>#5</b>								
LH Spiral-Flute – Plug	83131	3	1.94	0.37	0.62	0.141	13	100
RH Spiral-Flute – 3 to 4 Pitches	83102	3	1.94	0.37	0.62	0.141	13	100
<b>#6</b>								
LH Spiral-Flute – Plug	83132	3	2.00	0.39	0.81	0.141	13	100
RH Spiral-Flute – 3 to 4 Pitches	83141	3	2.00	0.39	0.81	0.141	13	100
<b>#8</b>								
LH Spiral-Flute – Plug	83133	3	2.13	0.43	0.87	0.168	13	100
RH Spiral-Flute – 3 to 4 Pitches	83142	3	2.13	0.43	0.87	0.168	13	100
<b>#10</b>								
LH Spiral-Flute – Plug	83134	3	2.38	0.51	1.06	0.194	13	100
RH Spiral-Flute – 3 to 4 Pitches	83143	3	2.38	0.51	1.06	0.194	13	100
<b>1/4"</b>								
LH Spiral-Flute – Plug	83135	3	2.50	0.56	1.23	0.255	13	80
RH Spiral-Flute – 3 to 4 Pitches	83144	3	2.50	0.56	1.23	0.255	13	80
<b>5/16"</b>								
LH Spiral-Flute – Plug	83136	3	2.72	0.63	1.39	0.318	13	80
RH Spiral-Flute – 3 to 4 Pitches	83145	3	2.72	0.63	1.39	0.318	13	80
<b>3/8"</b>								
LH Spiral-Flute – Plug	83137	3	2.94	0.71	1.55	0.381	13	80
RH Spiral-Flute – 3 to 4 Pitches	83146	3	2.94	0.71	1.55	0.381	13	80
<b>7/16"</b>								
LH Spiral-Flute – Plug	83138	3	3.16	0.88	–	0.323	15	80
RH Spiral-Flute – 3 to 4 Pitches	83147	3	3.16	0.88	–	0.323	15	80
<b>1/2"</b>								
LH Spiral-Flute – Plug	83139	3	3.38	0.92	–	0.367	15	80
RH Spiral-Flute – 3 to 4 Pitches	83148	3	3.38	0.92	–	0.367	15	80

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## Specials from Blanks • EM-TI • HSS-E-PM

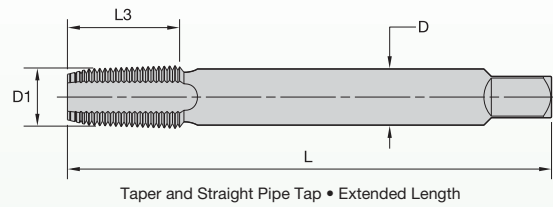
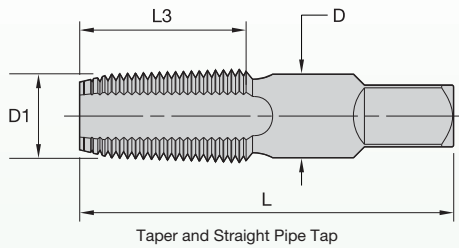
style	nitride	flutes	L	L3	L2	D	max D limit	pitch min
<b>M3</b>								
LH Spiral-Flute – Plug	72017	3	1.94	0.37	0.62	0.141	13	0.30
RH Spiral-Flute – 3 to 4 Pitches	72087	3	1.94	0.37	0.62	0.141	13	0.30
<b>M3.5</b>								
LH Spiral-Flute – Plug	83151	3	2.00	0.39	0.81	0.141	13	0.30
<b>M4</b>								
LH Spiral-Flute – Plug	72059	3	2.13	0.43	0.87	0.168	13	0.30
RH Spiral-Flute – 3 to 4 Pitches	83183	3	2.13	0.43	0.87	0.168	13	0.30
<b>M4.5</b>								
RH Spiral-Flute – 3 to 4 Pitches	83184	3	2.38	0.51	1.06	0.194	13	0.30
<b>M5</b>								
LH Spiral-Flute – Plug	83152	3	2.38	0.51	1.06	0.194	13	0.30
RH Spiral-Flute – 3 to 4 Pitches	83153	3	2.38	0.51	1.06	0.194	13	0.30
<b>M6</b>								
LH Spiral-Flute – Plug	83165	3	2.50	0.56	1.23	0.255	13	0.30
RH Spiral-Flute – 3 to 4 Pitches	83150	3	2.50	0.56	1.23	0.255	13	0.30
<b>M8</b>								
RH Spiral-Flute – 3 to 4 Pitches	68353	3	–	–	–	–	13	0.30
<b>M10</b>								
LH Spiral-Flute – Plug	83156	3	2.94	0.71	1.55	0.381	13	0.30
RH Spiral-Flute – 3 to 4 Pitches	83468	3	2.94	0.71	1.55	0.381	13	0.30
<b>M12</b>								
LH Spiral-Flute – Plug	83170	3	3.38	0.92	–	0.367	15	0.30
RH Spiral-Flute – 3 to 4 Pitches	83162	3	3.38	0.92	–	0.367	15	0.30

Pricing Based on Order Quantity

min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	47
48	72

Five day lead time.

## Specials from Blanks • National Pipe • HSS



style	uncoated	flutes	L	L3	D	projection min	shipping
<b>1/16 - 27</b>							
NPT	64687	4	2.13	0.69	0.380	0.136	24 Hours
NPT Interrupted	65638	3	2.13	0.69	0.380	0.136	48 Hours
NPTF	66225	4	2.13	0.69	0.380	0.136	24 Hours
NPTF Interrupted	65662	3	2.13	0.69	0.380	0.136	48 Hours
NPS	64718	4	2.13	0.69	0.380	-	24 Hours
NPSF	65982	4	2.13	0.69	0.380	-	24 Hours
<b>1/8 - 27</b>							
NPT	64688	4	2.13	0.75	0.438	0.136	24 Hours
NPT Small Shank	64689	4	2.13	0.75	0.313	0.136	24 Hours
Extended-Length NPT	64729	4	6.00	0.75	0.380	0.136	48 Hours
NPT Interrupted	65639	5	2.13	0.75	0.438	0.136	48 Hours
NPT Interrupted Small Shank	65640	5	2.13	0.75	0.313	0.136	48 Hours
Extended-Length NPT Interrupted	65672	5	6.00	0.75	0.380	0.136	72 Hours
NPTF	66226	4	2.13	0.75	0.438	0.136	24 Hours
NPTF Small Shank	66227	4	2.13	0.75	0.313	0.136	24 Hours
Extended-Length NPTF	65942	4	6.00	0.75	0.380	0.136	48 Hours
NPTF Interrupted	65663	5	2.13	0.75	0.438	0.136	48 Hours
NPTF Interrupted Small Shank	65664	5	2.13	0.75	0.313	0.136	48 Hours
Extended-Length NPTF Interrupted	65924	5	6.00	0.75	0.380	0.136	72 Hours
NPS	64720	4	2.13	0.75	0.438	-	24 Hours
NPS Small Shank	64719	4	2.13	0.75	0.313	-	24 Hours
NPSF	65984	4	2.13	0.75	0.438	-	24 Hours
NPSF Small Shank	65983	4	2.13	0.75	0.313	-	24 Hours
<b>1/4 - 18</b>							
NPT	64690	4	2.44	1.06	0.563	0.221	24 Hours
Extended-Length NPT	64730	4	6.00	1.06	0.438	0.221	48 Hours
NPT Interrupted	65641	5	2.44	1.06	0.563	0.221	48 Hours
Extended-Length NPT Interrupted	65673	5	6.00	1.06	0.438	0.221	72 Hours
NPTF	66228	4	2.44	1.06	0.563	0.221	24 Hours
Extended-Length NPTF	65943	4	6.00	1.06	0.438	0.221	48 Hours
NPTF Interrupted	65665	5	2.44	1.06	0.563	0.221	48 Hours
Extended-Length NPTF Interrupted	65925	5	6.00	1.06	0.438	0.221	72 Hours
NPS	64721	4	2.44	1.06	0.563	-	24 Hours
NPSF	65985	4	2.44	1.06	0.563	-	24 Hours
<b>3/8 - 18</b>							
NPT	64691	4	2.56	1.06	0.700	0.221	24 Hours
Extended-Length NPT	64731	4	6.00	1.06	0.700	0.221	48 Hours
NPT Interrupted	65642	5	2.56	1.06	0.700	0.221	48 Hours
Extended-Length NPT Interrupted	65674	5	6.00	1.06	0.700	0.221	72 Hours
NPTF	66229	4	2.56	1.06	0.700	0.221	24 Hours
Extended-Length NPTF	65944	4	6.00	1.06	0.700	0.221	48 Hours
NPTF Interrupted	65666	5	2.56	1.06	0.700	0.221	48 Hours
Extended-Length NPTF Interrupted	65926	5	6.00	1.06	0.700	0.221	72 Hours
NPS	64722	4	2.56	1.06	0.700	-	24 Hours
NPSF	65986	4	2.56	1.06	0.700	-	24 Hours

(continued)

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## Specials from Blanks • National Pipe • HSS

style	uncoated	flutes	L	L3	D	projection min	shipping
<b>1/2 - 14</b>							
NPT	64692	4	3.13	1.38	0.688	0.285	24 Hours
Extended-Length NPT	64732	4	6.00	1.38	0.688	0.285	48 Hours
NPT Interrupted	65643	5	3.13	1.38	0.688	0.285	48 Hours
Extended-Length NPT Interrupted	65675	5	6.00	1.38	0.688	0.285	72 Hours
NPTF	66230	4	3.13	1.38	0.688	0.285	24 Hours
Extended-Length NPTF	65945	4	6.00	1.38	0.688	0.285	48 Hours
NPTF Interrupted	65667	5	3.13	1.38	0.688	0.285	48 Hours
Extended-Length NPTF Interrupted	65927	5	6.00	1.38	0.688	0.285	72 Hours
NPS	64723	4	3.13	1.38	0.688	-	24 Hours
NPSF	65987	4	3.13	1.38	0.688	-	24 Hours
<b>3/4 - 14</b>							
NPT	64706	5	3.25	1.38	0.906	0.285	24 Hours
Extended-Length NPT	64733	5	6.00	1.38	0.906	0.285	48 Hours
NPT Interrupted	65632	5	3.25	1.38	0.906	0.285	48 Hours
Extended-Length NPT Interrupted	65676	5	6.00	1.38	0.906	0.285	72 Hours
NPTF	66231	5	3.25	1.38	0.906	0.285	24 Hours
Extended-Length NPTF	65946	5	6.00	1.38	0.906	0.285	48 Hours
NPTF Interrupted	65668	5	3.25	1.38	0.906	0.285	48 Hours
Extended-Length NPTF Interrupted	65928	5	6.00	1.38	0.906	0.285	72 Hours
NPS	64724	5	3.25	1.38	0.906	-	24 Hours
NPSF	65988	5	3.25	1.38	0.906	-	24 Hours
<b>1 - 11-1/2</b>							
NPT	64707	5	3.75	1.75	1.125	0.360	24 Hours
NPT Interrupted	65633	5	3.75	1.75	1.125	0.360	48 Hours
Extended-Length NPT	64734	5	6.00	1.75	1.125	0.360	48 Hours
Extended-Length NPT Interrupted	65677	5	6.00	1.75	1.125	0.360	72 Hours
NPTF	66232	5	3.75	1.75	1.125	0.360	24 Hours
NPTF Interrupted	65669	5	3.75	1.75	1.125	0.360	48 Hours
Extended-Length NPTF	65947	5	6.00	1.75	1.125	0.360	48 Hours
Extended-Length NPTF Interrupted	65929	5	6.00	1.75	1.125	0.360	72 Hours
NPS	64725	5	3.75	1.75	1.125	-	24 Hours
NPSF	65989	5	3.75	1.75	1.125	-	24 Hours
<b>1-1/4 - 11-1/2</b>							
NPT	64708	5	4.00	1.75	1.313	0.368	24 Hours
NPT Interrupted	65634	5	4.00	1.75	1.313	0.368	48 Hours
NPTF	66233	5	4.00	1.75	1.313	0.368	24 Hours
NPTF Interrupted	65670	5	4.00	1.75	1.313	0.368	48 Hours
NPS	64726	5	4.00	1.75	1.313	-	24 Hours
NPSF	65990	5	4.00	1.75	1.313	-	24 Hours

(continued)

### Standard Length

Pricing Based on Order Quantity	
min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	48

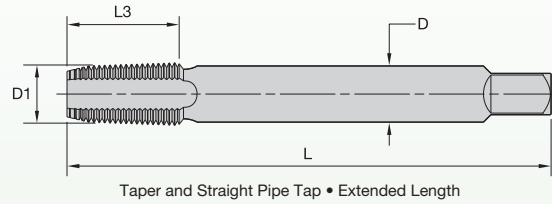
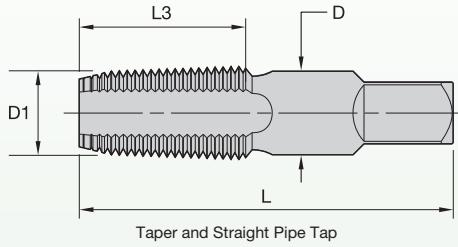
### Extended Length

Pricing Based on Order Quantity	
min	max
1	1
2	2
3	5
6	8
9	11
12	24



(continued)

## Specials from Blanks • National Pipe • HSS



style	uncoated	flutes	L	L3	D	projection min	shipping
<b>1-1/2 - 11-1/2</b>							
NPT	64713	7	4.25	1.75	1.500	0.381	24 Hours
NPT Interrupted	65635	7	4.25	1.75	1.500	0.381	48 Hours
NPTF	66234	7	4.25	1.75	1.500	0.381	24 Hours
NPTF Interrupted	65671	7	4.25	1.75	1.500	0.381	48 Hours
NPS	64727	7	4.25	1.75	1.500	-	24 Hours
NPSF	65991	7	4.25	1.75	1.500	-	24 Hours
<b>2 - 11-1/2</b>							
NPT	64714	7	4.50	1.75	1.880	0.349	24 Hours
NPT Interrupted	65636	7	4.50	1.75	1.880	0.349	48 Hours
NPTF	66235	7	4.50	1.75	1.880	0.349	24 Hours
NPTF Interrupted	66261	7	4.50	1.75	1.880	0.349	48 Hours
NPSF	65992	7	4.50	1.75	1.880	-	24 Hours
<b>2-1/2 - 8</b>							
NPT	64715	7	5.50	2.56	2.250	0.488	24 Hours
NPT Interrupted	65637	7	5.50	2.56	2.250	0.488	48 Hours
NPTF	66236	7	5.50	2.56	2.250	0.488	24 Hours
<b>3-1/2 - 8</b>							
NPT	64716	7	6.00	2.63	2.630	0.488	24 Hours
NPT Interrupted	65644	7	6.00	2.63	2.630	0.488	48 Hours
NPTF Interrupted	66263	7	6.00	2.63	2.630	0.488	48 Hours
<b>3-1/2 - 8</b>							
NPT	64717	9	6.50	2.69	2.813	0.500	24 Hours
NPT Interrupted	65645	9	6.50	2.69	2.813	0.500	48 Hours
<b>4 - 8</b>							
NPT	65181	9	6.75	2.75	3.000	0.512	24 Hours

**Standard Length**

**Pricing Based on Order Quantity**

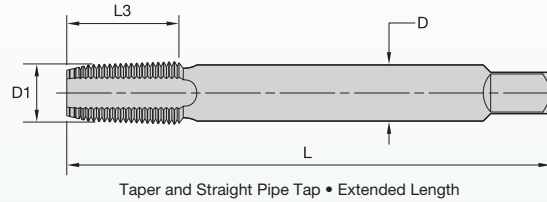
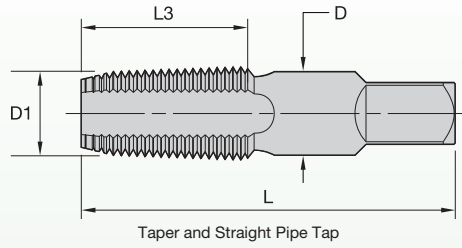
min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	48

**Extended Length**

**Pricing Based on Order Quantity**

min	max
1	1
2	2
3	5
6	8
9	11
12	24

## Specials from Blanks • ISO (British Whitworth) Pipe Taps • HSS



style	uncoated 3-flute	uncoated 4-flute	uncoated 5-flute	uncoated 7-flute	L	L3	D	shipping
<b>1/16 - 28</b>								
Taper Rc (BSPT)	-	66240	66246	-	2.13	0.69	0.313	72 Hours
Taper Rc (BSPT) Interrupted	66266	-	-	-	2.13	0.69	0.313	96 Hours
Straight G (BSPF)	-	65993	-	-	2.13	0.69	0.313	72 Hours
Straight Rp (BSPP)	-	72161	-	-	2.13	0.69	0.313	72 Hours
<b>1/8 - 28</b>								
Taper Rc (BSPT)	-	66241	66247	-	2.13	0.75	0.438	72 Hours
Taper Rc (BSPT) Small Shank	-	66242	66248	-	2.13	0.75	0.313	72 Hours
Ext-Lgth Taper Rc (BSPT)	-	65954	-	-	6.00	0.75	0.438	72 Hours
Taper Rc (BSPT) Interrupted	-	-	66267	-	2.13	0.75	0.438	96 Hours
Taper Rc (BSPT) SS Interrupted	-	-	66268	-	2.13	0.75	0.313	96 Hours
Ext-Lgth Taper Rc (BSPT) Int.	-	-	65936	-	6.00	0.75	0.438	96 Hours
Straight G (BSPF)	-	65995	-	-	2.13	0.75	0.438	72 Hours
Straight G (BSPF) SS	-	65994	-	-	2.13	0.75	0.313	72 Hours
Straight Rp (BSPP)	-	72163	-	-	2.13	0.75	0.438	72 Hours
Straight Rp (BSPP) SS	-	72162	-	-	2.13	0.75	0.313	72 Hours
<b>1/4 - 19</b>								
Taper Rc (BSPT)	-	66243	66249	-	2.44	1.06	0.563	72 Hours
Ext-Lgth Taper Rc (BSPT)	-	65955	-	-	6.00	1.06	0.563	72 Hours
Taper Rc (BSPT) Interrupted	-	-	66269	-	2.44	1.06	0.563	96 Hours
Ext-Lgth Taper Rc (BSPT) Int.	-	-	65937	-	6.00	1.06	0.563	96 Hours
Straight G (BSPF)	-	65996	-	-	2.44	1.06	0.563	72 Hours
Straight Rp (BSPP)	-	72164	-	-	2.44	1.06	0.563	72 Hours
<b>3/8 - 19</b>								
Taper Rc (BSPT)	-	66244	-	-	2.56	1.06	0.700	72 Hours
Ext-Lgth Taper Rc (BSPT)	-	65956	-	-	6.00	1.06	0.700	72 Hours
Taper Rc (BSPT) Interrupted	-	-	66270	-	2.56	1.06	0.700	96 Hours
Ext-Lgth Taper Rc (BSPT) Int.	-	-	65938	-	6.00	1.06	0.700	96 Hours
Straight G (BSPF)	-	65997	-	-	2.56	1.06	0.700	72 Hours
Straight Rp (BSPP)	-	72165	-	-	2.56	1.06	0.700	72 Hours
<b>1/2 - 14</b>								
Taper Rc (BSPT)	-	66245	66251	-	3.13	1.38	0.688	72 Hours
Ext-Lgth Taper Rc (BSPT)	-	65957	-	-	6.00	1.38	0.688	72 Hours
Taper Rc (BSPT) Interrupted	-	-	66271	-	3.13	1.38	0.688	96 Hours
Ext-Lgth Taper Rc (BSPT) Int.	-	-	65939	-	6.00	1.38	0.688	96 Hours
Straight G (BSPF)	-	65998	-	-	3.13	1.38	0.688	72 Hours

(continued)

(continued)

## Specials from Blanks • ISO (British Whitworth) Pipe Taps • HSS

style	uncoated 3-flute	uncoated 4-flute	uncoated 5-flute	uncoated 7-flute	L	L3	D	shipping
<b>Straight Rp (BSPP)</b>	-	72166	-	-	3.13	1.38	0.688	72 Hours
<b>3/4 - 14</b>								
Taper Rc (BSPT)	-	-	66252	-	3.25	1.38	0.906	72 Hours
Ext-Lgth Taper Rc (BSPT)	-	-	65958	-	6.00	1.38	0.906	72 Hours
Taper Rc (BSPT) Interrupted	-	-	66272	-	3.25	1.38	0.906	96 Hours
Ext-Lgth Taper Rc (BSPT) Int.	-	-	65940	-	6.00	1.38	0.906	96 Hours
Straight G (BSPF)	-	-	65999	-	3.25	1.38	0.906	72 Hours
Straight Rp (BSPP)	-	-	72167	-	3.25	1.38	0.906	72 Hours
<b>1 - 11</b>								
Taper Rc (BSPT)	-	-	66253	-	3.75	1.75	1.125	72 Hours
Ext-Lgth Taper Rc (BSPT)	-	-	65959	-	6.00	1.75	1.125	72 Hours
Taper Rc (BSPT) Interrupted	-	-	66273	-	3.75	1.75	1.125	96 Hours
Ext-Lgth Taper Rc (BSPT) Int.	-	-	65941	-	6.00	1.75	1.125	96 Hours
Straight G (BSPF)	-	-	65153	-	3.75	1.75	1.125	72 Hours
Straight Rp (BSPP)	-	-	72168	-	3.75	1.75	1.125	72 Hours
<b>1-1/4 - 11</b>								
Taper Rc (BSPT)	-	-	66254	-	4.00	1.75	1.313	72 Hours
Taper Rc (BSPT) Interrupted	-	-	66274	-	4.00	1.75	1.313	96 Hours
Straight G (BSPF)	-	-	65154	-	4.00	1.75	1.313	72 Hours
Straight Rp (BSPP)	-	-	72169	-	4.00	1.75	1.313	72 Hours
<b>1-1/2 - 11</b>								
Taper Rc (BSPT)	-	-	-	66255	4.25	1.75	1.500	72 Hours
Taper Rc (BSPT) Interrupted	-	-	-	66275	4.25	1.75	1.500	96 Hours
Straight G (BSPF)	-	-	-	65155	4.25	1.75	1.500	72 Hours
Straight Rp (BSPP)	-	-	-	72170	4.25	1.75	1.500	72 Hours
<b>2 - 11</b>								
Taper Rc (BSPT)	-	-	-	66256	4.50	1.75	1.875	72 Hours
Taper Rc (BSPT) Interrupted	-	-	-	66276	4.50	1.75	1.875	96 Hours
Straight G (BSPF)	-	-	-	65156	4.50	1.75	1.875	72 Hours
Straight Rp (BSPP)	-	-	-	72171	4.50	1.75	1.875	72 Hours
<b>2-1/2 - 11</b>								
Taper Rc (BSPT)	-	-	-	66257	5.50	2.56	2.250	72 Hours
<b>3 - 11</b>								
Taper Rc (BSPT)	-	-	-	66258	6.00	2.63	2.625	72 Hours

**Standard Length**

Pricing Based on Order Quantity	
min	max
1	1
2	2
3	5
6	8
9	11
12	23
24	48

**Extended Length**

Pricing Based on Order Quantity	
min	max
1	1
2	2
3	5
6	8
9	11
12	24

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1016374	KLS40M	U78	1020787	KJAM20	C78-79, C81-85, C87, C94-97	1059844	MS326	E35	1274800	ISSN443 K9	C13-15
1016544	SM837 K9	C77				1067609	CKC3	F73-76, F78-79, F81	1274807	ISSN643 K9	C13-14
1016546	SM840 K9	C76	1020789	KJAM22	C62-64, C67-77	1067610	CKC4	F73-76, F81	1293725	M40214	P6
1016624	SKCP343 K9	C25	1020791	KJAM23	C80, C87-90, C92, C94-97	1067613	CM74	E78, E80-82, E84, F24, F26-27, F29-31, F33, F36	1295391	14130	W140
1016626	SKDP343 K9	C27				1067614	CM75	E78, E80, E82, E84, F24, F26, F28, F30-31, F33, F36	1295731	17018	W178
1016628	SKCP453 K9	C25	1020805	KJAM26	C72, C76				1295732	17020	W178
1016644	IWSN433 K9	C18	1020807	KJAM27	C64, C67, C71				1315965	MS1489	F30-31, F36
1016648	ITSN323 K9	C15-16	1020809	KJAM28	C62, C67-71, C74-78, C80-81, C86-89, C91-97	1067630	CM146	E84, F33, F36-37	1319470	IWSN322 K9	C18
1016674	ISSN433 K9	C13, C39				1067631	CM147	E84, F33, F36-37	1329168	S424	H13, H18, I34, K6
1016676	ICSN322 K9	C9	1020811	KJAM30	C62, C67-71, C74-78, C80-81, C86-89, C91-97	1093271	75HC060M	R107	1363654	56-1018	S46-51
1016678	ICSN433 K9	C8-10, C36-37				1093272	75HC080M	R107	1363761	56-1020	S46-51
1016680	IDSN433 K9	C12	1020813	KJAM31	C62-64, C67-77, C80, C87-90, C92, C94-97	1093273	75HC100M	R107	1543065	551.326	C19-20
1016682	IDSN443 K9	C11-12, C38				1093524	75HC120M	R107	1543067	551.342	C19
1016728	SM40 K9	C21	1020835	KJAM32	C62-73, C76-77, C80, C88, C92	1093525	75HC140M	R107	1543077	554.260	C19-20
1016730	SM41 K9	C21-23, C39				1093526	75HC160M	R107	1546392	SMY65 K9	F75-76
1016820	SM119 K9	C21	1020839	KJAM34	C78-79, C81-85, C87, C94-97	1099381	CM182	E80, F26	1546393	SMY65 K9	F75-76
1016822	SM120 K9	C21				1099382	CM183	E80, F26	1568786	M41289	P8
1017170	SM417 K9	C25-26	1020841	KJAM35	C78, C81, C83-84	1099384	CM185	E80, F26	1602266	463200400RT TIALN-RT	M74
1017172	SM420 K9	E79	1020843	KJAM25	C62-73, C77, C80, C88, C92	1099445	SKSN566K K9	C67-69	1602268	463200500RT TIALN-RT	M74
1017174	SMY63 K9	F73-76, F78, F81				1099451	ICSN332 K9	C9	1602270	463200600RT TIALN-RT	M74
1017176	SMY3 K9	F73-76, F79, F81	1020857	CKM38	C72	1099452	IDSN322 K9	C11	1602273	463200800RT TIALN-RT	M74
1017178	SMY4 K9	F73-76, F81	1020917	SRS3	C25, C27, C29	1099453	IDSN543 K9	C11	1602274	463201000RT TIALN-RT	M74
1017180	SMY4 K9	F73-76, F81	1020919	SRS4	C25	1099461	SM416 K9	E79	1602275	463201500RT TIALN-RT	M74
1017220	ITSN322 K9	C72-73	1020923	SSY3T	F73-76, F78-79, F81	1099463	SM419 K9	E79	1602538	465102000RT TIALN-RT	M76
1017226	IVSN322 K9	C17-18	1020935	SSY4T	F73-76, F81	1099469	ITSN443 K9	C16	1606050	50HC040M	R107
1017228	SKVN343 K9	C29	1020941	SSN2T	F78-79, F81	1099614	MS1933	C44, C50, C78, C81, C83-84	1606061	50HC060M	R107
1017230	IDSN432 K9	C65-66	1020943	SSA3T	F73-76, F78-79, F81	1099615	MS1939	C42, C44	1606062	50HC080M	R107
1017246	IRSN43 K9	C13	1020965	SSA4T	F73-76, F81	1099643	MS1154	C87	1606064	50HC100M	R107
1017248	IRSN44 K9	C13	1020971	MS111	C76	1099644	MS1157	C42, C80, C88, C90, C92	1611066	465101000RT TIALN-RT	M76
1017252	ICSN432 K9	C62-64	1020975	MS125	C77	1099645	MS1160	T9, T12, T14, T17, T19, T22, T24, T27	1621087	MS2002	E37
1017276	ITSN433 K9	C15, C72-73	1021007	MS1321	C23-24	1099649	KLM33	C62, C67-71	1656841	463200400.. UNCOATED	M74
1017278	ISSN432 K9	C67-71	1021037	MS1027	C25-26	1099650	KLM54	C67-69	1656844	463200500.. UNCOATED	M74
1017282	IVSN432 K9	C17	1021039	MS1028	C25-26	1116889	CKM34	C62-64, C66-77	1656849	463200600.. UNCOATED	M74
1017294	ITSN534 K9	C72	1021087	MS337	E129	1121205	552.232	C19-20	1656853	463200800.. UNCOATED	M74
1017298	ICSN533 K9	C37	1021143	MS364	C64, C67, C71-72	1121232	552.221	C19	1656858	463201000.. UNCOATED	M74
1017300	ISSN633 K9	C39, C67, C71	1021337	MS1152	C94-97, T9, T12, T14, T17, T19, T22, T24, T27	1121256	552.223	C19	1656863	463201500.. UNCOATED	M74
1017334	ICSN633 K9	C9, C37, C64				1127019	MS1162	E37	1656867	463202000.. UNCOATED	M74
1018327	CK7	C21	1021339	MS1153	C25-28, C40-44, C46-51, C78-79, C81-87, C94-97	1131459	MS1488	F30-31, F36-37	1656873	463300400.. UNCOATED	M75
1018329	CK9	C21-22				1131646	191.405	C62, C67-71, C74-78, C80-81, C86-89, C91-97	1656875	463300400RT TIALN-RT	M75
1018331	CK10	C21-23, C39	1021341	MS1155	C25, C27, C40-51, C78, C80-81, C87-89, C91-97	1131653	191.406	C62-64, C67-77, C80, C87-90, C92, C94-97	1656878	463300500.. UNCOATED	M75
1018349	CK19	C21				1131658	191.407	C62-73, C76-77, C80, C88, C92	1656880	463300500RT TIALN-RT	M75
1018351	CK20	C39	1021343	MS1156	C25, C27, C29	1132119	191.725	I20-24	1656883	463300600.. UNCOATED	M75
1018367	CK23	C22	1021375	MS1158	C25	1132436	191.848	K22-25	1656885	463300600RT TIALN-RT	M75
1018413	CM109	E85, F34	1021421	STCM9	C62-73	1133349	SN3TPKG	F78-79, F81	1656890	463300800.. UNCOATED	M75
1018531	CM-72	F30-31, F36	1021423	STCM11	C76	1134385	192.432	I4-8, T9, T12, T14, T17, T19, T22, T24, T27	1656892	463300800RT TIALN-RT	M75
1018533	CM73	F30-31, F36	1021455	STCM8	C64, C67, C71, C77				1656893	463301000.. UNCOATED	M75
1018569	CM80	E78, E82, E84, F24, F29, F33	1021505	STCM37	C72-73				1656895	463301000RT TIALN-RT	M75
1018571	CM81	E78, E82, E84, F24, F28, F33	1021507	STCM38	C62-64, C67-77				1656898	463301200.. UNCOATED	M75
1018649	MW3	H66	1021509	STCM39	C72				1656900	463301500.. UNCOATED	M75
1019380	STC4	C21-22	1021511	STCM40	C65, C67-69				1656901	463301500RT TIALN-RT	M75
1019382	STC5	C21	1021535	KLM43	C62-64, C67-71	1136414	192.932	K38	1656903	463301500RT TIALN-RT	M75
1019388	STC8	C21-23, C39	1021537	KLM46	C62, C64-66, C72-73	1137111	125.625	E108	1656906	463301800.. UNCOATED	M75
1019390	STC9	C21	1021539	KLM58	C72	1137131	125.630	E108	1656908	463301800RT TIALN-RT	M75
1019392	STC11	C22, C39	1021541	KLM68	C64, C67, C71	1137453	129.025	K57, K64, K69	1656909	463302000.. UNCOATED	M75
1019640	S111	C21-23, E79	1021543	KLM33L	C72-73	1137493	129.512	K69	1656910	463302000RT TIALN-RT	M75
1019659	MS1575	E31	1021565	KLM34L	C72-73	1138413	170.023	J18	1656913	463302500RT TIALN-RT	M75
1019694	S19	C39	1021569	KLM46S	C62-71	1138430	170.024	T9, T14, T19, T24	1656916	463303000RT TIALN-RT	M75
1019696	S112	E79	1021591	FT7	S48-49	1138438	170.025	I20-24, J18, K22-25, K30-33	1656950	465101000.. UNCOATED	M76
1019936	S32	C50	1021593	FT8	S48-49				1656951	465101000CT TICN-CT	M76
1019938	S39	E84, F33	1021605	FT15	S48-49	1138446	170.026	K38	1656952	465101200.. UNCOATED	M76
1019940	S310	E78, E80-82, E84, F24, F26-29, F33	1021607	FT20	S48	1138465	170.028	I4-8	1656953	465101200CT TICN-CT	M76
1019978	S304	E85, F34	1021679	CM120	E79, E82, E84, F25, F29, F33	1146699	CKM35	C64, C67, C71-73, C77	1656954	465101200RT TIALN-RT	M76
1019990	S412	E79-80, E82, E84, F25-26, F28-29, F33	10221681	CM121	E79, E82, E84, F25, F28, F33	1175225	193.281	T9, T12, T14, T17, T19, T22, T24, T27	1656955	465101500.. UNCOATED	M76
			1022051	CM144	E79, F25				1656956	465101500CT TICN-CT	M76
1020058	S352	E78, E82, E84, E133-134, F24, F28-29, F33	1022436	CKM37	C67-69	1230373	CKM36	C62, C65-71	1656957	465101500RT TIALN-RT	M76
			1022519	TT25	T12, T17, T22, T27	1260086	CC09	D10-17, D96	1656959	465101800CT TICN-CT	M76
1020355	SL344	C21, E79	1023244	S422	E79, F25, K25, K33	1260087	CC11	D11-12	1656971	465102000.. UNCOATED	M76
1020576	KLS15	K13	1023315	S458	H6, H13, H18, H24, H29, H36, I8, I24, I34, K13, K89, K95, K98	1271092	FC11	D25-26	1656972	465102000CT TICN-CT	M76
1020603	CKM20	C76				1271093	FC14	D20, D22-28, D58	1744444	KJAM33	C71
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1752141	M41325	P9	2002503	VCGT333AL3 HCK10	B157	2005938	12625706700 WG	U53, U58	2010027	CCMT43141 THM	B31
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2018652	3IR175ISO TN6025	F54	2019195	3IR12W TN6025	F66	2021640	12251343000 W	E108	2025731	12147562300 W	J18
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2027966	DCMW2151 THM	B50	2029299	12147603900 W	U50-51	2029604	12148099300	K104-105, K116-117, K120-121	2101597	4EL50ISO TN6025	F53
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2028115	RCMT0602M0 THM	B65	2029316	12147613500 W	U52				2102347	4L45ISO TN6025	F56
2028129	RCMT0803M0 THM	B65	2029335	12147617400 W	U64	2029605	12148099400	K68-69, U56-59	2102653	2L32UN TN6025	F60
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2028568	SPUN633 THM	B80	2029521	12148031686 TTR	E112	2031814	12147620300 W	U66-67	2248995	75HC030M	R107
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2028660	TCMW2151 THM	B83				2031827	12147677000 W	J18	2256359	7N0100402RJ TIALN-RJ1	M131
2028670	TCMW3251 THM	B83				2031836	12148087100 W	U66-67	2256360	7N0100502RJ TIALN-RJ1	M131
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2498727	123567340 TN7525	E104	2563563	DCMT3251 HK1500	B47	2646601	M100D075Z02W100RD10 W	K82	2709361	623W38089	.08
2498728	123567350 TN7525	E104	2563990	CCMT3252 HK1500	B30	2646602	M100D075Z02W100RD10L628 W	K82	2709375	623W32089	.08
2498729	123567230 TN7525	E104	2564010	CCMT322 HK1500	B30	2646604	M100D100Z02W100RD10 W	K82	2709389	622W38089	.09
2498730	123567231 TN7525	E104	2564044	CCMT321 HK1500	B30	2646605	M100D100Z02W125RD10 W	K82	2709487	622W32089	.08
2498731	123567240 TN7525	E104	2564132	CCMT2151 HK1500	B30	2646607	M100D100Z02C100RD12L478 W	K88	2709494	622W25078	.08
2498733	123567420 TN7525	E105	2576202	S459	K6, K38	2646609	M100D100Z02M12RD12 W	K86	2709562	621W38089	.08
2498734	123567430 TN7525	E105	2585812	SFSTORXRHANDDRIVERT25	T9, T14, T19	2646610	M100D100Z02M12RD12 W	K87	2709569	621W38079	.09
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2511344	M4000CA-HP06	H67	2603957	19233	W143				2709606	621W25088	.08
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2530406	4K2319077 UNCOATED	M99	2603959	19748	W188	2646614	M100D100Z02W125RD12L715 W	K87	2709627	621W19077	.08
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2539335	CM185LP	E80, F26	2622810	19728	W188			M142	2709723	620W38079	.08
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2760449	7FO-0594T	S35	2821844	TPHB32X0 CM1	D82	2823236	SBIT WG	D91, D106, D121	2825253	QCB150085R WG	D32
2760452	7FO-0594A	S35	2822085	SDBM162545R WG	D39	2823592	TPGT2151HP CG5	D85	2825272	QCB150085R WG	D32
2760453	7FO-0591T	S35	2822265	SDBIC750105R WG	D19	2823595	TPGT2151HP CM1	D85	2825278	QCB150085L WG	D32
2760454	7FO-0591A	S35	2822272	SDBIC750105L WG	D19	2823605	TPGT2151HP CG5	D85	2825285	QCB150080R WG	D32
2760458	7FO-0578T	S35	2822277	SDBIC75065R WG	D19	2823619	TPMT2151LF CG6	D85	2825290	QCB137565R WG	D32
2760460	7FO-0578A	S35	2822283	SDBIC75065L WG	D19	2823625	TPMT2151LF CG5	D85	2825297	QCB137565L WG	D32
2760463	7FO-0571A	S35	2822289	SDBIC625105R WG	D19	2823646	TPMT21505LF CG5	D85	2825304	QCB137560R WG	D32
2760466	7FO-0563T	S35	2822301	SDBIC62565R WG	D19	2823739	TPHH2151L CG6	D83	2825318	QCB1W50083L WG	D44
2760472	7FO-0563A	S35	2822306	SDBIC62565L WG	D19	2823753	TPHH2151L CG5	D83	2825324	QCB1W50083R WG	D44
2760473	7FO-0551T	S35	2822327	SCBI875125R WG	D37	2823767	TPHH21505L TN7	D83	2825327	QCB1W37563L WG	D44
2760477	7FO-0551A	S35	2822433	SDBI62560L WG	D39	2823805	TPHH21505L CG5	D83	2825335	QCB1375653R WG	D44
2760478	7FO-0547T	S35	2822454	SCBI75065R WG	D37	2823812	TPHH21505R CG5	D83	2825345	QSB1W50063L WG	D43
2760481	7FO-0547A	S35	2822460	SCBI75065L WG	D37	2823851	TPCH221 CG6	D84	2825351	QSB1W50063R WG	D43
2760485	7FO-0531T	S35	2822467	SCBI75060R WG	D37	2823858	TPH2151 CG5	D84	2825357	QSB1W37553L WG	D43
2760489	7FO-0531A	S35	2822479	SCBI750105R WG	D37	2823908	TPHH21505 CG6	D84	2825364	QSB1W37553R WG	D43
2760492	7FO-0516A	S35	2822492	SCBI750100R WG	D37	2823914	TPHH21505 CG5	D84	2825394	QSM162565R WG	D18, D57
2760494	7FO-0512T	S35	2822500	SCBI62565R WG	D37	2823942	TPHB2151M CBN6	D82	2825449	QSM150055L WG	D18, D57
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2760718	56-2017	S46-47, S50-51	2822522	SCBI625105L WG	D37	2824015	TPHB2151M CPD1	D82	2825522	QSM137550155L WG	D30
2760719	56-2015	S46-47, S50-51	2822527	SCBI625100R WG	D37	2824022	TPHB21505M CPD1	D82	2825587	QSR1500660R WG	D41
2760725	56-1025	S46-47, S50-51	2822540	SCBI100065R WG	D37	2824037	TPHB2152 TN7	D82	2825594	QSR1500645R WG	D41
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2820865	FNT1528UN2R CG5	D89	2822591	SCBIW750103R WG	D46	2824090	TPHB2151 TN7	D82	2825633	QSR1375450R WG	D41
2820937	LSMI24450011870R WG	D58	2822595	SCBIW625103L WG	D46	2824104	TPHB2151 CM1	D82	2825640	QSO1375750155R WG	D33
2820944	LSMI2445008280R WG	D58	2822603	SCBIW625103R WG	D46	2824122	TPHB2151 C3	D82	2825647	QSO1375750150R WG	D33
2820948	LSMI24437511870R WG	D58	2822626	SSBI75085R WG	D19	2824129	TPHB2151 CG6	D82	2825654	QSO13126251255R WG	D33
2820954	LSMI2443758280R WG	D58	2822631	SSBI75085L WG	D19	2824136	TPHB2151 CG5	D82	2825660	QSO13126251250R WG	D33
2820981	LTM16 WG	D58, D91, D106, D121	2822637	SSBI62575R WG	D19	2824148	TPHB21505 TN7	D82	2825670	QSI1625460R WG	D59
2821023	WPMT3252LF CG55	D86	2822643	SSBI62575L WG	D19	2824168	TPHB21505 CM1	D82	2825679	QSI5006251560R WG	D59
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2821115	TPHH322L CG5	D83	2822857	SSOI5001000150R WG	D40	2824220	TPHB2150X CM1	D82	2825727	QSI1625750250R WG	D30
2821121	TPHH322R CG5	D83	2822864	SSII750860R WG	D59	2824236	TPHB2150X C3	D82	2825730	QSI1500625255R WG	D30
2821150	TPHH321L CG6	D83	2822888	SSCI625430L WG	D38	2824251	TPHB2150X CG5	D82	2825747	QSI1500625250R WG	D30
2821162	TPHH321L CG5	D83	2822898	SSBI75085R WG	D35	2824266	TBHB2150 CG5	D80	2825753	QSI1500625155R WG	D30
2821168	TPHH321R CG5	D83	2822901	SSBI75085L WG	D35	2824316	WPHT2151 CG5	D86	2825760	QSI1500625155L WG	D30
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2827839	GCP13756225L WG	D52	2829533	FSBM5212125R WG	D23	2830320	FSBI250625755L WG	D22	2831283	CCBM81525L WG	D15
2827845	GCP13756225R WG	D52	2829545	FSBM81005L WG	D21	2830324	FSBI250500755L WG	D22	2831289	CCBM81525R WG	D15
2828101	CTP132262590647R WG	D54	2829554	FSBM61000R WG	D21	2830329	FSBI250500750R WG	D22	2831307	CCBM61525L WG	D15
2828116	GSBMM61003L WG	D42	2829566	FSBM61005R WG	D21	2830335	FSBI2505001255R WG	D22	2831311	CCBM61525R WG	D15
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2828145	GSBWW31243R WG	D41	2829704	FCBI312625155R WG	D26	2830364	FSBI25045L WG	D20	2831383	CCPM812325L WG	D47
2828151	GSBWW25043L WG	D41	2829709	FCBI312625155L WG	D26	2830369	FSBI25040R WG	D20	2831394	CCPM7122525L WG	D47
2828161	GSBWW25043R WG	D41	2829716	FCBI312625150R WG	D26	2830380	FSBI20362555R WG	D22	2831399	CSPM7122525R WG	D47
2828167	GSBWW18743R WG	D41	2829722	FCBI31250031255R WG	D26	2830405	FSBI20350055R WG	D22	2831405	CSPM712255L WG	D47
2828170	GSBWW18743R WG	D41	2829736	FCBI31250031250R WG	D26	2830417	FSBI20350050R WG	D22	2831411	CSPM712255R WG	D47
2828184	GTP137562590647R WG	D54	2829740	FCBI312500155R WG	D26	2830430	FSBI20350015R WG	D22	2831441	CSBM5655R WG	D11
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2951386	..... A08RSCLR2 WG	..... C42	2952198	..... VNGA332T0820 CW5025	..... B196	2952618	..... RRG45T4015 CW2015	..... B185	2957429	..... RDMT1003MOT TN6525	..... K83
2951387	..... A08RSTFCR2 WG	..... C49	2952199	..... WNGA432T0820 CW5025	..... B196	2952619	..... RRG45T8015 CW2015	..... B185	2957430	..... RDMT1204MOTX TN6525	..... K91
2951388	..... A10SSCLR2 WG	..... C42	2952200	..... WNGA433T0820 CW5025	..... B196	2952620	..... RRG55T0820 CW2015	..... B185	2957432	..... RDMT1204MOTX TN6540	..... K91
2951389	..... A10SSTFCR2 WG	..... C49	2952201	..... WNGA434T0820 CW5025	..... B196	2952693	..... RCGV35T0420 CW2015	..... B184	2957533	..... RDMT1605MOTX TN6540	..... K96
2951391	..... A12SSQLCL3 WG	..... C42	2952333	..... 123567360 TN7525	..... E104	2952694	..... RCGV35T0820 CW2015	..... B184	2957535	..... RCMT1606MOTX TN6525	..... K99
2951392	..... A12SSCLR3 WG	..... C42	2952335	..... 123567460 TN7525	..... E105	2952695	..... RCGV35T2815 CW2015	..... B184	2957536	..... RDMT1605MOTX TN6525	..... K96
2951393	..... A12SSDUCL3 WG	..... C45	2952336	..... 123567480 TN7525	..... E105	2952697	..... RCGV45T0820 CW2015	..... B184	2957537	..... RCMT1606M043M TN6540	..... K99
2951394	..... A12SSDUCR3 WG	..... C45	2952337	..... 123567803 TN7525	..... E107	2952698	..... RCGV45T8015 CW2015	..... B184	2957546	..... HPGT225DZENGD TN6540	..... H45
2951395	..... A12SSTFCR2 WG	..... C49	2952338	..... 123567804 TN7525	..... E107	2952699	..... SCL433T0220 CW2015	..... B187	2957547	..... HPGT225DZERLD TN6525	..... H44
2951396	..... A16TCTFFR3 WG	..... C39	2952339	..... 123567805 TN7525	..... E107	2952700	..... SPG322T0420 CW2015	..... B191	2957548	..... HPGT225DZFRDL TN6501	..... H44
2951399	..... A16TSCCLR3 WG	..... C42	2952340	..... 123567806 TN7525	..... E107	2952701	..... TPG221T0420 CW2015	..... B191	2957549	..... HPGT06T3DZERGD3W TN6510	..... H45
2951400	..... A20UCTFFR3 WG	..... C39	2952341	..... 123568080 TN7525	..... E110	2952702	..... SPG422T0420 CW2015	..... B191	2957552	..... HPGT225DZENGD TN6540	..... H45
2951408	..... A20USCLR4 WG	..... C42	2952342	..... 123568100 TN7525	..... E110	2952703	..... SPU421T0220 CW2015	..... B192	2957583	..... HPGT225DZENGD TN6520	..... H45
2951418	..... A24USCLR4 WG	..... C42	2952343	..... 123568120 TN7525	..... E110	2952704	..... SPU422T0220 CW2015	..... B192	2957584	..... HPGT06T3DZERGD3W TN6525	..... H45
2951772	..... TC4AN313015 TICN-CT	..... M106	2952344	..... 123568140 TN7525	..... E110	2952705	..... SPU423T0220 CW2015	..... B192	2957585	..... HPGT225DZERLD TN6520	..... H44
2951832	..... 4AN208023 UNCOATED	..... M104	2952345	..... 123568160 TN7525	..... E110	2952706	..... TPG221T0420 CW2015	..... B195	2957586	..... HPGT225DZENGD TN6525	..... H45
2952069	..... SNMX453T0820 CW5025	..... B191	2952350	..... 123567360 TN7535	..... E104	2952707	..... TPG222T0420 CW2015	..... B195	2957587	..... HPGT225DZERLD TN6540	..... H44
2952070	..... SNMX454T0820 CW5025	..... B191	2952351	..... 123567380 TN7535	..... E104	2952708	..... TPG223T0420 CW2015	..... B195	2957588	..... HPGT225DZENGD TN6525	..... H45
2952071	..... SNMX554T0820 CW5025	..... B191	2952352	..... 123567460 TN7535	..... E105	2952709	..... TPG321T0220 CW2015	..... B195	2957589	..... HPGT225DZENGD TN6510	..... H45
2952072	..... TNG332T0820 CW5025	..... B193	2952353	..... 123567480 TN7535	..... E105	2952710	..... TPG321T0420 CW2015	..... B195	2961641	..... 7F5-2756A	..... S42
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2965019	17050108800	WU25PD	R72	2968382	17050212300	WU25PD	R78	2968543	17050310500	WU25PD	R81	2991957	TC4K6219077	TICN-CT	M96
2965020	17050108900	WU25PD	R72	2968393	17050212500	WU25PD	R78	2968544	17050310720	WU25PD	R81	3003329	TM4V0T32009S	ALTIN-MW	M9
2965021	17050109000	WU25PD	R72	2968394	17050212700	WU25PD	R78	2968545	17050310800	WU25PD	R81	3003330	TM4VPT16006S	ALTIN-MT	M12
2965022	17050109100	WU25PD	R72	2968395	17050212800	WU25PD	R78	2968546	17050311000	WU25PD	R81	3003331	TM4VPT16016S	ALTIN-MT	M12
2965023	17050109130	WU25PD	R72	2968396	17050213000	WU25PD	R78	2968547	17050311500	WU25PD	R82	3003332	TM4VPT19007S	ALTIN-MT	M12
2965024	17050109200	WU25PD	R72	2968397	17050213500	WU25PD	R78	2968548	17050311800	WU25PD	R82	3004373	TM4VPT19017S	ALTIN-MT	M12
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2965026	17050109400	WU25PD	R72	2968399	17050214000	WU25PD	R78	2968550	17050312000	WU25PD	R82	3004375	TM4VPT25028S	ALTIN-MT	M12
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3026683	32MHC140M	R107	3058580	TM7S5F07004 ALTIM-MT1	M139	3089250	7N1200802MJ ALTIM-MJ1	M127	3122422	3IL8PD TN6025	F69
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3026685	32MHC160M	R107	3058739	TM7S5F16006 ALTIM-MT1	M139	3089252	7N1201202MJ ALTIM-MJ1	M127	3122446	3IL9UN TN6025	F60
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3054754	M40416	P12	3085089	050281-002500 K10F	U11	3118384	2ILO4ISO TN6025	F55	3171159	19520	W44
3054914	TM7S1508000 ALTIM-MT1	M138	3085090	050281-002600 K10F	U11	3118386	2ILO5ISO TN6025	F55	3171161	19524	W44
3054915	TM7S2510004 ALTIM-MT1	M138	3085092	050281-002800 K10F	U11	3118387	2ILO6ISO TN6025	F55	3171162	19525	W44
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3055656	050280-001600 K10F	U15	3085106	050281-003200 K10F	U11	3118390	2ILO7ISO TN6025	F55	3176688	MS2173	C78, C81, C83-84
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3548062	SCMT3252MU TN5120	B69	3606931	NR2M125R TN6010	E71	3607036	NG3047L THM	E55	3607135	NR3047L TN6010	E72
3558220	CCMT2152MU TN5120	B33	3606932	NR2M150R TN6010	E71	3607037	NGP2M150L THM	E68	3607136	NP2002RK TN6010	E70
3558297	CCMT432MU TN5120	B33	3606933	NR2M175R TN6010	E71	3607038	NGP2M200L THM	E68	3607137	NG3094R TN6010	E54
3558306	SCMT322MU TN5120	B69	3606934	NR3M225L TN6010	E73	3607039	NGP2M250L THM	E68	3607138	NGP3M300RK TN6010	E59
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3583634	206473	E129	3606952	NR3M175L TN6010	E73	3607057	NG3125RK TN6010	E59	3607154	NP3002RK TN6010	E70
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3649763	5A0319007E UNCOATED	M85	3655943	250306 WG	E31	3665142	7N2101001RT TIALN-RT1	M132	3684162	5AN325028D UNCOATED	M89
3649764	5A0325008B UNCOATED	M85	3655944	250307 WG	E30	3665163	7N2101201RT TIALN-RT1	M132	3684608	CCMT3253 TN7125	B30
3649765	5A0325008E UNCOATED	M85	3655945	250308 WG	E31	3665164	7N2101501RT TIALN-RT1	M132	3684633	CNMM54365 TN7125	B44
3650508	250401 WG	E33	3655946	250309 WG	E30	3665166	7N2102001RT TIALN-RT1	M132	3738131	4K6219077C UNCOATED	M96
3650509	250402 WG	E33	3655947	250310 WG	E31	3665167	7N2102501RT TIALN-RT1	M132	3738132	4K6319077C UNCOATED	M99
3650510	250403 WG	E33	3655948	250311 WG	E32	3665168	7N2103001RT TIALN-RT1	M132	3738203	5A0207002C UNCOATED	M82
3650511	250404 WG	E33	3655949	250313 WG	E32	3669071	NST1	C23-24	3738879	5A0213015D UNCOATED	M82
3650512	250405 WG	E33	3656101	250314 WG	E32	3669072	NST2	C23-24	3738881	5A0216006B UNCOATED	M82

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3738923	5A0219007D UNCOATED	M83	3849051	TDM1000UPM WU25PD	S17	3849196	TDM1770UPM WU25PD	S19	3850950	TDM190R3SCF25M WG	S8
3738928	5A0225008D UNCOATED	M83	3849052	TDM1010UPM WU25PD	S17	3849197	TDM1780UPM WU25PD	S19	3850951	TDM190R5SCF25M WG	S11
3738929	5A0307002C UNCOATED	M84	3849053	TDM1020UPM WU25PD	S17	3849198	TDM1790UPM WU25PD	S19	3850952	TDM200R3SCF25M WG	S8
3738933	5A0316006B UNCOATED	M84	3849054	TDM1030UPM WU25PD	S17	3849199	TDM1800UPM WU25PD	S19	3850953	TDM200R5SCF25M WG	S11
3738934	5A0316006D UNCOATED	M84	3849055	TDM1040UPM WU25PD	S17	3849200	TDM1810UPM WU25PD	S19	3850959	TDM03125UP WU25PD	S16
3738937	5A0319007D UNCOATED	M85	3849056	TDM1050UPM WU25PD	S17	3849201	TDM1820UPM WU25PD	S19	3850960	TDM03214UP WU25PD	S16
3738940	TF4VN507012A TIALN-LT	M13	3849057	TDM1060UPM WU25PD	S17	3849202	TDM1830UPM WU25PD	S20	3850961	TDM03230UP WU25PD	S16
3738941	TF4VN507012B TIALN-LT	M13	3849058	TDM1070UPM WU25PD	S17	3849203	TDM1840UPM WU25PD	S20	3850962	TDM03281UP WU25PD	S16
3738993	TF4VN510014B TIALN-LT	M13	3849059	TDM1080UPM WU25PD	S17	3849204	TDM1850UPM WU25PD	S20	3850963	TDM03320UP WU25PD	S16
3738974	TF4VN510014C TIALN-LT	M13	3849060	TDM1090UPM WU25PD	S17	3849205	TDM1860UPM WU25PD	S20	3850964	TDM03390UP WU25PD	S16
3738975	TF4VN513005B TIALN-LW	M13	3849061	TDM1100UPM WU25PD	S17	3849206	TDM1870UPM WU25PD	S20	3850965	TDM03438UP WU25PD	S16
3738976	TF4VN513005C TIALN-LW	M13	3849062	TDM1110UPM WU25PD	S17	3849207	TDM1880UPM WU25PD	S20	3850966	TDM03480UP WU25PD	S16
3738977	TF4VN513005E TIALN-LW	M13	3849063	TDM1120UPM WU25PD	S17	3849208	TDM1890UPM WU25PD	S20	3850967	TDM03580UP WU25PD	S16
3738978	TF4VN516006C TIALN-LW	M13	3849064	TDM1130UPM WU25PD	S17	3849209	TDM1900UPM WU25PD	S20	3850968	TDM03594UP WU25PD	S16
3738979	TF4VN516006E TIALN-LW	M13	3849065	TDM1140UPM WU25PD	S17	3849210	TDM1910UPM WU25PD	S20	3850969	TDM03680UP WU25PD	S16
3738980	TF4VN519017B TIALN-LW	M13	3849066	TDM1150UPM WU25PD	S17	3849211	TDM1920UPM WU25PD	S20	3850970	TDM03750UP WU25PD	S17
3738981	TF4VN519017C TIALN-LW	M13	3849067	TDM1160UPM WU25PD	S17	3849212	TDM1930UPM WU25PD	S20	3850971	TDM03763UP WU25PD	S17
3738982	TF4VN519017E TIALN-LW	M13	3849068	TDM1170UPM WU25PD	S17	3849213	TDM1940UPM WU25PD	S20	3850972	TDM03770UP WU25PD	S17
3745847	TF4VN525018B TIALN-LW	M14	3849069	TDM1180UPM WU25PD	S17	3849214	TDM1950UPM WU25PD	S20	3850973	TDM03820UP WU25PD	S17
3738994	TF4VN525018C TIALN-LW	M14	3849070	TDM1190UPM WU25PD	S17	3849215	TDM1960UPM WU25PD	S20	3850974	TDM03860UP WU25PD	S17
3738995	TF4VN525018E TIALN-LW	M14	3849071	TDM1200UPM WU25PD	S18	3849216	TDM1970UPM WU25PD	S20	3850975	TDM03906UP WU25PD	S17
3739147	5A0313015D UNCOATED	M84	3849072	TDM1210UPM WU25PD	S18	3849217	TDM1980UPM WU25PD	S20	3850976	TDM03946UP WU25PD	S17
3745833	CNMM64365 TN7125	B44	3849073	TDM1220UPM WU25PD	S18	3849218	TDM1990UPM WU25PD	S20	3850977	TDM03970UP WU25PD	S17
3745851	CNMM54265 TN7125	B44	3849074	TDM1240UPM WU25PD	S18	3849219	TDM2000UPM WU25PD	S20	3850978	TDM04040UP WU25PD	S17
3745855	CNMM43265 TN7125	B76	3849075	TDM1250UPM WU25PD	S18	3849220	TDM2010UPM WU25PD	S20	3850979	TDM04062UP WU25PD	S17
3758942	CSPM81232225R WG	D47	3849076	TDM1260UPM WU25PD	S18	3849221	TDM2020UPM WU25PD	S20	3850980	TDM04130UP WU25PD	S17
3759184	GCPM122545R WG	D53	3849077	TDM1280UPM WU25PD	S18	3849222	TDM2030UPM WU25PD	S20	3850981	TDM04219UP WU25PD	S17
3761185	HNPJ535ANSNGD TN6520	H25, H31, H38	3849078	TDM1300UPM WU25PD	S18	3849223	TDM2040UPM WU25PD	S20	3850982	TDM04375UP WU25PD	S17
3761187	HNPJ535ANSNGD TN6540	H25, H31, H38	3849079	TDM1320UPM WU25PD	S18	3849224	TDM2050UPM WU25PD	S20	3850983	TDM04531UP WU25PD	S17
3761188	HNPJ535ANSNGD TN7535	H25, H31, H38	3849080	TDM1330UPM WU25PD	S18	3849225	TDM2060UPM WU25PD	S20	3850984	TDM04571UP WU25PD	S17
3780360	MS-2071	I32-34	3849081	TDM1340UPM WU25PD	S18	3849226	TDM2070UPM WU25PD	S20	3850985	TDM04688UP WU25PD	S17
3782377	GCPM102545L WG	D53	3849082	TDM1350UPM WU25PD	S18	3849227	TDM2080UPM WU25PD	S20	3850986	TDM04844UP WU25PD	S18
3782378	QCBMW102543R WG	D45	3849083	TDM1360UPM WU25PD	S18	3849228	TDM2090UPM WU25PD	S20	3850987	TDM04911UP WU25PD	S18
3783152	FSBH187355L WG	D20	3849084	TDM1370UPM WU25PD	S18	3849229	TDM2099UPM WU25PD	S20	3850988	TDM05000UP WU25PD	S18
3783153	QSBH50625255L WG	D30	3849085	TDM1380UPM WU25PD	S18	3849913	CCP31260L WG	D48	3850989	TDM05080UP WU25PD	S18
3784482	SCBH10060L WG	D37	3849086	TDM1400UPM WU25PD	S18	3850904	TDM080R3SCF12M WG	S8	3850990	TDM05156UP WU25PD	S18
3786518	FCBM6616635R WG	D27	3849087	TDM1410UPM WU25PD	S18	3850905	TDM080R5SCF12M WG	S11	3850991	TDM05312UP WU25PD	S18
3786519	FCBM8216795R WG	D27	3849088	TDM1420UPM WU25PD	S18	3850906	TDM085R3SCF12M WG	S8	3850992	TDM05469UP WU25PD	S18
3789922	CCB120362520R WG	D16	3849089	TDM1430UPM WU25PD	S18	3850907	TDM085R5SCF12M WG	S11	3850993	TDM05471UP WU25PD	S18
3790247	FCBM6616325R WG	D27	3849090	TDM1440UPM WU25PD	S18	3850908	TDM090R3SCF12M WG	S8	3850994	TDM05625UP WU25PD	S18
3792877	SSB175080L WG	D35	3849091	TDM1450UPM WU25PD	S18	3850909	TDM090R5SCF12M WG	S11	3850995	TDM05774UP WU25PD	S18
3795071	DCMT3251MU TN5105	B49	3849092	TDM1460UPM WU25PD	S18	3850910	TDM095R3SCF12M WG	S8	3850996	TDM05781UP WU25PD	S18
3795073	DCMT432MU TN5105	B49	3849093	TDM1470UPM WU25PD	S18	3850911	TDM095R5SCF12M WG	S11	3850997	TDM05938UP WU25PD	S18
3795074	DCMT433MU TN5105	B49	3849094	TDM1480UPM WU25PD	S18	3850912	TDM110R3SCF16M WG	S8	3850998	TDM06094UP WU25PD	S19
3795085	TCMT3252MU TN5105	B83	3849095	TDM1490UPM WU25PD	S18	3850923	TDM110R5SCF16M WG	S11	3850999	TDM06250UP WU25PD	S19
3811638	NWC3R14E TN6025	F19	3849096	TDM1500UPM WU25PD	S18	3850924	TDM110R5SCF16M WG	S8	3851000	TDM06310UP WU25PD	S19
3811639	NWC3R11E TN6025	F19	3849097	TDM1510UPM WU25PD	S18	3850925	TDM110R5SCF16M WG	S11	3851001	TDM06330UP WU25PD	S19
3837307	SSBH100050L WG	D35	3849098	TDM1520UPM WU25PD	S18	3850926	TDM111R3SCF16M WG	S8	3851002	TDM06406UP WU25PD	S19
3837881	QCB1375100R WG	D32	3849099	TDM1530UPM WU25PD	S19	3850927	TDM111R5SCF16M WG	S11	3851003	TDM06562UP WU25PD	S19
3838856	GCP162510225L WG	D52	3849100	TDM1540UPM WU25PD	S19	3850928	TDM115R3SCF16M WG	S8	3851004	TDM06643UP WU25PD	S19
3848984	TDM0800UPM WU25PD	S16	3849101	TDM1550UPM WU25PD	S19	3850929	TDM115R5SCF16M WG	S11	3851005	TDM06719UP WU25PD	S19
3848985	TDM0810UPM WU25PD	S16	3849102	TDM1560UPM WU25PD	S19	3850930	TDM1120R3SCF16M WG	S8	3851006	TDM06875UP WU25PD	S19
3848986	TDM0830UPM WU25PD	S16	3849103	TDM1570UPM WU25PD	S19	3850931	TDM1120R5SCF16M WG	S11	3851007	TDM07031UP WU25PD	S19
3848987	TDM0840UPM WU25PD	S16	3849104	TDM1580UPM WU25PD	S19	3850932	TDM1125R3SCF16M WG	S8	3851008	TDM07188UP WU25PD	S20
3848988	TDM0850UPM WU25PD	S16	3849105	TDM1600UPM WU25PD	S19	3850933	TDM1125R5SCF16M WG	S11	3851009	TDM07344UP WU25PD	S20
3848989	TDM0860UPM WU25PD	S16	3849106	TDM1610UPM WU25PD	S19	3850934	TDM1130R3SCF16M WG	S8	3851010	TDM07500UP WU25PD	S20
3848990	TDM0870UPM WU25PD	S16	3849107	TDM1620UPM WU25PD	S19	3850935	TDM1130R5SCF16M WG	S11	3851011	TDM07570UP WU25PD	S20
3848991	TDM0880UPM WU25PD	S16	3849108	TDM1630UPM WU25PD	S19	3850936	TDM1135R3SCF16M WG	S8	3851012	TDM07580UP WU25PD	S20
3848992	TDM0890UPM WU25PD	S16	3849109	TDM1640UPM WU25PD	S19	3850937	TDM1135R5SCF16M WG	S11	3851013	TDM07590UP WU25PD	S20
3849043	TDM0900UPM WU25PD	S16	3849110	TDM1650UPM WU25PD	S19	3850938	TDM1140R3SCF16M WG	S8	3851014	TDM07620UP WU25PD	S20
3849044	TDM0910UPM WU25PD	S16	3849111	TDM1660UPM WU25PD	S19	3850939	TDM1140R5SCF16M WG	S11	3851015	TDM07656UP WU25PD	S20
3849045	TDM0920UPM WU25PD	S16	3849112	TDM1670UPM WU25PD	S19	3850940	TDM1145R3SCF16M WG	S8	3851016	TDM07812UP WU25PD	S20
3849046	TDM0930UPM WU25PD	S16	3849113	TDM1680UPM WU25PD	S19	3850941	TDM1145R5SCF16M WG	S11	3851017	TDM07969UP WU25PD	S20
3849047	TDM0940UPM WU25PD	S17	3849114	TDM1690UPM WU25PD	S19	3850942	TDM1150R3SCF20M WG	S8	3851018	TDM08125UP WU25PD	S20
3849048	TDM0950UPM WU25PD	S17	3849115	TDM1700UPM WU25PD	S19	3850943	TDM1150R5SCF20M WG	S11	3851478	TDM0313R3SS038 WG	S6
3849049	TDM0960UPM WU25PD	S17	3849120	TDM1710UPM WU25PD	S19	3850944	TDM1160R3SCF20M WG	S8	3851479	TDM0313R5SS038 WG	S9
			3849121	TDM1720UPM WU25PD	S19	3850945	TDM1160R5SCF20M WG	S11	3851480	TDM0335R3SS038 WG	S6
			3849122	TDM1730UPM WU25PD	S19	3850946	TDM1170R3SCF20M WG	S8	3851481	TDM0335R5SS038 WG	S9
			3849193	TDM1740UPM WU25PD	S19	3850947	TDM1170R5SCF20M WG	S11	3851482	TDM0354R3SS038 WG	S6
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3851545	TDM0374R3SS044 WG	.....S6	3860681	BT50BRFX320060M WG	..... U75	3865373	HNGJ535ANFNLDJ TN6501	..... H25, H30, H32	3870378	STFPR08CA09 WG	..... C94
3851546	TDM0374R5SS038 WG	.....S9	3860682	BT50BRFX420060M WG	..... U75				3870379	STFPL12CA16 WG	..... C94
3851547	TDM0374R5SS044 WG	.....S9	3860693	BT50BRFX550065M WG	..... U75	3865375	XNGJ535ANFNLDJ3W TN6501	..... H32	3870380	STFPL10CA11 WG	..... C94
3851548	TDM0394R3SS044 WG	.....S6	3860694	BT50BRFX720070M WG	..... U75	3869578	CNG432T0420 CW3020	..... B179	3870381	STFPL08CA09 WG	..... C94
3851549	TDM0394R5SS044 WG	.....S9	3860696	DV40BRFX185060M WG	..... U72	3869579	CNG433T0420 CW3020	..... B179	3870382	SSSPR10CA09 WG	..... C93
3851550	TDM0413R3SS044 WG	.....S6	3860697	DV40BRFX245060M WG	..... U72	3869580	CNG434T0420 CW3020	..... B179	3870383	SSSPL10CA09 WG	..... C93
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3851553	TDM0433R5SS044 WG	.....S9	3860700	DV40BRFX550065M WG	..... U72	3869743	CNG452T0420 CW3020	..... B182	3870386	SSSCR10CA09 WG	..... C92
3851554	TDM0453R3SS050 WG	.....S6	3860701	DV50BRFX320060M WG	..... U73	3869745	DNG454T0420 CW3020	..... B182	3870387	SSSCL12CA12 WG	..... C92
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3851558	TDM0492R3SS056 WG	.....S6	3860896	CV40BRFX185236 WG	..... U70	3869749	RNG32T0420 CW3020	..... B185	3870391	SSRCL12CA12 WG	..... C90
3851559	TDM0492R5SS056 WG	.....S6	3860897	CV40BRFX245236 WG	..... U70	3869750	RNG43T0420 CW3020	..... B185	3870392	SSKPR12CA09 WG	..... C89
3851560	TDM0492R5SS050 WG	.....S9	3860898	CV40BRFX320236 WG	..... U70	3869751	RNG45T0420 CW3020	..... B185	3870393	SSKPR10CA09 WG	..... C89
3851561	TDM0492R5SS056 WG	.....S9	3860899	CV40BRFX420236 WG	..... U70	3869753	RPVG23T0420 CW3020	..... B186	3870394	SSKPL10CA09 WG	..... C89
3851562	TDM0512R3SS056 WG	.....S6	3860900	CV40BRFX550256 WG	..... U70	3869754	RPVG35T0420 CW3020	..... B186	3870403	MDQNL16CA4 WG	..... C66
3851563	TDM0512R5SS056 WG	.....S9	3860901	CV50BRFX320236 WG	..... U71	3869755	RPVG45T0420 CW3020	..... B186	3870404	MDJNR20CA4 WG	..... C65
3851564	TDM0532R3SS056 WG	.....S6	3860902	CV50BRFX420236 WG	..... U71	3869756	SNG433T0420 CW3020	..... B188	3870405	MDJNR16CA4 WG	..... C65
3851565	TDM0532R5SS056 WG	.....S9	3860903	CV50BRFX550236 WG	..... U71	3869757	SNG434T0420 CW3020	..... B188	3870406	MDJNL16CA4 WG	..... C65
3851566	TDM0551R3SS056 WG	.....S6	3860904	CV50BRFX720276 WG	..... U71	3869758	SNG453T0420 CW3020	..... B188	3870407	MCLNR25CA6 WG	..... C64
3851567	TDM0551R5SS056 WG	.....S9	3860905	SMAC200 WG	..... U55	3869759	SNG454T0420 CW3020	..... B189	3870408	MCLNR20CA4 WG	..... C64
3851568	TDM0571R3SS056 WG	.....S6	3860906	RFX420FBH006022 WG	..... U63	3869761	TNG332T0420 CW3020	..... B193	3870409	SSRCL12CA12 WG	..... C64
3851569	TDM0571R5SS063 WG	.....S9	3860907	KM40TSFBH006022 WG	..... U64	3870252	STWPR12CA16 WG	..... C97	3870410	MCLNR12CA4 WG	..... C64
3851570	TDM0591R3SS063 WG	.....S6	3860908	MASCFR09CA06F WG	..... U60	3870305	MSYNR25CA6 WG	..... C71	3870411	MCLNL25CA6 WG	..... C64
3851571	TDM0591R5SS063 WG	.....S9	3860909	MASCLCR09CA06F WG	..... U61	3870306	MSYNR16CA4 WG	..... C71	3870412	MCLNL20CA4 WG	..... C64
3851572	TDM0630R3SS069 WG	.....S6	3860910	MASTFCR09CA11F WG	..... U62	3870307	MSYNR12CA4 WG	..... C71	3870413	MCLNL16CA4 WG	..... C64
3851573	TDM0630R5SS069 WG	.....S9	3861123	KM32TSFBH022029 WG	..... U67	3870308	MSYNR10CA3 WG	..... C71	3870414	MCLNL12CA4 WG	..... C64
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3965518	4AN219087 UNCOATED	M105	3992545	TDM0472R8SS050 WG	S12	4033768	GT205125 GP6520	W9	4035580	GT405034 GP6520	W126
3965519	4AN225058 UNCOATED	M105	3992546	TDM0492R8SS050 WG	S12	4033770	GT205127 GP6520	W9	4035581	GT405035 GP6520	W126
3965520	4AN225068 UNCOATED	M105	3992547	TDM0492R8SS056 WG	S12	4033772	GT205129 GP6520	W9	4035582	GT405036 GP6520	W126
3965521	4AN310024 UNCOATED	M106	3992548	TDM0512R8SS056 WG	S12	4033776	GT305151 GP6520	W59	4035583	GT405037 GP6520	W126
3965522	4AN313025 UNCOATED	M106	3992549	TDM0532R8SS056 WG	S12	4033778	GT305153 GP6520	W59	4035584	GT405038 GP6520	W126
3965523	4AN313055 UNCOATED	M106	3992550	TDM0551R8SS056 WG	S12	4033779	GT305154 GP6520	W59	4047591	M370D100Z02M12W008	K4
3965524	4AN316026 UNCOATED	M106	3992551	TDM0571R8SS063 WG	S12	4033781	GT305156 GP6520	W59	4047592	M370D125Z03M16W008	K4
3965526	4AN319097 UNCOATED	M106	3992552	TDM0591R8SS063 WG	S12	4033783	GT305158 GP6520	W59	4047653	M370D150Z03M16W008	K4
3965528	4AN319087 UNCOATED	M106	3992553	TDM0630R8SS069 WG	S12	4033787	GT315014 GP6520	W62	4047654	M370D100Z02C100W008L600	K5
3965529	4AN325058 UNCOATED	M107	3992554	TDM0669R8SS069 WG	S12	4033789	GT315016 GP6520	W62	4047655	M370D100Z02C100W008L800	K5
3965531	4AN325068 UNCOATED	M107	3992555	TDM0709R8SS075 WG	S12	4033790	GT315017 GP6520	W62	4047656	M370D100Z03C100W008L600	K5
3965553	4AN319037 UNCOATED	M106	3992556	TDM0748R8SS075 WG	S12	4033792	GT315019 GP6520	W62	4047657	M370D125Z03C125W008L600	K5
3967072	440210M	E141, E143, E149, E151	3992557	TDM0787R8SS081 WG	S12	4033794	GT315021 GP6520	W62	4047658	M370D125Z03C125W008L800	K5
3968124	M4000CA-HN07	H67	3992558	TDM0827R8SS088 WG	S12	4033813	GT415005 GP6520	W129	4047659	M370D150Z03C125W008L600	K6
3969291	TDM2150UPM WU25PD	S21	3992559	TDM0868R8SS088 WG	S12	4033814	GT415006 GP6520	W129	4047660	M370D150Z04S05W008	K6
3992013	TDM2599UPM WU25PD	S21	3992560	TDM0906R8SS094 WG	S12	4033815	GT415007 GP6520	W129	4047661	M370D200Z05S075W008	K6
3992070	TDM210R3SCF25M WG	S8	3992561	TDM0945R8SS100 WG	S12	4033816	GT415008 GP6520	W129	4047662	M370D200Z07S075W008	K6
3992071	TDM220R3SCF25M WG	S8	3992562	TDM0984R8SS100 WG	S12	4033817	GT415009 GP6520	W129	4051233	17050103450 WU25PD	R70
3992072	TDM230R3SCF25M WG	S8	3998454	17050307600 WU25PD	R80	4033818	GT415010 GP6520	W129	4051234	17050303175 WU25PD	R70
3992141	TDM080R8SCF12M WG	S14	3998456	17050311110 WU25PD	R81	4035066	GT305116 GP6505	W58	4051235	17050113100 WU25PD	R73
3992142	TDM085R8SCF12M WG	S14	4002444	TDM2550UPM WU25PD	S21	4035067	GT305117 GP6505	W58	4051236	17050203455 WU25PD	R75
3992213	TDM090R8SCF12M WG	S14	4003203	TDM08440UP WU25PD	S21	4035068	GT305118 GP6505	W58	4051237	17050203175 WU25PD	R75
3992214	TDM095R8SCF12M WG	S14	4003204	TDM08750UP WU25PD	S21	4035069	GT305119 GP6505	W58	4051238	17050213100 WU25PD	R78
3992215	TDM100R8SCF16M WG	S14	4003205	TDM08840UP WU25PD	S21	4035070	GT305120 GP6505	W58	4051239	17050303175 WU25PD	R79
3992216	TDM105R8SCF16M WG	S14	4003206	TDM09375UP WU25PD	S21	4035071	GT305121 GP6505	W58	4051240	17050303175 WU25PD	R79
3992217	TDM110R8SCF16M WG	S14	4003207	TDM09690UP WU25PD	S21	4035072	GT305122 GP6505	W58	4051241	17050303200 WU25PD	R79
3992218	TDM115R8SCF16M WG	S14	4003208	TDM10000UP WU25PD	S21	4035073	GT305123 GP6505	W58	4051242	17050303250 WU25PD	R79
3992219	TDM120R8SCF16M WG	S14	4003209	TDM10110UP WU25PD	S21	4035074	GT305124 GP6505	W58	4051243	17050303400 WU25PD	R79
3992220	TDM125R8SCF16M WG	S14	4003210	TDM10160UP WU25PD	S21	4035106	GT305125 GP6505	W54	4051244	17050303455 WU25PD	R79
3992221	TDM130R8SCF16M WG	S14	4003225	TDM2100UPM WU25PD	S20	4035107	GT305126 GP6505	W54	4051245	17050303900 WU25PD	R79
3992222	TDM135R8SCF16M WG	S14	4003226	TDM2200UPM WU25PD	S21	4035108	GT305127 GP6505	W54	4051246	17050304100 WU25PD	R79
3992223	TDM140R8SCF16M WG	S14	4003227	TDM2250UPM WU25PD	S21	4035109	GT305128 GP6505	W54	4051247	17050304300 WU25PD	R79
3992224	TDM145R8SCF16M WG	S14	4003228	TDM2300UPM WU25PD	S21	4035110	GT305129 GP6505	W54	4051248	17050304400 WU25PD	R79
3992225	TDM150R8SCF20M WG	S14	4003229	TDM2350UPM WU25PD	S21	4035111	GT305130 GP6505	W54	4051249	17050304600 WU25PD	R79
3992226	TDM160R8SCF20M WG	S14	4003230	TDM2400UPM WU25PD	S21	4035112	GT305131 GP6505	W54	4051250	17050304650 WU25PD	R79
3992227	TDM170R8SCF20M WG	S14	4003231	TDM2450UPM WU25PD	S21	4035123	GT305132 GP6505	W54	4051251	17050304900 WU25PD	R80
3992228	TDM180R8SCF25M WG	S14	4003232	TDM2500UPM WU25PD	S21	4035124	GT305133 GP6505	W54	4051252	17050305100 WU25PD	R80
3992229	TDM190R8SCF25M WG	S14	4004710	CM215R ASSY	C17-18	4035125	GT305134 GP6505	W54	4051253	17050305200 WU25PD	R80
3992230	TDM200R8SCF25M WG	S14	4010625	TDM1618UPM WU25PD	S19	4035126	GT305135 GP6505	W54	4051254	17050305300 WU25PD	R80
3992231	TDM210R8SCF25M WG	S14	4033659	GT415001 GP6520	W129	4035127	GT305136 GP6505	W54	4051255	17050305400 WU25PD	R80
3992232	TDM220R8SCF25M WG	S14	4033660	GT415002 GP6520	W129	4035128	GT305137 GP6505	W54	4051256	17050305550 WU25PD	R80
3992233	TDM230R8SCF25M WG	S14	4033661	GT415003 GP6520	W129	4035129	GT305138 GP6505	W55	4051257	17050305600 WU25PD	R80
3992234	TDM240R8SCF25M WG	S14	4033662	GT415004 GP6520	W129	4035130	GT305139 GP6505	W55	4051258	17050305700 WU25PD	R80
3992235	TDM250R8SCF25M WG	S14	4033699	GT405001 GP6520	W127	4035131	GT305140 GP6505	W54	4051259	17050305900 WU25PD	R80
3992477	TDM0827R3SS088 WG	S6	4033700	GT405002 GP6520	W127	4035132	GT305141 GP6505	W54	4051260	17050306100 WU25PD	R80
3992478	TDM0866R3SS088 WG	S6	4033701	GT405003 GP6520	W127	4035133	GT305142 GP6505	W54	4051261	17050306200 WU25PD	R80
3992479	TDM0906R3SS094 WG	S6	4033702	GT405004 GP6520	W127	4035134	GT305143 GP6505	W54	4051262	17050306300 WU25PD	R80
3992480	TDM0945R3SS100 WG	S6	4033725	GT205113 GP6520	W8	4035136	GT305145 GP6505	W54	4051263	17050306400 WU25PD	R80
3992481	TDM0984R3SS100 WG	S6	4033726	GT205114 GP6520	W8	4035138	GT305147 GP6505	W55	4051264	17050306600 WU25PD	R80
3992483	TDM240R3SCF25M WG	S8	4033728	GT205116 GP6520	W8	4035535	GT405012 GP6520	W124	4051265	17050306700 WU25PD	R80
3992484	TDM250R3SCF25M WG	S8	4033730	GT205118 GP6520	W8	4035536	GT405013 GP6520	W124	4051266	17050306900 WU25PD	R80
3992485	TDM210R5SCF25M WG	S11	4033733	GT305161 GP6520	W58	4035537	GT405014 GP6520	W124	4051267	17050307100 WU25PD	R80
3992486	TDM220R5SCF25M WG	S11	4033735	GT305163 GP6520	W58	4035538	GT405015 GP6520	W124	4051268	17050307200 WU25PD	R80
3992487	TDM230R5SCF25M WG	S11	4033736	GT305164 GP6520	W58	4035539	GT405016 GP6520	W124	4051269	17050307300 WU25PD	R80
3992488	TDM240R5SCF25M WG	S11	4033738	GT305166 GP6520	W58	4035540	GT405017 GP6520	W124	4051270	17050307400 WU25PD	R80
3992489	TDM250R5SCF25M WG	S11	4033740	GT305168 GP6520	W58	4035541	GT405018 GP6520	W124	4051271	17050307700 WU25PD	R80
3992503	TDM0827R5SS088 WG	S9	4033744	GT315025 GP6520	W61	4035542	GT405019 GP6520	W124	4051272	17050307900 WU25PD	R80
3992504	TDM0866R5SS088 WG	S9	4033746	GT315027 GP6520	W61	4035563	GT405020 GP6520	W124	4051273	17050308100 WU25PD	R81
3992505	TDM0906R5SS094 WG	S9	4033747	GT315028 GP6520	W61	4035564	GT405021 GP6520	W124	4051274	17050308200 WU25PD	R81
3992506	TDM0945R5SS100 WG	S9	4033749	GT315030 GP6520	W61	4035565	GT405022 GP6520	W124	4051275	17050308300 WU25PD	R81
3992507	TDM0984R5SS100 WG	S9	4033751	GT315032 GP6520	W61	4035566	GT405023 GP6520	W124	4051276	17050308400 WU25PD	R81
3992536	TDM0313R8SS038 WG	S12	4033753	GT405005 GP6520	W127	4035567	GT405024 GP6520	W124	4051277	17050308600 WU25PD	R81
3992537	TDM0335R8SS038 WG	S12	4033754	GT405006 GP6520	W127	4035568	GT405025 GP6520	W124	4051278	17050308700 WU25PD	R81
3992538	TDM0354R8SS038 WG	S12	4033755	GT405007 GP6520	W127	4035569	GT405026 GP6520	W124	4051279	17050308800 WU25PD	R81
						4035570	GT405027 GP6520	W124	4051280	17050308900 WU25PD	R81

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4051281	17050309100 WU25PD	R81	4099037	TDM0413R5SCF063 W	S10	4116145	WMTS500M5P03PT WU10HT	E21	4136462	M1200D150Z05S050HN07	H13
4051282	17050309200 WU25PD	R81	4099038	TDM0433R5SCF063 W	S10	4116146	WMTS500M5P06PT WU10PT	E21	4136480	W0EJ080412SRMH TN6520	K7
4051283	17050309300 WU25PD	R81	4099039	TDM0453R5SCF063 W	S10	4116147	WMTS500M5P06PT WU25PT	E21	4138391	GTM115001 WU13PV	W199
4051284	17050309400 WU25PD	R81	4099040	TDM0472R5SCF063 W	S10	4116148	WMTS505M5U03PT WU10PT	E19	4138392	GTM115002 WU13PV	W199
4051285	17050309600 WU25PD	R81	4099041	TDM0492R5SCF063 W	S10	4116149	WMTS505M5U03PT WU25PT	E19	4138493	GTM115003 WU13PV	W199
4051286	17050309700 WU25PD	R81	4099042	TDM0512R5SCF063 W	S10	4116150	WMTS505M5U06PT WU10PT	E19	4138494	GTM115004 WU13PV	W199
4051287	17050309900 WU25PD	R81	4099043	TDM0532R5SCF063 W	S10	4116151	WMTS505M5U06PT WU25PT	E19	4138495	GTM115005 WU13PV	W199
4051288	17050310100 WU25PD	R81	4099044	TDM0551R5SCF063 W	S10	4117239	WMTS600M6P03PT WU10PT	E21	4138496	GTM115006 WU13PV	W199
4051289	17050310300 WU25PD	R81	4099045	TDM0571R5SCF063 W	S10	4117240	WMTS600M6P03PT WU25PT	E21	4138497	GTM115007 WU13PV	W199
4051290	17050310400 WU25PD	R81	4099046	TDM0591R5SCF075 W	S10	4117241	WMTS600M6P06PT WU10PT	E21	4138498	GTM115008 WU13PV	W199
4051291	17050310600 WU25PD	R81	4099047	TDM0630R5SCF075 W	S10	4117242	WMTS600M6P06PT WU25PT	E21	4138499	GTM115009 WU13PV	W199
4051292	17050310700 WU25PD	R81	4099048	TDM0669R5SCF075 W	S10	4117253	WMTS605M6U03PT WU10PT	E19	4138500	GTM115010 WU13PV	W199
4051293	17050310900 WU25PD	R81	4099049	TDM0709R5SCF075 W	S10	4117254	WMTS605M6U03PT WU25PT	E19	4138501	GTM115011 WU13PV	W199
4051294	17050311100 WU25PD	R81	4099050	TDM0748R5SCF075 W	S10	4117255	WMTS605M6U06PT WU10PT	E19	4138502	GTM115012 WU13PV	W199
4051295	17050311200 WU25PD	R81	4099051	TDM0787R5SCF100 W	S10	4117256	WMTS605M6U06PT WU25PT	E19	4138503	GTM115013 WU13PV	W199
4051296	17050311300 WU25PD	R82	4099052	TDM0827R5SCF100 W	S10	4117257	WMTS800M8P06PT WU10PT	E22	4138504	GTM115014 WU13PV	W199
4051297	17050311400 WU25PD	R82	4099053	TDM0866R5SCF100 W	S10	4117258	WMTS800M8P06PT WU25PT	E22	4138505	GTM115015 WU13PV	W199
4051298	17050311600 WU25PD	R82	4099054	TDM0906R5SCF100 W	S10	4117259	WMTS800M8P15PT WU10PT	E22	4138506	GTM115016 WU13PV	W199
4051299	17050311700 WU25PD	R82	4099055	TDM0945R5SCF100 W	S10	4117260	WMTS800M8P15PT WU25PT	E22	4138507	GTM115017 WU13PV	W199
4051300	17050311900 WU25PD	R82	4099056	TDM0984R5SCF100 W	S10	4117261	WMTS805M8U06PT WU10PT	E19	4138508	GTM115018 WU13PV	W199
4051301	17050313100 WU25PD	R82	4099057	TDM0313R8SCF050 W	S13	4117262	WMTS805M8U06PT WU25PT	E19	4138509	GTM115019 WU13PV	W199
4051302	17050316500 WU25PD	R82	4099058	TDM0335R8SCF050 W	S13	4117263	WMTS805M8U15PT WU10PT	E19	4138510	GTM115020 WU13PV	W199
4051303	17050316670 WU25PD	R82	4099059	TDM0354R8SCF050 W	S13	4117264	WMTS805M8U15PT WU25PT	E19	4138511	GTM115021 WU13PV	W199
4051304	17050316800 WU25PD	R82	4099060	TDM0374R8SCF050 W	S13	4118451	WMTS094I2BP02PT WU10PT	E20	4138512	GTM115022 WU13PV	W199
4051305	17050317000 WU25PD	R82	4099061	TDM0394R8SCF063 W	S13	4118452	WMTS094I2BP02PT WU25PT	E20	4138513	GTM115023 WU13PV	W199
4051306	17050317500 WU25PD	R82	4099062	TDM0413R8SCF063 W	S13	4118583	WMTS094I2BP04PT WU10PT	E20	4138514	GTM215001 WU12PV	W201
4051307	17050317800 WU25PD	R82	4099063	TDM0433R8SCF063 W	S13	4118584	WMTS094I2BP04PT WU25PT	E20	4138515	GTM215002 WU12PV	W201
4051308	17050318000 WU25PD	R82	4099064	TDM0453R8SCF063 W	S13	4118585	WMTS125I3P03PT WU10PT	E20	4138516	GTM215003 WU12PV	W201
4051309	17050318500 WU25PD	R82	4099065	TDM0472R8SCF063 W	S13	4118586	WMTS125I3P03PT WU25PT	E20	4138517	GTM215004 WU12PV	W201
4051310	17050318800 WU25PD	R82	4099066	TDM0492R8SCF063 W	S13	4118587	WMTS125I3P08PT WU10PT	E20	4138518	GTM215005 WU12PV	W201
4051311	17050319000 WU25PD	R82	4099067	TDM0512R8SCF063 W	S13	4118588	WMTS125I3P08PT WU25PT	E20	4138519	GTM215006 WU12PV	W201
4051312	17050319050 WU25PD	R82	4099068	TDM0532R8SCF063 W	S13	4118589	WMTS188I5P03PT WU10PT	E21	4138520	GTM215007 WU12PV	W201
4051313	17050319500 WU25PD	R82	4099069	TDM0551R8SCF063 W	S13	4118590	WMTS188I5P03PT WU25PT	E21	4138521	GTM215008 WU12PV	W201
4051314	17050319800 WU25PD	R82	4099070	TDM0571R8SCF063 W	S13	4118591	WMTS188I5P08PT WU10PT	E21	4138522	GTM215009 WU12PV	W201
4051315	17050320000 WU25PD	R82	4099071	TDM0591R8SCF075 W	S13	4118592	WMTS188I5P08PT WU25PT	E21	4138523	GTM215010 WU12PV	W201
4052411	W0EJ080412SRMH TN6525	K7	4099072	TDM0630R8SCF075 W	S13	4118593	WMTS250I6P03PT WU10PT	E22	4138524	GTM215011 WU12PV	W201
4068517	W0EJ080412SRMH TN7535	K7	4099073	TDM0669R8SCF075 W	S13	4118594	WMTS250I6P03PT WU25PT	E22	4138525	GTM215012 WU12PV	W201
4086796	M1200D600Z02S2050HN09	H28	4099074	TDM0709R8SCF075 W	S13	4118595	WMTS250I6P08PT WU10PT	E21	4138526	GTM215013 WU12PV	W201
4086797	M1200D800Z10S250HN09	H28	4099075	TDM0748R8SCF075 W	S13	4118596	WMTS250I6P08PT WU25PT	E21	4138527	GTM215014 WU12PV	W201
4086798	M1200D1000Z12S250HN09	H28	4099076	TDM0787R8SCF100 W	S13	4130534	M1200D500Z08S150HN07	H13	4138528	GTM215015 WU12PV	W201
4086799	M1200D1200Z14S250HN09	H28	4099077	TDM0827R8SCF100 W	S13	4130535	M1200D500Z12S150HN07	H13	4138529	GTM215016 WU12PV	W201
4098937	TDM0313R3SCF050 W	S7	4099078	TDM0866R8SCF100 W	S13	4130536	M1200D500Z16S150HN07	H13	4138530	GTM215017 WU12PV	W200
4098938	TDM0335R3SCF050 W	S7	4099079	TDM0906R8SCF100 W	S13	4136312	M4000D600Z08ADJ	H66	4138531	GTM215018 WU12PV	W200
4098939	TDM0354R3SCF050 W	S7	4099080	TDM0945R8SCF100 W	S13	4136353	M4000D600Z12ADJ	H66	4138532	GTM215019 WU12PV	W200
4098940	TDM0374R3SCF050 W	S7	4099081	TDM0984R8SCF100 W	S13	4136358	M4000D1200Z16ADJ	H66	4138533	GTM215020 WU12PV	W200
4098941	TDM0394R3SCF063 W	S7	4113563	WMTS300M3P03PT WU10PT	E20	4136359	M4000D1200Z22ADJ	H66	4138534	GTM215021 WU12PV	W200
4098942	TDM0413R3SCF063 W	S7	4113564	WMTS300M3P03PT WU25PT	E20	4136415	M1200HD150Z04S050HN07	H18	4138535	GTM215022 WU12PV	W200
4099013	TDM0433R3SCF063 W	S7	4113565	WMTS300M3P06PT WU10PT	E20	4136416	M1200HD150Z05S050HN07	H18	4138536	GTM215023 WU12PV	W200
4099014	TDM0453R3SCF063 W	S7	4113566	WMTS300M3P03PT WU10HT	E20	4136417	M1200HD200Z04S075HN07	H18	4138537	GTM215024 WU12PV	W200
4099015	TDM0472R3SCF063 W	S7	4113567	WMTS300M3P06PT WU10PT	E20	4136418	M1200HD200Z05S075HN07	H18	4138538	GTM215025 WU12PV	W200
4099016	TDM0492R3SCF063 W	S7	4113568	WMTS305M3U03PT WU10PT	E19	4136419	M1200HD250Z04S075HN07	H18	4138539	GTM215026 WU12PV	W200
4099017	TDM0512R3SCF063 W	S7	4113569	WMTS305M3U03PT WU25PT	E19	4136420	M1200HD250Z06S075HN07	H18	4138540	GTM215027 WU12PV	W200
4099018	TDM0532R3SCF063 W	S7	4113570	WMTS305M3U06PT WU10PT	E19	4136421	M1200HD300Z05S100HN07	H18	4138541	GTM215028 WU12PV	W200
4099019	TDM0551R3SCF063 W	S7	4113571	WMTS305M3U06PT WU25PT	E19	4136422	M1200HD300Z08S100HN07	H18	4138542	GTM215029 WU12PV	W200
4099020	TDM0571R3SCF063 W	S7	4113572	WMTS400M4P03PT WU10PT	E20	4136433	M1200HD400Z06S150HN07	H18	4138543	GTM215030 WU12PV	W200
4099021	TDM0591R3SCF075 W	S7	4113573	WMTS400M4P03PT WU10HT	E20	4136434	M1200HD400Z09S150HN07	H18	4138544	GTM215031 WU12PV	W200
4099022	TDM0630R3SCF075 W	S7	4113574	WMTS400M4P03PT WU25PT	E20	4136435	M1200HD500Z08S150HN07	H18	4138545	GTM315001 WU12PV	W203
4099023	TDM0669R3SCF075 W	S7	4113575	WMTS400M4P06PT WU10PT	E21	4136436	M1200HD500Z12S150HN07	H18	4138546	GTM315002 WU12PV	W203
4099024	TDM0709R3SCF075 W	S7	4113576	WMTS400M4P06PT WU25PT	E21	4136435	M1200HF100Z02C075HN07L480	H5	4138547	GTM315003 WU12PV	W203
4099025	TDM0748R3SCF075 W	S7	4113577	WMTS405M4U03PT WU10PT	E19	4136454	M1200HF100Z03C075HN07L480	H5	4138548	GTM315004 WU12PV	W203
4099026	TDM0787R3SCF100 W	S7	4113578	WMTS405M4U03PT WU25PT	E19	4136455	M1200HF125Z03C100HN07L520	H5	4138549	GTM315005 WU12PV	W203
4099027	TDM0827R3SCF100 W	S7	4113579	WMTS405M4U06PT WU10PT	E19	4136456	M1200HF125Z04C100HN07L520	H5	4138550	GTM315006 WU12PV	W203
4099028	TDM0866R3SCF100 W	S7	4113580	WMTS405M4U06PT WU25PT	E19	4136457	M1200HF150Z05S050HN07	H6	4138551	GTM315007 WU12PV	W203
4099029	TDM0906R3SCF100 W	S7	4113892	W0EJ080412SRMH TN6525	K7	4136458	M1200HF200Z05S075HN07	H6	4138552	GTM315008 WU12PV	W203
4099030	TDM0945R3SCF100 W	S7	4113916	W0EJ080412SRMH TN7535	K7	4136459	M1200HF250Z06S075HN07	H6	4138553	GTM315009 WU12PV	W203
4099031	TDM0984R3SCF100 W	S7	4116129	WMTS200M2P02PT WU10PT	E20	4136460	M1200HF300Z08S100HN07	H6	4138554	GTM315010 WU12PV	W203
4099032	TDM0313R5SCF050 W	S10	4116130	WMTS200M2P02PT WU25PT	E20	4136461	M1200D150Z04S050HN07	H13	4138555	GTM315011 WU12PV	W203
4099033	TDM0335R5SCF050 W	S10	4116131	WMTS205M2U02PT WU10PT	E19	4136462	M1200D150Z05S050HN07	H13	4138556	GTM315012 WU12PV	W203
4099034	TDM0354R5SCF050 W	S10	4116132	WMTS205M2U02PT WU25PT	E19	4136463	M1200D150Z06S075HN07	H6	4138557	GTM315013 WU12PV	W203
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4158548	TDG533A11500	WN10HD.....R120	4158619	TDG533A04800	WN10HD.....R118	4158690	TDG533A16600	WN10HD.....R122	4158766	GT045006	WH36MG.....W85
4158549	TDG533A11509	WN10HD.....R120	4158620	TDG532A19900	WN10HD.....R116	4158691	TDG533A16670	WN10HD.....R122	4158767	GT045007	WH36MG.....W85
4158550	TDG533A11600	WN10HD.....R120	4158621	TDG533A04852	WN10HD.....R118	4158692	TDG533A16700	WN10HD.....R122	4158768	GT045008	WH36MG.....W85
4158551	TDG533A11700	WN10HD.....R120	4158622	TDG532A20000	WN10HD.....R116	4158693	TDG533A06700	WN10HD.....R118	4158769	GT045009	WH36MG.....W85
4158552	TDG533A11800	WN10HD.....R120	4158623	TDG533A13600	WN10HD.....R121	4158694	TDG533A06746	WN10HD.....R118	4158770	GT045010	WH36MG.....W85
4158553	TDG533A03455	WN10HD.....R117	4158624	TDG533A13700	WN10HD.....R121	4158695	TDG533A06800	WN10HD.....R118	4158771	GT045011	WH36MG.....W85
4158554	TDG533A03500	WN10HD.....R117	4158625	TDG533A13800	WN10HD.....R121	4158696	TDG533A06900	WN10HD.....R119	4158772	GT045012	WH36MG.....W85
4158555	TDG532A18000	WN10HD.....R115	4158626	TDG533A13891	WN10HD.....R121	4158697	TDG533A07000	WN10HD.....R119	4158773	GT045013	WH36MG.....W85
4158556	TDG533A03571	WN10HD.....R117	4158627	TDG533A13900	WN10HD.....R121	4158698	TDG533A07100	WN10HD.....R119	4158774	GT045014	WH36MG.....W85
4158557	TDG532A18100	WN10HD.....R115	4158628	TDG533A14000	WN10HD.....R121	4158699	TDG533A07145	WN10HD.....R119	4158775	GT045015	WH36MG.....W85
4158558	TDG533A03600	WN10HD.....R117	4158629	TDG533A14100	WN10HD.....R121	4158700	TDG533A07200	WN10HD.....R119	4158776	GT045016	WH36MG.....W85
4158559	TDG532A18200	WN10HD.....R115	4158630	TDG533A14200	WN10HD.....R121	4158701	TDG533A07300	WN10HD.....R119	4158777	GT045017	WH36MG.....W85
4158560	TDG533A03658	WN10HD.....R117	4158631	TDG533A14288	WN10HD.....R121	4158702	TDG533A07400	WN10HD.....R119	4158778	GT045018	WH36MG.....W85
4158561	TDG532A18258	WN10HD.....R115	4158632	TDG533A14300	WN10HD.....R121	4158703	TDG533A16800	WN10HD.....R122	4158779	TDS412A03300	WK15PD.....R48
4158562	TDG533A03700	WN10HD.....R117	4158633	TDG533A04900	WN10HD.....R118	4158704	TDG533A16900	WN10HD.....R122	4158784	TDS412A03400	WK15PD.....R48
4158563	TDG533A11900	WN10HD.....R120	4158634	TDG532A21000	WN10HD.....R116	4158705	TDG533A17000	WN10HD.....R122	4158785	TDS412A03455	WK15PD.....R48
4158564	TDG533A11908	WN10HD.....R120	4158635	TDG533A05000	WN10HD.....R118	4158706	TDG533A17100	WN10HD.....R122	4158786	TDS412A03500	WK15PD.....R48
4158565	TDG533A12000	WN10HD.....R120	4158636	TDG532A22000	WN10HD.....R116	4158707	TDG533A17200	WN10HD.....R122	4158787	TDS412A03571	WK15PD.....R48
4158566	TDG533A12100	WN10HD.....R120	4158637	TDG532A23000	WN10HD.....R116	4158708	TDG533A17300	WN10HD.....R122	4158788	TDS412A03600	WK15PD.....R48
4158567	TDG533A12200	WN10HD.....R120	4158638	TDG533A05100	WN10HD.....R118	4158709	TDG533A17400	WN10HD.....R122	4158789	TDS412A03658	WK15PD.....R48
4158568	TDG533A12300	WN10HD.....R120	4158639	TDG533A05106	WN10HD.....R118	4158710	TDG533A17463	WN10HD.....R122	4158800	TDS412A03700	WK15PD.....R48
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4158570	TDG533A12400	WN10HD.....R120	4158641	TDG533A05200	WN10HD.....R118	4158712	TDG533A17600	WN10HD.....R122	4158802	TDS412A03800	WK15PD.....R48
4158571	TDG533A12500	WN10HD.....R120	4158642	TDG533A05300	WN10HD.....R118	4158713	TDG533A07500	WN10HD.....R119	4158803	TDS412A03900	WK15PD.....R48
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4158582	TDG533A04000	WN10HD.....R117	4158653	TDG533A05400	WN10HD.....R118	4158724	TDG533A17800	WN10HD.....R122	4158814	TDS412A04500	WK15PD.....R49
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4158819	TDS412A04800 WK15PD	R49	4158890	TDS412A09900 WK15PD	R50	4160097	GT145005 WN35MG	W15	4162292	TDS202A03734 WP20PD	R36
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4158836	TDS412A05900 WK15PD	R49	4159645	GT235003 WN38MG	W163	4160441	GT165005 WN35MG	W75	4162309	TDS202A04763 WP20PD	R37
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4158883	TDS412A09347 WK15PD	R50	4160061	GT805008 WN48EG	W79	4162285	TDS202A03400 WP20PD	R36	4162356	TDS202A08100 WP20PD	R38
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4163503	TDS401A05700 WP20PD	R43	4164501	DCGT21501P TN10U	B129	4165846	TNMA332 TN20K	B140	4165982	CNMG6436P TN15M	B127
4163504	TDS401A05800 WP20PD	R43	4164502	DCGT21501P TN15U	B129	4165847	TNMA333 TN20K	B140	4165983	CNMG6436P TN30M	B127
4163505	TDS401A05900 WP20PD	R43	4164523	DCGT32501P TN10U	B129	4165848	TNMA432 TN20K	B140	4165984	CNMG6436P TN10P	B132
4163506	TDS401A05954 WP20PD	R43	4164524	DCGT32501P TN15U	B129	4165849	VNMA332 TN20K	B145	4165985	CNMG6436P TN20P	B132
4163507	TDS401A06000 WP20PD	R43	4164525	DCGT4321P TN10U	B129	4165850	VNMA332 TN20K	B147	4165986	CNMG6436P TN30M	B132
4163508	TDS401A06100 WP20PD	R43	4164526	TCGT21501P TN10U	B138	4165851	VNMA432 TN20K	B147	4165987	CNMG64316P TN10P	B132
4163509	TDS401A06200 WP20PD	R43	4164527	TCGT21501P TN15U	B138	4165852	VNMA433 TN20K	B147	4165988	CNMG64316P TN20P	B132
4163510	TDS401A06300 WP20PD	R43	4164528	TCGT21511P TN10U	B138	4165853	CNMG4324P TN30M	B126	4165989	CNMG64316P TN15M	B132
4163511	TDS401A06350 WP20PD	R43	4164529	TCGT21511P TN15U	B138	4165854	CNMG4334P TN15M	B126	4165990	CNMG64316P TN30M	B132
4163512	TDS401A06400 WP20PD	R43	4164530	TCGT325051P TN10U	B138	4165855	CNMG4334P TN30M	B126	4165991	CNMG4326P TN10P	B132
4163513	TDS401A06500 WP20PD	R43	4164531	TCGT32511P TN10U	B138	4165856	CNMG5434P TN15M	B126	4165992	CNMG4326P TN20P	B132
4163514	TDS401A06528 WP20PD	R43	4164532	TCGT32511P TN15U	B138	4165857	CNMG5434P TN30M	B126	4165993	CNMG4326P TN30P	B132
4163515	TDS401A06600 WP20PD	R43	4164543	TCGT32521P TN10U	B138	4165858	CNMG6434P TN15M	B126	4165994	CNMG4326P TN15M	B132
4163516	TDS401A06630 WP20PD	R43	4164544	VBGT22051P TN10U	B144	4165859	CNMG6434P TN30M	B126	4165995	CNMG4326P TN30M	B132
4163517	TDS401A06700 WP20PD	R43	4164545	VBGT22051P TN15U	B144	4165860	CNMG4314P TN15M	B131	4165996	CNMG4336P TN10P	B132
4163518	TDS401A06746 WP20PD	R43	4164546	VBGT2201P TN10U	B144	4165861	CNMG4314P TN30M	B131	4165997	CNMG4336P TN20P	B132
4163519	TDS401A06800 WP20PD	R43	4164547	VBGT2201P TN15U	B144	4165862	CNMG4324P TN15M	B131	4166171	CNMG4312P TN10P	B126
4163520	TDS401A06900 WP20PD	R44	4164548	VBGT2211P TN10U	B144	4165863	CNMG4324P TN30M	B131	4166172	CNMG4312P TN20P	B126
4163521	TDS401A07000 WP20PD	R44	4164549	VBGT33051P TN10U	B144	4165864	CNMG4314P TN15M	B131	4166242	CCMT215051P TN15M	B123
4163522	TDS401A07100 WP20PD	R44	4164550	VBGT33051P TN15U	B144	4165865	CNMG4414P TN30M	B131	4166243	CNMG4312P TN20K	B126
4163523	TDS401A07145 WP20PD	R44	4164551	VBGT3301P TN10U	B144	4165866	CNMG4424P TN15M	B131	4166244	CNMG4312P TN15M	B126
4163524	TDS401A07200 WP20PD	R44	4164552	VBGT3311P TN10U	B144	4165867	CNMG4424P TN30M	B131	4166245	CNMG4312P TN30M	B126
4163525	TDS401A07300 WP20PD	R44	4164563	VBGT3311P TN15U	B144	4165868	CNMG4434P TN15M	B131	4166246	CNMG4312P TN10U	B126
4163526	TDS401A07400 WP20PD	R44	4164564	CNGP4305 TN10U	B35, B124	4165869	CNMG4434P TN30M	B131	4166247	CNMG4312P TN15U	B126
4163527	TDS401A07500 WP20PD	R44	4164565	CNGP430 TN10U	B35, B124	4165870	CNMG4324P TN15M	B135	4166248	CNMG4322P TN10P	B126
4163528	TDS401A07541 WP20PD	R44	4164566	CNGP431 TN10U	B35, B124	4165871	CNMG4324P TN30M	B135	4166249	CNMG4322P TN20P	B126
4163529	TDS401A07600 WP20PD	R44	4164567	CNGP431 TN15U	B124	4165872	CNMG4334P TN15M	B135	4166250	CNMG4322P TN20K	B126
4163530	TDS401A07700 WP20PD	R44	4164568	CNGP432 TN10U	B35, B124	4165873	CNMG4334P TN30M	B135	4166251	CNMG4322P TN15M	B126
4163531	TDS401A07800 WP20PD	R44	4164569	CNGP432 TN15U	B124	4165874	CNMG63314P TN15M	B141	4166252	CNMG4312P TN30M	B126
4163532	TDS401A07900 WP20PD	R44	4164570	CNGP433 TN10U	B124	4165875	CNMG63314P TN30M	B141	4166253	CNMG4322P TN10U	B126
4163533	TDS401A07938 WP20PD	R44	4164571	CNGP433 TN15U	B124	4165876	CNMG3324P TN15M	B141	4166254	CNMG4322P TN15U	B126
4163534	TDS401A08000 WP20PD	R44	4164572	CNGP4305 TN10U	B52, B130	4165877	CNMG3324P TN30M	B141	4166255	CNMG4332P TN10P	B126
4163535	TDS401A08100 WP20PD	R44	4164783	CNGP4305 TN15U	B130	4165878	CNMG3334P TN15M	B141	4166256	CNMG4332P TN20P	B126
4163536	TDS401A08200 WP20PD	R44	4164784	CNGP430 TN10U	B52, B130	4165879	CNMG3334P TN30M	B141	4166257	CNMG4312P TN20K	B126
4163537	TDS401A08300 WP20PD	R44	4164785	CNGP431 TN10U	B52, B130	4165880	CNMG4314P TN15M	B141	4166258	CNMG4332P TN15M	B126
4163538	TDS401A08334 WP20PD	R44	4164786	CNGP431 TN15U	B130	4165881	CNMG4314P TN30M	B141	4166259	CNMG4332P TN10U	B126
4163539	TDS401A08400 WP20PD	R44	4164787	CNGP432 TN10U	B52, B130	4165882	CNMG4324P TN15M	B141	4166260	CNMG4312P TN10P	B131
4163540	TDS401A08433 WP20PD	R44	4164788	CNGP432 TN15U	B130	4165883	CNMG4324P TN30M	B141	4166261	CNMG4312P TN20P	B131
4163541	TDS401A08500 WP20PD	R44	4164789	CNGP3305 TN10U	B140	4165884	CNMG4314P TN15M	B146	4166262	CNMG4312P TN20K	B131
4163542	TDS401A08600 WP20PD	R44	4164790	CNGP3305 TN15U	B140	4165885	VNMG3314P TN30M	B146	4166263	CNMG4312P TN15M	B131
4163543	TDS401A08700 WP20PD	R44	4164791	CNGP331 TN10U	B140	4165886	VNMG3324P TN15M	B146	4166264	CNMG4312P TN30M	B131
4163544	TDS401A08733 WP20PD	R44	4164792	CNGP331 TN15U	B140	4165887	VNMG3324P TN30M	B146	4166265	CNMG4312P TN10U	B131
4163545	TDS401A08800 WP20PD	R44	4164793	CNGP332 TN10U	B140	4165888	VNMG4314P TN15M	B148	4166266	CNMG4312P TN15U	B131
4163546	TDS401A08900 WP20PD	R44	4164794	CNGP3305 TN10U	B96, B145	4165889	VNMG4314P TN30M	B148	4166267	CNMG4312P TN10P	B131
4163547	TDS401A09000 WP20PD	R44	4164795	CNGP330 TN10U	B96, B145	4165890	VNMG4324P TN15M	B148	4166269	CNMG4322P TN20P	B131
4163548	TDS401A09100 WP20PD	R44	4164796	CNGP330 TN15U	B145	4165891	VNMG4324P TN30M	B148	4166271	CNMG4322P TN20K	B131
4163549	TDS401A09129 WP20PD	R44	4164797	CNGP431 TN10U	B96, B145	4165892	VNMG4334P TN30M	B148	4166273	CNMG4322P TN15M	B131
4163550	TDS401A09200 WP20PD	R44	4164798	CNGP431 TN15U	B145	4165948	CNMG3226P TN10P	B127	4166275	CNMG4322P TN30M	B131
4163551	TDS401A09300 WP20PD	R44	4164799	CNGP432 TN10U	B96, B145	4165949	CNMG3226P TN20P	B127	4166277	CNMG4322P TN10U	B131
4163552	TDS401A09347 WP20PD	R44	4164800	CNGP432 TN15U	B145	4165950	CNMG3226P TN15M	B127	4166279	CNMG4322P TN15U	B131
4163553	TDS401A09400 WP20PD	R44	4165244	CCMT215051P TN10P	B123	4165951	CNMG3226P TN30M	B127	4166281	CNMG3312P TN10P	B146
4163554	TDS401A09500 WP20PD	R44	4165245	CCMT215051P TN20K	B123	4165952	CNMG4316P TN10P	B127	4166282	CNMG3312P TN20P	B146
4163555	TDS401A09525 WP20PD	R44	4165470	CNMA431 TN20K	B125	4165963	CNMG4316P TN20P	B127	4166283	CNMG3312P TN20K	B146
4163556	TDS401A09600 WP20PD	R44	4165471	CNMA432 TN20K	B125	4165964	CNMG4316P TN15M	B127	4166284	CNMG4312P TN15M	B146
4163557	TDS401A09700 WP20PD	R44	4165472	CNMA433 TN20K	B125	4165965	CNMG4316P TN30M	B127	4166285	CNMG3312P TN30M	B146
4163558	TDS401A09800 WP20PD	R44	4165830	CNMG4314P TN15M	B126	4165966	CNMG4326P TN10P	B127	4166286	CNMG3312P TN10U	B146
4163559	TDS401A09900 WP20PD	R44	4165831	CNMG4314P TN30M	B126	4165967	CNMG4326P TN20P	B127	4166287	CNMG3312P TN15U	B146
4163560	TDS401A09921 WP20PD	R45	4165832	CNMG4324P TN15M	B126	4165968	CNMG4326P TN30P	B127	4166288	CNMG3322P TN10P	B146
4163978	CCGT215051P TN10U	B122	4165833	CNMA434 TN20K	B36, B125	4165969	CNMG4326P TN15M	B127	4166289	CNMG3322P TN20P	B146
4163979	CCGT215051P TN15U	B122	4165834	CNMA543 TN20K	B36, B125	4165970	CNMG4326P TN30M	B127	4166290	CNMG3322P TN20K	B146
4163980	CCGT21511P TN10U	B122	4165835	CNMA544 TN20K	B36, B125	4165971	CNMG4336P TN10P	B127	4166291	CNMG3322P TN15M	B146
4163981	CCGT21511P TN15U	B122	4165836	CNMA644 TN20K	B36, B125	4165972	CNMG4336P TN20P	B127	4166292	CNMG3322P TN10U	B146
4163982	CCGT21521P TN10U	B122	4165837	CNMA644 TN20K	B36, B125	4165973	CNMG4336P TN30P	B127	4166293	CNMG3322P TN15U	B146
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4166335	CCMT21521P TN20K	B123	4166429	TCMT32511P TN30M	B139	4166515	SNMG6437N TN20P	B137	4166586	VBMT2221P TN10U	B144
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4166337	CCMT21521P TN30M	B123	4166431	DNMG4337N TN30P	B133	4166517	SNMG6437N TN20K	B137	4166588	VBMT3311P TN20K	B144
4166338	CCMT21521P TN10U	B123	4166432	CNMG4337N TN10P	B128	4166518	SNMG6447N TN20P	B137	4166589	VBMT33051P TN30M	B144
4166339	CCMT325051P TN10U	B123	4166433	CNMG4337N TN20P	B128	4166519	SNMG6447N TN30P	B137	4166590	VBMT33051P TN10U	B144
4166340	CCMT325051P TN15U	B123	4166434	CNMG4337N TN30P	B128	4166520	SNMG6447N TN20K	B137	4166591	VBMT33051P TN15U	B144
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4166343	CCMT32511P TN20K	B123	4166437	CNMG4347N TN10P	B128	4166523	TNMG3327N TN20P	B143	4166594	VBMT3311P TN20K	B144
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4166345	CCMT32511P TN30M	B123	4166439	CNMG4347N TN20K	B128	4166525	TNMG3327N TN20K	B143	4166596	VBMT3311P TN30M	B144
4166346	CCMT32511P TN10U	B123	4166440	CNMG5437N TN10P	B128	4166526	TNMG3337N TN10P	B143	4166597	VBMT3311P TN10U	B144
4166347	CCMT32511P TN15U	B123	4166441	CNMG5437N TN20P	B128	4166527	TNMG3337N TN20P	B143	4166598	VBMT3311P TN15U	B144
4166348	CCMT32521P TN10P	B123	4166442	CNMG5437N TN30P	B128	4166528	TNMG3337N TN30P	B143	4166599	VBMT3321P TN10P	B144
4166349	CCMT32521P TN20P	B123	4166443	CNMG5437N TN20K	B128	4166529	TNMG3337N TN20K	B143	4166600	VBMT3321P TN20P	B144
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4166353	CCMT32521P TN10U	B123	4166447	CNMG6427N TN20K	B128	4166533	TNMG4327N TN20P	B143	4166604	VBMT3321P TN10U	B144
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4166355	CCMT4311P TN10P	B123	4166449	CNMG6437N TN20P	B128	4166535	TNMG4327N TN20K	B143	4166623	CCMT4321P TN30M	B123
4166356	CCMT4311P TN20P	B123	4166450	CNMG6447N TN30P	B128	4166536	TNMG4337N TN20P	B143	4166624	CCMT4321P TN10U	B123
4166357	CCMT4311P TN20K	B123	4166451	CNMG6447N TN20K	B128	4166537	TNMG4337N TN30P	B143	4166625	DCMT215051P TN10U	B129
4166358	CCMT4311P TN15M	B123	4166452	CNMG6667N TN10P	B128	4166538	TNMG4337N TN20K	B143	4166626	DCMT215051P TN15U	B129
4166359	CCMT4311P TN30M	B123	4166453	CNMG6667N TN20P	B128	4166539	TNMG5437N TN10P	B143	4166627	DCMT21511P TN10P	B129
4166361	DCMT4321P TN20K	B129	4166454	CNMG6667N TN30P	B128	4166540	TNMG5437N TN20P	B143	4166628	DCMT21511P TN20P	B129
4166362	SCMT32511P TN10P	B134	4166455	CNMG6667N TN20K	B128	4166541	TNMG5437N TN30P	B143	4166629	DCMT21511P TN20K	B129
4166366	CNMG4317N TN10P	B128	4166456	CNMG6667N TN30P	B128	4166542	TNMG5437N TN20K	B143	4166630	DCMT21511P TN15M	B129
4166367	CNMG4317N TN20P	B128	4166457	DNMG4317N TN10P	B133	4166543	TNMG6667N TN10P	B143	4166631	DCMT21511P TN30M	B129
4166368	CNMG4317N TN20K	B128	4166458	DNMG4317N TN20P	B133	4166544	TNMG6667N TN20P	B143	4166632	DCMT21511P TN10U	B129
4166389	CNMG4327N TN10P	B128	4166459	DNMG4327N TN10P	B133	4166545	TNMG6667N TN30P	B143	4166633	DCMT21511P TN15U	B129
4166390	CNMG4327N TN20P	B128	4166460	DNMG4327N TN20P	B133	4166546	TNMG6667N TN20K	B143	4166634	DCMT325051P TN10U	B129
4166391	CNMG4327N TN30P	B128	4166461	DNMG4327N TN30P	B133	4166547	WNMG4327N TN10P	B149	4166635	DCMT325051P TN15U	B129
4166392	CNMG4327N TN20K	B128	4166462	DNMG4327N TN20K	B133	4166548	WNMG4327N TN20P	B149	4166636	DCMT32511P TN10P	B129
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4166397	SCMT32511P TN10U	B134	4166467	DNMG4427N TN30P	B133	4166553	WNMG4337N TN30P	B149	4166641	DCMT32511P TN10U	B129
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4172617	DNMP443 WS25PT	B63	4173056	SNMG643RH WM25CT	B74	4173482	TDS504A06500 WU20PD	R91	4173657	CNMP644 WM25CT	B45
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4173037	CNMG434RH WM25CT	B41	4173463	TDS504A03970 WU20PD	R90	4173534	TDS504A16000 WU20PD	R92	4176840	GT205136 GP6520	W6
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4173039	CNMG543RH WM25CT	B41	4173465	TDS504A04500 WU20PD	R90	4173536	TDS504A17000 WU20PD	R92	4176842	GT205138 GP6520	W6
4173040	CNMG544RH WM25CT	B41	4173466	TDS504A04600 WU20PD	R90	4173537	TDS504A17463 WU20PD	R92	4176853	GT205139 GP6520	W6
4173041	CNMG642RH WM25CT	B41	4173467	TDS504A04763 WU20PD	R90	4173538	TDS504A17500 WU20PD	R92	4176854	GT205140 GP6520	W6
4173042	CNMG643RH WM25CT	B41	4173468	TDS504A04800 WU20PD	R90	4173539	TDS504A18000 WU20PD	R92	4176856	GT205142 GP6520	W6
4173043	CNMG644RH WM25CT	B41	4173469	TDS504A05000 WU20PD	R90	4173540	TDS504A18500 WU20PD	R92	4176858	GT205144 GP6520	W6
4173044	CNMG646RH WM25CT	B41	4173470	TDS504A05100 WU20PD	R90	4173541	TDS504A19000 WU20PD	R92	4176859	GT205145 GP6520	W6
4173045	DNMG432RH WM25CT	B59	4173471	TDS504A05200 WU20PD	R90	4173542	TDS504A19505 WU20PD	R92	4176860	GT205146 GP6520	W6
4173046	DNMG442RH WM25CT	B59	4173472	TDS504A05300 WU20PD	R90	4173543	TDS504A19500 WU20PD	R92	4176861	GT205147 GP6520	W6
4173047	DNMG443RH WM25CT	B59	4173473	TDS504A05410 WU20PD	R90	4173544	TDS504A20000 WU20PD	R92	4176862	GT205148 GP6520	W6
4173048	DNMG444RH WM25CT	B59	4173474	TDS504A05500 WU20PD	R90	4173545	TDS504A03455 WU20PD	R90	4176873	GT305174 GP6520	W56
4173049	SNMG432RH WM25CT	B74	4173475	TDS504A05558 WU20PD	R90	4173546	TDS504A03734 WU20PD	R90	4176874	GT305175 GP6520	W56
4173050	SNMG433RH WM25CT	B74	4173476	TDS504A05600 WU20PD	R90	4173547	TDS504A09347 WU20PD	R91	4176875	GT305176 GP6520	W56
4173051	SNMG434RH WM25CT	B74	4173477	TDS504A05700 WU20PD	R90	4173552	CNMP431 WM25CT	B45	4176876	GT305177 GP6520	W56
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5472637	VTSP06009 WU41EG	W31	5520833	GX355012 WK12PG	W120	5537873	TCF135R4SL20MA	T20, T22	5537963	TCF350R5SL40ME	T26
5472638	VTSP06010 WU41EG	W29	5520834	GX355121 WK12PG	W120	5537874	TCF120R5SL20MA	T25	5537964	TCF360R5SL40ME	T26-27
5472639	VTSP06011 WU41EG	W29	5520835	GX355122 WK12PG	W120	5537875	TCF125R5SL20MA	T25	5537965	TCF1188R2SSF125E	T8
5472640	VTSP06012 WU41EG	W31	5520836	GX355014 WK12PG	W120	5537876	TCF127R5SL20MA	T25	5537966	TCF1210R2SSF125E	T8
5472641	VTSP06013 WU41EG	W29	5520837	GX355141 WK12PG	W120	5537877	TCF130R5SL20MA	T25	5537967	TCF1219R2SSF125E	T8
5472644	VTSP06014 WU41EG	W29	5520838	GX355142 WK12PG	W120	5537878	TCF135R5SL20MA	T25, T27	5537968	TCF1250R2SSF125E	T8
5472645	VTSP06015 WU41EG	W31	5520839	GX475006 WN14PG	W121	5537879	TCF0473R2SSF075A	T8	5537969	TCF1280R2SSF125E	T8
5472646	VTSP06016 WU41EG	W29	5520840	GX475008 WN14PG	W121	5537880	TCF0500R2SSF075A	T8	5538060	TCF1313R2SSF125E	T8
5472647	VTSP06017 WU41EG	W29	5520841	GX475010 WN14PG	W121	5537881	TCF0531R2SSF075A	T8-9	5538061	TCF1375R2SSF125E	T8-9
5472648	VTSP06018 WU41EG	W31	5520842	GX495006 WN14PG	W160	5537882	TCF0473R3SSF075A	T13	5538062	TCF1406R2SSF150E	T8
5472649	VTSP06019 WU41EG	W29	5520843	GX495008 WN14PG	W160	5537883	TCF0500R3SSF075A	T13	5538063	TCF1438R2SSF150E	T8-9
5472650	VTSP06020 WU41EG	W29	5520844	GX495010 WN14PG	W160	5537884	TCF0531R3SSF075A	T13-14	5538064	TCF1188R3SSF125E	T13
5472651	VTSP06021 WU41EG	W31	5522490	SDMX432RMM WS30PM	H44	5537885	TCF0473R4SSF075A	T18	5538065	TCF1210R3SSF125E	T13
5472652	VTSP06022 WU41EG	W29	5528973	HNGJ535ANENLD WS30PM	H30,	5537886	TCF0500R4SSF075A	T18	5538066	TCF1219R3SSF125E	T13
5472653	VTSP06023 WU41EG	W29			H37	5537887	TCF0531R4SSF075A	T18-19	5538067	TCF1250R3SSF125E	T13
5472654	VTSP06024 WU41EG	W31	5528974	HNGJ535ANSNGD WS30PM	H26,	5537888	TCF0473R5SSF075A	T23	5538068	TCF1280R3SSF125E	T13
5472655	VTSP06025 WU41EG	W29			H31, H38	5537889	TCF0500R5SSF075A	T23	5538069	TCF1313R3SSF125E	T13
5472656	VTSP06026 WU41EG	W29	5528975	HNGJ0704ANENLD WS30PM	H7,	5537890	TCF0531R5SSF075A	T23-24	5538070	TCF1375R3SSF125E	T13-14
5472657	VTSP06027 WU41EG	W31			H14, H19	5537910	TCF1094R2SSF125D	T8	5538081	TCF1406R3SSF150E	T13
5472658	VTSP06028 WU41EG	W29	5528976	HNPJ0704ANSNGD WS30PM	H8,	5537911	TCF1125R2SSF125D	T8	5538082	TCF1438R3SSF150E	T13-14
5472659	VTSP06029 WU41EG	W29			H15, H20	5537912	TCF1156R2SSF125D	T8-9	5538083	TCF1188R4SSF125E	T18
5472660	VTSP06030 WU41EG	W31	5528978	HPGT225DZENGD WS30PM	H45	5537913	TCF0969R3SSF100D	T13	5538084	TCF1210R4SSF125E	T18
5472661	VTSP06031 WU41EG	W29	5536670	XDCT1101ERML WP35CM	I9	5537914	TCF0984R3SSF100D	T13	5538085	TCF1188R5SSF125E	T18
5472662	VTSP06032 WU41EG	W29	5536671	XDCT1101ERML WP25PM	I9	5537915	TCF1000R3SSF100D	T13-14	5538086	TCF1250R4SSF125E	T18
5472663	VTSP06033 WU41EG	W29	5537167	TCF240R2SL25MD	T10, T12	5537916	TCF1031R3SSF125D	T13	5538087	TCF1280R4SSF125E	T18
5472664	VTSP06034 WU41EG	W30	5537168	TCF250R2SL32MD	T10	5537917	TCF1063R3SSF125D	T13	5538088	TCF1313R4SSF125E	T18
5472665	VTSP06035 WU41EG	W30	5537169	TCF260R2SL32MD	T10	5537918	TCF1094R3SSF125D	T13	5538089	TCF1375R4SSF125E	T18-19
5472666	VTSP06036 WU41EG	W30	5537778	TCF120R2SL20MA	T10	5537919	TCF1125R4SSF125D	T13	5538090	TCF1406R4SSF150E	T18
5472667	VTSP06037 WU41EG	W30	5537779	TCF125R2SL20MA	T10	5537920	TCF1156R3SSF125D	T13-14	5538091	TCF1438R4SSF150E	T18-19
5472668	VTSP06038 WU41EG	W30	5537820	TCF265R2SL32MD	T10	5537921	TCF0969R4SSF100D	T18	5538092	TCF1188R5SSF125E	T23
5472669	VTSP06039 WU41EG	W30	5537821	TCF270R2SL32MD	T10	5537922	TCF0984R4SSF100D	T18	5538093	TCF1210R5SSF125E	T23
5472670	VTSP06040 WU41EG	W30	5537822	TCF280R2SL32MD	T10	5537923	TCF1000R4SSF100D	T18-19	5538094	TCF1219R5SSF125E	T23
5473198	TNMG433UR WS25PT	B89	5537823	TCF290R2SL32MD	T10, T12	5537924	TCF1031R4SSF125D	T18	5538095	TCF1438R5SSF125E	T23
5473222	TNMG433UM WS10PT	B88	5537824	TCF240R3SL25MD	T15, T17	5537925	TCF1063R4SSF125D	T18	5538096	TCF1280R5SSF125E	T23
5476633	RNPJ10T3MOSMH WJ35PM	K27	5537825	TCF250R3SL32MD	T15	5537926	TCF1094R4SSF125D	T18	5538097	TCF1313R5SSF125E	T23
5476634	RNPJ1204MOSMM WJ35PM	K35	5537826	TCF260R3SL32MD	T15	5537927	TCF1125R4SSF125D	T18	5538098	TCF1375R5SSF125E	T23-24
5476635	RNPJ1204MOSMH WJ35PM	K35	5537827	TCF265R3SL32MD	T15	5537928	TCF1156R4SSF125D	T18-19	5538099	TCF1406R5SSF125E	T23
5476636	RNPJ1605MOSMH WJ35PM	K40	5537828	TCF270R3SL32MD	T15	5537929	TCF0969R5SSF100D	T23	5538100	TCF1438R5SSF150E	T23-24
5476637	RNPJ1605MOSMM WJ35PM	K40	5537829	TCF280R3SL32MD	T15	5537930	TCF0984R5SSF100D	T23	5538204	CNGG431FS WS25PT	B35
5512536	CNMG643UR WS25PT	B43	5537830	TCF290R3SL32MD	T15, T17	5537931	TCF1000R5SSF100D	T23-24	5538205	CNGG432FS WS25PT	B35
5512538	SNMG643UR WS25PT	B75	5537831	TCF240R4SL25MD	T20, T22	5537932	TCF1031R5SSF125D	T23	5538206	DNGG330F5 WS25PT	B51
5514976	WGME116 W	E38	5537832	TCF250R4SL32MD	T20	5537933	TCF1063R5SSF125D	T23	5538207	DNGG431FS WS25PT	B51
5514977	WGME116 W	E38	5537833	TCF260R4SL32MD	T20	5537934	TCF1094R5SSF125D	T23	5538208	DNGG432FS WS25PT	B51
5515022	WGME2050 W	E38	5537834	TCF265R4SL32MD	T20	5537935	TCF1125R5SSF125D	T23	5538209	DNGG441FS WS25PT	B51
5515023	WGME2050 W	E38	5537835	TCF270R4SL32MD	T20	5537936	TCF1156R5SSF125D	T23-24	5538230	DNGG442FS WS25PT	B51
5517826	XDCT1102ERML WS30PM	I9	5537836	TCF280R4SL32MD	T20	5537937	TCF300R2SL32ME	T10	5538231	TNMG331FS WS25PT	B83
5517827	XDPT1108SRMM WS30PM	I10	5537837	TCF290R4SL32MD	T20, T22	5537938	TCF310R2SL32ME	T10	5538232	VNGG331FS WS25PT	B95
5519572	SDMX433RMM WS30PM	I44	5537838	TCF240R5SL25MD	T25, T27	5537939	TCF320R2SL32ME	T11-12	5538233	VNGG332FS WS25PT	B95
5519921	XDPT1102SRMM WS30PM	I10	5537839	TCF250R5SL32MD	T25	5537940	TCF330R2SL40ME	T11	5538234	WNGG431FS WS25PT	B99
5520247	RDMT1204MTX WS30PM	K91	5537840	TCF260R5SL32MD	T25	5537941	TCF340R2SL40ME	T11	5538235	WNGG432FS WS25PT	B99
5520248	WOEJ080412SRMM WS30PM	K7	5537841	TCF265R5SL32MD	T25	5537942	TCF350R2SL40ME	T11	5538500	TCF2250R2SSF200H	T9
5520249	WOEJ120712SRMM WS30PM	K14	5537842	TCF270R5SL32MD	T25	5537943	TCF360R2SL40ME	T11-12	5538501	TCF2375R2SSF200H	T9
5520350	RNGJ1204MOEML WS30PM	K34	5537843	TCF280R5SL32MD	T25	5537944	TCF300R3SL32ME	T15	5538502	TCF2500R2SSF200H	T9
5520351	RNGJ1204MOSMM WS30PM	K34	5537844	TCF290R5SL32MD	T25, T27	5537945	TCF310R3SL32ME	T15	5538503	TCF2250R3SSF200H	T14
5520352	RNGJ10T3MOEML WS30PM	K26	5537845	TCF0969R2SSF100D	T8	5537946	TCF320R3SL32ME	T16-17	5538504	TCF2375R3SSF200H	T14
5520353	RNGJ10T3MOSMM WS30PM	K26	5537846	TCF0984R2SSF100D	T8	5537947	TCF330R3SL40ME	T16	5538505	TCF2500R3SSF200H	T14
5520354	RNGJ1605MOEML WS30PM	K39	5537847	TCF1000R2SSF100D	T8-9	5537948	TCF340R3SL40ME	T16	5538506	TCF2250R4SSF200H	T19
5520817	GX505004 WK12PG	W123	5537848	TCF1031R2SSF125D	T8	5537949	TCF350R3SL40ME	T16	5538507	TCF2375R4SSF200H	T19
5520818	GX505005 WK12PG	W123	5537849	TCF1063R2SSF125D	T8	5537950	TCF360R3SL40ME	T16-17	5538508	TCF2500R4SSF200H	T19
5520819	GX505006 WK12PG	W123	5537860	TCF127R2SL20MA	T10	5537951	TCF300R4SL32ME	T20	5538509	TCF2250R5SSF200H	T24
5520820	GX505008 WK12PG	W123	5537861	TCF130R2SL20MA	T10	5537952	TCF310R4SL32ME	T20	5538510	TCF2375R5SSF200H	T24
5520822	GX505010 WK12PG	W123	5537862	TCF135R2SL20MA	T10, T12	5537953	TCF320R4SL32ME	T21-22	5538511	TCF2500R5SSF200H	T24
5520823	GX505012 WK12PG	W123	5537863	TCF120R3SL20MA	T15	5537954	TCF330R4SL40ME	T21	5538554	TCF090305DCV34 WJ25CH	T28
5520824	GX505014 WK12PG	W123	5537864	TCF125R3SL20MA	T15	5537955	TCF340R4SL40ME	T21	5538555	TCF090305DCV34 WJ40PH	T28
5520825	GX355006 WK12PG	W120	5537866	TCF127R3SL20MA	T15	5537956	TCF350R4SL40ME	T21	5538556	TCF090305DCV36 WJ25CH	T29
5520826	GX355007 WK12PG	W120	5537867	TCF130R3SL20MA	T15	5537957	TCF360R4SL40ME	T21-22	5538557	TCF090305DCV36 WJ40PH	T29
5520827	GX355008 WK12PG	W120	5537868	TCF135R3SL20MA	T15, T17	5537958	TCF300R5SL32ME	T25	5538558	TCF080308DPV34 WJ25CH	T30
5520828	GX355009 WK12PG	W120	5537869	TCF120R4SL20MA	T20	5537959	TCF310R5SL32ME	T25	5538559	TCF080308DPV34 WJ40PH	T30
5520829	GX355010 WK12PG	W120	5537870	TCF125R4SL20MA	T20	5537960	TCF320R5SL32ME	T26-27	5538600	TCF080308DPV34 WPK10CH	T30

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5563018	GT605065 WS34MG	W17	5565138	GT625018 WS34MG	W76	5565230	GT625514 WS34MG	W78	5576571	4V1516006NW WP15PE	M7
5563019	GT605066 WS34MG	W17	5565139	GT625019 WS30MG	W76	5565231	GT625515 WS30MG	W78	5576572	4V1516006SW WP15PE	M7
5563020	GT605067 WS34MG	W17	5565140	GT625020 WS34MG	W76	5565232	GT625516 WS34MG	W78	5576573	4V1519007NW WP15PE	M7
5563021	GT605503 WS30MG	W18	5565141	GT625021 WS30MG	W76	5565233	GT625517 WS30MG	W78	5576574	4V1519007SW WP15PE	M7
5563022	GT605504 WS34MG	W18	5565142	GT625022 WS34MG	W76	5565234	GT625518 WS34MG	W78	5576575	4V1525008NW WP15PE	M8
5563023	GT605505 WS30MG	W18	5565143	GT625023 WS30MG	W76	5565235	GT625519 WS30MG	W78	5576576	4V1525008SW WP15PE	M8
5563024	GT605506 WS34MG	W18	5565144	GT625024 WS34MG	W76	5565236	GT625520 WS34MG	W78	5576577	4V1507002AT WP15PE	M4
5563025	GT605507 WS30MG	W18	5565145	GT625025 WS30MG	W76	5565237	GT625521 WS30MG	W78	5576579	4V1507002BT WP15PE	M5
5563026	GT605508 WS34MG	W18	5565146	GT625026 WS34MG	W76	5565238	GT625522 WS34MG	W78	5576580	4V1508003BT WP15PE	M5
5563027	GT605509 WS30MG	W18	5565147	GT625027 WS30MG	W76	5576345	4V0503001NT WP15PE	M4	5576581	4V1510004BT WP15PE	M5
5563028	GT605510 WS34MG	W18	5565148	GT625028 WS34MG	W76	5576346	4V0503001ST WP15PE	M4	5576582	4V1510004CT WP15PE	M5
5563029	GT605511 WS30MG	W18	5565149	GT625029 WS30MG	W76	5576347	4V0505000NT WP15PE	M4	5576583	4V1513005BW WP15PE	M6
5563040	GT605512 WS34MG	W18	5565150	GT625030 WS34MG	W76	5576348	4V0505000ST WP15PE	M4	5576584	4V1513005CW WP15PE	M6
5563041	GT605513 WS30MG	W18	5565151	GT625031 WS30MG	W76	5576349	4V0507002NT WP15PE	M4	5576585	4V1516006CW WP15PE	M7
5563042	GT605514 WS34MG	W18	5565152	GT625032 WS34MG	W76	5576510	4V0507002ST WP15PE	M4	5576586	4V1519007BW WP15PE	M7
5563043	GT605515 WS30MG	W18	5565153	GT625033 WS30MG	W76	5576511	4V0508003NT WP15PE	M5	5576587	4V1519007CW WP15PE	M7
5563044	GT605516 WS34MG	W18	5565154	GT625034 WS34MG	W76	5576512	4V0508003ST WP15PE	M5	5576588	4V1525008BW WP15PE	M8
5563045	GT605517 WS30MG	W18	5565155	GT625035 WS30MG	W76	5576513	4V0510004NT WP15PE	M5	5576589	4V1525008CW WP15PE	M8
5564306	GT605518 WS34MG	W18	5565156	GT625036 WS34MG	W76	5576514	4V0510004ST WP15PE	M5	5576590	4V4503001NT WP15PE	M4
5564295	DCLNL123BK3C WG	C9	5565157	GT625037 WS30MG	W76	5576515	4V051101ANT WP15PE	M5	5576591	4V4503001ST WP15PE	M4
5564296	DCLNL124BK3C WG	C9	5565158	GT625038 WS34MG	W76	5576516	4V051101AST WP15PE	M5	5576592	4V4505000NT WP15PE	M4
5564297	DCLNL163DK3C WG	C9	5565159	GT625039 WS30MG	W76	5576517	4V0513005NW WP15PE	M6	5576593	4V4505000ST WP15PE	M4
5564298	DCLNL164DK3C WG	C9	5565160	GT625040 WS34MG	W76	5576518	4V0513005SW WP15PE	M6	5576595	4V4507002NT WP15PE	M4
5564299	DCLNL165DK4C WG	C9	5565161	GT625041 WS30MG	W76	5576519	4V0513015NW WP15PE	M6	5576596	4V4507002BT WP15PE	M4
5564310	DCLNL166DK4C WG	C9	5565163	GT625042 WS34MG	W76	5576520	4V0513015SW WP15PE	M6	5576597	4V4508003NT WP15PE	M5
5564311	DCLNL204DK3C WG	C9	5565164	GT625043 WS30MG	W76	5576521	4V0516006NW WP15PE	M6	5576598	4V4508003ST WP15PE	M5
5564312	DCLNL205DK4C WG	C9	5565165	GT625044 WS34MG	W76	5576522	4V0519007NW WP15PE	M7	5576599	4V4510004NT WP15PE	M5
5564313	DCLNL206DK4C WG	C9	5565166	GT625045 WS30MG	W76	5576523	4V0525008NW WP15PE	M7	5576600	4V4510004ST WP15PE	M5
5564315	DCLNL244DK3C WG	C9	5565167	GT625046 WS34MG	W76	5576525	4V0525008SW WP15PE	M7	5576601	4V451101ANT WP15PE	M5
5564316	DCLNL245DK4C WG	C9	5565168	GT625047 WS30MG	W76	5576526	4V0532009NW WP15PE	M8	5576602	4V451101AST WP15PE	M5
5564317	DCLNL246DK4C WG	C9	5565169	GT625048 WS34MG	W76	5576527	4V0532009SW WP15PE	M8	5576604	4V4513005NW WP15PE	M5
5564318	DCLNR123BK3C WG	C9	5565190	GT625049 WS30MG	W76	5576528	4V0516006SW WP15PE	M6	5576605	4V4513005SW WP15PE	M6
5564319	DCLNR124BK3C WG	C9	5565191	GT625050 WS34MG	W76	5576529	4V0519007SW WP15PE	M7	5576606	4V4516006NW WP15PE	M6
5564320	DCLNR163DK3C WG	C9	5565192	GT625051 WS30MG	W76	5576530	4V0503001AT WP15PE	M4	5576607	4V4516006SW WP15PE	M6
5564321	DCLNR164DK3C WG	C9	5565193	GT625052 WS34MG	W76	5576531	4V0505000AT WP15PE	M4	5576608	4V4519007NW WP15PE	M7
5564322	DCLNR165DK4C WG	C9	5565194	GT625053 WS30MG	W77	5576532	4V0505000BT WP15PE	M4	5576609	4V4519007SW WP15PE	M7
5564323	DCLNR166DK4C WG	C9	5565195	GT625054 WS34MG	W77	5576533	4V0507002AT WP15PE	M4	5576610	4V4507002BT WP15PE	M4
5564324	DCLNR204DK3C WG	C9	5565196	GT625055 WS30MG	W77	5576534	4V0507002BT WP15PE	M4	5576611	4V4508003BT WP15PE	M5
5564325	DCLNR205DK4C WG	C9	5565197	GT625056 WS34MG	W77	5576535	4V0507002CT WP15PE	M4	5576612	4V4510004BT WP15PE	M5
5564326	DCLNR206DK4C WG	C9	5565198	GT625057 WS30MG	W77	5576536	4V0508003AT WP15PE	M5	5576613	4V4513005BW WP15PE	M6
5564327	DCLNR244DK3C WG	C9	5565199	GT625058 WS34MG	W77	5576537	4V0508003BT WP15PE	M5	5576614	4V4513005CW WP15PE	M6
5564328	DCLNR245DK4C WG	C9	5565200	GT625059 WS30MG	W77	5576538	4V0508003CT WP15PE	M5	5576615	4V4516006CW WP15PE	M6
5564329	DCLNR246DK4C WG	C9	5565201	GT625060 WS34MG	W77	5576539	4V0510004AT WP15PE	M5	5576617	4V4516006EW WP15PE	M6
5564330	DCLNR246DK4C WG	C9	5565202	GT625061 WS30MG	W77	5576540	4V0510004BT WP15PE	M5	5576618	4V4510004ST WP15PE	M6
5564337	DDQNL164DK3C WG	C12	5565203	GT625062 WS34MG	W77	5576542	4V0510004CT WP15PE	M5	5576619	4V4519007CW WP15PE	M7
5564338	DDQNL204DK3C WG	C12	5565204	GT625063 WS30MG	W77	5576543	4V0510004DT WP15PE	M5	5576620	4V4519007EW WP15PE	M7
5564339	DDQNR164DK3C WG	C12	5565205	GT625064 WS34MG	W77	5576544	4V0513015AW WP15PE	M6	5576621	4V6513015NW WP15PE	M6
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5690813	.....	GT825049 WN44EG	.....	W81	5690936	.....	GT725040 WN44EG	.....	W21	5696545	.....	DDJNR163DK3 WG	.....	C11	5697762	.....	DTGNL163DK3 WG	.....	C16
5690817	.....	GT865010 WN44EG	.....	W82	5690937	.....	GT725041 WN44EG	.....	W21	5696546	.....	DDJNR164DK3 WG	.....	C11	5697763	.....	DTGNL164DK3 WG	.....	C16
5690818	.....	GT865011 WN44EG	.....	W82	5690938	.....	GT725042 WN44EG	.....	W21	5696547	.....	DDJNR165DK4 WG	.....	C11	5697764	.....	DTGNR123BK3 WG	.....	C16
5690819	.....	GT865012 WN44EG	.....	W82	5690939	.....	GT725043 WN44EG	.....	W21	5696548	.....	DDJNR203DK3 WG	.....	C11	5697765	.....	DTGNR163DK3 WG	.....	C16
5690840	.....	GT865013 WN44EG	.....	W82	5690940	.....	GT725044 WN44EG	.....	W21	5696549	.....	DDJNR204DK3 WG	.....	C11	5697766	.....	DTGNR164DK3 WG	.....	C16
5690841	.....	GT865014 WN44EG	.....	W82	5690941	.....	GT725045 WN44EG	.....	W21	5696550	.....	DDJNR205DK4 WG	.....	C11	5697767	.....	DTJNR164DK3 WG	.....	C16
5690842	.....	GT865015 WN44EG	.....	W82	5690942	.....	GT725046 WN44EG	.....	W21	5696551	.....	DDJNR245DK4 WG	.....	C11	5697768	.....	DVJNL123CK3 WG	.....	C17
5690843	.....	GT865016 WN44EG	.....	W82	5690943	.....	GT725047 WN44EG	.....	W21	5696552	.....	DDPNR164DK3 WG	.....	C12	5697769	.....	DVJNL853DK3 WG	.....	C17
5690844	.....	GT865017 WN44EG	.....	W82	5690944	.....	GT725048 WN44EG	.....	W21	5696553	.....	SNMM43265 WM25CT	.....	B76	5697780	.....	DVJNL854DK3 WG	.....	C17
5690845	.....	GT865018 WN44EG	.....	W82	5690945	.....	GT725049 WN44EG	.....	W21	5696554	.....	SNMM43265 WP25CT	.....	B76	5697781	.....	DVJNR123CK3 WG	.....	C17
5690846	.....	GT865019 WN44EG	.....	W82	5695949	.....	A16TDFCNL4K3C WG	.....	C36	5696555	.....	SNMM43265 WP35CT	.....	B76	5697782	.....	DVJNR853DK3 WG	.....	C17
5690847	.....	GT865020 WN44EG	.....	W82	5696050	.....	A20UDCFNL4K3C WG	.....											

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5697792	DWLN164DKC3 WG	C18	5705273	GT925104 WU32MG	W71	5705588	GT905096 WU32MG	W13	5705934	GT945011 WS39MG	W73
5697793	DWLN204DKC3 WG	C18	5705274	GT925099 WU32MG	W71	5705589	GT905032 WS39MG	W13	5705935	GT945012 WS39MG	W73
5698342	WOEJ120712SRMR WP40PM	K15	5705275	GT925096 WU32MG	W71	5705591	GT905098 WU32MG	W13	5705936	GT945048 WU32MG	W73
5698343	WOEJ120712SRMR WP25PM	K15	5705276	GT925091 WU32MG	W70	5705593	GT905033 WS39MG	W13	5705937	GT945013 WS39MG	W73
5698347	CNMM43265 WM25CT	B44	5705277	GT925088 WU32MG	W70	5705594	GT905099 WU32MG	W13	5705938	GT945001 WS39MG	W73
5698348	CNMM43265 WP15CT	B44	5705278	GT925083 WU32MG	W70	5705595	GT905034 WS39MG	W13	5705939	GT945037 WU32MG	W73
5698349	CNMM43265 WP25CT	B44	5705279	GT925077 WU32MG	W70	5705596	GT905100 WU32MG	W13	5705980	GT945002 WS39MG	W73
5698360	CNMM43265 WP35CT	B44	5705280	GT925071 WU32MG	W70	5705597	GT905035 WS39MG	W13	5705981	GT945038 WU32MG	W73
5698361	CNMM43265 WM25CT	B44	5705281	GT925127 WU32MG	W71	5705598	GT905101 WU32MG	W13	5705982	GT945003 WS39MG	W73
5698362	CNMM43265 WP15CT	B44	5705282	GT925124 WU32MG	W71	5705599	GT905064 WS39MG	W13	5705983	GT945004 WS39MG	W73
5698363	CNMM43265 WP25CT	B44	5705283	GT925160 WU32MG	W72	5705610	GT905130 WU32MG	W13	5705984	GT945005 WS39MG	W73
5698364	CNMM43265 WM25CT	B44	5705284	GT925162 WU32MG	W72	5705611	GT905065 WS39MG	W13	5705985	GT945041 WU32MG	W73
5698365	CNMM43265 WP25CT	B44	5705285	GT925151 WU32MG	W72	5705612	GT905131 WU32MG	W13	5705986	GT945006 WS39MG	W73
5698366	CNMM43265 WM25CT	B44	5705286	GT925155 WU32MG	W72	5705613	GT905066 WS39MG	W13	5705987	GT945007 WS39MG	W73
5698367	CNMM43265 WP35CT	B44	5705501	GT905085 WU32MG	W12	5705614	GT905132 WU32MG	W13	5705988	GT945008 WS39MG	W73
5698368	CNMM43265 WM25CT	B44	5705502	GT905020 WS39MG	W12	5705615	GT905110 WU32MG	W13	5705989	GT945044 WU32MG	W73
5698369	CNMM43265 WP15CT	B44	5705503	GT905086 WU32MG	W12	5705616	GT905045 WS39MG	W13	5705991	GT945009 WS39MG	W73
5698370	CNMM43265 WP25CT	B44	5705504	GT905021 WS39MG	W12	5705617	GT905111 WU32MG	W13	5705992	GT945045 WU32MG	W73
5698371	CNMM43265 WP35CT	B44	5705505	GT905022 WS39MG	W12	5705618	GT905046 WS39MG	W13	5705993	GT945032 WS39MG	W74
5698372	CNMM43265 WP15CT	B44	5705506	GT905088 WU32MG	W12	5705619	GT905112 WU32MG	W13	5705994	GT945033 WS39MG	W74
5698373	CNMM43265 WP25CT	B44	5705507	GT905023 WS39MG	W12	5705620	GT905047 WS39MG	W13	5705995	GT945014 WS39MG	W73
5698374	CNMM43265 WM25CT	B44	5705508	GT905024 WS39MG	W12	5705621	GT905048 WS39MG	W13	5705996	GT945050 WU32MG	W73
5698375	CNMM43265 WP35CT	B44	5705509	GT905090 WU32MG	W12	5705622	GT905114 WU32MG	W13	5705997	GT945051 WU32MG	W73
5698376	CNMM43265 WM25CT	B44	5705510	GT905025 WS39MG	W13	5705623	GT905049 WS39MG	W13	5705998	GT945052 WU32MG	W73
5698377	CNMM43265 WP15CT	B44	5705511	GT905091 WU32MG	W13	5705624	GT905115 WU32MG	W13	5705999	GT945053 WU32MG	W73
5698378	CNMM43265 WM25CT	B44	5705512	GT905026 WS39MG	W13	5705625	GT905050 WS39MG	W13	5706010	GT945018 WS39MG	W73
5698379	CNMM43265 WP15CT	B44	5705513	GT905092 WU32MG	W13	5705626	GT905116 WU32MG	W13	5706011	GT945054 WU32MG	W73
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5698411	CNMM43265 WM25CT	B62	5705515	GT905093 WU32MG	W13	5705628	GT905117 WU32MG	W13	5706013	GT945056 WU32MG	W73
5698412	CNMM43265 WP15CT	B62	5705516	GT905001 WS39MG	W12	5705629	GT905036 WS39MG	W13	5706014	GT945025 WS39MG	W74
5698413	CNMM43265 WM25CT	B62	5705517	GT905067 WU32MG	W12	5705630	GT905037 WS39MG	W13	5706015	GT945061 WU32MG	W74
5698414	CNMM43265 WP35CT	B62	5705518	GT905002 WS39MG	W12	5705631	GT905103 WU32MG	W13	5706016	GT945026 WS39MG	W74
5698415	CNMM43265 WM25CT	B62	5705519	GT905003 WS39MG	W12	5705632	GT905038 WS39MG	W13	5706017	GT945062 WU32MG	W74
5698416	CNMM43265 WP15CT	B62	5705520	GT905069 WU32MG	W12	5705633	GT905104 WU32MG	W13	5706018	GT945027 WS39MG	W74
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5698432	M370D200Z04S07W012L200	K13	5705524	GT905071 WU32MG	W12	5705637	GT905041 WS39MG	W13	5706022	GT945056 WU32MG	W73
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5705064	GT905125 WU32MG	W13	5705543	GT905017 WS39MG	W12	5705656	GT905143 WS39MG	W14	5708015	GT925021 WS39MG	W70
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5705218	GT925047 WS39MG	W71	5705585	GT905029 WS39MG	W13	5705668	GT905141 WS39MG	W14	5708147	GT925070 WU32MG	W70
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5708160	GT925005 WS39MG	W70	5708305	GT925052 WS39MG	W71	5825496	I4C1000W300L UNCOATED	N22	5825762	I4C0234T075R TIALN	N20
5708161	GT925006 WS39MG	W70	5708307	GT925120 WJ32MG	W71	5825624	I4B0031T008R TIALN	N26	5825764	I4C0250T050S TIALN	N20
5708162	GT925074 WJ32MG	W70	5708309	GT925053 WS39MG	W71	5825625	I4B0047T012R TIALN	N26	5825765	I4C0250T075R TIALN	N20
5708163	GT925007 WS39MG	W70	5708311	GT925054 WS39MG	W71	5825626	I4B0062T019R TIALN	N26	5825766	I4C0251T112L TIALN	N20
5708164	GT925008 WS39MG	W70	5708313	GT925122 WJ32MG	W71	5825627	I4B0078T019R TIALN	N26	5825767	I4C0250T150X TIALN	N20
5708165	GT925076 WJ32MG	W70	5708315	GT925055 WS39MG	W71	5825628	I4B0094T019R TIALN	N26	5825768	I4C0265T075R TIALN	N20
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5708168	GT925078 WJ32MG	W70	5708321	GT925159 WJ32MG	W72	5825646	I4B0125T025S TIALN	N26	5825771	I4C0312T050S TIALN	N20
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5708172	GT925013 WS39MG	W70	5708329	GT925137 WS39MG	W72	5825650	I4B0141T056R TIALN	N26	5825775	I4C0328T100R TIALN	N21
5708173	GT925014 WS39MG	W70	5708331	GT925150 WJ32MG	W72	5825651	I4B0156T031R TIALN	N26	5825776	I4C0325T112L TIALN	N21
5708174	GT925082 WJ32MG	W70	5708333	GT925139 WS39MG	W72	5825652	I4B0156T056L TIALN	N26	5825777	I4C0359T100R TIALN	N21
5708175	GT925015 WS39MG	W70	5708335	GT925138 WS39MG	W72	5825653	I4B0172T062R TIALN	N26	5825778	I4C0375T062S TIALN	N21
5708176	GT925016 WS39MG	W70	5708337	GT925140 WS39MG	W72	5825654	I4B0187T031S TIALN	N26	5825779	I4C0375T100R TIALN	N21
5708177	GT925017 WS39MG	W70	5708339	GT925141 WS39MG	W72	5825655	I4B0187T062R TIALN	N26	5825780	I4C0375T112L TIALN	N21
5708178	GT925018 WS39MG	W70	5708341	GT925142 WS39MG	W72	5825656	I4B0187T075L TIALN	N26	5825781	I4C0375T175X TIALN	N21
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5708190	GT925056 WS39MG	W71	5708345	GT925156 WJ32MG	W72	5825658	I4B0203T062R TIALN	N26	5825783	I4C0406T100R TIALN	N21
5708191	GT925057 WS39MG	W71	5708347	GT925144 WS39MG	W72	5825659	I4B0219T062R TIALN	N26	5825784	I4C0421T100R TIALN	N21
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5708194	GT925059 WS39MG	W71	5710527	XNGU1502SRMM WP25PM	I36	5825663	I4B0250T075R TIALN	N26	5825787	I4C0437T200L TIALN	N21
5708196	GT925060 WS39MG	W71	5710528	XNGU1502SRMM WP40PM	I36	5825664	I4B0250T112R TIALN	N27	5825788	I4C0437T300X TIALN	N21
5708197	GT925128 WJ32MG	W71	5710529	XNGU1502SRMM WJ35PM	I36	5825665	I4B0250T150L TIALN	N27	5825789	I4C0453T100R TIALN	N21
5708198	GT925061 WS39MG	W71	5710590	VSM490D100Z02W100XN15	I32	5825666	I4B0250T150X TIALN	N27	5825790	I4C0468T100R TIALN	N21
5708199	GT925129 WJ32MG	W71	5710591	VSM490D125Z03W100XN15	I32	5825667	I4B0260T075R TIALN	N27	5825791	I4C0484T100R TIALN	N21
5708201	GT925028 WS39MG	W71	5710592	VSM490D150Z04W125XN15	I32	5825668	I4B0281T075R TIALN	N27	5825792	I4C0500T062S TIALN	N21
5708203	GT925029 WS39MG	W71	5710593	VSM490D150Z05S050XN15	I34	5825669	I4B0312T050S TIALN	N27	5825793	I4C0500T100R TIALN	N21
5708205	GT925097 WJ32MG	W71	5710594	VSM490D200Z05S075XN15	I34	5825670	I4B0312T081R TIALN	N27	5825794	I4C0500T200L TIALN	N21
5708207	GT925030 WS39MG	W71	5710595	VSM490D200Z06S075XN15	I34	5825681	I4B0312T112L TIALN	N27	5825795	I4C0500T300X TIALN	N21
5708209	GT925031 WS39MG	W71	5710596	VSM490D250Z06S075XN15	I34	5825682	I4B0312T162X TIALN	N27	5825796	I4C0500T075R TIALN	N21
5708211	GT925032 WS39MG	W71	5710597	VSM490D250Z07S100XN15	I34	5825683	I4B0344T100R TIALN	N27	5825797	I4C0562T125L TIALN	N21
5708213	GT925033 WS39MG	W71	5710598	VSM490D300Z07S100XN15	I34	5825684	I4B0375T100S TIALN	N27	5825798	I4C0562T225X TIALN	N21
5708215	GT925034 WS39MG	W71	5710599	VSM490D400Z11S150XN15	I34	5825685	I4B0375T100L TIALN	N27	5825799	I4C0625T075S TIALN	N21
5708217	GT925065 WS39MG	W71	5825461	I4C0500W062S TIALN	N21	5825686	I4B0375T112R TIALN	N27	5825800	I4C0625T125R TIALN	N21
5708219	GT925133 WJ32MG	W71	5825462	I4C0500W100R TIALN	N21	5825687	I4B0375T150X TIALN	N27	5825801	I4C0625T225R TIALN	N21
5708221	GT925066 WS39MG	W71	5825463	I4C0500W200L TIALN	N21	5825688	I4B0437T100R TIALN	N27	5825802	I4C0625T400X TIALN	N21
5708223	GT925067 WS39MG	W71	5825464	I4C0500W300X TIALN	N21	5825689	I4B0500T100S TIALN	N27	5825803	I4C0687T137R TIALN	N21
5708225	GT925068 WS39MG	W71	5825465	I4C0562W075R TIALN	N21	5825690	I4B0500T100R TIALN	N27	5825804	I4C0750T100S TIALN	N21
5708227	GT925044 WS39MG	W71	5825466	I4C0562W125L TIALN	N21	5825691	I4B0500T150X TIALN	N27	5825805	I4C0750T150R TIALN	N21
5708229	GT925045 WS39MG	W71	5825467	I4C0562W225X TIALN	N21	5825692	I4B0500T200R TIALN	N27	5825806	I4C0750T225R TIALN	N21
5708241	GT925113 WJ32MG	W71	5825469	I4C0625W075S TIALN	N21	5825693	I4B0500T200L TIALN	N27	5825807	I4C0750T300L TIALN	N21
5708243	GT925046 WS39MG	W71	5825470	I4C0625W125R TIALN	N21	5825694	I4B0500T300X TIALN	N27	5825808	I4C0750T400X TIALN	N22
5708245	GT925114 WJ32MG	W71	5825471	I4C0625W225L TIALN	N21	5825695	I4B0562T125R TIALN	N27	5825809	I4C0812T150R TIALN	N22
5708247	GT925048 WS39MG	W71	5825472	I4C0625W400X TIALN	N21	5825696	I4B0625T075S TIALN	N27	5825810	I4C0875T150R TIALN	N22
5708249	GT925116 WJ32MG	W71	5825473	I4C0750W100S TIALN	N21	5825697	I4B0625T125R TIALN	N27	5825811	I4C0875T225L TIALN	N22
5708251	GT925049 WS39MG	W71	5825474	I4C0750W150R TIALN	N21	5825698	I4B0625T225L TIALN	N27	5825812	I4C1000T150S TIALN	N22
5708253	GT925117 WJ32MG	W71	5825475	I4C0750W225R TIALN	N21	5825699	I4B0625T300X TIALN	N27	5825813	I4C1000T225R TIALN	N22
5708255	GT925050 WS39MG	W71	5825476	I4C0750W300L TIALN	N21	5825700	I4B0750T100R TIALN	N27	5825814	I4C1000T300L TIALN	N22
5708257	GT925051 WS39MG	W71	5825477	I4C0750W400X TIALN	N22	5825711	I4B0750T150L TIALN	N27	5825815	I4C1000T400X TIALN	N22
5708259	GT925119 WJ32MG	W71	5825478	I4C0875W150R TIALN	N22	5825712	I4B0750T300X TIALN	N27	5825816	I4C1250T200R TIALN	N22
5708261	GT925036 WS39MG	W71	5825479	I4C0875W225L TIALN	N22	5825713	I4B0875T150R TIALN	N27	5825817	I4C0125T050R UNCOATED	N20
5708263	GT925037 WS39MG	W71	5825480	I4C1000W150S TIALN	N22	5825714	I4B1000T150R TIALN	N27	5825818	I4C0125T100X UNCOATED	N20
5708265	GT925105 WJ32MG	W71	5825481	I4C1000W225R TIALN	N22	5825715	I4B1000T225L TIALN	N27	5825819	I4C0187T062R UNCOATED	N20
5708267	GT925038 WS39MG	W71	5825482	I4C1000W300L TIALN	N22	5825747	I4C0125T025S TIALN	N20	5825820	I4C0187T112X UNCOATED	N20
5708269	GT925039 WS39MG	W71	5825483	I4C1000W400X TIALN	N22	5825748	I4C0125T050R TIALN	N20	5825821	I4C0250T050S UNCOATED	N20
5708271	GT925107 WJ32MG	W71	5825484	I4C0500W062S UNCOATED	N21	5825749	I4C0125T075L TIALN	N20	5825822	I4C0250T075R UNCOATED	N20
5708273	GT925040 WS39MG	W71	5825485	I4C0500W100R UNCOATED	N21	5825751	I4C0125T100X TIALN	N20	5825823	I4C0250T112L UNCOATED	N20
5708275	GT925108 WJ32MG	W71	5825486	I4C0500W200L UNCOATED	N21	5825752	I4C0140T056R TIALN	N20	5825824	I4C0250T150X UNCOATED	N20
5708277	GT925041 WS39MG	W71	5825487	I4C0562W125L UNCOATED	N21	5825753	I4C0156T056R TIALN	N20	5825825	I4C0312T050S UNCOATED	N20
5708279	GT925042 WS39MG	W71	5825488	I4C0625W125R UNCOATED	N21	5825754	I4C0187T062R TIALN	N20	5825826	I4C0312T081R UNCOATED	N21
5708281	GT925043 WS39MG	W71	5825489	I4C0625W225L UNCOATED	N21	5825755	I4C0187T075S TIALN	N20	5825827	I4C0312T112L UNCOATED	N21
5708283	GT925062 WS39MG	W71	5825490	I4C0750W150R UNCOATED	N21	5825756	I4C0187T075L TIALN	N20	5825828	I4C0312T162X UNCOATED	N21
5708285	GT925130 WJ32MG	W71	5825491	I4C0750W225R UNCOATED	N21	5825757	I4C0187T112L TIALN	N20	5825829	I4C0375T062S UNCOATED	N21
5708287	GT925063 WS39MG	W71	5825492	I4C0750W300L UNCOATED	N21	5825758	I4C0187T112X TIALN	N20	5825830	I4C0375T100R UNCOATED	N21
5708289	GT925131 WJ32MG	W71	5825493	I4C0875W150R UNCOATED	N22	5825759	I4C0203T062R TIALN	N20	5825831	I4C0375T112L UNCOATED	N21
5708301	GT925064 WS39MG	W71	5825494	I4C0875W225L UNCOATED	N22	5825760	I4C0218T043R TIALN	N20	5825832	I4C0375T175X UNCOATED	N21



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5873974	I2C0625W225R TIALN	N5	5878002	I2C0500W100R UNCOATED	N5	5878224	I2B0062T018R UNCOATED	N9	5879180	I4S0625T075S TIALN	N24
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5873976	I2C0625W400X TIALN	N5	5878004	I2C0500W300X UNCOATED	N5	5878226	I2B0125T025S UNCOATED	N9	5879182	I4S0625T225L TIALN	N24
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5873980	I2C0750W400X TIALN	N5	5878008	I2C0625W125R UNCOATED	N5	5878230	I2B031T2081R UNCOATED	N10	5879186	I4S0750T150R TIALN	N25
5873981	I2C0875W150R TIALN	N5	5878009	I2C0625W225R UNCOATED	N5	5878241	I2B0375T087R UNCOATED	N10	5879187	I4S0750T225R TIALN	N25
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5873983	I2C1000W225R TIALN	N5	5878011	I2C0625W400X UNCOATED	N5	5878243	I2B0500T200L UNCOATED	N10	5879189	I4S0750T400X TIALN	N25
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5877926	I2C0125T075X UNCOATED	N4	5878018	I2C1000W225R UNCOATED	N5	5879055	I4S0062T011R TIALN	N23	5879196	I4S1000T400X TIALN	N25
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5877931	I2C0188T062R UNCOATED	N4	5878173	I2B0062T018R TIALN	N9	5879060	I4S0125T025S TIALN	N23	5879201	I4S0125T050R UNCOATED	N23
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5877937	I2C0250T075R UNCOATED	N4	5878179	I2B0125T025S TIALN	N9	5879136	I4S0187T062R TIALN	N23	5879207	I4S0250T112L UNCOATED	N24
5877938	I2C0250T112R UNCOATED	N4	5878180	I2B0125T050R TIALN	N9	5879137	I4S0187T075S TIALN	N23	5879208	I4S0250T150X UNCOATED	N24
5877939	I2C0250T125L UNCOATED	N4	5878181	I2B0125T075L TIALN	N9	5879138	I4S0187T075L TIALN	N23	5879209	I4S0312T050S UNCOATED	N24
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5877951	I2C0281T075R UNCOATED	N4	5878183	I2B0156T031R TIALN	N9	5879140	I4S0187T112X TIALN	N23	5879211	I4S0312T112L UNCOATED	N24
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5877954	I2C0312T162X UNCOATED	N4	5878186	I2B0187T062R TIALN	N9	5879143	I4S0218T062L TIALN	N23	5879214	I4S0375T100R UNCOATED	N24
5877955	I2C0344T100R UNCOATED	N5	5878187	I2B0187T075L TIALN	N9	5879144	I4S0234T075R TIALN	N23	5879215	I4S0375T112L UNCOATED	N24
5877956	I2C0375T062S UNCOATED	N5	5878188	I2B0187T100X TIALN	N9	5879145	I4S0250T050S TIALN	N23	5879216	I4S0375T175X UNCOATED	N24
5877957	I2C0375T100R UNCOATED	N5	5878189	I2B0218T062R TIALN	N9	5879146	I4S0250T075R TIALN	N23	5879217	I4S0437T100S UNCOATED	N24
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5877960	I2C0375T300X UNCOATED	N5	5878192	I2B0250T112R TIALN	N9	5879149	I4S0265T075R TIALN	N24	5879220	I4S0500T062S UNCOATED	N24
5877961	I2C0406T100R UNCOATED	N5	5878193	I2B0250T150L TIALN	N9	5879150	I4S0281T075R TIALN	N24	5879221	I4S0500T100R UNCOATED	N24
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5877964	I2C0437T200L UNCOATED	N5	5878196	I2B0312T081R TIALN	N10	5879153	I4S0312T081R TIALN	N24	5879224	I4S0562T075R UNCOATED	N24
5877965	I2C0437T300X UNCOATED	N5	5878197	I2B0312T112L TIALN	N10	5879154	I4S0312T112L TIALN	N24	5879225	I4S0562T125L UNCOATED	N24
5877967	I2C0469T100R UNCOATED	N5	5878198	I2B0312T150X TIALN	N10	5879155	I4S0312T162X TIALN	N24	5879226	I4S0562T225X UNCOATED	N24
5877968	I2C0500T062S UNCOATED	N5	5878199	I2B0375T062S TIALN	N10	5879156	I4S0328T100R TIALN	N24	5879227	I4S0625T075S UNCOATED	N24
5877969	I2C0500T100R UNCOATED	N5	5878200	I2B0375T087R TIALN	N10	5879157	I4S0343T100R TIALN	N24	5879228	I4S0625T125R UNCOATED	N24
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5877971	I2C0500T300X UNCOATED	N5	5878202	I2B0375T175L TIALN	N10	5879159	I4S0375T062S TIALN	N24	5879230	I4S0625T400X UNCOATED	N25
5877972	I2C0562T075R UNCOATED	N5	5878203	I2B0375T300X TIALN	N10	5879160	I4S0375T100R TIALN	N24	5879231	I4S0750T100S UNCOATED	N25
5877973	I2C0562T125L UNCOATED	N5	5878204	I2B0406T100R TIALN	N10	5879161	I4S0375T112L TIALN	N24	5879232	I4S0750T150R UNCOATED	N25
5877974	I2C0562T225X UNCOATED	N5	5878205	I2B0437T100R TIALN	N10	5879162	I4S0375T175X TIALN	N24	5879233	I4S0750T225R UNCOATED	N25
5877975	I2C0625T075S UNCOATED	N5	5878206	I2B0500T062S TIALN	N10	5879163	I4S0406T100R TIALN	N24	5879234	I4S0750T300X UNCOATED	N25
5877976	I2C0625T125R UNCOATED	N5	5878207	I2B0500T100R TIALN	N10	5879164	I4S0406T100R TIALN	N24	5879235	I4S0750T400X UNCOATED	N25
5877977	I2C0625T225R UNCOATED	N5	5878208	I2B0500T150X TIALN	N10	5879165	I4S0421T100R TIALN	N24	5879236	I4S0875T150R UNCOATED	N25
5877978	I2C0625T300L UNCOATED	N5	5878209	I2B0500T200L TIALN	N10	5879166	I4S0437T100S TIALN	N24	5879237	I4S1000T150S UNCOATED	N25
5877979	I2C0625T400X UNCOATED	N5	5878210	I2B0500T300L TIALN	N10	5879167	I4S0437T100R TIALN	N24	5879238	I4S1000T225R UNCOATED	N25
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5877991	I2C0750T100S UNCOATED	N5	5878212	I2B0625T225L TIALN	N10	5879169	I4S0437T300X TIALN	N24	5879240	I4S1000T400X UNCOATED	N25
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5879530	I4S0562W075R TIALN	N24				5903679	..... CPNT120408T WP35CM	J6	5908925	SNMG643MS WS10PT	B73
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250304 W	E31	2ELO75ISO TN6025	F52	3EL8W TN6025	F65	3ILAG55 TN6025	F64
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4C0308003A UNCOATED	M64	4K0210074C UNCOATED	M95	4K1316076C UNCOATED	M99	4K6213055C UNCOATED	M95
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7N2200610MJ ALTN-MJ1	M126	7N2201701MJ ALTN-MJ1	M128	7S0SL	S47	7V2E10004AT WS15PE	M47
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CCBM61520L WG	D15	CCMT215051P TN15U	B123	CCMT32511P TN10U	B123	CCMT4311P TN30M	B123
CCBM61525L WG	D15	CCMT215051P TN20K	B123	CCMT32511P TN15M	B123	CCMT43141 THM	B31
CCBM61525R WG	D15	CCMT215051P TN30M	B123	CCMT32511P TN15U	B123	CCMT431FP WK20CT	B31
CCBM6516320R WG	D17	CCMT21505FP WM25CT	B31	CCMT32511P TN20K	B123	CCMT431FP WM15CT	B31
CCBM6516325L WG	D17	CCMT21505FP WP15CT	B31	CCMT32511P TN20P	B123	CCMT431FP WM25CT	B31
CCBM6516325R WG	D17	CCMT21505FP WP25CT	B31	CCMT32511P TN30M	B123	CCMT431FP WP15CT	B31
CCBM6612320R WG	D17	CCMT21505FW WP15CT	B32	CCMT3251FP WK20CT	B31	CCMT431FP WP25CT	B31
CCBM6612325L WG	D17	CCMT2151 HK1500	B30	CCMT3251FP WM15CT	B31	CCMT431MW WP15CT	B33
CCBM6612325R WG	D17	CCMT2151 THM	B30	CCMT3251FP WM25CT	B31	CCMT431MW WP25CT	B33
CCBM6612630R WG	D17	CCMT2151 TTI15	B30	CCMT3251FP WP15CT	B31	CCMT432 THM	B30
CCBM6612635L WG	D17	CCMT2151 TTR	B30	CCMT3251FP WP25CT	B31	CCMT432 TTR	B30
CCBM6612635R WG	D17	CCMT21511P TN10P	B123	CCMT3251FP WS10PT	B31	CCMT4321P TN10P	B123
CCBM81005L WG	D15	CCMT21511P TN10U	B123	CCMT3251FP WS25PT	B31	CCMT4321P TN10U	B123
CCBM81520L WG	D15	CCMT21511P TN15M	B123	CCMT3251FW WM15CT	B32	CCMT4321P TN15M	B123
CCBM81520R WG	D15	CCMT21511P TN15U	B123	CCMT3251FW WP15CT	B32	CCMT4321P TN20K	B123
CCBM81525L WG	D15	CCMT21511P TN20K	B123	CCMT3251MP WK20CT	B32	CCMT4321P TN20P	B123
CCBM81525R WG	D15	CCMT21511P TN20P	B123	CCMT3251MP WM15CT	B32	CCMT4321P TN30M	B123
CCGT215051P TN10U	B122	CCMT21511P TN30M	B123	CCMT3251MP WM25CT	B32	CCMT43241 THM	B31
CCGT215051P TN15U	B122	CCMT21512 TTI15	B30	CCMT3251MP WP15CT	B32	CCMT432FP WK20CT	B31
CCGT21505AL3 HCK10	B155	CCMT2151FP WK20CT	B31	CCMT3251MP WP25CT	B32	CCMT432FP WM15CT	B31
CCGT21505AL3 HWK15	B155	CCMT2151FP WM15CT	B31	CCMT3251MP WS10PT	B32	CCMT432FP WM25CT	B31
CCGT21511P TN10U	B122	CCMT2151FP WM25CT	B31	CCMT3251MU TN2000	B33	CCMT432FP WP15CT	B31
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CCGT2151AL3 HCK10	B155	CCMT2151FP WP25CT	B31	CCMT3251MU WK20CT	B33	CCMT432MP WK20CT	B32
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CCGT21521P TN10U	B122	CCMT2151FP WS25PT	B31	CCMT3251MU WP15CT	B33	CCMT432MP WM25CT	B32
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CCGT325051P TN15U	B122	CCMT2151MP WM15CT	B32	CCMT3251MW WP15CT	B33	CCMT432MU TN5120	B33
CCGT32505AL3 HWK15	B155	CCMT2151MP WM25CT	B32	CCMT3251MW WP25CT	B33	CCMT432MP WK20CT	B33
CCGT32511P TN10U	B122	CCMT2151MP WP15CT	B32	CCMT3252 HK1500	B30	CCMT432MU WM25CT	B33
CCGT32511P TN15U	B122	CCMT2151MP WP25CT	B32	CCMT3252 THM	B30	CCMT432MU WP15CT	B33
CCGT3251AL3 HCK10	B155	CCMT2151MP WS10PT	B32	CCMT32521P TN10P	B123	CCMT432MU WP25CT	B33
CCGT3251AL3 HWK15	B155	CCMT21521P TN10P	B123	CCMT32521P TN10U	B123	CCMT432MU WS25PT	B33
CCGT32521P TN10U	B122	CCMT21521P TN10U	B123	CCMT32521P TN15M	B123	CCMT432MW WP15CT	B33
CCGT32521P TN15U	B122	CCMT21521P TN15M	B123	CCMT32521P TN15U	B123	CCMT432MW WP25CT	B33
CCGT3252AL3 HWK15	B155	CCMT21521P TN20K	B123	CCMT32521P TN20K	B123	CCMT433FP WK20CT	B31
CCGT4305AL3 HWK15	B155	CCMT21521P TN20P	B123	CCMT32521P TN20P	B123	CCMT433FP WM25CT	B31
CCGT431AL3 HCK10	B155	CCMT21521P TN30M	B123	CCMT32521P TN30M	B123	CCMT433FP WP15CT	B31
CCGT431AL3 HWK15	B155	CCMT2152FP WK20CT	B31	CCMT3252FP WK20CT	B31	CCMT433FP WP25CT	B31
CCGT432AL3 HCK10	B155	CCMT2152FP WM15CT	B31	CCMT3252FP WM15CT	B31	CCMT433MP WK20CT	B32
CCGT432AL3 HWK15	B155	CCMT2152FP WM25CT	B31	CCMT3252FP WM25CT	B31	CCMT433MP WM15CT	B32
CCGW21505EC WBH25P	B197	CCMT2152FP WP15CT	B31	CCMT3252FP WP15CT	B31	CCMT433MP WM25CT	B32
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CCGW21505S0415C WBH10P	B197	CCMT2152FP WS10PT	B31	CCMT3252FP WS25PT	B31	CCMW21505 THM	B34
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CCGW2151S0415C WBH10P	B197	CCMT2152MU TN5120	B33	CCMT3252MP WM25CT	B32	CCMW2151FST WDN25U	B199
CCGW2151S0415C WBH25P	B197	CCMT2152MU WK20CT	B33	CCMT3252MP WP15CT	B32	CCMW2152FST WDN25U	B199
CCGW3251EFC WBH25P	B198	CCMT2152MU WM25CT	B33	CCMT3252MP WP25CT	B32	CCMW3205 THM	B34
CCGW3251FST WDN00U	B197	CCMT321 HK1500	B30	CCMT3252MP WS10PT	B32	CCMW321 THM	B34
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CCGW3251S0415MT WBH10P	B198	CCMT321MU TN2000	B33	CCMT3252MU WM25CT	B33	CCMW322 WK05CT	B34
CCGW3252EFC WBH25P	B198	CCMT321MU WM25CT	B33	CCMT3252MU WP15CT	B33	CCMW322 WK20CT	B34
CCGW3252FST WDN00U	B197	CCMT321MU WP25CT	B33	CCMT3252MU WP25CT	B33	CCMW3251 THM	B34
CCGW3252FST WDN25U	B197	CCMT322 HK1500	B30	CCMT3252MU WP35CT	B33	CCMW3251 WK05CT	B34
CCGW3252S0415C WBH25P	B197	CCMT322 THM	B30	CCMT3252MU WS10PT	B33	CCMW3251 WK20CT	B34
CCGW3252S0415MT WBH10P	B198	CCMT322 TTR	B30	CCMT3252MU WS25PT	B33	CCMW3251FST WDN25U	B199
CCGW3252S0415MT WBH30P	B198	CCMT322MU TN7115	B33	CCMT3252MW WP15CT	B33	CCMW3252 THM	B34
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CCLNL244DMX5 WG	C19	CCMT322MU WP15CT	B33	CCMT3253 TN7125	B30	CCMW3252 WK20CT	B34
CCLNR164DMX5 WG	C19	CCMT322MU WP25CT	B33	CCMT3253 TTR	B30	CCMW3252FST WDN25U	B199
CCLNR165DMX5 WG	C19	CCMT325051P TN10U	B123	CCMT3253MP WM25CT	B32	CCMW431 THM	B34
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CCM25040R WG	D56	CCMT32505FP WM25CT	B31	CCMT4311P TN10P	B123	CCMW431 WK20CT	B34
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CDHB1206X0 CG6	D76	CNG434T0820 CW2015	B179	CNMA431 TN20K	B125	CNMG431MS WS25PT	B40
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CNMG432MR WP25CT	B39	CNMG433RH WP25CT	B41	CNMG5437N TN30P	B128	CNMG643MS WU10HT	B40
CNMG432MR WP35CT	B39	CNMG433RH WP35CT	B41	CNMG543MR WM25CT	B39	CNMG643RH WP20CT	B41
CNMG432MS WS10PT	B40	CNMG433UF WM15CT	B42	CNMG543MR WM35CT	B39	CNMG643RH WM25CT	B41
CNMG432MS WS25PT	B40	CNMG433UF WM25CT	B42	CNMG543MR WP15CT	B39	CNMG643RH WP15CT	B41
CNMG432MS WU10HT	B40	CNMG433UM WM15CT	B42	CNMG543MR WP25CT	B39	CNMG643RH WP25CT	B41
CNMG432MW WK05CT	B40	CNMG433UM WM25CT	B42	CNMG543MR WP35CT	B39	CNMG643RH WP35CT	B41
CNMG432MW WM25CT	B40	CNMG433UM WM35CT	B42	CNMG543MS WS10PT	B40	CNMG643UR WK05CT	B43
CNMG432RH WK20CT	B41	CNMG433UM WS10PT	B42	CNMG543MS WS25PT	B40	CNMG643UR WK20CT	B43
CNMG432RH WM25CT	B41	CNMG433UR WK05CT	B43	CNMG543MS WU10HT	B40	CNMG643UR WM15CT	B43
CNMG432RH WP15CT	B41	CNMG433UR WK20CT	B43	CNMG543RH WK20CT	B41	CNMG643UR WM25CT	B43
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CNMG432RH WP35CT	B41	CNMG433UR WM25CT	B43	CNMG543RH WP15CT	B41	CNMG643UR WP15CT	B43
CNMG432UF WM15CT	B42	CNMG433UR WM35CT	B43	CNMG543RH WP25CT	B41	CNMG643UR WP25CT	B43
CNMG432UF WM25CT	B42	CNMG433UR WP15CT	B43	CNMG543RH WP35CT	B41	CNMG643UR WP35CT	B43
CNMG432UF WS10PT	B42	CNMG433UR WP25CT	B43	CNMG543UR WK20CT	B43	CNMG643UR WS10PT	B43
CNMG432UM WM15CT	B42	CNMG433UR WP35CT	B43	CNMG543UR WM15CT	B43	CNMG643UR WS25PT	B43
CNMG432UM WM25CT	B42	CNMG433UR WS10PT	B43	CNMG543UR WM25CT	B43	CNMG644 HK1500	B37
CNMG432UM WM35CT	B42	CNMG433UR WS25PT	B43	CNMG543UR WM35CT	B43	CNMG644 THM	B37
CNMG432UM WP15CT	B42	CNMG4347N TN10P	B128	CNMG543UR WP15CT	B43	CNMG6447N TN10P	B128
CNMG432UM WP25CT	B42	CNMG4347N TN20K	B128	CNMG543UR WP25CT	B43	CNMG6447N TN20K	B128
CNMG432UR WK05CT	B43	CNMG4347N TN20P	B128	CNMG543UR WP35CT	B43	CNMG6447N TN20P	B128
CNMG432UR WK20CT	B43	CNMG434ML WK20CT	B38	CNMG543UR WS10PT	B43	CNMG6447N TN30P	B128
CNMG432UR WM15CT	B43	CNMG434ML WP25CT	B38	CNMG5447N TN10P	B128	CNMG644MR WM25CT	B39
CNMG432UR WM25CT	B43	CNMG434MR WM25CT	B39	CNMG5447N TN20K	B128	CNMG644MR WM35CT	B39
CNMG432UR WM35CT	B43	CNMG434MR WM35CT	B39	CNMG5447N TN20P	B128	CNMG644MR WP15CT	B39
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CNMG4332P TN15M	B126	CNMG434RH WP15CT	B41	CNMG544RH WP15CT	B41	CNMG644RH WP15CT	B41
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CNMG4337N TN20P	B128	CNMG542MR WP25CT	B39	CNMG642MS WS25PT	B40	CNMG646RH WP25CT	B41
CNMG4337N TN30P	B128	CNMG542MS WS10PT	B40	CNMG642MS WU10HT	B40	CNMG646RH WP35CT	B41
CNMG433FF WK20CT	B37	CNMG542MS WS25PT	B40	CNMG642RH WK20CT	B41	CNMG8667N TN30P	B128
CNMG433FF WM25CT	B37	CNMG542MS WU10HT	B40	CNMG642RH WM25CT	B41	CNMM43265 TN7025	B44
CNMG433FF WP15CT	B37	CNMG542RH WK20CT	B41	CNMG642RH WP15CT	B41	CNMM43265 WM25CT	B44

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CNMM43265 WP15CT	B44	CPGW21505S0415C WBH10P	B203	CPNT120408T WK15CM	J6	CSBM5212255R WG	D13
CNMM43265 WP25CT	B44	CPGW21505S0415C WBH30P	B203	CPNT120408T WP35CM	J6	CSBM5650L WG	D11
CNMM43265 WP35CT	B44	CPGW2151FST WDN25U	B204	CPNT2151T WK15CM	J5	CSBM5650R WG	D11
CNMM43365 TN7115	B44	CPGW2151FWST WDN00U	B204	CPNT2151T WP35CM	J5	CSBM5655L WG	D11
CNMM43365 WM25CT	B44	CPGW2151FWST WDN25U	B204	CPNT2151T WP40PM	J5	CSBM5655R WG	D11
CNMM43365 WP15CT	B44	CPGW2151S0415C WBH10P	B203	CPNT2522T THM	J5	CSBM6410195L WG	D13
CNMM43365 WP25CT	B44	CPGW2151S0415C WBH25P	B203	CPNT2522T WK15CM	J5	CSBM6410195R WG	D13
CNMM43465 WM25CT	B44	CPGW2151S0415C WBH30P	B203	CPNT2522T WP35CM	J5	CSBM6412190R WG	D13
CNMM43465 WP25CT	B44	CPGW2152FST WDN25U	B204	CPNT3252T WK15CM	J6	CSBM6412195L WG	D13
CNMM54265 TN7125	B44	CPGW2152S0415C WBH25P	B203	CPNT3252T WP35CM	J6	CSBM6412195R WG	D13
CNMM54265 WP25CT	B44	CPGW3251FST WDN25U	B204	CPT20052R CG5	D88	CSBM6412320R WG	D13
CNMM54265 WP35CT	B44	CPGW3251S0415C WBH25P	B203	CPT20052R CM1	D88	CSBM6412325L WG	D13
CNMM54365 TN7125	B44	CPGW3251S0415MT WBH10P	B205	CRDPN162DV WG	C23	CSBM6412325R WG	D13
CNMM54365 WM25CT	B44	CPGW3251S0415MT WBH30P	B205	CRDPN163DV WG	C23	CSBM6650L WG	D11
CNMM54365 WP15CT	B44	CPGW3252FST WDN25U	B204	CRDPN164DV WG	C23	CSBM6650R WG	D11
CNMM54365 WP25CT	B44	CPGW3252FWST WDN00U	B204	CRDPN203DV WG	C23	CSBM6655L WG	D11
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CNMM54465 WP15CT	B44	CPGW3252S0415MT WBH10P	B205	CRGPL164DV WG	C24	CSBM8765L WG	D11
CNMM54465 WP25CT	B44	CPGW3252S0415MT WBH30P	B205	CRGPL203DV WG	C24	CSBM8765R WG	D11
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CNMM64365 WP35CT	B44	CPGW432FWST WDN00U	B204	CRGPR203DV WG	C24	CSDPN124 WG	C21
CNMM64465 WP15CT	B44	CPGW432FWST WDN25U	B204	CRGPR204DV WG	C24	CSDPN164 WG	C21
CNMM64465 WM25CT	B44	CPHB21205 CG5	D77	CS412	C23-24	CSH1000156 WG	D60
CNMM64465 WP15CT	B44	CPHB2121 CG5	D77	CSBH16518757L WG	D10	CSH1000187 WG	D60
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CNMM644SR WM25CT	B44	CPHH21205 CG6	D78	CSBH180187255L WG	D10	CSH1000312 WG	D60
CNMM644SR WP15CT	B44	CPHH21205 CM1	D78	CSBH180187255R WG	D10	CSH1000375 WG	D60
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CNMM646SR WP35CT	B44	CPMT2151FP WK20CT	B46	CSBH18050055L WG	D12	CSH15001000 WG	D60
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CNMM866SR WP15CT	B44	CPMT2151FP WM25CT	B46	CSBH187250R WG	D10	CSH1500750 WG	D60
CNMM866SR WP25CT	B44	CPMT2151FP WP15CT	B46	CSBH187255L WG	D10	CSH625156 WG	D60
CNMM866SR WP35CT	B44	CPMT2151FP WP25CT	B46	CSBH187255R WG	D10	CSH625187 WG	D60
CNMP431 WM15CT	B45	CPMT2152FP WK20CT	B46	CSBI20337510R WG	D12	CSH625250 WG	D60
CNMP431 WM25CT	B45	CPMT2152FP WM15CT	B46	CSBI20337515R WG	D12	CSH625312 WG	D60
CNMP431 WM35CT	B45	CPMT2152FP WM25CT	B46	CSBI20337550R WG	D12	CSH625375 WG	D60
CNMP431 WS1OPT	B45	CPMT2152FP WP15CT	B46	CSBI20337555R WG	D12	CSH750156 WG	D60
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CNMP432 WM25CT	B45	CPMT2152MP WP15CT	B46	CSBI20350015L WG	D12	CSH750250 WG	D60
CNMP432 WM35CT	B45	CPMT2152MP WP25CT	B46	CSBI20350015R WG	D12	CSH750312 WG	D60
CNMP432 WS1OPT	B45	CPMT32505FP WM25CT	B46	CSBI20350055L WG	D12	CSH750375 WG	D60
CNMP432 WS25PT	B45	CPMT32505LF CG5	D78	CSBI20350055R WG	D12	CSH750500 WG	D60
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CNMP543 WS1OPT	B45	CPMT3252LF CG5	D78	CSBI250500755L WG	D12	CSM125030R WG	D55
CNMP643 WS1OPT	B45	CPMT3252MP WK20CT	B46	CSBI250500755R WG	D12	CSMM6760R WG	D56
CNMP644 WM15CT	B45	CPMT3252MP WM15CT	B46	CSBM4510125L WG	D13	CSP125050010R WG	D46
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CNMP644 WM35CT	B45	CPMT3252MP WP15CT	B46	CSBM4512125L WG	D13	CSP125050015L WG	D46
CNMS432FST WDN25U	B202	CPMT3252MP WP25CT	B46	CSBM4512125R WG	D13	CSP125050015R WG	D46
CPG2032R CG5	D87	CPMT3253MP WK20CT	B46	CSBM4512255L WG	D13	CSP3125001250R WG	D46
CPG2062R CG5	D87	CPMT3253MP WM15CT	B46	CSBM4657L WG	D11	CSP3125001255L WG	D46
CPG421F WDN25U	B203	CPMT3253MP WP25CT	B46	CSBM4657R WG	D11	CSP3125001255R WG	D46
CPG422F WDN25U	B203	CPMW2151FST WDN25U	B205	CSBM5210125R WG	D13	CSPM71225225L WG	D47
CPGT151213 TN35	B45	CPMW3251FWST WDN25U	B205	CSBM5210250R WG	D13	CSPM71225225R WG	D47
CPGT151213 TTR	B45	CPMW7151FST WDN25U	B205	CSBM5210255R WG	D13	CSPM712255L WG	D47
CPGW21505EC WBH25P	B203	CPNT09T308T TTM08	J6	CSBM5212125L WG	D13	CSPM712255R WG	D47
CPGW21505FST WDN25U	B204	CPNT120408T TN7535	J6	CSBM5212250R WG	D13	CSPM81232225L WG	D47

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CSPM8123225R WG	D47	DCGW3251FST WDN25U	B206	DCMT3251FP WK20CT	B48	DCMT432FP WP15CT	B48
CSPM812325L WG	D47	DCGW3251S0415MT WBH10P	B206	DCMT3251FP WM15CT	B48	DCMT432FP WP25CT	B48
CSRPR10CA3 WG	C75	DCGW3252S0415MT WBH10P	B206	DCMT3251FP WM25CT	B48	DCMT432MU TN5105	B49
CSRPR12CA4 WG	C75	DCKNL164DKC3 WG	C8	DCMT3251FP WP15CT	B48	DCMT432MU WK05CT	B49
CSSPL10CA3 WG	C76	DCKNL204DKC3 WG	C8	DCMT3251FP WP25CT	B48	DCMT432MU WK20CT	B49
CSSPL12CA4 WG	C76	DCKNL205DKC4 WG	C8	DCMT3251FW WM15CT	B48	DCMT432MU WM25CT	B49
CSSPL20CA4 WG	C76	DCKNR124BK3 WG	C8	DCMT3251FW WP15CT	B48	DCMT432MU WP15CT	B49
CSSPR10CA3 WG	C76	DCKNR164DKC3 WG	C8	DCMT3251MP WK20CT	B49	DCMT432MU WP25CT	B49
CSSPR12CA4 WG	C76	DCKNR204DKC3 WG	C8	DCMT3251MP WP15CT	B49	DCMT432MU WS10PT	B49
CSWM 035 040	C78, C81, C83-84	DCKNR205DKC4 WG	C8	DCMT3251MP WP25CT	B49	DCMT432MU WS25PT	B49
CSWM 040 050	C78-79, C81-85, C87, C94-97	DCKNR206DKC4 WG	C8	DCMT3251MU TN5105	B49	DCMT433 THM	B47
CSWM 060 050	C62-64, C67-78, C80-81, C86-97	DCLNL123BK3 WG	C9	DCMT3251MU WK05CT	B49	DCMT433MU TN5105	B49
CSWM 080 050	C62-73, C76-77, C80, C88, C92	DCLNL124BK3 WG	C9	DCMT3251MU WK20CT	B49	DCMT433MU WK05CT	B49
CSWM 100 080	C64, C67, C71-72	DCLNL163DK3 WG	C9	DCMT3251MU WM25CT	B49	DCMT433MU WK20CT	B49
CT11 WG	D41-43, D54, D91, D106, D121	DCLNL164DK3 WG	C9	DCMT3251MU WP15CT	B49	DCMT434 THM	B47
CT15	D42	DCLNL165DKC4 WG	C9	DCMT3251MU WP25CT	B49	DCMW2151 THM	B50
CT15 WG	D41-42, D46-49, D91, D106, D121	DCLNL166DKC4 WG	C9	DCMT3251MU WS10PT	B49	DCMW2151 WK05CT	B50
CTAPR082B WG	C21	DCLNL204DKC3 WG	C9	DCMT3251MU WS25PT	B49	DCMW2151 MW WDN25U	B207
CTAPR123B WG	C21	DCLNL205DKC4 WG	C9	DCMT3251MW WP25CT	B50	DCMW3251 THM	B50
CTCPN443 WG	C22	DCLNL244DKC3 WG	C9	DCMT3252 HK1500	B47	DCMW3251 WK05CT	B50
CTEPR123B WG	C22	DCLNL245DKC4 WG	C9	DCMT3252 THM	B47	DCMW3251 WK20CT	B50
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CV50BRFX50256 WG	U71	DCMT215051P TN10U	B129	DCMT3252MP WM15CT	B49	DCRN164DKC3 WG	C10
CV50BRFX720276 WG	U71	DCMT215051P TN15U	B129	DCMT3252MP WM25CT	B49	DCRN164DKC3 WG	C10
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D100MTTB1330KM63	C55	DCMT2151 THM	B47	DCMT3252MU TN2000	B49	DCRN164DKC3 WG	C10
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KM50TSTCHS050067 WG	U51	M100D100Z02W125RD10 W	K87	M1200D500Z08S150HN09	H28	M170D025Z02A25RD10L180	K56
KM50TSTCHS067088 WG	U51	M100D100Z02W125RD12L715 W	K87	M1200D500Z10S150HN09	H28	M170D025Z02A25RD10L220	K56
KM63TSTCHS067088 WG	U67	M100D125Z02W125RD12 W	K87	M1200D500Z12S150HN07	H13	M170D025Z02M12RD10	K54
KM63TSTCHS088115 WG	U67	M100D125Z02W125RD12L615 W	K87	M1200D500Z14S150HN09	H28-29	M170D025Z03B25RD10	K55
KM63TSTCHS067088 WG	U51	M100D125Z02W150RD12 W	K87	M1200D600Z09S200HN07	H13	M170D025Z03M12RD10	K54
KM63TSTCHS088115 WG	U51	M100D150Z02M16RD12 W	K86	M1200D600Z09S200HN09	H28	M170D025Z05M12RD07	K48
KMSP315IP	C9, C11, C15-18	M100D150Z02W125RD16 W	K94	M1200D600Z12S200HN09	H28	M170D028Z02A25RD10L200	K56
KMSP39IP	C9	M100D150Z03W125RD12 W	K87	M1200D600Z16S200HN09	H28-29	M170D030Z04M16RD10	K54
KMSP415IP	C8-18, C36-39	M100D150Z03W125RD12L715 W	K87	M1200D800Z10S250HN09	H28	M170D030Z05M16RD07	K48
KMSP4S15IP	C37	M100D200Z03S075RD16 W	K95	M1200D800Z16S250HN09	H28-29	M170D032Z02A32RD12L200	K63
KMSP515IP	C8-11, C13, C37	M100D200Z04S075RC16 W	K98	M1200HD150Z04S050HN07	H18	M170D032Z02A32RD12L300	K63
KMSP5S15IP	C37	M100D200Z04S075RD12 W	K89	M1200HD150Z05S050HN07	H18	M170D032Z02M16RD16	K68
KMSP625IP	C8-10, C13-14, C37, C39	M100D200Z05S075RD12 W	K89	M1200HD200Z04S075HN07	H18	M170D032Z03B32RD12	K62
KUAM20	C78-79, C81-85, C87, C94-97	M100D250Z04S100RC16 W	K98	M1200HD200Z04S075HN09	H36	M170D035Z02A32RD12L300	K63
KUAM22	C62-64, C67-77	M100D250Z04S100RD16 W	K95	M1200HD200Z05S075HN07	H18	M170D035Z03M16RD12	K61
KUAM23	C80, C87-90, C92, C94-97	M100D300Z05S100RC16 W	K98	M1200HD200Z05S075HN09	H36	M170D035Z04M16RD12	K61
KUAM25	C62-73, C77, C80, C88, C92	M100D300Z05S100RD16 W	K95	M1200HD250Z04S075HN07	H18	M170D035Z05M16RD10	K54
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KUAM27	C64, C67, C71	M100D300Z07S100RD12 W	K89	M1200HD250Z06S075HN07	H18	M170D040Z04RD12	K64
KUAM28	C62, C67-71, C74-78, C80-81, C86-89, C91-97	M100D400Z06S125RD16 W	K95	M1200HD250Z06S075HN09	H36	M170D040Z05RD10	K57
KUAM30	C62, C67-71, C74-78, C80-81, C86-89, C91-97	M100D400Z07S125RC16 W	K98	M1200HD300Z05S100HN07	H18	M170D042Z05M16RD12	K61
KUAM31	C62-64, C67-77, C80, C87-90, C92, C94-97	M100D400Z07S150RC16 W	K98	M1200HD300Z05S100HN09	H36	M170D042Z05RD10	K57
KUAM32	C62-73, C76-77, C80, C88, C92	M100D600Z09S200RC16 W	K98	M1200HD300Z08S100HN07	H18	M170D042Z06M16RD10	K54
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LNUX191940T WK20CT	B65	M1200D100Z02C100HN07L800	H12	M1200HD400Z09S150HN07	H36	M170D052Z05RD12	K64
LNUX30194013 WK20CT	B64	M1200D100Z02M16HN07	H10	M1200HD500Z08S150HN07	H18	M170D052Z06RD10	K57
LNUX301940T WK20CT	B65	M1200D100Z03C100HN07L800	H12	M1200HD500Z12S200HN09	H36	M170D063Z05RD16	K69
LNUX400924EN95 TTR	B64	M1200D100Z03M16HN07	H10	M1200HF100Z02C075HN07L480	H5	M170D063Z06RD12	K64
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SNMG543RH WP25CT	B74	SNMG644UR WM25CT	B75	SPG322T0420 CW2015	B191	SSBI75040R WG	D35
SNMG543RH WP35CT	B74	SNMG644UR WM35CT	B75	SPG421T0420 CW2015	B191	SSBI75045L WG	D35
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SNMG5447N TN20P	B137	SNMM43365 WM25CT	B76	SPMR422 WP15CT	B78	SSBIW62573L WG	D45
SNMG5447N TN30P	B137	SNMM43365 WP25CT	B76	SPMR422 WP35CT	B78	SSBIW62573R WG	D45
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SNMG544MR WM35CT	B73	SNMM54465 WP25CT	B76	SPMR423 WP35CT	B78	SSBIW75083R WG	D45
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SNMG544RH WP15CT	B74	SNMM64365 WP15CT	B76	SPMT3251FP WP15CT	B79	SSBM202035L WG	D36
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SNMG544UR WP25CT	B75	SNMM64665 WM25CT	B76	SPMT3252MP WP25CT	B79	SSKCR16CA12 WG	C88
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TCMT3252 TTR	B81	TDG532A04090 WN10HD	R110	TDG532A09100 WN10HD	R112	TDG532A14800 WN10HD	R114
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TCMT32521P TN10U	B139	TDG532A04200 WN10HD	R110	TDG532A09200 WN10HD	R112	TDG532A15000 WN10HD	R114
TCMT32521P TN15M	B139	TDG532A04217 WN10HD	R110	TDG532A09300 WN10HD	R112	TDG532A15083 WN10HD	R114
TCMT32521P TN20K	B139	TDG532A04300 WN10HD	R111	TDG532A09347 WN10HD	R112	TDG532A15100 WN10HD	R114
TCMT32521P TN20P	B139	TDG532A04366 WN10HD	R111	TDG532A09400 WN10HD	R112	TDG532A15200 WN10HD	R114
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TDS413A08700 WK15PD	R56	TDS413A14500 WK15PD	R58	TDS501A06528 WU25PD	R71	TDS504A11500 WU20PD	R91
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TDS413A09100 WK15PD	R56	TDS413A14900 WK15PD	R58	TDS501A08433 WU25PD	R72	TDS504A12500 WU20PD	R92
TDS413A09129 WK15PD	R56	TDS413A15000 WK15PD	R58	TDS501A08733 WU25PD	R72	TDS504A12700 WU20PD	R92
TDS413A09200 WK15PD	R56	TDS413A15083 WK15PD	R58	TDS501A09347 WU25PD	R72	TDS504A13000 WU20PD	R92
TDS413A09300 WK15PD	R56	TDS413A15100 WK15PD	R58	TDS501A09750 WU25PD	R72	TDS504A13100 WU20PD	R92
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TDS413A09400 WK15PD	R56	TDS413A15300 WK15PD	R58	TDS501A12304 WU25PD	R73	TDS504A14000 WU20PD	R92
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VCGT4358AL3 HCK10	B157	VDS201A04700 WU25PD	R10	VDS201A09800 WU25PD	R11	VDS201A15700 WU25PD	R13
VCGT4358AL3 HWK15	B157	VDS201A04763 WU25PD	R10	VDS201A09900 WU25PD	R11	VDS201A15800 WU25PD	R13
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Turning Icons

Shank: KM-TS™ (ISO 26622)	ISO: 26622	Through Coolant: 100 bar	Through Coolant: 100 bar	Turning
Cut-off	I.D. Turning	I.D. Chamfering	I.D. Grooving	I.D. Face Grooving
I.D. Internal Threading	Profiling	Facing	Face Grooving	Back Boring
Threading	Grooving			

Indexable Milling Icons

Face Milling	Helical Milling	Plunge Milling	Ramping Blank	Slotting: Ball Nose
Slotting: Side Milling	Slotting: Side Milling with AE/AP Dimensions	Slotting: Square End	Slotting: T	Side Milling/Shoulder Milling: Ball Nose
Side Milling/Shoulder Milling: Square End	Side Milling: Square End with AE/AP Dimensions	Chamfer Milling	Side Milling: Roughing	3D Profiling
PCD Tool	Pocketing	Plain Shank	Shell Mill Shank	Weldon® Shank
Weldon Shank: 2 Flat	Screw-On Shank	Through Coolant: Radial: Indexable Milling		

Solid End Milling Icons

Plunge Milling	Ramping Blank	Slotting: Ball Nose	Slotting: Ball Nose with AP Dimension	Slotting: Square End
Slotting: Square End with AP Dimension	Trochoidal Milling	Trochoidal Milling: Ball Nose	Side Milling: Shoulder Milling: Ball Nose	Side Milling: Shoulder Milling: Ball Nose with AE/AP Dimension
Side Milling/Shoulder Milling: Square End	Side Milling/Shoulder Milling: Square End with AE/AP Dimension	3D Profiling	HSS-PM Material	HSS-M42
Corner Style: Ball Nose	Corner Style: Corner Chamfer	Corner Style: Corner Radius	Corner Style: Square End	Corner Style: Torus
Shank: NAS986 5.4D	Helix Angle: 0°	Helix Angle: 45°	Helix Angle: 50°	Helix Angle: 43°

(continued)

*(continued)*
**Solid End Milling Icons**

Helix Angle: 15°	Helix Angle: 20°	Helix Angle: 30°	Helix Angle: 35°	Helix Angle: 37°
Helix Angle: 38°	Helix Angle: 40°	Through Coolant: Axial: Solid End Mill	Tool Dimensions: Flute Configuration: X (Variable)	Tool Dimensions: Flute Configuration: 2
Tool Dimensions: Flute Configuration: 3	Tool Dimensions: Flute Configuration: 4	Tool Dimensions: Flute Configuration: 5	Tool Dimensions: Flute Configuration: 6	Tool Dimensions: Flute Configuration: 7
Manufacturer's Specs: JIS				

**Holemaking Icons**

Countersinking/Stroke Chamfering	Drilling	Chain Drilling	Drilling: Cross Hole	Drilling: Half Cylinder
Drilling: Corner Drilling 45°	Drilling: Inclined Entry	Drilling: Inclined Exit	Drilling: Exit Offset	Drilling: Stacked Plates
Drilling: Convex	Drilled Hole	Reaming: Through Hole	Reaming: Blind Hole	Reaming: Through Cross
Reaming: Blind and Cross Holes	Drilling Depth: 3x	Drilling Depth: 5x	Drilling Depth: 8x	Drilling Depth: 12x
Shank: Cylindrical Plain	Shank: Cylindrical Plain $\leq h6$	Flat Shank	Shank: Cylindrical with Flat	Shank: Cylindrical with Flat and Flange
KM™ Shank	Helix Angle 0°	Helix Angle 30°	DIN Number 212	DIN Number 6535
DIN Number 6537	Through Coolant: Radial: Drilling	Reaming: Through Coolant	Through Coolant: Radial: Indexable Drilling	Flood Coolant: Drilling
Flood Coolant: Reaming	Through Coolant: MQL (Minimum Quantity Lubricant): Drilling	Axial: Drilling	Through Coolant: Axial Reaming	Tool Dimensions: 2-Flute/2-Margin/Coolant
Tool Dimensions: 2-Flute/4-Margin/Coolant				

*(continued)*

(continued)

Tapping Icons

Tapping: Blind Hole	Tapping: Pipe Thread	Threading: Through Hole	Threading: Blind Hole	HSS: High-Speed Steel
HSS-E: High-Speed Steel with Cobalt Alloy for Materials with Higher Hardness	HSS-E-PM: High-Speed Steel with Cobalt Alloy for Materials with Higher Hardness (PM = Power Metal Steel)	HM: (Carbide)	Square Shank	Chamfer Form A (6-8)
Chamfer Form C (2-3)	Chamfer Form D (3.5-5)	Chamfer Form E (1.5-2)	Plug Chamfer (3-5)	Chamfer Form 25-35
Chamfer Form 1-2	Chamfer Form 3-4	Chamfer Form 7-10	Tapping Helix: Angle: 0°	Tapping Helix: Angle: 10°
Tapping Helix: Angle: L8°	Tapping Helix: Angle: 15°	Tapping Helix: Angle: L15°	Tapping Helix: Angle: 25°	Tapping Helix: Angle: 30°
Tapping Helix: Angle: 42°	Tapping Helix: Angle: 45°	DIN Number 371	DIN Number 374	DIN Number 2174
DIN/ANSI	DIN Number 376	Tapping: Through Coolant	Flood Coolant: Tapping	Through Coolant: Axial: Tapping
ISO 2	Manufacturer's Specs: JIS	Class of Fit: 2B	Class of Fit: 3B	Class of Fit: 6H
Class of Fit: 6HX	Class of Fit: 6G	Class of Fit: 2BX	Class of Fit: 3BX	ANSI Tap Dimensions
American National Standard Taper Pipe Tap	ANSI UNF	Dryseal American National Standard Taper Pipe Tap	ANSI M	ANSI MF
Unified Fine Thread	Unified Course Thread	American Tapered Pipe Thread for Threads with Dryseal Material	American Tapered Pipe Thread for Threads without Dryseal Material	American National Standards Institute
Unified Course Thread: J Profile	Unified Fine Thread: J Profile	American Straight Pipe Thread for Threads with Dryseal Material	American Straight Pipe Thread for Threads with Dryseal Material	ISO Metric Coarse Thread
ISO Metric Fine Thread				

DIN – German Institute for Standardization  
ANSI – American National Standards Institute



<b>P</b> Steel	<b>K</b> Cast Iron	<b>S</b> High-Temp Alloys
<b>M</b> Stainless Steel	<b>N</b> Non-Ferrous	<b>H</b> Hardened Materials

material group	description	content	tensile strength RM (MPa)*	hardness (HB)	hardness (HRC)	material number
<b>P0</b>	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	–	A36, 1008, 1010, 1018 through 1029; 1108, 1117
<b>P1</b>	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	–	10L18, 1200 Series, 1213, 12L14
<b>P2</b>	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	1035, 1045, 10L45, 1050, 10L50, 1080, 1137, 1144, 11L44, 1525, 1545, 1572
<b>P3</b>	Alloy Steels and Tool Steels	C >0,25%	600–850	<330	<35	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T
<b>P4</b>	Alloy Steels and Tool Steels	C >0,25%	850–1400	340–450	35–48	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T
<b>P5</b>	Ferritic, Martensitic, and PH Stainless Steels	–	600–900	<330	<35	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series
<b>P6</b>	High-Strength Ferritic, Martensitic, and PH Stainless Steels	–	900–1350	350–450	35–48	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series
<b>M1</b>	Austenitic Stainless Steel	–	<600	130–200	–	200 Series, 301, 302, 304, 304L, 309
<b>M2</b>	High-Strength Austenitic Stainless and Cast Stainless Steels	–	600–800	150–230	<25	310, 316, 316L, 321, 347, 384 ASTM Cast XM-1, XM-5, XM-7, XM-21
<b>M3</b>	Duplex Stainless Steel	–	<800	135–275	<30	323, 329, F55, 2205, S329000
<b>K1</b>	Gray Cast Iron	–	125–500	120–290	<32	class 20, 25, 30, 35, 40, 45, 50, 55, 60, G1800, G3000, G3500, G4000
<b>K2</b>	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	–	<600	130–260	<28	60-40-18, 65-45-12, 80-55-06, SAE J434:D4018, D4512, D5506, ASTM A47: Grade 32510, 35018, SAE J158: Grade M3210, M4504, M5003, M5503, M7002, ASTM A842: Grade 250, 300, 350, 400, 450
<b>K3</b>	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	–	>600	180–350	<43	ASTM A536:100-70-03, 120-90-02, SAE J434: D7003, SAE J158: Grade M8501AST A897: 125-80-10, 150-100-7, 175-125-4, 200-150-1, 230-185
<b>N1</b>	Wrought Aluminum	–	–	–	–	2025, 5050, 7050, 1000, 2017
<b>N2</b>	Low-Silicon Aluminum Alloys and Magnesium Alloys	Si <12,2%	–	–	–	2024, 6061, 7075
<b>N3</b>	High-Silicon Aluminum Alloys and Magnesium Alloys	Si >12,2%	–	–	–	–
<b>N4</b>	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	–	–	–	–	C81500
<b>N5</b>	Nylon, Plastics, Rubbers, Phenolics, Resins, Fiberglass	–	–	–	–	–
<b>N6</b>	Carbon, Graphite Composites, CFRP	–	–	–	–	Graphite, CFK, CFRP
<b>N7</b>	Metal Matrix Composites (MMC)	–	–	–	–	C63000
<b>S1</b>	Iron-Based, Heat-Resistant Alloys	–	500–1200	160–260	25–48	A-286, INCOLOY® 800 Series, A608, A567, Discaloy™, INVAR®, N-155, 16-25-6, 19-9 DL; Cast: ASTM A-297, A-351, A-567, A-608
<b>S2</b>	Cobalt-Based, Heat-Resistant Alloys	–	1000–1450	250–450	25–48	Haynes® 25 (L605), Haynes 188, J-1570, Stellite®, AiResist 213; Cast: AiResist 13, Haynes 21, MAR-M302, MAR-M509, NASA Co-W-Re, WI-52
<b>S3</b>	Nickel-Based, Heat-Resistant Alloys	–	600–1700	160–450	<48	Astrolloy™, Hastelloy® B/C/ C-276 /X, INCONEL® 600 and 700 Series, IN102, INCOLOY 900 Series, Rene 41, Waspalloy®, Monel®, K-500, MAR-M20, NIMONIC®, UDIMET®
<b>S4</b>	Titanium and Titanium Alloys	–	900–1600	300–400	33–48	Pure: Ti 98.8, Ti 98.9, Ti 99.9; Alloyed: Ti 5Al-2.5Sn, Ti6Al-4V, Ti6Al-2Sn-4Zr-2Mo, Ti-3Al-8V-6Cr-4Mo-4Zr, Ti-10V-2Fe-3Al, Ti-13V-11Cr-3Al
<b>H1</b>	Hardened Materials	–	–	–	44–48	Tool Steel H10, H11, H13, D2, D3, 4340, P20
<b>H2</b>	Hardened Materials	–	–	–	48–55	Tool Steel H10, H11, H13, D2, D3, 4340, P20
<b>H3</b>	Hardened Materials	–	–	–	56–60	Tool Steel H10, H11, H13, D2, D3, 4340, P20
<b>H4</b>	Hardened Materials	–	–	–	>60	Tool Steel H10, H11, H13, D2, D3, 4340, P20

<b>P</b> Steel	<b>K</b> Cast Iron	<b>S</b> High-Temp Alloys
<b>M</b> Stainless Steel	<b>N</b> Non-Ferrous	<b>H</b> Hardened Materials

material group	description	content	tensile strength RM (MPa)*	hardness (HB)	hardness (HRC)	material number
<b>P0</b>	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	–	–
<b>P1</b>	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	–	C15, Ck22, ST37-2, S235JR, 9SMnPb28, GS38
<b>P2</b>	Medium- and High-Carbon Steels	C >0,25%	>530	<220	<25	ST52, S355JR, C35, GS60, Cf53
<b>P3</b>	Alloy Steels and Tool Steels	C >0,25%	600–850	<330	<35	16MnCr5, Ck45, 21CrMoV5-7, 38SMn28
<b>P4</b>	Alloy Steels and Tool Steels	C >0,25%	850–1400	340–450	35–48	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
<b>P5</b>	Ferritic, Martensitic, and PH Stainless Steels	–	600–900	<330	<35	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
<b>P6</b>	High-Strength Ferritic, Martensitic, and PH Stainless Steels	–	900–1350	350–450	35–48	X102CrMo17, G-X120Cr29
<b>M1</b>	Austenitic Stainless Steel	–	<600	130–200	–	X5CrNi 18 10, X2CrNiMo 17 13 2, G-X25CrNiSi18 9, X15CrNiSi 20 12
<b>M2</b>	High-Strength Austenitic Stainless and Cast Stainless Steels	–	600–800	150–230	<25	X2CrNiMo 13 4, X5NiCr 32 21, X5CrNiNb 18 10, G-X15CrNi 25-20
<b>M3</b>	Duplex Stainless Steel	–	<800	135–275	<30	X8CrNiMo27 5, X2CrNiMoN22 5 3, X20CrNiSi25 4, G-X40CrNiSi27 4
<b>K1</b>	Gray Cast Iron	–	125–500	120–290	<32	GG15, GG25, GG30, GG40, GTW40
<b>K2</b>	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	–	<600	130–260	<28	GGG40, GTS35
<b>K3</b>	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	–	>600	180–350	<43	GGG60, GTW55, GTS65
<b>N1</b>	Wrought Aluminum	–	–	–	–	AlMg1, A199.5, AlCuMg1, AlCuBiPb, AlMgSi1, ALMgSiPb
<b>N2</b>	Low-Silicon Aluminum Alloys and Magnesium Alloys	Si <12,2%	–	–	–	GAISiCu4, GDAISi10Mg
<b>N3</b>	High-Silicon Aluminum Alloys and Magnesium Alloys	Si >12,2%	–	–	–	G-ALSi12, G-AISi17Cu4, G-AISi21CuNiMg
<b>N4</b>	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	–	–	–	–	CuZn40, Ms60, G-CuSn5ZnPb, CuZn37, CuSi3Mn
<b>N5</b>	Nylon, Plastics, Rubbers, Phenolics, Resins, Fiberglass	–	–	–	–	Lexan®, Hostalen™, Polystyrol, Makralon®
<b>N6</b>	Carbon, Graphite Composites, CFRP	–	–	–	–	CFK, GFK
<b>N7</b>	Metal Matrix Composites (MMC)	–	–	–	–	–
<b>S1</b>	Iron-Based, Heat-Resistant Alloys	–	500–1200	160–260	25–48	X1NiCrMoCu32 28 7, X12NiCrSi36 16, X5NiCrAlTi31 20, X40CoCrNi20 20
<b>S2</b>	Cobalt-Based, Heat-Resistant Alloys	–	1000–1450	250–450	25–48	Haynes® 188, Stellite® 6,21,31
<b>S3</b>	Nickel-Based, Heat-Resistant Alloys	–	600–1700	160–450	<48	INCONEL® 690, INCONEL 625, Hastelloy®, Nimonic® 75
<b>S4</b>	Titanium and Titanium Alloys	–	900–1600	300–400	33–48	Ti1, TiAl5Sn2, TiAl6V4, TiAl4Mo4Sn2
<b>H1</b>	Hardened Materials	–	–	–	44–48	GX260NiCr42, GX330NiCr42, GX300CrNiSi952, GX300CrMo153, Hardox® 400
<b>H2</b>	Hardened Materials	–	–	–	48–55	–
<b>H3</b>	Hardened Materials	–	–	–	56–60	–
<b>H4</b>	Hardened Materials	–	–	–	>60	–

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## IMPORTANT SAFETY INSTRUCTIONS: Read before using the tools in this catalog

# METALCUTTING SAFETY

### Projectile and Fragmentation Hazards

Modern metalcutting operations involve high spindle and cutter speeds and high temperatures and cutting forces. Hot metal chips may fly off the workpiece during metalcutting. Although cutting tools are designed and manufactured to withstand high cutting forces and temperatures, they can sometimes fragment, particularly if they are subjected to over-stress, severe impact, or other abuse.

To avoid injury:

- Always wear appropriate personal protective equipment, including safety goggles, when operating metalcutting machines or working nearby.
- Always make sure all machine guards are in place.

For more information, read the applicable Material Safety Data Sheet provided by WIDIA and consult General Industry Safety and Health Regulations, Part 1910, Title 29 of the Code of Federal Regulations.

These safety instructions are general guidelines. Many variables affect machining operations. It is impossible to cover every specific situation. The technical information included in this catalog and recommendations on machining practices may not apply to your particular operation.

For more information, consult WIDIA's Metalcutting Safety booklet, available free from WIDIA at +1 724 539 5747 or fax +1 724 539 5439. For specific product safety and environmental questions, contact our Corporate Environmental Health and Safety Office at +1 724 539 5066 or fax +1 724 539 5372.

### Breathing and Skin Contact Hazards

Grinding carbide or other advanced cutting tool materials produces dust or mist containing metallic particles. Breathing this dust or mist — especially over an extended period — can cause temporary or permanent lung disease or make existing medical conditions worse. Contact with this dust or mist can irritate eyes, skin, and mucous membranes and may make existing skin conditions worse.

To avoid injury:

- Always wear breathing protection and safety goggles when grinding.
- Provide ventilation control and collect and properly dispose of dust, mist, or sludge from grinding.
- Avoid skin contact with dust or mist.

ArCut, AluSurf, Blue Box, CERMET-DCFD, CW2015, CW3020, CW5025, ERICKSON, GP6505, GP6520, Green Box, GUN, HCK10, HSR, HydroForce, KM, KM-LOC, KM-LOC II, KM-TS, K10, K10F, K10F-DCFD, Lightning Service, M25, M100, M170, M200, M270, M370, M900, NINA, NOVO, ProGroove, Quadralock, Ranger, ROTAFLEX, Shoulder Mill 11, Shoulder Mill 17, Separator, SuperFeed, TN6010, TN6025, TopClamp, Top Cut 4, TOP DRILL, TOP DRILL G, TOP DRILL M1, TOP DRILL S, TOP DRILL S+, ToolBOSS, TopGroove, TopThread, VariDrill, VariMill, VariMill I, VariMill II, VariMill III, VariTap, VariTurn, Victory, Vision Plus, Vision Plus X-Feed, VSM11, VSM17, VSM490-15, WavCut, WavCut I, WBH10P, WBH25P, WBH30P, WBK40U, WDN00U, WDN25U, Widaflex, WIDIA, WIDIA-CIRCLE, WIDIA-GTD, WIDIA-Hanita, WIDIA-Metcut, WIDIA-Rubig, WK15CM, WK15PD, WMT, WMT-SX, WN10HD, WP15PE, WP20PD, WP25CT, WP35CT, WP40PM, WST, WS10PT, WS15PE, WS25PT, WS30PM, WU05PR, WU10HT, WU10PT, WU20PD, WU25PD, and X-Feed are trademarks of Kennametal, Inc. and are used as such herein. The absence of a product, service name, or logo from this list does not constitute a waiver of Kennametal's trademark or other intellectual property rights concerning that name or logo.

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