SGS
Solid Carbide Tools
An ISO 9001 Certified Company

PERFORMANCE BY DESIGN

WHERE PERFORMANCE IS OUR STANDARD

www.sgstool.com

SOLUTIONS AROUND THE GLOBE

SGS Tool Company is a privately-held, ISO-certified leader of round solid carbide cutting tool technology for the aerospace, medical, power generation, and automotive industries. With manufacturing sites in the United States and United Kingdom, our global network of Sales Representatives, Industrial Distributors, and Agents blanket the world selling into more than 60 countries.

LEADERS IN SOLID CARBIDE TOOL TECHNOLOGY

Brand names such as Z-Carb, S-Carb, V-Carb, Hi-PerCarb, Multi-Carb have become synonymous with high performance tooling in the machining and metalworking industry.

We're proud to have pioneered some of the world's most advanced cutting technology right here in our Northeast Ohio manufacturing campus. SGS high performance end mills, drills and routers are increasing productivity and reducing cost around the world.

EXCEEDING CUSTOMER EXPECTATIONS

In addition to our substantial R&D facilities, we offer a portfolio of products and services that have an unparalleled track record in manufacture, supply and value at the spindle.

- Incredible batch-to-batch consistency
- Metallurgical lab dedicated to testing and rigorous quality control
- ISO-certified quality procedures
- Patented geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality—even at extreme parameters
- Specialists in extreme and demanding product applications
- Experienced Field Sales Engineers who work to optimize a tool for your particular application
- Dedicated multi-lingual customer service representatives

Common Legend
Leyenda habitual
Légende commune

TO ORDER: Please specify quantity and EDP number.
PARA SU PEDIDO: Por favor especifique cantidad y número de EDP.
POUR COMMANDER: Veuillez préciser la quantité et le code article EDP.

RETURN POLICY: An RMA number must accompany all product returns. Contact your Customer Service Representative for an RMA number.
DEVOLUCIONES: Todo material devuelto debe ir acompañado de un número de RMA correspondiente. Para solicitarlo, póngase en contacto con su Representante de Servicio.
POLITIQUE DE RETOUR: Tous les produits retournés doivent être accompagnés d'un numéro RMA. Contacter votre interlocuteur commercial pour obtenir un numéro RMA.

REGULATION SAFETY GLASSES SHOULD ALWAYS BE WORN WHEN USING HIGH-SPEED CUTTING EQUIPMENT

DEBEN USARSE GAFAS PROTECTORAS CUANDO SE UTILIZA UN EQUIPO DE ALTA VELOCIDAD

DES LUNNETTES DE SÉCURITE DOIVENT ÊTRE IMPÉRATIVEMENT PORTÉES LORS D'UTILISATION D'OUTILS À GRANDE VITESSE

Z1PLB
FRACTIONAL SERIES
TECH INFO 57

Refers to exact page where Speed and Feed Information can be found.
Hace referencia a la página exacta en la que puede encontrarse la información de velocidades y avances.
Indique la page exacte des informations de vitesse et avance.

INDUSTRY
INDUSTRIAS
INDUSTRIES

These icons indicate for which industry applications SGS High Performance Products are best suited.

Estos íconos indican las aplicaciones industriales más adecuadas para los productos SGS de alto rendimiento.

Ces icônes indiquent les applications industrielles pour lesquelles les produits haute performance SGS sont les mieux adaptés.

Aerospace | Aeroespacial | Aérospatiale

Medical | Médica | Médical

Power Generation | Energética | Production d'énergie

Automotive | Automotriz | Automobile

Mold & Die | Moldes y matrices | Moules et coquilles

Castings & Foundaries | Fundición | Moulages et fonderies

General Engineering | Ingeniería | Ingénierie générale

Common Legend
Leyenda habitual
Légende commune

MATERIALS
MATERIALES
MATÉRIAUX

- Steels | Aceros | Aciers
- Stainless Steels | Aceros Inoxidables | Inox
- Cast Iron | Hierro Fundido | Fonte
- High Temp Alloys | Aleaciones a Altas Temperaturas | Alliages Haute Temp
- Titanium | Titanio | Titane
- Non-Ferrous | No Férrico | Non Ferreux
- Plastics/Composites | Plásticos/Resinas | Plastiques/Composites
- Hardened Steels | Aceros Endurecidos | Aciers Trempés

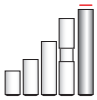
TOOL LENGTH
LONGITUD FRESA
LONGUEUR DE L'OUTIL


Stub | Corta | Court


Medium | Media | Moyen


Long | Larga | Long


Long Reach Neck | Larga con cuello | Gorge de dégagement longue portée


Extra Long | Extra-larga | Extra-long

FLUTES
FILOS
GOUJURES


Flutes - 2 | 2 filos | Goujures - 2


Flutes - 3 | 3 filos | Goujures - 3


Flutes - 4 | 4 filos | Goujures - 4


Flutes - 5 | 5 filos | Goujures - 5


Flutes - 6 | 6 filos | Goujures - 6


Multi-Flute | Filo múltiple | Multi-goujure

Tool Wizard

CALCULATE APPLICATION PARAMETERS

SGS Tool Wizard is a web-based program that calculates application parameters to help you select the right tool for the job.

- Includes All High Performance and General Purpose End Mills and Drills
- Find a tool by application or search for EDP number.
- Calculate Speeds and Feeds

The Tool Wizard software is designed to assist in the selection and application of products manufactured by SGS Tool Company. To the best of our knowledge, this information is accurate. However, due to differences in machining conditions (coolant, rigidity, spindle condition, etc.), and their subsequent effects, these recommendations must be considered a starting point, with possible variations to achieve the desired result. Refer to the SGS Tool Wizard for more complete technical information. Available at www.sgstool.com.

www.sgstool.com

SGS Tool Company introduced a new website featuring a variety of online tools and enhancements to our customers in finding products, technical data, and company news quickly.

Visit www.sgstool.com to have access to technical tips, videos, case studies and a showcase of resources dedicated to SGS products, including the exclusive Tool Wizard application.

As an industry leader, it is our job to provide unsurpassed customer service using the latest technology and quick access to support tools, custom quote forms and digital calculators. Visit www.sgstool.com for more.

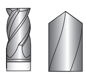
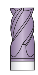
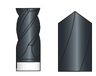
- Stay Current on Industry Trends
- Download SGS Literature
- EDP Quick Product Search
- Find a Distributor Near You
- Contact an International Office
- Get Connected

- Square and Corner Radius End Mill Calculator
- Ball End Mill Calculator
- Drill Calculator
- Drilling Power Calculator
- Milling Power Calculator
- Cost Analysis Calculator

www.sgstool.com

COATINGS

	 Ti-NAMITE	 Ti-NAMITE-A	 Ti-NAMITE-B
Coating	Titanium Nitride (TiN)	Aluminum Titanium Nitride (AlTiN)	Titanium DiBoride (TiB2)
Identifying Color	gold	violet-grey	light grey-silver
Layer Structure	monolayer	nano structure	monolayer
Thickness	1–4 microns	1–4 microns	1–2 microns
Hardness (HV)	2200	3300	4000
Coefficient of Friction (Fetting)	0.4–0.65	0.45	0.45
Thermal Stability	600°C / 1112°F	800°C / 1472°F	850°C / 1562°F
General Information	A general purpose coating with good adhesion and abrasion resistant properties. Suitable for a wide variety of materials.	Excellent thermal and chemical resistance allows for dry cutting and improvements in performance of carbide. The coating has a high hardness giving great protection against abrasive wear and erosion.	This coating offers a very smooth surface and a low affinity to cold welding or built up edge, which makes it optimal for Titanium, Aluminum (>10%) and copper applications. It has high toughness and high hardness.

Ti-NAMITE-C	Ti-NAMITE-X ADVANCED TOOL COATING	Di-NAMITE CRYSTALLINE DIAMOND COATING
Titanium Carbonitride (TiCN)	Proprietary (TX)	Crystalline Diamond (Diamond)
pink-red	violet-grey	light grey-silver
gradient	nano structure	monolayer
1–4 microns	1–4 microns	6–20 microns
3000	3000	>8000
0.3–0.45	0.50	0.15–0.2
400°C / 752°F	900°C / 1562°F	800°C / 1470°F
A very wear resistant coating with high toughness and shock resistance. Good in interrupted cuts found in applications like milling.	Applied utilizing a patented process, this coating offers unsurpassed adhesion aiding in long tool life. The coating deposition is consistent and dense giving strength advantages to the coating.	This is the hardest coating available with the best abrasion resistance. It is carbon based so it is limited in application capabilities. It is also the most expensive with the longest processing time.

END MILLS

Milling

(continued)

Fresado

Fraisage

End Mill Icon Legend
Leyenda del icono de las fresas
Légende d'icone de fraise

END CONFIGURATIONS
CONFIGURACIONES DE LA PUNTA
CONFIGURATIONS TERMINALES

Ball
Esférica
Boule

Corner
Plana con borde romo
Coin

Square
Plana
Carrée

SHANK TYPE
TIPO DE VÁSTAGO
TYPE DE TIGE

Weldon Flat
Weldon plano
Méplat Weldon

Common
Normal
Commune

Straight
Recto
Droite

HELIX ANGLES
ÁNGULOS HELICOIDALES
ANGLES DE L'HÉLICE

Right Spiral
Espiral sentido derecho
Spirale droite

Left Spiral
Espiral sentido izquierdo
Spirale gauche

Variable Right Spiral
Espiral sentido derecha con ángulo variable
Spirale droite variable

RAKE ANGLE
ÁNGULO DE ATAQUE
ANGLE DE PENTE

Positive
Positivo
Positif

Neutral
Neutro
Neutre

Negative
Negativo
Négatif

Variable
Variable
Variable

COOLANT OPTIONS
OPCIONES DE REFRIGERACIÓN
OPTIONS DE REFROIDISSEMENT

JetStream Coolant Slots

Ranuras del refrigerante JetStream
Fentes de refroidissement JetStream

Internal Coolant

Refrigerante interno
Refroidissement interne

External Coolant Recommended
Refrigerante externo recomendado
Agent de refroidissement recommandé

ADDITIONAL GEOMETRY
CARACTERÍSTICAS GEOMÉTRICAS ADICIONALES
GÉOMÉTRIE SUPPLÉMENTAIRE

Left Cut Direction
Fresado sentido izquierda
Coupe vers la gauche

Right Cut Direction
Fresado sentido derecha
Coupe vers la droite

Flute Spacing Unequal
Espaciado filos desigual
Espacement inégal entre les goujoures

Chip Breaker
Rompevirutas
Brise-copeaux

COATINGS
REVESTIMIENTOS
REVÊTEMENTS

Uncoated

Ti-NAMITE
(TiN)

Ti-NAMITE-A
(AlTiN)

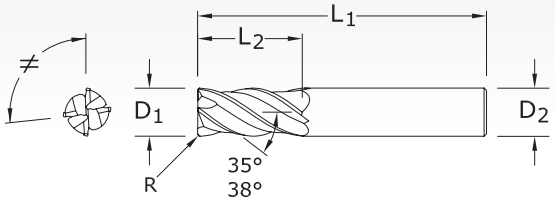
Ti-NAMITE-B
(TiB2)

Ti-NAMITE-C
(TiCN)

Ti-NAMITE-X
(TX)

Di-NAMITE
(Diamond)

Z-Carb-AP Variable Rake End Mills



Z1PCR
FRACTIONAL SERIES

TECH INFO 57

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

inch					EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	Ti-NAMITE-X	Ti-NAMITE-X W/FLAT	JetStream*
1/16	3/16	1-1/2	1/8	0.005	36872	–	–
3/32	9/32	1-1/2	1/8	0.010	36873	–	–
1/8	3/8	1-1/2	1/8	0.010	36370	–	–
1/8	3/8	1-1/2	1/8	0.015	36851	–	–
3/16	7/16	2	3/16	0.010	36371	–	–
3/16	7/16	2	3/16	0.015	36852	–	–
3/16	7/16	2	3/16	0.030	36722	–	–
1/4	1/2	2-1/2	1/4	0.010	36372	–	–
1/4	1/2	2-1/2	1/4	0.015	36723	–	–
1/4	1/2	2-1/2	1/4	0.020	36854	–	–
1/4	1/2	2-1/2	1/4	0.030	36373	–	–
1/4	3/4	2-1/2	1/4	0.010	36599	–	–
1/4	3/4	2-1/2	1/4	0.015	36600	–	–
1/4	3/4	2-1/2	1/4	0.020	36853	–	–
1/4	3/4	2-1/2	1/4	0.030	36601	–	–
5/16	13/16	2-1/2	5/16	0.015	36724	–	–
5/16	13/16	2-1/2	5/16	0.020	36855	–	–
5/16	13/16	2-1/2	5/16	0.030	36374	–	–
3/8	7/8	2-1/2	3/8	0.010	36375	36701	–
3/8	7/8	2-1/2	3/8	0.015	36725	36736	–
3/8	7/8	2-1/2	3/8	0.020	36856	36864	–
3/8	7/8	2-1/2	3/8	0.030	36376	36702	–
3/8	7/8	2-1/2	3/8	0.060	36727	36738	–
7/16	1	2-3/4	7/16	0.020	36857	36865	–

continued on next page

*JetStream Patented Coolant Technology

TOLERANCES (inch)

<1/8 DIAMETER
D_1 = +0.0005/–0.0005
D_2 = h_6
R = +0.000/–0.0010

1/8–1/4 DIAMETER
D_1 = +0.000/–0.0012
D_2 = h_6
R = +0.000/–0.0020

>1/4–3/8 DIAMETER
D_1 = +0.000/–0.0016
D_2 = h_6
R = +0.000/–0.0020

>3/8–1 DIAMETER
D_1 = +0.000/–0.0020
D_2 = h_6
R = +0.000/–0.0020

U.S. Patents 7,306,408 and 7,789,597

Z-Carb-AP Variable Rake End Mills

Z1PCR
FRACTIONAL SERIES

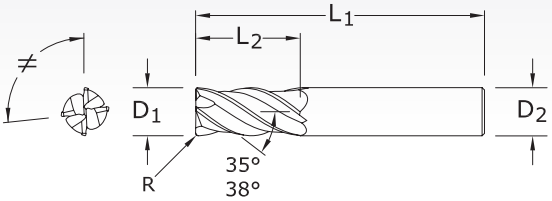
CONTINUED

inch					EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	Ti-NAMITE-X	Ti-NAMITE-X W/FLAT	JetStream*
1/2	1	3	1/2	0.010	36378	36704	36804
1/2	1	3	1/2	0.015	36729	36740	36810
1/2	1	3	1/2	0.030	36858	36866	36805
1/2	1	3	1/2	0.060	36380	36706	36811
1/2	1	3	1/2	0.090	36381	36707	36812
1/2	1	3	1/2	0.125	36731	36742	36813
1/2	1-1/4	3-1/4	1/2	0.010	36602	36603	–
1/2	1-1/4	3-1/4	1/2	0.015	36604	36605	–
1/2	1-1/4	3-1/4	1/2	0.030	36859	36867	–
1/2	1-1/4	3-1/4	1/2	0.060	36610	36611	–
1/2	1-1/4	3-1/4	1/2	0.090	36612	36613	–
1/2	1-1/4	3-1/4	1/2	0.125	36614	36615	–
9/16	1-1/8	3-1/2	9/16	0.030	36860	36868	36806
5/8	1-1/4	3-1/2	5/8	0.030	36383	36709	36814
5/8	1-1/4	3-1/2	5/8	0.040	36861	36869	36807
5/8	1-1/4	3-1/2	5/8	0.060	36384	36710	36815
5/8	1-1/4	3-1/2	5/8	0.090	36385	36711	36816
5/8	1-1/4	3-1/2	5/8	0.125	36733	36744	36817
3/4	1-1/2	4	3/4	0.030	36386	36712	36818
3/4	1-1/2	4	3/4	0.040	36862	36870	36808
3/4	1-1/2	4	3/4	0.060	36387	36713	36819
3/4	1-1/2	4	3/4	0.090	36388	36714	36820
3/4	1-1/2	4	3/4	0.125	36389	36715	36821
1	1-1/2	4	1	0.030	36390	36716	36822
1	1-1/2	4	1	0.040	36863	36871	36809
1	1-1/2	4	1	0.060	36391	36717	36823
1	1-1/2	4	1	0.090	36392	36718	36824
1	1-1/2	4	1	0.125	36393	36719	36825

*JetStream Patented Coolant Technology

U.S. Patents 7,306,408 and 7,789,597

Z-Carb-AP Variable Rake End Mills



Z1MPCR
METRIC SERIES

TECH INFO 58

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

mm					EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	Ti-NAMITE-X	Ti-NAMITE-X W/FLAT	JetStream*
1,5	4,5	57,0	6,0	0,1	46849	–	–
2,0	6,0	57,0	6,0	0,2	48850	–	–
3,0	8,0	57,0	6,0	0,3	46851	–	–
3,0	8,0	57,0	6,0	0,5	46880	–	–
4,0	11,0	57,0	6,0	0,3	46852	–	–
4,0	11,0	57,0	6,0	0,5	46881	–	–
5,0	6,0	57,0	13,0	0,3	46853	–	–
6,0	6,0	57,0	13,0	0,25	46882	–	–
6,0	6,0	57,0	13,0	0,5	46854	–	–
6,0	6,0	57,0	13,0	1,0	46855	–	–
6,0	6,0	57,0	13,0	1,5	46884	–	–
8,0	8,0	63,0	19,0	0,5	46856	–	–
8,0	8,0	63,0	19,0	1,0	46857	–	–
8,0	8,0	63,0	19,0	1,5	46886	–	–
8,0	8,0	63,0	19,0	2,0	46887	–	–
10,0	10,0	72,0	22,0	0,5	46858	–	–
10,0	10,0	72,0	22,0	1,0	46859	–	–
10,0	10,0	72,0	22,0	1,5	46889	–	–
10,0	10,0	72,0	22,0	2,0	46890	–	–
10,0	10,0	72,0	22,0	2,5	46891	–	–
12,0	12,0	83,0	26,0	0,5	46860	46909	–
12,0	12,0	83,0	26,0	0,75	46861	46910	–
12,0	12,0	83,0	26,0	1,0	46893	46911	–
12,0	12,0	83,0	26,0	1,5	46894	46912	–
12,0	12,0	83,0	26,0	2,0	46895	46913	–
12,0	12,0	83,0	26,0	2,5	46896	46914	–
12,0	12,0	83,0	26,0	3,0	42718	46915	–
14,0	14,0	83,0	26,0	1,0	46862	46916	46494
16,0	16,0	92,0	32,0	1,0	46863	46917	46495
16,0	16,0	92,0	32,0	1,5	46898	46918	–
16,0	16,0	92,0	32,0	2,0	46899	46919	–
16,0	16,0	92,0	32,0	2,5	46900	46920	–
16,0	16,0	92,0	32,0	3,0	46864	46921	–
20,0	20,0	104,0	38,0	1,0	46865	46922	46497
20,0	20,0	104,0	38,0	1,5	46903	46923	–
20,0	20,0	104,0	38,0	2,0	46904	46924	–
20,0	20,0	104,0	38,0	2,5	46905	46925	–
20,0	20,0	104,0	38,0	3,0	42722	46926	–
25,0	25,0	104,0	38,0	1,0	46866	46927	46498

TOLERANCES (mm)

<3 DIAMETER
D_1 = +0,012/–0,012
D_2 = h_6
R = +0,000/–0,025

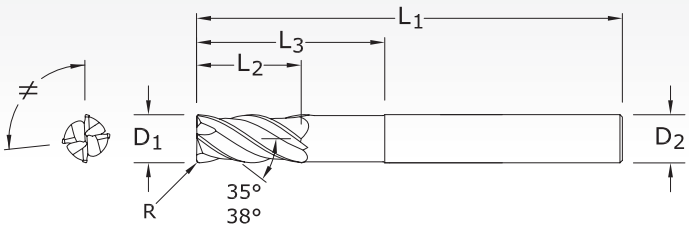
3–6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6
R = +0,000/–0,050

>6–10 DIAMETER
D_1 = +0,000/–0,040
D_2 = h_6
R = +0,000/–0,050

>10–25 DIAMETER
D_1 = +0,000/–0,050
D_2 = h_6
R = +0,000/–0,050

U.S. Patents 7,306,408 and 7,789,597
*JetStream Patented Coolant Technology

Z-Carb-AP Variable Rake End Mills



Z1PLC
FRACTIONAL SERIES

TECH INFO 57

TOLERANCES (inch)

1/4 DIAMETER
D_1 = +0.000/–0.0012
D_2 = h_6
R = +0.000/–0.0020

>1/4–3/8 DIAMETER
D_1 = +0.000/–0.0016
D_2 = h_6
R = +0.000/–0.0020

>3/8–1 DIAMETER
D_1 = +0.000/–0.0020
D_2 = h_6
R = +0.000/–0.0020

inch						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	Ti-NAMITE-X W/FLAT
1/4	1/2	4	1/4	1-1/4	0.020	36450
5/16	13/16	4	5/16	1-5/8	0.020	36452
3/8	7/8	5	3/8	1-7/8	0.020	36456
7/16	1	6	7/16	2	0.020	36460
1/2	1	6	1/2	2-1/4	0.030	36462
9/16	1-1/8	6	9/16	2-1/2	0.030	36466
5/8	1-1/4	6	5/8	3	0.040	36470
3/4	1-1/2	6	3/4	3-1/2	0.040	36472
1	1-1/2	6	1	4	0.040	36474

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM

Z1MPLC
METRIC SERIES

TECH INFO 58

TOLERANCES (mm)

6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6
R = +0,000/–0,050

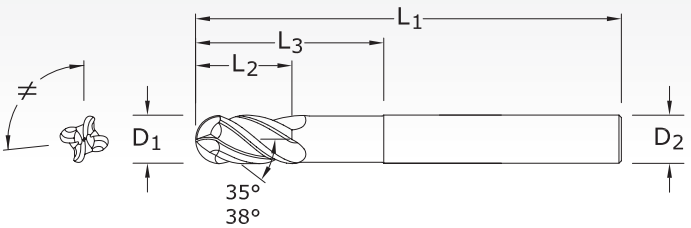
>6–10 DIAMETER
D_1 = +0,000/–0,040
D_2 = h_6
R = +0,000/–0,050

>10–25 DIAMETER
D_1 = +0,000/–0,050
D_2 = h_6
R = +0,000/–0,050

mm						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	Ti-NAMITE-X W/FLAT
6,0	8,0	75,0	6,0	24,0	0,5	46821
8,0	10,0	75,0	8,0	32,0	1,0	46822
8,0	10,0	75,0	8,0	32,0	2,0	46823
10,0	12,0	100,0	10,0	40,0	1,0	46824
10,0	12,0	100,0	10,0	40,0	2,0	46825
12,0	15,0	100,0	12,0	48,0	1,0	46826
12,0	15,0	100,0	12,0	48,0	1,5	46827
12,0	15,0	100,0	12,0	48,0	2,0	46828
12,0	15,0	100,0	12,0	48,0	3,0	46829
16,0	20,0	115,0	16,0	65,0	1,0	46830
16,0	20,0	115,0	16,0	65,0	1,5	46831
16,0	20,0	115,0	16,0	65,0	2,0	46832
16,0	20,0	115,0	16,0	65,0	3,0	46833
16,0	20,0	115,0	16,0	65,0	4,0	46834
16,0	20,0	115,0	16,0	65,0	5,0	46835
20,0	24,0	140,0	20,0	80,0	1,0	46836
20,0	24,0	140,0	20,0	80,0	1,5	46737
20,0	24,0	140,0	20,0	80,0	2,0	46838
20,0	24,0	140,0	20,0	80,0	3,0	46839
20,0	24,0	140,0	20,0	80,0	4,0	46840
20,0	24,0	140,0	20,0	80,0	5,0	46841

U.S. Patents 7,306,408 and 7,789,597

Z-Carb-AP Variable Rake End Mills



Z1PLB
FRACTIONAL SERIES

TECH INFO 57

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

inch					EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	Ti-NAMITE-X W/FLAT
1/4	1/2	4	1/4	1-1/4	36480
5/16	13/16	4	5/16	1-5/8	36482
3/8	7/8	5	3/8	1-7/8	36486
7/16	1	6	7/16	2	38490
1/2	1	6	1/2	2-1/4	38492
9/16	1-1/8	6	9/16	2-1/2	38496
5/8	1-1/4	6	5/8	3	36500
3/4	1-1/2	6	3/4	3-1/2	36502
1	1-1/2	6	1	4	36504

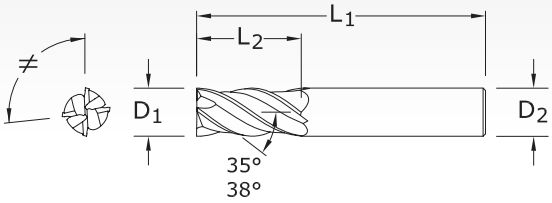
TOLERANCES (inch)

1/4 DIAMETER
D_1 = +0.000/–0.0012
D_2 = h_6

>1/4–3/8 DIAMETER
D_1 = +0.000/–0.0016
D_2 = h_6

>3/8–1 DIAMETER
D_1 = +0.000/–0.0020
D_2 = h_6

U.S. Patents 7,306,408 and 7,789,597



TOLERANCES (inch)

1/8–1/4 DIAMETER
D_1 = +0.000/–0.0012
D_2 = h_6

>1/4–3/8 DIAMETER
D_1 = +0.000/–0.0016
D_2 = h_6

>3/8–1 DIAMETER
D_1 = +0.000/–0.0020
D_2 = h_6

Z1
FRACTIONAL SERIES

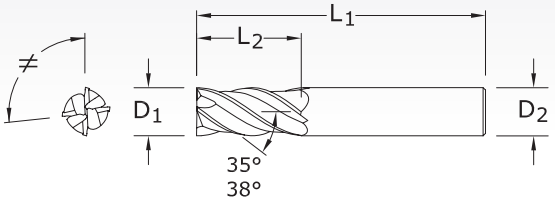
TECH INFO 59

inch				EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	JetStream*
1/8	3/8	1-1/2	1/8	36404	–	–
5/32	7/16	2	3/16	36406	–	–
3/16	7/16	2	3/16	36408	–	–
7/32	7/16	2-1/2	1/4	36410	–	–
1/4	1/2	2-1/2	1/4	36416	–	–
1/4	3/4	2-1/2	1/4	36596	–	–
9/32	5/8	2-1/2	5/16	36418	–	–
5/16	13/16	2-1/2	5/16	36420	–	–
11/32	13/16	2-1/2	3/8	36422	–	–
3/8	7/8	2-1/2	3/8	36424	36530	–
13/32	15/16	2-3/4	7/16	36426	36531	–
7/16	1	2-3/4	7/16	36428	36532	–
15/32	1	3	15/32	36430	36533	–
1/2	1	3	1/2	36432	36534	36826
1/2	1-1/4	3-1/4	1/2	36597	36598	–
9/16	1-1/8	3-1/2	9/16	36436	36535	36827
5/8	1-1/4	3-1/2	5/8	36440	36536	36828
3/4	1-1/2	4	3/4	36442	36537	36829
1	1-1/2	4	1	36444	36538	36830

*JetStream Patented Coolant Technology

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM

Z-Carb End Mills



Z1M
METRIC SERIES

TECH INFO 60

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)	JetStream*
3,0	8,0	57,0	6,0	46357	–
4,0	11,0	57,0	6,0	46358	–
5,0	13,0	57,0	6,0	46359	–
6,0	13,0	57,0	6,0	46360	–
8,0	19,0	63,0	8,0	46362	–
10,0	22,0	72,0	10,0	46364	–
12,0	26,0	83,0	12,0	46366	–
14,0	26,0	83,0	14,0	46368	46506
16,0	32,0	92,0	16,0	46370	46507
18,0	32,0	92,0	18,0	46372	46508
20,0	38,0	104,0	20,0	46374	46509
25,0	38,0	104,0	25,0	46376	46510

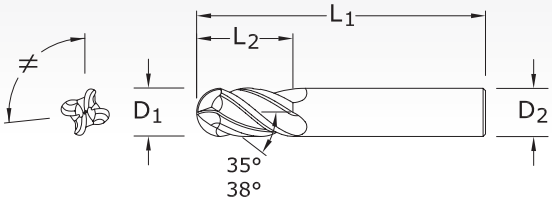
*JetStream Patented Coolant Technology

TOLERANCES (mm)

3–6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,000/–0,040
D_2 = h_6

>10–25 DIAMETER
D_1 = +0,000/–0,050
D_2 = h_6



TOLERANCES (inch)

1/8–1/4 DIAMETER
D_1 = +0.000/–0.0012
D_2 = h_6

>1/4–3/8 DIAMETER
D_1 = +0.000/–0.0016
D_2 = h_6

>3/8–1 DIAMETER
D_1 = +0.000/–0.0020
D_2 = h_6

Z1B
FRACTIONAL SERIES

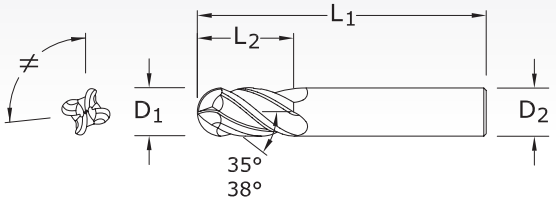
TECH INFO 59

inch				EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	JetStream*
1/8	3/8	1-1/2	1/8	36358	–	–
5/32	7/16	2	3/16	36357	–	–
3/16	7/16	2	3/16	36359	–	–
7/32	7/16	2-1/2	1/4	36361	–	–
1/4	1/2	2-1/2	1/4	36344	–	–
1/4	3/4	2-1/2	1/4	36590	–	–
9/32	5/8	2-1/2	5/16	36353	–	–
5/16	13/16	2-1/2	5/16	36345	–	–
11/32	13/16	2-1/2	3/8	36354	–	–
3/8	7/8	2-1/2	3/8	36346	36539	–
13/32	15/16	2-3/4	7/16	36355	36540	–
7/16	1	2-3/4	7/16	36347	36541	–
15/32	1	3	1/2	36356	36542	–
1/2	1	3	1/2	36348	36543	36846
1/2	1-1/4	3-1/4	1/2	36591	36592	–
9/16	1-1/8	3-1/2	9/16	36349	36544	36847
5/8	1-1/4	3-1/2	5/8	36350	36545	36848
3/4	1-1/2	4	3/4	36351	36546	36849
1	1-1/2	4	1	36352	36547	36850

*JetStream Patented Coolant Technology

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

Z-Carb End Mills



Z1MB
METRIC SERIES

TECH INFO 60

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)	JetStream*
3,0	8,0	57,0	6,0	46354	–
4,0	11,0	57,0	6,0	46355	–
5,0	13,0	57,0	6,0	46356	–
6,0	13,0	57,0	6,0	46343	–
8,0	19,0	63,0	8,0	46344	–
10,0	22,0	72,0	10,0	46345	–
12,0	26,0	83,0	12,0	46346	–
14,0	26,0	83,0	14,0	46347	46518
16,0	32,0	92,0	16,0	46348	46519
18,0	32,0	92,0	18,0	46349	46520
20,0	38,0	104,0	20,0	46350	46521
25,0	38,0	104,0	25,0	46351	46522

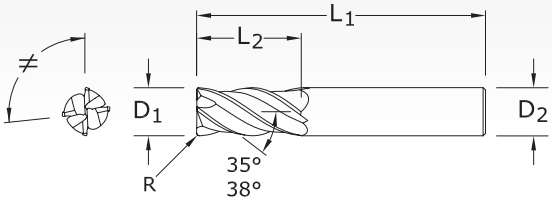
*JetStream Patented Coolant Technology

TOLERANCES (mm)

3–6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,000/–0,040
D_2 = h_6

>10–25 DIAMETER
D_1 = +0,000/–0,050
D_2 = h_6



TOLERANCES (inch)

1/8–1/4 DIAMETER
D_1 = +0.000/–0.0012
D_2 = h_6

>1/4–3/8 DIAMETER
D_1 = +0.000/–0.0016
D_2 = h_6

>3/8–1 DIAMETER
D_1 = +0.000/–0.0020
D_2 = h_6

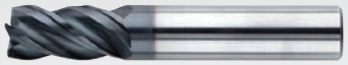
Z16CR
FRACTIONAL SERIES

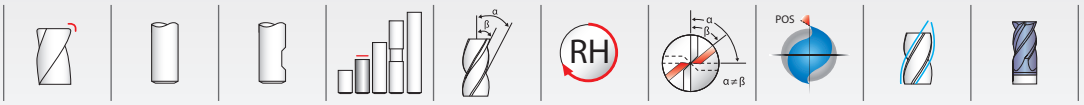
TECH INFO 59

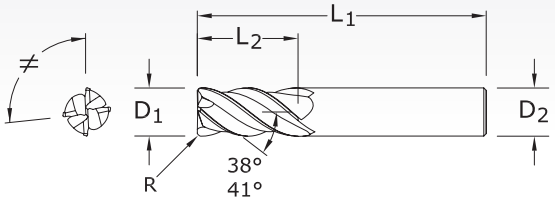
inch					EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	Ti-NAMITE-A (AlTiN)
1/8	1/4	1-1/2	1/8	0.010–0.015	36505
5/32	5/16	2	3/16	0.010–0.015	36506
3/16	3/8	2	3/16	0.010–0.015	36507
7/32	3/8	2	1/4	0.015–0.020	36508
1/4	7/16	2	1/4	0.015–0.020	36509
5/16	1/2	2	5/16	0.015–0.020	36511
3/8	5/8	2	3/8	0.015–0.020	36513
7/16	5/8	2-1/2	7/16	0.015–0.020	36515
1/2	5/8	2-1/2	1/2	0.025–0.030	36517
5/8	3/4	3	5/8	0.025–0.040	36519
3/4	1	3	3/4	0.025–0.040	36520

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM

Z-Carb-HTA End Mills







ZH1CR
FRACTIONAL SERIES

TECH INFO 61

HIGH TEMP ALLOYS

TITANIUM

inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
1/4	1/2	2-1/2	1/4	0.015–0.020	36570	–
1/4	3/4	2-1/2	1/4	0.015–0.020	36616	–
5/16	13/16	2-1/2	5/16	0.015–0.020	36571	–
3/8	7/8	2-1/2	3/8	0.015–0.020	36572	36555
7/16	1	2-3/4	7/16	0.015–0.020	36573	36556
1/2	1	3	1/2	0.025–0.030	36574	36557
1/2	1-1/4	3-1/4	1/2	0.025–0.030	36618	36617
9/16	1-1/8	3-1/2	9/16	0.025–0.030	36575	36558
5/8	1-1/4	3-1/2	5/8	0.035–0.040	36576	36559
3/4	1-1/2	4	3/4	0.035–0.040	36577	36560
1	1-1/2	4	1	0.035–0.040	36578	36561

TOLERANCES (inch)

1/4 DIAMETER
D_1 = +0.000/–0.0012
D_2 = h_6

>1/4–3/8 DIAMETER
D_1 = +0.000/–0.0016
D_2 = h_6

>3/8–1 DIAMETER
D_1 = +0.000/–0.002
D_2 = h_6

ZH1MCR
METRIC SERIES

TECH INFO 61

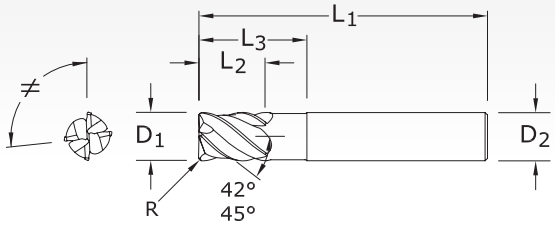
mm					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
6,0	13,0	57,0	6,0	0,5	46450	–
6,0	13,0	57,0	6,0	1,0	46451	–
6,0	13,0	57,0	6,0	1,5	46452	–
8,0	19,0	63,0	8,0	0,5	46453	–
8,0	19,0	63,0	8,0	1,0	46454	–
8,0	19,0	63,0	8,0	1,5	46455	–
10,0	22,0	72,0	10,0	0,5	46456	–
10,0	22,0	72,0	10,0	1,0	46457	–
10,0	22,0	72,0	10,0	1,5	46458	–
10,0	22,0	72,0	10,0	2,0	46459	–
12,0	26,0	83,0	12,0	0,5	46460	46471
12,0	26,0	83,0	12,0	1,0	46461	46472
12,0	26,0	83,0	12,0	1,5	46462	46473
12,0	26,0	83,0	12,0	2,0	46463	46474
12,0	26,0	83,0	12,0	3,0	46464	46475
16,0	32,0	92,0	16,0	1,5	46465	46476
16,0	32,0	92,0	16,0	2,0	46466	46477
16,0	32,0	92,0	16,0	3,0	46467	46478
20,0	38,0	104,0	20,0	3,0	46468	46479
20,0	38,0	104,0	20,0	4,0	46469	46480
20,0	38,0	104,0	20,0	5,0	46470	46481

TOLERANCES (mm)

6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6
R = +0,000/–0,050

>6–10 DIAMETER
D_1 = +0,000/–0,040
D_2 = h_6
R = +0,000/–0,050

>10–20 DIAMETER
D_1 = +0,000/–0,050
D_2 = h_6
R = +0,000/–0,050



TOLERANCES (inch)

1/8–1/4 DIAMETER
D_1 = +0.000/–0.0012
D_2 = h_6
R = +0.000/–0.002

>1/4–3/8 DIAMETER
D_1 = +0.000/–0.0016
D_2 = h_6
R = +0.000/–0.002

>3/8–1 DIAMETER
D_1 = +0.000/–0.002
D_2 = h_6
R = +0.000/–0.002

ZD1CR
FRACTIONAL SERIES

TECH INFO 62

inch						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	Ti-NAMITE-A (AlTiN)
1/8	5/32	2-1/2	1/4	1/2	0.010	36780
3/16	7/32	2-1/2	1/4	3/4	0.020	36781
1/4	9/32	2-1/2	1/4	3/4	0.020	36782
5/16	13/32	2-1/2	5/16	1	0.040	36783
3/8	15/32	2-1/2	3/8	1	0.040	36784
7/16	9/16	2-3/4	7/16	1	0.040	36785
1/2	5/8	3	1/2	1-1/4	0.040	36786
1/2	5/8	4-1/2	1/2	2-1/4	0.040	36787
5/8	3/4	3-1/2	5/8	1-1/2	0.040	36788
5/8	3/4	4-1/2	5/8	2-1/4	0.040	36789
5/8	3/4	5-1/2	5/8	3-1/4	0.040	36790
3/4	15/16	4	3/4	1-3/4	0.060	36791
3/4	15/16	4-1/2	3/4	2-1/4	0.060	36792
3/4	15/16	5-1/2	3/4	3-1/4	0.060	36793

STEELS

HARDENED STEELS

TOLERANCES (mm)

3–6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6
R = +0,000/–0,050

>6–10 DIAMETER
D_1 = +0,000/–0,040
D_2 = h_6
R = +0,000/–0,050

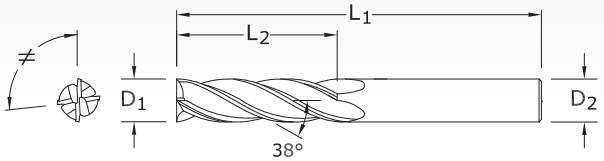
>10–20 DIAMETER
D_1 = +0,000/–0,050
D_2 = h_6
R = +0,000/–0,050

ZD1MCR
METRIC SERIES

TECH INFO 62

mm						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	Ti-NAMITE-A (AlTiN)
3,0	4,0	57,0	6,0	15,0	0,2	46560
4,0	5,0	57,0	6,0	15,0	0,3	46561
5,0	6,0	57,0	6,0	15,0	0,5	46562
6,0	7,0	57,0	6,0	15,0	1,0	46563
8,0	10,0	63,0	8,0	25,0	1,0	46564
10,0	12,0	72,0	10,0	30,0	1,0	46565
12,0	15,0	83,0	12,0	35,0	1,0	46566
16,0	20,0	92,0	16,0	45,0	1,5	46567
20,0	24,0	104,0	20,0	55,0	2,0	46568

Series 7 End Mills



7
FRACTIONAL SERIES

TECH INFO 63

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

inch				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)
1/8	3/4	2-1/4	1/8	70470
1/8	1	3	1/8	70471
3/16	3/4	2-1/2	3/16	70472
3/16	1-1/8	3	3/16	70473
1/4	1-1/8	3	1/4	70474
1/4	1-1/2	4	1/4	70475
5/16	1-1/8	3	5/16	70476
5/16	1-5/8	4	5/16	70477
3/8	1-1/8	3	3/8	70478
3/8	1-3/4	4	3/8	70479
7/16	2	4-1/2	7/16	70480
7/16	3	6	7/16	70481
1/2	2	4-1/2	1/2	70482
1/2	3	6	1/2	70483
5/8	2-1/4	5	5/8	70484
5/8	3	6	5/8	70485
3/4	2-1/4	5	3/4	70486
3/4	3	6	3/4	70487
1	2-1/4	5	1	70488
1	3	6	1	70489

TOLERANCES (inch)

D_1 = +0.000/–0.002

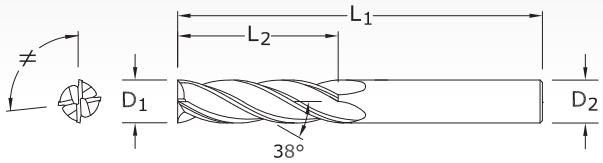
D_2 = h_6

Series 7 End Mills

TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6



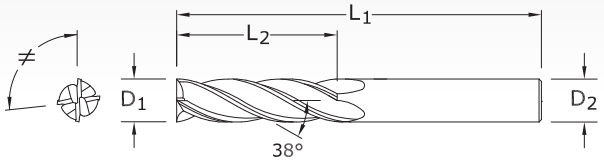
7M
METRIC SERIES

TECH INFO 64

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)
3,0	25,0	75,0	3,0	70551
4,0	25,0	75,0	4,0	70552
5,0	25,0	75,0	5,0	70553
6,0	25,0	75,0	6,0	70554
8,0	25,0	75,0	8,0	70555
10,0	38,0	100,0	10,0	70556
12,0	50,0	100,0	12,0	70557
12,0	75,0	150,0	12,0	70558
14,0	75,0	150,0	14,0	70559
16,0	75,0	150,0	16,0	70560
18,0	75,0	150,0	18,0	70561
20,0	75,0	150,0	20,0	70562
25,0	75,0	150,0	25,0	70563

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM

Series 7 End Mills



7B
FRACTIONAL SERIES

TECH INFO 63

TOLERANCES (inch)

D_1 = +0.000/–0.002

D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

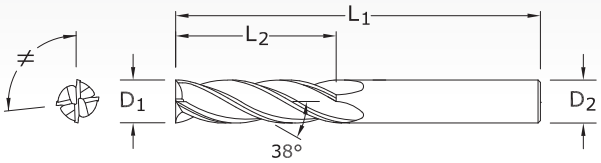
inch				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)
1/8	3/4	2-1/4	1/8	70441
1/8	1	3	1/8	70442
3/16	3/4	2-1/2	3/16	70444
3/16	1-1/8	3	3/16	70445
1/4	1-1/8	3	1/4	70447
1/4	1-1/2	4	1/4	70448
5/16	1-1/8	3	5/16	70450
5/16	1-5/8	4	5/16	70451
3/8	1-1/8	3	3/8	70453
3/8	1-3/4	4	3/8	70454
7/16	2	4-1/2	7/16	70456
7/16	3	6	7/16	70457
1/2	2	4-1/2	1/2	70459
1/2	3	6	1/2	70460
5/8	2-1/4	5	5/8	70462
5/8	3	6	5/8	70463
3/4	2-1/4	5	3/4	70465
3/4	3	6	3/4	70466
1	2-1/4	5	1	70468
1	3	6	1	70469

Series 7 End Mills

TOLERANCES (mm)

D_1 = +0,000/+0,050

D_2 = h_6



7MB
METRIC SERIES

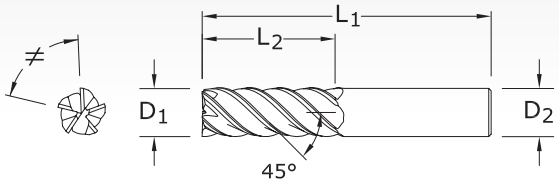
TECH INFO 64

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)
3,0	25,0	75,0	3,0	70527
4,0	25,0	75,0	4,0	70529
5,0	25,0	75,0	5,0	70531
6,0	25,0	75,0	6,0	70533
8,0	25,0	75,0	8,0	70535
10,0	38,0	100,0	10,0	70537
12,0	50,0	100,0	12,0	70539
12,0	75,0	150,0	12,0	70540
14,0	75,0	150,0	14,0	70542
16,0	75,0	150,0	16,0	70544
18,0	75,0	150,0	18,0	70546
20,0	75,0	150,0	20,0	70548
25,0	75,0	150,0	25,0	70550

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

V-Carb Finishing & Semi Finishing End Mills

CARB Five Flute End Mills



55
FRACTIONAL SERIES

TECH INFO 65

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

inch				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
1/8	1/4	1-1/2	1/8	32672	–
1/8	1/2	1-1/2	1/8	32655	–
5/32	9/16	2	3/8	32656	–
3/16	5/16	2	3/8	32673	–
3/16	5/8	2	3/8	32657	–
7/32	3/4	2-1/2	1/4	32658	–
1/4	3/8	2	1/4	32674	–
1/4	3/4	2-1/2	1/4	32659	–
5/16	7/16	2	5/16	32675	–
5/16	13/16	2-1/2	5/16	32660	–
3/8	1/2	2	3/8	32676	32677
3/8	1	2-1/2	3/8	32661	32662
7/16	1	2-3/4	7/16	32663	–
1/2	5/8	2-1/2	1/2	32678	32679
1/2	1-1/4	3	1/2	32664	32665
5/8	3/4	3	5/8	32680	32681
5/8	1-5/8	3-1/2	5/8	32666	32667
3/4	1	3	3/4	32682	32683
3/4	1-5/8	4	3/4	32668	32669
1	1-1/2	4	1	32670	32671

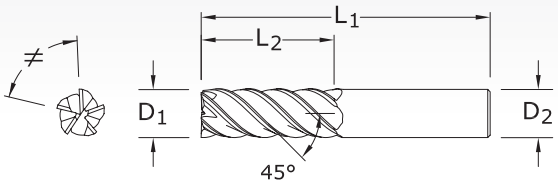
TOLERANCES (inch)

1/8–1 DIAMETER

D_1 = +0.000/–0.002

D_2 = h_6

V-Carb Finishing & Semi Finishing End Mills



TOLERANCES (mm)

6–20 DIAMETER

D_1 = +0,000/–0,050

D_2 = h_6

55M
METRIC SERIES

TECH INFO 66

mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
6,0	12,0	50,0	6,0	42606	–
6,0	19,0	63,0	6,0	42607	–
6,0	25,0	75,0	6,0	42608	–
8,0	12,0	50,0	8,0	42609	–
8,0	20,0	63,0	8,0	42610	–
8,0	25,0	75,0	8,0	42611	–
10,0	16,0	50,0	10,0	42612	–
10,0	22,0	75,0	10,0	42622	42613
10,0	38,0	100,0	10,0	42614	–
12,0	19,0	63,0	12,0	42615	–
12,0	25,0	75,0	12,0	42616	42623
12,0	50,0	100,0	12,0	42617	–
16,0	32,0	89,0	16,0	42618	42624
16,0	75,0	150,0	16,0	42619	–
20,0	38,0	100,0	20,0	42620	42625
20,0	75,0	150,0	20,0	42621	–

STEELS

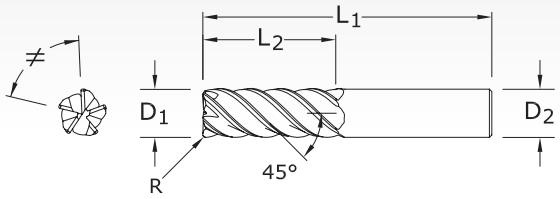
STAINLESS STEELS

CAST IRON

HIGH TEMP ALLOYS

TITANIUM

V-Carb Finishing & Semi Finishing End Mills



55CR
FRACTIONAL SERIES

TECH INFO 65

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM

inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
1/8	1/4	1-1/2	1/8	0.010	32606	–
1/8	1/2	1-1/2	1/8	0.010	32607	–
5/32	5/16	2	3/16	0.010	32608	–
5/32	9/16	2	3/16	0.010	32609	–
3/16	5/16	2	3/16	0.010	32610	–
3/16	5/8	2	3/16	0.010	32611	–
7/32	3/8	2	1/4	0.015	32612	–
7/32	3/4	2-1/2	1/4	0.015	32613	–
1/4	3/8	2	1/4	0.015	32614	–
1/4	3/4	2-1/2	1/4	0.015	32615	–
1/4	1-1/4	4	1/4	0.015	32616	–
5/16	7/16	2	5/16	0.015	32619	–
5/16	13/16	2-1/2	5/16	0.015	32620	–
5/16	1-1/4	4	5/16	0.015	32621	–
3/8	1/2	2	3/8	0.015	32625	32591
3/8	1/2	2	3/8	0.030	32592	32593
3/8	1	2-1/2	3/8	0.015	32626	32628
3/8	1	2-1/2	3/8	0.030	32573	32574
3/8	1-1/2	4	3/8	0.015	32627	–
3/8	1-1/2	4	3/8	0.030	32569	–

continued on next page

TOLERANCES (inch)

1/8–1 DIAMETER

D_1 = +0.000/–0.002

D_2 = h_6

R = +0.000/–0.002

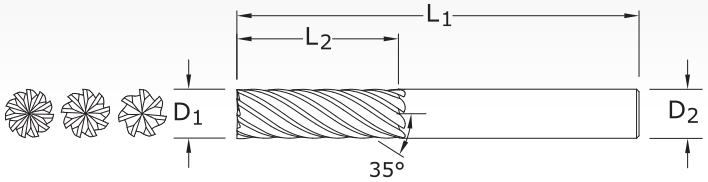
55CR
FRACTIONAL SERIES

CONTINUED

inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT
7/16	1	2-3/4	7/16	0.015	32632	–
7/16	2	4	7/16	0.015	32633	–
1/2	5/8	2-1/2	1/2	0.030	32594	32595
1/2	5/8	2-1/2	1/2	0.060	32596	32597
1/2	1-1/4	3	1/2	0.030	32575	32576
1/2	1-1/4	3	1/2	0.060	32577	32578
1/2	2	4	1/2	0.030	32685	–
1/2	2	4	1/2	0.060	32686	–
5/8	3/4	3	5/8	0.030	32598	32599
5/8	3/4	3	5/8	0.060	32600	32601
5/8	1-5/8	3-1/2	5/8	0.030	32579	32580
5/8	1-5/8	3-1/2	5/8	0.060	32581	32582
5/8	2-1/2	5	5/8	0.030	32570	–
5/8	2-1/2	5	5/8	0.060	32687	–
3/4	1	3	3/4	0.030	32602	32603
3/4	1	3	3/4	0.060	32604	32605
3/4	1-5/8	4	3/4	0.030	32583	32584
3/4	1-5/8	4	3/4	0.060	32585	32586
3/4	3-1/4	6	3/4	0.030	32571	–
3/4	3-1/4	6	3/4	0.060	32688	–
1	1-1/2	4	1	0.030	32587	32588
1	1-1/2	4	1	0.060	32589	32590
1	2-5/8	6	1	0.030	32572	–
1	2-5/8	6	1	0.060	32689	–

Multi-Carb Finishing End Mills

MULTI Carb
HIGH PERFORMANCE FINISHING END MILLS



66
FRACTIONAL SERIES

TECH INFO 67

inch					EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	Ti-NAMITE-A (AlTiN)
3/16	5/8	2	3/16	7	36620
1/4	3/4	2-1/2	1/4	7	36621
3/8	1	3	3/8	7	36622
1/2	1-1/4	3	1/2	9	36623
5/8	1-5/8	3-1/2	5/8	9	36624
3/4	1-5/8	4	3/4	11	36625
1	2	6	1	11	36626

Neck Option Available
Ideal Tool for High Speed Machining

TOLERANCES (inch)
3/16–1 DIAMETER
D_1 = +0.000/–0.002
D_2 = h_6

- STEELS
- STAINLESS STEELS
- HIGH TEMP ALLOYS
- TITANIUM

66M
METRIC SERIES

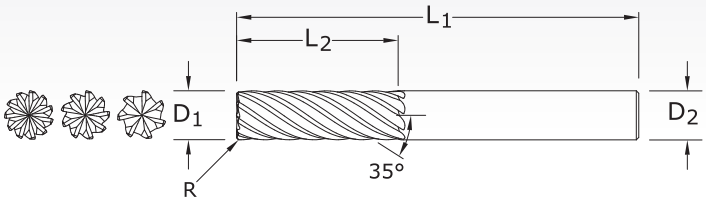
TECH INFO 68

mm					EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	Ti-NAMITE-A (AlTiN)
6,0	19,0	63,0	6,0	7	46620
8,0	20,0	63,0	8,0	7	46621
10,0	22,0	75,0	10,0	7	46622
12,0	26,0	83,0	12,0	9	46623
16,0	32,0	92,0	16,0	9	46624
20,0	38,0	104,0	20,0	11	46625
25,0	38,0	104,0	25,0	11	46626

Neck Option Available
Ideal Tool for High Speed Machining

TOLERANCES (mm)
6–20 DIAMETER
D_1 = +0,000/–0,050
D_2 = h_6

Multi-Carb Finishing End Mills



TOLERANCES (inch)

3/16–1 DIAMETER

D_1 = +0.000/–0.002

D_2 = h_6

R = +0.000/–0.002

66CR
FRACTIONAL SERIES

TECH INFO 67

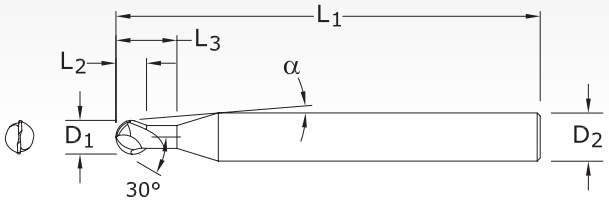
inch						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	NO. OF FLUTES	Ti-NAMITE-A (AlTiN)
3/16	5/8	2	3/16	0.010	7	36627
1/4	3/4	2-1/2	1/4	0.015	7	36628
3/8	1	3	3/8	0.015	7	36629
1/2	1-1/4	3	1/2	0.030	9	36630
1/2	1-1/4	3	1/2	0.090	9	36631
1/2	1-1/4	3	1/2	0.120	9	36632
5/8	1-5/8	3-1/2	5/8	0.030	9	36633
5/8	1-5/8	3-1/2	5/8	0.090	9	36634
5/8	1-5/8	3-1/2	5/8	0.120	9	36635
3/4	1-5/8	4	3/4	0.030	11	36636
3/4	1-5/8	4	3/4	0.090	11	36637
3/4	1-5/8	4	3/4	0.120	11	36638
1	2	6	1	0.030	11	36639
1	2	6	1	0.090	11	36640
1	2	6	1	0.120	11	36641

Neck Option Available
Ideal Tool for High Speed Machining

- STEELS
- STAINLESS STEELS
- HIGH TEMP ALLOYS
- TITANIUM

Turbo-Carb End Mills

56B
FRACTIONAL SERIES



TECH INFO 69

STEELS

HARDENED STEELS

inch						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	α	REACH L_3	Ti-NAMITE-A (AlTiN)
1/32	1/32	3	1/4	8°20'	1/16	93272
1/16	1/16	3	1/4	7°40'	1/8	93273
3/32	3/32	3	1/4	6°50'	3/16	93274
1/8	1/8	3	1/4	6°	1/4	93275
3/16	3/16	3	1/4	3°35'	3/8	93276
1/4	1/4	3-1/2	1/4	–	1/2	93277
5/16	5/16	4	5/16	–	5/8	93278
3/8	3/8	4	3/8	–	3/4	93279
1/2	1/2	4-1/2	1/2	–	1	93280
5/8	5/8	5-1/2	5/8	–	1/4	93281
3/4	3/4	6-1/2	3/4	–	1/2	93282

Neck Option Available

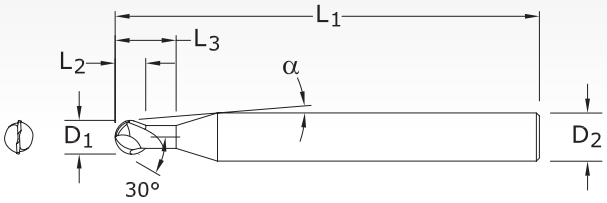
TOLERANCES (inch)

1/32–3/32 DIAMETER
D_1 = +0.000/–0.001
D_2 = h_6

>3/32–1/4 DIAMETER
D_1 = +0.000/–0.0012
D_2 = h_6

>1/4–3/8 DIAMETER
D_1 = +0.000/–0.0016
D_2 = h_6

>3/8–3/4 DIAMETER
D_1 = +0.000/–0.002
D_2 = h_6



56MB
METRIC SERIES

TECH INFO 66

TOLERANCES (mm)

1–2,5 DIAMETER
D_1 = +0,000/–0,025
D_2 = h_6

>2,5–6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,000/–0,040
D_2 = h_6

>10–20 DIAMETER
D_1 = +0,000/–0,050
D_2 = h_6

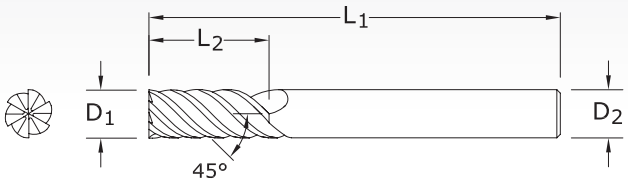
mm						EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	α	REACH L_3	Ti-NAMITE-A (AlTiN)
1,0	1,0	76,0	6,0	8°10'	2,0	91349
1,5	1,5	76,0	6,0	7°45'	3,0	91350
2,0	2,0	76,0	6,0	7°10'	4,0	91351
2,5	2,5	76,0	6,0	6°35'	5,0	91352
3,0	3,0	76,0	6,0	6°	6,0	91353
4,0	4,0	76,0	6,0	4°30'	8,0	91354
5,0	5,0	89,0	6,0	2°30'	10,0	91355
6,0	6,0	89,0	6,0	–	12,0	91356
8,0	8,0	102,0	8,0	–	16,0	91357
10,0	10,0	102,0	10,0	–	20,0	91358
12,0	12,0	114,0	12,0	–	24,0	91359
16,0	16,0	140,0	16,0	–	32,0	91360
20,0	20,0	165,0	20,0	–	40,0	91361

Neck Option Available

STEELS

HARDENED STEELS

Power-Carb End Mills



57
FRACTIONAL SERIES

TECH INFO 70

HARDENED STEELS

inch				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)
1/4	17/32	3-1/2	1/4	36140
5/16	11/16	4	5/16	36141
3/8	13/16	4	3/8	36142
1/2	1-3/32	4-1/2	1/2	36143

Neck Option Available
Ideal for Trochodial Milling

TOLERANCES (inch)

1/4 DIAMETER
D_1 = +0.000/–0.0012
D_2 = h_6

5/16 DIAMETER
D_1 = +0.000/–0.0016
D_2 = h_6

3/8 DIAMETER
D_1 = +0.000/–0.0016
D_2 = h_6

1/2 DIAMETER
D_1 = +0.000/–0.002
D_2 = h_6

57M
METRIC SERIES

TECH INFO 70

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)
6,0	13,0	89,0	6,0	46140
8,0	18,0	102,0	8,0	46141
10,0	22,0	102,0	10,0	46142
12,0	26,0	114,0	12,0	46143

Neck Option Available
Ideal for Trochodial Milling

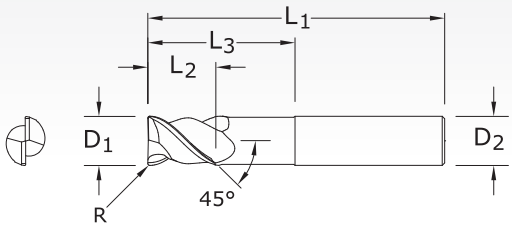
TOLERANCES (mm)

6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6

8 DIAMETER
D_1 = +0,000/–0,040
D_2 = h_6

10 DIAMETER
D_1 = +0,000/–0,040
D_2 = h_6

12 DIAMETER
D_1 = +0,000/–0,050
D_2 = h_6



TOLERANCES (inch)

1/4–3/8 DIAMETER
D_1 = +0.000/–0.00035
D_2 = h_6
R = +0.000/–0.002

1/2–5/8 DIAMETER
D_1 = +0.000/–0.00043
D_2 = h_6
R = +0.000/–0.002

3/4–1 DIAMETER
D_1 = +0.000/–0.00051
D_2 = h_6
R = +0.000/–0.002

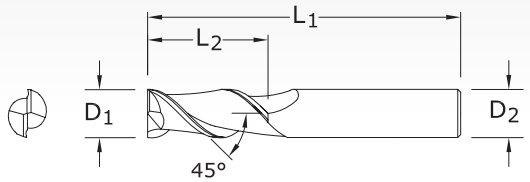
45
FRACTIONAL SERIES

TECH INFO 71

inch						EDP NO.			
CUTTING DIA. D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIA. D_2	REACH L_3	CORNER RADIUS R	UNCOATED W/FLAT	UNCOATED W/O FLAT	Ti-NAMITE-B (TiB_2) W/FLAT	Ti-NAMITE-B (TiB_2) W/O FLAT
1/4	3/8	2-1/2	3/8	1	0.010	91257	91250	91235	91242
5/16	7/16	2-1/2	3/8	1-1/8	0.012	91258	91251	91236	91243
3/8	9/16	2-1/2	3/8	1-1/8	0.015	91259	91252	91237	91244
1/2	3/4	3	1/2	1-1/2	0.020	91260	91253	91238	91245
5/8	7/8	3-1/2	5/8	1-3/4	0.025	91261	91254	91239	91246
3/4	1	4	3/4	2	0.030	91262	91255	91240	91247
1	1-1/4	4	1	2-1/8	0.040	91263	91256	91241	91248

NON-FERROUS
PLASTICS/COMPOSITES

Ski-Carb End Mills



44
FRACTIONAL SERIES

TECH INFO 71

NON-FERROUS

PLASTICS/COMPOSITES

inch					EDP NO.			
CUTTING DIA. D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIA. D_2	CORNER RADIUS* R	UNCOATED W/FLAT	UNCOATED W/O FLAT	Ti-NAMITE-B (TiB_2) W/FLAT	Ti-NAMITE-B (TiB_2) W/O FLAT
1/4	3/4	2-7/16	3/8	.015–.060	34501	32033	34502	32053
1/4	1-1/4	3-1/16	3/8	.015–.060	34503	32034	34504	32054
1/4	1-3/4	3-9/16	3/8	.015–.060	34505	32035	34506	32055
5/16	1-3/8	3-1/8	3/8	.015–.060	34507	32036	34508	32056
3/8	3/4	2-1/2	3/8	.015–.060	34509	32037	34510	32057
3/8	1-1/2	3-1/4	3/8	.015–.060	34511	32038	34512	32058
3/8	2-1/2	4-1/4	3/8	.015–.060	34513	32039	34514	32059
1/2	1-1/4	3-1/4	1/2	.015–.125	34515	32040	34516	32060
1/2	2	4	1/2	.015–.125	34517	32041	34518	32061
1/2	3	5	1/2	.015–.125	34519	32042	34520	32062
5/8	1-5/8	3-3/4	5/8	.015–.125	34521	32043	34522	32063
5/8	2-1/2	4-5/8	5/8	.015–.125	34523	32044	34524	32064
3/4	1-5/8	3-7/8	3/4	.015–.125	34525	32045	34526	32065
3/4	3	5-1/4	3/4	.015–.125	34527	32046	34528	32066
3/4	4	6-1/4	3/4	.015–.125	34529	32047	34530	32067
1	2	4-1/2	1	.015–.125	34531	32048	34532	32068
1	4	6-1/2	1	.015–.125	34533	32049	34534	32069

*Contact your SGS Sales Representative for more information on Corner Radius options.

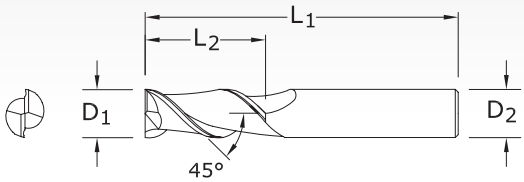
TOLERANCES (inch)

1/4–3/8 DIAMETER
D_1 = +0.000/–0.00035
D_2 = h_6
R = +0.000/–0.002

1/2–5/8 DIAMETER
D_1 = +0.000/–0.00043
D_2 = h_6
R = +0.000/–0.002

3/4–1 DIAMETER
D_1 = +0.000/–0.00051
D_2 = h_6
R = +0.000/–0.002

Ski-Carb End Mills



44M
METRIC SERIES

TECH INFO 71

TOLERANCES (mm)

≤3 DIAMETER
D_1 = +0,000/–0,006
D_2 = h_6
R = +0,000/–0,050

>3–6 DIAMETER
D_1 = +0,000/–0,008
D_2 = h_6
R = +0,000/–0,050

>6–10 DIAMETER
D_1 = +0,000/–0,009
D_2 = h_6
R = +0,000/–0,050

>10–18 DIAMETER
D_1 = +0,000/–0,011
D_2 = h_6
R = +0,000/–0,050

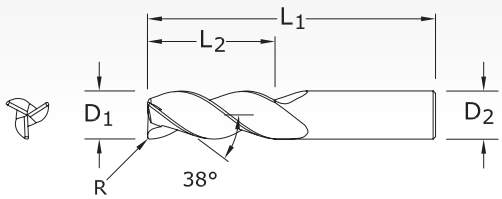
>18–20 DIAMETER
D_1 = +0,000/–0,013
D_2 = h_6
R = +0,000/–0,050

mm					EDP NO.			
CUTTING DIA. D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIA. D_2	CORNER RADIUS* R	UNCOATED W/FLAT	UNCOATED W/O FLAT	Ti-NAMITE-B (TiB_2) W/FLAT	Ti-NAMITE-B (TiB_2) W/O FLAT
3,0	8,0	52,0	6,0	0,36–0,76	44505	49663	44506	49674
4,0	11,0	55,0	6,0	0,36–0,76	44509	49664	44510	49675
5,0	13,0	57,0	6,0	0,36–0,76	44513	49665	44514	49676
6,0	13,0	57,0	6,0	0,36–0,76	44517	49666	44518	49677
8,0	19,0	69,0	10,0	0,38–1,52	44521	49667	44522	49678
10,0	22,0	72,0	10,0	0,38–1,52	44525	49668	44526	49679
12,0	26,0	83,0	12,0	0,38–3,17	44529	49669	44530	49680
14,0	26,0	83,0	14,0	0,38–3,17	44533	49670	44534	49681
16,0	32,0	92,0	16,0	0,38–3,17	44537	49671	44538	49682
18,0	32,0	92,0	18,0	0,38–3,17	44541	49672	44542	49683
20,0	38,0	104,0	20,0	0,38–3,17	44545	49673	44546	49684

*Contact your SGS Sales Representative for more information on Corner Radius options.

NON-FERROUS
PLASTICS/COMPOSITES

S-Carb End Mills



43CR
FRACTIONAL SERIES

TECH INFO 71

NON-FERROUS

PLASTICS/COMPOSITES

inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB_2)
1/8	3/8	1-1/2	1/8	0.010	34771	34793
3/16	9/16	2	3/16	0.010	34772	34794
1/4	3/4	2-1/2	1/4	0.010	34773	34795
1/4	3/4	2-1/2	1/4	0.030	34774	34796
5/16	5/8	2-1/2	5/16	0.030	34775	34797
3/8	1	2-1/2	3/8	0.010	34776	34798
3/8	1	2-1/2	3/8	0.030	34777	34799
3/8	1	2-1/2	3/8	0.060	32761	32825
1/2	1-1/4	3-1/4	1/2	0.010	34778	34800
1/2	1-1/4	3-1/4	1/2	0.030	34779	34801
1/2	1-1/4	3-1/4	1/2	0.060	34780	34802
1/2	1-1/4	3-1/4	1/2	0.090	34781	34803
1/2	1-1/4	3-1/4	1/2	0.120	32766	32830
5/8	1-5/8	3-3/4	5/8	0.030	34782	34804
5/8	1-5/8	3-3/4	5/8	0.060	34783	34805
5/8	1-5/8	3-3/4	5/8	0.090	34784	34806
3/4	1-5/8	4	3/4	0.030	34785	34807
3/4	1-5/8	4	3/4	0.060	34786	34808
3/4	1-5/8	4	3/4	0.090	34787	34809
3/4	1-5/8	4	3/4	0.120	34815	34817
1	2	4-1/2	1	0.030	34789	34811
1	2	4-1/2	1	0.060	34790	34812
1	2	4-1/2	1	0.090	34791	34813
1	2	4-1/2	1	0.120	34816	34818

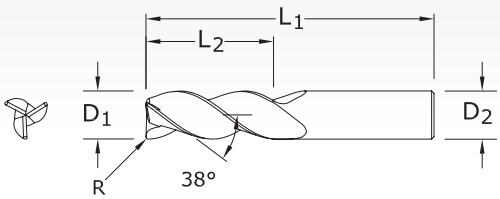
TOLERANCES (inch)

1/8–3/16 DIAMETER
D_1 = +0.000/–0.00032
D_2 = h_6
R = +0.000/–0.002

1/4–3/8 DIAMETER
D_1 = +0.000/–0.00035
D_2 = h_6
R = +0.000/–0.002

1/2–5/8 DIAMETER
D_1 = +0.000/–0.00043
D_2 = h_6
R = +0.000/–0.002

3/4–1 DIAMETER
D_1 = +0.000/–0.00051
D_2 = h_6
R = +0.000/–0.002



43MCR
METRIC SERIES

TECH INFO 71

TOLERANCES (mm)

6 DIAMETER
D_1 = +0,000/–0,008
D_2 = h_6
R = +0,000/–0,050

>6–10 DIAMETER
D_1 = +0,000/–0,009
D_2 = h_6
R = +0,000/–0,050

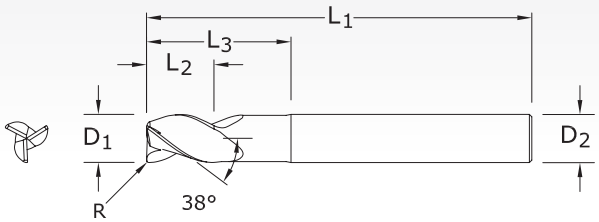
>10–18 DIAMETER
D_1 = +0,000/–0,011
D_2 = h_6
R = +0,000/–0,050

>18–20 DIAMETER
D_1 = +0,000/–0,013
D_2 = h_6
R = +0,000/–0,050

mm						EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB_2)
6,0	10,0	63,0	6,0	20,0	0,5	44769	44789
6,0	10,0	63,0	6,0	20,0	1,0	44770	44790
6,0	13,0	72,0	6,0	30,0	0,5	44771	44791
6,0	13,0	72,0	6,0	30,0	1,0	44772	44792
8,0	12,0	75,0	8,0	25,0	0,3	44773	44793
8,0	12,0	75,0	8,0	25,0	0,5	44774	44794
8,0	12,0	75,0	8,0	25,0	1,0	44775	44795
8,0	12,0	75,0	8,0	25,0	1,5	44776	44796
10,0	14,0	100,0	10,0	35,0	0,3	44777	44797
10,0	14,0	100,0	10,0	35,0	0,5	44778	44798
10,0	14,0	100,0	10,0	35,0	1,0	44779	44799
10,0	14,0	100,0	10,0	35,0	1,5	44780	44800
12,0	16,0	100,0	12,0	40,0	0,5	44781	44801
12,0	16,0	100,0	12,0	40,0	1,0	44782	44802
12,0	16,0	100,0	12,0	40,0	1,5	44783	44803
12,0	16,0	100,0	12,0	40,0	2,0	44784	44804
16,0	20,0	125,0	16,0	50,0	2,0	44785	44805
16,0	20,0	125,0	16,0	50,0	4,0	44786	44806
20,0	25,0	150,0	20,0	65,0	2,0	44787	44807
20,0	25,0	150,0	20,0	65,0	4,0	44788	44808

NON-FERROUS
PLASTICS/COMPOSITES

S-Carb End Mills



43LC
FRACTIONAL SERIES

TECH INFO 71

NON-FERROUS

PLASTICS/COMPOSITES

inch						EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB_2)
1/8	5/32	3	1/8	1/2	0.010	32751	32815
3/16	7/32	3	3/16	1/2	0.010	32752	32816
1/4	3/8	4	1/4	3/4	0.010	32753	32817
1/4	3/8	4	1/4	3/4	0.030	32754	32818
1/4	3/8	4	1/4	1-1/2	0.010	32755	32819
1/4	3/8	4	1/4	1-1/2	0.030	32756	32820
1/4	3/8	4	1/4	2-1/8	0.010	32757	32821
1/4	3/8	4	1/4	2-1/8	0.030	32758	32822
5/16	7/16	4	5/16	1-1/8	0.030	32759	32823
5/16	7/16	4	5/16	2-1/8	0.030	32760	32824
3/8	1/2	4	3/8	1-1/8	0.030	32762	32826
3/8	1/2	4	3/8	1-1/8	0.060	32763	32827
3/8	1/2	4	3/8	2-1/8	0.030	32764	32828
3/8	1/2	4	3/8	2-1/8	0.060	32765	32829
1/2	5/8	4	1/2	1-3/8	0.030	32767	32831
1/2	5/8	4	1/2	1-3/8	0.060	32768	32832
1/2	5/8	4	1/2	1-3/8	0.090	32769	32833
1/2	5/8	4	1/2	1-3/8	0.120	32770	32834
1/2	5/8	6	1/2	2-1/8	0.030	32771	32835
1/2	5/8	6	1/2	2-1/8	0.060	32772	32836
1/2	5/8	6	1/2	2-1/8	0.090	32773	32837
1/2	5/8	6	1/2	2-1/8	0.120	32774	32838
1/2	5/8	6	1/2	3-3/8	0.030	32775	32839
1/2	5/8	6	1/2	3-3/8	0.060	32776	32840
1/2	5/8	6	1/2	3-3/8	0.090	32777	32841
1/2	5/8	6	1/2	3-3/8	0.120	32778	32842

continued on next page

TOLERANCES (inch)

1/8–3/16 DIAMETER
D_1 = +0.000/–0.00032
D_2 = h_6
R = +0.000/–0.002

1/4–3/8 DIAMETER
D_1 = +0.000/–0.00035
D_2 = h_6
R = +0.000/–0.002

1/2–5/8 DIAMETER
D_1 = +0.000/–0.00043
D_2 = h_6
R = +0.000/–0.002

3/4–1 DIAMETER
D_1 = +0.000/–0.00051
D_2 = h_6
R = +0.000/–0.002

43LC
FRACTIONAL SERIES

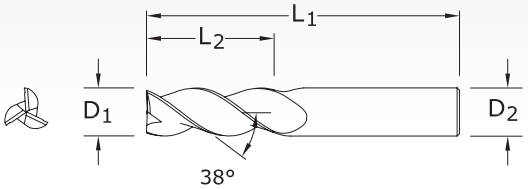
CONTINUED

inch						EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB_2)
5/8	3/4	4	5/8	1-3/4	0.030	32779	32843
5/8	3/4	4	5/8	1-3/4	0.060	32780	32844
5/8	3/4	4	5/8	1-3/4	0.090	32781	32845
5/8	3/4	4	5/8	1-3/4	0.120	32782	32846
5/8	3/4	4	5/8	2-3/8	0.030	32783	32847
5/8	3/4	4	5/8	2-3/8	0.060	32784	32848
5/8	3/4	4	5/8	2-3/8	0.090	32785	32849
5/8	3/4	4	5/8	2-3/8	0.120	32786	32850
5/8	3/4	6	5/8	3-3/8	0.030	32787	32851
5/8	3/4	6	5/8	3-3/8	0.060	32788	32852
5/8	3/4	6	5/8	3-3/8	0.090	32789	32853
5/8	3/4	6	5/8	3-3/8	0.120	32790	32854
3/4	1	4	3/4	1-3/4	0.030	32791	32855
3/4	1	4	3/4	1-3/4	0.060	32792	32856
3/4	1	4	3/4	1-3/4	0.090	32793	32857
3/4	1	4	3/4	1-3/4	0.120	32794	32858
3/4	1	6	3/4	2-3/8	0.030	32795	32859
3/4	1	6	3/4	2-3/8	0.060	32796	32860
3/4	1	6	3/4	2-3/8	0.090	32797	32861
3/4	1	6	3/4	2-3/8	0.120	32798	32862
3/4	1	6	3/4	3-3/8	0.030	32799	32863
3/4	1	6	3/4	3-3/8	0.060	32800	32864
3/4	1	6	3/4	3-3/8	0.090	32801	32865
3/4	1	6	3/4	3-3/8	0.120	32802	32866
1	1-1/4	6	1	2-3/8	0.030	32803	32867
1	1-1/4	6	1	2-3/8	0.060	32804	32868
1	1-1/4	6	1	2-3/8	0.090	32805	32869
1	1-1/4	6	1	2-3/8	0.120	32806	32870
1	1-1/4	6	1	3-3/8	0.030	32807	32871
1	1-1/4	6	1	3-3/8	0.060	32808	32872
1	1-1/4	6	1	3-3/8	0.090	32809	32873
1	1-1/4	6	1	3-3/8	0.120	32810	32874

NON-FERROUS

PLASTICS/COMPOSITES

S-Carb End Mills



43
FRACTIONAL SERIES

TECH INFO 71

NON-FERROUS

PLASTICS/COMPOSITES

inch				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-B (TiB_2)
1/8	3/8	1-1/2	1/8	34701	34728
3/16	9/16	2	3/8	34702	34729
1/4	3/8	2	1/4	34703	34730
1/4	3/4	2-1/2	1/4	34704	34731
1/4	1-1/4	3-1/2	1/4	34705	34732
5/16	7/16	2	5/16	34706	34733
5/16	5/8	2-1/2	5/16	34707	34734
5/16	1-1/4	4	5/16	34708	34735
3/8	1/2	2	3/8	34709	34736
3/8	1	2-1/2	3/8	34710	34737
3/8	1-1/2	3-1/2	3/8	34711	34738
1/2	5/8	2-1/2	1/2	34712	34739
1/2	1-1/4	3-1/4	1/2	34713	34740
1/2	2	4	1/2	34714	34741
1/2	3-1/8	6	1/2	34715	34742
5/8	3/4	3	5/8	34716	34743
5/8	1-5/8	3-3/4	5/8	34717	34744
5/8	2-1/2	5	5/8	34718	34745
5/8	3-3/4	6	5/8	34719	34746
3/4	1	3	3/4	34720	34747
3/4	1-5/8	4	3/4	34721	34748
3/4	2-1/4	5	3/4	34722	34749
3/4	3-1/4	6	3/4	34723	34750
1	1-1/4	4	1	34724	34751
1	2	4-1/2	1	34725	34752
1	2-5/8	6	1	34726	34753
1	3-1/4	6	1	34727	34754

TOLERANCES (inch)

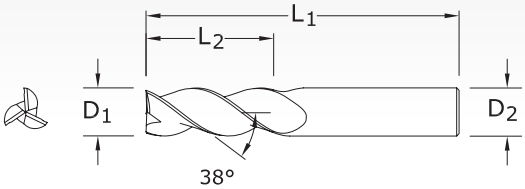
1/8–3/16 DIAMETER
D_1 = +0.000/–0.00032
D_2 = h_6

1/4–3/8 DIAMETER
D_1 = +0.000/–0.00035
D_2 = h_6

1/2–5/8 DIAMETER
D_1 = +0.000/–0.00043
D_2 = h_6

3/4–1 DIAMETER
D_1 = +0.000/–0.00051
D_2 = h_6

S-Carb End Mills



TOLERANCES (mm)

6 DIAMETER
D_1 = +0,000/–0,008
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,000/–0,009
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,000/–0,011
D_2 = h_6

>18–20 DIAMETER
D_1 = +0,000/–0,013
D_2 = h_6

43M
METRIC SERIES

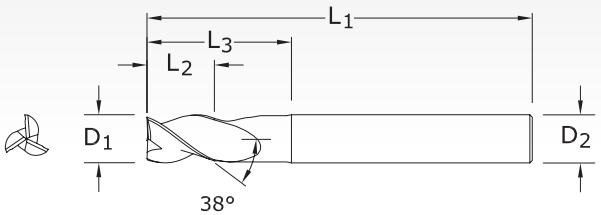
TECH INFO 71

mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-B (TiB_2)
6,0	13,0	57,0	6,0	44701	44715
6,0	13,0	72,0	6,0	44702	44716
8,0	19,0	63,0	8,0	44703	44717
10,0	22,0	72,0	10,0	44705	44719
12,0	26,0	83,0	12,0	44708	44722
16,0	32,0	92,0	16,0	44711	44725
20,0	38,0	104,0	20,0	44714	44728

NON-FERROUS

PLASTICS/COMPOSITES

S-Carb End Mills



43L
FRACTIONAL SERIES

TECH INFO 71

NON-FERROUS

PLASTICS/COMPOSITES

inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	UNCOATED	Ti-NAMITE-B (TiB_2)
1/8	5/32	3	1/8	1/2	32700	32725
3/16	7/32	3	3/16	1/2	32701	32726
1/4	3/8	4	1/4	3/4	32702	32727
1/4	3/8	4	1/4	1-1/2	32703	32728
1/4	3/8	4	1/4	2-1/8	32704	32729
5/16	7/16	4	5/16	1-1/8	32705	32730
5/16	7/16	4	5/16	2-1/8	32706	32731
3/8	1/2	4	3/8	1-1/8	32707	32732
3/8	1/2	4	3/8	2-1/8	32708	32733
1/2	5/8	4	1/2	1-3/8	32709	32734
1/2	5/8	6	1/2	2-1/8	32710	32735
1/2	5/8	6	1/2	3-3/8	32711	32736
5/8	3/4	4	5/8	1-3/4	32712	32737
5/8	3/4	4	5/8	2-3/8	32713	32738
5/8	3/4	6	5/8	3-3/8	32714	32739
3/4	1	4	3/4	1-3/4	32715	32740
3/4	1	6	3/4	2-3/8	32716	32741
3/4	1	6	3/4	3-3/8	32717	32742
1	1-1/4	6	1	2-3/8	32718	32743
1	1-1/4	6	1	3-3/8	32719	32744
1	1-1/4	7	1	4-3/8	32720	32745

TOLERANCES (inch)

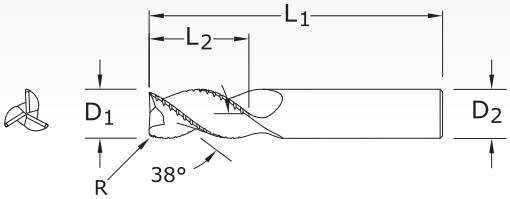
1/8–3/16 DIAMETER
D_1 = +0.000/–0.00032
D_2 = h_6

1/4–3/8 DIAMETER
D_1 = +0.000/–0.00035
D_2 = h_6

1/2–5/8 DIAMETER
D_1 = +0.000/–0.00043
D_2 = h_6

3/4–1 DIAMETER
D_1 = +0.000/–0.00051
D_2 = h_6

S-Carb Roughing End Mills



43CB
FRACTIONAL SERIES

TECH INFO 71

inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB_2)
3/8	1	2-1/2	3/8	.010	34300	34305
1/2	1-1/4	3-1/4	1/2	.030	34301	34306
5/8	1-5/8	3-3/4	5/8	.030	34302	34307
3/4	1-5/8	4	3/4	.030	34303	34308
1	2	4-1/2	1	.030	34304	34309

NON-FERROUS

PLASTICS/COMPOSITES

TOLERANCES (inch)

3/8 DIAMETER
D_1 = +0.000/–0.00035
D_2 = h_6
R = +0.000/–0.002

1/2–5/8 DIAMETER
D_1 = +0.000/–0.00043
D_2 = h_6
R = +0.000/–0.002

3/4–1 DIAMETER
D_1 = +0.000/–0.00051
D_2 = h_6
R = +0.000/–0.002

43MCB
METRIC SERIES

TECH INFO 71

mm					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB_2)
8,0	19,0	63,0	8,0	0,3	44300	44305
10,0	22,0	72,0	10,0	0,3	44301	44306
12,0	26,0	83,0	12,0	1,0	44302	44307
16,0	32,0	92,0	16,0	1,0	44303	44308
20,0	38,0	104,0	20,0	1,0	44304	44309

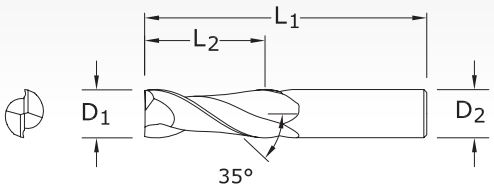
TOLERANCES (mm)

8–10 DIAMETER
D_1 = +0,000/–0,009
D_2 = h_6
R = +0,000/–0,050

>10–18 DIAMETER
D_1 = +0,000/–0,011
D_2 = h_6
R = +0,000/–0,050

>18–20 DIAMETER
D_1 = +0,000/–0,013
D_2 = h_6
R = +0,000/–0,050

S-Carb End Mills



47
FRACTIONAL SERIES

TECH INFO 71

NON-FERROUS

PLASTICS/COMPOSITES

inch				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-B (TiB_2)
1/8	3/8	1-1/2	1/8	34620	34660
3/16	9/16	2	3/16	34621	34661
1/4	3/4	2-1/2	1/4	34622	34662
5/16	13/16	2-1/2	5/16	34623	34663
3/8	1	2-1/2	3/8	34624	34664
1/2	1-1/4	3-1/4	1/2	34625	34665
5/8	1-5/8	3-3/4	5/8	34626	34666
3/4	1-5/8	4	3/4	34627	34667
1	2	4-1/2	1	34628	34668

TOLERANCES (inch)

1/8–1 DIAMETER

D_1 = +0.0001/–0.0004

D_2 = h_6

47M
METRIC SERIES

TECH INFO 71

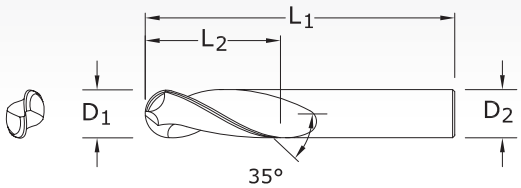
mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-B (TiB_2)
3,0	8,0	38,0	3,0	44550	44587
4,0	11,0	50,0	4,0	44551	44588
5,0	13,0	50,0	5,0	44552	44589
6,0	13,0	57,0	6,0	44553	44590
8,0	19,0	63,0	8,0	44554	44591
10,0	22,0	72,0	10,0	44555	44592
12,0	26,0	83,0	12,0	44556	44593
14,0	26,0	83,0	14,0	44557	44594
16,0	32,0	92,0	16,0	44558	44595
20,0	38,0	104,0	20,0	44559	44596
25,0	44,0	104,0	25,0	44560	44597

TOLERANCES (mm)

3–25 DIAMETER

D_1 = +0,0025/–0,010

D_2 = h_6



TOLERANCES (inch)

1/8–1 DIAMETER

D_1 = +0.0001/–0.0004

D_2 = h_6

47B
FRACTIONAL SERIES

TECH INFO 71

inch				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-B (TiB_2)
1/8	3/8	1-1/2	1/8	34630	34669
3/16	9/16	2	3/16	34631	34670
1/4	3/4	2-1/2	1/4	34632	34671
5/16	13/16	2-1/2	5/16	34633	34672
3/8	1	2-1/2	3/8	34634	34673
1/2	1-1/4	3-1/4	1/2	34635	34674
5/8	1-5/8	3-3/4	5/8	34636	34675
3/4	1-5/8	4	3/4	34637	34676
1	2	4-1/2	1	34638	34677

NON-FERROUS

PLASTICS/COMPOSITES

TOLERANCES (mm)

3–25 DIAMETER

D_1 = +0,0025/–0,010

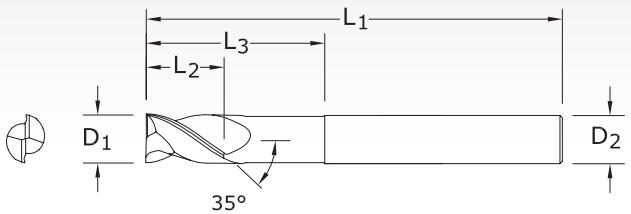
D_2 = h_6

47MB
METRIC SERIES

TECH INFO 71

mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-B (TiB_2)
3,0	8,0	38,0	3,0	44570	44598
4,0	11,0	50,0	4,0	44571	44599
5,0	13,0	50,0	5,0	44572	44600
6,0	13,0	57,0	6,0	44573	44601
8,0	19,0	63,0	8,0	44574	44602
10,0	22,0	72,0	10,0	44575	44603
12,0	26,0	83,0	12,0	44576	44604
14,0	26,0	83,0	14,0	44577	44605
16,0	32,0	92,0	16,0	44578	44606
20,0	38,0	104,0	20,0	44579	44607
25,0	44,0	104,0	25,0	44580	44608

S-Carb End Mills



47ES
FRACTIONAL SERIES

TECH INFO 71

NON-FERROUS

PLASTICS/COMPOSITES

inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	UNCOATED	Ti-NAMITE-B (TiB_2)
1/4	3/8	4	1/4	2-1/8	34640	34678
3/8	1/2	4	3/8	2-1/8	34641	34679
1/2	5/8	6	1/2	2-1/8	34642	34680
1/2	5/8	6	1/2	3-3/8	34643	34681
5/8	3/4	6	5/8	2-3/8	34644	34682
5/8	3/4	6	5/8	3-3/8	34645	34683
3/4	1	6	3/4	2-1/2	34646	34684
3/4	1	6	3/4	3-3/8	34647	34685

TOLERANCES (inch)

1/4–3/4 DIAMETER

D_1 = +0.0001/–0.0004

D_2 = h_6

47MES
METRIC SERIES

TECH INFO 71

mm					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	UNCOATED	Ti-NAMITE-B (TiB_2)
6,0	10,0	100,0	6,0	54,0	44561	44609
8,0	12,0	100,0	8,0	54,0	44562	44610
10,0	12,0	100,0	10,0	54,0	44563	44611
12,0	16,0	150,0	12,0	80,0	44564	44612
16,0	20,0	150,0	16,0	80,0	44565	44613
20,0	25,0	150,0	20,0	80,0	44566	44614

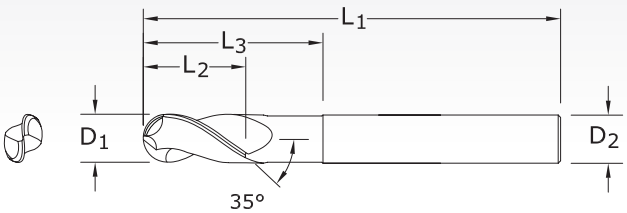
TOLERANCES (mm)

6–20 DIAMETER

D_1 = +0,0025/–0,010

D_2 = h_6

S-Carb End Mills



TOLERANCES (inch)

1/4–3/4 DIAMETER

D_1 = +0.0001/–0.0004

D_2 = h_6

47EB
FRACTIONAL SERIES

TECH INFO 71

inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	UNCOATED	Ti-NAMITE-B (TiB_2)
1/4	3/8	4	1/4	2-1/8	34650	34686
3/8	1/2	4	3/8	2-1/8	34651	34687
1/2	5/8	6	1/2	2-1/8	34652	34688
1/2	5/8	6	1/2	3-3/8	34653	34689
5/8	3/4	6	5/8	3-3/8	34654	34690
5/8	3/4	6	5/8	2-3/8	34655	34691
3/4	1	6	3/4	2-1/2	34656	34693
3/4	1	6	3/4	3-3/8	34657	34692

NON-FERROUS

PLASTICS/COMPOSITES

TOLERANCES (mm)

6–20 DIAMETER

D_1 = +0,0025/–0,010

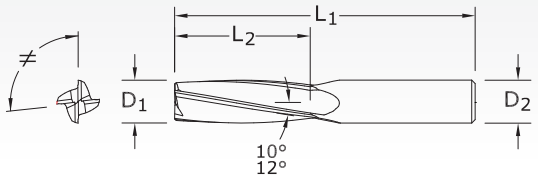
D_2 = h_6

47MEB
METRIC SERIES

TECH INFO 71

mm					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	UNCOATED	Ti-NAMITE-B (TiB_2)
6,0	10,0	100,0	6,0	54,0	44581	44615
8,0	12,0	100,0	8,0	54,0	44582	44616
10,0	12,0	100,0	10,0	54,0	44583	44617
12,0	16,0	150,0	12,0	80,0	44584	44618
16,0	20,0	150,0	16,0	80,0	44585	44619
20,0	25,0	150,0	20,0	80,0	44586	44620

CFRP Slow Helix End Mills



27
FRACTIONAL SERIES

TECH INFO 72

inch				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Di-NAMITE (Diamond)
1/4	1	2-1/2	1/4	72978	72979
3/8	1-1/8	2-1/2	3/8	72980	72981
1/2	1-1/2	3-1/2	1/2	72982	72983
3/4	1-3/8	4	3/4	72984	72985

TOLERANCES (inch)

D_1 = +0.000/–0.0030

D_2 = h_6

NON-FERROUS

PLASTICS/COMPOSITES

27M
METRIC SERIES

TECH INFO 73

mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Di-NAMITE (Diamond)
6,0	25,0	63,0	6,0	83056	83057
8,0	25,0	63,0	8,0	83058	83059
10,0	28,0	63,0	10,0	83060	83061
12,0	38,0	89,0	12,0	83062	83063
16,0	48,0	115,0	16,0	83064	83065

TOLERANCES (mm)

D_1 = +0,000/–0,080

D_2 = h_6

Speed & Feed Recommendations

CARB-AP
Patented Variable Rake End Mills

Z1PCR, Z1PLC, Z1PLB Fractional	HARDNESS	CUT	SPEED	FEED (inch/flute)						
	BRINELL	Type	sfm	1/16	1/8	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	Slot	505	0.00019	0.00047	0.0012	0.0023	0.0031	0.0037	0.0043
		Profile	630	0.00019	0.00047	0.0012	0.0023	0.0031	0.0037	0.0043
		Light	1040	0.00044	0.00107	0.0028	0.0053	0.0071	0.0085	0.0100
	> 175 ≤ 275	Slot	440	0.00019	0.00047	0.0012	0.0023	0.0031	0.0037	0.0043
		Profile	550	0.00019	0.00047	0.0012	0.0023	0.0031	0.0037	0.0043
		Light	910	0.00044	0.00107	0.0028	0.0053	0.0071	0.0085	0.0100
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	Slot	370	0.00014	0.00035	0.0009	0.0017	0.0023	0.0028	0.0032
		Profile	465	0.00014	0.00035	0.0009	0.0017	0.0023	0.0028	0.0032
		Light	765	0.00033	0.00079	0.0021	0.0040	0.0053	0.0063	0.0074
	> 275 ≤ 375	Slot	250	0.00014	0.00035	0.0009	0.0017	0.0023	0.0028	0.0032
		Profile	315	0.00014	0.00035	0.0009	0.0017	0.0023	0.0028	0.0032
		Light	520	0.00033	0.00079	0.0021	0.0040	0.0053	0.0063	0.0074
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Slot	240	0.00014	0.00035	0.0009	0.0017	0.0023	0.0028	0.0032
		Profile	300	0.00014	0.00035	0.0009	0.0017	0.0023	0.0028	0.0032
		Light	495	0.00033	0.00079	0.0021	0.0040	0.0053	0.0063	0.0074
	> 250 ≤ 375	Slot	145	0.00011	0.00027	0.0007	0.0014	0.0018	0.0022	0.0025
		Profile	185	0.00011	0.00027	0.0007	0.0014	0.0018	0.0022	0.0025
		Light	305	0.00026	0.00062	0.0017	0.0031	0.0041	0.0050	0.0058
CAST IRON Gray, Malleable, Ductile	≤ 220	Slot	355	0.00018	0.00042	0.0011	0.0021	0.0028	0.0034	0.0039
		Profile	445	0.00018	0.00042	0.0011	0.0021	0.0028	0.0034	0.0039
		Light	730	0.00040	0.00096	0.0026	0.0048	0.0064	0.0077	0.0090
	> 220 ≤ 260	Slot	265	0.00018	0.00042	0.0011	0.0021	0.0028	0.0034	0.0039
		Profile	330	0.00018	0.00042	0.0011	0.0021	0.0028	0.0034	0.0039
		Light	545	0.00040	0.00096	0.0026	0.0048	0.0064	0.0077	0.0090
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 275	Slot	455	0.00014	0.00035	0.0009	0.0017	0.0023	0.0028	0.0032
		Profile	570	0.00014	0.00035	0.0009	0.0017	0.0023	0.0028	0.0032
		Light	935	0.00033	0.00079	0.0021	0.0040	0.0053	0.0063	0.0074
STAINLESS (difficult) 304, 304L, 316, 316L	≤ 275	Slot	315	0.00011	0.00027	0.0007	0.0014	0.0018	0.0022	0.0025
		Profile	395	0.00011	0.00027	0.0007	0.0014	0.0018	0.0022	0.0025
		Light	650	0.00026	0.00062	0.0017	0.0031	0.0041	0.0050	0.0058
STAINLESS (PH) 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	Slot	290	0.00011	0.00027	0.0007	0.0014	0.0018	0.0022	0.0025
		Profile	360	0.00011	0.00027	0.0007	0.0014	0.0018	0.0022	0.0025
		Light	595	0.00026	0.00062	0.0017	0.0031	0.0041	0.0050	0.0058
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Slot	170	0.00013	0.00030	0.0008	0.0015	0.0020	0.0024	0.0028
		Profile	215	0.00013	0.00030	0.0008	0.0015	0.0020	0.0024	0.0028
		Light	355	0.00029	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	≤ 300	Slot	65	0.00009	0.00023	0.0006	0.0011	0.0015	0.0018	0.0021
		Profile	80	0.00009	0.00023	0.0006	0.0011	0.0015	0.0018	0.0021
		Light	130	0.00022	0.00052	0.0014	0.0026	0.0034	0.0041	0.0048

CUT TYPE				
SLOT		PROFILE		LIGHT*
Regular Rw = D_1 Ad = D_1	Long Reach Rw = D_1 Ad = .25 x D_1	Regular Rw = .5 x D_1 Ad = 1.5 x D_1	Long Reach Rw = .2 x D_1 Ad = 1.5 x D_1	Regular, Long Reach Rw = .05 x D_1 Ad = L_2
				

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

Z1MPCR, Z1MPLC Metric	HARDNESS BRINELL	CUT Type	SPEED m/min	FEED (mm/flute) 1.5	3	6	10	12	20	25
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	Slot	154	0.0046	0.0113	0.029	0.061	0.074	0.099	0.108
		Profile	192	0.0046	0.0113	0.029	0.061	0.074	0.099	0.108
		Light	317	0.0106	0.0257	0.067	0.141	0.170	0.227	0.250
	> 175 ≤ 275	Slot	134	0.0046	0.0113	0.029	0.061	0.074	0.099	0.108
		Profile	168	0.0046	0.0113	0.029	0.061	0.074	0.099	0.108
		Light	278	0.0106	0.0257	0.067	0.141	0.170	0.227	0.250
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	Slot	113	0.0034	0.0084	0.022	0.045	0.055	0.075	0.080
		Profile	141	0.0034	0.0084	0.022	0.045	0.055	0.075	0.080
		Light	233	0.0079	0.0190	0.050	0.107	0.127	0.168	0.185
	> 275 ≤ 375	Slot	77	0.0034	0.0084	0.022	0.045	0.055	0.075	0.080
		Profile	96	0.0034	0.0084	0.022	0.045	0.055	0.075	0.080
		Light	158	0.0079	0.0190	0.050	0.107	0.127	0.168	0.185
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Slot	73	0.0034	0.0084	0.022	0.045	0.055	0.075	0.080
		Profile	91	0.0034	0.0084	0.022	0.045	0.055	0.075	0.080
		Light	151	0.0079	0.0190	0.050	0.107	0.127	0.168	0.185
	> 250 ≤ 375	Slot	45	0.0026	0.0065	0.017	0.037	0.043	0.059	0.063
		Profile	56	0.0026	0.0065	0.017	0.037	0.043	0.059	0.063
		Light	93	0.0062	0.0149	0.041	0.083	0.098	0.133	0.145
CAST IRON Gray, Malleable, Ductile	≤ 220	Slot	108	0.0043	0.0101	0.026	0.056	0.067	0.091	0.098
		Profile	135	0.0043	0.0101	0.026	0.056	0.067	0.091	0.098
		Light	223	0.0096	0.0230	0.062	0.128	0.154	0.205	0.225
	> 220 ≤ 260	Slot	80	0.0043	0.0101	0.026	0.056	0.067	0.091	0.098
		Profile	101	0.0043	0.0101	0.026	0.056	0.067	0.091	0.098
		Light	166	0.0096	0.0230	0.062	0.128	0.154	0.205	0.225
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 275	Slot	138	0.0034	0.0084	0.022	0.045	0.055	0.075	0.080
		Profile	173	0.0034	0.0084	0.022	0.045	0.055	0.075	0.080
		Light	286	0.0079	0.0190	0.050	0.107	0.127	0.168	0.185
STAINLESS (difficult) 304, 304L, 316, 316L	≤ 275	Slot	96	0.0026	0.0065	0.017	0.037	0.043	0.059	0.063
		Profile	120	0.0026	0.0065	0.017	0.037	0.043	0.059	0.063
		Light	198	0.0062	0.0149	0.041	0.083	0.098	0.133	0.145
STAINLESS (PH) 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	Slot	88	0.0026	0.0065	0.017	0.037	0.043	0.059	0.063
		Profile	110	0.0026	0.0065	0.017	0.037	0.043	0.059	0.063
		Light	181	0.0062	0.0149	0.041	0.083	0.098	0.133	0.145
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Slot	52	0.0031	0.0072	0.019	0.040	0.048	0.064	0.070
		Profile	65	0.0031	0.0072	0.019	0.040	0.048	0.064	0.070
		Light	108	0.0070	0.0166	0.043	0.091	0.110	0.147	0.160
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	≤ 300	Slot	19	0.0022	0.0055	0.014	0.029	0.036	0.048	0.053
		Profile	24	0.0022	0.0055	0.014	0.029	0.036	0.048	0.053
		Light	40	0.0053	0.0125	0.034	0.069	0.082	0.109	0.120

CUT TYPE				
SLOT		PROFILE		LIGHT*
Regular Rw = D_1 Ad = D_1	Long Reach Rw = D_1 Ad = .25 x D_1	Regular Rw = .5 x D_1 Ad = 1.5 x D_1	Long Reach Rw = .2 x D_1 Ad = 1.5 x D_1	Regular, Long Reach Rw = .05 x D_1 Ad = L_2
				

rpm = (1000 x m/min) / (3.14 x D_1)
mm/min = (mm/flute) x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

Z1, Z1B, Z16CR Fractional	HARDNESS	CUT	SPEED	FEED (inch/flute)					
	BRINELL	Type	sfm	1/8	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	Slot	505	0.00038	0.0010	0.0019	0.0025	0.0030	0.0035
		Profile	630	0.00038	0.0010	0.0019	0.0025	0.0030	0.0035
		Light	1040	0.00086	0.0023	0.0043	0.0057	0.0069	0.0080
	> 175 ≤ 275	Slot	440	0.00038	0.0010	0.0019	0.0025	0.0030	0.0035
		Profile	550	0.00038	0.0010	0.0019	0.0025	0.0030	0.0035
		Light	910	0.00086	0.0023	0.0043	0.0057	0.0069	0.0080
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	Slot	370	0.00028	0.0008	0.0014	0.0019	0.0023	0.0026
		Profile	465	0.00028	0.0008	0.0014	0.0019	0.0023	0.0026
		Light	765	0.00065	0.0017	0.0032	0.0043	0.0052	0.0060
	> 275 ≤ 375	Slot	250	0.00028	0.0008	0.0014	0.0019	0.0023	0.0026
		Profile	315	0.00028	0.0008	0.0014	0.0019	0.0023	0.0026
		Light	520	0.00065	0.0017	0.0032	0.0043	0.0052	0.0060
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Slot	240	0.00025	0.0007	0.0012	0.0017	0.0020	0.0023
		Profile	300	0.00025	0.0007	0.0012	0.0017	0.0020	0.0023
		Light	495	0.00057	0.0015	0.0028	0.0038	0.0045	0.0053
	> 250 ≤ 375	Slot	145	0.00020	0.0005	0.0010	0.0013	0.0016	0.0018
		Profile	185	0.00020	0.0005	0.0010	0.0013	0.0016	0.0018
		Light	305	0.00045	0.0012	0.0023	0.0030	0.0036	0.0042
CAST IRON Gray, Malleable, Ductile	≤ 220	Slot	355	0.00035	0.0009	0.0018	0.0024	0.0028	0.0033
		Profile	445	0.00035	0.0009	0.0018	0.0024	0.0028	0.0033
		Light	730	0.00081	0.0022	0.0041	0.0054	0.0065	0.0076
	> 220 ≤ 260	Slot	265	0.00035	0.0009	0.0018	0.0024	0.0028	0.0033
		Profile	330	0.00035	0.0009	0.0018	0.0024	0.0028	0.0033
		Light	545	0.00081	0.0022	0.0041	0.0054	0.0065	0.0076
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 275	Slot	455	0.00027	0.0007	0.0014	0.0018	0.0022	0.0025
		Profile	570	0.00027	0.0007	0.0014	0.0018	0.0022	0.0025
		Light	935	0.00062	0.0017	0.0031	0.0041	0.0050	0.0058
STAINLESS (difficult) 304, 304L, 316, 316L	≤ 275	Slot	315	0.00022	0.0006	0.0011	0.0014	0.0017	0.0020
		Profile	395	0.00022	0.0006	0.0011	0.0014	0.0017	0.0020
		Light	650	0.00050	0.0013	0.0025	0.0033	0.0040	0.0046
STAINLESS (PH) 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	Slot	290	0.00022	0.0006	0.0011	0.0014	0.0017	0.0020
		Profile	360	0.00022	0.0006	0.0011	0.0014	0.0017	0.0020
		Light	595	0.00050	0.0013	0.0025	0.0033	0.0040	0.0046
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Slot	170	0.00020	0.0005	0.0010	0.0013	0.0016	0.0018
		Profile	215	0.00020	0.0005	0.0010	0.0013	0.0016	0.0018
		Light	355	0.00045	0.0012	0.0023	0.0030	0.0036	0.0042
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	≤ 300	Slot	65	0.00015	0.0004	0.0008	0.0010	0.0012	0.0014
		Profile	80	0.00015	0.0004	0.0008	0.0010	0.0012	0.0014
		Light	130	0.00034	0.0009	0.0017	0.0023	0.0028	0.0032

CUT TYPE			
SLOT	PROFILE		LIGHT*
Short, Regular Rw = D_1 Ad = D_1	Short Rw = .5 x D_1 Ad = L_2	Regular Rw = .5 x D_1 Ad = 1.5 x D_1	Short, Regular Rw = .05 x D_1 Ad = L_2
			

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x 4 x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

Z1M, Z1MB Metric	HARDNESS BRINELL	CUT Type	SPEED m/min	FEED (mm/flute) 3	6	10	12	20	25
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	Slot	154	0.0091	0.024	0.051	0.060	0.080	0.088
		Profile	192	0.0091	0.024	0.051	0.060	0.080	0.088
		Light	317	0.0206	0.055	0.115	0.137	0.184	0.200
	> 175 ≤ 275	Slot	134	0.0091	0.024	0.051	0.060	0.080	0.088
		Profile	168	0.0091	0.024	0.051	0.060	0.080	0.088
		Light	278	0.0206	0.055	0.115	0.137	0.184	0.200
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	Slot	113	0.0067	0.019	0.037	0.046	0.061	0.065
		Profile	141	0.0067	0.019	0.037	0.046	0.061	0.065
		Light	233	0.0156	0.041	0.085	0.103	0.139	0.150
	> 275 ≤ 375	Slot	77	0.0067	0.019	0.037	0.046	0.061	0.065
		Profile	96	0.0067	0.019	0.037	0.046	0.061	0.065
		Light	158	0.0156	0.041	0.085	0.103	0.139	0.150
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Slot	73	0.0060	0.017	0.032	0.041	0.053	0.058
		Profile	91	0.0060	0.017	0.032	0.041	0.053	0.058
		Light	151	0.0137	0.036	0.075	0.091	0.120	0.133
	> 250 ≤ 375	Slot	45	0.0048	0.012	0.027	0.031	0.043	0.045
		Profile	56	0.0048	0.012	0.027	0.031	0.043	0.045
		Light	93	0.0108	0.029	0.061	0.072	0.096	0.105
CAST IRON Gray, Malleable, Ductile	≤ 220	Slot	108	0.0084	0.022	0.048	0.058	0.075	0.083
		Profile	135	0.0084	0.022	0.048	0.058	0.075	0.083
		Light	223	0.0194	0.053	0.109	0.130	0.173	0.190
	> 220 ≤ 260	Slot	80	0.0084	0.022	0.048	0.058	0.075	0.083
		Profile	101	0.0084	0.022	0.048	0.058	0.075	0.083
		Light	166	0.0194	0.053	0.109	0.130	0.173	0.190
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 275	Slot	138	0.0065	0.017	0.037	0.043	0.059	0.063
		Profile	173	0.0065	0.017	0.037	0.043	0.059	0.063
		Light	286	0.0149	0.041	0.083	0.098	0.133	0.145
STAINLESS (difficult) 304, 304L, 316, 316L	≤ 275	Slot	96	0.0053	0.014	0.029	0.034	0.045	0.050
		Profile	120	0.0053	0.014	0.029	0.034	0.045	0.050
		Light	198	0.0120	0.031	0.067	0.079	0.107	0.115
STAINLESS (PH) 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	Slot	88	0.0053	0.014	0.029	0.034	0.045	0.050
		Profile	110	0.0053	0.014	0.029	0.034	0.045	0.050
		Light	181	0.0120	0.031	0.067	0.079	0.107	0.115
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Slot	52	0.0048	0.012	0.027	0.031	0.043	0.045
		Profile	65	0.0048	0.012	0.027	0.031	0.043	0.045
		Light	108	0.0108	0.029	0.061	0.072	0.096	0.105
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	≤ 300	Slot	19	0.0036	0.010	0.021	0.024	0.032	0.035
		Profile	24	0.0036	0.010	0.021	0.024	0.032	0.035
		Light	40	0.0082	0.022	0.045	0.055	0.075	0.080

CUT TYPE		
SLOT	PROFILE	LIGHT*
$Rw = D_1$ $Ad = D_1$	$Rw = .5 \times D_1$ $Ad = 1.5 \times D_1$	$Rw = .05 \times D_1$ $Ad = L_2$
		

rpm = (1000 x m/min) / (3.14 x D_1)
ipm = (mm/flute) x 4 x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

ZH1CR Fractional	HARDNESS	CUT	SPEED	FEED (inch/flute)				
	BRINELL	Type	sfm	1/4	3/8	1/2	3/4	1
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Udimet, Waspalloy	≤ 300	Slot	70	0.0007	0.0012	0.0017	0.0020	0.0023
		Profile	85	0.0007	0.0012	0.0017	0.0020	0.0023
		Light	145	0.0015	0.0028	0.0038	0.0045	0.0053
	> 300	Slot	55	0.0005	0.0009	0.0012	0.0014	0.0016
		Profile	70	0.0005	0.0009	0.0012	0.0014	0.0016
		Light	110	0.0011	0.0020	0.0026	0.0032	0.0037

ZH1MCR Metric	HARDNESS	CUT	SPEED	FEED (mm/flute)				
	BRINELL	Type	m/min	6	10	12	20	25
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Udimet, Waspalloy	≤ 300	Slot	21	0.017	0.032	0.041	0.053	0.058
		Profile	27	0.017	0.032	0.041	0.053	0.058
		Light	45	0.036	0.075	0.091	0.120	0.133
	> 300	Slot	16	0.012	0.024	0.029	0.037	0.040
		Profile	21	0.012	0.024	0.029	0.037	0.040
		Light	34	0.026	0.053	0.062	0.085	0.093

CUT TYPE		
SLOT	PROFILE	LIGHT*
Rw = D_1 Ad = D_1	Rw = .5 x D_1 Ad = 1.5 x D_1	Rw = .05 x D_1 Ad = 1.5 x D_1
		

rpm = sfm x 3.82 / D_1
rpm = (1000 x m/min) / (3.14 x D_1)
ipm = (inch/flute) x 4 x rpm
mm/min = (mm/flute) x 4 x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

ZD1CR Fractional	HARDNESS	CUT	SPEED	FEED (inch/flute)					
	BRINELL	Type	sfm	1/8	1/4	3/8	1/2	5/8	3/4
STEEL TOOL STEEL MOLD & DIE STEEL 300M, 4340, 52100, HP 9-4-20, M-50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 420	Slot	215	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038
		Profile	265	0.0009	0.0018	0.0026	0.0035	0.0044	0.0053
		Light	560	0.0011	0.0022	0.0033	0.0044	0.0055	0.0066
	> 420 ≤ 560	Slot	120	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030
		Profile	150	0.0007	0.0014	0.0021	0.0028	0.0035	0.0042
		Light	490	0.0009	0.0018	0.0026	0.0035	0.0044	0.0053
	> 560 ≤ 655	Slot	65	0.0004	0.0008	0.0011	0.0015	0.0019	0.0023
		Profile	80	0.0005	0.0011	0.0016	0.0021	0.0026	0.0032
		Light	250	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038

ZD1MCR Metric	HARDNESS	CUT	SPEED	FEED (mm/flute)					
	BRINELL	Type	m/min	3	6	10	12	16	20
STEEL TOOL STEEL MOLD & DIE STEEL 300M, 4340, 52100, HP 9-4-20, M-50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 420	Slot	66	0.016	0.032	0.048	0.064	0.079	0.097
		Profile	81	0.023	0.046	0.066	0.089	0.112	0.135
		Light	171	0.028	0.056	0.084	0.112	0.140	0.168
	> 420 ≤ 560	Slot	37	0.013	0.025	0.038	0.051	0.064	0.076
		Profile	46	0.018	0.036	0.053	0.071	0.089	0.107
		Light	149	0.023	0.046	0.066	0.089	0.112	0.135
	> 560 ≤ 655	Slot	20	0.010	0.020	0.028	0.038	0.048	0.058
		Profile	24	0.013	0.028	0.041	0.053	0.066	0.081
		Light	76	0.015	0.033	0.048	0.064	0.079	0.097

CUT TYPE				
SLOT		PROFILE		LIGHT*
≤ 560 Brinell Rw = D_1 Ad = .5 x D_1	> 560 ≤ 655 Brinell Rw = D_1 Ad = .3 x D_1	≤ 560 Brinell Rw = .5 x D_1 Ad = D_1	> 560 ≤ 655 Brinell Rw = .3 x D_1 Ad = D_1	≤ 655 Brinell Rw = .1 x D_1 Ad = .1 x D_1
				

rpm = sfm x 3.82 / D_1
rpm = (1000 x m/min) / (3.14 x D_1)
ipm = (inch/flute) x 4 x rpm
mm/min = (mm/flute) x 4 x rpm

- maximum recommended depths shown

*finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

7, 7B Fractional	HARDNESS	CUT	SPEED	FEED (inch/flute)					
	BRINELL	Type	sfm	1/8	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	Finish	825	0.00069	0.0018	0.0035	0.0046	0.0055	0.0064
	> 175 ≤ 275	Finish	720	0.00069	0.0018	0.0035	0.0046	0.0055	0.0064
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	Finish	605	0.00051	0.0014	0.0026	0.0034	0.0041	0.0048
	> 275 ≤ 375	Finish	410	0.00051	0.0014	0.0026	0.0034	0.0041	0.0048
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Finish	565	0.00036	0.0010	0.0018	0.0024	0.0029	0.0034
	> 250 ≤ 375	Finish	350	0.00029	0.0008	0.0015	0.0020	0.0024	0.0028
CAST IRON Gray, Malleable, Ductile	≤ 220	Finish	605	0.00055	0.0015	0.0028	0.0037	0.0044	0.0052
	> 220 ≤ 260	Finish	450	0.00055	0.0015	0.0028	0.0037	0.0044	0.0052
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 275	Finish	420	0.00036	0.0010	0.0018	0.0024	0.0029	0.0034
STAINLESS (difficult) 304, 304L, 316, 316L	≤ 275	Finish	290	0.00034	0.0009	0.0017	0.0020	0.0027	0.0031
STAINLESS (PH) 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	Finish	265	0.00029	0.0008	0.0015	0.0020	0.0024	0.0028
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Finish	300	0.00038	0.0010	0.0019	0.0025	0.0030	0.0035
HIGH TEMPERATURE ALLOY Inconel, Rene, Waspalloy	≤ 300	Finish	80	0.00030	0.0008	0.0014	0.0019	0.0023	0.0034

CUT TYPE

FINISH

Rw = .02 x D_1
Ad = L_2

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x 4 x rpm

- maximum recommended depths shown
- adjust feed as required for optimum results
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

7M, 7MB Metric	HARDNESS BRINELL	CUT Type	SPEED m/min	FEED (mm/flute) 3	6	10	12	20	25
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	Finish	250	0.0166	0.043	0.093	0.110	0.147	0.160
	> 175 ≤ 275	Finish	220	0.0166	0.043	0.093	0.110	0.147	0.160
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	Finish	185	0.0122	0.034	0.069	0.082	0.109	0.120
	> 275 ≤ 375	Finish	125	0.0122	0.034	0.069	0.082	0.109	0.120
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Finish	170	0.0086	0.024	0.048	0.058	0.077	0.085
	> 250 ≤ 375	Finish	105	0.0070	0.019	0.040	0.048	0.064	0.070
CAST IRON Gray, Malleable, Ductile	≤ 220	Finish	185	0.0132	0.036	0.075	0.089	0.117	0.130
	> 220 ≤ 260	Finish	135	0.0132	0.036	0.075	0.089	0.117	0.130
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 275	Finish	130	0.0086	0.024	0.048	0.058	0.077	0.085
STAINLESS (difficult) 304, 304L, 316, 316L	≤ 275	Finish	90	0.0082	0.022	0.045	0.048	0.072	0.078
STAINLESS (PH) 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	Finish	80	0.0070	0.019	0.040	0.048	0.064	0.070
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Finish	90	0.0091	0.024	0.051	0.060	0.080	0.088
HIGH TEMPERATURE ALLOY Inconel, Rene, Waspalloy	≤ 300	Finish	25	0.0072	0.019	0.037	0.046	0.061	0.085

CUT TYPE

FINISH

Rw = .02 x D_1
Ad = L_2

rpm = (1000 x m/min) / (3.14 x D_1)
mm/min = (mm/flute) x 4 x rpm

- maximum recommended depths shown
- adjust feed as required for optimum results
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

55CR, 55 Fractional	HARDNESS	CUT	SPEED	FEED (inch/flute)					
	BRINELL	Type	sfm	1/8	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	Slot	350	0.00030	0.0008	0.0015	0.0020	0.0024	0.0028
		Profile	435	0.00030	0.0008	0.0015	0.0020	0.0024	0.0028
		Light	720	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
	> 175 ≤ 275	Slot	305	0.00030	0.0008	0.0015	0.0020	0.0024	0.0028
		Profile	380	0.00030	0.0008	0.0015	0.0020	0.0024	0.0028
		Light	630	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	Slot	255	0.00023	0.0006	0.0011	0.0015	0.0018	0.0021
		Profile	320	0.00023	0.0006	0.0011	0.0015	0.0018	0.0021
		Light	530	0.00052	0.0014	0.0026	0.0034	0.0041	0.0048
	> 275 ≤ 375	Slot	175	0.00023	0.0006	0.0011	0.0015	0.0018	0.0021
		Profile	220	0.00023	0.0006	0.0011	0.0015	0.0018	0.0021
		Light	360	0.00052	0.0014	0.0026	0.0034	0.0041	0.0048
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Slot	230	0.00021	0.0006	0.0011	0.0014	0.0017	0.0020
		Profile	285	0.00021	0.0006	0.0011	0.0014	0.0017	0.0020
		Light	470	0.00048	0.0013	0.0024	0.0032	0.0039	0.0045
	> 250 ≤ 375	Slot	140	0.00017	0.0004	0.0008	0.0011	0.0013	0.0015
		Profile	175	0.00017	0.0004	0.0008	0.0011	0.0013	0.0015
		Light	290	0.00038	0.0010	0.0019	0.0025	0.0030	0.0035
CAST IRON Gray, Malleable, Ductile	≤ 220	Slot	340	0.00030	0.0008	0.0015	0.0020	0.0024	0.0028
		Profile	430	0.00030	0.0008	0.0015	0.0020	0.0024	0.0028
		Light	705	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
	> 220 ≤ 260	Slot	255	0.00030	0.0008	0.0015	0.0020	0.0024	0.0028
		Profile	320	0.00030	0.0008	0.0015	0.0020	0.0024	0.0028
		Light	525	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 275	Slot	270	0.00023	0.0006	0.0011	0.0015	0.0018	0.0021
		Profile	340	0.00023	0.0006	0.0011	0.0015	0.0018	0.0021
		Light	560	0.00052	0.0014	0.0026	0.0034	0.0041	0.0048
STAINLESS (difficult) 304, 304L, 316, 316L	≤ 275	Slot	185	0.00018	0.0005	0.0009	0.0012	0.0014	0.0017
		Profile	235	0.00018	0.0005	0.0009	0.0012	0.0014	0.0017
		Light	385	0.00041	0.0001	0.0021	0.0028	0.0033	0.0039
STAINLESS (PH) 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	Slot	170	0.00018	0.0005	0.0009	0.0012	0.0014	0.0017
		Profile	215	0.00018	0.0005	0.0009	0.0012	0.0014	0.0017
		Light	355	0.00041	0.0001	0.0021	0.0028	0.0033	0.0039
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Slot	190	0.00021	0.0006	0.0011	0.0014	0.0017	0.0020
		Profile	235	0.00021	0.0006	0.0011	0.0014	0.0017	0.0020
		Light	390	0.00048	0.0013	0.0024	0.0032	0.0039	0.0045
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	≤ 300	Slot	52	0.00018	0.0005	0.0009	0.0012	0.0014	0.0017
		Profile	64	0.00018	0.0005	0.0009	0.0012	0.0014	0.0017
		Light	107	0.00041	0.0001	0.0021	0.0028	0.0033	0.0039

CUT TYPE					
SLOT		PROFILE		LIGHT*	
Short Rw = D_1 Ad = .6 x D_1	Regular Rw = D_1 Ad = .5 x D_1	Short Rw = .5 x D_1 Ad = L_2	Regular Rw = .3 x D_1 Ad = 1.5 x D_1	Short, Regular Rw = .05 x D_1 Ad = L_2	Long Rw = .02 x D_1 Ad = 3 x D_1
					

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x 5 x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed
- long flute tools not recommended for Slot or Profile

* finish cuts typically require reduced feed and cutting depths of .02 x D1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

CARB Five Flute End Mills

55M Metric	HARDNESS BRINELL	CUT Type	SPEED m/min	FEED (mm/flute) 6	8	10	12	16	20
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	Slot	107	0.0192	0.032	0.040	0.048	0.064	0.064
		Profile	133	0.0192	0.032	0.040	0.048	0.064	0.064
		Light	219	0.0432	0.073	0.091	0.110	0.147	0.147
	> 175 ≤ 275	Slot	93	0.0192	0.032	0.040	0.048	0.064	0.064
		Profile	116	0.0192	0.032	0.040	0.048	0.064	0.064
		Light	192	0.0432	0.073	0.091	0.110	0.147	0.147
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	Slot	78	0.0144	0.023	0.029	0.036	0.048	0.048
		Profile	98	0.0144	0.023	0.029	0.036	0.048	0.048
		Light	162	0.0336	0.055	0.069	0.082	0.109	0.109
	> 275 ≤ 375	Slot	53	0.0144	0.023	0.029	0.036	0.048	0.048
		Profile	67	0.0144	0.023	0.029	0.036	0.048	0.048
		Light	110	0.0336	0.055	0.069	0.082	0.109	0.109
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Slot	70	0.0144	0.023	0.029	0.034	0.045	0.045
		Profile	87	0.0144	0.023	0.029	0.034	0.045	0.045
		Light	143	0.0312	0.051	0.064	0.077	0.102	0.104
	> 250 ≤ 375	Slot	43	0.0096	0.017	0.021	0.026	0.035	0.035
		Profile	53	0.0096	0.017	0.021	0.026	0.035	0.035
		Light	88	0.0240	0.041	0.051	0.060	0.080	0.080
CAST IRON Gray, Malleable, Ductile	≤ 220	Slot	104	0.0192	0.032	0.040	0.048	0.064	0.064
		Profile	131	0.0192	0.032	0.040	0.048	0.064	0.064
		Light	215	0.0432	0.073	0.091	0.110	0.147	0.147
	> 220 ≤ 260	Slot	78	0.0192	0.032	0.040	0.048	0.064	0.064
		Profile	98	0.0192	0.032	0.040	0.048	0.064	0.064
		Light	160	0.0432	0.073	0.091	0.110	0.147	0.147
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 275	Slot	82	0.0144	0.023	0.029	0.036	0.048	0.048
		Profile	104	0.0144	0.023	0.029	0.036	0.048	0.048
		Light	171	0.0336	0.055	0.069	0.082	0.109	0.109
STAINLESS (difficult) 304, 304L, 316, 316L	≤ 275	Slot	56	0.0120	0.019	0.024	0.029	0.038	0.037
		Profile	72	0.0120	0.019	0.024	0.029	0.038	0.037
		Light	117	0.0026	0.045	0.056	0.067	0.090	0.088
STAINLESS (PH) 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	Slot	52	0.0120	0.019	0.024	0.029	0.038	0.037
		Profile	66	0.0120	0.019	0.024	0.029	0.038	0.037
		Light	108	0.0026	0.045	0.056	0.067	0.090	0.088
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Slot	58	0.0144	0.023	0.029	0.034	0.045	0.045
		Profile	72	0.0144	0.023	0.029	0.034	0.045	0.045
		Light	119	0.0312	0.051	0.064	0.077	0.102	0.104
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	≤ 300	Slot	16	0.0120	0.019	0.024	0.029	0.038	0.037
		Profile	20	0.0120	0.019	0.024	0.029	0.038	0.037
		Light	33	0.0026	0.045	0.056	0.067	0.090	0.088

CUT TYPE					
SLOT		PROFILE		LIGHT*	
Short Rw = D_1 Ad = .6 x D_1	Regular Rw = D_1 Ad = .5 x D_1	Short Rw = .5 x D_1 Ad = L_2	Regular Rw = .3 x D_1 Ad = 1.5 x D_1	Short, Regular Rw = .05 x D_1 Ad = L_2	Long Rw = .02 x D_1 Ad = 3 x D_1
					

rpm = (1000 x m/min) / (3.14 x D_1)
mm/min = (mm/flute) x 5 x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed
- long flute tools not recommended for Slot or Profile

* finish cuts typically require reduced feed and cutting depths of .02 x D1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

66CR, 66 Fractional	HARDNESS	CUT	SPEED	FEED (inch/flute)						
	BRINELL	Type	sfm	3/16	1/4	3/8	1/2	5/8	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	Profile	570	0.0006	0.0009	0.0016	0.0022	0.0024	0.0026	0.0030
		Light	720	0.0008	0.0012	0.0022	0.0030	0.0033	0.0036	0.0042
	> 175 ≤ 275	Profile	495	0.0006	0.0009	0.0016	0.0022	0.0024	0.0026	0.0030
		Light	630	0.0008	0.0012	0.0022	0.0030	0.0033	0.0036	0.0042
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	Profile	415	0.0004	0.0007	0.0013	0.0017	0.0019	0.0020	0.0023
		Light	530	0.0006	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032
	> 275 ≤ 375	Profile	285	0.0004	0.0007	0.0013	0.0017	0.0019	0.0020	0.0023
		Light	360	0.0006	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Profile	370	0.0004	0.0006	0.0011	0.0015	0.0017	0.0018	0.0021
		Light	470	0.0005	0.0008	0.0015	0.0021	0.0023	0.0025	0.0029
	> 250 ≤ 375	Profile	230	0.0003	0.0005	0.0009	0.0012	0.0013	0.0014	0.0016
		Light	290	0.0004	0.0006	0.0012	0.0016	0.0018	0.0019	0.0022
CAST IRON Gray, Malleable, Ductile	≤ 220	Profile	555	0.0006	0.0009	0.0016	0.0022	0.0024	0.0026	0.0030
		Light	705	0.0008	0.0012	0.0022	0.0030	0.0033	0.0036	0.0042
	> 220 ≤ 260	Profile	415	0.0006	0.0009	0.0016	0.0022	0.0024	0.0026	0.0030
		Light	525	0.0008	0.0012	0.0022	0.0030	0.0033	0.0036	0.0042
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 275	Profile	430	0.0004	0.0007	0.0013	0.0017	0.0019	0.0020	0.0023
		Light	560	0.0006	0.0009	0.0017	0.0023	0.0026	0.0028	0.0032
STAINLESS (difficult) 304, 304L, 316, 316L	≤ 275	Profile	305	0.0004	0.0005	0.0010	0.0013	0.0015	0.0016	0.0019
		Light	385	0.0005	0.0007	0.0014	0.0018	0.0020	0.0022	0.0026
STAINLESS (PH) 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	Profile	280	0.0004	0.0005	0.0010	0.0013	0.0015	0.0016	0.0019
		Light	355	0.0005	0.0007	0.0014	0.0018	0.0020	0.0022	0.0026
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Profile	305	0.0004	0.0006	0.0011	0.0015	0.0017	0.0018	0.0021
		Light	390	0.0005	0.0008	0.0015	0.0021	0.0023	0.0025	0.0029
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	≤ 300	Profile	85	0.0004	0.0005	0.0010	0.0013	0.0015	0.0016	0.0019
		Light	105	0.0005	0.0007	0.0014	0.0018	0.0020	0.0022	0.0026

CUT TYPE	
PROFILE	LIGHT*
Rw = .1 x D_1 Ad = D_1	Rw = .05 x D_1 Ad = D_1

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x no. of flutes x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

MULTI Carb
HIGH PERFORMANCE FINISHING END MILLS

66M Metric	HARDNESS	CUT	SPEED	FEED (mm/flute)						
	BRINELL	Type	m/min	6	8	10	12	16	20	25
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	Profile	174	0.022	0.034	0.043	0.053	0.061	0.069	0.075
		Light	219	0.029	0.047	0.059	0.072	0.084	0.096	0.105
	> 175 ≤ 275	Profile	151	0.022	0.034	0.043	0.053	0.061	0.069	0.075
		Light	192	0.029	0.047	0.059	0.072	0.084	0.096	0.105
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	Profile	126	0.017	0.028	0.035	0.041	0.049	0.053	0.058
		Light	162	0.022	0.036	0.045	0.055	0.067	0.075	0.080
	> 275 ≤ 375	Profile	87	0.017	0.028	0.035	0.041	0.049	0.053	0.058
		Light	110	0.022	0.036	0.045	0.055	0.067	0.075	0.080
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Profile	113	0.014	0.023	0.029	0.036	0.044	0.048	0.053
		Light	143	0.019	0.032	0.040	0.050	0.059	0.067	0.073
	> 250 ≤ 375	Profile	70	0.012	0.019	0.024	0.029	0.033	0.037	0.040
		Light	88	0.014	0.026	0.032	0.038	0.046	0.051	0.055
CAST IRON Gray, Malleable, Ductile	≤ 220	Profile	169	0.022	0.034	0.043	0.053	0.061	0.069	0.075
		Light	215	0.029	0.047	0.059	0.072	0.084	0.096	0.105
	> 220 ≤ 260	Profile	126	0.022	0.034	0.043	0.053	0.061	0.069	0.075
		Light	160	0.029	0.047	0.059	0.072	0.084	0.096	0.105
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 275	Profile	131	0.017	0.028	0.035	0.041	0.049	0.053	0.058
		Light	171	0.022	0.036	0.045	0.055	0.067	0.075	0.080
STAINLESS (difficult) 304, 304L, 316, 316L	≤ 275	Profile	93	0.012	0.021	0.027	0.031	0.038	0.043	0.048
		Light	117	0.017	0.030	0.037	0.043	0.051	0.059	0.065
STAINLESS (PH) 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	Profile	85	0.012	0.021	0.027	0.031	0.038	0.043	0.048
		Light	108	0.017	0.030	0.037	0.043	0.051	0.059	0.065
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Profile	93	0.014	0.023	0.029	0.036	0.044	0.048	0.053
		Light	119	0.019	0.032	0.040	0.050	0.059	0.067	0.073
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	≤ 300	Profile	26	0.012	0.021	0.027	0.031	0.038	0.043	0.048
		Light	33	0.017	0.030	0.037	0.043	0.051	0.059	0.065

CUT TYPE	
PROFILE	LIGHT*
Rw = .1 x D_1 Ad = D_1	Rw = .05 x D_1 Ad = D_1

rpm = (1000 x m/min) / (3.14 x D_1)
mm/min = (mm/flute) x no. of flutes x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

56B Fractional	HARDNESS	CUT	SPEED	FEED (inch/flute)							
	BRINELL	Type	sfm	1/32	1/16	1/8	3/16	1/4	3/8	1/2	3/4
STEEL, TOOL STEEL, MOLD & DIE STEEL 300M, 4340, 52100, HP 9-4-20, M-50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 370	Heavy	625	0.0006	0.0015	0.0030	0.0040	0.0050	0.0080	0.0100	0.0120
		Light	950	0.0007	0.0017	0.0033	0.0044	0.0044	0.0088	0.0110	0.0130
	> 370 ≤ 475	Heavy	750	0.0005	0.0011	0.0023	0.0030	0.0038	0.0060	0.0075	0.0085
		Light	1150	0.0006	0.0012	0.0025	0.0033	0.0042	0.0066	0.0082	0.0100
	> 475 ≤ 655	Heavy	500	0.0004	0.0008	0.0017	0.0023	0.0029	0.0045	0.0057	0.0063
		Light	1000	0.0005	0.0009	0.0019	0.0025	0.0032	0.0050	0.0063	0.0071

56MB Metric	HARDNESS	CUT	SPEED	FEED (mm/flute)							
	BRINELL	Type	m/min	1	1.5	3	5	6	10	12	20
STEEL, TOOL STEEL, MOLD & DIE STEEL 300M, 4340, 52100, HP 9-4-20, M-50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 370	Heavy	191	0.015	0.038	0.076	0.102	0.127	0.203	0.254	0.305
		Light	290	0.018	0.043	0.084	0.112	0.112	0.224	0.279	0.330
	> 370 ≤ 475	Heavy	229	0.013	0.028	0.058	0.076	0.097	0.152	0.191	0.216
		Light	351	0.015	0.030	0.064	0.084	0.107	0.168	0.208	0.254
	> 475 ≤ 655	Heavy	152	0.010	0.020	0.043	0.058	0.074	0.114	0.145	0.160
		Light	305	0.013	0.023	0.048	0.064	0.081	0.127	0.160	0.180

CUT TYPE					
< 370 BRINELL		> 370 ≤ BRINELL		> 475 ≤ BRINELL	
HEAVY	LIGHT*	HEAVY	LIGHT*	HEAVY	LIGHT*
Rw = .4 x D_1 Ad = .1 x D_1	Rw = .4 x D_1 Ad = .03 x D_1	Rw = .4 x D_1 Ad = .05 x D_1	Rw = .4 x D_1 Ad = .02 x D_1	Rw = .4 x D_1 Ad = .04 x D_1	Rw = .4 x D_1 Ad = .01 x D_1

rpm = sfm x 3.82 / D_1
rpm = (1000 x m/min) / (3.14 x D_1)
ipm = (inch/flute) x 2 x rpm
mm/min = (mm/flute) x 2 x rpm
Rw = Pitch

- maximum recommended depths shown
- * finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

57 Fractional	HARDNESS	CUT	SPEED	FEED (inch/flute)			
	BRINELL	Type	sfm	1/4	5/16	3/8	1/2
STEEL TOOL STEEL MOLD & DIE STEEL 300M, 4340, 52100, HP 9-4-20, M-50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 280 ≤ 420	Slot	215	0.0013	0.0019	0.0025	0.0031
		Profile	265	0.0018	0.0026	0.0035	0.0044
		High Speed	560	0.0022	0.0033	0.0044	0.0055
	> 420 ≤ 560	Slot	120	0.0010	0.0015	0.0020	0.0025
		Profile	150	0.0014	0.0021	0.0028	0.0035
		High Speed	490	0.0018	0.0026	0.0035	0.0044
	> 560 ≤ 745	Slot	65	0.0008	0.0011	0.0015	0.0019
		Profile	80	0.0011	0.0016	0.0021	0.0026
		High Speed	250	0.0013	0.0019	0.0025	0.0031

57M Metric	HARDNESS	CUT	SPEED	FEED (mm/flute)			
	BRINELL	Type	m/min	6	8	10	12
STEEL TOOL STEEL MOLD & DIE STEEL 300M, 4340, 52100, HP 9-4-20, M-50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 280 ≤ 420	Slot	66	0.032	0.048	0.064	0.079
		Profile	81	0.046	0.066	0.089	0.112
		High Speed	171	0.056	0.084	0.112	0.140
	> 420 ≤ 560	Slot	37	0.025	0.038	0.051	0.064
		Profile	46	0.036	0.053	0.071	0.089
		High Speed	149	0.046	0.066	0.089	0.112
	> 560 ≤ 745	Slot	20	0.020	0.028	0.038	0.048
		Profile	24	0.028	0.041	0.053	0.066
		High Speed	76	0.033	0.048	0.064	0.079

CUT TYPE					
SLOT		PROFILE		HIGH SPEED	
> 280 ≤ 560 Bhn Rw = D_1 Ad = .3 x D_1	> 560 ≤ 740 Bhn Rw = D_1 Ad = .1 x D_1	> 280 ≤ 560 Bhn Rw = .1 x D_1 Ad = 1.5 X D_1	> 560 ≤ 740 Bhn Rw = .05 x D_1 Ad = 1.5 x D_1	> 280 ≤ 560 Bhn Rw = .04 x D_1 Ad = 1.5 x D_1	> 560 ≤ 740 Bhn Rw = .01 x D_1 Ad = 1.5 x D_1
					

rpm = sfm x 3.82 / D_1
rpm = (1000 x m/min) / (3.14 x D_1)
ipm = (inch/flute) x 6 x rpm
mm/min = (mm/flute) x 6 x rpm

- maximum recommended depths shown
- finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

44, 45, 43CR, 43CB, 43LC, 43, 43L, 47, 47B, 47ES, 47EB Fractional	CUT	SPEED	FEED (inch/flute)					
	Type	sfm	1/8	1/4	3/8	1/2	3/4	1
ALUMINUM ALLOY 2024, 5052, 5086, 6061, 6063, 7075	Slot	1600	0.0009	0.0025	0.0045	0.0060	0.0070	0.0085
	Profile	2000	0.0009	0.0025	0.0045	0.0060	0.0070	0.0085
	Light	3300	0.0021	0.0055	0.0105	0.0140	0.0165	0.0195
ALUMINUM DIE CAST ALLOY (High Silicon) A-390, A-392, B-390	Slot	600	0.0009	0.0025	0.0045	0.0060	0.0070	0.0085
	Profile	750	0.0009	0.0025	0.0045	0.0060	0.0070	0.0085
	Light	1240	0.0021	0.0055	0.0105	0.0140	0.0165	0.0195
COPPER ALLOY Aluminum Bronze, Muntz Brass, Naval Brass, Red Brass	Slot	865	0.0008	0.0020	0.0040	0.0050	0.0060	0.0070
	Profile	1080	0.0008	0.0020	0.0040	0.0050	0.0060	0.0070
	Light	1780	0.0017	0.0045	0.0085	0.0115	0.0140	0.0160
COPPER ALLOY Beryllium Copper, C110, Manganese Bronze, Tin Bronze	Slot	345	0.0008	0.0020	0.0040	0.0050	0.0060	0.0070
	Profile	430	0.0008	0.0020	0.0040	0.0050	0.0060	0.0070
	Light	710	0.0017	0.0045	0.0085	0.0115	0.0140	0.0160
PLASTIC ABS, Polycarbonate, PVC, Polypropylene	Slot	1600	0.0015	0.0040	0.0075	0.0100	0.0120	0.0140
	Profile	2000	0.0015	0.0040	0.0075	0.0100	0.0120	0.0140
	Light	3300	0.0034	0.0090	0.0170	0.0230	0.0275	0.0320

44M, 43MCR, 43MCB, 43M, 47M, 47MB, 47MES, 47MEB Metric	CUT	SPEED	FEED (mm/flute)					
	Type	m/min	3	6	10	12	20	25
ALUMINUM ALLOY 2024, 5052, 5086, 6061, 6063, 7075	Slot	490	0.022	0.060	0.120	0.144	0.187	0.213
	Profile	610	0.022	0.060	0.120	0.144	0.187	0.213
	Light	1005	0.050	0.132	0.280	0.336	0.440	0.488
ALUMINUM DIE CAST ALLOY (High Silicon) A-390, A-392, B-390	Slot	185	0.022	0.060	0.120	0.144	0.187	0.213
	Profile	230	0.022	0.060	0.120	0.144	0.187	0.213
	Light	380	0.050	0.132	0.280	0.336	0.440	0.488
COPPER ALLOY Aluminum Bronze, Muntz Brass, Naval Brass, Red Brass	Slot	265	0.019	0.048	0.107	0.120	0.160	0.175
	Profile	330	0.019	0.048	0.107	0.120	0.160	0.175
	Light	545	0.041	0.108	0.227	0.276	0.373	0.400
COPPER ALLOY Beryllium Copper, C110, Manganese Bronze, Tin Bronze	Slot	105	0.019	0.048	0.107	0.120	0.160	0.175
	Profile	130	0.019	0.048	0.107	0.120	0.160	0.175
	Light	215	0.041	0.108	0.227	0.276	0.373	0.400
PLASTIC ABS, Polycarbonate, PVC, Polypropylene	Slot	490	0.036	0.096	0.200	0.240	0.320	0.350
	Profile	610	0.036	0.096	0.200	0.240	0.320	0.350
	Light	1005	0.082	0.216	0.453	0.552	0.733	0.800

CUT TYPE					
SLOT		PROFILE		LIGHT*	
Short, Regular Rw = D_1 Ad = .6 x D_1	Long Reach, Long Flute Rw = D_1 Ad = .5 x D_1	Short, Regular Rw = .5 x D_1 Ad = L_2	Long Reach, Long Flute Rw = .3 x D_1 Ad = 1.5 x D_1	Short, Regular, Long Reach Rw = .05 x D_1 Ad = L_2	Long Flute, Extra Long Flute Rw = .02 x D_1 Ad = 3 x D_1
					

rpm = sfm x 3.82 / D_1
rpm = (1000 x m/min) / (3.14 x D_1)

ipm = (inch/flute) x no. of flutes x rpm
mm/min = (mm/flute) x no. of flutes x rpm

- maximum recommended depths shown
- * finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

27 Fractional	CUT	SPEED	FEED (inch/flute)				
	Type	sfm	1/4	5/16	3/8	1/2	3/4
CFRP, AFRP (Carbon Fiber, Aramid Fiber)	Slot	400	0.0016	0.0025	0.0030	0.0040	0.0048
	Profile	500	0.0016	0.0025	0.0030	0.0040	0.0048
	Light	825	0.0037	0.0057	0.0069	0.0092	0.0110
GFRP (Fiberglass)	Slot	320	0.0016	0.0025	0.0030	0.0040	0.0048
	Profile	400	0.0016	0.0025	0.0030	0.0040	0.0048
	Light	660	0.0037	0.0057	0.0069	0.0092	0.0110
CARBON, GRAPHITE	Slot	480	0.0020	0.0031	0.0038	0.0050	0.0060
	Profile	600	0.0020	0.0031	0.0038	0.0050	0.0060
	Light	990	0.0046	0.0072	0.0086	0.0115	0.0138
PLASTIC	Slot	800	0.0020	0.0031	0.0038	0.0050	0.0060
	Profile	1000	0.0020	0.0031	0.0038	0.0050	0.0060
	Light	1650	0.0046	0.0072	0.0086	0.0115	0.0138
MACHINABLE CERAMIC, MACHINABLE GLASS	Slot	40	0.0008	0.0013	0.0015	0.0020	0.0024
	Profile	50	0.0008	0.0013	0.0015	0.0020	0.0024
	Light	85	0.0018	0.0029	0.0034	0.0046	0.0055

CUT TYPE		
SLOT	PROFILE	LIGHT*
Rw = D_1 Ad = D_1	Rw = .5 x D_1 Ad = 1.5 x D_1	Rw = .05 x D_1 Ad = L_2
		

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x no. of flutes x rpm

- maximum recommended depths shown
- adjust speed and feed based upon resin type and/or fiber structure
- reduce speed when overheating causes melting or damage to resin
- reduce feed if delamination or fraying occurs

* finish cuts typically require reduced feed and cutting depths

- rates shown are for use without coolant; rates may be increased with coolant use
- dust collection is vital when machining dry
- diamond coating will increase tool life in graphite and composite materials
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

27M Metric	CUT	SPEED	FEED (mm/flute)				
	Type	m/min	6	8	10	12	16
CFRP, AFRP (Carbon Fiber, Aramid Fiber)	Slot	120	0.040	0.065	0.075	0.100	0.120
	Profile	150	0.040	0.065	0.075	0.100	0.120
	Light	250	0.095	0.145	0.175	0.235	0.280
GFRP (Fiberglass)	Slot	100	0.040	0.065	0.075	0.100	0.120
	Profile	120	0.040	0.065	0.075	0.100	0.120
	Light	200	0.095	0.145	0.175	0.235	0.280
CARBON, GRAPHITE	Slot	145	0.050	0.080	0.095	0.125	0.150
	Profile	185	0.050	0.080	0.095	0.125	0.150
	Light	300	0.115	0.185	0.220	0.290	0.350
PLASTIC	Slot	245	0.050	0.080	0.095	0.125	0.150
	Profile	305	0.050	0.080	0.095	0.125	0.150
	Light	505	0.115	0.185	0.220	0.290	0.350
MACHINABLE CERAMIC, MACHINABLE GLASS	Slot	10	0.020	0.035	0.040	0.050	0.060
	Profile	15	0.020	0.035	0.040	0.050	0.060
	Light	25	0.045	0.075	0.085	0.115	0.140

CUT TYPE		
SLOT	PROFILE	LIGHT*
Rw = D_1 Ad = D_1	Rw = .5 x D_1 Ad = 1.5 x D_1	Rw = .05 x D_1 Ad = L_2
		

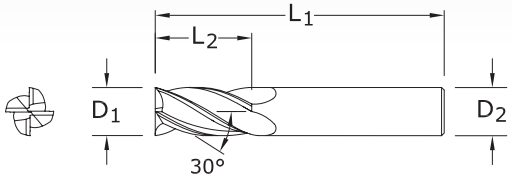
rpm = (1000 x m/min) / (3.14 x D_1)
mm/min = (mm/flute) x no. of flutes x rpm

- maximum recommended depths shown
- adjust speed and feed based upon resin type and/or fiber structure
- reduce speed when overheating causes melting or damage to resin
- reduce feed if delamination or fraying occurs

* finish cuts typically require reduced feed and cutting depths

- rates shown are for use without coolant; rates may be increased with coolant use
- dust collection is vital when machining dry
- diamond coating will increase tool life in graphite and composite materials
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

4 Flute Square End Stub



16
FRACTIONAL SERIES

TECH INFO 115

TOLERANCES (inch)

D_1 = +0.000/–0.002
D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

inch				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/16	1/8	1-1/2	1/8	31601	31650	31238	31251
3/32	3/16	1-1/2	1/8	31603	31651	31239	31252
1/8	1/4	1-1/2	1/8	31605	31652	31240	31253
5/32	5/16	2	3/16	31607	31653	31241	31254
3/16	3/8	2	3/16	31609	31654	31242	31255
7/32	7/16	2	1/4	31611	31655	31243	31256
1/4	1/2	2	1/4	31613	31656	31244	31257
5/16	1/2	2	5/16	31615	31657	31245	31258
3/8	5/8	2	3/8	31617	31658	31246	31259
7/16	5/8	2-1/2	7/16	31619	31659	31247	31260
1/2	5/8	2-1/2	1/2	31621	31660	31248	31261
5/8	3/4	3	5/8	31623	31661	31249	31262
3/4	1	3	3/4	31625	31662	31250	31263

16M
METRIC SERIES

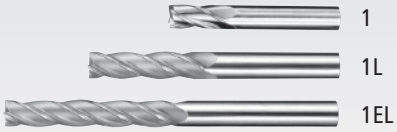
TECH INFO 116

TOLERANCES (mm)

D_1 = +0,000/–0,050
D_2 = h_6

mm				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED EDP NO.	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41605	49136	49157	49178
1,5	3,0	38,0	3,0	41609	49137	49158	49179
2,0	4,0	38,0	3,0	41613	49138	49159	49180
2,5	5,0	38,0	3,0	41617	49139	49160	49181
3,0	6,0	38,0	3,0	41621	49140	49161	49182
3,5	7,0	50,0	4,0	41625	49141	49162	49183
4,0	8,0	50,0	4,0	41629	49142	49163	49184
4,5	9,5	50,0	4,5	41633	49143	49164	49185
5,0	10,0	50,0	5,0	41637	49144	49165	49186
6,0	12,0	50,0	6,0	41641	49145	49166	49187
7,0	12,0	50,0	8,0	41645	49146	49167	49188
8,0	12,0	50,0	8,0	41649	49147	49168	49189
9,0	14,0	50,0	9,0	41653	49148	49169	49190
10,0	16,0	50,0	10,0	41657	49149	49170	49191
11,0	19,0	63,0	12,0	41661	49150	49171	49192
12,0	19,0	63,0	12,0	40165	49151	49172	49193

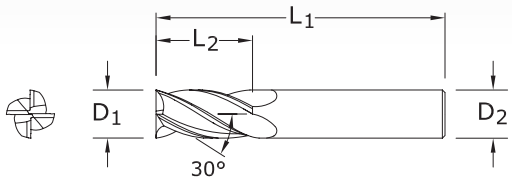
4 Flute End Mills



TOLERANCES (inch)

D_1 = +0.000/–0.002

D_2 = h_6



1 • 1L • 1EL
FRACTIONAL SERIES

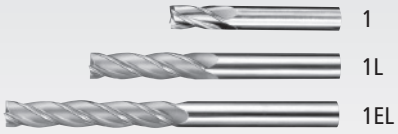
TECH INFO 115

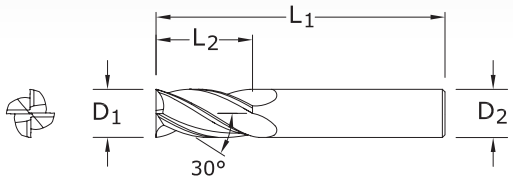
inch				EDP NO.							SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	UNCOATED W/FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE (Diamond)	
1/64	1/32	1-1/2	1/8	30101	–	39101	39001	30191	–	–	1
1/32	5/64	1-1/2	1/8	30103	–	39103	39003	30192	–	–	1
3/64	7/64	1-1/2	1/8	30105	–	39105	39005	30193	–	–	1
1/16	3/16	1-1/2	1/8	30107	–	39107	39007	30194	–	91268	1
5/64	3/16	1-1/2	1/8	30109	–	39109	39009	30195	–	–	1
3/32	9/32	1-1/2	1/8	30111	–	39111	39011	30196	–	–	1
7/64	3/8	1-1/2	1/8	30113	–	39113	39013	30197	–	–	1
1/8	3/8	1-1/2	1/8	30177	–	39177	39077	30029	–	–	1
*1/8	1/2	1-1/2	1/8	30115	–	39115	39015	30198	–	91272	1
1/8	3/4	2-1/4	1/8	33141	–	31727	31737	31747	–	–	1L
1/8	1	3	1/8	33143	–	31860	31870	31880	–	–	1EL
9/64	1/2	2	3/16	30117	–	39117	39017	30199	–	–	1
5/32	1/2	2	3/16	30119	–	39119	39019	30000	–	–	1
11/64	5/8	2	3/16	30121	–	39121	39021	30001	–	–	1
*3/16	5/8	2	3/16	30123	–	39123	39023	30002	–	91276	1
3/16	3/4	2-1/2	3/16	33101	–	31728	31738	31748	–	–	1L
3/16	1-1/8	3	3/16	33121	–	31861	31871	31881	–	–	1EL
13/64	5/8	2-1/2	1/4	30125	–	39125	39025	30003	–	–	1
7/32	5/8	2-1/2	1/4	30127	–	39127	39027	30004	–	–	1
15/64	3/4	2-1/2	1/4	30129	–	39129	39029	30005	–	–	1
*1/4	3/4	2-1/2	1/4	30131	–	39131	39031	30006	–	91280	1
1/4	1-1/8	3	1/4	33103	–	31729	31739	31749	–	–	1L
1/4	1-1/2	4	1/4	33123	–	31862	31872	31882	–	–	1EL
17/64	3/4	2-1/2	5/16	30133	–	39133	39033	30007	–	–	1
9/32	3/4	2-1/2	5/16	30135	–	39135	39035	30008	–	–	1
19/64	13/16	2-1/2	5/16	30137	–	39137	39037	30009	–	–	1
*5/16	13/16	2-1/2	5/16	30139	–	39139	39039	30010	–	91284	1
5/16	1-1/8	3	5/16	33105	–	31730	31740	31763	–	–	1L
5/16	1-5/8	4	5/16	33125	–	31863	31873	31883	–	–	1EL
21/64	1	2-1/2	3/8	30141	–	39141	39041	30011	–	–	1
11/32	1	2-1/2	3/8	30143	–	39143	39043	30012	–	–	1
23/64	1	2-1/2	3/8	30145	–	39145	39045	30013	–	–	1
*3/8	1	2-1/2	3/8	30147	30179	39147	39047	30014	30379	91288	1
3/8	1-1/8	3	3/8	33107	–	31731	31741	31764	–	–	1L
3/8	1-3/4	4	3/8	33127	–	31864	31874	31884	–	–	1EL
25/64	1	2-3/4	7/16	30149	–	39149	39049	30015	–	–	1

continued on next page

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
NON-FERROUS
PLASTICS/COMPOSITES

4 Flute End Mills





1 • 1L • 1EL
FRACTIONAL SERIES

TOLERANCES (inch)
D_1 = +0.000/–0.002
D_2 = h_6

TECH INFO 115

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

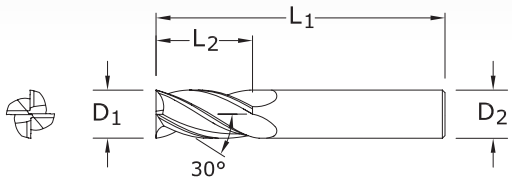
inch				EDP NO.							SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	UNCOATED W/FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE (Diamond)	
13/32	1	2-3/4	7/16	30151	–	39151	39051	30016	–	–	1
27/64	1	2-3/4	7/16	30153	–	39153	39053	30017	–	–	1
7/16	1	2-3/4	7/16	30155	–	39155	39055	30018	–	–	1
7/16	2	4-1/2	7/16	33109	–	31732	31742	31765	–	–	1L
7/16	3	6	7/16	33129	–	31865	31875	31885	–	–	1EL
29/64	1	3	1/2	30157	–	39157	39057	30019	–	–	1
15/32	1	3	1/2	30159	–	39159	39059	30020	–	–	1
31/64	1	3	1/2	30161	–	39161	39061	30021	–	–	1
1/2	1	3	1/2	30163	30180	39163	39063	30022	30380	91292	1
1/2	2	4-1/2	1/2	33111	–	31733	31743	31766	–	–	1L
1/2	3	6	1/2	33131	–	31866	31876	31886	–	–	1EL
9/16	1-1/8	3-1/2	9/16	30165	–	39165	39065	30023	–	–	1
5/8	1-1/4	3-1/2	5/8	30167	30181	39167	39067	30024	30381	–	1
5/8	2-1/4	5	5/8	33113	–	31734	31744	31767	–	–	1L
5/8	3	6	5/8	33133	–	31867	31877	31887	–	–	1EL
11/16	1-3/8	4	3/4	30169	–	39169	39069	30025	–	–	1
3/4	1-1/2	4	3/4	30171	30182	39171	39071	30026	30382	–	1
3/4	2-1/4	5	3/4	33115	–	31735	31745	31768	–	–	1L
3/4	3	6	3/4	33135	–	31868	31878	31888	–	–	1EL
7/8	1-1/2	4	7/8	30173	–	39173	39073	30027	–	–	1
1	1-1/2	4	1	30175	30183	39175	39075	30028	30383	–	1
1	2-1/4	5	1	33117	–	31736	31746	31769	–	–	1L
1	3	6	1	33137	–	31869	31879	31889	–	–	1EL
*Series 1 Set				30189	–	39189	39089	30030	–	–	1

4 Flute End Mills

TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6



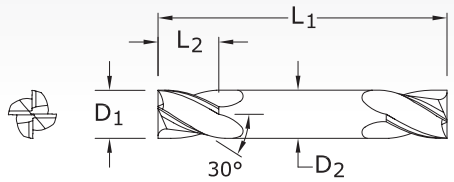
1M • 1XLM
METRIC SERIES

TECH INFO 116

mm				EDP NO.				SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED EDP NO.	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40105	48500	48522	48543	1M
1,5	4,5	38,0	3,0	40109	48501	48523	48544	1M
2,0	6,3	38,0	3,0	40113	48502	48524	48545	1M
2,5	9,5	38,0	3,0	40117	48503	48525	48546	1M
3,0	12,0	38,0	3,0	40121	48504	48526	48547	1M
3,0	25,0	75,0	3,0	43101	49388	49401	49414	1XLM
3,5	12,0	50,0	4,0	40125	48505	48527	48548	1M
4,0	14,0	50,0	4,0	40129	48506	48528	48549	1M
4,0	25,0	75,0	4,0	43103	49389	49402	49415	1XLM
4,5	16,0	50,0	6,0	40133	48507	48529	48550	1M
5,0	16,0	50,0	6,0	40137	48508	48530	48551	1M
5,0	25,0	75,0	5,0	43107	49391	49404	49417	1XLM
6,0	19,0	50,0	6,0	40141	48509	48531	48552	1M
6,0	25,0	75,0	6,0	43105	49390	49403	49416	1XLM
7,0	19,0	63,0	8,0	40145	48510	48532	48553	1M
8,0	20,0	63,0	8,0	40149	48511	48533	48554	1M
8,0	25,0	75,0	8,0	43115	49392	49405	49418	1XLM
9,0	22,0	75,0	10,0	40153	48512	48534	48555	1M
10,0	22,0	75,0	10,0	40157	48513	48535	48556	1M
10,0	38,0	100,0	10,0	43125	49393	49406	49419	1XLM
11,0	25,0	75,0	12,0	40161	48514	48536	48557	1M
12,0	25,0	75,0	12,0	41665	48515	48537	48558	1M
12,0	50,0	100,0	12,0	43135	49394	49407	49420	1XLM
12,0	75,0	150,0	12,0	43145	49395	49408	49421	1XLM
14,0	32,0	89,0	14,0	40169	48516	48538	48559	1M
14,0	75,0	150,0	14,0	43155	49396	49409	49422	1XLM
16,0	32,0	89,0	16,0	40173	48517	48539	48560	1M
16,0	75,0	150,0	16,0	43165	49397	49410	49423	1XLM
18,0	38,0	100,0	18,0	40177	48518	48540	48561	1M
18,0	75,0	150,0	18,0	43175	49398	49411	49424	1XLM
20,0	38,0	100,0	20,0	40181	48519	48541	48562	1M
20,0	75,0	150,0	20,0	43185	49399	49412	49425	1XLM
25,0	38,0	100,0	25,0	40185	48520	48542	48563	1M
25,0	75,0	150,0	25,0	43195	49400	49413	49426	1XLM

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

4 Flute Double End Mills



14
FRACTIONAL SERIES

TOLERANCES (inch)

D_1 = +0.000/–0.002
D_2 = h_6

TECH INFO 115

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

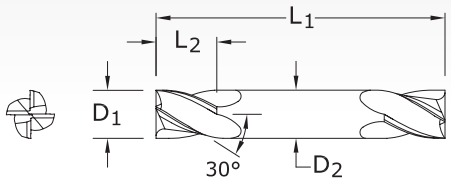
inch				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/32	1/16	1-1/2	1/8	31401	31441	39601	31170
3/64	3/32	1-1/2	1/8	31403	31443	39603	31171
1/16	1/8	1-1/2	1/8	31405	31445	39605	31172
5/64	1/8	1-1/2	1/8	31407	31447	39607	31173
3/32	3/16	1-1/2	1/8	31409	31449	39609	31174
7/64	3/16	1-1/2	1/8	31411	31451	39611	31175
1/8	1/4	1-1/2	1/8	31413	31453	39613	31176
9/64	5/16	2	3/16	31415	31455	39615	31177
5/32	5/16	2	3/16	31417	31457	39617	31178
11/64	5/16	2	3/16	31419	31459	39619	31179
3/16	3/8	2	3/16	31421	31461	39621	31180
13/64	1/2	2-1/2	1/4	31423	31463	39623	31181
7/32	1/2	2-1/2	1/4	31425	31465	39625	31182
15/64	1/2	2-1/2	1/4	31427	31467	39627	31183
1/4	1/2	2-1/2	1/4	31429	31469	39629	31184
9/32	1/2	2-1/2	5/16	31431	31471	39631	31185
5/16	1/2	2-1/2	5/16	31433	31473	39633	31186
3/8	9/16	2-1/2	3/8	31435	31475	39635	31187
7/16	9/16	2-3/4	7/16	31437	31477	39637	31188
1/2	5/8	3	1/2	31439	31479	39639	31189

4 Flute Double End Mills

TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6



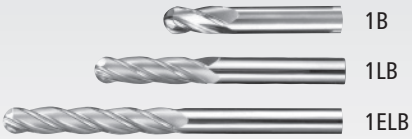
14M
METRIC SERIES

TECH INFO 116

mm				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41405	48884	48905	48926
1,5	3,0	38,0	3,0	41409	48885	48906	48927
2,0	4,0	38,0	3,0	41413	48886	48907	48928
2,5	5,0	38,0	3,0	41417	48887	48908	48929
3,0	6,0	38,0	3,0	41421	48888	48909	48930
3,5	7,0	50,0	4,0	41425	48889	48910	48931
4,0	8,0	50,0	4,0	41429	48890	48911	48932
4,5	9,5	63,0	4,5	41433	48891	48912	48933
5,0	10,0	63,0	5,0	41437	48892	48913	48934
6,0	12,0	63,0	6,0	41441	48893	48914	48935
7,0	12,0	63,0	8,0	41445	48894	48915	48936
8,0	12,0	63,0	8,0	41449	48895	48916	48937
9,0	14,0	75,0	9,0	41453	48896	48917	48938
10,0	14,0	75,0	10,0	41457	48897	48918	48939
11,0	14,0	75,0	12,0	41461	48898	48919	48940
12,0	16,0	75,0	12,0	41465	48899	48920	48941

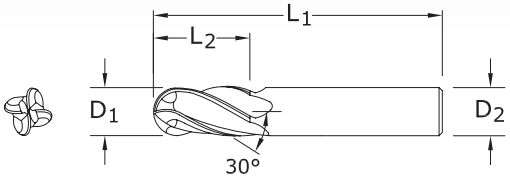
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

4 Flute Ball End



1B • 1LB • 1ELB

FRACTIONAL SERIES



TOLERANCES (inch)

D_1 = +0.000/–0.002

D_2 = h_6

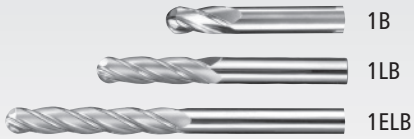
TECH INFO 115

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

inch				EDP NO.							SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	UNCOATED W/ FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE (Diamond)	
1/64	1/32	1-1/2	1/8	30102	–	39102	39002	30031	–	–	1B
1/32	5/64	1-1/2	1/8	30104	–	39104	39004	30032	–	–	1B
3/64	7/64	1-1/2	1/8	30106	–	39106	39006	30033	–	–	1B
1/16	3/16	1-1/2	1/8	30108	–	39108	39008	30034	–	91269	1B
5/64	3/16	1-1/2	1/8	30110	–	39110	39010	30035	–	–	1B
3/32	9/32	1-1/2	1/8	30112	–	39112	39012	30036	–	–	1B
7/64	3/8	1-1/2	1/8	30114	–	39114	39014	30037	–	–	1B
*1/8	3/8	1-1/2	1/8	30069	–	39178	39078	–	–	–	1B
1/8	1/2	1-1/2	1/8	30116	–	39116	39016	30038	–	91273	1B
1/8	3/4	2-1/4	1/8	33142	–	31770	31780	31790	–	–	1LB
1/8	1	3	1/8	33144	–	31900	31918	31928	–	–	1ELB
9/64	1/2	2	3/16	30118	–	39118	39018	30039	–	–	1B
5/32	1/2	2	3/16	30120	–	39120	39020	30040	–	–	1B
11/64	5/8	2	3/16	30122	–	39122	39022	30041	–	–	1B
*3/16	5/8	2	3/16	30124	–	39124	39024	30042	–	–	1B
3/16	3/4	2-1/2	3/16	33102	–	31771	31781	31791	–	91277	1LB
3/16	1-1/8	3	3/16	33122	–	31902	31919	31929	–	–	1ELB
13/64	5/8	2-1/2	1/4	30126	–	39126	39026	30043	–	–	1B
7/32	5/8	2-1/2	1/4	30128	–	39128	39028	30044	–	–	1B
15/64	3/4	2-1/2	1/4	30130	–	39130	39030	30045	–	–	1B
*1/4	3/4	2-1/2	1/4	30132	–	39132	39032	30046	–	91281	1B
1/4	1-1/8	3	1/4	33104	–	31772	31782	31792	–	–	1LB
1/4	1-1/2	4	1/4	33124	–	31904	31920	31930	–	–	1ELB
17/64	3/4	2-1/2	5/16	30134	–	39134	39034	30047	–	–	1B
9/32	3/4	2-1/2	5/16	30136	–	39136	39036	30048	–	–	1B
19/64	13/16	2-1/2	5/16	30138	–	39138	39038	30049	–		1B
*5/16	13/16	2-1/2	5/16	30140	–	39140	39040	30050	–	91285	1B
5/16	1-1/8	3	5/16	33106	–	31773	31783	31793	–	–	1LB

continued on next page

4 Flute Ball End



1B • 1LB • 1ELB

FRACTIONAL SERIES

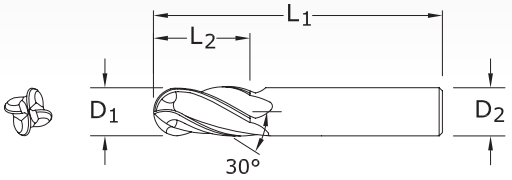
CONTINUED

inch				EDP NO.							SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	UNCOATED W/ FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE (Diamond)	
5/16	1-5/8	4	5/16	33126	–	31906	31921	31931	–	–	1ELB
21/64	1	2-1/2	3/8	30142	–	39142	39042	30051	–	–	1B
11/32	1	2-1/2	3/8	30144	–	39144	39044	30052	–	–	1B
23/64	1	2-1/2	3/8	30146	–	39146	39046	30053	–	–	1B
*3/8	1	2-1/2	3/8	30148	30184	39148	39048	30054	30384	91289	1B
3/8	1-1/8	3	3/8	33108	–	31774	31784	31794	–	–	1LB
3/8	1-3/4	4	3/8	33128	–	31908	31922	31932	–	–	1ELB
25/64	1	2-3/4	7/16	30150	–	39150	39050	30055	–	–	1B
13/32	1	2-3/4	7/16	30152	–	39152	39052	30056	–	–	1B
27/64	1	2-3/4	7/16	30154	–	39154	39054	30057	–	–	1B
7/16	1	2-3/4	7/16	30156	–	39156	39056	30058	–	–	1B
7/16	2	4-1/2	7/16	33110	–	31775	31785	31795	–	–	1LB
7/16	3	6	7/16	33130	–	31910	31923	31933	–	–	1ELB
29/64	1	3	1/2	30158	–	39158	39058	30059	–	–	1B
15/32	1	3	1/2	30160	–	39160	39060	30060	–	–	1B
31/64	1	3	1/2	30162	–	39162	39062	30061	–	–	1B
*1/2	1	3	1/2	30164	30185	39164	39064	30062	30385	91293	1B
1/2	2	4-1/2	1/2	33112	–	31776	31786	31796	–	–	1LB
1/2	3	6	1/2	33132	–	31912	31924	31934	–	–	1ELB
9/16	1-1/8	3-1/2	9/16	30166	–	39166	39066	30063	–	–	1B
5/8	1-1/4	3-1/2	5/8	30168	30186	39168	39068	30064	30386	–	1B
5/8	2-1/4	5	5/8	33114	–	31777	31787	31797	–	–	1LB
5/8	3	6	5/8	33134	–	31914	31925	31935	–	–	1ELB
11/16	1-3/8	4	3/4	30170	–	39170	39070	30065	–	–	1B
3/4	1-1/2	4	3/4	30172	30187	39172	39072	30066	30387	–	1B
3/4	2-1/4	5	3/4	33116	–	31778	31788	31798	–	–	1LB
3/4	3	6	3/4	33136	–	31916	31926	31936	–	–	1ELB
7/8	1-1/2	4	7/8	30174	–	39174	39074	30067	–	–	1B
1	1-1/2	4	1	30176	30188	39176	39076	30068	30388	–	1B
1	2-1/4	5	1	33118	–	31779	31789	31799	–	–	1LB
1	3	6	1	33138	–	31917	31927	31937	–	–	1ELB
*Series 1B Set				30190	–	39190	39090	30070	–	–	1B

4 Flute Ball End

1MB • 1XLMB

METRIC SERIES



TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6

TECH INFO 116

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

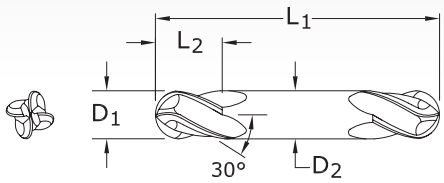
mm				EDP NO.				SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED EDP NO.	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40106	48564	48586	48607	1MB
1,5	4,5	38,0	3,0	40110	48565	48587	48608	1MB
2,0	6,3	38,0	3,0	40114	48566	48588	48609	1MB
2,5	9,5	38,0	3,0	40118	48567	48589	48610	1MB
3,0	12,0	38,0	3,0	40122	48568	48590	48611	1MB
3,0	25,0	75,0	3,0	43102	49505	49518	49531	1XLMB
3,5	12,0	50,0	4,0	40126	48569	48591	48612	1MB
4,0	14,0	50,0	4,0	40130	48570	48592	48613	1MB
4,0	25,0	75,0	4,0	43104	49506	49519	49532	1XLMB
4,5	16,0	50,0	6,0	40134	48571	48593	48614	1MB
5,0	16,0	50,0	6,0	40138	48572	48594	48615	1MB
5,0	25,0	75,0	5,0	43108	49508	49521	49534	1XLMB
6,0	19,0	50,0	6,0	40142	48573	48595	48616	1MB
6,0	25,0	75,0	6,0	43106	49507	49520	49533	1XLMB
7,0	19,0	63,0	8,0	40146	48574	48596	48617	1MB
8,0	20,0	63,0	8,0	40150	48575	48597	48618	1MB
8,0	25,0	75,0	8,0	43116	49509	49522	49535	1XLMB
9,0	22,0	75,0	10,0	40154	48576	48598	48619	1MB
10,0	22,0	75,0	10,0	40158	48577	48599	48620	1MB
10,0	38,0	100,0	10,0	43126	49510	49523	49536	1XLMB
11,0	25,0	75,0	12,0	40162	48578	48600	48621	1MB
12,0	25,0	75,0	12,0	40166	48579	48601	48622	1MB
12,0	50,0	100,0	12,0	43136	49511	49524	49537	1XLMB
12,0	75,0	150,0	12,0	43146	49512	49525	49538	1XLMB
14,0	32,0	89,0	14,0	40170	48580	48602	48623	1MB
14,0	75,0	150,0	14,0	43156	49513	49526	49539	1XLMB
16,0	32,0	89,0	16,0	40174	48581	48603	48624	1MB
16,0	75,0	150,0	16,0	43166	49514	49527	49540	1XLMB
18,0	38,0	100,0	18,0	40178	48582	48604	48625	1MB
18,0	75,0	150,0	18,0	43176	49515	49528	49541	1XLMB
20,0	38,0	100,0	20,0	40182	48583	48605	48626	1MB
20,0	75,0	150,0	20,0	43186	49516	49529	49542	1XLMB
25,0	38,0	100,0	25,0	40186	48584	48606	48627	1MB
25,0	75,0	150,0	25,0	43196	49517	49530	49543	1XLMB

4 Flute Double End Ball End

TOLERANCES (inch)

D_1 = +0.000/–0.002

D_2 = h_6



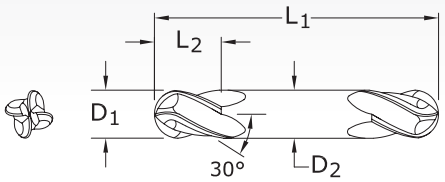
14B
FRACTIONAL SERIES

TECH INFO 115

inch				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/32	1/16	1-1/2	1/8	31402	31442	39602	31218
3/64	3/32	1-1/2	1/8	31404	31444	39604	31219
1/16	1/8	1-1/2	1/8	31406	31446	39606	31220
5/64	1/8	1-1/2	1/8	31408	31448	39608	31221
3/32	3/16	1-1/2	1/8	31410	31450	39610	31222
7/64	3/16	1-1/2	1/8	31412	31452	39612	31223
*1/8	1/4	1-1/2	1/8	31414	31454	39614	31224
9/64	5/16	2	3/16	31416	31456	39616	31225
5/32	5/16	2	3/16	31418	31458	39618	31226
11/64	5/16	2	3/16	31420	31460	39620	31227
*3/16	3/8	2	3/16	31422	31462	39622	31228
13/64	1/2	2-1/2	1/4	31424	31464	39624	31229
7/32	1/2	2-1/2	1/4	31426	31466	39626	31230
15/64	1/2	2-1/2	1/4	31428	31468	39628	31231
*1/4	1/2	2-1/2	1/4	31430	31470	39630	31232
9/32	1/2	2-1/2	5/16	31432	31472	39632	31233
*5/16	1/2	2-1/2	5/16	31434	31474	39634	31234
*3/8	9/16	2-1/2	3/8	31436	31476	39636	31235
7/16	9/16	2-3/4	7/16	31438	31478	39638	31236
*1/2	5/8	3	1/2	31440	31480	39640	31237
*Series 14B Set				31490	31482	39642	31217

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

4 Flute Double End Ball End



14MB
METRIC SERIES

TOLERANCES (mm)
D_1 = +0,000/–0,050
D_2 = h_6

TECH INFO 116

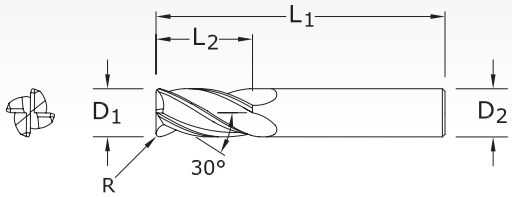
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

mm				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41406	48947	48968	48989
1,5	3,0	38,0	3,0	41410	48948	48969	48990
2,0	4,0	38,0	3,0	41414	48949	48970	48991
2,5	5,0	38,0	3,0	41418	48950	48971	48992
3,0	6,0	38,0	3,0	41422	48951	48972	48993
3,5	7,0	50,0	4,0	41426	48952	48973	48994
4,0	8,0	50,0	4,0	41430	48953	48974	48995
4,5	9,5	63,0	4,5	41434	48954	48975	48996
5,0	10,0	63,0	5,0	41438	48955	48976	48997
6,0	12,0	63,0	6,0	41442	48956	48977	48998
7,0	12,0	63,0	8,0	41446	48957	48978	48999
8,0	12,0	63,0	8,0	41450	48958	48979	49000
9,0	14,0	75,0	9,0	41454	48959	48980	49001
10,0	14,0	75,0	10,0	41458	48960	48981	49002
11,0	14,0	75,0	12,0	41462	48961	48982	49003
12,0	16,0	75,0	12,0	41466	48962	48983	49004

4 Flute Corner Radius

TOLERANCES (inch)

D_1 = –0.001/–0.002
D_2 = h_6
R = +0.000/–0.002



1CR
FRACTIONAL SERIES

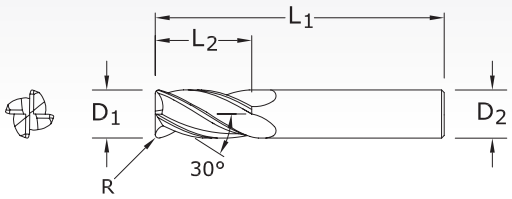
TECH INFO 115

inch					EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIA. D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/8	1/2	1-1/2	1/8	0.015	38001	38002	38115	38157
1/8	1/2	1-1/2	1/8	0.020	38003	38004	38116	38158
3/16	5/8	2	3/16	0.015	38009	38010	38117	38159
3/16	5/8	2	3/16	0.020	38011	38012	38118	38160
3/16	5/8	2	3/16	0.030	38013	38014	38119	38161
1/4	3/4	2-1/2	1/4	0.015	38019	38020	38120	38162
1/4	3/4	2-1/2	1/4	0.020	38021	38022	38121	38163
1/4	3/4	2-1/2	1/4	0.030	38023	38024	38122	38164
1/4	3/4	2-1/2	1/4	0.045	38025	38026	38123	38165
5/16	13/16	2-1/2	5/16	0.015	38031	38032	38124	38166
5/16	13/16	2-1/2	5/16	0.020	38033	38034	38125	38167
5/16	13/16	2-1/2	5/16	0.030	38035	38036	38126	38168
5/16	13/16	2-1/2	5/16	0.045	38037	38038	38127	38169
3/8	1	2-1/2	3/8	0.015	38045	38046	38128	38170
3/8	1	2-1/2	3/8	0.020	38047	38048	38129	38171
3/8	1	2-1/2	3/8	0.030	38049	38050	38130	38172
3/8	1	2-1/2	3/8	0.045	38051	38052	38131	38173
1/2	1	3	1/2	0.015	38059	38060	38132	38174
1/2	1	3	1/2	0.020	38061	38062	38133	38175
1/2	1	3	1/2	0.030	38063	38064	38134	38176
1/2	1	3	1/2	0.045	38065	38066	38135	38177
1/2	1	3	1/2	0.060	38067	38068	38136	38178
5/8	1-1/4	3-1/2	5/8	0.015	38073	38074	38137	38179
5/8	1-1/4	3-1/2	5/8	0.020	38075	38076	38138	38180
5/8	1-1/4	3-1/2	5/8	0.030	38077	38078	38139	38181
5/8	1-1/4	3-1/2	5/8	0.045	38079	38080	38140	38182
5/8	1-1/4	3-1/2	5/8	0.060	38081	38082	38141	38183
5/8	1-1/4	3-1/2	5/8	0.090	38083	38084	38142	38184
3/4	1-1/2	4	3/4	0.015	38087	38088	38143	38185
3/4	1-1/2	4	3/4	0.020	38089	38090	38144	38186

continued on next page

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

4 Flute Corner Radius



1CR
FRACTIONAL SERIES

TOLERANCES (inch)
D_1 = –0.001/–0.002
D_2 = h_6
R = +0.000/–0.002

TECH INFO 115

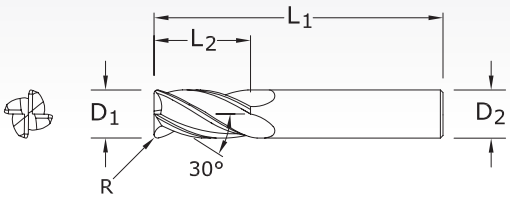
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

inch					EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIA. D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
3/4	1-1/2	4	3/4	0.030	38091	38092	38145	38187
3/4	1-1/2	4	3/4	0.045	38093	38094	38146	38188
3/4	1-1/2	4	3/4	0.060	38095	38096	38147	38189
3/4	1-1/2	4	3/4	0.090	38097	38098	38148	38190
3/4	1-1/2	4	3/4	0.125	38099	38100	38149	38191
1	1-1/2	4	1	0.015	38101	38102	38150	38192
1	1-1/2	4	1	0.020	38103	38104	38151	38193
1	1-1/2	4	1	0.030	38105	38106	38152	38194
1	1-1/2	4	1	0.045	38107	38108	38153	38195
1	1-1/2	4	1	0.060	38109	38110	38154	38196
1	1-1/2	4	1	0.090	38111	38112	38155	38197
1	1-1/2	4	1	0.125	38113	38114	38156	38198

4 Flute Corner Radius

TOLERANCES (mm)

D_1 = +0,000/–0,050
D_2 = h_6
R = +0,000/–0,050



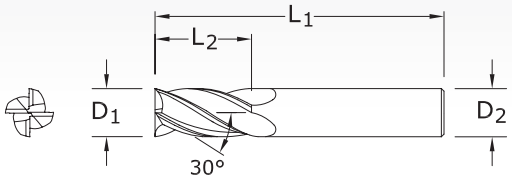
1MCR
METRIC SERIES

TECH INFO 116

mm					EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	CORNER RADIUS R	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)
4,0	14,0	50,0	0,25	4,0	40000
4,0	14,0	50,0	0,50	4,0	40001
4,0	14,0	50,0	1,00	4,0	40003
5,0	16,0	50,0	0,25	6,0	40004
5,0	16,0	50,0	0,50	6,0	40005
5,0	16,0	50,0	1,00	6,0	40007
6,0	19,0	50,0	0,25	6,0	40009
6,0	19,0	50,0	0,50	6,0	40010
6,0	19,0	50,0	0,75	6,0	40011
6,0	19,0	50,0	1,00	6,0	40012
8,0	20,0	63,0	0,50	8,0	40015
8,0	20,0	63,0	0,75	8,0	40016
8,0	20,0	63,0	1,00	8,0	40017
8,0	20,0	63,0	1,50	8,0	40019
8,0	20,0	63,0	2,00	8,0	40020
10,0	22,0	75,0	0,50	10,0	40021
10,0	22,0	75,0	1,00	10,0	40023
10,0	22,0	75,0	1,50	10,0	40024
10,0	22,0	75,0	2,00	10,0	40025
12,0	25,0	75,0	0,50	12,0	40028
12,0	25,0	75,0	1,00	12,0	40030
12,0	25,0	75,0	1,50	12,0	40031
12,0	25,0	75,0	2,00	12,0	40032
16,0	32,0	89,0	0,50	16,0	40035
16,0	32,0	89,0	1,00	16,0	40037
16,0	32,0	89,0	1,50	16,0	40038
16,0	32,0	89,0	2,00	16,0	40039

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
NON-FERROUS
PLASTICS/COMPOSITES

4 Flute High Shear End Mills



54
FRACTIONAL SERIES

TECH INFO 118

TOLERANCES (inch)

D1 = +0.000/–0.002

D2 = h_6

NON-FERROUS

PLASTICS/COMPOSITES

inch				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-C (TiCN)
1/16	3/16	1-1/2	1/8	35473	35500
3/32	3/8	1-1/2	1/8	35475	35501
1/8	7/16	1-1/2	1/8	35477	35502
5/32	9/16	2	3/16	35478	35503
3/16	9/16	2	3/16	35479	35504
7/32	5/8	2-1/2	1/4	35480	35505
1/4	3/4	2-1/2	1/4	35481	35506
9/32	3/4	2-1/2	5/16	35482	35507
5/16	13/16	2-1/2	5/16	35483	35508
3/8	7/8	2-1/2	3/8	35485	35509
7/16	1	2-3/4	7/16	35487	35510
1/2	1	3	1/2	35489	35511
9/16	1-1/8	3-1/2	9/16	35491	35512
5/8	1-1/4	3-1/2	5/8	35493	35513
3/4	1-1/2	4	3/4	35495	35514
1	1-1/2	4	1	35497	35515

54M
METRIC SERIES

TECH INFO 119

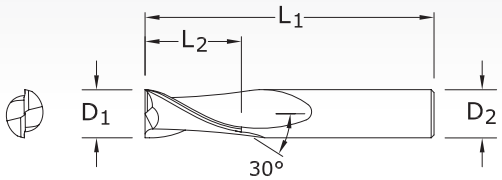
TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6

mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-C (TiCN)
3,0	8,0	38,0	3,0	45477	45478
3,5	10,0	57,0	6,0	45479	45480
4,0	11,0	57,0	6,0	45481	45482
4,5	11,0	57,0	6,0	45483	45484
5,0	13,0	57,0	6,0	45485	45486
6,0	13,0	57,0	6,0	45487	45488
8,0	19,0	63,0	8,0	45489	45490
10,0	22,0	72,0	10,0	45491	45492
12,0	26,0	83,0	12,0	45493	45494
14,0	26,0	83,0	14,0	45495	45496
16,0	32,0	92,0	16,0	45497	45498
20,0	38,0	104,0	20,0	45499	45500

2 Flute Square End Stub



TOLERANCES (inch)

D1 = +0.000/–0.002

D2 = h_6

17
FRACTIONAL SERIES

TECH INFO 115

inch				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/16	1/8	1-1/2	1/8	31701	31750	31303	31358
3/32	3/16	1-1/2	1/8	31703	31751	31304	31359
1/8	1/4	1-1/2	1/8	31705	31752	31305	31360
5/32	5/16	2	3/16	31707	31753	31306	31361
3/16	3/8	2	3/16	31709	31754	31307	31362
7/32	7/16	2	1/4	31711	31755	31308	31363
1/4	1/2	2	1/4	31713	31756	31309	31364
5/16	1/2	2	5/16	31715	31757	31310	31365
3/8	5/8	2	3/8	31717	31758	31311	31366
7/16	5/8	2-1/2	7/16	31719	31759	31312	31367
1/2	5/8	2-1/2	1/2	31721	31760	31313	31368
5/8	3/4	3	5/8	31723	31761	31314	31369
3/4	1	3	3/4	31725	31762	31315	31370

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
NON-FERROUS
PLASTICS/COMPOSITES

TOLERANCES (mm)

D_1 = +0,000/–0,050

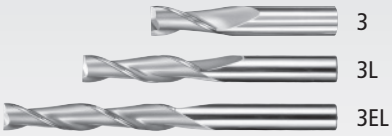
D_2 = h_6

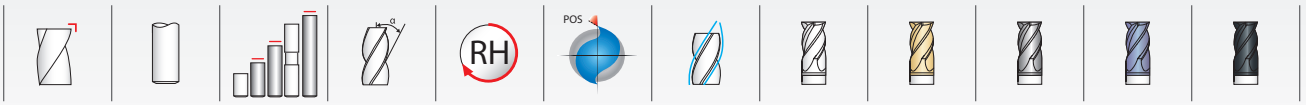
17M
METRIC SERIES

TECH INFO 116

mm				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41705	49262	49283	49304
1,5	3,0	38,0	3,0	41709	49263	49284	49305
2,0	4,0	38,0	3,0	41713	49264	49285	49306
2,5	5,0	38,0	3,0	41717	49265	49286	49307
3,0	6,0	38,0	3,0	41721	49266	49287	49308
3,5	7,0	50,0	4,0	41725	49267	49288	49309
4,0	8,0	50,0	4,0	41729	49268	49289	49310
4,5	9,5	50,0	4,5	41733	49269	49290	49311
5,0	10,0	50,0	5,0	41737	49270	49291	49312
6,0	12,0	50,0	6,0	41741	49271	49292	49313
7,0	12,0	50,0	8,0	41745	49272	49293	49314
8,0	12,0	50,0	8,0	41749	49273	49294	49315
9,0	14,0	50,0	9,0	41753	49274	49295	49316
10,0	16,0	50,0	10,0	41757	49275	49296	49317
11,0	19,0	63,0	12,0	41761	49276	49297	49318
12,0	19,0	63,0	12,0	41765	49277	49298	49319

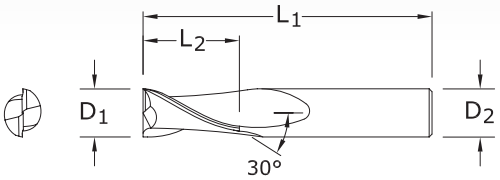
2 Flute Square End





3 • 3L • 3EL

FRACTIONAL SERIES



TOLERANCES (inch)

D_1 = +0.000/–0.002

D_2 = h_6

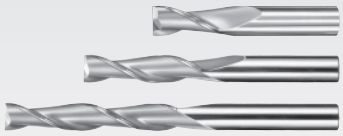
TECH INFO 115

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

inch				EDP NO.					SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Di-NAMITE (Diamond)	
1/64	1/32	1-1/2	1/8	30301	39301	39501	30397	–	3
1/32	5/64	1-1/2	1/8	30303	39303	39503	30398	–	3
3/64	7/64	1-1/2	1/8	30305	39305	39505	30399	–	3
1/16	3/16	1-1/2	1/8	30307	39307	39507	30400	91266	3
5/64	3/16	1-1/2	1/8	30309	39309	39509	30435	–	3
3/32	9/32	1-1/2	1/8	30311	39311	39511	30436	–	3
7/64	3/8	1-1/2	1/8	30313	39313	39513	30437	–	3
1/8	3/8	1-1/2	1/8	30377	39377	39577	30469	–	3
*1/8	1/2	1-1/2	1/8	30315	39315	39515	30438	91270	3
1/8	3/4	2-1/4	1/8	33341	31800	31810	31850	–	3L
1/8	1	3	1/8	33343	31938	31948	31958	–	3EL
9/64	1/2	2	3/16	30317	39317	39517	30439	–	3
5/32	1/2	2	3/16	30319	39319	39519	30440	–	3
11/64	5/8	2	3/16	30321	39321	39521	30441	–	3
*3/16	5/8	2	3/16	30323	39323	39523	30442	91274	3
3/16	3/4	2-1/2	3/16	33301	31820	31825	31851	–	3L
3/16	1-1/8	3	3/16	33321	31939	31949	31959	–	3EL
13/64	5/8	2-1/2	1/4	30325	39325	39525	30443	–	3
7/32	5/8	2-1/2	1/4	30327	39327	39527	30444	–	3
15/64	3/4	2-1/2	1/4	30329	39329	39529	30445	–	3
*1/4	3/4	2-1/2	1/4	30331	39331	39531	30446	91278	3
1/4	1-1/8	3	1/4	33303	31802	31812	31852	–	3L
1/4	1-1/2	4	1/4	33323	31940	31950	31960	–	3EL
17/64	3/4	2-1/2	5/16	30333	39333	39533	30447	–	3
9/32	3/4	2-1/2	5/16	30335	39335	39535	30448	–	3
19/64	13/16	2-1/2	5/16	30337	39337	39537	30449	–	3
*5/16	13/16	2-1/2	5/16	30339	39339	39539	30450	91282	3
5/16	1-1/8	3	5/16	33305	31821	31826	31853	–	3L

continued on next page

2 Flute Square End



3 • 3L • 3EL
FRACTIONAL SERIES

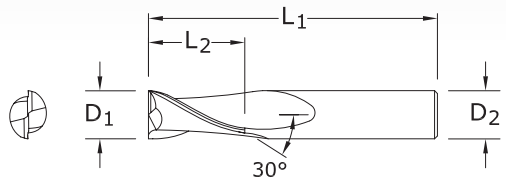
CONTINUED

inch				EDP NO.					SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Di-NAMITE (Diamond)	
5/16	1-5/8	4	5/16	33325	31941	31951	31961	–	3EL
21/64	1	2-1/2	3/8	30341	39341	39541	30451	–	3
11/32	1	2-1/2	3/8	30343	39343	39543	30452	–	3
23/64	1	2-1/2	3/8	30345	39345	39545	30453	–	3
*3/8	1	2-1/2	3/8	30347	39347	39547	30454	91286	3
3/8	1-1/8	3	3/8	33307	31804	31814	31854	–	3L
3/8	1-3/4	4	3/8	33327	31942	31952	31962	–	3EL
25/64	1	2-3/4	7/16	30349	39349	39549	30455	–	3
13/32	1	2-3/4	7/16	30351	39351	39551	30456	–	3
27/64	1	2-3/4	7/16	30353	39353	39553	30457	–	3
7/16	1	2-3/4	7/16	30355	39355	39555	30458	–	3
7/16	2	4-1/2	7/16	33309	31822	31827	31855	–	3L
7/16	3	6	7/16	33329	31943	31953	31963	–	3EL
29/64	1	3	1/2	30357	39357	39557	30459	–	3
15/32	1	3	1/2	30359	39359	39559	30460	–	3
31/64	1	3	1/2	30361	39361	39561	30461	–	3
*1/2	1	3	1/2	30363	39363	39563	30462	91290	3
1/2	2	4-1/2	1/2	33311	31806	31816	31856	–	3L
1/2	3	6	1/2	33331	31944	31954	31964	–	3EL
9/16	1-1/8	3-1/2	9/16	30365	39365	39565	30463	–	3
5/8	1-1/4	3-1/2	5/8	30367	39367	39567	30464	–	3
5/8	2-1/4	5	5/8	33313	31823	31817	31857	–	3L
5/8	3	6	5/8	33333	31945	31955	31965	–	3EL
11/16	1-3/8	4	3/4	30369	39369	39569	30465	–	3
3/4	1-1/2	4	3/4	30371	39371	39571	30466	–	3
3/4	2-1/4	5	3/4	33315	31808	31818	31858	–	3L
3/4	3	6	3/4	33335	31946	31956	31966	–	3EL
7/8	1-1/2	4	7/8	30373	39373	39573	30467	–	3
1	1-1/2	4	1	30375	39375	39575	30468	–	3
1	2-1/4	5	1	33317	31824	31819	31859	–	3L
1	3	6	1	33337	31947	31957	31967	–	3EL
*Series 3 Set				30389	39389	39589	30470	–	3

2 Flute Square End

3M • 3XLM

METRIC SERIES



TOLERANCES (mm)

D_1 = +0,000/–0,050

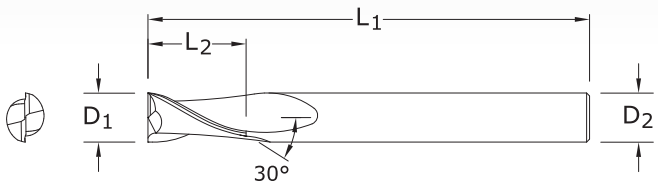
D_2 = h_6

TECH INFO 116

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

mm				EDP NO.				SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40305	48628	48650	48671	3M
1,5	4,5	38,0	3,0	40309	48629	48651	48672	3M
2,0	6,3	38,0	3,0	40313	48630	48652	48673	3M
2,5	9,5	38,0	3,0	40317	48631	48653	48674	3M
3,0	12,0	38,0	3,0	40321	48632	48654	48675	3M
3,0	25,0	75,0	3,0	43301	49427	49440	49453	3XLM
3,5	12,0	50,0	4,0	40325	48633	48655	48676	3M
4,0	14,0	50,0	4,0	40329	48634	48656	48677	3M
4,0	25,0	75,0	4,0	43303	49428	49441	49454	3XLM
4,5	16,0	50,0	6,0	40333	48635	48657	48678	3M
5,0	16,0	50,0	6,0	40337	48636	48658	48679	3M
5,0	25,0	75,0	5,0	43307	49430	49443	49456	3XLM
6,0	19,0	50,0	6,0	40341	48637	48659	48680	3M
6,0	25,0	75,0	6,0	43305	49429	49442	49455	3XLM
7,0	19,0	63,0	8,0	40345	48638	48660	48681	3M
8,0	20,0	63,0	8,0	40349	48639	48661	48682	3M
8,0	25,0	75,0	8,0	43315	49431	49444	49457	3XLM
9,0	22,0	75,0	10,0	40353	48640	48662	48683	3M
10,0	22,0	75,0	10,0	40357	48641	48663	48684	3M
10,0	38,0	100,0	10,0	43325	49432	49445	49458	3XLM
11,0	25,0	75,0	12,0	40361	48642	48664	48685	3M
12,0	25,0	75,0	12,0	40365	48643	48665	48686	3M
12,0	50,0	100,0	12,0	43335	49433	49446	49459	3XLM
12,0	75,0	150,0	12,0	43345	49434	49447	49460	3XLM
14,0	32,0	89,0	14,0	40369	48644	48666	48687	3M
14,0	75,0	150,0	14,0	43355	49435	49448	49461	3XLM
16,0	32,0	89,0	16,0	40373	48645	48667	48688	3M
16,0	75,0	150,0	16,0	43365	49436	49449	49462	3XLM
18,0	38,0	100,0	18,0	40377	48646	48668	48689	3M
18,0	75,0	150,0	18,0	43375	49437	49450	49463	3XLM
20,0	38,0	100,0	20,0	40381	48647	48669	48690	3M
20,0	75,0	150,0	20,0	43385	49438	49451	49464	3XLM
25,0	38,0	100,0	25,0	40385	48648	48670	48691	3M
25,0	75,0	150,0	25,0	43395	49439	49452	49465	3XLM

2 Flute Square End Long Reach



TOLERANCES (inch)

D_1 = +0.000/–0.002

D_2 = h_6

59
FRACTIONAL SERIES

TECH INFO 115

inch				EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/8	3/8	2-1/2	1/4	32280	32260	32270
3/16	9/16	3	1/4	32281	32261	32271
1/4	5/8	3-1/2	1/4	32282	32262	32272
5/16	11/16	4	5/16	32283	32263	32273
3/8	7/8	4	3/8	32284	32264	32274
1/2	1	4-1/2	1/2	32285	32265	32275
5/8	1-1/8	5	5/8	32286	32266	32276
3/4	1-3/8	5-1/4	3/4	32287	32267	32277

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES
- HARDENED STEELS

TOLERANCES (mm)

D_1 = +0,000/–0,050

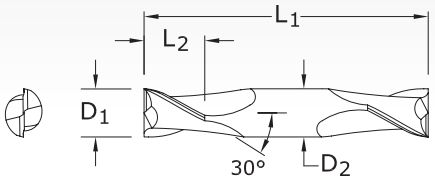
D_2 = h_6

59M
METRIC SERIES

TECH INFO 116

mm				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
3,0	9,0	60,0	6,0	43910	43920	43930	43950
4,0	12,0	70,0	6,0	43911	43921	43931	43951
6,0	15,0	80,0	6,0	43912	43922	43932	43952
8,0	20,0	89,0	8,0	43913	43923	43933	43953
10,0	25,0	100,0	10,0	43914	43924	43934	43954
12,0	30,0	110,0	12,0	43915	43925	43935	43955
14,0	35,0	120,0	16,0	43916	43926	43936	43956
16,0	40,0	120,0	16,0	43917	43927	43937	43957
18,0	40,0	130,0	20,0	43918	43928	43938	43958
20,0	45,0	130,0	20,0	43919	43929	43939	43959

2 Flute Double End Mills



15
FRACTIONAL SERIES

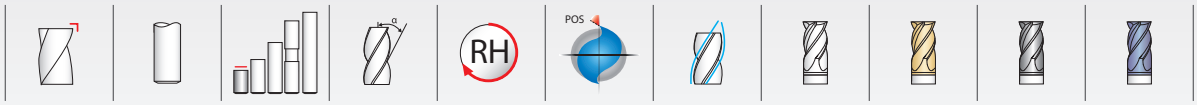
TOLERANCES (inch)
D_1 = +0.000/–0.002
D_2 = h_6

TECH INFO 115

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

inch				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/32	1/16	1-1/2	1/8	31501	31541	39651	31316
3/64	3/32	1-1/2	1/8	31503	31543	39653	31317
1/16	1/8	1-1/2	1/8	31505	31545	39655	31318
5/64	1/8	1-1/2	1/8	31507	31547	39657	31319
3/32	3/16	1-1/2	1/8	31509	31549	39659	31320
7/64	3/16	1-1/2	1/8	31511	31551	39661	31321
*1/8	1/4	1-1/2	1/8	31513	31553	39663	31322
9/64	5/16	2	3/16	31515	31555	39665	31323
5/32	5/16	2	3/16	31517	31557	39667	31324
11/64	5/16	2	3/16	31519	31559	39669	31325
*3/16	3/8	2	3/16	31521	31561	39671	31326
13/64	1/2	2-1/2	1/4	31523	31563	39673	31327
7/32	1/2	2-1/2	1/4	31525	31565	39675	31328
15/64	1/2	2-1/2	1/4	31527	31567	39677	31329
*1/4	1/2	2-1/2	1/4	31529	31569	39679	31330
9/32	1/2	2-1/2	5/16	31531	31571	39681	31331
*5/16	1/2	2-1/2	5/16	31533	31573	39683	31332
*3/8	9/16	2-1/2	3/8	31535	31575	39685	31333
7/16	9/16	2-3/4	7/16	31537	31577	39687	31334
*1/2	5/8	3	1/2	31539	31579	39689	31335
*Series 15 Set				31589	31581	39691	31336

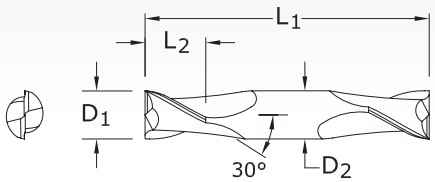
2 Flute Double End Mills



TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6



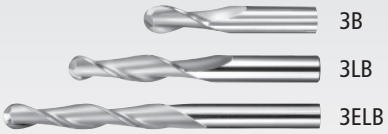
15M
METRIC SERIES

TECH INFO 116

mm				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41505	49010	49031	49052
1,5	3,0	38,0	3,0	41509	49011	49032	49053
2,0	4,0	38,0	3,0	41513	49012	49033	49054
2,5	5,0	38,0	3,0	41517	49013	49034	49055
3,0	6,0	38,0	3,0	41521	49014	49035	49056
3,5	7,0	50,0	4,0	41525	49015	49036	49057
4,0	8,0	50,0	4,0	41529	49016	49037	49058
4,5	9,5	63,0	4,5	41533	49017	49038	49059
5,0	10,0	63,0	5,0	41537	49018	49039	49060
6,0	12,0	63,0	6,0	41541	49019	49040	49061
7,0	12,0	63,0	8,0	41545	49020	49041	49062
8,0	12,0	63,0	8,0	41549	49021	49042	49063
9,0	14,0	75,0	9,0	41553	49022	49043	49064
10,0	14,0	75,0	10,0	41557	49023	49044	49065
11,0	14,0	75,0	12,0	41561	49024	49045	49066
12,0	16,0	75,0	12,0	41565	49025	49046	49067

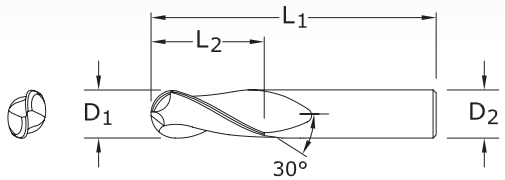
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

2 Flute Ball End



3B • 3LB • 3ELB

FRACTIONAL SERIES



TOLERANCES (inch)

D_1 = +0.000/–0.002

D_2 = h_6

TECH INFO 115

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES
- HARDENED STEELS

inch				EDP NO.				SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1/64	1/32	1-1/2	1/8	30302	39302	39502	30471	3B
1/32	5/64	1-1/2	1/8	30304	39304	39504	30472	3B
3/64	7/64	1-1/2	1/8	30306	39306	39506	30473	3B
1/16	3/16	1-1/2	1/8	30308	39308	39508	30474	3B
5/64	3/16	1-1/2	1/8	30310	39310	39510	30475	3B
3/32	9/32	1-1/2	1/8	30312	39312	39512	30476	3B
7/64	3/8	1-1/2	1/8	30314	39314	39514	30477	3B
1/8	3/8	1-1/2	1/8	30378	39378	39578	30599	3B
*1/8	1/2	1-1/2	1/8	30316	39316	39516	30478	3B
1/8	3/4	2-1/4	1/8	33342	31830	31840	31890	3LB
1/8	1	3	1/8	33344	31968	31978	31988	3ELB
9/64	1/2	2	3/16	30318	39318	39518	30479	3B
5/32	1/2	2	3/16	30320	39320	39520	30480	3B
11/64	5/8	2	3/16	30322	39322	39522	30481	3B
*3/16	5/8	2	3/16	30324	39324	39524	30482	3B
3/16	3/4	2-1/2	3/16	33302	31831	31841	31891	3LB
3/16	1-1/8	3	3/16	33322	31969	31979	31989	3ELB
13/64	5/8	2-1/2	1/4	30326	39326	39526	30483	3B
7/32	5/8	2-1/2	1/4	30328	39328	39528	30484	3B
15/64	3/4	2-1/2	1/4	30330	39330	39530	30485	3B
*1/4	3/4	2-1/2	1/4	30332	39332	39532	30486	3B
1/4	1-1/8	3	1/4	33304	31832	31842	31892	3LB
1/4	1-1/2	4	1/4	33324	31970	31980	31990	3ELB
17/64	3/4	2-1/2	5/16	30334	39334	39534	30487	3B
9/32	3/4	2-1/2	5/16	30336	39336	39536	30488	3B
19/64	13/16	2-1/2	5/16	30338	39338	39538	30489	3B
*5/16	13/16	2-1/2	5/16	30340	39340	39540	30490	3B
5/16	1-1/8	3	5/16	33306	31833	31843	31893	3LB

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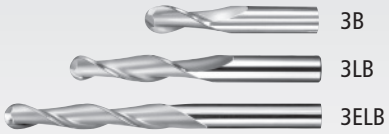
2 Flute Ball End



3B • 3LB • 3ELB

FRACTIONAL SERIES

CONTINUED

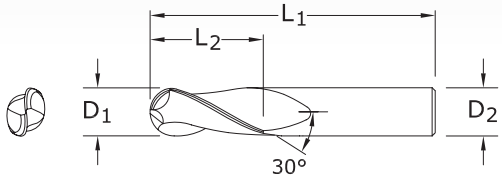
inch				EDP NO.				SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
5/16	1-5/8	4	5/16	33326	31971	31981	31991	3ELB
21/64	1	2-1/2	3/8	30342	39342	39542	30491	3B
11/32	1	2-1/2	3/8	30344	39344	39544	30492	3B
23/64	1	2-1/2	3/8	30346	39346	39546	30493	3B
*3/8	1	2-1/2	3/8	30348	39348	39548	30494	3B
3/8	1-1/8	3	3/8	33308	31834	31844	31894	3LB
3/8	1-3/4	4	3/8	33328	31972	31982	31992	3ELB
25/64	1	2-3/4	7/16	30350	39350	39550	30495	3B
13/32	1	2-3/4	7/16	30352	39352	39552	30496	3B
27/64	1	2-3/4	7/16	30354	39354	39554	30497	3B
7/16	1	2-3/4	7/16	30356	39356	39556	30498	3B
7/16	2	4-1/2	7/16	33310	31835	31845	31895	3LB
7/16	3	6	7/16	33330	31973	31983	31993	3ELB
29/64	1	3	1/2	30358	39358	39558	30499	3B
15/32	1	3	1/2	30360	39360	39560	30500	3B
31/64	1	3	1/2	30362	39362	39562	30591	3B
*1/2	1	3	1/2	30364	39364	39564	30592	3B
1/2	2	4-1/2	1/2	33312	31836	31846	31896	3LB
1/2	3	6	1/2	33332	31974	31984	31994	3ELB
9/16	1-1/8	3-1/2	9/16	30366	39366	39566	30593	3B
5/8	1-1/4	3-1/2	5/8	30368	39368	39568	30594	3B
5/8	2-1/4	5	5/8	33314	31837	31847	31897	3LB
5/8	3	6	5/8	33334	31975	31985	31995	3ELB
11/16	1-3/8	4	3/4	30370	39370	39570	30595	3B
3/4	1-1/2	4	3/4	30372	39372	39572	30596	3B
3/4	2-1/4	5	3/4	33316	31838	31848	31898	3LB
3/4	3	6	3/4	33336	31976	31986	31996	3ELB
7/8	1-1/2	4	7/8	30374	39374	39574	30597	3B
1	1-1/2	4	1	30376	39376	39576	30598	3B
1	2-1/4	5	1	33318	31839	31849	31899	3LB
1	3	6	1	33338	31977	31987	31997	3ELB
*Series 3B Set				30390	39390	39590	30600	3B

2 Flute Ball End

3MB
3XLMB

3MB • 3XLMB

METRIC SERIES



TOLERANCES (mm)

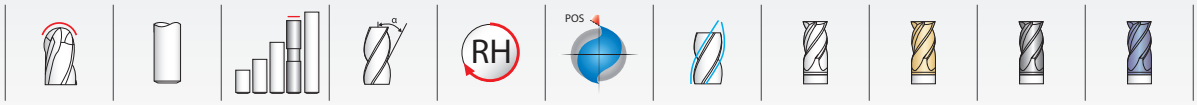
D_1 = +0,000/–0,050
D_2 = h_6

TECH INFO 116

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

mm				EDP NO.				SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40306	48692	48714	48735	3MB
1,5	4,5	38,0	3,0	40310	48693	48715	48736	3MB
2,0	6,3	38,0	3,0	40314	48694	48716	48737	3MB
2,5	9,5	38,0	3,0	40318	48695	48717	48738	3MB
3,0	12,0	38,0	3,0	40322	48696	48718	48739	3MB
3,0	25,0	75,0	3,0	43302	49544	49557	49570	3XLMB
3,5	12,0	50,0	4,0	40326	48697	48719	48740	3MB
4,0	14,0	50,0	4,0	40330	48698	48720	48741	3MB
4,0	25,0	75,0	4,0	43304	49545	49558	49571	3XLMB
4,5	16,0	50,0	6,0	40334	48699	48721	48742	3MB
5,0	16,0	50,0	6,0	40338	48700	48722	48743	3MB
5,0	25,0	75,0	5,0	43308	49547	49560	49573	3XLMB
6,0	19,0	50,0	6,0	40342	48701	48723	48744	3MB
6,0	25,0	75,0	6,0	43306	49546	49559	49572	3XLMB
7,0	19,0	63,0	8,0	40346	48702	48724	48745	3MB
8,0	20,0	63,0	8,0	40350	48703	48725	48746	3MB
8,0	25,0	75,0	8,0	43316	49548	49561	49574	3XLMB
9,0	22,0	75,0	10,0	40354	48704	48726	48747	3MB
10,0	22,0	75,0	10,0	40358	48705	48727	48748	3MB
10,0	38,0	100,0	10,0	43326	49549	49562	49575	3XLMB
11,0	25,0	75,0	12,0	40362	48706	48728	48749	3MB
12,0	25,0	75,0	12,0	40366	48707	48729	48750	3MB
12,0	50,0	100,0	12,0	43336	49550	49563	49576	3XLMB
12,0	75,0	150,0	12,0	43346	49551	49564	49577	3XLMB
14,0	32,0	89,0	14,0	40370	48708	48730	48751	3MB
14,0	75,0	150,0	14,0	43356	49552	49565	49578	3XLMB
16,0	32,0	89,0	16,0	40374	48709	48731	48752	3MB
16,0	75,0	150,0	16,0	43366	49553	49566	49579	3XLMB
18,0	38,0	100,0	18,0	40378	48710	48732	48753	3MB
18,0	75,0	150,0	18,0	43376	49554	49567	49580	3XLMB
20,0	38,0	100,0	20,0	40382	48711	48733	48754	3MB
20,0	75,0	150,0	20,0	43386	49555	49568	49581	3XLMB
25,0	38,0	100,0	25,0	40386	48712	48734	48755	3MB
25,0	75,0	150,0	25,0	43396	49556	49569	49582	3XLMB

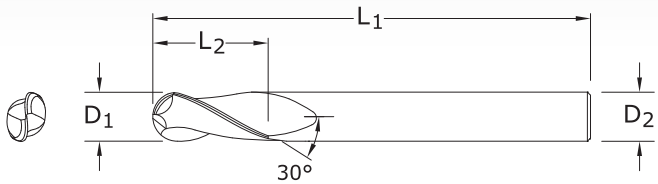
2 Flute Ball End Long Reach



TOLERANCES (inch)

D_1 = +0.000/–0.002

D_2 = h_6



59B
FRACTIONAL SERIES

TECH INFO 115

inch				EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/8	3/8	2-1/2	1/4	32210	32290	32200
3/16	9/16	3	1/4	32211	32291	32201
1/4	5/8	3-1/2	1/4	32212	32292	32202
5/16	11/16	4	5/16	32213	32293	32203
3/8	7/8	4	3/8	32214	32294	32204
1/2	1	4-1/2	1/2	32215	32295	32205
5/8	1-1/8	5	5/8	32216	32296	32206
3/4	1-3/8	5-1/4	3/4	32217	32297	32207

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6

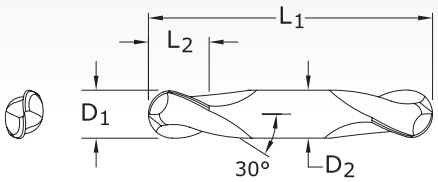
59MB
METRIC SERIES

TECH INFO 116

mm				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
3,0	9,0	60,0	6,0	43900	49622	49632	49642
4,0	12,0	70,0	6,0	43901	49623	49633	49643
6,0	15,0	80,0	6,0	43902	49624	49634	49644
8,0	20,0	89,0	8,0	43903	49625	49635	49645
10,0	25,0	100,0	10,0	43904	49626	49636	49646
12,0	30,0	110,0	12,0	43905	49627	49637	49647
14,0	35,0	120,0	16,0	43906	49628	49638	49648
16,0	40,0	120,0	16,0	43907	49629	49639	49649
18,0	40,0	130,0	20,0	43908	49630	49640	49650
20,0	45,0	130,0	20,0	43909	49631	49641	49651

Neck Option Available

2 Flute Double End Ball End



15B
FRACTIONAL SERIES

TOLERANCES (inch)

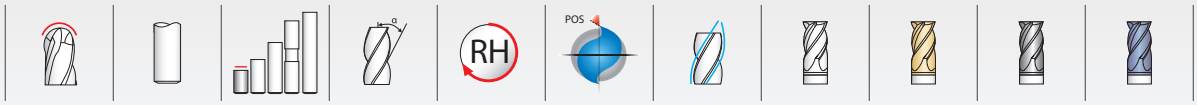
D_1 = +0.000/–0.002
D_2 = h_6

TECH INFO 115

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

inch				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/32	1/16	1-1/2	1/8	31502	31542	39652	31337
3/64	3/32	1-1/2	1/8	31504	31544	39654	31338
1/16	1/8	1-1/2	1/8	31506	31546	39656	31339
5/64	1/8	1-1/2	1/8	31508	31548	39658	31340
3/32	3/16	1-1/2	1/8	31510	31550	39660	31341
7/64	3/16	1-1/2	1/8	31512	31552	39662	31342
*1/8	1/4	1-1/2	1/8	31514	31554	39664	31343
9/64	5/16	2	3/16	31516	31556	39666	31344
5/32	5/16	2	3/16	31518	31558	39668	31345
11/64	5/16	2	3/16	31520	31560	39760	31346
*3/16	3/8	2	3/16	31522	31562	39672	31347
13/64	1/2	2-1/2	1/4	31524	31564	39674	31348
7/32	1/2	2-1/2	1/4	31526	31566	39676	31349
15/64	1/2	2-1/2	1/4	31528	31568	39678	31350
*1/4	1/2	2-1/2	1/4	31530	31570	39680	31351
9/32	1/2	2-1/2	5/16	31532	31572	39682	31352
*5/16	1/2	2-1/2	5/16	31534	31574	39684	31353
*3/8	9/16	2-1/2	3/8	31536	31576	39686	31354
7/16	9/16	2-3/4	7/16	31538	31578	39688	31355
*1/2	5/8	3	1/2	31540	31580	39690	31356
*Series 15B Set				31590	31582	39692	31357

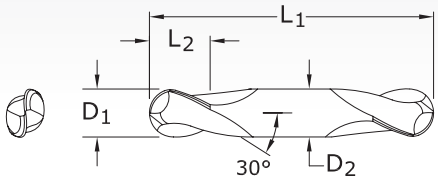
2 Flute Double End Ball End



TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6



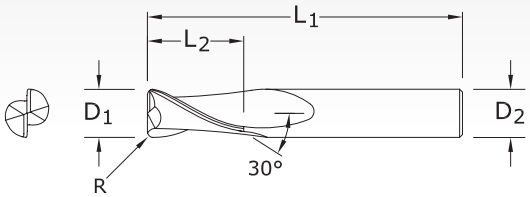
15MB
METRIC SERIES

TECH INFO 116

mm				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41506	49073	49094	49115
1,5	3,0	38,0	3,0	41510	49074	49095	49116
2,0	4,0	38,0	3,0	41514	49075	49096	49117
2,5	5,0	38,0	3,0	41518	49076	49097	49118
3,0	6,0	38,0	3,0	41522	49077	49098	49119
3,5	7,0	50,0	4,0	41526	49078	49099	49120
4,0	8,0	50,0	4,0	41530	49079	49100	49121
4,5	9,5	63,0	4,5	41534	49080	49101	49122
5,0	10,0	63,0	5,0	41538	49081	49102	49123
6,0	12,0	63,0	6,0	41542	49082	49103	49124
7,0	12,0	63,0	8,0	41546	49083	49104	49125
8,0	12,0	63,0	8,0	41550	49084	49105	49126
9,0	14,0	75,0	9,0	41554	49085	49106	49127
10,0	14,0	75,0	10,0	41558	49086	49107	49128
11,0	14,0	75,0	12,0	41562	49087	49108	49129
12,0	16,0	75,0	12,0	41566	49088	49109	49130

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

2 Flute Corner Radius



3CR
FRACTIONAL SERIES

TOLERANCES (inch)

D_1 = –0.001/–0.002
D_2 = h_6
R = +0.000/–0.002

TECH INFO 115

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

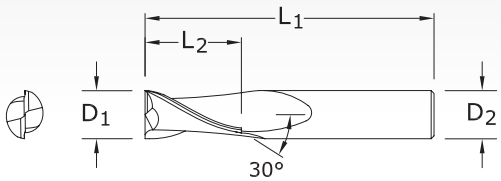
inch					EDP NO.			
NOMINAL CUTTING DIA. D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIA. D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/8	1/2	1-1/2	1/8	0.015	38201	38202	38315	38357
1/8	1/2	1-1/2	1/8	0.020	38203	38204	38316	38358
3/16	5/8	2	3/16	0.015	38209	38210	38317	38359
3/16	5/8	2	3/16	0.020	38211	38212	38318	38360
3/16	5/8	2	3/16	0.030	38213	38214	38319	38361
1/4	3/4	2-1/2	1/4	0.015	38219	38220	38320	38362
1/4	3/4	2-1/2	1/4	0.020	38221	38222	38321	38363
1/4	3/4	2-1/2	1/4	0.030	38223	38224	38322	38364
1/4	3/4	2-1/2	1/4	0.045	38225	38226	38323	38365
5/16	13/16	2-1/2	5/16	0.015	38231	38232	38324	38366
5/16	13/16	2-1/2	5/16	0.020	38233	38234	38325	38367
5/16	13/16	2-1/2	5/16	0.030	38235	38236	38326	38368
5/16	13/16	2-1/2	5/16	0.045	38237	38238	38327	38369
3/8	1	2-1/2	3/8	0.015	38245	38246	38328	38370
3/8	1	2-1/2	3/8	0.020	38247	38248	38329	38371
3/8	1	2-1/2	3/8	0.030	38249	38250	38330	38372
3/8	1	2-1/2	3/8	0.045	38251	38252	38331	38373
1/2	1	3	1/2	0.015	38259	38260	38332	38374
1/2	1	3	1/2	0.020	38261	38262	38333	38375
1/2	1	3	1/2	0.030	38263	38264	38334	38376
1/2	1	3	1/2	0.045	38265	38266	38335	38377
1/2	1	3	1/2	0.060	38267	38268	38336	38378
5/8	1-1/4	3-1/2	5/8	0.015	38273	38274	38337	38379
5/8	1-1/4	3-1/2	5/8	0.020	38275	38276	38338	38380
5/8	1-1/4	3-1/2	5/8	0.030	38277	38278	38339	38381
5/8	1-1/4	3-1/2	5/8	0.045	38279	38280	38340	38382
5/8	1-1/4	3-1/2	5/8	0.060	38281	38282	38341	38383
5/8	1-1/4	3-1/2	5/8	0.090	38283	38284	38342	38384
3/4	1-1/2	4	3/4	0.015	38287	38288	38343	38385
3/4	1-1/2	4	3/4	0.020	38289	38290	38344	38386
3/4	1-1/2	4	3/4	0.030	38291	38292	38345	38387
3/4	1-1/2	4	3/4	0.045	38293	38294	38346	38388
3/4	1-1/2	4	3/4	0.060	38295	38296	38347	38389
3/4	1-1/2	4	3/4	0.090	38297	38298	38348	38390
3/4	1-1/2	4	3/4	0.125	38299	38300	38349	38391
1	1-1/2	4	1	0.015	38301	38302	38350	38392
1	1-1/2	4	1	0.020	38303	38304	38351	38393
1	1-1/2	4	1	0.030	38305	38306	38352	38394
1	1-1/2	4	1	0.045	38307	38308	38353	38395
1	1-1/2	4	1	0.060	38309	38310	38354	38396
1	1-1/2	4	1	0.090	38311	38312	38355	38397
1	1-1/2	4	1	0.125	38313	38314	38356	38398

2 Flute High Shear End Mills

TOLERANCES (inch)

D_1 = +0.000/–0.002

D_2 = h_6



52
FRACTIONAL SERIES

TECH INFO 118

inch				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-C (TiCN)
1/16	3/16	1-1/2	1/8	35273	35300
3/32	3/8	1-1/2	1/8	35275	35301
1/8	7/16	1-1/2	1/8	35277	35302
5/32	9/16	2	3/16	35278	35303
3/16	9/16	2	3/16	35279	35304
7/32	5/8	2-1/2	1/4	35280	35305
1/4	3/4	2-1/2	1/4	35281	35306
9/32	3/4	2-1/2	5/16	35282	35307
5/16	13/16	2-1/2	5/16	35283	35308
3/8	7/8	2-1/2	3/8	35285	35309
7/16	1	2-3/4	7/16	35287	35310
1/2	1	3	1/2	35289	35311
9/16	1-1/8	3-1/2	9/16	35291	35312
5/8	1-1/4	3-1/2	5/8	35293	35313
3/4	1-1/2	4	3/4	35295	35314
1	1-1/2	4	1	35297	35315

NON-FERROUS

PLASTICS/COMPOSITES

TOLERANCES (mm)

D_1 = +0,000/–0,050

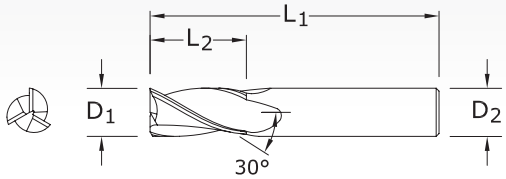
D_2 = h_6

52M
FRACTIONAL SERIES

TECH INFO 119

mm				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE-C (TiCN)
3,0	7,0	38,0	3,0	45277	49829
3,5	7,0	57,0	6,0	45279	49830
4,0	8,0	57,0	6,0	45281	49831
4,5	8,0	57,0	6,0	45283	49832
5,0	10,0	57,0	6,0	45285	49833
6,0	10,0	57,0	6,0	45287	49834
8,0	16,0	63,0	8,0	45289	49835
10,0	19,0	72,0	10,0	45291	49836
12,0	22,0	83,0	12,0	45293	49837
14,0	22,0	83,0	14,0	45295	49838
16,0	26,0	92,0	16,0	45297	49839
20,0	32,0	104,0	20,0	45299	49840

3 Flute Square End



5
FRACTIONAL SERIES

TOLERANCES (inch)
D_1 = +0.000/–0.002
D_2 = h_6

TECH INFO 115

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

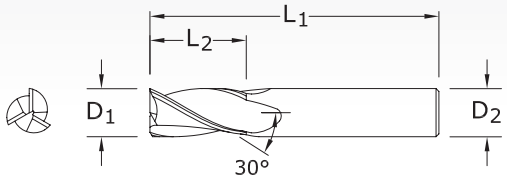
inch				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/64	1/32	1-1/2	1/8	30501	39701	30771	30811
1/32	5/64	1-1/2	1/8	30503	39703	30772	30812
3/64	7/64	1-1/2	1/8	30505	39705	30773	30813
1/16	3/16	1-1/2	1/8	30507	39707	30774	30814
5/64	3/16	1-1/2	1/8	30509	39709	30775	30815
3/32	9/32	1-1/2	1/8	30511	39711	30776	30816
7/64	3/8	1-1/2	1/8	30513	39713	30777	30817
1/8	3/8	1-1/2	1/8	30577	39777	30809	30849
1/8	1/2	1-1/2	1/8	30515	39715	30778	30818
9/64	1/2	2	3/16	30517	39717	30779	30819
5/32	1/2	2	3/16	30519	39719	30780	30820
11/64	5/8	2	3/16	30521	39721	30781	30821
3/16	5/8	2	3/16	30523	39723	30782	30822
13/64	5/8	2-1/2	1/4	30525	39725	30783	30823
7/32	5/8	2-1/2	1/4	30527	39727	30784	30824
15/64	3/4	2-1/2	1/4	30529	39729	30785	30825
1/4	3/4	2-1/2	1/4	30531	39731	30786	30826
17/64	3/4	2-1/2	5/16	30533	39733	30787	30827
9/32	3/4	2-1/2	5/16	30535	39735	30788	30828
19/64	13/16	2-1/2	5/16	30537	39737	30789	30829
5/16	13/16	2-1/2	5/16	30539	39739	30790	30830
21/64	1	2-1/2	3/8	30541	39741	30791	30831
11/32	1	2-1/2	3/8	30543	39743	30792	30832
23/64	1	2-1/2	3/8	30545	39745	30793	30833
3/8	1	2-1/2	3/8	30547	39747	30794	30834
25/64	1	2-3/4	7/16	30549	39749	30795	30835
13/32	1	2-3/4	7/16	30551	39751	30796	30836
27/64	1	2-3/4	7/16	30553	39753	30797	30837
7/16	1	2-3/4	7/16	30555	39755	30798	30838
29/64	1	3	1/2	30557	39757	30799	30839
15/32	1	3	1/2	30559	39759	30800	30840
31/64	1	3	1/2	30561	39761	30801	30841
1/2	1	3	1/2	30563	39763	30802	30842
9/16	1-1/8	3-1/2	9/16	30565	39765	30803	30843
5/8	1-1/4	3-1/2	5/8	30567	39767	30804	30844
11/16	1-3/8	4	3/4	30569	39769	30805	30845
3/4	1-1/2	4	3/4	30571	39771	30806	30846
7/8	1-1/2	4	7/8	30573	39773	30807	30847
1	1-1/2	4	1	30575	39775	30808	30848

3 Flute Square End

TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6



5M • 5XLM
METRIC SERIES

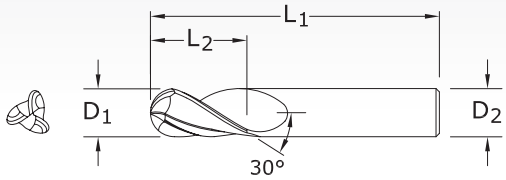
TECH INFO 116

mm				EDP NO.				SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40505	48756	48778	48799	5M
1,5	4,5	38,0	3,0	40509	48757	48779	48800	5M
2,0	6,3	38,0	3,0	40513	48758	48780	48801	5M
2,5	9,5	38,0	3,0	40517	48759	48781	48802	5M
3,0	12,0	38,0	3,0	40521	48760	48782	48803	5M
3,0	25,0	75,0	3,0	43501	49466	49479	49492	5XLM
3,5	12,0	50,0	4,0	40525	48761	48783	48804	5M
4,0	14,0	50,0	4,0	40529	48762	48784	48805	5M
4,0	25,0	75,0	4,0	43503	49467	49480	49493	5XLM
4,5	16,0	50,0	6,0	40533	48763	48785	48806	5M
5,0	16,0	50,0	6,0	40537	48764	48786	48807	5M
5,0	25,0	75,0	5,0	43507	49469	49482	49495	5XLM
6,0	19,0	50,0	6,0	40541	48765	48787	48808	5M
6,0	25,0	75,0	6,0	43505	49468	49481	49494	5XLM
7,0	19,0	63,0	8,0	40545	48766	48788	48809	5M
8,0	20,0	63,0	8,0	40549	48767	48789	48810	5M
8,0	25,0	75,0	8,0	43515	49470	49483	49496	5XLM
9,0	22,0	75,0	10,0	40553	48768	48790	48811	5M
10,0	22,0	75,0	10,0	40557	48769	48791	48812	5M
10,0	38,0	100,0	10,0	43525	49471	49484	49497	5XLM
11,0	25,0	75,0	12,0	40561	48770	48792	48813	5M
12,0	25,0	75,0	12,0	40565	48771	48793	48814	5M
12,0	50,0	100,0	12,0	43535	49472	49485	49498	5XLM
12,0	75,0	150,0	12,0	43545	49473	49486	49499	5XLM
14,0	32,0	89,0	14,0	40569	48772	48794	48815	5M
14,0	75,0	150,0	14,0	43555	49474	49487	49500	5XLM
16,0	32,0	89,0	16,0	40573	48773	48795	48816	5M
16,0	75,0	150,0	16,0	43565	49475	49488	49501	5XLM
18,0	38,0	100,0	18,0	40577	48774	48796	48817	5M
18,0	75,0	150,0	18,0	43575	49476	49489	49502	5XLM
20,0	38,0	100,0	20,0	40581	48775	48797	48818	5M
20,0	75,0	150,0	20,0	43585	49477	49490	49503	5XLM
25,0	38,0	100,0	25,0	40585	48776	48798	48819	5M
25,0	75,0	150,0	25,0	43595	49478	49491	49504	5XLM

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
NON-FERROUS
PLASTICS/COMPOSITES

3 Flute Ball End

5B
FRACTIONAL SERIES



TOLERANCES (inch)

D_1 = +0.000/–0.002
D_2 = h_6

TECH INFO 115

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

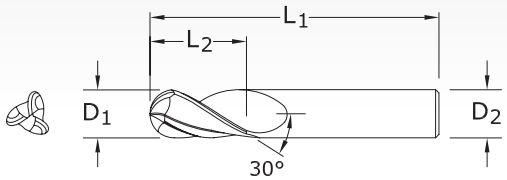
inch				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/64	1/32	1-1/2	1/8	30502	30851	30602	31130
1/32	5/64	1-1/2	1/8	30504	30852	30604	31131
3/64	7/64	1-1/2	1/8	30506	30853	30606	31132
1/16	3/16	1-1/2	1/8	30508	30854	30608	31133
5/64	3/16	1-1/2	1/8	30510	30855	30610	31134
3/32	9/32	1-1/2	1/8	30512	30856	30612	31135
7/64	3/8	1-1/2	1/8	30514	30857	30902	31136
1/8	3/8	1-1/2	1/8	30578	30889	30943	31168
1/8	1/2	1-1/2	1/8	30516	30858	30904	31137
9/64	1/2	2	3/16	30518	30859	30906	31138
5/32	1/2	2	3/16	30520	30860	30908	31139
11/64	5/8	2	3/16	30522	30861	30910	31140
3/16	5/8	2	3/16	30524	30862	30912	31141
13/64	5/8	2-1/2	1/4	30526	30863	30914	31142
7/32	5/8	2-1/2	1/4	30528	30864	30916	31143
15/64	3/4	2-1/2	1/4	30530	30865	30918	31144
1/4	3/4	2-1/2	1/4	30532	30866	30920	31145
17/64	3/4	2-1/2	5/16	30534	30867	30921	31146
9/32	3/4	2-1/2	5/16	30536	30868	30922	31147
19/64	13/16	2-1/2	5/16	30538	30869	30923	31148
5/16	13/16	2-1/2	5/16	30540	30870	30924	31149
21/64	1	2-1/2	3/8	30542	30871	30925	31150
11/32	1	2-1/2	3/8	30544	30872	30926	31151
23/64	1	2-1/2	3/8	30546	30873	30927	31152
3/8	1	2-1/2	3/8	30548	30874	30928	31153
25/64	1	2-3/4	7/16	30550	30875	30929	31154
13/32	1	2-3/4	7/16	30552	30876	30930	31155
27/64	1	2-3/4	7/16	30554	30877	30931	31156
7/16	1	2-3/4	7/16	30556	30878	30932	31157
29/64	1	3	1/2	30558	30879	30933	31158
15/32	1	3	1/2	30560	30880	30934	31159
31/64	1	3	1/2	30562	30881	30935	31160
1/2	1	3	1/2	30564	30882	30936	31161
9/16	1-1/8	3-1/2	9/16	30566	30883	30937	31162
5/8	1-1/4	3-1/2	5/8	30568	30884	30938	31163
11/16	1-3/8	4	3/4	30570	30885	30939	31164
3/4	1-1/2	4	3/4	30572	30886	30940	31165
7/8	1-1/2	4	7/8	30574	30887	30941	31166
1	1-1/2	4	1	30576	30888	30942	31167
*Series 5B Set				30590	30900	30944	31169

3 Flute Ball End

TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6



5MB • 5XLMB

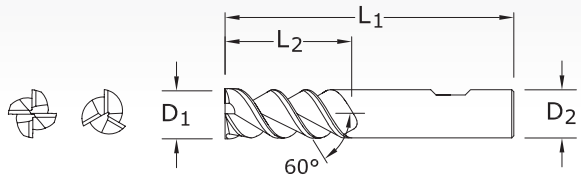
METRIC SERIES

TECH INFO 116

mm				EDP NO.				SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	
1,0	4,0	38,0	3,0	40506	48820	48842	48863	5MB
1,5	4,5	38,0	3,0	40510	48821	48843	48864	5MB
2,0	6,3	38,0	3,0	40514	48822	48844	48865	5MB
2,5	9,5	38,0	3,0	40518	48823	48845	48866	5MB
3,0	12,0	38,0	3,0	40522	48824	48846	48867	5MB
3,0	25,0	75,0	3,0	43502	49583	49596	49609	5XLMB
3,5	12,0	50,0	4,0	40526	48825	48847	48868	5MB
4,0	14,0	50,0	4,0	40530	48826	48848	48869	5MB
4,0	25,0	75,0	4,0	43504	49584	49597	49610	5XLMB
4,5	16,0	50,0	6,0	40534	48827	48849	48870	5MB
5,0	16,0	50,0	6,0	40538	48828	48850	48871	5MB
5,0	25,0	75,0	5,0	43508	49586	49599	49612	5XLMB
6,0	19,0	50,0	6,0	40542	48829	48851	48872	5MB
6,0	25,0	75,0	6,0	43506	49585	49598	49611	5XLMB
7,0	19,0	63,0	8,0	40546	48830	48852	48873	5MB
8,0	20,0	63,0	8,0	40550	48831	48853	48874	5MB
8,0	25,0	75,0	8,0	43516	49587	49600	49613	5XLMB
9,0	22,0	75,0	10,0	40554	48832	48854	48875	5MB
10,0	22,0	75,0	10,0	40558	48833	48855	48876	5MB
10,0	38,0	100,0	10,0	43526	49588	49601	49614	5XLMB
11,0	25,0	75,0	12,0	40562	48834	48856	48877	5MB
12,0	25,0	75,0	12,0	40566	48835	48857	48878	5MB
12,0	50,0	100,0	12,0	43536	49589	49602	49615	5XLMB
12,0	75,0	150,0	12,0	43546	49590	49603	49616	5XLMB
14,0	32,0	89,0	14,0	40570	48836	48858	48879	5MB
14,0	75,0	150,0	14,0	43556	49591	49604	49617	5XLMB
16,0	32,0	89,0	16,0	40574	48837	48859	48880	5MB
16,0	75,0	150,0	16,0	43566	49592	49605	49618	5XLMB
18,0	38,0	100,0	18,0	40578	48838	48860	48881	5MB
18,0	75,0	150,0	18,0	43576	49593	49606	49619	5XLMB
20,0	38,0	100,0	20,0	40582	48839	48861	48882	5MB
20,0	75,0	150,0	20,0	43586	49594	49607	49620	5XLMB
25,0	38,0	100,0	25,0	40586	48840	48862	48883	5MB
25,0	75,0	150,0	25,0	43596	49595	49608	49621	5XLMB

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
NON-FERROUS
PLASTICS/COMPOSITES

High Helix End Mills



60
FRACTIONAL SERIES

TECH INFO 120

inch					EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/8	1/2	2-1/2	1/4	3	36001	32169	32180	32220
3/16	5/8	2-1/2	1/4	3	36003	32170	32181	32221
1/4	3/4	2-1/2	1/4	3	36005	32171	32182	32222
5/16	13/16	2-1/2	5/16	3	36007	32172	32183	32223
3/8	1	2-1/2	3/8	3	36009	32173	32184	32224
7/16	1	3	7/16	3	36011	32174	32185	32225
1/2	1	3	1/2	3	36013	32175	32186	32226
9/16	1-1/4	3-1/2	9/16	3	36015	32176	32187	32227
5/8	1-1/4	3-1/2	5/8	3	36017	32177	32188	32228
3/4	1-1/2	4	3/4	4	36023	32191	32193	32231
1	1-1/2	4	1	4	36025	32192	32194	32232

STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM

TOLERANCES (inch)

D_1 = +0.000/–0.002
D_2 = h_6

60M
METRIC SERIES

TECH INFO 120

mm					EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
3,0	8,0	57,0	6,0	3	46001	46002	43940	43960
4,0	11,0	57,0	6,0	3	46003	46006	43941	43961
5,0	13,0	57,0	6,0	3	46004	46010	43942	43962
6,0	13,0	57,0	6,0	3	46005	46011	43943	43963
8,0	19,0	69,0	10,0	3	46009	46012	43944	43964
10,0	22,0	72,0	10,0	3	46013	46014	43945	43965
12,0	26,0	83,0	12,0	3	46017	46018	43946	43966
16,0	32,0	92,0	16,0	4	46021	46022	43947	43967
20,0	38,0	104,0	20,0	4	46025	46026	43948	43968

TOLERANCES (inch)

3 DIAMETER
D_1 = +0,000/–0,040
D_2 = h_6

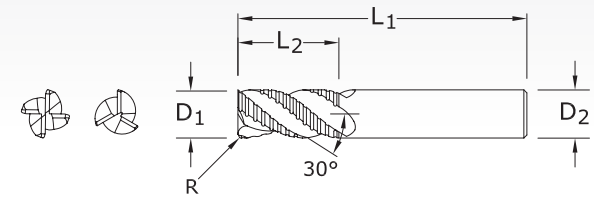
>3–6 DIAMETER
D_1 = +0,000/–0,048
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,000/–0,058
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,000/–0,070
D_2 = h_6

>18–20 DIAMETER
D_1 = +0,000/–0,084
D_2 = h_6

Single End Roughers



TOLERANCES (inch)

D_1 = +0.000/–0.004
D_2 = h_6
R = +0.005/–0.005

61
FRACTIONAL SERIES

TECH INFO 121

inch						EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	NO. OF FLUTES	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/4*	3/4	2-1/2	1/4	.045	3	36107	36106	36110
5/16*	3/4	2-1/2	5/16	.045	3	36109	36108	36111
3/8	7/8	2-1/2	3/8	.060	3	36113	36112	36114
1/2	1	3	1/2	.060	4	36117	36116	36118
5/8	1-1/4	3-1/2	5/8	.060	4	36121	36120	36222
3/4	1-5/8	4	3/4	.060	4	36125	36124	36126
1	1-3/4	4	1	.060	5	36129	36128	36130

*Without Flat

STEELS
STAINLESS STEELS
CAST IRON

TOLERANCES h10 (mm)

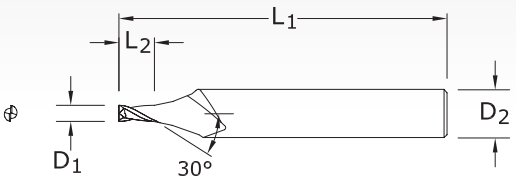
D_1 = +0,000/–0,100
D_2 = h_6
R = +0,127/–0,127

61M
METRIC SERIES

TECH INFO 122

mm						EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	NO. OF FLUTES	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
6,0	19,0	63,0	6,0	1,14	3	46107	46106	46110
8,0	19,0	63,0	8,0	1,14	3	46109	46108	46111
10,0	22,0	72,0	10,0	1,52	3	46113	46112	46114
12,0	26,0	83,0	12,0	1,52	4	46117	46116	46118
16,0	32,0	92,0	16,0	1,52	4	46121	46120	46122
20,0	38,0	104,0	20,0	1,52	4	46129	46128	46132
25,0	44,0	104,0	25,0	1,52	5	46131	46130	46133

Micro End Mills



MK2
FRACTIONAL SERIES

TECH INFO 123

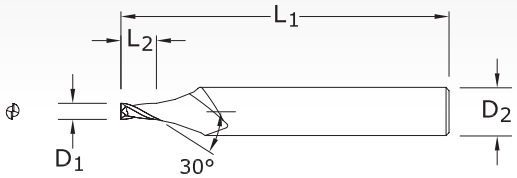
TOLERANCES (inch)

D_1 = +/–0.0005

D_2 = h_6

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

inch				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED
0.008	0.012	1-1/2	1/8	39208
0.009	0.014	1-1/2	1/8	39209
0.010	0.015	1-1/2	1/8	39210
0.011	0.017	1-1/2	1/8	39211
0.012	0.018	1-1/2	1/8	39212
0.013	0.020	1-1/2	1/8	39213
0.014	0.021	1-1/2	1/8	39214
0.015	0.023	1-1/2	1/8	39215
0.016	0.024	1-1/2	1/8	39216
0.017	0.026	1-1/2	1/8	39217
0.018	0.027	1-1/2	1/8	39218
0.019	0.029	1-1/2	1/8	39219
0.020	0.030	1-1/2	1/8	39220
0.021	0.032	1-1/2	1/8	39221
0.022	0.033	1-1/2	1/8	39222
0.023	0.035	1-1/2	1/8	39223
0.024	0.036	1-1/2	1/8	39224
0.025	0.038	1-1/2	1/8	39225
0.026	0.039	1-1/2	1/8	39226
0.027	0.041	1-1/2	1/8	39227
0.028	0.042	1-1/2	1/8	39228
0.029	0.044	1-1/2	1/8	39229
0.030	0.045	1-1/2	1/8	39230
0.031	0.047	1-1/2	1/8	39231
0.035	0.053	1-1/2	1/8	39235
0.040	0.060	1-1/2	1/8	39240
0.047	0.071	1-1/2	1/8	39247
0.050	0.075	1-1/2	1/8	39250
0.055	0.083	1-1/2	1/8	39255
0.060	0.090	1-1/2	1/8	39260



TOLERANCES (mm)

D_1 = +/–0,013

D_2 = h_6

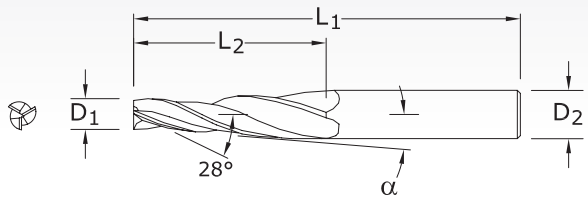
MK2M
METRIC SERIES

TECH INFO 124

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED
0,20	0,30	38,0	3,17	39208
0,23	0,36	38,0	3,17	39209
0,25	0,38	38,0	3,17	39210
0,28	0,43	38,0	3,17	39211
0,30	0,46	38,0	3,17	39212
0,33	0,51	38,0	3,17	39213
0,36	0,53	38,0	3,17	39214
0,38	0,58	38,0	3,17	39215
0,41	0,61	38,0	3,17	39216
0,43	0,66	38,0	3,17	39217
0,46	0,69	38,0	3,17	39218
0,48	0,74	38,0	3,17	39219
0,51	0,76	38,0	3,17	39220
0,53	0,81	38,0	3,17	39221
0,56	0,84	38,0	3,17	39222
0,58	0,89	38,0	3,17	39223
0,61	0,91	38,0	3,17	39224
0,63	0,96	38,0	3,17	39225
0,66	0,99	38,0	3,17	39226
0,69	1,04	38,0	3,17	39227
0,71	1,07	38,0	3,17	39228
0,74	1,12	38,0	3,17	39229
0,76	1,14	38,0	3,17	39230
0,79	1,19	38,0	3,17	39231
0,89	1,35	38,0	3,17	39235
1,02	1,52	38,0	3,17	39240
1,19	1,80	38,0	3,17	39247
1,27	1,90	38,0	3,17	39250
1,40	2,11	38,0	3,17	39255
1,52	2,29	38,0	3,17	39260

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

Tapered Square End



23
FRACTIONAL SERIES

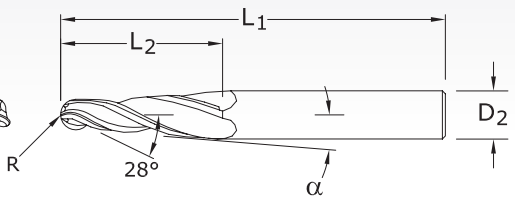
TOLERANCES (inch)
D_1 = +0.001/–0.002
D_2 = h_6

TECH INFO 115

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

inch					EDP NO.			
SHANK DIAMETER D_2	CENTER LINE ANGLE	SMALL DIAMETER D_1	APPROX. LENGTH OF CUT L_2	OVERALL LENGTH L_1	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/4	1°	1/8	1-1/2	3	32301	32370	32302	32345
1/4	1°30'	1/8	1-1/2	3	32303	32371	32304	32346
1/4	2°	1/8	1-1/4	3	32305	32372	32306	32347
1/4	3°	1/8	1	3	32307	32373	32308	32348
1/4	5°	1/8	3/4	3	32309	32374	32310	32349
1/4	7°	1/8	1/2	3	32311	32375	32312	32350
1/4	10°	3/32	1/2	3	32313	32376	32314	32351
3/8	1°	3/16	1-3/4	3-1/2	32315	32377	32316	23252
3/8	1°30'	3/16	1-3/4	3-1/2	32317	32378	32318	32353
3/8	2°	3/16	1-3/4	3-1/2	32319	32379	32320	32354
3/8	3°	5/32	1-3/4	3-1/2	32321	32380	32322	32355
3/8	5°	1/8	1-1/2	3-1/2	32323	32381	32324	32356
3/8	7°	1/8	1	3-1/2	32325	32382	32326	32357
3/8	10°	1/8	3/4	3-1/2	32327	32383	32328	32358
1/2	2°	1/4	2	4	32329	32384	32330	32359
1/2	2°	1/4	2	4	32333	32385	323324	32360
1/2	3°	1/4	2	4	32335	32386	32336	32361
1/2	5°	1/4	1-1/4	4	32337	32387	32388	32362
1/2	5°	1/4	1-1/4	4	32339	32388	32340	32363
1/2	10°	1/8	1	4	32341	32389	32342	32364

Tapered Radius End



TOLERANCES (inch)

D_2 = h_6

R = +0.0005/–0.0010

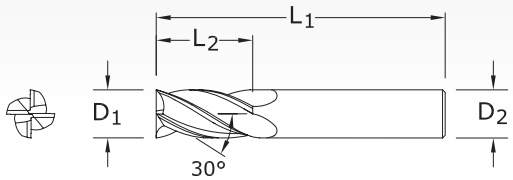
24
FRACTIONAL SERIES

TECH INFO 115

inch					EDP NO.			
SHANK DIAMETER D_2	CENTER LINE ANGLE	RADIUS R	LENGTH OF CUT L_2	OVERALL LENGTH L_1	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/4	1°	0.062	1-1/2	3	32402	32403	32445	32470
1/4	1°30'	0.062	1-1/2	3	32404	32405	32446	32471
1/4	2°	0.062	1-1/4	3	32406	32407	32447	32472
1/4	3°	0.062	1	3	32408	32409	32448	32473
1/4	5°	0.062	3/4	3	32410	32411	32449	32474
1/4	7°	0.062	1/2	3	32412	32413	32450	32475
1/4	10°	0.047	1/2	3	32414	32415	32451	32476
3/8	1°	0.093	1-3/4	3-1/2	32416	32417	32452	32477
3/8	1°30'	0.093	1-3/4	3-1/2	32418	32419	32453	32478
3/8	2°	0.093	1-3/4	3-1/2	32420	32421	32454	32479
3/8	3°	0.078	1-3/4	3-1/2	32422	32423	32455	32480
3/8	5°	0.062	1-1/2	3-1/2	32424	32425	32456	32481
3/8	7°	0.062	1	3-1/2	32426	32427	32457	32482
3/8	10°	0.062	3/4	3-1/2	32428	32429	32458	32483
1/2	1°	0.125	2	4	32430	32431	32459	32484
1/2	2°	0.125	2	4	32434	32435	32460	32485
1/2	3°	0.125	2	4	32436	32437	32461	32486
1/2	5°	0.125	1-1/4	4	32438	32439	32462	32487
1/2	7°	0.093	1-1/4	4	32440	32441	32463	32488
1/2	10°	0.062	1	4	32442	32443	32464	32489

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
NON-FERROUS
PLASTICS/COMPOSITES

End Mills Sets



CUTTING DIAMETER D_1	SINGLE END LENGTH OF CUT L_2	DOUBLE END LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2
1/8	1/2	1/4	1-1/2	1/8
3/16	5/8	3/8	2	3/16
1/4	3/4	1/2	2-1/2	1/4
5/16	13/16	1/2	2-1/2	5/16
3/8	1	9/16	2-1/2	3/8
1/2	1	5/8	3	1/2

Square End

FRACTIONAL SERIES

DESCRIPTION	EDP NO.			
	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
Series 1 – 4 Flute, Single End	30189	39189	39089	30030
Series 3 – 2 Flute, Single End	30389	39389	39589	30470
Series 5 – 3 Flute, Single End	30589	39789	30810	30850
Series 14 – 4 Flute, Double End	31489	31481	39641	31190
Series 15 – 2 Flute, Double End	31589	31581	39691	31336

Ball End

FRACTIONAL SERIES

DESCRIPTION	EDP NO.			
	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
Series 1B – 4 Flute, Single End	30190	39109	39090	30070
Series 3B – 2 Flute, Single End	30390	39390	39590	30600
Series 5B – 3 Flute, Single End	30590	30900	30944	31169
Series 14B – 4 Flute, Double End	31490	31482	39642	31217
Series 15B – 2 Flute, Double End	31590	31582	39692	31357

Speed & Feed Recommendations

1, 3, 5, 14, 15, 16, 17, 23, 24, 59 Fractional	HARDNESS	CUT	SPEED (sfm)				FEED (inch/flute)								
	BRINELL	Type	AlTiN	TiCN	TiN	non	1/64	1/32	1/16	1/8	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 10L50, 1525, 1536	≤ 175	Slot	335	320	305	255	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
		Profile	460	440	420	350	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
		Light	685	660	635	530	0.00007	0.00014	0.00029	0.0007	0.0018	0.0034	0.0046	0.0055	0.0064
ALLOY STEEL 4140, 4150, 4340, 5150, 8630	≤ 275	Slot	245	235	225	190	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
		Profile	335	325	310	260	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
		Light	505	485	465	390	0.00005	0.00011	0.00022	0.0005	0.0014	0.0026	0.0034	0.0041	0.0048
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Slot	230	220	210	175	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
		Profile	315	305	290	240	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
		Light	470	455	435	365	0.00005	0.00011	0.00022	0.0005	0.0014	0.0026	0.0034	0.0041	0.0048
CAST IRON Gray, Malleable, Ductile	≤ 220	Slot	245	235	225	190	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
		Profile	335	325	310	260	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
		Light	505	485	465	390	0.00007	0.00014	0.00029	0.0007	0.0018	0.0034	0.0046	0.0055	0.0064
STAINLESS (free machining) 303, 420F, 440F	≤ 275	Slot	270	260	250	210	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
		Profile	370	360	345	285	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
		Light	560	535	515	430	0.00005	0.00011	0.00022	0.0005	0.0014	0.0026	0.0034	0.0041	0.0048
STAINLESS (difficult) 304, 316, 17-4PH	≤ 275	Slot	185	180	175	145	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
		Profile	255	250	240	200	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
		Light	385	370	355	295	0.00004	0.00009	0.00017	0.0004	0.0011	0.0021	0.0028	0.0033	0.0039
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V	≤ 350	Slot	130	125	120	100	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
		Profile	180	170	165	140	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
		Light	270	260	250	205	0.00004	0.00009	0.00017	0.0004	0.0011	0.0021	0.0028	0.0033	0.0039
HIGH TEMPERATURE ALLOY Incoloy, Inconel, Rene, Waspalloy	≤ 300	Slot	45	45	45	35	0.00002	0.00003	0.00006	0.0002	0.0004	0.0008	0.0010	0.0012	0.0014
		Profile	65	60	60	50	0.00002	0.00003	0.00006	0.0002	0.0004	0.0008	0.0010	0.0012	0.0014
		Light	95	95	90	75	0.00004	0.00007	0.00014	0.0003	0.0009	0.0017	0.0023	0.0028	0.0032
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 150	Slot	–	640	–	640	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
		Profile	–	880	–	880	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
		Light	–	1320	–	1320	0.00014	0.00029	0.00057	0.0014	0.0037	0.0069	0.0092	0.0110	0.0128
COPPER ALLOY Aluminum Bronze, C110, Muntz Brass	≤ 140	Slot	–	350	–	350	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
		Profile	–	485	–	485	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
		Light	–	725	–	725	0.00007	0.00014	0.00029	0.0007	0.0018	0.0034	0.0046	0.0055	0.0064
PLASTIC Polycarbonate, PVC, Polypropylene		Slot	–	640	–	640	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
		Profile	–	880	–	880	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
		Light	–	1320	–	1320	0.00014	0.00029	0.00057	0.0014	0.0037	0.0069	0.0092	0.0110	0.0128
GRAPHITE		Slot	–	480	–	480	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
		Profile	–	660	–	660	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
		Light	–	990	–	990	0.00014	0.00029	0.00057	0.0014	0.0037	0.0069	0.0092	0.0110	0.0128

CUT TYPE					
SLOT			PROFILE		LIGHT*
4 flute Rw = D_1 Ad = .4 x D_1	3 flute Rw = D_1 Ad = .5 x D_1	2 flute Rw = D_1 Ad = D_1	4, 3 flute Rw = .25 x D_1 Ad = 1.5 x D_1	2 flute Rw = .5 x D_1 Ad = 1.5 x D_1	6, 4, 3, 2 flute Rw = .05 x D_1 Ad = 1.5 x D_1
					

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x no. of flutes x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed
- for tapered end mills, base the speed on the largest diameter contacting the workpiece, and the feed on the smallest diameter
- limit cut depths of long flute, extra long flute, and straight flute to .05 x D_1 Ad for Slot or Rw for Profile

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

1M, 3M, 5M, 14M, 15M, 16M, 17M, 59M Metric	HARDNESS	CUT	SPEED (m/min)				FEED (mm/flute)								
	BRINELL	Type	AlTiN	TiCN	TiN	non	0.40	0.75	1.5	3	6	10	12	20	25
CARBON STEEL 1018, 1040, 1080, 10L50, 1525, 1536	≤ 225	Slot	101	98	94	78	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
		Profile	140	134	129	107	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
		Light	209	201	193	161	0.0018	0.0034	0.0070	0.017	0.043	0.091	0.110	0.147	0.160
ALLOY STEEL 4140, 4150, 4340, 5150, 8630	≤ 275	Slot	74	72	69	57	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
		Profile	102	98	94	79	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
		Light	154	148	142	118	0.0013	0.0027	0.0053	0.012	0.034	0.069	0.082	0.109	0.120
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Slot	70	67	64	54	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
		Profile	96	92	88	74	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
		Light	144	138	133	111	0.0013	0.0027	0.0053	0.012	0.034	0.069	0.082	0.109	0.120
CAST IRON Gray, Malleable, Ductile	≤ 200	Slot	74	72	69	57	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
		Profile	102	98	94	79	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
		Light	154	148	142	118	0.0018	0.0034	0.0070	0.017	0.043	0.091	0.110	0.147	0.160
STAINLESS (free machining) 303, 420F, 440F	≤ 185	Slot	82	79	76	63	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
		Profile	113	109	105	87	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
		Light	170	163	157	131	0.0013	0.0027	0.0053	0.012	0.034	0.069	0.082	0.109	0.120
STAINLESS (difficult) 304, 316, 17-4PH	≤ 185	Slot	57	55	53	44	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
		Profile	78	76	73	60	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
		Light	118	113	109	91	0.0010	0.0022	0.0041	0.010	0.026	0.056	0.067	0.088	0.097
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V	≤ 350	Slot	40	38	37	30	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
		Profile	55	52	50	42	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
		Light	82	79	76	63	0.0010	0.0022	0.0041	0.010	0.026	0.056	0.067	0.088	0.097
HIGH TEMPERATURE ALLOY Incoloy, Inconel, Rene, Waspalloy	≤ 300	Slot	14	14	13	11	0.0005	0.0007	0.0014	0.004	0.010	0.021	0.024	0.032	0.035
		Profile	20	19	18	15	0.0005	0.0007	0.0014	0.004	0.010	0.021	0.024	0.032	0.035
		Light	30	28	27	23	0.0010	0.0017	0.0034	0.008	0.022	0.045	0.055	0.075	0.080
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 150	Slot	–	195	–	195	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
		Profile	–	268	–	268	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
		Light	–	402	–	402	0.0036	0.0071	0.0137	0.033	0.089	0.184	0.221	0.293	0.320
COPPER ALLOY Aluminum Bronze, C110, Muntz Brass	≤ 140	Slot	–	107	–	107	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
		Profile	–	148	–	148	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
		Light	–	221	–	221	0.0018	0.0034	0.0070	0.017	0.043	0.091	0.110	0.147	0.160
PLASTIC Polycarbonate, PVC, Polypropylene		Slot	–	195	–	195	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
		Profile	–	268	–	268	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
		Light	–	402	–	402	0.0036	0.0071	0.0137	0.033	0.089	0.184	0.221	0.293	0.320
GRAPHITE		Slot	–	146	–	146	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
		Profile	–	201	–	201	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
		Light	–	302	–	302	0.0036	0.0071	0.0137	0.033	0.089	0.184	0.221	0.293	0.320

CUT TYPE					
SLOT			PROFILE		LIGHT*
4 flute Rw = D_1 Ad = .4 x D_1	3 flute Rw = D_1 Ad = .5 x D_1	2 flute Rw = D_1 Ad = D_1	4, 3 flute Rw = .25 x D_1 Ad = 1.5 x D_1	2 flute Rw = .5 x D_1 Ad = 1.5 x D_1	4, 3, 2 flute Rw = .05 x D_1 Ad = 1.5 x D_1
					

rpm = (1000 x m/min) / (3.14 x D_1)
mm/min = (mm/flute) x no. of flutes x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed
- limit cut depths of long flute, extra long flute, and straight flute to .05 x D_1 Ad for Slot or Rw for Profile

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

Diamond 1, 1B, 3, 3B Fractional	CUT	SPEED	FEED (inch/flute)				
	Type	sfm	1/8	1/4	5/16	3/8	1/2
ALUMINUM DIE CAST ALLOY* (High Silicon) A-390, A-392, B-390	Slot	290	0.00060	0.0016	0.0025	0.0030	0.0040
	Profile	360	0.00069	0.0018	0.0029	0.0035	0.0046
	Light	400	0.00138	0.0037	0.0057	0.0069	0.0092
CERAMIC* Machinable	Slot	30	0.00030	0.0008	0.0013	0.0015	0.0020
	Profile	40	0.00035	0.0009	0.0014	0.0017	0.0023
	Light	60	0.00069	0.0018	0.0029	0.0034	0.0046
GRAPHITE Ultrafine, Superfine	Slot	580	0.00075	0.0020	0.0031	0.0038	0.0050
	Profile	720	0.00087	0.0023	0.0036	0.0043	0.0058
	Light	800	0.00172	0.0046	0.0072	0.0086	0.0115
COMPOSITE FRP, CFRP, GRP	Slot	350	0.00045	0.0012	0.0019	0.0023	0.0030
	Profile	385	0.00052	0.0014	0.0022	0.0026	0.0035
	Light	580	0.00103	0.0028	0.0043	0.0052	0.0069
PLASTIC G10, PVC, PEEK, Phenolic	Slot	960	0.00075	0.0020	0.0031	0.0038	0.0050
	Profile	1200	0.00087	0.0023	0.0036	0.0043	0.0058
	Light	1320	0.00172	0.0046	0.0072	0.0086	0.0115

CUT TYPE		
SLOT	PROFILE	LIGHT*
Rw = D_1 Ad = D_1	Rw = .25 x D_1 Ad = 1.5 x D_1	Rw = .05 x D_1 Ad = 1.5 x D_1
		

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x no. of flutes x rpm

*Diamond not intended for Aluminum Alloys or Ceramics

- maximum recommended depths shown
- limit cut depths of long flute and extra long flute to .05 x D_1 Ad for Slot or Rw for Profile

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

52, 54 Fractional	CUT	SPEED	FEED (inch/flute)					
	Type	sfm	1/8	1/4	3/8	1/2	3/4	1
ALUMINUM ALLOY 2024, 5052, 5086, 6061, 6063, 7075	Slot	1090	0.00063	0.0017	0.0032	0.0042	0.0050	0.0059
	Profile	1360	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
	Light	2245	0.00145	0.0039	0.0072	0.0096	0.0116	0.0135
ALUMINUM DIE CAST ALLOY (High Silicon) A-390, A-392, B-390	Slot	410	0.00063	0.0017	0.0032	0.0042	0.0050	0.0059
	Profile	510	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
	Light	840	0.00145	0.0039	0.0072	0.0096	0.0116	0.0135
COPPER ALLOY Aluminum Bronze, Muntz Brass, Naval Brass, Red Brass	Slot	475	0.00036	0.0010	0.0018	0.0024	0.0029	0.0034
	Profile	590	0.00039	0.0010	0.0020	0.0026	0.0031	0.0037
	Light	980	0.00083	0.0022	0.0041	0.0055	0.0066	0.0077
COPPER ALLOY Beryllium Copper, C110, Manganese Bronze, Tin Bronze	Slot	190	0.00036	0.0010	0.0018	0.0024	0.0029	0.0034
	Profile	235	0.00039	0.0010	0.0020	0.0026	0.0031	0.0037
	Light	390	0.00083	0.0022	0.0041	0.0055	0.0066	0.0077
PLASTIC ABS, Polycarbonate, PVC, Polypropylene	Slot	1280	0.00100	0.0027	0.0051	0.0068	0.0082	0.0095
	Profile	1600	0.00110	0.0030	0.0056	0.0074	0.0089	0.0100
	Light	2640	0.00230	0.0062	0.0117	0.0156	0.0187	0.0220
PLASTIC Fiberglass, Glass Filled	Slot	575	0.00075	0.0020	0.0038	0.0050	0.0060	0.0070
	Profile	720	0.00082	0.0022	0.0041	0.0055	0.0065	0.0076
	Light	1185	0.00172	0.0046	0.0086	0.0115	0.0138	0.0016

CUT TYPE			
SLOT		PROFILE	LIGHT*
Series 52 Rw = D_1 Ad = D_1	Series 54 Rw = D_1 Ad = .25 x D_1	Series 52, 54 Rw = .3 x D_1 Ad = 1.5 X D_1	Series 52, 54 Rw = .05 x D_1 Ad = 1.5 x D_1
			

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x 6 x rpm

- maximum recommended depths shown
- * finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

52M, 54M Metric	CUT	SPEED	FEED (mm/flute)					
	Type	m/min	3	6	10	12	20	25
ALUMINUM ALLOY 2024, 5052, 5086, 6061, 6063, 7075	Slot	330	0.0151	0.041	0.085	0.101	0.133	0.148
	Profile	415	0.0166	0.043	0.091	0.110	0.147	0.160
	Light	685	0.0348	0.094	0.192	0.230	0.309	0.338
ALUMINUM DIE CAST ALLOY (High Silicon) A-390, A-392, B-390	Slot	125	0.0151	0.041	0.085	0.101	0.133	0.148
	Profile	155	0.0166	0.043	0.091	0.110	0.147	0.160
	Light	255	0.0348	0.094	0.192	0.230	0.309	0.338
COPPER ALLOY Aluminum Bronze, Muntz Brass, Naval Brass, Red Brass	Slot	145	0.0086	0.024	0.048	0.058	0.077	0.085
	Profile	180	0.0094	0.024	0.053	0.062	0.083	0.093
	Light	300	0.0199	0.053	0.109	0.132	0.176	0.193
COPPER ALLOY Beryllium Copper, C110, Manganese Bronze, Tin Bronze	Slot	60	0.0086	0.024	0.048	0.058	0.077	0.085
	Profile	70	0.0094	0.024	0.053	0.062	0.083	0.093
	Light	120	0.0199	0.053	0.109	0.132	0.176	0.193
PLASTIC ABS, Polycarbonate, PVC, Polypropylene	Slot	390	0.0240	0.065	0.136	0.163	0.219	0.238
	Profile	490	0.0264	0.072	0.149	0.178	0.237	0.250
	Light	805	0.0552	0.149	0.312	0.374	0.499	0.550
PLASTIC Fiberglass, Glass Filled	Slot	175	0.0180	0.048	0.101	0.120	0.160	0.175
	Profile	220	0.0197	0.053	0.109	0.132	0.173	0.190
	Light	360	0.0413	0.110	0.229	0.276	0.368	0.040

CUT TYPE			
SLOT		PROFILE	LIGHT*
Series 52 Rw = D_1 Ad = D_1	Series 54 Rw = D_1 Ad = .25 x D_1	Series 52, 54 Rw = .3 x D_1 Ad = 1.5 X D_1	Series 52, 54 Rw = .05 x D_1 Ad = 1.5 x D_1
			

rpm = (1000 x m/min) / (3.14 x D_1)
mm/min = (mm/flute) x 6 x rpm

- maximum recommended depths shown
- * finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

60 Fractional	HARDNESS	CUT	SPEED (sfm)				FEED (inch/flute)					
	BRINELL	Type	AlTiN	TiCN	TiN	non	1/8	1/4	3/8	1/2	3/4	1
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 185	Profile	395	380	365	300	.00050	.0015	.0025	.0035	.0040	.0045
		Light	650	625	600	500	.00100	.0030	.0050	.0070	.0085	.0095
	> 185 ≤ 275	Profile	370	360	345	285	.00050	.0015	.0025	.0035	.0040	.0045
		Light	615	590	565	470	.00100	.0030	.0050	.0070	.0085	.0095
STAINLESS (difficult) 304, 316, 15-5PH, 17-4PH	≤ 185	Profile	315	300	290	240	.00040	.0010	.0020	.0025	.0030	.0035
		Light	520	500	480	400	.00085	.0020	.0040	.0055	.0065	.0075
	> 185 ≤ 325	Profile	235	225	220	180	.00040	.0010	.0020	.0025	.0030	.0035
		Light	390	375	360	300	.00085	.0020	.0040	.0055	.0065	.0075
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Profile	180	170	165	140	.00040	.0010	.0020	.0025	.0030	.0035
		Light	295	285	275	225	.00085	.0020	.0040	.0055	.0065	.0075
	> 350 ≤ 380	Profile	145	140	130	110	.00040	.0010	.0020	.0025	.0030	.0035
		Light	235	225	220	180	.00085	.0020	.0040	.0055	.0065	.0075
HIGH TEMP ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	> 200 ≤ 300	Profile	65	60	60	50	.00030	.0008	.0015	.0020	.0025	.0030
		Light	105	100	100	80	.00070	.0017	.0035	.0045	.0050	.0060
	> 300 ≤ 400	Profile	50	50	45	40	.00021	.0006	.0011	.0014	.0017	.0020
		Light	85	80	75	65	.00045	.0012	.0022	.0030	.0036	.0042

60M Metric	HARDNESS	CUT	SPEED (m/min)				FEED (mm/flute)					
	BRINELL	Type	AlTiN	TiCN	TiN	non	3	6	10	12	20	25
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 185	Profile	120	116	111	91	0.0120	0.036	0.067	0.084	0.107	0.113
		Light	198	191	183	152	0.0240	0.072	0.133	0.168	0.227	0.238
	> 185 ≤ 275	Profile	113	110	105	87	0.0120	0.036	0.067	0.084	0.107	0.113
		Light	187	180	172	143	0.0240	0.072	0.133	0.168	0.227	0.238
STAINLESS (difficult) 304, 316, 15-5PH, 17-4PH	≤ 185	Profile	96	91	88	73	0.0096	0.024	0.053	0.060	0.080	0.088
		Light	158	152	146	122	0.0204	0.048	0.107	0.132	0.173	0.188
	> 185 ≤ 325	Profile	72	69	67	55	0.0096	0.024	0.053	0.060	0.080	0.088
		Light	119	114	110	91	0.0204	0.048	0.107	0.132	0.173	0.188
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Profile	55	52	50	43	0.0096	0.024	0.053	0.060	0.080	0.088
		Light	90	87	84	69	0.0204	0.048	0.107	0.132	0.173	0.188
	> 350 ≤ 380	Profile	44	43	40	34	0.0096	0.024	0.053	0.060	0.080	0.088
		Light	72	69	67	55	0.0204	0.048	0.107	0.132	0.173	0.188
HIGH TEMP ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	> 200 ≤ 300	Profile	20	19	18	15	0.0072	0.019	0.040	0.048	0.067	0.075
		Light	33	31	30	24	0.0168	0.041	0.093	0.108	0.133	0.150
	> 300 ≤ 400	Profile	16	15	14	12	0.0050	0.014	0.029	0.034	0.045	0.050
		Light	25	24	23	20	0.0108	0.029	0.059	0.072	0.096	0.105

CUT TYPE	
PROFILE	LIGHT*
Rw = .3 x D_1 Ad = 1.5 x D_1	Rw = .05 x D_1 Ad = 1.5 x D_1
	

rpm = sfm x 3.82 / D_1
rpm = (1000 x m/min) / (3.14 x D_1)
ipm = (inch/flute) x no. of flutes x rpm
mm/min = (mm/flute) x no. of flutes x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

61 Fractional	HARDNESS	SERIES	CUT	SPEED (sfm)				FEED (inch/flute)				
	BRINELL		Type	AlTiN	TiCN	TiN	non	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 10L50, 1525, 1536	≤ 175	61	Slot	400	385	370	–	.0006	.0011	.0014	.0017	.0020
			Profile	500	480	460	–	.0006	.0011	.0014	.0017	.0020
			Light	550	530	505	–	.0007	.0012	.0016	.0019	.0023
	> 175 ≤ 275		Slot	330	315	300	–	.0006	.0011	.0014	.0017	.0020
			Profile	415	400	380	–	.0006	.0011	.0014	.0017	.0020
			Light	480	460	445	–	.0007	.0012	.0016	.0019	.0023
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	61	Slot	295	280	270	–	.0004	.0008	.0011	.0013	.0015
			Profile	365	355	340	–	.0004	.0008	.0011	.0013	.0015
			Light	400	390	370	–	.0005	.0010	.0012	.0015	.0018
	> 275 ≤ 375		Slot	200	190	185	–	.0004	.0008	.0011	.0013	.0015
			Profile	250	240	230	–	.0004	.0008	.0011	.0013	.0015
			Light	275	265	255	–	.0005	.0010	.0012	.0015	.0018
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	61	Slot	275	265	255	–	.0006	.0009	.0015	.0018	.0021
			Profile	345	330	315	–	.0006	.0009	.0015	.0018	.0021
			Light	380	365	350	–	.0007	.0011	.0017	.0021	.0024
	> 250 ≤ 375		Slot	170	160	155	–	.0005	.0009	.0012	.0014	.0017
			Profile	210	205	195	–	.0005	.0009	.0012	.0014	.0017
			Light	230	225	215	–	.0006	.0010	.0014	.0017	.0019
CAST IRON Gray, Malleable, Ductile	≤ 220	61	Slot	295	280	270	–	.0008	.0015	.0020	.0024	.0028
			Profile	365	355	340	–	.0008	.0015	.0020	.0024	.0028
			Light	405	390	370	–	.0009	.0017	.0023	.0028	.0032
	> 220 ≤ 260		Slot	225	215	210	–	.0006	.0009	.0015	.0018	.0021
			Profile	280	270	260	–	.0006	.0009	.0015	.0018	.0021
			Light	310	300	285	–	.0007	.0011	.0017	.0021	.0024

CUT TYPE		
SLOT	PROFILE	LIGHT
Rw = D_1 Ad = D_1	Rw = .5 x D_1 Ad = D_1	Rw = .25 x D_1 Ad = 1.5 x D_1
		

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x no. of flutes x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

61M Metric	HARDNESS BRINELL	SERIES	CUT Type	SPEED (m/min) AlTiN	TiCN	TiN	non	FEED (mm/flute) 6	10	12	20	25
CARBON STEEL 1018, 1040, 1080, 10L50, 1525, 1536	≤ 175	61M	Slot	122	117	113	–	0.014	0.029	0.034	0.045	0.050
			Profile	152	146	140	–	0.014	0.029	0.034	0.045	0.050
			Light	168	162	154	–	0.017	0.032	0.038	0.051	0.058
	> 175 ≤ 275		Slot	101	96	91	–	0.014	0.029	0.034	0.045	0.050
			Profile	126	122	116	–	0.014	0.029	0.034	0.045	0.050
			Light	146	140	136	–	0.017	0.032	0.038	0.051	0.058
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	61M	Slot	90	85	82	–	0.010	0.021	0.026	0.035	0.038
			Profile	111	108	104	–	0.010	0.021	0.026	0.035	0.038
			Light	122	119	113	–	0.012	0.027	0.029	0.040	0.045
	> 275 ≤ 375		Slot	61	58	56	–	0.010	0.021	0.026	0.035	0.038
			Profile	76	73	70	–	0.010	0.021	0.026	0.035	0.038
			Light	84	81	78	–	0.012	0.027	0.029	0.040	0.045
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	61M	Slot	84	81	78	–	0.014	0.024	0.036	0.048	0.053
			Profile	105	101	96	–	0.014	0.024	0.036	0.048	0.053
			Light	116	111	107	–	0.017	0.029	0.041	0.056	0.060
	> 250 ≤ 375		Slot	52	49	47	–	0.012	0.024	0.029	0.037	0.043
			Profile	64	62	59	–	0.012	0.024	0.029	0.037	0.043
			Light	70	69	66	–	0.014	0.027	0.034	0.045	0.048
CAST IRON Gray, Malleable, Ductile	≤ 220	61M	Slot	90	85	82	–	0.019	0.040	0.048	0.064	0.070
			Profile	111	108	104	–	0.019	0.040	0.048	0.064	0.070
			Light	123	119	113	–	0.022	0.045	0.055	0.075	0.080
	> 220 ≤ 260		Slot	69	66	64	–	0.014	0.024	0.036	0.048	0.053
			Profile	85	82	79	–	0.014	0.024	0.036	0.048	0.053
			Light	94	91	87	–	0.017	0.029	0.041	0.056	0.060

CUT TYPE		
SLOT	PROFILE	LIGHT
Rw = D_1 Ad = D_1	Rw = .5 x D_1 Ad = D_1	Rw = .25 x D_1 Ad = 1.5 x D_1
		

rpm = (1000 x m/min) / (3.14 x D_1)
mm/min = (mm/flute) x 2 x rpm

- maximum recommended depths shown
- reduce speed and feed for materials harder than listed
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

MK2 Fractional	HARDNESS	CUT	SPEED	FEED (inch/flute)				
	BRINELL	Type	sfm	.008	.016	.031	.040	.060
CARBON STEEL 1018, 1040, 1080, 10L50, 1525, 1536	≤ 175	Slot	255	0.000016	0.00003	0.00006	0.00009	0.00013
		Profile	320	0.000018	0.00004	0.00007	0.00011	0.00014
		Finish	415	0.000037	0.00007	0.00014	0.00022	0.00029
ALLOY STEEL 4140, 4150, 4340, 5150, 8630	≤ 275	Slot	190	0.000012	0.00002	0.00005	0.00007	0.00009
		Profile	235	0.000014	0.00003	0.00005	0.00008	0.00011
		Finish	305	0.000028	0.00005	0.00011	0.00016	0.00022
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Slot	175	0.000012	0.00002	0.00005	0.00007	0.00009
		Profile	220	0.000014	0.00003	0.00005	0.00008	0.00011
		Finish	285	0.000028	0.00005	0.00011	0.00016	0.00022
CAST IRON Gray, Malleable, Ductile	≤ 220	Slot	190	0.000016	0.00003	0.00006	0.00009	0.00013
		Profile	235	0.000018	0.00004	0.00007	0.00011	0.00014
		Finish	305	0.000037	0.00007	0.00014	0.00022	0.00029
STAINLESS (free machining) 303, 420F, 440F	≤ 275	Slot	210	0.000012	0.00002	0.00005	0.00007	0.00009
		Profile	260	0.000014	0.00003	0.00005	0.00008	0.00011
		Finish	340	0.000028	0.00005	0.00011	0.00016	0.00022
STAINLESS (difficult) 304, 316, 17-4PH	≤ 275	Slot	145	0.000010	0.00002	0.00004	0.00006	0.00008
		Profile	180	0.000011	0.00002	0.00004	0.00006	0.00009
		Finish	235	0.000022	0.00004	0.00009	0.00013	0.00017
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Slot	100	0.000010	0.00002	0.00004	0.00006	0.00008
		Profile	125	0.000011	0.00002	0.00004	0.00006	0.00009
		Finish	160	0.000022	0.00004	0.00009	0.00013	0.00017
HIGH TEMP ALLOY Incoloy, Inconel, Rene, Waspalloy	≤ 300	Slot	35	0.000008	0.00002	0.00003	0.00005	0.00006
		Profile	45	0.000009	0.00002	0.00004	0.00005	0.00007
		Finish	60	0.000018	0.00004	0.00007	0.00011	0.00014
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 150	Slot	640	0.000032	0.00006	0.00013	0.00019	0.00025
		Profile	800	0.000037	0.00007	0.00014	0.00022	0.00029
		Finish	1040	0.000073	0.00014	0.00029	0.00043	0.00057
COPPER ALLOY Aluminum Bronze, C110, Muntz Brass	≤ 140	Slot	190	0.000016	0.00003	0.00006	0.00009	0.00013
		Profile	240	0.000018	0.00004	0.00007	0.00011	0.00014
		Finish	310	0.000037	0.00007	0.00014	0.00022	0.00029
PLASTIC Polycarbonate, PVC, Polypropylene		Slot	640	0.000032	0.00006	0.00013	0.00019	0.00025
		Profile	800	0.000037	0.00007	0.00014	0.00022	0.00029
		Finish	1040	0.000073	0.00014	0.00029	0.00043	0.00057
GRAPHITE		Slot	480	0.000032	0.00006	0.00013	0.00019	0.00025
		Profile	600	0.000037	0.00007	0.00014	0.00022	0.00029
		Finish	780	0.000073	0.00014	0.00029	0.00043	0.00057

CUT TYPE		
SLOT	PROFILE	LIGHT*
Rw = D_1 Ad = D_1	Rw = .5 x D_1 Ad = 1.5 x D_1	Rw = .05 x D_1 Ad = 1.5 x D_1
		

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x 2 x rpm

- maximum recommended depths shown
- reduce speed to meet machine limitations
- reduce speed and feed for materials harder than listed

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

MK2M Metric	HARDNESS BRINELL	CUT Type	SPEED m/min	FEED (mm/flute) .20	.41	.79	1.02	1.52
CARBON STEEL 1018, 1040, 1080, 10L50, 1525, 1536	≤ 175	Slot	78	0.00041	0.0008	0.0015	0.0023	0.0033
		Profile	98	0.00046	0.0010	0.0018	0.0028	0.0036
		Finish	127	0.00094	0.0018	0.0036	0.0056	0.0074
ALLOY STEEL 4140, 4150, 4340, 5150, 8630	≤ 275	Slot	57	0.00030	0.0005	0.0013	0.0018	0.0023
		Profile	72	0.00036	0.0008	0.0013	0.0020	0.0028
		Finish	93	0.00071	0.0013	0.0028	0.0041	0.0056
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	Slot	54	0.00030	0.0005	0.0013	0.0018	0.0023
		Profile	67	0.00036	0.0008	0.0013	0.0020	0.0028
		Finish	87	0.00071	0.0013	0.0028	0.0041	0.0056
CAST IRON Gray, Malleable, Ductile	≤ 220	Slot	57	0.00041	0.0008	0.0015	0.0023	0.0033
		Profile	72	0.00046	0.0010	0.0018	0.0028	0.0036
		Finish	93	0.00094	0.0018	0.0036	0.0056	0.0074
STAINLESS (free machining) 303, 420F, 440F	≤ 275	Slot	63	0.00030	0.0005	0.0013	0.0018	0.0023
		Profile	79	0.00036	0.0008	0.0013	0.0020	0.0028
		Finish	103	0.00071	0.0013	0.0028	0.0041	0.0056
STAINLESS (difficult) 304, 316, 17-4PH	≤ 275	Slot	44	0.00025	0.0005	0.0010	0.0015	0.0020
		Profile	55	0.00028	0.0005	0.0010	0.0015	0.0023
		Finish	71	0.00056	0.0010	0.0023	0.0033	0.0043
TITANIUM Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 350	Slot	30	0.00025	0.0005	0.0010	0.0015	0.0020
		Profile	38	0.00028	0.0005	0.0010	0.0015	0.0023
		Finish	49	0.00056	0.0010	0.0023	0.0033	0.0043
HIGH TEMP ALLOY Incoloy, Inconel, Rene, Waspalloy	≤ 300	Slot	11	0.00020	0.0005	0.0008	0.0013	0.0015
		Profile	14	0.00023	0.0005	0.0010	0.0013	0.0018
		Finish	18	0.00046	0.0010	0.0018	0.0028	0.0036
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 150	Slot	195	0.00081	0.0015	0.0033	0.0048	0.0064
		Profile	244	0.00094	0.0018	0.0036	0.0056	0.0074
		Finish	317	0.00185	0.0036	0.0074	0.0109	0.0145
COPPER ALLOY Aluminum Bronze, C110, Muntz Brass	≤ 140	Slot	59	0.00041	0.0008	0.0015	0.0023	0.0033
		Profile	73	0.00046	0.0010	0.0018	0.0028	0.0036
		Finish	95	0.00094	0.0018	0.0036	0.0056	0.0074
PLASTIC Polycarbonate, PVC, Polypropylene		Slot	195	0.00081	0.0015	0.0033	0.0048	0.0064
		Profile	244	0.00094	0.0018	0.0036	0.0056	0.0074
		Finish	317	0.00185	0.0036	0.0074	0.0109	0.0145
GRAPHITE		Slot	146	0.00081	0.0015	0.0033	0.0048	0.0064
		Profile	183	0.00094	0.0018	0.0036	0.0056	0.0074
		Finish	238	0.00185	0.0036	0.0074	0.0109	0.0145

CUT TYPE		
SLOT	PROFILE	LIGHT*
Rw = D_1 Ad = D_1	Rw = .5 x D_1 Ad = 1.5 x D_1	Rw = .05 x D_1 Ad = 1.5 x D_1
		

rpm = (1000 x m/min) / (3.14 x D_1)
mm/min = (mm/flute) x 2 x rpm

- maximum recommended depths shown
- reduce speed to meet machine limitations
- reduce speed and feed for materials harder than listed

* finish cuts typically require reduced feed and cutting depths of .02 x D_1 maximum

- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Tool	• Whenever possible, select an end mill with the largest diameter, shortest flute length, and shortest overall length for the best rigidity • Long flute tools are not intended for pocketing, slotting, or heavy profiling – limit Rw to .02D • High Performance tools minimize cycle time and extend tool life
Tool Holders	• Holders with adequate gripping pressure and TIR are required • Stub holders or zero length collet style holders are recommended for heavy stock removal • When using solid holders, hand ground screw flats are not recommended
Workpiece	• Secure clamping of the workpiece will reduce chatter and deflection
Machine	• Spindle must be in optimum condition for precise TIR and maximum tool life • Sufficient horsepower is required to perform at recommended speeds and feeds • Reduce rates for low power machines to prevent workpiece and / or tool damage
Coolant	• Avoid re-milling chips through use of air blast or liquid coolant as necessary • Maintain clean coolant with appropriate concentration • General recommendations: –Water Soluble Oil or Air Blast: Tool Steels, Mold & Die Steels, Carbon or Alloy Steels –Water Soluble Oil: Stainless Steels, Titanium, High Temperature Alloys, Non-Ferrous Alloys
Methods	• Climb milling is generally preferred • Attention to programming details, tool holders, TIR, balance, fixturing, etc. improve cutting tool performance and extend tool life

END MILLING GUIDELINE

D_1 = cutting diameter L_2 = flute length

Speeds and Feeds for Cut Types are based on Radial Width (Rw) and Axial Depth (Ad)

Reductions to Speeds and Feeds may be necessary when:
- Rw and Ad exceed recommendations
- Using long flute or extended reach tools
- Using long tool holders
- Machining materials harder than listed

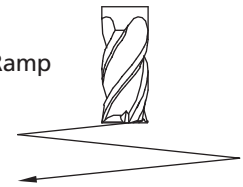
ENTRY METHODS

Pre-Drilled Hole

Pre-drilling is the preferred entry method for most applications.

Helical

Ramp



Alternative methods are helical and ramping. Use slotting speeds and 25% to 50% slotting feeds. Engage at about 5° for General Purpose tools and 5° to 10° for High Performance tools.

Plunge

Plunge only in non-ferrous and short-chipping materials using slotting speeds and 25% slotting feeds.

Puntas para aplicaciones

Herramientas	• Siempre que sea posible, seleccione el cortador con el mayor diámetro, largo de filo y largo total mas corto posible para obtener una mejor rigidez. • Las herramientas con filos largos no son recomendadas para operaciones de apertura de cajas en el maquinado, operación de ranurado o perfilado pesado – limitar la profundidad radial (Rw) a .02D • Las herramientas de alto desempeño minimizan el tiempo de ciclo del maquinado y extienden la vida útil de la herramienta
Portaherramientas	• Los Portaherramientas deberán tener buena presión de agarre para la sujeción de la herramienta y una concentricidad máxima indicada (TIR) • Se recomienda usar portaherramientas de agarre directo cortos, o de boquilla con longitud cero para lograr un máximo arranque de viruta • Cuando se utilicen portaherramientas de agarre directo, no se recomienda hacer manualmente el plano para la sujeción del tornillo en el zanco de la herramienta
Pieza a maquinar	• La buena sujeción de la pieza a maquinar reducirá la vibración y la desviación de la herramienta
Máquina	• El usillo de la maquina debe estar en condiciones optimas, para asegurar la concentricidad de giro (TIR) y asegurar el máximo rendimiento de la herramienta • Para lograr los avances y velocidades recomendados, se necesita suficiente potencia (HP) en la maquina • Reducir los parámetros de corte en maquinas de baja potencia (HP) para prevenir el daño en la herramienta o pieza de trabajo
Refrigerante	• Evite el re-maquinado de virutas usando aire a presión o líquido refrigerante según sea necesario • Mantener limpio el refrigerante con su concentración adecuada • Recomendaciones generales: –Para el maquinado de Aceros Grado Herramienta, para Moldes y Dados o Aleaciones de Bajo Carbón, utilice Aceite Soluble en Agua o aire a presión –Para el maquinado de Aleaciones Inoxidables, Aleaciones de Alta Temperatura, Titanio y Aleaciones No Ferrosas, utilice solamente Aceite Soluble en Agua
Métodos	• Se recomienda el maquinado en sentido ascendente o trepado • El cuidado en los detalles de la programación, la concentricidad de giro (TIR) el balance de los portaherramientas, la sujeción de la pieza a maquinar, etc. son factores que contribuyen a prolongar la vida de la herramienta

GUÍAS DE FRESADO

D_1 = diámetro de corte L_2 = largo de filo

Las velocidades y avances para cortes están basados en la profundidad radial (→|Rw|←), y profundidad axial ($\frac{\downarrow}{\text{Ad}}{\uparrow}$)

Reducciones en velocidades y avances serán necesarias cuando:
- Rw y Ad exceda las recomendaciones
- Se utilicen filos largos o herramientas de largo alcance
- Se utilicen portaherramientas largos
- Se maquinen materiales más duros que los recomendados

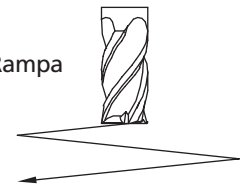
MÉTODOS DE ENTRADA

Barreno previo

Preferentemente usar un barreno previo como método de entrada para la mayor parte de las aplicaciones.

Interpolado Helicoidal

Rampa



El corte en rampa y el interpolado helicoidal son métodos alternativos. Usar los parámetros de 25% a 50% de la velocidad de corte usada en una ranura. Con avances alrededor de 5" para herramientas de uso en general y de 5" a 10" en herramientas de alto desempeño.

Agujero o Barrenado

Este método se puede utilizar únicamente en materiales no ferrosos y materiales de formación de virutas cortas, usando la velocidad de ranurado y el 25% de su avance.

Conseils relatifs à l'application

Outil	• Chaque fois que possible, choisissez une fraise de plus grand diamètre possible, la plus courte possible, elle garantira la meilleure rigidité • Les outils longs ne sont pas optimum pour l'ébauche, le pocketing, le rainurage - ae limité à 0,02 D • Les outils Haute performance optimisent les temps de cycle et de augmentent la durée de vie
Porte-outils	• Des attachements à serrage puissant et à faux rond précis sont recommandés • Attachements à méplats ou pinces à serrage nominale sont recommandées pour les ébauches • Lorsque vous utilisez des attachement rigides, les serrage de l'outil par vis ne sont pas recommandés
Pièce	• Le système de fixation et de bridage de la pièce devra permettre de réduire les vibrations et la déformation
Machine	• Broche doit être en bon état optimal au niveau de son faux rond • Suffisamment puissance est nécessaire pour effectuer à des vitesses recommandées et se nourrit • Réduire les efforts pour les machines de faible puissance pour éviter l'endommagement de la pièce et / ou de l'outil
Liquide de refroidissement	• Évitez les recyclage de copeaux par l'utilisation de soufflage d'air comprimé ou de liquide de refroidissement. • Maintenir le lubrifiant propre à la concentration appropriée • Recommandations générales - –Huile soluble ou Air comprimé: aciers à outils, aciers pour moules, aciersau carbone ou alliés –Huile soluble: aciers inoxydables, titane, alliages à haute température, alliages non ferreux
Méthodes	• L'usinage en avalant est généralement préconisé • Attention à la programmation, porte-outils, faux rond, équilibrage, fixation, etc améliorent les performances de l'outil en coupe et prolonge la durée de vie

GUIDE DU FRAISAGE

D_1 = diamètre de coupe L_2 = longueur de coupe

Vitesses & avances pour ces cas d'usinage sont basées sur l'engagement radial (ae), et axial (ap)

La réduction de la vitesse et de l'avance doit être nécessaire quand:
- Les engagements ap et ae sont importants
- Des dentures longues ou des séries longues sont utilisées
- Des attachement longs sont utilisés
- Lors d'usinage de matériaux durs

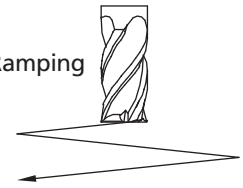
TYPES D'ENTREE MATIERE

Preperçage

Le pré-perçage est la méthode préférable dans la plupart de applications.

Hélicoïdale

Ramping



Méthodes alternatives, entrée hélicoïdale et ramping.Utiliser vitesse de rainurage et les avance réduite de 25 à 50%. Angle de plongée environ 5° pour les outils standards. 5 à 10° pour les outils hautes performance.

Plongée

Plongée uniquement dans les non ferreux. Vitesse rainurage et avances réduites de 25%.

DRILLS

Hole Making

Taladrado

Outils de perçage

Drill Icon Legend
Leyenda del icono de los taladros
Légende d'icone de perçage

END CONFIGURATIONS
CONFIGURACIONES DE LA PUNTA
CONFIGURATIONS TERMINALES

Drill
Fresa
Fraise

SHANK TYPE
TIPO DE VÁSTAGO
TYPE DE TIGE

Common
Normal
Commune

Straight
Recto
Droite

REACH
TRANSLATION
TRANSLATION

3xD

>3xD Reach
Alcance >3xD
>Longueur 3xD

5xD

5xD Reach
Alcance 5xD
Longueur 5xD

8xD

8xD Reach
Alcance 8xD
Longueur 8xD

HELIX ANGLES
ÁNGULOS HELICOIDALES
ANGLES DE L'HÉLICE

Right Spiral
Espiral sentido derecho
Spirale droite

None
Ninguno
Aucun

ADDITIONAL GEOMETRY
CARACTERÍSTICAS GEOMÉTRICAS ADICIONALES
GÉOMÉTRIE SUPPLÉMENTAIRE

Right Cut Direction
Fresado sentido derecha
Coupe vers la droite

COOLANT OPTIONS
OPCIONES DE REFRIGERACIÓN
OPTIONS DE REFROIDISSEMENT

Internal Coolant
Refrigerante externo
Refroidissement interne

External Coolant
Refrigerante interno
Refroidissement externe

COATINGS
REVESTIMIENTOS
REVÊTEMENTS

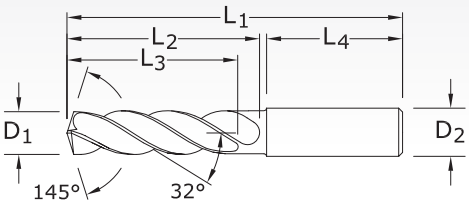
Uncoated

Ti-NAMITE-A
(AlTiN)

Di-NAMITE
(Diamond)

Hi-PerCarb Double Margin Drills

HI-PERCARB® HIGH PERFORMANCE CARBIDE DRILLS



135 3xD
FRACTIONAL & METRIC SERIES

TECH INFO 149–150

TOLERANCES (inch)

≤.1181 DIAMETER
D_1 = +.00008/+.00047
D_2 = h_6

>.1181–.2362 DIAMETER
D_1 = +.00016/+.00063
D_2 = h_6

>.2362–.3937 DIAMETER
D_1 = +.00024/+.00083
D_2 = h_6

>.3937–.7087 DIAMETER
D_1 = +.00028/+.00098
D_2 = h_6

>.7087–1.1811 DIAMETER
D_1 = +.00031/+.00114
D_2 = h_6

TOLERANCES (mm)

≤3 DIAMETER
D_1 = +0,002/+0,012
D_2 = h_6

>3–6 DIAMETER
D_1 = +0,004/+0,016
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,006/+0,021
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,007/+0,025
D_2 = h_6

>18–30 DIAMETER
D_1 = +0,008/+0,029
D_2 = h_6

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	EDP NO.
1/64*	0.0156		1/8	1-1/2	1/8	5/64	1	51752
1/32*	0.0312		1/8	1-1/2	1/4	3/16	1	51269
3/64*	0.0469	1/16-64	1/8	1-1/2	3/8	5/16	1	51270
1/16*	0.0625	5/64-60	1/8	2	7/16	3/8	1-1/4	51271
5/64*	0.0781		1/8	2	1/2	7/16	1-1/4	51272
3/32	0.0938	1/8-32	1/8	2	1/2	7/16	1-1/4	51273
#40	0.0980		1/8	2	9/16	1/2	1-1/4	51274
#39	0.0995		1/8	2	9/16	1/2	1-1/4	51753
#38	0.1015	5-40	1/8	2	9/16	1/2	1-1/4	51754
#37	0.1040	5-44	1/8	2	9/16	1/2	1-1/4	51755
#36	0.1065	6-32	1/8	2	9/16	1/2	1-1/4	51756
7/64	0.1094		1/8	2	5/8	9/16	1-1/4	51275
#35	0.1100		1/8	2	5/8	9/16	1-1/4	51276
#34	0.1110		1/8	2	5/8	9/16	1-1/4	51277
#33	0.1130	6-40	1/8	2	5/8	9/16	1-1/4	51757
#32	0.1160		1/8	2	5/8	9/16	1-1/4	51758
3,0mm	0.1181		6,0mm	62,0mm	20,1mm	17,0	36,0mm	63155
#31	0.1200		1/8	2	5/8	9/16	1-1/4	51759
3.1mm	0.1220		6,0mm	62,0mm	20,0mm	17,0	36,0mm	63741
1/8	0.1250		1/4	2-9/16	3/4	21/32	1-7/16	51330
3.2mm	0.1260	M3,5 X 0,35	6,0mm	62,0mm	20,0mm	17,0	36,0mm	63156
#30	0.1285		1/4	2-9/16	3/4	21/32	1-7/16	51278
3.3mm	0.1299	M4 X 0, 7	6,0mm	62,0mm	20,0mm	17,0	36,0mm	63157
3.4mm	0.1339		6,0mm	62,0mm	20,0mm	17,0	36,0mm	63158
#29	0.1360	8-32,8-36	1/4	2-1/2	3/4	21/32	1-7/16	51331
3.5mm	0.1378	M4 X 0, 5	6,0mm	62,0mm	20,0mm	17,0	36,0mm	63159
#28	0.1405	8-40	1/4	2-1/2	3/4	21/32	1-7/16	51760
9/64	0.1406		1/4	2-1/2	3/4	21/32	1-7/16	51332
3.6mm	0.1417	M4 X 0,35	6,0mm	62,0mm	20,0mm	17,0	36,0mm	63160
#27	0.1440		1/4	2-1/2	3/4	21/32	1-7/16	51761
3.7mm	0.1457	M4.5 X 0,75	6,0mm	62,0mm	20,0mm	17,0	36,0mm	63161
#26	0.1470	3/16-24	1/4	2-1/2	3/4	21/32	1-7/16	51762
#25	0.1495	10-24	1/4	2-5/8	7/8	23/32	1-7/16	51333
3.8mm	0.1496		6,0	66,0	24,0	21,0	36,0	63472
#24	0.1520	10-28	1/4	2-5/8	7/8	23/32	1-7/16	51763
3.9mm	0.1535		6,0mm	66,0mm	20,0mm	21,0	43,5mm	63743
#23	0.1540		1/4	2-5/8	7/8	23/32	1-7/16	51764
5/32	0.1562		1/4	2-5/8	7/8	23/32	1-7/16	51334
#22	0.1570	10-30	1/4	2-5/8	7/8	23/32	1-7/16	51765
4.0mm	0.1575	M4,5 X 0,5	6,0mm	66,0mm	24,1mm	21,0	36,0mm	63162
#21	0.1590	10-32	1/4	2-5/8	7/8	23/32	1-7/16	51335
#20	0.1610	13/64-24	1/4	2-5/8	7/8	23/32	1-7/16	51279
4.1mm	0.1614		6,0mm	66,0mm	20,0mm	21,0	36,0mm	63744
4.2mm	0.1654	M5 / M5 X 0,75	6,0mm	66,0mm	24,1mm	21,0	36,0mm	63163

*Single Margin

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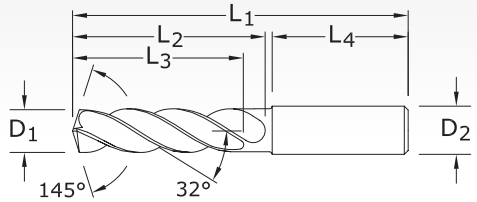
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
HARDENED STEELS

Hi-PerCarb Double Margin Drills

HI-PERCARB
HIGH PERFORMANCE CARBIDE DRILLS



135 3xD

FRACTIONAL & METRIC SERIES

TECH INFO 149–150

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	EDP NO.
#19	0.1660		1/4	2-5/8	7/8	23/32	1-7/16	51766
4.3mm	0.1693		6,0mm	66,0mm	24,1mm	21,0	36,0mm	63164
#18	0.1695		1/4	2-5/8	7/8	23/32	1-7/16	51767
11/64	0.1719		1/4	2-5/8	7/8	23/32	1-7/16	51336
#17	0.1730		1/4	2-5/8	7/8	23/32	1-7/16	51768
4.4mm	0.1732		6,0mm	66,0mm	20,0mm	21,0	36,0mm	63745
#16	0.1770	12-24	1/4	2-5/8	7/8	23/32	1-7/16	51769
4.5mm	0.1772	M5 X 0,5	6,0mm	66,0mm	24,1mm	21,0	36,0mm	63165
#15	0.1800		1/4	2-5/8	7/8	23/32	1-7/16	51770
4.6mm	0.1811	12-28	6,0mm	66,0mm	24,1mm	21,0	36,0mm	63166
#14	0.1820		1/4	2-5/8	7/8	23/32	1-7/16	51771
#13	0.1850	12-32	1/4	2-5/8	7/8	23/32	1-7/16	51772
4.7mm	0.1850		6,0mm	66,0mm	20,0mm	21,0	36,0mm	63746
3/16	0.1875		1/4	2-5/8	1	53/64	1-7/16	51337
#12	0.1890	7/32-32	1/4	2-5/8	1	53/64	1-7/16	51773
4.8mm	0.1890		6,0mm	66,0mm	28,0mm	24,0	36,0mm	63167
#11	0.1910		1/4	2-5/8	1	53/64	1-7/16	51774
4.9mm	0.1929		6,0mm	66,0mm	28,0mm	24,0	36,0mm	63747
#10	0.1935	14-20	1/4	2-5/8	1	53/64	1-7/16	51775
#09	0.1960		1/4	2-5/8	1	53/64	1-7/16	51776
5mm	0.1969	M6 X 1	6,0mm	66,0mm	28,0mm	24,0	36,0mm	63168
#08	0.1990		1/4	2-5/8	1	53/64	1-7/16	51777
5.1mm	0.2008		6,0mm	66,0mm	28,0mm	24,0	36,0mm	63748
#07	0.2010	1/4-20	1/4	2-5/8	1	53/64	1-7/16	51338
13/64	0.2031		1/4	2-5/8	1	53/64	1-7/16	51339
#06	0.2040		1/4	2-5/8	1	53/64	1-7/16	51778
5.2mm	0.2047	M6 X 0,75	6,0mm	66,0mm	28,0mm	24,0	36,0mm	63749
#05	0.2055		1/4	2-5/8	1	53/64	1-7/16	51779
5.25mm	0.2067		6,0mm	66,0mm	28,0mm	24,0	36,0mm	63169
5.3mm	0.2087		6,0mm	66,0mm	28,0mm	24,0	36,0mm	63170
#04	0.2090	1/4-24	1/4	2-5/8	1	53/64	1-7/16	51780
5.4mm	0.2126		6,0mm	66,0mm	28,0mm	24,0	36,0	63750
#03	0.2130	1/4-28	1/4	2-5/8	1	53/64	1-7/16	51340
5.5mm	0.2165	M6 X 0,5	6,0mm	68,0mm	28,0mm	24,0	36,0mm	63171
7/32	0.2188	1/4-32	1/4	2-5/8	1	53/64	1-7/16	51341
5.6mm	0.2205		6,0mm	66,0mm	28,0mm	24,0	36,0	63751
#02	0.2210		1/4	2-5/8	1	53/64	1-7/16	51781
5.7mm	0.2244		6,0mm	66,0mm	28,0mm	24,0	36,0	63752
#01	0.2280		1/4	2-5/8	1	53/64	1-7/16	51782
5.8mm	0.2283		6,0mm	66,0mm	28,0mm	24,0	36,0mm	63172
5.9mm	0.2323		6,0mm	66,0mm	28,0mm	24,0	36,0	63753
A	0.2340		1/4	2-5/8	1	53/64	1-7/16	51601
15/64	0.2344		1/4	2-5/8	1	53/64	1-7/16	51342
6mm	0.2362	M7 X 1	6,0mm	66,0mm	28,0mm	24,0	36,0mm	63173

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TOLERANCES (inch)

≤.1181 DIAMETER
D_1 = +.00008/+.00047
D_2 = h_6

>.1181–.2362 DIAMETER
D_1 = +.00016/+.00063
D_2 = h_6

>.2362–.3937 DIAMETER
D_1 = +.00024/+.00083
D_2 = h_6

>.3937–.7087 DIAMETER
D_1 = +.00028/+.00098
D_2 = h_6

>.7087–1.1811 DIAMETER
D_1 = +.00031/+.00114
D_2 = h_6

TOLERANCES (mm)

≤3 DIAMETER
D_1 = +0,002/+0,012
D_2 = h_6

>3–6 DIAMETER
D_1 = +0,004/+0,016
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,006/+0,021
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,007/+0,025
D_2 = h_6

>18–30 DIAMETER
D_1 = +0,008/+0,029
D_2 = h_6

Hi-PerCarb Double Margin Drills

135 3xD
FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER D_1	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	SHANK LENGTH L_4	Ti-NAMITE-A (AlTiN) EDP NO.
B	0.2380		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51602
6.1mm	0.2402		8,0mm	79,0mm	34,0mm	28,0	36,0	63754
C	0.2420		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51603
6.2mm	0.2441		8,0mm	79,0mm	34,0mm	28,0	36,0	63755
D	0.2460		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51604
6.25mm	0.2461	M7 X 0, 75	8,0mm	79,0mm	34,0mm	28,0	36,0mm	63174
6.3mm	0.2480		8,0mm	79,0mm	34,0mm	28,0	36,0	63756
1/4	0.2500		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51343
E	0.2500		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51605
6.4mm	0.2520		8,0mm	79,0mm	34,0mm	28,0	36,0mm	63175
6.5mm	0.2559		8,0mm	79,0mm	34,0mm	28,0	36,0mm	63213
F	0.2570	5/16-18	5/16	3-1/8	1-5/16	1-3/64	1-7/16	51344
6.6mm	0.2598		8,0mm	79,0mm	34,0mm	28,0	36,0	63757
G	0.2610		5/16	3-1/8	1-5/16	1-3/64	1-7/16	51606
6.7mm	0.2638		8,0mm	79,0mm	28,0	28,0	36,0	63758
17/64	0.2656	5/16-20	5/16	3-1/8	1-5/16	1-3/64	1-7/16	51345
H	0.2660		5/16	3-1/8	1-5/16	1-3/64	1-7/16	51607
6.8mm	0.2677	M8 X 1,25	8,0mm	79,0mm	34,0mm	28,0	36,0mm	63176
6.9mm	0.2717		8,0mm	79,0mm	34,0mm	28,0	36,0	63759
I	0.2720	5/16-24	5/16	3-1/8	1-5/16	1-3/64	1-7/16	51346
7mm	0.2756	M8 X 1	8,0mm	79,0mm	34,0mm	28,0	36,0mm	63177
J	0.2770		5/16	3-1/8	1-5/16	1-3/64	1-7/16	51608
7.1mm	0.2795		8,0mm	79,0mm	41,0mm	34,0	36,0	63760
K	0.2810		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51609
9/32	0.2812	5/16-32	5/16	3-1/8	1-9/16	1-3/16	1-7/16	51347
7.2mm	0.2835		8,0mm	79,0mm	41,0mm	34,0	36,0	63761
7.25mm	0.2854	M8 X 0, 75	8,0mm	79,0mm	41,0mm	34,0	36,0mm	63178
7.3mm	0.2874		8,0mm	79,0mm	41,0mm	34,0	36,0	63762
L	0.2900		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51610
7.4mm	0.2913		8,0mm	79,0mm	41,0	34,0	36,0	63763
M	0.2950		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51611
7.5mm	0.2953	M8 X 0,5	8,0mm	79,0mm	41,0mm	34,0	36,0mm	63179
19/64	0.2969		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51348
7.6mm	0.2992		8,0mm	79,0mm	41,0	34,0	30,0mm	63764
N	0.3020		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51612
7.7mm	0.3031		8,0mm	79,0mm	41,0	34,0	36,0	63765
7.8mm	0.3071	M9 X 1,25	8,0mm	79,0mm	41,0mm	34,0	36,0mm	63180
7.9mm	0.3110		8,0mm	79,0mm	41,0	34,0	36,0	63766
5/16	0.3125	3/8-16	5/16	3-1/8	1-9/16	1-3/16	1-7/16	51349
8mm	0.3150	M9 X 1	8,0mm	79,0mm	41,0mm	34,0	36,0mm	63181
O	0.3160		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51613
8.1mm	0.3189		10,0mm	89,0mm	47,0mm	40,0	40,0	63767
8.2mm	0.3228		10,0mm	89,0mm	47,0mm	40,0	40,0	63768
P	0.3230		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51614
8.3mm	0.3268		10,0mm	89,0mm	41,0	40,0	40,0	63769
21/64	0.3281	3/8-20	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51350
8.4mm	0.3307		10,0mm	89,0	47,0mm	40,0	40,0mm	63182
Q	0.3320	3/8-24	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51351
8.5mm	0.3346	M10 X 1,5	10,0mm	89,0	47,0mm	40,0	40,0mm	63183
8.6mm	0.3386		10,0mm	89,0mm	47,0	40,0	40,0	63770

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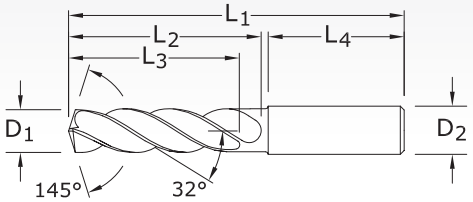
Hi-PerCarb Double Margin Drills

HI-PERCARB
HIGH PERFORMANCE CARBIDE DRILLS



135 3xD

FRACTIONAL & METRIC SERIES

TECH INFO 149–150

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	EDP NO.
R	0.3390		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51615
8.7mm	0.3425		10,0mm	89,0mm	47,0	40,0	40,0	63771
11/32	0.3438	3/8-32	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51352
8.8mm	0.3465	M10 X 1,25	10,0mm	89,0	47,0mm	40,0	40,0mm	63184
S	0.3480		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51616
8.9mm	0.3504		10,0mm	89,0mm	47,0	40,0	40,0	63772
9mm	0.3543	M10 X 1	10,0mm	89,0	47,0mm	40,0	40,0mm	63185
T	0.3580		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51617
9.1mm	0.3583		10,0mm	89,0mm	47,0	40,0	40,0	63773
23/64	0.3594		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51353
9.2mm	0.3622	M10 X 0,75	10,0mm	89,0mm	47,0	40,0	40,0	63774
9.25mm	0.3642		10,0mm	89,0	47,0mm	40,0	40,0mm	63186
9.3mm	0.3661		10,0mm	89,0mm	47,0	40,0	40,0	63775
U	0.3680	7/16-14	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51354
9.4mm	0.3701		10,0mm	89,0mm	47,0	40,0	40,0	63776
9.5mm	0.3740	M10 X 0,5	10,0mm	89,0	47,0mm	40,0	40,0mm	63187
3/8	0.3750		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51355
V	0.3770		1/2	3-1/2	1-27/32	1-37/64	1-9/16	51618
9.6mm	0.3780		10,0mm	89,0mm	47,0	40,0	40,0	63777
9.7mm	0.3819		10,0mm	89,0mm	47,0	40,0	40,0	63778
9.8mm	0.3858		10,0mm	89,0mm	47,0	40,0	40,0	63779
W	0.3860		1/2	3-1/2	1-27/32	1-37/64	2-9/16	51619
9.9mm	0.3898		10,0mm	89,0mm	47,0	40,0	40,0	63780
25/64	0.3906	7/16-20	1/2	3-1/2	1-27/32	1-37/64	1-9/16	51356
10mm	0.3937		10,0mm	89,0	47,0mm	40,0	40,0mm	63188
X	0.3970	7/16-24	1/2	4-1/16	2-3/11	1-51/64	1-49/64	51620
10.1mm	0.3976		12,0mm	102,0mm	33,0mm	55,0	45,0	63781
10.2mm	0.4016	M12 X 1,75	12,0mm	102,0	55,0mm	45,0	45,0mm	63189
Y	0.4040	7/16-28	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51621
10.3mm	0.4055		12,0mm	102,0mm	55,0	45,0	45,0	63782
13/32	0.4062		1/2	4-1/16	2-3/16	1-51/64	1-49/64	51357
10.4mm	0.4095		12,0mm	102,0mm	40,0mm	45,0	45,0	63783
Z	0.4130		1/2	4-1/16	2-3/16	1-51/64	1-49/64	51622
10.5mm	0.4134	M12 X 1,5	12,0mm	102,0	55,0mm	45,0	45,0mm	63190
10.6mm	0.4173		12,0mm	102,0mm	55,0	45,0	45,0	63784
10.7mm	0.4213		12,0mm	102,0mm	55,0	45,0	45,0	63785
27/64	0.4219	1/2-13	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51358
10.8mm	0.4252	M12 X 1,25	12,0mm	102,0	55,0mm	45,0	45,0mm	63191
10.9mm	0.4291		12,0mm	102,0mm	55,0	45,0	45,0	63786
11mm	0.4331	M12 X 1	12,0mm	102,0	55,0mm	45,0	45,0mm	63192
11.1mm	0.4370		12,0mm	102,0mm	55,0	45,0	45,0	63787
7/16	0.4375	1/4-18 NPT	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51359
11.2mm	0.4409		12,0mm	102,0mm	55,0	45,0	45,0	63788
11.25mm	0.4429		12,0mm	102,0	55,0mm	45,0	45,0	63193

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
D_1 = +.00008/+.00047
D_2 = h_6

>.1181–.2362 DIAMETER
D_1 = +.00016/+.00063
D_2 = h_6

>.2362–.3937 DIAMETER
D_1 = +.00024/+.00083
D_2 = h_6

>.3937–.7087 DIAMETER
D_1 = +.00028/+.00098
D_2 = h_6

>.7087–1.1811 DIAMETER
D_1 = +.00031/+.00114
D_2 = h_6

TOLERANCES (mm)

≤3 DIAMETER
D_1 = +0,002/+0,012
D_2 = h_6

>3–6 DIAMETER
D_1 = +0,004/+0,016
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,006/+0,021
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,007/+0,025
D_2 = h_6

>18–30 DIAMETER
D_1 = +0,008/+0,029
D_2 = h_6

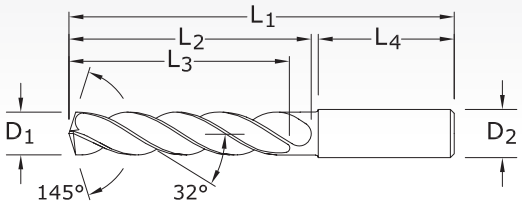
Hi-PerCarb Double Margin Drills

135 3xD
FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER D_1	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	SHANK LENGTH L_4	Ti-NAMITE-A (AlTiN) EDP NO.
11.3mm	0.4449		12,0mm	102,0mm	55,0	45,0	45,0	63789
11.4mm	0.4488		12,0mm	102,0mm	55,0	45,0	45,0	63790
11.5mm	0.4528	M12 X 0,5	12,0mm	102,0	55,0mm	45,0	45,0mm	63194
29/64	0.4531	1/2-20	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51360
11.6mm	0.4567		12,0mm	102,0mm	55,0	45,0	45,0	63791
11.7mm	0.4606		12,0mm	102,0mm	55,0	45,0	45,0	63792
11.8mm	0.4646		12,0mm	102,0mm	55,0	45,0	45,0	63793
11.9mm	0.4685		12,0mm	102,0mm	55,0	45,0	45,0	63794
15/32	0.4688	1/2-28	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51361
12mm	0.4724	M14 X 2	12,0mm	102,0	55,0mm	45,0	45,0mm	63195
31/64	0.4844	9/16-12	1/2	4-1/4	2-5/16	1-7/8	1-49/64	51362
12.5mm	0.4921	M14 X 1,5	14,0mm	107,0	60,0mm	45,0	45,0mm	63196
1/2	0.5000		1/2	4-1/4	2-5/16	1-7/8	1-49/64	51363
12.8mm	0.5039	M14 X 1,25	14,0mm	107,0	60,0mm	45,0	45,0mm	63197
13mm	0.5118	M14 X 1	14,0mm	107,0	60,0mm	45,0	45,0mm	63198
33/64	0.5156	9/16-18	5/8	4-1/4	2-5/16	1-7/8	1-49/64	51364
17/32	0.5312	5/8-11	5/8	4-1/4	2-5/16	1-7/8	1-49/64	51365
13.5mm	0.5315		14,0mm	107,0	60,0mm	45,0	45,0mm	63199
35/64	0.5469	5/8-12	5/8	4-1/4	2-5/16	1-7/8	1-49/64	51783
14mm	0.5512	M16 X 2	14,0mm	107,0mm	60,0mm	49,0	45,0mm	63200
9/16	0.5625		5/8	4-9/16	2-1/2	2	1-57/64	51366
14.5mm	0.5709	M16 X 1,5	16,0mm	115,0mm	65,0mm	51,0	48,0mm	63201
37/64	0.5781	5/8-18	5/8	4-9/16	2-1/2	2	1-57/64	51367
15mm	0.5906	M16 X 1	16,0mm	115,0mm	65,0mm	51,0	48,0mm	63202
19/32	0.5938	11/16-11	5/8	4-9/16	2-1/2	2	1-57/64	51784
39/64	0.6094	11/16-12	5/8	4-9/16	2-1/2	2	1-57/64	51785
15.5mm	0.6102	M18 X 2,5	16,0mm	115,0mm	65,0mm	51,0	48,0mm	63203
5/8	0.6250	11/16-16	5/8	4-9/16	2-1/2	2	1-57/64	51368
16mm	0.6299		16,0mm	115,0mm	65,0mm	51,0	48,0mm	63204
41/64	0.6406	11/16-24	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51786
16.5mm	0.6496	M18 X 1,5	18,0mm	123,0mm	73,0mm	58,0	48,0mm	63205
21/32	0.6562	3/4-10	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51369
17mm	0.6693		18,0mm	123,0mm	73,0mm	58,0	48,0mm	63206
43/64	0.6719	3/4-12	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51787
11/16	0.6875	3/4-16	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51370
17.5mm	0.6890	M20 X 2,5	18,0mm	123,0mm	73,0mm	58,0	48,0mm	63207
45/64	0.7031	3/4-20, 1/2-14	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51788
18mm	0.7087		18,0mm	131,0mm	73,0mm	58,0	48,0mm	63208
23/32	0.7188		3/4	4-7/8	2-3/4	2-5/16	1-57/64	51789
18.5mm	0.7283	M20 X 1,5	20,0mm	131,0mm	79,0mm	63,0	50,0mm	63209
47/64	0.7344	13/16-12	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51790
19mm	0.7480		20,0mm	131,0mm	79,0mm	63,0	50,0mm	63210
3/4	0.7500	13/16-16	3/4	5-1/4	3-1/16	2-7/16	1-31/32	51371
49/64	0.7656	7/8-9	7/8	5-1/4	3-1/16	2-7/16	1-31/32	51372
19.5mm	0.7677	M22 X 2,5	20,0mm	131,0mm	79,0mm	63,0	50,0mm	63211
25/32	0.7812		7/8	6	3-11/16	2-11/16	2-1/8	51791
20mm	0.7874		20,0mm	131,0mm	79,0mm	63,0	50,0mm	63212
51/64	0.7969	7/8-12	7/8	6	3-11/16	2-11/16	2-1/8	51792
13/16	0.8125	7/8-14	7/8	6	3-11/16	2-11/16	2-1/8	51373
7/8	0.8750	15/16-16, 1-8	7/8	6	3-11/16	2-11/16	2-1/8	51374
59/64	0.9219	1-12	1	6	3-11/16	2-11/16	2-1/8	51375

Hi-PerCarb Double Margin Drills



135 5xD
FRACTIONAL SERIES

TECH INFO 151

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	inch					EDP NO.
			SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	
1/8	0.1250		1/4	3	1	53/64	1-15/16	51580
#30	0.1285		1/4	3	1	53/64	1-15/16	51581
#29	0.1360	8-32,8-36	1/4	3	1	53/64	1-15/16	51582
9/64	0.1406		1/4	3	1	53/64	1-15/16	51583
#25	0.1495	10-24	1/4	3-1/4	1-1/4	1-5/64	1-15/16	51584
5/32	0.1562		1/4	3-1/4	1-1/4	1-5/64	1-15/16	51585
#21	0.1590	10-32	1/4	3-1/4	1-1/4	1-5/64	1-15/16	51586
#20	0.1610	13/64-24	1/4	3-1/4	1-1/4	1-5/64	1-15/16	51587
11/64	0.1719		1/4	3-1/4	1-1/4	1-5/64	1-15/16	51588
3/16	0.1875		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51589
#07	0.2010	1/4-20	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51506
13/64	0.2031		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51507
#05	0.2055		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51590
#04	0.2090	1/4-24	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51508
#03	0.2090	1/4-28	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51509
7/32	0.2188	1/4-32	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51510
15/64	0.2344		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51591
1/4	0.2500		1/4	3-5/8	2-5/64	1-51/64	1-7/16	51511
F	0.2570	5/16-18	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51512
17/64	0.2656	5/16-20	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51513
I	0.2720	5/16-24	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51514
9/32	0.2812	5/16-32	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51515
19/64	0.2969		5/16	3-5/8	2-5/64	1-51/64	1-7/16	51516
5/16	0.3125	3/8-16	5/16	3-5/8	2-5/64	1-51/64	1-7/16	51517
P	0.3230		3/8	4	2-13/32	2-1/8	1-9/16	51518
21/64	0.3281	3/8-20	3/8	4	2-13/32	2-1/8	1-9/16	51519
Q	0.3320	3/8-24	3/8	4	2-13/32	2-1/8	1-9/16	51520
11/32	0.3438	3/8-32	3/8	4	2-13/32	2-1/8	1-9/16	51521
S	0.3480		3/8	4	2-13/32	2-1/8	1-9/16	51522
23/64	0.3594		3/8	4	2-13/32	2-1/8	1-9/16	51523

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TOLERANCES (inch)

≤.1181 DIAMETER
D_1 = +.00008/+.00047
D_2 = h_6

>.1181–.2362 DIAMETER
D_1 = +.00016/+.00063
D_2 = h_6

>.2362–.3937 DIAMETER
D_1 = +.00024/+.00083
D_2 = h_6

>.3937–.7087 DIAMETER
D_1 = +.00028/+.00098
D_2 = h_6

>.7087–1.1811 DIAMETER
D_1 = +.00031/+.00114
D_2 = h_6

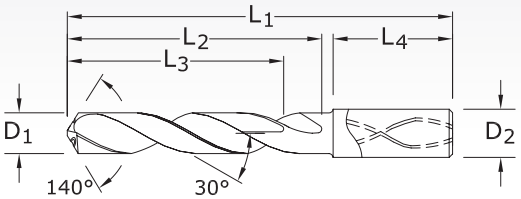
Hi-PerCarb Double Margin Drills

135 5xD
FRACTIONAL SERIES

CONTINUED

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	inch					EDP NO.
			SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	
U	0.3680	7/16-14	3/8	4	2-13/32	2-1/8	1-9/16	51524
3/8	0.3750		3/8	4	2-13/32	2-1/8	1-9/16	51525
W	0.3860		1/2	4	2-13/32	2-1/8	1-9/16	51526
25/64	0.3906	7/16-20	1/2	4	2-13/32	2-1/8	1-9/16	51527
13/32	0.4062		1/2	4-11/16	2-3/4	2-23/64	1-49/64	51528
27/64	0.4219	1/2-13	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51529
7/16	0.4375	1/4-18 NPT	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51530
29/64	0.4531	1/2-20	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51531
15/32	0.4688	1/2-28	1/2	4-11/16	2-3/4	2-23/64	1-49/64	51532
31/64	0.4844	9/16-12	1/2	4-7/8	3-1/32	2-19/32	1-49/64	51533
1/2	0.5000		1/2	4-7/8	3-1/32	2-19/32	1-49/64	51534
33/64	0.5156	9/16-18	5/8	4-7/8	3-1/32	2-19/32	1-49/64	51535
17/32	0.5312	5/8-11	5/8	4-7/8	3-1/32	2-19/32	1-49/64	51536
35/64	0.5469	5/8-12	5/8	4-7/8	3-1/32	2-19/32	1-49/64	51537
9/16	0.5625		5/8	5-1/4	3-1/4	2-3/4	1-57/64	51538
37/64	0.5781	5/8-18	5/8	5-1/4	3-1/4	2-3/4	1-57/64	51539
19/32	0.5938	11/16-11	5/8	5-1/4	3-1/4	2-3/4	1-57/64	51592
39/64	0.6094	11/16-12	5/8	5-1/4	3-1/4	2-3/4	1-57/64	51593
5/8	0.6250	11/16-16	5/8	5-1/4	3-1/4	2-3/4	1-57/64	51540
41/64	0.6406	11/16-24	3/4	5-5/8	3-5/8	3-3/16	1-57/64	51594
21/32	0.6562	3/4-10	3/4	5-5/8	3-5/8	3-3/16	1-57/64	51541
43/64	0.6719	3/4-12	3/4	5-5/8	3-5/8	3-3/16	1-57/64	51595
11/16	0.6875	3/4-16	3/4	5-5/8	3-5/8	3-3/16	1-57/64	51542
45/64	0.7031	3/4-20, 1/2-14 NPT	3/4	5-5/8	3-5/8	3-3/16	1-57/64	51543
23/32	0.7188		3/4	6	4	3-3/8	1-31/32	51596
47/64	0.7344	13/16-12	3/4	6	4	3-3/8	1-31/32	51544
3/4	0.7500	13/16-16	3/4	6	4	3-3/8	1-31/32	51545

ICe-Carb Internal Coolant Drills



140 5xD

FRACTIONAL & METRIC SERIES

TECH INFO 152–153

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	mm SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	EDP NO. Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	
3,0 mm	0.1181		6,0	66,0	28,0	23,0	36,0	63901
3,1 mm	0.1220		6,0	66,0	28,0	23,0	36,0	63902
1/8	0.1250		6,0	66,0	28,0	23,0	36,0	51901
3,2 mm	0.1260	M3,5 X 0,35	6,0	66,0	28,0	23,0	36,0	63903
3,3 mm	0.1299	M4 X 0,7	6,0	66,0	28,0	23,0	36,0	63904
3,4 mm	0.1339		6,0	66,0	28,0	23,0	36,0	63905
29	0.1360	8-32,8-36	6,0	66,0	28,0	23,0	36,0	51902
3,5 mm	0.1378	M4 X 0,5	6,0	66,0	28,0	23,0	36,0	63906
9/64	0.1406		6,0	66,0	28,0	23,0	36,0	51903
3,6 mm	0.1417	M4 X 0,35	6,0	66,0	28,0	23,0	36,0	63907
3,7 mm	0.1457	M4,5 X 0,75	6,0	66,0	28,0	23,0	36,0	63908
3,8 mm	0.1496	10-24	6,0	74,0	36,0	29,0	36,0	51904
3,9 mm	0.1535		6,0	74,0	36,0	29,0	36,0	63909
5/32	0.1562		6,0	74,0	36,0	29,0	36,0	51905
4,0 mm	0.1575	M4,5 X 0,5	6,0	74,0	36,0	29,0	36,0	63910
21	0.1590	10-32	6,0	74,0	36,0	29,0	36,0	51906
4,1 mm	0.1614		6,0	74,0	36,0	29,0	36,0	63911
4,2 mm	0.1654	M5 / M5 x 0,75	6,0	74,0	36,0	29,0	36,0	63912
4,3 mm	0.1693		6,0	74,0	36,0	29,0	36,0	63913
11/64	0.1719		6,0	74,0	36,0	29,0	36,0	51907
4,4 mm	0.1732	12-24	6,0	74,0	36,0	29,0	36,0	63914
4,5 mm	0.1772	M5 X 0,5	6,0	74,0	36,0	29,0	36,0	63915
4,6 mm	0.1811	12-28,0	6,0	74,0	36,0	29,0	36,0	63916
4,7 mm	0.1850	12-32	6,0	74,0	36,0	29,0	36,0	63917
3/16	0.1875		6,0	82,0	44,0	35,0	36,0	51908
4,8 mm	0.1890	7/32-32	6,0	82,0	44,0	35,0	36,0	63918
4,9 mm	0.1929		6,0	82,0	44,0	35,0	36,0	63919
5,0 mm	0.1969	M6 X 1	6,0	82,0	44,0	35,0	36,0	63920
5,1 mm	0.2008	1/4-20	6,0	82,0	44,0	35,0	36,0	63900
13/64	0.2031		6,0	82,0	44,0	35,0	36,0	51910
5,2 mm	0.2047	M6 X 0,75	6,0	82,0	44,0	35,0	36,0	63921
5,3 mm	0.2087		6,0	82,0	44,0	35,0	36,0	63922

continued on next page

TOLERANCES (inch)

≤.1181 DIAMETER
D_1 = +.00008/+.00047
D_2 = h_6

>.1181–.2362 DIAMETER
D_1 = +.00016/+.00063
D_2 = h_6

>.2362–.3937 DIAMETER
D_1 = +.00024/+.00083
D_2 = h_6

>.3937–.7087 DIAMETER
D_1 = +.00028/+.00098
D_2 = h_6

>.7087–1.1811 DIAMETER
D_1 = +.00031/+.00114
D_2 = h_6

TOLERANCES (mm)

≤3 DIAMETER
D_1 = +0,002/+0,012
D_2 = h_6

>3–6 DIAMETER
D_1 = +0,004/+0,016
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,006/+0,021
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,007/+0,025
D_2 = h_6

>18–30 DIAMETER
D_1 = +0,008/+0,029
D_2 = h_6

ICe-Carb Internal Coolant Drills

140 5xD
FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	mm					EDP NO.
			SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	
5,4 mm	0.2126		6,0	82,0	44,0	35,0	36,0	63998
5,5 mm	0.2165	M6 X 0,5	6,0	82,0	44,0	35,0	36,0	63923
7/32	0.2188	1/4-32	6,0	82,0	44,0	35,0	36,0	51912
5,6 mm	0.2205		6,0	82,0	44,0	35,0	36,0	63924
5,7 mm	0.2244		6,0	82,0	44,0	35,0	36,0	63925
5,8 mm	0.2283		6,0	82,0	44,0	35,0	36,0	63926
5,9 mm	0.2323		6,0	82,0	44,0	35,0	36,0	63927
15/64	0.2344		6,0	82,0	44,0	35,0	36,0	51913
6,0 mm	0.2362	M7 X 1	6,0	82,0	44,0	35,0	36,0	63928,0
6,1 mm	0.2402		8,0	91,0	53,0	43,0	36,0	63929
6,2 mm	0.2441	M7 X 0,75	8,0	91,0	53,0	43,0	36,0	63930
6,3 mm	0.2480		8,0	91,0	53,0	43,0	36,0	63931
1/4	0.2500		8,0	91,0	53,0	43,0	36,0	51914
6,4 mm	0.2520		8,0	91,0	53,0	43,0	36,0	63932
6,5 mm	0.2559		8,0	91,0	53,0	43,0	36,0	63933
F	0.2570	5/16-18	8,0	91,0	53,0	43,0	36,0	51915
6,6 mm	0.2598		8,0	91,0	53,0	43,0	36,0	63934
6,7 mm	0.2638		8,0	91,0	53,0	43,0	36,0	63935
17/64	0.2657	5/16-20	8,0	91,0	53,0	43,0	36,0	51916
6,8 mm	0.2677	M8 X 1,25	8,0	91,0	53,0	43,0	36,0	63936
6,9 mm	0.2717	5/16-24	8,0	91,0	53,0	43,0	36,0	63999
7,0 mm	0.2756	M8 X 1	8,0	91,0	53,0	43,0	36,0	63937
7,1 mm	0.2795		8,0	91,0	53,0	43,0	36,0	63938
9/32	0.2812	5/16-32	8,0	91,0	53,0	43,0	36,0	51918
7,2 mm	0.2835	M8 X 0,75	8,0	91,0	53,0	43,0	36,0	63939
7,3 mm	0.2874		8,0	91,0	53,0	43,0	36,0	63940
7,4 mm	0.2913		8,0	91,0	53,0	43,0	36,0	63941
7,5 mm	0.2953	M8 X 0,5	8,0	91,0	53,0	43,0	36,0	63942
19/64	0.2969		8,0	91,0	53,0	43,0	36,0	51919
7,6 mm	0.2992		8,0	91,0	53,0	43,0	36,0	63943
7,7 mm	0.3031		8,0	91,0	53,0	43,0	36,0	63944
7,8 mm	0.3071	M9 X 1,25	8,0	91,0	53,0	43,0	36,0	63945
7,9 mm	0.3110		8,0	91,0	53,0	43,0	36,0	63946
5/16	0.3125	3/8-16	8,0	91,0	53,0	43,0	36,0	51920
8,0 mm	0.3150	M9 X 1	8,0	91,0	53,0	43,0	36,0	63947
8,1 mm	0.3189		10,0	103,0	61,0	49,0	40,0	63948
8,2 mm	0.3228		10,0	103,0	61,0	49,0	40,0	63949
8,3 mm	0.3268		10,0	103,0	61,0	49,0	40,0	63950

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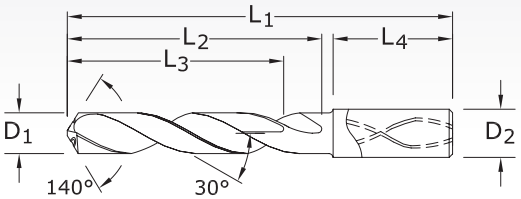
ICe-Carb Internal Coolant Drills



140 5xD

FRACTIONAL & METRIC SERIES

TECH INFO 152–153

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	mm SHANK DIAMETER	mm OVERALL LENGTH	mm FLUTE LENGTH	mm CLEARED LENGTH	mm SHANK LENGTH	EDP NO. Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	
21/64	0.3281	3/8-20	10,0	103,0	61,0	49,0	40,0	51921
8,4 mm	0.3307		10,0	103,0	61,0	49,0	40,0	63951
Q	0.3320	3/8-24	10,0	103,0	61,0	49,0	40,0	51922
8,5 mm	0.3346	M10 X 1,5	10,0	103,0	61,0	49,0	40,0	63952
8,6 mm	0.3386		10,0	103,0	61,0	49,0	40,0	63953
8,7 mm	0.3425		10,0	103,0	61,0	49,0	40,0	63954
11/32	0.3438	3/8-32	10,0	103,0	61,0	49,0	40,0	51923
8,8 mm	0.3465	M10 X 1,25	10,0	103,0	61,0	49,0	40,0	63955
8,9 mm	0.3504		10,0	103,0	61,0	49,0	40,0	63956
9,0 mm	0.3543	M10 X 1	10,0	103,0	61,0	49,0	40,0	63957
9,1 mm	0.3583		10,0	103,0	61,0	49,0	40,0	63958
23/64	0.3594		10,0	103,0	61,0	49,0	40,0	51924
9,2 mm	0.3622	M10 X 0,75	10,0	103,0	61,0	49,0	40,0	63959
9,3 mm	0.3661		10,0	103,0	61,0	49,0	40,0	63960
U	0.3680	7/16-14	10,0	103,0	61,0	49,0	40,0	51925
9,4 mm	0.3701		10,0	103,0	61,0	49,0	40,0	63961
9,5 mm	0.3740	M11 / M10 X 0,5	10,0	103,0	61,0	49,0	40,0	63962
3/8	0.3750		10,0	103,0	61,0	49,0	40,0	51926
9,6 mm	0.3780		10,0	103,0	61,0	49,0	40,0	63963
9,7 mm	0.3819		10,0	103,0	61,0	49,0	40,0	63964
9,8 mm	0.3858		10,0	103,0	61,0	49,0	40,0	63965
9,9 mm	0.3898		10,0	103,0	61,0	49,0	40,0	63966
25/64	0.3906	7/16-20	10,0	103,0	61,0	49,0	40,0	51927
10,0 mm	0.3937		10,0	103,0	61,0	49,0	40,0	63967
10,1 mm	0.3976		12,0	118,0	71,0	56,0	45,0	63968
10,2 mm	0.4016	M12 X 1,75	12,0	118,0	71,0	56,0	45,0	63969
10,3 mm	0.4055		12,0	118,0	71,0	56,0	45,0	63970
13/32	0.4062		12,0	118,0	71,0	56,0	45,0	51928
10,4 mm	0.4094		12,0	118,0	71,0	56,0	45,0	63971
10,5 mm	0.4134	M12 X 1,5	12,0	118,0	71,0	56,0	45,0	63972
10,6 mm	0.4173		12,0	118,0	71,0	56,0	45,0	63973
10,7 mm	0.4213		12,0	118,0	71,0	56,0	45,0	63974

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TOLERANCES (inch)

≤.1181 DIAMETER
D_1 = +.00008/+.00047
D_2 = h_6

>.1181–.2362 DIAMETER
D_1 = +.00016/+.00063
D_2 = h_6

>.2362–.3937 DIAMETER
D_1 = +.00024/+.00083
D_2 = h_6

>.3937–.7087 DIAMETER
D_1 = +.00028/+.00098
D_2 = h_6

>.7087–1.1811 DIAMETER
D_1 = +.00031/+.00114
D_2 = h_6

TOLERANCES (mm)

≤3 DIAMETER
D_1 = +0,002/+0,012
D_2 = h_6

>3–6 DIAMETER
D_1 = +0,004/+0,016
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,006/+0,021
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,007/+0,025
D_2 = h_6

>18–30 DIAMETER
D_1 = +0,008/+0,029
D_2 = h_6

ICe-Carb Internal Coolant Drills

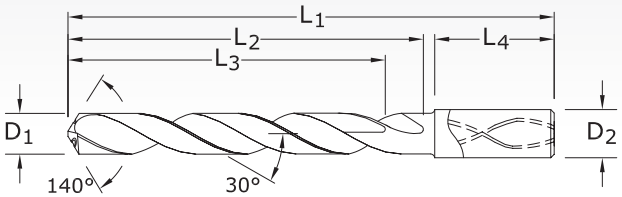
140 5xD

FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	mm					EDP NO.
			SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	
27/64	0.4219	1/2-13	12,0	118,0	71,0	56,0	45,0	51929
10,8 mm	0.4252	M12 X 1,25	12,0	118,0	71,0	56,0	45,0	63975
10,9 mm	0.4291		12,0	118,0	71,0	56,0	45,0	63976
11,0 mm	0.4331	M12 X 1	12,0	118,0	71,0	56,0	45,0	63977
11,1 mm	0.4370		12,0	118,0	71,0	56,0	45,0	63978
7/16	0.4375	1/4-18NPT	12,0	118,0	71,0	56,0	45,0	51930
11,2 mm	0.4409		12,0	118,0	71,0	56,0	45,0	63979
11,3 mm	0.4449		12,0	118,0	71,0	56,0	45,0	63980
11,4 mm	0.4488		12,0	118,0	71,0	56,0	45,0	63981
11,5 mm	0.4528	M12 X 0,5	12,0	118,0	71,0	56,0	45,0	64000
11,6 mm	0.4567		12,0	118,0	71,0	56,0	45,0	63982
11,7 mm	0.4606		12,0	118,0	71,0	56,0	45,0	63983
11,8 mm	0.4646		12,0	118,0	71,0	56,0	45,0	63984
11,9 mm	0.4685		12,0	118,0	71,0	56,0	45,0	63985
15/32	0.4688	1/2-28,0	12,0	118,0	71,0	56,0	45,0	51932
12,0 mm	0.4724	M14 X 2	12,0	118,0	71,0	56,0	45,0	63986
31/64	0.4844	9/16-12	14,0	124,0	77,0	60,0	45,0	51933
12,5 mm	0.4921	M14 X 1,5	14,0	124,0	77,0	60,0	45,0	63987
1/2	0.5000		14,0	124,0	77,0	60,0	45,0	51934
12,8 mm	0.5039	M14 X 1,25	14,0	124,0	77,0	60,0	45,0	63988
13,0 mm	0.5118	M14 X 1	14,0	124,0	77,0	60,0	45,0	63989
33/64	0.5156	9/16-18	14,0	124,0	77,0	60,0	45,0	51935
13,5 mm	0.5315	5/8-11	14,0	124,0	77,0	60,0	45,0	64001
13,8 mm	0.5433		14,0	124,0	77,0	60,0	45,0	63990
14,0 mm	0.5512	M16 X 2	14,0	124,0	77,0	60,0	45,0	63991
9/16	0.5625		16,0	133,0	83,0	63,0	48,0	51937
14,5 mm	0.5709	M16 X 1,5	16,0	133,0	83,0	63,0	48,0	63992
37/64	0.5781	5/8-18	16,0	133,0	83,0	63,0	48,0	51938
14,8 mm	0.5827		16,0	133,0	83,0	63,0	48,0	63993
15,0 mm	0.5906	M16 X 1	16,0	133,0	83,0	63,0	48,0	63994
15,5 mm	0.6102	M18 X 2,5	16,0	133,0	83,0	63,0	48,0	63995
15,8 mm	0.6220		16,0	133,0	83,0	63,0	48,0	63996
5/8	0.6250	11/16-16	16,0	133,0	83,0	63,0	48,0	51939
16,0 mm	0.6299		16,0	133,0	83,0	63,0	48,0	63997
21/32	0.6562	3/4-10	18,0	143,0	93,0	71,0	48,0	51940
11/16	0.6875	3/4-16	18,0	143,0	93,0	71,0	48,0	51941
3/4	0.7500	13/16-16	20,0	153,0	101,0	77,0	50,0	51942

ICe-Carb Internal Coolant Drills



140 8xD

FRACTIONAL & METRIC SERIES

TECH INFO 154–155

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	mm SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	EDP NO. Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	
3,0 mm	0.1181		6,0	72,0	34,0	29,0	36,0	63575
3,1 mm	0.1220		6,0	72,0	34,0	29,0	36,0	63576
1/8	0.1250		6,0	72,0	34,0	29,0	36,0	51801
3,2 mm	0.1260	M3,5 X 0,35	6,0	72,0	34,0	29,0	36,0	63577
3,3 mm	0.1299	M4 X 0,7	6,0	72,0	34,0	29,0	36,0	63578
3,4 mm	0.1339		6,0	72,0	34,0	29,0	36,0	63579
#29	0.1360	8-32,8-36	6,0	72,0	34,0	29,0	36,0	51802
3,5 mm	0.1378	M4 X 0, 5	6,0	72,0	34,0	29,0	36,0	63580
9/64	0.1406		6,0	72,0	34,0	29,0	36,0	51803
3,6 mm	0.1417	M4 X 0,35	6,0	72,0	34,0	29,0	36,0	63581
3,7 mm	0.1457	M4,5 X 0,75	6,0	72,0	34,0	29,0	36,0	63582
3,8 mm	0.1496	10-24	6,0	81,0	43,0	36,0	36,0	63583
3,9 mm	0.1535		6,0	81,0	43,0	36,0	36,0	63584
5/32	0.1562		6,0	81,0	43,0	36,0	36,0	51804
4,0 mm	0.1575	M4,5 X 0,5	6,0	81,0	43,0	36,0	36,0	63585
#21	0.1590	10-32	6,0	81,0	43,0	36,0	36,0	51805
4,1 mm	0.1614		6,0	81,0	43,0	36,0	36,0	63586
4,2 mm	0.1654	M5 / M5 x 0,75	6,0	81,0	43,0	36,0	36,0	63587
4,3 mm	0.1693		6,0	81,0	43,0	36,0	36,0	63588
11/64	0.1719		6,0	81,0	43,0	36,0	36,0	51806
4,4 mm	0.1732	12-24	6,0	81,0	43,0	36,0	36,0	63589
4,5 mm	0.1772	M5 X 0,5	6,0	81,0	43,0	36,0	36,0	63590
4,6 mm	0.1811	12-28	6,0	81,0	43,0	36,0	36,0	63591
4,7 mm	0.1850	12-32	6,0	81,0	43,0	36,0	36,0	63592
3/16	0.1875		6,0	95,0	57,0	48,0	36,0	51807
4,8 mm	0.1890	7/32-32	6,0	95,0	57,0	48,0	36,0	63593
4,9 mm	0.1929		6,0	95,0	57,0	48,0	36,0	63594
5,0 mm	0.1969	M6 X 1	6,0	95,0	57,0	48,0	36,0	63595
5,1 mm	0.2008	1/4-20	6,0	95,0	57,0	48,0	36,0	63596
13/64	0.2031		6,0	95,0	57,0	48,0	36,0	51808
5,2 mm	0.2047	M6 X 0,75	6,0	95,0	57,0	48,0	36,0	63597
5,3 mm	0.2087		6,0	95,0	57,0	48,0	36,0	63598

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TOLERANCES (inch)

≤.1181 DIAMETER
D_1 = +.00008/+.00047
D_2 = h_6

>.1181–.2362 DIAMETER
D_1 = +.00016/+.00063
D_2 = h_6

>.2362–.3937 DIAMETER
D_1 = +.00024/+.00083
D_2 = h_6

>.3937–.7087 DIAMETER
D_1 = +.00028/+.00098
D_2 = h_6

>.7087–1.1811 DIAMETER
D_1 = +.00031/+.00114
D_2 = h_6

TOLERANCES (mm)

≤3 DIAMETER
D_1 = +0,002/+0,012
D_2 = h_6

>3–6 DIAMETER
D_1 = +0,004/+0,016
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,006/+0,021
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,007/+0,025
D_2 = h_6

>18–30 DIAMETER
D_1 = +0,008/+0,029
D_2 = h_6

ICe-Carb Internal Coolant Drills

140 8xD

FRACTIONAL & METRIC SERIES

CONTINUED

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	mm					EDP NO.
			SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	
5,4 mm	0.2126		6,0	95,0	57,0	48,0	36,0	63599
5,5 mm	0.2165	M6 X 0,5	6,0	95,0	57,0	48,0	36,0	63600
7/32	0.2188	1/4-32	6,0	95,0	57,0	48,0	36,0	51809
5,6 mm	0.2205		6,0	95,0	57,0	48,0	36,0	63601
5,7 mm	0.2244		6,0	95,0	57,0	48,0	36,0	63602
5,8 mm	0.2283		6,0	95,0	57,0	48,0	36,0	63603
5,9 mm	0.2323		6,0	95,0	57,0	48,0	36,0	63604
15/64	0.2344		6,0	95,0	57,0	48,0	36,0	51810
6,0 mm	0.2362	M7 X 1	6,0	95,0	57,0	48,0	36,0	63605
6,1 mm	0.2402		8,0	114,0	76,0	64,0	36,0	63606
6,2 mm	0.2441	M7 X 0,75	8,0	114,0	76,0	64,0	36,0	63607
6,3 mm	0.2480		8,0	114,0	76,0	64,0	36,0	63608
1/4	0.2500		8,0	114,0	76,0	64,0	36,0	51811
6,4 mm	0.2520		8,0	114,0	76,0	64,0	36,0	63609
6,5 mm	0.2559		8,0	114,0	76,0	64,0	36,0	63610
F	0.2570	5/16-18	8,0	114,0	76,0	64,0	36,0	51812
6,6 mm	0.2598		8,0	114,0	76,0	64,0	36,0	63611
6,7 mm	0.2638		8,0	114,0	76,0	64,0	36,0	63612
17/64	0.2657	5/16-20	8,0	114,0	76,0	64,0	36,0	51813
6,8 mm	0.2677	M8 X 1,25	8,0	114,0	76,0	64,0	36,0	63613
6,9 mm	0.2717		8,0	114,0	76,0	64,0	36,0	63614
7,0 mm	0.2756	M8 X 1	8,0	114,0	76,0	64,0	36,0	63615
7,1 mm	0.2795		8,0	114,0	76,0	64,0	36,0	63616
9/32	0.2812	5/16-32	8,0	114,0	76,0	64,0	36,0	51814
7,2 mm	0.2835	M8 X 0,75	8,0	114,0	76,0	64,0	36,0	63617
7,3 mm	0.2874		8,0	114,0	76,0	64,0	36,0	63618
7,4 mm	0.2913		8,0	114,0	76,0	64,0	36,0	63619
7,5 mm	0.2953	M8 X 0,5	8,0	114,0	76,0	64,0	36,0	63620
19/64	0.2969		8,0	114,0	76,0	64,0	36,0	51815
7,6 mm	0.2992		8,0	114,0	76,0	64,0	36,0	63621
7,7 mm	0.3031		8,0	114,0	76,0	64,0	36,0	63622
7,8 mm	0.3071	M9 X 1,25	8,0	114,0	76,0	64,0	36,0	63623
7,9 mm	0.3110		8,0	114,0	76,0	64,0	36,0	63624
5/16	0.3125	3/8-16	8,0	114,0	76,0	64,0	36,0	51816
8,0 mm	0.3150	M9 X 1	8,0	114,0	76,0	64,0	36,0	63625
8,1 mm	0.3189		10,0	142,0	95,0	80,0	40,0	63626
8,2 mm	0.3228		10,0	142,0	95,0	80,0	40,0	63627
8,3 mm	0.3268		10,0	142,0	95,0	80,0	40,0	63628

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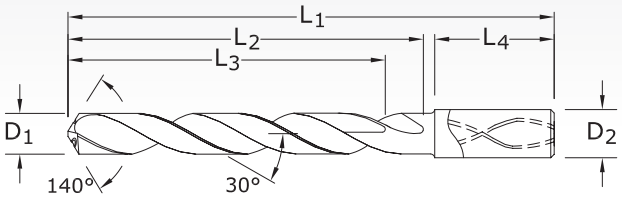
ICe-Carb Internal Coolant Drills



140 8xD

FRACTIONAL & METRIC SERIES

TECH INFO 154–155

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

CUTTING DIAMETER	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	mm SHANK DIAMETER	OVERALL LENGTH	FLUTE LENGTH	CLEARED LENGTH	SHANK LENGTH	EDP NO. Ti-NAMITE-A (AlTiN)
D_1			D_2	L_1	L_2	L_3	L_4	
21/64	0.3281	3/8-20	10,0	142,0	95,0	80,0	40,0	51817
8,4 mm	0.3307		10,0	142,0	95,0	80,0	40,0	63629
Q	0.3320	3/8-24	10,0	142,0	95,0	80,0	40,0	51818
8,5 mm	0.3346	M10 X 1,5	10,0	142,0	95,0	80,0	40,0	63630
8,6 mm	0.3386		10,0	142,0	95,0	80,0	40,0	63631
8,7 mm	0.3425		10,0	142,0	95,0	80,0	40,0	63632
11/32	0.3438	3/8-32	10,0	142,0	95,0	80,0	40,0	51819
8,8 mm	0.3465	M10 X 1,25	10,0	142,0	95,0	80,0	40,0	63633
8,9 mm	0.3504		10,0	142,0	95,0	80,0	40,0	63634
9,0 mm	0.3543	M10 X 1	10,0	142,0	95,0	80,0	40,0	63635
9,1 mm	0.3583		10,0	142,0	95,0	80,0	40,0	63636
23/64	0.3594		10,0	142,0	95,0	80,0	40,0	51820
9,2 mm	0.3622	M10 X 0,75	10,0	142,0	95,0	80,0	40,0	63637
9,3 mm	0.3661		10,0	142,0	95,0	80,0	40,0	63638
U	0.3680	7/16-14	10,0	142,0	95,0	80,0	40,0	51821
9,4 mm	0.3701		10,0	142,0	95,0	80,0	40,0	63639
9,5 mm	0.3740	M11 / M10 X 0,5	10,0	142,0	95,0	80,0	40,0	63640
3/8	0.3750		10,0	142,0	95,0	80,0	40,0	51822
9,6 mm	0.3780		10,0	142,0	95,0	80,0	40,0	63641
9,7 mm	0.3819		10,0	142,0	95,0	80,0	40,0	63642
9,8 mm	0.3858		10,0	142,0	95,0	80,0	40,0	63643
9,9 mm	0.3898		10,0	142,0	95,0	80,0	40,0	63644
25/64	0.3906	7/16-20	10,0	142,0	95,0	80,0	40,0	51823
10,0 mm	0.3937		10,0	142,0	95,0	80,0	40,0	63645
10,1 mm	0.3976		12,0	162,0	114,0	96,0	45,0	63646
10,2 mm	0.4016	M12 X 1,75	12,0	162,0	114,0	96,0	45,0	63647
10,3 mm	0.4055		12,0	162,0	114,0	96,0	45,0	63648
13/32	0.4062		12,0	162,0	114,0	96,0	45,0	51824
10,4 mm	0.4094		12,0	162,0	114,0	96,0	45,0	63649
10,5 mm	0.4134	M12 X 1,5	12,0	162,0	114,0	96,0	45,0	63650
10,6 mm	0.4173		12,0	162,0	114,0	96,0	45,0	63651
10,7 mm	0.4213		12,0	162,0	114,0	96,0	45,0	63652

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TOLERANCES (inch)

≤.1181 DIAMETER
D_1 = +.00008/+.00047
D_2 = h_6

>.1181–.2362 DIAMETER
D_1 = +.00016/+.00063
D_2 = h_6

>.2362–.3937 DIAMETER
D_1 = +.00024/+.00083
D_2 = h_6

>.3937–.7087 DIAMETER
D_1 = +.00028/+.00098
D_2 = h_6

>.7087–1.1811 DIAMETER
D_1 = +.00031/+.00114
D_2 = h_6

TOLERANCES (mm)

≤3 DIAMETER
D_1 = +0,002/+0,012
D_2 = h_6

>3–6 DIAMETER
D_1 = +0,004/+0,016
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,006/+0,021
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,007/+0,025
D_2 = h_6

>18–30 DIAMETER
D_1 = +0,008/+0,029
D_2 = h_6

ICe-Carb Internal Coolant Drills

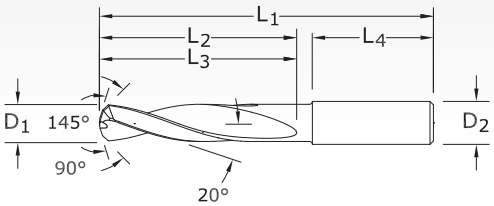
140 8xD

FRACTIONAL & METRIC SERIES

CONTINUED

			mm					EDP NO.
CUTTING DIAMETER D_1	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	SHANK LENGTH L_4	Ti-NAMITE-A (AlTiN)
27/64	0.4219	1/2-13	12,0	162,0	114,0	96,0	45,0	51825
10,8 mm	0.4252	M12 X 1,25	12,0	162,0	114,0	96,0	45,0	63653
10,9 mm	0.4291		12,0	162,0	114,0	96,0	45,0	63654
11,0 mm	0.4331	M12 X 1	12,0	162,0	114,0	96,0	45,0	63655
11,1 mm	0.4370		12,0	162,0	114,0	96,0	45,0	63656
7/16	0.4375	1/4-18NPT	12,0	162,0	114,0	96,0	45,0	51826
11,2 mm	0.4409		12,0	162,0	114,0	96,0	45,0	63657
11,3 mm	0.4449		12,0	162,0	114,0	96,0	45,0	63658
11,4 mm	0.4488		12,0	162,0	114,0	96,0	45,0	63659
11,5 mm	0.4528	M12 X 0,5	12,0	162,0	114,0	96,0	45,0	63660
11,6 mm	0.4567		12,0	162,0	114,0	96,0	45,0	63661
11,7 mm	0.4606		12,0	162,0	114,0	96,0	45,0	63662
11,8 mm	0.4646		12,0	162,0	114,0	96,0	45,0	63663
11,9 mm	0.4685		12,0	162,0	114,0	96,0	45,0	63664
15/32	0.4688	1/2-28	12,0	162,0	114,0	96,0	45,0	51827
12,0 mm	0.4724	M14 X 2	12,0	162,0	114,0	96,0	45,0	63665
31/64	0.4844	9/16-12	14,0	178,0	133,0	112,0	45,0	51828
12,5 mm	0.4921	M14 X 1,5	14,0	178,0	133,0	112,0	45,0	63666
1/2	0.5000		14,0	178,0	133,0	112,0	45,0	51829
12,8 mm	0.5039	M14 X 1,25	14,0	178,0	133,0	112,0	45,0	63667
13,0 mm	0.5118	M14 X 1	14,0	178,0	133,0	112,0	45,0	63668
33/64	0.5156	9/16-18	14,0	178,0	133,0	112,0	45,0	51830
13,5 mm	0.5315	5/8-11	14,0	178,0	133,0	112,0	45,0	63669
13,8 mm	0.5433		14,0	178,0	133,0	112,0	45,0	63670
14,0 mm	0.5512	M16 X 2	14,0	178,0	133,0	112,0	45,0	63671
9/16	0.5625		16,0	203,0	152,0	128,0	48,0	51831
14,5 mm	0.5709	M16 X 1,5	16,0	203,0	152,0	128,0	48,0	63672
37/64	0.5781	5/8-18	16,0	203,0	152,0	128,0	48,0	51832
14,8 mm	0.5827		16,0	203,0	152,0	128,0	48,0	63673
15,0 mm	0.5906	M16 X 1,5	16,0	203,0	152,0	128,0	48,0	63674
15,5 mm	0.6102	M18 X 2,5	16,0	203,0	152,0	128,0	48,0	63675
15,8 mm	0.6220		16,0	203,0	152,0	128,0	48,0	63676
5/8	0.6250	11/16-16	16,0	203,0	152,0	128,0	48,0	51833
16,0 mm	0.6299		16,0	203,0	152,0	128,0	48,0	63677
21/32	0.6562	3/4-10	18,0	222,0	171,0	144,0	48,0	51834
11/16	0.6875	3/4-16	18,0	222,0	171,0	144,0	48,0	51835
3/4	0.7500	13/16-16	20,0	243,0	190,0	160,0	50,0	51836

CFRP 8 Facet Drills



120
FRACTIONAL & METRIC SERIES

TECH INFO 156

CUTTING DIAMETER D_1	DECIMAL EQUIV.	SHANK DIAMETER D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2 / L_3	SHANK LENGTH L_4	Di-NAMITE (Diamond) EDP NO.
#40	0.0980	1/8	2	9/16	1-1/4	50000
2,7 mm	0.1063	6,0	63,0	20,0	32,0	50001
3,0 mm	0.1181	6,0	63,0	20,0	36,0	50002
1/8	0.1250	1/4	2-1/2	3/4	1-7/16	50003
3,2 mm	0.1260	6,0	63,0	20,0	36,0	50004
#30	0.1290	1/4	2-1/2	3/4	1-7/16	50005
#28	0.1410	1/4	2-1/2	3/4	1-7/16	50006
#22	0.1570	1/4	2-5/8	7/8	1-7/16	50007
#21	0.1590	1/4	2-5/8	7/8	1-7/16	50008
4,1 mm	0.1610	6,0	66,0	24,0	36,0	50009
#19	0.1660	1/4	2-5/8	7/8	1-7/16	50010
11/64	0.1720	1/4	2-5/8	7/8	1-7/16	50011
3/16	0.1880	1/4	2-5/8	1	1-7/16	50012
#11	0.1910	1/4	2-5/8	1	1-7/16	50013
#8	0.1990	1/4	2-5/8	1	1-7/16	50014
#7	0.2010	1/4	2-5/8	1	1-7/16	50015
#2	0.2210	1/4	2-5/8	1	1-7/16	50016
6,0 mm	0.2362	6,0	66,0	28,0	36,0	50017
1/4	0.2500	1/4	3-1/8	1-5/16	1-7/16	50018
.2510	0.2510	5/16	3-1/8	1-5/16	1-7/16	50019
F	0.2570	5/16	3-1/8	1-5/16	1-7/16	50020
I	0.2720	5/16	3-1/8	1-5/16	1-7/16	50021
J	0.2770	5/16	3-1/8	1-5/16	1-7/16	50022
K	0.2810	5/16	3-1/8	1-9/16	1-7/16	50023
5/16	0.3130	5/16	3-1/8	1-9/16	1-7/16	50024
8,0 mm	0.3150	8,0	79,0	41,0	36,0	50025
3/8	0.3750	3/8	3-1/2	1-27/32	1-9/16	50026
V	0.3770	1/2	3-1/2	1-27/32	1-9/16	50027
10,0 mm	0.3940	10,0	89,0	47,0	40,0	50028
7/16	0.4380	1/2	4-1/4	2-3/16	1-9/16	50029
12,0 mm	0.4720	12,0	102,0	55,0	45,0	50030
1/2	0.5000	1/2	4-1/4	2-5/16	1-3/4	50031

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

TOLERANCES (inch)

D_1 = +.0000/–.0005
D_2 = h_6

TOLERANCES (mm)

D_1 = +0,000/–0,013
D_2 = h_6

Speed & Feed Recommendations

Series 135 3xD Fractional	HARDNESS	SPEED	FEED (inch/rev)								
	BRINELL	sfm	1/64	1/32	1/16	1/8	1/4	3/8	1/2	5/8	7/8
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	400	0.00050	0.0010	0.0020	0.0040	0.0080	0.0120	0.0160	0.0200	0.0280
	> 200 ≤ 300	350	0.00045	0.0009	0.0018	0.0035	0.0070	0.0105	0.0140	0.0175	0.0245
	> 300 ≤ 420	160	0.00035	0.0008	0.0015	0.0030	0.0060	0.0090	0.0120	0.0150	0.0210
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	300	0.00035	0.0008	0.0015	0.0030	0.0060	0.0090	0.0120	0.0150	0.0210
	> 270 ≤ 370	220	0.00030	0.0006	0.0013	0.0025	0.0050	0.0075	0.0100	0.0125	0.0175
	> 370 ≤ 450	120	0.00020	0.0005	0.0009	0.0018	0.0035	0.0055	0.0070	0.0090	0.0125
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	220	0.00030	0.0006	0.0013	0.0025	0.0050	0.0075	0.0100	0.0125	0.0175
	> 250 ≤ 330	150	0.00020	0.0005	0.0009	0.0018	0.0035	0.0055	0.0070	0.0090	0.0125
	> 330 ≤ 450	70	0.00010	0.0003	0.0005	0.0010	0.0020	0.0030	0.0040	0.0050	0.0070
CAST IRON Gray, Malleable, Ductile	≤ 200	400	0.00060	0.0013	0.0025	0.0050	0.0100	0.0150	0.0200	0.0250	0.0350
	> 200 ≤ 330	250	0.00055	0.0011	0.0023	0.0045	0.0090	0.0135	0.0180	0.0225	0.0315
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 250	200	0.00030	0.0006	0.0013	0.0025	0.0050	0.0075	0.0100	0.0125	0.0175
	> 250 ≤ 330	150	0.00025	0.0005	0.0010	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140
STAINLESS (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	90	0.00020	0.0005	0.0009	0.0018	0.0035	0.0055	0.0070	0.0090	0.0125
	> 270 ≤ 370	70	0.00020	0.0004	0.0008	0.0015	0.0030	0.0045	0.0060	0.0075	0.0105
TITANIUM TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	120	0.00020	0.0005	0.0009	0.0018	0.0035	0.0055	0.0070	0.0090	0.0125
	> 280 ≤ 350	100	0.00020	0.0004	0.0008	0.0015	0.0030	0.0045	0.0060	0.0075	0.0105
	> 350 ≤ 440	70	0.00015	0.0003	0.0007	0.0013	0.0025	0.0040	0.0050	0.0065	0.0090
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	60	0.00010	0.0003	0.0005	0.0010	0.0020	0.0030	0.0040	0.0050	0.0070
	> 220 ≤ 330	40	0.00010	0.0002	0.0004	0.0008	0.0015	0.0025	0.0030	0.0040	0.0055
	> 330 ≤ 420	30	0.00005	0.0001	0.0003	0.0005	0.0010	0.0015	0.0020	0.0025	0.0035
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	700	0.00070	0.0014	0.0028	0.0055	0.0110	0.0165	0.0220	0.0275	0.0385
	> 80	600	0.00060	0.0013	0.0025	0.0050	0.0100	0.0150	0.0200	0.0250	0.0350
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	500	0.00025	0.0005	0.0010	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140
	> 140	400	0.00025	0.0005	0.0010	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140

Reduce speed & feed for materials harder than listed

$rpm = sfm \times 3.82 / D_1$

$ipm = (inch/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

HI-PERCARB®
HIGH PERFORMANCE CARBIDE DRILLS

Series 135 3xD Metric	HARDNESS	SPEED	FEED (mm/rev)						
	BRINELL	m/min	3	6	8	10	12	16	20
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	122	0.095	0.195	0.255	0.320	0.385	0.515	0.640
	> 200 ≤ 300	107	0.085	0.170	0.225	0.280	0.340	0.450	0.560
	> 300 ≤ 420	49	0.070	0.145	0.190	0.240	0.290	0.385	0.480
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	91	0.070	0.145	0.190	0.240	0.290	0.385	0.480
	> 270 ≤ 370	67	0.060	0.120	0.160	0.200	0.240	0.320	0.400
	> 370 ≤ 450	37	0.040	0.085	0.115	0.145	0.170	0.230	0.285
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	67	0.060	0.120	0.160	0.200	0.240	0.320	0.400
	> 250 ≤ 330	46	0.040	0.085	0.115	0.145	0.170	0.230	0.285
	> 330 ≤ 450	21	0.025	0.050	0.065	0.080	0.095	0.130	0.160
CAST IRON Gray, Malleable, Ductile	≤ 200	122	0.120	0.240	0.320	0.400	0.485	0.640	0.800
	> 200 ≤ 330	76	0.110	0.215	0.290	0.360	0.435	0.575	0.720
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 250	61	0.060	0.120	0.160	0.200	0.240	0.320	0.400
	> 250 ≤ 330	46	0.050	0.095	0.130	0.160	0.195	0.255	0.320
STAINLESS (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	27	0.040	0.085	0.115	0.145	0.170	0.230	0.285
	> 270 ≤ 370	21	0.035	0.070	0.095	0.120	0.145	0.190	0.240
TITANIUM TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	37	0.040	0.085	0.115	0.145	0.170	0.230	0.285
	> 280 ≤ 350	30	0.035	0.070	0.095	0.120	0.145	0.190	0.240
	> 350 ≤ 440	21	0.030	0.060	0.085	0.105	0.120	0.165	0.205
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	18	0.025	0.050	0.065	0.080	0.095	0.130	0.160
	> 220 ≤ 330	12	0.020	0.035	0.050	0.065	0.070	0.105	0.125
	> 330 ≤ 420	9	0.010	0.025	0.030	0.040	0.050	0.065	0.080
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	213	0.135	0.265	0.355	0.440	0.530	0.705	0.880
	> 80	183	0.120	0.240	0.320	0.400	0.485	0.640	0.800
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	152	0.050	0.095	0.130	0.160	0.195	0.255	0.320
	> 140	122	0.050	0.095	0.130	0.160	0.195	0.255	0.320

Reduce speed & feed for materials harder than listed

$rpm = (1000 \times m/min) / (3.14 \times D_1)$

$mm/min = (mm/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

HI-PERCARB
HIGH PERFORMANCE CARBIDE DRILLS

Speed & Feed Recommendations

Series 135 5xD Fractional	HARDNESS	SPEED	FEED (inch/rev)						
	BRINELL	sfm	1/8	3/16	1/4	3/8	1/2	5/8	3/4
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	360	0.00400	0.0060	0.0080	0.0120	0.0160	0.0200	0.0280
	> 200 ≤ 300	310	0.00350	0.0053	0.0070	0.0105	0.0140	0.0175	0.0245
	> 300 ≤ 420	150	0.00300	0.0045	0.0060	0.0090	0.0120	0.0150	0.0210
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	270	0.00300	0.0045	0.0060	0.0090	0.0120	0.0150	0.0210
	> 270 ≤ 370	200	0.00250	0.0038	0.0050	0.0075	0.0100	0.0125	0.0175
	> 370 ≤ 450	110	0.00175	0.0026	0.0035	0.0055	0.0070	0.0090	0.0125
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	200	0.00250	0.0038	0.0050	0.0075	0.0100	0.0125	0.0175
	> 250 ≤ 330	130	0.00175	0.0027	0.0035	0.0055	0.0070	0.0090	0.0125
	> 330 ≤ 450	60	0.00100	0.0015	0.0020	0.0030	0.0040	0.0050	0.0070
CAST IRON Gray, Malleable, Ductile	≤ 200	360	0.00500	0.0075	0.0100	0.0150	0.0200	0.0250	0.0350
	> 200 ≤ 330	230	0.00450	0.0068	0.0090	0.0135	0.0180	0.0225	0.0315
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 250	180	0.00250	0.0038	0.0050	0.0075	0.0100	0.0125	0.0175
	> 250 ≤ 330	130	0.00200	0.0030	0.0040	0.0060	0.0080	0.0100	0.0140
STAINLESS (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	80	0.00175	0.0026	0.0035	0.0055	0.0070	0.0090	0.0125
	> 270 ≤ 370	60	0.00150	0.0023	0.0030	0.0045	0.0060	0.0075	0.0105
TITANIUM TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	100	0.00175	0.0027	0.0035	0.0055	0.0070	0.0090	0.0125
	> 280 ≤ 350	80	0.00150	0.0023	0.0030	0.0045	0.0060	0.0075	0.0105
	> 350 ≤ 440	60	0.00125	0.0019	0.0025	0.0040	0.0050	0.0065	0.0090
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	50	0.00100	0.0015	0.0020	0.0030	0.0040	0.0050	0.0070
	> 220 ≤ 330	30	0.00075	0.0012	0.0015	0.0025	0.0030	0.0040	0.0055
	> 330 ≤ 420	20	0.00050	0.0008	0.0010	0.0015	0.0020	0.0025	0.0035
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	630	0.00550	0.0083	0.0110	0.0165	0.0220	0.0275	0.0385
	> 80	540	0.00500	0.0075	0.0100	0.0150	0.0200	0.0250	0.0350
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	450	0.00200	0.0030	0.0040	0.0060	0.0080	0.0100	0.0140
	> 140	360	0.00200	0.0030	0.0040	0.0060	0.0080	0.0100	0.0140

Reduce speed & feed for materials harder than listed

$rpm = sfm \times 3.82 / D_1$

$ipm = (inch/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

Series 140 5xD Fractional	HARDNESS	SPEED	FEED (inch/rev)						
	BRINELL	sfm	1/8	3/16	1/4	3/8	1/2	5/8	3/4
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	440	0.0040	0.0060	0.0080	0.0120	0.0160	0.0200	0.0240
	> 200 ≤ 300	380	0.0035	0.0053	0.0070	0.0105	0.0140	0.0175	0.0210
	> 300 ≤ 420	180	0.0030	0.0045	0.0060	0.0090	0.0120	0.0150	0.0180
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	330	0.0030	0.0045	0.0060	0.0090	0.0120	0.0150	0.0180
	> 270 ≤ 370	240	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0150
	> 370 ≤ 450	140	0.0018	0.0027	0.0035	0.0055	0.0070	0.0090	0.0110
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	240	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0150
	> 250 ≤ 330	180	0.0018	0.0026	0.0035	0.0055	0.0070	0.0090	0.0110
	> 330 ≤ 450	90	0.0010	0.0015	0.0020	0.0030	0.0040	0.0050	0.0060
CAST IRON Gray, Malleable, Ductile	≤ 200	440	0.0050	0.0075	0.0100	0.0150	0.0200	0.0250	0.0300
	> 200 ≤ 330	280	0.0045	0.0068	0.0090	0.0135	0.0180	0.0225	0.0270
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 250	220	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0150
	> 250 ≤ 330	170	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
STAINLESS (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	150	0.0018	0.0027	0.0035	0.0055	0.0070	0.0090	0.0110
	> 270 ≤ 370	120	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
TITANIUM TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	200	0.0018	0.0027	0.0035	0.0055	0.0070	0.0090	0.0110
	> 280 ≤ 350	160	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
	> 350 ≤ 440	120	0.0013	0.0019	0.0025	0.0040	0.0050	0.0065	0.0080
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	100	0.0010	0.0015	0.0020	0.0030	0.0040	0.0050	0.0060
	> 220 ≤ 330	70	0.0008	0.0012	0.0015	0.0025	0.0030	0.0040	0.0050
	> 330 ≤ 420	50	0.0005	0.0008	0.0010	0.0015	0.0020	0.0025	0.0030
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	770	0.0055	0.0083	0.0110	0.0165	0.0220	0.0275	0.0330
	> 80	660	0.0050	0.0075	0.0100	0.0150	0.0200	0.0250	0.0300
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	550	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
	> 140	440	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120

Reduce speed & feed for materials harder than listed

$rpm = sfm \times 3.82 / D_1$

$ipm = (inch/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

Series 140 5xD Metric	HARDNESS	SPEED	FEED (mm/rev)						
	BRINELL	m/min	3	6	8	10	12	14	16
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	134	0.145	0.195	0.255	0.320	0.385	0.450	0.515
	> 200 ≤ 300	116	0.125	0.170	0.225	0.280	0.340	0.395	0.450
	> 300 ≤ 420	55	0.110	0.145	0.190	0.240	0.290	0.335	0.385
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	101	0.110	0.145	0.190	0.240	0.290	0.335	0.385
	> 270 ≤ 370	73	0.090	0.120	0.160	0.200	0.240	0.280	0.320
	> 370 ≤ 450	43	0.065	0.085	0.115	0.145	0.170	0.200	0.230
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	73	0.090	0.120	0.160	0.200	0.240	0.280	0.320
	> 250 ≤ 330	55	0.065	0.085	0.115	0.145	0.170	0.200	0.230
	> 330 ≤ 450	27	0.035	0.050	0.065	0.080	0.095	0.110	0.130
CAST IRON Gray, Malleable, Ductile	≤ 200	134	0.180	0.240	0.320	0.400	0.485	0.560	0.640
	> 200 ≤ 330	85	0.165	0.215	0.290	0.360	0.435	0.505	0.575
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 250	67	0.090	0.120	0.160	0.200	0.240	0.280	0.320
	> 250 ≤ 330	52	0.070	0.095	0.130	0.160	0.195	0.225	0.255
STAINLESS (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	46	0.065	0.085	0.115	0.145	0.170	0.200	0.230
	> 270 ≤ 370	37	0.055	0.070	0.095	0.120	0.145	0.170	0.190
TITANIUM TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	61	0.065	0.085	0.115	0.145	0.170	0.200	0.230
	> 280 ≤ 350	49	0.055	0.070	0.095	0.120	0.145	0.170	0.190
	> 350 ≤ 440	37	0.045	0.060	0.085	0.105	0.120	0.145	0.165
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	30	0.035	0.050	0.065	0.080	0.095	0.110	0.130
	> 220 ≤ 330	21	0.030	0.035	0.050	0.065	0.070	0.090	0.105
	> 330 ≤ 420	15	0.020	0.025	0.030	0.040	0.050	0.055	0.065
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	235	0.200	0.265	0.355	0.440	0.530	0.620	0.705
	> 80	201	0.180	0.240	0.320	0.400	0.485	0.560	0.640
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	168	0.070	0.095	0.130	0.160	0.195	0.225	0.255
	> 140	134	0.070	0.095	0.130	0.160	0.195	0.225	0.255

Reduce speed & feed for materials harder than listed

$rpm = (1000 \times m/min) / (3.14 \times D_1)$

$mm/min = (mm/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

IC-Carb
High Performance Internal Coolant Drills

Series 140 8xD Fractional	HARDNESS	SPEED	FEED (inch/rev)						
	BRINELL	sfm	1/8	3/16	1/4	3/8	1/2	5/8	3/4
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	420	0.0035	0.0053	0.0070	0.0105	0.0140	0.0175	0.0210
	> 200 ≤ 300	370	0.0030	0.0045	0.0060	0.0090	0.0120	0.0150	0.0180
	> 300 ≤ 420	170	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0150
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	320	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0150
	> 270 ≤ 370	230	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
	> 370 ≤ 450	130	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	230	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
	> 250 ≤ 330	160	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
	> 330 ≤ 450	80	0.0008	0.0013	0.0015	0.0025	0.0030	0.0040	0.0045
CAST IRON Gray, Malleable, Ductile	≤ 200	420	0.0045	0.0068	0.0090	0.0135	0.0180	0.0225	0.0270
	> 200 ≤ 330	270	0.0040	0.0060	0.0080	0.0120	0.0160	0.0200	0.0240
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 250	210	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
	> 250 ≤ 330	160	0.0018	0.0028	0.0035	0.0055	0.0070	0.0090	0.0105
STAINLESS (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	130	0.0018	0.0028	0.0035	0.0055	0.0070	0.0090	0.0105
	> 270 ≤ 370	100	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
TITANIUM TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	180	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
	> 280 ≤ 350	140	0.0013	0.0020	0.0025	0.0040	0.0050	0.0065	0.0075
	> 350 ≤ 440	110	0.0010	0.0015	0.0020	0.0030	0.0040	0.0050	0.0060
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	80	0.0008	0.0013	0.0015	0.0025	0.0030	0.0040	0.0045
	> 220 ≤ 330	50	0.0005	0.0008	0.0010	0.0015	0.0020	0.0025	0.0030
	> 330 ≤ 420	35	0.0005	0.0008	0.0010	0.0015	0.0020	0.0025	0.0030
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	730	0.0050	0.0075	0.0100	0.0150	0.0200	0.0250	0.0300
	> 80	630	0.0045	0.0068	0.0090	0.0135	0.0180	0.0225	0.0270
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	520	0.0018	0.0028	0.0035	0.0055	0.0070	0.0090	0.0105
	> 140	420	0.0018	0.0028	0.0035	0.0055	0.0070	0.0090	0.0105

Reduce speed & feed for materials harder than listed

$rpm = sfm \times 3.82 / D_1$

$ipm = (inch/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

Series 140 8xD Metric	HARDNESS	SPEED	FEED (mm/rev)						
	BRINELL	m/min	3	6	8	10	12	14	16
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	128	0.125	0.170	0.225	0.280	0.340	0.395	0.450
	> 200 ≤ 300	113	0.110	0.145	0.190	0.240	0.290	0.335	0.385
	> 300 ≤ 420	52	0.090	0.120	0.160	0.200	0.240	0.280	0.320
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	98	0.090	0.120	0.160	0.200	0.240	0.280	0.320
	> 270 ≤ 370	70	0.070	0.095	0.130	0.160	0.195	0.225	0.255
	> 370 ≤ 450	40	0.055	0.070	0.095	0.120	0.145	0.170	0.190
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	70	0.070	0.095	0.130	0.160	0.195	0.225	0.255
	> 250 ≤ 330	49	0.055	0.070	0.095	0.120	0.145	0.170	0.190
	> 330 ≤ 450	24	0.030	0.035	0.050	0.065	0.070	0.090	0.105
CAST IRON Gray, Malleable, Ductile	≤ 200	128	0.165	0.215	0.290	0.360	0.435	0.505	0.575
	> 200 ≤ 330	82	0.145	0.195	0.255	0.320	0.385	0.450	0.515
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 250	64	0.070	0.095	0.130	0.160	0.195	0.225	0.255
	> 250 ≤ 330	49	0.065	0.085	0.115	0.145	0.170	0.200	0.230
STAINLESS (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	40	0.065	0.085	0.115	0.145	0.170	0.200	0.230
	> 270 ≤ 370	30	0.055	0.070	0.095	0.120	0.145	0.170	0.190
TITANIUM TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	55	0.055	0.070	0.095	0.120	0.145	0.170	0.190
	> 280 ≤ 350	43	0.050	0.060	0.085	0.105	0.120	0.145	0.165
	> 350 ≤ 440	34	0.035	0.050	0.065	0.080	0.095	0.110	0.130
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	24	0.030	0.035	0.050	0.065	0.070	0.090	0.105
	> 220 ≤ 330	15	0.020	0.025	0.030	0.040	0.050	0.055	0.065
	> 330 ≤ 420	11	0.020	0.025	0.030	0.040	0.050	0.055	0.065
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	223	0.180	0.240	0.320	0.400	0.485	0.560	0.640
	> 80	192	0.165	0.215	0.290	0.360	0.435	0.505	0.575
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	158	0.065	0.085	0.115	0.145	0.170	0.200	0.230
	> 140	128	0.065	0.085	0.115	0.145	0.170	0.200	0.230

Reduce speed & feed for materials harder than listed

rpm = (1000 × m/min) / (3.14 × D_1)

mm/min = (mm/rev) × rpm

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

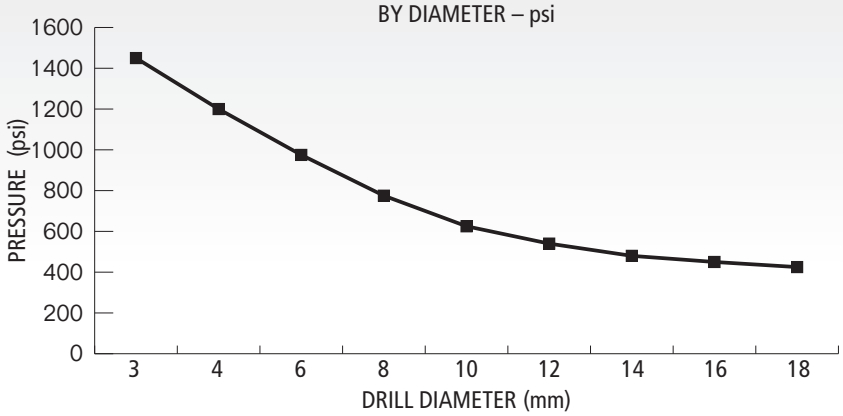
Series 120 Fractional	SPEED (sfm)	FEED (inch/rev)						
	CVD	1/8	3/16	1/4	5/16	3/8	7/16	1/2
CFRP, AFRP Carbon Fiber, Aramid Fiber	320	0.0006	0.0008	0.0012	0.0015	0.0018	0.0021	0.0024
GFRP Fiberglass	240	0.0006	0.0008	0.0012	0.0015	0.0018	0.0021	0.0024
CARBON, GRAPHITE	400	0.0008	0.0012	0.0016	0.0020	0.0024	0.0028	0.0032
Adjust speed and/or feed based upon resin type and/or fiber structure	rpm = sfm × 3.82 / D_1			Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)				
	ipm = (inch/rev) × rpm							

Series 120 Metric	SPEED (m/min)	FEED (mm/rev)						
	CVD	2.5	3	4.1	6	8	10	12
CFRP, AFRP Carbon Fiber, Aramid Fiber	100	0.015	.018	0.020	0.030	0.038	0.046	0.053
GFRP Fiberglass	75	0.015	.018	0.020	0.030	0.038	0.046	0.053
CARBON, GRAPHITE	120	0.020	.024	0.030	0.041	0.051	0.061	0.071
Adjust speed and/or feed based upon resin type and/or fiber structure	rpm = (1000 × m/min) / (3.14 × D_1)			Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)				
	mm/min = (mm/rev) × rpm							

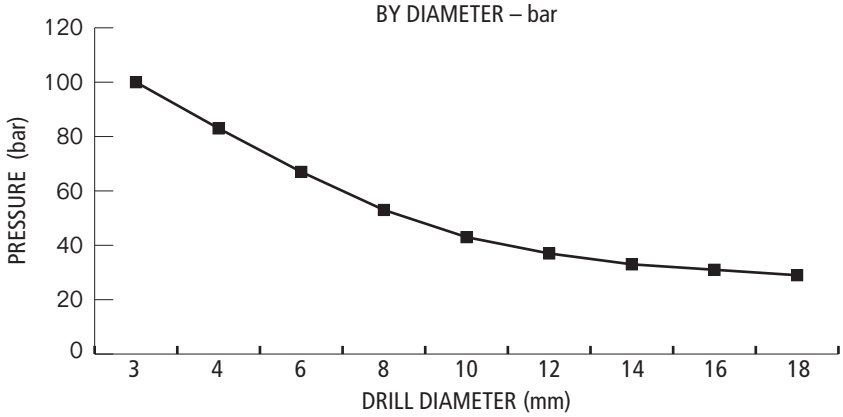
Drilling Operations
Coolant Recommendations

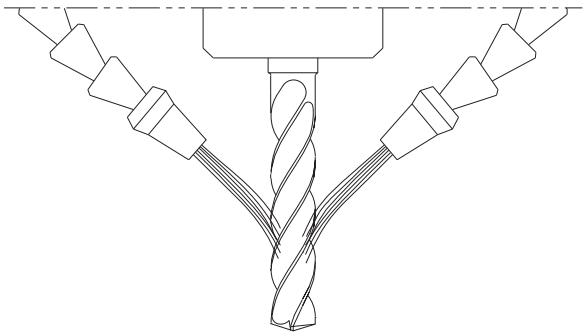
- Coolant works to mobilize chips away from the cut zone, reduce the heat created during the cutting process and minimize friction.
- It is important to optimize the coolant pressure and position in order to gain the full benefits coolant offers the cutting process.
- Proper coolant application promotes greater operating parameters, greater material removal rates, improved surface finishes, predictable tool life, reduced power consumption and reduced cycle times.
- Pressure is important, but more importantly is consistency of the pressure and application onto the tool; intermittent cooling of carbide leads to thermal stressing of the material and the formation of "microcracks."
- Proper cleanliness and filtration of coolants is important in order for the coolant to maintain its beneficial properties, and also to avoid a reduction in coolant pressure or the possibility of clogging the coolant channels in coolant through drills.

RECOMMENDED COOLANT PRESSURE
BY DIAMETER – psi

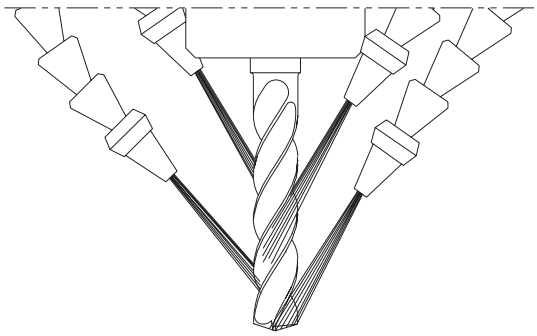


RECOMMENDED COOLANT PRESSURE
BY DIAMETER – bar





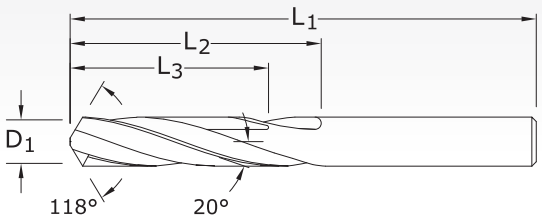
LARGE TIP – LOW VELOCITY
NO COVERAGE AT MAXIMUM DEPTH



SMALL TIP – HIGH VELOCITY
COMPLETE COVERAGE

- Reducing the nozzle size helps maximize the cooling benefits of the unique double margin design on the Hi-PerCarb drill by increasing velocity. Aim the nozzles in line with the secondary flute located between the two margins as well as the flute for best results.

Slow Spiral Drills



101
FRACTIONAL & METRIC SERIES

TECH INFO 178–179

TOLERANCES (inch)

D_1 = +.0000/–.0005

TOLERANCES (mm)

D_1 = +0,0000/–0,0127

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
#80	0.0135	3/4	3/16	5/32	51080	57076
#79	0.0145	3/4	3/16	5/32	51079	57077
1/64	0.0156	3/4	3/16	5/32	51101	57078
#78	0.0160	3/4	3/16	5/32	51078	57079
#77	0.0180	3/4	3/16	5/32	51077	57080
#76	0.0200	7/8	1/4	13/64	51076	57081
#75	0.0210	7/8	1/4	13/64	51075	57082
#74	0.0225	7/8	1/4	13/64	51074	57083
#73	0.0240	7/8	1/4	13/64	51073	57084
#72	0.0250	1	5/16	1/4	51072	57085
#71	0.0260	1	5/16	1/4	51071	57086
0,7 mm	0.0276	28,0	9,0	7,0	61001	68268
#70	0.0280	1-1/4	1/2	13/32	51070	57087
#69	0.0292	1-1/4	1/2	13/32	51069	57088
#68	0.0310	1-1/4	1/2	13/32	51068	57089
1/32	0.0312	1-1/4	1/2	13/32	51102	57090
0,8 mm	0.0315	30,0	10,0	8,0	61003	68269
#67	0.0320	1-1/4	1/2	13/32	51067	57091
#66	0.0330	1-1/4	1/2	13/32	51066	57092
#65	0.0350	1-3/8	5/8	1/2	51065	57093
0,9 mm	0.0354	32,0	11,0	8,0	61005	68270
#64	0.0360	1-3/8	5/8	1/2	51064	57094
#63	0.0370	1-3/8	5/8	1/2	51063	57095
#62	0.0380	1-3/8	5/8	1/2	51062	57096
#61	0.0390	1-3/8	5/8	1/2	51061	57097
1,0 mm	0.0394	34,0	12,0	9,0	61007	68271
#60	0.0400	1-1/2	3/4	39/64	51060	57098
#59	0.0410	1-1/2	3/4	39/64	51059	57099
#58	0.0420	1-1/2	3/4	39/64	51058	57100
#57	0.0430	1-1/2	3/4	39/64	51057	57101
1,1 mm	0.0433	36,0	14,0	11,0	61052	68294
#56	0.0465	1-1/2	3/4	39/64	51056	57102
3/64	0.0469	1-1/2	3/4	39/64	51103	57103
1,2 mm	0.0472	38,0	16,0	12,0	61053	68295
1,3 mm	0.0512	38,0	16,0	12,0	61054	68296
#55	0.0520	1-1/2	3/4	39/64	51055	57104
#54	0.0550	1-1/2	3/4	39/64	51054	57105
1,4 mm	0.0551	40,0	18,0	14,0	61055	68297

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CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
1,5 mm	0.0591	40,0	18,0	14,0	61009	68272
#53	0.0595	1-1/2	3/4	39/64	51053	57106
*1/16	0.0625	1-1/2	3/4	39/64	51104	57107
1,6 mm	0.0630	43,0	20,0	16,0	61056	68298
#52	0.0635	1-1/2	3/4	39/64	51052	57108
1,7 mm	0.0669	43,0	20,0	17,0	61057	68299
#51	0.0670	1-1/2	3/4	39/64	51051	57109
#50	0.0700	1-3/4	7/8	45/64	51050	57110
1,8 mm	0.0709	46,0	22,0	17,0	61058	68300
#49	0.0730	1-3/4	7/8	45/64	51049	57111
1,9 mm	0.0748	46,0	22,0	17,0	61059	68301
#48	0.0760	1-3/4	7/8	45/64	51048	57112
5/64	0.0781	1-3/4	7/8	45/64	51105	57113
#47	0.0785	1-3/4	7/8	45/64	51047	57114
2,0 mm	0.0787	49,0	24,0	19,0	61011	68273
#46	0.0810	1-3/4	7/8	45/64	51046	57115
#45	0.0820	1-3/4	7/8	45/64	51045	57116
2,1 mm	0.0827	49,0	24,0	19,0	61060	68302
#44	0.0860	2	1	51/64	51044	57117
2,2 mm	0.0866	53,0	27,0	21,0	61061	68303
#43	0.0890	2	1	51/64	51043	57118
2,3 mm	0.0906	53,0	27,0	21,0	61062	68304
#42	0.0935	2	1	51/64	51042	57119
3/32 mm	0.0938	2	1	51/64	51106	57120
2,4 mm	0.0945	57,0	30,0	24,0	61063	68305
#41	0.0960	2	1	51/64	51041	57121
#40	0.0980	2	1	51/64	51040	57122
2,5 mm	0.0984	57,0	30,0	24,0	61013	68274
#39	0.0995	2-1/4	1-1/4	1	51039	57123
#38	0.1015	2-1/4	1-1/4	1	51038	57124
2,6 mm	0.1024	57,0	30,0	24,0	61064	68306
#37	0.1040	2-1/4	1-1/4	1	51037	57125
2,7 mm	0.1063	61,0	33,0	26,0	61065	68307
#36	0.1065	2-1/4	1-1/4	1	51036	57126
7/64	0.1094	2-1/4	1-1/4	1	51107	57127
#35	0.1100	2-1/4	1-1/4	1	51035	57128
2,8 mm	0.1102	61,0	33,0	26,0	61066	68308
#34	0.1110	2-1/4	1-1/4	1	51034	57129
#33	0.1130	2-1/4	1-1/4	1	51033	57130
2,9 mm	0.1142	61,0	33,0	26,0	61067	68309
#32	0.1160	2-1/4	1-1/4	1	51032	57131
3,0 mm	0.1181	61,0	33,0	26,0	61015	68275
#31	0.1200	2-1/4	1-1/4	1	51031	57132
3,1 mm	0.1220	65,0	36,0	28,0	61068	68310

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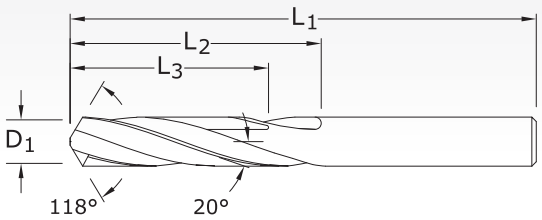
Slow Spiral Drills



101
FRACTIONAL & METRIC SERIES

TECH INFO 178–179

TOLERANCES (inch)

D_1 = +.0000/–.0005

TOLERANCES (mm)

D_1 = +0,0000/–0,0127

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
*1/8	0.1250	2-1/4	1-1/4	1	51108	57133
3,2 mm	0.1260	65,0	36,0	28,0	61069	68311
#30	0.1285	2-1/4	1-1/4	1	51030	57134
3,3 mm	0.1299	65,0	36,0	28,0	61070	68312
3,4 mm	0.1339	70,0	39,0	31,0	61071	68313
#29	0.1360	2-1/2	1-3/8	1-7/64	51029	57135
3,5 mm	0.1378	70,0	39,0	31,0	61017	68276
#28	0.1405	2-1/2	1-3/8	1-7/64	51028	57136
9/64	0.1406	2-1/2	1-3/8	1-7/64	51109	57137
3,6 mm	0.1417	70,0	39,0	31,0	61072	68314
#27	0.1440	2-1/2	1-3/8	1-7/64	51027	57138
3,7 mm	0.1457	70,0	39,0	31,0	61073	68315
#26	0.1470	2-1/2	1-3/8	1-7/64	51026	57139
#25	0.1495	2-1/2	1-3/8	1-7/64	51025	57140
3,8 mm	0.1496	75,0	43,0	34,0	61074	68316
#24	0.1520	2-1/2	1-3/8	1-7/64	51024	57141
3,9 mm	0.1535	75,0	43,0	34,0	61075	68317
#23	0.1540	2-1/2	1-3/8	1-7/64	51023	57142
5/32	0.1562	2-1/2	1-3/8	1-7/64	51110	57143
#22	0.1570	2-1/2	1-3/8	1-7/64	51022	57144
4,0 mm	0.1575	75,0	43,0	34,0	61019	68277
#21	0.1590	2-1/2	1-3/8	1-7/64	51021	57145
#20	0.1610	2-1/2	1-3/8	1-7/64	51020	57146
4,1 mm	0.1614	75,0	43,0	34,0	61076	68318
4,2 mm	0.1654	75,0	43,0	34,0	61077	68319
#19	0.1660	2-1/2	1-5/8	1-19/64	51019	57147
4,3 mm	0.1693	80,0	47,0	37,0	61078	68320
#18	0.1695	2-3-4	1-5/8	1-19/64	51018	57148
11/64	0.1719	2-3-4	1-5/8	1-19/64	51111	57149
#17	0.1730	2-3-4	1-5/8	1-19/64	51017	57150
4,4 mm	0.1732	80,0	47,0	37,0	61079	68321
#16	0.1770	2-3-4	1-5/8	1-19/64	51016	57151
4,5 mm	0.1772	80,0	47,0	37,0	61021	68278
#15	0.1800	2-3-4	1-5/8	1-19/64	51015	57152
4,6 mm	0.1811	80,0	47,0	37,0	61080	68322
#14	0.1820	2-3-4	1-5/8	1-19/64	51014	57153
4,7 mm	0.1850	80,0	47,0	37,0	61081	68323
#13	0.1850	2-3-4	1-5/8	1-19/64	51013	57154

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CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
*3/16	0.1875	2-3-4	1-5/8	1-19/64	51112	57155
4,8 mm	0.1890	86,0	52,0	41,0	61082	68324
#12	0.1890	2-3-4	1-5/8	1-19/64	51012	57156
#11	0.1910	2-3-4	1-5/8	1-19/64	51011	57157
4,9 mm	0.1929	86,0	52,0	41,0	61083	68325
#10	0.1935	2-3-4	1-5/8	1-19/64	51010	57158
#9	0.1960	3	1-3/4	1-13/32	51009	57159
5,0 mm	0.1969	86,0	52,0	41,0	61023	68279
#8	0.1990	3	1-3/4	1-13/32	51008	57160
5,1 mm	0.2008	86,0	52,0	41,0	61084	68326
#7	0.2010	3	1-3/4	1-13/32	51007	57161
13/64	0.2031	3	1-3/4	1-13/32	51113	57162
#6	0.2040	3	1-3/4	1-13/32	51006	57163
5,2 mm	0.2047	86,0	52,0	41,0	61085	68327
#5	0.2055	3	1-3/4	1-13/32	51005	57164
5,3 mm	0.2087	86,0	52,0	41,0	61086	68328
#4	0.2090	3	1-3/4	1-13/32	51004	57165
5,4 mm	0.2126	93,0	57,0	45,0	61087	68329
#3	0.2130	3	1-3/4	1-13/32	51003	57166
5,5 mm	0.2165	94,5	57,0	1-13/32	61025	68280
7/32	0.2188	3	1-3/4	1-13/32	51114	57167
5,6 mm	0.2205	93,0	57,0	45,0	61088	68330
#2	0.2210	3	1-3/4	1-13/32	51002	57168
5,7 mm	0.2244	93,0	57,0	45,0	61089	68331
#1	0.2280	3	1-3/4	1-13/32	51001	57169
5,8 mm	0.2283	93,0	57,0	45,0	61090	68332
5,9 mm	0.2323	93,0	57,0	45,0	61091	68333
A	0.2340	3-1/4	2	1-39/64	51201	57170
15/64	0.2344	3-1/4	2	1-39/64	51115	57171
6,0 mm	0.2362	93,0	57,0	45,0	61027	68281
B	0.2380	3-1/4	2	1-39/64	51202	57172
6,1 mm	0.2402	101,0	63,0	50,0	61092	68334
C	0.2420	3-1/4	2	1-39/64	51203	57173
6,2 mm	0.2441	101,0	63,0	50,0	61093	68335
D	0.2460	3-1/4	2	1-39/64	51204	57174
6,3 mm	0.2480	101,0	63,0	50,0	61094	68336
*E	0.2500	3-1/4	2	1-39/64	51116	57175
1/4	0.2500	3-1/4	2	1-39/64	51205	57176
6,4 mm	0.2520	101,0	63,0	50,0	61095	68337
6,5 mm	0.2559	101,0	63,0	50,0	61029	68282
F	0.2570	3-1/4	2	1-39/64	51206	57177
6,6 mm	0.2598	101,0	63,0	50,0	61096	68338
G	0.2610	3-1/2	2-1/8	1-45/64	51207	57178
6,7 mm	0.2638	101,0	63,0	50,0	61097	68339

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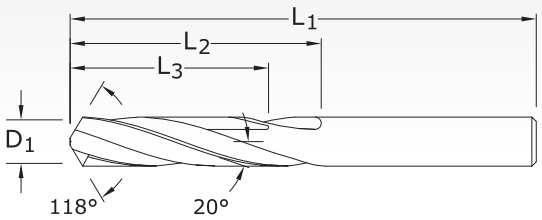
Slow Spiral Drills



101
FRACTIONAL & METRIC SERIES

TECH INFO 178–179

TOLERANCES (inch)

D_1 = +.0000/–.0005

TOLERANCES (mm)

D_1 = +0,0000/–0,0127

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
17/64	0.2656	3-1/2	2-1/8	1-45/64	51117	57179
H	0.2660	3-1/2	2-1/8	1-45/64	51208	57180
6,8 mm	0.2677	109,0	69,0	55,0	61098	68340
6,9 mm	0.2717	109,0	69,0	55,0	61099	68341
I	0.2720	3-1/2	2-1/8	1-45/64	51209	57181
7,0 mm	0.2756	109,0	69,0	55,0	61031	68283
J	0.2770	3-1/2	2-1/8	1-45/64	51210	57182
7,1 mm	0.2795	109,0	69,0	55,0	61100	68342
K	0.2810	3-1/2	2-1/8	1-45/64	51211	57183
9/32	0.2812	3-1/2	2-1/8	1-45/64	51118	57184
7,2 mm	0.2835	109,0	69,0	55,0	61101	68343
7,3 mm	0.2874	109,0	69,0	55,0	61102	68344
L	0.2900	3-1/2	2-1/8	1-45/64	51212	57185
7,4 mm	0.2913	109,0	69,0	55,0	61103	68345
M	0.2950	3-3/4	2-3/8	1-29/32	51213	57186
7,5 mm	0.2953	109,0	69,0	55,0	61033	68284
19/64	0.2969	3-3/4	2-3/8	1-29/32	51119	57187
7,6 mm	0.2992	117,0	75,0	60,0	61104	68346
N	0.3020	3-3/4	2-3/8	1-29/32	51214	57188
7,7 mm	0.3031	117,0	75,0	60,0	61105	68347
7,8 mm	0.3071	117,0	75,0	60,0	61106	68348
7,9 mm	0.3110	117,0	75,0	60,0	61107	68349
*5/16	0.3125	3-3/4	2-3/8	1-29/32	51120	57189
8,0 mm	0.3150	117,0	75,0	60,0	61035	68285
O	0.3160	3-3/4	2-3/8	1-29/32	51215	57190
8,1 mm	0.3189	117,0	75,0	60,0	61108	68350
8,2 mm	0.3228	117,0	75,0	60,0	61109	68351
P	0.3230	3-3/4	2-3/8	1-29/32	51216	57191
8,3 mm	0.3268	117,0	75,0	60,0	61110	68352
21/64	0.3281	4	2-1/2	2	51121	57192
8,4 mm	0.3307	117,0	75,0	60,0	61111	68353
Q	0.3320	4	2-1/2	2	51217	57193
8,5 mm	0.3346	117,0	75,0	60,0	61037	68286
8,6 mm	0.3386	125,0	81,0	64,0	61112	68354
R	0.3390	4	2-1/2	2	51218	57194
8,7 mm	0.3425	125,0	81,0	64,0	61113	68355
11/32	0.3438	4	2-1/2	2	51122	57195
8,8 mm	0.3465	125,0	81,0	64,0	61114	68356

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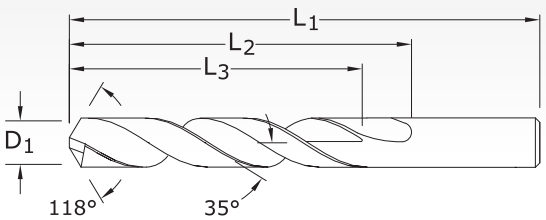
CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
S	0.3480	4	2-1/2	2	51219	57196
8,9 mm	0.3504	125,0	81,0	64,0	61115	68357
9,0 mm	0.3543	125,0	81,0	64,0	61039	68287
T	0.3580	4-1/4	2-3/4	2-13/64	51220	57197
9,1 mm	0.3583	125,0	81,0	64,0	61116	68358
23/64	0.3594	4-1/4	2-3/4	2-13/64	51123	57198
9,2 mm	0.3622	125,0	81,0	64,0	61117	68359
9,3 mm	0.3661	125,0	81,0	64,0	61118	68360
U	0.3680	4-1/4	2-3/4	2-13/64	51221	57199
9,4 mm	0.3701	125,0	81,0	64,0	61119	68361
9,5 mm	0.3740	125,0	81,0	64,0	61041	68288
*3/8	0.3750	4-1/4	2-3/4	2-13/64	51124	57200
V	0.3770	4-1/4	2-3/4	2-13/64	51222	57201
9,6 mm	0.3780	133,0	87,0	69,0	61120	68362
9,7 mm	0.3819	133,0	87,0	69,0	61121	68363
9,8 mm	0.3858	133,0	87,0	69,0	61122	68364
W	0.3860	4-1/2	2-7/8	2-19/64	51223	57202
9,9 mm	0.3898	133,0	87,0	69,0	61123	68365
25/64	0.3906	4-1/2	2-7/8	2-19/64	51125	57203
10,0 mm	0.3937	133,0	87,0	69,0	61043	68289
X	0.3970	4-1/2	2-7/8	2-19/64	51224	57204
10,2 mm	0.4016	133,0	87,0	69,0	61124	68366
Y	0.4040	4-1/2	2-7/8	2-19/64	51225	57205
13/32	0.4062	4-1/2	2-7/8	2-19/64	51126	57206
Z	0.4130	4-1/2	2-7/8	2-19/64	51226	57207
10,5 mm	0.4134	133,0	87,0	69,0	61045	68290
27/64	0.4219	4-1/2	2-7/8	2-19/64	51127	57208
11,0 mm	0.4331	142,0	94,0	75,0	61047	68291
7/16	0.4375	4-1/2	2-7/8	2-19/64	51128	57209
11,5 mm	0.4528	142,0	94,0	75,0	61049	68292
29/64	0.4531	4-3/4	3	2-13/32	51129	57210
15/32	0.4688	4-3/4	3	2-13/32	51130	57211
12,0 mm	0.4724	151,0	101,0	80,0	61051	68293
31/64	0.4844	4-3/4	3	2-13/32	51131	57212
1/2	0.5000	4-3/4	3	2-13/32	51132	57213
*Series 101 Set					61175	57351

Fast Spiral Drills



125
FRACTIONAL SERIES

TECH INFO 178

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

inch					EDP NO.	
CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	UNCOATED	Ti-NAMITE-A (AlTiN)
#80	0.0135	3/4	3/16	5/32	52080	57214
#79	0.0145	3/4	3/16	5/32	52079	57215
#78	0.0160	3/4	3/16	5/32	52078	57216
#77	0.0180	3/4	3/16	5/32	52077	57217
#76	0.0200	7/8	1/4	13/64	52076	57218
#75	0.0210	7/8	1/4	13/64	52075	57219
#74	0.0225	7/8	1/4	13/64	52074	57220
#73	0.0240	7/8	1/4	13/64	52073	57221
#72	0.0250	1	5/16	1/4	52072	57222
#71	0.0260	1	5/16	1/4	52071	57223
#70	0.0280	1-1/4	1/2	13/32	52070	57224
#69	0.0292	1-1/4	1/2	13/32	52069	57225
#68	0.0310	1-1/4	1/2	13/32	52068	57226
1/32	0.0312	1-1/4	1/2	13/32	52102	57227
#67	0.0320	1-1/4	1/2	13/32	52067	57228
#66	0.0330	1-1/4	1/2	13/32	52066	57229
#65	0.0350	1-3/8	5/8	1/2	52065	57230
#64	0.0360	1-3/8	5/8	1/2	52064	57231
#63	0.0370	1-3/8	5/8	1/2	52063	57232
#62	0.0380	1-3/8	5/8	1/2	52062	57233
#61	0.0390	1-3/8	5/8	1/2	52061	57234
#60	0.0400	1-1/2	3/4	39/64	52060	57235
#59	0.0410	1-1/2	3/4	39/64	52059	57236
#58	0.0420	1-1/2	3/4	39/64	52058	57237
#57	0.0430	1-1/2	3/4	39/64	52057	57238
#56	0.0465	1-1/2	3/4	39/64	52056	57239
3/64	0.0469	1-1/2	3/4	39/64	52103	57240
#55	0.0520	1-1/2	3/4	39/64	52055	57241
#54	0.0550	1-1/2	3/4	39/64	52054	57242
#53	0.0595	1-1/2	3/4	39/64	52053	57243
*1/16	0.0625	1-1/2	3/4	39/64	52104	57244
#52	0.0635	1-1/2	3/4	39/64	52052	57245
#51	0.0670	1-1/2	3/4	39/64	52051	57246
#50	0.0700	1-3/4	7/8	45/64	52050	57247
#49	0.0730	1-3/4	7/8	45/64	52049	57248
#48	0.0760	1-3/4	7/8	45/64	52048	57249
5/64	0.0781	1-3/4	7/8	45/64	52105	57250
#47	0.0785	1-3/4	7/8	45/64	52047	57251
#46	0.0810	1-3/4	7/8	45/64	52046	57252
#45	0.0820	1-3/4	7/8	45/64	52045	57253
#44	0.0860	2	1	51/64	52044	57254
#43	0.0890	2	1	51/64	52043	57255
#42	0.0935	2	1	51/64	52042	57256
3/32	0.0938	2	1	51/64	52106	57257

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TOLERANCES (inch)

D_1 = +.0000/–.0005

TOLERANCES (mm)

D_1 = +0,0000/–0,0127

CONTINUED

		inch			EDP NO.	
CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	UNCOATED	Ti-NAMITE-A (AlTiN)
#41	0.0960	2	1	51/64	52041	57258
#40	0.0980	2	1	51/64	52040	57259
#39	0.0995	2-1/4	1-1/4	1	52039	57260
#38	0.1015	2-1/4	1-1/4	1	52038	57261
#37	0.1040	2-1/4	1-1/4	1	52037	57262
#36	0.1065	2-1/4	1-1/4	1	52036	57263
7/64	0.1094	2-1/4	1-1/4	1	52107	57264
#35	0.1100	2-1/4	1-1/4	1	52035	57265
#34	0.1110	2-1/4	1-1/4	1	52034	57266
#33	0.1130	2-1/4	1-1/4	1	52033	57267
#32	0.1160	2-1/4	1-1/4	1	52032	57268
#31	0.1200	2-1/4	1-1/4	1	52031	57269
*1/8	0.1250	2-1/4	1-1/4	1	52108	57270
#30	0.1285	2-1/4	1-1/4	1	52030	57271
#29	0.1360	2-1/2	1-3/8	1-7/64	52029	57272
#28	0.1405	2-1/2	1-3/8	1-7/64	52028	57273
9/64	0.1406	2-1/2	1-3/8	1-7/64	52109	57274
#27	0.1440	2-1/2	1-3/8	1-7/64	52027	57275
#26	0.1470	2-1/2	1-3/8	1-7/64	52026	57276
#25	0.1495	2-1/2	1-3/8	1-7/64	52025	57277
#24	0.1520	2-1/2	1-3/8	1-7/64	52024	57278
#23	0.1540	2-1/2	1-3/8	1-7/64	52023	57279
5/32	0.1562	2-1/2	1-3/8	1-7/64	52110	57280
#22	0.1570	2-1/2	1-3/8	1-7/64	52022	57281
#21	0.1590	2-1/2	1-3/8	1-7/64	52021	57282
#20	0.1610	2-1/2	1-3/8	1-7/64	52020	57283
#19	0.1660	2-3/4	1-5/8	1-19/64	52019	57284
#18	0.1695	2-3/4	1-5/8	1-19/64	52018	57285
11/64	0.1719	2-3/4	1-5/8	1-19/64	52111	57286
#17	0.1730	2-3/4	1-5/8	1-19/64	52017	57287
#16	0.1770	2-3/4	1-5/8	1-19/64	52016	57288
#15	0.1800	2-3/4	1-5/8	1-19/64	52015	57289
#14	0.1820	2-3/4	1-5/8	1-19/64	52014	57290
#13	0.1850	2-3/4	1-5/8	1-19/64	52013	57291
*3/16	0.1875	2-3/4	1-5/8	1-19/64	52112	57292
#12	0.1890	2-3/4	1-5/8	1-19/64	52012	57293
#11	0.1910	2-3/4	1-5/8	1-19/64	52011	57294
#10	0.1935	2-3/4	1-5/8	1-19/64	52010	57295
#9	0.1960	3	1-3/4	1-13/32	52009	57296
#8	0.1990	3	1-3/4	1-13/32	52008	57297
#7	0.2010	3	1-3/4	1-13/32	52007	57298
13/64	0.2031	3	1-3/4	1-13/32	52113	57299
#6	0.2040	3	1-3/4	1-13/32	52006	57300
#5	0.2055	3	1-3/4	1-13/32	52005	57301
#4	0.2090	3	1-3/4	1-13/32	52004	57302
#3	0.2130	3	1-3/4	1-13/32	52003	57303
7/32	0.2188	3	1-3/4	1-13/32	52114	57304
#2	0.2210	3	1-3/4	1-13/32	52002	57305
#1	0.2280	3	1-3/4	1-13/32	52001	57306
A	0.2340	3-1/4	2	1-39/64	52201	57307

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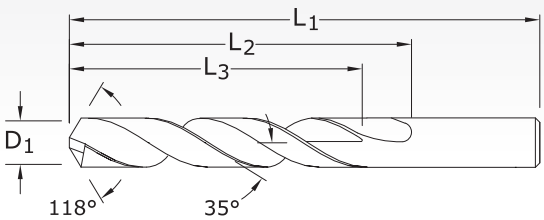
Fast Spiral Drills



125
FRACTIONAL SERIES

TECH INFO 178

TOLERANCES (inch)

D_1 = +.0000/–.0005

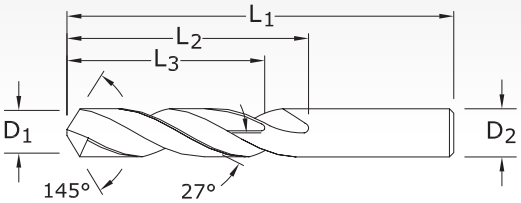
TOLERANCES (mm)

D_1 = +0,0000/–0,0127

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

inch					EDP NO.	
CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	UNCOATED	Ti-NAMITE-A (AlTiN)
15/64	0.2344	3-1/4	2	1-39/64	52115	57308
B	0.2380	3-1/4	2	1-39/64	52202	57309
C	0.2420	3-1/4	2	1-39/64	52203	57310
1/4	0.2500	3-1/4	2	1-39/64	52116	57313
*E	0.2500	3-1/4	2	1-39/64	52205	57312
F	0.2570	3-1/4	2	1-39/64	52206	57314
G	0.2610	3-1/2	2-1/8	1-45/64	52207	57315
17/64	0.2656	3-1/2	2-1/8	1-45/64	52117	57316
H	0.2660	3-1/2	2-1/8	1-45/64	52208	57317
I	0.2720	3-1/2	2-1/8	1-45/64	52209	57318
J	0.2770	3-1/2	2-1/8	1-45/64	52210	57319
K	0.2810	3-1/2	2-1/8	1-45/64	52211	57320
9/32	0.2812	3-1/2	2-1/8	1-45/64	52118	57321
L	0.2900	3-1/2	2-1/8	1-45/64	52212	57322
M	0.2950	3-3/4	2-3/8	1-29/32	52213	57323
19/64	0.2969	3-3/4	2-3/8	1-29/32	52119	57324
N	0.3020	3-3/4	2-3/8	1-29/32	52214	57325
*5/16	0.3125	3-3/4	2-3/8	1-29/32	52120	57326
O	0.3160	3-3/4	2-3/8	1-29/32	52215	57327
P	0.3230	3-3/4	2-3/8	1-29/32	52216	57328
21/64	0.3281	4	2-1/2	2	52121	57329
Q	0.3320	4	2-1/2	2	52217	57330
R	0.3390	4	2-1/2	2	52218	57331
11/32	0.3438	4	2-1/2	2	52122	57332
S	0.3480	4	2-1/2	2	52219	57333
T	0.3580	4-1/4	2-3/4	2-13/64	52220	57334
23/64	0.3594	4-1/4	2-3/4	2-13/64	52123	57335
U	0.3680	4-1/4	2-3/4	2-13/64	52221	57336
*3/8	0.3750	4-1/4	2-3/4	2-13/64	52124	57337
V	0.3770	4-1/4	2-3/4	2-13/64	52222	57338
W	0.3860	4-1/2	2-7/8	2-19/64	52223	57339
25/64	0.3906	4-1/2	2-7/8	2-19/64	52125	57340
X	0.3970	4-1/2	2-7/8	2-19/64	52224	57341
Y	0.4040	4-1/2	2-7/8	2-19/64	52225	57342
13/32	0.4062	4-1/2	2-7/8	2-19/64	52126	57343
Z	0.4130	4-1/2	2-7/8	2-19/64	52226	57344
27/64	0.4219	4-1/2	2-7/8	2-19/64	52127	57345
7/16	0.4375	4-1/2	2-7/8	2-19/64	52128	57346
29/64	0.4531	4-3/4	3	2-13/32	52129	57347
15/32	0.4688	4-3/4	3	2-13/32	52130	57348
31/64	0.4844	4-3/4	3	2-13/32	52131	57349
1/2	0.5000	4-3/4	3	2-13/32	52132	57350
*Series 125 Set					62175	57352

Short Length Self Centering Drills • DIN 6539



TOLERANCES h_6 (mm)

≤3 DIAMETER
D_1 = +0,000/–0,010
D_2 = h_6

>3–6 DIAMETER
D_1 = +0,000/–0,012
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,000/–0,015
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,000/–0,018
D_2 = h_6

>18–30 DIAMETER
D_1 = +0,000/–0,021
D_2 = h_6

108M Plus
METRIC SERIES

TECH INFO 179

mm				EDP NO,	
CUTTING DIAMETER D_1 / D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	UNCOATED	Ti-NAMITE-A (AlTiN)
0,5	20,0	3,0	2,1	62001	68643
0,55	21,0	3,5	2,5	62003	68644
0,6	21,0	3,5	2,5	62005	68645
0,65	22,0	4,0	2,9	62007	68646
0,7	23,0	4,5	3,2	62009	68647
0,75	23,0	4,5	3,2	62011	68648
0,8	24,0	5,0	3,6	62013	68649
0,85	24,0	5,0	3,6	62015	68650
0,9	25,0	5,5	4,0	62017	68651
0,95	25,0	5,5	4,0	62019	68652
1,0	26,0	6,0	4,7	62021	68653
1,05	26,0	6,0	4,7	62023	68654
1,1	28,0	7,0	5,4	62025	68655
1,15	28,0	7,0	5,4	62027	68656
1,2	30,0	8,0	6,0	62029	68657
1,25	30,0	8,0	6,0	62031	68658
1,3	30,0	8,0	6,0	62033	68659
1,35	32,0	9,0	7,0	62035	68660
1,4	32,0	9,0	7,0	62037	68661
1,45	32,0	9,0	7,0	62039	68662
1,5	32,0	9,0	7,0	62041	68663
1,6	34,0	10,0	7,0	62043	68664
1,7	34,0	10,0	7,0	62045	68665
1,8	36,0	11,0	8,0	62047	68666
1,9	36,0	11,0	8,0	62049	68667
2,0	38,0	12,0	9,0	62051	68668
2,1	38,0	12,0	9,0	62053	68669
2,2	40,0	13,0	10,0	62055	68670
2,3	40,0	13,0	10,0	62057	68671
2,4	43,0	14,0	11,0	62059	68672
2,5	43,0	14,0	11,0	62061	68673
2,6	43,0	14,0	11,0	62063	68674
2,7	46,0	16,0	12,0	62065	68675
2,8	46,0	16,0	12,0	62067	68676
2,9	46,0	16,0	12,0	62069	68677
3,0	46,0	16,0	12,0	62071	68678
3,1	49,0	18,0	14,0	62073	68679
3,2	49,0	18,0	14,0	62075	68680

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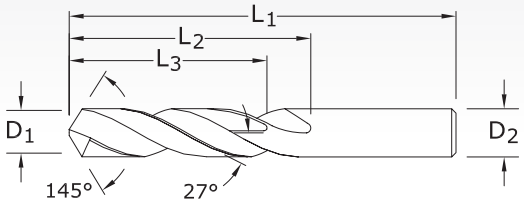
STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
NON-FERROUS
PLASTICS/COMPOSITES

Short Length Self Centering Drills • DIN 6539



108M Plus

METRIC SERIES

TECH INFO 179

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

mm				EDP NO,	
CUTTING DIAMETER D_1 / D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	UNCOATED	Ti-NAMITE-A (AlTiN)
3,3	49,0	18,0	14,0	62077	68681
3,4	52,0	20,0	15,0	62079	68682
3,5	52,0	20,0	15,0	62081	68683
3,6	52,0	20,0	15,0	62083	68684
3,7	52,0	20,0	15,0	62085	68685
3,8	55,0	22,0	17,0	62087	68686
3,9	55,0	22,0	17,0	62089	68687
4,0	55,0	22,0	17,0	62091	68688
4,1	55,0	22,0	17,0	62093	68689
4,2	55,0	22,0	17,0	62095	68690
4,3	58,0	24,0	18,0	62097	68691
4,4	58,0	24,0	18,0	62099	68692
4,5	58,0	24,0	18,0	62101	68693
4,6	58,0	24,0	18,0	62103	68694
4,7	58,0	24,0	18,0	62105	68695
4,8	62,0	26,0	20,0	62107	68696
4,9	62,0	26,0	20,0	62109	68697
5,0	62,0	26,0	20,0	62111	68698
5,1	62,0	26,0	20,0	62113	68699
5,2	62,0	26,0	20,0	62115	68700
5,3	62,0	26,0	20,0	62117	68701
5,4	66,0	28,0	21,0	62119	68702
5,5	66,0	28,0	21,0	62121	68703
5,6	66,0	28,0	21,0	62123	68704
5,7	66,0	28,0	21,0	62125	68705
5,8	66,0	28,0	21,0	62127	68706
5,9	66,0	28,0	21,0	62129	68707
6,0	66,0	28,0	21,0	62131	68708
6,1	70,0	31,0	23,0	62133	68709
6,2	70,0	31,0	23,0	62135	68710
6,3	70,0	31,0	23,0	62137	68711
6,4	70,0	31,0	23,0	62139	68712
6,5	70,0	31,0	23,0	62141	68713
6,8	70,0	31,0	23,0	62142	68603
7,0	74,0	34,0	25,0	62143	68718
7,5	74,0	34,0	25,0	62145	68723
7,8	79,0	37,0	27,0	62146	68604
8,0	79,0	37,0	27,0	62147	68728

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TOLERANCES h_6 (mm)

≤3 DIAMETER
D_1 = +0,000/–0,010
D_2 = h_6

>3–6 DIAMETER
D_1 = +0,000/–0,012
D_2 = h_6

>6–10 DIAMETER
D_1 = +0,000/–0,015
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,000/–0,018
D_2 = h_6

>18–30 DIAMETER
D_1 = +0,000/–0,021
D_2 = h_6

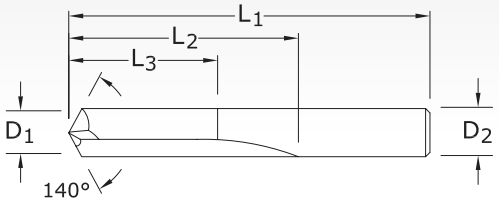
Short Length Self Centering Drills • DIN 6539

108M Plus
METRIC SERIES

CONTINUED

mm				EDP NO,	
CUTTING DIAMETER D_1 / D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	UNCOATED	Ti-NAMITE-A (AlTiN)
8,5	79,0	37,0	27,0	62149	68733
9,0	84,0	40,0	29,0	62151	68738
9,5	84,0	40,0	29,0	62153	68743
9,8	89,0	43,0	31,0	62154	68606
10,0	89,0	43,0	31,0	62155	68748
10,2	89,0	43,0	31,0	62156	68607
10,5	89,0	43,0	31,0	62066	68753
11,0	95,0	47,0	33,0	62157	68758
11,5	95,0	47,0	33,0	62084	68763
11,8	102,0	51,0	35,0	62158	68608
12,0	102,0	51,0	35,0	62159	68768
12,5	102,0	51,0	35,0	62102	68773
13,0	102,0	51,0	35,0	62112	68778
13,8	107,0	54,0	37,0	62164	68609
14,0	107,0	54,0	37,0	62116	68780
14,5	111,0	56,0	38,0	62166	68611
14,8	111,0	56,0	38,0	62167	68612
15,0	111,0	56,0	38,0	62168	68613
15,8	115,0	58,0	38,0	62170	68614
16,0	115,0	58,0	38,0	62171	68616

Straight Flute Drills



106
FRACTIONAL & METRIC SERIES

TECH INFO 180

TOLERANCES (inch)

D_1 = +.0000/–.0005

TOLERANCES (mm)

D_1 = +0,0000/–0,0127

CAST IRON

HARDENED STEELS

CUTTING DIAMETER D_1 / D_2	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
1,0 mm	0.0394	26,0	6,0	4,5	66001	66002
#60	0.0400	1-1/2	1/2	13/32	56060	56269
#59	0.0410	1-1/2	1/2	13/32	56059	56268
#58	0.0420	1-1/2	1/2	13/32	56058	56267
#57	0.0430	1-1/2	1/2	13/32	56057	56266
#56	0.0465	1-1/2	1/2	13/32	56056	56265
3/64	0.0469	1-1/2	1/2	13/32	56103	56135
#55	0.0520	1-1/2	1/2	13/32	56055	56264
#54	0.0550	1-1/2	1/2	13/32	56054	56263
1,5 mm	0.0591	32,0	9,0	7,0	66003	66004
#53	0.0595	1-1/2	1/2	13/32	56053	56262
1/16	0.0625	1-1/2	5/8	1/2	56104	56136
#52	0.0635	1-11/16	11/16	35/64	56052	56261
#51	0.0670	1-11/16	11/16	35/64	56051	56260
#50	0.0700	1-11/16	11/16	35/64	56050	56259
#49	0.0730	1-11/16	11/16	35/64	56049	56258
#48	0.0760	1-11/16	11/16	35/64	56048	56257
5/64	0.0781	1-11/16	11/16	35/64	56105	56137
#47	0.0785	1-3/4	3/4	39/64	56047	56256
2,0 mm	0.0787	38,0	12,0	9,0	66005	66006
#46	0.0810	1-3/4	3/4	39/64	56046	56255
#45	0.0820	1-3/4	3/4	39/64	56045	56254
#44	0.0860	1-3/4	3/4	39/64	56044	56253
#43	0.0890	1-3/4	3/4	39/64	56043	56252
#42	0.0935	1-3/4	3/4	39/64	56042	56251
3/32	0.0938	1-3/4	3/4	39/64	56106	56138
#41	0.0960	1-13/16	13/16	21/32	56041	56250
#40	0.0980	1-13/16	13/16	21/32	56040	56249
2,5 mm	0.0984	43,0	14,0	11,0	66007	66008
#39	0.0995	1-13/16	13/16	21/32	56039	56248
#38	0.1015	1-13/16	13/16	21/32	56038	56247
#37	0.1040	1-13/16	13/16	21/32	56037	56246
#36	0.1065	1-13/16	13/16	21/32	56036	56245
7/64	0.1094	1-13/16	13/16	21/32	56107	56139
#35	0.1100	1-7/8	7/8	45/64	56035	56244
#34	0.1110	1-7/8	7/8	45/64	56034	56243
#33	0.1130	1-7/8	7/8	45/64	56033	56242
#32	0.1160	1-7/8	7/8	45/64	56032	56241
3,0 mm	0.1181	46,0	16,0	12,0	66009	66010

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CONTINUED

CUTTING DIAMETER D_1 / D_2	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
#31	0.1200	1-7/8	7/8	45/64	56031	56240
1/8	0.1250	1-7/8	7/8	45/64	56108	56140
#30	0.1285	1-15/16	15/16	3/4	56030	56239
#29	0.1360	1-15/16	15/16	3/4	56029	56238
3,5 mm	0.1378	52,0	20,0	15,0	66011	66012
#28	0.1405	1-15/16	15/16	3/4	56028	56237
9/64	0.1406	1-15/16	15/16	3/4	56109	56141
#27	0.1440	2-1/16	1	51/64	56027	56236
#26	0.1470	2-1/16	1	51/64	56026	56235
#25	0.1495	2-1/16	1	51/64	56025	56234
#24	0.1520	2-1/16	1	51/64	56024	56233
#23	0.1540	2-1/16	1	51/64	56023	56232
5/32	0.1562	2-1/16	1	51/64	56110	56142
#22	0.1570	2-1/8	1-1/16	55/64	56022	56231
4,0 mm	0.1575	55,0	22,0	17,0	66013	66014
#21	0.1590	2-1/8	1-1/16	55/64	56021	56230
#20	0.1610	2-1/8	1-1/16	55/64	56020	56229
#19	0.1660	2-1/8	1-1/16	55/64	56019	56228
#18	0.1695	2-1/8	1-1/16	55/64	56018	56227
11/64	0.1719	2-1/8	1-1/16	55/64	56111	56143
#17	0.1730	2-3/16	1-1/8	29/32	56017	56226
#16	0.1770	2-3/16	1-1/8	29/32	56016	56225
4,5 mm	0.1772	58,0	24,0	18,0	66015	66016
#15	0.1800	2-3/16	1-1/8	29/32	56015	56224
#14	0.1820	2-3/16	1-1/8	29/32	56014	56223
#13	0.1850	2-3/16	1-1/8	29/32	56013	56222
3/16	0.1875	2-3/16	1-1/8	29/32	56112	56144
#12	0.1890	2-3/16	1-1/8	29/32	56012	56221
#11	0.1910	2-3/16	1-1/8	29/32	56011	56220
#10	0.1935	2-3/16	1-1/8	29/32	56010	56219
#9	0.1960	2-1/4	1-3/16	61/64	56009	56218
5,0 mm	0.1969	62,0	26,0	20,0	66017	66018
#8	0.1990	2-1/4	1-3/16	61/64	56008	56217
#7	0.2010	2-1/4	1-3/16	61/64	56007	56216
13/64	0.2031	2-1/4	1-3/16	61/64	56113	56145
#6	0.2040	2-3/8	1-1/4	1	56006	56215
#5	0.2055	2-3/8	1-1/4	1	56005	56214
#4	0.2090	2-3/8	1-1/4	1	56004	56213
#3	0.2130	2-3/8	1-1/4	1	56003	56212
5,5 mm	0.2165	66,0	28,0	21,0	66019	66020
7/32	0.2188	2-3/8	1-1/4	1	56114	56146
#2	0.2210	2-7/16	1-5/16	1-3/64	56002	56211
#1	0.2280	2-7/16	1-5/16	1-3/64	56001	56210
15/64	0.2344	2-7/16	1-5/16	1-3/64	56115	56147
6,0 mm	0.2362	66,0	28,0	21,0	66021	66045

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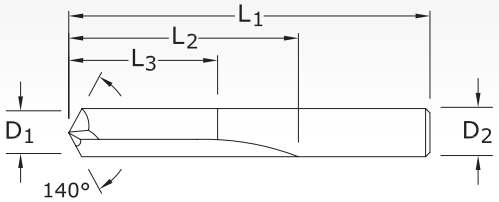
Straight Flute Drills



106
FRACTIONAL & METRIC SERIES

TECH INFO 180

CAST IRON

HARDENED STEELS

CUTTING DIAMETER D_1 / D_2	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
1/4	0.2500	2-1/2	1-3/8	1-7/64	56116	56148
6,5 mm	0.2559	70,0	31,0	23,0	66022	66046
17/64	0.2656	2-5/8	1-7/16	1-7/64	56117	56149
7,0 mm	0.2756	74,0	34,0	25,0	66023	66024
9/32	0.2812	2-11/16	1-1/2	1-13/64	56118	56150
7,5 mm	0.2953	74,0	34,0	25,0	66025	66026
19/64	0.2969	2-3/4	1-9/16	1-1/4	56119	56151
5/16	0.3125	2-13/16	1-5/8	1-19/64	56120	56152
8,0 mm	0.3150	79,0	37,0	27,0	66027	66028
21/64	0.3281	2-15/16	1-11/16	1-23/64	56121	56153
8,5 mm	0.3346	79,0	37,0	27,0	66029	66030
11/32	0.3438	3-11/64	1-11/16	1-23/64	56122	56154
9,0 mm	0.3543	84,0	40,0	29,0	66031	66032
23/64	0.3594	3-1/16	1-3/4	1-13/32	56123	56155
9,5 mm	0.3740	84,0	40,0	29,0	66033	66034
3/8	0.3750	3-1/8	1-13/16	1-29/64	56124	56156
25/64	0.3906	3-1/4	1-7/8	1-1/2	56125	56157
10,0 mm	0.3937	89,0	43,0	31,0	66035	66036
13/32	0.4062	3-5/16	1-15/16	1-35/64	56126	56158
10,5 mm	0.4134	95,0	43,0	31,0	66037	66038
27/64	0.4219	3-3/8	2	1-39/64	56127	56159
11,0 mm	0.4331	95,0	47,0	33,0	66039	66040
7/16	0.4375	3-7/16	2-1/16	1-21/32	56128	56160
11,5 mm	0.4528	95,0	47,0	33,0	66041	66042
29/64	0.4531	3-9/16	2-1/8	1-45/64	56129	56161
15/32	0.4688	3-5/8	2-1/8	1-45/64	56130	56162
12,0 mm	0.4724	102,0	51,0	35,0	66043	66044
31/64	0.4844	3-11/16	2-3/16	1-3/4	56131	56163
1/2	0.5000	3-3/4	2-1/4	1-51/64	56132	56164

TOLERANCES (inch)

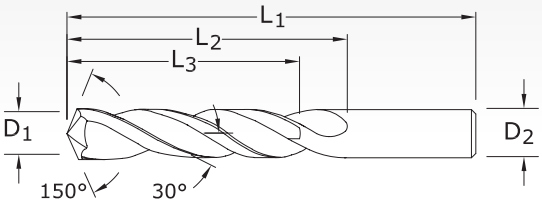
D_1 = +.0000/–.0005

TOLERANCES (mm)

D_1 = +0,0000/–0,0127

3 Flute Drills with 150 Point Geometry

3xD (mm) | 5xD (inch) | RH



TOLERANCES (inch)

D_1 = +.0000/–.0005
D_2 = h_6

TOLERANCES (mm)

D_1 = +0,0000/–0,0127
D_2 = h_6

103
FRACTIONAL & METRIC SERIES

TECH INFO 181–182

CUTTING DIAMETER D_1 / D_2	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
#36	0.1065	2-1/4	1-1/4	1	53036	58011
7/64	0.1094	2-1/4	1-1/4	1	53107	58012
#35	0.1100	2-1/4	1-1/4	1	53035	58013
#34	0.1110	2-1/4	1-1/4	1	53034	58014
#33	0.1130	2-1/4	1-1/4	1	53033	58015
#32	0.1160	2-1/4	1-1/4	1	53032	58016
3,0 mm	0.1181	46,0	16,0	12,0	63000	68965
#31	0.1200	2-1/4	1-1/4	1	53031	58017
3,1 mm	0.1220	49,0	18,0	14,0	63044	68966
1/8	0.1250	2-1/4	1-1/4	1	53108	58018
3,2 mm	0.1260	49,0	18,0	14,0	63045	68967
#30	0.1285	2-1/4	1-1/4	1	53030	58019
3,3 mm	0.1299	49,0	18,0	14,0	63001	68968
3,4 mm	0.1339	52,0	20,0	15,0	63046	68969
#29	0.1360	2-1/2	1-3/8	1-7/64	53029	58020
3,5 mm	0.1378	52,0	20,0	15,0	63002	68970
#28	0.1405	2-1/2	1-3/8	1-7/64	53028	58021
9/64	0.1406	2-1/2	1-3/8	1-7/64	53109	58022
3,6 mm	0.1417	52,0	20,0	15,0	63047	68971
#27	0.1440	2-1/2	1-3/8	1-7/64	53027	58023
3,7 mm	0.1457	52,0	20,0	15,0	63003	68972
#26	0.1470	2-1/2	1-3/8	1-7/64	53026	58024
#25	0.1495	2-1/2	1-3/8	1-7/64	53025	58025
3,8 mm	0.1496	55,0	22,0	17,0	63048	68973
#24	0.1520	2-1/2	1-3/8	1-7/64	53024	58026
3,9 mm	0.1535	55,0	22,0	17,0	63049	68974
#23	0.1540	2-1/2	1-3/8	1-7/64	53023	58027
5/32	0.1562	2-1/2	1-3/8	1-7/64	53110	58028
#22	0.1570	2-1/2	1-3/8	1-7/64	53022	58029
4,0 mm	0.1575	55,0	22,0	17,0	63004	68975
#21	0.1590	2-1/2	1-3/8	1-7/64	53021	58030
#20	0.1610	2-1/2	1-3/8	1-7/64	53020	58031
4,1 mm	0.1614	55,0	22,0	17,0	63050	68976
4,2 mm	0.1654	55,0	22,0	17,0	63005	68977
#19	0.1660	2-3/4	1-5/8	1-19/64	53019	58032
4,3 mm	0.1693	58,0	24,0	18,0	63051	68978
#18	0.1695	2-3/4	1-5/8	1-19/64	53018	58033
11/64	0.1719	2-3/4	1-5/8	1-19/64	53111	58034

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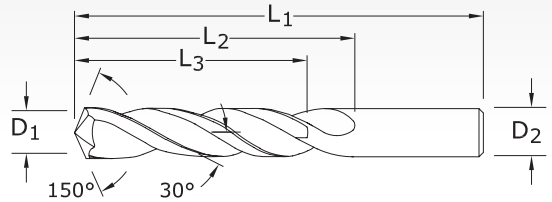
3 Flute Drills with 150 Point Geometry

3xD (mm) | 5xD (inch) | RH



103
FRACTIONAL & METRIC SERIES

TECH INFO 181–182

TOLERANCES (inch)

D_1 = +.0000/–.0005

TOLERANCES (mm)

D_1 = +0,0000/–0,0127

STEELS
CAST IRON
NON-FERROUS

CUTTING DIAMETER D_1 / D_2	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
#17	0.1730	2-3/4	1-5/8	1-19/64	53017	58035
4,4 mm	0.1732	58,0	24,0	18,0	63052	68979
#16	0.1770	2-3/4	1-5/8	1-19/64	53016	58036
4,5 mm	0.1772	58,0	24,0	18,0	63006	68980
#15	0.1800	2-3/4	1-5/18	1-19/64	53015	58037
4,6 mm	0.1811	58,0	24,0	18,0	63053	68981
#14	0.1820	2-3/4	1-5/8	1-19/64	53014	58038
#13	0.1850	2-3/4	1-5/8	1-19/64	53013	58039
4,7 mm	0.1850	62,0	26,0	18,0	63054	68982
3/16	0.1875	2-3/4	1-5/8	1-19/64	53112	58040
#12	0.1890	2-3/4	1-5/8	1-19/64	53012	58041
4,8 mm	0.1890	62,0	26,0	20,0	63055	68983
#11	0.1910	2-3/4	1-5/8	1-19/64	53011	58042
4,9 mm	0.1929	62,0	26,0	20,0	63056	68984
#10	0.1935	2-3/4	1-5/8	1-19/64	53010	58043
#9	0.1960	3	1-3/4	1-13/32	53009	58044
5,0 mm	0.1969	62,0	26,0	20,0	63007	68985
#8	0.1990	3	1-3/4	1-13/32	53008	58045
5,1 mm	0.2008	62,0	26,0	20,0	63057	68986
#7	0.2010	3	1-3/4	1-13/32	53007	58046
13/64	0.2031	3	1-3/4	1-13/32	53113	58047
#6	0.2040	3	1-3/4	1-13/32	53006	58048
5,2 mm	0.2047	62,0	26,0	20,0	63008	68987
#5	0.2055	3	1-3/4	1-13/32	53005	58049
5,3 mm	0.2087	62,0	26,0	20,0	63058	68988
#4	0.2090	3	1-3/4	1-13/32	53004	58050
5,4 mm	0.2126	66,0	28,0	21,0	63059	68989
#3	0.2130	3	1-3/4	1-13/32	53003	58051
5,5 mm	0.2165	66,0	28,0	21,0	63009	68990
7/32	0.2188	3	1-3/4	1-13/32	53114	58052
5,6 mm	0.2205	66,0	28,0	21,0	63060	68991
#2	0.2210	3	1-3/4	1-13/32	53002	58053
5,7 mm	0.2244	66,0	28,0	21,0	63061	68992
#1	0.2280	3	1-3/4	1-13/32	53001	58054
5,8 mm	0.2283	66,0	28,0	21,0	63062	68993
5,9 mm	0.2323	66,0	28,0	21,0	63063	68994
A	0.2340	3-1/4	2	1-39/64	53201	58055
15/64	0.2344	3-1/4	2	1-39/64	53115	58056

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3 Flute Drills with 150 Point Geometry

CONTINUED

CUTTING DIAMETER D_1 / D_2	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
6,0 mm	0.2362	66,0	28,0	21,0	63010	68995
B	0.2380	3-1/4	2	1-39/64	53202	58057
6,1 mm	0.2402	70,0	31,0	23,0	63064	68996
C	0.2420	3-1/4	2	1-39/64	53203	58058
6,2 mm	0.2441	70,0	31,0	23,0	63011	68997
D	0.2460	3-1/4	2	1-39/64	53204	58059
6,3 mm	0.2480	70,0	31,0	23,0	63065	68998
E	0.2500	3-1/4	2	1-39/64	53205	58060
1/4	0.2500	3-1/4	2	1-39/64	53116	58061
6,4 mm	0.2520	70,0	31,0	23,0	63066	68999
6,5 mm	0.2559	70,0	31,0	23,0	63012	69000
F	0.2570	3-1/4	2	1-39/64	53206	58062
6,6 mm	0.2598	70,0	31,0	23,0	63067	69001
G	0.2610	3-1/2	2-1/8	1-45/64	53207	58063
6,7 mm	0.2638	70,0	31,0	23,0	63068	69002
17/64	0.2656	3-1/2	2-1/8	1-45/64	53117	58064
H	0.2660	3-1/2	2-1/8	1-45/64	53208	58065
6,8 mm	0.2677	74,0	34,0	25,0	63013	69003
6,9 mm	0.2717	74,0	34,0	25,0	63069	69004
I	0.2720	3-1/2	2-1/8	1-45/64	53209	58066
7,0 mm	0.2756	74,0	34,0	25,0	63014	69005
J	0.2770	3-1/2	2-1/8	1-45/64	53210	58067
7,1 mm	0.2795	74,0	34,0	25,0	63070	69006
K	0.2810	3-1/2	2-1/8	1-45/64	53211	58068
9/32	0.2812	3-1/2	2-1/8	1-45/64	53118	58069
7,2 mm	0.2835	74,0	34,0	25,0	63015	69007
7,3 mm	0.2874	74,0	34,0	25,0	63071	69008
L	0.2900	3-1/2	2-1/8	1-45/64	53212	58070
7,4 mm	0.2913	74,0	34,0	25,0	63072	69009
M	0.2950	3-3/4	2-3/8	1-29/32	53213	58071
7,5 mm	0.2953	74,0	34,0	25,0	63016	69010
19/64	0.2969	3-3/4	2-3/8	1-29/32	53119	58072
7,6 mm	0.2992	79,0	37,0	27,0	63073	69011
N	0.3020	2-3/8	2-3/8	1-29/32	53214	58073
7,7 mm	0.3031	79,0	37,0	27,0	63074	69012
7,8 mm	0.3071	79,0	37,0	27,0	63075	69013
7,9 mm	0.3110	79,0	37,0	27,0	63076	69014
5/16	0.3125	3-3/4	2-3/8	1-29/32	53120	58074
8,0 mm	0.3150	79,0	37,0	27,0	63017	69015
O	0.3160	3-3/4	2-3/8	1-29/32	53215	58075
8,1 mm	0.3189	79,0	37,0	27,0	63077	69016
8,2 mm	0.3228	79,0	37,0	27,0	63018	69017
P	0.3230	3-3/4	2-3/8	1-29/32	53216	58076
8,3 mm	0.3268	79,0	37,0	27,0	63078	69018

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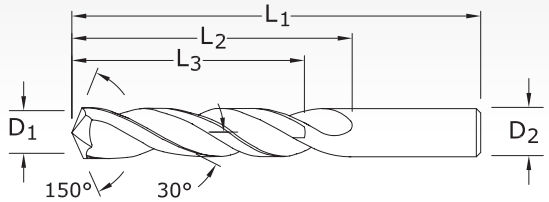
3 Flute Drills with 150 Point Geometry

3xD (mm) | 5xD (inch) | RH



103
FRACTIONAL & METRIC SERIES

TECH INFO 181–182

TOLERANCES (inch)

D_1 = +.0000/–.0005

TOLERANCES (mm)

D_1 = +0,0000/–0,0127

STEELS
CAST IRON
NON-FERROUS

CUTTING DIAMETER D_1 / D_2	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
21/64	0.3281	4	2-1/2	2	53121	58077
8,4 mm	0.3307	79,0	37,0	27,0	63019	69019
Q	0.3320	4	2-1/2	2	53217	58078
8,5 mm	0.3346	79,0	37,0	27,0	63020	69020
8,6 mm	0.3386	84,0	40,0	29,0	63021	69021
R	0.3390	4	2-1/2	2	53218	58079
8,7 mm	0.3425	89,0	40,0	29,0	63079	69022
11/32	0.3438	4	2-1/2	2	53122	58080
8,8 mm	0.3465	89,0	40,0	29,0	63022	69023
S	0.3480	4	2-1/2	2	53219	58081
8,9 mm	0.3504	84,0	40,0	29,0	63080	69024
9,0 mm	0.3543	84,0	40,0	29,0	63023	69025
T	0.3580	4-1/4	2-3/4	2-13/64	53220	58082
9,1 mm	0.3583	84,0	40,0	29,0	63081	69026
23/64	0.3594	4-1/4	2-3/4	2-13/64	53123	58083
9,2 mm	0.3622	84,0	40,0	29,0	63024	69027
9,3 mm	0.3661	84,0	40,0	29,0	63082	69028
U	0.3680	4-1/4	2-3/4	2-13/64	53221	58084
9,4 mm	0.3701	84,0	40,0	29,0	63083	69029
9,5 mm	0.3740	84,0	40,0	29,0	63025	69030
3/8	0.3750	4-1/4	2-3/4	2-13/64	53124	58085
V	0.3770	4-1/4	2-3/4	2-13/64	53222	58086
9,6 mm	0.3780	89,0	43,0	31,0	63084	69031
9,7 mm	0.3819	89,0	43,0	31,0	63085	69032
9,8 mm	0.3858	89,0	43,0	31,0	63086	69033
W	0.3860	4-1/2	2-7/8	2-19/64	53223	58087
9,9 mm	0.3898	89,0	43,0	31,0	63087	69034
25/64	0.3906	4-1/2	2-7/8	2-19/64	53125	58088
10,0 mm	0.3937	89,0	43,0	31,0	63026	69035
X	0.3970	4-1/2	2-7/8	2-19/64	53224	58089
10,1 mm	0.3976	89,0	43,0	31,0	63088	69036
10,2 mm	0.4016	89,0	43,0	31,0	63027	69037
Y	0.4040	4-1/2	2-7/8	2-19/64	53225	58090
13/32	0.4062	4-1/2	2-7/8	2-19/64	53126	58091
10,4 mm	0.4094	89,0	43,0	31,0	63028	69038
Z	0.4130	4-1/2	2-7/8	2-19/64	53226	58092
10,5 mm	0.4134	89,0	43,0	31,0	63029	69039
10,7 mm	0.4213	95,0	47,0	33,0	63030	69040

continued on next page

3 Flute Drills with 150 Point Geometry

CONTINUED

CUTTING DIAMETER D_1 / D_2	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
27/64	0.4219	4-1/2	2-7/8	2-19/64	53127	58093
10,8 mm	0.4252	95,0	47,0	33,0	63031	69041
11,0 mm	0.4331	95,0	47,0	33,0	63032	69042
7/16	0.4375	4-1/2	2-7/8	2-19/64	53128	58094
11,5 mm	0.4528	95,0	47,0	33,0	63033	69043
29/64	0.4531	4-3/4	3	2-13/32	53129	58095
15/32	0.4688	4-3/4	3	2-13/32	53130	58096
12,0 mm	0.5039	102,0	51,0	35,0	63034	69044
31/64	0.4844	4-3/4	3	2-13/32	53131	58097
12,5 mm	0.4921	102,0	51,0	35,0	63035	69045
1/2	0.5000	4-3/4	3	2-13/32	53132	58098
12,8 mm	0.5039	102,0	51,0	35,0	63036	69046
13,0 mm	0.5118	102,0	51,0	35,0	63089	69047
33/64	0.5156	4-3/4	3	2-13/32	53135	58099
13,1 mm	0.5157	102,0	51,0	35,0	63037	69048
13,5 mm	0.5315	107,0	54,0	37,0	63090	69049
14,0 mm	0.5512	107,0	54,0	37,0	63038	69050
9/16	0.5625	4-3/4	3	2-13/32	53136	58100
14,3 mm	0.5630	111,0	56,0	38,0	63039	69051
14,5 mm	0.5709	111,0	56,0	38,0	63040	69052
15,0 mm	0.5906	111,0	56,0	38,0	63091	69053
5/8	0.6250	5-3/4	3-1/2	2-51/64	53133	58101
11/16	0.6875	5-3/4	3-1/2	2-51/64	53137	58102
17,5 mm	0.6890	123,0	62,0	40,0	63041	69054
3/4	0.7500	5-3/4	4-1/4	3 13/32	53134	58103
19,5 mm	0.7677	131,0	66,0	42,0	63042	69055
20,0 mm	0.7874	131,0	66,0	42,0	63043	69056

Speed & Feed Recommendations

101, 125 Fractional	HARDNESS	SPEED (sfm)		FEED (inch/rev)						
	BRINELL	AlTin	Uncoated	1/64	1/32	1/16	1/8	1/4	3/8	1/2
CARBON STEEL* 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	265	220	0.00020	0.0004	0.0009	0.0017	0.0034	0.0050	0.0070
	> 200 ≤ 300	125	105	0.00020	0.0004	0.0008	0.0016	0.0031	0.0045	0.0060
	> 300 ≤ 420	85	70	0.00010	0.0002	0.0005	0.0009	0.0018	0.0025	0.0035
ALLOY STEEL* 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	230	190	0.00020	0.0004	0.0008	0.0016	0.0031	0.0045	0.0060
	> 270 ≤ 370	145	120	0.00020	0.0004	0.0008	0.0015	0.0030	0.0045	0.0060
	> 370 ≤ 450	60	50	0.00010	0.0002	0.0004	0.0007	0.0013	0.0020	0.0025
TOOL STEEL* A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	85	70	0.00010	0.0002	0.0005	0.0009	0.0018	0.0025	0.0035
	> 250 ≤ 330	55	45	0.00005	0.0001	0.0002	0.0004	0.0008	0.0010	0.0015
	> 330 ≤ 450	40	35	0.00005	0.0001	0.0002	0.0004	0.0008	0.0010	0.0015
CAST IRON* Gray, Malleable, Ductile	≤ 200	280	235	0.00025	0.0005	0.0011	0.0021	0.0041	0.0060	0.0080
	> 200 ≤ 330	250	210	0.00025	0.0005	0.0011	0.0021	0.0041	0.0060	0.0080
STAINLESS* (free machining) 303, 416, 420F, 430F, 440F	≤ 250	210	175	0.00015	0.0003	0.0006	0.0012	0.0024	0.0035	0.0050
	> 250 ≤ 330	110	90	0.00010	0.0002	0.0004	0.0007	0.0014	0.0020	0.0030
STAINLESS* (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	65	55	0.00010	0.0002	0.0005	0.0009	0.0018	0.0025	0.0035
	> 270 ≤ 370	55	45	0.00010	0.0002	0.0004	0.0008	0.0015	0.0025	0.0030
TITANIUM* TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	85	70	0.00020	0.0004	0.0008	0.0016	0.0032	0.0050	0.0065
	> 280 ≤ 350	65	55	0.00010	0.0002	0.0005	0.0009	0.0018	0.0025	0.0035
	> 350 ≤ 440	55	45	0.00010	0.0002	0.0004	0.0008	0.0015	0.0025	0.0030
HIGH TEMPERATURE ALLOY* A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	40	35	0.00010	0.0002	0.0005	0.0009	0.0018	0.0025	0.0035
	> 220 ≤ 330	25	20	0.00010	0.0002	0.0004	0.0008	0.0016	0.0025	0.0030
	> 330 ≤ 420	20	15	0.00005	0.0001	0.0002	0.0004	0.0007	0.0010	0.0015
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	540	450	0.00030	0.0006	0.0013	0.0025	0.0050	0.0075	0.0100
	> 80	455	380	0.00030	0.0006	0.0013	0.0025	0.0050	0.0075	0.0100
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	190	160	0.00015	0.0003	0.0006	0.0012	0.0024	0.0035	0.0050
	> 140	175	145	0.00015	0.0003	0.0006	0.0012	0.0024	0.0035	0.0050
PLASTICS Polycarbonate, PVC		490	410	0.00030	0.0006	0.0013	0.0025	0.0049	0.0075	0.0100

* AlTiN coating recommended
Reduce speed & feed for materials harder than listed

$rpm = sfm \times 3.82 / D_1$

$ipm = (inch/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

101M, 108M Metric	HARDNESS	SPEED (m/min)		FEED (mm/rev)						
	BRINELL	AlTin	Uncoated	1	3	6	8	10	12	16
CARBON STEEL* 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	80	67	0.0150	0.040	0.080	0.110	0.135	0.170	0.230
	> 200 ≤ 300	38	32	0.0150	0.035	0.075	0.095	0.120	0.145	0.190
	> 300 ≤ 420	26	21	0.0050	0.020	0.045	0.055	0.065	0.085	0.115
ALLOY STEEL* 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	69	58	0.0150	0.035	0.075	0.095	0.120	0.145	0.190
	> 270 ≤ 370	44	37	0.0100	0.035	0.070	0.095	0.120	0.145	0.190
	> 370 ≤ 450	18	15	0.0050	0.015	0.030	0.040	0.055	0.060	0.075
TOOL STEEL* A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	26	21	0.0050	0.020	0.045	0.055	0.065	0.085	0.115
	> 250 ≤ 330	16	14	0.0050	0.010	0.020	0.025	0.025	0.035	0.050
	> 330 ≤ 450	13	11	0.0050	0.010	0.020	0.025	0.025	0.035	0.050
CAST IRON* Gray, Malleable, Ductile	≤ 200	86	72	0.0150	0.050	0.100	0.130	0.160	0.195	0.255
	> 200 ≤ 330	77	64	0.0150	0.050	0.100	0.130	0.160	0.195	0.255
STAINLESS* (free machining) 303, 416, 420F, 430F, 440F	≤ 250	64	53	0.0100	0.030	0.060	0.075	0.095	0.120	0.165
	> 250 ≤ 330	33	27	0.0050	0.015	0.035	0.045	0.055	0.070	0.105
STAINLESS* (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	20	17	0.0050	0.020	0.045	0.055	0.065	0.085	0.115
	> 270 ≤ 370	16	14	0.0050	0.020	0.035	0.050	0.065	0.070	0.105
TITANIUM* TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	26	21	0.0150	0.040	0.075	0.105	0.135	0.155	0.205
	> 280 ≤ 350	20	17	0.0050	0.020	0.045	0.055	0.065	0.085	0.115
	> 350 ≤ 440	16	14	0.0050	0.020	0.035	0.050	0.065	0.070	0.105
HIGH TEMPERATURE ALLOY* A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	13	11	0.0050	0.020	0.045	0.055	0.065	0.085	0.115
	> 220 ≤ 330	7	6	0.0050	0.020	0.040	0.055	0.065	0.070	0.105
	> 330 ≤ 420	6	5	0.0050	0.010	0.015	0.020	0.025	0.035	0.050
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	165	137	0.0200	0.060	0.120	0.160	0.200	0.240	0.320
	> 80	139	116	0.0200	0.060	0.120	0.160	0.200	0.240	0.320
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	59	49	0.0100	0.030	0.060	0.075	0.095	0.120	0.165
	> 140	53	44	0.0100	0.030	0.060	0.075	0.095	0.120	0.165
PLASTICS Polycarbonate, PVC		150	125	0.0200	0.060	0.120	0.160	0.200	0.240	0.320

* AlTiN coating recommended
Reduce speed & feed for materials harder than listed

rpm = (1000 × m/min) / (3.14 × D_1)

mm/min = (mm/rev) × rpm

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

106 Fractional	HARDNESS	SPEED (sfm)		FEED (inch/rev)					
	BRINELL	AlTin	Uncoated	1/16	1/8	3/16	1/4	3/8	1/2
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	> 420 ≤ 500	33	28	0.0003	0.0006	0.0008	0.0012	0.0018	0.0024
	> 500 ≤ 615	33	28	0.0002	0.0004	0.0005	0.0007	0.001	0.0014
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	> 420 ≤ 500	34	28	0.0003	0.0006	0.0008	0.0012	0.0018	0.0023
	> 500 ≤ 615	33	28	0.0002	0.0003	0.0004	0.0006	0.0008	0.0014
CAST IRON Gray, Malleable, Ductile	≤ 200	252	210	0.001	0.002	0.003	0.004	0.006	0.0081
	> 200 ≤ 330	185	154	0.001	0.002	0.003	0.004	0.006	0.0081
AlTiN coating recommended		rpm = sfm × 3.82 / D_1 ipm = (inch/rev) × rpm		Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)					

106M Metric	HARDNESS	SPEED (m/min)		FEED (mm/rev)					
	BRINELL	AlTin	Uncoated	1	3	6	8	10	12
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	> 420 ≤ 500	10	9	0.006	0.017	0.034	0.045	0.057	0.068
	> 500 ≤ 615	10	9	0.003	0.009	0.018	0.024	0.03	0.036
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	> 420 ≤ 500	10	9	0.003	0.009	0.018	0.024	0.03	0.036
	> 500 ≤ 615	8	6	0.002	0.007	0.014	0.019	0.023	0.028
CAST IRON Gray, Malleable, Ductile	≤ 200	77	64	0.016	0.048	0.096	0.128	0.16	0.192
	> 200 ≤ 330	56	47	0.016	0.048	0.096	0.128	0.16	0.192
AlTiN coating recommended		rpm = (1000 × m/min) / (3.14 × D_1) mm/min = (mm/rev) × rpm		Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)					

Speed & Feed Recommendations

103 Fractional	HARDNESS	SPEED (sfm)		FEED (inch/rev)					
	BRINELL	AlTin	Uncoated	1/8	1/4	3/8	1/2	5/8	3/4
CARBON STEEL* 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	265	220	0.00020	0.0004	0.0009	0.0017	0.0034	0.0050
	> 200 ≤ 300	125	105	0.00020	0.0004	0.0008	0.0016	0.0031	0.0045
	> 300 ≤ 420	85	70	0.00010	0.0002	0.0005	0.0009	0.0018	0.0025
ALLOY STEEL* 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	230	190	0.00020	0.0004	0.0008	0.0016	0.0031	0.0045
	> 270 ≤ 370	145	120	0.00020	0.0004	0.0008	0.0015	0.0030	0.0045
	> 370 ≤ 450	60	50	0.00010	0.0002	0.0004	0.0007	0.0013	0.0020
TOOL STEEL* A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	85	70	0.00010	0.0002	0.0005	0.0009	0.0018	0.0025
	> 250 ≤ 330	55	45	0.00005	0.0001	0.0002	0.0004	0.0008	0.0010
	> 330 ≤ 450	40	35	0.00005	0.0001	0.0002	0.0004	0.0008	0.0010
CAST IRON* Gray, Malleable, Ductile	≤ 200	280	235	0.00025	0.0005	0.0011	0.0021	0.0041	0.0060
	> 200 ≤ 330	250	210	0.00025	0.0005	0.0011	0.0021	0.0041	0.0060
TITANIUM* TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	85	70	0.00020	0.0004	0.0008	0.0016	0.0032	0.0050
	> 280 ≤ 350	65	55	0.00010	0.0002	0.0005	0.0009	0.0018	0.0025
	> 350 ≤ 440	55	45	0.00010	0.0002	0.0004	0.0008	0.0015	0.0025
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	540	450	0.00030	0.0006	0.0013	0.0025	0.0050	0.0075
	> 80	455	380	0.00030	0.0006	0.0013	0.0025	0.0050	0.0075
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	190	160	0.00015	0.0003	0.0006	0.0012	0.0024	0.0035
	> 140	175	145	0.00015	0.0003	0.0006	0.0012	0.0024	0.0035

* AlTiN coating recommended
Reduce speed & feed for materials harder than listed

$rpm = sfm \times 3.82 / D_1$

$ipm = (inch/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

103M Metric	HARDNESS	SPEED (m/min)		FEED (mm/rev)					
	BRINELL	AlTin	Uncoated	3	6	10	12	16	20
CARBON STEEL* 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	84	70	0.053	0.108	0.176	0.216	0.264	0.352
	> 200 ≤ 300	45	37	0.048	0.096	0.160	0.192	0.240	0.320
	> 300 ≤ 420	32	27	0.031	0.062	0.104	0.125	0.156	0.208
ALLOY STEEL* 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	70	59	0.048	0.096	0.160	0.190	0.240	0.320
	> 270 ≤ 370	43	36	0.048	0.094	0.160	0.185	0.240	0.320
	> 370 ≤ 450	27	22	0.031	0.065	0.104	0.130	0.156	0.208
TOOL STEEL* A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	26	22	0.031	0.065	0.104	0.132	0.156	0.208
	> 250 ≤ 330	16	13	0.017	0.036	0.056	0.074	0.084	0.112
	> 330 ≤ 450	13	11	0.012	0.024	0.040	0.046	0.060	0.080
CAST IRON* Gray, Malleable, Ductile	≤ 200	77	64	0.060	0.125	0.200	0.247	0.300	0.400
	> 200 ≤ 330	56	47	0.060	0.122	0.200	0.245	0.300	0.400
TITANIUM* TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	26	22	0.048	0.098	0.160	0.197	0.240	0.320
	> 280 ≤ 350	20	17	0.029	0.058	0.096	0.113	0.144	0.192
	> 350 ≤ 440	16	13	0.029	0.055	0.096	0.110	0.144	0.192
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	164	137	0.077	0.156	0.256	0.312	0.384	0.512
	> 80	139	116	0.077	0.156	0.256	0.312	0.384	0.512
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	70	58	0.038	0.077	0.128	0.156	0.192	0.256
	> 140	58	48	0.038	0.077	0.128	0.156	0.192	0.256

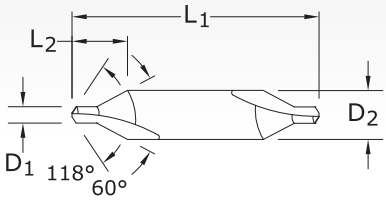
* AlTiN coating recommended
Reduce speed & feed for materials harder than listed

rpm = (1000 × m/min) / (3.14 × D_1)

mm/min = (mm/rev) × rpm

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Combined Drill & Countersink



TOLERANCES (inch)

D_1 = +.003/–.000

D_2 = –.0001/–.0005

301
FRACTIONAL SERIES

TECH INFO 186

SIZE	inch BODY DIAMETER D_2	DRILL DIAMETER D_1	APPROX. OVERALL LENGTH L_1	EDP NO. UNCOATED	Ti-NAMITE-A (AlTiN)
00*	1/8	.025	1-1/2	57005	57015
0*	1/8	1/32	1-1/2	57006	57016
1*	1/8	3/64	1-1/2	57007	57017
2*	3/16	5/64	1-7/8	57008	57018
3*	1/4	7/64	2	57009	57019
4*	5/16	1/8	2-1/8	57010	57020
5*	7/16	3/16	2-3/4	57011	57021
6*	1/2	7/32	3	57012	57022
Series 301 Set	–	–	–	57075	–

*Included in Series 301 Set

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
NON-FERROUS
PLASTICS/COMPOSITES

TOLERANCES (mm)

0,5–2,5 DIAMETER

D_1 = +0,140/–0,000

>2,5–5 DIAMETER

D_1 = +0,000/–0,012

TOLERANCES h9 (mm)

0,5–3 DIAMETER

D_2 = +0,000/–0,025

>3–5 DIAMETER

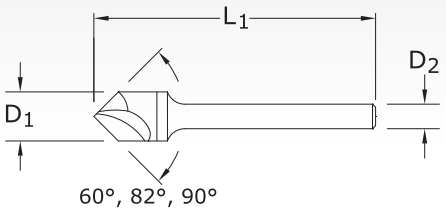
D_2 = +0,000/–0,030

301M
METRIC SERIES

TECH INFO 187

SIZE D_1	mm BODY DIAMETER D_2	APPROX. OVERALL LENGTH L_1	EDP NO. UNCOATED	Ti-NAMITE-A (AlTiN)
0,5	3,15	20,0	67005	67035
0,8	3,15	20,0	67007	67037
1	3,15	31,5	67009	67039
1,25	3,15	31,5	67011	67041
1,6	4,0	35,5	67013	67043
2	5,0	40,0	67015	67045
2,5	6,3	45,0	67017	67047
3,15	8,0	50,0	67019	67049
4	10,0	56,0	67021	67051
5	12,5	63,0	67023	67053

Single Flute Countersink



601
FRACTIONAL SERIES

TECH INFO 188

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

inch			EDP NO.		
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	OVERALL LENGTH L_1	UNCOATED 60°	UNCOATED 82°	UNCOATED 90°
1/8	1/8	1-1/2	74001	74101	74201
3/16	3/16	2	74004	74104	74204
1/4	1/4	2	74007	74107	74207
3/8*	1/4	2-13/16	74010	74110	74210
1/2*	1/4	2-7/8	74013	74113	74213
5/8*	3/8	3	74016	74116	74216
3/4*	1/2	3	74019	74119	74219
1*	1/2	3-1/4	74022	74122	74222

*Steel Shank / Con mango de acero / Avec queue en acier

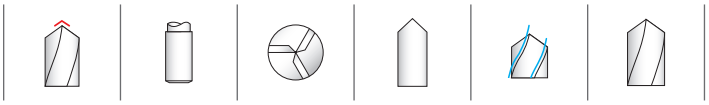
TOLERANCES (inch)

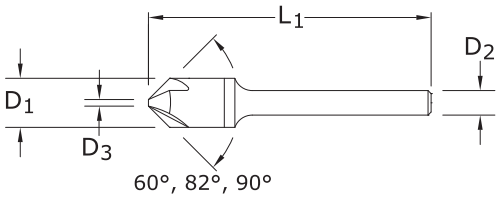
1/8–1/4 DIAMETER
D_1 = +.0000/–.0005

3/8–1 DIAMETER
D_1 = +.003/–.000

Included Angle +1°/–1°

3 Flute Countersink





603
FRACTIONAL SERIES

TECH INFO 189

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES

inch			EDP NO.		
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	OVERALL LENGTH L_1	UNCOATED 60°	UNCOATED 82°	UNCOATED 90°
1/8	1/8	1-1/2	74025	74125	74225
3/16	3/16	2	74028	74128	74228
1/4	1/4	2	74031	74131	74231
3/8*	1/4	2-13/16	74034	74134	74234
1/2*	1/4	2-7/8	74037	74137	74237
5/8*	3/8	3	74040	74140	74240
3/4*	1/2	3	74043	74143	74243
1*	1/2	3-1/4	74046	74146	74246

*Steel Shank / Con mango de acero / Avec queue en acier

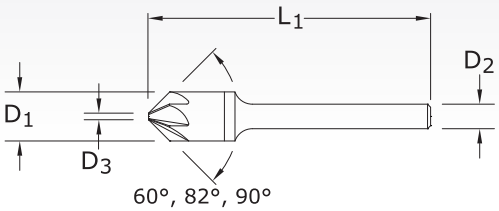
TOLERANCES (inch)

1/8–1/4 DIAMETER
D_1 = +.0000/–.0005

3/8–1 DIAMETER
D_1 = +.003/–.000

Included Angle +1°/–1°

6 Flute Countersink



TOLERANCES (inch)

1/8–1/4 DIAMETER

D_1 = +.0000/–.0005

3/8–1 DIAMETER

D_1 = +.003/–.000

Included Angle +1°/–1°

606
FRACTIONAL SERIES

TECH INFO 190

inch			EDP NO.		
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	OVERALL LENGTH L_1	UNCOATED 60°	UNCOATED 82°	UNCOATED 90°
1/8	1/8	1-1/2	74049	74149	74249
3/16	3/16	2	74052	74152	74252
1/4	1/4	2	74055	74155	74255
3/8*	1/4	2-13/16	74058	74158	74258
1/2*	1/4	2-7/8	74061	74161	74261
5/8*	3/8	3	74064	74164	74264
3/4*	1/2	3	74067	74167	74267
1*	1/2	3-1/4	74070	74170	74270

*Steel Shank / Con mango de acero / Avec queue en acier

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM
NON-FERROUS
PLASTICS/COMPOSITES

Speed & Feed Recommendations

301 Fractional	HARDNESS	SPEED (sfm)		FEED (inch/rev)					
	BRINELL	AlTin	Uncoated	1/32	3/64	5/64	1/8	3/16	7/32
CARBON STEEL* 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	275	230	0.0003	0.0005	0.0007	0.0012	0.0018	0.0021
	> 200 ≤ 300	150	125	0.0003	0.0004	0.0007	0.0011	0.0016	0.0019
	> 300 ≤ 420	105	90	0.0002	0.0003	0.0005	0.0007	0.0011	0.0013
ALLOY STEEL* 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	230	190	0.0003	0.0004	0.0006	0.0010	0.0015	0.0018
	> 270 ≤ 370	140	120	0.0003	0.0004	0.0006	0.0010	0.0015	0.0018
	> 370 ≤ 450	90	75	0.0002	0.0003	0.0004	0.0007	0.0010	0.0012
TOOL STEEL* A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	85	70	0.0002	0.0003	0.0004	0.0007	0.0010	0.0012
	> 250 ≤ 330	50	45	0.0001	0.0002	0.0002	0.0004	0.0006	0.0007
	> 330 ≤ 450	40	35	0.0001	0.0002	0.0002	0.0004	0.0006	0.0007
CAST IRON* Gray, Malleable, Ductile	≤ 200	250	210	0.0004	0.0005	0.0009	0.0014	0.0021	0.0025
	> 200 ≤ 330	185	155	0.0003	0.0005	0.0009	0.0014	0.0021	0.0024
STAINLESS* (free machining) 303, 416, 420F, 430F, 440F	≤ 250	155	125	0.0002	0.0002	0.0004	0.0006	0.0009	0.0011
	> 250 ≤ 330	110	90	0.0001	0.0002	0.0004	0.0006	0.0009	0.0010
STAINLESS* (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	70	55	0.0001	0.0002	0.0004	0.0006	0.0009	0.0010
	> 270 ≤ 370	50	45	0.0001	0.0002	0.0002	0.0004	0.0006	0.0007
TITANIUM* TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	85	70	0.0003	0.0004	0.0007	0.0011	0.0017	0.0020
	> 280 ≤ 350	65	55	0.0001	0.0002	0.0004	0.0006	0.0009	0.0010
	> 350 ≤ 440	50	45	0.0001	0.0002	0.0002	0.0004	0.0006	0.0007
HIGH TEMPERATURE ALLOY* A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	25	20	0.0002	0.0003	0.0005	0.0007	0.0011	0.0013
	> 220 ≤ 330	25	20	0.0001	0.0001	0.0002	0.0003	0.0005	0.0006
	> 330 ≤ 420	15	25	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	540	450	0.0004	0.0007	0.0011	0.0018	0.0027	0.0031
	> 80	455	380	0.0004	0.0007	0.0011	0.0018	0.0027	0.0031
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	230	190	0.0002	0.0003	0.0005	0.0009	0.0013	0.0015
	> 140	195	160	0.0002	0.0003	0.0005	0.0009	0.0013	0.0015

* AlTiN coating recommended
Reduce speed & feed for materials harder than listed

$rpm = sfm \times 3.82 / D_1$

$ipm = (inch/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

301M Metric	HARDNESS	SPEED (m/min)		FEED (mm/rev)					
	BRINELL	AlTin	Uncoated	0.5	1	1.6	2.5	4	5
CARBON STEEL* 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	84	70	0.005	0.011	0.014	0.024	0.038	0.048
	> 200 ≤ 300	46	38	0.005	0.009	0.014	0.022	0.034	0.043
	> 300 ≤ 420	32	27	0.003	0.006	0.010	0.014	0.023	0.030
ALLOY STEEL* 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	70	58	0.005	0.009	0.012	0.020	0.032	0.041
	> 270 ≤ 370	43	37	0.005	0.009	0.012	0.020	0.032	0.041
	> 370 ≤ 450	27	23	0.003	0.006	0.008	0.014	0.021	0.027
TOOL STEEL* A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	26	21	0.003	0.006	0.008	0.014	0.021	0.027
	> 250 ≤ 330	15	14	0.048	0.126	0.097	0.207	0.315	0.407
	> 330 ≤ 450	12	11	0.002	0.004	0.004	0.008	0.013	0.016
CAST IRON* Gray, Malleable, Ductile	≤ 200	76	64	0.007	0.011	0.018	0.028	0.045	0.057
	> 200 ≤ 330	56	47	0.005	0.011	0.018	0.028	0.045	0.055
STAINLESS* (free machining) 303, 416, 420F, 430F, 440F	≤ 250	47	38	0.003	0.004	0.008	0.012	0.019	0.025
	> 250 ≤ 330	34	27	0.002	0.004	0.008	0.012	0.019	0.023
STAINLESS* (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	21	17	0.002	0.004	0.008	0.012	0.019	0.023
	> 270 ≤ 370	15	14	0.002	0.004	0.004	0.008	0.013	0.016
TITANIUM* TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	26	21	0.005	0.009	0.014	0.022	0.036	0.046
	> 280 ≤ 350	20	17	0.002	0.004	0.008	0.012	0.019	0.023
	> 350 ≤ 440	15	14	0.002	0.004	0.004	0.008	0.013	0.016
HIGH TEMPERATURE ALLOY* A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	8	6	0.003	0.006	0.010	0.014	0.023	0.030
	> 220 ≤ 330	8	6	0.002	0.002	0.004	0.006	0.011	0.014
	> 330 ≤ 420	5	8	0.002	0.002	0.002	0.004	0.006	0.009
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	165	137	0.007	0.015	0.023	0.036	0.057	0.071
	> 80	139	116	0.007	0.015	0.023	0.036	0.057	0.071
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	70	58	0.003	0.006	0.010	0.018	0.028	0.034
	> 140	59	49	0.003	0.006	0.010	0.018	0.028	0.034

* AlTiN coating recommended
Reduce speed & feed for materials harder than listed

$rpm = (1000 \times m/min) / (3.14 \times D_1)$

$mm/min = (mm/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

601 Fractional	HARDNESS	SPEED	FEED (inch/rev)						
	BRINELL	sfm	1/8	3/16	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	125	0.0005	0.0008	0.0011	0.0016	0.0021	0.0032	0.0042
	> 200 ≤ 300	60	0.0005	0.0007	0.0010	0.0014	0.0019	0.0029	0.0038
	> 300 ≤ 420	45	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	95	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
	> 270 ≤ 370	60	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
	> 370 ≤ 450	35	0.0003	0.0004	0.0006	0.0008	0.0011	0.0017	0.0022
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	35	0.0003	0.0004	0.0006	0.0008	0.0011	0.0017	0.0022
	> 250 ≤ 330	20	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
	> 330 ≤ 450	20	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
CAST IRON Gray, Malleable, Ductile	≤ 200	105	0.0006	0.0009	0.0012	0.0018	0.0024	0.0036	0.0048
	> 200 ≤ 330	75	0.0006	0.0009	0.0012	0.0018	0.0024	0.0036	0.0048
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 250	53	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
	> 250 ≤ 330	46	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
STAINLESS (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	28	0.0004	0.0005	0.0007	0.0011	0.0014	0.0021	0.0028
	> 270 ≤ 370	21	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
TITANIUM TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	36	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
	> 280 ≤ 350	28	0.0004	0.0005	0.0007	0.0011	0.0014	0.0021	0.0028
	> 350 ≤ 440	21	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	18	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
	> 220 ≤ 330	14	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
	> 330 ≤ 420	12	0.0002	0.0003	0.0004	0.0006	0.0008	0.0012	0.0016
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	225	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0060
	> 80	190	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0060
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	95	0.0004	0.0006	0.0008	0.0011	0.0015	0.0023	0.0030
	> 140	80	0.0004	0.0006	0.0008	0.0011	0.0015	0.0023	0.0030

Coatings allow up to 20% increased speed
Reduce speed & feed for materials harder than listed

$rpm = sfm \times 3.82 / D_1$

$ipm = (inch/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

603 Fractional	HARDNESS	SPEED	FEED (inch/rev)						
	BRINELL	sfm	1/8	3/16	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	125	0.0008	0.0012	0.0016	0.0024	0.0032	0.0047	0.0063
	> 200 ≤ 300	60	0.0007	0.0011	0.0014	0.0021	0.0029	0.0043	0.0057
	> 300 ≤ 420	45	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	95	0.0007	0.0010	0.0014	0.0020	0.0027	0.0041	0.0054
	> 270 ≤ 370	60	0.0007	0.0010	0.0014	0.0020	0.0027	0.0041	0.0054
	> 370 ≤ 450	35	0.0004	0.0006	0.0008	0.0012	0.0017	0.0025	0.0033
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	35	0.0004	0.0006	0.0008	0.0012	0.0017	0.0025	0.0033
	> 250 ≤ 330	20	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
	> 330 ≤ 450	20	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
CAST IRON Gray, Malleable, Ductile	≤ 200	105	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072
	> 200 ≤ 330	75	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 250	53	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
	> 250 ≤ 330	46	0.0003	0.0005	0.0007	0.0010	0.0014	0.0020	0.0027
STAINLESS (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	28	0.0005	0.0008	0.0011	0.0016	0.0021	0.0032	0.0042
	> 270 ≤ 370	21	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
TITANIUM TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	36	0.0007	0.0010	0.0014	0.0020	0.0027	0.0041	0.0054
	> 280 ≤ 350	28	0.0005	0.0008	0.0011	0.0016	0.0021	0.0032	0.0042
	> 350 ≤ 440	21	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	18	0.0003	0.0005	0.0007	0.0010	0.0014	0.0020	0.0027
	> 220 ≤ 330	14	0.0003	0.0005	0.0007	0.0010	0.0014	0.0020	0.0027
	> 330 ≤ 420	12	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	225	0.0011	0.0017	0.0023	0.0034	0.0045	0.0068	0.0090
	> 80	190	0.0011	0.0017	0.0023	0.0034	0.0045	0.0068	0.0090
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	95	0.0006	0.0008	0.0011	0.0017	0.0023	0.0034	0.0045
	> 140	80	0.0006	0.0008	0.0011	0.0017	0.0023	0.0034	0.0045

Coatings allow up to 20% increased speed
Reduce speed & feed for materials harder than listed

$rpm = sfm \times 3.82 / D_1$

$ipm = (inch/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

606 Fractional	HARDNESS	SPEED	FEED (inch/rev)						
	BRINELL	sfm	1/8	3/16	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	125	0.0011	0.0016	0.0021	0.0032	0.0042	0.0063	0.0084
	> 200 ≤ 300	60	0.0010	0.0014	0.0019	0.0029	0.0038	0.0057	0.0076
	> 300 ≤ 420	45	0.0006	0.0009	0.0012	0.0018	0.0024	0.0036	0.0048
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	95	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072
	> 270 ≤ 370	60	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072
	> 370 ≤ 450	35	0.0006	0.0008	0.0011	0.0017	0.0022	0.0033	0.0044
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	35	0.0006	0.0008	0.0011	0.0017	0.0022	0.0033	0.0044
	> 250 ≤ 330	20	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
	> 330 ≤ 450	20	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
CAST IRON Gray, Malleable, Ductile	≤ 200	105	0.0012	0.0018	0.0024	0.0036	0.0048	0.0072	0.0096
	> 200 ≤ 330	75	0.0012	0.0018	0.0024	0.0036	0.0048	0.0072	0.0096
STAINLESS (free machining) 303, 416, 420F, 430F, 440F	≤ 250	53	0.0006	0.0009	0.0012	0.0018	0.0024	0.0036	0.0048
	> 250 ≤ 330	46	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
STAINLESS (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	28	0.0007	0.0011	0.0014	0.0021	0.0028	0.0042	0.0056
	> 270 ≤ 370	21	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
TITANIUM TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	36	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072
	> 280 ≤ 350	28	0.0007	0.0011	0.0014	0.0021	0.0028	0.0042	0.0056
	> 350 ≤ 440	21	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	18	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
	> 220 ≤ 330	14	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
	> 330 ≤ 420	12	0.0004	0.0006	0.0008	0.0012	0.0016	0.0024	0.0032
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	225	0.0015	0.0023	0.0030	0.0045	0.0060	0.0090	0.0120
	> 80	190	0.0015	0.0023	0.0030	0.0045	0.0060	0.0090	0.0120
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	95	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0060
	> 140	80	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0060

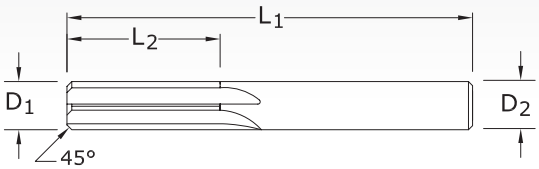
Coatings allow up to 20% increased speed
Reduce speed & feed for materials harder than listed

$rpm = sfm \times 3.82 / D_1$

$ipm = (inch/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Straight Flute Reamer



TOLERANCES (mm)

1–6 DIAMETER
D_1 = +0,008/–0,000

>6–10 DIAMETER
D_1 = +0,011/–0,00

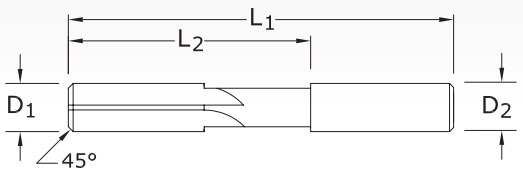
201M
METRIC SERIES

TECH INFO 195

mm					EDP NO.
DIAMETER D_1	SHANK DIAMETER D_2	MAXIMUM REAM LENGTH L_2	OVERALL LENGTH L_1	NO. OF FLUTES Z	UNCOATED
1,0	1,0	6,0	32,0	4	81001
1,5	1,5	9,5	38,0	4	81003
2,0	2,0	12,7	44,0	4	81005
2,5	2,5	12,7	50,0	4	81007
3,0	3,0	16,0	57,0	4	81009
3,5	3,5	19, 0	63,0	4	81011
4,0	4,0	19,0	63,0	4	81013
4,5	4,5	22,0	70,0	4	81015
5,0	5,0	25,0	75,0	4	81017
5,5	5,5	25,0	75,0	4	81019
6,0	6,0	25,0	75,0	4	81021
7,0	7,0	28,0	82,0	6	81023
8,0	8,0	28,0	82,0	6	81025
9,0	9,0	31,0	89,0	6	81027
10,0	10,0	31,0	89,0	6	81029

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- HARDENED STEELS

Straight Flute Accu-Reamer



200
FRACTIONAL SERIES

TECH INFO 194

TOLERANCES (inch)

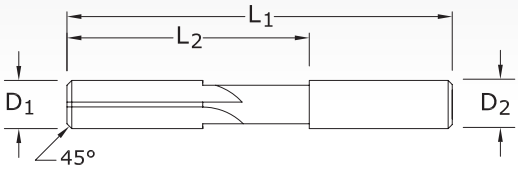
D_1 = +.0002/–.0000

D_2 = +.0002/–.0000

- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES
- HARDENED STEELS

inch					EDP NO.
REAMER DIAMETER D_1	SHANK DIAMETER D_2	MAXIMUM REAM LENGTH L_2	OVERALL LENGTH L_1	NO. OF FLUTES Z	UNCOATED
3/64	3/64	3/4	1-1/2	4	70003
1/16	1/16	3/4	1-1/2	4	70004
5/64	5/64	1	2	4	70005
3/32	3/32	1-1/4	2-1/4	4	70006
7/64	7/64	1-1/4	2-1/4	4	70007
1/8	1/8	1-1/4	2-1/4	4	70008
9/64	9/64	1-1/2	2-1/2	4	70009
5/32	5/32	1-1/2	2-1/2	4	70010
11/64	11/64	1-3/4	2-3/4	4	70011
3/16	3/16	1-3/4	2-3/4	4	70012
13/64	13/64	2	3	4	70013
7/32	7/32	2	3	4	70014
15/64	15/64	2	3	4	70015
1/4	1/4	2	3	4	70016
17/64	17/64	2-1/4	3-1/4	6	70017
9/32	9/32	2-1/4	3-1/4	6	70018
19/64	19/64	2-1/4	3-1/4	6	70019
5/16	5/16	2-1/4	3-1/4	6	70020
21/64	21/64	2-3/8	3-1/2	6	70021
11/32	11/32	2-3/8	3-1/2	6	70022
23/64	23/64	2-3/8	3-1/2	6	70023
3/8	3/8	2-3/8	3-1/2	6	70024
25/64	25/64	2-7/8	4	6	70025
13/32	13/32	2-7/8	4	6	70026
27/64	27/64	2-7/8	4	6	70027
7/16	7/16	2-7/8	4	6	70028
29/64	29/64	2-7/8	4	6	70029
15/32	15/32	2-7/8	4	6	70030
31/64	31/64	2-7/8	4	6	70031
1/2	1/2	2-7/8	4	6	70032

Straight Flute Accu-Reamer



TOLERANCES (inch)

D_1 = +.0002/–.0000
D_2 = +.0002/–.0000

200
FRACTIONAL SERIES

TECH INFO 194

inch				
REAMER DIAMETER D_1	SHANK DIAMETER D_2	MAXIMUM REAM LENGTH L_2	OVERALL LENGTH L_1	NO. OF FLUTES Z
.0470 – .0625	1/16	3/4	1-1/2	4
.0626 – .0781	5/64	1	2	4
.0782 – .0938	3/32	1-1/4	2-1/4	4
.0939 – .1094	7/64	1-1/4	2-1/4	4
.1095 – .1250	1/8	1-1/4	2-1/4	4
.1251 – .1406	9/64	1-1/2	2-1/2	4
.1407 – .1563	5/32	1-1/2	2-1/2	4
.1564 – .1719	11/64	1-3/4	2-3/4	4
.1720 – .1875	3/16	1-3/4	2-3/4	4
.1876 – .2031	13/64	2	3	4
.2032 – .2188	7/32	2	3	4
.2189 – .2344	15/64	2	3	4
.2345 – .2500	1/4	2	3	4
.2501 – .2656	17/64	2-1/4	3-1/4	6
.2657 – .2813	9/32	2-1/4	3-1/4	6
.2814 – .2969	19/64	2-1/4	3-1/4	6
.2970 – .3125	5/16	2-1/4	3-1/4	6
.3126 – .3281	21/64	2-3/8	3-1/2	6
.3282 – .3438	11/32	2-3/8	3-1/2	6
.3439 – .3594	23/64	2-3/8	3-1/2	6
.3595 – .3750	3/8	2-3/8	3-1/2	6
.3751 – .3906	25/64	2-7/8	4	6
.3907 – .4063	13/32	2-7/8	4	6
.4064 – .4219	27/64	2-7/8	4	6
.4220 – .4375	7/16	2-7/8	4	6
.4376 – .4531	29/64	2-7/8	4	6
.4532 – .4688	15/32	2-7/8	4	6
.4689 – .4844	31/64	2-7/8	4	6
.4845 – .5000	1/2	2-7/8	4	6

Speed & Feed Recommendations

200 Fractional	HARDNESS	SPEED	FEED (inch/rev)						
	BRINELL	sfm	1/16	1/8	3/16	1/4	5/16	3/8	1/2
CARBON STEEL* 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	150	0.0018	0.0035	0.0053	0.0071	0.0088	0.0106	0.0141
	> 200 ≤ 300	75	0.0016	0.0031	0.0047	0.0062	0.0078	0.0093	0.0124
	> 300 ≤ 420	55	0.0009	0.0019	0.0028	0.0037	0.0046	0.0056	0.0074
ALLOY STEEL* 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	115	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
	> 270 ≤ 370	70	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
	> 370 ≤ 450	45	0.0009	0.0019	0.0028	0.0037	0.0046	0.0056	0.0074
TOOL STEEL* A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	40	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078
	> 250 ≤ 330	25	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
	> 330 ≤ 450	20	0.0004	0.0008	0.0012	0.0016	0.0019	0.0023	0.0031
CAST IRON* Gray, Malleable, Ductile	≤ 200	125	0.0020	0.0040	0.0060	0.0081	0.0101	0.0121	0.0161
	> 200 ≤ 330	95	0.0020	0.0040	0.0060	0.0081	0.0101	0.0121	0.0161
STAINLESS* (free machining) 303, 416, 420F, 430F, 440F	≤ 250	75	0.0010	0.0019	0.0029	0.0039	0.0048	0.0058	0.0077
	> 250 ≤ 330	55	0.0008	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060
STAINLESS* (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	35	0.0010	0.0019	0.0029	0.0039	0.0048	0.0058	0.0077
	> 270 ≤ 370	25	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
TITANIUM* TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	45	0.0015	0.0031	0.0046	0.0061	0.0076	0.0092	0.0122
	> 280 ≤ 350	35	0.0010	0.0019	0.0029	0.0039	0.0048	0.0058	0.0077
	> 350 ≤ 440	25	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
HIGH TEMPERATURE ALLOY* A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	20	0.0008	0.0016	0.0023	0.0031	0.0039	0.0047	0.0062
	> 220 ≤ 330	15	0.0006	0.0013	0.0019	0.0026	0.0032	0.0038	0.0051
	> 330 ≤ 420	10	0.0004	0.0007	0.0011	0.0015	0.0018	0.0022	0.0029
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	270	0.0025	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200
	> 80	230	0.0025	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	115	0.0013	0.0026	0.0038	0.0051	0.0064	0.0077	0.0102
	> 140	95	0.0013	0.0026	0.0038	0.0051	0.0064	0.0077	0.0102

* AlTiN coating recommended
Reduce speed & feed for materials harder than listed

$rpm = sfm \times 3.82 / D_1$

$ipm = (inch/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

201M Metric	HARDNESS	SPEED	FEED (mm/rev)						
	BRINELL	m/min	1	2	3	4	6	8	10
CARBON STEEL* 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	45	0.028	0.056	0.085	0.113	0.169	0.226	0.282
	> 200 ≤ 300	23	0.025	0.050	0.074	0.099	0.149	0.198	0.248
	> 300 ≤ 420	16	0.015	0.030	0.044	0.059	0.089	0.118	0.148
ALLOY STEEL* 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	35	0.024	0.048	0.072	0.096	0.144	0.192	0.240
	> 270 ≤ 370	22	0.024	0.048	0.072	0.096	0.144	0.192	0.240
	> 370 ≤ 450	13	0.015	0.030	0.044	0.059	0.089	0.118	0.148
TOOL STEEL* A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	13	0.016	0.031	0.047	0.062	0.094	0.125	0.156
	> 250 ≤ 330	8	0.010	0.020	0.030	0.040	0.060	0.080	0.100
	> 330 ≤ 450	6	0.006	0.012	0.019	0.025	0.037	0.050	0.062
CAST IRON* Gray, Malleable, Ductile	≤ 200	38	0.032	0.064	0.097	0.129	0.193	0.258	0.322
	> 200 ≤ 330	28	0.032	0.064	0.097	0.129	0.193	0.258	0.322
STAINLESS* (free machining) 303, 416, 420F, 430F, 440F	≤ 250	23	0.015	0.031	0.046	0.062	0.092	0.123	0.154
	> 250 ≤ 330	17	0.012	0.024	0.036	0.048	0.072	0.096	0.120
STAINLESS* (difficult) 304, 316, 321, 15-5ph, 17-4PH, Nitronic 32	≤ 270	10	0.015	0.031	0.046	0.062	0.092	0.123	0.154
	> 270 ≤ 370	8	0.010	0.020	0.030	0.040	0.060	0.080	0.100
TITANIUM* TiCODE-12, Ti-6Al4V, Ti-5Al-5V-5Mo-3Cr, Ti-7Al4Mo, Ti8Al1Mo1V	≤ 280	13	0.024	0.049	0.073	0.098	0.146	0.195	0.244
	> 280 ≤ 350	10	0.015	0.031	0.046	0.062	0.092	0.123	0.154
	> 350 ≤ 440	8	0.010	0.020	0.030	0.040	0.060	0.080	0.100
HIGH TEMPERATURE ALLOY* A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Waspalloy	≤ 220	6	0.012	0.025	0.037	0.050	0.074	0.099	0.124
	> 220 ≤ 330	4	0.010	0.020	0.031	0.041	0.061	0.082	0.102
	> 330 ≤ 420	3	0.006	0.012	0.017	0.023	0.035	0.046	0.058
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 80	82	0.040	0.080	0.120	0.160	0.240	0.320	0.400
	> 80	69	0.040	0.080	0.120	0.160	0.240	0.320	0.400
COPPER ALLOY Alum Bronze, C110, Muntz Brass	≤ 140	35	0.020	0.041	0.061	0.082	0.122	0.163	0.204
	> 140	29	0.020	0.041	0.061	0.082	0.122	0.163	0.204

* AlTiN coating recommended
Reduce speed & feed for materials harder than listed

$rpm = (1000 \times m/min) / (3.14 \times D_1)$

$mm/min = (mm/rev) \times rpm$

Refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

ROUTERS

Routing

Ranurado

Détourage

Router Icon Legend
Leyenda del icono de los ranuradores
Légende des icônes de détourage

END CONFIGURATIONS
CONFIGURACIONES DE LA PUNTA
CONFIGURATIONS TERMINALES

Square
Plana
Carrée

SHANK TYPE
TIPO DE VÁSTAGO
TYPE DE TIGE

Straight
Recto
Droite

RAKE ANGLE
ÁNGULO DE ATAQUE
ANGLE DE PENTE

Positive
Positivo
Positif

Neutral
Neutro
Neutre

Negative
Negativo
Négatif

Variable
Variable
Variable

HELIX ANGLES
ÁNGULOS HELICOIDALES
ANGLES DE L'HÉLICE

Right Spiral
Espiral sentido derecho
Spirale droite

Left Spiral
Espiral sentido izquierdo
Spirale gauche

ADDITIONAL GEOMETRY
CARACTERÍSTICAS GEOMÉTRICAS ADICIONALES
GÉOMÉTRIE SUPPLÉMENTAIRE

Left Cut Direction
Fresado sentido izquierda
Coupe vers la gauche

Right Cut Direction
Fresado sentido derecha
Coupe vers la droite

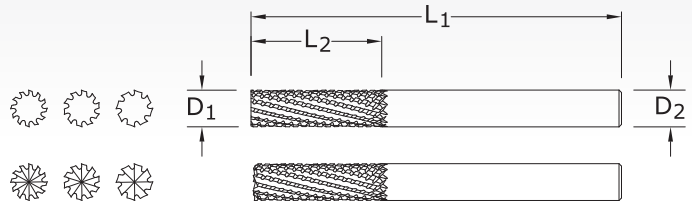
Chip Breaker
Rompevirutas
Brise-copeaux

COATINGS
REVESTIMIENTOS
REVÊTEMENTS

Uncoated

Di-NAMITE
(Diamond)

Carbon Composite Routers



20-CCR
FRACTIONAL SERIES

TECH INFO 205

PLASTICS/COMPOSITES

inch						EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	END STYLE	UNCOATED	Di-NAMITE (Diamond)
1/4	1	2-1/2	1/4	8	No End Cutting	72930	73013
1/4	1	2-1/2	1/4	8	End Cutting	72947	73012
5/16	1	2-1/2	5/16	10	No End Cutting	72948	73026
5/16	1	2-1/2	5/16	10	End Cutting	72949	73014
3/8	1-1/8	2-1/2	3/8	12	No End Cutting	72950	73028
3/8	1-1/8	2-1/2	3/8	12	End Cutting	72951	73027
1/2	1-1/2	3-1/2	1/2	12	No End Cutting	72952	73041
1/2	1-1/2	3-1/2	1/2	12	End Cutting	72953	73029

TOLERANCES (inch)
D_1 = +.000/–.005
D_2 = h_6

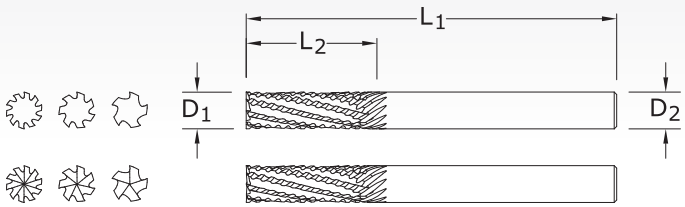
20M-CCR
METRIC SERIES

TECH INFO 206

mm						EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	END STYLE	UNCOATED	Di-NAMITE (Diamond)
6,0	25,0	63,0	6,0	8	No End Cutting	82966	83027
6,0	25,0	63,0	6,0	8	End Cutting	82967	83026
8,0	25,0	63,0	8,0	10	No End Cutting	82968	83029
8,0	25,0	63,0	8,0	10	End Cutting	82969	83028
10,0	28,0	63,0	10,0	12	No End Cutting	82970	83042
10,0	28,0	63,0	10,0	12	End Cutting	82971	83041
12,0	38,0	89,0	12,0	12	No End Cutting	82972	83044
12,0	38,0	89,0	12,0	12	End Cutting	82973	83043

TOLERANCES (mm)
D_1 = +0,00/–0,13
D_2 = h_6

Coarse Cut Carbon Composite Routers



TOLERANCES (inch)

D_1 = +.000/–.005

D_2 = h_6

31-CCR
FRACTIONAL SERIES

TECH INFO 205

inch						EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	END STYLE	UNCOATED	Di-NAMITE (Diamond)
1/4	1	2-1/2	1/4	5	End Cutting	72954	72955
1/4	1	2-1/2	1/4	5	No End Cutting	72956	72957
5/16	1	2-1/2	5/16	7	End Cutting	72958	72959
5/16	1	2-1/2	5/16	7	No End Cutting	72960	72961
3/8	1-1/8	2-1/2	3/8	8	End Cutting	72962	72963
3/8	1-1/8	2-1/2	3/8	8	No End Cutting	72964	72965
1/2	1-1/2	3-1/2	1/2	10	End Cutting	72966	72967
1/2	1-1/2	3-1/2	1/2	10	No End Cutting	72968	72969

PLASTICS/COMPOSITES

TOLERANCES (mm)

D_1 = +0,00/–0,13

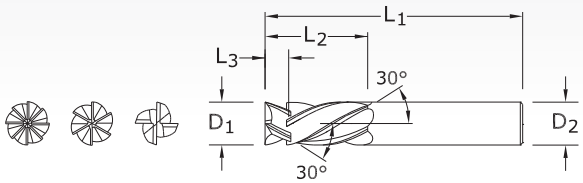
D_2 = h_6

31M-CCR
METRIC SERIES

TECH INFO 206

mm						EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	END STYLE	UNCOATED	Di-NAMITE (Diamond)
6,0	18,0	63,0	6,0	5	End Cutting	82974	82982
6,0	18,0	63,0	6,0	5	No End Cutting	82975	82983
8,0	25,0	63,0	8,0	7	End Cutting	82976	82984
8,0	25,0	63,0	8,0	7	No End Cutting	82977	82985
10,0	30,0	63,0	10,0	8	End Cutting	82978	82986
10,0	30,0	63,0	10,0	8	No End Cutting	82979	82987
12,0	38,0	89,0	12,0	10	End Cutting	82980	82988
12,0	38,0	89,0	12,0	10	No End Cutting	82981	82989

Compression Routers



25
FRACTIONAL SERIES

TECH INFO 207

PLASTICS/COMPOSITES

inch					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	REACH L_3	SHANK DIAMETER D_2	UNCOATED	Di-NAMITE (Diamond)
1/4	1	2-1/2	11/64	1/4	72970	72971
5/16	1	2-1/2	7/32	5/16	72972	72973
3/8	1-1/8	2-1/2	17/64	3/8	72974	72975
1/2	1-1/2	3-1/2	23/64	1/2	72976	72977

TOLERANCES (inch)

D_1 = +.000/–.003

D_2 = h_6

25M
METRIC SERIES

TECH INFO 208

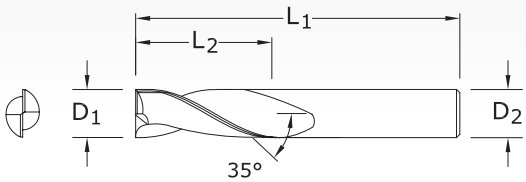
mm					EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	REACH L_3	SHANK DIAMETER D_2	UNCOATED	Di-NAMITE (Diamond)
6,0	25,0	63,0	4,10	6,0	82990	82991
8,0	25,0	63,0	5,58	8,0	82992	82993
10,0	28,0	63,0	7,05	10,0	82994	82995
12,0	38,0	89,0	8,60	12,0	82996	82997

TOLERANCES (mm)

D_1 = +0,00/–0,08

D_2 = h_6

Up Cut Routers



TOLERANCES (inch)

D_1 = +.000/–.003

D_2 = h_6

21
FRACTIONAL SERIES

TECH INFO 209

inch				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED
1/8	1/2	2	1/4	90001
5/32	5/8	2-1/2	1/4	90005
3/16	3/4	2-1/2	1/4	90009
1/4	3/4	2-1/2	1/4	90013
1/4	1	2-1/2	1/4	90017
5/16	1	2-1/2	5/16	90021
5/16	1	3	1/2	90025
3/8	1	2-1/2	3/8	90029
3/8	1-1/4	3	1/2	90033
1/2	1-1/4	3	1/2	90037
1/2	1-1/2	3-1/2	1/2	90041
1/2	2	4	1/2	90045
5/8	2	4-1/2	5/8	90049
3/4	2	4-1/2	3/4	90053

NON-FERROUS

PLASTICS/COMPOSITES

TOLERANCES (mm)

D_1 = +0,00/–0,08

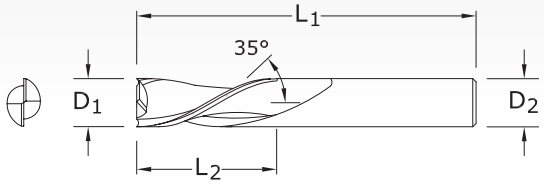
D_2 = h_6

21M
METRIC SERIES

TECH INFO 209

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED
3,0	13,0	50,0	6,0	90101
4,0	16,0	63,0	6,0	90107
5,0	19,0	63,0	6,0	90109
6,0	25,0	63,0	6,0	90113
8,0	25,0	63,0	8,0	90121
10,0	31,0	75,0	10,0	90129
12,0	31,0	75,0	12,0	90137

Down Cut Routers



22
FRACTIONAL SERIES

TECH INFO 209

TOLERANCES (inch)

D_1 = +.000/–.003

D_2 = h_6

NON-FERROUS

PLASTICS/COMPOSITES

inch				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED
1/8	1/2	2	1/4	91001
5/32	5/8	2-1/2	1/4	91005
3/16	3/4	2-1/2	1/4	91009
1/4	3/4	2-1/2	1/4	91013
1/4	1	2-1/2	1/4	91017
5/16	1	2-1/2	5/16	91021
5/16	1	3	1/2	91025
3/8	1	2-1/2	3/8	91029
3/8	1-1/4	3	1/2	91033
1/2	1-1/4	3	1/2	91037
1/2	1-1/2	3-1/2	1/2	91041
1/2	2	4	1/2	91045
5/8	2	4-1/2	5/8	91049
3/4	2	4-1/2	3/4	91053

22M
METRIC SERIES

TECH INFO 209

TOLERANCES (mm)

D_1 = +0,00/–0,08

D_2 = h_6

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED
3,0	13,0	50,0	6,0	91101
4,0	16,0	63,0	6,0	91107
5,0	19,0	63,0	6,0	91109
6,0	25,0	63,0	6,0	91113
8,0	25,0	63,0	8,0	91121
10,0	31,0	75,0	10,0	91129
12,0	31,0	75,0	12,0	91137

Speed & Feed Recommendations

20, 31 Fractional	CUT TYPE	SPEED sfm	FEED (inch/rev) 1/16	1/8	1/4	3/8	1/2
CFRP, AFRP (Carbon Fiber, Aramid Fiber)	Slot	400	0.0012	0.0024	0.0048	0.0090	0.0120
	Profile	500	0.0012	0.0024	0.0048	0.0090	0.0120
	Light	825	0.0028	0.0056	0.0111	0.0207	0.0276
GFRP (Fiberglass)	Slot	320	0.0012	0.0024	0.0048	0.0090	0.0120
	Profile	400	0.0012	0.0024	0.0048	0.0090	0.0120
	Light	660	0.0028	0.0056	0.0111	0.0207	0.0276
CARBON, GRAPHITE	Slot	480	0.0015	0.0030	0.0060	0.0114	0.0150
	Profile	600	0.0015	0.0030	0.0060	0.0114	0.0150
	Light	990	0.0035	0.0069	0.0138	0.0258	0.0345
PLASTIC	Slot	800	0.0015	0.0030	0.0060	0.0114	0.0150
	Profile	1000	0.0015	0.0030	0.0060	0.0114	0.0150
	Light	1650	0.0035	0.0069	0.0138	0.0258	0.0345
MACHINABLE CERAMIC, MACHINABLE GLASS	Slot	40	0.0006	0.0012	0.0024	0.0045	0.0060
	Profile	50	0.0006	0.0012	0.0024	0.0045	0.0060
	Light	85	0.0014	0.0027	0.0054	0.0102	0.0138

CUT TYPE		
SLOT	**PROFILE**	**LIGHT***
31 Rw = D_1 Ad = D_1	31 Rw = .5 x D_1 Ad = 1.5 x D_1	20, 31 Rw = .05 x D_1 Ad = L_2
		

rpm = sfm x 3.82 / D_1
ipm = (inch/rev) x rpm

- maximum recommended depths shown
- adjust speed and feed based upon resin type and/or fiber structure
- reduce speed when overheating causes melting or damage to resin
- reduce feed if delamination or fraying occurs

* finish cuts typically require reduced feed and cutting depths

- rates shown are for use without coolant; rates may be increased with coolant use
- dust collection is vital when machining dry
- diamond coating will increase tool life in graphite and composite materials
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

20M, 31M Metric	CUT TYPE	SPEED m/min	FEED (mm/rev) 1.6	3	6	10	12
CFRP, AFRP (Carbon Fiber, Aramid Fiber)	Slot	120	0.030	0.060	0.120	0.230	0.305
	Profile	150	0.030	0.060	0.120	0.230	0.305
	Light	250	0.070	0.140	0.280	0.525	0.700
GFRP (Fiberglass)	Slot	100	0.030	0.060	0.120	0.230	0.305
	Profile	120	0.030	0.060	0.120	0.230	0.305
	Light	200	0.070	0.140	0.280	0.525	0.700
CARBON, GRAPHITE	Slot	145	0.040	0.075	0.150	0.290	0.380
	Profile	185	0.040	0.075	0.150	0.290	0.380
	Light	300	0.090	0.175	0.350	0.655	0.875
PLASTIC	Slot	245	0.040	0.075	0.150	0.290	0.380
	Profile	305	0.040	0.075	0.150	0.290	0.380
	Light	505	0.090	0.175	0.350	0.655	0.875
MACHINABLE CERAMIC, MACHINABLE GLASS	Slot	10	0.015	0.030	0.060	0.115	0.150
	Profile	15	0.015	0.030	0.060	0.115	0.150
	Light	25	0.035	0.070	0.135	0.260	0.350

CUT TYPE		
SLOT	PROFILE	LIGHT*
31M Rw = D_1 Ad = D_1	31M Rw = .5 x D_1 Ad = 1.5 x D_1	20M, 31M Rw = .05 x D_1 Ad = L_2
		

rpm = (1000 x m/min) / (3.14 x D_1)
mm/min = (mm/rev) x rpm

- maximum recommended depths shown
- adjust speed and feed based upon resin type and/or fiber structure
- reduce speed when overheating causes melting or damage to resin
- reduce feed if delamination or fraying occurs

* finish cuts typically require reduced feed and cutting depths

- rates shown are for use without coolant; rates may be increased with coolant use
- dust collection is vital when machining dry
- diamond coating will increase tool life in graphite and composite materials
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

25 Fractional	CUT TYPE	SPEED sfm	FEED (inch/flute) 1/4	5/16	3/8	1/2	3/4
CFRP, AFRP (Carbon Fiber, Aramid Fiber)	Profile	500	0.0016	0.0025	0.0030	0.0040	0.0048
	Light	825	0.0037	0.0057	0.0069	0.0092	0.0110
GFRP (Fiberglass)	Profile	400	0.0016	0.0025	0.0030	0.0040	0.0048
	Light	660	0.0037	0.0057	0.0069	0.0092	0.0110
CARBON, GRAPHITE	Profile	600	0.0020	0.0031	0.0038	0.0050	0.0060
	Light	990	0.0046	0.0072	0.0086	0.0115	0.0138
PLASTIC	Profile	1000	0.0020	0.0031	0.0038	0.0050	0.0060
	Light	1650	0.0046	0.0072	0.0086	0.0115	0.0138
MACHINABLE CERAMIC, MACHINABLE GLASS	Profile	50	0.0008	0.0013	0.0015	0.0020	0.0024
	Light	85	0.0018	0.0029	0.0034	0.0046	0.0055

CUT TYPE	
PROFILE	**LIGHT***
Rw = .5 x D_1 Ad = 1.5 x D_1	Rw = .05 x D_1 Ad = L_2
	

rpm = sfm x 3.82 / D_1
ipm = (inch/flute) x no. of flutes x rpm

- maximum recommended depths shown
- adjust speed and feed based upon resin type and/or fiber structure
- reduce speed when overheating causes melting or damage to resin
- reduce feed if delamination or fraying occurs

* finish cuts typically require reduced feed and cutting depths

- rates shown are for use without coolant; rates may be increased with coolant use
- dust collection is vital when machining dry
- diamond coating will increase tool life in graphite and composite materials
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

25M Metric	CUT TYPE	SPEED m/min	FEED (mm/flute) 6	8	10	12	16
CFRP, AFRP (Carbon Fiber, Aramid Fiber)	Profile	150	0.040	0.065	0.075	0.100	0.120
	Light	250	0.095	0.145	0.175	0.235	0.280
GFRP (Fiberglass)	Profile	120	0.040	0.065	0.075	0.100	0.120
	Light	200	0.095	0.145	0.175	0.235	0.280
CARBON, GRAPHITE	Profile	185	0.050	0.080	0.095	0.125	0.150
	Light	300	0.115	0.185	0.220	0.290	0.350
PLASTIC	Profile	305	0.050	0.080	0.095	0.125	0.150
	Light	505	0.115	0.185	0.220	0.290	0.350
MACHINABLE CERAMIC, MACHINABLE GLASS	Profile	15	0.020	0.035	0.040	0.050	0.060
	Light	25	0.045	0.075	0.085	0.115	0.140

CUT TYPE	
PROFILE	LIGHT*
Rw = .5 x D_1 Ad = 1.5 x D_1	Rw = .05 x D_1 Ad = L_2
	

rpm = (1000 x m/min) / (3.14 x D_1)
mm/min = (mm/flute) x no. of flutes x rpm

- maximum recommended depths shown
- adjust speed and feed based upon resin type and/or fiber structure
- reduce speed when overheating causes melting or damage to resin
- reduce feed if delamination or fraying occurs

* finish cuts typically require reduced feed and cutting depths

- rates shown are for use without coolant; rates may be increased with coolant use
- dust collection is vital when machining dry
- diamond coating will increase tool life in graphite and composite materials
- refer to the SGS Tool Wizard for more complete technical information (available at www.sgstool.com)

Speed & Feed Recommendations

21, 22 Fractional	CUT TYPE	SPEED sfm	FEED (inch/flute) 1/8	1/4	3/8	1/2	3/4
HARDWOOD	Slot	1550	0.0008	0.0015	0.0025	0.0030	0.0045
	Profile						
SOFTWOOD	Slot	1950	0.0010	0.0020	0.0030	0.0035	0.0055
	Profile						
PLYWOOD	Slot	1950	0.0013	0.0025	0.0040	0.0050	0.0075
	Profile						
ALUMINUM	Slot	1150	0.0006	0.0015	0.0020	0.0025	0.0040
	Profile						
PLASTIC	Slot	1950	0.0008	0.0017	0.0025	0.0035	0.0050
	Profile						

21M, 22M Metric	CUT TYPE	SPEED m/min	FEED (mm/flute) 3	6	10	12	20
HARDWOOD	Slot	470	0.020	0.040	0.065	0.075	0.115
	Profile						
SOFTWOOD	Slot	600	0.025	0.050	0.075	0.090	0.140
	Profile						
PLYWOOD	Slot	600	0.030	0.065	0.100	0.125	0.190
	Profile						
ALUMINUM	Slot	350	0.015	0.040	0.050	0.065	0.100
	Profile						
PLASTIC	Slot	600	0.020	0.040	0.065	0.090	0.125
	Profile						

CUT TYPE	
SLOT	PROFILE
$Rw = D_1$ $Ad = D_1$	$Rw = .5 \times D_1$ $Ad = 1.5 \times D_1$
	

$rpm = sfm \times 3.82 / D_1$
$rpm = (1000 \times m/min) / (3.14 \times D_1)$
$ipm = (inch/flute) \times 2 \times rpm$
$mm/min = (mm/flute) \times 2 \times rpm$

- maximum recommended depths shown

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

EDP Number Index

ISO H6 SPECIFICATIONS

DIAMETER	+	–	DIAMETER	+	–
≥ 1/8 - 3/16	0.00000	–0.00032	≤ 3	0,000	0,006
> 3/16 - 7/16	0.00000	–0.00035	> 3 - 6	0,000	0,008
> 7/16 - 5/8	0.00000	–0.00043	> 6 - 10	0,000	0,009
> 5/8 - 1	0.00000	–0.00051	> 10 - 18	0,000	0,011
> 1 - 1-1/4	0.00000	–0.00063	> 18 - 25	0,000	0,013

MACHINING FORMULAS

INCH FORMULAS

sfm = rpm x .262 x cutting diameter

rpm = sfm x 3.82 / cutting diameter

feed (inches per tooth) = ipm / (number of teeth x rpm)

feed (inches / minute) = inches per tooth x number of teeth x rpm

feed (inches / minute) = ipr x rpm

feed (inches / revolution) = ipm / rpm

cusp height* = (tool diameter / 2) – $\sqrt{(\text{tool diameter}^2 - \text{pitch}^2) / 4}$

pitch = $\sqrt{4 \times (\text{cusp height} \times \text{tool diameter}) - 4 \times (\text{cusp height}^2)}$

mrr – milling – (in^3/min) = width of cut x depth of cut x ipm

cutting time – drilling – (minutes) = length / ipm

METRIC FORMULAS

m/min = (3.14 x cutting diameter x rpm) / 1000

rpm = (1000 x m / min) / (3.14 x cutting diameter)

feed (mm per tooth) = millimeters per minute / (number of teeth x rpm)

feed (mm/minute) = feed per tooth x number of teeth x rpm

feed (mm/minute) = mmr x rpm

feed (mm per revolution) = mmr / rpm

cusp height* = (tool diameter / 2) – $\sqrt{(\text{tool diameter}^2 - \text{pitch}^2) / 4}$

pitch = $\sqrt{4 \times (\text{cusp height} \times \text{tool diameter}) - 4 \times (\text{cusp height}^2)}$

mrr – milling – (cm^3/min) = (width of cut x depth of cut x mm/min) / 1000

cutting time – drilling – (minutes) = length / mm/min

sfm	surface feet per minute
rpm	revolutions per minute
ipm	feed rate in inches per minutes
ipr	inches per revolution
mmr	millimeters per revolution
mm/min	feed rate in millimeters per minute
mrr	material removal rate
*	on flat surface

GENERAL FORMULAS

coolant pressure: 1 Bar = 14.5 Pounds per Square Inch (PSI)

calculation of coolant pressure: Pounds Per Square Inch (PSI) = (Horsepower of Pump x 1.460) / Gallons per Minute (GPM)

1 Liter = 0.254 Gallons

inch = millimeters / 25.4 millimeters = inch x 25.4

inch tap drill sizes = major diameter – ((1.299 x % of thread) / threads per inch)

metric tap drill sizes = major diameter – (1.082 x pitch x % of thread)

inch thread forming drill size: maximum diameter = basic major diameter – (3/8 x number of threads per inch)

inch thread forming drill size: minimum diameter = basic major diameter – (1/2 x number of threads per inch)

metric thread forming drill size: maximum diameter = basic major diameter – (.375 x pitch)

metric thread forming drill size: minimum diameter = basic major diameter – (.500 x pitch)

Decimal Equivalents

Fraction • Number • Letter • Metric Sizes

INCH	METRIC	DECIMAL EQUIVALENT
#1	5,79	0.2280
–	5,80	0.2283
–	5,90	0.2323
A	5,94	0.2340
15/64	5,95	0.2344
–	6,00	0.2362
B	6,05	0.2380
–	6,10	0.2402
C	6,15	0.2420
–	6,20	0.2441
D	6,25	0.2461
–	6,30	0.2480
E	6,35	0.2500
1/4	6,35	0.2500
–	6,40	0.2520
–	6,50	0.2559
F	6,53	0.2570
–	6,60	0.2598
G	6,63	0.2610
–	6,70	0.2638
17/64	6,75	0.2656
H	6,76	0.2660
–	6,80	0.2677
–	6,90	0.2717
I	6,91	0.2720
–	7,00	0.2756
J	7,04	0.2770
–	7,10	0.2795
K	7,14	0.2810
9/32	7,14	0.2812
–	7,20	0.2835
–	7,25	0.2854
–	7,30	0.2874
L	7,37	0.2900
–	7,40	0.2913
M	7,49	0.2950
–	7,50	0.2953
19/64	7,54	0.2969
–	7,60	0.2992
N	7,67	0.3020
–	7,70	0.3031
–	7,75	0.3051
–	7,80	0.3071
–	7,90	0.3110
5/16	7,94	0.3125
–	8,00	0.3150
O	8,03	0.3160
–	8,10	0.3189
–	8,20	0.3228
P	8,20	0.3230
–	8,25	0.3248
–	8,30	0.3268
21/64	8,33	0.3281
–	8,40	0.3307
Q	8,43	0.3320
–	8,50	0.3346
–	8,60	0.3386

INCH	METRIC	DECIMAL EQUIVALENT
R	8,61	0.3390
–	8,70	0.3425
11/32	8,73	0.3438
–	8,75	0.3445
–	8,80	0.3465
S	8,84	0.3480
–	8,90	0.3504
–	9,00	0.3543
T	9,09	0.3580
–	9,10	0.3583
23/64	9,13	0.3594
–	9,20	0.3622
–	9,25	0.3642
–	9,30	0.3661
U	9,35	0.3680
–	9,40	0.3701
–	9,50	0.3740
3/8	9,53	0.3750
V	9,56	0.3770
–	9,60	0.3780
–	9,70	0.3819
–	9,75	0.3839
W	9,80	0.3858
–	9,90	0.3898
25/64	9,92	0.3906
–	10,00	0.3937
X	10,08	0.3970
–	10,10	0.3976
–	10,20	0.4016
Y	10,26	0.4040
–	10,30	0.4055
13/32	10,32	0.4062
–	10,40	0.4094
Z	10,49	0.4130
–	10,50	0.4134
–	10,60	0.4173
–	10,70	0.4213
27/64	10,72	0.4219
–	10,80	0.4252
–	10,90	0.4291
–	11,00	0.4331
–	11,10	0.4370
7/16	11,11	0.4375
–	11,20	0.4409
–	11,30	0.4449
–	11,40	0.4488
–	11,50	0.4528
29/64	11,51	0.4531
–	11,60	0.4567
–	11,70	0.4606
–	11,80	0.4646
–	11,90	0.4685
15/32	11,91	0.4688
–	12,00	0.4724
31/64	12,30	0.4844
–	12,50	0.4921
1/2	12,70	0.5000

INCH	METRIC	DECIMAL EQUIVALENT
–	13,00	0.5118
33/64	13,10	0.5156
17/32	13,49	0.5312
–	13,50	0.5315
35/64	13,89	0.5469
–	14,00	0.5512
9/16	14,29	0.5625
–	14,50	0.5709
37/64	14,68	0.5781
–	15,00	0.5906
19/32	15,08	0.5938
39/64	15,48	0.6094
–	15,50	0.6102
5/8	15,88	0.6250
–	16,00	0.6299
41/64	16,27	0.6406
–	16,50	0.6496
21/32	16,67	0.6562
–	17,00	0.6693
43/64	17,07	0.6719
11/16	17,46	0.6875
–	17,50	0.6890
45/64	17,86	0.7031
–	18,00	0.7087
23/32	18,26	0.7188
–	18,50	0.7283
47/64	18,65	0.7344
–	19,00	0.7480
3/4	19,05	0.7500
49/64	19,45	0.7656
–	19,50	0.7677
25/32	19,84	0.7812
–	20,00	0.7874
51/64	20,24	0.7969
–	20,50	0.8071
13/16	20,64	0.8125
–	21,00	0.8268
53/64	21,03	0.8281
27/32	21,43	0.8438
–	21,50	0.8465
55/64	21,84	0.8594
–	22,00	0.8661
7/8	22,23	0.8750
–	22,50	0.8858
57/64	22,62	0.8906
–	23,00	0.9055
29/32	23,02	0.9062
59/64	23,42	0.9219
–	23,50	0.9252
15/16	23,81	0.9375
–	24,00	0.9449
61/64	24,21	0.9531
–	24,50	0.9646
31/32	24,61	0.9688
–	25,00	0.9843
63/64	25,00	0.9844
1	25,40	1.0000

INCH	METRIC	DECIMAL EQUIVALENT
–	0,10	0.0039
–	0,20	0.0079
–	0,25	0.0098
–	0,30	0.0118
#80	0,34	0.0135
–	0,35	0.0138
#79	0,37	0.0145
1/64	0,40	0.0156
#78	0,41	0.0160
–	0,45	0.0177
#77	0,46	0.0180
–	0,50	0.0197
#76	0,51	0.0200
#75	0,53	0.0210
–	0,55	0.0217
#74	0,57	0.0225
–	0,60	0.0236
#73	0,61	0.0240
#72	0,64	0.0250
–	0,65	0.0256
#71	0,66	0.0260
–	0,70	0.0276
#70	0,71	0.0280
#69	0,74	0.0292
–	0,75	0.0295
#68	0,79	0.0310
1/32	0,79	0.0313
–	0,80	0.0315
#67	0,81	0.0320
#66	0,84	0.0330
–	0,85	0.0335
#65	0,89	0.0350
–	0,90	0.0354
#64	0,91	0.0360
#63	0,94	0.0370
–	0,95	0.0374
#62	0,97	0.0380
#61	0,99	0.0390
–	1,00	0.0394
#60	1,02	0.0400
#59	1,04	0.0410
–	1,05	0.0413
#58	1,07	0.0420
#57	1,09	0.0430
–	1,10	0.0433
–	1,15	0.0453
#56	1,18	0.0465
3/64	1,19	0.0469
–	1,20	0.0472
–	1,25	0.0492
–	1,30	0.0512
#55	1,32	0.0520
–	1,35	0.0531
#54	1,40	0.0550
#53	1,51	0.0595
–	1,55	0.0610
1/16	1,59	0.0625

INCH	METRIC	DECIMAL EQUIVALENT
–	1,60	0.0630
#52	1,61	0.0635
–	1,65	0.0650
#51	1,70	0.0669
–	1,75	0.0689
#50	1,78	0.0700
–	1,80	0.0709
#49	1,85	0.0728
–	1,90	0.0748
#48	1,93	0.0760
–	1,95	0.0768
5/64	1,98	0.0781
#47	1,99	0.0785
–	2,00	0.0787
–	2,05	0.0807
#46	2,06	0.0810
#45	2,08	0.0820
–	2,10	0.0827
–	2,15	0.0846
#44	2,18	0.0860
–	2,20	0.0866
–	2,25	0.0886
#43	2,26	0.0890
–	2,30	0.0906
–	2,35	0.0925
#42	2,37	0.0935
3/32	2,38	0.0938
–	2,40	0.0945
#41	2,44	0.0960
–	2,45	0.0965
#40	2,50	0.0984
#39	2,53	0.0995
#38	2,58	0.1015
–	2,60	0.1024
#37	2,64	0.1040
–	2,70	0.1063
#36	2,71	0.1065
–	2,75	0.1083
7/64	2,78	0.1094
#35	2,79	0.1100
–	2,80	0.1102
#34	2,82	0.1110
#33	2,87	0.1130
–	2,90	0.1142
#32	2,95	0.1160
–	3,00	0.1181
#31	3,05	0.1200
–	3,10	0.1220
1/8	3,18	0.1250
–	3,20	0.1260
–	3,25	0.1280
#30	3,26	0.1285
–	3,30	0.1299
–	3,40	0.1339
#29	3,45	0.1360
–	3,50	0.1378
#28	3,57	0.1405

INCH	METRIC	DECIMAL EQUIVALENT
9/64	3,57	0.1406
–	3,60	0.1417
#27	3,66	0.1440
–	3,70	0.1457
#26	3,73	0.1470
–	3,75	0.1476
#25	3,80	0.1495
–	3,80	0.1496
#24	3,86	0.1520
–	3,90	0.1535
#23	3,91	0.1540
5/32	3,97	0.1562
#22	3,99	0.1570
–	4,00	0.1575
#21	4,04	0.1590
#20	4,09	0.1610
–	4,10	0.1614
–	4,20	0.1654
#19	4,22	0.1660
–	4,25	0.1673
–	4,30	0.1693
#18	4,31	0.1695
11/64	4,37	0.1719
#17	4,39	0.1730
–	4,40	0.1732
#16	4,50	0.1770
–	4,50	0.1772
#15	4,57	0.1800
–	4,60	0.1811
#14	4,62	0.1820
#13	4,70	0.1850
–	4,75	0.1870
3/16	4,76	0.1875
#12	4,80	0.1890
#11	4,85	0.1910
–	4,90	0.1929
#10	4,91	0.1935
#9	4,98	0.1960
–	5,00	0.1969
#8	5,05	0.1990
–	5,10	0.2008
#7	5,11	0.2010
13/64	5,16	0.2031
#6	5,18	0.2040
–	5,20	0.2047
#5	5,22	0.2055
–	5,25	0.2067
–	5,3	0.2087
#4	5,31	0.2090
–	5,40	0.2126
#3	5,41	0.2130
–	5,50	0.2165
7/32	5,56	0.2188
–	5,60	0.2205
#2	5,61	0.2210
–	5,70	0.2244
–	5,75	0.2264

Hardness Conversion Chart

ROCKWELL HARDNESS (HRb)	ROCKWELL HARDNESS (HRc)	BRINELL HARDNESS (HB)	VICKERS HARDNESS (HV)	TENSILE STRENGTH (N/mm2)	PSI (1000lb/in2)
67	–	121	122	401	58
70	–	126	127	432	63
73	–	132	132	448	65
75	–	136	137	455	66
77	–	140	143	463	67
80	–	147	150	479	69
82	–	153	156	494	72
84	–	159	163	525	76
86	–	165	171	540	78
89	–	177	178	556	81
91	–	186	188	602	88
93	–	197	196	632	92
96	–	216	212	664	97
97	–	223	218	695	101
98	21	230	234	756	110
–	22	236	241	772	112
–	23	242	247	787	114
–	24	248	255	818	118
–	25	254	261	849	123
–	27	266	269	865	125
–	28	272	275	895	130
–	29	278	284	911	132
–	30	284	292	942	136
–	31	293	300	973	141
–	32	302	308	988	143
–	33	310	318	1019	147
–	34	319	327	1050	152
–	35	328	337	1096	159
–	37	345	349	1127	163
–	38	353	359	1158	168
–	39	362	370	1189	172
–	40	370	381	1235	179
–	41	381	395	1266	183
–	42	391	408	1312	190
–	44	411	422	1359	197
–	45	422	437	1420	206
–	46	433	452	1467	212
–	48	455	470	1513	219
–	50	479	497	1559	226
–	51	485	517	1621	235
–	52	497	532	1668	241
–	54	–	573	1729	250
–	56	–	609	1807	262
–	57	–	630	1884	273
–	59	–	670	1961	284
–	60	–	698	2039	295
–	61	–	725	–	–
–	62	–	740	–	–
–	63	–	780	–	–
–	64	–	812	–	–
–	65	–	847	–	–
–	66	–	885	–	–
–	67	–	926	–	–
–	68	–	971	–	–

Conversions from each scale are approximate

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