SGS

PRODUCT CATALOG





www.sgstool.com

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Tool Wizard

CALCULATE APPLICATION PARAMETERS

The SGS Tool Wizard is designed to assist in the selection and application of products manufactured by SGS Tool Company and is now available to download on the App Store for Apple and Android Devices.

Use the Tool Wizard to calculate application parameters and select the right tool for the job.

- High Performance End Mills and Drills
- General Purpose Tooling
- Search by Application or EDP number
- Calculate Speeds and Feeds

To the best of our knowledge, the information contained in the Tool Wizard database is accurate. Due to differences in machining conditions (coolant, rigidity, spindle condition, etc.), and the 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 complete technical information.

Available for Android and Apple devices on the App store or visit www.sgstool.com to sign up.

www.sgstool.com

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



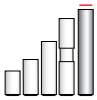
Medium | Media | Moyen



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

COATINGS

	 Ti-NAMITE	 Ti-NAMITE-A	 Ti-NAMITE-B
Coating	Titanium (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.

		
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.

ENDMILLS



Milling

HIGH PERFORMANCE END MILLS	SERIES	PAGE
Z-Carb-AP Variable Rake End Mills	Z1PCR, Z1MPCR, Z1PLC, Z1MPLC, Z1PLB	14
Z-Carb End Mills	Z1, Z1M, Z1B, Z1MB, Z16CR	19
Z-Carb-HTA End Mills	ZH1CR, ZH1MCR	24
Z-Carb-MD End Mills	ZD1CR, ZD1MCR	25
Series 7 End Mills	7, 7M, 7B, 7MB	26
V-Carb Finishing & Semi-Finishing End Mills	55, 55M, 55CR	30
T-Carb End Mills	51, 51M, 51L, 51ML, 51CR, 51MCR, 51LC, 51MLC	34
Multi-Carb Finishing End Mills	66, 66M, 66CR, 66MCR	38
Turbo-Carb End Mills	56B, 56MB	40
Power-Carb End Mills	57, 57M	41
Series 33 End Mills	33CR, 33MCR	42
Ski-Carb End Mills	45, 44, 44M	43
S-Carb 3 Flute End Mills	43CR, 43MCR, 43LC, 43, 43M, 43L	46
S-Carb Roughing End Mills	43CB, 43MCB	53
S-Carb 2 Flute End Mills	47, 47M, 47B, 47MB, 47ES, 47MES, 47EB, 47MEB	54
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(continued)

GENERAL PURPOSE END MILLS	SERIES	PAGE
4 Flute Square End Stub	16, 16M	98
4 Flute Square End	1, 1L, 1EL, 1M, 1XLM	99
4 Flute Double End Mills	14, 14M	102
4 Flute Ball End	1B, 1LB, 1ELB, 1MB, 1XLMB	104
4 Flute Double End Ball End	14B, 14MB	107
4 Flute Corner Radius	1CR, 1MCR	109
4 Flute High Shear End Mills	54, 54M	112
2 Flute Square End Stub	17, 17M	113
2 Flute Square End	3, 3L, 3EL, 3M, 3XLM	114
2 Flute Square End Long Reach	59, 59M	117
2 Flute Double End Mills	15, 15M	118
2 Flute Ball End	3B, 3LB, 3ELB, 3MB, 3XLMB	120
2 Flute Ball End Long Reach	59B, 59MB	123
2 Flute Double End Ball End	15B, 15MB	124
2 Flute Corner Radius	3CR	126
2 Flute High Shear End Mills	52, 52M	127
3 Flute Square End	5, 5M, 5XLM	128
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Single End Roughers	61, 61M, 62, 62M	132
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Fresado

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Fresas de inclinación variable Z-Carb-AP	Z1PCR, Z1MPCR, Z1PLC, Z1MPLC, Z1PLB	14
Fresas Z-Carb	Z1, Z1M, Z1B, Z1MB, Z16CR	19
Fresas Z-Carb-HTA	ZH1CR, ZH1MCR	24
Fresas Z-Carb-MD	ZD1CR, ZD1MCR	25
Fresas Serie 7	7, 7M, 7B, 7MB	26
Fresas de acabado y semiacabado V-Carb	55, 55M, 55CR	30
Fresas T-Carb	51, 51M, 51L, 51ML, 51CR, 51MCR, 51LC, 51MLC	34
Fresas de acabado Multi-Carb	66, 66M, 66CR, 66MCR	38
Fresas Turbo-Carb	56B, 56MB	40
Fresas Power-Carb	57, 57M	41
Fresas Serie 33	33CR, 33MCR	42
Fresas Ski-Carb	45, 44, 44M	43
Fresas de 3 filos S-Carb	43CR, 43MCR, 43LC, 43, 43M, 43L	46
Fresas desbastadoras S-Carb	43CB, 43MCB	53
Fresas de 2 filos S-Carb	47, 47M, 47B, 47MB, 47ES, 47MES, 47EB, 47MEB	54
Fresas helicoidales de avance lento CFRP	27, 27M	58
INFORMACIÓN TÉCNICA		
Velocidades y avances recomendados		60

FRESAS DE USO GENERAL	SERIE	PÁGINA
4 filos, pieza de punta cuadrada	16, 16M	98
4 filos, punta cuadrada	1, 1L, 1EL, 1M, 1XLM	99
4 filos, fresas dobles	14, 14M	102
4 filos, punta esférica	1B, 1LB, 1ELB, 1MB, 1XLMB	104
4 filos, punta doble, punta esférica	14B, 14MB	107
4 filos, radio angulado	1CR, 1MCR	109
4 filos, fresas de corte de alto rendimiento	54, 54M	112
2 filos, pieza de punta cuadrada	17, 17M	113
2 filos, punta cuadrada	3, 3L, 3EL, 3M, 3XLM	114
2 filos, punta cuadrada, largo alcance	59, 59M	117
2 filos, fresas dobles	15, 15M	118
2 filos, punta esférica	3B, 3LB, 3ELB, 3MB, 3XLMB	120
2 filos, punta esférica, largo alcance	59B, 59MB	123
2 filos, punta doble, punta esférica	15B, 15MB	124
2 filos, radio angulado	3CR	126
2 filos, fresas de corte de alto rendimiento	52, 52M	127
3 filos, punta cuadrada	5, 5M, 5XLM	128
3 filos, punta esférica	5B, 5MB, 5XLMB	130
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Fraisage

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Fraises en bout Z-Carb	Z1, Z1M, Z1B, Z1MB, Z16CR	19
Fraises en bout Z-Carb HTA	ZH1CR, ZH1MCR	24
Fraises en bout Z-Carb MD	ZD1CR, ZD1MCR	25
Fraises en bout série 7	7, 7M, 7B, 7MB	26
Fraises en bout de finition et semi-finition V-Carb	55, 55M, 55CR	30
Fraises en bout T-Carb	51, 51M, 51L, 51ML, 51CR, 51MCR, 51LC, 51MLC	34
Fraises en bout de finition Multi-Carb	66, 66M, 66CR, 66MCR	38
Fraises en bout Turbo-Carb	56B, 56MB	40
Fraises en bout Power-Carb	57, 57M	41
Fraises en bout série 33	33CR, 33MCR	42
Fraises en bout Ski-Carb	45, 44, 44M	43
Fraise 3 dents S-Carb	43CR, 43MCR, 43LC, 43, 43M, 43L	46
Fraise d'ébauche S-Carb	43CB, 43MCB	53
Fraise 2 dents S-Carb	47, 47M, 47B, 47MB, 47ES, 47MES, 47EB, 47MEB	54
Fraises hélice lente CFRP	27, 27M	58
INFORMATIONS TECHNIQUES		
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FRAISES A USAGE GENERAL	SERIES	PAGE
Moignon 4 dents bout plat.	16, 16M	98
4 dents bout plat	1, 1L, 1EL, 1M, 1XLM	99
Fraises 4 dents double bouts	14, 14M	102
Fraise 4 dents en bout hémisphérique	1B, 1LB, 1ELB, 1MB, 1XLMB	104
Fraise 4 dents en bout double bouts hémisphérique	14B, 14MB	107
4 dents, rayon en coin	1CR, 1MCR	109
Fraises 4 dents en bout cisaillement élevé	54, 54M	112
Moignon 2 dents bout plat	17, 17M	113
2 dents en bout plat	3, 3L, 3EL, 3M, 3XLM	114
2 dents en bout plat longue portée	59, 59M	117
Fraises 2 dents en double bouts	15, 15M	118
2 dents en bout hémisphérique	3B, 3LB, 3ELB, 3MB, 3XLMB	120
2 dents en bout hémisphérique longue portée	59B, 59MB	123
2 dents en double bouts hémisphériques	15B, 15MB	124
2 dents, rayon en coin	3CR	126
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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



High Speed Machining
Mecanizado de alta velocidad
Usinage à grande vitesse

COATINGS
REVESTIMIENTOS
REVÊTEMENTS



Uncoated



Ti-NAMITE
(TiN)



Ti-NAMITE-A
(AlTiN)



Ti-NAMITE-B
(TiB2)



Ti-NAMITE-C
(TiCN)



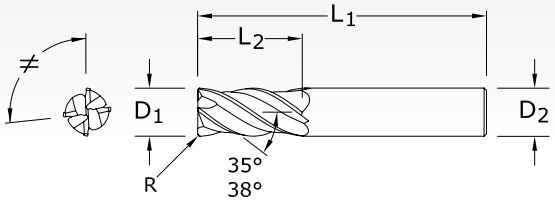
Ti-NAMITE-X
(TX)



Di-NAMITE
(Diamond)







Z1PCR

FRACTIONAL SERIES

TECH INFO 60

- 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	.005	36872	–	–
3/32	9/32	1-1/2	1/8	.010	36873	–	–
1/8	3/8	1-1/2	1/8	.010	36370	–	–
1/8	3/8	1-1/2	1/8	.015	36851	–	–
3/16	7/16	2	3/16	.010	36371	–	–
3/16	7/16	2	3/16	.015	36852	–	–
3/16	7/16	2	3/16	.030	36722	–	–
1/4	1/2	2-1/2	1/4	.010	36372	–	–
1/4	1/2	2-1/2	1/4	.015	36723	–	–
1/4	1/2	2-1/2	1/4	.020	36853	–	–
1/4	1/2	2-1/2	1/4	.030	36373	–	–
1/4	3/4	2-1/2	1/4	.010	36599	–	–
1/4	3/4	2-1/2	1/4	.015	36600	–	–
1/4	3/4	2-1/2	1/4	.020	36854	–	–
1/4	3/4	2-1/2	1/4	.030	36601	–	–
5/16	13/16	2-1/2	5/16	.015	36724	–	–
5/16	13/16	2-1/2	5/16	.020	36855	–	–
5/16	13/16	2-1/2	5/16	.030	36374	–	–
3/8	7/8	2-1/2	3/8	.010	36375	36701	–
3/8	7/8	2-1/2	3/8	.015	36725	36736	–
3/8	7/8	2-1/2	3/8	.020	36856	36864	–
3/8	7/8	2-1/2	3/8	.030	36376	36702	–
3/8	7/8	2-1/2	3/8	.060	36727	36738	–
7/16	1	2-3/4	7/16	.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



Z1PCR
FRACTIONAL SERIES

CONTINUED

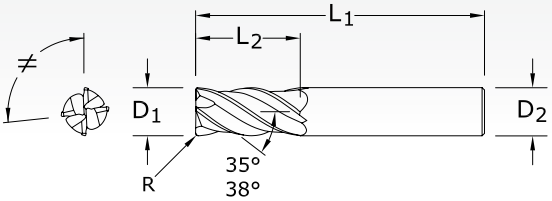
inch					EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	Ti-NAMITE-X	Ti-NAMITE-X W/FLAT	JetStream*
1/2	1	3	1/2	.010	36378	36704	36804
1/2	1	3	1/2	.015	36729	36740	36810
1/2	1	3	1/2	.030	36858	36866	36805
1/2	1	3	1/2	.060	36380	36706	36811
1/2	1	3	1/2	.090	36381	36707	36812
1/2	1	3	1/2	.125	36731	36742	36813
1/2	1-1/4	3-1/4	1/2	.010	36602	36603	–
1/2	1-1/4	3-1/4	1/2	.015	36604	36605	–
1/2	1-1/4	3-1/4	1/2	.030	36859	36867	–
1/2	1-1/4	3-1/4	1/2	.060	36610	36611	–
1/2	1-1/4	3-1/4	1/2	.090	36612	36613	–
1/2	1-1/4	3-1/4	1/2	.125	36614	36615	–
9/16	1-1/8	3-1/2	9/16	.030	36860	36868	36806
5/8	1-1/4	3-1/2	5/8	.030	36383	36709	36814
5/8	1-1/4	3-1/2	5/8	.040	36861	36869	36807
5/8	1-1/4	3-1/2	5/8	.060	36384	36710	36815
5/8	1-1/4	3-1/2	5/8	.090	36385	36711	36816
5/8	1-1/4	3-1/2	5/8	.125	36733	36744	36817
3/4	1-1/2	4	3/4	.030	36386	36712	36818
3/4	1-1/2	4	3/4	.040	36862	36870	36808
3/4	1-1/2	4	3/4	.060	36387	36713	36819
3/4	1-1/2	4	3/4	.090	36388	36714	36820
3/4	1-1/2	4	3/4	.125	36389	36715	36821
1	1-1/2	4	1	.030	36390	36716	36822
1	1-1/2	4	1	.040	36863	36871	36809
1	1-1/2	4	1	.060	36391	36717	36823
1	1-1/2	4	1	.090	36392	36718	36824
1	1-1/2	4	1	.125	36393	36719	36825

*JetStream Patented Coolant Technology

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







Z1MPCR

METRIC SERIES

TECH INFO 62

- 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	46850	–	–
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	13,0	57,0	6,0	0,3	46853	–	–
6,0	13,0	57,0	6,0	0,25	46882	–	–
6,0	13,0	57,0	6,0	0,5	46854	–	–
6,0	13,0	57,0	6,0	1,0	46855	–	–
6,0	13,0	57,0	6,0	1,5	46884	–	–
8,0	19,0	63,0	8,0	0,5	46856	–	–
8,0	19,0	63,0	8,0	1,0	46857	–	–
8,0	19,0	63,0	8,0	1,5	46886	–	–
8,0	19,0	63,0	8,0	2,0	46887	–	–
10,0	22,0	72,0	10,0	0,5	46858	–	–
10,0	22,0	72,0	10,0	1,0	46859	–	–
10,0	22,0	72,0	10,0	1,5	46889	–	–
10,0	22,0	72,0	10,0	2,0	46890	–	–
10,0	22,0	72,0	10,0	2,5	46891	–	–
12,0	26,0	83,0	12,0	0,5	46860	46909	–
12,0	26,0	83,0	12,0	0,75	46861	46910	–
12,0	26,0	83,0	12,0	1,0	46893	46911	–
12,0	26,0	83,0	12,0	1,5	46894	46912	–
12,0	26,0	83,0	12,0	2,0	46895	46913	–
12,0	26,0	83,0	12,0	2,5	46896	46914	–
12,0	26,0	83,0	12,0	3,0	42718	46915	–
14,0	26,0	83,0	14,0	1,0	46862	46916	46494
16,0	32,0	92,0	16,0	1,0	46863	46917	46495
16,0	32,0	92,0	16,0	1,5	46898	46918	–
16,0	32,0	92,0	16,0	2,0	46899	46919	–
16,0	32,0	92,0	16,0	2,5	46900	46920	–
16,0	32,0	92,0	16,0	3,0	46864	46921	–
20,0	38,0	104,0	20,0	1,0	46865	46922	46497
20,0	38,0	104,0	20,0	1,5	46903	46923	–
20,0	38,0	104,0	20,0	2,0	46904	46924	–
20,0	38,0	104,0	20,0	2,5	46905	46925	–
20,0	38,0	104,0	20,0	3,0	42722	46926	–
25,0	38,0	104,0	25,0	1,0	46866	46927	46498

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

TOLERANCES (mm)

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

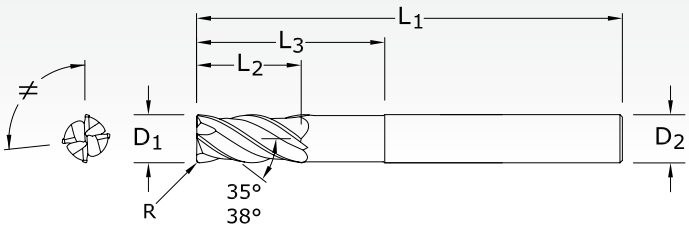
3–6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6
R = +0,000/–0,050

>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







TOLERANCES (inch)

1/4 DIAMETER
D_1 = +0.0000/–0.0012
D_2 = h_6
R = +0.0000/–0.0020

>1/4–3/8 DIAMETER
D_1 = +0.0000/–0.0016
D_2 = h_6
R = +0.0000/–0.0020

>3/8–1 DIAMETER
D_1 = +0.0000/–0.0020
D_2 = h_6
R = +0.0000/–0.0020

Z1PLC
FRACTIONAL SERIES

TECH INFO 60

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
1/4	1/2	4	1/4	1-1/4	.020	36450
5/16	13/16	4	5/16	1-5/8	.020	36452
3/8	7/8	5	3/8	1-7/8	.020	36456
7/16	1	6	7/16	2	.020	36460
1/2	1	6	1/2	2-1/4	.030	36462
9/16	1-1/8	6	9/16	2-1/2	.030	36466
5/8	1-1/4	6	5/8	3	.040	36470
3/4	1-1/2	6	3/4	3-1/2	.040	36472
1	1-1/2	6	1	4	.040	36474

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM

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

Z1MPLC
METRIC SERIES

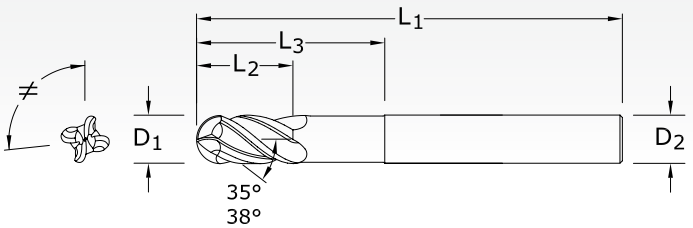
TECH INFO 62

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-X
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







Z1PLB

FRACTIONAL SERIES

TECH INFO 60

- 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
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 = +0.0000/–0.0012

D_2 = h_6

>1/4–3/8 DIAMETER

D_1 = +0.0000/–0.0016

D_2 = h_6

>3/8–1 DIAMETER

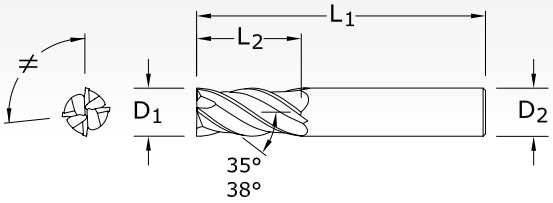
D_1 = +0.0000/–0.0020

D_2 = h_6

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







TOLERANCES (inch)

1/8–1/4 DIAMETER
D_1 = +0.0000/–0.0012
D_2 = h_6

>1/4–3/8 DIAMETER
D_1 = +0.0000/–0.0016
D_2 = h_6

>3/8–1 DIAMETER
D_1 = +0.0000/–0.0020
D_2 = h_6

Z1
FRACTIONAL SERIES

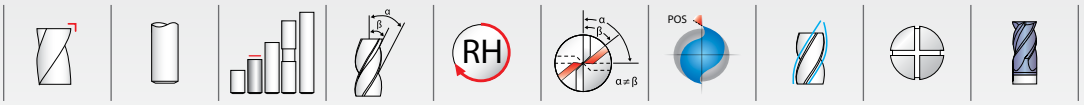
TECH INFO 64

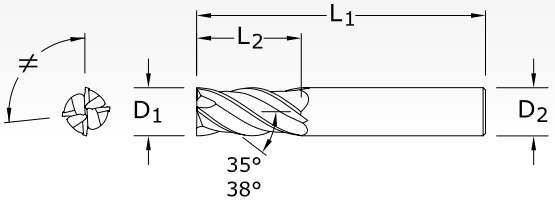
inch				EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	JetStream*
1/8	3/8	1-1/2	1/8	36404	–	–
5/32	7/16	2	3/16	36406	–	–
3/16	7/16	2	3/16	36408	–	–
7/32	7/16	2-1/2	1/4	36410	–	–
1/4	1/2	2-1/2	1/4	36416	–	–
1/4	3/4	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	–
1/2	1	3	1/2	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







Z1M
METRIC SERIES

TECH INFO 66

- 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)

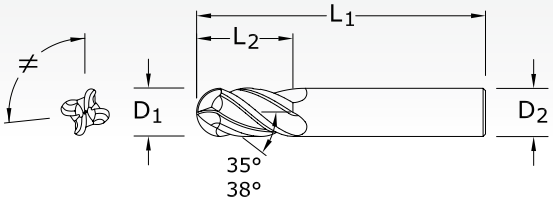
3–6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6

>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 = +0.0000/–0.0012
D_2 = h_6

>1/4–3/8 DIAMETER
D_1 = +0.0000/–0.0016
D_2 = h_6

>3/8–1 DIAMETER
D_1 = +0.0000/–0.0020
D_2 = h_6

Z1B
FRACTIONAL SERIES

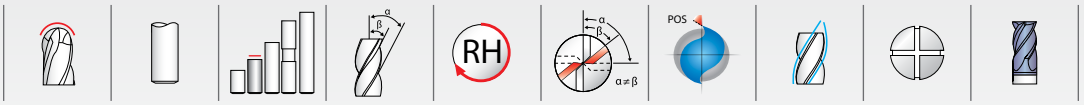
TECH INFO 64

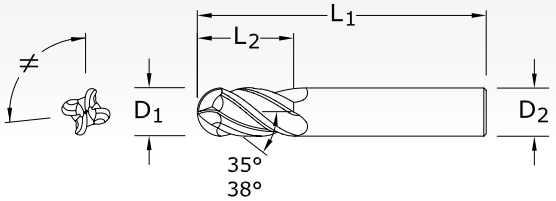
inch				EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	JetStream*
1/8	3/8	1-1/2	1/8	36358	–	–
5/32	7/16	2	3/16	36357	–	–
3/16	7/16	2	3/16	36359	–	–
7/32	7/16	2-1/2	1/4	36361	–	–
1/4	1/2	2-1/2	1/4	36344	–	–
1/4	3/4	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







Z1MB
METRIC SERIES

TECH INFO 66

- 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)

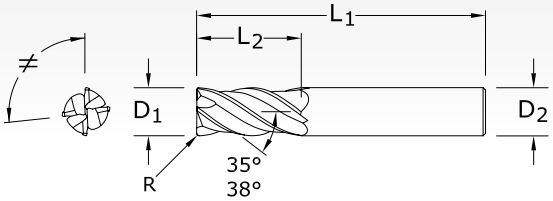
3–6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6

>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 = +0.0000/–0.0012
D_2 = h_6

>1/4–3/8 DIAMETER
D_1 = +0.0000/–0.0016
D_2 = h_6

>3/8–1 DIAMETER
D_1 = +0.0000/–0.0020
D_2 = h_6

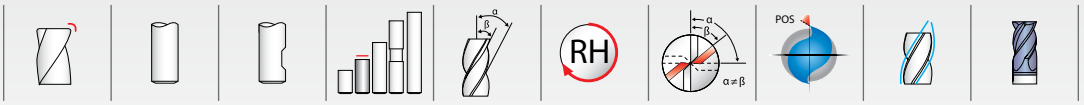
Z16CR
FRACTIONAL SERIES

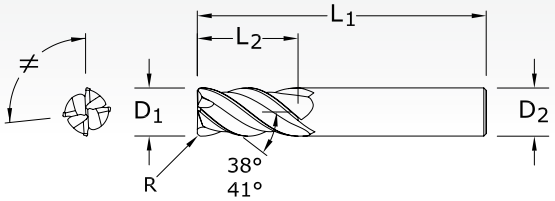
TECH INFO 64

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	.010–.015	36505
5/32	5/16	2	3/16	.010–.015	36506
3/16	3/8	2	3/16	.010–.015	36507
7/32	3/8	2	1/4	.015–.020	36508
1/4	7/16	2	1/4	.015–.020	36509
5/16	1/2	2	5/16	.015–.020	36511
3/8	5/8	2	3/8	.015–.020	36513
7/16	5/8	2-1/2	7/16	.015–.020	36515
1/2	5/8	2-1/2	1/2	.025–.030	36517
5/8	3/4	3	5/8	.035–.040	36519
3/4	1	3	3/4	.035–.040	36520

STEELS
STAINLESS STEELS
CAST IRON
HIGH TEMP ALLOYS
TITANIUM







ZH1CR
FRACTIONAL SERIES

TECH INFO 68

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	.015–.020	36570	–
1/4	3/4	2-1/2	1/4	.015–.020	36616	–
5/16	13/16	2-1/2	5/16	.015–.020	36571	–
3/8	7/8	2-1/2	3/8	.015–.020	36572	36555
7/16	1	2-3/4	7/16	.015–.020	36573	36556
1/2	1	3	1/2	.025–.030	36574	36557
1/2	1-1/4	3-1/4	1/2	.025–.030	36618	36617
9/16	1-1/8	3-1/2	9/16	.025–.030	36575	36558
5/8	1-1/4	3-1/2	5/8	.035–.040	36576	36559
3/4	1-1/2	4	3/4	.035–.040	36577	36560
1	1-1/2	4	1	.035–.040	36578	36561

TOLERANCES (inch)

1/4 DIAMETER
D_1 = +0.0000/–0.0012
D_2 = h_6

>1/4–3/8 DIAMETER
D_1 = +0.0000/–0.0016
D_2 = h_6

>3/8–1 DIAMETER
D_1 = +0.0000/–0.0020
D_2 = h_6

ZH1MCR
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	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

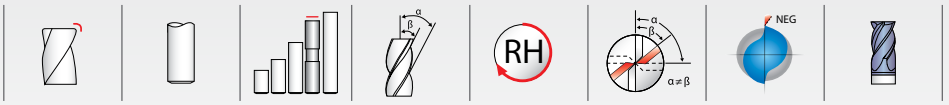
TOLERANCES (mm)

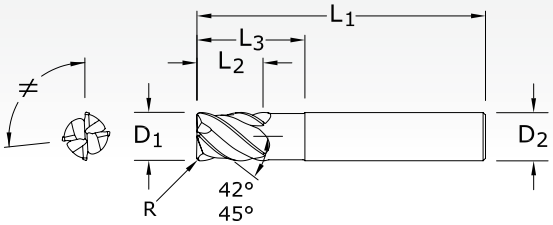
6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6
R = +0,000/–0,050

>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 = +0.0000/–0.0012
D_2 = h_6
R = +0.0000/–0.0020

>1/4–3/8 DIAMETER
D_1 = +0.0000/–0.0016
D_2 = h_6
R = +0.0000/–0.0020

>3/8–1 DIAMETER
D_1 = +0.0000/–0.002
D_2 = h_6
R = +0.0000/–0.0020

ZD1CR
FRACTIONAL SERIES

TECH INFO 69

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	.010	36780
3/16	7/32	2-1/2	1/4	3/4	.020	36781
1/4	9/32	2-1/2	1/4	3/4	.020	36782
5/16	13/32	2-1/2	5/16	1	.040	36783
3/8	15/32	2-1/2	3/8	1	.040	36784
7/16	9/16	2-3/4	7/16	1	.040	36785
1/2	5/8	3	1/2	1-1/4	.040	36786
1/2	5/8	4-1/2	1/2	2-1/4	.040	36787
5/8	3/4	3-1/2	5/8	1-1/2	.040	36788
5/8	3/4	4-1/2	5/8	2-1/4	.040	36789
5/8	3/4	5-1/2	5/8	3-1/4	.040	36790
3/4	15/16	4	3/4	1-3/4	.060	36791
3/4	15/16	4-1/2	3/4	2-1/4	.060	36792
3/4	15/16	5-1/2	3/4	3-1/4	.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

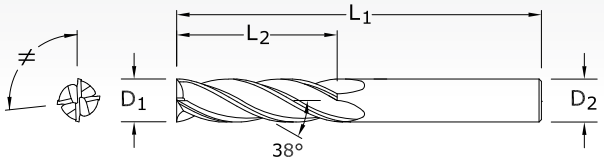
ZD1MCR
METRIC SERIES

TECH INFO 69

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







7
FRACTIONAL SERIES

TECH INFO 70

TOLERANCES (inch)

D_1 = +0.0000/–0.0020

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	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

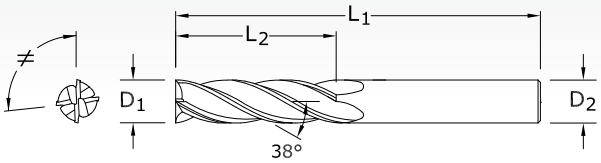




TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6



7M
METRIC SERIES

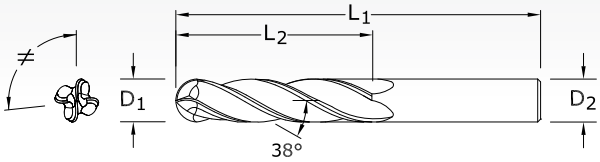
TECH INFO 71

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	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







7B
FRACTIONAL SERIES

TECH INFO 70

TOLERANCES (inch)

D_1 = +0.0000/–0.0020

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

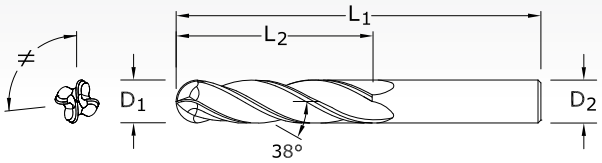




TOLERANCES (mm)

D_1 = +0,000/+0,050

D_2 = h_6



7MB
METRIC SERIES

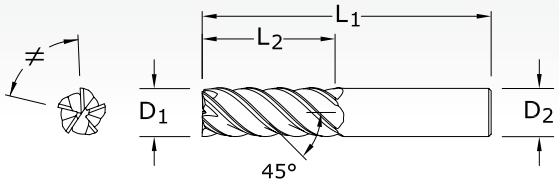
TECH INFO 71

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	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







55
FRACTIONAL SERIES

TECH INFO 72

- 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

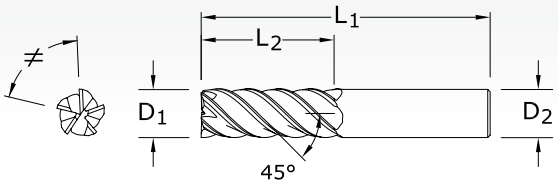
TOLERANCES (inch)

D_1 = +0.0000/–0.0020

D_2 = h_6







TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6

55M
METRIC SERIES

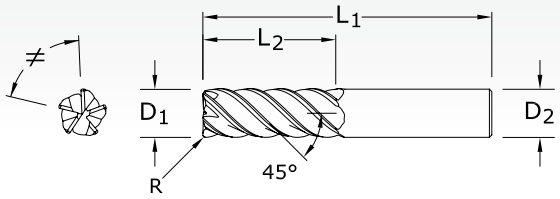
TECH INFO 74

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







55CR
FRACTIONAL SERIES

TECH INFO 72

TOLERANCES (inch)

D_1 = +0.0000/–0.0020
D_2 = h_6
R = +0.0000/–0.0020

- 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	.010	32606	–
1/8	1/2	1-1/2	1/8	.010	32607	–
5/32	5/16	2	3/16	.010	32608	–
5/32	9/16	2	3/16	.010	32609	–
3/16	5/16	2	3/16	.010	32610	–
3/16	5/8	2	3/16	.010	32611	–
7/32	3/8	2	1/4	.015	32612	–
7/32	3/4	2-1/2	1/4	.015	32613	–
1/4	3/8	2	1/4	.015	32614	–
1/4	3/4	2-1/2	1/4	.015	32615	–
1/4	1-1/4	4	1/4	.015	32616	–
5/16	7/16	2	5/16	.015	32619	–
5/16	13/16	2-1/2	5/16	.015	32620	–
5/16	1-1/4	4	5/16	.015	32621	–
3/8	1/2	2	3/8	.015	32625	32591
3/8	1/2	2	3/8	.030	32592	32593
3/8	1	2-1/2	3/8	.015	32626	32628
3/8	1	2-1/2	3/8	.030	32573	32574
3/8	1-1/2	4	3/8	.015	32627	–
3/8	1-1/2	4	3/8	.030	32569	–

continued on next page



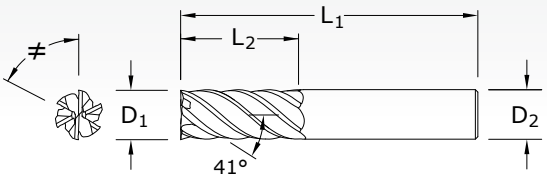
55CR
FRACTIONAL SERIES

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	.015	32632	–
7/16	2	4	7/16	.015	32633	–
1/2	5/8	2-1/2	1/2	.030	32594	32595
1/2	5/8	2-1/2	1/2	.060	32596	32597
1/2	1-1/4	3	1/2	.030	32575	32576
1/2	1-1/4	3	1/2	.060	32577	32578
1/2	2	4	1/2	.030	32685	–
1/2	2	4	1/2	.060	32686	–
5/8	3/4	3	5/8	.030	32598	32599
5/8	3/4	3	5/8	.060	32600	32601
5/8	1-5/8	3-1/2	5/8	.030	32579	32580
5/8	1-5/8	3-1/2	5/8	.060	32581	32582
5/8	2-1/2	5	5/8	.030	32570	–
5/8	2-1/2	5	5/8	.060	32687	–
3/4	1	3	3/4	.030	32602	32603
3/4	1	3	3/4	.060	32604	32605
3/4	1-5/8	4	3/4	.030	32583	32584
3/4	1-5/8	4	3/4	.060	32585	32586
3/4	3-1/4	6	3/4	.030	32571	–
3/4	3-1/4	6	3/4	.060	32688	–
1	1-1/2	4	1	.030	32587	32588
1	1-1/2	4	1	.060	32589	32590
1	2-5/8	6	1	.030	32572	–
1	2-5/8	6	1	.060	32689	–







51
FRACTIONAL SERIES

TECH INFO 76

inch				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-X
1/4	3/4	2-1/2	1/4	35100
3/8	1	2-1/2	3/8	35101
1/2	1-1/4	3	1/2	35102
5/8	1-5/8	3-1/2	5/8	35103
3/4	1-5/8	4	3/4	35104
1	2-5/8	6	1	35105

TOLERANCES (inch)
D1 = +0.0000/–0.0020
D2 = h6

- STEELS
- STAINLESS STEELS
- HIGH TEMP ALLOYS
- TITANIUM

51M
METRIC SERIES

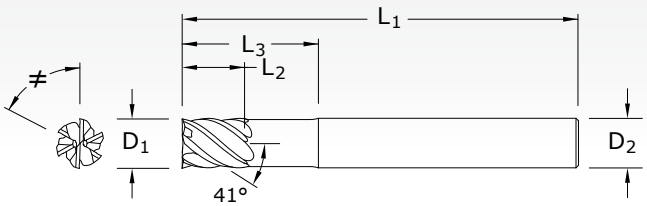
TECH INFO 78

mm				EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	Ti-NAMITE-X
6,0	19,0	63,0	6,0	45100
8,0	20,0	63,0	8,0	45101
10,0	22,0	75,0	10,0	45102
12,0	26,0	83,0	12,0	45103
16,0	32,0	92,0	16,0	45104
20,0	38,0	104,0	20,0	45105

TOLERANCES (mm)
D1 = +0,000/–0,050
D2 = h6







TOLERANCES (inch)

D1 = +0.0000/–0.0020
D2 = h6

51L
FRACTIONAL SERIES

TECH INFO 76

inch					EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_2	Ti-NAMITE-X
1/4	3/8	4	1/4	1-1/8	35106
3/8	1/2	4	3/8	2-1/8	35107
1/2	5/8	4	1/2	2-1/4	35108
5/8	3/4	5	5/8	2-1/2	35109
3/4	1	6	3/4	3-3/8	35110
1	1-1/4	6	1	3-3/8	35111

STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM

TOLERANCES (mm)

D1 = +0,000/–0,050
D2 = h6

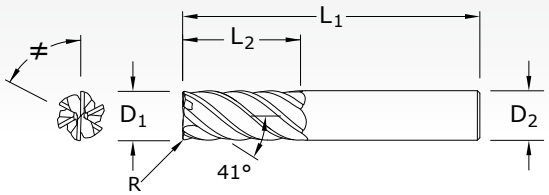
51ML
METRIC SERIES

TECH INFO 78

mm					EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_2	Ti-NAMITE-X
6,0	8,0	75,0	6,0	32,0	45106
8,0	10,0	75,0	8,0	32,0	45107
10,0	12,0	100,0	10,0	40,0	45108
12,0	15,0	100,0	12,0	48,0	45109
16,0	20,0	115,0	16,0	65,0	45110
20,0	24,0	150,0	20,0	80,0	45111







51CR
FRACTIONAL SERIES

TECH INFO 76

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
1/4	3/4	2-1/2	1/4	.015	35112
3/8	1	2-1/2	3/8	.015	35113
3/8	1	2-1/2	3/8	.030	35114
1/2	1-1/4	3	1/2	.030	35115
1/2	1-1/4	3	1/2	.090	35116
1/2	1-1/4	3	1/2	.120	35117
5/8	1-5/8	3-1/2	5/8	.030	35118
5/8	1-5/8	3-1/2	5/8	.090	35119
5/8	1-5/8	3-1/2	5/8	.120	35120
3/4	1-5/8	4	3/4	.030	35121
3/4	1-5/8	4	3/4	.090	35122
3/4	1-5/8	4	3/4	.120	35123
1	2-5/8	6	1	.030	35124
1	2-5/8	6	1	.090	35125
1	2-5/8	6	1	.120	35126

TOLERANCES (inch)
D1 = +0.0000/–0.0020
D2 = h6
R = +0.000/–0.002

STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM

51MCR
METRIC SERIES

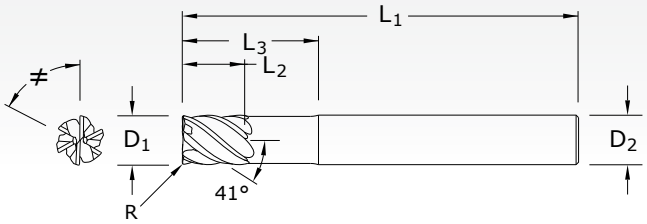
TECH INFO 78

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
6,0	19,0	63,0	6,0	0,5	45112
8,0	20,0	63,0	8,0	0,5	45113
8,0	20,0	63,0	8,0	1,0	45114
10,0	22,0	75,0	10,0	1,0	45115
10,0	22,0	75,0	10,0	1,5	45116
10,0	22,0	75,0	10,0	2,0	45117
12,0	26,0	83,0	12,0	1,0	45118
12,0	26,0	83,0	12,0	1,5	45119
12,0	26,0	83,0	12,0	2,0	45120
16,0	32,0	92,0	16,0	1,0	45121
16,0	32,0	92,0	16,0	1,5	45122
16,0	32,0	92,0	16,0	2,0	45123
20,0	38,0	104,0	20,0	1,0	45124
20,0	38,0	104,0	20,0	1,5	45125
20,0	38,0	104,0	20,0	2,0	45126

TOLERANCES (mm)
D1 = +0,000/–0,050
D2 = h6
R = +0,000/–0,050







TOLERANCES (inch)

D1 = +0.0000/–0.0020
D2 = h6
R = +0.000/–0.002

51LC
FRACTIONAL SERIES

TECH INFO 76

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
1/4	3/8	4	1/4	1-1/8	.015	35127
3/8	1/2	4	3/8	2-1/8	.015	35128
3/8	1/2	4	3/8	2-1/8	.030	35129
1/2	5/8	4	1/2	2-1/4	.030	35130
1/2	5/8	4	1/2	2-1/4	.090	35131
1/2	5/8	4	1/2	2-1/4	.120	35132
5/8	3/4	5	5/8	2-1/2	.030	35133
5/8	3/4	5	5/8	2-1/2	.090	35134
5/8	3/4	5	5/8	2-1/2	.120	35135
3/4	1	6	3/4	3-3/8	.030	35136
3/4	1	6	3/4	3-3/8	.090	35137
3/4	1	6	3/4	3-3/8	.120	35138
1	1-1/4	6	1	3-3/8	.030	35139
1	1-1/4	6	1	3-3/8	.090	35140
1	1-1/4	6	1	3-3/8	.120	35141

STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM

TOLERANCES (mm)

D1 = +0,000/–0,050
D2 = h6
R = +0,000/–0,050

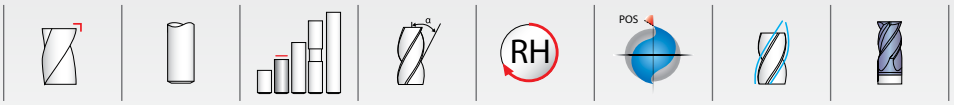
51MLC
METRIC SERIES

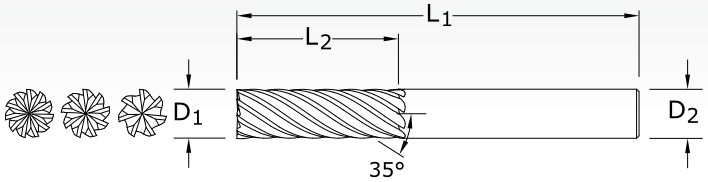
TECH INFO 78

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
6,0	8,0	75,0	6,0	32,0	0,5	45127
8,0	10,0	75,0	8,0	32,0	0,5	45128
8,0	10,0	75,0	8,0	32,0	1,0	45129
10,0	12,0	100,0	10,0	40,0	1,0	45130
10,0	12,0	100,0	10,0	40,0	1,5	45131
10,0	12,0	100,0	10,0	40,0	2,0	45132
12,0	15,0	100,0	12,0	48,0	1,0	45133
12,0	15,0	100,0	12,0	48,0	1,5	45134
12,0	15,0	100,0	12,0	48,0	2,0	45135
16,0	20,0	115,0	16,0	65,0	1,0	45136
16,0	20,0	115,0	16,0	65,0	1,5	45137
16,0	20,0	115,0	16,0	65,0	2,0	45138
20,0	24,0	150,0	20,0	80,0	1,0	45139
20,0	24,0	150,0	20,0	80,0	1,5	45140
20,0	24,0	150,0	20,0	80,0	2,0	45141

MULTI Carb
HIGH PERFORMANCE FINISHING END MILLS







66
FRACTIONAL SERIES

TECH INFO 80

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

STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM

TOLERANCES (inch)
D_1 = +0.0000/–0.0020
D_2 = h_6

66M
METRIC SERIES

TECH INFO 82

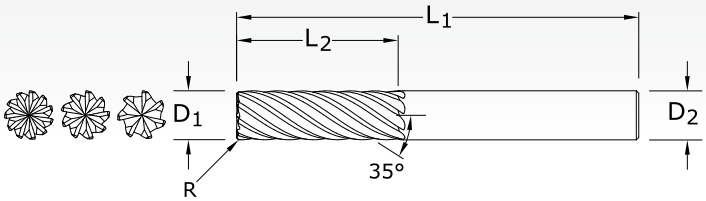
mm					EDP NO.
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	Ti-NAMITE-A (AlTiN)
6,0	19,0	63,0	6,0	7	46620
8,0	20,0	63,0	8,0	7	46621
10,0	22,0	75,0	10,0	7	46622
12,0	26,0	83,0	12,0	9	46623
16,0	32,0	92,0	16,0	9	46624
20,0	38,0	104,0	20,0	11	46625
25,0	38,0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

Neck Option Available

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







TOLERANCES (inch)

D_1 = +0.0000/–0.0020
D_2 = h_6
R = +0.0000/–0.0020

66CR
FRACTIONAL SERIES

TECH INFO 82

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	.010	7	36627
1/4	3/4	2-1/2	1/4	.015	7	36628
3/8	1	3	3/8	.015	7	36629
1/2	1-1/4	3	1/2	.030	9	36630
1/2	1-1/4	3	1/2	.090	9	36631
1/2	1-1/4	3	1/2	.120	9	36632
5/8	1-5/8	3-1/2	5/8	.030	9	36633
5/8	1-5/8	3-1/2	5/8	.090	9	36634
5/8	1-5/8	3-1/2	5/8	.120	9	36635
3/4	1-5/8	4	3/4	.030	11	36636
3/4	1-5/8	4	3/4	.090	11	36637
3/4	1-5/8	4	3/4	.120	11	36638
1	2	6	1	.030	11	36639
1	2	6	1	.090	11	36640
1	2	6	1	.120	11	36641

Neck Option Available

STEELS
STAINLESS STEELS
HIGH TEMP ALLOYS
TITANIUM

TOLERANCES (mm)

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

66MCR
METRIC SERIES

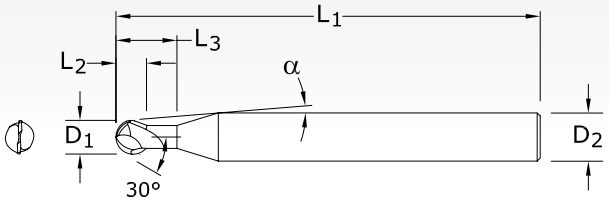
TECH INFO 82

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)
6,0	19,0	63,0	6,0	0,5	7	46627
8,0	20,0	63,0	8,0	0,5	7	46629
10,0	22,0	75,0	10,0	0,5	7	46632
12,0	26,0	83,0	12,0	1,0	9	46636
12,0	26,0	83,0	12,0	2,0	9	46638
12,0	26,0	83,0	12,0	3,0	9	46640
16,0	32,0	92,0	16,0	1,0	9	46641
16,0	32,0	92,0	16,0	2,0	9	46643
16,0	32,0	92,0	16,0	3,0	9	46645
20,0	38,0	104,0	20,0	1,0	11	46647
20,0	38,0	104,0	20,0	2,0	11	46649
20,0	38,0	104,0	20,0	3,0	11	46651
25,0	38,0	104,0	25,0	1,0	11	46654
25,0	38,0	104,0	25,0	2,0	11	46656
25,0	38,0	104,0	25,0	3,0	11	46658

Neck Option Available







56B
FRACTIONAL SERIES

TECH INFO 84

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	–	1-1/4	93281
3/4	3/4	6-1/2	3/4	–	1-1/2	93282

Neck Option Available

TOLERANCES (inch)

1/32–3/32 DIAMETER
D_1 = +0.0000/–0.0010
D_2 = h_6

>3/32–1/4 DIAMETER
D_1 = +0.0000/–0.0012
D_2 = h_6

>1/4–3/8 DIAMETER
D_1 = +0.0000/–0.0016
D_2 = h_6

>3/8–3/4 DIAMETER
D_1 = +0.0000/–0.0020
D_2 = h_6

56MB
METRIC SERIES

TECH INFO 85

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

TOLERANCES (mm)

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

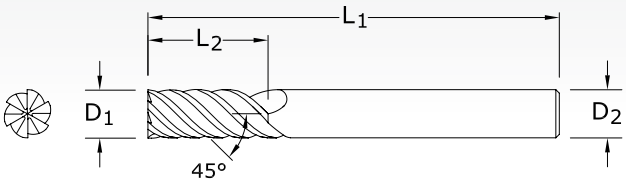
>2,5–6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6

>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







TOLERANCES (inch)

1/4 DIAMETER
D_1 = +0.0000/–0.0012
D_2 = h_6

5/16 DIAMETER
D_1 = +0.0000/–0.0016
D_2 = h_6

3/8 DIAMETER
D_1 = +0.0000/–0.0016
D_2 = h_6

1/2 DIAMETER
D_1 = +0.0000/–0.0020
D_2 = h_6

57
FRACTIONAL SERIES

TECH INFO 86

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 (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

57M
METRIC SERIES

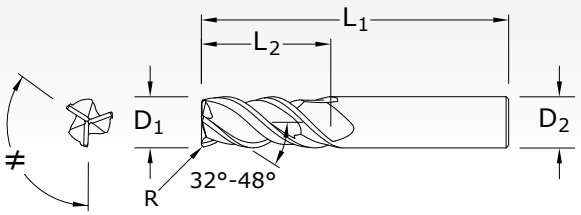
TECH INFO 87

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







33CR
FRACTIONAL SERIES

TECH INFO 88

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

inch					
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	TI-NAMITE-A (AlTiN) EDP NO.
1/8	3/8	2-1/2	1/4	.015	33345
3/16	9/16	2-1/2	1/4	.015	33346
1/4	3/4	2-1/2	1/4	.020	33347
5/16	13/16	2-1/2	5/16	.020	33348
3/8	1	2-1/2	3/8	.020	33349
7/16	1-1/8	2-3/4	7/16	.020	33350
1/2	1-1/4	3-1/4	1/2	.030	33351
5/8	1-1/2	3-1/2	5/8	.040	33352
3/4	1-3/4	4	3/4	.040	33353
1	2-1/4	5	1	.040	33354

TOLERANCES (inch)

1/8–1/4 DIAMETER
D1 = +0.0000/–0.0012
D2 = h6
R = +0.0000/–0.0020

>1/4–3/8 DIAMETER
D1 = +0.0000/–0.0016
D2 = h6
R = +0.0000/–0.0020

>3/8–1 DIAMETER
D1 = +0.0000/–0.0020
D2 = h6
R = +0.0000/–0.0020

33MCR
METRIC SERIES

TECH INFO 90

mm					
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	CORNER RADIUS R	TI-NAMITE-A (AlTiN) EDP NO.
3,0	9,0	57,0	6,0	0,3	43445
4,0	12,0	57,0	6,0	0,3	43446
5,0	15,0	57,0	6,0	0,3	43447
6,0	18,0	57,0	6,0	0,5	43448
8,0	20,0	63,0	8,0	0,5	43449
10,0	27,0	72,0	10,0	0,5	43450
12,0	30,0	83,0	12,0	0,5	43451
16,0	38,0	92,0	16,0	1,0	43452
20,0	46,0	104,0	20,0	1,0	43453

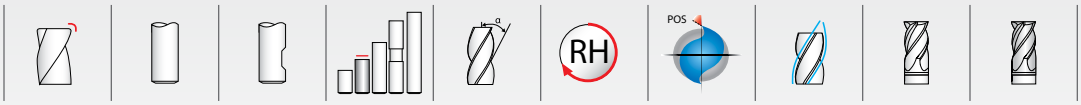
TOLERANCES (mm)

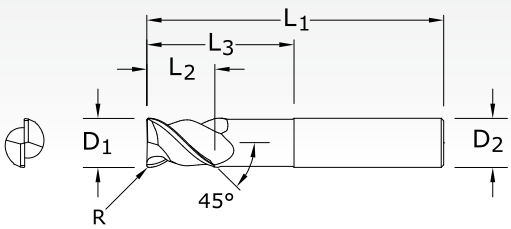
3–6 DIAMETER
D_1 = +0,000/–0,030
D_2 = h_6
R = +0,00/–0,05

>6–10 DIAMETER
D_1 = +0,000/–0,040
D_2 = h_6
R = +0,00/–0,05

>10–25 DIAMETER
D_1 = +0,000/–0,050
D_2 = h_6
R = +0,00/–0,05







TOLERANCES (inch)

1/4–3/8 DIAMETER
D_1 = +0.0000/–0.00035
D_2 = h_6
R = +0.0000/–0.0020

1/2–5/8 DIAMETER
D_1 = +0.0000/–0.00043
D_2 = h_6
R = +0.0000/–0.002

3/4–1 DIAMETER
D_1 = +0.0000/–0.00051
D_2 = h_6
R = +0.0000/–0.0020

45
FRACTIONAL SERIES

TECH INFO 92

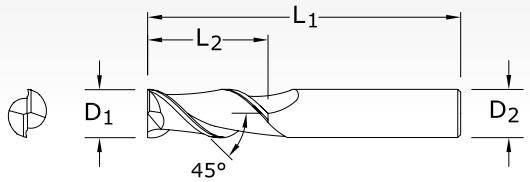
inch						EDP NO.			
CUTTING DIA. D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIA. D_2	REACH* L_3	CORNER RADIUS R	UNCOATED W/FLAT	UNCOATED W/O FLAT	Ti-NAMITE-B (TiB_2) W/FLAT	Ti-NAMITE-B (TiB_2) W/O FLAT
1/4	3/8	2-1/2	3/8	1	.010	91257	91250	91235	91242
5/16	7/16	2-1/2	3/8	1-1/8	.012	91258	91251	91236	91243
3/8	9/16	2-1/2	3/8	1-1/8	.015	91259	91252	91237	91244
1/2	3/4	3	1/2	1-1/2	.020	91260	91253	91238	91245
5/8	7/8	3-1/2	5/8	1-3/4	.025	91261	91254	91239	91246
3/4	1	4	3/4	2	.030	91262	91255	91240	91247
1	1-1/4	4	1	2-1/8	.040	91263	91256	91241	91248

*Reach (Optional)

NON-FERROUS
PLASTICS/COMPOSITES







44
FRACTIONAL SERIES

TECH INFO 92

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)

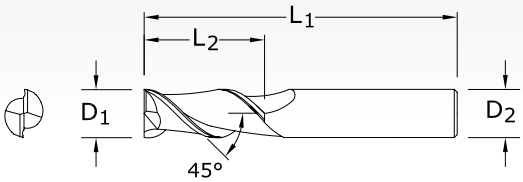
1/4–3/8 DIAMETER
D_1 = +0.0000/–0.00035
D_2 = h_6
R = +0.0000/–0.0020

1/2–5/8 DIAMETER
D_1 = +0.0000/–0.00043
D_2 = h_6
R = +0.0000/–0.0020

3/4–1 DIAMETER
D_1 = +0.0000/–0.00051
D_2 = h_6
R = +0.0000/–0.0020







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

44M
METRIC SERIES

TECH INFO 94

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

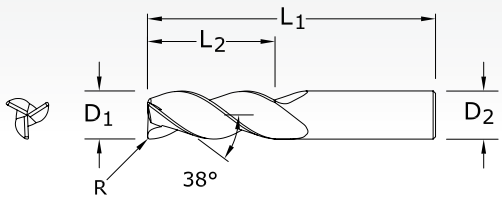
*Contact your SGS Sales Representative for more information on Corner Radius options.

NON-FERROUS

PLASTICS/COMPOSITES







43CR
FRACTIONAL SERIES

TECH INFO 92

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	.010	34771	34793
3/16	9/16	2	3/16	.010	34772	34794
1/4	3/4	2-1/2	1/4	.010	34773	34795
1/4	3/4	2-1/2	1/4	.030	34774	34796
5/16	5/8	2-1/2	5/16	.030	34775	34797
3/8	1	2-1/2	3/8	.010	34776	34798
3/8	1	2-1/2	3/8	.030	34777	34799
3/8	1	2-1/2	3/8	.060	32761	32825
1/2	1-1/4	3-1/4	1/2	.010	34778	34800
1/2	1-1/4	3-1/4	1/2	.030	34779	34801
1/2	1-1/4	3-1/4	1/2	.060	34780	34802
1/2	1-1/4	3-1/4	1/2	.090	34781	34803
1/2	1-1/4	3-1/4	1/2	.120	32766	32830
5/8	1-5/8	3-3/4	5/8	.030	34782	34804
5/8	1-5/8	3-3/4	5/8	.060	34783	34805
5/8	1-5/8	3-3/4	5/8	.090	34784	34806
3/4	1-5/8	4	3/4	.030	34785	34807
3/4	1-5/8	4	3/4	.060	34786	34808
3/4	1-5/8	4	3/4	.090	34787	34809
3/4	1-5/8	4	3/4	.120	34815	34817
1	2	4-1/2	1	.030	34789	34811
1	2	4-1/2	1	.060	34790	34812
1	2	4-1/2	1	.090	34791	34813
1	2	4-1/2	1	.120	34816	34818

TOLERANCES (inch)

1/8–3/16 DIAMETER
D_1 = +0.0000/–0.00032
D_2 = h_6
R = +0.0000/–0.0020

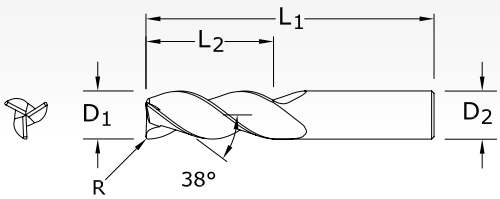
1/4–3/8 DIAMETER
D_1 = +0.0000/–0.00035
D_2 = h_6
R = +0.0000/–0.0020

1/2–5/8 DIAMETER
D_1 = +0.0000/–0.00043
D_2 = h_6
R = +0.0000/–0.0020

3/4–1 DIAMETER
D_1 = +0.0000/–0.00051
D_2 = h_6
R = +0.0000/–0.0020







43MCR
METRIC SERIES

TECH INFO 94

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

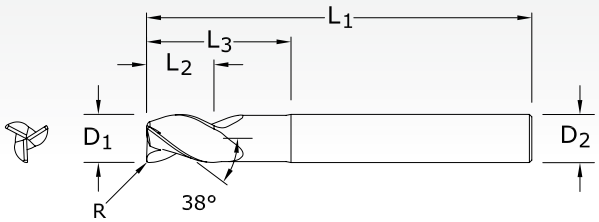
>18–20 DIAMETER
D_1 = +0,000/–0,013
D_2 = h_6
R = +0,000/–0,050

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







43LC
FRACTIONAL SERIES

TECH INFO 92

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	.010	32751	32815
3/16	7/32	3	3/16	1/2	.010	32752	32816
1/4	3/8	4	1/4	3/4	.010	32753	32817
1/4	3/8	4	1/4	3/4	.030	32754	32818
1/4	3/8	4	1/4	1-1/2	.010	32755	32819
1/4	3/8	4	1/4	1-1/2	.030	32756	32820
1/4	3/8	4	1/4	2-1/8	.010	32757	32821
1/4	3/8	4	1/4	2-1/8	.030	32758	32822
5/16	7/16	4	5/16	1-1/8	.030	32759	32823
5/16	7/16	4	5/16	2-1/8	.030	32760	32824
3/8	1/2	4	3/8	1-1/8	.030	32762	32826
3/8	1/2	4	3/8	1-1/8	.060	32763	32827
3/8	1/2	4	3/8	2-1/8	.030	32764	32828
3/8	1/2	4	3/8	2-1/8	.060	32765	32829
1/2	5/8	4	1/2	1-3/8	.030	32767	32831
1/2	5/8	4	1/2	1-3/8	.060	32768	32832
1/2	5/8	4	1/2	1-3/8	.090	32769	32833
1/2	5/8	4	1/2	1-3/8	.120	32770	32834
1/2	5/8	6	1/2	2-1/8	.030	32771	32835
1/2	5/8	6	1/2	2-1/8	.060	32772	32836
1/2	5/8	6	1/2	2-1/8	.090	32773	32837
1/2	5/8	6	1/2	2-1/8	.120	32774	32838
1/2	5/8	6	1/2	3-3/8	.030	32775	32839
1/2	5/8	6	1/2	3-3/8	.060	32776	32840
1/2	5/8	6	1/2	3-3/8	.090	32777	32841
1/2	5/8	6	1/2	3-3/8	.120	32778	32842

continued on next page

TOLERANCES (inch)

1/8–3/16 DIAMETER
D_1 = +0.0000/–0.00032
D_2 = h_6
R = +0.0000/–0.0020

1/4–3/8 DIAMETER
D_1 = +0.0000/–0.00035
D_2 = h_6
R = +0.0000/–0.0020

1/2–5/8 DIAMETER
D_1 = +0.0000/–0.00043
D_2 = h_6
R = +0.0000/–0.0020

3/4–1 DIAMETER
D_1 = +0.0000/–0.00051
D_2 = h_6
R = +0.0000/–0.0020



43LC
FRACTIONAL SERIES

CONTINUED

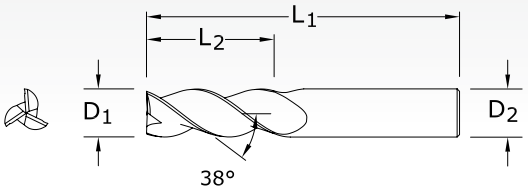
inch						EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	REACH L_3	CORNER RADIUS R	UNCOATED	Ti-NAMITE-B (TiB_2)
5/8	3/4	4	5/8	1-3/4	.030	32779	32843
5/8	3/4	4	5/8	1-3/4	.060	32780	32844
5/8	3/4	4	5/8	1-3/4	.090	32781	32845
5/8	3/4	4	5/8	1-3/4	.120	32782	32846
5/8	3/4	4	5/8	2-3/8	.030	32783	32847
5/8	3/4	4	5/8	2-3/8	.060	32784	32848
5/8	3/4	4	5/8	2-3/8	.090	32785	32849
5/8	3/4	4	5/8	2-3/8	.120	32786	32850
5/8	3/4	6	5/8	3-3/8	.030	32787	32851
5/8	3/4	6	5/8	3-3/8	.060	32788	32852
5/8	3/4	6	5/8	3-3/8	.090	32789	32853
5/8	3/4	6	5/8	3-3/8	.120	32790	32854
3/4	1	4	3/4	1-3/4	.030	32791	32855
3/4	1	4	3/4	1-3/4	.060	32792	32856
3/4	1	4	3/4	1-3/4	.090	32793	32857
3/4	1	4	3/4	1-3/4	.120	32794	32858
3/4	1	6	3/4	2-3/8	.030	32795	32859
3/4	1	6	3/4	2-3/8	.060	32796	32860
3/4	1	6	3/4	2-3/8	.090	32797	32861
3/4	1	6	3/4	2-3/8	.120	32798	32862
3/4	1	6	3/4	3-3/8	.030	32799	32863
3/4	1	6	3/4	3-3/8	.060	32800	32864
3/4	1	6	3/4	3-3/8	.090	32801	32865
3/4	1	6	3/4	3-3/8	.120	32802	32866
1	1-1/4	6	1	2-3/8	.030	32803	32867
1	1-1/4	6	1	2-3/8	.060	32804	32868
1	1-1/4	6	1	2-3/8	.090	32805	32869
1	1-1/4	6	1	2-3/8	.120	32806	32870
1	1-1/4	6	1	3-3/8	.030	32807	32871
1	1-1/4	6	1	3-3/8	.060	32808	32872
1	1-1/4	6	1	3-3/8	.090	32809	32873
1	1-1/4	6	1	3-3/8	.120	32810	32874

NON-FERROUS

PLASTICS/COMPOSITES







43
FRACTIONAL SERIES

TECH INFO 92

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	3/16	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 = +0.0000/–0.00032
D_2 = h_6

1/4–3/8 DIAMETER
D_1 = +0.0000/–0.00035
D_2 = h_6

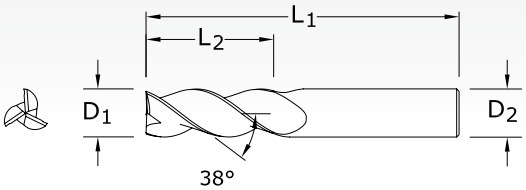
1/2–5/8 DIAMETER
D_1 = +0.0000/–0.00043
D_2 = h_6

3/4–1 DIAMETER
D_1 = +0.0000/–0.00051
D_2 = h_6

CARB
Solid Carbide End Mills for Aluminum







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

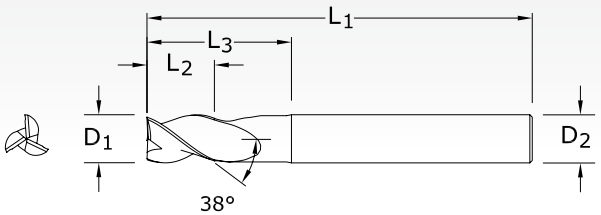
TECH INFO 94

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







43L
FRACTIONAL SERIES

TECH INFO 92

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 = +0.0000/–0.00032
D_2 = h_6

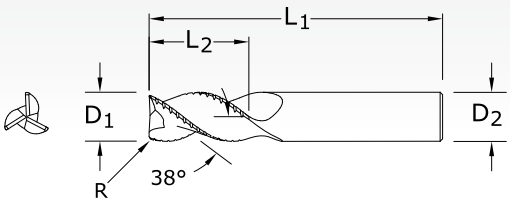
1/4–3/8 DIAMETER
D_1 = +0.0000/–0.00035
D_2 = h_6

1/2–5/8 DIAMETER
D_1 = +0.0000/–0.00043
D_2 = h_6

3/4–1 DIAMETER
D_1 = +0.0000/–0.00051
D_2 = h_6







43CB
FRACTIONAL SERIES

TECH INFO 92

TOLERANCES (inch)

3/8 DIAMETER
D_1 = +0.0000/–0.00035
D_2 = h_6
R = +0.0000/–0.0020

1/2–5/8 DIAMETER
D_1 = +0.0000/–0.00043
D_2 = h_6
R = +0.0000/–0.0020

3/4–1 DIAMETER
D_1 = +0.0000/–0.00051
D_2 = h_6
R = +0.0000/–0.0020

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	.020	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

43MCB
METRIC SERIES

TECH INFO 94

TOLERANCES (mm)

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

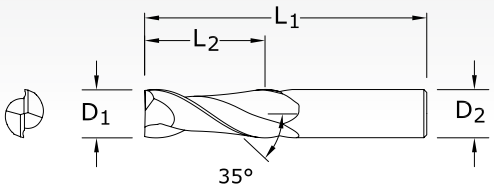
>10–18 DIAMETER
D_1 = +0,000/–0,011
D_2 = h_6
R = +0,000/–0,050

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

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







47
FRACTIONAL SERIES

TECH INFO 92

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)

1/8–3/16 DIAMETER
D_1 = +0.0000/–0.00032
D_2 = h_6

1/4–3/8 DIAMETER
D_1 = +0.0000/–0.00035
D_2 = h_6

1/2–5/8 DIAMETER
D_1 = +0.0000/–0.00043
D_2 = h_6

3/4–1 DIAMETER
D_1 = +0.0000/–0.00051
D_2 = h_6

47M
METRIC SERIES

TECH INFO 94

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+ DIAMETER
D_1 = +0,000/–0,006
D_2 = h_6

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

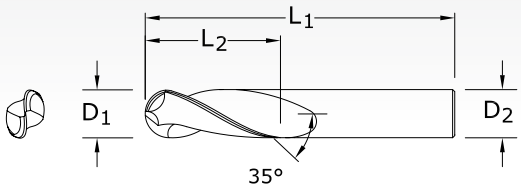
>6–10 DIAMETER
D_1 = +0,000/–0,009
D_2 = h_6

>10–18 DIAMETER
D_1 = +0,000/–0,012
D_2 = h_6

>18–25 DIAMETER
D_1 = +0,000/–0,013
D_2 = h_6







TOLERANCES (inch)

1/8–3/16 DIAMETER
D_1 = +0.0000/–0.00032
D_2 = h_6

1/4–3/8 DIAMETER
D_1 = +0.0000/–0.00035
D_2 = h_6

1/2–5/8 DIAMETER
D_1 = +0.0000/–0.00043
D_2 = h_6

3/4–1 DIAMETER
D_1 = +0.0000/–0.00051
D_2 = h_6

47B
FRACTIONAL SERIES

TECH INFO 92

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+ DIAMETER
D_1 = +0,000/–0,006
D_2 = h_6

>3–6 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/–0,012
D_2 = h_6

>18–25 DIAMETER
D_1 = +0,000/–0,013
D_2 = h_6

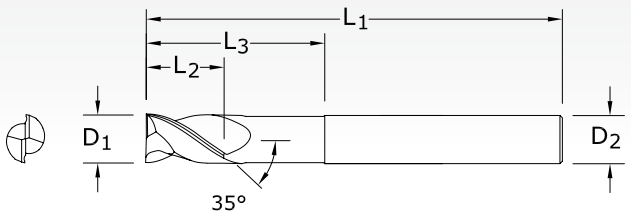
47MB
METRIC SERIES

TECH INFO 94

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







47ES
FRACTIONAL SERIES

TECH INFO 92

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)

1/4–3/8 DIAMETER
D_1 = +0.0000/–0.00035
D_2 = h_6

1/2–5/8 DIAMETER
D_1 = +0.0000/–0.00043
D_2 = h_6

3/4–1 DIAMETER
D_1 = +0.0000/–0.00051
D_2 = h_6

47MES
METRIC SERIES

TECH INFO 94

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

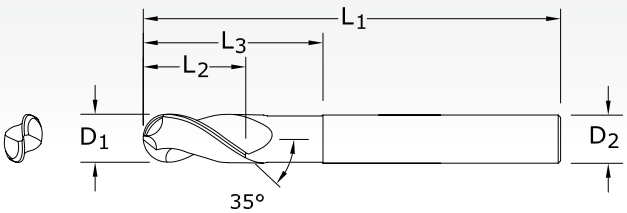
>6–10 DIAMETER
D_1 = +0,000/–0,009
D_2 = h_6

>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







TOLERANCES (inch)

1/4–3/8 DIAMETER
D_1 = +0.0000/–0.00035
D_2 = h_6

1/2–5/8 DIAMETER
D_1 = +0.0000/–0.00043
D_2 = h_6

3/4–1 DIAMETER
D_1 = +0.0000/–0.00051
D_2 = h_6

47EB
FRACTIONAL SERIES

TECH INFO 92

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	34691
5/8	3/4	6	5/8	2-3/8	34655	34690
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 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

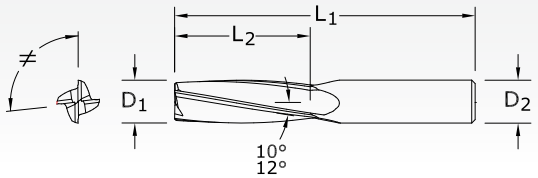
47MEB
METRIC SERIES

TECH INFO 94

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







27
FRACTIONAL SERIES

TECH INFO 96

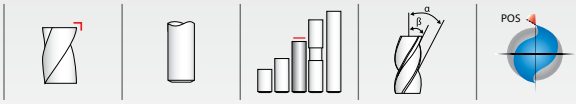
PLASTICS/COMPOSITES

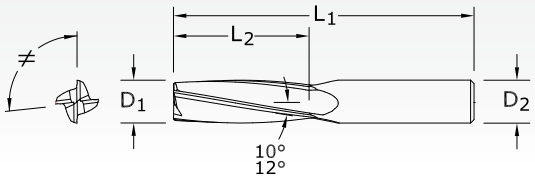
inch				EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Di-NAMITE (Diamond)
1/4	1	2-1/2	1/4	72978	72979
3/8	1-1/8	2-1/2	3/8	72980	72981
1/2	1-1/2	3-1/2	1/2	72982	72983
3/4	1-3/8	4	3/4	72984	72985

TOLERANCES (inch)

D_1 = +0.0000/–0.0030
D_2 = h_6







TOLERANCES (mm)

D_1 = +0,000/–0,080

D_2 = h_6

27M
METRIC SERIES

TECH INFO 97

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

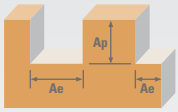
PLASTICS/COMPOSITES



	Series Z1PCR, Z1PLC, Z1PLB Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	5/8	3/4	1
P	**CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536**	≤ 275	Profile	≤ 0.5	≤ 1.5	555	RPM	16961	8480	5654	4240	3392	2827	2120
						(444-666)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (IPM)	27.1	33.9	43.0	42.4	42.1	36.2	29.7
			Slot	1	≤ 1	440	RPM	13446	6723	4482	3362	2689	2241	1681
						(352-528)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (IPM)	21.5	26.9	34.1	33.6	33.3	28.7	23.5
P	**ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100**	≤ 375	Profile	≤ 0.5	≤ 1.5	315	RPM	9626	4813	3209	2407	1925	1604	1203
						(252-378)	Fz	0.0003	0.0008	0.0014	0.0019	0.0024	0.0025	0.0027
							Feed (IPM)	13.1	15.4	18.0	18.3	18.5	16.0	13.0
			Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0003	0.0008	0.0014	0.0019	0.0024	0.0025	0.0027
							Feed (IPM)	10.4	12.2	14.3	14.5	14.7	12.7	10.3
P	**TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2**	≤ 375	Profile	≤ 0.5	≤ 1.5	185	RPM	5654	2827	1885	1413	1131	942	707
						(148-222)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	4.5	5.7	7.5	7.3	7.2	6.4	5.1
			Slot	1	≤ 1	145	RPM	4431	2216	1477	1108	886	739	554
						(116-174)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	3.5	4.4	5.9	5.8	5.7	5.0	4.0
K	**CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile**	≤ 220	Profile	≤ 0.5	≤ 1.5	355	RPM	10849	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0004	0.0010	0.0018	0.0024	0.0030	0.0031	0.0034
							Feed (IPM)	18.2	21.7	26.0	26.0	26.0	22.4	18.4
			Slot	1	≤ 1	445	RPM	13599	6800	4533	3400	2720	2267	1700
						(356-534)	Fz	0.0004	0.0010	0.0018	0.0024	0.0030	0.0031	0.0034
							Feed (IPM)	22.8	27.2	32.6	32.6	32.6	28.1	23.1
K	**CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile**	> 220 ≤ 260	Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	12.5	14.5	19.4	18.7	19.1	16.6	13.0
			Slot	1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
						(216-324)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	9.9	11.6	15.4	14.9	15.2	13.2	10.3
M	**STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F**	≤ 275	Profile	≤ 0.5	≤ 1.5	490	RPM	14974	7487	4991	3744	2995	2496	1872
						(392-588)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	18.0	21.0	28.0	27.0	27.6	24.0	18.7
			Slot	1	≤ 1	390	RPM	11918	5959	3973	2980	2384	1986	1490
						(312-468)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	14.3	16.7	22.2	21.5	21.9	19.1	14.9

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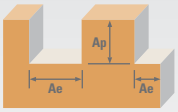
CARB-AP
Patented Variable Rake End Mills



	Series Z1PCR, Z1PLC, Z1PLB Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	5/8	3/4	1
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (IPM)	8.3	12.5	15.2	14.5	15.0	13.2	10.4
			Slot	1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
						(216-324)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (IPM)	6.6	9.9	12.1	11.6	11.9	10.5	8.3
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.5	≤ 1.5	310	RPM	9474	4737	3158	2368	1895	1579	1184
						(248-372)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (IPM)	7.6	11.4	13.9	13.3	13.6	12.0	9.5
			Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (IPM)	6.1	9.2	11.2	10.7	11.0	9.7	7.6
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.5	≤ 1.5	80	RPM	2445	1222	815	611	489	407	306
						(64-96)	Fz	0.0002	0.0004	0.0008	0.0010	0.0013	0.0014	0.0015
							Feed (IPM)	1.5	2.0	2.6	2.4	2.5	2.3	1.8
			Slot	1	≤ 1	65	RPM	1986	993	662	497	397	331	248
						(52-78)	Fz	0.0002	0.0004	0.0008	0.0010	0.0013	0.0014	0.0015
							Feed (IPM)	1.2	1.6	2.1	2.0	2.1	1.9	1.5
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.5	≤ 1.5	62	RPM	1895	947	632	474	379	316	237
						(50-74)	Fz	0.0001	0.0003	0.0005	0.0007	0.0009	0.0010	0.0011
							Feed (IPM)	0.8	1.1	1.3	1.3	1.4	1.3	1.0
			Slot	1	≤ 1	50	RPM	1528	764	509	382	306	255	191
						(40-60)	Fz	0.0001	0.0003	0.0005	0.0007	0.0009	0.0010	0.0011
							Feed (IPM)	0.6	0.9	1.0	1.1	1.1	1.0	0.8
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.5	≤ 1.5	215	RPM	6570	3285	2190	1643	1314	1095	821
						(172-258)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	5.3	6.6	8.8	8.5	8.4	7.4	5.9
			Slot	1	≤ 1	170	RPM	5195	2598	1732	1299	1039	866	649
						(136-204)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	4.2	5.2	6.9	6.8	6.6	5.9	4.7
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.5	≤ 1.5	75	RPM	2292	1146	764	573	458	382	287
						(60-90)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	1.8	2.3	3.1	3.0	2.9	2.6	2.1
			Slot	1	≤ 1	60	RPM	1834	917	611	458	367	306	229
						(48-72)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	1.5	1.8	2.4	2.4	2.3	2.1	1.7

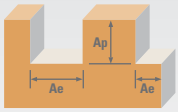
rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 4 x rpm
maximum Slotting Ap for Z1PLC / Z1PLB is .25 x D_1
maximum Profile Ae for Z1PLC / Z1PLB is .2 x D_1
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

CARB-AP
Patented Variable Rake End Mills

	Series Z1MPCR, Z1MPLC Metric	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	16	20	25
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275	Profile	≤ 0.5	≤ 1.5	169	RPM	17934	8967	6725	5380	4484	3363	2690	2152
						(135-203)	Fz	0.010	0.024	0.041	0.051	0.060	0.079	0.085	0.088
							Feed (mm/min)	689	861	1091	1090	1076	1067	918	753
			Slot	1	≤ 1	134	RPM	14218	7109	5332	4265	3555	2666	2133	1706
						(107-161)	Fz	0.010	0.024	0.041	0.051	0.060	0.079	0.085	0.088
							Feed (mm/min)	546	682	865	864	853	846	728	597
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375	Profile	≤ 0.5	≤ 1.5	96	RPM	10179	5089	3817	3054	2545	1909	1527	1221
						(77-115)	Fz	0.008	0.019	0.030	0.037	0.046	0.061	0.067	0.068
							Feed (mm/min)	332	391	456	456	464	469	407	330
			Slot	1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212	969
						(61-91)	Fz	0.008	0.019	0.030	0.037	0.046	0.061	0.067	0.068
							Feed (mm/min)	264	310	362	362	368	372	323	262
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375	Profile	≤ 0.5	≤ 1.5	56	RPM	5978	2989	2242	1793	1495	1121	897	717
						(45-68)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	115	143	191	191	186	184	163	129
			Slot	1	≤ 1	44	RPM	4686	2343	1757	1406	1171	879	703	562
						(35-53)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	90	112	150	150	146	144	127	101
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220	Profile	≤ 0.5	≤ 1.5	108	RPM	11471	5736	4302	3441	2868	2151	1721	1377
						(87-130)	Fz	0.010	0.024	0.038	0.048	0.058	0.077	0.083	0.085
							Feed (mm/min)	462	551	661	661	661	661	569	468
			Slot	1	≤ 1	136	RPM	14380	7190	5392	4314	3595	2696	2157	1726
						(109-163)	Fz	0.010	0.024	0.038	0.048	0.058	0.077	0.083	0.085
							Feed (mm/min)	580	690	828	828	828	828	713	587
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	> 220 ≤ 260	Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	316	369	492	492	475	485	422	330
			Slot	1	≤ 1	82	RPM	8725	4362	3272	2617	2181	1636	1309	1047
						(66-99)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	251	293	391	391	377	385	385	262
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275	Profile	≤ 0.5	≤ 1.5	149	RPM	15834	7917	5938	4750	3958	2969	2375	1900
						(119-179)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	456	532	709	709	684	699	608	475
			Slot	1	≤ 1	119	RPM	12602	6301	4726	3781	3151	2363	1890	1512
						(95-143)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	363	423	565	565	544	557	484	378

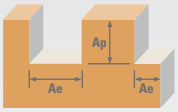
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CARB-AP
Patented Variable Rake End Mills



	Series Z1MPCR, Z1MPLC Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	16	20	25
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	211	316	387	387	369	380	334	264
			Slot	1	≤ 1	82	RPM	8725	4362	3272	2617	2181	1636	1309	1047
						(66-99)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	168	251	307	307	293	302	265	209
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.5	≤ 1.5	94	RPM	10017	5009	3756	3005	2504	1878	1503	1202
						(76-113)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	192	288	353	353	337	346	305	240
			Slot	1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212	969
						(61-91)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	155	233	284	284	271	279	246	194
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.5	≤ 1.5	24	RPM	2585	1293	969	776	646	485	388	310
						(20-29)	Fz	0.004	0.010	0.017	0.021	0.024	0.033	0.037	0.038
							Feed (mm/min)	37	50	66	66	62	65	58	47
			Slot	1	≤ 1	20	RPM	2100	1050	788	630	525	394	315	252
						(16-24)	Fz	0.004	0.010	0.017	0.021	0.024	0.033	0.037	0.038
							Feed (mm/min)	30	40	54	54	50	52	47	38
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.5	≤ 1.5	19	RPM	2003	1002	751	601	501	376	301	240
						(15-23)	Fz	0.002	0.007	0.011	0.013	0.017	0.023	0.027	0.028
							Feed (mm/min)	19	29	32	32	34	35	32	26
			Slot	1	≤ 1	15	RPM	1616	808	606	485	404	303	242	194
						(12-18)	Fz	0.002	0.007	0.011	0.013	0.017	0.023	0.027	0.028
							Feed (mm/min)	16	23	26	26	27	28	26	21
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.5	≤ 1.5	66	RPM	6947	3474	2605	2084	1737	1303	1042	834
						(52-79)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	133	167	222	222	217	213	189	150
			Slot	1	≤ 1	52	RPM	5493	2747	2060	1648	1373	1030	824	659
						(41-62)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	105	132	176	176	171	169	149	119
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.5	≤ 1.5	23	RPM	2424	1212	909	727	606	454	364	291
						(18-27)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	47	58	78	78	76	74	66	52
			Slot	1	≤ 1	18	RPM	1939	969	727	582	485	364	291	233
						(15-22)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	37	47	62	62	60	60	53	42

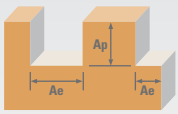
rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 4 x rpm
maximum Slotting Ap for Z1PLC / Z1PLB is .25 x D_1
maximum Profile Ae for Z1PLC / Z1PLB is .2 x D_1
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



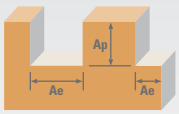
	Series Z1, Z1B, Z16CR Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	5/8	3/4	1
P	**CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536**	≤ 275	Profile	≤ 0.5	≤ 1.5	555	RPM	16961	8480	5654	4240	3392	2827	2120
						(444-666)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (IPM)	25.8	33.9	43.0	42.4	42.1	36.5	29.7
			Slot	1	≤ 1	440	RPM	13446	6723	4482	3362	2689	2241	1681
						(352-528)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (IPM)	20.4	26.9	34.1	33.6	33.3	29.0	23.5
P	**ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100**	≤ 375	Profile	≤ 0.5	≤ 1.5	315	RPM	9626	4813	3209	2407	1925	1604	1203
						(252-378)	Fz	0.0003	0.0008	0.0014	0.0019	0.0024	0.0025	0.0027
							Feed (IPM)	10.8	15.4	18.0	18.3	18.5	16.0	13.0
			Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0003	0.0008	0.0014	0.0019	0.0024	0.0025	0.0027
							Feed (IPM)	8.6	12.2	14.3	14.5	14.7	12.7	10.3
P	**TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2**	≤ 375	Profile	≤ 0.5	≤ 1.5	185	RPM	5654	2827	1885	1413	1131	942	707
						(148-222)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	4.5	5.7	7.5	7.3	7.2	6.4	5.1
			Slot	1	≤ 1	145	RPM	4431	2216	1477	1108	886	739	554
						(116-174)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	3.5	4.4	5.9	5.8	5.7	5.0	4.0
K	**CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile**	≤ 220	Profile	≤ 0.5	≤ 1.5	445	RPM	13599	6800	4533	3400	2720	2267	1700
						(356-534)	Fz	0.0004	0.0010	0.0018	0.0024	0.0030	0.0031	0.0034
							Feed (IPM)	19.0	27.2	32.6	32.6	32.6	28.1	23.1
			Slot	1	≤ 1	355	RPM	10849	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0004	0.0010	0.0018	0.0024	0.0030	0.0031	0.0034
							Feed (IPM)	15.2	21.7	26.0	26.0	26.0	22.4	18.4
K	**CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile**	> 220 ≤ 260	Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	12.5	14.5	19.4	18.7	19.1	16.6	13.0
			Slot	1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
						(216-324)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	9.9	11.6	15.4	14.9	15.2	13.2	10.3
M	**STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F**	≤ 275	Profile	≤ 0.5	≤ 1.5	490	RPM	14974	7487	4991	3744	2995	2496	1872
						(392-588)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	18.0	21.0	28.0	27.0	27.6	24.0	18.7
			Slot	1	≤ 1	390	RPM	11918	5959	3973	2980	2384	1986	1490
						(312-468)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	14.3	16.7	22.2	21.5	21.9	19.1	14.9

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CARB
SOLID CARBIDE END MILLS

	Series Z1, Z1B, Z16CR Fractional	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	5/8	3/4	1
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (IPM)	8.3	12.5	15.2	14.5	15.0	13.2	10.4
			Slot	1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
						(216-324)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (IPM)	6.6	9.9	12.1	11.6	11.9	10.5	8.3
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.5	≤ 1.5	310	RPM	9474	4737	3158	2368	1895	1579	1184
						(248-372)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (IPM)	7.6	11.4	13.9	13.3	13.6	12.0	9.5
			Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0002	0.0006	0.0011	0.0014	0.0018	0.0019	0.0020
							Feed (IPM)	6.1	9.2	11.2	10.7	11.0	9.7	7.6
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.5	≤ 1.5	80	RPM	2445	1222	815	611	489	407	306
						(64-96)	Fz	0.0002	0.0004	0.0008	0.0010	0.0013	0.0014	0.0015
							Feed (IPM)	2.2	2.0	2.6	2.4	2.5	2.3	1.8
			Slot	1	≤ 1	65	RPM	1986	993	662	497	397	331	248
						(52-78)	Fz	0.0002	0.0004	0.0008	0.0010	0.0013	0.0014	0.0015
							Feed (IPM)	1.6	1.6	2.1	2.0	2.1	1.9	1.5
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.5	≤ 1.5	62	RPM	1895	947	632	474	379	316	237
						(50-74)	Fz	0.0001	0.0003	0.0005	0.0007	0.0008	0.0009	0.0010
							Feed (IPM)	0.8	1.1	1.3	1.3	1.2	1.1	0.9
			Slot	1	≤ 1	50	RPM	1497	749	499	374	299	250	187
						(40-60)	Fz	0.0001	0.0003	0.0005	0.0007	0.0008	0.0009	0.0010
							Feed (IPM)	0.6	0.9	1.0	1.0	1.0	0.9	0.7
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.5	≤ 1.5	215	RPM	6570	3285	2190	1643	1314	1095	821
						(172-258)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	5.3	6.6	8.8	8.5	8.4	7.4	5.9
			Slot	1	≤ 1	170	RPM	5195	2598	1732	1299	1039	866	649
						(136-204)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	4.2	5.2	6.9	6.8	6.6	5.9	4.7
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.5	≤ 1.5	75	RPM	2292	1146	764	573	458	382	287
						(60-90)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	1.8	2.3	3.1	3.0	2.9	2.6	2.1
			Slot	1	≤ 1	60	RPM	1834	917	611	458	367	306	229
						(48-72)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	1.5	1.8	2.4	2.4	2.3	2.1	1.7

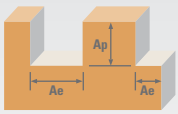
rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 4 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



	Series Z1M, Z1MB Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	16	20	25
P	**CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536**	≤ 275	Profile	≤ 0.5	≤ 1.5	169	RPM	17934	8967	6725	5380	4484	3363	2690	2152
						(135-203)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.086	0.088
							Feed (mm/min)	654	861	1091	1090	1076	1067	927	753
			Slot	1	≤ 1	134	RPM	14218	7109	5332	4265	3555	2666	2133	1706
						(107-161)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.086	0.088
							Feed (mm/min)	519	682	865	864	853	846	735	597
P	**ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100**	≤ 375	Profile	≤ 0.5	≤ 1.5	96	RPM	10179	5089	3817	3054	2545	1909	1527	1221
						(77-115)	Fz	0.007	0.019	0.030	0.037	0.046	0.061	0.067	0.068
							Feed (mm/min)	274	391	456	456	464	469	407	330
			Slot	1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212	969
						(61-91)	Fz	0.007	0.019	0.030	0.037	0.046	0.061	0.067	0.068
							Feed (mm/min)	217	310	362	362	368	372	323	262
P	**TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2**	≤ 375	Profile	≤ 0.5	≤ 1.5	56	RPM	5978	2989	2242	1793	1495	1121	897	717
						(45-68)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	115	143	191	191	186	184	163	129
			Slot	1	≤ 1	44	RPM	4686	2343	1757	1406	1171	879	703	562
						(35-53)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	90	112	150	150	146	144	127	101
K	**CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile**	≤ 220	Profile	≤ 0.5	≤ 1.5	136	RPM	14380	7190	5392	4314	3595	2696	2157	1726
						(109-163)	Fz	0.008	0.024	0.038	0.048	0.058	0.077	0.083	0.085
							Feed (mm/min)	483	690	828	828	828	828	713	587
			Slot	1	≤ 1	108	RPM	11471	5736	4302	3441	2868	2151	1721	1377
						(87-130)	Fz	0.008	0.024	0.038	0.048	0.058	0.077	0.083	0.085
							Feed (mm/min)	385	551	661	661	661	661	569	468
K	**CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile**	> 220 ≤ 260	Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	316	369	492	492	475	485	422	330
			Slot	1	≤ 1	82	RPM	8725	4362	3272	2617	2181	1636	1309	1047
						(66-99)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	251	293	391	391	377	385	335	262
M	**STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F**	≤ 275	Profile	≤ 0.5	≤ 1.5	149	RPM	15834	7917	5938	4750	3958	2969	2375	1900
						(119-179)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	456	532	709	709	684	699	608	475
			Slot	1	≤ 1	119	RPM	12602	6301	4726	3781	3151	2363	1890	1512
						(95-143)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	363	423	565	565	544	557	484	378

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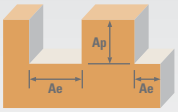
CARB
SOLID CARBIDE END MILLS



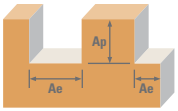
	Series Z1M, Z1MB Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	16	20	25
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	211	316	387	387	369	380	334	264
			Slot	1	≤ 1	82	RPM	8725	4362	3272	2617	2181	1636	1309	1047
						(66-99)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	168	251	307	307	293	302	265	209
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.5	≤ 1.5	94	RPM	10017	5009	3756	3005	2504	1878	1503	1202
						(76-113)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	192	288	353	353	337	346	305	240
			Slot	1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212	969
						(61-91)	Fz	0.005	0.014	0.023	0.029	0.034	0.046	0.051	0.050
							Feed (mm/min)	155	233	284	284	271	279	246	194
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.5	≤ 1.5	24	RPM	2585	1293	969	776	646	485	388	310
						(20-29)	Fz	0.005	0.010	0.017	0.021	0.024	0.033	0.037	0.038
							Feed (mm/min)	55	50	66	53	62	65	58	47
			Slot	1	≤ 1	20	RPM	2100	1050	788	630	525	394	315	252
						(16-24)	Fz	0.005	0.010	0.017	0.021	0.024	0.033	0.037	0.038
							Feed (mm/min)	40	40	54	54	50	52	47	38
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.5	≤ 1.5	19	RPM	2003	1002	751	601	501	376	301	240
						(15-23)	Fz	0.002	0.007	0.011	0.013	0.017	0.020	0.024	0.025
							Feed (mm/min)	19	29	32	32	34	31	29	24
			Slot	1	≤ 1	15	RPM	1583	792	594	475	396	297	238	190
						(12-18)	Fz	0.002	0.007	0.011	0.013	0.017	0.020	0.024	0.025
							Feed (mm/min)	15	23	25	25	27	24	23	19
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.5	≤ 1.5	66	RPM	6947	3474	2605	2084	1737	1303	1042	834
						(52-79)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	133	167	222	222	217	213	189	150
			Slot	1	≤ 1	52	RPM	5493	2747	2060	1648	1373	1030	824	659
						(41-62)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	105	132	176	176	171	169	149	119
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.5	≤ 1.5	23	RPM	2424	1212	909	727	606	454	364	291
						(18-27)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	47	58	78	78	76	74	66	52
			Slot	1	≤ 1	18	RPM	1939	969	727	582	485	364	291	233
						(15-22)	Fz	0.005	0.012	0.021	0.027	0.031	0.041	0.045	0.045
							Feed (mm/min)	37	47	62	62	60	60	53	42

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 4 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

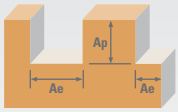


	Series ZH1CR Fractional	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/4	3/8	1/2	3/4	1
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.5	≤ 1.5	85	RPM	1299	866	649	433	325
						(68-102)	Fz	0.0007	0.0012	0.0017	0.0020	0.0023
							Feed (IPM)	3.6	4.2	4.4	3.5	3.0
			Slot	1	≤ 1	70	RPM	1070	713	535	357	267
						(56-84)	Fz	0.0007	0.0012	0.0017	0.0020	0.0023
							Feed (IPM)	3.0	3.4	3.6	2.9	2.5
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.5	≤ 1.5	70	RPM	1070	713	535	357	267
						(56-84)	Fz	0.0005	0.0009	0.0012	0.0014	0.0016
							Feed (IPM)	2.1	2.6	2.6	2.0	1.7
			Slot	1	≤ 1	55	RPM	840	560	420	280	210
						(44-66)	Fz	0.0005	0.0009	0.0012	0.0014	0.0016
							Feed (IPM)	1.7	2.0	2.0	1.6	1.3

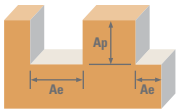
rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 4 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series ZH1MCR Metric	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	10	12	20	25
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.5	≤ 1.5	26	RPM	1373	824	687	412	330
						(21-31)	Fz	0.017	0.032	0.041	0.053	0.058
							Feed (mm/min)	93	105	113	87	76
			Slot	1	≤ 1	21	RPM	1131	679	565	339	271
						(17-26)	Fz	0.017	0.032	0.041	0.053	0.058
							Feed (mm/min)	77	87	93	72	63
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.5	≤ 1.5	21	RPM	1131	679	565	339	271
						(17-26)	Fz	0.012	0.024	0.029	0.037	0.040
							Feed (mm/min)	54	65	66	50	43
			Slot	1	≤ 1	17	RPM	889	533	444	267	213
						(13-20)	Fz	0.012	0.024	0.029	0.037	0.040
							Feed (mm/min)	43	51	52	39	34

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 4 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

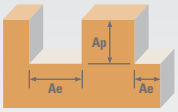
	Series ZD1CR Fractional	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	5/8	3/4
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375	Profile	≤ 0.4	≤ 1	405	RPM	12377	6188	4126	3094	2475	2063
						(324-486)	Fz	0.0005	0.0012	0.0023	0.0030	0.0039	0.0042
							Feed (IPM)	24.8	29.7	38.0	37.1	38.6	34.7
			Slot	1	≤ 0.4	320	RPM	9779	4890	3260	2445	1956	1630
						(256-384)	Fz	0.0005	0.0012	0.0023	0.0030	0.0039	0.0042
							Feed (IPM)	19.6	23.5	30.0	29.3	30.5	27.4
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	> 375 ≤ 475	Profile	≤ 0.4	≤ 1	210	RPM	6418	3209	2139	1604	1284	1070
						(168-252)	Fz	0.0004	0.0010	0.0019	0.0025	0.0032	0.0035
							Feed (IPM)	10.3	12.8	16.3	16.0	16.4	15.0
			Slot	1	≤ 0.4	170	RPM	5195	2598	1732	1299	1039	866
						(136-204)	Fz	0.0004	0.0010	0.0019	0.0025	0.0032	0.0035
							Feed (IPM)	8.3	10.4	13.2	13.0	13.3	12.1
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	> 475 ≤ 655	Profile	≤ 0.4	≤ 1	90	RPM	2750	1375	917	688	550	458
						(72-108)	Fz	0.0002	0.0005	0.0010	0.0013	0.0017	0.0018
							Feed (IPM)	2.2	2.8	3.7	3.6	3.7	3.3
			Slot	1	≤ 0.4	70	RPM	2139	1070	713	535	428	357
						(56-84)	Fz	0.0002	0.0005	0.0010	0.0013	0.0017	0.0018
							Feed (IPM)	1.7	2.1	2.9	2.8	2.9	2.6

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 4 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series ZD1MCR Metric	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	16	20
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375	Profile	≤ 0.4	≤ 1	123	RPM	13087	6544	4908	3926	3272	2454	1963
						(99-148)	Fz	0.012	0.029	0.049	0.061	0.072	0.083	0.112
							Feed (mm/min)	628	754	963	963	942	817	879
			Slot	1	≤ 0.4	98	RPM	10340	5170	3878	3102	2585	1939	1551
						(78-117)	Fz	0.012	0.029	0.049	0.061	0.072	0.083	0.112
							Feed (mm/min)	496	596	761	761	744	645	695
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	> 375 ≤ 475	Profile	≤ 0.4	≤ 1	64	RPM	6786	3393	2545	2036	1696	1272	1018
						(51-77)	Fz	0.010	0.024	0.041	0.051	0.060	0.068	0.093
							Feed (mm/min)	261	326	413	413	407	347	380
			Slot	1	≤ 0.4	52	RPM	5493	2747	2060	1648	1373	1030	824
						(41-62)	Fz	0.010	0.024	0.041	0.051	0.060	0.068	0.093
							Feed (mm/min)	211	264	334	334	330	281	308
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	> 475 ≤ 655	Profile	≤ 0.4	≤ 1	27	RPM	2908	1454	1091	872	727	545	436
						(22-33)	Fz	0.005	0.012	0.021	0.027	0.031	0.036	0.048
							Feed (mm/min)	56	70	93	93	91	79	84
			Slot	1	≤ 0.4	21	RPM	2262	1131	848	679	565	424	339
						(17-26)	Fz	0.005	0.012	0.021	0.027	0.031	0.036	0.048
							Feed (mm/min)	43	54	72	72	71	62	65

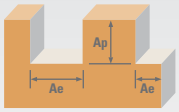
rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 4 x rpm
maximum Slotting Ap for Z1PLC / Z1PLB is .25 x D_1
maximum Profile Ae for Z1PLC / Z1PLB is .2 x D_1
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

SERIES 7 HIGH PERFORMANCE END MILLS



	Series 7, 7B Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	5/8	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275	Finish	≤ 0.02	≤ 2	480	RPM	14669	7334	4890	3667	2934	2445	1834
						(384-576)	Fz	0.0004	0.0010	0.0019	0.0025	0.0032	0.0033	0.0035
							Feed (IPM)	23.5	29.3	37.2	36.7	37.6	32.3	25.7
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375	Finish	≤ 0.02	≤ 2	275	RPM	8404	4202	2801	2101	1681	1401	1051
						(220-330)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (IPM)	10.1	11.8	15.7	15.1	15.5	13.4	10.9
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375	Finish	≤ 0.02	≤ 2	230	RPM	7029	3514	2343	1757	1406	1171	879
						(184-276)	Fz	0.0002	0.0006	0.0012	0.0016	0.0020	0.0021	0.0022
							Feed (IPM)	5.6	8.4	11.2	11.2	11.2	9.8	7.7
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220	Finish	≤ 0.02	≤ 2	605	RPM	18489	9244	6163	4622	3698	3081	2311
						(484-726)	Fz	0.0006	0.0015	0.0028	0.0037	0.0046	0.0047	0.0051
							Feed (IPM)	44.4	55.5	69.0	68.4	68.0	57.9	47.1
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	> 220 ≤ 260	Finish	≤ 0.02	≤ 2	465	RPM	14210	7105	4737	3553	2842	2368	1776
						(372-558)	Fz	0.0004	0.0011	0.0021	0.0028	0.0034	0.0036	0.0039
							Feed (IPM)	22.7	31.3	39.8	39.8	38.7	34.1	27.7
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275	Finish	≤ 0.02	≤ 2	420	RPM	12835	6418	4278	3209	2567	2139	1604
						(336-504)	Fz	0.0004	0.0010	0.0019	0.0025	0.0032	0.0033	0.0035
							Feed (IPM)	20.5	25.7	32.5	32.1	32.9	28.2	22.5
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Finish	≤ 0.02	≤ 2	290	RPM	8862	4431	2954	2216	1772	1477	1108
						(232-348)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (IPM)	10.6	12.4	16.5	16.0	16.3	14.2	11.5
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Finish	≤ 0.02	≤ 2	265	RPM	8098	4049	2699	2025	1620	1350	1012
						(212-318)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (IPM)	9.7	11.3	15.1	14.6	14.9	13.0	10.5
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Finish	≤ 0.02	≤ 2	80	RPM	2445	1222	815	611	489	407	306
						(64-96)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (IPM)	2.9	3.4	4.6	4.4	4.5	3.9	3.2
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Finish	≤ 0.02	≤ 2	65	RPM	1986	993	662	497	397	331	248
						(52-78)	Fz	0.0002	0.0006	0.0010	0.0014	0.0017	0.0018	0.0019
							Feed (IPM)	1.6	2.4	2.6	2.8	2.7	2.4	1.9
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Finish	≤ 0.02	≤ 2	300	RPM	9168	4584	3056	2292	1834	1528	1146
						(240-360)	Fz	0.0004	0.0011	0.0021	0.0028	0.0034	0.0036	0.0039
							Feed (IPM)	14.7	20.2	25.7	25.7	24.9	22.0	17.9
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Finish	≤ 0.02	≤ 2	105	RPM	3209	1604	1070	802	642	535	401
						(84-126)	Fz	0.0004	0.0011	0.0021	0.0028	0.0034	0.0036	0.0039
							Feed (IPM)	5.1	7.1	9.0	9.0	8.7	7.7	6.3

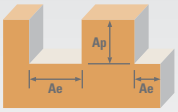
rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 4 x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



	Series 7M, 7MB Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	16	20	25
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275	Finish	≤ 0.02	≤ 2	146	RPM	15511	7755	5816	4653	3878	2908	2327	1861
						(117-176)	Fz	0.0166	0.043	0.075	0.093	0.110	0.125	0.147	0.160
							Feed (mm/min)	1030	1334	1745	1731	1706	1454	1368	1191
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375	Finish	≤ 0.02	≤ 2	84	RPM	8886	4443	3332	2666	2222	1666	1333	1066
						(67-101)	Fz	0.0122	0.034	0.051	0.069	0.082	0.091	0.109	0.120
							Feed (mm/min)	434	604	680	736	729	606	581	512
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375	Finish	≤ 0.02	≤ 2	70	RPM	7432	3716	2787	2230	1858	1394	1115	892
						(56-84)	Fz	0.0070	0.019	0.040	0.043	0.048	0.057	0.064	0.070
							Feed (mm/min)	208	282	446	384	357	318	285	250
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220	Finish	≤ 0.02	≤ 2	184	RPM	19550	9775	7331	5865	4887	3666	2932	2346
						(148-221)	Fz	0.0132	0.036	0.052	0.075	0.089	0.099	0.117	0.130
							Feed (mm/min)	10322	1408	1525	1759	1740	1452	1372	1220
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	> 220 ≤ 260	Finish	≤ 0.02	≤ 2	142	RPM	15026	7513	5635	4508	3756	2817	2254	1803
						(113-170)	Fz	0.0132	0.036	0.052	0.075	0.089	0.099	0.117	0.130
							Feed (mm/min)	793	1082	1172	1352	1337	1116	1055	938
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275	Finish	≤ 0.02	≤ 2	128	RPM	13572	6786	5089	4072	3393	2545	2036	1629
						(102-154)	Fz	0.0086	0.024	0.040	0.048	0.058	0.065	0.077	0.087
							Feed (mm/min)	467	651	814	782	787	662	627	567
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Finish	≤ 0.02	≤ 2	88	RPM	9371	4686	3514	2811	2343	1757	1406	1125
						(71-106)	Fz	0.0082	0.022	0.037	0.045	0.048	0.060	0.072	0.078
							Feed (mm/min)	307	412	520	506	450	422	405	351
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Finish	≤ 0.02	≤ 2	81	RPM	8563	4282	3211	2569	2141	1606	1284	1028
						(65-97)	Fz	0.0070	0.019	0.029	0.040	0.048	0.055	0.064	0.070
							Feed (mm/min)	240	325	372	411	411	353	329	288
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Finish	≤ 0.02	≤ 2	24	RPM	2585	1293	969	776	646	485	388	310
						(20-29)	Fz	0.0072	0.019	0.029	0.037	0.046	0.053	0.061	0.085
							Feed (mm/min)	74	98	112	90	119	103	95	105
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Finish	≤ 0.02	≤ 2	20	RPM	2100	1050	788	630	525	394	315	252
						(16-24)	Fz	0.0075	0.016	0.021	0.030	0.038	0.044	0.051	0.070
							Feed (mm/min)	63	67	66	76	80	69	64	71
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Finish	≤ 0.02	≤ 2	91	RPM	9694	4847	3635	2908	2424	1818	1454	1163
						(73-110)	Fz	0.0091	0.024	0.004	0.005	0.060	0.070	0.080	0.088
							Feed (mm/min)	353	465	51	59	582	509	465	409
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Finish	≤ 0.02	≤ 2	32	RPM	3393	1696	1272	1018	848	636	509	407
						(26-38)	Fz	0.0082	0.019	0.029	0.037	0.046	0.053	0.061	0.085
							Feed (mm/min)	111	129	148	151	156	135	124	138

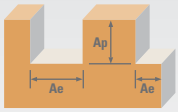
rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 4 x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

CARB Five Flute End Mills

	Series 55, 55CR Fractional	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	5/8	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275	Profile	≤ 0.25	≤ 1.5	385	RPM	11766	5883	3922	2941	2353	1961	1471
						(308-462)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0028	0.0032
							Feed (IPM)	20.6	26.5	33.3	33.8	34.1	27.5	23.5
			HSM	≤ 0.05	≤ 2	630	RPM	19253	9626	6418	4813	3851	3209	2407
						(504-756)	Fz	0.0007	0.0018	0.0034	0.0046	0.0057	0.0055	0.0064
							Feed (IPM)	67.4	86.6	109.1	110.7	109.7	88.2	77.0
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375	Profile	≤ 0.25	≤ 1.5	325	RPM	9932	4966	3311	2483	1986	1655	1242
						(260-390)	Fz	0.0003	0.0007	0.0013	0.0017	0.0022	0.0021	0.0024
							Feed (IPM)	12.9	17.4	21.5	21.1	21.9	17.4	14.9
			HSM	≤ 0.05	≤ 2	530	RPM	16197	8098	5399	4049	3239	2699	2025
						(424-636)	Fz	0.0005	0.0014	0.0026	0.0034	0.0043	0.0041	0.0048
							Feed (IPM)	42.1	56.7	70.2	68.8	69.6	55.3	48.6
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375	Profile	≤ 0.25	≤ 1.5	175	RPM	5348	2674	1783	1337	1070	891	669
						(140-210)	Fz	0.0002	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	5.3	6.7	8.9	8.7	8.6	7.6	6.0
			HSM	≤ 0.05	≤ 2	290	RPM	8862	4431	2954	2216	1772	1477	1108
						(232-348)	Fz	0.0004	0.0010	0.0019	0.0025	0.0032	0.0033	0.0035
							Feed (IPM)	17.7	22.2	28.1	27.7	28.4	24.4	19.4
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220	Profile	≤ 0.25	≤ 1.5	470	RPM	14363	7182	4788	3591	2873	2394	1795
						(376-564)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (IPM)	25.1	32.3	40.7	41.3	41.7	35.9	28.7
			HSM	≤ 0.05	≤ 2	705	RPM	21545	10772	7182	5386	4309	3591	2693
						(564-846)	Fz	0.0007	0.0018	0.0034	0.0046	0.0057	0.0059	0.0064
							Feed (IPM)	75.4	97.0	122.1	123.9	122.8	105.9	86.2
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	> 220 ≤ 260	Profile	≤ 0.25	≤ 1.5	360	RPM	11002	5501	3667	2750	2200	1834	1375
						(288-432)	Fz	0.0003	0.0007	0.0013	0.0017	0.0022	0.0023	0.0024
							Feed (IPM)	14.3	19.3	23.8	23.4	24.2	21.1	16.5
			HSM	≤ 0.05	≤ 2	540	RPM	16502	8251	5501	4126	3300	2750	2063
						(432-648)	Fz	0.0005	0.0014	0.0026	0.0034	0.0043	0.0044	0.0048
							Feed (IPM)	42.9	57.8	71.5	70.1	71.0	60.5	49.5
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275	Profile	≤ 0.25	≤ 1.5	370	RPM	11307	5654	3769	2827	2261	1885	1413
						(296-444)	Fz	0.0003	0.0007	0.0013	0.0017	0.0022	0.0023	0.0024
							Feed (IPM)	14.7	19.8	24.5	24.0	24.9	21.7	17.0
			HSM	≤ 0.05	≤ 2	560	RPM	17114	8557	5705	4278	3423	2852	2139
						(448-672)	Fz	0.0005	0.0014	0.0026	0.0034	0.0043	0.0044	0.0048
							Feed (IPM)	44.5	59.9	74.2	72.7	73.6	62.7	51.3

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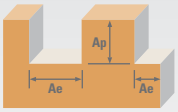
CARB Five Flute End Mills



	Series 55, 55CR Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	5/8	3/4	1
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.25	≤ 1.5	255	RPM	7793	3896	2598	1948	1559	1299	974
						(204-306)	Fz	0.0002	0.0006	0.0012	0.0016	0.0020	0.0021	0.0023
							Feed (IPM)	9.4	11.7	15.6	15.6	15.6	13.6	11.2
			HSM	≤ 0.05	≤ 2	385	RPM	11766	5883	3922	2941	2353	1961	1471
						(308-462)	Fz	0.0005	0.0013	0.0024	0.0032	0.0040	0.0041	0.0045
							Feed (IPM)	28.2	38.2	47.1	47.1	47.1	40.2	33.1
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.25	≤ 1.5	235	RPM	7182	3591	2394	1795	1436	1197	898
						(188-282)	Fz	0.0002	0.0006	0.0010	0.0014	0.0017	0.0018	0.0019
							Feed (IPM)	7.5	10.8	12.0	12.6	12.2	10.8	8.5
			HSM	≤ 0.05	≤ 2	355	RPM	10849	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0004	0.0011	0.0021	0.0028	0.0034	0.0036	0.0039
							Feed (IPM)	22.2	29.8	38.0	38.0	36.9	32.5	26.4
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.25	≤ 1.5	70	RPM	2139	1070	713	535	428	357	267
						(56-84)	Fz	0.0002	0.0006	0.0010	0.0014	0.0017	0.0018	0.0019
							Feed (IPM)	2.2	3.2	3.6	3.7	3.6	3.2	2.5
			HSM	≤ 0.05	≤ 2	107	RPM	3270	1635	1090	817	654	545	409
						(86-128)	Fz	0.0004	0.0011	0.0021	0.0028	0.0034	0.0036	0.0039
							Feed (IPM)	6.7	9.0	11.4	11.4	11.1	9.8	8.0
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.25	≤ 1.5	55	RPM	1681	840	560	420	336	280	210
						(44-66)	Fz	0.0002	0.0004	0.0008	0.0010	0.0013	0.0014	0.0015
							Feed (IPM)	1.3	1.7	2.2	2.1	2.2	2.0	1.6
			HSM	≤ 0.05	≤ 2	85	RPM	2598	1299	866	649	520	433	325
						(68-102)	Fz	0.0003	0.0008	0.0015	0.0021	0.0026	0.0027	0.0029
							Feed (IPM)	4.0	5.2	6.5	6.8	6.8	5.8	4.7
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.25	≤ 1.5	235	RPM	7182	3591	2394	1795	1436	1197	898
						(188-282)	Fz	0.0002	0.0006	0.0012	0.0016	0.0020	0.0021	0.0023
							Feed (IPM)	7.2	10.8	14.4	14.4	14.4	12.6	10.3
			HSM	≤ 0.05	≤ 2	390	RPM	11918	5959	3973	2980	2384	1986	1490
						(312-468)	Fz	0.0005	0.0013	0.0024	0.0032	0.0040	0.0041	0.0045
							Feed (IPM)	29.8	38.7	47.7	47.7	47.7	40.7	33.5
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.25	≤ 1.5	85	RPM	2598	1299	866	649	520	433	325
						(68-102)	Fz	0.0002	0.0006	0.0012	0.0016	0.0020	0.0021	0.0023
							Feed (IPM)	2.6	3.9	5.2	5.2	5.2	4.5	3.7
			HSM	≤ 0.05	≤ 2	140	RPM	4278	2139	1426	1070	856	713	535
						(112-168)	Fz	0.0005	0.0013	0.0024	0.0032	0.0040	0.0042	0.0045
							Feed (IPM)	10.7	13.9	17.1	17.1	17.1	15.0	12.0

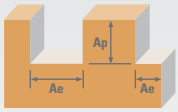
rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 5 x rpm
HSM (high speed machining)
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
reduce Ap to 1 x D_1 (maximum) when profile milling with long or extra long flute length tools
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

CARB Five Flute End Mills

	Series 55M Metric	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	8	10	12	16	20
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275	Profile	≤ 0.25	≤ 1.5	117	RPM	6220	4665	3732	3110	2333	1866
						(94-141)	Fz	0.022	0.036	0.061	0.070	0.072	0.085
							Feed (mm/min)	672	846	1145	1082	836	796
			HSM	≤ 0.05	≤ 2	192	RPM	10179	7634	6107	5089	3817	3054
						(154-230)	Fz	0.043	0.073	0.123	0.137	0.141	0.154
							Feed (mm/min)	2198	2769	3746	3481	2687	2345
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375	Profile	≤ 0.25	≤ 1.5	99	RPM	5251	3938	3151	2626	1969	1575
						(79-119)	Fz	0.017	0.028	0.045	0.053	0.054	0.064
							Feed (mm/min)	441	546	571	693	529	504
			HSM	≤ 0.05	≤ 2	162	RPM	8563	6422	5138	4282	3211	2569
						(129-194)	Fz	0.034	0.055	0.091	0.103	0.105	0.128
							Feed (mm/min)	1438	1781	2329	2209	1685	1644
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375	Profile	≤ 0.25	≤ 1.5	53	RPM	2827	2121	1696	1414	1060	848
						(43-64)	Fz	0.012	0.021	0.035	0.038	0.044	0.048
							Feed (mm/min)	170	226	294	271	231	204
			HSM	≤ 0.05	≤ 2	88	RPM	4686	3514	2811	2343	1757	1406
						(71-106)	Fz	0.024	0.041	0.067	0.077	0.084	0.093
							Feed (mm/min)	562	712	937	900	742	656
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220	Profile	≤ 0.25	≤ 1.5	143	RPM	7594	5695	4556	3797	2848	2278
						(115-172)	Fz	0.022	0.036	0.061	0.070	0.077	0.085
							Feed (mm/min)	820	1033	1397	1321	1093	972
			HSM	≤ 0.05	≤ 2	215	RPM	11391	8543	6834	5695	4271	3417
						(172-258)	Fz	0.043	0.073	0.123	0.137	0.151	0.171
							Feed (mm/min)	2460	3099	4192	3895	3226	2916
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	> 220 ≤ 260	Profile	≤ 0.25	≤ 1.5	110	RPM	5816	4362	3490	2908	2181	1745
						(88-132)	Fz	0.017	0.028	0.045	0.053	0.059	0.064
							Feed (mm/min)	489	605	791	768	642	558
			HSM	≤ 0.05	≤ 2	165	RPM	8725	6544	5235	4362	3272	2617
						(132-198)	Fz	0.034	0.055	0.091	0.103	0.113	0.128
							Feed (mm/min)	1466	1815	2373	2251	1843	1675
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275	Profile	≤ 0.25	≤ 1.5	113	RPM	5978	4484	3587	2989	2242	1793
						(90-135)	Fz	0.017	0.028	0.045	0.053	0.059	0.064
							Feed (mm/min)	502	622	813	789	660	574
			HSM	≤ 0.05	≤ 2	171	RPM	9048	6786	5429	4524	3393	2714
						(137-205)	Fz	0.034	0.055	0.091	0.103	0.113	0.128
							Feed (mm/min)	1520	1882	2461	2334	1911	1737

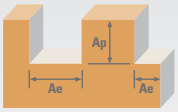
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CARB Five Flute End Mills

	Series 55M Metric	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	8	10	12	16	20
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.25	≤ 1.5	78	RPM	4120	3090	2472	2060	1545	1236
						(62-93)	Fz	0.014	0.026	0.043	0.048	0.054	0.061
							Feed (mm/min)	297	396	527	494	415	379
			HSM	≤ 0.05	≤ 2	117	RPM	6220	4665	3732	3110	2333	1866
						(94-141)	Fz	0.031	0.051	0.085	0.096	0.105	0.120
							Feed (mm/min)	970	1194	1592	1493	1224	1120
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.25	≤ 1.5	72	RPM	3797	2848	2278	1898	1424	1139
						(57-86)	Fz	0.014	0.021	0.037	0.041	0.046	0.051
							Feed (mm/min)	273	13260	425	387	328	289
			HSM	≤ 0.05	≤ 2	108	RPM	5736	4302	3441	2868	2151	1721
						(87-130)	Fz	0.026	0.045	0.075	0.082	0.092	0.104
							Feed (mm/min)	757	14850	1285	1170	991	895
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.25	≤ 1.5	21	RPM	1131	848	679	565	424	339
						(17-26)	Fz	0.014	0.021	0.037	0.041	0.046	0.051
							Feed (mm/min)	81	16530	196792	115	98	86
			HSM	≤ 0.05	≤ 2	33	RPM	1729	1297	1037	864	648	519
						(26-39)	Fz	0.026	0.045	0.075	0.082	0.092	0.104
							Feed (mm/min)	228	290	387	353	299	270
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.25	≤ 1.5	17	RPM	889	666	533	444	333	267
						(13-20)	Fz	0.010	0.017	0.027	0.031	0.036	0.040
							Feed (mm/min)	43	57	71	69	60	53
			HSM	≤ 0.05	≤ 2	26	RPM	1373	1030	824	687	515	412
						(21-31)	Fz	0.019	0.032	0.056	0.062	0.069	0.077
							Feed (mm/min)	132	165	231	214	178	159
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.25	≤ 1.5	72	RPM	3797	2848	2278	1898	1424	1139
						(57-86)	Fz	0.014	0.026	0.043	0.048	0.054	0.061
							Feed (mm/min)	273	365	486	456	383	349
			HSM	≤ 0.05	≤ 2	119	RPM	6301	4726	3781	3151	2363	1890
						(95-143)	Fz	0.031	0.051	0.085	0.096	0.105	0.120
							Feed (mm/min)	983	1210	1613	1512	1240	1134
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.25	≤ 1.5	26	RPM	1373	1030	824	687	515	412
						(21-31)	Fz	0.014	0.026	0.043	0.048	0.054	0.061
							Feed (mm/min)	99	132	176	165	138	126
			HSM	≤ 0.05	≤ 2	43	RPM	2262	1696	1357	1131	848	679
						(34-51)	Fz	0.031	0.051	0.085	0.096	0.108	0.120
							Feed (mm/min)	353	434	579	543	456	407

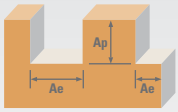
rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 5 x rpm
HSM (high speed machining)
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
reduce Ap to 1 x D_1 (maximum) when profile milling with long or extra long flute length tools
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

CARB Six Flute End Mills

	Series 51, 51CR Fractional	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/4	3/8	1/2	5/8	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275	Profile	≤ 0.1	≤ 1	720	RPM	11002	7334	5501	4401	3667	2750
						(576-864)	Fz	0.0020	0.0035	0.0050	0.0055	0.0061	0.0071
							Feed (IPM)	132	154	165	145	134	117
			HSM	≤ 0.05	≤ 2	915	RPM	13981	9321	6991	5592	4660	3495
						(732-1098)	Fz	0.0028	0.0053	0.0070	0.0077	0.0085	.0100
							Feed (IPM)	235	296	294	258	238	21
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375	Profile	≤ 0.1	≤ 1	490	RPM	7487	4991	3744	2995	2496	1872
						(392-588)	Fz	0.0015	0.0029	0.0038	0.0042	0.0046	0.0054
							Feed (IPM)	67	87	85	75	69	61
			HSM	≤ 0.05	≤ 2	620	RPM	9474	6316	4737	3789	3158	2368
						(496-744)	Fz	0.0021	0.0039	0.0052	0.0057	0.0062	0.0073
							Feed (IPM)	119	148	148	130	117	104
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375	Profile	≤ 0.1	≤ 1	240	RPM	3667	2445	1834	1467	1222	917
						(192-288)	Fz	0.0012	0.0023	0.0030	0.0034	0.0037	0.0043
							Feed (IPM)	26	34	33	30	27	24
			HSM	≤ 0.05	≤ 2	305	RPM	4660	3107	2330	1864	1553	1165
						(244-366)	Fz	0.0017	0.0032	0.0042	0.0046	0.0050	0.0059
							Feed (IPM)	48	60	59	51	47	41
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275	Profile	≤ 0.1	≤ 1	510	RPM	7793	5195	3896	3117	2598	1948
						(459-561)	Fz	0.0015	0.0028	0.0038	0.0041	0.0045	0.0053
							Feed (IPM)	70	87	89	77	70	62
			HSM	≤ 0.05	≤ 2	650	RPM	9932	6621	4966	3973	3311	2483
						(585-715)	Fz	0.0021	0.0038	0.0051	0.0056	0.0061	0.0072
							Feed (IPM)	125	151	152	133	121	107
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.1	≤ 1	350	RPM	5348	3565	2674	2139	1783	1337
						(315-385)	Fz	0.0012	0.0023	0.0030	0.0033	0.0036	0.0042
							Feed (IPM)	39	49	48	42	39	34
			HSM	≤ 0.05	≤ 2	450	RPM	6876	4584	3438	2750	2292	1719
						(405-495)	Fz	0.0017	0.0032	0.0042	0.0046	0.0050	0.0059
							Feed (IPM)	70	88	87	76	69	61
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.1	≤ 1	325	RPM	4966	3311	2483	1986	1655	1242
						(293-358)	Fz	0.0012	0.0023	0.0030	0.0033	0.0036	0.0042
							Feed (IPM)	36	46	45	39	36	31
			HSM	≤ 0.05	≤ 2	410	RPM	6265	4177	3132	2506	2088	1566
						(369-451)	Fz	0.0017	0.0032	0.0042	0.0046	0.0050	0.0059
							Feed (IPM)	64	80	79	69	63	55

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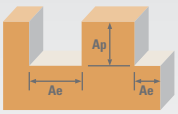
CARB Six Flute End Mills



	Series 51, 51CR Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/4	3/8	1/2	5/8	3/4	1
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.1	≤ 1	105	RPM	1604	1070	802	642	535	401
						(84-126)	Fz	0.0014	0.0027	0.0036	0.0039	0.0043	0.0050
							Feed (IPM)	13	17	17	15	14	12
			HSM	≤ 0.05	≤ 2	130	RPM	1986	1324	993	795	662	497
						(104-156)	Fz	0.0016	0.0036	0.0048	0.0053	0.0058	0.0067
							Feed (IPM)	19	29	29	25	23	20
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.1	≤ 1	80	RPM	1222	815	611	489	407	306
						(64-96)	Fz	0.0010	0.0018	0.0025	0.0027	0.0029	0.0034
							Feed (IPM)	7	9	9	8	7	6
			HSM	≤ 0.05	≤ 2	100	RPM	1528	1019	764	611	509	382
						(80-120)	Fz	0.0013	0.0025	0.0034	0.0037	0.0041	0.0047
							Feed (IPM)	12	15	16	14	13	11
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.1	≤ 1	280	RPM	4278	2852	2139	1711	1426	1070
						(224-336)	Fz	0.0010	0.0018	0.0025	0.0027	0.0029	0.0034
							Feed (IPM)	26	31	32	28	25	22
			HSM	≤ 0.05	≤ 2	355	RPM	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0013	0.0025	0.0034	0.0037	0.0041	0.0047
							Feed (IPM)	42	54	55	48	44	38
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.1	≤ 1	155	RPM	2368	1579	1184	947	789	592
						(124-186)	Fz	0.0010	0.0018	0.0025	0.0027	0.0029	0.0034
							Feed (IPM)	14	17	18	15	14	12
			HSM	≤ 0.05	≤ 2	200	RPM	3056	2037	1528	1222	1019	764
						(160-240)	Fz	0.0013	0.0025	0.0034	0.0037	0.0041	0.0047
							Feed (IPM)	24	31	31	27	25	22

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 6 x rpm
HSM (high speed machining)
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

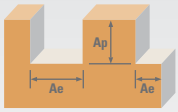
CARB Six Flute End Mills



	Series 51M, 51MCR Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	8	10	12	16	20
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275	Profile	≤ 0.1	≤ 1	219	RPM	11633	8725	6980	5816	4362	3490
						(176-263)	Fz	0.048	0.081	0.101	0.121	0.142	0.158
							Feed (mm/min)	3350	4240	4230	4223	3717	3308
			HSM	≤ 0.05	≤ 2	279	RPM	14784	11088	8870	7392	5544	4435
						(223-335)	Fz	0.066	0.113	0.141	0.169	0.197	0.220
							Feed (mm/min)	5854	7517	7504	7495	6553	5854
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375	Profile	≤ 0.1	≤ 1	149	RPM	7917	5938	4750	3958	2969	2375
						(119-179)	Fz	0.036	0.061	0.077	0.092	0.107	0.119
							Feed (mm/min)	1710	2173	2195	2185	1906	1696
			HSM	≤ 0.05	≤ 2	189	RPM	10017	7513	6010	5009	3756	3005
						(151-227)	Fz	0.049	0.083	0.104	0.125	0.146	0.163
							Feed (mm/min)	2945	3741	3750	3756	3291	2939
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375	Profile	≤ 0.1	≤ 1	73	RPM	3878	2908	2327	1939	1454	1163
						(59-88)	Fz	0.029	0.049	0.061	0.073	0.086	0.096
							Feed (mm/min)	675	855	852	849	750	670
			HSM	≤ 0.05	≤ 2	93	RPM	4928	3696	2957	2464	1848	1478
						(74-112)	Fz	0.040	0.069	0.086	0.103	0.120	0.134
							Feed (mm/min)	1183	1530	1526	1523	1331	1189
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275	Profile	≤ 0.1	≤ 1	155	RPM	8240	6180	4944	4120	3090	2472
						(140-171)	Fz	0.035	0.060	0.075	0.090	0.105	0.117
							Feed (mm/min)	1730	2225	2225	2225	1947	1735
			HSM	≤ 0.05	≤ 2	198	RPM	10502	7877	6301	5251	3938	3151
						(178-218)	Fz	0.048	0.082	0.102	0.122	0.143	0.159
							Feed (mm/min)	3025	3875	3856	3844	3379	3006
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.1	≤ 1	107	RPM	5655	4241	3393	2827	2121	1696
						(96-117)	Fz	0.029	0.049	0.061	0.073	0.086	0.096
							Feed (mm/min)	984	1247	1242	1238	1094	977
			HSM	≤ 0.05	≤ 2	137	RPM	7271	5453	4362	3635	2726	2181
						(123-151)	Fz	0.040	0.069	0.086	0.103	0.120	0.134
							Feed (mm/min)	1745	2258	2251	2247	1963	1754
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.1	≤ 1	99	RPM	5251	3938	3151	2626	1969	1575
						(89-109)	Fz	0.029	0.049	0.061	0.073	0.086	0.096
							Feed (mm/min)	914	1158	1153	1150	1016	907
			HSM	≤ 0.05	≤ 2	125	RPM	6624	4968	3975	3312	2484	1987
						(112-137)	Fz	0.040	0.069	0.086	0.103	0.120	0.134
							Feed (mm/min)	1590	2057	2051	2047	1789	1598

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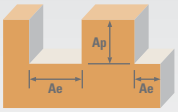
CARB Six Flute End Mills



	Series 51M, 51MCR Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	8	10	12	16	20
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.1	≤ 1	32	RPM	1696	1272	1018	848	636	509
						(26-38)	Fz	0.034	0.057	0.071	0.085	0.100	0.110
							Feed (mm/min)	346	435	434	433	382	336
			HSM	≤ 0.05	≤ 2	40	RPM	2100	1575	1260	1050	788	630
						(32-48)	Fz	0.046	0.077	0.097	0.120	0.140	0.150
							Feed (mm/min)	580	728	733	756	662	567
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.1	≤ 1	24	RPM	1293	969	776	646	485	388
						(20-29)	Fz	0.023	0.039	0.049	0.059	0.068	0.077
							Feed (mm/min)	178	227	228	229	198	179
			HSM	≤ 0.05	≤ 2	30	RPM	1616	1212	969	808	606	485
						(24-37)	Fz	0.032	0.054	0.068	0.081	0.095	0.110
							Feed (mm/min)	310	393	396	393	345	320
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.1	≤ 1	85	RPM	4524	3393	2714	2262	1696	1357
						(68-102)	Fz	0.023	0.039	0.049	0.059	0.068	0.077
							Feed (mm/min)	624	794	798	801	692	627
			HSM	≤ 0.05	≤ 2	108	RPM	5736	4302	3441	2868	2151	1721
						(87-130)	Fz	0.032	0.054	0.068	0.081	0.095	0.110
							Feed (mm/min)	1101	1394	1404	1394	1226	1136
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.1	≤ 1	47	RPM	2504	1878	1503	1252	939	751
						(38-57)	Fz	0.023	0.039	0.049	0.059	0.068	0.077
							Feed (mm/min)	346	440	442	443	383	347
			HSM	≤ 0.05	≤ 2	61	RPM	3231	2424	1939	1616	1212	969
						(49-73)	Fz	0.032	0.054	0.068	0.081	0.095	0.110
							Feed (mm/min)	620	785	791	785	691	640

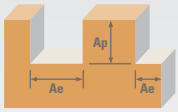
rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 6 x rpm
HSM (high speed machining)
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

MULTI Carb
HIGH PERFORMANCE FINISHING END MILLS



	Series 66, 66CR Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 3/16	1/4	3/8	1/2	5/8	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275	Profile	≤ 0.05	≤ 1	635	RPM	12937	9703	6469	4851	3881	3234	2426
						(508-762)	Fz	0.0008	0.0012	0.0022	0.0030	0.0037	0.0038	0.0042
							Feed (IPM)	72.4	81.5	99.6	131.0	129.2	135.2	112.1
			Finish	≤ 0.02	≤ 2	762	RPM	15524	11643	7762	5822	4657	3881	2911
						(610-914)	Fz	0.0006	0.0010	0.0018	0.0024	0.0030	0.0030	0.0034
							Feed (IPM)	69.5	78.2	95.6	125.7	124.1	129.8	107.6
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375	Profile	≤ 0.05	≤ 1	360	RPM	7334	5501	3667	2750	2200	1834	1375
						(288-432)	Fz	0.0006	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (IPM)	30.8	34.7	43.6	56.9	57.4	60.5	48.4
			Finish	≤ 0.02	≤ 2	432	RPM	8801	6601	4401	3300	2640	2200	1650
						(346-518)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (IPM)	29.6	33.3	41.9	54.7	55.1	58.1	46.5
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375	Profile	≤ 0.05	≤ 1	290	RPM	5908	4431	2954	2216	1772	1477	1108
						(232-348)	Fz	0.0004	0.0006	0.0012	0.0016	0.0020	0.0021	0.0022
							Feed (IPM)	16.5	18.6	24.8	31.9	31.9	34.1	26.8
			Finish	≤ 0.02	≤ 2	348	RPM	7090	5317	3545	2659	2127	1772	1329
						(278-418)	Fz	0.0003	0.0005	0.0010	0.0013	0.0016	0.0017	0.0018
							Feed (IPM)	15.9	17.9	23.8	30.6	30.6	32.8	25.7
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220	Profile	≤ 0.05	≤ 1	705	RPM	14363	10772	7182	5386	4309	3591	2693
						(564-846)	Fz	0.0008	0.0012	0.0022	0.0030	0.0037	0.0038	0.0042
							Feed (IPM)	80.4	90.5	110.6	145.4	143.5	150.1	124.4
			Finish	≤ 0.02	≤ 2	846	RPM	17236	12927	8618	6463	5171	4309	3232
						(677-1015)	Fz	0.0006	0.0010	0.0018	0.0024	0.0030	0.0030	0.0034
							Feed (IPM)	77.2	86.9	106.2	139.6	137.7	144.1	119.4
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	> 220 ≤ 260	Profile	≤ 0.05	≤ 1	540	RPM	11002	8251	5501	4126	3300	2750	2063
						(432-648)	Fz	0.0006	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (IPM)	46.2	52.0	65.5	85.4	86.1	90.8	72.6
			Finish	≤ 0.02	≤ 2	648	RPM	13202	9901	6601	4951	3961	3300	2475
						(518-778)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (IPM)	44.4	49.9	62.8	82.0	82.7	87.1	69.7
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275	Profile	≤ 0.05	≤ 1	560	RPM	11409	8557	5705	4278	3423	2852	2139
						(448-672)	Fz	0.0006	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (IPM)	47.9	53.9	67.9	88.6	89.3	94.1	75.3
			Finish	≤ 0.02	≤ 2	448	RPM	9127	6845	4564	3423	2738	2282	1711
						(358-538)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (IPM)	30.7	34.5	43.4	56.7	57.2	60.2	48.2

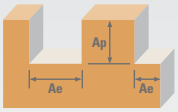
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	Series 66, 66CR Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 3/16	1/4	3/8	1/2	5/8	3/4	1
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.05	≤ 1	385	RPM	7844	5883	3922	2941	2353	1961	1471
						(308-462)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (IPM)	27.5	28.8	38.4	47.7	48.7	51.8	42.1
			Finish	≤ 0.02	≤ 2	462	RPM	9412	7059	4706	3530	2824	2353	1765
						(370-554)	Fz	0.0004	0.0006	0.0011	0.0014	0.0018	0.0019	0.0021
							Feed (IPM)	26.4	27.7	36.9	45.7	46.8	49.7	40.4
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.05	≤ 1	355	RPM	7233	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (IPM)	25.3	26.6	35.4	43.9	44.9	47.7	38.8
			Finish	≤ 0.02	≤ 2	426	RPM	8679	6509	4340	3255	2604	2170	1627
						(341-511)	Fz	0.0004	0.0006	0.0011	0.0014	0.0018	0.0019	0.0021
							Feed (IPM)	24.3	25.5	34.0	42.2	43.1	45.8	37.2
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.05	≤ 1	105	RPM	2139	1604	1070	802	642	535	401
						(84-126)	Fz	0.0005	0.0007	0.0014	0.0018	0.0023	0.0024	0.0026
							Feed (IPM)	7.5	7.9	10.5	13.0	13.3	14.1	11.5
			Finish	≤ 0.02	≤ 2	126	RPM	2567	1925	1284	963	770	642	481
						(101-151)	Fz	0.0004	0.0006	0.0011	0.0014	0.0018	0.0019	0.0021
							Feed (IPM)	7.2	7.5	10.1	12.5	12.8	13.6	11.0
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.05	≤ 1	85	RPM	1732	1299	866	649	520	433	325
						(68-102)	Fz	0.0003	0.0005	0.0009	0.0011	0.0014	0.0015	0.0016
							Feed (IPM)	3.6	4.5	5.5	6.4	6.5	7.1	5.7
			Finish	≤ 0.02	≤ 2	102	RPM	2078	1559	1039	779	623	520	390
						(82-122)	Fz	0.0002	0.0004	0.0007	0.0009	0.0011	0.0012	0.0013
							Feed (IPM)	3.5	4.4	5.2	6.2	6.3	6.9	5.5
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.05	≤ 1	390	RPM	7946	5959	3973	2980	2384	1986	1490
						(312-468)	Fz	0.0005	0.0008	0.0015	0.0021	0.0026	0.0027	0.0029
							Feed (IPM)	27.8	33.4	41.7	56.3	55.8	59.0	47.5
			Finish	≤ 0.02	≤ 2	468	RPM	9535	7151	4767	3576	2860	2384	1788
						(374-562)	Fz	0.0004	0.0006	0.0012	0.0017	0.0021	0.0022	0.0023
							Feed (IPM)	26.7	32.0	40.0	54.1	53.5	56.6	45.6
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.05	≤ 1	140	RPM	2852	2139	1426	1070	856	713	535
						(112-168)	Fz	0.0005	0.0008	0.0015	0.0021	0.0026	0.0027	0.0029
							Feed (IPM)	10.0	12.0	15.0	20.2	20.0	21.2	17.1
			Finish	≤ 0.02	≤ 2	168	RPM	3423	2567	1711	1284	1027	856	642
						(134-202)	Fz	0.0004	0.0006	0.0012	0.0017	0.0021	0.0022	0.0023
							Feed (IPM)	9.6	11.5	14.4	19.4	19.2	20.3	16.4

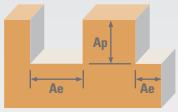
rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x number of flutes x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

MULTI Carb
HIGH PERFORMANCE FINISHING END MILLS



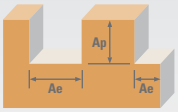
	Series 66M, 66MCR Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	8	10	12	16	20	25
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 275	Profile	≤ 0.05	≤ 1	194	RPM	10260	7695	6156	5130	3847	3078	2462
						(155-232)	Fz	0.029	0.047	0.059	0.072	0.095	0.101	0.105
							Feed (mm/min)	2068	2528	2528	3324	3280	3431	2844
			Finish	≤ 0.02	≤ 2	232	RPM	12312	9234	7387	6156	4617	3693	2955
						(186-279)	Fz	0.023	0.038	0.047	0.058	0.076	0.081	0.084
							Feed (mm/min)	1985	2427	2427	3191	3149	3294	2730
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 375	Profile	≤ 0.05	≤ 1	110	RPM	5816	4362	3490	2908	2181	1745	1396
						(88-132)	Fz	0.022	0.036	0.045	0.055	0.074	0.080	0.080
							Feed (mm/min)	879	1108	1107	1445	1457	1536	1229
			Finish	≤ 0.02	≤ 2	132	RPM	6980	5235	4188	3490	2617	2094	1675
						(105-158)	Fz	0.017	0.029	0.036	0.044	0.059	0.064	0.064
							Feed (mm/min)	844	1063	1063	1387	1399	1474	1179
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 375	Profile	≤ 0.05	≤ 1	88	RPM	4686	3514	2811	2343	1757	1406	1125
						(71-106)	Fz	0.014	0.026	0.032	0.038	0.051	0.056	0.055
							Feed (mm/min)	472	630	630	810	810	866	680
			Finish	≤ 0.02	≤ 2	106	RPM	5622.615 12	4217	3374	2811	2108	1687	1349
						(85-127)	Fz	0.012	0.020	0.026	0.031	0.041	0.045	0.044
							Feed (mm/min)	453	605	605	777	777	831	653
K	CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile	≤ 220	Profile	≤ 0.05	≤ 1	215	RPM	11391	8543	6834	5695	4271	3417	2734
						(172-258)	Fz	0.029	0.047	0.059	0.072	0.095	0.101	0.105
							Feed (mm/min)	2296	2807	2807	3690	3641	3809	3158
			Finish	≤ 0.02	≤ 2	258	RPM	13669	10252	8201	6834	5126	4101	3281
						(206-309)	Fz	0.023	0.038	0.047	0.058	0.076	0.081	0.084
							Feed (mm/min)	2204	2695	2694	3543	3496	3657	3031
K	CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile	> 220 ≤ 260	Profile	≤ 0.05	≤ 1	165	RPM	8725	6544	5235	4362	3272	2617	2094
						(132-198)	Fz	0.022	0.036	0.045	0.055	0.074	0.080	0.080
							Feed (mm/min)	1319	1661	1661	2167	2186	2303	1843
			Finish	≤ 0.02	≤ 2	198	RPM	10470	7852	6282	5235	3926	3141	2513
						(158-237)	Fz	0.017	0.029	0.036	0.044	0.059	0.064	0.064
							Feed (mm/min)	1266	1595	1595	2080	2099	2211	1769
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275	Profile	≤ 0.05	≤ 1	171	RPM	9048	6786	5429	4524	3393	2714	2171
						(137-205)	Fz	0.022	0.036	0.045	0.055	0.074	0.080	0.080
							Feed (mm/min)	1368	1723	1723	2247	2267	2389	1911
			Finish	≤ 0.02	≤ 2	137	RPM	7238	5429	4343	3619	2714	2171	1737
						(109-164)	Fz	0.017	0.029	0.036	0.044	0.059	0.064	0.064
							Feed (mm/min)	875	1103	1103	1438	1451	1529	1223

continued on next page



	Series 66M, 66MCR Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	8	10	12	16	20	25
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.05	≤ 1	117	RPM	6220	4665	3732	3110	2333	1866	1493
						(94-141)	Fz	0.017	0.030	0.037	0.043	0.059	0.064	0.065
							Feed (mm/min)	731	975	975	1209	1236	1314	1067
			Finish	≤ 0.02	≤ 2	141	RPM	7465	5598	4479	3732	2799	2239	1791
						(113-169)	Fz	0.013	0.024	0.030	0.035	0.047	0.051	0.052
							Feed (mm/min)	702	17	936	1161	1187	1261	1025
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.05	≤ 1	108	RPM	5736	4302	3441	2868	2151	1721	1377
						(87-130)	Fz	0.017	0.030	0.037	0.043	0.059	0.064	0.065
							Feed (mm/min)	674	899	899	1115	1140	1211	984
			Finish	≤ 0.02	≤ 2	130	RPM	6883	5162	4130	3441	2581	2065	1652
						(104-156)	Fz	0.013	0.024	0.030	0.035	0.047	0.051	0.052
							Feed (mm/min)	647	863	863	1070	1094	1163	945
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.05	≤ 1	32	RPM	1696	1272	1018	848	636	509	407
						(26-38)	Fz	0.017	0.030	0.037	0.043	0.059	0.064	0.065
							Feed (mm/min)	199	266	213	330	337	358	291
			Finish	≤ 0.02	≤ 2	38	RPM	2036	1527	1221	1018	763	611	489
						(31-46)	Fz	0.013	0.024	0.030	0.035	0.047	0.051	0.052
							Feed (mm/min)	192	255	255	317	324	344	279
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.05	≤ 1	26	RPM	1373	1030	824	687	515	412	330
						(21-31)	Fz	0.012	0.019	0.024	0.026	0.036	0.040	0.040
							Feed (mm/min)	115	138	138	163	166	181	145
			Finish	≤ 0.02	≤ 2	31	RPM	1648	1236	989	824	618	494	396
						(25-37)	Fz	0.010	0.015	0.019	0.021	0.029	0.032	0.032
							Feed (mm/min)	111	133	133	157	159	174	139
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.05	≤ 1	119	RPM	6301	4726	3781	3151	2363	1890	1512
						(95-143)	Fz	0.019	0.032	0.040	0.050	0.067	0.072	0.073
							Feed (mm/min)	847	1059	1059	1429	1415	1497	1206
			Finish	≤ 0.02	≤ 2	143	RPM	7561	5671	4537	3781	2836	2268	1815
						(114-171)	Fz	0.015	0.026	0.032	0.040	0.053	0.058	0.058
							Feed (mm/min)	813	1016	1016	1372	1359	1437	1158
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.05	≤ 1	43	RPM	2262	1696	1357	1131	848	679	543
						(34-51)	Fz	0.019	0.032	0.040	0.050	0.067	0.072	0.073
							Feed (mm/min)	304	380	380	513	508	537	433
			Finish	≤ 0.02	≤ 2	51	RPM	2714	2036	1629	1357	1018	814	651
						(41-61)	Fz	0.015	0.026	0.032	0.040	0.053	0.058	0.058
							Feed (mm/min)	292	365	365	492	488	516	416

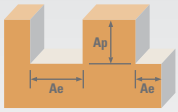
rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x number of flutes x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



	Series 56B Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/32	1/16	1/8	3/16	1/4	3/8	1/2	3/4
P	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 370	Rough	≤ 0.4	≤ 0.1	625	RPM	76400	38200	19100	12733	9550	6367	4775	3183
						(500-750)	Fz	0.0006	0.0015	0.0030	0.0040	0.0050	0.0080	0.0100	0.0120
							Feed (IPM)	92	115	115	102	96	102	96	76
			HSM	≤ 0.4	≤ 0.03	950	RPM	116128	58064	29032	19355	14516	9677	7258	4839
						(760-1140)	Fz	0.0007	0.0017	0.0033	0.0044	0.0060	0.0088	0.0110	0.0013
							Feed (IPM)	163	197	192	170	174	170	160	126
P	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 370 ≤ 475	Rough	≤ 0.4	≤ 0.05	750	RPM	91680	45840	22920	15280	11460	7640	5730	3820
						(600-900)	Fz	0.0005	0.0011	0.0023	0.0030	0.0038	0.0060	0.0075	0.0085
							Feed (IPM)	92	101	105	92	87	92	86	65
			HSM	≤ 0.4	≤ 0.02	1150	RPM	140576	70288	35144	23429	17572	11715	8786	5857
						(920-1380)	Fz	0.0006	0.0012	0.0025	0.0033	0.0042	0.0066	0.0082	0.0100
							Feed (IPM)	169	169	176	155	148	155	144	117
H	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 475 ≤ 655	Rough	≤ 0.4	≤ 0.04	500	RPM	61120	30560	15280	10187	7640	5093	3820	2547
						(400-600)	Fz	0.0004	0.0008	0.0017	0.0023	0.0029	0.0045	0.0057	0.0063
							Feed (IPM)	49	49	52	47	44	46	44	32
			HSM	≤ 0.4	≤ 0.01	1000	RPM	122240	61120	30560	20373	15280	10187	7640	5093
						(800-1200)	Fz	0.0005	0.0009	0.0019	0.0025	0.0032	0.0050	0.0063	0.0071
							Feed (IPM)	122	110	116	102	98	102	96	72

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 2 x rpm
HSM (high speed machining)
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

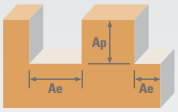
Turbo-Carb HIGH PERFORMANCE CARBIDE END MILLS



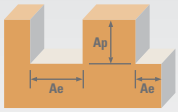
	Series 56MB Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 1	1.5	3	5	6	10	12	20
P	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 370	Rough	≤ 0.4	≤ 0.1	191	RPM	60748	40498	20249	12150	10125	6075	5062	3037
						(153-229)	Fz	0.015	0.038	0.076	0.102	0.127	0.203	0.254	0.305
							Feed (mm/min)	1822	3078	3078	2479	2572	2466	2572	1853
			HSM	≤ 0.4	≤ 0.03	290	RPM	92235	61490	46117	18447	15372	9223	7686	4612
						(232-348)	Fz	0.018	0.043	0.084	0.112	0.117	0.224	0.279	0.330
							Feed (mm/min)	3320	5288	7748	4132	3597	4132	4289	3044
P	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 370 ≤ 475	Rough	≤ 0.4	≤ 0.05	229	RPM	72833	48556	24278	14567	12139	7283	6069	3642
						(183-275)	Fz	0.013	0.028	0.058	0.076	0.097	0.152	0.191	0.216
							Feed (mm/min)	1894	2719	2816	2214	2355	2214	2319	1573
			HSM	≤ 0.4	≤ 0.02	351	RPM	111636	74424	37212	22327	18606	11164	9303	5582
						(281-421)	Fz	0.015	0.030	0.064	0.084	0.107	0.168	0.208	0.254
							Feed (mm/min)	3349	4465	4763	3751	3982	3751	3870	2836
H	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 475 ≤ 655	Rough	≤ 0.4	≤ 0.04	152	RPM	48344	32229	16115	9669	8057	4834	4029	2417
						(122-182)	Fz	0.010	0.020	0.043	0.058	0.074	0.114	0.145	0.160
							Feed (mm/min)	967	1289	1386	1122	1192	1102	1168	773
			HSM	≤ 0.4	≤ 0.01	305	RPM	97005	64670	32335	19401	16168	9701	8084	4850
						(244-366)	Fz	0.013	0.023	0.048	0.064	0.081	0.127	0.160	0.180
							Feed (mm/min)	2522	2975	3104	2483	2619	2464	2587	1746

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 2 x rpm
HSM (high speed machining)
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

Power-Carb™ HIGH PERFORMANCE CARBIDE END MILLS

	Series 57 Fractional	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/4	5/16	3/8	1/2
P	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 280 ≤ 420	Slot	1	≤ 0.3	215	RPM	3285	2628	2190	1643
						(172-258)	Fz	0.0013	0.0019	0.0025	0.0031
							Feed (IPM)	26	30	33	31
			Profile	≤ 0.1	≤ 1.5	265	RPM	4049	3239	2699	2025
						(212-318)	Fz	0.0018	0.0026	0.0035	0.0440
							Feed (IPM)	44	51	57	53
			HSM	≤ 0.04	≤ 1.5	560	RPM	8557	6845	5705	4278
						(448-672)	Fz	0.0022	0.0033	0.0044	0.0055
							Feed (IPM)	113	136	151	141
P	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 420 ≤ 560	Slot	1	≤ 0.3	120	RPM	1834	1467	1222	917
						(96-144)	Fz	0.0010	0.0015	0.0020	0.0025
							Feed (IPM)	11	13	15	14
			Profile	≤ 0.1	≤ 1.5	150	RPM	2292	1834	1528	1146
						(120-180)	Fz	0.0014	0.0021	0.0028	0.0035
							Feed (IPM)	19	23	26	24
			HSM	≤ 0.04	≤ 1.5	490	RPM	7487	5990	4991	3744
						(392-588)	Fz	0.0018	0.0026	0.0035	0.0044
							Feed (IPM)	81	93	105	99
H	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 560 < 745	Slot	1	≤ 0.3	65	RPM	993	795	662	497
						(52-78)	Fz	0.0008	0.0011	0.0015	0.0019
							Feed (IPM)	5	5	6	6
			Profile	≤ 0.1	≤ 1.5	80	RPM	1222	978	815	611
						(64-96)	Fz	0.0011	0.0016	0.0021	0.0026
							Feed (IPM)	8	9	10	10
			HSM	≤ 0.04	≤ 1.5	250	RPM	3820	3056	2547	1910
						(200-300)	Fz	0.0013	0.0019	0.0025	0.0031
							Feed (IPM)	30	35	38	36

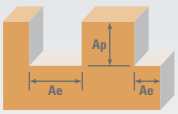
rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 6 x rpm
HSM (high speed machining)
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



	Series 57M Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	8	10	12
P	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 280 ≤ 420	Slot	1	≤ 0.3	66	RPM	3499	2624	2099	1749
						(53-79)	Fz	0.032	0.048	0.064	0.079
							Feed (mm/min)	672	756	806	829
			Profile	≤ 0.1	≤ 1.5	81	RPM	4294	3220	2576	2147
						(65-97)	Fz	0.046	0.066	0.089	0.112
							Feed (mm/min)	1185	1275	1376	1443
			HSM	≤ 0.04	≤ 1.5	171	RPM	9064	6798	5439	4532
						(137-205)	Fz	0.056	0.084	0.112	0.140
							Feed (mm/min)	3046	3426	3655	3807
P	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 420 ≤ 560	Slot	1	≤ 0.3	37	RPM	1961	1471	1177	981
						(30-44)	Fz	0.025	0.038	0.051	0.064
							Feed (mm/min)	294	335	360	377
			Profile	≤ 0.1	≤ 1.5	46	RPM	2438	1829	1463	1219
						(37-55)	Fz	0.036	0.053	0.071	0.089
							Feed (mm/min)	527	582	623	651
			HSM	≤ 0.04	≤ 1.5	149	RPM	7898	5924	4739	3949
						(119-179)	Fz	0.046	0.066	0.089	0.112
							Feed (mm/min)	2180	2346	2531	2654
H	TOOL STEELS MOLD AND DIE STEEL 300M, 4340, 52100, HP-9-4-20, M50, A2, D2, H13, L2, M2, P20, S7, T15, W2	> 560 < 745	Slot	1	≤ 0.3	20	RPM	1060	795	636	530
						(16-24)	Fz	0.020	0.028	0.038	0.048
							Feed (mm/min)	127	134	145	153
			Profile	≤ 0.1	≤ 1.5	24	RPM	1272	954	763	636
						(19-29)	Fz	0.028	0.041	0.053	0.066
							Feed (mm/min)	214	235	243	252
			HSM	≤ 0.04	≤ 1.5	76	RPM	4029	3021	2417	2014
						(61-91)	Fz	0.033	0.048	0.064	0.079
							Feed (mm/min)	798	870	928	955

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 6 x rpm
HSM (high speed machining)
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

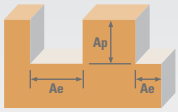
SERIES 33 THREE FLUTE END MILLS



	Series 33CR Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	5/8	3/4	1
P	**CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536**	≤ 275	Profile	≤ 0.5	≤ 1.5	550	RPM	16808	8404	5603	4202	3362	2801	2101
						(440-660)	Fz	0.0005	0.0012	0.0023	0.0031	0.0039	0.0040	0.0043
							Feed (IPM)	25.2	30.3	38.7	39.1	39.3	33.6	27.1
			Slot	1	≤ 1	440	RPM	13446	6723	4482	3362	2689	2241	1681
						(352-528)	Fz	0.0005	0.0012	0.0023	0.0031	0.0039	0.0040	0.0043
							Feed (IPM)	20.2	24.2	30.9	31.3	31.5	26.9	21.7
P	**ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100**	> 275 ≤ 375	Profile	≤ 0.5	≤ 1.5	315	RPM	9626	4813	3209	2407	1925	1604	1203
						(252-378)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (IPM)	11.6	13.0	16.4	16.6	16.7	14.4	11.6
			Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (IPM)	9.2	10.3	13.0	13.2	13.3	11.5	9.2
P	**TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2**	> 250 ≤ 375	Profile	≤ 0.5	≤ 1.5	185	RPM	5654	2827	1885	1413	1131	942	707
						(148-222)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	5.1	5.9	7.9	7.6	7.8	6.8	5.3
			Slot	1	≤ 1	145	RPM	4431	2216	1477	1108	886	739	554
						(116-174)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	4.0	4.7	6.2	6.0	6.1	5.3	4.2
K	**CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile**	≤ 220	Profile	≤ 0.5	≤ 1.5	445	RPM	13599	6800	4533	3400	2720	2267	1700
						(356-534)	Fz	0.0004	0.0011	0.0021	0.0028	0.0035	0.0036	0.0039
							Feed (IPM)	14.3	22.4	28.6	28.6	28.6	24.5	19.9
			Slot	1	≤ 1	355	RPM	10849	5424	3616	2712	2170	1808	1356
						(284-426)	Fz	0.0004	0.0011	0.0021	0.0028	0.0035	0.0036	0.0039
							Feed (IPM)	11.4	17.9	22.8	22.8	22.8	19.5	15.9
K	**CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile**	> 220 ≤ 260	Profile	≤ 0.5	≤ 1.5	340	RPM	10390	5195	3463	2598	2078	1732	1299
						(272-408)	Fz	0.0003	0.0008	0.0016	0.0021	0.0026	0.0027	0.0029
							Feed (IPM)	9.4	12.5	16.6	16.4	16.2	14.0	11.3
			Slot	1	≤ 1	270	RPM	8251	4126	2750	2063	1650	1375	1031
						(216-324)	Fz	0.0003	0.0008	0.0016	0.0021	0.0026	0.0027	0.0029
							Feed (IPM)	7.4	9.9	13.2	13.0	12.9	11.1	9.0
M	**STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F**	≤ 275	Profile	≤ 0.5	≤ 1.5	490	RPM	14974	7487	4991	3744	2995	2496	1872
						(392-588)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (IPM)	17.1	22.5	28.5	28.1	27.9	24.0	19.7
			Slot	1	≤ 1	390	RPM	11918	5959	3973	2980	2384	1986	1490
						(312-468)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (IPM)	13.6	17.9	22.6	22.3	22.2	19.1	15.6

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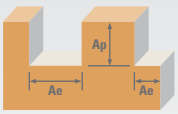
SERIES 33 THREE FLUTE END MILLS



	Series 33CR Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	5/8	3/4	1
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.5	≤ 1.5	340	RPM	16808	8404	5603	4202	3362	2801	2101
						(272-408)	Fz	0.0005	0.0012	0.0023	0.0031	0.0039	0.0040	0.0043
							Feed (IPM)	25.2	30.3	38.7	39.1	39.3	33.6	27.1
			Slot	1	≤ 1	270	RPM	13446	6723	4482	3362	2689	2241	1681
						(216-324)	Fz	0.0005	0.0012	0.0023	0.0031	0.0039	0.0040	0.0043
							Feed (IPM)	20.2	24.2	30.9	31.3	31.5	26.9	21.7
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.5	≤ 1.5	310	RPM	9626	4813	3209	2407	1925	1604	1203
						(248-372)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (IPM)	11.6	13.0	16.4	16.6	16.7	14.4	11.6
			Slot	1	≤ 1	250	RPM	7640	3820	2547	1910	1528	1273	955
						(200-300)	Fz	0.0004	0.0009	0.0017	0.0023	0.0029	0.0030	0.0032
							Feed (IPM)	9.2	10.3	13.0	13.2	13.3	11.5	9.2
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.5	≤ 1.5	80	RPM	5654	2827	1885	1413	1131	942	707
						(64-96)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	5.1	5.9	7.9	7.6	7.8	6.8	5.3
			Slot	1	≤ 1	65	RPM	4431	2216	1477	1108	886	739	554
						(52-78)	Fz	0.0003	0.0007	0.0014	0.0018	0.0023	0.0024	0.0025
							Feed (IPM)	4.0	4.7	6.2	6.0	6.1	5.3	4.2
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.5	≤ 1.5	62	RPM	13599	6800	4533	3400	2720	2267	1700
						(50-74)	Fz	0.0004	0.0011	0.0021	0.0028	0.0035	0.0036	0.0039
							Feed (IPM)	14.3	22.4	28.6	28.6	28.6	24.5	19.9
			Slot	1	≤ 1	49	RPM	10849	5424	3616	2712	2170	1808	1356
						(39-59)	Fz	0.0004	0.0011	0.0021	0.0028	0.0035	0.0036	0.0039
							Feed (IPM)	11.4	17.9	22.8	22.8	22.8	19.5	15.9
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.5	≤ 1.5	215	RPM	10390	5195	3463	2598	2078	1732	1299
						(172-258)	Fz	0.0003	0.0008	0.0016	0.0021	0.0026	0.0027	0.0029
							Feed (IPM)	9.4	12.5	16.6	16.4	16.2	14.0	11.3
			Slot	1	≤ 1	170	RPM	8251	4126	2750	2063	1650	1375	1031
						(136-204)	Fz	0.0003	0.0008	0.0016	0.0021	0.0026	0.0027	0.0029
							Feed (IPM)	7.4	9.9	13.2	13.0	12.9	11.1	9.0
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.5	≤ 1.5	75	RPM	14974	7487	4991	3744	2995	2496	1872
						(60-90)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (IPM)	17.1	22.5	28.5	28.1	27.9	24.0	19.7
			Slot	1	≤ 1	60	RPM	11918	5959	3973	2980	2384	1986	1490
						(48-72)	Fz	0.0004	0.0010	0.0019	0.0025	0.0031	0.0032	0.0035
							Feed (IPM)	13.6	17.9	22.6	22.3	22.2	19.1	15.6

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 3 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

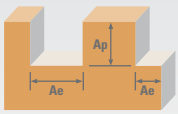
SERIES 33 THREE FLUTE END MILLS



	Series 33MCR Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	16	20	25
P	**CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536**	> 175 ≤ 275	Profile	≤ 0.5	≤ 1.5	168	RPM	17773	8886	6665	5332	4443	3332	2666	2133
						(134-201)	Fz	0.012	0.029	0.049	0.061	0.074	0.100	0.107	0.108
							Feed (mm/min)	640	768	981	981	992	998	853	688
			Slot	1	≤ 1	134	RPM	14218	7109	5332	4265	3555	2666	2133	1706
						(107-161)	Fz	0.012	0.029	0.049	0.061	0.074	0.100	0.107	0.108
							Feed (mm/min)	512	614	785	785	793	798	682	550
P	**ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100**	> 275 ≤ 375	Profile	≤ 0.5	≤ 1.5	96	RPM	10179	5089	3817	3054	2545	1909	1527	1221
						(77-115)	Fz	0.010	0.022	0.036	0.045	0.055	0.074	0.080	0.080
							Feed (mm/min)	293	330	415	415	421	425	366	293
			Slot	1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212	969
						(61-91)	Fz	0.010	0.022	0.036	0.045	0.055	0.074	0.080	0.080
							Feed (mm/min)	233	262	330	330	334	337	291	233
P	**TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2**	> 250 ≤ 375	Profile	≤ 0.5	≤ 1.5	56	RPM	5978	2989	2242	1793	1495	1121	897	717
						(45-68)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	129	151	201	201	194	198	172	135
			Slot	1	≤ 1	44	RPM	4686	2343	1757	1406	1171	879	703	562
						(35-53)	Fz	0.007	0.017	0.030	0.037	0.043	0.059	0.064	0.063
							Feed (mm/min)	101	118	157	157	152	155	135	105
K	**CAST IRONS (LOW & MEDIUM ALLOY) Gray, Malleable, Ductile**	≤ 220	Profile	≤ 0.5	≤ 1.5	136	RPM	14380	7190	5392	4314	3595	2696	2157	1726
						(109-163)	Fz	0.008	0.026	0.045	0.056	0.067	0.090	0.096	0.098
							Feed (mm/min)	362	569	725	725	725	725	621	505
			Slot	1	≤ 1	108	RPM	11471	5736	4302	3441	2868	2151	1721	1377
						(87-130)	Fz	0.008	0.026	0.045	0.056	0.067	0.090	0.096	0.098
							Feed (mm/min)	289	454	578	578	578	578	496	403
K	**CAST IRONS (HIGH ALLOY) Gray, Malleable, Ductile**	> 220 ≤ 260	Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.007	0.019	0.034	0.043	0.050	0.067	0.072	0.073
							Feed (mm/min)	237	316	422	422	415	411	356	287
			Slot	1	≤ 1	82	RPM	8725	4362	3272	2617	2181	1636	1309	1047
						(66-99)	Fz	0.007	0.019	0.034	0.043	0.050	0.067	0.072	0.073
							Feed (mm/min)	188	251	335	335	330	327	283	228
M	**STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F**	≤ 275	Profile	≤ 0.5	≤ 1.5	149	RPM	15834	7917	5938	4750	3958	2969	2375	1900
						(119-179)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.085	0.088
							Feed (mm/min)	433	570	722	722	712	707	608	499
			Slot	1	≤ 1	119	RPM	12602	6301	4726	3781	3151	2363	1890	1512
						(95-143)	Fz	0.009	0.024	0.041	0.051	0.060	0.079	0.085	0.088
							Feed (mm/min)	345	454	575	575	567	563	484	397

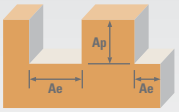
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SERIES 33 THREE FLUTE END MILLS



	Series 33MCR Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	16	20	25
M	STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L	≤ 275	Profile	≤ 0.5	≤ 1.5	104	RPM	10987	5493	4120	3296	2747	2060	1648	1318
						(83-124)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	0.070
							Feed (mm/min)	237	316	396	396	395	396	343	277
			Slot	1	≤ 1	82	RPM	8725	4362	3272	2617	2181	1636	1309	1047
						(66-99)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	0.070
							Feed (mm/min)	188	251	314	314	314	314	272	220
M	STAINLESS STEELS (PH) 13-8 PH,15-5PH,17-4 PH, Custom 450	< 325	Profile	≤ 0.5	≤ 1.5	94	RPM	10017	5009	3756	3005	2504	1878	1503	1202
						(76-113)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	0.070
							Feed (mm/min)	216	288	361	361	361	361	313	252
			Slot	1	≤ 1	76	RPM	8078	4039	3029	2424	2020	1515	1212	969
						(61-91)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	0.070
							Feed (mm/min)	174	233	291	291	291	291	252	204
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400	≤ 300	Profile	≤ 0.5	≤ 1.5	24	RPM	2585	1293	969	776	646	485	388	310
						(20-29)	Fz	0.006	0.017	0.028	0.035	0.041	0.054	0.059	0.060
							Feed (mm/min)	48	65	81	65	79	78	68	56
			Slot	1	≤ 1	20	RPM	2100	1050	788	630	525	394	315	252
						(16-24)	Fz	0.006	0.017	0.028	0.035	0.041	0.054	0.059	0.060
							Feed (mm/min)	39	53	66	66	64	64	55	45
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 718, 750X, Incoly 925, Waspaloy, Hastelloy, Rene	> 300	Profile	≤ 0.5	≤ 1.5	19	RPM	2003	1002	751	601	501	376	301	240
						(15-23)	Fz	0.005	0.012	0.019	0.024	0.029	0.038	0.043	0.043
							Feed (mm/min)	29	36	43	43	43	43	38	31
			Slot	1	≤ 1	15	RPM	11471	5736	4302	3441	2868	2151	1721	1377
						(12-18)	Fz	0.008	0.026	0.045	0.056	0.067	0.090	0.096	0.098
							Feed (mm/min)	289	454	578	578	578	578	496	403
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si	≤ 350	Profile	≤ 0.5	≤ 1.5	66	RPM	6947	3474	2605	2084	1737	1303	1042	834
						(52-79)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	0.070
							Feed (mm/min)	150	200	250	250	250	250	217	175
			Slot	1	≤ 1	52	RPM	5493	2747	2060	1648	1373	1030	824	659
						(41-62)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	0.070
							Feed (mm/min)	119	158	198	198	198	198	171	138
S	TITANIUM ALLOYS (DIFFICULT) Ti10Al2Fe3Al, Ti5Al5V5Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti15V3 Cr3Sn3Al	> 350 ≤ 440	Profile	≤ 0.5	≤ 1.5	23	RPM	2424	1212	909	727	606	454	364	291
						(18-27)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	0.070
							Feed (mm/min)	52	70	87	87	87	87	76	61
			Slot	1	≤ 1	18	RPM	1939	969	727	582	485	364	291	233
						(15-22)	Fz	0.007	0.019	0.032	0.040	0.048	0.064	0.069	0.070
							Feed (mm/min)	42	56	70	70	70	70	60	49

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 3 x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

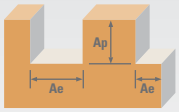
	Series 44, 45, 43CR, 43CB, 43LC, 43, 43L, 47, 47B, 47ES, 47EB Fractional		 Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	3/4	1
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7975	Slot	1	≤ 1	1600	RPM	48896	24448	16299	12224	8149	6112
					(1280-1920)	Fz	0.0009	0.0025	0.0045	0.0060	0.0070	0.0085
						Feed 2 flutes (IPM)	88	122	147	147	114	104
						Feed 3 flutes (IPM)	132	183	220	220	171	156
		Profile	≤ 0.5	≤ 1.5	2000	RPM	61120	30560	20373	15280	10187	7640
					(1600-2400)	Fz	0.0009	0.0025	0.0045	0.0060	0.0070	0.0085
						Feed 2 flutes (IPM)	110	153	183	183	143	130
						Feed 3 flutes (IPM)	165	229	275	275	214	195
		HSM	≤ 0.5	≤ 2	3300	RPM	100848	50424	33616	25212	16808	12606
					(2640-3960)	Fz	0.0021	0.0055	0.0105	0.0140	0.0165	0.0195
						Feed 2 flutes (IPM)	424	555	706	706	555	492
						Feed 3 flutes (IPM)	635	832	1059	1059	832	737
N	ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B- 390	Slot	1	≤ 1	600	RPM	18336	9168	6112	4584	3056	2292
					(480-720)	Fz	0.0009	0.0025	0.0045	0.0060	0.0070	0.0085
						Feed 2 flutes (IPM)	33	46	55	55	43	39
						Feed 3 flutes (IPM)	50	69	83	83	64	58
		Profile	≤ 0.5	≤ 1.5	750	RPM	22920	11460	7640	5730	3820	2865
					(600-900)	Fz	0.0009	0.0025	0.0045	0.0060	0.0070	0.0085
						Feed 2 flutes (IPM)	41	57	69	69	53	49
						Feed 3 flutes (IPM)	62	86	103	103	80	73
		HSM	≤ 0.5	≤ 2	1240	RPM	37894	18947	12631	9474	6316	4737
					(992-1488)	Fz	0.0021	0.0055	0.0105	0.0140	0.0165	0.0195
						Feed 2 flutes (IPM)	159	208	265	265	208	185
						Feed 3 flutes (IPM)	239	313	398	398	313	277
N	COPPER ALLOYS Aluminum Bronze Brass Naval Brass Red Brass	Slot	1	≤ 1	865	RPM	26434	13217	8811	6609	8149	6112
					(692-1038)	Fz	0.0008	0.0020	0.0040	0.0050	0.0060	0.0070
						Feed 2 flutes (IPM)	42	53	70	66	98	86
						Feed 3 flutes (IPM)	63	79	106	99	147	128
		Profile	≤ 0.5	≤ 1.5	1080	RPM	33005	16502	11002	8251	5501	4126
					(864-1296)	Fz	0.0008	0.0020	0.0040	0.0050	0.0060	0.0070
						Feed 2 flutes (IPM)	53	66	88	83	66	58
						Feed 3 flutes (IPM)	79	99	132	124	99	87
		HSM	≤ 0.5	≤ 2	1780	RPM	54397	27198	18132	13599	9066	6800
					(1424-2136)	Fz	0.0017	0.0045	0.0085	0.0115	0.0140	0.0160
						Feed 2 flutes (IPM)	185	245	308	313	254	218
						Feed 3 flutes (IPM)	277	367	462	469	381	326

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SGS SKI-CARB

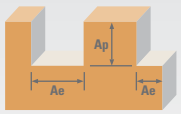
CARB

Series
44, 45, 43CR, 43CB, 43LC, 43, 43L, 47, 47B, 47ES, 47EB
Fractional



			Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	3/4	1
N	**COPPER ALLOYS Beryllium Copper C110, Maganese Bronze, Tin Bronze**	Slot	1	≤ 1	345	RPM	10543	5272	3514	2636	1757	1318
					(276-414)	Fz	0.0008	0.0020	0.0040	0.0050	0.0060	0.0070
						Feed 2 flutes (IPM)	17	21	28	26	21	18
						Feed 3 flutes (IPM)	25	32	42	40	32	28
		Profile	≤ 0.5	≤ 1.5	430	RPM	13141	6570	4380	3285	2190	1643
					(344-516)	Fz	0.0008	0.0020	0.0040	0.0050	0.0060	0.0070
						Feed 2 flutes (IPM)	21	26	35	33	26	23
						Feed 3 flutes (IPM)	32	39	53	49	39	34
		HSM	≤ 0.5	≤ 2	710	RPM	21698	10849	7233	5424	3616	2712
					(568-852)	Fz	0.0017	0.0045	0.0085	0.0115	0.0140	0.0160
						Feed 2 flutes (IPM)	74	98	123	125	101	87
						Feed 3 flutes (IPM)	111	146	184	187	152	130
	PLASTICS ABS, Polycarbonate, PVC, Polypropylene	Slot	1	≤ 1	1600	RPM	48896	24448	16299	12224	8149	6112
					(1280-1920)	Fz	0.0015	0.0040	0.0075	0.0100	0.0120	0.0140
						Feed 2 flutes (IPM)	147	196	244	244	196	171
						Feed 3 flutes (IPM)	220	293	367	367	293	257
		Profile	≤ 0.5	≤ 1.5	2000	RPM	61120	30560	20373	15280	10187	7640
					(1600-2400)	Fz	0.0015	0.0040	0.0075	0.0100	0.0120	0.0140
						Feed 2 flutes (IPM)	183	244	306	306	244	214
						Feed 3 flutes (IPM)	275	367	458	458	367	321
		HSM	≤ 0.5	≤ 2	3300	RPM	100848	50424	33616	25212	16808	12606
					(2640-3960)	Fz	0.0034	0.0090	0.0170	0.0230	0.0275	0.0320
						Feed 2 flutes (IPM)	686	908	1143	1160	924	807
						Feed 3 flutes (IPM)	1029	1361	1714	1740	1387	1210

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x number of flutes x rpm
HSM (high speed machining)
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

Series 44M, 43MCR, 43MCB, 43M, 47M, 47MB, 47MES, 47MEB Metric		 Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	10	12	20	25
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6073, 7975	Slot	1	≤ 1	490	RPM	52022	26011	15607	13005	7803	6243
					(392-588)	Fz	0.022	0.060	0.120	0.144	0.187	0.213
						Feed 2 flutes (m/min)	2247	3121	3746	3745	2913	2653
						Feed 3 flutes (m/min)	3371	4682	5618	5618	4370	3980
		Profile	≤ 0.5	≤ 1.5	610	RPM	64762	32381	19429	16190	9714	7771
					(488-732)	Fz	0.022	0.060	0.120	0.144	0.187	0.213
						Feed 2 flutes (m/min)	2797	3885	4663	4662	3627	3303
						Feed 3 flutes (m/min)	4196	5828	6994	6994	5440	4955
		HSM	≤ 0.5	≤ 2	1005	RPM	106698	53349	32009	26674	16005	12804
					(804-1206)	Fz	0.050	0.132	0.280	0.336	0.440	0.488
						Feed 2 flutes (m/min)	10754	14083	17925	17924	14084	12484
						Feed 3 flutes (m/min)	16131	21124	26888	26885	21126	18726
N	ALUMINUM DIE CAST ALLOYS (HIGH SILICONE) A-390, A-392, B- 390	Slot	1	≤ 1	185	RPM	19641	9820	15607	13005	7803	6243
					(148-222)	Fz	0.022	0.060	0.120	0.144	0.187	0.213
						Feed 2 flutes (m/min)	848	1178	3746	3745	2913	2653
						Feed 3 flutes (m/min)	1273	1768	5618	5618	4370	3980
		Profile	≤ 0.5	≤ 1.5	230	RPM	24418	12209	7326	6105	3663	2930
					(184-276)	Fz	0.022	0.060	0.120	0.144	0.187	0.213
						Feed 2 flutes (m/min)	1055	1465	1758	1758	1367	1245
						Feed 3 flutes (m/min)	1582	2197	2637	2637	2051	1868
		HSM	≤ 0.5	≤ 2	380	RPM	40343	20172	12103	10086	6052	4841
					(304-456)	Fz	0.050	0.132	0.280	0.336	0.440	0.488
						Feed 2 flutes (m/min)	4066	5325	6778	6777	5325	4720
						Feed 3 flutes (m/min)	6099	7987	10166	10166	7988	7081
N	COPPER ALLOYS Aluminum Bronze Brass Naval Brass Red Brass	Slot	1	≤ 1	265	RPM	28134	14067	8440	7034	7803	6243
					(212-318)	Fz	0.019	0.048	0.107	0.120	0.160	0.175
						Feed 2 flutes (m/min)	1080	1350	1801	1688	2497	2185
						Feed 3 flutes (m/min)	1620	2025	2701	2532	3746	3278
		Profile	≤ 0.5	≤ 1.5	330	RPM	35035	17518	10511	8759	5255	4204
					(264-396)	Fz	0.019	0.048	0.107	0.120	0.160	0.175
						Feed 2 flutes (m/min)	1345	1682	2242	2102	1682	1472
						Feed 3 flutes (m/min)	2018	2522	3363	3153	2523	2207
		HSM	≤ 0.5	≤ 2	545	RPM	57861	28930	17358	14465	8679	6943
					(436-654)	Fz	0.041	0.108	0.227	0.276	0.373	0.400
						Feed 2 flutes (m/min)	4721	6248	7869	7984	6480	5555
						Feed 3 flutes (m/min)	7082	9373	11804	11976	9721	8332

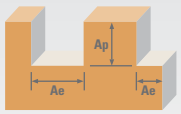
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SGS SKI-CARB

Series 44M, 43MCR, 43MCB, 43M, 47M, 47MB, 47MES, 47MEB Metric			Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	10	12	20	25
N	COPPER ALLOYS Beryllium Copper C110, Maganese Bronze, Tin Bronze	Slot	1	≤ 1	105	RPM	11148	5574	3344	2787	1672	1338
					(84-126)	Fz	0.019	0.048	0.107	0.120	0.160	0.175
						Feed 2 flutes (m/min)	428	535	713	669	535	468
						Feed 3 flutes (m/min)	642	803	1070	1003	803	702
		Profile	≤ 0.5	≤ 1.5	130	RPM	13802	6901	4141	3450	2070	1656
					(104-156)	Fz	0.019	0.048	0.107	0.120	0.160	0.175
						Feed 2 flutes (m/min)	530	662	883	828	662	580
						Feed 3 flutes (m/min)	795	994	1325	1242	994	870
		HSM	≤ 0.5	≤ 2	215	RPM	22826	11413	6848	5706	3424	2739
					(172-258)	Fz	0.041	0.108	0.227	0.276	0.373	0.400
						Feed 2 flutes (m/min)	1862	2465	3104	3150	2556	2191
						Feed 3 flutes (m/min)	2794	3697	4656	4725	3835	3287
	PLASTICS ABS, Polycarbonate, PVC, Polypropylene	Slot	1	≤ 1	490	RPM	52022	26011	15607	13005	7803	6243
					(392-588)	Fz	0.036	0.096	0.200	0.240	0.320	0.350
						Feed 2 flutes (m/min)	3745	4994	6243	6242	4994	4370
						Feed 3 flutes (m/min)	5618	7490	9364	9363	7491	6555
		Profile	≤ 0.5	≤ 1.5	610	RPM	64762	32381	19429	16190	9714	7771
					(488-732)	Fz	0.036	0.096	0.200	0.240	0.320	0.350
						Feed 2 flutes (m/min)	4662	6217	7771	7771	6217	5440
						Feed 3 flutes (m/min)	6994	9325	11657	11656	9326	8160
		HSM	≤ 0.5	≤ 2	1005	RPM	106698	53349	32009	26674	16005	12804
					(804-1206)	Fz	0.082	0.216	0.453	0.552	0.733	0.800
						Feed 2 flutes (m/min)	17412	23045	29022	29446	23473	20487
						Feed 3 flutes (m/min)	26117	34567	43532	44169	35210	30730

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x number of flutes x rpm
HSM (high speed machining)
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

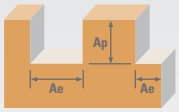
DI-NAMITE CRYSTALLINE DIAMOND COATING

Series 27 Fractional		 Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/4	5/16	3/8	1/2	3/4
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot	1	≤ 1	400	RPM	6112	4890	4075	3056	2037
				(320-480)	Fz	0.0016	0.0025	0.0030	0.0040	0.0048
					Feed (IPM)	39.1	48.9	48.9	48.9	39.1
	Profile	≤ 0.5	≤ 1.5	500	RPM	7640	6112	5093	3820	2547
				(400-600)	Fz	0.0016	0.0025	0.0030	0.0040	0.0048
					Feed (IPM)	48.9	61.1	61.1	61.1	48.9
	HSM	≤ 0.5	≤ 2	825	RPM	12606	10085	8404	6303	4202
				(660-990)	Fz	0.0037	0.0057	0.0069	0.0092	0.0110
					Feed (IPM)	186.6	229.9	232.0	232.0	184.9
GFRP (FIBERGLASS)	Slot	1	≤ 1	320	RPM	4890	3912	3260	2445	1630
				(256-384)	Fz	0.0016	0.0025	0.0030	0.0040	0.0048
					Feed (IPM)	31.3	39.1	39.1	39.1	31.3
	Profile	≤ 0.5	≤ 1.5	400	RPM	6112	4890	4075	3056	2037
				(320-480)	Fz	0.0016	0.0025	0.0030	0.0040	0.0048
					Feed (IPM)	39.1	48.9	48.9	48.9	39.1
	HSM	≤ 0.5	≤ 2	660	RPM	10085	8068	6723	5042	3362
				(528-792)	Fz	0.0037	0.0057	0.0069	0.0092	0.0110
					Feed (IPM)	149.3	183.9	185.6	185.6	147.9
CARBON, GRAPHITE	Slot	1	≤ 1	480	RPM	7334	5868	4890	3667	2445
				(384-576)	Fz	0.0020	0.0031	0.0038	0.0050	0.0060
					Feed (IPM)	58.7	72.8	74.3	73.3	58.7
	Profile	≤ 0.5	≤ 1.5	600	RPM	9168	7334	6112	4584	3056
				(480-720)	Fz	0.0020	0.0031	0.0038	0.0050	0.0060
					Feed (IPM)	73.3	90.9	92.9	91.7	73.3
	HSM	≤ 0.5	≤ 2	990	RPM	15127	12102	10085	7564	5042
				(792-1188)	Fz	0.0046	0.0072	0.0086	0.0115	0.0138
					Feed (IPM)	278.3	348.5	346.9	347.9	278.3
PLASTICS	Slot	1	≤ 1	800	RPM	12224	9779	8149	6112	4075
				(640-690)	Fz	0.0020	0.0031	0.0038	0.0050	0.0060
					Feed (IPM)	97.8	121.3	123.9	122.2	97.8
	Profile	≤ 0.5	≤ 1.5	1000	RPM	15280	12224	10187	7640	5093
				(800-1200)	Fz	0.0020	0.0031	0.0038	0.0050	0.0060
					Feed (IPM)	122.2	151.6	154.8	152.8	122.2
	HSM	≤ 0.5	≤ 2	1650	RPM	25212	20170	16808	12606	8404
				(1320-1980)	Fz	0.0046	0.0072	0.0086	0.0115	0.0138
					Feed (IPM)	463.9	580.9	578.2	579.9	463.9
MACHINABLE CERAMICS MACHINABLE GLASS	Slot	1	≤ 1	40	RPM	611	489	407	306	204
				(32-48	Fz	0.0008	0.0013	0.0015	0.0020	0.0024
					Feed (IPM)	2.0	2.5	2.4	2.4	2.0
	Profile	≤ 0.5	≤ 1.5	50	RPM	764	611	509	382	255
				(40-60)	Fz	0.0008	0.0013	0.0015	0.0020	0.0024
					Feed (IPM)	2.4	3.2	3.1	3.1	2.4
	HSM	≤ 0.5	≤ 2	85	RPM	1299	1039	866	649	433
				(68-102)	Fz	0.0018	0.0029	0.0034	0.0046	0.0055
					Feed (IPM)	9.4	12.1	11.8	11.9	9.5

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 4 x rpm
HSM (high speed machining)
adjust parameters based on resin type and fiber structure
reduce speed when overheating causes melting or damage to resin
reduce feed if delamination or fraying occur

finish cuts typically required reduced feed and cutting depths
rates shown are for use without coolant; rates may be increased with coolant
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 complete technical information (www.sgstool.com)

DI-NAMITE CRYSTALLINE DIAMOND COATING



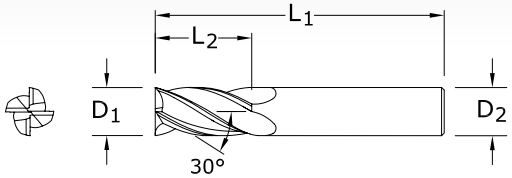
Series 27M Metric		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	8	10	12	16
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot	1	≤ 1	120	RPM	6361	4771	3817	3181	2385
				(96-164)	Fz	0.040	0.065	0.075	0.100	0.120
					Feed (mm/min)	1018	1240	1145	1272	1145
	Profile	≤ 0.5	≤ 1.5	150	RPM	7951	5963	4771	3976	2982
				(120-180)	Fz	0.040	0.065	0.075	0.100	0.120
					Feed (mm/min)	1272	1550	1431	1590	1431
	HSM	≤ 0.5	≤ 2	250	RPM	13252	9939	7951	6626	4970
				(200-300)	Fz	0.095	0.145	0.175	0.235	0.280
					Feed (mm/min)	5036	5765	5566	6228	5566
GFRP (FIBERGLASS)	Slot	1	≤ 1	100	RPM	5301	3976	3181	2650	1988
				(80-120)	Fz	0.040	0.065	0.075	0.100	0.120
					Feed (mm/min)	848	1034	954	1060	954
	Profile	≤ 0.5	≤ 1.5	120	RPM	6361	4771	3817	3181	2385
				(96-164)	Fz	0.040	0.065	0.075	0.100	0.120
					Feed (mm/min)	1018	1240	1145	1272	1145
	HSM	≤ 0.5	≤ 2	200	RPM	10602	7951	6361	5301	3976
				(160-240)	Fz	0.095	0.145	0.175	0.235	0.280
					Feed (mm/min)	4029	4612	4453	4983	4453
CARBON, GRAPHITE	Slot	1	≤ 1	145	RPM	7686	5765	4612	3843	2882
				(116-174)	Fz	0.050	0.080	0.095	0.125	0.150
					Feed (mm/min)	1537	1845	1752	1922	1729
	Profile	≤ 0.5	≤ 1.5	185	RPM	9807	7355	5884	4903	3677
				(148-222)	Fz	0.050	0.080	0.095	0.125	0.150
					Feed (mm/min)	1961	2354	2236	2452	2206
	HSM	≤ 0.5	≤ 2	300	RPM	15903	11927	9542	7951	5963
				(240-360)	Fz	0.115	0.185	0.220	0.290	0.350
					Feed (mm/min)	7315	8826	8397	9223	8349
PLASTICS	Slot	1	≤ 1	245	RPM	12987	9740	7792	6494	4870
				(196-294)	Fz	0.050	0.080	0.095	0.125	0.150
					Feed (mm/min)	2597	3117	2961	3247	2922
	Profile	≤ 0.5	≤ 1.5	305	RPM	16168	12126	9701	8084	6063
				(244-366)	Fz	0.050	0.080	0.095	0.125	0.150
					Feed (mm/min)	3234	3880	3686	4042	3638
	HSM	≤ 0.5	≤ 2	505	RPM	26769	20077	16062	13385	10038
				(404-606)	Fz	0.115	0.185	0.220	0.290	0.350
					Feed (mm/min)	12314	14857	14134	15526	14054
MACHINABLE CERAMICS MACHINABLE GLASS	Slot	1	≤ 1	10	RPM	530	398	318	265	199
				(8-12)	Fz	0.020	0.035	0.040	0.050	0.060
					Feed (mm/min)	42	56	51	53	48
	Profile	≤ 0.5	≤ 1.5	15	RPM	795	596	477	398	298
				(12-18)	Fz	0.020	0.035	0.040	0.050	0.060
					Feed (mm/min)	64	83	76	80	72
	HSM	≤ 0.5	≤ 2	25	RPM	1325	994	795	663	497
				(20-30)	Fz	0.045	0.075	0.085	0.115	0.140
					Feed (mm/min)	239	298	270	305	278

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 4 x rpm
HSM (high speed machining)
adjust parameters based on resin type and fiber structure
reduce speed when overheating causes melting or damage to resin
reduce feed if delamination or fraying occur

finish cuts typically required reduced feed and cutting depths
rates shown are for use without coolant; rates may be increased with coolant
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 complete technical information (www.sgstool.com)







16
FRACTIONAL SERIES

TECH INFO 139

TOLERANCES (inch)

D_1 = +0.0000/–0.0020
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

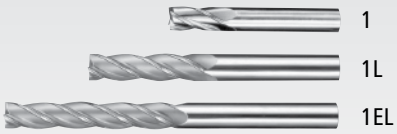
16M
METRIC SERIES

TECH INFO 141

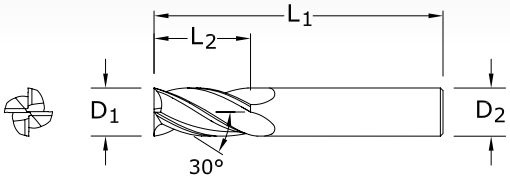
TOLERANCES (mm)

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







TOLERANCES (inch)

D_1 = +0.0000/–0.0020

D_2 = h_6

1 • 1L • 1EL

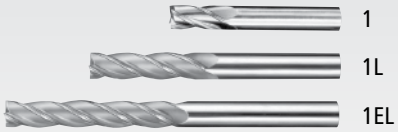
FRACTIONAL SERIES

TECH INFO 139

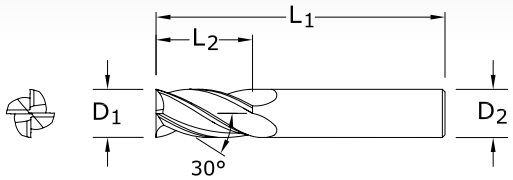
inch				EDP NO.							SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	UNCOATED W/FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE (Diamond)	
1/64	1/32	1-1/2	1/8	30101	–	39101	39001	30191	–	–	1
1/32	5/64	1-1/2	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







1 • 1L • 1EL

FRACTIONAL SERIES

TOLERANCES (inch)

D_1 = +0.0000/–0.0020

D_2 = h_6

TECH INFO 139

- 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

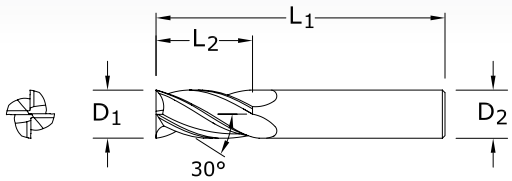




TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6



1M • 1XLM

METRIC SERIES

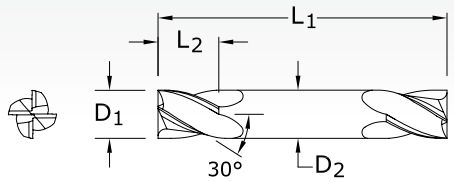
TECH INFO 141

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







14
FRACTIONAL SERIES

TOLERANCES (inch)

D_1 = +0.0000/–0.0020
D_2 = h_6

TECH INFO 139

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

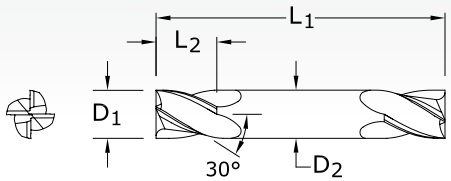
inch				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/32	1/16	1-1/2	1/8	31401	31441	39601	31170
3/64	3/32	1-1/2	1/8	31403	31443	39603	31171
1/16	1/8	1-1/2	1/8	31405	31445	39605	31172
5/64	1/8	1-1/2	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





TOLERANCES (mm)

D_1 = +0,000/–0,050
D_2 = h_6

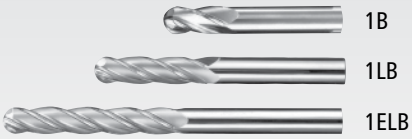


14M
METRIC SERIES

TECH INFO 141

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

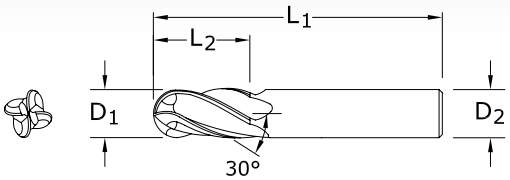
- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- NON-FERROUS
- PLASTICS/COMPOSITES





1B • 1LB • 1ELB

FRACTIONAL SERIES



TOLERANCES (inch)

D_1 = +0.0000/–0.0020

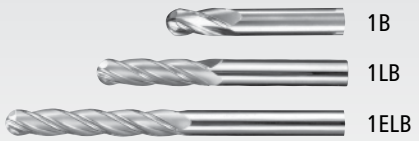
D_2 = h_6

TECH INFO 139

- 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



1B • 1LB • 1ELB

FRACTIONAL SERIES

CONTINUED

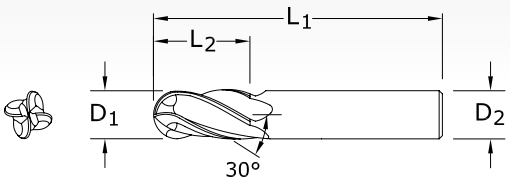
inch				EDP NO.							SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	UNCOATED W/FLAT	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN) W/FLAT	Di-NAMITE (Diamond)	
5/16	1-5/8	4	5/16	33126	–	31906	31921	31931	–	–	1ELB
21/64	1	2-1/2	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





1MB • 1XLMB

METRIC SERIES



TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6

TECH INFO 141

- 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

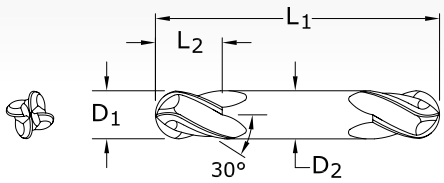




TOLERANCES (inch)

D_1 = +0.0000/–0.0020

D_2 = h_6



14B
FRACTIONAL SERIES

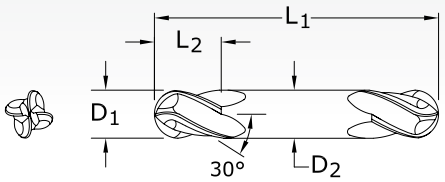
TECH INFO 139

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







14MB
METRIC SERIES

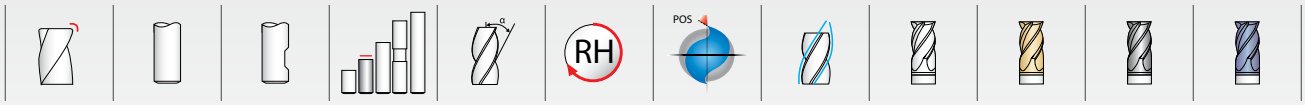
TOLERANCES (mm)
D_1 = +0,000/–0,050
D_2 = h_6

TECH INFO 141

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

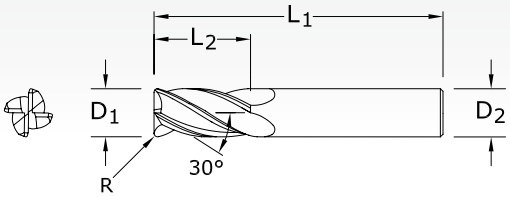
mm				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1,0	2,0	38,0	3,0	41406	48947	48968	48989
1,5	3,0	38,0	3,0	41410	48948	48969	48990
2,0	4,0	38,0	3,0	41414	48949	48970	48991
2,5	5,0	38,0	3,0	41418	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





TOLERANCES (inch)

D_1 = –0.0010/–0.0020
D_2 = h_6
R = +0.0000/–0.0020



1CR
FRACTIONAL SERIES

TECH INFO 139

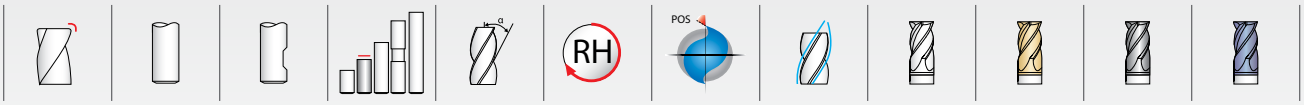
inch					EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIA. D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/8*	1/2	1-1/2	1/8	.015	38001	38002	38115	38157
1/8*	1/2	1-1/2	1/8	.020	38003	38004	38116	38158
3/16*	5/8	2	3/16	.015	38009	38010	38117	38159
3/16*	5/8	2	3/16	.020	38011	38012	38118	38160
3/16*	5/8	2	3/16	.030	38013	38014	38119	38161
1/4*	3/4	2-1/2	1/4	.015	38019	38020	38120	38162
1/4*	3/4	2-1/2	1/4	.020	38021	38022	38121	38163
1/4*	3/4	2-1/2	1/4	.030	38023	38024	38122	38164
1/4*	3/4	2-1/2	1/4	.045	38025	38026	38123	38165
5/16*	13/16	2-1/2	5/16	.015	38031	38032	38124	38166
5/16*	13/16	2-1/2	5/16	.020	38033	38034	38125	38167
5/16*	13/16	2-1/2	5/16	.030	38035	38036	38126	38168
5/16*	13/16	2-1/2	5/16	.045	38037	38038	38127	38169
3/8	1	2-1/2	3/8	.015	38045	38046	38128	38170
3/8	1	2-1/2	3/8	.020	38047	38048	38129	38171
3/8	1	2-1/2	3/8	.030	38049	38050	38130	38172
3/8	1	2-1/2	3/8	.045	38051	38052	38131	38173
1/2	1	3	1/2	.015	38059	38060	38132	38174
1/2	1	3	1/2	.020	38061	38062	38133	38175
1/2	1	3	1/2	.030	38063	38064	38134	38176
1/2	1	3	1/2	.045	38065	38066	38135	38177
1/2	1	3	1/2	.060	38067	38068	38136	38178
5/8	1-1/4	3-1/2	5/8	.015	38073	38074	38137	38179
5/8	1-1/4	3-1/2	5/8	.020	38075	38076	38138	38180
5/8	1-1/4	3-1/2	5/8	.030	38077	38078	38139	38181
5/8	1-1/4	3-1/2	5/8	.045	38079	38080	38140	38182
5/8	1-1/4	3-1/2	5/8	.060	38081	38082	38141	38183
5/8	1-1/4	3-1/2	5/8	.090	38083	38084	38142	38184
3/4	1-1/2	4	3/4	.015	38087	38088	38143	38185
3/4	1-1/2	4	3/4	.020	38089	38090	38144	38186

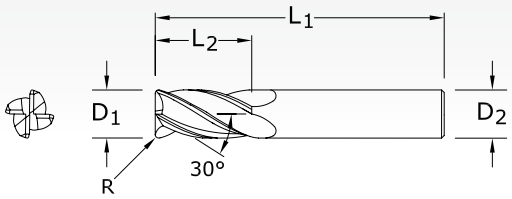
*Without Flat

continued on next page

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







1CR
FRACTIONAL SERIES

TOLERANCES (inch)

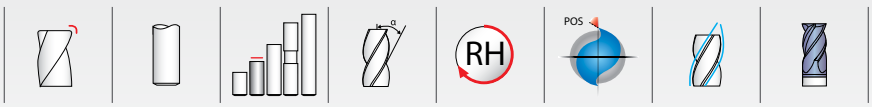
D_1 = –0.0010/–0.0020
D_2 = h_6
R = +0.0000/–0.0020

TECH INFO 139

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

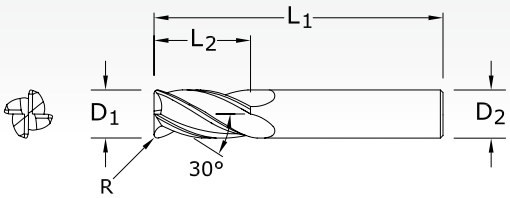
inch					EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIA. D_2	CORNER RADIUS R	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
3/4	1-1/2	4	3/4	.030	38091	38092	38145	38187
3/4	1-1/2	4	3/4	.045	38093	38094	38146	38188
3/4	1-1/2	4	3/4	.060	38095	38096	38147	38189
3/4	1-1/2	4	3/4	.090	38097	38098	38148	38190
3/4	1-1/2	4	3/4	.125	38099	38100	38149	38191
1	1-1/2	4	1	.015	38101	38102	38150	38192
1	1-1/2	4	1	.020	38103	38104	38151	38193
1	1-1/2	4	1	.030	38105	38106	38152	38194
1	1-1/2	4	1	.045	38107	38108	38153	38195
1	1-1/2	4	1	.060	38109	38110	38154	38196
1	1-1/2	4	1	.090	38111	38112	38155	38197
1	1-1/2	4	1	.125	38113	38114	38156	38198





TOLERANCES (mm)

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



1MCR
METRIC SERIES

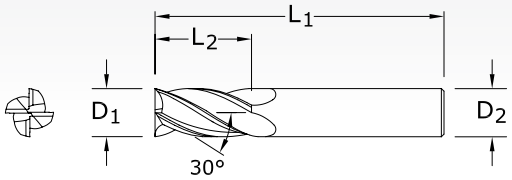
TECH INFO 141

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







54
FRACTIONAL SERIES

TECH INFO 144

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

TOLERANCES (inch)

D1 = +0.0000/–0.0020

D2 = h_6

54M
METRIC SERIES

TECH INFO 145

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

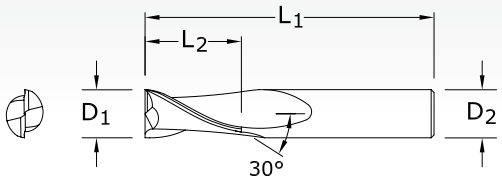
TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6







TOLERANCES (inch)

D1 = +0.0000/–0.0020
D2 = h_6

17
FRACTIONAL SERIES

TECH INFO 139

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

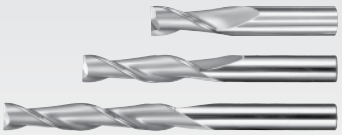
TOLERANCES (mm)

D_1 = +0,000/–0,050
D_2 = h_6

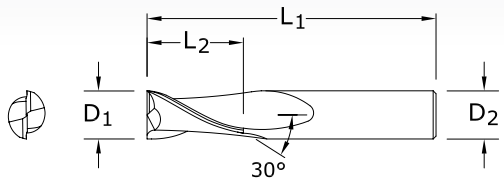
17M
METRIC SERIES

TECH INFO 141

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







3 • 3L • 3EL

FRACTIONAL SERIES

TOLERANCES (inch)

D_1 = +0.0000/–0.0020

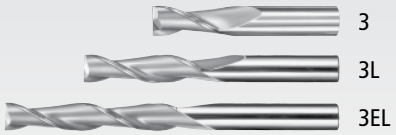
D_2 = h_6

TECH INFO 139

- 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

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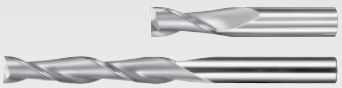


3 • 3L • 3EL

FRACTIONAL SERIES

CONTINUED

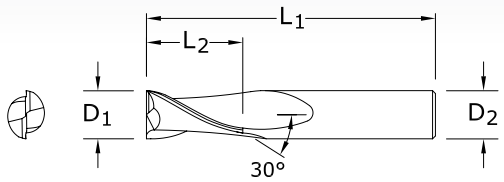
inch				EDP NO.					SERIES
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Di-NAMITE (Diamond)	
5/16	1-5/8	4	5/16	33325	31941	31951	31961	–	3EL
21/64	1	2-1/2	3/8	30341	39341	39541	30451	–	3
11/32	1	2-1/2	3/8	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





3M • 3XLM

METRIC SERIES



TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6

TECH INFO 141

- 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

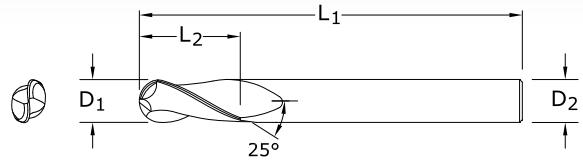




TOLERANCES (inch)

D_1 = +0.0000/–0.0020

D_2 = h_6



59
FRACTIONAL SERIES

TECH INFO 139

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

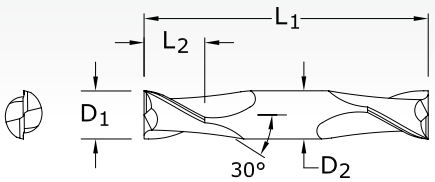
59M
METRIC SERIES

TECH INFO 141

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







15
FRACTIONAL SERIES

TOLERANCES (inch)

D_1 = +0.0000/–0.0020
D_2 = h_6

TECH INFO 139

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

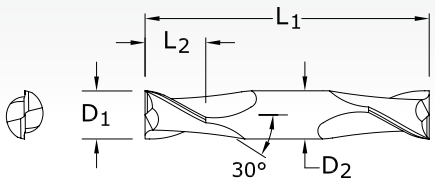
inch				EDP NO.			
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/32	1/16	1-1/2	1/8	31501	31541	39651	31316
3/64	3/32	1-1/2	1/8	31503	31543	39653	31317
1/16	1/8	1-1/2	1/8	31505	31545	39655	31318
5/64	1/8	1-1/2	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





TOLERANCES (mm)

D_1 = +0,000/–0,050
D_2 = h_6

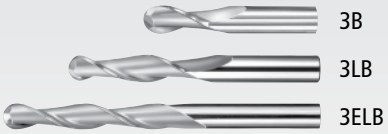


15M
METRIC SERIES

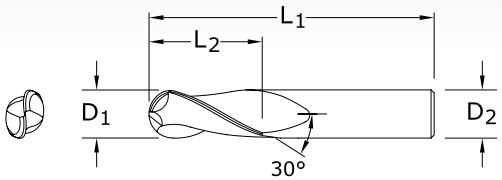
TECH INFO 141

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







3B • 3LB • 3ELB

FRACTIONAL SERIES

TOLERANCES (inch)

D_1 = +0.0000/–0.0020

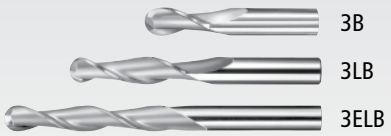
D_2 = h_6

TECH INFO 139

- 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

continued on next page



3B • 3LB • 3ELB

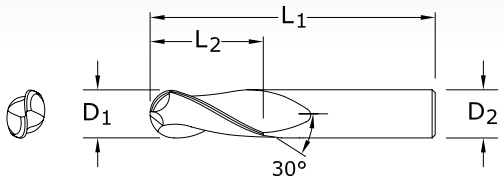
FRACTIONAL SERIES

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







3MB • 3XLMB

METRIC SERIES

TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6

TECH INFO 141

- 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

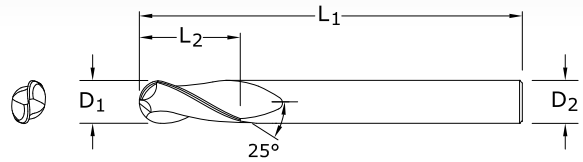




TOLERANCES (inch)

D_1 = +0.0000/–0.0020

D_2 = h_6



59B
FRACTIONAL SERIES

TECH INFO 139

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

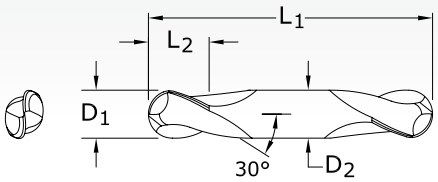
TECH INFO 141

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







15B
FRACTIONAL SERIES

TOLERANCES (inch)

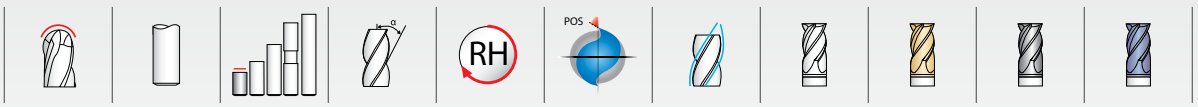
D_1 = +0.0000/–0.0020
D_2 = h_6

TECH INFO 139

- 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

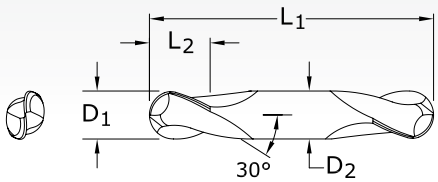




TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6



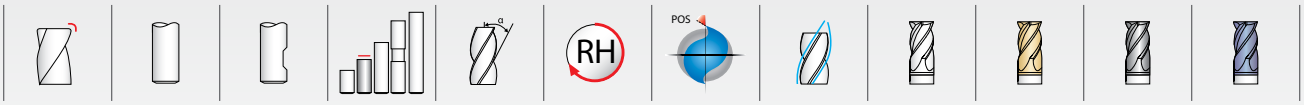
15MB
METRIC SERIES

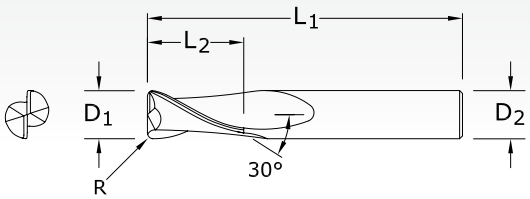
TECH INFO 141

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







3CR
FRACTIONAL SERIES

TOLERANCES (inch)

D_1 = –0.0010/–0.0020
D_2 = h_6
R = +0.0000/–0.0020

TECH INFO 139

- 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	.015	38201	38202	38315	38357
1/8*	1/2	1-1/2	1/8	.020	38203	38204	38316	38358
3/16*	5/8	2	3/16	.015	38209	38210	38317	38359
3/16*	5/8	2	3/16	.020	38211	38212	38318	38360
3/16*	5/8	2	3/16	.030	38213	38214	38319	38361
1/4*	3/4	2-1/2	1/4	.015	38219	38220	38320	38362
1/4*	3/4	2-1/2	1/4	.020	38221	38222	38321	38363
1/4*	3/4	2-1/2	1/4	.030	38223	38224	38322	38364
1/4*	3/4	2-1/2	1/4	.045	38225	38226	38323	38365
5/16*	13/16	2-1/2	5/16	.015	38231	38232	38324	38366
5/16*	13/16	2-1/2	5/16	.020	38233	38234	38325	38367
5/16*	13/16	2-1/2	5/16	.030	38235	38236	38326	38368
5/16*	13/16	2-1/2	5/16	.045	38237	38238	38327	38369
3/8	1	2-1/2	3/8	.015	38245	38246	38328	38370
3/8	1	2-1/2	3/8	.020	38247	38248	38329	38371
3/8	1	2-1/2	3/8	.030	38249	38250	38330	38372
3/8	1	2-1/2	3/8	.045	38251	38252	38331	38373
1/2	1	3	1/2	.015	38259	38260	38332	38374
1/2	1	3	1/2	.020	38261	38262	38333	38375
1/2	1	3	1/2	.030	38263	38264	38334	38376
1/2	1	3	1/2	.045	38265	38266	38335	38377
1/2	1	3	1/2	.060	38267	38268	38336	38378
5/8	1-1/4	3-1/2	5/8	.015	38273	38274	38337	38379
5/8	1-1/4	3-1/2	5/8	.020	38275	38276	38338	38380
5/8	1-1/4	3-1/2	5/8	.030	38277	38278	38339	38381
5/8	1-1/4	3-1/2	5/8	.045	38279	38280	38340	38382
5/8	1-1/4	3-1/2	5/8	.060	38281	38282	38341	38383
5/8	1-1/4	3-1/2	5/8	.090	38283	38284	38342	38384
3/4	1-1/2	4	3/4	.015	38287	38288	38343	38385
3/4	1-1/2	4	3/4	.020	38289	38290	38344	38386
3/4	1-1/2	4	3/4	.030	38291	38292	38345	38387
3/4	1-1/2	4	3/4	.045	38293	38294	38346	38388
3/4	1-1/2	4	3/4	.060	38295	38296	38347	38389
3/4	1-1/2	4	3/4	.090	38297	38298	38348	38390
3/4	1-1/2	4	3/4	.125	38299	38300	38349	38391
1	1-1/2	4	1	.015	38301	38302	38350	38392
1	1-1/2	4	1	.020	38303	38304	38351	38393
1	1-1/2	4	1	.030	38305	38306	38352	38394
1	1-1/2	4	1	.045	38307	38308	38353	38395
1	1-1/2	4	1	.060	38309	38310	38354	38396
1	1-1/2	4	1	.090	38311	38312	38355	38397
1	1-1/2	4	1	.125	38313	38314	38356	38398

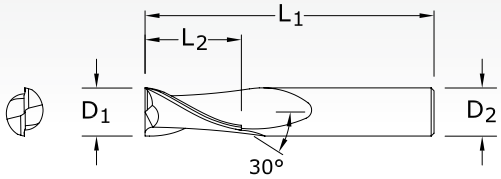
*Without Flat





TOLERANCES (inch)

D_1 = +0.0000/–0.0020
D_2 = h_6



52
FRACTIONAL SERIES

TECH INFO 144

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

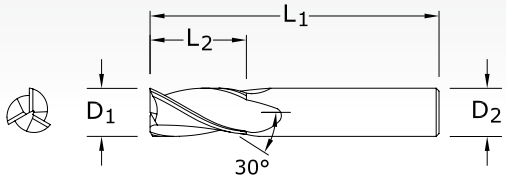
52M
FRACTIONAL SERIES

TECH INFO 145

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







5
FRACTIONAL SERIES

TOLERANCES (inch)

D_1 = +0.0000/–0.0020

D_2 = h_6

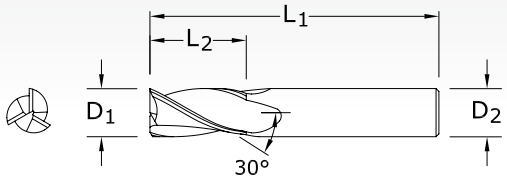
TECH INFO 139

- 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







TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6

5M • 5XLM

METRIC SERIES

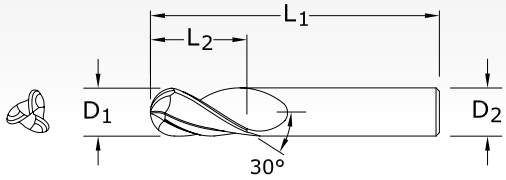
TECH INFO 141

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







5B
FRACTIONAL SERIES

TOLERANCES (inch)

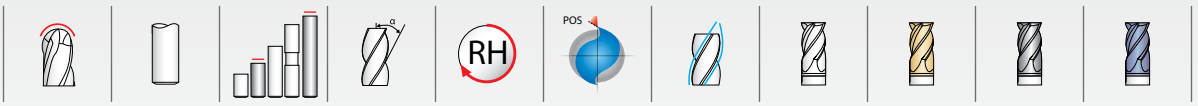
D_1 = +0.0000/–0.0020
D_2 = h_6

TECH INFO 139

- 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

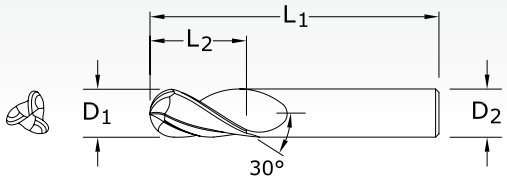




TOLERANCES (mm)

D_1 = +0,000/–0,050

D_2 = h_6



5MB • 5XLMB

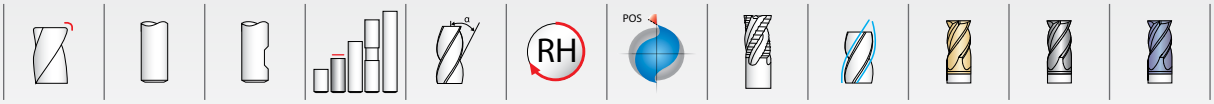
METRIC SERIES

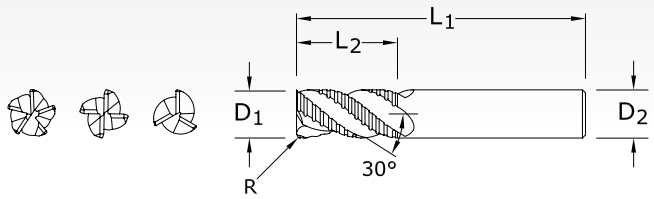
TECH INFO 141

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







61
FRACTIONAL SERIES

TECH INFO 146

TOLERANCES (inch)

D_1 = +0.0000/–0.0040
D_2 = h_6
R = +0.0050/–0.0050

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

61M
METRIC SERIES

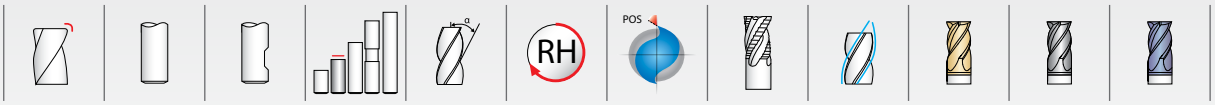
TECH INFO 147

TOLERANCES h10 (mm)

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

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





TOLERANCES (inch)

D_1 = +0.0000/–0.0040
D_2 = h_6
R = +0.0050/–0.0050

62
FRACTIONAL SERIES

TECH INFO 148

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 (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
1/4*	3/4	2-1/2	1/4	3	36207	36206	36210
5/16*	3/4	2-1/2	5/16	3	36209	36208	36211
3/8	7/8	2-1/2	3/8	3	36213	36212	36214
1/2	1	3	1/2	4	36217	36216	36218
5/8	1-1/4	3-1/2	5/8	4	36221	36220	36222
3/4	1-5/8	4	3/4	4	36225	36224	36226
1	1-3/4	4	1	6	36229	36228	36230

*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

62M
METRIC SERIES

TECH INFO 149

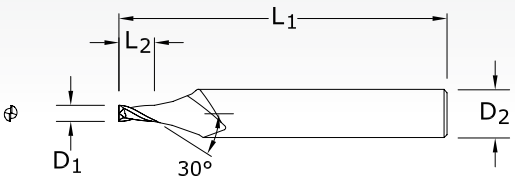
mm					EDP NO.		
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	NO. OF FLUTES	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
6	19	63	6	3	46207	46206	46210
8	19	63	8	3	46209	46208	46211
10	22	72	10	3	46213	46212	46214
12	26	83	12	4	46217	46216	46218
16	32	92	16	4	46221	46220	46222
20	38	104	20	4	46229	46228	46232
25	44	104	25	6	46231	46230	46233





MK2

FRACTIONAL SERIES



TOLERANCES (inch)

D_1 = +/–0.0005

D_2 = h_6

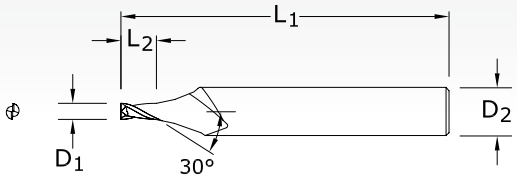
TECH INFO 150

- 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

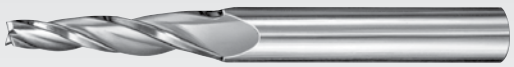
D_2 = h_6

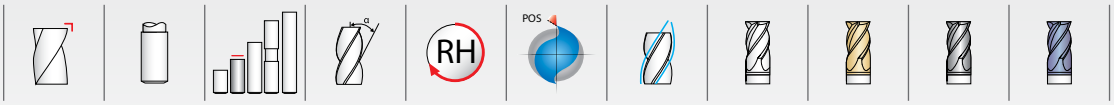
MK2M
METRIC SERIES

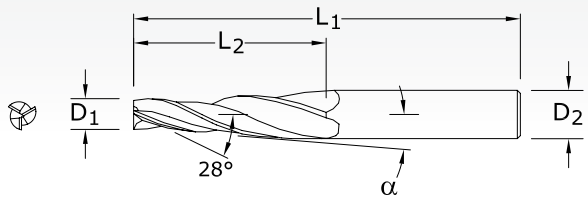
TECH INFO 152

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







23
FRACTIONAL SERIES

TOLERANCES (inch)

D_1 = +0.0010/–0.0020
D_2 = h_6

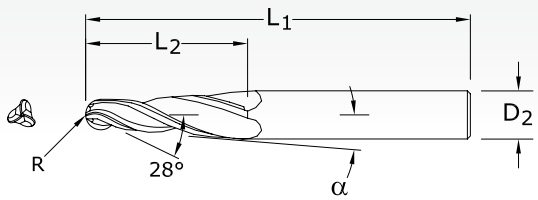
TECH INFO 139

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

inch					EDP NO.			
SHANK DIAMETER D_2	CENTER LINE ANGLE α	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	32352
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	1°	1/4	2	4	32329	32384	32330	32359
1/2	2°	1/4	2	4	32333	32385	32334	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	7°	1/4	1-1/4	4	32339	32388	32340	32363
1/2	10°	1/8	1	4	32341	32389	32342	32364







TOLERANCES (inch)

D_2 = h_6

R = +0.0005/–0.0010

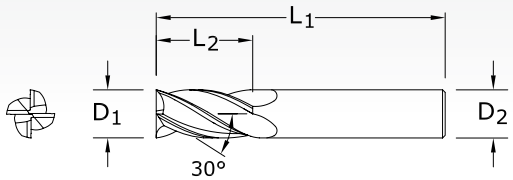
24
FRACTIONAL SERIES

TECH INFO 139

inch					EDP NO.			
SHANK DIAMETER D_2	CENTER LINE ANGLE α	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





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



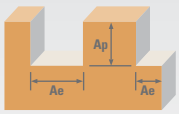
DESCRIPTION	EDP NO.			
	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
Series 1 – 4 Flute, Single End	30189	39189	39089	30030
Series 3 – 2 Flute, Single End	30389	39389	39589	30470
Series 5 – 3 Flute, Single End	30589	39789	30810	30850
Series 14 – 4 Flute, Double End	31489	31481	39641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

Ball End

FRACTIONAL SERIES

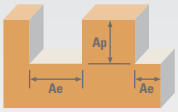


DESCRIPTION	EDP NO.			
	UNCOATED	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
Series 1B – 4 Flute, Single End	30190	39109	39090	30070
Series 3B – 2 Flute, Single End	30390	39390	39590	30600
Series 5B – 3 Flute, Single End	30590	30900	30944	31169
Series 14B – 4 Flute, Double End	31490	31482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



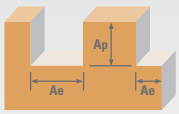
	Series 1, 3, 5, 14, 15, 16, 17, 23, 24, 59 Fractional	Hardness BRINELL		Flutes	Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/64	1/32	1/16	1/8	1/4	3/8	1/2	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175					460	RPM	112461	56230	28115	14058	7029	4686	3514	2343	1757
			Profile					Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	≤ 0.50	≤ 1.5	(368-552)	Feed (IPM)	6.7	6.7	7.3	8.4	11.2	14.1	14.1	11.2	9.8
				3	≤ 0.25	≤ 1.5			10.1	10.1	11.0	12.7	16.9	21.1	21.1	16.9	14.8
				4	≤ 0.25	≤ 1.5			13.5	13.5	14.6	16.9	22.5	28.1	28.1	22.5	19.7
							335	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280
			Slot					Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	1	≤ 1	(268-402)	Feed (IPM)	4.9	4.9	5.3	6.1	8.2	10.2	10.2	8.2	7.2
				3	1	≤ 0.5			7.4	7.4	8.0	9.2	12.3	15.4	15.4	12.3	10.7
				4	1	≤ 0.4			9.8	9.8	10.6	12.3	16.4	20.5	20.5	16.4	14.3
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275					335	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280
			Profile					Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	≤ 0.50	≤ 1.5	(268-402)	Feed (IPM)	3.3	4.1	3.7	4.1	6.1	7.5	7.7	6.1	5.4
				3	≤ 0.25	≤ 1.5			4.9	6.1	5.5	6.1	9.2	11.3	11.5	9.2	8.1
				4	≤ 0.25	≤ 1.5			6.6	8.2	7.4	8.2	12.3	15.0	15.4	12.3	10.7
							245	RPM	59898	29949	14974	7487	3744	2496	1872	1248	936
			Slot					Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	1	≤ 1	(196-294)	Feed (IPM)	2.4	3.0	2.7	3.0	4.5	5.5	5.6	4.5	3.9
				3	1	≤ 0.5			3.6	4.5	4.0	4.5	6.7	8.2	8.4	6.7	5.9
				4	1	≤ 0.4			4.8	6.0	5.4	6.0	9.0	11.0	11.2	9.0	7.9
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250					315	RPM	77011	38506	19253	9626	4813	3209	2407	1604	1203
			Profile					Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	≤ 0.50	≤ 1.5	(252-378)	Feed (IPM)	3.1	3.9	3.5	3.9	5.8	7.1	7.2	5.8	5.1
				3	≤ 0.25	≤ 1.5			4.6	5.8	5.2	5.8	8.7	10.6	10.8	8.7	7.6
				4	≤ 0.25	≤ 1.5			6.2	7.7	6.9	7.7	11.6	14.1	14.4	11.6	10.1
							230	RPM	56230	28115	14058	7029	3514	2343	1757	1171	879
			Slot					Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	1	≤ 1	(184-276)	Feed (IPM)	2.2	2.8	2.5	2.8	4.2	5.2	5.3	4.2	3.7
				3	1	≤ 0.5			3.4	4.2	3.8	4.2	6.3	7.7	7.9	6.3	5.5
				4	1	≤ 0.4			4.5	5.6	5.1	5.6	8.4	10.3	10.5	8.4	7.4
K	CAST IRONS Gray, Malleable, Ductile	≤ 220					335	RPM	81901	40950	20475	10238	5119	3413	2559	1706	1280
			Profile					Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	≤ 0.50	≤ 1.5	(268-402)	Feed (IPM)	4.9	4.9	5.3	6.1	8.2	10.2	10.2	8.2	7.2
				3	≤ 0.25	≤ 1.5			7.4	7.4	8.0	9.2	12.3	15.4	15.4	12.3	10.7
				4	≤ 0.25	≤ 1.5			9.8	9.8	10.6	12.3	16.4	20.5	20.5	16.4	14.3
							245	RPM	59898	29949	14974	7487	3744	2496	1872	1248	936
			Slot					Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	1	≤ 1	(196-294)	Feed (IPM)	3.6	3.6	3.9	4.5	6.0	7.5	7.5	6.0	5.2
				3	1	≤ 0.5			5.4	5.4	5.8	6.7	9.0	11.2	11.2	9.0	7.9
				4	1	≤ 0.4			7.2	7.2	7.8	9.0	12.0	15.0	15.0	12.0	10.5
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275					370	RPM	90458	45229	22614	11307	5654	3769	2827	1885	1413
			Profile					Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	≤ 0.50	≤ 1.5	(296-444)	Feed (IPM)	3.6	4.5	4.1	4.5	6.8	8.3	8.5	6.8	5.9
				3	≤ 0.25	≤ 1.5			5.4	6.8	6.1	6.8	10.2	12.4	12.7	10.2	8.9
				4	≤ 0.25	≤ 1.5			7.2	9.0	8.1	9.0	13.6	16.6	17.0	13.6	11.9
							270	RPM	66010	33005	16502	8251	4126	2750	2063	1375	1031
			Slot					Fz	0.00002	0.00005	0.00009	0.0002	0.0006	0.0011	0.0015	0.0018	0.0021
				2	1	≤ 1	(216-324)	Feed (IPM)	2.6	3.3	3.0	3.3	5.0	6.1	6.2	5.0	4.3
				3	1	≤ 0.5			4.0	5.0	4.5	5.0	7.4	9.1	9.3	7.4	6.5
				4	1	≤ 0.4			5.3	6.6	5.9	6.6	9.9	12.1	12.4	9.9	8.7
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4 PH, 15-5, 13-4, Custom 450	≤ 275					255	RPM	62342	31171	15586	7793	3896	2598	1948	1299	974
			Profile					Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
				2	≤ 0.50	≤ 1.5	(204-306)	Feed (IPM)	2.5	2.5	2.5	2.6	3.9	4.7	4.7	3.6	3.3
				3	≤ 0.25	≤ 1.5			3.7	3.7	3.7	4.0	5.8	7.0	7.0	5.5	5.0
				4	≤ 0.25	≤ 1.5			5.0	5.0	5.0	5.3	7.8	9.4	9.4	7.3	6.6
							185	RPM	45229	22614	11307	5654	2827	1885	1413	942	707
			Slot					Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
				2	1	≤ 1	(148-222)	Feed (IPM)	1.8	1.8	1.8	1.9	2.8	3.4	3.4	2.6	2.4
				3	1	≤ 0.5			2.7	2.7	2.7	2.9	4.2	5.1	5.1	4.0	3.6
				4	1	≤ 0.4			3.6	3.6	3.6	3.8	5.7	6.8	6.8	5.3	4.8

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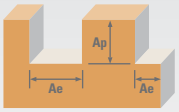
	Series 1, 3, 5, 14, 15, 16, 17, 23, 24, 59 Fractional	Hardness BRINELL		Flutes	Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/64	1/32	1/16	1/8	1/4	3/8	1/2	3/4	1
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, 718, Incoly 800, Monel 400,Rene, Waspalloy	≤ 300	Profile				65	RPM	15891	7946	3973	1986	993	662	497	331	248
								Fz	0.00002	0.00003	0.00006	0.0002	0.0004	0.0008	0.0010	0.0012	0.0014
				2	≤ 0.50	≤ 1.5	(52-78)	Feed (IPM)	0.6	0.5	0.5	0.7	0.7	1.1	1.0	0.8	0.7
				3	≤ 0.25	≤ 1.5			1.0	0.7	0.7	1.1	1.0	1.6	1.5	1.2	1.0
				4	≤ 0.25	≤ 1.5			1.3	1.0	1.0	1.4	1.4	2.1	2.0	1.6	1.4
			Slot				45	RPM	11002	5501	2750	1375	688	458	344	229	172
								Fz	0.00002	0.00003	0.00006	0.0002	0.0004	0.0008	0.0010	0.0012	0.0014
				2	1	≤ 1	(36-54)	Feed (IPM)	0.4	0.3	0.3	0.5	0.5	0.7	0.7	0.6	0.5
				3	1	≤ 0.5			0.7	0.5	0.5	0.7	0.7	1.1	1.0	0.8	0.7
				4	1	≤ 0.4			0.9	0.7	0.7	1.0	1.0	1.5	1.4	1.1	1.0
S	TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al	≤ 350	Profile				180	RPM	44006	22003	11002	5501	2750	1834	1375	917	688
								Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
				2	≤ 0.50	≤ 1.5	(144-216)	Feed (IPM)	1.8	1.8	1.8	2.2	2.8	3.3	3.3	2.6	2.3
				3	≤ 0.25	≤ 1.5			2.6	2.6	2.6	3.3	4.1	5.0	5.0	3.9	3.5
				4	≤ 0.25	≤ 1.5			3.5	3.5	3.5	4.4	5.5	6.6	6.6	5.1	4.7
			Slot				130	RPM	31782	15891	7946	3973	1986	1324	993	662	497
								Fz	0.00002	0.00004	0.00008	0.0002	0.0005	0.0009	0.0012	0.0014	0.0017
				2	1	≤ 1	(104-156)	Feed (IPM)	1.3	1.3	1.3	1.6	2.0	2.4	2.4	1.9	1.7
				3	1	≤ 0.5			1.9	1.9	1.9	2.4	3.0	3.6	3.6	2.8	2.5
				4	1	≤ 0.4			2.5	2.5	2.5	3.2	4.0	4.8	4.8	3.7	3.4
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150	Profile				880	RPM	215142	107571	53786	26893	13446	8964	6723	4482	3362
								Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
				2	≤ 0.50	≤ 1.5	(704-1056)	Feed (IPM)	25.8	28.0	26.9	32.3	43.0	53.8	53.8	43.0	37.6
				3	≤ 0.25	≤ 1.5			38.7	42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5
			Slot				640	RPM	156467	78234	39117	19558	9779	6519	4890	3260	2445
								Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
				2	1	≤ 1	(512-768)	Feed (IPM)	18.8	20.3	19.6	23.5	31.3	39.1	39.1	31.3	27.4
				3	1	≤ 0.5			28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	Profile				485	RPM	118573	59286	29643	14822	7411	4941	3705	2470	1853
								Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	≤ 0.50	≤ 1.5	(388-582)	Feed (IPM)	7.1	7.1	7.7	8.9	11.9	14.8	14.8	11.9	10.4
				3	≤ 0.25	≤ 1.5			10.7	10.7	11.6	13.3	17.8	22.2	22.2	17.8	15.6
				4	≤ 0.25	≤ 1.5			14.2	14.2	15.4	17.8	23.7	29.6	29.6	23.7	20.8
			Slot				350	RPM	85568	42784	21392	10696	5348	3565	2674	1783	1337
								Fz	0.00003	0.00006	0.00013	0.0003	0.0008	0.0015	0.0020	0.0024	0.0028
				2	1	≤ 1	(280-420)	Feed (IPM)	5.1	5.1	5.6	6.4	8.6	10.7	10.7	8.6	7.5
				3	1	≤ 0.5			7.7	7.7	8.3	9.6	12.8	16.0	16.0	12.8	11.2
				4	1	≤ 0.4			10.3	10.3	11.1	12.8	17.1	21.4	21.4	17.1	15.0
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile				880	RPM	215142	107571	53786	26893	13446	8964	6723	4482	3362
								Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
				2	≤ 0.50	≤ 1.5	(704-1056)	Feed (IPM)	25.8	28.0	26.9	32.3	43.0	53.8	53.8	43.0	37.6
				3	≤ 0.25	≤ 1.5			38.7	42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5
				4	≤ 0.25	≤ 1.5			51.6	55.9	53.8	64.5	86.1	107.6	107.6	86.1	75.3
			Slot				640	RPM	156467	78234	39117	19558	9779	6519	4890	3260	2445
								Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
				2	1	≤ 1	(512-768)	Feed (IPM)	18.8	20.3	19.6	23.5	31.3	39.1	39.1	31.3	27.4
				3	1	≤ 0.5			28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1
				4	1	≤ 0.4			37.6	40.7	39.1	46.9	62.6	78.2	78.2	62.6	54.8
	GRAPHITE		Profile				660	RPM	161357	80678	40339	20170	10085	6723	5042	3362	2521
								Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
				2	≤ 0.50	≤ 1.5	(528-792)	Feed (IPM)	19.4	21.0	20.2	24.2	32.3	40.3	40.3	32.3	28.2
				3	≤ 0.25	≤ 1.5			29.0	31.5	30.3	36.3	48.4	60.5	60.5	48.4	42.4
				4	≤ 0.25	≤ 1.5			38.7	42.0	40.3	48.4	64.5	80.7	80.7	64.5	56.5
			Slot				480	RPM	117350	58675	29338	14669	7334	4890	3667	2445	1834
								Fz	0.00006	0.00013	0.00025	0.0006	0.0016	0.0030	0.0040	0.0048	0.0056
				2	1	≤ 1	(384-576)	Feed (IPM)	14.1	15.3	14.7	17.6	23.5	29.3	29.3	23.5	20.5
				3	1	≤ 0.5			21.1	22.9	22.0	26.4	35.2	44.0	44.0	35.2	30.8
				4	1	≤ 0.4			28.2	30.5	29.3	35.2	46.9	58.7	58.7	46.9	41.1

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x number of flutes x rpm
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 and extra long flute mills to .05 x D1 when slotting or profiling
reduce feed and Ae when finish milling (.02 x D1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



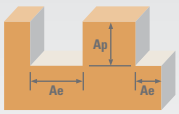
	Series 1M, 3M, 5M, 14M, 15M, 16M, 17M, 59M Metric	Hardness BRINELL		Flutes	Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.4	0.75	1.5	3	6	10	12	20	25
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175					140	RPM	111483	59458	29729	14864	7432	4459	3716	2230	1784
			Profile					Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
				2	≤ 0.50	≤ 1.5	(112-168)	Feed (mm/min)	178	178	184	208	282	357	357	285	250
				3	≤ 0.25	≤ 1.5			268	268	276	312	424	535	535	428	375
				4	≤ 0.25	≤ 1.5			357	357	369	416	565	713	713	571	499
							102	RPM	81189	43301	21650	10825	5413	3248	2706	1624	1299
			Slot					Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
				2	1	≤ 1	(82-123)	Feed (mm/min)	130	130	134	152	206	260	260	208	182
				3	1	≤ 0.5			195	195	201	227	309	390	390	312	273
				4	1	≤ 0.4			260	260	268	303	411	520	520	416	364
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275					102	RPM	81189	43301	21650	10825	5413	3248	2706	1624	1299
			Profile					Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
				2	≤ 0.50	≤ 1.5	(82-123)	Feed (mm/min)	81	104	95	130	152	188	195	156	135
				3	≤ 0.25	≤ 1.5			122	156	143	195	227	283	292	234	203
				4	≤ 0.25	≤ 1.5			162	208	191	260	303	377	390	312	270
							75	RPM	59377	31668	15834	7917	3958	2375	1979	1188	950
			Slot					Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
				2	1	≤ 1	(60-90)	Feed (mm/min)	59	76	70	95	111	138	143	114	99
				3	1	≤ 0.5			119	152	139	190	222	276	285	228	198
				4	1	≤ 0.4			119	152	139	190	222	276	285	228	198
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250					96	RPM	76342	40715	20358	10179	5089	3054	2545	1527	1221
			Profile					Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
				2	≤ 0.50	≤ 1.5	(77-115)	Feed (mm/min)	76	98	90	122	143	177	183	147	127
				3	≤ 0.25	≤ 1.5			115	147	134	183	214	266	275	220	191
				4	≤ 0.25	≤ 1.5			153	195	179	244	285	354	366	293	254
							70	RPM	55741	29729	14864	7432	3716	2230	1858	1115	892
			Slot					Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
				2	1	≤ 1	(56-84)	Feed (mm/min)	56	71	65	89	104	129	134	107	93
				3	1	≤ 0.5			84	107	98	134	156	194	201	161	139
				4	1	≤ 0.4			111	143	131	178	208	259	268	214	186
K	CAST IRONS Gray, Malleable, Ductile	≤ 220					102	RPM	81189	43301	21650	10825	5413	3248	2706	1624	1299
			Profile					Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
				2	≤ 0.50	≤ 1.5	(82-123)	Feed (mm/min)	130	130	134	152	206	260	260	208	182
				3	≤ 0.25	≤ 1.5			195	195	201	227	309	390	390	312	273
				4	≤ 0.25	≤ 1.5			260	260	268	303	411	520	520	416	364
							75	RPM	59377	31668	15834	7917	3958	2375	1979	1188	950
			Slot					Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
				2	1	≤ 1	(60-90)	Feed (mm/min)	95	95	98	111	150	190	190	152	133
				3	1	≤ 0.5			143	143	147	166	226	285	285	228	200
				4	1	≤ 0.4			190	190	196	222	301	380	380	304	266
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 275					113	RPM	89671	47825	23912	11956	5978	3587	2989	1793	1435
			Profile					Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
				2	≤ 0.50	≤ 1.5	(90-135)	Feed (mm/min)	90	115	105	143	167	208	215	172	149
				3	≤ 0.25	≤ 1.5			135	172	158	215	251	312	323	258	224
				4	≤ 0.25	≤ 1.5			179	230	210	287	335	416	430	344	298
							82	RPM	65436	34899	17449	8725	4362	2617	2181	1309	1047
			Slot					Fz	0.0005	0.0012	0.0022	0.006	0.014	0.029	0.036	0.048	0.052
				2	1	≤ 1	(66-99)	Feed (mm/min)	65	84	77	105	122	152	157	126	109
				3	1	≤ 0.5			98	126	115	157	183	228	236	188	163
				4	1	≤ 0.4			131	168	154	209	244	304	314	251	218
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4 PH, 15-5, 13-4, Custom 450	≤ 275					78	RPM	61800	32960	16480	8240	4120	2472	2060	1236	989
			Profile					Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
				2	≤ 0.50	≤ 1.5	(62-93)	Feed (mm/min)	62	66	63	66	99	119	119	91	83
				3	≤ 0.25	≤ 1.5			93	99	94	99	148	178	179	137	125
				4	≤ 0.25	≤ 1.5			124	132	125	132	198	237	239	183	166
							56	RPM	44836	23912	11956	5978	2989	1793	1495	897	717
			Slot					Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
				2	1	≤ 1	(45-68)	Feed (mm/min)	45	48	45	48	72	86	87	66	60
				3	1	≤ 0.5			67	72	68	72	108	129	130	100	90
				4	1	≤ 0.4			90	96	91	96	143	172	173	133	121

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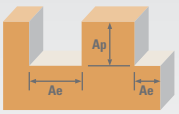


	Series 1M, 3M, 5M, 14M, 15M, 16M, 17M, 59M Metric	Hardness BRINELL		Flutes	Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.4	0.75	1.5	3	6	10	12	20	25
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, 718, Incoly 800, Monel 400,Rene, Waspalloy	≤ 300	Profile				20	RPM	15753	8402	4201	2100	1050	630	525	315	252
								Fz	0.0005	0.0007	0.0014	0.004	0.010	0.021	0.024	0.032	0.035
				2	≤ 0.50	≤ 1.5	(16-24)	Feed (mm/ min)	16	12	12	17	21	26	25	20	18
				3	≤ 0.25	≤ 1.5			24	18	18	25	32	40	38	30	26
				4	≤ 0.25	≤ 1.5			32	24	24	34	42	53	50	40	35
			Slot				14	RPM	10906	5816	2908	1454	727	436	364	218	174
								Fz	0.0005	0.0007	0.0014	0.004	0.010	0.021	0.024	0.032	0.035
				2	1	≤ 1	(11-16)	Feed (mm/ min)	11	8	8	12	15	18	17	14	12
				3	1	≤ 0.5			16	12	12	17	22	27	26	21	18
				4	1	≤ 0.4			22	16	16	23	29	37	35	28	24
S	TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al	≤ 350	Profile				55	RPM	43624	23266	11633	5816	2908	1745	1454	872	698
								Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
				2	≤ 0.50	≤ 1.5	(44-66)	Feed (mm/ min)	44	47	44	47	70	84	84	65	59
				3	≤ 0.25	≤ 1.5			65	70	66	70	105	126	127	97	88
				4	≤ 0.25	≤ 1.5			87	93	88	93	140	168	169	129	117
			Slot				40	RPM	31506	16803	8402	4201	2100	1260	1050	630	504
								Fz	0.0005	0.0010	0.0019	0.004	0.012	0.024	0.029	0.037	0.042
				2	1	≤ 1	(32-48)	Feed (mm/ min)	32	34	32	34	50	60	61	47	42
				3	1	≤ 0.5			47	50	48	50	76	91	91	70	64
				4	1	≤ 0.4			63	67	64	67	101	121	122	93	85
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 150	Profile				268	RPM	213272	113745	56872	28436	14218	8531	7109	4265	3412
								Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
				2	≤ 0.50	≤ 1.5	(215-322)	Feed (mm/min)	640	728	682	796	1081	1365	1365	1092	955
				3	≤ 0.25	≤ 1.5			960	1092	1024	1194	1621	2047	2047	1638	1433
			Slot				195	RPM	155107	82724	41362	20681	10340	6204	5170	3102	2482
								Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
				2	1	≤ 1	(156-234)	Feed (mm/ min)	465	529	496	579	786	993	993	794	695
				3	1	≤ 0.5			698	794	745	869	1179	1489	1489	1191	1042
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	Profile				148	RPM	117542	62689	31344	15672	7836	4702	3918	2351	1881
								Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
				2	≤ 0.50	≤ 1.5	(118-177)	Feed (mm/ min)	188	188	194	219	298	376	376	301	263
				3	≤ 0.25	≤ 1.5			282	282	292	329	447	564	564	451	395
				4	≤ 0.25	≤ 1.5			376	376	389	439	596	752	752	602	527
			Slot					RPM	84824	45239	22620	11310	5655	3393	2827	1696	1357
								Fz	0.0008	0.0015	0.0031	0.007	0.019	0.040	0.048	0.064	0.070
				2	1	≤ 1		Feed (mm/ min)	136	136	140	158	215	271	271	217	190
				3	1	≤ 0.5			204	204	210	238	322	407	407	326	285
				4	1	≤ 0.4			271	271	280	317	430	543	543	434	380
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile				268	RPM	213272	113745	56872	28436	14218	8531	7109	4265	3412
								Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
				2	≤ 0.50	≤ 1.5	(215-322)	Feed (mm/ min)	640	728	682	796	1081	1365	1365	1092	955
				3	≤ 0.25	≤ 1.5			960	1092	1024	1194	1621	2047	2047	1638	1433
				4	≤ 0.25	≤ 1.5			1280	1456	1365	1592	2161	2730	2730	2184	1911
			Slot				195	RPM	155107	82724	41362	20681	10340	6204	5170	3102	2482
								Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
				2	1	≤ 1	(156-234)	Feed (mm/ min)	465	529	496	579	786	993	993	794	695
				3	1	≤ 0.5			698	794	745	869	1179	1489	1489	1191	1042
				4	1	≤ 0.4			931	1059	993	1158	1572	1985	1985	1588	1390
	GRAPHITE		Profile				201	RPM	159954	85309	42654	21327	10664	6398	5332	3199	2559
								Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
				2	≤ 0.50	≤ 1.5	(161-241)	Feed (mm/ min)	480	546	512	597	810	1024	1024	819	717
				3	≤ 0.25	≤ 1.5			720	819	768	896	1216	1536	1536	1228	1075
				4	≤ 0.25	≤ 1.5			960	1092	1024	1194	1621	2047	2047	1638	1433
			Slot				146	RPM	116330	62043	31021	15511	7755	4653	3878	2327	1861
								Fz	0.0015	0.0032	0.0060	0.014	0.038	0.080	0.096	0.128	0.140
				2	1	≤ 1	(117-176)	Feed (mm/ min)	349	397	372	434	589	745	745	596	521
				3	1	≤ 0.5			523	596	558	651	884	1117	1117	893	782
				4	1	≤ 0.4			698	794	745	869	1179	1489	1489	1191	1042

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x number of flutes x rpm
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 and extra long flute mills to .05 x D1 when slotting or profiling
reduce feed and Ae when finish milling (.02 x D1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

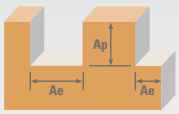
Diamond 1, 1B, 3, 3B Fractional	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	5/16	3/8	1/2
GRAPHITE Ultrafine, Superfine	N/A	Profile	≤ 0.25	≤ 1.5	720	RPM	22003	11002	8801	7334	5501
					(576-864)	Fz	0.0009	0.0023	0.0036	0.0043	0.0058
						Feed 2 flutes (IPM)	38.3	50.6	63.4	63.1	63.8
						Feed 3 flutes (IPM)	76.6	101.2	126.7	126.2	127.6
		Slot	≤ 1	≤ 1	580	RPM	17725	8862	7090	5908	4431
					(464-696)	Fz	0.0075	0.0020	0.0031	0.0038	0.0050
						Feed 2 flutes (IPM)	265.9	35.4	44.0	44.9	44.3
						Feed 3 flutes (IPM)	531.7	70.9	87.9	89.8	88.6
COMPOSITES FRP, CFRP, GRP	N/A	Profile	≤ 0.25	≤ 1.5	385	RPM	11766	5883	4706	3922	2941
					(308-462)	Fz	0.0005	0.0014	0.0022	0.0026	0.0035
						Feed 2 flutes (IPM)	12.2	16.5	20.7	20.4	20.6
						Feed 3 flutes (IPM)	24.5	32.9	41.4	40.8	41.2
		Slot	≤ 1	≤ 1	350	RPM	10696	5348	4278	3565	2674
					(280-420)	Fz	0.0005	0.0012	0.0019	0.0023	0.0030
						Feed 2 flutes (IPM)	9.6	12.8	16.3	16.4	16.0
						Feed 3 flutes (IPM)	19.3	25.7	32.5	32.8	32.1
PLASTICS Polycarbonate, PVC, Polypropylene	N/A	Profile	≤ 0.25	≤ 1.5	1200	RPM	36672	18336	14669	12224	9168
					(960-1440)	Fz	0.0009	0.0023	0.0036	0.0043	0.0058
						Feed 2 flutes (IPM)	63.8	84.3	105.6	105.1	106.3
						Feed 3 flutes (IPM)	127.6	168.7	211.2	210.3	212.7
		Slot	≤ 1	≤ 1	960	RPM	29338	14669	11735	9779	7334
					(768-1152)	Fz	0.0008	0.0020	0.0031	0.0038	0.0050
						Feed 2 flutes (IPM)	44.0	58.7	72.8	74.3	73.3
						Feed 3 flutes (IPM)	88.0	117.4	145.5	148.6	146.7

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x number of flutes x rpm
limit cut depths on long and extra long flute mills to .05 x D_1 when slotting or profiling
finish cuts typically require reduced feed and cut depths (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



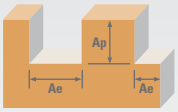
	Series 52, 54 Fractional		Flutes	Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	3/4	1
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	Profile				1360	RPM	41562	20781	13854	10390	6927	5195
							Fz	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
			2	≤ 0.3	≤ 1.5	(1088-1632)	Feed (IPM)	57.4	74.8	94.2	95.6	76.2	66.5
			4	≤ 0.3	≤ 1.5			114.7	149.6	188.4	191.2	152.4	133.0
		Slot				1090	RPM	33310	16655	11103	8328	5552	4164
							Fz	0.00063	0.0017	0.0032	0.0042	0.0050	0.0059
			2	1	≤ 1	(872-1308)	Feed (IPM)	42.0	56.6	71.1	70.0	55.5	49.1
			4	1	≤ 0.25			83.9	113.3	142.1	139.9	111.0	98.3
N	ALUMINUM DIE CAST ALLOYS (HIGH SILICON) A-390, A-392, B-390	Profile				510	RPM	15586	7793	5195	3896	2598	1948
							Fz	0.00069	0.0018	0.0034	0.0046	0.0055	0.0064
			2	≤ 0.3	≤ 1.5	(408-612)	Feed (IPM)	21.5	28.1	35.3	35.8	28.6	24.9
			4	≤ 0.3	≤ 1.5			43.0	56.1	70.7	71.7	57.1	49.9
		Slot				410	RPM	12530	6265	4177	3132	2088	1566
							Fz	0.00063	0.0017	0.0032	0.0042	0.0050	0.0059
			2	1	≤ 1	(328-492)	Feed (IPM)	15.8	21.3	26.7	26.3	20.9	18.5
			4	1	≤ 0.25			31.6	42.6	53.5	52.6	41.8	37.0
N	COPPER ALLOYS Aluminum Bronze, Nuntz Brass, Naval, Brass, Red Brass	Profile				590	RPM	18030	9015	6010	4508	3005	2254
							Fz	0.00039	0.0010	0.0020	0.0026	0.0031	0.0037
			2	≤ 0.3	≤ 1.5	(472-708)	Feed (IPM)	14.1	18.0	24.0	23.4	18.6	16.7
			4	≤ 0.3	≤ 1.5			28.1	36.1	48.1	46.9	37.3	33.4
		Slot				475	RPM	14516	7258	4839	3629	2419	1815
							Fz	0.00036	0.0010	0.0018	0.0024	0.0029	0.0034
			2	1	≤ 1	(380-570)	Feed (IPM)	10.5	14.5	17.4	17.4	14.0	12.3
			4	1	≤ 0.25			20.9	29.0	34.8	34.8	28.1	24.7
N	COPPER ALLOYS Beryllium Copper, C110, Manganese Bronze, Tin Bronze	Profile				235	RPM	7182	3591	2394	1795	1197	898
							Fz	0.00039	0.0010	0.0020	0.0026	0.0031	0.0037
			2	≤ 0.3	≤ 1.5	(188-282)	Feed (IPM)	5.6	7.2	9.6	9.3	7.4	6.6
			4	≤ 0.3	≤ 1.5			11.2	14.4	19.2	18.7	14.8	13.3
		Slot				190	RPM	5806	2903	1935	1452	968	726
							Fz	0.00036	0.0010	0.0018	0.0024	0.0029	0.0034
			2	1	≤ 1	(152-228)	Feed (IPM)	4.2	5.8	7.0	7.0	5.6	4.9
			4	1	≤ 0.25			8.4	11.6	13.9	13.9	11.2	9.9
	PLASTICS ABS, Polycarbonate, PVC, Polypropylene	Profile				1600	RPM	48896	24448	16299	12224	8149	6112
							Fz	0.00110	0.0030	0.0056	0.0074	0.0089	0.0100
			2	≤ 0.3	≤ 1.5	(1280-1920)	Feed (IPM)	107.6	146.7	182.5	180.9	145.1	122.2
			4	≤ 0.3	≤ 1.5			215.1	293.4	365.1	361.8	290.1	244.5
		Slot				1280	RPM	39117	19558	13039	9779	6519	4890
							Fz	0.00100	0.0027	0.0051	0.0068	0.0082	0.0095
			2	1	≤ 1	(1024-1536)	Feed (IPM)	78.2	105.6	133.0	133.0	106.9	92.9
			4	1	≤ 0.25			156.5	211.2	266.0	266.0	213.8	185.8
	PLASTICS Fiberglass, Glass Filled	Profile				1600	RPM	22003	11002	7334	5501	3667	2750
							Fz	0.00082	0.0022	0.0041	0.0055	0.0065	0.0076
			2	≤ 0.3	≤ 1.5	(1280-1920)	Feed (IPM)	36.1	48.4	60.1	60.5	47.7	41.8
			4	≤ 0.3	≤ 1.5			72.2	96.8	120.3	121.0	95.3	83.6
		Slot				1280	RPM	17572	8786	5857	4393	2929	2197
							Fz	0.00075	0.0020	0.0037	0.0050	0.0060	0.0070
			2	1	≤ 1	(1024-1536)	Feed (IPM)	26.4	35.1	43.3	43.9	35.1	30.8
			4	1	≤ 0.25			52.7	70.3	86.7	87.9	70.3	61.5

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x number of flutes x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



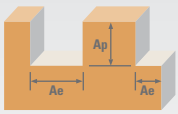
	Series 52, 54 Metric		Flutes	Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	10	12	20	25
N	ALUMINUM ALLOYS 2024, 5052, 5086, 6061, 6063, 7075	Profile				415	RPM	43947	21973	13184	10987	6592	5274
							Fz	0.0166	0.043	0.091	0.110	0.147	0.160
			2	≤ 0.3	≤ 1.5	(332-497)	Feed (mm/min)	1459	1890	2399	2417	1938	1688
			4	≤ 0.3	≤ 1.5			2918	3779	4799	4834	3876	3375
		Slot				332	RPM	35222	17611	10567	8806	5283	4227
							Fz	0.0151	0.041	0.085	0.101	0.133	0.148
			2	1	≤ 1	(266-399)	Feed (mm/min)	1064	1444	1796	1779	1405	1251
			4	1	≤ 0.25			2127	2888	3593	3557	2811	2502
N	ALUMINUM DIE CAST ALLOYS (HIGH SILICON) A-390, A-392, B-390	Profile				155	RPM	16480	8240	4944	4120	2472	1978
							Fz	0.0166	0.043	0.091	0.110	0.147	0.160
			2	≤ 0.3	≤ 1.5	(124-187)	Feed (mm/min)	547	709	900	906	727	633
			4	≤ 0.3	≤ 1.5			1094	1417	1800	1813	1454	1266
		Slot				125	RPM	13249	6624	3975	3312	1987	1590
							Fz	0.0151	0.041	0.085	0.101	0.133	0.148
			2	1	≤ 1	(100-150)	Feed (mm/min)	400	543	676	669	529	471
			4	1	≤ 0.25			800	1086	1351	1338	1057	941
N	COPPER ALLOYS Aluminum Bronze, Nuntz Brass, Naval, Brass, Red Brass	Profile				180	RPM	19065	9533	5720	4766	2860	2288
							Fz	0.0094	0.024	0.053	0.062	0.083	0.093
			2	≤ 0.3	≤ 1.5	(144-216)	Feed (mm/min)	358	458	606	591	475	426
			4	≤ 0.3	≤ 1.5			717	915	1213	1182	949	851
		Slot				145	RPM	15349	7675	4605	3837	2302	1842
							Fz	0.0086	0.024	0.048	0.058	0.077	0.085
			2	1	≤ 1	(116-174)	Feed (mm/min)	264	368	442	445	355	313
			4	1	≤ 0.25			528	737	884	890	709	626
N	COPPER ALLOYS Beryllium Copper, C110, Manganese Bronze, Tin Bronze	Profile				72	RPM	7594	3797	2278	1898	1139	911
							Fz	0.0094	0.024	0.053	0.062	0.083	0.093
			2	≤ 0.3	≤ 1.5	(57-86)	Feed (mm/min)	143	182	241	235	189	169
			4	≤ 0.3	≤ 1.5			286	365	483	471	378	339
		Slot				58	RPM	6140	3070	1842	1535	921	737
							Fz	0.0086	0.024	0.048	0.058	0.077	0.085
			2	1	≤ 1	(46-69)	Feed (mm/min)	106	147	177	178	142	125
			4	1	≤ 0.25			211	295	354	356	284	250
	PLASTICS ABS, Polycarbonate, PVC, Polypropylene	Profile				488	RPM	51702	25851	15511	12926	7755	6204
							Fz	0.0264	0.072	0.149	0.178	0.237	0.250
			2	≤ 0.3	≤ 1.5	(390-585)	Feed (mm/min)	2730	3723	4622	4601	3676	3102
			4	≤ 0.3	≤ 1.5			5460	7445	9244	9203	7352	6204
		Slot				390	RPM	41362	20681	12409	10340	6204	4963
							Fz	0.0240	0.065	0.136	0.163	0.210	0.238
			2	1	≤ 1	(312-468)	Feed (mm/min)	1985	2689	3375	3371	2606	2363
			4	1	≤ 0.25			3971	5377	6750	6742	5212	4725
	PLASTICS Fiberglass, Glass Filled	Profile				219	RPM	23266	11633	6980	5816	3490	2792
							Fz	0.0197	0.053	0.109	0.132	0.173	0.190
			2	≤ 0.3	≤ 1.5	(176-263)	Feed (mm/min)	917	1233	1522	1536	1208	1061
			4	≤ 0.3	≤ 1.5			1833	2466	3043	3071	2415	2122
		Slot				175	RPM	18580	9290	5574	4645	2787	2230
							Fz	0.0180	0.048	0.101	0.120	0.160	0.175
			2	1	≤ 1	(140-210)	Feed (mm/min)	669	892	1126	1115	892	780
			4	1	≤ 0.25			1338	1784	2252	2230	1784	1561

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x number of flutes x rpm
reduce speed and feed for materials harder than listed
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

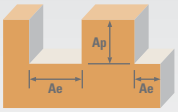


	Series 61 Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/4	3/8	1/2	3/4	1
P	**CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536**	≤ 175	Profile	≤ 0.5	≤ 1.5	500	RPM	7640	5093	3820	2547	1910
						(400-600)	Fz	0.0006	0.0011	0.0014	0.0017	0.0020
							Feed (IPM)	13.8	16.8	21.4	17.3	19.1
			Slot	1	≤ 1	400	RPM	6112	4075	3056	2037	1528
						(320-480)	Fz	0.0006	0.0011	0.0014	0.0017	0.0020
							Feed (IPM)	7.3	9.0	8.6	6.9	6.1
P	**ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100**	≤ 275	Profile	≤ 0.5	≤ 1.5	365	RPM	5577	3718	2789	1859	1394
						(292-438)	Fz	0.0004	0.0008	0.0011	0.0013	0.0015
							Feed (IPM)	4.5	5.9	6.1	4.8	4.2
			Slot	1	≤ 1	295	RPM	4508	3005	2254	1503	1127
						(236-354)	Fz	0.0004	0.0008	0.0011	0.0013	0.0015
							Feed (IPM)	3.6	4.8	5.0	3.9	3.4
P	**TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2**	≤ 250	Profile	≤ 0.5	≤ 1.5	345	RPM	5272	3514	2636	1757	1318
						(276-414)	Fz	0.0006	0.0009	0.0015	0.0018	0.0021
							Feed (IPM)	6.3	6.3	7.9	6.3	5.5
			Slot	1	≤ 1	275	RPM	4202	2801	2101	1401	1051
						(220-330)	Fz	0.0006	0.0009	0.0015	0.0018	0.0021
							Feed (IPM)	5.0	5.0	6.3	5.0	4.4
K	**CAST IRONS Gray, Mallable, Ductile**	≤ 220	Profile	≤ 0.5	≤ 1.5	365	RPM	5577	3718	2789	1859	1394
						(292-438)	Fz	0.0008	0.0015	0.0020	0.0024	0.0028
							Feed (IPM)	8.9	11.2	11.2	8.9	7.8
			Slot	1	≤ 1	295	RPM	4508	3005	2254	1503	1127
						(236-354)	Fz	0.0008	0.0015	0.0020	0.0024	0.0028
							Feed (IPM)	7.2	9.0	9.0	7.2	6.3

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x number of flutes x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

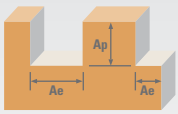
	Series 61M Metric	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	10	12	20	25
P	**CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536**	≤ 175	Profile	≤ 0.5	≤ 1.5	152	RPM	8078	4847	4039	2424	1939
						(122-183)	Fz	0.014	0.029	0.034	0.045	0.050
							Feed (mm/min)	339	422	549	436	485
			Slot	1	≤ 1	122	RPM	6463	3878	3231	1939	1551
						(98-146)	Fz	0.014	0.029	0.034	0.045	0.050
							Feed (mm/min)	271	337	439	349	388
P	**ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100**	≤ 275	Profile	≤ 0.5	≤ 1.5	111	RPM	5897	3538	2949	1769	1415
						(89-134)	Fz	0.010	0.021	0.026	0.035	0.038
							Feed (mm/min)	177	223	307	248	269
			Slot	1	≤ 1	90	RPM	4766	2860	2383	1430	1144
						(72-108)	Fz	0.010	0.021	0.026	0.035	0.038
							Feed (mm/min)	143	180	248	200	217
P	**TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2**	≤ 250	Profile	≤ 0.5	≤ 1.5	105	RPM	5574	3344	2787	1672	1338
						(84-126)	Fz	0.014	0.024	0.036	0.048	0.053
							Feed (mm/min)	234	241	401	321	355
			Slot	1	≤ 1	84	RPM	4443	2666	2222	1333	1066
						(67-101)	Fz	0.014	0.024	0.036	0.048	0.053
							Feed (mm/min)	187	192	320	256	283
K	**CAST IRONS Gray, Mallable, Ductile**	≤ 220	Profile	≤ 0.5	≤ 1.5	111	RPM	5897	3538	2949	1769	1415
						(89-134)	Fz	0.019	0.040	0.048	0.064	0.070
							Feed (mm/min)	336	425	566	453	495
			Slot	1	≤ 1	90	RPM	4766	2860	2383	1430	1144
						(72-108)	Fz	0.019	0.040	0.048	0.064	0.070
							Feed (mm/min)	272	343	458	366	400

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x number of flutes x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



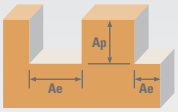
	Series 62 Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/4	3/8	1/2	3/4	1
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 275	Profile	≤ 0.5	≤ 1.5	405	RPM	6188	4126	3094	2063	1547
						(324-486)	Fz	0.0006	0.0011	0.0015	0.0019	0.0021
							Feed (IPM)	11.1	13.6	18.6	15.7	19.5
			Slot	1	≤ 1	325	RPM	4966	3311	2483	1655	1242
						(260-390)	Fz	0.0006	0.0011	0.0015	0.0019	0.0021
							Feed (IPM)	8.9	10.9	14.9	12.6	15.6
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4PH, 15-5PH, 13-4PH, Custom 450	≤ 275	Profile	≤ 0.5	≤ 1.5	280	RPM	4278	2852	2139	1426	1070
						(224-336)	Fz	0.0005	0.0009	0.0012	0.0015	0.0017
							Feed (IPM)	6.4	7.7	10.3	8.6	10.9
			Slot	1	≤ 1	225	RPM	3438	2292	1719	1146	860
						(180-270)	Fz	0.0005	0.0009	0.0012	0.0015	0.0017
							Feed (IPM)	5.2	6.2	8.3	6.9	8.8
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspalloy	≤ 300	Profile	≤ 0.5	≤ 1.5	70	RPM	1070	713	535	357	267
						(56-84)	Fz	0.0004	0.0008	0.0010	0.0013	0.0014
							Feed (IPM)	1.3	1.7	2.1	1.9	2.2
			Slot	1	≤ 1	56	RPM	856	570	428	285	214
						(45-67)	Fz	0.0004	0.0008	0.0010	0.0013	0.0014
							Feed (IPM)	1.0	1.4	1.7	1.5	1.8
S	TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al	≤ 350	Profile	≤ 0.5	≤ 1.5	155	RPM	2368	1579	1184	789	592
						(124-186)	Fz	0.0005	0.0009	0.0012	0.0015	0.0017
							Feed (IPM)	3.6	4.3	5.7	4.7	6.0
			Slot	1	≤ 1	195	RPM	2980	1986	1490	993	745
						(156-234)	Fz	0.0005	0.0009	0.0012	0.0015	0.0017
							Feed (IPM)	4.5	5.4	7.2	6.0	7.6

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x number of flutes x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



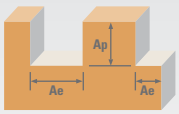
	Series 62M Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	10	12	20	25
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F, 440F	≤ 175	Profile	≤ 0.5	≤ 1.5	123	RPM	6544	3926	3272	1963	1570
						(99-148)	Fz	0.014	0.029	0.036	0.051	0.053
							Feed (mm/min)	283	345	471	398	495
			Slot	1	≤ 1	99	RPM	5251	3151	2626	1575	1260
						(79-119)	Fz	0.014	0.029	0.036	0.051	0.053
							Feed (mm/min)	227	277	378	319	397
M	STAINLESS STEELS (DIFFICULT) 304, 304L, 316, 316L, 17-4PH, 15-5PH, 13-4PH, Custom 450	≤ 275	Profile	≤ 0.5	≤ 1.5	85	RPM	4524	2714	2262	1357	1086
						(68-102)	Fz	0.012	0.024	0.029	0.040	0.043
							Feed (mm/min)	163	195	261	217	277
			Slot	1	≤ 1	69	RPM	3635	2181	1818	1091	872
						(55-82)	Fz	0.012	0.024	0.029	0.040	0.043
							Feed (mm/min)	131	157	209	174	222
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspalloy	≤ 250	Profile	≤ 0.5	≤ 1.5	21	RPM	1131	679	565	339	271
						(17-26)	Fz	0.010	0.021	0.024	0.035	0.035
							Feed (mm/min)	33	43	54	47	57
			Slot	1	≤ 1	17	RPM	905	543	452	271	217
						(14-20)	Fz	0.010	0.021	0.024	0.035	0.035
							Feed (mm/min)	26	35	43	38	46
S	TITANIUM ALLOYS Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al	≤ 220	Profile	≤ 0.5	≤ 1.5	47	RPM	2504	1503	1252	751	601
						(38-57)	Fz	0.012	0.024	0.029	0.040	0.043
							Feed (mm/min)	90	108	144	120	153
			Slot	1	≤ 1	59	RPM	3151	1890	1575	945	756
						(48-71)	Fz	0.012	0.024	0.029	0.040	0.043
							Feed (mm/min)	113	136	181	151	193

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x number of flutes x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

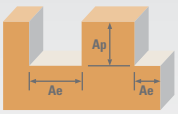


	Series MK2 Fractional	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 0.008	0.016	0.031	0.04	0.06
P	**CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536**	≤ 175	Profile	≤ 0.5	≤ 1.5	320	RPM	152800	76400	39432	30560	20373
						(256-384)	Fz	0.000018	0.000040	0.000070	0.000110	0.000140
							Feed (IPM)	5.5	6.1	5.5	6.7	5.7
			Slot	1	≤ 1	255	RPM	121763	60881	31423	24353	16235
						(204-306)	Fz	0.000016	0.000030	0.000060	0.000090	0.000130
							Feed (IPM)	3.9	3.7	3.8	4.4	4.2
P	**ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100**	≤ 275	Profile	≤ 0.5	≤ 1.5	235	RPM	112213	56106	28958	22443	14962
						(188-282)	Fz	0.000014	0.000030	0.000050	0.000080	0.000110
							Feed (IPM)	3.1	3.4	2.9	3.6	3.3
			Slot	1	≤ 1	190	RPM	90725	45363	23413	18145	12097
						(152-228)	Fz	0.000012	0.000020	0.000050	0.000070	0.000090
							Feed (IPM)	2.2	1.8	2.3	2.5	2.2
P	**TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2**	≤ 250	Profile	≤ 0.5	≤ 1.5	220	RPM	105050	52525	27110	21010	14007
						(176-264)	Fz	0.000014	0.000030	0.000050	0.000080	0.000110
							Feed (IPM)	2.9	3.2	2.7	3.4	3.1
			Slot	1	≤ 1	175	RPM	83563	41781	21565	16713	11142
						(140-210)	Fz	0.000012	0.000020	0.000050	0.000070	0.000090
							Feed (IPM)	2.0	1.7	2.2	2.3	2.0
K	**CAST IRONS Gray, Malleable, Ductile**	≤ 220	Profile	≤ 0.5	≤ 1.5	235	RPM	112213	56106	28958	22443	14962
						(188-282)	Fz	0.000018	0.000040	0.000070	0.000110	0.000140
							Feed (IPM)	4.0	4.5	4.1	4.9	4.2
			Slot	1	≤ 1	190	RPM	90725	45363	23413	18145	12097
						(152-228)	Fz	0.000016	0.000030	0.000060	0.000090	0.000130
							Feed (IPM)	2.9	2.7	2.8	3.3	3.1
M	**STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F**	≤ 275	Profile	≤ 0.5	≤ 1.5	260	RPM	124150	62075	32039	24830	16553
						(208-312)	Fz	0.000014	0.000030	0.000050	0.000080	0.000110
							Feed (IPM)	3.5	3.7	3.2	4.0	3.6
			Slot	1	≤ 1	210	RPM	100275	50138	25877	20055	13370
						(168-252)	Fz	0.000012	0.000020	0.000050	0.000070	0.000090
							Feed (IPM)	2.4	2.0	2.6	2.8	2.4
M	**STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L**	≤ 275	Profile	≤ 0.5	≤ 1.5	180	RPM	85950	42975	22181	17190	11460
						(144-216)	Fz	0.000011	0.000020	0.000040	0.000060	0.000090
							Feed (IPM)	1.9	1.7	1.8	2.1	2.1
			Slot	1	≤ 1	145	RPM	69238	34619	17868	13848	9232
						(116-174)	Fz	0.000010	0.000020	0.000040	0.000060	0.000080
							Feed (IPM)	1.4	1.4	1.4	1.7	1.5

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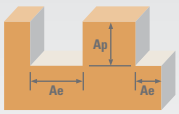
	Series MK2 Fractional	Hardness BRINELL		 Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 0.008	0.016	0.031	0.04	0.06
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, 718, Incoly 800, Monel 400, Rene, Waspalloy**	≤ 300	Profile	≤ 0.5	≤ 1.5	45	RPM	21488	10744	5545	4298	2865
						(36-54)	Fz	0.000009	0.000020	0.000040	0.000050	0.000070
							Feed (IPM)	0.4	0.4	0.4	0.4	0.4
			Slot	1	≤ 1	35	RPM	16713	8356	4313	3343	2228
						(28-42)	Fz	0.000008	0.000015	0.000030	0.000040	0.000060
							Feed (IPM)	0.3	0.3	0.3	0.3	0.3
S	**TITANIUM ALLOYS (DIFFICULT) Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al**	≤ 350	Profile	≤ 0.5	≤ 1.5	125	RPM	59688	29844	15403	11938	7958
						(100-150)	Fz	0.000011	0.000020	0.000040	0.000060	0.000090
							Feed (IPM)	1.3	1.2	1.2	1.4	1.4
			Slot	1	≤ 1	100	RPM	47750	23875	12323	9550	6367
						(80-120)	Fz	0.000010	0.000020	0.000040	0.000060	0.000080
							Feed (IPM)	1.0	1.0	1.0	1.1	1.0
N	**ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075**	≤ 150	Profile	≤ 0.5	≤ 1.5	800	RPM	382000	191000	98581	76400	50933
						(640-960)	Fz	0.000037	0.000070	0.000140	0.000220	0.000290
							Feed (IPM)	28.3	26.7	27.6	33.6	29.5
			Slot	1	≤ 1	640	RPM	305600	152800	78865	61120	40747
						(512-768)	Fz	0.000032	0.000060	0.000130	0.000190	0.000250
							Feed (IPM)	19.6	18.3	20.5	23.2	20.4
N	**COPPER ALLOYS Alum Bronze, C110, Muntz Brass**	≤ 140	Profile	≤ 0.5	≤ 1.5	240	RPM	114600	57300	29574	22920	15280
						(192-288)	Fz	0.000018	0.000040	0.000070	0.000110	0.000140
							Feed (IPM)	4.1	4.6	4.1	5.0	4.3
			Slot	1	≤ 1	190	RPM	90725	45363	23413	18145	12097
						(152-228)	Fz	0.000016	0.000030	0.000060	0.000090	0.000130
							Feed (IPM)	2.9	2.7	2.8	3.3	3.1
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ 0.5	≤ 1.5	800	RPM	382000	191000	98581	76400	50933
						(640-960)	Fz	0.000037	0.000070	0.000140	0.000220	0.000290
							Feed (IPM)	28.3	26.7	27.6	33.6	29.5
			Slot	1	≤ 1	640	RPM	305600	152800	78865	61120	40747
						(512-768)	Fz	0.000032	0.000060	0.000130	0.000190	0.000250
							Feed (IPM)	19.6	18.3	20.5	23.2	20.4
	GRAPHITE	≤ 140	Profile	≤ 0.5	≤ 1.5	600	RPM	286500	143250	73935	57300	38200
						(480-720)	Fz	0.000037	0.000070	0.000140	0.000220	0.000290
							Feed (IPM)	21.2	20.1	20.7	25.2	22.2
			Slot	1	≤ 1	480	RPM	229200	114600	59148	45840	30560
						(384-576)	Fz	0.000032	0.000060	0.000130	0.000190	0.000250
							Feed (IPM)	14.7	13.8	15.4	17.4	15.3

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 2 x rpm
reduce speed and feed for materials harder than listed
reduce speed to meet machine limitations
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)



	Series MK2 Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.2	0.41	0.79	1.02	1.52
P	**CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536**	≤ 175	Profile	≤ 0.5	≤ 1.5	98	RPM	155107	75662	39267	30413	20409
						(78-117)	Fz	0.00046	0.0010	0.0018	0.0028	0.0036
							Feed (mm/min)	143	151	141	170	147
			Slot	1	≤ 1	78	RPM	123601	60293	31291	24235	16263
						(62-93)	Fz	0.00041	0.0008	0.0015	0.0023	0.0033
							Feed (IPM)	101	96	94	111	107
P	**ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100**	≤ 275	Profile	≤ 0.5	≤ 1.5	72	RPM	113906	55564	28837	22335	14988
						(57-86)	Fz	0.00036	0.0008	0.0013	0.0002	0.0028
							Feed (IPM)	82	89	75	9	84
			Slot	1	≤ 1	58	RPM	92095	44924	23315	18058	12118
						(46-69)	Fz	0.00030	0.0005	0.0013	0.0018	0.0023
							Feed (IPM)	55	45	61	65	56
P	**TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2**	≤ 250	Profile	≤ 0.5	≤ 1.5	67	RPM	106636	52017	26996	20909	14031
						(54-80)	Fz	0.00036	0.0008	0.0013	0.0002	0.0028
							Feed (IPM)	77	83	70	8	79
			Slot	1	≤ 1	53	RPM	84824	41378	21474	16632	11161
						(43-64)	Fz	0.00030	0.0005	0.0013	0.0018	0.0023
							Feed (IPM)	51	41	56	60	51
K	**CAST IRONS Gray, Malleable, Ductile**	≤ 220	Profile	≤ 0.5	≤ 1.5	72	RPM	113906	55564	28837	22335	14988
						(57-86)	Fz	0.00046	0.0010	0.0018	0.0028	0.0036
							Feed (IPM)	105	111	104	125	108
			Slot	1	≤ 1	58	RPM	92095	44924	23315	18058	12118
						(46-69)	Fz	0.00041	0.0008	0.0015	0.0023	0.0033
							Feed (IPM)	76	72	70	83	80
M	**STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F**	≤ 275	Profile	≤ 0.5	≤ 1.5	79	RPM	126024	61475	31905	24711	16582
						(63-95)	Fz	0.00036	0.0008	0.0013	0.0002	0.0028
							Feed (IPM)	91	98	83	10	93
			Slot	1	≤ 1	64	RPM	101789	49653	25769	19959	13393
						(51-77)	Fz	0.00030	0.0005	0.0013	0.0018	0.0023
							Feed (IPM)	61	50	67	72	62
M	**STAINLESS STEELS (DIFFICULT) 304, 304L,316, 316L**	≤ 275	Profile	≤ 0.5	≤ 1.5	55	RPM	87247	42560	22088	17107	11480
						(44-66)	Fz	0.00028	0.0005	0.0010	0.0015	0.0023
							Feed (IPM)	49	43	44	51	53
			Slot	1	≤ 1	44	RPM	70283	34284	17793	13781	9248
						(35-53)	Fz	0.00025	0.0005	0.0010	0.0015	0.0020
							Feed (IPM)	35	34	36	41	37

continued on next page



	Series MK2 Metric	Hardness BRINELL		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 0.2	0.41	0.79	1.02	1.52
S	**SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, 718, Incoly 800, Monel 400, Rene, Waspalloy**	≤ 300	Profile	≤ 0.5	≤ 1.5	14	RPM	21812	10640	5522	4277	2870
						(11-16)	Fz	0.00023	0.0005	0.0010	0.0013	0.0018
							Feed (IPM)	10	11	11	11	10
			Slot	1	≤ 1	11	RPM	16965	8276	4295	3326	2232
						(9-13)	Fz	0.00020	0.0005	0.0008	0.0013	0.0015
							Feed (IPM)	7	8	7	9	7
S	**TITANIUM ALLOYS (DIFFICULT) Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti10Al2Fe3Al, Ti5Al53Mo3Cr, Ti7Al4Mo, Ti3Al8V6Cr4Zr4Mo, Ti6Al6V6Sn, Ti152 Cr3Sn3Al**	≤ 350	Profile	≤ 0.5	≤ 1.5	38	RPM	60589	29555	15339	11880	7972
						(30-46)	Fz	0.00028	0.0005	0.0010	0.0015	0.0023
							Feed (IPM)	34	30	31	36	37
			Slot	1	≤ 1	30	RPM	48471	23644	12271	9504	6378
						(24-37)	Fz	0.00025	0.0005	0.0010	0.0015	0.0020
							Feed (IPM)	24	24	25	29	26
N	**ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075**	≤ 150	Profile	≤ 0.5	≤ 1.5	244	RPM	387767	189154	98169	76033	51022
						(195-293)	Fz	0.00094	0.0018	0.0036	0.0056	0.0074
							Feed (IPM)	729	681	707	852	755
			Slot	1	≤ 1	195	RPM	310213	151324	78535	60826	40818
						(156-234)	Fz	0.00081	0.0015	0.0033	0.0048	0.0064
							Feed (IPM)	503	454	518	584	522
N	**COPPER ALLOYS Alum Bronze, C110, Muntz Brass**	≤ 140	Profile	≤ 0.5	≤ 1.5	73	RPM	116330	56746	29451	22810	15307
						(59-88)	Fz	0.00046	0.0010	0.0018	0.0028	0.0036
							Feed (IPM)	107	113	106	128	110
			Slot	1	≤ 1	58	RPM	92095	44924	23315	18058	12118
						(46-69)	Fz	0.00041	0.0008	0.0015	0.0023	0.0033
							Feed (IPM)	76	72	70	83	80
	PLASTICS Polycarbonate, PVC, Polypropylene		Profile	≤ 0.5	≤ 1.5	244	RPM	387767	189154	98169	76033	51022
						(195-293)	Fz	0.00094	0.0018	0.0036	0.0056	0.0074
							Feed (IPM)	729	681	707	852	755
			Slot	1	≤ 1	195	RPM	310213	151324	78535	60826	40818
						(156-234)	Fz	0.00081	0.0015	0.0033	0.0048	0.0064
							Feed (IPM)	503	454	518	584	522
	GRAPHITE	≤ 140	Profile	≤ 0.5	≤ 1.5	183	RPM	290825	141866	73627	57024	38266
						(146-219)	Fz	0.00094	0.0018	0.0036	0.0056	0.0074
							Feed (IPM)	547	511	530	639	566
			Slot	1	≤ 1	146	RPM	232660	113493	58901	45620	30613
						(117-176)	Fz	0.00081	0.0015	0.0033	0.0048	0.0064
							Feed (IPM)	377	340	389	438	392

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 2 x rpm
reduce speed and feed for materials harder than listed
reduce speed to meet machine limitations
reduce feed and Ae when finish milling (.02 x D_1 maximum)
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

Application Tips

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

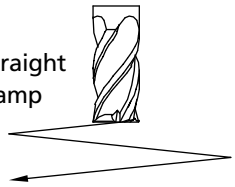


Pre-drilling is the preferred entry method for most applications.

Helical Ramp



Straight Ramp



Alternative methods are helical and straight ramping. High ramp angles require reduced feed. Lower ramp angles will allow higher feed rates and extend tool life. Use slotting speeds and feeds for ramp angles of 1° to 2°. Reduce feed to 25% when ramp angles approach 6°. General purpose tools and/or difficult to machine materials will require lower ramp angles and reduced feed.

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 (Ad)

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

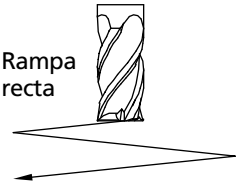


Preferentemente usar un barreno previo como método de entrada para la mayor parte de las aplicaciones.

Rampa helicoidal



Rampa recta



Los métodos alternativos son las rampas helicoidales y rectas. Un ángulo elevado de rampa necesita un avance reducido. Un ángulo de rampa inferior permitirá tasas de avance más elevadas y una mayor duración de la herramienta. Usar velocidades y alcances de ranurado para ángulos de rampa de 1° a 2°. Disminuir el avance un 25% cuando los ángulos de rampa se aproximan a 6°. Las herramientas de uso general y/o materiales difíciles de mecanizar precisarán ángulos de rampa inferiores y un avance reducido.

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

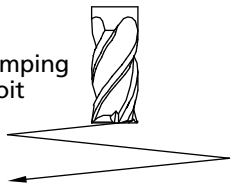


Le pré-perçage est la méthode préférable dans la plupart de applications.

Ramping hélicoïdal



Ramping droit



Les autres méthodes sont un ramping hélicoïdal et un ramping droit. Les angles de ramping élevés exigent une avance inférieure. Les angles de ramping inférieurs permettent les taux d'avance supérieurs et prolongeront la vie de l'outil. Utilisez des avances et vitesses de mortaisage pour les angles de ramping de 1° à 2°. Réduisez l'avance à 25 % lorsque les angles de ramping avoisinent 6°. Les outils tout usage et/ou les matériaux difficiles à usiner exigeront des angles de ramping inférieurs et une charge réduite.

Plongée



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

SGS

DRILLS



Hole Making

HIGH PERFORMANCE DRILLS	SERIES	PAGE
Hi-PerCarb Double Margin Drills	135 3xD, 135 5xD	163
ICe-Carb Internal Coolant Drills	140 5xD, 140 8xD	170
CFRP 8 Facet Drills	120	178
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Coolant Recommendations		194

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3 Flute Drills with 150 Point Geometry	103	209
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Taladrado

TALADROS DE ALTO RENDIMIENTO	SERIE	PÁGINA
Taladros de doble margen Hi-PerCarb	135 3xD, 135 5xD	163
Taladros con refrigerante interno ICe-Carb	140 5xD, 140 8xD	170
Taladros de 8 caras CFRP	120	178
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Refrigerantes recomendados		194

TALADROS DE USO GENERAL	SERIE	PÁGINA
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Taladro autocentrante de longitud corta • DIN 6539	108M Plus	203
Taladros de filo recto	106	206
Taladros de 3 filos con geometría de 150 puntos	103	209
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Avellanador de 3 filos	603	223
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Perceuse ICe-Carb à refroidissement interne	140 5xD, 140 8xD	170
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Agents de refroidissement recommandés		194

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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
ALCANCE
LONGUEUR

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)

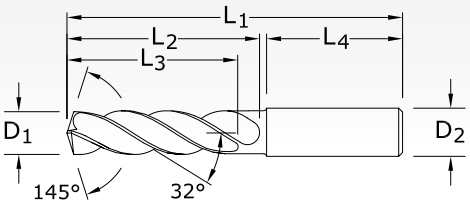


Di-NAMITE
(Diamond)

HI-PERCARB
HIGH PERFORMANCE CARBIDE DRILLS







135 3xD

FRACTIONAL & METRIC SERIES

TECH INFO 179–182

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 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.
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	63742
#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

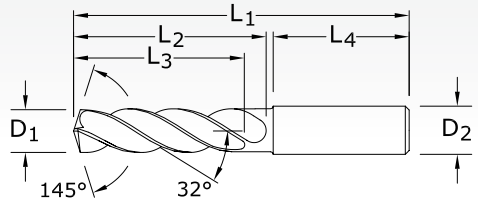
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- STEELS
- STAINLESS STEELS
- CAST IRON
- HIGH TEMP ALLOYS
- TITANIUM
- HARDENED STEELS

HI-PERCARB
HIGH PERFORMANCE CARBIDE DRILLS







135 3xD

FRACTIONAL & METRIC SERIES

TECH INFO 179–182

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

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.
#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	66,0mm	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
HIGH PERFORMANCE CARBIDE DRILLS



135 3xD

FRACTIONAL & METRIC SERIES

CONTINUED

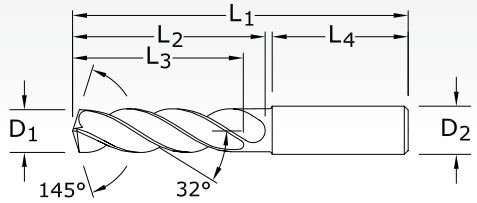
CUTTING DIAMETER D_1	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	SHANK LENGTH L_4	Ti-NAMITE-A (AlTiN) EDP NO.
B	0.2380		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51602
6.1mm	0.2402		8,0mm	79,0mm	34,0mm	28,0	36,0	63754
C	0.2420		1/4	3-1/8	1-5/16	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
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
R	0.3390		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51615

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HI-PERCARB
HIGH PERFORMANCE CARBIDE DRILLS







135 3xD

FRACTIONAL & METRIC SERIES

TECH INFO 179–182

- 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.
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	55,0mm	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
11.3mm	0.4449		12,0mm	102,0mm	55,0	45,0	45,0	63789

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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
HIGH PERFORMANCE CARBIDE DRILLS



135 3xD

FRACTIONAL & METRIC SERIES

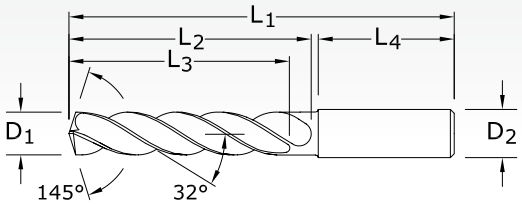
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CUTTING DIAMETER D_1	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	SHANK DIAMETER D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	SHANK LENGTH L_4	Ti-NAMITE-A (AlTiN) EDP NO.
11.4mm	0.4488		12,0mm	102,0mm	55,0	45,0	45,0	63790
11.5mm	0.4528	M12 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
HIGH PERFORMANCE CARBIDE DRILLS







135 5xD

FRACTIONAL SERIES

TECH INFO 183–184

- 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
HIGH PERFORMANCE CARBIDE DRILLS



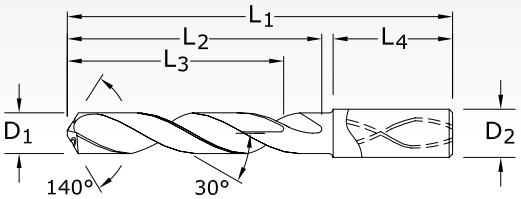
135 5xD
FRACTIONAL SERIES

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







140 5xD

FRACTIONAL & METRIC SERIES

TECH INFO 185–188

- 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

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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



140 5xD

FRACTIONAL & METRIC SERIES

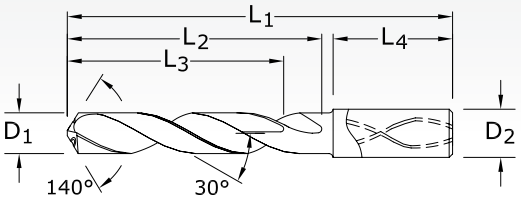
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CUTTING DIAMETER D_1	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	mm SHANK DIAMETER D_2	mm OVERALL LENGTH L_1	mm FLUTE LENGTH L_2	mm CLEARED LENGTH L_3	mm SHANK LENGTH L_4	EDP NO. Ti-NAMITE-A (AlTiN)
5,4 mm	0.2126		6,0	82,0	44,0	35,0	36,0	63998
5,5 mm	0.2165	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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140 5xD

FRACTIONAL & METRIC SERIES

TECH INFO 185–188

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

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	
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



140 5xD

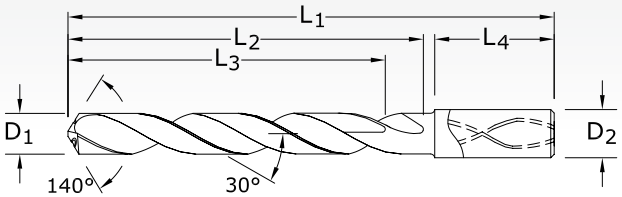
FRACTIONAL & METRIC SERIES

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







140 8xD

FRACTIONAL & METRIC SERIES

TECH INFO 189–192

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

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	
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



140 8xD

FRACTIONAL & METRIC SERIES

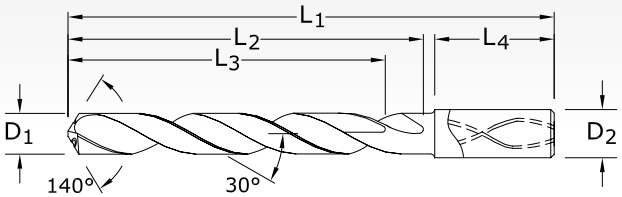
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CUTTING DIAMETER D_1	DECIMAL EQUIV.	TAP SIZE REFERENCE ONLY	mm SHANK DIAMETER D_2	mm OVERALL LENGTH L_1	mm FLUTE LENGTH L_2	mm CLEARED LENGTH L_3	mm SHANK LENGTH L_4	EDP NO. Ti-NAMITE-A (AlTiN)
5,4 mm	0.2126		6,0	95,0	57,0	48,0	36,0	63599
5,5 mm	0.2165	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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140 8xD

FRACTIONAL & METRIC SERIES

TECH INFO 189–192

- 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



140 8xD

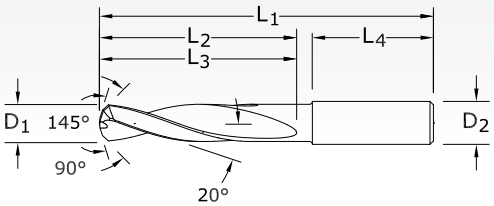
FRACTIONAL & METRIC SERIES

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	
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







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FRACTIONAL & METRIC SERIES

TECH INFO 193

PLASTICS/COMPOSITES

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	0.1285	1/4	2-1/2	3/4	1-7/16	50005
#28	0.1405	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	0.1614	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	0.1719	1/4	2-5/8	7/8	1-7/16	50011
3/16	0.1875	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	0.3125	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	0.3937	10,0	89,0	47,0	40,0	50028
7/16	0.4375	1/2	4-1/4	2-3/16	1-9/16	50029
12,0 mm	0.4724	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

TOLERANCES (inch)

D_1= +.0000/–.0005

D_2 = h_6

TOLERANCES (mm)

D_1 = +0,000/–0,013

D_2 = h_6

	Series 135 3D Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/32	1/8	1/4	3/8	1/2	5/8	7/8
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	400	RPM	48896	12224	6112	4075	3056	2445	1746
			(320-480)	Fr	0.001	0.0040	0.0080	0.0120	0.0160	0.0200	0.0280
				Feed (IPM)	48.9	48.9	48.9	48.9	48.9	48.9	48.9
		> 200 ≤ 300	350	RPM	42784	10696	5348	3565	2674	2139	1528
			(280-420)	Fr	0.0009	0.0035	0.0070	0.0105	0.0140	0.0175	0.0245
				Feed (IPM)	38.5	37.4	37.4	37.4	37.4	37.4	37.4
		> 300 ≤ 420	160	RPM	19558	4890	2445	1630	1222	978	699
			(128-192)	Fz	0.0008	0.0030	0.0060	0.0090	0.0120	0.0150	0.0210
				Feed (IPM)	15.6	14.7	14.7	14.7	14.7	14.7	14.7
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	300	RPM	36672	9168	4584	3056	2292	1834	1310
			(240-360)	Fz	0.0008	.0030	0.0060	0.0090	0.0120	0.0150	0.0210
				Feed (IPM)	29.3	27.5	27.5	27.5	27.5	27.5	27.5
		> 275 ≤ 375	220	RPM	26893	6723	3362	2241	1681	1345	960
			(176-264)	Fr	0.0006	.0025	0.0050	0.0075	0.0100	0.0125	0.0175
				Feed (IPM)	16.1	16.8	16.8	16.8	16.8	16.8	16.8
		> 375 ≤ 450	120	RPM	14669	3667	1834	1222	917	733	524
			(96-144)	Fr	0.0005	.0018	0.0035	0.0055	0.0070	0.0090	0.0125
				Feed (IPM)	7.3	6.6	6.4	6.7	6.4	6.6	6.5
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	220	RPM	26893	6723	3362	2241	1681	1345	960
			(176-264)	Fr	0.0006	0.0025	0.0050	0.0075	0.0100	0.0125	0.0175
				Feed (IPM)	16.1	16.8	16.8	16.8	16.8	16.8	16.8
		> 250 ≤ 330	150	RPM	18336	4584	2292	1528	1146	917	655
			(120-180)	Fr	0.0005	0.0018	0.0035	0.0055	0.0070	0.0090	0.0125
				Feed (IPM)	9.2	8.0	8.0	8.4	8.0	8.3	8.2
		> 330 ≤ 450	70	RPM	8557	2139	1070	713	535	428	306
			(56-84)	Fr	0.0003	0.0010	0.0020	0.0030	0.0040	0.0050	0.0070
				Feed (IPM)	2.6	2.1	2.1	2.1	2.1	2.1	2.1
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	400	RPM	48896	12224	6112	4075	3056	2445	1746
			(320-480)	Fr	0.0013	0.0050	0.0100	0.0150	0.0200	0.0250	0.0350
				Feed (IPM)	63.6	61.1	61.1	61.1	61.1	61.1	61.1
		> 200 ≤ 330	250	RPM	30560	7640	3820	2547	1910	1528	1091
			(200-300)	Fr	0.0011	0.0045	0.0090	0.0135	0.0180	0.0225	0.0315
				Feed (IPM)	33.6	34.4	34.4	34.4	34.4	34.4	34.4
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	200	RPM	24448	6112	3056	2037	1528	1222	873
			(160-240)	Fr	0.0006	0.0025	0.0050	0.0075	0.0100	0.0125	0.0175
				Feed (IPM)	14.7	15.3	15.3	15.3	15.3	15.3	15.3
		> 250 ≤ 330	150	RPM	18336	4584	2292	1528	1146	917	655
			(120-180)	Fr	0.0005	0.0018	0.0035	0.0055	0.0070	0.0090	0.0125
				Feed (IPM)	9.2	8.0	8.0	8.4	8.0	8.3	8.2

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HI-PERCARB
HIGH PERFORMANCE CARBIDE DRILLS

	Series 135 3D Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/32	1/8	1/4	3/8	1/2	5/8	7/8
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	> 270 ≤ 370	90	RPM	11002	2750	1375	917	688	550	393
			(72-108)	Fr	0.0005	0.0018	0.0035	0.0055	0.0070	0.0090	0.0125
				Feed (IPM)	5.5	5.0	4.8	5.0	4.8	5.0	4.9
		> 270 ≤ 370	70	RPM	8557	2139	1070	713	535	428	306
			(56-84)	Fr	0.0004	0.0015	0.0030	0.0045	0.0060	0.0075	0.0105
				Feed (IPM)	3.4	3.2	3.2	3.2	3.2	3.2	3.2
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	60	RPM	7334	1834	917	611	458	367	262
			(48-72)	Fr	0.0003	0.0010	0.0020	0.0030	0.0040	0.0050	0.0070
				Feed (IPM)	2.2	1.8	1.8	1.8	1.8	1.8	1.8
		> 220 ≤ 330	40	RPM	4890	1222	611	407	306	244	175
			(32-48)	Fr	0.0002	0.0008	0.0015	0.0025	0.0030	0.0040	0.0055
				Feed (IPM)	1.0	0.9	0.9	1.0	0.9	1.0	1.0
		> 330 ≤ 420	30	RPM	3667	917	458	306	229	183	131
			(24-36)	Fr	0.0001	0.0003	0.0010	0.0015	0.0020	0.0025	0.0035
				Feed (IPM)	0.4	0.3	0.5	0.5	0.5	0.5	0.5
S	TITANIUM ALLOYS (DIFFICULT) Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	120	RPM	14669	3667	1834	1222	917	733	524
			(96-144)	Fr	0.0005	0.0018	0.0035	0.0055	0.0070	0.0090	0.0125
				Feed (IPM)	7.3	6.4	6.4	6.7	6.4	6.6	6.5
		> 280 ≤ 350	100	RPM	12224	3056	1528	1019	764	611	437
			(80-120)	Fr	0.0004	0.0015	0.0030	0.0045	0.0060	0.0075	0.0105
				Feed (IPM)	4.9	4.6	4.6	4.6	4.6	4.6	4.6
		> 350 ≤ 440	70	RPM	8557	2139	1070	713	535	428	306
			(56-84)	Fr	0.0003	0.0013	0.0025	0.0040	0.0050	0.0065	0.0090
				Feed (IPM)	2.6	2.7	2.7	2.9	2.7	2.8	2.8
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	700	RPM	85568	21392	10696	7131	5348	4278	3056
			(560-840)	Fr	0.0014	0.0055	0.0110	0.0165	0.0220	0.0275	0.0385
				Feed (IPM)	119.8	117.7	117.7	117.7	117.7	117.7	117.7
		> 80	600	RPM	73344	18336	9168	6112	4584	3667	2619
			(480-720)	Fr	0.0013	0.0050	0.0100	0.0150	0.0200	0.0250	0.0350
				Feed (IPM)	95.3	91.7	91.7	91.7	91.7	91.7	91.7
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	500	RPM	61120	15280	7640	5093	3820	3056	2183
			(400-600)	Fr	0.0005	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140
				Feed (IPM)	30.6	30.6	30.6	30.6	30.6	30.6	30.6
		> 140	400	RPM	48896	12224	6112	4075	3056	2445	1746
			(320-480)	Fr	0.0005	0.0020	0.0040	0.0060	0.0080	0.0100	0.0140
				Feed (IPM)	24.4	24.4	24.4	24.4	24.4	24.4	24.4

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 135M 3D Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	16	20
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	122	RPM	12926	6463	4847	3878	3231	2424	1939
			(98-146)	Fr	0.095	0.195	0.255	0.320	0.385	0.515	0.640
				Feed (mm/min)	1228	1260	1236	1241	1244	1248	1241
		> 200 ≤ 300	107	RPM	11310	5655	4241	3393	2827	2121	1696
			(85-128)	Fr	0.085	0.170	0.225	0.280	0.340	0.450	0.560
				Feed (mm/min)	961	961	954	950	961	954	950
		> 300 ≤ 420	49	RPM	5170	2585	1939	1551	1293	969	776
			(39-59)	Fz	0.070	0.145	0.190	0.240	0.290	0.385	0.480
				Feed (mm/min)	362	375	368	372	375	373	372
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	91	RPM	9694	4847	3635	2908	2424	1818	1454
			(73-110)	Fz	0.070	0.145	0.190	0.240	0.290	0.385	0.480
				Feed (mm/min)	679	703	691	698	703	700	698
		> 275 ≤ 375	67	RPM	7109	3555	2666	2133	1777	1333	1066
			(54-80)	Fr	0.060	0.120	0.160	0.200	0.240	0.320	0.400
				Feed (mm/min)	427	427	427	427	427	427	427
		> 375 ≤ 450	37	RPM	3878	1939	1454	1163	969	727	582
			(29-44)	Fr	0.040	0.085	0.115	0.145	0.170	0.230	0.285
				Feed (mm/min)	155	165	167	169	165	167	166
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	67	RPM	7109	3555	2666	2133	1777	1333	1066
			(54-80)	Fr	0.060	0.120	0.160	0.200	0.240	0.320	0.400
				Feed (mm/min)	427	427	427	427	427	427	427
		> 250 ≤ 330	46	RPM	4847	2424	1818	1454	1212	909	727
			(37-55)	Fr	0.040	0.085	0.115	0.145	0.170	0.230	0.285
				Feed (mm/min)	194	206	209	211	206	209	207
		> 330 ≤ 450	21	RPM	2262	1131	848	679	565	424	339
			(17-26)	Fr	0.025	0.050	0.065	0.080	0.095	0.130	0.160
				Feed (mm/min)	57	57	55	54	54	55	54
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	122	RPM	12926	6463	4847	3878	3231	2424	1939
			(98-146)	Fr	0.120	0.240	0.320	0.400	0.485	0.640	0.800
				Feed (mm/min)	1551	1551	1551	1551	1567	1551	1551
		> 200 ≤ 330	76	RPM	8078	4039	3029	2424	2020	1515	1212
			(61-91)	Fr	0.110	0.215	0.290	0.360	0.435	0.575	0.720
				Feed (mm/min)	889	868	879	872	879	871	872
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	61	RPM	6463	3231	2424	1939	1616	1212	969
			(49-73)	Fr	0.060	0.120	0.160	0.200	0.240	0.320	0.400
				Feed (mm/min)	388	388	388	388	388	388	388
		> 250 ≤ 330	46	RPM	4847	2424	1818	1454	1212	909	727
			(37-55)	Fr	0.050	0.095	0.130	0.160	0.195	0.255	0.320
				Feed (mm/min)	242	230	236	233	236	232	233

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HIGH PERFORMANCE CARBIDE DRILLS

	Series 135M 3D Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	16	20
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	> 270 ≤ 370	27	RPM	2908	1454	1091	872	727	545	436
			(22-33)	Fr	0.035	0.070	0.095	0.120	0.145	0.190	0.240
				Feed (mm/min)	102	102	104	105	105	104	105
		> 270 ≤ 370	21	RPM	2262	1131	848	679	565	424	339
			(17-26)	Fr	0.035	0.070	0.095	0.120	0.145	0.190	0.240
				Feed (mm/min)	79	79	81	81	82	81	81
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	18	RPM	1939	969	727	582	485	364	291
			(15-22)	Fr	0.025	0.050	0.065	0.080	0.095	0.130	0.160
				Feed (mm/min)	48	48	47	47	46	47	47
		> 220 ≤ 330	12	RPM	1293	646	485	388	323	242	194
			(10-15)	Fr	0.020	0.035	0.050	0.065	0.070	0.105	0.125
				Feed (mm/min)	26	23	24	25	23	25	24
		> 330 ≤ 420	9	RPM	969	485	364	291	242	182	145
			(7-11)	Fr	0.010	0.025	0.030	0.040	0.050	0.065	0.080
				Feed (mm/min)	10	12	11	12	12	12	12
S	TITANIUM ALLOYS (DIFFICULT) Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	37	RPM	3878	1939	1454	1163	969	727	582
			(29-44)	Fr	0.040	0.085	0.115	0.145	0.170	0.230	0.285
				Feed (mm/min)	155	165	167	169	165	167	166
		> 280 ≤ 350	30	RPM	3231	1616	1212	969	808	606	485
			(24-37)	Fr	0.035	0.070	0.095	0.120	0.145	0.190	0.240
				Feed (mm/min)	113	113	115	116	117	115	116
		> 350 ≤ 440	21	RPM	2262	1131	848	679	565	424	339
			(17-26)	Fr	0.030	0.060	0.085	0.105	0.120	0.165	0.205
				Feed (mm/min)	68	68	72	71	68	70	70
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	213	RPM	22620	11310	8482	6786	5655	4241	3393
			(171-256)	Fr	0.135	0.265	0.355	0.440	0.530	0.705	0.880
				Feed (mm/min)	3054	2997	3011	2986	2997	2990	2986
		> 80	183	RPM	19388	9694	7271	5816	4847	3635	2908
			(146-219)	Fr	0.120	0.240	0.320	0.400	0.485	0.640	0.800
				Feed (mm/min)	2327	2327	2327	2327	2351	2327	2327
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	152	RPM	16157	8078	6059	4847	4039	3029	2424
			(122-183)	Fr	0.050	0.095	0.130	0.160	0.195	0.255	0.320
				Feed (mm/min)	808	767	788	776	788	773	776
		> 140	122	RPM	12926	6463	4847	3878	3231	2424	1939
			(98-146)	Fr	0.050	0.095	0.130	0.160	0.195	0.255	0.320
				Feed (mm/min)	646	614	630	620	630	618	620

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 135 5D Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	5/8	3/4
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	360	RPM	11002	7334	5501	3667	2750	2200	1834
			(288-432)	Fr	0.0040	0.0060	0.0080	0.0120	0.0160	0.0200	0.0280
				Feed (IPM)	44.0	44.0	44.0	44.0	44.0	44.0	51.3
		> 200 ≤ 300	310	RPM	9474	6316	4737	3158	2368	1895	1579
			(248-372)	Fr	0.0035	0.0053	0.0070	0.0105	0.0140	0.0175	0.0245
				Feed (IPM)	33.2	33.5	33.2	33.2	33.2	33.2	38.7
		> 300 ≤ 420	150	RPM	4584	3056	2292	1528	1146	917	764
			(120-180)	Fz	0.0030	0.0045	0.0060	0.0090	0.0120	0.0150	0.0210
				Feed (IPM)	13.8	13.8	13.8	13.8	13.8	13.8	16.0
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 270	270	RPM	8251	5501	4126	2750	2063	1650	1375
			(216-324)	Fz	0.0030	0.0045	0.0060	0.0090	0.0120	0.0150	0.0210
				Feed (IPM)	24.8	24.8	24.8	24.8	24.8	24.8	28.9
		> 270 ≤ 370	200	RPM	6112	4075	3056	2037	1528	1222	1019
			(160-240)	Fr	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0175
				Feed (IPM)	15.3	15.5	15.3	15.3	15.3	15.3	17.8
		> 375 ≤ 450	110	RPM	3362	2241	1681	1121	840	672	560
			(88-132)	Fr	0.0018	0.0026	0.0035	0.0055	0.0070	0.0090	0.0125
				Feed (IPM)	5.9	5.8	5.9	6.2	5.9	6.1	7.0
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	200	RPM	6112	4075	3056	2037	1528	1222	1019
			(160-240)	Fr	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0175
				Feed (IPM)	15.3	15.5	15.3	15.3	15.3	15.3	17.8
		> 250 ≤ 330	130	RPM	3973	2649	1986	1324	993	795	662
			(104-156)	Fr	0.0018	0.0027	0.0035	0.0055	0.0070	0.0090	0.0125
				Feed (IPM)	7.0	7.2	7.0	7.3	7.0	7.2	8.3
		> 330 ≤ 450	60	RPM	1834	1222	917	611	458	367	306
			(48-72)	Fr	0.0010	0.0015	0.0020	0.0030	0.0040	0.0050	0.0070
				Feed (IPM)	1.8	1.8	1.8	1.8	1.8	1.8	2.1
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	360	RPM	11002	7334	5501	3667	2750	2200	1834
			(288-432)	Fr	0.0050	0.0075	0.0100	0.0150	0.0200	0.0250	0.0350
				Feed (IPM)	55.0	55.0	55.0	55.0	55.0	55.0	64.2
		> 200 ≤ 330	230	RPM	7029	4686	3514	2343	1757	1406	1171
			(184-276)	Fr	0.0045	0.0068	0.0090	0.0135	0.0180	0.0225	0.0315
				Feed (IPM)	31.6	31.9	31.6	31.6	31.6	31.6	36.9
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	180	RPM	5501	3667	2750	1834	1375	1100	917
			(144-216)	Fr	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0175
				Feed (IPM)	13.8	13.9	13.8	13.8	13.8	13.8	16.0
		> 250 ≤ 330	130	RPM	3973	2649	1986	1324	993	795	662
			(104-156)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0140
				Feed (IPM)	7.9	7.9	7.9	7.9	7.9	7.9	9.3

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HIGH PERFORMANCE CARBIDE DRILLS

	Series 135 5D Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	5/8	3/4
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	> 270 ≤ 370	80	RPM	2445	1630	1222	815	611	489	407
			(64-96)	Fr	0.0018	0.0026	0.0035	0.0055	0.0070	0.0090	0.0125
				Feed (IPM)	4.3	4.2	4.3	4.5	4.3	4.4	5.1
		> 270 ≤ 370	60	RPM	1834	1222	917	611	458	367	306
			(48-72)	Fr	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0105
				Feed (IPM)	2.8	2.8	2.8	2.8	2.8	2.8	3.2
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	50	RPM	1528	1019	764	509	382	306	255
			(40-60)	Fr	0.0010	0.0015	0.0020	0.0030	0.0040	0.0050	0.0070
				Feed (IPM)	1.5	1.5	1.5	1.5	1.5	1.5	1.8
		> 220 ≤ 330	30	RPM	917	611	458	306	229	183	153
			(24-36)	Fr	0.0008	0.0012	0.0015	0.0025	0.0030	0.0040	0.0055
				Feed (IPM)	0.7	0.7	0.7	0.8	0.7	0.7	0.8
		> 330 ≤ 420	20	RPM	611	407	306	204	153	122	102
			(16-24)	Fr	0.0005	0.0008	0.0010	0.0015	0.0020	0.0025	0.0035
				Feed (IPM)	0.3	0.3	0.3	0.3	0.3	0.3	0.4
S	TITANIUM ALLOYS (DIFFICULT) Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	100	RPM	3056	2037	1528	1019	764	611	509
			(80-120)	Fr	0.0018	0.0027	0.0035	0.0055	0.0070	0.0090	0.0125
				Feed (IPM)	5.3	5.5	5.3	5.6	5.3	5.5	6.4
		> 280 ≤ 350	80	RPM	2445	1630	1222	815	611	489	407
			(64-96)	Fr	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0105
				Feed (IPM)	3.7	3.7	3.7	3.7	3.7	3.7	4.3
		> 350 ≤ 440	60	RPM	1834	1222	917	611	458	367	306
			(48-72)	Fr	0.0013	0.0019	0.0025	0.0040	0.0050	0.0065	0.0090
				Feed (IPM)	2.3	2.3	2.3	2.4	2.3	2.4	2.8
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	630	RPM	19253	12835	9626	6418	4813	3851	3209
			(504-756)	Fr	0.0055	0.0083	0.0110	0.0165	0.0220	0.0275	0.0385
				Feed (IPM)	105.9	106.5	105.9	105.9	105.9	105.9	123.5
		> 80	540	RPM	16502	11002	8251	5501	4126	3300	2750
			(432-648)	Fr	0.0050	0.0075	0.0100	0.0150	0.0200	0.0250	0.0350
				Feed (IPM)	82.5	82.5	82.5	82.5	82.5	82.5	96.3
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	450	RPM	13752	9168	6876	4584	3438	2750	2292
			(360-540)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0140
				Feed (IPM)	27.5	27.5	27.5	27.5	27.5	27.5	32.1
		> 140	360	RPM	11002	7334	5501	3667	2750	2200	1834
			(288-432)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0140
				Feed (IPM)	22.0	22.0	22.0	22.0	22.0	22.0	25.7

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 140 5D Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	5/8	3/4
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	440	RPM	13446	8964	6723	4482	3362	2689	2241
			(352-528)	Fr	0.0040	0.0060	0.0080	0.0120	0.0160	0.0200	0.0240
				Feed (IPM)	53.8	53.8	53.8	53.8	53.8	53.8	53.8
		> 200 ≤ 300	380	RPM	11613	7742	5806	3871	2903	2323	1935
			(304-456)	Fr	0.0035	0.0053	0.0070	0.0105	0.0140	0.0175	0.0210
				Feed (IPM)	40.6	41.0	40.6	40.6	40.6	40.6	40.6
		> 300 ≤ 420	180	RPM	5501	3667	2750	1834	1375	1100	917
			(144-216)	Fz	0.0030	0.0045	0.0060	0.0090	0.0120	0.0150	0.0180
				Feed (IPM)	16.5	16.5	16.5	16.5	16.5	16.5	16.5
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 270	330	RPM	10085	6723	5042	3362	2521	2017	1681
			(264-396)	Fz	0.0030	0.0045	0.0060	0.0090	0.0120	0.0150	0.0180
				Feed (IPM)	30.3	30.3	30.3	30.3	30.3	30.3	30.3
		> 270 ≤ 370	240	RPM	7334	4890	3667	2445	1834	1467	1222
			(192-288)	Fr	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0150
				Feed (IPM)	18.3	18.6	18.3	18.3	18.3	18.3	18.3
		> 375 ≤ 450	140	RPM	4278	2852	2139	1426	1070	856	713
			(112-168)	Fr	0.0018	0.0027	0.0035	0.0055	0.0070	0.0090	0.0110
				Feed (IPM)	7.7	7.7	7.5	7.8	7.5	7.7	7.8
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	240	RPM	7334	4890	3667	2445	1834	1467	1222
			(192-288)	Fr	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0150
				Feed (IPM)	18.3	18.6	18.3	18.3	18.3	18.3	18.3
		> 250 ≤ 330	180	RPM	5501	3667	2750	1834	1375	1100	917
			(144-216)	Fr	0.0018	0.0027	0.0035	0.0055	0.0070	0.0090	0.0110
				Feed (IPM)	9.9	9.9	9.6	10.1	9.6	9.9	10.1
		> 330 ≤ 450	90	RPM	2750	1834	1375	917	688	550	458
			(72-108)	Fr	0.0010	0.0015	0.0020	0.0030	0.0040	0.0050	0.0060
				Feed (IPM)	2.8	2.8	2.8	2.8	2.8	2.8	2.8
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	440	RPM	13446	8964	6723	4482	3362	2689	2241
			(352-528)	Fr	0.0050	0.0075	0.0100	0.0150	0.0200	0.0250	0.0300
				Feed (IPM)	67.2	67.2	67.2	67.2	67.2	67.2	67.2
		> 200 ≤ 330	280	RPM	8557	5705	4278	2852	2139	1711	1426
			(224-336)	Fr	0.0045	0.0068	0.0090	0.0135	0.0180	0.0225	0.0270
				Feed (IPM)	38.5	38.8	38.5	38.5	38.5	38.5	38.5
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	220	RPM	6723	4482	3362	2241	1681	1345	1121
			(176-264)	Fr	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0150
				Feed (IPM)	16.8	17.0	16.8	16.8	16.8	16.8	16.8
		> 250 ≤ 330	170	RPM	5195	3463	2598	1732	1299	1039	866
			(136-204)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
				Feed (IPM)	10.4	10.4	10.4	10.4	10.4	10.4	10.4

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IC Carb
High Performance Internal Coolant Drills

	Series 140 5D Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	5/8	3/4
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	> 270	150	RPM	4584	3056	2292	1528	1146	917	764
			(120-180)	Fr	0.0018	0.0027	0.0035	0.0055	0.0070	0.0090	0.0110
				Feed (IPM)	8.3	8.3	8.0	8.4	8.0	8.3	8.4
		> 270 ≤ 370	120	RPM	3667	2445	1834	1222	917	733	611
			(96-144)	Fr	0.0012	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
				Feed (IPM)	4.4	132.0	5.5	5.5	5.5	5.5	5.5
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	100	RPM	3056	2037	1528	1019	764	611	509
			(80-120)	Fr	0.0010	0.0015	0.0020	0.0030	0.0040	0.0050	0.0060
				Feed (IPM)	3.1	3.1	3.1	3.1	3.1	3.1	3.1
		> 220 ≤ 330	70	RPM	2139	1426	1070	713	535	428	357
			(56-84)	Fr	0.0008	0.0012	0.0015	0.0025	0.0030	0.0040	0.0050
				Feed (IPM)	1.7	1.7	1.6	1.8	1.6	1.7	1.8
		> 330 ≤ 420	50	RPM	1528	1019	764	509	382	306	255
			(40-60)	Fr	0.0005	0.0008	0.0010	0.0015	0.0020	0.0025	0.0030
				Feed (IPM)	0.8	0.8	0.8	0.8	0.8	0.8	0.8
S	TITANIUM ALLOYS (DIFFICULT) Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	200	RPM	6112	4075	3056	2037	1528	1222	1019
			(160-240)	Fr	0.0018	0.0027	0.0035	0.0055	0.0070	0.0090	0.0110
				Feed (IPM)	11.0	11.0	10.7	11.2	10.7	11.0	11.2
		> 280 ≤ 350	160	RPM	4890	3260	2445	1630	1222	978	815
			(128-192)	Fr	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
				Feed (IPM)	7.3	7.5	7.3	7.3	7.3	7.3	7.3
		> 350 ≤ 440	120	RPM	3667	2445	1834	1222	917	733	611
			(96-144)	Fr	0.0013	0.0019	0.0025	0.0040	0.0050	0.0065	0.0080
				Feed (IPM)	4.8	4.6	4.6	4.9	4.6	4.8	4.9
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	770	RPM	23531	15687	11766	7844	5883	4706	3922
			(616-924)	Fr	0.0055	0.0083	0.0110	0.0165	0.0220	0.0275	0.0330
				Feed (IPM)	129.4	130.2	129.4	129.4	129.4	129.4	129.4
		> 80	660	RPM	20170	13446	10085	6723	5042	4034	3362
			(528-792)	Fr	0.0050	0.0075	0.0100	0.0150	0.0200	0.0250	0.0300
				Feed (IPM)	100.8	100.8	100.8	100.8	100.8	100.8	100.8
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	550	RPM	16808	11205	8404	5603	4202	3362	2801
			(440-660)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
				Feed (IPM)	33.6	33.6	33.6	33.6	33.6	33.6	33.6
		> 140	440	RPM	13446	8964	6723	4482	3362	2689	2241
			(352-528)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
				Feed (IPM)	26.9	26.9	26.9	26.9	26.9	26.9	26.9

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

IC Carb
High Performance Internal Coolant Drills

	Series 140M 5D Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	14	16
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	134	RPM	14206	7103	5327	4262	3552	3044	2664
			(107-161)	Fr	0.145	0.195	0.255	0.320	0.385	0.450	0.515
				Feed (mm/min)	2060	1385	1358	1364	1367	1370	1372
		> 200 ≤ 300	116	RPM	12298	6149	4612	3689	3074	2635	2306
			(93-139)	Fr	0.125	0.170	0.225	0.280	0.340	0.395	0.450
				Feed (mm/min)	1537	1045	1038	1033	1045	1041	1038
		> 300 ≤ 420	55	RPM	5831	2915	2187	1749	1458	1249	1093
			(44-66)	Fz	0.110	0.145	0.190	0.240	0.290	0.335	0.385
				Feed (mm/min)	641	423	415	420	423	419	421
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 270	101	RPM	10708	5354	4015	3212	2677	2295	2008
			(81-121)	Fz	0.110	0.145	0.190	0.240	0.290	0.335	0.385
				Feed (mm/min)	1178	776	763	771	776	769	773
		> 270 ≤ 370	73	RPM	7739	3870	2902	2322	1935	1658	1451
			(58-88)	Fr	0.090	0.120	0.160	0.200	0.240	0.280	0.320
				Feed (mm/min)	697	464	464	464	464	464	464
		> 370 ≤ 450	43	RPM	4559	2279	1710	1368	1140	977	855
			(34-52)	Fr	0.065	0.085	0.115	0.145	0.170	0.200	0.230
				Feed (mm/min)	296	194	197	198	194	195	197
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	73	RPM	7739	3870	2902	2322	1935	1658	1451
			(58-88)	Fr	0.090	0.120	0.160	0.200	0.240	0.280	0.320
				Feed (mm/min)	697	464	464	464	464	464	464
		> 250 ≤ 330	55	RPM	5831	2915	2187	1749	1458	1249	1093
			(44-66)	Fr	0.065	0.085	0.115	0.145	0.170	0.200	0.230
				Feed (mm/min)	379	248	251	254	248	250	251
		> 330 ≤ 450	27	RPM	2862	1431	1073	859	716	613	537
			(22-32)	Fr	0.035	0.050	0.065	0.080	0.095	0.110	0.130
				Feed (mm/min)	100	72	70	69	68	67	70
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	134	RPM	14206	7103	5327	4262	3552	3044	2664
			(107-161)	Fr	0.180	0.240	0.320	0.400	0.485	0.560	0.640
				Feed (mm/min)	2557	1705	1705	1705	1723	1705	1705
		> 200 ≤ 330	85	RPM	9011	4506	3379	2703	2253	1931	1690
			(68-102)	Fr	0.165	0.215	0.290	0.360	0.435	0.505	0.575
				Feed (mm/min)	1487	969	980	973	980	975	972
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	67	RPM	7103	3552	2664	2131	1776	1522	1332
			(54-80)	Fr	0.090	0.120	0.160	0.200	0.240	0.280	0.320
				Feed (mm/min)	639	426	426	426	426	426	426
		> 250 ≤ 330	50	RPM	5301	2650	1988	1590	1325	1136	994
			(40-60)	Fr	0.070	0.095	0.130	0.160	0.195	0.225	0.255
				Feed (mm/min)	371	252	258	254	258	256	253

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	Series 140M 5D Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	14	16
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	> 270 ≤ 370	46	RPM	4877	2438	1829	1463	1219	1045	914
			(37-55)	Fr	0.065	0.085	0.115	0.145	0.170	0.200	0.230
				Feed (mm/min)	317	207	210	212	207	209	210
		> 270 ≤ 370	37	RPM	3923	1961	1471	1177	981	841	735
			(30-44)	Fr	0.055	0.070	0.095	0.120	0.145	0.170	0.190
				Feed (mm/min)	132	137	140	141	142	143	140
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	30	RPM	3181	1590	1193	954	795	682	596
			(24-36)	Fr	0.035	0.050	0.065	0.080	0.095	0.110	0.130
				Feed (mm/min)	111	80	78	62	76	75	78
		> 220 ≤ 330	21	RPM	2226	1113	835	668	557	477	417
			(17-25)	Fr	0.030	0.035	0.050	0.065	0.070	0.090	0.105
				Feed (mm/min)	67	39	42	43	39	43	44
		> 330 ≤ 420	15	RPM	1590	795	596	477	398	341	298
			(12-18)	Fr	0.020	0.025	0.030	0.040	0.050	0.055	0.065
				Feed (mm/min)	32	20	18	19	20	19	19
S	TITANIUM ALLOYS (DIFFICULT) Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	61	RPM	6467	3234	2425	1940	1617	1386	1213
			(49-73)	Fr	0.065	0.085	0.115	0.145	0.170	0.200	0.230
				Feed (mm/min)	420	275	279	281	275	277	279
		> 280 ≤ 350	49	RPM	5195	2597	1948	1558	1299	1113	974
			(39-59)	Fr	0.055	0.070	0.095	0.120	0.145	0.170	0.190
				Feed (mm/min)	286	182	185	187	188	189	185
		> 350 ≤ 440	37	RPM	3923	1961	1471	1177	981	841	735
			(30-44)	Fr	0.045	0.060	0.085	0.105	0.120	0.145	0.165
				Feed (mm/min)	177	118	125	124	118	122	121
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	235	RPM	24914	12457	9343	7474	6228	5339	4671
			(188-282)	Fr	0.200	0.265	0.355	0.440	0.530	0.620	0.705
				Feed (mm/min)	4983	3301	3317	3289	3301	3310	3293
		> 80	201	RPM	21309	10655	7991	6393	5327	4566	3996
			(161-241)	Fr	0.180	0.240	0.320	0.400	0.485	0.560	0.640
				Feed (mm/min)	3836	2557	2557	2557	2584	2557	2557
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	168	RPM	17811	8905	6679	5343	4453	3817	3340
			(134-202)	Fr	0.070	0.095	0.130	0.160	0.195	0.225	0.255
				Feed (mm/min)	1247	846	868	855	868	859	852
		> 140	134	RPM	14206	7103	5327	4262	3552	3044	2664
			(107-161)	Fr	0.070	0.095	0.130	0.160	0.195	0.225	0.255
				Feed (mm/min)	994	675	693	682	693	685	679

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

IC Carb
High Performance Internal Coolant Drills

Series 140 8D Fractional		Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	5/8	3/4
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	420	RPM	12835	8557	6418	4278	3209	2567	2139
			(336-504)	Fr	0.0035	0.0053	0.0070	0.0105	0.0140	0.0175	0.0210
				Feed (IPM)	44.9	45.4	44.9	44.9	44.9	44.9	44.9
		> 200 ≤ 300	370	RPM	11307	7538	5654	3769	2827	2261	1885
			(296-444)	Fr	0.0030	0.0045	0.0060	0.0090	0.0120	0.0150	0.0180
				Feed (IPM)	33.9	33.9	33.9	33.9	33.9	33.9	33.9
		> 300 ≤ 420	170	RPM	5195	3463	2598	1732	1299	1039	866
			(136-204)	Fz	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0150
				Feed (IPM)	13.0	13.2	13.0	13.0	13.0	13.0	13.0
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 270	320	RPM	9779	6519	4890	3260	2445	1956	1630
			(256-384)	Fz	0.0025	0.0038	0.0050	0.0075	0.0100	0.0125	0.0150
				Feed (IPM)	24.4	24.8	24.4	24.4	24.4	24.4	24.4
		> 270 ≤ 370	230	RPM	7029	4686	3514	2343	1757	1406	1171
			(184-276)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0125
				Feed (IPM)	70288.0	14.1	14.1	14.1	14.1	14.1	14.6
		> 370 ≤ 450	130	RPM	3973	2649	1986	1324	993	795	662
			(104-156)	Fr	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
				Feed (IPM)	156.0	6.1	6.0	6.0	6.0	6.0	6.0
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	230	RPM	7029	4686	3514	2343	1757	1406	1171
			(184-276)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0125
				Feed (IPM)	240.0	14.1	14.1	14.1	14.1	14.1	14.6
		> 250 ≤ 330	160	RPM	4890	3260	2445	1630	1222	978	815
			(128-192)	Fr	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
				Feed (IPM)	342.0	7.5	7.3	7.3	7.3	7.3	7.3
		> 330 ≤ 450	80	RPM	2445	1630	1222	815	611	489	407
			(64-96)	Fr	0.0008	0.0013	0.0015	0.0025	0.0030	0.0040	0.0045
				Feed (IPM)	2.0	2.1	1.8	2.0	1.8	2.0	1.8
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	420	RPM	12835	8557	6418	4278	3209	2567	2139
			(336-504)	Fr	0.0045	0.0068	0.0090	0.0135	0.0180	0.0225	0.0270
				Feed (IPM)	57.8	58.2	57.8	57.8	57.8	57.8	57.8
		> 200 ≤ 330	270	RPM	8251	5501	4126	2750	2063	1650	1375
			(216-324)	Fr	0.0040	0.0060	0.0080	0.0120	0.0160	0.0200	0.0240
				Feed (IPM)	33.0	33.0	33.0	33.0	33.0	33.0	33.0
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	210	RPM	6418	4278	3209	2139	1604	1284	1070
			(168-252)	Fr	0.0020	0.0030	0.0040	0.0060	0.0080	0.0100	0.0120
				Feed (IPM)	12.8	12.8	12.8	12.8	12.8	12.8	12.8
		> 250 ≤ 330	160	RPM	4890	3260	2445	1630	1222	978	815
			(128-192)	Fr	0.0018	0.0028	0.0035	0.0055	0.0070	0.0090	0.0105
				Feed (IPM)	8.8	9.1	8.6	9.0	8.6	8.8	8.6

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IC Carb
High Performance Internal Coolant Drills

	Series 140 8D Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	5/8	3/4
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	> 270	130	RPM	3973	2649	1986	1324	993	795	662
			(104-156)	Fr	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
				Feed (IPM)	6.0	6.1	6.0	6.0	6.0	6.0	6.0
		> 270 ≤ 370	100	RPM	3056	2037	1528	1019	764	611	509
			(80-120)	Fr	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
				Feed (IPM)	4.6	4.7	4.6	4.6	4.6	4.6	4.6
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	80	RPM	2445	1630	1222	815	611	489	407
			(64-96)	Fr	0.0008	0.0013	0.0015	0.0025	0.0030	0.0040	0.0045
				Feed (IPM)	2.0	2.1	1.8	2.0	1.8	2.0	1.8
		> 220 ≤ 330	50	RPM	1528	1019	764	509	382	306	255
			(40-60)	Fr	0.0005	0.0008	0.0010	0.0015	0.0020	0.0025	0.0030
				Feed (IPM)	0.8	0.8	0.8	0.8	0.8	0.8	0.8
		> 330 ≤ 420	35	RPM	1070	713	535	357	267	214	178
			(28-42)	Fr	0.0005	0.0008	0.0010	0.0015	0.0020	0.0025	0.0030
				Feed (IPM)	0.5	0.6	0.5	0.5	0.5	0.5	0.5
S	TITANIUM ALLOYS (DIFFICULT) Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	180	RPM	5501	3667	2750	1834	1375	1100	917
			(144-216)	Fr	0.0015	0.0023	0.0030	0.0045	0.0060	0.0075	0.0090
				Feed (IPM)	8.3	8.4	8.3	8.3	8.3	8.3	8.3
		> 280 ≤ 350	140	RPM	4278	2852	2139	1426	1070	856	713
			(112-168)	Fr	0.0013	0.0020	0.0025	0.0040	0.0050	0.0065	0.0080
				Feed (IPM)	5.6	5.7	5.3	5.7	5.3	5.6	5.7
		> 350 ≤ 440	110	RPM	3362	2241	1681	1121	840	672	560
			(88-132)	Fr	0.0013	0.0020	0.0025	0.0040	0.0050	0.0065	0.0080
				Feed (IPM)	4.4	4.5	4.2	4.5	4.2	4.4	4.5
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	730	RPM	22309	14873	11154	7436	5577	4462	3718
			(584-876)	Fr	0.0050	0.0075	0.0100	0.0150	0.0200	0.0250	0.0300
				Feed (IPM)	111.5	111.5	111.5	111.5	111.5	111.5	111.5
		> 80	630	RPM	19253	12835	9626	6418	4813	3851	3209
			(504-756)	Fr	0.0045	0.0068	0.0090	0.0135	0.0180	0.0225	0.0270
				Feed (IPM)	86.6	87.3	86.6	86.6	86.6	86.6	86.6
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	520	RPM	15891	10594	7946	5297	3973	3178	2649
			(416-624)	Fr	0.0018	0.0028	0.0035	0.0055	0.0070	0.0090	0.0105
				Feed (IPM)	28.6	29.7	27.8	29.1	27.8	28.6	27.8
		> 140	420	RPM	12835	8557	6418	4278	3209	2567	2139
			(336-504)	Fr	0.0018	0.0028	0.0035	0.0055	0.0070	0.0090	0.0105
				Feed (IPM)	23.1	24.0	22.5	23.5	22.5	23.1	22.5

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

IC Carb
High Performance Internal Coolant Drills

	Series 140M 8D Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	14	16
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	128	RPM	13570	6785	5089	4071	3393	2908	2544
			(100-170	Fr	0.125	0.170	0.225	0.280	0.340	0.395	0.450
				Feed (mm/min)	1696	1153	1145	1140	1153	1149	1145
		> 200 ≤ 300	113	RPM	11980	5990	4492	3594	2995	2567	31
			(90-136)	Fr	0.110	0.145	0.190	0.240	0.290	0.335	0.385
				Feed (mm/min)	1318	869	854	863	869	860	12
		> 300 ≤ 420	52	RPM	5513	2756	2067	1654	1378	1181	1034
			(42-62)	Fz	0.090	0.120	0.160	0.200	0.240	0.280	0.320
				Feed (mm/min)	496	331	331	331	331	331	331
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 270	98	RPM	10390	5195	3896	3117	2597	2226	1948
			(78-118)	Fz	0.090	0.120	0.160	0.200	0.240	0.280	0.320
				Feed (mm/min)	935	623	623	2494	623	2494	623
		> 270 ≤ 370	70	RPM	7421	3711	2783	2226	1855	1590	1391
			(56-84)	Fr	0.070	0.095	0.130	0.160	0.195	0.225	0.255
				Feed (mm/min)	519	353	362	356	362	358	355
		> 370 ≤ 450	40	RPM	4241	2120	1590	1272	1060	909	795
			(32-48)	Fr	0.055	0.070	0.095	0.120	0.145	0.170	0.190
				Feed (mm/min)	233	148	151	153	154	154	151
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	70	RPM	7421	3711	2783	2226	1855	1590	1391
			(56-84)	Fr	0.070	0.095	0.130	0.160	0.195	0.225	0.255
				Feed (mm/min)	519	353	362	356	362	358	355
		> 250 ≤ 330	49	RPM	5195	2597	1948	1558	1299	1113	974
			(39-59)	Fr	0.055	0.070	0.095	0.120	0.145	0.170	0.190
				Feed (mm/min)	286	182	185	187	188	189	185
		> 330 ≤ 450	24	RPM	2544	1272	954	763	636	545	477
			(19-29)	Fr	0.030	0.035	0.050	0.065	0.070	0.090	0.105
				Feed (mm/min)	76	45	48	50	45	49	50
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	128	RPM	13570	6785	5089	4071	3393	2908	2544
			(102-154)	Fr	0.165	0.215	0.290	0.360	0.435	0.505	0.575
				Feed (mm/min)	2239	1459	1476	1466	1476	1468	1463
		> 200 ≤ 330	82	RPM	8693	4347	3260	2608	2173	1863	1630
			(66-98)	Fr	0.145	0.195	0.255	0.320	0.385	0.450	0.515
				Feed (mm/min)	1261	848	831	835	2510	838	2518
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	64	RPM	6785	3393	2544	2036	1696	1454	1272
			(51-77)	Fr	0.070	0.095	0.130	0.160	0.195	0.225	0.255
				Feed (mm/min)	475	322	331	326	331	327	324
		> 250 ≤ 330	49	RPM	5195	2597	1948	1558	1299	1113	974
			(39-59)	Fr	0.065	0.085	0.115	0.145	0.170	0.200	0.230
				Feed (mm/min)	338	221	224	226	221	223	224

continued on next page

	Series 140M 8D Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 3	6	8	10	12	14	16
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	> 270 ≤ 370	40	RPM	4241	2120	1590	1272	1060	909	795
			(32-48)	Fr	0.065	0.085	0.115	0.145	0.170	0.200	0.230
				Feed (mm/min)	276	180	183	184	180	182	183
		> 270 ≤ 370	30	RPM	3181	1590	1193	954	795	682	596
			(24-36)	Fr	0.055	0.070	0.095	0.120	0.145	0.170	0.190
				Feed (mm/min)	175	111	113	114	115	116	113
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	24	RPM	2544	1272	954	763	636	545	477
			(19-29)	Fr	0.030	0.035	0.050	0.065	0.070	0.090	0.105
				Feed (mm/min)	76	45	132	9160	45	49	50
		> 220 ≤ 330	15	RPM	1590	795	596	477	398	341	298
			(12-18)	Fr	0.020	0.025	0.030	0.040	0.050	0.055	0.065
				Feed (mm/min)	32	20	210	19	20	19	19
		> 330 ≤ 420	11	RPM	1166	583	437	350	292	250	219
			(9-13)	Fr	0.020	0.025	0.030	0.040	0.050	0.055	0.065
				Feed (mm/min)	23	15	13	14	15	14	14
S	TITANIUM ALLOYS (DIFFICULT) Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	55	RPM	5831	2915	2187	1749	1458	1249	1093
			(44-66)	Fr	0.055	0.070	0.095	0.120	0.145	0.170	0.190
				Feed (mm/min)	321	204	208	210	211	212	208
		> 280 ≤ 350	48	RPM	5089	2544	1908	1527	1272	1090	954
			(38-58)	Fr	0.045	0.060	0.085	0.105	0.120	0.145	0.165
				Feed (mm/min)	229	153	162	160	153	158	157
		> 350 ≤ 440	34	RPM	3605	1802	1352	1081	901	772	676
			(27-41)	Fr	0.035	0.050	0.065	0.080	0.095	0.110	0.130
				Feed (mm/min)	126	90	88	87	86	85	88
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	223	RPM	23642	11821	8866	7093	5910	5066	4433
			(178-268)	Fr	0.180	0.240	0.320	0.400	0.485	0.560	0.640
				Feed (mm/min)	4256	2837	2837	2837	2867	2837	2837
		> 80	192	RPM	20355	10178	7633	6107	5089	4362	3817
			(154-230)	Fr	0.165	0.215	0.290	0.360	0.435	0.505	0.575
				Feed (mm/min)	3359	2188	2214	2198	2214	2203	2195
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	158	RPM	16751	8375	6281	5025	4188	3589	3141
			(126-190)	Fr	0.065	0.085	0.115	0.145	0.170	0.200	0.230
				Feed (mm/min)	1089	712	722	729	712	718	722
		> 140	128	RPM	13570	6785	5089	4071	3393	2908	2544
			(102-154)	Fr	0.065	0.085	0.115	0.145	0.170	0.200	0.230
				Feed (mm/min)	882	577	585	590	577	582	585

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

DI-NAMITE CRYSTALLINE DIAMOND COATING

Series 120 Fractional	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	5/16	3/8	7/16	1/2
CFRP, AFRP (Carbon Fiber, Aramid Fiber)	320	RPM	9779	6519	4890	3912	3260	2794	2445
	(256-384)	Fr	0.0006	0.0008	0.0012	0.0015	0.0018	0.0021	0.0024
		Feed (IPM)	5.9	5.2	5.9	5.9	5.9	5.9	5.9
GFRP (Fiberglass)	240	RPM	7334	4890	3667	2934	2445	2096	1834
	(192-288)	Fr	0.0006	0.0008	0.0012	0.0015	0.0018	0.0021	0.0024
		Feed (IPM)	4.4	3.9	4.4	4.4	4.4	4.4	4.4
CARBON, GRAPHITE	400	RPM	12224	8149	6112	4890	4075	3493	3056
	(320-480)	Fr	0.0008	0.0012	0.0016	0.0020	0.0024	0.0028	0.0032
		Feed (IPM)	9.8	9.8	9.8	9.8	9.8	9.8	9.8

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
adjust speed and / or feed based on resin type and / or fiber structure
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

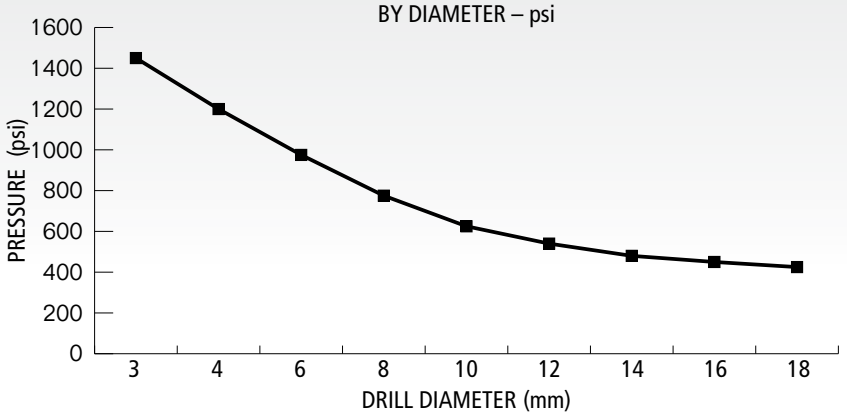
Series 120 Metric	Vc (m/min)		Diameter (D_1) (mm) 2.5	3	4	6	8	10	12
CFRP, AFRP (Carbon Fiber, Aramid Fiber)	100	RPM	12722	10602	7951	5301	3976	3181	2650
	(80-120)	Fr	0.015	0.018	0.020	0.030	0.038	0.046	0.053
		Feed (mm/min)	191	191	159	159	151	146	140
GFRP (Fiberglass)	75	RPM	9542	7951	5963	3976	2982	2385	1988
	(65-90)	Fr	0.015	0.018	0.020	0.030	0.038	0.046	0.053
		Feed (mm/min)	143	143	119	119	113	110	105
CARBON, GRAPHITE	120	RPM	15266	12722	9542	6361	4771	3817	3181
	(96-144)	Fr	0.020	0.024	0.030	0.041	0.051	0.061	0.071
		Feed (mm/min)	305	305	286	261	243	233	226

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / revolution) x rpm
adjust speed and / or feed based on resin type and / or fiber structure
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

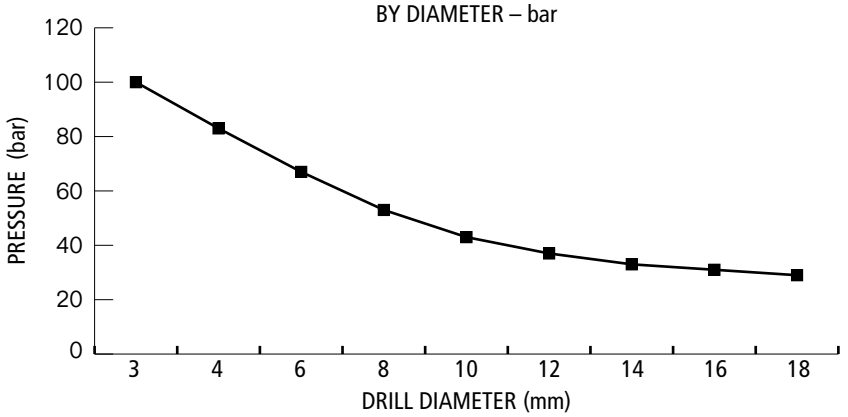
Drilling Operations Coolant Recommendations

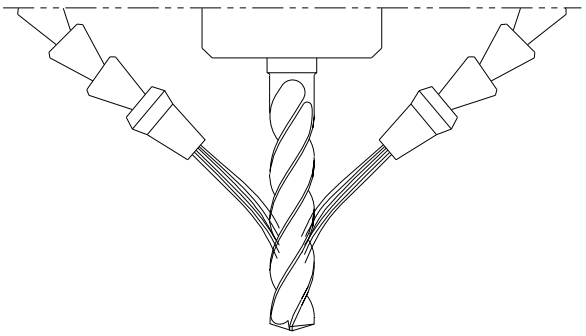
- Coolant works to mobilize chips away from the cut zone, reduce the heat created during the cutting process and minimize friction.
- It is important to optimize the coolant pressure and position in order to gain the full benefits coolant offers the cutting process.
- Proper coolant application promotes 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

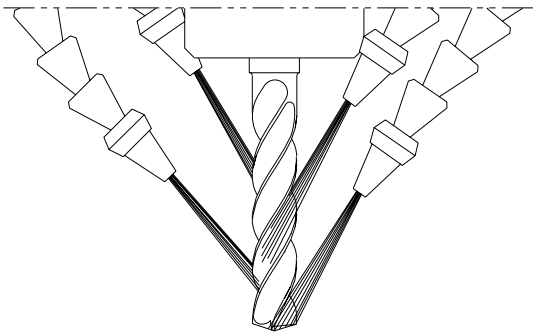


RECOMMENDED COOLANT PRESSURE
BY DIAMETER – bar





LARGE TIP – LOW VELOCITY
NO COVERAGE AT MAXIMUM DEPTH



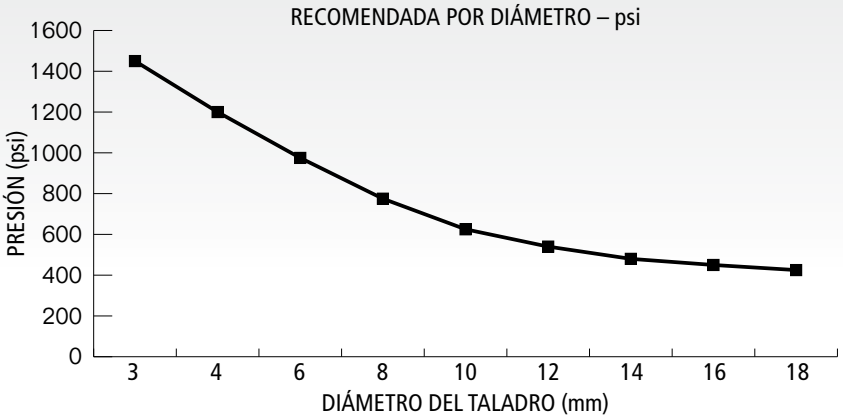
SMALL TIP – HIGH VELOCITY
COMPLETE COVERAGE

- 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.

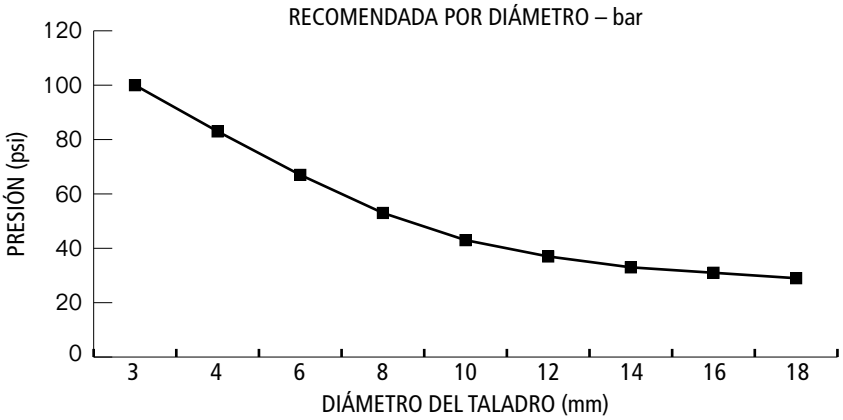
Operaciones de taladrado
Refrigerantes recomendados

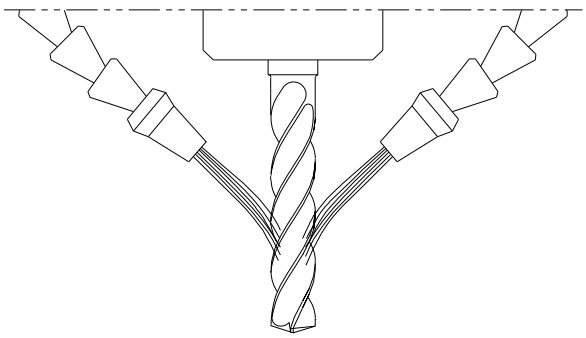
- El líquido refrigerante actúa movilizando las virutas fuera de la zona de corte, disminuyendo el calor generado durante el proceso de corte y minimizando la fricción.
- Es importante optimizar la presión del refrigerante y la posición para poder obtener todos los beneficios del refrigerante durante el proceso de corte.
- Una aplicación apropiada del refrigerante fomenta mayores parámetros de operación, mayores índices de eliminación de material, acabados de superficie mejorados, una duración de la herramienta más predecible, bajo consumo de energía y un tiempo de ciclo reducido.
- La presión es importante pero lo es más la estabilidad de la presión y la aplicación en la herramienta; la refrigeración intermitente del carburo conlleva un estrés térmico del material y la formación de "microfisuras".
- La limpieza adecuada y la filtración de refrigerantes es importante para que el mismo mantenga sus propiedades beneficiosas, y también para evitar una reducción en la presión o la posibilidad de obstruir los canales del refrigerante del taladro.

PRESIÓN DE REFRIGERANTE
RECOMENDADA POR DIÁMETRO – psi

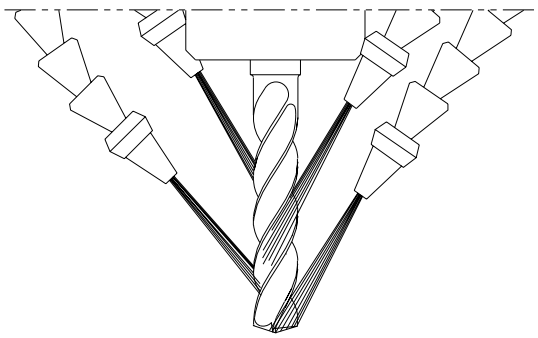


PRESIÓN DE REFRIGERANTE
RECOMENDADA POR DIÁMETRO – bar





PUNTA GRANDE – BAJA VELOCIDAD
SIN ALCANCE A PROFUNDIDAD MÁXIMA



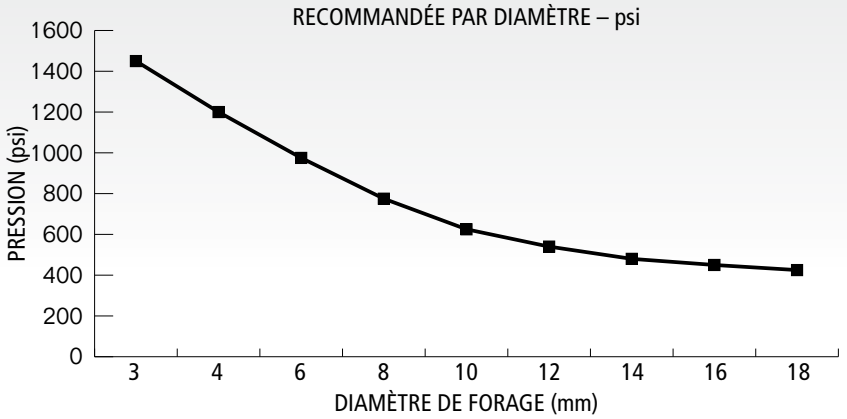
PUNTA PEQUEÑA – ALTA VELOCIDAD
COMPLETO ALCANCE

- Reducir el tamaño de la boquilla ayuda a maximizar los beneficios de refrigeración del exclusivo diseño de doble margen del taladro Hi-PerCarb aumentando la velocidad. Coloque las boquillas en línea con el segundo filo que se encuentra entre los dos márgenes y también el filo para obtener mejores resultados.

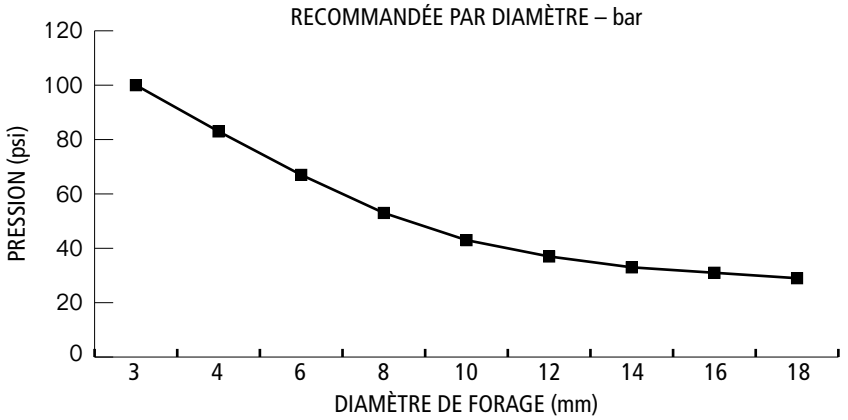
Opérations de forage
Recommandations en matière de refroidissement

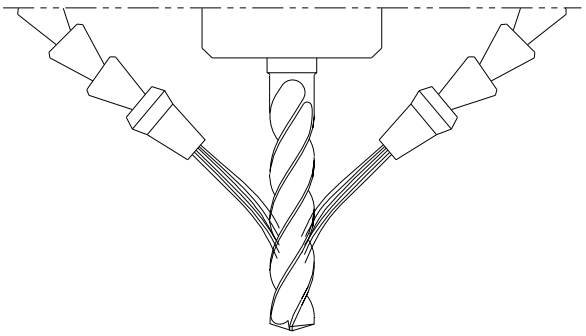
- Le réfrigérant sert à éloigner les copeaux de la zone de coupe, à réduire la chaleur dégagée durant la coupe et à minimiser la friction.
- Il est important d'optimiser la pression et la position du réfrigérant pour en retirer les bénéfices maximums durant la coupe.
- L'application adéquate de réfrigérant se traduit par des paramètres opératoires supérieurs, des taux d'élimination supérieurs des matériaux, de plus belles finitions des surfaces, une durée de vie des outils prévisible, moins de consommation d'énergie et des temps de cycle réduits.
- La pression est importante, mais une pression régulière et l'application sur l'outil sont des facteurs encore plus importants ; le refroidissement intermittent du carbure se traduit par des contraintes thermiques pour le matériau et la formation de microfissures.
- La propreté et le filtrage adéquats des réfrigérants sont importants pour qu'ils conservent leur propriétés, mais aussi pour éviter la réduction de pression du réfrigérant ou le risque d'obturation des conduits à réfrigérant dans les perceuses à réfrigérant intégré.

PRESSION DE RÉFRIGÉRANT
RECOMMANDÉE PAR DIAMÈTRE – psi

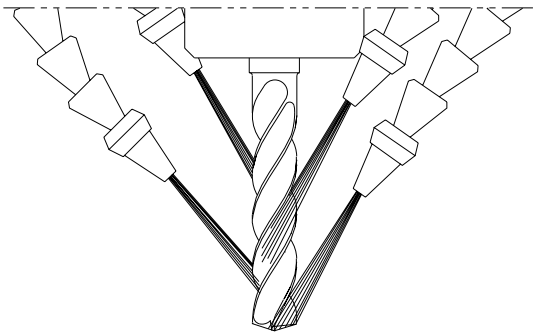


PRESSION DE RÉFRIGÉRANT
RECOMMANDÉE PAR DIAMÈTRE – bar





POINTE LARGE – BASSE VITESSE
PAS DE COUVERTURE À LA PROFONDEUR MAXIMUM

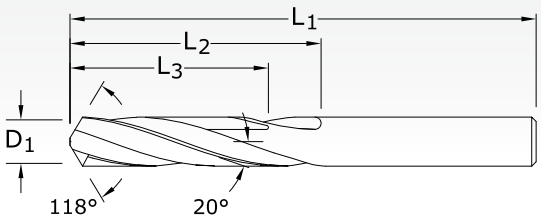


POINTE FINE – GRANDE VITESSE
COUVERTURE COMPLÈTE

- La réduction de la taille de l'embout permet de maximiser les bienfaits du refroidissement du concept à double listel original de la perceuse Hi-PerCarb en augmentant la vitesse. Pour les meilleurs résultats, orientez les embouts dans l'axe de la goujure secondaire située entre les deux listels, de même que la goujure primaire.







TOLERANCES (inch)

D_1 = +.0000/–.0005

TOLERANCES (mm)

D_1 = +0,0000/–0,0127

101

FRACTIONAL & METRIC SERIES

TECH INFO 214–217

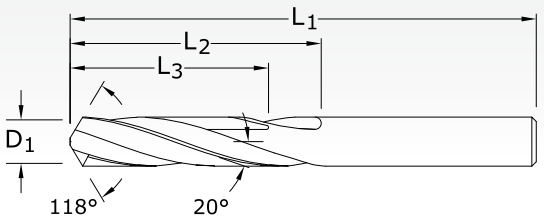
CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
#80	0.0135	3/4	3/16	5/32	51080	57076
#79	0.0145	3/4	3/16	5/32	51079	57077
1/64	0.0156	3/4	3/16	5/32	51101	57078
#78	0.0160	3/4	3/16	5/32	51078	57079
#77	0.0180	3/4	3/16	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
1,5 mm	0.0591	40,0	18,0	14,0	61009	68272

continued on next page

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







101

FRACTIONAL & METRIC SERIES

TECH INFO 214–217

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)
#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

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101
FRACTIONAL & METRIC SERIES

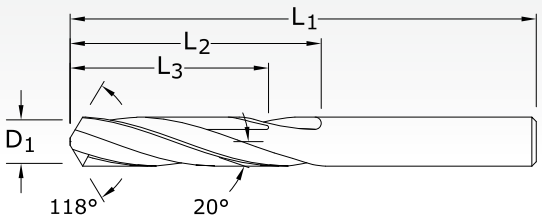
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CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
#32	0.1160	2-1/4	1-1/4	1	51032	57131
3,0 mm	0.1181	61,0	33,0	26,0	61015	68275
#31	0.1200	2-1/4	1-1/4	1	51031	57132
3,1 mm	0.1220	65,0	36,0	28,0	61068	68310
*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
*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

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FRACTIONAL & METRIC SERIES

TECH INFO 214–217

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)
#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
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

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101
FRACTIONAL & METRIC SERIES

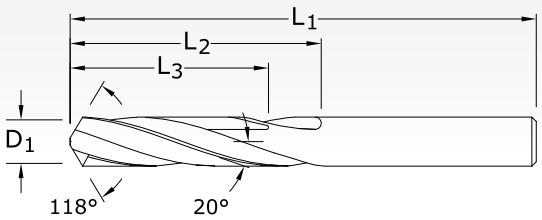
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CUTTING DIAMETER D_1	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
6,6 mm	0.2598	101,0	63,0	50,0	61096	68338
G	0.2610	3-1/2	2-1/8	1-45/64	51207	57178
6,7 mm	0.2638	101,0	63,0	50,0	61097	68339
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
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

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FRACTIONAL & METRIC SERIES

TECH INFO 214–217

TOLERANCES (inch)

D_1 = +.0000/–.0005

TOLERANCES (mm)

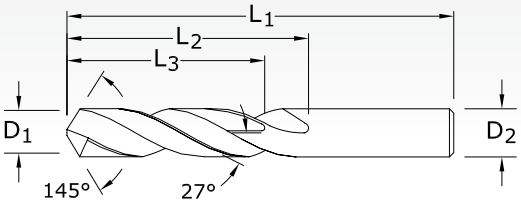
D_1 = +0,0000/–0,0127

- 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)
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







108M Plus

METRIC SERIES

TECH INFO 216

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

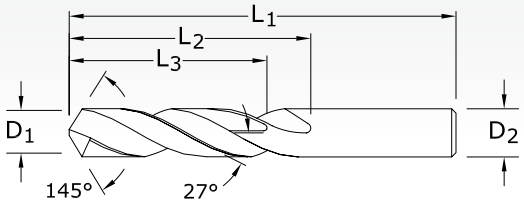
mm				EDP NO,	
CUTTING DIAMETER D_1 / D_2	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	UNCOATED	Ti-NAMITE-A (AlTiN)
0,5	20,0	3,0	2,1	62001	68643
0,55	21,0	3,5	2,5	62003	68644
0,6	21,0	3,5	2,5	62005	68645
0,65	22,0	4,0	2,9	62007	68646
0,7	23,0	4,5	3,2	62009	68647
0,75	23,0	4,5	3,2	62011	68648
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

continued on next page

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







108M Plus

METRIC SERIES

TECH INFO 216

- 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

continued on next page

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

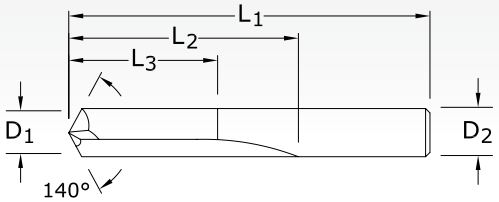
METRIC SERIES

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







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FRACTIONAL & METRIC SERIES

TECH INFO 218

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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TOLERANCES (inch)

D_1 = +.0000/–.0005
D_2 = h6

TOLERANCES (mm)

D_1 = +0,0000/–0,0127
D_2 = h6



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FRACTIONAL & METRIC SERIES

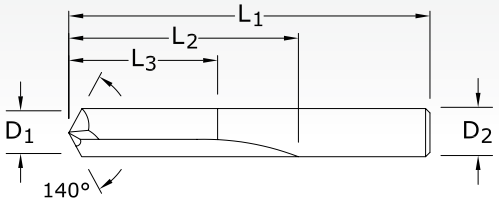
CONTINUED

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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FRACTIONAL & METRIC SERIES

TECH INFO 218

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)

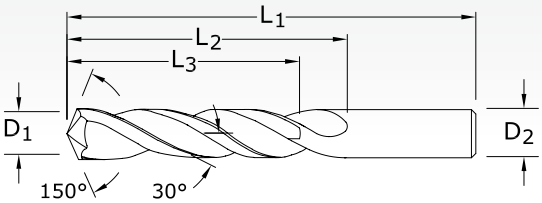
D_1 = +.0000/–.0005
D_2 = h6

TOLERANCES (mm)

D_1 = +0,0000/–0,0127
D_2 = h6







TOLERANCES (inch)

D_1 = +.0000/–.0005

D_2 = h_6

TOLERANCES (mm)

D_1 = +0,0000/–0,0127

D_2 = h_6

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FRACTIONAL & METRIC SERIES

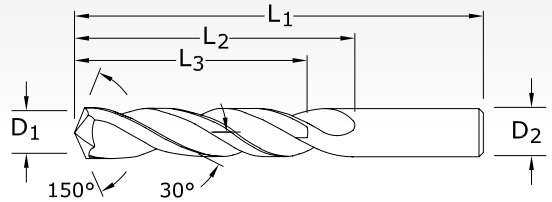
TECH INFO 219–220

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



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FRACTIONAL & METRIC SERIES

TECH INFO 219–220

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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TOLERANCES (inch)

D_1 = +.0000/–.0005
D_2 = h6

TOLERANCES (mm)

D_1 = +0,0000/–0,0127
D_2 = h6



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FRACTIONAL & METRIC SERIES

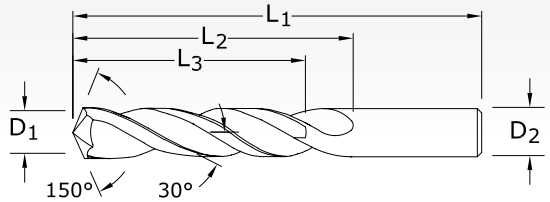
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CUTTING DIAMETER D_1 / D_2	DECIMAL EQUIV.	OVERALL LENGTH L_1	FLUTE LENGTH L_2	CLEARED LENGTH L_3	EDP NO. UNCOATED	EDP NO. Ti-NAMITE-A (AlTiN)
6,0 mm	0.2362	66,0	28,0	21,0	63010	68995
B	0.2380	3-1/4	2	1-39/64	53202	58057
6,1 mm	0.2402	70,0	31,0	23,0	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
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
21/64	0.3281	4	2-1/2	2	53121	58077

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



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FRACTIONAL & METRIC SERIES

TECH INFO 219–220

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)
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
27/64	0.4219	4-1/2	2-7/8	2-19/64	53127	58093

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TOLERANCES (inch)

D_1 = +.0000/–.0005
D_2 = h6

TOLERANCES (mm)

D_1 = +0,0000/–0,0127
D_2 = h6



103
FRACTIONAL & METRIC SERIES

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)
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

	Series 101 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/64	1/32	1/16	1/8	1/4	3/8	1/2
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	265	RPM	64787	32394	16197	8098	4049	2699	2025
			(212-318)	Fr	0.0002	0.0004	0.0009	0.0017	0.0034	0.0050	0.0070
				Feed (IPM)	13.0	13.0	14.6	13.8	13.8	13.5	14.2
		> 200 ≤ 300	125	RPM	30560	15280	7640	3820	1910	1273	955
			(100-150)	Fr	0.0002	0.0004	0.0008	0.0016	0.0031	0.0045	0.0060
				Feed (IPM)	6.1	6.1	6.1	6.1	5.9	5.7	5.7
		> 300 ≤ 420	85	RPM	20781	10390	5195	2598	1299	866	649
			(68-102)	Fz	0.0001	0.0002	0.0005	0.0009	0.0018	0.0025	0.0035
				Feed (IPM)	2.1	2.1	2.6	2.3	2.3	2.2	2.3
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	230	RPM	56230	28115	14058	7029	3514	2343	1757
			(184-276)	Fz	0.0002	0.0004	0.0008	0.0016	0.0031	0.0045	0.0060
				Feed (IPM)	11.2	11.2	11.2	11.2	10.9	10.5	10.5
		> 275 ≤ 375	145	RPM	35450	17725	8862	4431	2216	1477	1108
			(116-174)	Fr	0.0002	0.0004	0.0008	0.0015	0.0030	0.0045	0.0060
				Feed (IPM)	7.1	7.1	7.1	6.6	6.6	6.6	6.6
		> 375 ≤ 450	60	RPM	14669	7334	3667	1834	917	611	458
			(48-72)	Fr	0.0001	0.0002	0.0004	0.0007	0.0013	0.0020	0.0025
				Feed (IPM)	1.5	1.5	1.5	1.3	1.2	1.2	1.1
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	85	RPM	20781	10390	5195	2598	1299	866	649
			(68-102)	Fr	0.0001	0.0002	0.0005	0.0009	0.0018	0.0025	0.0035
				Feed (IPM)	2.1	2.1	2.6	2.3	2.3	2.2	2.3
		> 250 ≤ 330	55	RPM	13446	6723	3362	1681	840	560	420
			(44-66)	Fr	0.00005	0.0001	0.0002	0.0004	0.0008	0.0010	0.0015
				Feed (IPM)	0.7	0.7	0.7	0.7	0.7	0.6	0.6
		> 330 ≤ 450	40	RPM	9779	4890	2445	1222	611	407	306
			(32-48)	Fr	0.00005	0.0001	0.0002	0.0004	0.0008	0.0010	0.0015
				Feed (IPM)	0.5	0.5	0.5	0.5	0.5	0.4	0.5
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	280	RPM	68454	34227	17114	8557	4278	2852	2139
			(224-336)	Fr	0.00025	0.0005	0.0011	0.0021	0.0041	0.0060	0.0080
				Feed (IPM)	17.1	17.1	18.8	18.0	17.5	17.1	17.1
		> 200 ≤ 330	250	RPM	61120	30560	15280	7640	3820	2547	1910
			(200-300)	Fr	0.00025	0.0005	0.0011	0.0021	0.0041	0.0060	0.0080
				Feed (IPM)	15.3	15.3	16.8	16.0	15.7	15.3	15.3
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	210	RPM	51341	25670	12835	6418	3209	2139	1604
			(168-252)	Fr	0.00015	0.0003	0.0006	0.0012	0.0024	0.0035	0.0050
				Feed (IPM)	7.7	7.7	7.7	7.7	7.7	7.5	8.0
		> 250 ≤ 330	110	RPM	26893	13446	6723	3362	1681	1121	840
			(88-132)	Fr	0.0001	0.0002	0.0004	0.0007	0.0014	0.0020	0.0030
				Feed (IPM)	2.7	2.7	2.7	2.4	2.4	2.2	2.5

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	Series 101 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/64	1/32	1/16	1/8	1/4	3/8	1/2
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	> 270 ≤ 370	65	RPM	15891	7946	3973	1986	993	662	497
			(52-78)	Fr	0.0001	0.0002	0.0005	0.0009	0.0018	0.0025	0.0035
				Feed (IPM)	1.6	1.6	2.0	1.8	1.8	1.7	1.7
		> 270 ≤ 370	55	RPM	13446	6723	3362	1681	840	560	420
			(44-66)	Fr	0.0001	0.0002	0.0004	0.0008	0.0015	0.0025	0.0030
				Feed (IPM)	1.3	1.3	1.3	1.3	1.3	1.4	1.3
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	40	RPM	9779	4890	2445	1222	611	407	306
			(32-48)	Fr	0.0001	0.0002	0.0005	0.0009	0.0018	0.0025	0.0035
				Feed (IPM)	1.0	1.0	1.2	1.1	1.1	1.0	1.1
		> 220 ≤ 330	25	RPM	6112	3056	1528	764	382	255	191
			(20-30)	Fr	0.0001	0.0002	0.0004	0.0008	0.0015	0.0025	0.0030
				Feed (IPM)	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		> 330 ≤ 420	20	RPM	4890	2445	1222	611	306	204	153
			(16-24)	Fr	0.00005	0.0001	0.0002	0.0004	0.0008	0.0010	0.0015
				Feed (IPM)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
S	TITANIUM ALLOYS (DIFFICULT) Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	85	RPM	20781	10390	5195	2598	1299	866	649
			(68-102)	Fr	0.0002	0.0004	0.0008	0.0016	0.0032	0.0050	0.0065
				Feed (IPM)	4.2	4.2	4.2	4.2	4.2	4.3	4.2
		> 280 ≤ 350	65	RPM	15891	7946	3973	1986	993	662	497
			(52-78)	Fr	0.0001	0.0002	0.0005	0.0009	0.0018	0.0025	0.0035
				Feed (IPM)	1.6	1.6	2.0	1.8	1.8	1.7	1.7
		> 350 ≤ 440	55	RPM	13446	6723	3362	1681	840	560	420
			(44-66)	Fr	0.0001	0.0002	0.0004	0.0008	0.0015	0.0025	0.0030
				Feed (IPM)	1.3	1.3	1.3	1.3	1.3	1.4	1.3
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	540	RPM	132019	66010	33005	16502	8251	5501	4126
			(432-648)	Fr	0.0003	0.0006	0.0013	0.0025	0.0050	0.0075	0.0100
				Feed (IPM)	39.6	39.6	42.9	41.3	41.3	41.3	41.3
		> 80	455	RPM	111238	55619	27810	13905	6952	4635	3476
			(364-546)	Fr	0.0003	0.0006	0.0013	0.0025	0.0050	0.0075	0.0100
				Feed (IPM)	33.4	33.4	36.2	34.8	34.8	34.8	34.8
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	190	RPM	46451	23226	11613	5806	2903	1935	1452
			(152-228)	Fr	0.00015	0.0003	0.0006	0.0012	0.0024	0.0035	0.0050
				Feed (IPM)	7.0	7.0	7.0	7.0	7.0	6.8	7.3
		> 140	175	RPM	42784	21392	10696	5348	2674	1783	1337
			(140-210)	Fr	0.00015	0.0003	0.0006	0.0012	0.0024	0.0035	0.0050
				Feed (IPM)	6.4	6.4	6.4	6.4	6.4	6.2	6.7
	PLASTICS Polycarbonate, PVC		500	RPM	122240	61120	30560	15280	7640	5093	3820
			(400-600)	Fr	0.0003	0.0006	0.0013	0.0025	0.0050	0.0075	0.0100
				Feed (IPM)	36.7	36.7	39.7	38.2	38.2	38.2	38.2

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed rates shown by 30 percent when using uncoated drills
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 101M, 108M Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 1	3	6	8	10	12	16
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	81	RPM	25690	8563	4282	3211	2569	2141	1606
			(65-97)	Fr	0.015	0.040	0.080	0.110	0.135	0.170	0.230
				Feed (mm/min)	385	343	343	353	347	364	369
		> 200 ≤ 300	38	RPM	12118	4039	2020	1515	1212	1010	757
			(30-46)	Fr	0.015	0.035	0.075	0.095	0.120	0.145	0.190
				Feed (mm/min)	182	141	151	144	145	146	144
		> 300 ≤ 420	26	RPM	8240	2747	1373	1030	824	687	515
			(21-31)	Fz	0.005	0.020	0.045	0.055	0.065	0.085	0.115
				Feed (mm/min)	41	55	62	57	54	58	59
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 270	70	RPM	22297	7432	3716	2787	2230	1858	1394
			(56-84)	Fz	0.015	0.035	0.075	0.095	0.120	0.145	0.190
				Feed (mm/min)	334	260	279	265	268	269	265
		> 275 ≤ 375	44	RPM	14057	4686	2343	1757	1406	1171	879
			(35-53)	Fr	0.010	0.035	0.070	0.095	0.120	0.145	0.190
				Feed (mm/min)	141	164	164	167	169	170	167
		> 375 ≤ 450	18	RPM	5816	1939	969	727	582	485	364
			(15-22)	Fr	0.005	0.015	0.030	0.040	0.055	0.060	0.075
				Feed (mm/min)	29	29	29	29	32	29	27
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	26	RPM	8240	2747	1373	1030	824	687	515
			(21-31)	Fr	0.005	0.020	0.045	0.055	0.065	0.085	0.115
				Feed (mm/min)	41	55	62	57	54	58	59
		> 250 ≤ 330	17	RPM	5332	1777	889	666	533	444	333
			(13-20)	Fr	0.005	0.010	0.020	0.025	0.030	0.035	0.050
				Feed (mm/min)	27	18	18	17	16	16	17
		> 330 ≤ 450	12	RPM	3878	1293	646	485	388	323	242
			(10-15)	Fr	0.005	0.010	0.020	0.025	0.030	0.035	0.050
				Feed (mm/min)	19	13	13	12	12	11	12
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	85	RPM	27144	9048	4524	3393	2714	2262	1696
			(68-102)	Fr	0.015	0.050	0.100	0.130	0.160	0.195	0.255
				Feed (mm/min)	407	452	452	441	434	441	433
		> 200 ≤ 330	76	RPM	24235	8078	4039	3029	2424	2020	1515
			(61-91)	Fr	0.015	0.050	0.100	0.130	0.160	0.195	0.255
				Feed (mm/min)	364	404	404	394	388	394	386
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	64	RPM	20358	6786	3393	2545	2036	1696	1272
			(51-77)	Fr	0.010	0.030	0.060	0.075	0.095	0.120	0.165
				Feed (mm/min)	204	204	204	191	193	204	210
		> 250 ≤ 330	34	RPM	10664	3555	1777	1333	1066	889	666
			(27-40)	Fr	0.050	0.015	0.035	0.045	0.055	0.070	0.105
				Feed (mm/min)	533	53	62	60	59	62	70

continued on next page

	Series 101M, 108M Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 1	3	6	8	10	12	16
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 270	20	RPM	6301	2100	1050	788	630	525	394
			(16-24)	Fr	0.005	0.020	0.045	0.055	0.065	0.085	0.115
				Feed (mm/min)	32	42	47	43	41	45	45
		> 270 ≤ 370	17	RPM	5332	1777	889	666	533	444	333
			(13-20)	Fr	0.005	0.020	0.035	0.050	0.065	0.070	0.105
				Feed (mm/min)	27	36	31	33	35	31	35
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	12	RPM	3878	1293	646	485	388	323	242
			(10-15)	Fr	0.005	0.020	0.045	0.055	0.065	0.085	0.115
				Feed (mm/min)	19	26	29	27	25	27	28
		> 220 ≤ 330	8	RPM	2424	808	404	303	242	202	151
			(6-9)	Fr	0.005	0.020	0.035	0.050	0.065	0.070	0.105
				Feed (mm/min)	12	16	14	15	16	14	16
		> 330 ≤ 420	6	RPM	1939	646	323	242	194	162	121
			(5-7)	Fr	0.010	0.025	0.030	0.040	0.050	0.065	0.080
				Feed (mm/min)	19	16	10	10	10	11	10
S	TITANIUM ALLOYS (DIFFICULT) Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	26	RPM	8240	2747	1373	1030	824	687	515
			(21-31)	Fr	0.015	0.040	0.075	0.105	0.135	0.155	0.205
				Feed (mm/min)	124	110	103	108	111	106	106
		> 280 ≤ 350	20	RPM	6301	2100	1050	788	630	525	394
			(16-24)	Fr	0.005	0.020	0.045	0.055	0.065	0.085	0.115
				Feed (mm/min)	32	42	47	43	41	45	45
		> 350 ≤ 440	17	RPM	5332	1777	889	666	533	444	333
			(13-20)	Fr	0.005	0.020	0.035	0.050	0.065	0.070	0.105
				Feed (mm/min)	27	36	31	33	35	31	35
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	165	RPM	52348	17449	8725	6544	5235	4362	3272
			(132-198)	Fr	0.020	0.060	0.120	0.160	0.200	0.240	0.320
				Feed (mm/min)	1047	1047	1047	1047	1047	1047	1047
		> 80	139	RPM	44108	14703	7351	5514	4411	3676	2757
			(111-166)	Fr	0.020	0.060	0.120	0.160	0.200	0.240	0.320
				Feed (mm/min)	882	882	882	882	882	882	882
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	58	RPM	18419	6140	3070	2302	1842	1535	1151
			(46-69)	Fr	0.010	0.030	0.060	0.075	0.095	0.120	0.165
				Feed (mm/min)	184	184	184	173	175	184	190
		> 140	53	RPM	16965	5655	2827	2121	1696	1414	1060
			(43-64)	Fr	0.010	0.030	0.060	0.075	0.095	0.120	0.165
				Feed (mm/min)	170	170	170	159	161	170	175
	PLASTICS Polycarbonate, PVC		152	RPM	48471	16157	8078	6059	4847	4039	3029
			(122-183)	Fr	0.020	0.060	0.120	0.160	0.200	0.240	0.320
				Feed (mm/min)	969	969	969	969	969	969	969

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / revolution) x rpm
reduce speed and feed rates shown by 30 percent when using uncoated drills
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 106 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/16	1/8	3/16	1/4	3/8	1/2
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	> 420 ≤ 500	33	RPM	2017	1008	672	504	336	252
			(26-40)	Fz	0.0003	0.0006	0.0008	0.0012	0.0018	0.0024
				Feed (IPM)	0.6	0.6	0.5	0.6	0.6	0.6
		> 500 ≤ 615	33	RPM	2017	1008	672	504	336	252
			(26-40)	Fr	0.0002	0.0004	0.0005	0.0007	0.0010	0.0014
				Feed (IPM)	0.4	0.4	0.3	0.4	0.3	0.4
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	> 420 ≤ 500	34	RPM	2078	1039	693	520	346	260
			(27-41)	Fr	0.0003	0.0006	0.0008	0.0012	0.0018	0.0023
				Feed (IPM)	0.6	0.6	0.6	0.6	0.6	0.6
		> 500 ≤ 615	33	RPM	2017	1008	672	504	336	252
			(26-40)	Fr	0.0002	0.0003	0.0004	0.0006	0.0008	0.0014
				Feed (IPM)	0.4	0.3	0.3	0.3	0.3	0.4
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	252	RPM	15402	7701	5134	3851	2567	1925
			(202-302)	Fr	0.001	0.0020	0.0030	0.0040	0.0060	0.0081
				Feed (IPM)	15.4	15.4	15.4	15.4	15.4	15.6
		> 200 ≤ 330	185	RPM	11307	5654	3769	2827	1885	1413
			(148-222)	Fr	0.001	0.0020	0.0030	0.0040	0.0060	0.0081
				Feed (IPM)	11.3	11.3	11.3	11.3	11.3	11.4

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed rates shown by 30 percent when using uncoated drills
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 106M Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 1	3	6	8	10	12
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	> 420 ≤ 500	10	RPM	3199	1066	533	400	320	267
			(8-12)	Fz	0.006	0.017	0.034	0.045	0.057	0.068
				Feed (mm/min)	19	18	18	18	18	18
		> 500 ≤ 615	10	RPM	3199	1066	533	400	320	267
			(8-12)	Fr	0.003	0.009	0.018	0.024	0.030	0.036
				Feed (mm/min)	10	10	10	10	10	10
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	> 420 ≤ 500	10	RPM	3296	1099	549	412	330	275
			(8-12)	Fr	0.003	0.009	0.018	0.024	0.030	0.036
				Feed (mm/min)	10	10	10	10	10	10
		> 500 ≤ 615	10	RPM	3199	1066	533	400	320	267
			(8-12)	Fr	0.002	0.007	0.014	0.019	0.023	0.028
				Feed (mm/min)	6	7	7	8	7	7
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	77	RPM	24429	8143	4072	3054	2443	2036
			(61-92)	Fr	0.016	0.048	0.096	0.128	0.160	0.192
				Feed (mm/min)	391	391	391	391	391	391
		> 200 ≤ 330	56	RPM	17934	5978	2989	2242	1793	1495
			(45-68)	Fr	0.016	0.048	0.096	0.128	0.160	0.192
				Feed (mm/min)	287	287	287	287	287	287

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed rates shown by 30 percent when using uncoated drills
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 103 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	5/8	3/4
P	**CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536**	≤ 200	265	RPM	8098	4049	2699	2025	1620	1350
			(212-318)	Fr	0.0002	0.0004	0.0009	0.0017	0.0034	0.0050
				Feed (IPM)	1.6	1.6	2.4	3.4	5.5	6.7
		> 200 ≤ 300	125	RPM	3820	1910	1273	955	764	637
			(100-150)	Fr	0.0002	0.0004	0.0008	0.0016	0.0031	0.0045
				Feed (IPM)	0.8	0.8	1.0	1.5	2.4	2.9
		> 300 ≤ 420	85	RPM	2598	1299	866	649	520	433
			(68-102)	Fz	0.0001	0.0002	0.0005	0.0009	0.0018	0.0025
				Feed (IPM)	0.3	0.3	0.4	0.6	0.9	1.1
P	**ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100**	≤ 275	230	RPM	7029	3514	2343	1757	1406	1171
			(184-276)	Fz	0.0002	0.0004	0.0008	0.0016	0.0031	0.0045
				Feed (IPM)	1.4	1.4	1.9	2.8	4.4	5.3
		> 275 ≤ 375	145	RPM	4431	2216	1477	1108	886	739
			(116-174)	Fr	0.0002	0.0004	0.0008	0.0015	0.0030	0.0045
				Feed (IPM)	0.9	0.9	1.2	1.7	2.7	3.3
		> 375 ≤ 450	60	RPM	1834	917	611	458	367	306
			(48-72)	Fr	0.0001	0.0002	0.0004	0.0007	0.0013	0.0020
				Feed (IPM)	0.2	0.2	0.2	0.3	0.5	0.6
P	**TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2**	≤ 250	85	RPM	2598	1299	866	649	520	433
			(68-102)	Fr	0.0001	0.0002	0.0005	0.0009	0.0018	0.0025
				Feed (IPM)	0.3	0.3	0.4	0.6	0.9	1.1
		> 250 ≤ 330	55	RPM	1681	840	560	420	336	280
			(44-66)	Fr	0.00005	0.0001	0.0002	0.0004	0.0008	0.0010
				Feed (IPM)	0.1	0.1	0.1	0.2	0.3	0.3
		> 330 ≤ 450	40	RPM	1222	611	407	306	244	204
			(32-48)	Fr	0.00005	0.0001	0.0002	0.0004	0.0008	0.0010
				Feed (IPM)	0.1	0.1	0.1	0.1	0.2	0.2
K	**CAST IRONS Gray, Malleable, Ductile**	≤ 200	280	RPM	8557	4278	2852	2139	1711	1426
			(224-336)	Fr	0.00025	0.0005	0.0011	0.0021	0.0041	0.0060
				Feed (IPM)	2.1	2.1	3.1	4.5	7.0	8.6
		> 200 ≤ 330	250	RPM	7640	3820	2547	1910	1528	1273
			(200-300)	Fr	0.00025	0.0005	0.0011	0.0021	0.0041	0.0060
				Feed (IPM)	1.9	1.9	2.8	4.0	6.3	7.6
S	**TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V**	≤ 280	85	RPM	2598	1299	866	649	520	433
			(68-102)	Fr	0.0002	0.0004	0.0008	0.0016	0.0032	0.0050
				Feed (IPM)	0.5	0.5	0.7	1.0	1.7	2.2
		> 280 ≤ 350	65	RPM	1986	993	662	497	397	331
			(52-78)	Fr	0.0001	0.0002	0.0005	0.0009	0.0018	0.0025
				Feed (IPM)	0.2	0.2	0.3	0.4	0.7	0.8
		> 350 ≤ 440	55	RPM	1681	840	560	420	336	280
			(44-66)	Fr	0.0001	0.0002	0.0004	0.0008	0.0015	0.0025
				Feed (IPM)	0.2	0.2	0.2	0.3	0.5	0.7
N	**ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075**	≤ 80	540	RPM	16502	8251	5501	4126	3300	2750
			(432-648)	Fr	0.0003	0.0006	0.0013	0.0025	0.0050	0.0075
				Feed (IPM)	5.0	5.0	7.2	10.3	16.5	20.6
		> 80	455	RPM	13905	6952	4635	3476	2781	2317
			(364-546)	Fr	0.0003	0.0006	0.0013	0.0025	0.0050	0.0075
				Feed (IPM)	4.2	4.2	6.0	8.7	13.9	17.4
N	**COPPER ALLOYS Alum Bronze, C110, Muntz Brass**	≤ 140	190	RPM	5806	2903	1935	1452	1161	968
			(152-228)	Fr	0.00015	0.0003	0.0006	0.0012	0.0024	0.0035
				Feed (IPM)	0.9	0.9	1.2	1.7	2.8	3.4
		> 140	175	RPM	5348	2674	1783	1337	1070	891
			(140-210)	Fr	0.00015	0.0003	0.0006	0.0012	0.0024	0.0035
				Feed (IPM)	0.8	0.8	1.1	1.6	2.6	3.1

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed rates shown by 30 percent when using uncoated drills
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

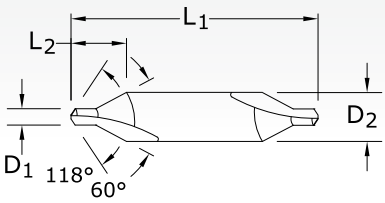
	Series 103M Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 3	6	10	12	16	20
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	81	RPM	8563	4282	2569	2141	1606	1284
			(65-97)	Fr	0.053	0.108	0.176	0.216	0.264	0.352
				Feed (IPM)	454	462	452	462	424	452
		> 200 ≤ 300	38	RPM	4039	2020	1212	1010	757	606
			(30-46)	Fr	0.048	0.096	0.160	0.192	0.240	0.320
				Feed (IPM)	194	194	194	194	182	194
		> 300 ≤ 420	26	RPM	2747	1373	824	687	515	412
			(21-31)	Fz	0.031	0.062	0.104	0.125	0.156	0.208
				Feed (IPM)	85	85	86	86	80	86
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 270	70	RPM	7432	3716	2230	1858	1394	1115
			(56-84)	Fz	0.048	0.096	0.160	0.192	0.240	0.320
				Feed (IPM)	357	357	357	357	334	357
		> 275 ≤ 375	44	RPM	4686	2343	1406	1171	879	703
			(35-53)	Fr	0.048	0.096	0.160	0.192	0.240	0.320
				Feed (IPM)	225	225	225	225	211	225
		> 375 ≤ 450	18	RPM	1939	969	582	485	364	291
			(15-22)	Fr	0.031	0.062	0.104	0.125	0.156	0.208
				Feed (IPM)	60	60	60	61	57	60
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	26	RPM	2747	1373	824	687	515	412
			(21-31)	Fr	0.031	0.062	0.104	0.125	0.156	0.208
				Feed (IPM)	85	85	86	86	80	86
		> 250 ≤ 330	17	RPM	1777	889	533	444	333	267
			(13-20)	Fr	0.017	0.036	0.056	0.074	0.084	0.112
				Feed (IPM)	30	32	30	33	28	30
		> 330 ≤ 450	12	RPM	1293	646	388	323	242	194
			(10-15)	Fr	0.012	0.024	0.040	0.046	0.060	0.080
				Feed (IPM)	16	16	16	15	15	16
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	85	RPM	9048	4524	2714	2262	1696	1357
			(68-102)	Fr	0.060	0.125	0.200	0.247	0.300	0.400
				Feed (IPM)	543	565	543	559	509	543
		> 200 ≤ 330	76	RPM	8078	4039	2424	2020	1515	1212
			(61-91)	Fr	0.060	0.125	0.200	0.247	0.300	0.400
				Feed (IPM)	485	505	485	499	454	485
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	26	RPM	2747	1373	824	687	515	412
			(21-31)	Fr	0.048	0.096	0.160	0.192	0.240	0.320
				Feed (IPM)	132	132	132	132	124	132
		> 280 ≤ 350	20	RPM	2100	1050	630	525	394	315
			(16-24)	Fr	0.029	0.058	0.096	0.113	0.144	0.192
				Feed (IPM)	61	61	60	59	57	60
		> 350 ≤ 440	17	RPM	1777	889	533	444	333	267
			(13-20)	Fr	0.029	0.058	0.096	0.113	0.144	0.192
				Feed (IPM)	52	52	51	50	48	51
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	165	RPM	17449	8725	5235	4362	3272	2617
			(132-198)	Fr	0.077	0.156	0.256	0.312	0.384	0.512
				Feed (IPM)	1344	1361	1340	1361	1256	1340
		> 80	139	RPM	14703	7351	4411	3676	2757	2205
			(111-166)	Fr	0.077	0.156	0.256	0.312	0.384	0.512
				Feed (IPM)	1132	1147	1129	1147	1059	1129
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	58	RPM	6140	3070	1842	1535	1151	921
			(46-69)	Fr	0.038	0.077	0.128	0.156	0.192	0.256
				Feed (IPM)	233	236	236	239	221	236
		> 140	53	RPM	5655	2827	1696	1414	1060	848
			(43-64)	Fr	0.038	0.077	0.128	0.156	0.192	0.256
				Feed (IPM)	215	218	217	221	204	217

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / revolution) x rpm
reduce speed and feed rates shown by 30 percent when using uncoated drills

reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)







TOLERANCES (inch)

D_1 = +.003/–.000
D_2 = –.0001/–.0005

301
FRACTIONAL SERIES

TECH INFO 225

inch				EDP NO.	
SIZE	BODY DIAMETER D_2	DRILL DIAMETER D_1	APPROX. OVERALL LENGTH L_1	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

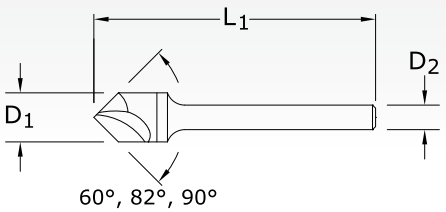
301M
METRIC SERIES

TECH INFO 227

mm			EDP NO.	
SIZE D_1	BODY DIAMETER D_2	APPROX. OVERALL LENGTH L_1	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







601
FRACTIONAL SERIES

TECH INFO 229

- 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)

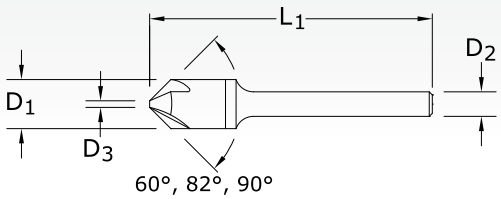
1/8–1/4 DIAMETER
D_1 = +.0000/–.0005

3/8–1 DIAMETER
D_1 = +.003/–.000

Included Angle +1°/–1°







TOLERANCES (inch)

1/8–1/4 DIAMETER
D_1 = +.0000/–.0005

3/8–1 DIAMETER
D_1 = +.003/–.000

Included Angle +1°/–1°

603
FRACTIONAL SERIES

TECH INFO 231

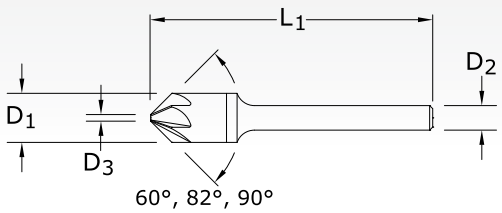
inch			EDP NO.		
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	OVERALL LENGTH L_1	UNCOATED 60°	UNCOATED 82°	UNCOATED 90°
1/8	1/8	1-1/2	74025	74125	74225
3/16	3/16	2	74028	74128	74228
1/4	1/4	2	74031	74131	74231
3/8*	1/4	2-13/16	74034	74134	74234
1/2*	1/4	2-7/8	74037	74137	74237
5/8*	3/8	3	74040	74140	74240
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
NOTE: D3 dimension varies based on angle. Contact SGS representative or consult Tool Wizard for dimension information.

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







606
FRACTIONAL SERIES

TECH INFO 233

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
NOTE: D3 dimension varies based on angle. Contact SGS representative or consult Tool Wizard for dimension information.

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

TOLERANCES (inch)

1/8–1/4 DIAMETER
D_1 = +.0000/–.0005

3/8–1 DIAMETER
D_1 = +.003/–.000

Included Angle +1°/–1°

	Series 301 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/32	3/64	5/64	1/8	3/16	7/32
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	275	RPM	33616	22411	13446	8404	5603	4802
			(220-330)	Fr	0.0003	0.0005	0.0007	0.0012	0.0018	0.0021
				Feed (IPM)	10.1	11.2	9.4	10.1	10.1	10.1
		> 200 ≤ 300	150	RPM	18336	12224	7334	4584	3056	2619
			(120-180)	Fr	0.0003	0.0004	0.0007	0.0011	0.0016	0.0019
				Feed (IPM)	5.5	4.9	5.1	5.0	4.9	5.0
		> 300 ≤ 420	105	RPM	12835	8557	5134	3209	2139	1834
			(84-126)	Fz	0.0002	0.0003	0.0005	0.0007	0.0011	0.0013
				Feed (IPM)	2.6	2.6	2.6	2.2	2.4	2.4
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	230	RPM	28115	18743	11246	7029	4686	4016
			(184-276)	Fz	0.0003	0.0004	0.0006	0.0010	0.0015	0.0018
				Feed (IPM)	8.4	7.5	6.7	7.0	7.0	7.2
		> 275 ≤ 375	140	RPM	17114	11409	6845	4278	2852	2445
			(112-168)	Fr	0.0003	0.0004	0.0006	0.0010	0.0015	0.0018
				Feed (IPM)	5.1	4.6	4.1	4.3	4.3	4.4
		> 375 ≤ 450	90	RPM	11002	7334	4401	2750	1834	1572
			(72-108)	Fr	0.0002	0.0003	0.0004	0.0007	0.0010	0.0012
				Feed (IPM)	2.2	2.2	1.8	1.9	1.8	1.9
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	85	RPM	10390	6927	4156	2598	1732	1484
			(68-102)	Fr	0.0002	0.0003	0.0004	0.0007	0.0010	0.0012
				Feed (IPM)	2.1	2.1	1.7	1.8	1.7	1.8
		> 250 ≤ 330	50	RPM	6112	4075	2445	1528	1019	873
			(40-60)	Fr	0.0001	0.0002	0.0002	0.0004	0.0006	0.0007
				Feed (IPM)	0.6	0.8	0.5	0.6	0.6	0.6
		> 330 ≤ 450	40	RPM	4890	3260	1956	1222	815	699
			(32-48)	Fr	0.0001	0.0002	0.0002	0.0004	0.0006	0.0007
				Feed (IPM)	0.5	0.7	0.4	0.5	0.5	0.5
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	250	RPM	30560	20373	12224	7640	5093	4366
			(200-300)	Fr	0.0004	0.0005	0.0009	0.0014	0.0021	0.0025
				Feed (IPM)	12.2	10.2	11.0	10.7	10.7	10.9
		> 200 ≤ 330	185	RPM	22614	15076	9046	5654	3769	3231
			(148-222)	Fr	0.0003	0.0005	0.0009	0.0014	0.0021	0.0024
				Feed (IPM)	6.8	7.5	8.1	7.9	7.9	7.8
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	155	RPM	18947	12631	7579	4737	3158	2707
			(124-186)	Fr	0.0002	0.0003	0.0004	0.0006	0.0009	0.0011
				Feed (IPM)	3.8	3.8	3.0	2.8	2.8	3.0
		> 250 ≤ 330	110	RPM	13446	8964	5379	3362	2241	1921
			(88-132)	Fr	0.0002	0.0003	0.0004	0.0006	0.0009	0.0011
				Feed (IPM)	2.7	2.7	2.2	2.0	2.0	2.1

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	Series 301 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/32	3/64	5/64	1/8	3/16	7/32
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	> 270 ≤ 370	70	RPM	8557	5705	3423	2139	1426	1222
			(56-84)	Fr	0.0002	0.0003	0.0004	0.0006	0.0009	0.0011
				Feed (IPM)	1.7	1.7	1.4	1.3	1.3	1.3
		> 270 ≤ 370	50	RPM	6112	4075	2445	1528	1019	873
			(40-60)	Fr	0.0001	0.0002	0.0003	0.0004	0.0006	0.0007
				Feed (IPM)	0.6	0.8	0.7	0.6	0.6	0.6
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	25	RPM	3056	2037	1222	764	509	437
			(20-30)	Fr	0.0002	0.0003	0.0005	0.0007	0.0011	0.0013
				Feed (IPM)	0.6	0.6	0.6	0.5	0.6	0.6
		> 220 ≤ 330	20	RPM	2445	1630	978	611	407	349
			(16-24)	Fr	0.0001	0.0001	0.0002	0.0003	0.0005	0.0006
				Feed (IPM)	0.2	0.2	0.2	0.2	0.2	0.2
		> 330 ≤ 420	15	RPM	1834	1222	733	458	306	262
			(12-18)	Fr	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004
				Feed (IPM)	0.2	0.1	0.1	0.1	0.1	0.1
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	85	RPM	10390	6927	4156	2598	1732	1484
			(68-102)	Fr	0.0003	0.0004	0.0007	0.0011	0.0017	0.0020
				Feed (IPM)	3.1	2.8	2.9	2.9	2.9	3.0
		> 280 ≤ 350	65	RPM	7946	5297	3178	1986	1324	1135
			(52-78)	Fr	0.0001	0.0002	0.0004	0.0006	0.0009	0.0010
				Feed (IPM)	0.8	1.1	1.3	1.2	1.2	1.1
		> 350 ≤ 440	50	RPM	6112	4075	2445	1528	1019	873
			(40-60)	Fr	0.0002	0.0004	0.0008	0.0015	0.0025	0.0030
				Feed (IPM)	1.2	1.6	2.0	2.3	2.5	2.6
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	540	RPM	66010	44006	26404	16502	11002	9430
			(432-648)	Fr	0.0004	0.0007	0.0011	0.0018	0.0027	0.0031
				Feed (IPM)	26.4	30.8	29.0	29.7	29.7	29.2
		> 80	455	RPM	55619	37079	22248	13905	9270	7946
			(364-546)	Fr	0.0004	0.0007	0.0011	0.0018	0.0027	0.0031
				Feed (IPM)	22.2	26.0	24.5	25.0	25.0	24.6
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	230	RPM	28115	18743	11246	7029	4686	4016
			(184-276)	Fr	0.0002	0.0003	0.0005	0.0009	0.0013	0.0015
				Feed (IPM)	5.6	5.6	5.6	6.3	6.1	6.0
		> 140	175	RPM	21392	14261	8557	5348	3565	3056
			(140-210)	Fr	0.0002	0.0003	0.0005	0.0009	0.0013	0.0015
				Feed (IPM)	4.3	4.3	4.3	4.8	4.6	4.6

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 301M Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 0.5	1	1.6	2.5	4	5
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	84	RPM	53318	26659	16662	10664	6665	5332
			(67-101)	Fr	0.005	0.011	0.014	0.024	0.038	0.048
				Feed (mm/min)	267	293	233	256	253	256
		> 200 ≤ 300	46	RPM	29082	14541	9088	5816	3635	2908
			(37-55)	Fr	0.005	0.009	0.014	0.022	0.034	0.043
				Feed (mm/min)	145	131	127	128	124	125
		> 300 ≤ 420	32	RPM	20358	10179	6362	4072	2545	2036
			(26-38)	Fz	0.003	0.006	0.010	0.014	0.023	0.030
				Feed (mm/min)	61	61	64	57	59	61
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 270	70	RPM	44593	22297	13935	8919	5574	4459
			(56-84)	Fz	0.005	0.009	0.012	0.020	0.032	0.041
				Feed (mm/min)	223	201	167	178	178	183
		> 275 ≤ 375	43	RPM	27144	13572	8482	5429	3393	2714
			(34-51)	Fr	0.005	0.009	0.012	0.020	0.032	0.041
				Feed (mm/min)	136	122	102	109	109	111
		> 375 ≤ 450	27	RPM	17449	8725	5453	3490	2181	1745
			(22-33)	Fr	0.003	0.006	0.008	0.014	0.021	0.027
				Feed (mm/min)	52	52	44	49	46	47
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	26	RPM	16480	8240	5150	3296	2060	1648
			(21-31)	Fr	0.003	0.006	0.008	0.014	0.021	0.027
				Feed (mm/min)	49	49	41	46	43	44
		> 250 ≤ 330	15	RPM	9694	4847	3029	1939	1212	969
			(12-18)	Fr	0.002	0.005	0.007	0.010	0.017	0.021
				Feed (mm/min)	19	24	21	19	21	20
		> 330 ≤ 450	12	RPM	7755	3878	2424	1551	969	776
			(10-15)	Fr	0.002	0.004	0.006	0.008	0.013	0.016
				Feed (mm/min)	16	16	15	12	13	12
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	76	RPM	48471	24235	15147	9694	6059	4847
			(61-91)	Fr	0.007	0.011	0.018	0.028	0.045	0.057
				Feed (mm/min)	339	267	273	271	273	276
		> 200 ≤ 330	56	RPM	35868	17934	11209	7174	4484	3587
			(45-68)	Fr	0.007	0.011	0.018	0.028	0.045	0.057
				Feed (mm/min)	251	197	202	201	202	204
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	47	RPM	30052	15026	9391	6010	3756	3005
			(38-57)	Fr	0.003	0.004	0.008	0.012	0.019	0.025
				Feed (mm/min)	90	60	75	72	71	75
		> 250 ≤ 330	34	RPM	21327	10664	6665	4265	2666	2133
			(27-40)	Fr	0.002	0.004	0.008	0.012	0.019	0.023
				Feed (mm/min)	43	43	53	51	51	49

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	Series 301M Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 0.5	1	1.6	2.5	4	5
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	> 270 ≤ 370	21	RPM	13572	6786	4241	2714	1696	1357
			(17-26)	Fr	0.002	0.004	0.008	0.012	0.019	0.023
				Feed (mm/min)	27	27	34	33	32	31
		> 270 ≤ 370	15	RPM	9694	4847	3029	1939	1212	969
			(12-18)	Fr	0.002	0.004	0.006	0.008	0.013	0.016
				Feed (mm/min)	19	19	18	16	16	16
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	8	RPM	4847	2424	1515	969	606	485
			(6-9)	Fr	0.003	0.006	0.010	0.014	0.023	0.030
				Feed (mm/min)	15	15	15	14	14	15
		> 220 ≤ 330	6	RPM	3878	1939	1212	776	485	388
			(5-7)	Fr	0.002	0.003	0.004	0.006	0.011	0.014
				Feed (mm/min)	8	6	5	5	5	5
		> 330 ≤ 420	5	RPM	2908	1454	909	582	364	291
			(4-5)	Fr	0.002	0.002	0.002	0.004	0.006	0.009
				Feed (mm/min)	6	3	2	2	2	3
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	26	RPM	16480	8240	5150	3296	2060	1648
			(21-31)	Fr	0.005	0.009	0.014	0.022	0.036	0.046
				Feed (mm/min)	82	74	72	73	74	76
		> 280 ≤ 350	20	RPM	12602	6301	3938	2520	1575	1260
			(16-24)	Fr	0.002	0.004	0.008	0.012	0.019	0.023
				Feed (mm/min)	25	25	32	30	30	29
		> 350 ≤ 440	15	RPM	9694	4847	3029	1939	1212	969
			(12-18)	Fr	0.002	0.004	0.004	0.008	0.013	0.016
				Feed (mm/min)	19	19	12	16	16	16
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	165	RPM	104697	52348	32718	20939	13087	10470
			(132-198)	Fr	0.007	0.015	0.023	0.036	0.057	0.071
				Feed (mm/min)	733	785	753	754	746	743
		> 80	139	RPM	88217	44108	27568	17643	11027	8822
			(111-166)	Fr	0.007	0.015	0.023	0.036	0.057	0.071
				Feed (mm/min)	618	662	634	635	629	626
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	70	RPM	44593	22297	13935	8919	5574	4459
			(56-84)	Fr	0.003	0.006	0.010	0.018	0.028	0.034
				Feed (mm/min)	134	134	139	161	156	152
		> 140	53	RPM	33930	16965	10603	6786	4241	3393
			(43-64)	Fr	0.003	0.006	0.010	0.018	0.028	0.034
				Feed (mm/min)	102	102	106	122	119	115

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 601 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	125	RPM	3820	2547	1910	1273	955	637	478
			(100-150)	Fr	0.0005	0.0008	0.0011	0.0016	0.0021	0.0032	0.0042
				Feed (IPM)	1.9	2.0	2.1	2.0	2.0	2.0	2.0
		> 200 ≤ 300	60	RPM	1834	1222	917	611	458	306	229
			(48-72)	Fr	0.0005	0.0007	0.0010	0.0014	0.0019	0.0029	0.0038
				Feed (IPM)	0.9	0.9	0.9	0.9	0.9	0.9	0.9
		> 300 ≤ 420	45	RPM	1375	917	688	458	344	229	172
			(36-54)	Fz	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
				Feed (IPM)	0.4	0.5	0.4	0.4	0.4	0.4	0.4
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	95	RPM	2903	1935	1452	968	726	484	363
			(76-114)	Fz	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
				Feed (IPM)	1.5	1.4	1.3	1.4	1.3	1.3	1.3
		> 275 ≤ 375	60	RPM	1834	1222	917	611	458	306	229
			(48-72)	Fr	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
				Feed (IPM)	0.9	0.9	0.8	0.9	0.8	0.8	0.8
		> 375 ≤ 450	35	RPM	1070	713	535	357	267	178	134
			(28-42)	Fr	0.0003	0.0004	0.0006	0.0008	0.0011	0.0017	0.0022
				Feed (IPM)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	35	RPM	1070	713	535	357	267	178	134
			(28-42)	Fr	0.0003	0.0004	0.0006	0.0008	0.0011	0.0017	0.0022
				Feed (IPM)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		> 250 ≤ 330	25	RPM	764	509	382	255	191	127	96
			(20-30)	Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
				Feed (IPM)	0.2	0.1	0.1	0.1	0.1	0.1	0.1
		> 330 ≤ 450	20	RPM	611	407	306	204	153	102	76
			(16-24)	Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
				Feed (IPM)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	105	RPM	3209	2139	1604	1070	802	535	401
			(84-126)	Fr	0.0006	0.0009	0.0012	0.0018	0.0024	0.0036	0.0048
				Feed (IPM)	1.9	1.9	1.9	1.9	1.9	1.9	1.9
		> 200 ≤ 330	75	RPM	2292	1528	1146	764	573	382	287
			(60-90)	Fr	0.0006	0.0009	0.0012	0.0018	0.0024	0.0036	0.0048
				Feed (IPM)	1.4	1.4	1.4	1.4	1.4	1.4	1.4
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	53	RPM	1620	1080	810	540	405	270	202
			(42-64)	Fr	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
				Feed (IPM)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		> 250 ≤ 330	46	RPM	1406	937	703	469	351	234	176
			(37-55)	Fr	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
				Feed (IPM)	0.3	0.3	0.4	0.3	0.3	0.3	0.3

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	Series 601 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	3/4	1
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	> 270	28	RPM	856	570	428	285	214	143	107
			(22-34)	Fr	0.0004	0.0005	0.0007	0.0011	0.0014	0.0021	0.0028
				Feed (IPM)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		> 270 ≤ 370	21	RPM	642	428	321	214	160	107	80
			(17-25)	Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
				Feed (IPM)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	18	RPM	550	367	275	183	138	92	69
			(14-22)	Fr	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
				Feed (IPM)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		> 220 ≤ 330	14	RPM	428	285	214	143	107	71	53
			(11-17)	Fr	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
				Feed (IPM)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		> 330 ≤ 420	12	RPM	367	244	183	122	92	61	46
			(10-14)	Fr	0.0002	0.0003	0.0004	0.0006	0.0008	0.0012	0.0016
				Feed (IPM)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	36	RPM	1100	733	550	367	275	183	138
			(29-43)	Fr	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
				Feed (IPM)	0.6	0.5	0.5	0.5	0.5	0.5	0.5
		> 280 ≤ 350	28	RPM	856	570	428	285	214	143	107
			(22-34)	Fr	0.0004	0.0005	0.0007	0.0011	0.0014	0.0021	0.0028
				Feed (IPM)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		> 350 ≤ 440	21	RPM	642	428	321	214	160	107	80
			(17-25)	Fr	0.0002	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012
				Feed (IPM)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	225	RPM	6876	4584	3438	2292	1719	1146	860
			(180-270)	Fr	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0060
				Feed (IPM)	5.5	5.0	5.2	5.3	5.2	5.2	5.2
		> 80	190	RPM	5806	3871	2903	1935	1452	968	726
			(152-228)	Fr	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0060
				Feed (IPM)	4.6	4.3	4.4	4.5	4.4	4.4	4.4
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	95	RPM	2903	1935	1452	968	726	484	363
			(76-114)	Fr	0.0004	0.0006	0.0008	0.0011	0.0015	0.0023	0.0030
				Feed (IPM)	1.2	1.2	1.2	1.1	1.1	1.1	1.1
		> 140	80	RPM	2445	1630	1222	815	611	407	306
			(64-96)	Fr	0.0004	0.0006	0.0008	0.0011	0.0015	0.0023	0.0030
				Feed (IPM)	1.0	1.0	1.0	0.9	0.9	0.9	0.9

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 603 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	125	RPM	3820	2547	1910	1273	955	637	478
			(100-150)	Fr	0.0008	0.0012	0.0016	0.0024	0.0032	0.0047	0.0063
				Feed (IPM)	3.1	3.1	3.1	3.1	3.1	3.0	3.0
		> 200 ≤ 300	60	RPM	1834	1222	917	611	458	306	229
			(48-72)	Fr	0.0007	0.0011	0.0014	0.0021	0.0029	0.0043	0.0057
				Feed (IPM)	1.3	1.3	1.3	1.3	1.3	1.3	1.3
		> 300 ≤ 420	45	RPM	1375	917	688	458	344	229	172
			(36-54)	Fz	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
				Feed (IPM)	0.7	0.6	0.6	0.6	0.6	0.6	0.6
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	95	RPM	2903	1935	1452	968	726	484	363
			(76-114)	Fz	0.0007	0.0010	0.0014	0.0020	0.0027	0.0041	0.0054
				Feed (IPM)	2.0	1.9	2.0	1.9	2.0	2.0	2.0
		> 275 ≤ 375	60	RPM	1834	1222	917	611	458	306	229
			(48-72)	Fr	0.0007	0.0010	0.0014	0.0020	0.0027	0.0041	0.0054
				Feed (IPM)	1.3	1.2	1.3	1.2	1.2	1.3	1.2
		> 375 ≤ 450	35	RPM	1070	713	535	357	267	178	134
			(28-42)	Fr	0.0004	0.0006	0.0008	0.0012	0.0017	0.0025	0.0033
				Feed (IPM)	0.4	0.4	0.4	0.4	0.5	0.4	0.4
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	35	RPM	1070	713	535	357	267	178	134
			(28-42)	Fr	0.0004	0.0006	0.0008	0.0012	0.0017	0.0025	0.0033
				Feed (IPM)	0.4	0.4	0.4	0.4	0.5	0.4	0.4
		> 250 ≤ 330	25	RPM	764	509	382	255	191	127	96
			(20-30)	Fr	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
				Feed (IPM)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		> 330 ≤ 450	20	RPM	611	407	306	204	153	102	76
			(16-24)	Fr	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
				Feed (IPM)	0.1	0.1	0.2	0.1	0.1	0.1	0.1
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	105	RPM	3209	2139	1604	1070	802	535	401
			(84-126)	Fr	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072
				Feed (IPM)	2.9	3.0	2.9	2.9	2.9	2.9	2.9
		> 200 ≤ 330	75	RPM	2292	1528	1146	764	573	382	287
			(60-90)	Fr	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072
				Feed (IPM)	2.1	2.1	2.1	2.1	2.1	2.1	2.1
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250	53	RPM	1620	1080	810	540	405	270	202
			(42-64)	Fr	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
				Feed (IPM)	0.8	0.8	0.7	0.8	0.7	0.7	0.7
		> 250 ≤ 330	46	RPM	1406	937	703	469	351	234	176
			(37-55)	Fr	0.0003	0.0005	0.0007	0.0010	0.0014	0.0020	0.0027
				Feed (IPM)	0.4	0.5	0.5	0.5	0.5	0.5	0.5

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	Series 603 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	3/4	1
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 270	28	RPM	856	570	428	285	214	143	107
			(22-34)	Fr	0.0005	0.0008	0.0011	0.0016	0.0021	0.0032	0.0042
				Feed (IPM)	0.4	0.5	0.5	0.5	0.4	0.5	0.4
		> 270 ≤ 370	21	RPM	642	428	321	214	160	107	80
			(17-25)	Fr	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
				Feed (IPM)	0.1	0.1	0.2	0.1	0.1	0.1	0.1
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	18	RPM	550	367	275	183	138	92	69
			(14-22)	Fr	0.0003	0.0005	0.0007	0.0010	0.0014	0.0020	0.0027
				Feed (IPM)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		> 220 ≤ 330	14	RPM	428	285	214	143	107	71	53
			(11-17)	Fr	0.0003	0.0005	0.0007	0.0010	0.0014	0.0020	0.0027
				Feed (IPM)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		> 330 ≤ 420	12	RPM	367	244	183	122	92	61	46
			(10-14)	Fr	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
				Feed (IPM)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	36	RPM	1100	733	550	367	275	183	138
			(29-43)	Fr	0.0007	0.0010	0.0014	0.0020	0.0027	0.0041	0.0054
				Feed (IPM)	0.8	0.7	0.8	0.7	0.7	0.8	0.7
		> 280 ≤ 350	28	RPM	856	570	428	285	214	143	107
			(22-34)	Fr	0.0005	0.0008	0.0011	0.0016	0.0021	0.0032	0.0042
				Feed (IPM)	0.4	0.5	0.5	0.5	0.4	0.5	0.4
		> 350 ≤ 440	21	RPM	642	428	321	214	160	107	80
			(17-25)	Fr	0.0002	0.0003	0.0005	0.0007	0.0009	0.0014	0.0018
				Feed (IPM)	0.1	0.1	0.2	0.1	0.1	0.1	0.1
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	225	RPM	6876	4584	3438	2292	1719	1146	860
			(180-270)	Fr	0.0011	0.0017	0.0023	0.0034	0.0045	0.0068	0.0090
				Feed (IPM)	7.6	7.8	7.9	7.8	7.7	7.8	7.7
		> 80	190	RPM	5806	3871	2903	1935	1452	968	726
			(152-228)	Fr	0.0011	0.0017	0.0023	0.0034	0.0045	0.0068	0.0090
				Feed (IPM)	6.4	6.6	6.7	6.6	6.5	6.6	6.5
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	95	RPM	2903	1935	1452	968	726	484	363
			(76-114)	Fr	0.0006	0.0008	0.0011	0.0017	0.0023	0.0034	0.0045
				Feed (IPM)	1.7	1.5	1.6	1.6	1.7	1.6	1.6
		> 140	80	RPM	2445	1630	1222	815	611	407	306
			(64-96)	Fr	0.0006	0.0008	0.0011	0.0017	0.0023	0.0034	0.0045
				Feed (IPM)	1.5	1.3	1.3	1.4	1.4	1.4	1.4

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 606 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	3/4	1
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	125	RPM	3820	2547	1910	1273	955	637	478
			(100-150)	Fr	0.0011	0.0016	0.0021	0.0032	0.0042	0.0063	0.0084
				Feed (IPM)	4.2	4.1	4.0	4.1	4.0	4.0	4.0
		> 200 ≤ 300	60	RPM	1834	1222	917	611	458	306	229
			(48-72)	Fr	0.0010	0.0014	0.0019	0.0029	0.0038	0.0057	0.0076
				Feed (IPM)	1.8	1.7	1.7	1.8	1.7	1.7	1.7
		> 300 ≤ 420	45	RPM	1375	917	688	458	344	229	172
			(36-54)	Fz	0.0006	0.0009	0.0012	0.0018	0.0024	0.0036	0.0048
				Feed (IPM)	0.8	0.8	0.8	0.8	0.8	0.8	0.8
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	95	RPM	2903	1935	1452	968	726	484	363
			(76-114)	Fz	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072
				Feed (IPM)	2.6	2.7	2.6	2.6	2.6	2.6	2.6
		> 275 ≤ 375	60	RPM	1834	1222	917	611	458	306	229
			(48-72)	Fr	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072
				Feed (IPM)	1.7	1.7	1.7	1.7	1.7	1.7	1.7
		> 375 ≤ 450	35	RPM	1070	713	535	357	267	178	134
			(28-42)	Fr	0.0006	0.0008	0.0011	0.0017	0.0022	0.0033	0.0044
				Feed (IPM)	0.6	0.6	0.6	0.6	0.6	0.6	0.6
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	35	RPM	1070	713	535	357	267	178	134
			(28-42)	Fr	0.0006	0.0008	0.0011	0.0017	0.0022	0.0033	0.0044
				Feed (IPM)	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		> 250 ≤ 330	25	RPM	764	509	382	255	191	127	96
			(20-30)	Fr	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
				Feed (IPM)	0.2	0.3	0.2	0.2	0.2	0.2	0.2
		> 330 ≤ 450	20	RPM	611	407	306	204	153	102	76
			(16-24)	Fr	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
				Feed (IPM)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	105	RPM	3209	2139	1604	1070	802	535	401
			(84-126)	Fr	0.0012	0.0018	0.0024	0.0036	0.0048	0.0072	0.0096
				Feed (IPM)	3.9	3.9	3.9	3.9	3.9	3.9	3.9
		> 200 ≤ 330	75	RPM	2292	1528	1146	764	573	382	287
			(60-90)	Fr	0.0012	0.0018	0.0024	0.0036	0.0048	0.0072	0.0096
				Feed (IPM)	2.8	2.8	2.8	2.8	2.8	2.8	2.8
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250	53	RPM	1620	1080	810	540	405	270	202
			(42-64)	Fr	0.0006	0.0009	0.0012	0.0018	0.0024	0.0036	0.0048
				Feed (IPM)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		> 250 ≤ 330	46	RPM	1406	937	703	469	351	234	176
			(37-55)	Fr	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
				Feed (IPM)	0.7	0.7	0.6	0.7	0.6	0.6	0.6

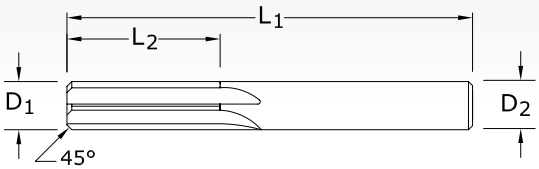
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	Series 606 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/8	3/16	1/4	3/8	1/2	3/4	1
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 270	28	RPM	856	570	428	285	214	143	107
			(22-34)	Fr	0.0007	0.0011	0.0014	0.0021	0.0028	0.0042	0.0056
				Feed (IPM)	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		> 270 ≤ 370	21	RPM	642	428	321	214	160	107	80
			(17-25)	Fr	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
				Feed (IPM)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	18	RPM	550	367	275	183	138	92	69
			(14-22)	Fr	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
				Feed (IPM)	0.3	0.3	0.2	0.3	0.2	0.2	0.2
		> 220 ≤ 330	14	RPM	428	285	214	143	107	71	53
			(11-17)	Fr	0.0005	0.0007	0.0009	0.0014	0.0018	0.0027	0.0036
				Feed (IPM)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		> 330 ≤ 420	12	RPM	367	244	183	122	92	61	46
			(10-14)	Fr	0.0004	0.0006	0.0008	0.0012	0.0016	0.0024	0.0032
				Feed (IPM)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	36	RPM	1100	733	550	367	275	183	138
			(29-43)	Fr	0.0009	0.0014	0.0018	0.0027	0.0036	0.0054	0.0072
				Feed (IPM)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		> 280 ≤ 350	28	RPM	856	570	428	285	214	143	107
			(22-34)	Fr	0.0007	0.0011	0.0014	0.0021	0.0028	0.0042	0.0056
				Feed (IPM)	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		> 350 ≤ 440	21	RPM	642	428	321	214	160	107	80
			(17-25)	Fr	0.0003	0.0005	0.0006	0.0009	0.0012	0.0018	0.0024
				Feed (IPM)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	225	RPM	6876	4584	3438	2292	1719	1146	860
			(180-270)	Fr	0.0015	0.0023	0.0030	0.0045	0.0060	0.0090	0.0120
				Feed (IPM)	10.3	10.5	10.3	10.3	10.3	10.3	10.3
		> 80	190	RPM	5806	3871	2903	1935	1452	968	726
			(152-228)	Fr	0.0015	0.0023	0.0030	0.0045	0.0060	0.0090	0.0120
				Feed (IPM)	8.7	8.9	8.7	8.7	8.7	8.7	8.7
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	95	RPM	2903	1935	1452	968	726	484	363
			(76-114)	Fr	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0060
				Feed (IPM)	2.3	2.1	2.2	2.2	2.2	2.2	2.2
		> 140	80	RPM	2445	1630	1222	815	611	407	306
			(64-96)	Fr	0.0008	0.0011	0.0015	0.0023	0.0030	0.0045	0.0060
				Feed (IPM)	2.0	1.8	1.8	1.9	1.8	1.8	1.8

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)







TOLERANCES (mm)

1–6 DIAMETER
D_1 = +0,008/–0,000

>6–10 DIAMETER
D_1 = +0,011/–0,00

201M
METRIC SERIES

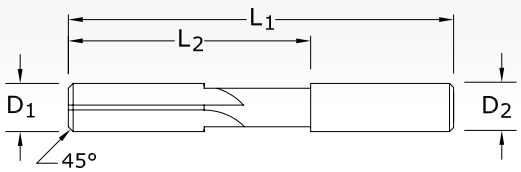
TECH INFO 240

mm					EDP NO.
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	MAXIMUM REAM LENGTH L_2	OVERALL LENGTH L_1	NO. OF FLUTES	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







200
FRACTIONAL SERIES

TECH INFO 238

TOLERANCES (inch)

D_1 = +.0002/–.0000

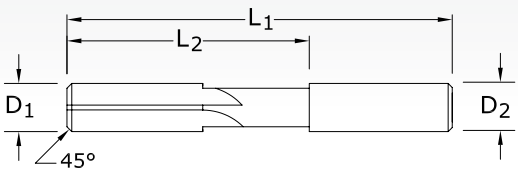
D_2 = +.0002/–.0000

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

inch					EDP NO.
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	MAXIMUM REAM LENGTH L_2	OVERALL LENGTH L_1	NO. OF FLUTES	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







TOLERANCES (inch)

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

200
FRACTIONAL SERIES

TECH INFO 238

inch				
CUTTING DIAMETER D_1	SHANK DIAMETER D_2	MAXIMUM REAM LENGTH L_2	OVERALL LENGTH L_1	NO. OF FLUTES
.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

	Series 200 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/16	1/8	3/16	1/4	1/3	3/8	1/2
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	150	RPM	9168	4584	3056	2292	1834	1528	1146
			(120-180)	Fr	0.0018	0.0035	0.0053	0.0071	0.0088	0.0106	0.0141
				Feed (IPM)	16.5	16.0	16.2	16.3	16.1	16.2	16.2
		> 200 ≤ 300	75	RPM	4584	2292	1528	1146	917	764	573
			(60-90)	Fr	0.0016	0.0031	0.0047	0.0062	0.0078	0.0093	0.0124
				Feed (IPM)	7.3	7.1	7.2	7.1	7.2	7.1	7.1
		> 300 ≤ 420	55	RPM	3362	1681	1121	840	672	560	420
			(44-66)	Fz	0.0009	0.0019	0.0028	0.0037	0.0046	0.0056	0.0074
				Feed (IPM)	3.0	3.2	3.1	3.1	3.1	3.1	3.1
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	115	RPM	7029	3514	2343	1757	1406	1171	879
			(92-138)	Fz	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
				Feed (IPM)	10.5	10.5	10.5	10.5	10.5	10.5	10.5
		> 275 ≤ 375	70	RPM	4278	2139	1426	1070	856	713	535
			(56-84)	Fr	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
				Feed (IPM)	6.4	6.4	6.4	6.4	6.4	6.4	6.4
		> 375 ≤ 450	45	RPM	2750	1375	917	688	550	458	344
			(36-54)	Fr	0.0009	0.0019	0.0028	0.0037	0.0046	0.0056	0.0074
				Feed (IPM)	2.5	2.6	2.6	2.5	2.5	2.6	2.5
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	40	RPM	2445	1222	815	611	489	407	306
			(32-48)	Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078
				Feed (IPM)	2.4	2.4	2.4	2.4	2.4	2.4	2.4
		> 250 ≤ 330	25	RPM	1528	764	509	382	306	255	191
			(20-30)	Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
				Feed (IPM)	0.9	1.0	1.0	1.0	0.9	1.0	1.0
		> 330 ≤ 450	20	RPM	1222	611	407	306	244	204	153
			(16-24)	Fr	0.0004	0.0008	0.0012	0.0016	0.0019	0.0023	0.0031
				Feed (IPM)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	125	RPM	7640	3820	2547	1910	1528	1273	955
			(100-150)	Fr	0.0020	0.0040	0.0060	0.0081	0.0101	0.0121	0.0161
				Feed (IPM)	15.3	15.3	15.3	15.5	15.4	15.4	15.4
		> 200 ≤ 330	95	RPM	5806	2903	1935	1452	1161	968	726
			(76-114)	Fr	0.0020	0.0040	0.0060	0.0081	0.0101	0.0121	0.0161
				Feed (IPM)	11.6	11.6	11.6	11.8	11.7	11.7	11.7
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	≤ 250	75	RPM	4584	2292	1528	1146	917	764	573
			(60-90)	Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078
				Feed (IPM)	4.6	4.6	4.4	4.5	4.5	4.5	4.5
		> 250 ≤ 330	55	RPM	3362	1681	1121	840	672	560	420
			(44-66)	Fr	0.0008	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060
				Feed (IPM)	2.7	2.5	2.6	2.5	2.6	2.5	2.5

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	Series 200 Fractional	Hardness BRINELL	Vc (SFM)		Diameter (D_1) (inch) 1/16	1/8	3/16	1/4	1/3	3/8	1/2
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 270	35	RPM	2139	1070	713	535	428	357	267
			(28-42)	Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078
				Feed (IPM)	2.1	2.1	2.1	2.1	2.1	2.1	2.1
		> 270 ≤ 370	25	RPM	1528	764	509	382	306	255	191
			(20-30)	Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
				Feed (IPM)	0.9	1.0	1.0	1.0	0.9	1.0	1.0
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	20	RPM	1222	611	407	306	244	204	153
			(16-24)	Fr	0.0008	0.0015	0.0023	0.0030	0.0038	0.0045	0.0060
				Feed (IPM)	1.0	0.9	0.9	0.9	0.9	0.9	0.9
		> 220 ≤ 330	15	RPM	917	458	306	229	183	153	115
			(12-18)	Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
				Feed (IPM)	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		> 330 ≤ 420	10	RPM	611	306	204	153	122	102	76
			(8-12)	Fr	0.0004	0.0007	0.0011	0.0015	0.0018	0.0022	0.0029
				Feed (IPM)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	45	RPM	2750	1375	917	688	550	458	344
			(36-54)	Fr	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0120
				Feed (IPM)	4.1	4.1	4.1	4.1	4.1	4.1	4.1
		> 280 ≤ 350	35	RPM	2139	1070	713	535	428	357	267
			(28-42)	Fr	0.0010	0.0020	0.0029	0.0039	0.0049	0.0059	0.0078
				Feed (IPM)	2.1	2.1	2.1	2.1	2.1	2.1	2.1
		> 350 ≤ 440	25	RPM	1528	764	509	382	306	255	191
			(20-30)	Fr	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038	0.0050
				Feed (IPM)	0.9	1.0	1.0	1.0	0.9	1.0	1.0
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	270	RPM	16502	8251	5501	4126	3300	2750	2063
			(216-324)	Fr	0.0025	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200
				Feed (IPM)	41.3	41.3	41.3	41.3	41.3	41.3	41.3
		> 80	230	RPM	14058	7029	4686	3514	2812	2343	1757
			(184-276)	Fr	0.0025	0.0050	0.0075	0.0100	0.0125	0.0150	0.0200
				Feed (IPM)	35.1	35.1	35.1	35.1	35.1	35.1	35.1
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	115	RPM	7029	3514	2343	1757	1406	1171	879
			(92-138)	Fr	0.0013	0.0026	0.0038	0.0051	0.0064	0.0077	0.0102
				Feed (IPM)	9.1	9.1	8.9	9.0	9.0	9.0	9.0
		> 140	95	RPM	5806	2903	1935	1452	1161	968	726
			(76-114)	Fr	0.0013	0.0026	0.0038	0.0051	0.0064	0.0077	0.0102
				Feed (IPM)	7.5	7.5	7.4	7.4	7.4	7.5	7.4

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
increase speed and feed rates shown by 30 percent when using coated reamers
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

	Series 201M Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 1	2	3	4	6	8	10
P	CARBON STEELS 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	46	RPM	14541	7271	4847	3635	2424	1818	1454
			(37-55)	Fr	0.028	0.056	0.085	0.113	0.169	0.226	0.282
				Feed (mm/min)	407	407	412	411	410	411	410
		> 200 ≤ 300	23	RPM	7271	3635	2424	1818	1212	909	727
			(18-27)	Fr	0.025	0.050	0.074	0.099	0.149	0.198	0.248
				Feed (mm/min)	182	182	179	180	181	180	180
		> 300 ≤ 420	17	RPM	5332	2666	1777	1333	889	666	533
			(13-20)	Fz	0.015	0.030	0.044	0.059	0.089	0.118	0.148
				Feed (mm/min)	80	80	78	79	79	79	79
P	ALLOY STEELS 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 270	35	RPM	11148	5574	3716	2787	1858	1394	1115
			(28-42)	Fz	0.024	0.048	0.072	0.096	0.144	0.192	0.240
				Feed (mm/min)	268	268	268	268	268	268	268
		> 275 ≤ 375	21	RPM	6786	3393	2262	1696	1131	848	679
			(17-26)	Fr	0.024	0.048	0.072	0.096	0.144	0.192	0.240
				Feed (mm/min)	163	163	163	163	163	163	163
		> 375 ≤ 450	14	RPM	4362	2181	1454	1091	727	545	436
			(11-16)	Fr	0.015	0.030	0.044	0.059	0.089	0.118	0.148
				Feed (mm/min)	65	65	64	64	65	64	65
P	TOOL STEELS A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	12	RPM	3878	1939	1293	969	646	485	388
			(10-15)	Fr	0.016	0.031	0.047	0.062	0.094	0.125	0.156
				Feed (mm/min)	62	60	61	60	61	61	60
		> 250 ≤ 330	8	RPM	2424	1212	808	606	404	303	242
			(6-9)	Fr	0.010	0.020	0.030	0.040	0.060	0.080	0.100
				Feed (mm/min)	24	24	24	24	24	24	24
		> 330 ≤ 450	6	RPM	1939	969	646	485	323	242	194
			(5-7)	Fr	0.006	0.012	0.019	0.025	0.037	0.050	0.062
				Feed (mm/min)	12	12	12	12	12	12	12
K	CAST IRONS Gray, Malleable, Ductile	≤ 200	38	RPM	12118	6059	4039	3029	2020	1515	1212
			(30-46)	Fr	0.032	0.064	0.097	0.129	0.193	0.258	0.322
				Feed (mm/min)	388	388	392	391	390	391	390
		> 200 ≤ 330	29	RPM	9209	4605	3070	2302	1535	1151	921
			(23-35)	Fr	0.032	0.064	0.097	0.129	0.193	0.258	0.322
				Feed (mm/min)	295	295	298	297	296	297	297
M	STAINLESS STEELS (FREE MACHINING) 303, 416, 420F, 430F 440F	< 250	23	RPM	7271	3635	2424	1818	1212	909	727
			(18-27)	Fr	0.015	0.030	0.044	0.059	0.089	0.118	0.148
				Feed (mm/min)	109	109	107	107	108	107	108
		> 250 ≤ 330	17	RPM	5332	2666	1777	1333	889	666	533
			(13-20)	Fr	0.012	0.024	0.036	0.048	0.072	0.096	0.120
				Feed (mm/min)	64	64	64	64	64	64	64

continued on next page

	Series 201M Metric	Hardness BRINELL	Vc (m/min)		Diameter (D_1) (mm) 1	2	3	4	6	8	10
M	STAINLESS STEELS (DIFFICULT) 304, 316, 321, 13-8 PH, 15-5PH, 17-4 PH, Custom 450	≤ 270	11	RPM	3393	1696	1131	848	565	424	339
			(9-13)	Fr	0.015	0.030	0.044	0.059	0.089	0.118	0.148
				Feed (mm/min)	51	51	50	50	50	50	50
		> 270 ≤ 370	8	RPM	2424	1212	808	606	404	303	242
			(6-9)	Fr	0.010	0.020	0.030	0.040	0.060	0.080	0.100
				Feed (mm/min)	24	24	24	24	24	24	24
S	SUPER ALLOYS (NICKEL, COBALT, IRON BASE) Inconel 601, 617, 625, Incoly 800, Monel 400, Rene, Waspaloy	≤ 220	6	RPM	1939	969	646	485	323	242	194
			(5-7)	Fr	0.012	0.024	0.036	0.048	0.072	0.096	0.120
				Feed (mm/min)	23	23	23	23	23	23	23
		> 220 ≤ 330	5	RPM	1454	727	485	364	242	182	145
			(4-5)	Fr	0.010	0.020	0.030	0.040	0.060	0.080	0.100
				Feed (mm/min)	15	15	15	15	15	15	15
		> 330 ≤ 420	3	RPM	969	485	323	242	162	121	97
			(2-4)	Fr	0.006	0.012	0.019	0.025	0.037	0.050	0.062
				Feed (mm/min)	6	6	6	6	6	6	6
S	TITANIUM ALLOYS Pure Ttanium, Ti6Al4V, Ti6Al2Sn4Zr2Mo, Ti4Al4Mo2Sn0.5Si, Ti-6Al4V	≤ 280	14	RPM	4362	2181	1454	1091	727	545	436
			(11-16)	Fr	0.024	0.048	0.072	0.096	0.144	0.192	0.240
				Feed (mm/min)	105	105	105	105	105	105	105
		> 280 ≤ 350	11	RPM	3393	1696	1131	848	565	424	339
			(9-13)	Fr	0.015	0.030	0.044	0.059	0.089	0.118	0.148
				Feed (mm/min)	51	51	50	50	50	50	50
		> 350 ≤ 440	8	RPM	2424	1212	808	606	404	303	242
			(6-9)	Fr	0.010	0.020	0.030	0.040	0.060	0.080	0.100
				Feed (mm/min)	24	24	24	24	24	24	24
N	ALUMINUM ALLOYS 2017, 2024, 356, 6061, 7075	≤ 80	82	RPM	26174	13087	8725	6544	4362	3272	2617
			(66-99)	Fr	0.040	0.080	0.120	0.160	0.240	0.320	0.400
				Feed (mm/min)	1047	1047	1047	1047	1047	1047	1047
		> 80	70	RPM	22297	11148	7432	5574	3716	2787	2230
			(56-84)	Fr	0.040	0.080	0.120	0.160	0.240	0.320	0.400
				Feed (mm/min)	892	892	892	892	892	892	892
N	COPPER ALLOYS Alum Bronze, C110, Muntz Brass	≤ 140	35	RPM	11148	5574	3716	2787	1858	1394	1115
			(28-42)	Fr	0.020	0.041	0.061	0.082	0.122	0.163	0.204
				Feed (mm/min)	223	229	227	229	227	227	227
		> 140	29	RPM	9209	4605	3070	2302	1535	1151	921
			(23-35)	Fr	0.020	0.041	0.061	0.082	0.122	0.163	0.204
				Feed (mm/min)	184	189	187	189	187	188	188

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / revolution) x rpm
increase speed and feed rates shown by 30 percent when using coated reamers
reduce speed and feed for materials harder than listed
refer to the SGS Tool Wizard for complete technical information (www.sgstool.com)

ROUTERS



Routing

HIGH PERFORMANCE ROUTERS	SERIES	PAGE
Carbon Composite Routers	20-CCR, 20M-CCR	246
Coarse Cut Carbon Composite Routers	31-CCR, 31M-CCR	247
Compression Routers	25, 25-M	248

GENERAL PURPOSE ROUTERS	SERIES	PAGE
Up Cut Routers	21, 21M	249
Down Cut Routers	22, 22M	250

TECHNICAL INFORMATION

Speed & Feed Recommendations 251

Ranurado

RANURADORES DE ALTO RENDIMIENTO	SERIE	PÁGINA
Ranuradores de compuesto de carbono	20-CCR, 20M-CCR	246
Ranuradores de compuesto de carbono de corte áspero	31-CCR, 31M-CCR	247
Ranuradores de compresión	25, 25-M	248
RANURADORES DE USO GENERAL	**SERIE**	**PÁGINA**
Ranuradores de corte ascendente	21, 21M	249
Ranuradores de corte descendente	22, 22M	250
INFORMACIÓN TÉCNICA		
Velocidades y avances recomendados		251

Détourage

FRAISES A DETOURER HAUTE PERFORMANCE	SERIES	PAGE
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Fraises à détourer pour composite carbone coupe grossière	31-CCR, 31M-CCR	247
Fraises à détourer compression	25, 25-M	248
FRAISES À DÉTOURER UNIVERSELLES	**SERIES**	**PAGE**
Fraises à détourer up cut	21, 21M	249
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INFORMATIONS TECHNIQUES		
Recommandations de vitesse et avance		251

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



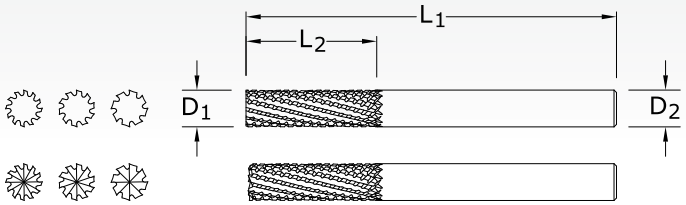
Uncoated



Di-NAMITE
(Diamond)







20-CCR
FRACTIONAL SERIES

TECH INFO 251

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

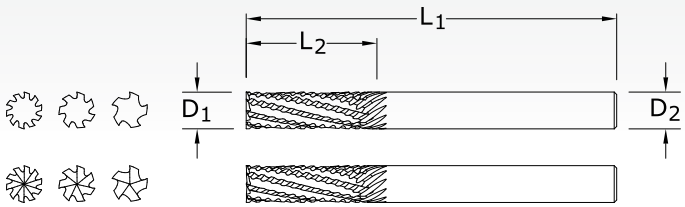
TECH INFO 252

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







TOLERANCES (inch)

D_1 = +.000/–.005

D_2 = h_6

31-CCR
FRACTIONAL SERIES

TECH INFO 251

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	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

TOLERANCES (mm)

D_1 = +0,00/–0,13

D_2 = h_6

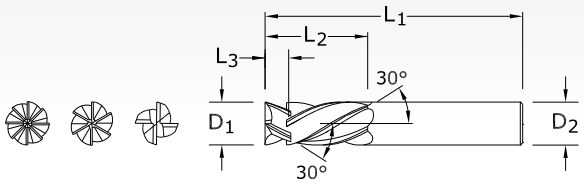
31M-CCR
METRIC SERIES

TECH INFO 252

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







25
FRACTIONAL SERIES

TECH INFO 253

PLASTICS/COMPOSITES

inch						EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	L_3	NO. OF FLUTES	UNCOATED	Di-NAMITE (Diamond)
1/4	1	2-1/2	1/4	11/64	4	72970	72971
5/16	1	2-1/2	5/16	7/32	4	72972	72973
3/8	1-1/8	2-1/2	3/8	17/64	6	72974	72975
1/2	1-1/2	3-1/2	1/2	23/64	8	72976	72977

TOLERANCES (inch)

D_1 = +.000/–.003
D_2 = h_6

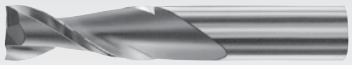
25M
METRIC SERIES

TECH INFO 254

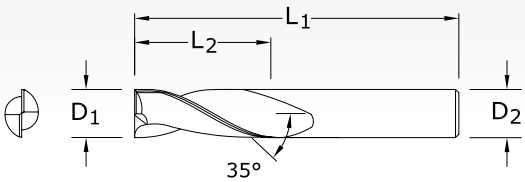
mm						EDP NO.	
CUTTING DIAMETER D_1	LENGTH OF CUT L_2	OVERALL LENGTH L_1	SHANK DIAMETER D_2	L_3	NO. OF FLUTES	UNCOATED	Di-NAMITE (Diamond)
6,0	25,0	63,0	6,0	4,10	4	82990	82991
8,0	25,0	63,0	8,0	5,58	4	82992	82993
10,0	28,0	63,0	10,0	7,05	6	82994	82995
12,0	38,0	89,0	12,0	8,60	8	82996	82997

TOLERANCES (mm)

D_1 = +0,00/–0,08
D_2 = h_6







TOLERANCES (inch)

D_1 = +.000/–.003
D_2 = h_6

21
FRACTIONAL SERIES

TECH INFO 255

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

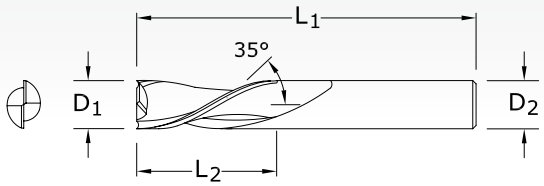
21M
METRIC SERIES

TECH INFO 256

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







22
FRACTIONAL SERIES

TECH INFO 255

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 256

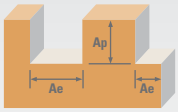
TOLERANCES (mm)

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

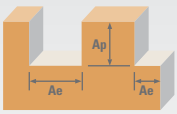
CCR CARBON-FIBER COMPOSITE ROUTERS



Series 20, 31 Fractional		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/4	5/16	3/8	1/2
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot	1	≤ 1	400	RPM	6112	4890	4075	3056
				(320-480)	Fz	0.0060	0.0075	0.0090	0.0120
					Feed (IPM)	36.7	36.7	36.7	36.7
	Profile	≤ 0.5	≤ 1.5	500	RPM	7640	6112	5093	3820
				(400-600)	Fz	0.0060	0.0075	0.0090	0.0120
					Feed (IPM)	45.8	45.8	45.8	45.8
	HSM	≤ 0.5	≤ 2	825	RPM	12606	10085	8404	6303
				(660-990)	Fz	0.0138	0.0173	0.0207	0.0276
					Feed (IPM)	174.0	174.0	174.0	174.0
GFRP (FIBERGLASS)	Slot	1	≤ 1	320	RPM	4890	3912	3260	2445
				(256-384)	Fz	0.0060	0.0075	0.0090	0.0120
					Feed (IPM)	29.3	29.3	29.3	29.3
	Profile	≤ 0.5	≤ 1.5	400	RPM	6112	4890	4075	3056
				(320-480)	Fz	0.0060	0.0075	0.0090	0.0120
					Feed (IPM)	36.7	36.7	36.7	36.7
	HSM	≤ 0.05	≤ 2	660	RPM	10085	8068	6723	5042
				(528-792)	Fz	0.0138	0.0172	0.0207	0.0276
					Feed (IPM)	139.0	139.0	139.0	139.0
CARBON, GRAPHITE	Slot	1	≤ 1	480	RPM	7334	5868	4890	3667
				(384-576)	Fz	0.0075	0.0094	0.0112	0.0150
					Feed (IPM)	55.0	55.0	55.0	55.0
	Profile	≤ 0.5	≤ 1.5	600	RPM	9168	7334	6112	4584
				(480-720)	Fz	0.0075	0.0094	0.0112	0.0150
					Feed (IPM)	68.7	68.7	68.7	68.7
	HSM	≤ 0.05	≤ 2	990	RPM	15127	12102	10085	7564
				(792-1188)	Fz	0.0172	0.0215	0.0258	0.0344
					Feed (IPM)	260.0	260.0	260.0	260.0
PLASTICS	Slot	1	≤ 1	800	RPM	12224	9779	8149	6112
				(640-690)	Fz	0.0075	0.0094	0.0113	0.0150
					Feed (IPM)	91.7	91.7	91.7	91.7
	Profile	≤ 0.5	≤ 1.5	1000	RPM	15280	12224	10187	7640
				(800-1200)	Fz	0.0075	0.0094	0.0113	0.0150
					Feed (IPM)	114.6	114.6	114.6	114.6
	HSM	≤ 0.05	≤ 2	1650	RPM	25212	20170	16808	12606
				(1320-1980)	Fz	0.0069	0.0086	0.0104	0.0138
					Feed (IPM)	174.0	174.0	174.0	174.0

rpm = sfm x 3.82 / D_1
ipm = (inch / revolution) x rpm
HSM (high speed machining)
adjust parameters based on resin type and fiber structure
reduce speed when overheating causes melting or damage to resin
reduce feed if delamination or fraying occur

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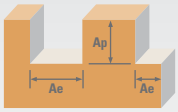


Series 20, 31 Metric		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	8	10	12
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Slot	1	≤ 1	120 (96-164)	RPM	6361	4771	3817	3181
					Fz	0.152	0.203	0.254	0.305
					Feed (mm/min)	970	970	970	970
	Profile	≤ 0.5	≤ 1.5	150 (120-180)	RPM	7951	5963	4771	3976
					Fz	0.153	0.203	0.254	0.305
					Feed (mm/min)	1213	1213	1213	1213
	HSM	≤ 0.05	≤ 2	250 (200-300)	RPM	13252	9939	7951	6626
					Fz	0.350	0.467	0.583	0.700
					Feed (mm/min)	4638	4638	4638	4638
GFRP (FIBERGLASS)	Slot	1	≤ 1	100 (80-120)	RPM	5301	3976	3181	2650
					Fz	0.152	0.203	0.254	0.305
					Feed (mm/min)	808	808	808	808
	Profile	≤ 0.5	≤ 1.5	120 (96-164)	RPM	6361	4771	3817	3181
					Fz	0.152	0.203	0.254	0.305
					Feed (mm/min)	970	970	970	970
	HSM	≤ 0.05	≤ 2	200 (160-240)	RPM	10602	7951	6361	5301
					Fz	0.350	0.467	0.583	0.700
					Feed (mm/min)	3711	3711	3711	3711
CARBON, GRAPHITE	Slot	1	≤ 1	145 (116-174)	RPM	7686	5765	4612	3843
					Fz	0.190	0.253	0.317	0.380
					Feed (mm/min)	1460	1460	1460	1460
	Profile	≤ 0.5	≤ 1.5	185 (148-222)	RPM	9807	7355	5884	4903
					Fz	0.190	0.253	0.317	0.380
					Feed (mm/min)	1863	1863	1863	1863
	HSM	≤ 0.05	≤ 2	300 (240-360)	RPM	15903	11927	9542	7951
					Fz	0.437	0.583	0.729	0.875
					Feed (mm/min)	6957	6957	6957	6957
PLASTICS	Slot	1	≤ 1	245 (196-294)	RPM	12987	9740	7792	6494
					Fz	0.075	0.100	0.125	0.150
					Feed (mm/min)	974	974	974	974
	Profile	≤ 0.5	≤ 1.5	305 (244-366)	RPM	16168	12126	9701	8084
					Fz	0.075	0.100	0.125	0.150
					Feed (mm/min)	1213	1213	1213	1213
	HSM	≤ 0.05	≤ 2	505 (404-606)	RPM	26769	20077	16062	13385
					Fz	0.175	0.233	0.292	0.350
					Feed (mm/min)	4685	4685	4685	4685

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / revolution) x rpm
HSM (high speed machining)
adjust parameters based on resin type and fiber structure
reduce speed when overheating causes melting or damage to resin
reduce feed if delamination or fraying occur

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DI-NAMITE CRYSTALLINE DIAMOND COATING

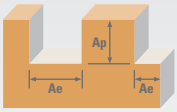


Series 25 Fractional		Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/4	5/16	3/8	1/2	3/4
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Profile	≤ 0.5	≤ 1.5	500	RPM	7640	6112	5093	3820	2547
				(400-600)	Fz	0.0016	0.0025	0.0030	0.0040	0.0048
					Feed (IPM)	48.9	61.1	91.7	122.2	97.8
	HSM	≤ 0.05	≤ 2	825	RPM	12606	10085	8404	6303	4202
				(660-990)	Fz	0.0037	0.0057	0.0069	0.0092	0.0110
					Feed (IPM)	186.6	229.9	347.9	463.9	369.8
GFRP (FIBERGLASS)	Profile	≤ 0.5	≤ 1.5	400	RPM	6112	4890	4075	3056	2037
				(320-480)	Fz	0.0016	0.0025	0.0030	0.0040	0.0048
					Feed (IPM)	39.1	48.9	73.3	97.8	78.2
	HSM	≤ 0.05	≤ 2	660	RPM	10085	8068	6723	5042	3362
				(528-792)	Fz	0.0037	0.0057	0.0069	0.0092	0.0110
					Feed (IPM)	149.3	183.9	278.3	371.1	295.8
CARBON, GRAPHITE	Profile	≤ 0.5	≤ 1.5	600	RPM	9168	7334	6112	4584	3056
				(480-720)	Fz	0.0020	0.0031	0.0038	0.0050	0.0050
					Feed (IPM)	73.3	90.9	139.4	183.4	122.2
	HSM	≤ 0.05	≤ 2	990	RPM	15127	12102	10085	7564	5042
				(792-1188)	Fz	0.0046	0.0072	0.0086	0.0115	0.0138
					Feed (IPM)	278.3	348.5	520.4	695.9	556.7
PLASTICS	Profile	≤ 0.5	≤ 1.5	1000	RPM	15280	12224	10187	7640	5093
				(800-1200)	Fz	0.0020	0.0031	0.0038	0.0050	0.0060
					Feed (IPM)	122.2	151.6	232.3	305.6	244.5
	HSM	≤ 0.05	≤ 2	1650	RPM	25212	20170	16808	12606	8404
				(1320-1980)	Fz	0.0046	0.0072	0.0086	0.0115	0.0138
					Feed (IPM)	463.9	580.9	867.3	1159.8	927.8
MACHINABLE CERAMICS MACHINABLE GLASS	Profile	≤ 0.5	≤ 1.5	50	RPM	764	611	509	382	255
				(40-60)	Fz	0.0008	0.0013	0.0015	0.0020	0.0024
					Feed (IPM)	2.4	3.2	4.6	6.1	4.9
	HSM	≤ 0.05	≤ 2	85	RPM	1299	1039	866	649	433
				(68-102)	Fz	0.0018	0.0029	0.0034	0.0046	0.0550
					Feed (IPM)	9.4	12.1	17.7	23.9	190.5

rpm = sfm x 3.82 / D_1
ipm = (inch / flute) x 4 x rpm
HSM (high speed machining)
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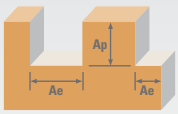
DI-NAMITE CRYSTALLINE DIAMOND COATING



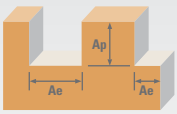
Series 25 Metric		Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 6	8	10	12	16
CFRP, AFRP (CARBON FIBER, ARAMID FIBER)	Profile	≤ 0.5	≤ 1.5	150	RPM	7951	5963	4771	3976	2982
				(96-164)	Fz	0.040	0.065	0.075	0.100	0.120
					Feed (mm/min)	1272	1550	2147	3181	2862
	HSM	≤ 0.05	≤ 2	250	RPM	13252	9939	7951	6626	4970
				(200-300)	Fz	0.095	0.145	0.175	0.235	0.280
					Feed (mm/min)	5036	5765	8349	12457	11132
GFRP (FIBERGLASS)	Profile	≤ 0.5	≤ 1.5	120	RPM	6361	4771	3817	3181	2385
				(96-164)	Fz	0.040	0.065	0.075	0.100	0.120
					Feed (mm/min)	1018	1240	1717	2544	2290
	HSM	≤ 0.05	≤ 2	200	RPM	10602	7951	6361	5301	3976
				(160-240)	Fz	0.095	0.145	0.175	0.235	0.280
					Feed (mm/min)	4029	4612	6679	9966	8905
CARBON, GRAPHITE	Profile	≤ 0.5	≤ 1.5	185	RPM	9807	7355	5884	4903	3677
				(148-222)	Fz	0.050	0.080	0.095	0.125	0.150
					Feed (mm/min)	1961	2354	3354	4903	4413
	HSM	≤ 0.05	≤ 2	300	RPM	15903	11927	9542	7951	5963
				(240-360)	Fz	0.115	0.185	0.220	0.290	0.350
					Feed (mm/min)	7315	8826	12595	18447	16698
PLASTICS	Profile	≤ 0.5	≤ 1.5	305	RPM	16168	12126	9701	8084	6063
				(244-366)	Fz	0.050	0.080	0.095	0.125	0.150
					Feed (mm/min)	3234	3880	5529	8084	7275
	HSM	≤ 0.05	≤ 2	505	RPM	26769	20077	16062	13385	10038
				(404-606)	Fz	0.115	0.185	0.220	0.290	0.350
					Feed (mm/min)	12314	14857	21201	31052	28108
MACHINABLE CERAMICS MACHINABLE GLASS	Profile	≤ 0.5	≤ 1.5	15	RPM	795	596	477	398	298
				(12-18)	Fz	0.020	0.035	0.045	0.050	0.060
					Feed (mm/min)	64	83	129	159	143
	HSM	≤ 0.05	≤ 2	25	RPM	1325	994	795	663	497
				(20-30)	Fz	0.045	0.075	0.085	0.115	0.140
					Feed (mm/min)	239	298	406	610	557

rpm = (1000 x m/min) / (3.14 x D_1)
mm / min = (mm / flute) x 4 x rpm
HSM (high speed machining)
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	Series 21, 22 Fractional		 Ae x D_1	Ap x D_1	Vc (SFM)		Diameter (D_1) (inch) 1/8	1/4	3/8	1/2	3/4
	HARDWOODS	Slot	1	≤ 1	1550	RPM	47368	23684	15789	11842	7895
					(1240-1860)	Fz	0.0008	0.0015	0.0025	0.0030	0.0045
						Feed (IPM)	76	71	79	71	71
		Profile	≤ 0.5	≤ 1.5	1550	RPM	47368	23684	15789	11842	7895
					(1240-1860)	Fz	0.0008	0.0015	0.0025	0.0030	0.0045
						Feed (IPM)	76	71	79	71	71
	SOFTWOODS	Slot	1	≤ 1	1950	RPM	59592	29796	19864	14898	9932
					(1560-2340)	Fz	0.0010	0.0020	0.0030	0.0035	0.0055
						Feed (IPM)	119	119	119	104	109
		Profile	≤ 0.5	≤ 1.5	1950	RPM	59592	29796	19864	14898	9932
					(1560-2340)	Fz	0.0010	0.0020	0.0030	0.0035	0.0055
						Feed (IPM)	119	119	119	104	109
	PLYWOODS	Slot	1	≤ 1	1950	RPM	59592	29796	19864	14898	9932
					(1560-2340)	Fz	0.0013	0.0025	0.0040	0.0050	0.0075
						Feed (IPM)	155	149	159	149	149
		Profile	≤ 0.5	≤ 1.5	1950	RPM	59592	29796	19864	14898	9932
					(1560-2340)	Fz	0.0013	0.0025	0.0040	0.0050	0.0075
						Feed (IPM)	155	149	159	149	149
N	**ALUMINUM ALLOYS**	Slot	1	≤ 1	1150	RPM	35144	17572	11715	8786	5857
					(920-1380)	Fz	0.0006	0.0015	0.0020	0.0025	0.0040
						Feed (IPM)	42	53	47	44	47
		Profile	≤ 0.5	≤ 1.5	1150	RPM	35144	17572	11715	8786	5857
					(920-1380)	Fz	0.0006	0.0015	0.0020	0.0025	0.0040
						Feed (IPM)	42	53	47	44	47
	PLASTICS	Slot	1	≤ 1	1950	RPM	59592	29796	19864	14898	9932
					(1560-2340)	Fz	0.0008	0.0017	0.0025	0.0035	0.0050
						Feed (IPM)	95	101	99	104	99
		Profile	≤ 0.5	≤ 1.5	1950	RPM	59592	29796	19864	14898	9932
					(1560-2340)	Fz	0.0008	0.0017	0.0025	0.0035	0.0050
						Feed (IPM)	95	101	99	104	99

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

	Series 21M, 22M Metric		 Ae x D_1	Ap x D_1	Vc (m/min)		Diameter (D_1) (mm) 3	6	10	12	20
	HARDWOODS	Slot	1	≤ 1	470	RPM	49828	24914	14948	12457	7474
					(376-564)	Fz	0.020	0.040	0.065	0.075	0.115
						Feed (mm/min)	1993	1993	1943	1869	1719
		Profile	≤ 0.5	≤ 1.5	470	RPM	49828	24914	8155	4241	1509
					(376-564)	Fz	0.020	0.040	0.065	0.075	0.115
						Feed (mm/min)	1993	1993	1060	636	347
	SOFTWOODS	Slot	1	≤ 1	600	RPM	63610	31805	19083	15903	9542
					(480-720)	Fz	0.025	0.050	0.075	0.090	0.140
						Feed (mm/min)	3181	3181	2862	2862	2672
		Profile	≤ 0.5	≤ 1.5	600	RPM	63610	31805	19083	15903	303467
					(480-720)	Fz	0.025	0.050	0.075	0.090	0.140
						Feed (mm/min)	3181	3181	2862	2862	84971
	PLYWOODS	Slot	1	≤ 1	600	RPM	63610	31805	19083	15903	9542
					(480-720)	Fz	0.030	0.065	0.100	0.125	0.190
						Feed (mm/min)	3817	4135	3817	3976	3626
		Profile	≤ 0.5	≤ 1.5	600	RPM	63610	31805	19083	15903	303467
					(480-720)	Fz	0.030	0.065	0.100	0.125	0.190
						Feed (mm/min)	3817	4135	3817	3976	115318
N	ALUMINUM ALLOYS	Slot	1	≤ 1	350	RPM	37106	18553	11132	9276	5566
					(289-420)	Fz	0.015	0.040	0.050	0.065	0.100
						Feed (mm/min)	1113	1484	1113	1206	1113
		Profile	≤ 0.5	≤ 1.5	350	RPM	37106	18553	11132	9276	177023
					(289-420)	Fz	0.015	0.040	0.050	0.065	0.100
						Feed (mm/min)	1113	1484	1113	1206	35405
	PLASTICS	Slot	1	≤ 1	600	RPM	63610	31805	19083	15903	9542
					(480-720)	Fz	0.020	0.040	0.065	0.090	0.125
						Feed (mm/min)	2544	2544	2481	2862	2385
		Profile	≤ 0.5	≤ 1.5	600	RPM	63610	31805	19083	15903	9542
					(480-720)	Fz	0.020	0.040	0.065	0.090	0.125
						Feed (mm/min)	2544	2544	2481	2862	2385

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

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69014	211
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69023	212
69024	212
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69030	212
69031	212
69032	212
69033	212
69034	212
69035	212
69036	212
69037	212
69038	212
69039	212
69040	212
69041	213
69042	213
69043	213
69044	213
69045	213
69046	213
69047	213
69048	213
69049	213
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69051	213
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69053	213
69054	213
69055	213
69056	213
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70004	236
70005	236
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70471	26
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70473	26
70474	26
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70558	27
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70561	27
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74113	222
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74143	223
74146	223
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74261	224
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74270	224
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81005	235
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91005	250
91009	250
91013	250
91017	250
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91109	250
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91129	250
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91263	43
91266	114
91268	99
91269	104
91270	114
91272	99
91273	104
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91281	104
91282	114
91284	99
91285	104
91286	115
91288	99
91289	105
91290	115
91292	100
91293	105
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91360	40
91361	40
93272	40
93273	40
93274	40
93275	40
93276	40
93277	40
93278	40
93279	40
93280	40
93281	40
93282	40

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
–	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

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

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



Performance by Design

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