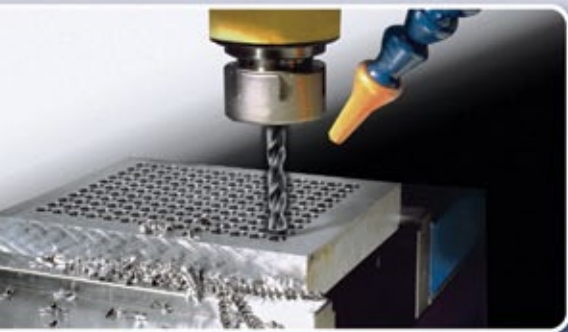


SGS[®]

SGS PRODUCT CATALOG

Solid Carbide Tools

An ISO 9001 Certified Company



www.sgstool.com

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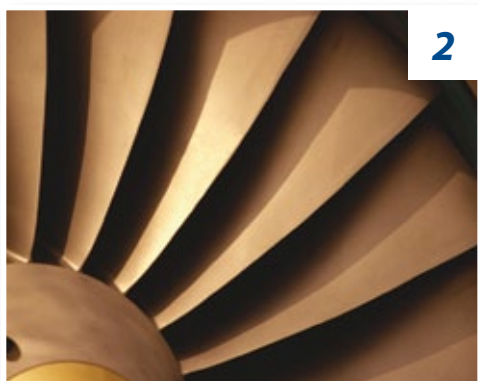
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SGS Solid Carbide Tools are the Tools of Choice in Industry



- Over 13,000 metric and fractional tools in stock
- Distributor network serving over 60 countries
- Twelve SGS sales and warehouse facilities located in Europe, Asia and North America

1. Mold and Die
2. Aerospace
3. Power Generation
4. Automotive Production
5. Foundry/Casting
6. Medical




- Más de 13,000 herramientas disponibles en pulgadas y milímetros
- Red de distribuidores sirviendo a más de 60 países
- Doce puntos de ventas y facilidades de almacenes localizados en Europa, Asia y Norte América

1. Moldes y Matrices
2. Aeroespacio
3. Generación de Energía
4. Producción Automovilística
5. Fundición
6. Médico



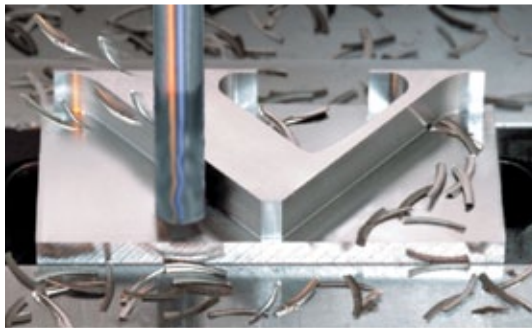
- Plus de 13000 outils stockés en cotes métriques et pouces
- Un réseau de distribution dans plus de 60 pays
- 12 points de vente et de stockage localisés en Europe, Asie et Amérique du Nord

1. Moule et Matrice
2. Aéronautique
3. Production d'énergie
4. Automobile
5. Fonderie
6. Médical

 As a technological leader, SGS Tool Company is committed to providing you with leading-edge, high-performance products. We address the complexities of high speed machining with particular focus upon Aerospace, Automotive, Mold & Die and Production Machining Applications.

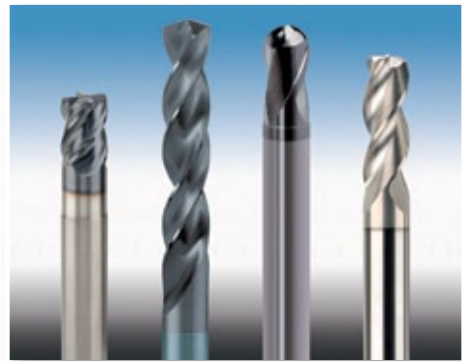



Extensive product testing has shown that SGS High Performance tools can increase productivity rates many times over conventional carbide end mills and drills. The experience we acquire from designing and manufacturing these high performance products has a positive impact upon every standard and special application tool we produce.



All SGS High Performance Products are coated with our own specially developed Ti-NAMITE PVD Process Tool Coatings. Coatings such as Ti-NAMITE-A Aluminum Titanium Nitride (AlTiN) and Ti-NAMITE-B Titanium Diboride (TiB₂) provide maximized tool life and increased speed and feed rates in any application. Ti-NAMITE

Tool Coatings are developed and processed in our own multi-million dollar facility in Munroe Falls, OH USA.

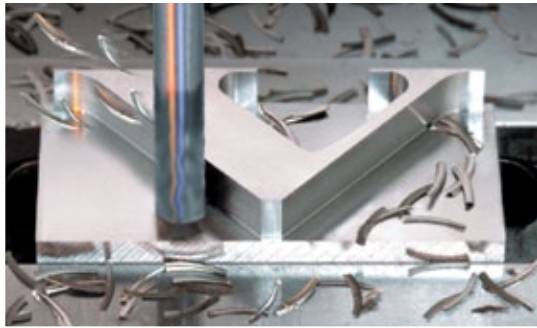


 En su carácter de líder tecnológico, SGS Tool Company se compromete a suministrarle productos de vanguardia y de alto rendimiento. Encaramos las complejidades del maquinado de alta velocidad concentrándonos en particular en las aplicaciones de maquinado aeroespaciales, automotrices, de moldes y matrices, y de producción.



Las pruebas exhaustivas de producto han demostrado que las herramientas SGS de alto rendimiento pueden incrementar los índices de productividad varias


veces en relación con las fresas y brocas convencionales de carburo. La experiencia que adquirimos al diseñar y fabricar estos productos de alto rendimiento tiene una influencia positiva sobre cada herramienta estándar y de aplicación especial que producimos.



Todos los productos SGS

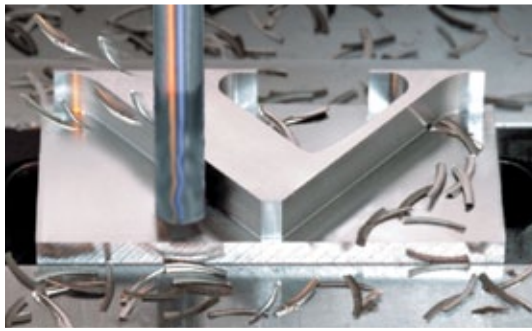
de alto rendimiento están recubiertos por nuestros recubrimientos Ti-Namite PVD, un proceso especial de recubrimientos que hemos desarrollado. Los recubrimientos como el Ti-NAMITE-A de nitruro de aluminio-titanio (AlTiN) y Ti-NAMITE-B de diboruro de titanio (TiB₂) maximizan la vida útil de la herramienta, e incrementan la velocidad y el avance en cualquier aplicación. Los recubrimientos para herramientas Ti-NAMITE se desarrollan y procesan en nuestra facilidad multimillonaria localizada.



 À titre de leader technologique, la société SGS Tool Company s'engage à vous fournir des produits haute performance à la fine pointe de la technologie. Nous relevons tous les défis complexes de l'usinage haute précision, particulièrement dans les secteurs de l'aérospatiale, de l'automobile et de production de moules et filières.



De nombreux tests de produits ont démontré que les outils haute performance SGS peuvent augmenter plusieurs fois les taux de productivité par rapport aux fraises à queue et aux perceuses au carbure classiques. L'expérience que nous avons acquise avec la conception et la fabrication de ces produits haute performance ont des



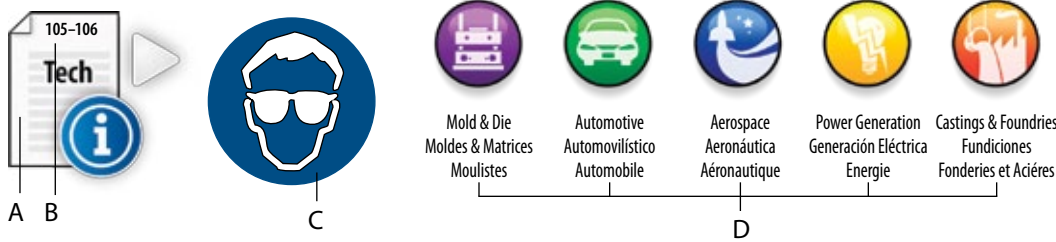
répercussions positives sur tous les outils standard et spéciaux que nous fabriquons.

Tous les produits SGS haute performance sont enduits de nos revêtements d'outils de process Ti-NAMITE PVD spécialement développés. Les revêtements Ti-NAMITE-A au nitrure de titane et d'aluminium (AlTiN) et Ti-NAMITE-B au diboride de

titane (TiB₂) maximisent la longévité des outils tout en augmentant la vitesse de rotation et la vitesse d'avance, quelle que soit l'application. Les revêtements d'outils Ti-NAMITE sont développés et fabriqués dans notre usine moderne de Munroe Falls, dans l'Ohio aux États-Unis.



Legend • Notación • Légende



English: To Order: Please specify Quantity and EDP No.

A: Technical Page Icon – Refers to pages containing speed and feed recommendations, located in the Technical Recommendations section of this catalog

B: Technical Page Number – Refers to the exact page where information can be found for a particular tool

C: Regulation Safety Glasses should always be worn when using high-speed cutting equipment

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

RETURN POLICY: An RMA number must accompany all product returns. Contact your Customer Service Representative for an RMA number.

Español: Para su pedido: Por favor especifique cantidad y número de EDP

A: Icono de página técnica: Se refiere a las páginas que contienen información técnica (revoluciones y avances recomendados) localizados en la sección Recomendaciones Técnicas de este catálogo

B: Número de página técnica: Muestra la página exacta donde se encuentra la información referente a una herramienta concreta

C: Deben usarse gafas protectoras cuando se utiliza un equipo de alta velocidad

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

DEVOLUCIONES: Todo material devuelto debe ir acompañado de un número de RMA correspondiente. Para solicitarlo, póngase en contacto con su Representante de Servicio.

Français: Pour commander: Veuillez préciser la quantité et le code article EDP

A: Icon Page Technique – Veuillez vous référer aux pages recommandations de vitesse situées à la section préconisations du catalogue

B: Numéro de la page technique – Veuillez vous référer à la page exacte où vous trouverez l'information pour un outil spécifique.

C: Des Lunettes de Sécurité doivent être impérativement portées lors d'utilisation d'outils à grande vitesse

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

POLITIQUE DE RETOUR : Tous les produits retournés doivent être accompagnés d'un numéro RMA. Contacter votre interlocuteur commercial pour obtenir un numéro RMA.

SGS is a proud member of



Introduction • Introducción • Introduction



Founded in 1951, SGS Tool Company is a global leader in manufacturing solid carbide rotary cutting tools. SGS associates are committed to providing:

- A wide array of high quality, standard and high performance cutting tools
- Leading-edge technology in engineering designs, manufacturing and inspection
- State-of-the-art proprietary coatings from our PVD coatings facility
- Custom-designed tools for your special application needs
- A network of experienced field sales engineers
- "Personal Touch," multilingual customer service group
- Worldwide experience, with industrial distributors in over 60 countries
- World-class ISO 9001 Certification

To locate a distributor, please contact the SGS Office nearest you (see back cover), or visit our website (www.sgstool.com).



Fundada en 1951, SGS Tool Company es líder mundial en la fabricación de herramientas de carburo sólido. La sociedad de SGS está preparada para ofrecer:

- Una amplia gama de herramientas de corte de alta calidad y rendimiento
- Tecnología líder en la investigación y desarrollo de diseños, fabricación e inspección
- Recubrimientos desarrollados en nuestras propias cámaras de recubrimiento PVD
- Herramientas especiales según las necesidades de los clientes
- Amplia y experimentada red de ventas
- Personalización y soporte multilingüe al servicio del cliente
- Experiencia mundial, con distribuidores en más de 60 países
- Certificación ISO 9001

Para localizar a un distribuidor, por favor contacte la oficina mas cercana de SGS (ver contraportada), o visite nuestra página web (www.sgstool.com).

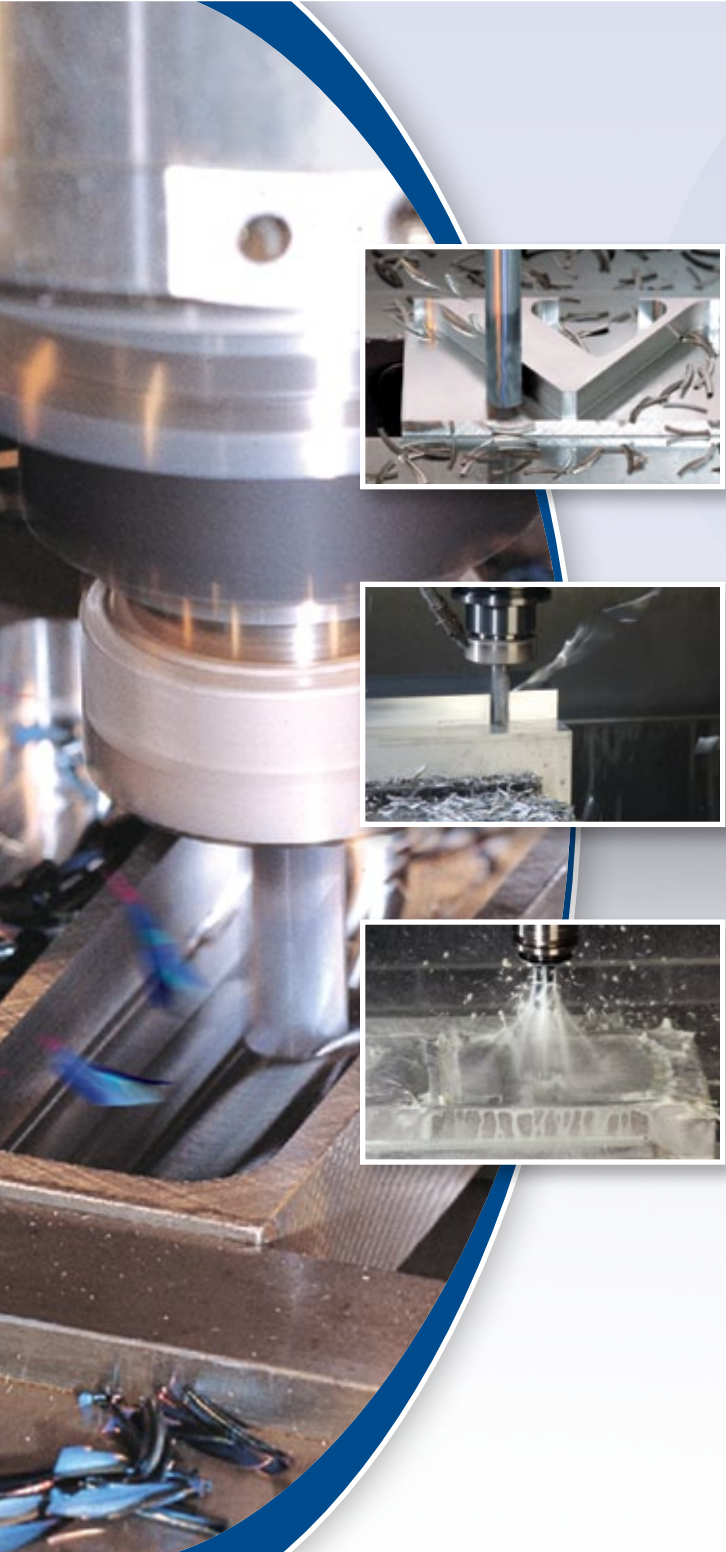


Fondée en 1951, la société SGS est un des leaders de la fabrication de fraises en carbure de tungstène monobloc. SGS et ses filiales sont à même de vous proposer:

- Une gamme étendue d'outils de grande qualité, standard et hautes performances
- Une technologie éprouvée en conception, fabrication et contrôle
- Des revêtements PVD brevetés, établis à partir de notre savoir-faire.
- Des outils spéciaux conçus en fonction des spécificités du client.
- Un ensemble de techniciens expérimentés
- Un service multilingue adapté à chaque pays
- Une expérience mondiale, disposant de distributeurs dans plus de 60 pays
- La certification ISO 9001

Pour tout renseignement, veuillez contacter notre filiale dont les coordonnées figurent au dos de cette documentation, ou visitez notre site (www.sgstool.com).

END MILLS



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High Performance End Mills

High Performance End Mills	Series	Includes	Page
Z-Carb-AP Variable Rake End Mills	Z1PCR, Z1MPCR		18 – 25
Z-Carb End Mills for Ferrous Applications	Z1, Z1M, Z1B, Z1MB, Z1ACR, Z1PLC, Z1MPLC, Z1PLB, Z16CR		26 – 35
Z-Carb-HTA End Mills for High Temperature Alloys	ZH1CR, ZH1MCR		36 – 37
Z-Carb-MD End Mills for Mold & Die Applications	ZD1CR, ZD1MCR		38 – 39
Series 7 High Performance End Mills	7, 7M, 7B, 7MB		40 – 45
V-Carb 5 Flute End Mills for Finishing & Semi-Finishing	55CR, 55, 55M		46 – 49
Tri-Carb 3 Flute End Mills for Roughing & Semi-Roughing	65, 65M		50 – 52
Turbo-Carb End Mills for Hardened Mold & Die Applications	56B, 56MB		53 – 55
Power-Carb End Mills for Mold Grade Steels up to 65Rc	57, 57M		56 – 58
Ski-Carb End Mills for Aluminum & Non-Ferrous Applications	44, 44M, 45		59 – 63
S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials	43CR, 43LC, 43, 43L, 43MCR, 43M		64 – 73
S-Carb 2-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials	47, 47M, 47B, 47MB, 47ES, 47MES, 47EB, 47MEB		74 – 79



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4 Flute Single End Corner Radius	1CR, 1MCR		87 – 89
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2 Flute Single End Ball End	3B, 3MB	3LB, 3ELB, 3XLMB, 59B, 59MB	94 – 96
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2 Flute Double End Ball End	15B, 15MB	11B	108 – 109
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2 Flute Single End Square End Straight Flute	4		121
2 Flute Straight Flute Single End 14°	12		122
4 Flute Single End Square End Left Hand Spiral	9		123
6 Flute Single End Square End	6		124
End Mill Sets	1, 3, 5, 14, 15		125



Herramientas de Carburo Sólido de Alto Rendimiento

Herramientas de Carburo Sólido de Alto Rendimiento	Series	Includes	Page
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Fresas Z-Carb para Aplicaciones Ferrosas	Z1, Z1M, Z1B, Z1MB, Z1ACR, Z1PLC, Z1MPLC, Z1PLB, Z16CR		26 – 35
Fresas Z-Carb-HTA Para Aleaciones de Alta Temperatura	ZH1CR, ZH1MCR		36 – 37
Fresas Z-Carb-MD para Aplicaciones de Moldes y Matrices	ZD1CR, ZD1MCR		38 – 39
Serie 7 Herramientas de Carburo Sólido de Alto Rendimiento	7, 7M, 7B, 7MB		40 – 45
Fresas V-Carb de 5 Filos para Acabado y Semiacabado	55CR, 55, 55M		46 – 49
Fresas Tri-Carb de 3 Filos para Desbastado y Demidesbastado	65, 65M		50 – 52
Fresas Turbo-Carb para Aplicaciones en Aceros para Moldes y Dados Endurecidos	56B, 56MB		53 – 55
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Fresas Ski-Carb para Aplicaciones de Aluminio y No Ferrosas	44, 44M, 45		59 – 63
Fresas S-Carb de 3 Filos para Aluminio, Materiales No Ferrosos y No Metálicos	43CR, 43LC, 43, 43L, 43MCR, 43M		64 – 73
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Fresas Frontales	Series	Includes	Page
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Fresas de 4 Filos – Radio en la Punta	1CR, 1MCR		87 – 89
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Fresas de 2 Filos – Punta Radial o Esférica	3B, 3MB	3LB, 3ELB, 3XLMB, 59B, 59MB	94 – 96
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Fresas de 4 Filos – Doble Punta – Punta Plana	14, 14M	10	102 – 103
Fresas de 4 Filos – Doble Punta – Punta Radial o Esférica	14B, 14MB	10B	104 – 105
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Fresas de 3 Filos – Punta Plana – Hélice Cónica	23		118
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Fresas de 4 Filos – Punta Plana – Filos Rectos	2		120
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Outils Massifs au Carbure Haute Performance

Outils Massifs au Carbure Haute Performance	Series	Includes	Page
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Fraises à Queue Z-Carb-HTA pour Alliages Haute Temperature	ZH1CR, ZH1MCR		36 – 37
Fraises à Queue Z-Carb-MD pour Moules et Filières	ZD1CR, ZD1MCR		38 – 39
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Fraises à Queue Turbo-Carb pour Moules et Filières en Acier Durci	56B, 56MB		53 – 55
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Fraises à Queue Ski-Carb pour Aluminium et Applications Non Ferreuses	44, 44M, 45		59 – 63
Fraises à Queue S-Carb 3 Goujures pour l'aluminium, Ainsi que les Matériaux Non Ferreux et Non Métalliques	43CR, 43LC, 43, 43L, 43MCR, 43M		64 – 73
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Fraises 3 Dents – Bout Plat – Cône Hélicoïdal	23		118
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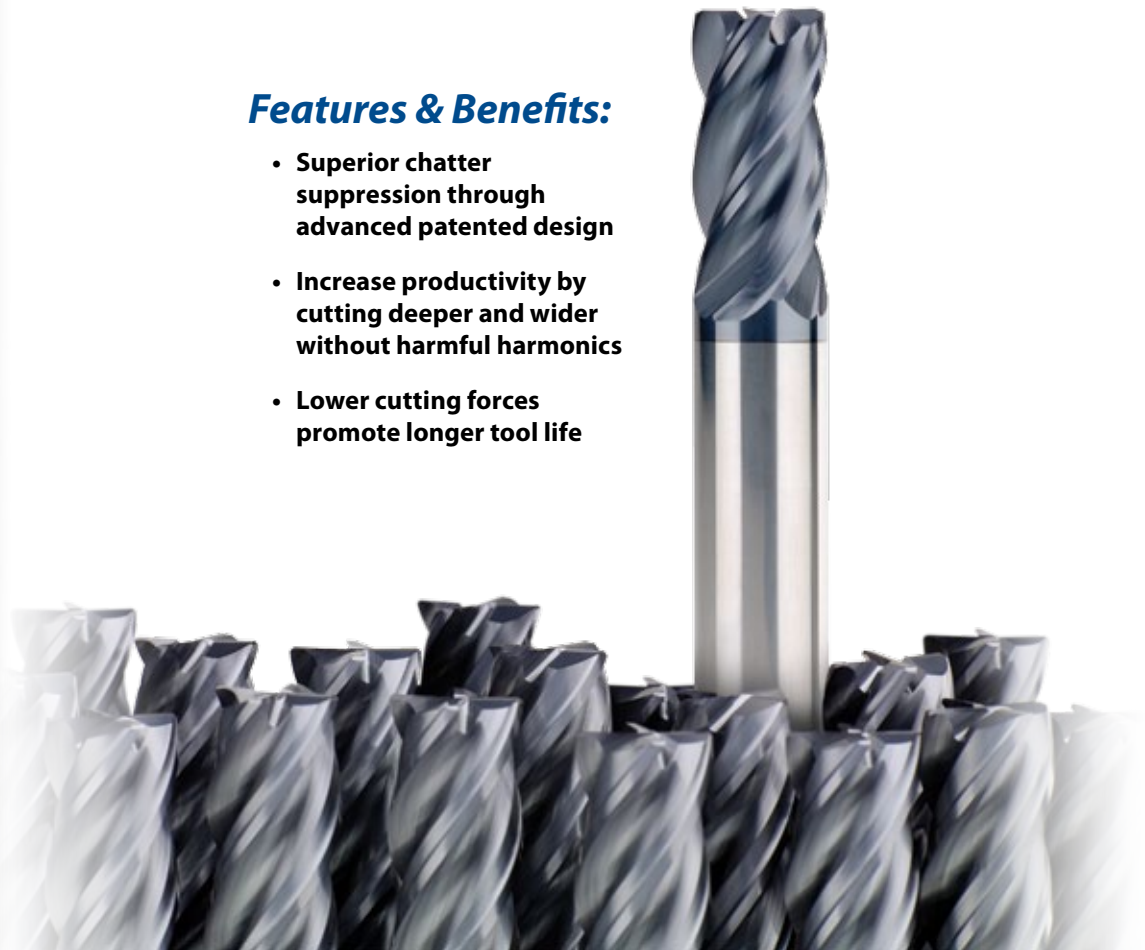


Rise Above High Performance.

The Z-Carb-AP offers performance so advanced, it goes way beyond typical "High Performance" end mills.

Features & Benefits:

- Superior chatter suppression through advanced patented design
- Increase productivity by cutting deeper and wider without harmful harmonics
- Lower cutting forces promote longer tool life





Más allá del alto rendimiento.

La Z-Carb-AP ofrece un desempeño tan avanzado, que va mucho más allá de las típicas fresas de 'alto rendimiento'.

Características y ventajas:

- Supresión de golpeteo superior, gracias a su diseño de avanzada patentado
- Incremente la productividad con cortes más profundos y anchos, sin armónicas dañinas
- Fuerzas de corte inferiores, que favorecen una vida útil más prolongada de la herramienta

Élevez-vous au-delà du seuil de haute performance.

Les produits Z-Carb-AP offrent des performances extraordinaires, bien au-delà des fraises à queue « haute performance » typiques.

Caractéristiques et avantages :

- Capacité supérieure de suppression du broutage, grâce à une conception technique brevetée
- Productivité accrue en fraisant plus profondément et plus large sans harmonique parasite
- Pression de fraisage plus faible favorisant la longévité de l'outil

END MILLS
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Advanced Patented Design Delivers Advanced Productivity

- ▶ With most end mills, the cutting teeth enter and exit the material creating a natural rhythm that results in damaging harmonics.
- ▶ The harmonics produce a frequency that resonates through the entire tool, resulting in one of the most damaging forms of cutter wear known as chatter.
- ▶ The Z-Carb-AP with its patented, one of a kind geometry offers three stages of chatter suppression resulting in the quietest, most stable milling experience available.

The NEW Z-Carb-AP offers enhanced corner geometry with a tighter tolerance corner radius for more accurate machining and geometry that offers improved shearing capabilities while producing less tool pressure.

Stage 2
The patented unequal helix design aids in eliminating the damaging harmonics that occur during typical machining by changing the angle at which each cutting edge enters and exits the material during the milling process.

Stage 1
Unequal flute spacing helps to disrupt the rhythmic pattern created by the cutting edge of typical end mills, which helps to suppress the development of damaging harmonics.

Stage 3
The rake angle is the main factor that determines the size and shape of the chip, as well as the pressure and temperature of the cutting zone. By incorporating the SGS Patented Variable Rake Geometry, the Z-Carb-AP can alter and control the cutting dynamic like no other tool available, which takes chatter suppression to a whole new level of advanced productivity.

Diseño patentado de avanzada que brinda productividad de avanzada

- En la mayoría de las fresas los dientes cortantes entran y salen del material, y con ello crean un ritmo natural que da como resultado armónicas dañinas.
- Las armónicas producen una frecuencia que resuena por toda la herramienta, y da como resultado una de las formas más dañinas de desgaste del cortador, conocida como 'golpeteo'.
- La Z-Carb-AP, con su geometría patentada única en su genero, ofrece tres etapas de supresión del golpeteo, y con ello la experiencia de fresado más silenciosa y estable que usted puede obtener.

La NUEVA Z-Carb-AP ofrece una geometría de esquinas mejorada con un radio de esquina de tolerancia más estrecha, para un maquinado más exacto, y una geometría que posibilita una mejora en la capacidad de corte y produce al mismo tiempo menor presión de la herramienta.

Etapa 1

El espaciado desigual de los canales perturba el patrón rítmico creado por el filo de las fresas típicas, y con esto ayuda a suprimir el desarrollo de las armónicas dañinas.

Etapa 2

El diseño patentado de hélices desiguales ayuda a eliminar las armónicas dañinas que se producen durante el maquinado típico, por el cambio del ángulo con el que cada filo entra y sale del material durante el proceso de fresado.

Etapa 3

El ángulo de inclinación es el factor principal que determina el tamaño y la forma de las virutas, así como la presión y la temperatura de la zona de corte. Al incorporar la geometría de inclinación variable patentada por SGS, la Z-Carb-AP puede alterar y controlar la dinámica del corte como ninguna otra herramienta disponible, y esto lleva la supresión del golpeteo a un nivel totalmente nuevo de productividad de avanzada.

Conception de pointe brevetée pour une productivité accrue

- Avec la plupart des fraises en bout, les dents de coupe entrent et sortent du matériau, en créant un rythme naturel qui amène des harmoniques dommageables.
- Certains de ces harmoniques sont à une fréquence qui fait résonner tout l'outil, ce qui entraîne l'un des modes les plus destructeurs d'usure de tranchant, connu sous le nom de broutage.
- La fraise Z-Carb-AP, avec sa géométrie unique brevetée, permet une suppression de ce broutage à trois niveaux, d'où un fraisage bien plus stable et plus silencieux.

Le NOUVEAU Z-Carb-AP offre une géométrie de pointe, avec un rayon à tolérance plus serrée pour un usinage plus précis, et une forme qui donne des capacités de taille améliorées tout en nécessitant moins de pression sur l'outil.

Niveau 1

Un espacement de goujure inégal aide à briser la configuration du rythme créée par le bord de coupe des fraises en bout typiques, ce qui aide à supprimer le développement des harmoniques dommageables.

Niveau 2

La conception unique brevetée en hélice asymétrique aide à éliminer les harmoniques dommageables qui sont produits pendant un usinage type, en changeant l'angle avec lequel le bord de coupe entre et sort du matériau durant le processus de fraisage.

Niveau 3

L'angle de coupe est le facteur principal qui détermine taille et forme de copeau, ainsi que la pression et la température de la zone de coupe. En incorporant la géométrie brevetée SGS à angle de coupe variable, le Z-Carb-AP peut altérer et contrôler la dynamique de coupe mieux que tout autre outil disponible, ce qui amène la suppression du broutage à un tout nouveau stade pour une productivité sans égale.



Series Z1PCR • Z1MPCR

Z-Carb-AP Variable Rake End Mills –
4-Flute – Corner Radius

Serie Z1PCR • Z1MPCR

Fresas de inclinación variable
Z-Carb-AP

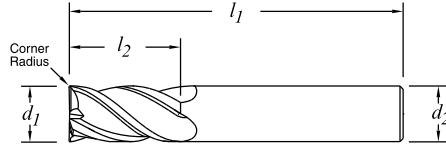
Série Z1PCR • Z1MPCR

Fraises Z-Carb-AP à vague de
coupe variable

Z-Carb-AP Patented Variable Rake End Mills

Fractional
Series

Z1PCR



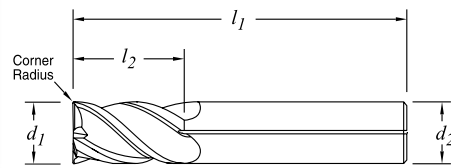
Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 1/4	+0.000/-0.012	h6
> 1/4 – 3/8	+0.000/-0.016	h6
> 3/8 – 1	+0.000/-0.020	h6

Corner Radius Tolerances

+0.00/-0.02

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Corner Radius	Ti-NAMITE-A (AlTiN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No. W/Flat	JetStream EDP No.
1/8	3/8	1-1/2	1/8	.015	36851	–	–
3/16	7/16	2	3/16	.015	36852	–	–
1/4	1/2	2-1/2	1/4	.020	36853	–	–
1/4	3/4	2 1/2	1/4	.020	36854	–	–
5/16	13/16	2-1/2	5/16	.020	36855	–	–
3/8	7/8	2-1/2	3/8	.020	36856	36864	–
7/16	1	2-3/4	7/16	.020	36857	36865	–
1/2	1	3	1/2	.030	36858	36866	36805
1/2	1-1/4	3-1/4	1/2	.030	36859	36867	–
9/16	1-1/8	3-1/2	9/16	.030	36860	36868	36806
5/8	1-1/4	3-1/2	5/8	.040	36861	36869	36807
3/4	1-1/2	4	3/4	.040	36862	36870	36808
1	1-1/2	4	1	.040	36863	36871	36809



JetStream Corner Radius

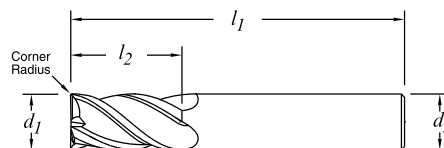


The items on this page have replaced previous series Z1CR.

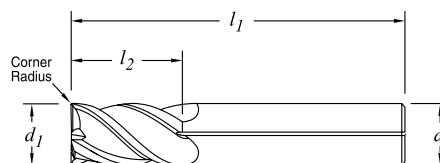


Diameter	Tolerances (mm)	
	d_1	d_2
3 – 6	+0,000/–0,030	h6
> 6 – 10	+0,000/–0,040	h6
> 10 – 25	+0,000/–0,050	h6

Corner Radius Tolerances	
+0,000/–0,050	



Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Corner Radius	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN)	JetStream EDP No.
					EDP No.	W/Flat EDP No.	
3	8	57	6	0,3	46851	–	–
4	11	57	6	0,3	46852	–	–
5	13	57	6	0,3	46853	–	–
6	13	57	6	0,5	46854	–	–
6	13	57	6	1,0	46855	–	–
8	19	63	8	0,5	46856	–	–
8	19	63	8	1,0	46857	–	–
10	22	72	10	0,5	46858	–	–
10	22	72	10	1,0	46859	–	–
12	26	83	12	0,5	46860	–	–
12	26	83	12	0,75	46861	–	–
14	26	83	14	1,0	46862	–	46494
16	32	92	16	1,0	46863	–	46495
16	32	92	16	3,0	46864	–	–
20	38	104	20	1,0	46865	–	46497
25	38	104	25	1,0	46866	–	46498



JetStream Corner Radius



The items on this page have replaced previous series Z1MCR.



Series Z1PLC • Z1MPLC

Z-Carb-AP Variable Rake End Mills
Z1PLC/Z1MPLC: 4-Flute – Long Reach
with Corner Radius
Z1PLB: 4-Flute – Long Reach
Ball End

Serie Z1PLC • Z1MPLC

Fresas de inclinación variable
Z-Carb-AP
Z1PLC/Z1MPLC: 4 filos – Largo
alcance con radio de esquina
Z1PLB: 4 filos – Largo alcance con
punta esférica

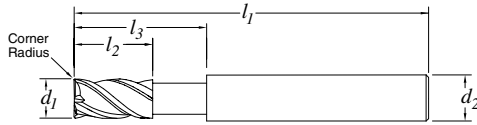
Série Z1PLC • Z1MPLC

Fraises Z-Carb-AP à vague de
coupe variable
Z1PLC/Z1MPLC: 4 goujures – Portée
longue avec rayon de coin
Z1PLB: Extrémité sphérique
longue portée



Z-Carb – AP Patented Variable Rake End Mills

Fractional Series **Z1PLC**



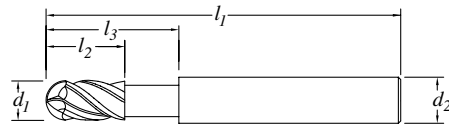
Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 1/4	+0.0000/-0.0012	h6
> 1/4 – 3/8	+0.0000/-0.0016	h6
> 3/8 – 1	+0.0000/-0.0020	h6

Corner Radius Tolerances

+0.000/-0.002

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Reach l ₃	Corner Radius	Ti-NAMITE-A (AlTiN) EDP No.
1/4	1/2	4	1/4	1-1/4	0.020	36450
5/16	13/16	4	5/16	1-5/8	0.020	36452
3/8	7/8	5	3/8	1-7/8	0.020	36456
7/16	1	6	7/16	2	0.020	36460
1/2	1	6	1/2	2-1/4	0.030	36462
9/16	1-1/8	6	9/16	2-1/2	0.030	36466
5/8	1-1/4	6	5/8	3	0.040	36470
3/4	1-1/2	6	3/4	3-1/2	0.040	36472
1	1-1/2	6	1	4	0.040	36474

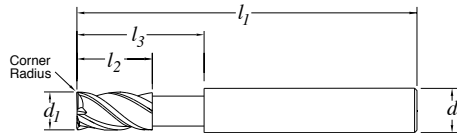


Fractional Series **Z1PLB**

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Reach l ₃	Ti-NAMITE-A (AlTiN) EDP No.
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



Diameter	Tolerances (mm)	
	d_1	d_2
3 – 6	+0,000/–0,030	h6
> 6 – 10	+0,000/–0,040	h6
> 10 – 25	+0,000/–0,050	h6

**Corner Radius Tolerances**

+0,000/–0,050

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Reach l_3 mm	Corner Radius mm	Ti-NAMITE-A (AlTiN) EDP Number
6	8	75	6	24	0,5	46821
8	10	75	8	32	1,0	46822
8	10	75	8	32	2,0	46823
10	12	100	10	40	1,0	46824
10	12	100	10	40	2,0	46825
12	15	100	12	48	1,0	46826
12	15	100	12	48	1,5	46827
12	15	100	12	48	2,0	46828
12	15	100	12	48	3,0	46829
16	20	115	16	65	1,0	46830
16	20	115	16	65	1,5	46831
16	20	115	16	65	2,0	46832
16	20	115	16	65	3,0	46833
16	20	115	16	65	4,0	46834
16	20	115	16	65	5,0	46835
20	24	140	20	80	1,0	46836
20	24	140	20	80	1,5	46837
20	24	140	20	80	2,0	46838
20	24	140	20	80	3,0	46839
20	24	140	20	80	4,0	46840
20	24	140	20	80	5,0	46841





CARB[™]
SOLID CARBIDE END MILLS

Z-Carb End Mills for Ferrous Applications

The Z-Carb family of end mills maximizes stock removal and improves productivity in most milling operations. Chatter is the most common problem associated with aggressive milling. The Z-Carb family of end mills offers design features that reduce chatter, increase tool life and optimize performance. The Z-Carb family of end mills includes:



- Z-Carb[™]-HTA, which offers the exceptional performance of the original Z-Carb with geometric enhancements for high temperature alloys.
- Z-Carb[™]-MD with reduced neck diameters, which produces a chatter-free finish when machining hardened steel.
- Z-Carb[™] with unique JetStream Patented Coolant Technology that maximizes coolant flow and delivery to the shear zone.



Z-Carb Features & Benefits:

Chatter-Resistant Design:

- Improves surface finish

Optimum Material Removal:

- Increases cutting depth
- Increases feed rates

Increased Tool Life:

- **Ti-NAMITE-A[®] (AlTiN Coated)**
- **Corner radius**
- **Special gash break out grind**
- **Eccentric relief**

Minimum Tool Deflection:

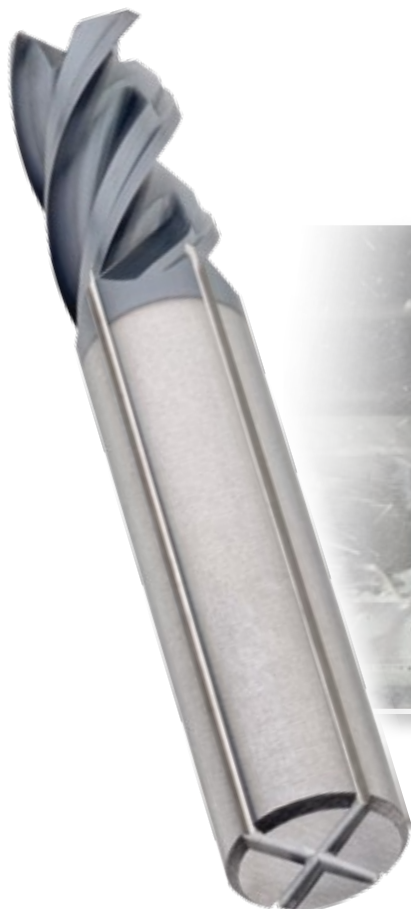
- Reduces harmful machine vibration
- Improves vibrational control

Material Applications Include:

- Low Carbon Steels
- Tool Steels
- Cast Iron
- Stainless Steels
- Titanium/High Temp Alloys



Z-Carb[®]-MD for Mold and Die Applications



Z-Carb[™] with JetStream Coolant Technology

END MILLS
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Fresas Z-Carb para aplicaciones ferrosas

La familia de fresas Z-Carb maximiza el arranque de viruta y aumenta la productividad en la mayoría de las operaciones de fresado. La vibración (chatter) es el problema más común asociado con el fresado agresivo. La familia de fresas Z-Carb ofrece características de diseño que reducen la vibración, aumentan la vida útil de la herramienta y optimizan el rendimiento. La familia de fresas Z-Carb incluye:

- **Z-Carb-HTA, que ofrece el excepcional rendimiento de la Z-Carb original con realces geométricos para aleaciones de alta temperatura.**
- **Z-Carb-MD con diámetros de cuello reducidos, que produce un acabado sin vibración cuando se maquina acero templado.**
- **Z-Carb con la tecnología única de refrigerante patentada JetStream, que maximiza el flujo y suministro de refrigerante a la zona de corte.**

Características y ventajas de Z-Carb:

Diseño resistente a la vibración:

- **Mejora el acabado de la superficie**

Arranque de viruta óptimo:

- **Aumenta la profundidad de corte**
- **Aumenta las velocidades de avance**

Aumento de la vida útil de la herramienta:

- **Ti-NAMITE-A® (recubrimiento de AlTiN)**
- **Radio de esquina**
- **Desbaste especial en el filo para desalajo de rebaba**
- **Desahogo excéntrico**

Deflexión mínima de la herramienta:

- **Reduce la vibración dañina en la máquina**
- **Mejora el control de la vibración**

Los materiales de aplicación incluyen:

- **Aceros con bajo contenido de carbono**
- **Aceros para herramientas**
- **Hierro fundido**
- **Aceros inoxidables**
- **Aleaciones de titanio/Aleaciones de alta temperatura**



Fraises à queue Z-Carb pour applications ferreuses

La famille de fraises à queue Z-Carb maximise l'enlèvement de matière et améliore la productivité dans la plupart des applications de fraisage. Le broutage est le problème le plus courant dans les applications de fraisage agressif. Les fraises à queue Z-Carb ont une conception technique qui réduit le broutage, qui augmente la longévité des outils et qui optimise les performances. La famille de fraises à queue Z-Carb comprend:

- **Les fraises Z-Carb-HTA offrent les performances exceptionnelles de la fraise originale Z-Carb, mais avec des améliorations géométriques pour les alliages haute température.**
- **Les fraises Z-Carb-MD ont un col à diamètre étroit produisant une finition sans broutage durant l'usinage d'acier durci.**
- **Les fraises Z-Carb avec technologie brevetée de refroidissement JetStream maximisant l'écoulement du liquide de refroidissement et son acheminement à la zone de taille.**

Caractéristiques et avantages des fraises Z-Carb :

Conception anti-broutage:

- **Améliore la finition des surfaces**

Optimisation de l'enlèvement de matière:

- **Augmentation de la profondeur de fraisage**
- **Augmentation des vitesses d'avance**

Longévité accrue des outils:

- **Revêtement Ti-NAMITE-A[®] (AlTiN)**
- **Rayon de coin**
- **Meulage spécial d'entredent**
- **Détalonnage excentrique**

Déflexion d'outil minimale:

- **Réduit les vibrations de machine nuisibles**
- **Améliore le contrôle des vibrations**

Matériaux pouvant être fraisés:

- **Aciers à faible teneur en carbone**
- **Aciers d'outillage**
- **Fonte**
- **Aciers inoxydables**
- **Alliages haute température au titane**

END MILLS
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Series Z1 • Z1M

Z-Carb End Mills for Ferrous Applications – 4-Flute – Square End – Z-Carb with JetStream Patented Coolant Technology

Serie Z1 • Z1M



Fresas Z-Carb Para Aplicaciones Ferrosas – 4 filos – Punta plana – Z-Carb con tecnología de refrigerante patentada JetStream

Série Z1 • Z1M

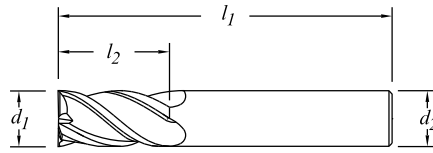


Fraises à queue Z-Carb Pour Applications Ferreuses – 4 goujures – Extrémité carrée – Z-Carb avec technologie brevetée de refroidissement JetStream

Z-Carb End Mills for Ferrous Applications

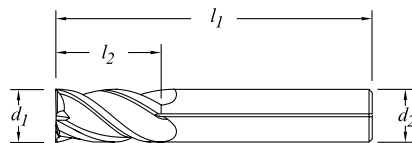
Fractional Series

Z1



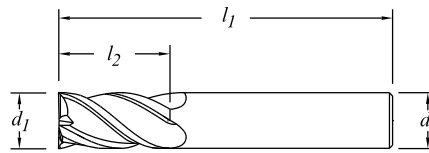
Diameter	Tolerances (inch)	
	d ₁	d ₂
1/8 – 1/4	+0.0000/-0.0012	h6
> 1/4 – 3/8	+0.0000/-0.0016	h6
> 3/8 – 1	+0.0000/-0.0020	h6

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Ti-NAMITE-A (AlTiN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No. W/Flat	JetStream* EDP No.
1/8	3/8	1-1/2	1/8	36404	–	–
5/32	7/16	2	3/16	36406	–	–
3/16	7/16	2	3/16	36408	–	–
7/32	7/16	2-1/2	1/4	36410	–	–
1/4	1/2	2-1/2	1/4	36416	–	–
1/4	3/4	2-1/2	1/4	36596	–	–
9/32	5/8	2-1/2	5/16	36418	–	–
5/16	13/16	2-1/2	5/16	36420	–	–
11/32	13/16	2-1/2	3/8	36422	–	–
3/8	7/8	2-1/2	3/8	36424	36530	–
13/32	15/16	2-3/4	7/16	36426	36531	–
7/16	1	2-3/4	7/16	36428	36532	–
15/32	1	3	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

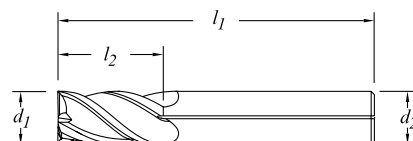




Diameter	Tolerances (mm)	
	d_1	d_2
3 – 6	+0,000/–0,030	h6
> 6 – 10	+0,000/–0,040	h6
> 10 – 25	+0,000/–0,050	h6

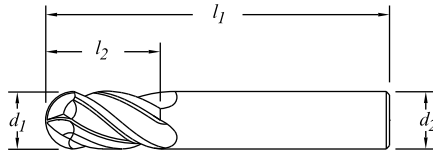


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Ti-NAMITE-A (AlTiN) EDP No.	JetStream* EDP No.
3	8	57	6	46357	–
4	11	57	6	46358	–
5	13	57	6	46359	–
6	13	57	6	46360	–
8	19	63	8	46362	–
10	22	72	10	46364	–
12	26	83	12	46366	–
14	26	83	14	46368	46506
16	32	92	16	46370	46507
18	32	92	18	46372	46508
20	38	104	20	46374	46509
25	38	104	25	46376	46510



END MILLS
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Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 1/4	+0.0000/-0.0012	h6
> 1/4 – 3/8	+0.0000/-0.0016	h6
> 3/8 – 1	+0.0000/-0.0020	h6



Series Z1B • Z1MB

Z-Carb End Mills for Ferrous Applications – 4-Flute – Ball End – Z-Carb with JetStream Patented Coolant Technology

Serie Z1B • Z1MB



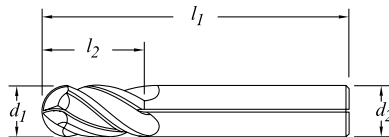
Fresas Z-Carb Para Aplicaciones Ferrosas – 4 filos – Punta esférica – Z-Carb con tecnología de refrigerante patentada JetStream

Série Z1B • Z1MB



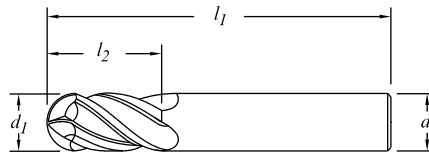
Fraises à queue Z-Carb Pour Applications Ferreuses – 4 goujures – Extrémité sphérique – Z-Carb avec technologie brevetée de refroidissement JetStream

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Ti-NAMITE-A (AlTiN) EDP No.	Ti-NAMITE-A (AlTiN) W/Flat EDP No.	JetStream* EDP No.
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

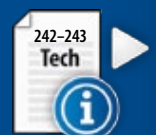
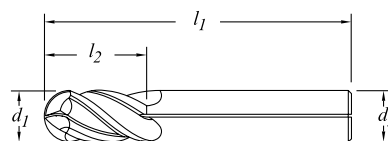


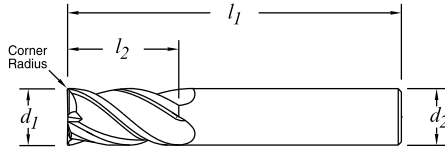


Diameter	Tolerances (mm)	
	d_1	d_2
3 – 6	+0,000/–0,030	h6
> 6 – 10	+0,000/–0,040	h6
> 10 – 25	+0,000/–0,050	h6



Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Ti-NAMITE-A (AlTiN) EDP No.	JetStream* EDP No.
3	8	57	6	46354	–
4	11	57	6	46355	–
5	13	57	6	46356	–
6	13	57	6	46343	–
8	19	63	8	46344	–
10	22	72	10	46345	–
12	26	83	12	46346	–
14	26	83	14	46347	46518
16	32	92	16	46348	46519
18	32	92	18	46349	46520
20	38	104	20	46350	46521
25	38	104	25	46351	46522





Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 1/4	+ .0000 / - .0012	h6
> 1/4 – 3/8	+ .0000 / - .0016	h6
> 3/8 – 1	+ .0000 / - .0020	h6

Corner Radius Tolerances

+ .000 / - .002



Series Z1ACR



Z-Carb End Mills for Ferrous Applications – 4-Flute – Specific Corner Radius

Serie Z1ACR



Fresas Z-Carb Para Aplicaciones Ferrosas – 4 filos – Radio de esquina específico

Série Z1ACR



Fraises à queue Z-Carb Pour Applications Ferreuses – 4 goujures – Rayon de coin spécifique

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Corner Radius	Ti-NAMITE-A (AlTiN)	
					EDP No.	EDP No. w/Flat
1/8	3/8	1-1/2	1/8	0.010	36370	–
1/8	3/8	1-1/2	1/8	0.015	36851	–
3/16	7/16	2	3/16	0.010	36371	–
3/16	7/16	2	3/16	0.015	36852	–
3/16	7/16	2	3/16	0.030	36722	–
1/4	1/2	2-1/2	1/4	0.010	36372	–
1/4	1/2	2-1/2	1/4	0.015	36723	–
1/4	1/2	2-1/2	1/4	0.030	36373	–
1/4	3/4	2-1/2	1/4	0.010	36599	–
1/4	3/4	2-1/2	1/4	0.015	36600	–
1/4	3/4	2-1/2	1/4	0.030	36601	–
5/16	13/16	2-1/2	5/16	0.015	36724	–
5/16	13/16	2-1/2	5/16	0.030	36374	–
3/8	7/8	2-1/2	3/8	0.010	36375	36701
3/8	7/8	2-1/2	3/8	0.015	36725	36736
3/8	7/8	2-1/2	3/8	0.030	36376	36702
3/8	7/8	2-1/2	3/8	0.045	36726	36737
3/8	7/8	2-1/2	3/8	0.060	36727	36738
7/16	1	2-3/4	7/16	0.015	36728	36739
7/16	1	2-3/4	7/16	0.030	36377	36703
1/2	1	3	1/2	0.010	36378	36704
1/2	1	3	1/2	0.015	36729	36740
1/2	1	3	1/2	0.030	36858	36866
1/2	1	3	1/2	0.045	36730	36741
1/2	1	3	1/2	0.060	36380	36706
1/2	1	3	1/2	0.090	36381	36707
1/2	1	3	1/2	0.125	36731	36742
1/2	1-1/4	3-1/4	1/2	0.010	36602	36603
1/2	1-1/4	3-1/4	1/2	0.015	36604	36605
1/2	1-1/4	3-1/4	1/2	0.030	36606	36607
1/2	1-1/4	3-1/4	1/2	0.045	36608	36609
1/2	1-1/4	3-1/4	1/2	0.060	36610	36611
1/2	1-1/4	3-1/4	1/2	0.090	36612	36613
1/2	1-1/4	3-1/4	1/2	0.125	36614	36615
9/16	1-1/8	3-1/2	9/16	0.030	36860	36868
5/8	1-1/4	3-1/2	5/8	0.030	36383	36709

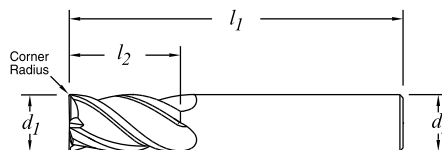
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Highlighted EDP numbers are Z-Carb-AP (Series Z1PCR) products.
See page 18 for more information.



Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 1/4	+0.0000/-0.0012	h6
> 1/4 – 3/8	+0.0000/-0.0016	h6
> 3/8 – 1	+0.0000/-0.0020	h6



Corner Radius Tolerances

+0.000/-0.002

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Corner Radius	Ti-NAMITE-A (AlTiN)	
					EDP No.	EDP No. w/Flat
5/8	1-1/4	3-1/2	5/8	0.045	36732	36743
5/8	1-1/4	3-1/2	5/8	0.060	36384	36710
5/8	1-1/4	3-1/2	5/8	0.090	36385	36711
5/8	1-1/4	3-1/2	5/8	0.125	36733	36744
3/4	1-1/2	4	3/4	0.030	36386	36712
3/4	1-1/2	4	3/4	0.045	36734	36745
3/4	1-1/2	4	3/4	0.060	36387	36713
3/4	1-1/2	4	3/4	0.090	36388	36714
3/4	1-1/2	4	3/4	0.125	36389	36715
1	1-1/2	4	1	0.030	36390	36716
1	1-1/2	4	1	0.045	36735	36746
1	1-1/2	4	1	0.060	36391	36717
1	1-1/2	4	1	0.090	36392	36718
1	1-1/2	4	1	0.125	36393	36719



Series Z16CR

Z-Carb End Mills for Ferrous Applications – 4-Flute – Short Length with Corner Radius

Serie Z16CR

Fresas Z-Carb Para Aplicaciones Ferrosas – 4 filos – Longitud corta con radio de esquina

Série Z16CR

Fraises à queue Z-Carb Pour Applications Ferreuses – 4 goujures – Longueur courte avec rayon de coin

Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 1/4	+0.0000/-0.0012	h6
> 1/4 – 3/8	+0.0000/-0.0016	h6
> 3/8 – 1	+0.0000/-0.0020	h6

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Corner Radius	Ti-NAMITE-A (AlTiN)
					EDP No.
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

END MILLS
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Series ZH1CR • ZH1MCR

Z-Carb-HTA End Mills for High Temperature Alloys – 4-Flute – Corner Radius

Serie ZH1CR • ZH1MCR

Fresas Z-Carb-HTA para aleaciones de alta temperatura – 4 filos – Radio de esquina

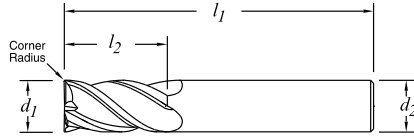
Série ZH1CR • ZH1MCR

Fraises à queue Z-Carb-HTA pour alliages haute température – 4 goujures – Rayon de coin

Z-Carb-HTA End Mills for High Temperature Alloys

Fractional Series

ZH1CR

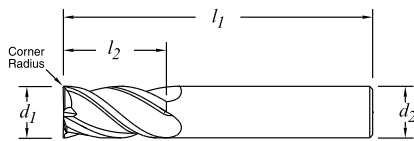


Tolerances (inch)

Diameter	d ₁	d ₂
1/4	+0.000 / -0.0012	h6
> 1/4-3/8	+0.000 / -0.0016	h6
> 3/8-1	+0.000 / -0.0020	h6

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Corner Radius	Ti-NAMITE-A (AITiN)	
					EDP Number	EDP Number 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

Z-Carb-HTA End Mills for High Temperature Alloys



Tolerances (mm)

Diameter	d_1	d_2
6	+0,000 / -0,030	h6
> 6-10	+0,000 / -0,040	h6
> 10-20	+0,000 / -0,050	h6

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Corner Radius	Ti-NAMITE-A (AlTiN)	
					EDP No.	EDP No. w/Flat
6	13	57	6	0,5	46450	–
6	13	57	6	1,0	46451	–
6	13	57	6	1,5	46452	–
8	19	63	8	0,5	46453	–
8	19	63	8	1,0	46454	–
8	19	63	8	1,5	46455	–
10	22	72	10	0,5	46456	–
10	22	72	10	1,0	46457	–
10	22	72	10	1,5	46458	–
10	22	72	10	2,0	46459	–
12	26	83	12	0,5	46460	46471
12	26	83	12	1,0	46461	46472
12	26	83	12	1,5	46462	46473
12	26	83	12	2,0	46463	46474
12	26	83	12	3,0	46464	46475
16	32	92	16	1,5	46465	46476
16	32	92	16	2,0	46466	46477
16	32	92	16	3,0	46467	46478
16	32	92	16	4,0	46482	46483
20	38	104	20	3,0	46468	46479
20	38	104	20	4,0	46469	46480
20	38	104	20	5,0	46470	46481

END MILLS
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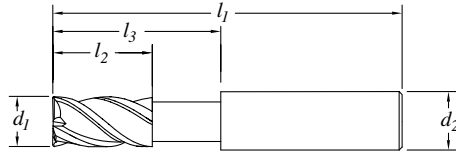




Z-Carb-MD End Mills for Mold & Die Applications

Fractional Series

ZD1CR



Tolerances (inch)

Diameter	d ₁	d ₂
1/4	+0.000 / -0.0012	h6
> 1/4-3/8	+0.000 / -0.0016	h6
> 3/8-1	+0.000 / -0.0020	h6

Corner Radius Tolerances

+0.000 / -0.002



Series ZD1CR • ZD1MCR

Z-Carb-MD End Mills for Mold & Die Applications – 4-Flute – Corner Radius

Serie ZD1CR • ZD1MCR

Fresas Z-Carb-MD para aplicaciones de moldes y matrices – 4 filos – Radio de esquina

Série ZD1CR • ZD1MCR

Fraises à queue Z-Carb-MD pour moules et filières – 4 goujures – Rayon de coin

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Reach l ₃	Corner Radius	Ti-NAMITE-A (AlTiN) EDP Number
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

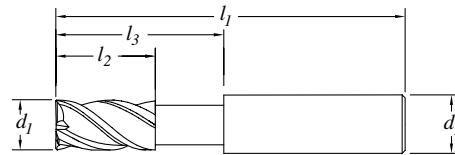
Z-Carb-MD End Mills for Mold & Die Applications


Tolerances (mm)

Diameter	d_1	d_2
6	+0,000 / -0,030	h6
> 6-10	+0,000 / -0,040	h6
> 10-20	+0,000 / -0,050	h6

Corner Radius Tolerances

+0,000 / -0,050



Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Reach l_3 mm	Corner Radius	Ti-NAMITE-A (AlTiN) EDP Number
3	4	57	6	15	0,2	46560
4	5	57	6	15	0,3	46561
5	6	57	6	15	0,5	46562
6	7	57	6	15	1	46563
8	10	63	8	25	1	46564
10	12	72	10	30	1	46565
12	15	83	12	35	1	46566
16	20	92	16	45	1,5	46567
20	24	104	20	55	2	46568

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SERIES 7

HIGH PERFORMANCE END MILLS

Series 7 High Performance End Mills

The Series 7 End Mill provides precision performance and high production rates without chatter. This is the tool that can deliver it all: improved chatter suppression, longer tool life, better surface finishes, reduced harmonics and improved side-wall straightness.



Features & Benefits:

Variable pitch-fluting geometry

- Improved chatter suppression
- Longer tool life
- Better surface finishes
- Higher productivity

Rigid construction

- Reduced harmonics
- Reduced radial side deflection allows for improved side wall straightness

Ti-NAMITE-A (AlTiN) High Performance Coating

- Longer tool life
- Higher productivity

Suitable for use in a variety of materials up to 45 Rc

Certified premium micro-grain carbide



Fresas de alto rendimiento Serie 7

La fresa de la Serie 7 proporciona un desempeño de precisión y altos índices de producción, sin golpeteo. Esta es la herramienta que puede cumplir con todo esto: supresión de golpeteo mejorada, mayor vida útil de la herramienta, mejores acabados superficiales, armónicas reducidas, y mayor rectitud de las paredes laterales.

Características y ventajas:

Geometría de canales de paso variable

- Supresión de golpeteo mejorada
- Mayor vida útil de la herramienta
- Mejores acabados superficiales
- Mayor productividad

Construcción rígida

- Armónicas reducidas
- La deflexión lateral radial reducida permite una mayor rectitud de las paredes laterales

Recubrimiento de alto rendimiento Ti-NAMITE-A (AlTiN)

- Mayor vida útil de la herramienta
- Mayor productividad

Apto para utilizar en una amplia variedad de materiales de hasta 45 Rc

Carburo de micrograno de calidad superior certificado

Fraises à queue haute performance Série 7

La fraise à queue Série 7 offre une grande précision et une productivité élevée, sans broutage. Cet outil offre de nombreux avantages : meilleure suppression du broutage, longévité accrue, meilleure finition des surfaces, réduction des harmoniques et plus grande rectitude des parois latérales.

Caractéristiques et avantages :

Géométrie de cannelures à pas variable

- Meilleure suppression du broutage
- Longévité accrue de l'outil
- Meilleure finition des surfaces
- Meilleure productivité

Construction rigide

- Réduction des harmoniques
- Réduction de défection latérale radiale, permettant une amélioration de rectitude des parois latérales

Revêtement Ti-NAMITE-A (AlTiN) haute performance

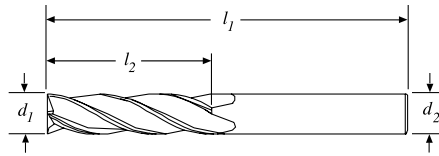
- Longévité accrue de l'outil
- Meilleure productivité

Convient à une utilisation sur une grande variété de matériaux jusqu'à 45 Rc

Carbure à micrograins de qualité supérieure certifiée

END MILLS
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TOLERANCES

$$d_1 = +0.000 / -0.002$$

$$d_2 = h6$$



Series 7 • 7M



4-Flute – Square End

Serie 7 • 7M



4 Filos – Punta plana

Série 7 • 7M



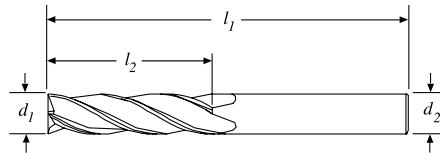
4 goujures – Extrémité carrée

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Ti-NAMITE-A (AlTiN) EDP No.
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

$$d_1 = +0,000 / -0,050$$

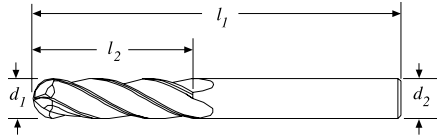
$$d_2 = h6$$



Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Ti-NAMITE-A (AlTiN) EDP No.
3	25	75	3	70551
4	25	75	4	70552
5	25	75	5	70553
6	25	75	6	70554
8	25	75	8	70555
10	38	100	10	70556
12	50	100	12	70557
12	75	150	12	70558
14	75	150	14	70559
16	75	150	16	70560
18	75	150	18	70561
20	75	150	20	70562
25	75	150	25	70563

END MILLS
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TOLERANCES

$d_1 = +0.000 / -0.002$
 $d_2 = h6$



Series 7B • 7MB



4-Flute – Ball End

Serie 7B • 7MB



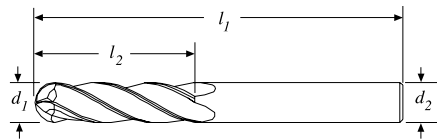
4 Filos – Punta esférica

Série 7B • 7MB



4 goujures – Extrémité sphérique

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Ti-NAMITE-A (AlTiN) EDP No.
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 $d_1 = +0,000 / -0,050$ $d_2 = h6$ 

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Ti-NAMITE-A (AlTiN) EDP No.
3	25	75	3	70527
4	25	75	4	70529
5	25	75	5	70531
6	25	75	6	70533
8	25	75	8	70535
10	38	100	10	70537
12	50	100	12	70539
12	75	150	12	70540
14	75	150	14	70542
16	75	150	16	70544
18	75	150	18	70546
20	75	150	20	70548
25	75	150	25	70550

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Five Flute End Mills

V-Carb 5 Flute End Mills for Finishing & Semi-Finishing

The Finishing Touch. Expect more from a Finishing Mill.

Produce exceptional results in semi-finish and finish milling applications. Tackle heavy milling tasks, including roughing and slotting.



Features & Benefits:

- Unique 5 flute geometry
- Certified premium micro-grain carbide
- Available in stub, regular and long flute lengths
- Corner radii improves strength
- Ti-NAMITE-A (AlTiN) coated for longer tool life
- Reduced harmonics
 - Improved finishes
 - Heavier stock removal
- Can be run at higher production rates
- Suitable for a variety of materials up to 45 Rc



🇪🇸 Fresas V-Carb de 5 filos para acabado y semiacabado

El toque final. Espere mejores resultados de una fresa de acabado.

Produce resultados excepcionales en aplicaciones de fresado de semiacabado y acabado. Aborda tareas de fresado pesado, incluyendo desbastado y ranurado.

Características y ventajas:

- Geometría única de 5 filos
- Carburo de micrograno de calidad superior certificado
- Disponibles con canales cortos, normales y largos
- Las esquinas con radio aumentan la resistencia
- Recubiertas con Ti-NAMITE-A (AlTiN) para prolongar la vida útil de la herramienta
- Reducción en vibraciones
 - Acabados mejorados
 - Arranque de viruta más abundante
- Pueden funcionar con mayores rangos de producción
- Aptas para una amplia variedad de materiales de hasta 45 Rc

🇫🇷 Fraises à rainurer V-Carb 5 goujures pour travaux de finition et de semi-finition

La touche de finition. Une fraise de finition dépassant toute attente.

Produit d'excellents résultats dans les applications de fraisage de finition et de semi-finition. S'attaque aux tâches de fraisage profond, notamment de dégrossissage et de rainurage.

Caractéristiques et avantages :

- Géométrie unique à 5 goujures
- Carbure à micrograins de qualité supérieure certifiée
- Disponible avec goujures courtes, normales et longues
- Rayons de coin améliorant la solidité
- Revêtement Ti-NAMITE-A (AlTiN) augmentant la longévité des outils
- Réduction des harmoniques
 - Amélioration des finitions
 - Enlèvement de matière plus épais
- S'utilise avec des taux de production plus élevés
- Convient à une grande variété de matériaux avec une dureté jusqu'à 45 Rc

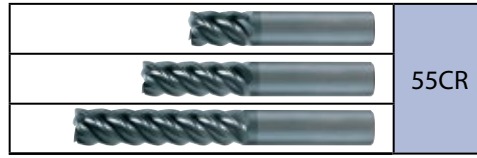
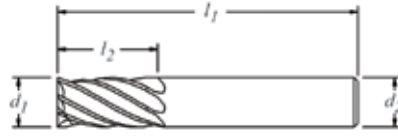
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V-Carb 5-Flute End Mills for Finishing & Semi Finishing

Fractional Series **55CR**



Tolerances (inch)

Diameter	d ₁	d ₂	Corner Radius
1/8 -1	+ .0000 / - .0020	h6	+ .000 / - .002



Series 55CR



V-Carb 5 Flute End Mills for Finishing & Semi-Finishing – 5-Flute – Corner Radius

Serie 55CR



Fresas V-Carb de 5 filos para acabado y semiacabado – 5 filos – Radio de esquina

Série 55CR



Fraises à rainurer V-Carb 5 goujures pour travaux de finition et de semi-finition – 5 goujures – Rayon de coin

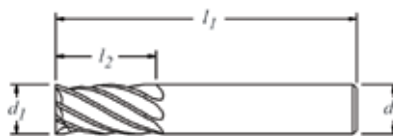
Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Corner Radius	Ti-NAMITE -A (AlTiN) EDP No.	Ti-NAMITE -A (AlTiN) EDP No. w/ Flat
1/8	1/4	1-1/2	1/8	.010	32606	–
1/8	1/2	1-1/2	1/8	.010	32607	–
5/32	5/16	2	3/16	.010	32608	–
5/32	9/16	2	3/16	.010	32609	–
3/16	5/16	2	3/16	.010	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	–
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	–



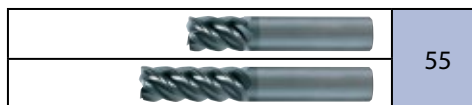
V-Carb 5-Flute End Mills for Finishing & Semi Finishing



Tolerances (inch)



Diameter	d ₁	d ₂
1/8-1	+.0000/-0.0020	h6



Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Ti-NAMITE -A (AITiN) EDP No.	Ti-NAMITE -A (AITiN) EDP No. 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	3/16	32656	—
3/16	5/16	2	3/16	32673	—
3/16	5/8	2	3/16	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



Series 55 • 55M



V-Carb 5 Flute End Mills for Finishing & Semi-Finishing – 5-Flute – Square End

Serie 55 • 55M



Fresas V-Carb de 5 filos para acabado y semiacabado – 5 filos – Punta plana

Série 55 • 55M



Fraises à rainurer V-Carb 5 goujures pour travaux de finition et de semi-finition – 5 goujures – Extrémité carrée

Tolerance (mm)

Diameter	d ₁	d ₂
6-20	+0,000/-0,050	h6

Cutting Diameter d ₁ mm	Length of Cut l ₂ mm	Overall Length l ₁ mm	Shank Diameter d ₂ mm	Ti-NAMITE -A (AITiN) EDP No.	Ti-NAMITE -A (AITiN) EDP No. w/Flat
6	12	50	6	42606	—
6	19	63	6	42607	—
6	25	75	6	42608	—
8	12	50	8	42609	—
8	20	63	8	42610	—
8	25	75	8	42611	—
10	16	50	10	42612	—
10	22	75	10	42622	42613
10	38	100	10	42614	—
12	19	63	12	42615	—
12	25	75	12	42616	42623
12	50	100	12	42617	—
16	32	89	16	42618	42624
16	75	150	16	42619	—
20	38	100	20	42620	42625
20	75	150	20	42621	—

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Tri-Carb 3-Flute End Mills for Roughing & Semi-Roughing

Improved productivity in Milling Stainless Steel, Nickel and Titanium Alloys. Approaching High-Strength and Heat-Resisting Materials.

Benefits:

- Increased productivity
- Improved surface finish
- Longer tool life
- Reduced need for coolant
- More accurate cutting



High Performance Carbide End Mills

Features:

- Optional shank neck
- Faced hook
- High hardness
- Short length
- Enhanced corner strength
- Application-specific carbide
- Corner radius
- Ti-NAMITE-A (AlTiN) coated
- Maximum rigidity
- High shear geometry
- High transverse rupture strength





Fresas Tri-Carb de 3 filas para desbastado y semidesbastado

Productividad mejorada en el fresado de aleaciones de titanio, acero inoxidable y níquel. Abordaje de materiales de altas resistencias mecánicas y resistentes al calor.

Ventajas:

- Aumento de la productividad
- Mejor acabado de la superficie
- Mayor vida útil de la herramienta
- Reducción en la necesidad de refrigerante
- Mayor exactitud en los cortes

Características:

- Cuello opcional en el mango
- Filo pulido en forma de gancho
- Alta dureza
- Longitud reducida
- Resistencia aumentada en las esquinas
- Carburo específico para la aplicación
- Radio de esquina
- Recubiertas con Ti-NAMITE-A (AlTiN)
- Máxima rigidez
- Geometría de alto corte
- Alta resistencia a la ruptura transversal

Fraises à queue Tri-Carb 3 goujures pour dégrossissage et semi-dégrossissage

Amélioration de la productivité dans le fraisage des alliages d'acier inoxydable, de nickel et de titane. Approche des matériaux très durs et résistants à la chaleur.

Avantages :

- Productivité accrue
- Meilleure finition des surfaces
- Longévité accrue des outils
- Consommation moindre de liquide de refroidissement
- Fraisage plus précis

Caractéristiques :

- Col à tige optionnel
- Crochet strié
- Dureté supérieure
- Longueur courte
- Résistance des coins renforcée
- Carbure adapté à l'application
- Rayon de coin
- Revêtement Ti-NAMITE-A (AlTiN)
- Rigidity maximale
- Géométrie de taille élevée
- Résistance élevée à la rupture transversale

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Series 65 • 65M



Tri-Carb 3-Flute End Mills for Roughing & Semi-Roughing – 3-Flute

Serie 65 • 65M



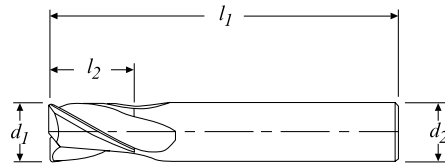
Fresas Tri-Carb de 3 filos para desbastado y semidesbastado – 3 filos

Série 65 • 65M



Fraises à queue Tri-Carb 3 goujures pour dégrossissage et semi-dégrossissage – 3 goujures

Tri-Carb 3-Flute End Mills for Roughing & Semi-Roughing



Fractional Series

65

Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 1	+0.000/–.002	h6

Corner Radius: +.000/–.002

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Corner Radius	Ti-NAMITE-A (AlTiN) EDP No.
1/8	1/4	1-1/2	1/8	.010	91200
3/16	5/16	2	3/16	.010	91201
1/4	3/8	2-1/2	1/4	.010	91202
5/16	7/16	2-1/2	5/16	.010	91203
3/8	1/2	2-1/2	3/8	.011	91204
1/2	5/8	3	1/2	.015	91205
5/8	3/4	3-1/2	5/8	.019	91206
3/4	1	4	3/4	.023	91207
1	1-1/4	4	1	.030	91208

Tolerances (mm)

Diameter	d ₁	d ₂
3 – 6	+0,00/–0,03	h6
> 6 – 10	+0,00/–0,04	h6
> 10 – 20	+0,00/–0,05	h6

Corner Radius: +0,00/–0,05

Fractional Series

65M

Cutting Diameter d ₁ mm	Length of Cut l ₂ mm	Overall Length l ₁ mm	Shank Diameter d ₂ mm	Corner Radius	Ti-NAMITE-A (AlTiN) EDP No.
3	6	38	3	0,25	91300
4	8	50	4	0,25	91301
5	8	50	6	0,25	91302
6	9	63	6	0,25	91303
8	11	63	8	0,25	91304
10	13	63	10	0,30	91305
12	15	75	12	0,36	91306
16	19	89	16	0,48	91307
20	26	100	20	0,61	91308





Turbo-Carb End Mills for Hardened Mold & Die Applications

Turbo-Carb Solid Carbide High Performance End Mills

For Machining complex, contour shapes in tough and hardened mold & die steels.



Features:

- Designed for high speed rough and finish milling of mold & die steels up to 60 Rc
- Application-specific carbide improves wear resistance and toughness
- Ti-NAMITE-A (AlTiN) coated for maximum heat and wear resistance
- Helical ball gashing for improved shearing action
- Available with extended reach and reduced neck diameters
- Rigid construction



Fresas Turbo-Carb para aplicaciones en aceros para moldes y dados endurecidos

Fresas Turbo-Carb de carburo sólido de alto rendimiento

Para el maquinado de formas complejas y contorneadas en aceros tenaces y templados de moldes y matrices.

Características:

- Diseñadas para fresado de acabado y desbastado de alta velocidad de aceros de moldes y matrices hasta 60 Rc
- Utilización del carburo adecuado en aplicaciones específicas aumenta la resistencia al desgaste y la tenacidad
- Recubiertas con Ti-NAMITE-A (AlTiN), para una resistencia máxima al calor y al desgaste
- Desbaste Helicoidal en la esfera para una mejor acción de corte
- Disponibles con alcance extendido y diámetros de cuello reducidos
- Construcción rígida

Fraises à queue Turbo-Carb pour moules et filières en acier durci

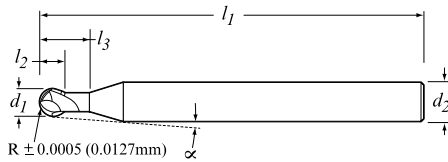
Fraises à queue Turbo-Carb haute performance en carbure massif

Pour l'usinage de formes à contours complexes sur des moules et des filières en acier durci.

Caractéristiques :

- Conçues pour le fraisage haute vitesse de dégrossissement et de finition des moules et filières ayant une dureté jusqu'à 60 Rc
- Carbure adapté aux applications améliorant la solidité et la résistance à l'usure
- Revêtement Ti-NAMITE-A (AlTiN) maximisant la résistance à l'usure et à la chaleur
- Rainurage d'entredent à boule hélicoïdale qui améliore le fraisage
- Disponibles avec portée longue et cols étroits
- Construction rigide

Turbo-Carb End Mills for Hardened Mold & Die Applications



Diameter	Tolerances (inch)	
	d ₁	d ₂
1/32 – 3/32	+0.0000/–0.0010	h6
> 3/32 – 1/4	+0.0000/–0.0012	h6
> 1/4 – 3/8	+0.0000/–0.0016	h6
> 3/8 – 3/4	+0.0000/–0.0020	h6

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) EDP No.
1/32	1/32	3	1/4	8° 20'	1/16	93272
1/16	1/16	3	1/4	7° 40'	1/8	93273
3/32	3/32	3	1/4	6° 50'	3/16	93274
1/8	1/8	3	1/4	6°	1/4	93275
3/16	3/16	3	1/4	3° 35'	3/8	93276
1/4	1/4	3-1/2	1/4	–	1/2	93277
5/16	5/16	4	5/16	–	5/8	93278
3/8	3/8	4	3/8	–	3/4	93279
1/2	1/2	4-1/2	1/2	–	1	93280
5/8	5/8	5-1/2	5/8	–	1/4	93281
3/4	3/4	6-1/2	3/4	–	1/2	93282

Diameter	Tolerances (mm)	
	d ₁	d ₂
1 – 2.5	+0,000/–0,025	h6
> 2.5 – 6	+0,000/–0,030	h6
> 6 – 10	+0,000/–0,040	h6
> 10 – 20	+0,000/–0,050	h6

Cutting Diameter d ₁ mm	Length of Cut l ₂ mm	Overall Length l ₁ mm	Shank Diameter d ₂ mm	α	Reach l ₃ mm	Ti-NAMITE-A (AlTiN) EDP No.
1	1	76	6	8° 10'	2	91349
1,5	1,5	76	6	7° 45'	3	91350
2	2	76	6	7° 10'	4	91351
2,5	2,5	76	6	6° 35'	5	91352
3	3	76	6	6°	6	91353
4	4	76	6	4° 30'	8	91354
5	5	89	6	2° 30'	10	91355
6	6	89	6	–	12	91356
8	8	102	8	–	16	91357
10	10	102	10	–	20	91358
12	12	114	12	–	24	91359
16	16	140	16	–	32	91360
20	20	165	20	–	40	91361

Series 56B • 56MB



Turbo-Carb End Mills for Hardened Mold & Die Applications – 2-Flute – Ball End

Serie 56B • 56MB



Fresas Turbo-Carb para aplicaciones en aceros para moldes y dados endurecidos – 2 filos – Punta esférica

Série 56B • 56MB



Fraises à queue Turbo-Carb pour moules et filières en acier durci 2 goujures – Extrémité sphérique

END MILLS
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Power-Carb End Mills for Mold Grade Steels up to 65 HRc

Maximize your milling performance of mold grade steels up to 65 HRc.

Features:

- Eccentric Relief / Extreme Negative Radial Rake for increased edge strength
- Engineered Carbide for challenging operations
- High Helix / Multi-Edge Design for increased rigidity, feed rates and shearing ability that improve surface finish while reducing cutter deflection
- Extra Long Shanks for extended reach capabilities

Benefits:

Exceptionally strong geometry, specifically engineered carbide and Ti-NAMITE-A (AlTiN) coating for:

- Slot and finish milling applications
- Improved surface finishes
- High feed rates
- High speed or conventional machining
- Maximum hardness and fracture resistance
- Wet or dry machining

Additional Benefits of Dry Milling:

- Eliminates procurements costs for cutting fluids*
- Eliminates coolant disposal costs
- Reduces chip disposal costs
- Reduces cutting fluid related health issues (stricter standards have been proposed)

*Research shows coolants to be 17% of manufacturing costs.

Fresas Power-Carb para aceros de calidad de molde hasta 65 HRc

Maximice su rendimiento en el fresado de aceros de calidad de molde hasta 65 HRc.

Características:

- Desahogo excéntrico / Inclinación radial negativa extrema, para aumentar la resistencia del filo
- Carburo diseñado para las operaciones más desafiantes
- Diseño de ángulo de hélice alto / multi-filo que asegura mayor rigidez, velocidades de avance y capacidad de corte que mejoran el acabado de la superficie mientras reducen la deflexión del cortador
- Mangos extralargos, para lograr capacidades de alcance extendido



Ventajas:

Carburo diseñado especialmente con una geometría excepcionalmente fuerte y recubrimiento Ti-NAMITE-A (AlTiN), para:

- Aplicaciones de fresado de ranuras y de acabado
- Acabados superficiales mejorados
- Altas velocidades de avance
- Maquinado de alta velocidad o convencional
- Máxima dureza y resistencia a la fractura
- Maquinado mojado o seco

Ventajas adicionales del fresado seco:

- Elimina costos de adquisición de líquidos de corte*
- Elimina costos de desecho de refrigerante
- Reduce costos de desecho de virutas
- Reduce los problemas de salud relacionados con los líquidos de corte (se han propuesto normas más estrictas)

*La investigación demuestra que los refrigerantes representan el 17% de los costos de fabricación.

Fraises à queue Power-Carb pour acier de moules ayant une dureté jusqu'à 65 HRc

Maximisez vos performances de fraisage sur l'acier à moules d'une dureté jusqu'à 65 HRc.

Caractéristiques :

- Détalonnage excentrique / vague de coupe radiale extrêmement négative pour accroître la solidité des rebords
- Carbure spécial pour opérations difficiles
- Conception à hélice haute/multi-rebords pour augmenter la rigidité, la vitesse d'avance et la capacité de fraisage pour améliorer la finition des surfaces tout en réduisant la déflexion de la fraise
- Tiges très longues pour une portée supplémentaire

Avantages :

Géométrie exceptionnellement solide, en carbure spécial avec revêtement Ti-NAMITE-A (AlTiN) pour:

- Rainurage et fraisage de finition
- Meilleure finition des surfaces
- Vitesses d'avance élevées
- Vitesse de rotation élevée ou usinage classique
- Dureté maximale avec meilleure résistance à la rupture
- Fraisage sec ou mouillé

Avantages supplémentaires du fraisage à sec :

- Élimine le coût d'achat des fluides d'usinage*
- Élimine le coût de mise aux rebuts du liquide de refroidissement usé
- Réduit le coût de mise aux rebuts des copeaux
- Réduit les problèmes de santé associés aux fluides d'usinage (de nouvelles normes plus strictes ont été proposées)

*Des recherches révèlent que les fluides d'usinage représentent 17% des coûts de fabrication.

END MILLS
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Series 57 • 57M



Power-Carb End Mills for Mold Grade Steels up to 65 HRC – 6-Flute

Serie 57 • 57M



Fresas Power-Carb para aceros de calidad de molde hasta 65 HRC – 6 filos

Série 57 • 57M

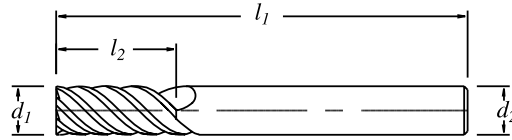


Fraises à queue Power-Carb pour acier de moules ayant une dureté jusqu'à 65 HRC – 6 goujures

**Power Carb End Mills for
Mold Grade Steels up to 65HRc**

Fractional
Series

57



Tolerances (inch)

Diameter	d ₁	d ₂
1/4	+0.000 / -0.012	h6
5/16	+0.000 / -0.016	h6
3/8	+0.000 / -0.016	h6
1/2	+0.000 / -0.020	h6

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Ti-NAMITE-A (AlTiN) EDP No.
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

Tolerances (mm)

Diameter	d ₁	d ₂
6	+0,000 / -0,030	h6
8	+0,000 / -0,040	h6
10	+0,000 / -0,040	h6
12	+0,000 / -0,050	h6

Metric
Series

57M

Cutting Diameter d ₁ mm	Length of Cut l ₂ mm	Overall Length l ₁ mm	Shank Diameter d ₂ mm	Ti-NAMITE-A (AlTiN) EDP No.
6	13	89	6	46140
8	18	102	8	46141
10	22	102	10	46142
12	26	114	12	46143



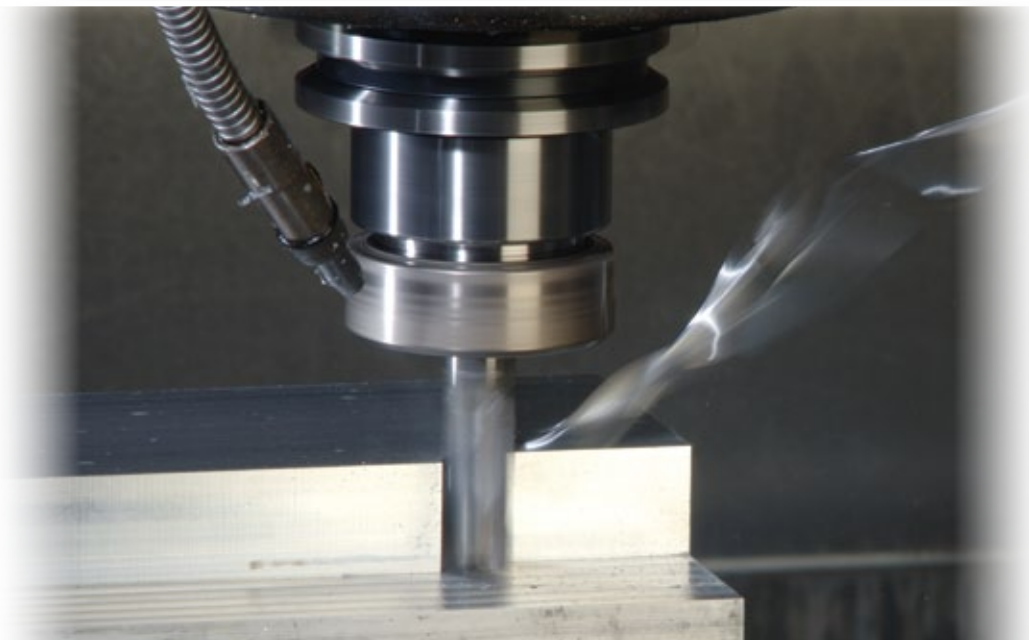


Ski-Carb End Mills for Aluminum & Non-Ferrous Applications

The Original High Performance End Mill for Aluminum

Patented Design Features:

- Circular Land reduces edge aggressiveness for varied speed & feed rates and allows for milling into corners while significantly reducing chatter.
- Ski Land with primary and secondary flute wall construction avoids chip interference by directing chips away from secondary flute.
- High Helix (45 degree) increases effective rake for greater shearing ability with out reducing edge strength.
- Short Length for increased rigidity.
- Available Corner Radii for additional protection against chipping.



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

END MILLS
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Fresas Ski-Carb para aplicaciones de aluminio y no ferrosas

La fresa de alto rendimiento original para aluminio

Características de diseño patentadas:

- El plano circular reduce la agresividad del filo para diversas velocidades y avances, y permite fresar en esquinas al tiempo que reduce significativamente la vibración.
- La geometría Ski-Land, con la construcción de las paredes de canal primario y secundario, evita la interferencia de las virutas dirigiéndolas lejos del canal secundario.
- El ángulo de hélice alto (45 grados) aumenta la inclinación efectiva, con lo que se logra una mayor capacidad de corte sin reducir la resistencia del filo.
- Longitud reducida, para aumentar la rigidez.
- Disponibles con radio de esquina, para protección adicional contra el astillado.

Comuníquese con su Representante de Ventas SGS para obtener más información sobre las opciones de radio de esquina.

Fraises à queue Ski-Carb pour aluminium et applications non ferreuses

La fraise à queue haute performance originale pour l'aluminium

Caractéristiques techniques brevetées :

- Listel circulaire réduisant l'agressivité des rebords avec diverses vitesses de rotation et d'avance, permettant de fraiser dans les coins tout en réduisant considérablement le broutage.
- Listel de glisse avec goujure primaire et secondaire évitant les interférences des copeaux en les écartant de la goujure secondaire.
- Hélice haute (45 degrés) augmentant la vague de coupe efficace pour une meilleure capacité de fraisage sans réduire la résistance des rebords.
- Longueur courte pour une rigidité accrue.
- Rayons de coin disponibles pour une protection supplémentaire contre les copeaux.


Pour de plus amples informations sur les options de rayon de coin, contactez votre représentant commercial SGS.


Ski-Carb End Mills for Aluminum & Non-Ferrous Applications




www.sgstool.com



Series 44 
Ski-Carb End Mills for Aluminum & Non-Ferrous Applications – 2-Flute

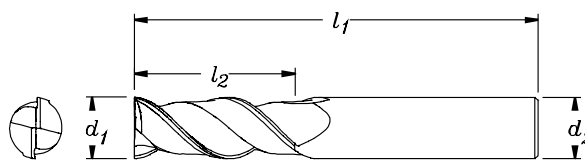
Serie 44 
Fresas Ski-Carb para aplicaciones de aluminio y no ferrosas – 2 fillos

Série 44 
Fraises à queue Ski-Carb pour aluminium et applications non ferreuses – 2 goujures

END MILLS
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Tolerances (inch)		
Diameter	d ₁	d ₂
1/4 – 3/8	+0.00000/-0.00035	h6
1/2 – 5/8	+0.00000/-0.00043	h6
3/4 – 1	+0.00000/-0.00051	h6



Corner Radius Tolerances (inch)	
+.000/-0.002	

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Corner Radius* (optional)	Uncoated	Ti-NAMITE-B (TiB ₂)	Uncoated	Ti-NAMITE-B (TiB ₂)
					EDP No. W/Flat	EDP No. W/Flat	EDP No. W/O Flat	EDP No. W/O Flat
1/4	3/4	2-7/16	3/8	.015-.060	34501	34502	32033	32053
1/4	1-1/4	3-1/16	3/8	.015-.060	34503	34504	32034	32054
1/4	1-3/4	3-9/16	3/8	.015-.060	34505	34506	32035	32055
5/16	1-3/8	3-1/8	3/8	.015-.060	34507	34508	32036	32056
3/8	3/4	2-1/2	3/8	.015-.060	34509	34510	32037	32057
3/8	1-1/2	3-1/4	3/8	.015-.060	34511	34512	32038	32058
3/8	2-1/2	4-1/4	3/8	.015-.060	34513	34514	32039	32059
1/2	1-1/4	3-1/4	1/2	.015-.125	34515	34516	32040	32060
1/2	2	4	1/2	.015-.125	34517	34518	32041	32061
1/2	3	5	1/2	.015-.125	34519	34520	32042	32062
5/8	1-5/8	3-3/4	5/8	.015-.125	34521	34522	32043	32063
5/8	2-1/2	4-5/8	5/8	.015-.125	34523	34524	32044	32064
3/4	1-5/8	3-7/8	3/4	.015-.125	34525	34526	32045	32065
3/4	3	5-1/4	3/4	.015-.125	34527	34528	32046	32066
3/4	4	6-1/4	3/4	.015-.125	34529	34530	32047	32067
1	2	4-1/2	1	.015-.125	34531	34532	32048	32068
1	4	6-1/2	1	.015-.125	34533	34534	32049	32069

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



Series 44M



Ski-Carb End Mills for Aluminum & Non-Ferrous Applications – 2 Flute

Serie 44M



Fresas Ski-Carb para aplicaciones de aluminio y no ferrosas – 2 filos

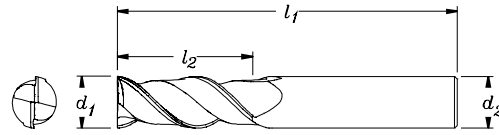
Série 44M



Fraises à queue Ski-Carb pour aluminium et applications non ferreuses – 2 goujures

Ski-Carb End Mills for Aluminum & Non-Ferrous Applications

Metric Series **44M**



Diameter	Tolerances (mm)	
	d ₁	d ₂
≤ 3	+0,000/-0,006	h6
> 3 – 6	+0,000/-0,008	h6
> 6 – 10	+0,000/-0,009	h6
> 10 – 18	+0,000/-0,011	h6
> 18 – 20	+0,000/-0,013	h6

Corner Radius Tolerances (mm)

+0,00/-0,05

Cutting Diameter d ₁ mm	Length of Cut l ₂ mm	Overall Length l ₁ mm	Shank Diameter d ₂ mm	Corner Radius * (optional) mm	Uncoated	Ti-NAMITE-B (TiB ₂)	Uncoated	Ti-NAMITE-B (TiB ₂)
					EDP No. W/Flat	EDP No. W/Flat	EDP No. W/O Flat	EDP No. W/O Flat
3	8	52	6	0,38-0,76	44505	44506	49663	49674
4	11	55	6	0,38-0,76	44509	44510	49664	49675
5	13	57	6	0,38-0,76	44513	44514	49665	49676
6	13	57	6	0,38-1,52	44517	44518	49666	49677
8	19	69	10	0,38-1,52	44521	44522	49667	49678
10	22	72	10	0,38-1,52	44525	44526	49668	49679
12	26	83	12	0,38-3,17	44529	44530	49669	49680
14	26	83	14	0,38-3,17	44533	44534	49670	49681
16	32	92	16	0,38-3,17	44537	44538	49671	49682
18	32	92	18	0,38-3,17	44541	44542	49672	49683
20	38	104	20	0,38-3,17	44545	44546	49673	49684

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

Ski-Carb End Mills for Aluminum & Non-Ferrous Applications



www.sgstool.com



Series 45



Ski-Carb End Mills for Aluminum & Non-Ferrous Applications – 2-Flute – Short Length

Serie 45



Fresas Ski-Carb para aplicaciones de aluminio y no ferrosas – 2 filos – Courtes longueurs

Série 45

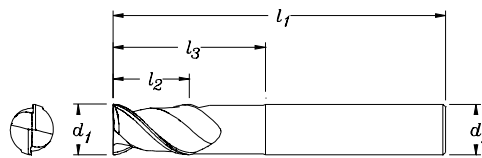


Fraises à queue Ski-Carb pour aluminium et applications non ferreuses – 2 goujures – Longitudes reducidas

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Diameter	Tolerances (inch)	
	d ₁	d ₂
1/4 – 3/8	+0.00000/-0.00035	h6
1/2 – 5/8	+0.00000/-0.00043	h6
3/4 – 1	+0.00000/-0.00051	h6



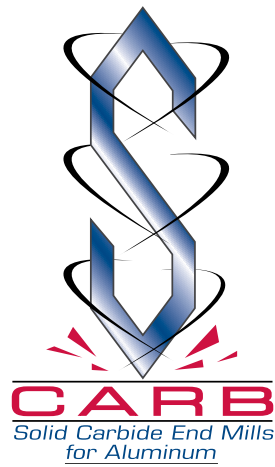
Corner Radius Tolerances (inch)

+0.000/-0.002

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Reach* (Optional) l ₃	Shank Diameter d ₂	Corner Radius	Uncoated	Ti-NAMITE-B (TiB ₂)	Uncoated	Ti-NAMITE-B (TiB ₂)
						EDP No. W/Flat	EDP No. W/Flat	EDP No. W/O Flat	EDP No. W/O Flat
1/4	3/8	2-1/2	1	3/8	.010	91257	91235	91250	91242
5/16	7/16	2-1/2	1-1/8	3/8	.012	91258	91236	91251	91243
3/8	9/16	2-1/2	1-1/8	3/8	.015	91259	91237	91252	91244
1/2	3/4	3	1-1/2	1/2	.020	91260	91238	91253	91245
5/8	7/8	3-1/2	1-3/4	5/8	.025	91261	91239	91254	91246
3/4	1	4	2	3/4	.030	91262	91240	91255	91247
1	1-1/4	4	2-1/8	1	.040	91263	91241	91256	91248

*Contact your SGS Sales Representative for more information on Reach Options.

S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials



Features & Benefits:

Engineered Flute Design

- Effective chip removal at high feed rates
- Lower cutting forces than comparable products

Unique Symmetrical End Gashing

- Improved balance at high spindle speeds
- Improved workpiece finish through better balance
- More effective plunging vs. conventional designs

Circular Land

- Increased control at various speed and feed levels
- Reduced chatter

Long Reach with Neck Options

- Axial slotting up to 1xD; radial profiling up to 0.5xD
- Necked design with blended diameter transitions provide clearance to reach

Selection of Popular Lengths and Corner Radii

- Available from stock
- CNC ground corner radii
- Resharpener service available



Ti-NANITE-3

Available with TiB₂ coating (Titanium Diboride) for exceptional performance in a variety of aluminum and magnesium alloys.

Microhardness: 4000HV

Oxidation Temperature: 850°C – 1562°F

Coefficient of Friction: .45

Thickness: 1 – 2 Microns (based on tool diameter)



Fresas S-Carb de 3 filos para aluminio, materiales no ferrosos y no metálicos

Características y ventajas:

Diseño especial de canales

- Efectivo arranque de viruta a altas velocidades de avance
- Menores fuerzas de corte que en productos comparables

Exclusivo muescado extremo simétrico

- Equilibrio mejorado a altas velocidades del husillo
- Mejor acabado de la pieza a través de un mejor balance
- Penetración más efectiva que en los diseños convencionales

Interpolación circular

- Mayor control de circularidad a altas velocidades y avances
- Reducción de la vibración

Serie larga con reducción de diámetro

- Rainauraje hasta 1xD; passas radiales hasta 0.5XD
- El diseño del cuerpo y la amplia gama de dimensiones asegura una multitud de diámetros

Selección de las longitudes y radios de esquina más comunes

- Disponibles en inventario
- Radios de esquina rectificadas con CNC
- Se ofrece el servicio de reafilado

Ti-NANITE-S

Disponible con recubrimiento TiB₂ (diboruro de titanio), que asegura un excepcional rendimiento en una amplia variedad de aleaciones de magnesio y aluminio.

Microdureza: 4000 HV

Temperatura de oxidación: 850 °C (1562 °F)

Coefficiente de rozamiento: 0.45

Espesor: 1 – 2 micrones (en base al diámetro de la herramienta)

END MILLS
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Fraises à queue S-Carb 3 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques

Caractéristiques et avantages :

Goujures spécialement conçues

- Enlèvement efficace des copeaux avec avance rapide
- Forces de découpage moindres que produits comparables

Creux de dent à extrémité symétrique unique

- Meilleur équilibre avec vitesses de broche élevées
- Meilleur équilibre conduisant à une meilleure finition des pièces travaillées
- Entrée verticale plus efficace que les modèles classiques

Interpolation circulaire

- Meilleur contrôle de la circularité aux grandes vitesses de coupe et d'avances
- Réduction des vibrations

Serie longue avec détalonnage

- Rainurage jusqu'à 1xD; Contournage jusqu'à 0.5XD
- La conception du corps et la grande gamme de dimensions permet d'assurer une multitude de diamètres

Choix de rayons de coin et de longueurs populaires

- Disponibles en stock
- Rayon de coin pour usinage sur machine à commande numérique par ordinateur
- Service de réaffutage disponible



Disponibles avec revêtement TiB₂ (diboride de titane) pour des performances exceptionnelles avec une grande variété d'alliages contenant de l'aluminium et du magnésium.

Micro-dureté: 4000HV

Température d'oxydation : 850°C – 1562°F

Coefficient de friction : 0,45

Épaisseur : 1 – 2 microns (selon le diamètre de l'outil)



Series 43CR



S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials – 3-Flute – Corner Radius

Serie 43CR



Fresas S-Carb de 3 filos para aluminio, materiales no ferrosos y no metálicos – 3 filos – Radio de esquina

Série 43CR

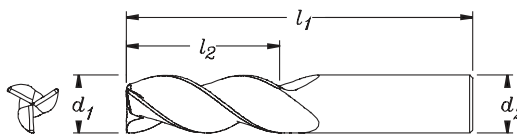


Fraises à queue S-Carb 3 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques – 3 goujures – Rayon de coin

END MILLS
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Diameter	Tolerances (inch)	
	d ₁	d ₂
1/8 – 3/16	+0.00000/-0.00032	h6
1/4 – 3/8	+0.00000/-0.00035	h6
1/2 – 5/8	+0.00000/-0.00043	h6
3/4 – 1	+0.00000/-0.00051	h6



Corner Radius Tolerances (inch)

+0.000/-0.002

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Corner Radius	Uncoated EDP No.	Ti-NAMITE-B (TiB ₂) EDP No.
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



Series 43LC



S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials – 3-Flute – Corner Radius Long Reach with Neck

Serie 43LC



Fresas S-Carb de 3 filos para aluminio, materiales no ferrosos y no metálicos – 3 filos – Radio de esquina Serie larga con reducción de diámetro

Série 43LC

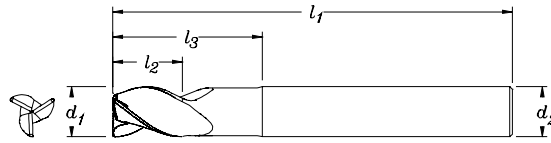


Fraises à queue S-Carb 3 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques – 3 goujures – Rayon de coin Serie longue avec détalonnage

S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials

Fractional Series

43LC



Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 3/16	+0.00000/-0.00032	h6
1/4 – 3/8	+0.00000/-0.00035	h6
1/2 – 5/8	+0.00000/-0.00043	h6
3/4 – 1	+0.00000/-0.00051	h6

Corner Radius Tolerances (inch)

+ .000/- .002

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Reach l ₃	Corner Radius	Uncoated EDP No.	Ti-NAMITE-B (TiB ₂) EDP No.
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
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

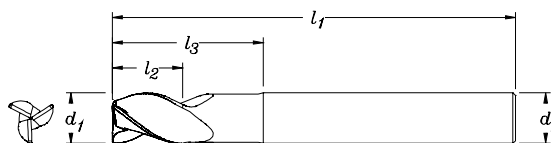
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Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 3/16	+0.00000/-0.00032	h6
1/4 – 3/8	+0.00000/-0.00035	h6
1/2 – 5/8	+0.00000/-0.00043	h6
3/4 – 1	+0.00000/-0.00051	h6



Corner Radius Tolerances (inch)

+0.000/-0.002

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Reach l ₃	Corner Radius	Uncoated	Ti-NAMITE-B (TiB ₂)
						EDP No.	EDP No.
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

END MILLS
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Series 43



S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials – 3-Flute – Square End

Serie 43



Fresas S-Carb de 3 filos para aluminio, materiales no ferrosos y no metálicos – 3 filos – Punta plana

Série 43

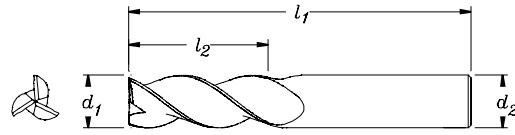


Fraises à queue S-Carb 3 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques – 3 goujures – Extrémité carrée

S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials

Fractional Series

43



Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 3/16	+0.00000/–0.00032	h6
1/4 – 3/8	+0.00000/–0.00035	h6
1/2 – 5/8	+0.00000/–0.00043	h6
3/4 – 1	+0.00000/–0.00051	h6

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Uncoated EDP No.	Ti-NAMITE-B (TiB ₂) EDP No.
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

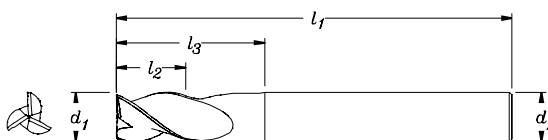


S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials



Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 3/16	+0.00000/-0.00032	h6
1/4 – 3/8	+0.00000/-0.00035	h6
1/2 – 5/8	+0.00000/-0.00043	h6
3/4 – 1	+0.00000/-0.00051	h6



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)
					EDP No.	EDP No.
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

Series 43L



S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials – 3-Flute – Square End Long Reach with Neck

Serie 43L



Fresas S-Carb de 3 filos para aluminio, materiales no ferrosos y no metálicos – 3 filos – Punta plana Serie larga con reducción de diámetro

Série 43L



Fraises à queue S-Carb 3 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques – 3 goujures – Extrémité carrée Serie longue avec détalonnage

END MILLS
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Series 43MCR



S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials – 3-Flute – Corner Radius

Serie 43MCR



Fresas S-Carb de 3 filos para aluminio, materiales no ferrosos y no metálicos – 3 filos – Radio de esquina

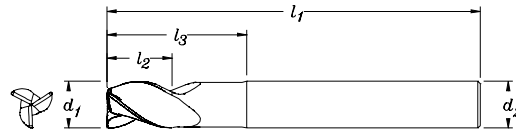
Série 43MCR



Fraises à queue S-Carb 3 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques – 3 goujures – Rayon de coin

S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials

Metric Series **43MCR**



Tolerances (mm)		
Diameter	d ₁	d ₂
6	+0,000/-0,008	h6
>6-10	+0,000/-0,009	h6
>10-18	+0,000/-0,011	h6
>18-20	+0,000/-0,013	h6

Corner Radius Tolerances

+0,00/-0,05

Cutting Diameter d ₁ mm	Length of Cut l ₂ mm	Overall Length l ₁ mm	Shank Diameter d ₂ mm	Reach l ₃ mm	Corner Radius	Uncoated EDP No.	Ti-NAMITE-B (TiB ₂) EDP No.
6	10	63	6	20	0,5	44769	44789
6	10	63	6	20	1	44770	44790
6	13	72	6	30	0,5	44771	44791
6	13	72	6	30	1	44772	44792
8	12	75	8	25	0,3	44773	44793
8	12	75	8	25	0,5	44774	44794
8	12	75	8	25	1	44775	44795
8	12	75	8	25	1,5	44776	44796
10	14	100	10	35	0,3	44777	44797
10	14	100	10	35	0,5	44778	44798
10	14	100	10	35	1	44779	44799
10	14	100	10	35	1,5	44780	44800
12	16	100	12	40	0,5	44781	44801
12	16	100	12	40	1	44782	44802
12	16	100	12	40	1,5	44783	44803
12	16	100	12	40	2	44784	44804
16	20	125	16	50	2	44785	44805
16	20	125	16	50	4	44786	44806
20	25	150	20	65	2	44787	44807
20	25	150	20	65	4	44788	44808

S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials

Series 43M 

S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials – 3-Flute – Square End

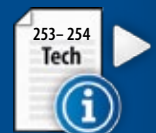
Serie 43M 

Fresas S-Carb de 3 filos para aluminio, materiales no ferrosos y no metálicos – 3 filos – Punta plana

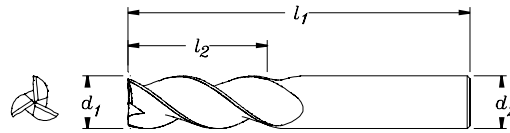
Série 43M 

Fraises à queue S-Carb 3 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques – 3 goujures – Extrémité carrée

END MILLS
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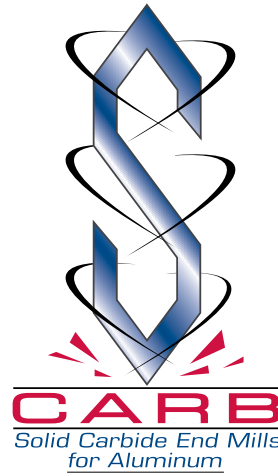


Diameter	Tolerances (mm)	
	d_1	d_2
6	+0,000/-0,008	h6
>6-10	+0,000/-0,009	h6
>10-18	+0,000/-0,011	h6
>18-20	+0,000/-0,013	h6



Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated	Ti-NAMITE-B (TiB ₂)
				EDP No.	EDP No.
6	13	57	6	44701	44715
6	13	72	6	44702	44716
8	19	63	8	44703	44717
10	22	72	10	44705	44719
12	26	83	12	44708	44722
16	32	92	16	44711	44725
20	38	104	20	44714	44728

S-Carb 2-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials



Features & Benefits:

Chatter Free Operation

- Improves material removal rates
- Improves surface finishes

Low Cutting Force

- Permits higher feed rates
- Increases tool life

Selection of Styles

- Regular length, square and ball end
- Extended reach, square and ball end
- Fractional and metric sizes

Suitable for Non-Ferrous/Non-Metallic Materials

- Aluminum Alloys
- Plastics
- Copper
- Brass/Bronze

Ti-NANITE-S

Available with TiB₂ coating (Titanium Diboride) for exceptional performance in a variety of aluminum and magnesium alloys.

Microhardness: 4000HV

Oxidation Temperature: 850°C – 1562°F

Coefficient of Friction: .45

Thickness: 1 – 2 Microns (based on tool diameter)



Fresas S-Carb de 2 filos para aluminio, materiales no ferrosos y no metálicos

Características y ventajas:

Funcionamiento libre de vibración

- Mejora las velocidades de arranque de material
- Mejora los acabados de la superficie

Baja fuerza de corte

- Permite mayores velocidades de avance
- Prolonga la vida útil de la herramienta

Selección de estilos

- Longitud normal, punta plana y esférica
- Alcance extendido, punta plana y esférica
- Tamaños fraccionales y métricos

Aptas para materiales no ferrosos y no metálicos

- Aleaciones de aluminio
- Plásticos
- Cobre
- Latón y bronce



Disponible con recubrimiento TiB₂ (diboruro de titanio), que asegura un excepcional rendimiento en una amplia variedad de aleaciones de magnesio y aluminio.

Microdureza: 4000 HV

Temperatura de oxidación: 850 °C – 1562 °F

Coefficiente de rozamiento: 0.45

Espesor: 1 – 2 micrones (en base al diámetro de la herramienta)

Fraises à queue S-Carb 2 goujures pour aluminium et matériaux non ferreux/non métalliques

Caractéristiques et avantages :

Fonctionnement sans broutage

- Améliore les taux d'enlèvement de matière
- Améliore la finition des surfaces

Faible force de découpage

- Permet des vitesses d'avance plus élevées
- Meilleure longévité des outils

Choix de styles

- Longueur normale, extrémité carré/sphérique
- Portée prolongée, extrémité carré/sphérique
- Dimensions métriques et fractionnelles

Convient aux matériaux non ferreux/non métalliques

- Alliages d'aluminium
- Plastiques



Disponibles avec revêtement TiB₂ (diborure de titane) pour des performances exceptionnelles avec une grande variété d'alliages contenant de l'aluminium et du magnésium.

Micro-dureté: 4000HV

Température d'oxydation : 850°C – 1562°F

Coefficient de friction : 0,45

Épaisseur : 1 – 2 microns (selon le diamètre de l'outil)

**END MILLS
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Series 47 • 47M



S-Carb 2-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials – 2-Flute – Square End

Serie 47 • 47M



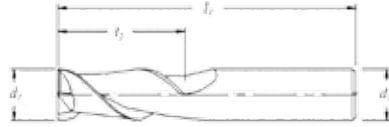
Fresas S-Carb de 2 filos para aluminio, materiales no ferrosos y no metálicos – 2 filos – Punta plana

Série 47 • 47M



Fraises à queue S-Carb 2 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques – 2 goujures – Extrémité carrée

S-Carb 2-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials



Tolerances (inch)

Diameter	d ₁	d ₂
1/8 – 1	–.0001/–.0004	h6

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Uncoated EDP No.	Ti-NAMITE-B (TiB ₂) EDP No.
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 (mm)

Diameter	d ₁	d ₂
3–25	–0,0025/–0,010	h6

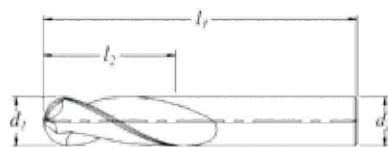
Metric Series

47M

Cutting Diameter d ₁ mm	Length of Cut l ₂ mm	Overall Length l ₁ mm	Shank Diameter d ₂ mm	Uncoated EDP No.	Ti-NAMITE-B (TiB ₂) EDP No.
3	8	38	3	44550	44587
4	11	50	4	44551	44588
5	13	50	5	44552	44589
6	13	57	6	44553	44590
8	19	63	8	44554	44591
10	22	72	10	44555	44592
12	26	83	12	44556	44593
14	26	83	14	44557	44594
16	32	92	16	44558	44595
20	38	104	20	44559	44596
25	44	104	25	44560	44597



S-Carb 2-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials



Diameter	Tolerances (inch)	
	d ₁	d ₂
1/8 - 1	-.0001/-.0004	h6

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Uncoated	Ti-NAMITE-B (TiB ₂)
				EDP No.	EDP No.
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

Diameter	Tolerances (mm)	
	d ₁	d ₂
3 - 25	-0,0025/-0,010	h6

Cutting Diameter d ₁ mm	Length of Cut l ₂ mm	Overall Length l ₁ mm	Shank Diameter d ₂ mm	Uncoated	Ti-NAMITE-B (TiB ₂)
				EDP No.	EDP No.
3	8	38	3	44570	44598
4	11	50	4	44571	44599
5	13	50	5	44572	44600
6	13	57	6	44573	44601
8	19	63	8	44574	44602
10	22	72	10	44575	44603
12	26	83	12	44576	44604
14	26	83	14	44577	44605
16	32	92	16	44578	44606
20	38	104	20	44579	44607
25	44	104	25	44580	44608



Series 47B • 47MB



S-Carb 2-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials – 2-Flute – Ball End

Serie 47B • 47MB



Fresas S-Carb de 2 filos para aluminio, materiales no ferrosos y no metálicos – 2 filos – Punta esférica

Série 47B • 47MB



Fraises à queue S-Carb 2 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques – 2 goujures – Extrémité sphérique





Series 47ES • 47MES



S-Carb 2-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials – 2-Flute – Square End – Extended Reach

Serie 47ES • 47MES



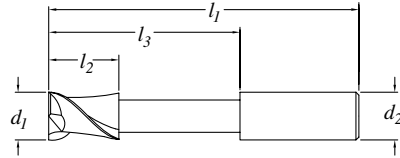
Fresas S-Carb de 2 filos para aluminio, materiales no ferrosos y no metálicos – 2 filos – Punta plana – Alcance extendido

Série 47ES • 47MES



Fraises à queue S-Carb 2 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques – 2 goujures – Extrémité carrée – Portée très longue

S-Carb 2-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials



Fractional Series **47ES**

Diameter	Tolerances (inch)	
	d ₁	d ₂
1/4 – 3/4	–.0001/–.0004	h6

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)
					EDP No.	EDP No.
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

Diameter	Tolerances (mm)	
	d ₁	d ₂
6 – 20	–0,0025/–0,010	h6

Metric Series **47MES**

Cutting Diameter d ₁ mm	Length of Cut l ₂ mm	Overall Length l ₁ mm	Shank Diameter d ₂ mm	Reach l ₃ mm	Uncoated	Ti-NAMITE-B (TiB ₂)
					EDP No.	EDP No.
6	10	100	6	54	44561	44609
8	12	100	8	54	44562	44610
10	12	100	10	54	44563	44611
12	16	150	12	80	44564	44612
16	20	150	16	80	44565	44613
20	25	150	20	80	44566	44614

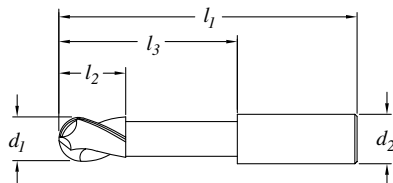


Fractional Series **47EB**

S-Carb 2-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials



www.sgstool.com



Diameter	Tolerances (inch)	
	d ₁	d ₂
1/4 – 3/4	–.0001/–.0004	h6

Cutting Diameter d ₁	Length of Cut l ₂	Overall Length l ₁	Shank Diameter d ₂	Reach l ₃	Uncoated	Ti-NAMITE-B
					EDP No.	(TiB ₂) EDP No.
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	2-3/8	34654	34690
5/8	3/4	6	5/8	3-3/8	34655	34691
3/4	1	6	3/4	2-1/2	34656	34692
3/4	1	6	3/4	3-3/8	34657	34693



Series 47EB • 47MEB

S-Carb 2-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials - 2-Flute – Ball End – Extended Reach

Serie 47EB • 47MEB

Fresas S-Carb de 2 filos para aluminio, materiales no ferrosos y no metálicos - 2 filos – Punta esférica - Alcance extendido

Série 47EB • 47MEB

Fraises à queue S-Carb 2 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques - 2 goujures – Extrémité sphérique - Portée très longue



Metric Series **47MEB**

Diameter	Tolerances (mm)	
	d ₁	d ₂
6 – 20	–0,0025/–0,010	h6

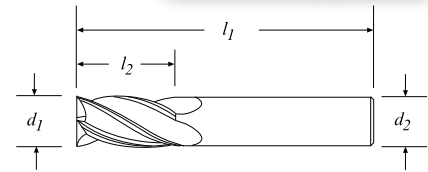
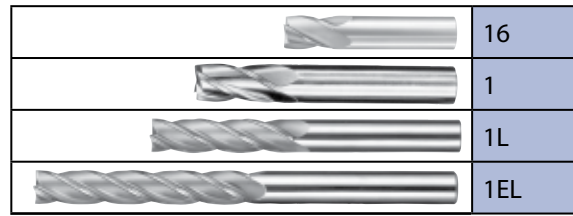
Cutting Diameter d ₁ mm	Length of Cut l ₂ mm	Overall Length l ₁ mm	Shank Diameter d ₂ mm	Reach l ₃ mm	Uncoated	Ti-NAMITE-B
					EDP No.	(TiB ₂) EDP No.
6	10	100	6	54	44581	44615
8	12	100	8	54	44582	44616
10	12	100	10	54	44583	44617
12	16	150	12	80	44584	44618
16	20	150	16	80	44585	44619
20	25	150	20	80	44586	44620



4 Flute – Single End – Square End

Fractional Series

1



TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$

Series 1



4-Flute End Mills – Square End – Micrograin Solid Carbide – 30° Right Hand Spiral – Right Hand Cutting – Center Cutting
** 6 flutes
† AD = Amorphous Diamond
CVD = Dia-Carb CVD Diamond Coatings

Serie 1



Fresas de 4 filos – Punta plana – Carburo sólido con micrograno – Hélice a derecha 30° – Corte a derecha – Corte al Centro
** 6 filos
† AD = Diamante amorfo
CVD = Recubrimientos de diamante CVD Dia-Carb

Série 1

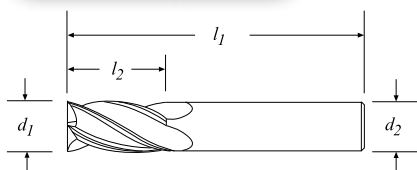


Fraises 4 dents – Bout plat – Carbure monobloc, micrograin – Hélice à droite, 30° – Coupe à droite – Coupe au centre
** 6 dents
† AD = Diamant amorphe
CVD = Revêtements de diamant Dia-Carb CVD

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Uncoated	Ti-NAMITE	Ti-NAMITE-C	Ti-NAMITE-A	Ti-NAMITE-A	AD [†]	CVD [†]	Series Number
				EDP No.	EDP No. w/Flat	(TiN) EDP No.	(TiCN) EDP No.	(AlTiN) EDP No.	(AlTiN) EDP No. w/Flat	EDP No.	EDP No.	
1/64	1/32	1-1/2	1/8	30101	-	39101	39001	30191	-	93300	-	1
1/32	5/64	1-1/2	1/8	30103	-	39103	39003	30192	-	93301	-	1
3/64	7/64	1-1/2	1/8	30105	-	39105	39005	30193	-	93302	-	1
1/16	1/8	1-1/2	1/8	31601	-	31650	31238	31251	-	-	-	16
1/16	3/16	1-1/2	1/8	30107	-	39107	39007	30194	-	93303	91268	1
5/64	3/16	1-1/2	1/8	30109	-	39109	39009	30195	-	93304	-	1
3/32	3/16	1-1/2	1/8	31603	-	31651	31239	31252	-	-	-	16
3/32	9/32	1-1/2	1/8	30111	-	39111	39011	30196	-	93305	-	1
7/64	3/8	1-1/2	1/8	30113	-	39113	39013	30197	-	93306	-	1
1/8	1/4	1-1/2	1/8	31605	-	31652	31240	31253	-	-	-	16
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	-	93307	91272	1
1/8	3/4	2-1/4	1/8	33141	-	31727	31737	31747	-	93324	-	1L
1/8	1	3	1/8	33143	-	31860	31870	31880	-	93334	-	1EL
9/64	1/2	2	3/16	30117	-	39117	39017	30199	-	-	-	1
5/32	5/16	2	3/16	31607	-	31653	31241	31254	-	-	-	16
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	3/8	2	3/16	31609	-	31654	31242	31255	-	-	-	16
*3/16	5/8	2	3/16	30123	-	39123	39023	30002	-	93308	91276	1
3/16	3/4	2-1/2	3/16	33101	-	31728	31738	31748	-	93325	-	1L
3/16	1-1/8	3	3/16	33121	-	31861	31871	31881	-	93335	-	1EL
13/64	5/8	2-1/2	1/4	30125	-	39125	39025	30003	-	-	-	1
7/32	7/16	2	1/4	31611	-	31655	31243	31256	-	-	-	16
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	1/2	2	1/4	31613	-	31656	31244	31257	-	-	-	16
*1/4	3/4	2-1/2	1/4	30131	-	39131	39031	30006	-	93309	91280	1
1/4	1-1/8	3	1/4	33103	-	31729	31739	31749	-	93326	-	1L
1/4	1-1/2	4	1/4	33123	-	31862	31872	31882	-	93336	-	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	1/2	2	5/16	31615	-	31657	31245	31258	-	-	-	16
*5/16	13/16	2-1/2	5/16	30139	-	39139	39039	30010	-	93310	91284	1
5/16	1-1/8	3	5/16	33105	-	31730	31740	31763	-	93327	-	1L
5/16	1-5/8	4	5/16	33125	-	31863	31873	31883	-	93337	-	1EL

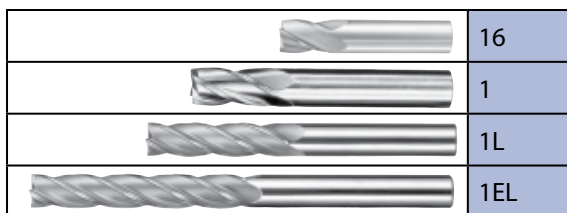
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4 Flute – Single End – Square End



TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$



Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Ti-NAMITE-A (AlTiN)	AD [†]	CVD [†]	Series Number
				EDP No.	EDP No. w/Flat	EDP No.	EDP No.	EDP No.	EDP No. w/Flat	EDP No.	EDP No.	
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	5/8	2	3/8	31617	—	31658	31246	31259	—	—	—	16
*3/8	1	2-1/2	3/8	30147	30179	39147	39047	30014	30379	93311	91288	1
3/8	1-1/8	3	3/8	33107	—	31731	31741	31764	—	93328	—	1L
3/8	1-3/4	4	3/8	33127	—	31864	31874	31884	—	93338	—	1EL
25/64	1	2-3/4	7/16	30149	—	39149	39049	30015	—	—	—	1
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	5/8	2-1/2	7/16	31619	—	31659	31247	31260	—	—	—	16
7/16	1	2-3/4	7/16	30155	—	39155	39055	30018	—	93344	—	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	5/8	2-1/2	1/2	31621	—	31660	31248	31261	—	—	—	16
*1/2	1	3	1/2	30163	30180	39163	39063	30022	30380	93345	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	3/4	3	5/8	31623	—	31661	31249	31262	—	—	—	16
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	3	3/4	31625	—	31662	31250	31263	—	—	—	16
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
** 1-1/2	2	4-1/2	1-1/4	34611	—	—	—	—	—	—	—	1
*Series 1 Set				30189	—	39189	39089	30030	—	—	—	1

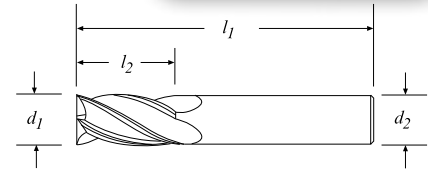
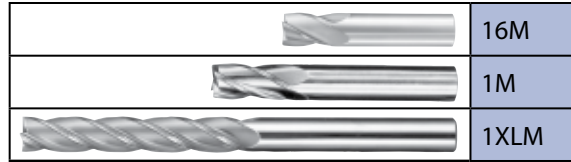
END MILLS
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4 Flute – Single End – Square End

Metric Series

1M



TOLERANCES

$$d_1 = +0,000 - 0,05$$

$$d_2 = h6$$

Series 1M



4-Flute End Mills – Square End –
Micrograin Solid Carbide – 30° Right
Hand Spiral – Right Hand Cutting –
Center Cutting

Serie 1M



Fresas de 4 filos – Punta plana
– Carburo sólido con micrograno
– Hélice a derecha 30° – Corte a
derecha – Corte al Centro

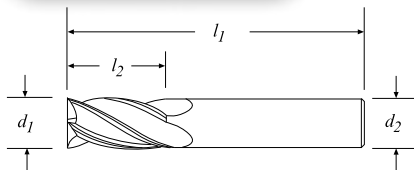
Série 1M



Fraises 4 dents – Bout plat –
Carbure monobloc, micrograin –
Hélice à droite, 30° – Coupe à droite
– Coupe au centre

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	2	38	3	41605	49136	49157	49178	16M
1	4	38	3	40105	48500	48522	48543	1M
1,5	3	38	3	41609	49137	49158	49179	16M
1,5	4,5	38	3	40109	48501	48523	48544	1M
2	4	38	3	41613	49138	49159	49180	16M
2	6,3	38	3	40113	48502	48524	48545	1M
2,5	5	38	3	41617	49139	49160	49181	16M
2,5	9,5	38	3	40117	48503	48525	48546	1M
3	6	38	3	41621	49140	49161	49182	16M
3	12	38	3	40121	48504	48526	48547	1M
3,5	7	50	4	41625	49141	49162	49183	16M
3,5	12	50	4	40125	48505	48527	48548	1M
3	25	75	3	43101	49388	49401	49414	1XLM
4	8	50	4	41629	49142	49163	49184	16M
4	14	50	4	40129	48506	48528	48549	1M
4	25	75	4	43103	49389	49402	49415	1XLM
4,5	9,5	50	4,5	41633	49143	49164	49185	16M
4,5	16	50	6	40133	48507	48529	48550	1M
5	10	50	5	41637	49144	49165	49186	16M
5	16	50	6	40137	48508	48530	48551	1M
5	25	75	5	43107	49391	49404	49417	1XLM
6	12	50	6	41641	49145	49166	49187	16M
6	19	50	6	40141	48509	48531	48552	1M
6	25	75	6	43105	49390	49403	49416	1XLM
7	12	50	8	41645	49146	49167	49188	16M
7	19	63	8	40145	48510	48532	48553	1M
8	12	50	8	41649	49147	49168	49189	16M
8	20	63	8	40149	48511	48533	48554	1M
8	25	75	8	43115	49392	49405	49418	1XLM
9	14	50	9	41653	49148	49169	49190	16M
9	22	75	10	40153	48512	48534	48555	1M
10	16	50	10	41657	49149	49170	49191	16M
10	22	75	10	40157	48513	48535	48556	1M

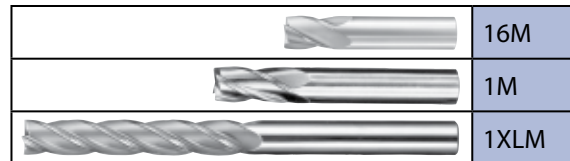
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TOLERANCES

$$d_1 = +0,000 - 0,05$$

$$d_2 = h6$$



Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Series Number
				EDP No.	EDP No.	EDP No.	EDP No.	
10	38	100	10	43125	49393	49406	49419	1XLM
11	19	63	12	41661	49150	49171	49192	16M
11	25	75	12	40161	48514	48536	48557	1M
12	19	63	12	40165	49151	49172	49193	16M
12	25	75	12	41665	48515	48537	48558	1M
12	50	100	12	43135	49394	49407	49420	1XLM
12	75	150	12	43145	49395	49408	49421	1XLM
14	32	89	14	40169	48516	48538	48559	1M
14	75	150	14	43155	49396	49409	49422	1XLM
16	32	89	16	40173	48517	48539	48560	1M
16	75	150	16	43165	49397	49410	49423	1XLM
18	38	100	18	40177	48518	48540	48561	1M
18	75	150	18	43175	49398	49411	49424	1XLM
20	38	100	20	40181	48519	48541	48562	1M
20	75	150	20	43185	49399	49412	49425	1XLM
25	38	100	25	40185	48520	48542	48563	1M
25	75	150	25	43195	49400	49413	49426	1XLM

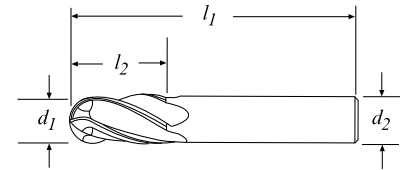
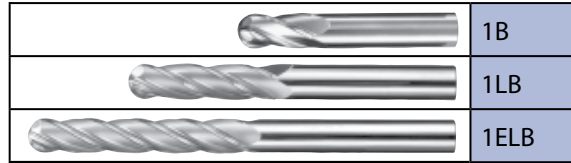
END MILLS
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4 Flute – Single End – Ball End

Fractional Series

1B



TOLERANCES

$$d_1 = +.000 - .002$$

$$d_2 = h6$$

Series 1B



4-Flute End Mills – Ball End –
Micrograin Solid Carbide – 30° Right
Hand Spiral – Right Hand Cutting –
Center Cutting

† AD = Amorphous Diamond
CVD = Dia-Carb CVD Diamond
Coatings

Serie 1B



Fresas de 4 filos – Punta radial
o esférica – Carburo sólido con
micrograno – Hélice a derecha 30°
– Corte a derecha – Corte al centro

† AD = Diamante amorfo
CVD = Recubrimientos de
diamante CVD Dia-Carb

Série 1B

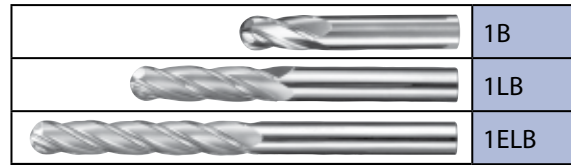
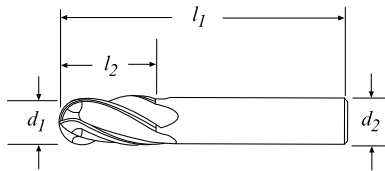


Fraise 4 dents – Bout hémisphérique
– Carbure monobloc, micrograin –
Hélice à droite, 30° – Coupe à droite
– Coupe au centre

† AD = Diamant amorphe
CVD = Revêtements de diamant
Dia-Carb CVD

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Uncoated	Ti-NAMITE	Ti-NAMITE-C	Ti-NAMITE-A	Ti-NAMITE-A	AD†	CVD†	Series Number
				EDP No.	EDP No. w/Flat	(TiN) EDP No.	(TiCN) EDP No.	(AlTiN) EDP No.	(AlTiN) EDP No. w/Flat	EDP No.	EDP No.	
1/64	1/32	1-1/2	1/8	30102	–	39102	39002	30031	–	93312	–	1B
1/32	5/64	1-1/2	1/8	30104	–	39104	39004	30032	–	93313	–	1B
3/64	7/64	1-1/2	1/8	30106	–	39106	39006	30033	–	93314	–	1B
1/16	3/16	1-1/2	1/8	30108	–	39108	39008	30034	–	93315	91269	1B
5/64	3/16	1-1/2	1/8	30110	–	39110	39010	30035	–	93316	–	1B
3/32	9/32	1-1/2	1/8	30112	–	39112	39012	30036	–	93317	–	1B
7/64	3/8	1-1/2	1/8	30114	–	39114	39014	30037	–	93318	–	1B
*1/8	3/8	1-1/2	1/8	30178	–	39178	39078	30069	–	93319	–	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	–	93329	–	1LB
1/8	1	3	1/8	33144	–	31900	31918	31928	–	93339	–	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	–	93320	91277	1B
3/16	3/4	2-1/2	3/16	33102	–	31771	31781	31791	–	93330	–	1LB
3/16	1-1/8	3	3/16	33122	–	31902	31919	31929	–	93340	–	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	–	93321	91281	1B
1/4	1-1/8	3	1/4	33104	–	31772	31782	31792	–	93331	–	1LB
1/4	1-1/2	4	1/4	33124	–	31904	31920	31930	–	93341	–	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	–	93322	91285	1B
5/16	1-1/8	3	5/16	33106	–	31773	31783	31793	–	93332	–	1LB
5/16	1-5/8	4	5/16	33126	–	31906	31921	31931	–	93342	–	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	93323	91289	1B
3/8	1-1/8	3	3/8	33108	–	31774	31784	31794	–	93333	–	1LB
3/8	1-3/4	4	3/8	33128	–	31908	31922	31932	–	93343	–	1ELB

→ continued on next page



TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$

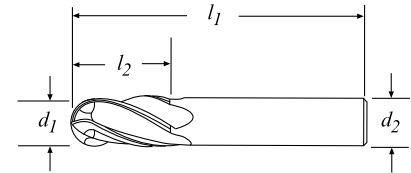
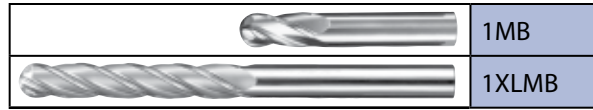
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Uncoated	Ti-NAMITE	Ti-NAMITE-C	Ti-NAMITE-A	Ti-NAMITE-A	AD [†]	CVD [†]	Series Number
				EDP No.	EDP No. w/Flat	(TiN) EDP No.	(TiCN) EDP No.	(AlTiN) EDP No.	(AlTiN) EDP No. w/Flat	EDP No.	EDP No.	
25/64	1	2-3/4	7/16	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	—	93346	—	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	93347	91293	1B
1/2	2	4-1/2	1/2	33112	—	31776	31786	31796	—	—	—	1LB
1/2	3	6	1/2	33132	—	31912	31924	31934	—	—	—	1ELB
9/16	1-1/8	3-1/2	9/16	30166	—	39166	39066	30063	—	—	—	1B
5/8	1-1/4	3-1/2	5/8	30168	30186	39168	39068	30064	30386	—	—	1B
5/8	2-1/4	5	5/8	33114	—	31777	31787	31797	—	—	—	1LB
5/8	3	6	5/8	33134	—	31914	31925	31935	—	—	—	1ELB
11/16	1-3/8	4	3/4	30170	—	39170	39070	30065	—	—	—	1B
3/4	1-1/2	4	3/4	30172	30187	39172	39072	30066	30387	—	—	1B
3/4	2-1/4	5	3/4	33116	—	31778	31788	31798	—	—	—	1LB
3/4	3	6	3/4	33136	—	31916	31926	31936	—	—	—	1ELB
7/8	1-1/2	4	7/8	30174	—	39174	39074	30067	—	—	—	1B
1	1-1/2	4	1	30176	30188	39176	39076	30068	30388	—	—	1B
1	2-1/4	5	1	33118	—	31779	31789	31799	—	—	—	1LB
1	3	6	1	33138	—	31917	31927	31937	—	—	—	1ELB
* Series 1B Set				30190	—	39190	39090	30070	—	—	—	1B



4 Flute – Single End – Ball End

Metric Series

1MB



TOLERANCES

$$d_1 = +0,000 - 0,05$$

$$d_2 = h6$$

Series 1MB



4 Flute End Mills – Ball End –
Micrograin Solid Carbide – 30° Right
Hand Spiral – Right Hand Cutting
– Center Cutting

Serie 1MB



Fresas de 4 filos – Punta radial
o esférica – Carburo sólido con
micrograno – Hélice a derecha 30°
– Corte a derecha - Corte al centro

Série 1MB

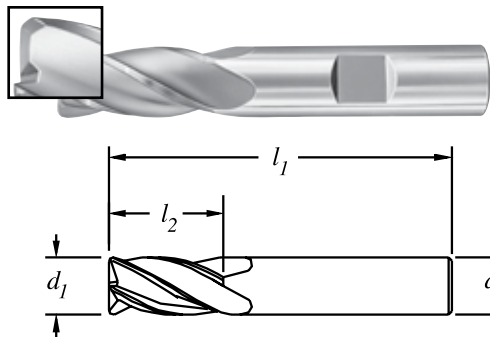


Fraise 4 dents – Bout
hémisphérique – Carbure
monobloc, micrograin – Hélice à
droite, 30° – Coupe à droite - Coupe
au centre

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Series Number
				EDP No.	EDP No.	EDP No.	EDP No.	
1	4	38	3	40106	48564	48586	48607	1MB
1,5	4,5	38	3	40110	48565	48587	48608	1MB
2	6,3	38	3	40114	48566	48588	48609	1MB
2,5	9,5	38	3	40118	48567	48589	48610	1MB
3	12	38	3	40122	48568	48590	48611	1MB
3	25	75	3	43102	49505	49518	49531	1XLMB
3,5	12	50	4	40126	48569	48591	48612	1MB
4	14	50	4	40130	48570	48592	48613	1MB
4	25	75	4	43104	49506	49519	49532	1XLMB
4,5	16	50	6	40134	48571	48593	48614	1MB
5	16	50	6	40138	48572	48594	48615	1MB
5	25	75	5	43108	49508	49521	49534	1XLMB
6	19	50	6	40142	48573	48595	48616	1MB
6	25	75	6	43106	49507	49520	49533	1XLMB
7	19	63	8	40146	48574	48596	48617	1MB
8	20	63	8	40150	48575	48597	48618	1MB
8	25	75	8	43116	49509	49522	49535	1XLMB
9	22	75	10	40154	48576	48598	48619	1MB
10	22	75	10	40158	48577	48599	48620	1MB
10	38	100	10	43126	49510	49523	49536	1XLMB
11	25	75	12	40162	48578	48600	48621	1MB
12	25	75	12	41666	48579	48601	48622	1MB
12	50	100	12	43136	49511	49524	49537	1XLMB
12	75	150	12	43146	49512	49525	49538	1XLMB
14	32	89	14	40170	48580	48602	48623	1MB
14	75	150	14	43156	49513	49526	49539	1XLMB
16	32	89	16	40174	48581	48603	48624	1MB
16	75	150	16	43166	49514	49527	49540	1XLMB
18	38	100	18	40178	48582	48604	48625	1MB
18	75	150	18	43176	49515	49528	49541	1XLMB
20	38	100	20	40182	48583	48605	48626	1MB
20	75	150	20	43186	49516	49529	49542	1XLMB
25	38	100	25	40186	48584	48606	48627	1MB
25	75	150	25	43196	49517	49530	49543	1XLMB



4 Flute – Single End – Corner Radius



TOLERANCES

$d_1 = -.001-.002$
 $d_2 = h6$
 $r = +.000-.002$

Nominal Cutting Diameter d_1	Actual Cutting Diameter	Shank Diameter d_2	Length of Cut l_2	Overall Length l_1	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Series Number
					0.015 EDP No.	0.020 EDP No.	0.030 EDP No.	0.045 EDP No.	0.060 EDP No.	0.090 EDP No.	0.125 EDP No.	
1/8	.1240/.1230	1/8	1/2	1-1/2	38001	38003	-	-	-	-	-	1CR
3/16	.1865/.1855	3/16	5/8	2	38009	38011	38013	-	-	-	-	1CR
1/4	.2490/.2480	1/4	3/4	2-1/2	38019	38021	38023	38025	-	-	-	1CR
5/16	.3115/.3105	5/16	13/16	2-1/2	38031	38033	38035	38037	-	-	-	1CR
*3/8	.3740/.3730	3/8	1	2-1/2	38045	38047	38049	38051	-	-	-	1CR
*1/2	.4990/.4980	1/2	1	3	38059	38061	38063	38065	38067	-	-	1CR
*5/8	.6240/.6230	5/8	1-1/4	3-1/2	38073	38075	38077	38079	38081	38083	-	1CR
*3/4	.7490/.7480	3/4	1-1/2	4	38087	38089	38091	38093	38095	38097	38099	1CR
*1	.9990/.9980	1	1-1/2	4	38101	38103	38105	38107	38109	38111	38113	1CR

Nominal Cutting Diameter d_1	Actual Cutting Diameter	Shank Diameter d_2	Length of Cut l_2	Overall Length l_1	(TiN)	(TiN)	(TiN)	(TiN)	(TiN)	(TiN)	(TiN)	Series Number
					Ti-NAMITE 0.015 EDP No.	Ti-NAMITE 0.020 EDP No.	Ti-NAMITE 0.030 EDP No.	Ti-NAMITE 0.045 EDP No.	Ti-NAMITE 0.060 EDP No.	Ti-NAMITE 0.090 EDP No.	Ti-NAMITE 0.125 EDP No.	
1/8	.1240/.1230	1/8	1/2	1-1/2	38002	38004	-	-	-	-	-	1CR
3/16	.1865/.1855	3/16	5/8	2	38010	38012	38014	-	-	-	-	1CR
1/4	.2490/.2480	1/4	3/4	2-1/2	38020	38022	38024	38026	-	-	-	1CR
5/16	.3115/.3105	5/16	13/16	2-1/2	38032	38034	38036	38038	-	-	-	1CR
*3/8	.3740/.3730	3/8	1	2-1/2	38046	38048	38050	38052	-	-	-	1CR
*1/2	.4990/.4980	1/2	1	3	38060	38062	38064	38066	38068	-	-	1CR
*5/8	.6240/.6230	5/8	1-1/4	3-1/2	38074	38076	38078	38080	38082	38084	-	1CR
*3/4	.7490/.7480	3/4	1-1/2	4	38088	38090	38092	38094	38096	38098	38100	1CR
*1	.9990/.9980	1	1-1/2	4	38102	38104	38106	38108	38110	38112	38114	1CR

Series 1CR



Corner Radius
 Micrograin Solid Carbide
 4 Flute – 30° Right Hand Spiral –
 Right Hand Cutting – Center Cutting
 * Weldon Flat on Shank

Serie 1CR



Radio en la punta
 Carburo sólido con micrograno
 4 filos – Hélice a derecha 30° –
 Corte a derecha – Corte al centro
 * Mango con Weldon

Série 1CR

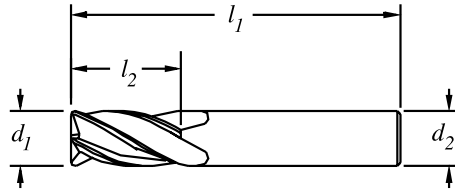


Rayon en bout
 Carbure monobloc micrograin
 4 dents – Hélice à droite 30° –
 Coupe à droite – Coupe au centre
 * Méplat Weldon sur queue

END MILLS
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4 Flute – Single End – Corner Radius



TOLERANCES

$d_1 = -.001 - .002$

$d_2 = h6$

$r = +.000 - .002$

Series 1CR • 1MCR



Corner Radius
Micrograin Solid Carbide – 4 Flute –
30° Right Hand Spiral – Right Hand
Cutting – Center Cutting
* Weldon Flat on Shank.

Serie 1CR • 1MCR



Radio en la punta
Carburo sólido con micrograno
4 filos – Hélice a derecha 30° –
Corte a derecha – Corte al centro
* Mango con Weldon

Série 1CR • 1MCR



Rayon en bout
Carbure monobloc micrograin
4 dents – Hélice à droite 30° –
Coupe à droite – Coupe au centre
* Méplat Weldon sur queue

Nominal Cutting Diameter d_1	Actual Cutting Diameter	Shank Diameter d_2	Length of Cut l_2	Overall Length l_1	(TiCN)	(TiCN)	(TiCN)	(TiCN)	(TiCN)	(TiCN)	(TiCN)	Series Number
					Ti-NAMITE-C 0.015 EDP No.	Ti-NAMITE-C 0.020 EDP No.	Ti-NAMITE-C 0.030 EDP No.	Ti-NAMITE-C 0.045 EDP No.	Ti-NAMITE-C 0.060 EDP No.	Ti-NAMITE-C 0.090 EDP No.	Ti-NAMITE-C 0.125 EDP No.	
1/8	.1240/.1230	1/8	1/2	1-1/2	38115	38116	-	-	-	-	-	1CR
3/16	.1865/.1855	3/16	5/8	2	38117	38118	38119	-	-	-	-	1CR
1/4	.2490/.2480	1/4	3/4	2-1/2	38120	38121	38122	38123	-	-	-	1CR
5/16	.3115/.3105	5/16	13/16	2-1/2	38124	38125	38126	38127	-	-	-	1CR
*3/8	.3740/.3730	3/8	1	2-1/2	38128	38129	38130	38131	-	-	-	1CR
*1/2	.4990/.4980	1/2	1	3	38132	38133	38134	38135	38136	-	-	1CR
*5/8	.6240/.6230	5/8	1-1/4	3-1/2	38137	38138	38139	38140	38141	38142	-	1CR
*3/4	.7490/.7480	3/4	1-1/2	4	38143	38144	38145	38146	38147	38148	38149	1CR
*1	.9990/.9980	1	1-1/2	4	38150	38151	38152	38153	38154	38155	38156	1CR

Nominal Cutting Diameter d_1	Actual Cutting Diameter	Shank Diameter d_2	Length of Cut l_2	Overall Length l_1	(AlTiN)	(AlTiN)	(AlTiN)	(AlTiN)	(AlTiN)	(AlTiN)	(AlTiN)	Series Number
					Ti-NAMITE-A 0.015 EDP No.	Ti-NAMITE-A 0.020 EDP No.	Ti-NAMITE-A 0.030 EDP No.	Ti-NAMITE-A 0.045 EDP No.	Ti-NAMITE-A 0.060 EDP No.	Ti-NAMITE-A 0.090 EDP No.	Ti-NAMITE-A 0.125 EDP No.	
1/8	.1240/.1230	1/8	1/2	1-1/2	38157	38158	-	-	-	-	-	1CR
3/16	.1865/.1855	3/16	5/8	2	38159	38160	38161	-	-	-	-	1CR
1/4	.2490/.2480	1/4	3/4	2-1/2	38162	38163	38164	38165	-	-	-	1CR
5/16	.3115/.3105	5/16	13/16	2-1/2	38166	38167	38168	38169	-	-	-	1CR
*3/8	.3740/.3730	3/8	1	2-1/2	38170	38171	38172	38173	-	-	-	1CR
*1/2	.4990/.4980	1/2	1	3	38174	38175	38176	38177	38178	-	-	1CR
*5/8	.6240/.6230	5/8	1-1/4	3-1/2	38179	38180	38181	38182	38183	38184	-	1CR
*3/4	.7490/.7480	3/4	1-1/2	4	38185	38186	38187	38188	38189	38190	38191	1CR
*1	.9990/.9980	1	1-1/2	4	38192	38193	38194	38195	38196	38197	38198	1CR

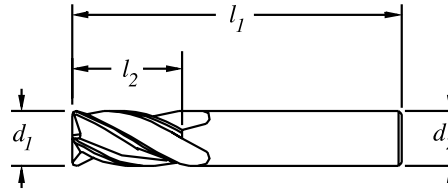


4 Flute – Single End – Corner Radius**TOLERANCES**

$$d_1 = -.001-.002$$

$$d_2 = h6$$

$$r = +.000-.002$$



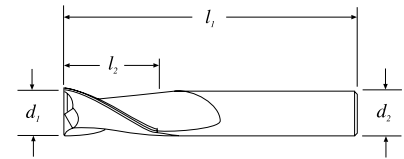
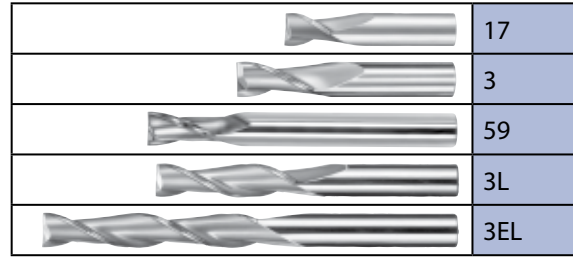
Nominal Cutting Diameter	Shank Diameter	Length of Cut	Overall Length	(AITN)	(AITN)	(AITN)	(AITN)	(AITN)	(AITN)	Series Number
				Ti-NAMITE-A	Ti-NAMITE-A	Ti-NAMITE-A	Ti-NAMITE-A	Ti-NAMITE-A	Ti-NAMITE-A	
d_1 mm	d_2 mm	l_2 mm	l_1 mm	0,25 EDP No.	0,50 EDP No.	0,75 EDP No.	1,0 EDP No.	1,5 EDP No.	2,0 EDP No.	
4	4	14	50	40000	40001	–	40003	–	–	1MCR
5	6	16	50	40004	40005	–	40007	–	–	1MCR
6	6	19	50	40009	40010	40011	40012	–	–	1MCR
8	8	20	63	–	40015	40016	40017	40019	40020	1MCR
10	10	22	75	–	40021	–	40023	40024	40025	1MCR
12	12	25	75	–	40028	–	40030	40031	40032	1MCR
16	16	32	89	–	40035	–	40037	40038	40039	1MCR



END MILLS
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2 Flute – Single End – Square End



TOLERANCES

$$d_1 = +.000 - .002$$

$$d_2 = h6$$

Series 3



2-Flute End Mills – Square End
Micrograin Solid Carbide
30° Right Hand Spiral – Right Hand
Cutting – Center Cutting
† CVD = Dia-Carb CVD Diamond
Coatings

Serie 3



Fresas de 2 filos – Punta plana
Carburo sólido con micrograno
Hélice a derecha 30° – Corte a
derecha – Corte al centro
† CVD = Recubrimientos de
diamante CVD Dia-Carb

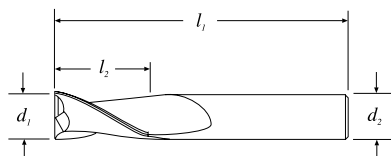
Série 3



Fraises 2 dents – Bout plat
Carbure monobloc, micrograin
Hélice à droite, 30° – Coupe à droite
– Coupe au centre
† CVD = Revêtements de diamant
Dia-Carb CVD

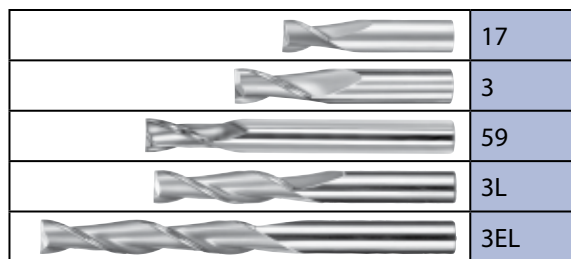
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	DIA-CARB (CVD)†	Series Number
				EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
1/64	1/32	1-1/2	1/8	30301	39301	39501	30397	–	3
1/32	5/64	1-1/2	1/8	30303	39303	39503	30398	–	3
3/64	7/64	1-1/2	1/8	30305	39305	39505	30399	–	3
1/16	1/8	1-1/2	1/8	31701	31750	31303	31358	–	17
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	3/16	1-1/2	1/8	31703	31751	31304	31359	–	17
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	1/4	1-1/2	1/8	31705	31752	31305	31360	–	17
1/8	3/8	1-1/2	1/8	30377	39377	39577	30469	–	3
1/8	3/8	2-1/2"	1/4"	–	32280	32260	32270	–	59
*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	5/16	2	3/16	31707	31753	31306	31361	–	17
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	3/8	2	3/16	31709	31754	31307	31362	–	17
3/16	9/16	3	1/4	–	32281	32261	32271	–	59
*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	7/16	2	1/4	31711	31755	31308	31363	–	17
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	1/2	2	1/4	31713	31756	31309	31364	–	17
1/4	5/8	3-1/2	1/4	–	32282	32262	32272	–	59
*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	1/2	2	5/16	31715	31757	31310	31365	–	17
5/16	11/16	4	5/16	–	32283	32263	32273	–	59
*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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TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$



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)	DIA-CARB (CVD) [†]	Series Number
				EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
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	5/8	2	3/8	31717	31758	31311	31366	–	17
3/8	7/8	4	3/8	–	32284	32264	32274	–	59
*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	5/8	2-1/2	7/16	31719	31759	31312	31367	–	17
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	5/8	2-1/2	1/2	31721	31760	31313	31368	–	17
*1/2	1	3	1/2	30363	39363	39563	30462	91290	3
1/2	1	4-1/2	1/2	–	32285	32265	32275	–	59
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	3/4	3	5/8	31723	31761	31314	31369	–	17
5/8	1-1/8	5	5/8	–	32286	32266	32276	–	59
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	3	3/4	31725	31762	31315	31370	–	17
3/4	1-3/8	5-1/4	3/4	–	32287	32267	32277	–	59
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
				30389	39389	39589	30470	–	3

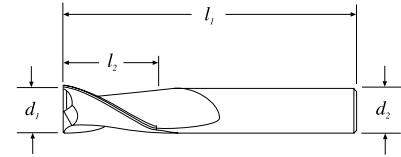
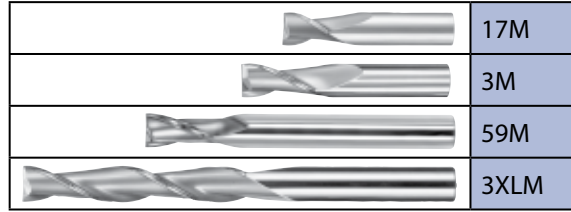
* Series 3 Set



2 Flute – Single End – Square End

Metric Series

3M



TOLERANCES

$$d_1 = +0,000 - 0,05$$

$$d_2 = h6$$

Series 3M



2-Flute End Mills – Square End
Micrograin Solid Carbide
30° Right Hand Spiral – Right Hand
Cutting – Center Cutting
† CVD = Dia-Carb CVD Diamond
Coatings

Serie 3M



Fresas de 2 filos – Punta plana
Carburo sólido con micrograno
Hélice a derecha 30° – Corte a
derecha – Corte al centro
† CVD = Recubrimientos de
diamante CVD Dia-Carb

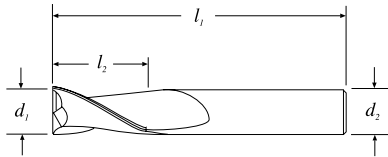
Série 3M



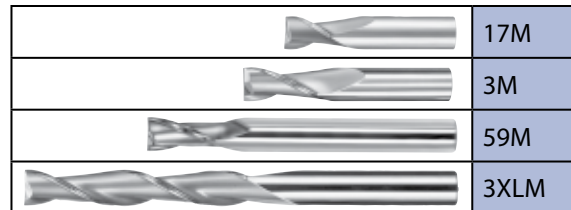
Fraises 2 dents – Bout plat
Carbure monobloc, micrograin
Hélice à droite, 30° – Coupe à droite
– Coupe au centre
† CVD = Revêtements de diamant
Dia-Carb CVD

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	2	38	3	41705	49262	49283	49304	17M
1	4	38	3	40305	48628	48650	48671	3M
1,5	3	38	3	41709	49263	49284	49305	17M
1,5	4,5	38	3	40309	48629	48651	48672	3M
2	4	38	3	41713	49264	49285	49306	17M
2	6,3	38	3	40313	48630	48652	48673	3M
2,5	5	38	3	41717	49265	49286	49307	17M
2,5	9,5	38	3	40317	48631	48653	48674	3M
3	6	38	3	41721	49266	49287	49308	17M
3	9	60	6	43910	43920	43930	43950	59M
3	12	38	3	40321	48632	48654	48675	3M
3	25	75	3	43301	49427	49440	49453	3XLM
3,5	7	50	4	41725	49267	49288	49309	17M
3,5	12	50	4	40325	48633	48655	48676	3M
4	8	50	4	41729	49268	49289	49310	17M
4	12	70	6	43911	43921	43931	43951	59M
4	14	50	4	40329	48634	48656	48677	3M
4	25	75	4	43303	49428	49441	49454	3XLM
4,5	9,5	50	4,5	41733	49269	49290	49311	17M
4,5	16	50	6	40333	48635	48657	48678	3M
5	10	50	5	41737	49270	49291	49312	17M
5	16	50	6	40337	48636	48658	48679	3M
5	25	75	5	43307	49430	49443	49456	3XLM
6	12	50	6	41741	49271	49292	49313	17M
6	15	80	6	43912	43922	43932	43952	59M
6	19	50	6	40341	48637	48659	48680	3M
6	25	75	6	43305	49429	49442	49455	3XLM
7	12	50	8	41745	49272	49293	49314	17M
7	19	63	8	40345	48638	48660	48681	3M
8	12	50	8	41749	49273	49294	49315	17M
8	20	63	8	40349	48639	48661	48682	3M
8	20	90	8	43913	43923	43933	43953	59M
8	25	75	8	43315	49431	49444	49457	3XLM
9	14	50	9	41753	49274	49295	49316	17M
9	22	75	10	40353	48640	48662	48683	3M

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TOLERANCES

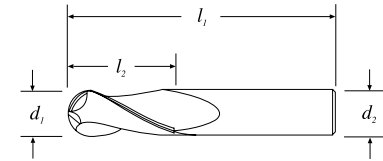
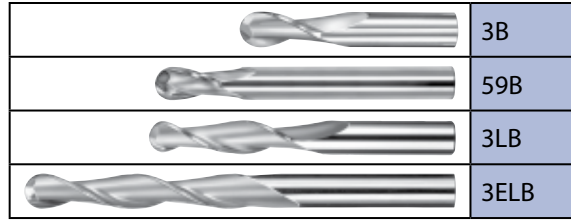
 $d_1 = +0,000 - 0,05$ $d_2 = h6$ 

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Series Number
				EDP No.	EDP No.	EDP No.	EDP No.	
10	16	50	10	41757	49275	49296	49317	17M
10	22	75	10	40357	48641	48663	48684	3M
10	25	100	10	43914	43924	43934	43954	59M
10	38	100	10	43325	49432	49445	49458	3XLM
11	19	63	12	41761	49276	49297	49318	17M
11	25	75	12	40361	48642	48664	48685	3M
12	19	63	12	41765	49277	49298	49319	17M
12	25	75	12	40365	48643	48665	48686	3M
12	30	110	12	43915	43925	43935	43955	59M
12	50	100	12	43335	49433	49446	49459	3XLM
12	75	150	12	43345	49434	49447	49460	3XLM
14	32	89	14	40369	48644	48666	48687	3M
14	35	120	16	43916	43926	43936	43956	59M
14	75	150	14	43355	49435	49448	49461	3XLM
16	32	89	16	40373	48645	48667	48688	3M
16	40	120	16	43917	43927	43937	43957	59M
16	75	150	16	43365	49436	49449	49462	3XLM
18	38	100	18	40377	48646	48668	48689	3M
18	40	130	20	43918	43928	43938	43958	59M
18	75	150	18	43375	49437	49450	49463	3XLM
20	38	100	20	40381	48647	48669	48690	3M
20	45	130	20	43919	43929	43939	43959	59M
20	75	150	20	43385	49438	49451	49464	3XLM
25	38	100	25	40385	48648	48670	48691	3M
25	75	150	25	43395	49439	49452	49465	3XLM

END MILLS
Table of Contents



2 Flute – Single End – Ball End



TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$

Series 3B



2-Flute End Mills – Ball End
Micrograin Solid Carbide
30° Right Hand Spiral – Right Hand
Cutting – Center Cutting
† CVD = Dia-Carb CVD Diamond
Coatings

Serie 3B



Fresas de 2 filos – Punta radial o
esférica
Carburo sólido con micrograno
Hélice a derecha 30° – Corte a
derecha – Corte al centro
† CVD = Recubrimientos de
diamante CVD Dia-Carb

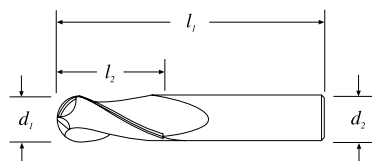
Série 3B



Fraises 2 dents – Bout
hémisphérique
Carbure monobloc, micrograin
Hélice à droite, 30° – Coupe à droite
– Coupe au centre
† CVD = Revêtements de diamant
Dia-Carb CVD

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Ti-NAMITE	Ti-NAMITE-C	Ti-NAMITE-A	DIA-CARB	Series Number
				EDP No.	(TiN) EDP No.	(TiCN) EDP No.	(AlTiN) EDP No.	(CVD)† EDP No.	
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	91267	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	3/8	2-1/2	1/4	–	32210	32290	32200	–	59B
*1/8	1/2	1-1/2	1/8	30316	39316	39516	30478	91271	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	9/16	3	1/4	–	32211	32291	32201	–	59B
*3/16	5/8	2	3/16	30324	39324	39524	30482	91275	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	5/8	3-1/2	1/4	–	32212	32292	32202	–	59B
*1/4	3/4	2-1/2	1/4	30332	39332	39532	30486	91279	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	11/16	4	5/16	–	32213	32293	32203	–	59B
*5/16	13/16	2-1/2	5/16	30340	39340	39540	30490	91283	3B
5/16	1-1/8	3	5/16	33306	31833	31843	31893	–	3LB
5/16	1-5/8	4	5/16	33326	31971	31981	31991	–	3ELB

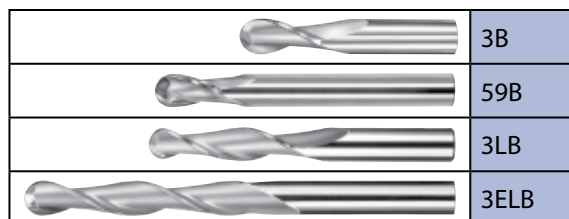
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TOLERANCES

$d_1 = +.000 - .002$

$d_2 = h6$

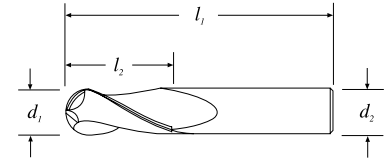
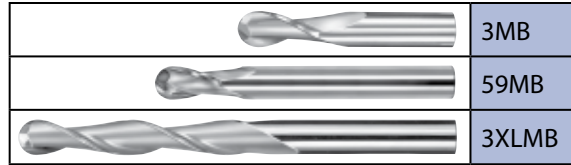


Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	DIA-CARB (CVD) [†]	Series Number
				EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
21/64	1	2-1/2	3/8	30342	39342	39542	30491	–	3B
11/32	1	2-1/2	3/8	30344	39344	39544	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	91287	3B
3/8	7/8	4	3/8	–	32214	32294	32204	–	59B
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	91291	3B
1/2	1	4-1/2	1/2	–	32215	32295	32205	–	59B
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	1-1/8	5	5/8	–	32216	32296	32206	–	59B
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	1-3/8	5-1/4	3/4	–	32217	32297	32207	–	59B
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
				30390	39390	39590	30600	–	3B

* Series 3B Set



2 Flute – Single End – Ball End



TOLERANCES

$$d_1 = +0,000 - 0,05$$

$$d_2 = h6$$

Series 3MB



2-Flute End Mills – Ball End
Micrograin Solid Carbide
30° Right Hand Spiral – Right Hand
Cutting – Center Cutting
† CVD = Dia-Carb CVD Diamond
Coatings

Serie 3MB



Fresas de 2 filos – Punta radial o
esférica
Carburo sólido con micrograno
Hélice a derecha 30° – Corte a
derecha – Corte al centro
† CVD = Recubrimientos de
diamante CVD Dia-Carb

Série 3MB



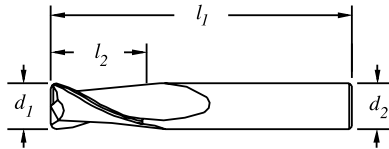
Fraises 2 dents – Bout
hémisphérique
Carbure monobloc, micrograin
Hélice à droite, 30° – Coupe à droite
– Coupe au centre
† CVD = Revêtements de diamant
Dia-Carb CVD

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	4	38	3	40306	48692	48714	48735	3MB
1,5	4,5	38	3	40310	48693	48715	48736	3MB
2	6,3	38	3	40314	48694	48716	48737	3MB
2,5	9,5	38	3	40318	48695	48717	48738	3MB
3	9	60	6	43900	49622	49632	49642	59MB
3	12	38	3	40322	48696	48718	48739	3MB
3	25	75	3	43302	49544	49557	49570	3XLMB
3,5	12	50	4	40326	48697	48719	48740	3MB
4	12	70	6	43901	49623	49633	49643	59MB
4	14	50	4	40330	48698	48720	48741	3MB
4	25	75	4	43304	49545	49558	49571	3XLMB
4,5	16	50	6	40334	48699	48721	48742	3MB
5	16	50	6	40338	48700	48722	48743	3MB
5	25	75	5	43308	49547	49560	49573	3XLMB
6	15	80	6	43902	49624	49634	49644	59MB
6	19	50	6	40342	48701	48723	48744	3MB
6	25	75	6	43306	49546	49559	49572	3XLMB
7	19	63	8	40346	48702	48724	48745	3MB
8	20	63	8	40350	48703	48725	48746	3MB
8	20	90	8	43903	49625	49635	49645	59MB
8	25	75	8	43316	49548	49561	49574	3XLMB
9	22	75	10	40354	48704	48726	48747	3MB
10	22	75	10	40358	48705	48727	48748	3MB
10	25	100	10	43904	49626	49636	49646	59MB
10	38	100	10	43326	49549	49562	49575	3XLMB
11	25	75	12	40362	48706	48728	48749	3MB
12	25	75	12	40366	48707	48729	48750	3MB
12	30	110	12	43905	49627	49637	49647	59MB
12	50	100	12	43336	49550	49563	49576	3XLMB
12	75	150	12	43346	49551	49564	49577	3XLMB
14	32	89	14	40370	48708	48730	48751	3MB
14	35	120	16	43906	49628	49638	49648	59MB
14	75	150	14	43356	49552	49565	49578	3XLMB
16	32	89	16	40374	48709	48731	48752	3MB
16	40	120	16	43907	49629	49639	49649	59MB
16	75	150	16	43366	49553	49566	49579	3XLMB
18	38	100	18	40378	48710	48732	48753	3MB
18	40	130	20	43908	49630	49640	49650	59MB
18	75	150	18	43376	49554	49567	49580	3XLMB
20	38	100	20	40382	48711	48733	48754	3MB
20	45	130	20	43909	49631	49641	49651	59MB
20	75	150	20	43386	49555	49568	49581	3XLMB
25	38	100	25	40386	48712	48734	48755	3MB
25	75	150	25	43396	49556	49569	49582	3XLMB



TOLERANCES

$d_1 = -.001-.002$
 $d_2 = h6$
 $r = +.000-.002$



Nominal Cutting Diameter d_1	Actual Cutting Diameter	Shank Diameter d_2	Length of Cut l_2	Overall Length l_1	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Series Number
					0.015 EDP No.	0.020 EDP No.	0.030 EDP No.	0.045 EDP No.	0.060 EDP No.	0.090 EDP No.	0.125 EDP No.	
1/8	.1240/.1230	1/8	1/2	1-1/2	38201	38203	-	-	-	-	-	3CR
3/16	.1865/.1855	3/16	5/8	2	38209	38211	38213	-	-	-	-	3CR
1/4	.2490/.2480	1/4	3/4	2-1/2	38219	38221	38223	38225	-	-	-	3CR
5/16	.3115/.3105	5/16	13/16	2-1/2	38231	38233	38235	38237	-	-	-	3CR
*3/8	.3740/.3730	3/8	1	2-1/2	38245	38247	38249	38251	-	-	-	3CR
*1/2	.4990/.4980	1/2	1	3	38259	38261	38263	38265	38267	-	-	3CR
*5/8	.6240/.6230	5/8	1-1/4	3-1/2	38273	38275	38277	38279	38281	38283	-	3CR
*3/4	.7490/.7480	3/4	1-1/2	4	38287	38289	38291	38293	38295	38297	38299	3CR
*1	.9990/.9980	1	1-1/2	4	38301	38303	38305	38307	38309	38311	38313	3CR

Nominal Cutting Diameter d_1	Actual Cutting Diameter	Shank Diameter d_2	Length of Cut l_2	Overall Length l_1	(TiN)	(TiN)	(TiN)	(TiN)	(TiN)	(TiN)	(TiN)	Series Number
					Ti-NAMITE 0.015 EDP No.	Ti-NAMITE 0.020 EDP No.	Ti-NAMITE 0.030 EDP No.	Ti-NAMITE 0.045 EDP No.	Ti-NAMITE 0.060 EDP No.	Ti-NAMITE 0.090 EDP No.	Ti-NAMITE 0.125 EDP No.	
1/8	.1240/.1230	1/8	1/2	1-1/2	38202	38204	-	-	-	-	-	3CR
3/16	.1865/.1855	3/16	5/8	2	38210	38212	38214	-	-	-	-	3CR
1/4	.2490/.2480	1/4	3/4	2-1/2	38220	38222	38224	38226	-	-	-	3CR
5/16	.3115/.3105	5/16	13/16	2-1/2	38232	38234	38236	38238	-	-	-	3CR
*3/8	.3740/.3730	3/8	1	2-1/2	38246	38248	38250	38252	-	-	-	3CR
*1/2	.4990/.4980	1/2	1	3	38260	38262	38264	38266	38268	-	-	3CR
*5/8	.6240/.6230	5/8	1-1/4	3-1/2	38274	38276	38278	38280	38282	38284	-	3CR
*3/4	.7490/.7480	3/4	1-1/2	4	38288	38290	38292	38294	38296	38298	38300	3CR
*1	.9990/.9980	1	1-1/2	4	38302	38304	38306	38308	38310	38312	38314	3CR

Nominal Cutting Diameter d_1	Actual Cutting Diameter	Shank Diameter d_2	Length of Cut l_2	Overall Length l_1	(TiCN)	(TiCN)	(TiCN)	(TiCN)	(TiCN)	(TiCN)	(TiCN)	Series Number
					Ti-NAMITE-C 0.015 EDP No.	Ti-NAMITE-C 0.020 EDP No.	Ti-NAMITE-C 0.030 EDP No.	Ti-NAMITE-C 0.045 EDP No.	Ti-NAMITE-C 0.060 EDP No.	Ti-NAMITE-C 0.090 EDP No.	Ti-NAMITE-C 0.125 EDP No.	
1/8	.1240/.1230	1/8	1/2	1-1/2	38315	38316	-	-	-	-	-	3CR
3/16	.1865/.1855	3/16	5/8	2	38317	38318	38319	-	-	-	-	3CR
1/4	.2490/.2480	1/4	3/4	2-1/2	38320	38321	38322	38323	-	-	-	3CR
5/16	.3115/.3105	5/16	13/16	2-1/2	38324	38325	38326	38327	-	-	-	3CR
*3/8	.3740/.3730	3/8	1	2-1/2	38328	38329	38330	38331	-	-	-	3CR
*1/2	.4990/.4980	1/2	1	3	38332	38333	38334	38335	38336	-	-	3CR
*5/8	.6240/.6230	5/8	1-1/4	3-1/2	38337	38338	38339	38340	38341	38342	-	3CR
*3/4	.7490/.7480	3/4	1-1/2	4	38343	38344	38345	38346	38347	38348	38349	3CR
*1	.9990/.9980	1	1-1/2	4	38350	38351	38352	38353	38354	38355	38356	3CR

Nominal Cutting Diameter d_1	Actual Cutting Diameter	Shank Diameter d_2	Length of Cut l_2	Overall Length l_1	(AlTiN)	(AlTiN)	(AlTiN)	(AlTiN)	(AlTiN)	(AlTiN)	(AlTiN)	Series Number
					Ti-NAMITE-A 0.015 EDP No.	Ti-NAMITE-A 0.020 EDP No.	Ti-NAMITE-A 0.030 EDP No.	Ti-NAMITE-A 0.045 EDP No.	Ti-NAMITE-A 0.060 EDP No.	Ti-NAMITE-A 0.090 EDP No.	Ti-NAMITE-A 0.125 EDP No.	
1/8	.1240/.1230	1/8	1/2	1-1/2	38357	38358	-	-	-	-	-	3CR
3/16	.1865/.1855	3/16	5/8	2	38359	38360	38361	-	-	-	-	3CR
1/4	.2490/.2480	1/4	3/4	2-1/2	38362	38363	38364	38365	-	-	-	3CR
5/16	.3115/.3105	5/16	13/16	2-1/2	38366	38367	38368	38369	-	-	-	3CR
*3/8	.3740/.3730	3/8	1	2-1/2	38370	38371	38372	38373	-	-	-	3CR
*1/2	.4990/.4980	1/2	1	3	38374	38375	38376	38377	38378	-	-	3CR
*5/8	.6240/.6230	5/8	1-1/4	3-1/2	38379	38380	38381	38382	38383	38384	-	3CR
*3/4	.7490/.7480	3/4	1-1/2	4	38385	38386	38387	38388	38389	38390	38391	3CR
*1	.9990/.9980	1	1-1/2	4	38392	38393	38394	38395	38396	38397	38398	3CR

Series 3CR

Corner Radius
 Micrograin Solid Carbide – 2 Flute –
 30° Right Hand Spiral – Right Hand
 Cutting – Center Cutting
 * Weldon Flat on Shank

Serie 3CR

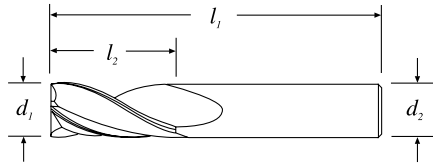
Radio en la punta
 Carburo sólido con micrograno
 2 filos – Hélice a derecha 30° –
 Corte a derecha – Corte al centro
 * Mango con Weldon.

Série 3CR

Rayon en bout
 Carbure Monobloc Micrograin
 2 dents – Hélice à droite 30° –
 Coupe à droite – Coupe au centre
 * Méplat Weldon sur queue



3 Flute – Single End – Square End



TOLERANCES

$d_1 = -.001 - .002$
 $d_2 = h6$

Series 5 • 5M



3-Flute End Mills – Square End
Micrograin Solid Carbide
30° Right Hand Spiral – Right Hand
Cutting – Center Cutting.

Serie 5 • 5M



Fresas de 3 filos – Punta plana
Carburo sólido con micrograno
Hélice a derecha 30° – Corte a
derecha – Corte al centro.

Série 5 • 5M



Fraises 3 dents – Bout plat
Carbure monobloc, micrograin
Hélice à droite, 30° – Coupe à droite
– Coupe au centre

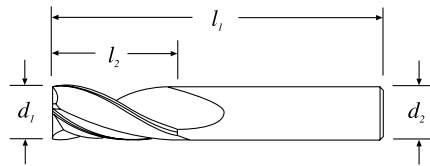
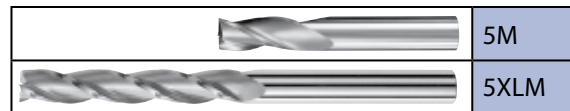
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1/64	1/32	1-1/2	1/8	30501	39701	30771	30811	5
1/32	5/64	1-1/2	1/8	30503	39703	30772	30812	5
3/64	7/64	1-1/2	1/8	30505	39705	30773	30813	5
1/16	3/16	1-1/2	1/8	30507	39707	30774	30814	5
5/64	3/16	1-1/2	1/8	30509	39709	30775	30815	5
3/32	9/32	1-1/2	1/8	30511	39711	30776	30816	5
7/64	3/8	1-1/2	1/8	30513	39713	30777	30817	5
1/8	3/8	1-1/2	1/8	30577	39777	30809	30849	5
1/8	1/2	1-1/2	1/8	30515	39715	30778	30818	5
9/64	1/2	2	3/16	30517	39717	30779	30819	5
5/32	1/2	2	3/16	30519	39719	30780	30820	5
11/64	5/8	2	3/16	30521	39721	30781	30821	5
3/16	5/8	2	3/16	30523	39723	30782	30822	5
13/64	5/8	2-1/2	1/4	30525	39725	30783	30823	5
7/32	5/8	2-1/2	1/4	30527	39727	30784	30824	5
15/64	3/4	2-1/2	1/4	30529	39729	30785	30825	5
1/4	3/4	2-1/2	1/4	30531	39731	30786	30826	5
17/64	3/4	2-1/2	5/16	30533	39733	30787	30827	5
9/32	3/4	2-1/2	5/16	30535	39735	30788	30828	5
19/64	13/16	2-1/2	5/16	30537	39737	30789	30829	5
5/16	13/16	2-1/2	5/16	30539	39739	30790	30830	5
21/64	1	2-1/2	3/8	30541	39741	30791	30831	5
11/32	1	2-1/2	3/8	30543	39743	30792	30832	5
23/64	1	2-1/2	3/8	30545	39745	30793	30833	5
3/8	1	2-1/2	3/8	30547	39747	30794	30834	5
25/64	1	2-3/4	7/16	30549	39749	30795	30835	5
13/32	1	2-3/4	7/16	30551	39751	30796	30836	5
27/64	1	2-3/4	7/16	30553	39753	30797	30837	5
7/16	1	2-3/4	7/16	30555	39755	30798	30838	5
29/64	1	3	1/2	30557	39757	30799	30839	5
15/32	1	3	1/2	30559	39759	30800	30840	5
31/64	1	3	1/2	30561	39761	30801	30841	5
1/2	1	3	1/2	30563	39763	30802	30842	5
9/16	1-1/8	3-1/2	9/16	30565	39765	30803	30843	5
5/8	1-1/4	3-1/2	5/8	30567	39767	30804	30844	5
11/16	1-3/8	4	3/4	30569	39769	30805	30845	5
3/4	1-1/2	4	3/4	30571	39771	30806	30846	5
7/8	1-1/2	4	7/8	30573	39773	30807	30847	5
1	1-1/2	4	1	30575	39775	30808	30848	5



TOLERANCES

$$d_1 = +0,000 - 0,05$$

$$d_2 = h6$$

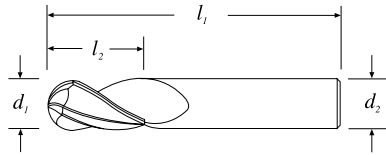


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Series Number
				EDP No.	EDP No.	EDP No.	EDP No.	
1	4	38	3	40505	48756	48778	48799	5M
1,5	4,5	38	3	40509	48757	48779	48800	5M
2	6,3	38	3	40513	48758	48780	48801	5M
2,5	9,5	38	3	40517	48759	48781	48802	5M
3	12	38	3	40521	48760	48782	48803	5M
3	25	75	3	43501	49466	49479	49492	5XLM
3,5	12	50	4	40525	48761	48783	48804	5M
4	14	50	4	40529	48762	48784	48805	5M
4	25	75	4	43503	49467	49480	49493	5XLM
4,5	16	50	6	40533	48763	48785	48806	5M
5	16	50	6	40537	48764	48786	48807	5M
5	25	75	5	43507	49469	49482	49495	5XLM
6	19	50	6	40541	48765	48787	48808	5M
6	25	75	6	43505	49468	49481	49494	5XLM
7	19	63	8	40545	48766	48788	48809	5M
8	20	63	8	40549	48767	48789	48810	5M
8	25	75	8	43515	49470	49483	49496	5XLM
9	22	75	10	40553	48768	48790	48811	5M
10	22	75	10	40557	48769	48791	48812	5M
10	38	100	10	43525	49471	49484	49497	5XLM
11	25	75	12	40561	48770	48792	48813	5M
12	25	75	12	40565	48771	48793	48814	5M
12	50	100	12	43535	49472	49485	49498	5XLM
12	75	150	12	43545	49473	49486	49499	5XLM
14	32	89	14	40569	48772	48794	48815	5M
14	75	150	14	43555	49474	49487	49500	5XLM
16	32	89	16	40573	48773	48795	48816	5M
16	75	150	16	43565	49475	49488	49501	5XLM
18	38	100	18	40577	48774	48796	48817	5M
18	75	150	18	43575	49476	49489	49502	5XLM
20	38	100	20	40581	48775	48797	48818	5M
20	75	150	20	43585	49477	49490	49503	5XLM
25	38	100	25	40585	48776	48798	48819	5M
25	75	150	25	43595	49478	49491	49504	5XLM

END MILLS
Table of Contents



3 Flute – Single End – Ball End



TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$

Series 5B • 5MB



3-Flute End Mills – Ball End
Micrograin Solid Carbide
30° Right Hand Spiral – Right Hand
Cutting – Center Cutting.

Serie 5B • 5MB



Fresas de 3 filos – Punta radial o
esférica
Carburo sólido con micrograno
Hélice a derecha 30° – Corte a
derecha – Corte al centro.

Série 5B • 5MB



Fraises 3 dents – Bout
hémisphérique
Carbure monobloc, micrograin
Hélice à droite, 30° – Coupe à droite
– Coupe au centre

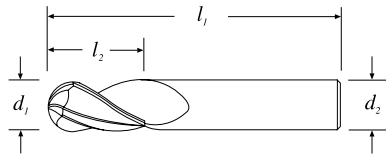
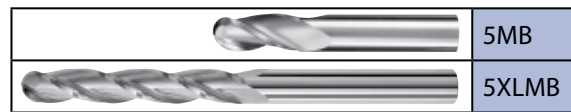
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1/64	1/32	1-1/2	1/8	30502	30851	30602	31130	5B
1/32	5/64	1-1/2	1/8	30504	30852	30604	31131	5B
3/64	7/64	1-1/2	1/8	30506	30853	30606	31132	5B
1/16	3/16	1-1/2	1/8	30508	30854	30608	31133	5B
5/64	3/16	1-1/2	1/8	30510	30855	30610	31134	5B
3/32	9/32	1-1/2	1/8	30512	30856	30612	31135	5B
7/64	3/8	1-1/2	1/8	30514	30857	30902	31136	5B
1/8	3/8	1-1/2	1/8	30578	30889	30943	31168	5B
1/8	1/2	1-1/2	1/8	30516	30858	30904	31137	5B
9/64	1/2	2	3/16	30518	30859	30906	31138	5B
5/32	1/2	2	3/16	30520	30860	30908	31139	5B
11/64	5/8	2	3/16	30522	30861	30910	31140	5B
3/16	5/8	2	3/16	30524	30862	30912	31141	5B
13/64	5/8	2-1/2	1/4	30526	30863	30914	31142	5B
7/32	5/8	2-1/2	1/4	30528	30864	30916	31143	5B
15/64	3/4	2-1/2	1/4	30530	30865	30918	31144	5B
1/4	3/4	2-1/2	1/4	30532	30866	30920	31145	5B
17/64	3/4	2-1/2	5/16	30534	30867	30921	31146	5B
9/32	3/4	2-1/2	5/16	30536	30868	30922	31147	5B
19/64	13/16	2-1/2	5/16	30538	30869	30923	31148	5B
5/16	13/16	2-1/2	5/16	30540	30870	30924	31149	5B
21/64	1	2-1/2	3/8	30542	30871	30925	31150	5B
11/32	1	2-1/2	3/8	30544	30872	30926	31151	5B
23/64	1	2-1/2	3/8	30546	30873	30927	31152	5B
3/8	1	2-1/2	3/8	30548	30874	30928	31153	5B
25/64	1	2-3/4	7/16	30550	30875	30929	31154	5B
13/32	1	2-3/4	7/16	30552	30876	30930	31155	5B
27/64	1	2-3/4	7/16	30554	30877	30931	31156	5B
7/16	1	2-3/4	7/16	30556	30878	30932	31157	5B
29/64	1	3	1/2	30558	30879	30933	31158	5B
15/32	1	3	1/2	30560	30880	30934	31159	5B
31/64	1	3	1/2	30562	30881	30935	31160	5B
1/2	1	3	1/2	30564	30882	30936	31161	5B
9/16	1-1/8	3-1/2	9/16	30566	30883	30937	31162	5B
5/8	1-1/4	3-1/2	5/8	30568	30884	30938	31163	5B
11/16	1-3/8	4	3/4	30570	30885	30939	31164	5B
3/4	1-1/2	4	3/4	30572	30886	30940	31165	5B
7/8	1-1/2	4	7/8	30574	30887	30941	31166	5B
1	1-1/2	4	1	30576	30888	30942	31167	5B



TOLERANCES

$d_1 = +0,000 - 0,05$

$d_2 = h6$

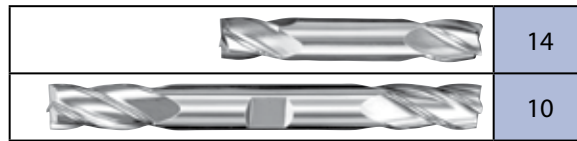


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated	Ti-NAMITE	Ti-NAMITE-C	Ti-NAMITE-A	Series Number
				EDP No.	(Ti) EDP No.	(TiCN) EDP No.	(AlTiN) EDP No.	
1	4	38	3	40506	48820	48842	48863	5MB
1,5	4,5	38	3	40510	48821	48843	48864	5MB
2	6,3	38	3	40514	48822	48844	48865	5MB
2,5	9,5	38	3	40518	48823	48845	48866	5MB
3	12	38	3	40522	48824	48846	48867	5MB
3	25	75	3	43502	49583	49596	49609	5XLMB
3,5	12	50	4	40526	48825	48847	48868	5MB
4	14	50	4	40530	48826	48848	48869	5MB
4	25	75	4	43504	49584	49597	49610	5XLMB
4,5	16	50	6	40534	48827	48849	48870	5MB
5	16	50	6	40538	48828	48850	48871	5MB
5	25	75	5	43508	49586	49599	49612	5XLMB
6	19	50	6	40542	48829	48851	48872	5MB
6	25	75	6	43506	49585	49598	49611	5XLMB
7	19	63	8	40546	48830	48852	48873	5MB
8	20	63	8	40550	48831	48853	48874	5MB
8	25	75	8	43516	49587	49600	49613	5XLMB
9	22	75	10	40554	48832	48854	48875	5MB
10	22	75	10	40558	48833	48855	48876	5MB
10	38	100	10	43526	49588	49601	49614	5XLMB
11	25	75	12	40562	48834	48856	48877	5MB
12	25	75	12	40566	48835	48857	48878	5MB
12	50	100	12	43536	49589	49602	49615	5XLMB
12	75	150	12	43546	49590	49603	49616	5XLMB
14	32	89	14	40570	48836	48858	48879	5MB
14	75	150	14	43556	49591	49604	49617	5XLMB
16	32	89	16	40574	48837	48859	48880	5MB
16	75	150	16	43566	49592	49605	49618	5XLMB
18	38	100	18	40578	48838	48860	48881	5MB
18	75	150	18	43576	49593	49606	49619	5XLMB
20	38	100	20	40582	48839	48861	48882	5MB
20	75	150	20	43586	49594	49607	49620	5XLMB
25	38	100	25	40586	48840	48862	48883	5MB
25	75	150	25	43596	49595	49608	49621	5XLMB

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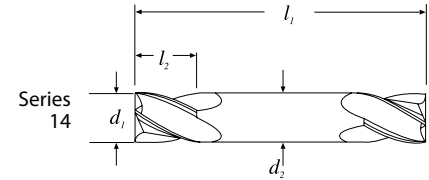
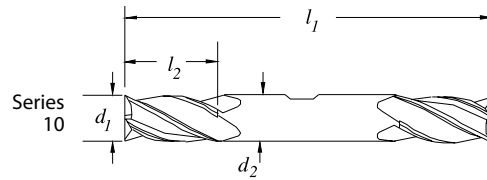
4 Flute – Double End – Square End



TOLERANCES

$$d_1 = +.000 - .002$$

$$d_2 = h6$$



Series 14 • 14M



End Mills – Double End – Square End – Micrograin Solid Carbide – 4 Flute – 30° Right Hand Spiral – Right Hand Cutting – Center Cutting
* With Flat

Serie 14 • 14M



Fresas Frontales – Doble punta – Punta plana – Carburo sólido con micrograno – 4 filos – Hélice a derecha 30° – Corte a derecha – Corte al centro
* Con en el Mango

Série 14 • 14M



Fraises – Tailée aux 2 bouts – Bout plat – Carbure monobloc, micrograin – 4 dents – Hélice à droite, 30° – Coupe à droite – Coupe au centre
* Avec Méplat

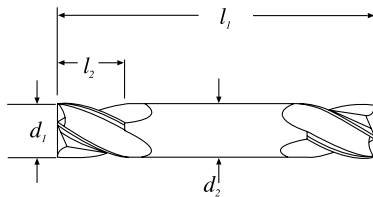
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Series Number
				EDP No.	EDP No.	EDP No.	EDP No.	
1/32	1/16	1-1/2	1/8	31401	31441	39601	31170	14
3/64	3/32	1-1/2	1/8	31403	31443	39603	31171	14
1/16	1/8	1-1/2	1/8	31405	31445	39605	31172	14
5/64	1/8	1-1/2	1/8	31407	31447	39607	31173	14
3/32	3/16	1-1/2	1/8	31409	31449	39609	31174	14
7/64	3/16	1-1/2	1/8	31411	31451	39611	31175	14
1/8	1/4	1-1/2	1/8	31413	31453	39613	31176	14
*1/8	3/8	3-1/16	3/8	31001	30946	30957	30968	10
9/64	5/16	2	3/16	31415	31455	39615	31177	14
5/32	5/16	2	3/16	31417	31457	39617	31178	14
*5/32	7/16	3-1/8	3/8	31003	30947	30958	30969	10
11/64	5/16	2	3/16	31419	31459	39619	31179	14
3/16	3/8	2	3/16	31421	31461	39621	31180	14
*3/16	1/2	3-1/4	3/8	31005	30948	30959	30970	10
13/64	1/2	2-1/2	1/4	31423	31463	39623	31181	14
7/32	1/2	2-1/2	1/4	31425	31465	39625	31182	14
*7/32	9/16	3-3/8	3/8	31007	30949	30960	30971	10
15/64	1/2	2-1/2	1/4	31427	31467	39627	31183	14
1/4	1/2	2-1/2	1/4	31429	31469	39629	31184	14
*1/4	5/8	3-3/8	3/8	31009	30950	30961	30972	10
9/32	1/2	2-1/2	5/16	31431	31471	39631	31185	14
*9/32	11/16	3-3/8	3/8	31011	30951	30962	30973	10
5/16	1/2	2-1/2	5/16	31433	31473	39633	31186	14
*5/16	3/4	3-1/2	3/8	31013	30952	30963	30974	10
*11/32	3/4	3-1/2	3/8	31015	30953	30964	30975	10
3/8	9/16	2-1/2	3/8	31435	31475	39635	31187	14
*3/8	3/4	3-1/2	3/8	31017	30954	30965	30976	10
7/16	9/16	2-3/4	7/16	31437	31477	39637	31188	14
*7/16	7/8	4	1/2	31019	30955	30966	30977	10
1/2	5/8	3	1/2	31439	31479	39639	31189	14
*1/2	1	4	1/2	31021	30956	30967	30978	10



TOLERANCES

$$d_1 = +0,000 - 0,05$$

$$d_2 = h6$$

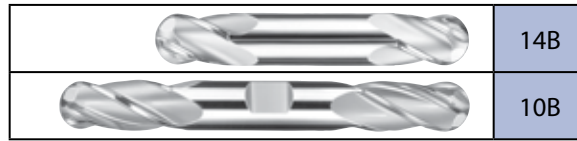


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	2	38	3	41405	48884	48905	48926	14M
1,5	3	38	3	41409	48885	48906	48927	14M
2	4	38	3	41413	48886	48907	48928	14M
2,5	5	38	3	41417	48887	48908	48929	14M
3	6	38	3	41421	48888	48909	48930	14M
3,5	7	50	4	41425	48889	48910	48931	14M
4	8	50	4	41429	48890	48911	48932	14M
4,5	9,5	63	4,5	41433	48891	48912	48933	14M
5	10	63	5	41437	48892	48913	48934	14M
6	12	63	6	41441	48893	48914	48935	14M
7	12	63	8	41445	48894	48915	48936	14M
8	12	63	8	41449	48895	48916	48937	14M
9	14	75	9	41453	48896	48917	48938	14M
10	14	75	10	41457	48897	48918	48939	14M
11	14	75	12	41461	48898	48919	48940	14M
12	16	75	12	41465	48899	48920	48941	14M

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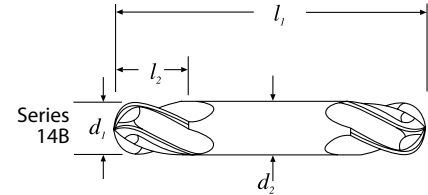
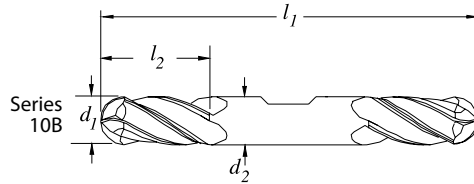
4 Flute – Double End – Ball End



TOLERANCES

$$d_1 = +.000 - .002$$

$$d_2 = h6$$



Series 14B • 14MB



End Mills – Double End – Ball End
Micrograin Solid Carbide – 4 Flute –
30° Right Hand Spiral – Right Hand
Cutting – Center Cutting

* With Flat

Serie 14B • 14MB



Fresas Frontales – Doble punta –
Punta radial o esférica – Carburo
sólido con micrograno – 4 filos
– Hélice a derecha 30° – Corte a
derecha – Corte al centro

* Con en el Mango

Série 14B • 14MB



Fraises – Tailée aux 2 bouts –
Bout hémisphérique – Carbure
monobloc, micrograin – 4 dents –
Hélice à droite, 30° – Coupe à droite
– Coupe au centre

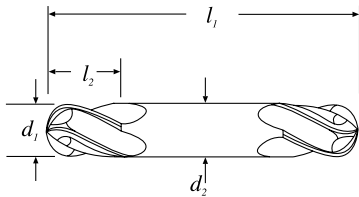
* Avec Méplat

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Ti-NAMITE	Ti-NAMITE-C	Ti-NAMITE-A	Series Number
				EDP No.	(TiN) EDP No.	(TiCN) EDP No.	(AlTiN) EDP No.	
1/32	1/16	1-1/2	1/8	31402	31442	39602	31218	14B
3/64	3/32	1-1/2	1/8	31404	31444	39604	31219	14B
1/16	1/8	1-1/2	1/8	31406	31446	39606	31220	14B
5/64	1/8	1-1/2	1/8	31408	31448	39608	31221	14B
3/32	3/16	1-1/2	1/8	31410	31450	39610	31222	14B
7/64	3/16	1-1/2	1/8	31412	31452	39612	31223	14B
1/8	1/4	1-1/2	1/8	31414	31454	39614	31224	14B
*1/8	3/8	3-1/16	3/8	31002	30979	30990	31023	10B
9/64	5/16	2	3/16	31416	31456	39616	31225	14B
5/32	5/16	2	3/16	31418	31458	39618	31226	14B
*5/32	7/16	3-1/8	3/8	31004	30980	30991	31024	10B
11/64	5/16	2	3/16	31420	31460	39620	31227	14B
3/16	3/8	2	3/16	31422	31462	39622	31228	14B
*3/16	1/2	3-1/4	3/8	31006	30981	30992	31025	10B
13/64	1/2	2-1/2	1/4	31424	31464	39624	31229	14B
7/32	1/2	2-1/2	1/4	31426	31466	39626	31230	14B
*7/32	9/16	3-3/8	3/8	31008	30982	30993	31026	10B
15/64	1/2	2-1/2	1/4	31428	31468	39628	31231	14B
1/4	1/2	2-1/2	1/4	31430	31470	39630	31232	14B
*1/4	5/8	3-3/8	3/8	31010	30983	30994	31027	10B
9/32	1/2	2-1/2	5/16	31432	31472	39632	31233	14B
*9/32	11/16	3-3/8	3/8	31012	30984	30995	31028	10B
5/16	1/2	2-1/2	5/16	31434	31474	39634	31234	14B
*5/16	3/4	3-1/2	3/8	31014	30985	30996	31029	10B
*11/32	3/4	3-1/2	3/8	31016	30986	30997	31030	10B
3/8	9/16	2-1/2	3/8	31436	31476	39636	31235	14B
*3/8	3/4	3-1/2	3/8	31018	30987	30998	31031	10B
7/16	9/16	2-3/4	7/16	31438	31478	39638	31236	14B
*7/16	7/8	4	1/2	31020	30988	30999	31032	10B
1/2	5/8	3	1/2	31440	31480	39640	31237	14B
*1/2	1	4	1/2	31022	30989	31000	31033	10B



TOLERANCES

$d_1 = +0,000 - 0,05$
 $d_2 = h6$

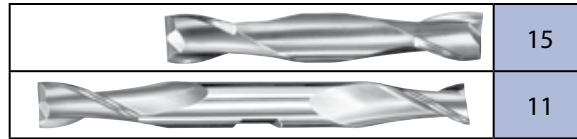


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	2	38	3	41406	48947	48968	48989	14MB
1,5	3	38	3	41410	48948	48969	48990	14MB
2	4	38	3	41414	48949	48970	48991	14MB
2,5	5	38	3	41418	48950	48971	48992	14MB
3	6	38	3	41422	48951	48972	48993	14MB
3,5	7	50	4	41426	48952	48973	48994	14MB
4	8	50	4	41430	48953	48974	48995	14MB
4,5	9,5	63	4,5	41434	48954	48975	48996	14MB
5	10	63	5	41438	48955	48976	48997	14MB
6	12	63	6	41442	48956	48977	48998	14MB
7	12	63	8	41446	48957	48978	48999	14MB
8	12	63	8	41450	48958	48979	49000	14MB
9	14	75	9	41454	48959	48980	49001	14MB
10	14	75	10	41458	48960	48981	49002	14MB
11	14	75	12	41462	48961	48982	49003	14MB
12	16	75	12	41466	48962	48983	49004	14MB

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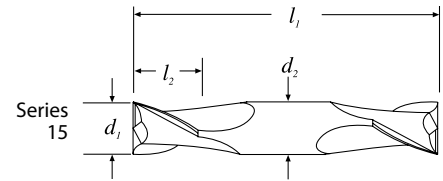
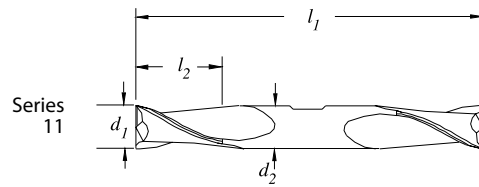
2 Flute – Double End – Square End



TOLERANCES

$$d_1 = +.000 - .002$$

$$d_2 = h6$$



Series 15 • 15M



End Mills – Double End – Square End – Micrograin Solid Carbide – 2 Flute – 30° Right Hand Spiral – Right Hand Cutting – Center Cutting * With Flat

Serie 15 • 15M



Fresas – Doble punta – Punta plana – Carburo sólido con micrograno – 2 filos – Hélice a derecha 30° – Corte a derecha – Corte al centro * Con en el Mango

Série 15 • 15M



Fraises – Tailée aux 2 bouts – Bout plat – Carbure monobloc, micrograin – 2 dents – Hélice à droite, 30° – Coupe à droite - Coupe au centre * Avec Méplat

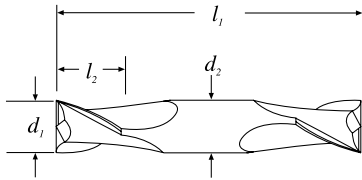
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Series Number
				EDP No.	EDP No.	EDP No.	EDP No.	
1/32	1/16	1-1/2	1/8	31501	31541	39651	31316	15
3/64	3/32	1-1/2	1/8	31503	31543	39653	31317	15
1/16	1/8	1-1/2	1/8	31505	31545	39655	31318	15
5/64	1/8	1-1/2	1/8	31507	31547	39657	31319	15
3/32	3/16	1-1/2	1/8	31509	31549	39659	31320	15
7/64	3/16	1-1/2	1/8	31511	31551	39661	31321	15
1/8	1/4	1-1/2	1/8	31513	31553	39663	31322	15
*1/8	3/8	3-1/16	3/8	31101	31034	31045	31056	11
9/64	5/16	2	3/16	31515	31555	39665	31323	15
5/32	5/16	2	3/16	31517	31557	39667	31324	15
*5/32	7/16	3-1/8	3/8	31103	31035	31046	31057	11
11/64	5/16	2	3/16	31519	31559	39669	31325	15
3/16	3/8	2	3/16	31521	31561	39671	31326	15
*3/16	1/2	3-1/4	3/8	31105	31036	31047	31058	11
13/64	1/2	2-1/2	1/4	31523	31563	39673	31327	15
7/32	1/2	2-1/2	1/4	31525	31565	39675	31328	15
*7/32	9/16	3-3/8	3/8	31107	31037	31048	31059	11
15/64	1/2	2-1/2	1/4	31527	31567	39677	31329	15
1/4	1/2	2-1/2	1/4	31529	31569	39679	31330	15
*1/4	5/8	3-3/8	3/8	31109	31038	31049	31060	11
9/32	1/2	2-1/2	5/16	31531	31571	39681	31331	15
*9/32	11/16	3-3/8	3/8	31111	31039	31050	31061	11
5/16	1/2	2-1/2	5/16	31533	31573	39683	31332	15
*5/16	3/4	3-1/2	3/8	31113	31040	31051	31062	11
*11/32	3/4	3-1/2	3/8	31115	31041	31052	31063	11
3/8	9/16	2-1/2	3/8	31535	31575	39685	31333	15
*3/8	3/4	3-1/2	3/8	31117	31042	31053	31064	11
7/16	9/16	2-3/4	7/16	31537	31577	39687	31334	15
*7/16	7/8	4	1/2	31119	31043	31054	31065	11
1/2	5/8	3	1/2	31539	31579	39689	31335	15
*1/2	1	4	1/2	31121	31044	31055	31066	11



TOLERANCES

$$d_1 = +0,000 - 0,05$$

$$d_2 = h6$$

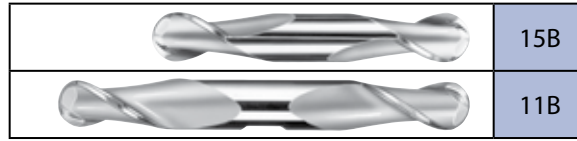


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	2	38	3	41505	49010	49031	49052	15M
1,5	3	38	3	41509	49011	49032	49053	15M
2	4	38	3	41513	49012	49033	49054	15M
2,5	5	38	3	41517	49013	49034	49055	15M
3	6	38	3	41521	49014	49035	49056	15M
3,5	7	50	4	41525	49015	49036	49057	15M
4	8	50	4	41529	49016	49037	49058	15M
4,5	9,5	63	4,5	41533	49017	49038	49059	15M
5	10	63	5	41537	49018	49039	49060	15M
6	12	63	6	41541	49019	49040	49061	15M
7	12	63	8	41545	49020	49041	49062	15M
8	12	63	8	41549	49021	49042	49063	15M
9	14	75	9	41553	49022	49043	49064	15M
10	14	75	10	41557	49023	49044	49065	15M
11	14	75	12	41561	49024	49045	49066	15M
12	16	75	12	41565	49025	49046	49067	15M

END MILLS
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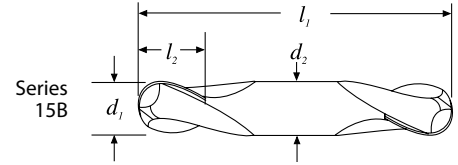
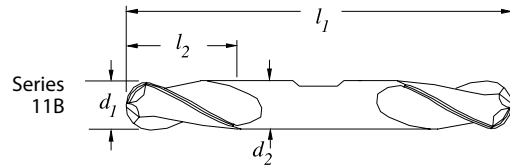
2 Flute – Double End – Ball End



TOLERANCES

$$d_1 = +.000 - .002$$

$$d_2 = h6$$



Series 15B • 15MB



End Mills – Double End – Ball End
Micrograin Solid Carbide – 2 Flute –
30° Right Hand Spiral – Right Hand
Cutting – Center Cutting
* With Flat

Serie 15B • 15MB



Fresas – Doble punta – Punta
radial o esférica – Carburo sólido
con micrograno – 2 filos – Hélice
a derecha 30° – Corte a derecha –
Corte al centro
* Con en el Mango

Série 15B • 15MB



Fraises – Tailée aux 2 bouts –
Bout hémisphérique – Carbure
monobloc, micrograin – 2 dents –
Hélice à droite, 30° – Coupe à droite
– Coupe au centre
* Avec Méplat

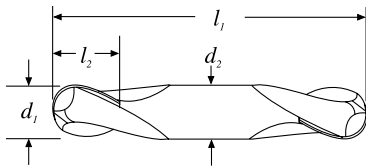
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)	Series Number
				EDP No.	EDP No.	EDP No.	EDP No.	
1/32	1/16	1-1/2	1/8	31502	31542	39652	31337	15B
3/64	3/32	1-1/2	1/8	31504	31544	39654	31338	15B
1/16	1/8	1-1/2	1/8	31506	31546	39656	31339	15B
5/64	1/8	1-1/2	1/8	31508	31548	39658	31340	15B
3/32	3/16	1-1/2	1/8	31510	31550	39660	31341	15B
7/64	3/16	1-1/2	1/8	31512	31552	39662	31342	15B
1/8	1/4	1-1/2	1/8	31514	31554	39664	31343	15B
*1/8	3/8	3-1/16	3/8	31102	31067	31078	31089	11B
9/64	5/16	2	3/16	31516	31556	39666	31344	15B
5/32	5/16	2	3/16	31518	31558	39668	31345	15B
*5/32	7/16	3-1/8	3/8	31104	31068	31079	31090	11B
11/64	5/16	2	3/16	31520	31560	39670	31346	15B
3/16	3/8	2	3/16	31522	31562	39672	31347	15B
*3/16	1/2	3-1/4	3/8	31106	31069	31080	31091	11B
13/64	1/2	2-1/2	1/4	31524	31564	39674	31348	15B
7/32	1/2	2-1/2	1/4	31526	31566	39676	31349	15B
*7/32	9/16	3-3/8	3/8	31108	31070	31081	31092	11B
15/64	1/2	2-1/2	1/4	31528	31568	39678	31350	15B
1/4	1/2	2-1/2	1/4	31530	31570	39680	31351	15B
*1/4	5/8	3-3/8	3/8	31110	31071	31082	31093	11B
9/32	1/2	2-1/2	5/16	31532	31572	39682	31352	15B
*9/32	11/16	3-3/8	3/8	31112	31072	31083	31094	11B
5/16	1/2	2-1/2	5/16	31534	31574	39684	31353	15B
*5/16	3/4	3-1/2	3/8	31114	31073	31084	31095	11B
*11/32	3/4	3-1/2	3/8	31116	31074	31085	31096	11B
3/8	9/16	2-1/2	3/8	31536	31576	39686	31354	15B
*3/8	3/4	3-1/2	3/8	31118	31075	31086	31097	11B
7/16	9/16	2-3/4	7/16	31538	31578	39688	31355	15B
*7/16	7/8	4	1/2	31120	31076	31087	31098	11B
1/2	5/8	3	1/2	31540	31580	39690	31356	15B
*1/2	1	4	1/2	31122	31077	31088	31099	11B



TOLERANCES

$$d_1 = +0,000 - 0,05$$

$$d_2 = h6$$



Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	2	38	3	41506	49073	49094	49115	15MB
1,5	3	38	3	41510	49074	49095	49116	15MB
2	4	38	3	41514	49075	49096	49117	15MB
2,5	5	38	3	41518	49076	49097	49118	15MB
3	6	38	3	41522	49077	49098	49119	15MB
3,5	7	50	4	41526	49078	49099	49120	15MB
4	8	50	4	41530	49079	49100	49121	15MB
4,5	9,5	63	4,5	41534	49080	49101	49122	15MB
5	10	63	5	41538	49081	49102	49123	15MB
6	12	63	6	41542	49082	49103	49124	15MB
7	12	63	8	41546	49083	49104	49125	15MB
8	12	63	8	41550	49084	49105	49126	15MB
9	14	75	9	41554	49085	49106	49127	15MB
10	14	75	10	41558	49086	49107	49128	15MB
11	14	75	12	41562	49087	49108	49129	15MB
12	16	75	12	41566	49088	49109	49130	15MB

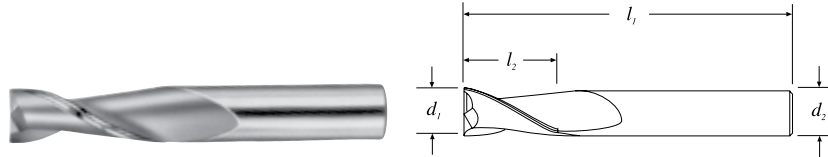
END MILLS
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2-Flute End Mills for Aluminum – Single End – Square End

Fractional
Series

52



TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$

Series 52 • 52M



2 Flute – Single End – Square End
for Aluminum

Serie 52 • 52M



2 filos – Punta Plana – Para
Aluminio

Série 52 • 52M



2 dents – Bout Plat – Pour
Aluminium

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Ti-NAMITE-C
				EDP No.	(TiCN) EDP No.
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

TOLERANCES

$d_1 = +0,000 - 0,05$
 $d_2 = h6$

Metric
Series

52M

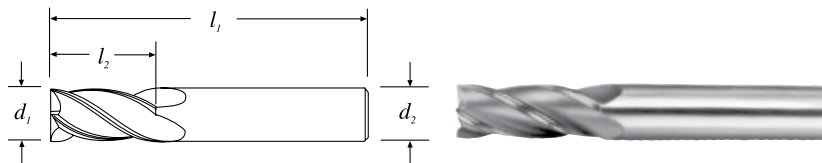
Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated	Ti-NAMITE-C
				EDP No.	(TiCN) EDP No.
3	7	38	3	45277	49829
3,5	7	57	6	45279	49830
4	8	57	6	45281	49831
4,5	8	57	6	45283	49832
5	10	57	6	45285	49833
6	10	57	6	45287	49834
8	16	63	8	45289	49835
10	19	72	10	45291	49836
12	22	83	12	45293	49837
14	22	83	14	45295	49838
16	26	92	16	45297	49839
20	32	104	20	45299	49840



4-Flute End Mills for Aluminum – Single End – Square End

TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$



Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Ti-NAMITE-C (TiCN)
				EDP No.	EDP No.
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

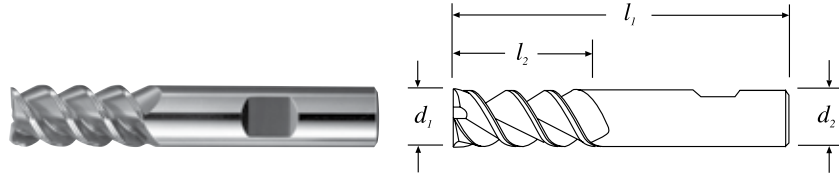
TOLERANCES

$d_1 = +0,000 - 0,05$
 $d_2 = h6$

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated	Ti-NAMITE-C (TiCN)
				EDP No.	EDP No.
3	8	38	3	45477	45478
3,5	10	57	6	45479	45480
4	11	57	6	45481	45482
4,5	11	57	6	45483	45484
5	13	57	6	45485	45486
6	13	57	6	45487	45488
8	19	63	8	45489	45490
10	22	72	10	45491	45492
12	26	83	12	45493	45494
14	26	83	14	45495	45496
16	32	92	16	45497	45498
20	38	104	20	45499	45500

- Series 54 • 54M** 4 Flute – Single End – Square End for Aluminum
- Serie 54 • 54M** 4 filos – Punta Plana – Para Aluminio
- Série 54 • 54M** 4 dents – Bout Plat – Pour Aluminium





TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
3 Flutes / Filos / Dents							
1/8	1/2	2-1/2	1/4	36001	32169	32180	32220
3/16	5/8	2-1/2	1/4	36003	32170	32181	32221
1/4	3/4	2-1/2	1/4	36005	32171	32182	32222
5/16	13/16	2-1/2	5/16	36007	32172	32183	32223
*3/8	1	2-1/2	3/8	36009	32173	32184	32224
7/16	1	3	7/16	36011	32174	32185	32225
*1/2	1	3	1/2	36013	32175	32186	32226
9/16	1-1/4	3-1/2	9/16	36015	32176	32187	32227
*5/8	1-1/4	3-1/2	5/8	36017	32177	32188	32228
*3/4	1-1/2	4	3/4	36019	32178	32189	32229
*1	1-1/2	4	1	36021	32179	32190	32230
4 Flutes / Filos / Dents							
*3/4	1-1/2	4	3/4	36023	32191	32193	32231
*1	1-1/2	4	1	36025	32192	32194	32232

Series 60 • 60M



Micrograin Solid Carbide – High Spiral – High Helix End Mills For Titanium, Inconel, Stainless Steel & Steel Alloy 3 & 4 Flute – 60° Right Hand Spiral – Right Hand Cutting – Center Cutting
*With Flat

Serie 60 • 60M



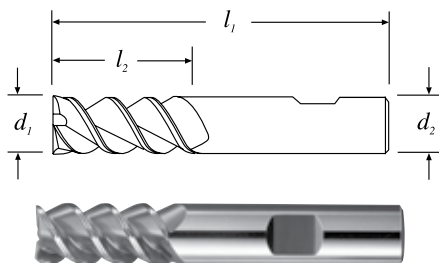
Carburo sólido con micrograno – Alto desempeño – Fresas con hélice rápida para titanio, inconel, acero inoxidable y aleaciones de acero. Hélice a derecha 60° – 3 y 4 filos – Corte al centro
*Con en el Mango

Série 60 • 60M



Carbure monobloc, micrograin – Angle d'hélice 60° – Fraises à angle d'hélice 60° pour titane, inconel, acier inoxydable et alliage d'acier. 3 et 4 dents – Hélice à droite à 60° – Coupe à droite – Coupe au centre
*Avec Méplat

d ₁ TOLERANCES h10		d ₂ TOLERANCES h6	
mm	mm	mm	mm
3	+0,000/-0,040	1-3	h6
> 3-6	+0,000/-0,048	> 3-6	h6
> 6-10	+0,000/-0,058	> 6-10	h6
> 10-18	+0,000/-0,070	> 10-18	h6
> 18-20	+0,000/-0,084	> 18-20	h6



Cutting Diameter d ₁ mm h10	Length of Cut l ₂ mm	Overall Length l ₁ mm	Shank Diameter d ₂ mm h6	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
				EDP No.	EDP No.	EDP No.	EDP No.
*3	8	57	6	46001	46002	43940	43960
*4	11	57	6	46003	46006	43941	43961
*5	13	57	6	46004	46010	43942	43962
*6	13	57	6	46005	46011	43943	43963
*8	19	69	10	46009	46012	43944	43964
*10	22	72	10	46013	46014	43945	43965
*12	26	83	12	46017	46018	43946	43966
*16	32	92	16	46021	46022	43947	43967
*20	38	104	20	46025	46026	43948	43968

END MILLS
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Roughers – Single End

Metric Series **61, 62, 63**

CORNER RADIUS

$$d_1 = 1/4 - 5/16 = .045$$

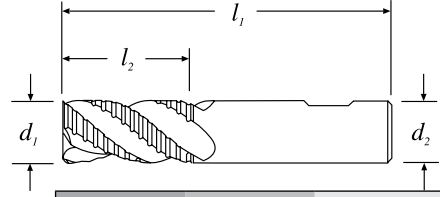
$$d_1 = 3/8 - 1 = .060$$

TOLERANCES

$$d_1 = +.000 - .004$$

$$d_2 = h6$$

61



Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	No. of Flutes Z	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
1/4	3/4	2-1/2	1/4	3	36107	36106	36110
5/16	3/4	2-1/2	5/16	3	36109	36108	36111
3/8	7/8	2-1/2	3/8	3	36113	36112	36114
1/2	1	3	1/2	4	36117	36116	36118
5/8	1-1/4	3-1/2	5/8	4	36121	36120	36122
3/4	1-5/8	4	3/4	4	36125	36124	36126
1	1-3/4	4	1	5	36129	36128	36130

Roughers



Series 61 • 61M

Mild Steel, Steel Alloys, Stainless Steel and Cast Iron.

Series 62 • 62M

"Space Age Exotics" including Titanium, Inconel, Rene and Waspaloy

Series 63 • 63M

Aluminum, Brass and Copper.

Desbastadoras



Serie 61 • 61M

Aceros de fácil mecanización, aceros aleados, aceros inoxidables y fundición.

Serie 62 • 62M

"Materiales de la era espacial" incluyendo el titanio, inconel, Rene y Waspaloy.

Serie 63 • 63M

Aluminio, latón y cobre.

Ravageuses



Série 61 • 61M

L'acier tendre, des alliages d'acier, de l'acier inoxydable et de la fonte.

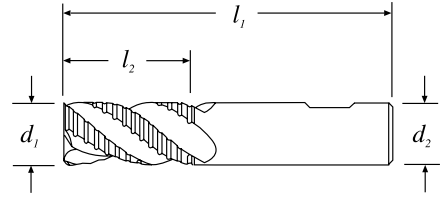
Série 62 • 62M

Matière "exotiques de l'ère spatiale" telles que titane, inconel, alliage René et Waspaloy.

Série 63 • 63M

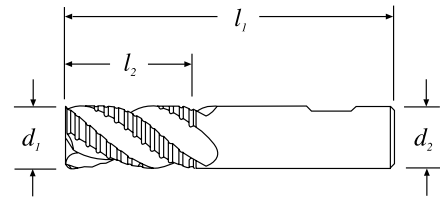
L'aluminium, du laiton et du cuivre.

62



Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	No. of Flutes Z	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
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

63



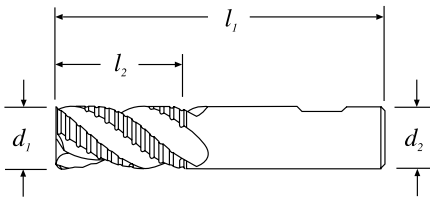
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	No. of Flutes Z	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.
1/4	3/4	2-1/2	1/4	3	36299	36307	36306
5/16	3/4	2-1/2	5/16	3	36300	36309	36308
3/8	7/8	2-1/2	3/8	3	36301	36313	36312
1/2	1	3	1/2	3	36302	36317	36316
5/8	1-1/4	3-1/2	5/8	3	36303	36321	36320
3/4	1-5/8	4	3/4	3	36304	36325	36324
1	1-3/4	4	1	3	36305	36329	36328

TOLERANCES

$d_1 = +0,000-0,10$
 $d_2 = h6$

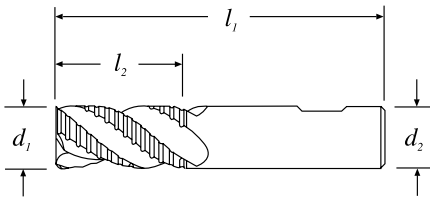
Corner Radius / Radio en punta / Rayon

$d_1 = 6\text{mm to } 8\text{mm} = 1,14$
 $d_1 = 10\text{mm to } 25\text{mm} = 1,52$



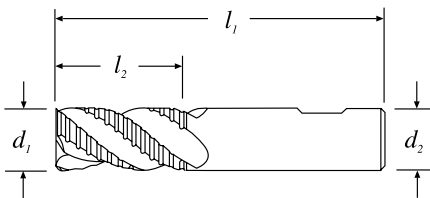
61M

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	No. of Flutes Z	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
6	19	63	6	3	46107	46106	46110
8	19	63	8	3	46109	46108	46111
10	22	72	10	3	46113	46112	46114
12	26	83	12	4	46117	46116	46118
16	32	92	16	4	46121	46120	46122
20	38	104	20	4	46129	46128	46132
25	44	104	25	5	46131	46130	46133



62M

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	No. of Flutes Z	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
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

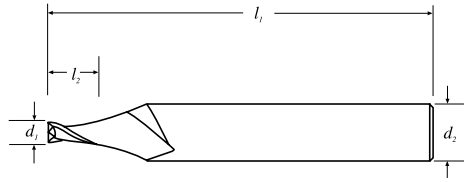


63M

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	No. of Flutes Z	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.
6	19	63	6	3	46299	46307	46306
8	19	63	8	3	46300	46309	46308
10	22	72	10	3	46301	46313	46312
12	26	83	12	3	46302	46317	46316
16	32	92	16	3	46303	46321	46320
20	38	104	20	3	46304	46329	46328
25	44	104	25	3	46305	46331	46330

END MILLS
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TOLERANCES

$d_1 = \pm 0.0005$
 $d_2 = h6$

Series MK2 • MK2M

Micrograin Solid Carbide
2 Flute – 30° Right Hand Spiral
– Right Hand Cutting – Center
Cutting

Serie MK2 • MK2M

Carburo sólido con micrograno
Hélice a derecha 30° – Corte a
derecha – Corte al centro

Série MK2 • MK2M

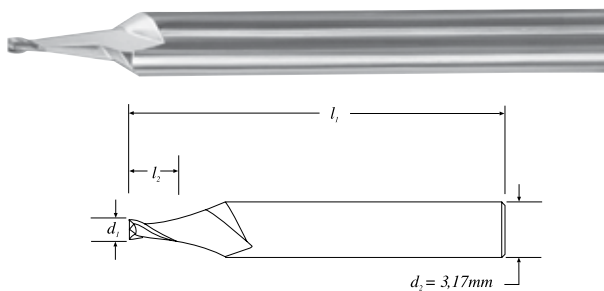
Fraises Série MK2
Carbure monobloc, micrograin
2 dents – Hélice à droite, 30° –
Coupe à droite – Coupe au centre.

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.
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

$d_1 = \pm 0,013$
 $d_2 = h6$

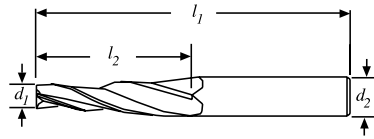


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.
0,20	0,30	38	3,17	39208
0,23	0,36	38	3,17	39209
0,25	0,38	38	3,17	39210
0,28	0,43	38	3,17	39211
0,30	0,46	38	3,17	39212
0,33	0,51	38	3,17	39213
0,36	0,53	38	3,17	39214
0,38	0,58	38	3,17	39215
0,41	0,61	38	3,17	39216
0,43	0,66	38	3,17	39217
0,46	0,69	38	3,17	39218
0,48	0,74	38	3,17	39219
0,51	0,76	38	3,17	39220
0,53	0,81	38	3,17	39221
0,56	0,84	38	3,17	39222
0,58	0,89	38	3,17	39223
0,61	0,91	38	3,17	39224
0,63	0,96	38	3,17	39225
0,66	0,99	38	3,17	39226
0,69	1,04	38	3,17	39227
0,71	1,07	38	3,17	39228
0,74	1,12	38	3,17	39229
0,76	1,14	38	3,17	39230
0,79	1,19	38	3,17	39231
0,89	1,35	38	3,17	39235
1,02	1,52	38	3,17	39240
1,19	1,80	38	3,17	39247
1,27	1,90	38	3,17	39250
1,40	2,11	38	3,17	39255
1,52	2,29	38	3,17	39260

END MILLS
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3 Flute – Single End – Taper Spiral – Square End



TOLERANCES

$d_1 = +.001 - .002$
 $d_2 = h6$

Series 23



Micrograin Solid Carbide – 3 Flute – Taper Spiral – Straight Shank – Right Hand Cutting

Serie 23



Carburo sólido con micrograno – 3 filos – Hélice cónica – Mango cilíndrico – Corte a derecha

Série 23



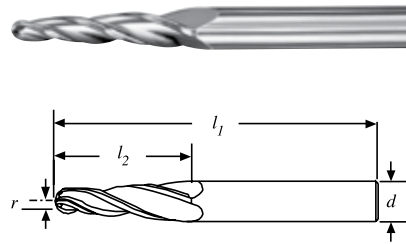
Carbure monobloc micrograin – 3 dents – Cône hélicoïdal – Queue droite – Coupe à droite

Shank Diameter d_2	Center Line Angle	Small Diameter d_1	Appx. Length of Cut l_2	Overall Length l_1	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
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	32338	32362
1/2	7°	3/16	1-1/4	4	32339	32388	32340	32363
1/2	10°	1/8	1	4	32341	32389	32342	32364



TOLERANCES

r=+.0005-.001
d=-.0001-.0004



Shank Diameter d	Center Line Angle	Radius r	Appx. Length of Cut l ₂	Overall Length l ₁	Uncoated	Ti-NAMITE (TiN)	Ti-NAMITE-C (TiCN)	Ti-NAMITE-A (AlTiN)
					EDP No.	EDP No.	EDP No.	EDP No.
1/4	1°	.062	1-1/2	3	32402	32403	32445	32470
1/4	1°30'	.062	1-1/2	3	32404	32405	32446	32471
1/4	2°	.062	1-1/4	3	32406	32407	32447	32472
1/4	3°	.062	1	3	32408	32409	32448	32473
1/4	5°	.062	3/4	3	32410	32411	32449	32474
1/4	7°	.062	1/2	3	32412	32413	32450	32475
1/4	10°	.047	1/2	3	32414	32415	32451	32476
3/8	1°	.093	1-3/4	3-1/2	32416	32417	32452	32477
3/8	1°30'	.093	1-3/4	3-1/2	32418	32419	32453	32478
3/8	2°	.093	1-3/4	3-1/2	32420	32421	32454	32479
3/8	3°	.078	1-3/4	3-1/2	32422	32423	32455	32480
3/8	5°	.062	1-1/2	3-1/2	32424	32425	32456	32481
3/8	7°	.062	1	3-1/2	32426	32427	32457	32482
3/8	10°	.062	3/4	3-1/2	32428	32429	32458	32483
1/2	1°	.125	2	4	32430	32431	32459	32484
1/2	2°	.125	2	4	32434	32435	32460	32485
1/2	3°	.125	2	4	32436	32437	32461	32486
1/2	5°	.125	1-1/4	4	32438	32439	32462	32487
1/2	7°	.093	1-1/4	4	32440	32441	32463	32488
1/2	10°	.062	1	4	32442	32443	32464	32489

Series 24



Micrograin Solid Carbide – 3 Flute – Ball End – Taper Spiral – Straight Shank – Right Hand Cutting

Serie 24



Carburo sólido con micrograno – 3 filos – Punta esférica – Hélice cónica – Mango cilíndrico – Corte a derecha

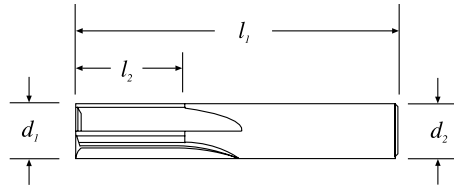
Série 24



Carbure monobloc micrograin – 3 dents – à bout hémisphérique – Cône hélicoïdal – Queue droite – Coupe à droite



4 Flute – Straight Flute – Single End – Square End



TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$

Series 2



Micrograin Solid Carbide – 4 Flute – Straight Flute – Square end – Right Hand Cutting – Center Cutting

Serie 2



Carburo sólido con micrograno – 4 filos – Filos rectos – Punta plana – Corte a derecha – Corte al centro

Série 2



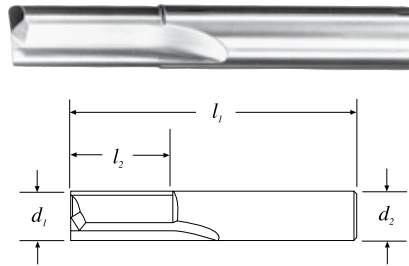
Carbure monobloc, micrograin – 4 dents – Denture droite – Bout plat – Coupe à droite – Coupe au centre

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
1/16	3/16	1-1/2	1/8	30201	30235	30252	30269
3/32	9/32	1-1/2	1/8	30203	30236	30253	30270
1/8	1/2	1-1/2	1/8	30205	30237	30254	30271
5/32	1/2	2	3/16	30207	30238	30255	30272
3/16	5/8	2	3/16	30209	30239	30256	30273
7/32	5/8	2-1/2	1/4	30211	30240	30257	30274
1/4	3/4	2-1/2	1/4	30213	30241	30258	30275
9/32	3/4	2-1/2	5/16	30215	30242	30259	30276
5/16	13/16	2-1/2	5/16	30217	30243	30260	30277
3/8	1	2-1/2	3/8	30219	30244	30261	30278
7/16	1	2-3/4	7/16	30221	30245	30262	30279
1/2	1	3	1/2	30223	30246	30263	30280
9/16	1-1/8	3-1/2	9/16	30225	30247	30264	30281
5/8	1-1/4	3-1/2	5/8	30227	30248	30265	30282
11/16	1-3/8	4	3/4	30229	30249	30266	30283
3/4	1-1/2	4	3/4	30231	30250	30267	30284
1	1-1/2	4	1	30233	30251	30268	30285



TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$



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)
				EDP No.	EDP No.	EDP No.	EDP No.
1/16	3/16	1-1/2	1/8	30401	30670	30687	30704
3/32	9/32	1-1/2	1/8	30403	30671	30688	30705
1/8	1/2	1-1/2	1/8	30405	30672	30689	30706
5/32	1/2	2	3/16	30407	30673	30690	30707
3/16	5/8	2	3/16	30409	30674	30691	30708
7/32	5/8	2-1/2	1/4	30411	30675	30692	30709
1/4	3/4	2-1/2	1/4	30413	30676	30693	30710
9/32	3/4	2-1/2	5/16	30415	30677	30694	30711
5/16	13/16	2-1/2	5/16	30417	30678	30695	30712
3/8	1	2-1/2	3/8	30419	30679	30696	30713
7/16	1	2-3/4	7/16	30421	30680	30697	30714
1/2	1	3	1/2	30423	30681	30698	30715
9/16	1-1/8	3-1/2	9/16	30425	30682	30699	30716
5/8	1-1/4	3-1/2	5/8	30427	30683	30700	30717
11/16	1-3/8	4	3/4	30429	30684	30701	30718
3/4	1-1/2	4	3/4	30431	30685	30702	30719
1	1-1/2	4	1	30433	30686	30703	30720

Series 4



Micrograin Solid Carbide – 2 Flute – Straight Flute – Square End – Right Hand Cutting – Center Cutting

Serie 4



Carburo sólido con micrograno – 2 filos – Filos rectos – Punta plana – Corte a derecha – Corte al centro

Série 4

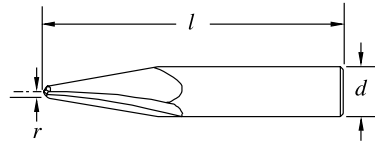


Carbure monobloc, micrograin – 2 dents – Denture droite – Bout plat – Coupe à droite – Coupe au centre

END MILLS
Table of Contents



2 Flute – Straight Flute – 14° – Single End



TOLERANCES

r=+.0005–.001
d=–.0001–.0004

Series 12



Micrograin Solid Carbide – 14° Die Sinking Cutter – 2 Straight Flutes – Ball End – Straight Shank – Right Hand Cutting

Serie 12



Carburo sólido con micrograno – Herramienta de copiado de matrices de 14° – 2 filos rectos – Punta esférica – Mango cilíndrico – Corte a derecha

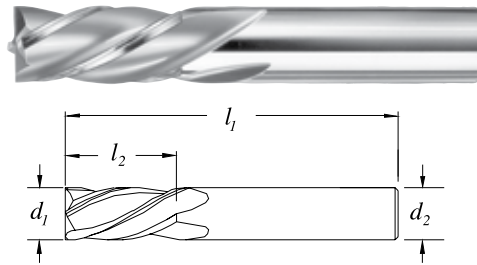
Série 12



Carbure monobloc, micrograin – Fraise à matrices 14° – 2 dents droites – à bout hémisphérique – Queue cylindrique – Coupe à droite

Radius r	Overall Length l	Shank Diameter d	Uncoated	Ti-NAMITE (TiN)
			EDP No.	EDP No.
.030	1-1/2	1/8	31202	31201
.040	2	5/32	31204	31203
.046	2	3/16	31206	31205
.062	2-1/2	1/4	31208	31207
.078	2-1/2	5/16	31210	31209
.093	2-1/2	3/8	31212	31211
.109	2-3/4	7/16	31214	31213
.125	3	1/2	31216	31215

4 Flute – Single End – Square End – Left Hand Spiral



TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.
1/16	3/16	1-1/2	1/8	30901
1/8	1/2	1-1/2	1/8	30903
3/16	5/8	2	3/16	30905
1/4	3/4	2-1/2	1/4	30907
5/16	13/16	2-1/2	5/16	30909
3/8	1	2-1/2	3/8	30911
7/16	1	2-3/4	7/16	30913
1/2	1	3	1/2	30915
5/8	1-1/4	3-1/2	5/8	30917
3/4	1-1/2	4	3/4	30919

Series 9



Micrograin Solid Carbide – 4 Flute – Square End – 30° Left Hand Spiral – Right Hand Cutting

Serie 9



Carburo sólido con micrograno – 4 filos – Punta plana – Hélice a izquierda 30° – Corte a derecha

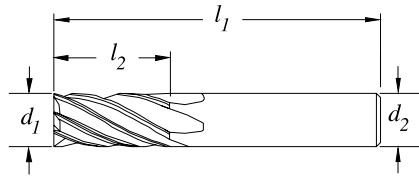
Série 9



Carbure monobloc, micrograin – 4 dents – Bout plat – Hélice à gauche, 30° – Coupe à droite



6 Flute – Single End – Square End



TOLERANCES

$d_1 = +.000 - .002$
 $d_2 = h6$

Series 6



Micrograin Solid Carbide – 6 Flute – Square End – 30° Right Hand Spiral – Right Hand Cutting

Serie 6



Carburo sólido con micrograno – 6 filos – Punta plana – Hélice a derecha 30° – Corte a derecha

Série 6



Carbure monobloc, micrograin – 6 dents – Bout plat – Hélice à droite, 30° – Coup à droite

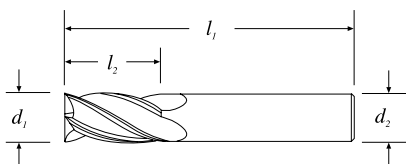
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
1/8	1/2	1-1/2	1/8	30601	30616	30624	30632
5/32	1/2	2	3/16	30603	30617	30625	30633
3/16	5/8	2	3/16	30605	30618	30626	30634
1/4	3/4	2-1/2	1/4	30607	30619	30627	30635
5/16	13/16	2-1/2	5/16	30609	30620	30628	30636
3/8	1	2-1/2	3/8	30611	30621	30629	30637
7/16	1	2-3/4	7/16	30613	30622	30630	30638
1/2	1	3	1/2	30615	30623	30631	30639



TOLERANCES

$d_1 = +.000 - .002$

$d_2 = h6$



Cutting Diameter d_1	Shank Diameter d_2	Overall Length l_1	Single End Length of Cut l_2	Double End Length of Cut l_2
1/8	1/8	1-1/2	1/2	1/4
3/16	3/16	2	5/8	3/8
1/4	1/4	2-1/2	3/4	1/2
5/16	5/16	2-1/2	13/16	1/2
3/8	3/8	2-1/2	1	9/16
1/2	1/2	3	1	5/8

End Mill Sets



Each End Mill Set Contains One Each:
1/8, 3/16, 1/4, 5/16, 3/8, 1/2

Coda Estuches



Coda Estuches Contiene:
1/8, 3/16, 1/4, 5/16, 3/8, 1/2

Chaque Coffret de Fraises



Chaque Coffret de Fraises Contient:
1/8, 3/16, 1/4, 5/16, 3/8, 1/2

	Square End Punta Plana Bout Plat EDP No.	Ball End Punta Esférica Bout Hemisphérique EDP No.	Square End Punta Plana Bout Plat Ti-NAMITE (TiN) EDP No.	Ball End Punta Esférica Bout Hemisphérique Ti-NAMITE (TiN) EDP No.
Series 1/1B – 4 Flute, Single End	30189	30190	39189	39190
Series 3/3B – 2 Flute, Single End	30389	30390	39389	39390
Series 5/5B – 3 Flute, Single End	30589	30590	39789	30900
Series 14/14B – 4 Flute, Double End	31489	31490	31481	31482
Series 15/15B – 2 Flute, Double End	31589	31590	31581	31582

	Square End Punta Plana Bout Plat Ti-NAMITE-C (TiCN) EDP No.	Ball End Punta Esférica Bout Hemisphérique Ti-NAMITE-C (TiCN) EDP No.	Square End Punta Plana Bout Plat Ti-NAMITE-A (AlTiN) EDP No.	Ball End Punta Esférica Bout Hemisphérique Ti-NAMITE-A (AlTiN) EDP No.
Series 1/1B – 4 Flute, Single End	39089	39090	30030	30070
Series 3/3B – 2 Flute, Single End	39589	39590	30470	30600
Series 5/5B – 3 Flute, Single End	30810	30944	30850	31169
Series 14/14B – 4 Flute, Double End	39641	39642	31190	31217
Series 15/15B – 2 Flute, Double End	39691	39692	31336	31357

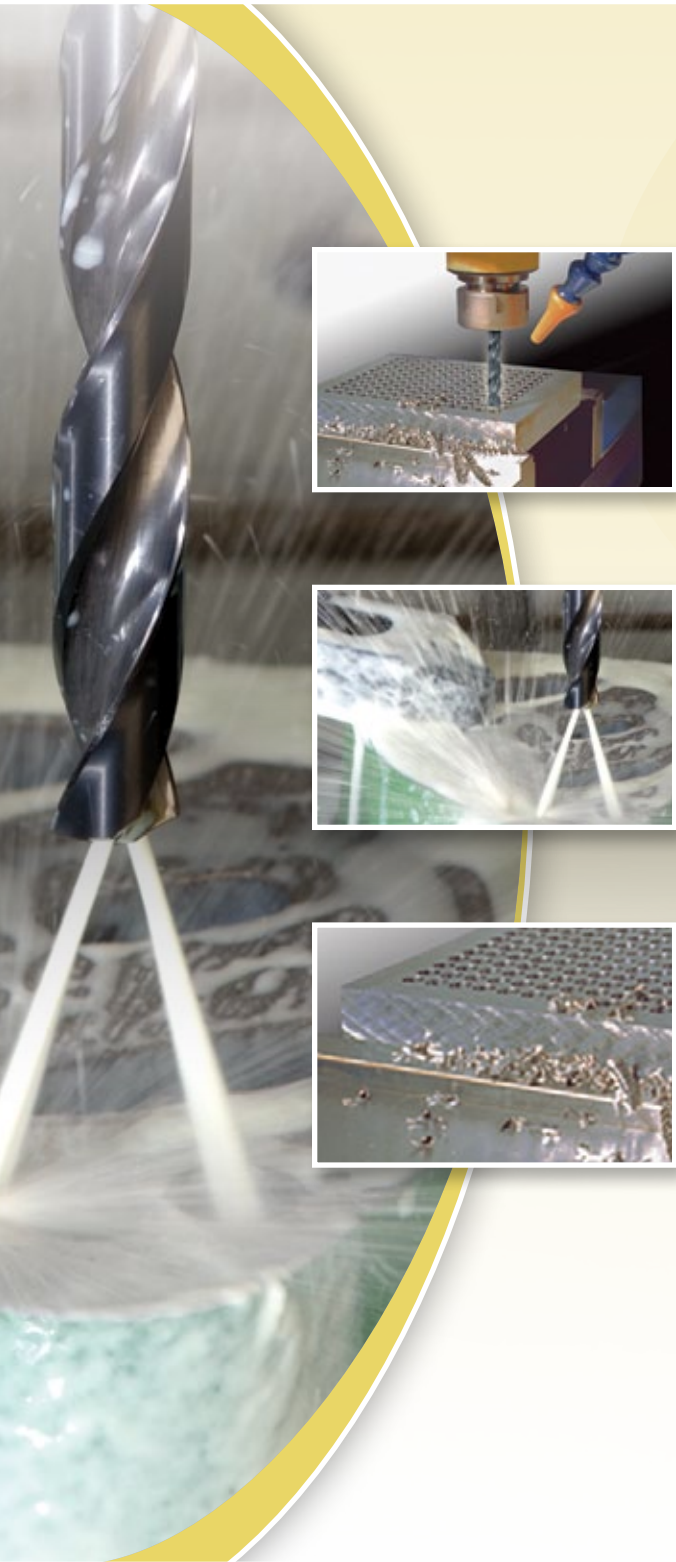
END MILLS
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DRILLS



DRILLS



High Performance Drills.....Page 130
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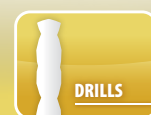
Drills

High Performance Drills	Series	Includes	Page
Hi-PerCarb High Performance Double Margin Drills	135 3xD, 135 5xD		130 – 139
ICe-Carb Internal Coolant Drills for Depths up to 8XD	140 5xD, 140 8xD		140 – 149

Drills	Series	Includes	Page
2 Flute Regular and Fast Spiral	101, 125	101M	150 – 153
2 Flute Single End Short Length DIN 6539	108M Plus		154 – 155
2 Flute Straight Flute Single End	106	106M	156 – 157
3 Flute Single End	103	103M	158 – 160
Single End Flat	104		161
Double End Combined Drill and Countersink	301		162
Double End Combined Drill and Countersink / DIN 333	301M		163
Single Flute Single End Countersink	601		164
3 Flute Single End Countersink	603		164
6 Flute Single End Countersink	606		165



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Brocas

Brocas de Alto Rendimiento	Series	Includes	Page
Brocas Hi-PerCarb de Alto Rendimiento de Doble Margen	135 3xD, 135 5xD		130 – 139
Brocas ICe-Carb con Refrigerante Interno para Profundidades de Hasta 8xD	140 5xD, 140 8xD		140 – 149

Brocas	Series	Includes	Page
2 Filos - Brocas de Espiral Regular y Rápido	101, 125	101M	150 – 153
Brocas DIN 6539 Serie Corta	108M Plus		154 – 155
2 Filos - Filos Rectos	106	106M	156 – 157
3 Filos	103	103M	158 – 160
Brocas Planas	104		161
Doble Punta - Broca de Centros	301		162
Doble Punta - Broca de Centros - DIN 333	301M		163
Avellanador de un Filo Countersink	601		164
Avellanador de 3 Filos	603		164
Avellanador de 6 Filos	606		165



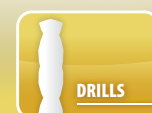
Forets

Forets Haute Performance	Series	Includes	Page
Forets Double Marge Haute Performance Hi-PerCarb	135 3xD, 135 5xD		130 – 139
Forets ICe-Carb à Refroidissement Interne pour Profondeurs Jusqu'à 8xD	140 5xD, 140 8xD		140 – 149

Forets	Series	Includes	Page
2 Dents - Forets Hélicoïdaux Réguliers et Rapides	101, 125	101M	150 – 153
Forets Courts - DIN 6539	108M Plus		154 – 155
2 Dents Forets à Arête Droite	106	106M	156 – 157
3 Dents	103	103M	158 – 160
Forets à Langue d'aspic	104		161
Tailée aux 2 Bouts - Forêt à Centrer	301		162
Tailée aux 2 Bouts - Forêt à Centrer DIN 333	301M		163
Foret Aléseur à Goujure Unique	601		164
Foret Aléseur à 3 Dents	603		164
Foret Aléseur à 6 Dents	606		165



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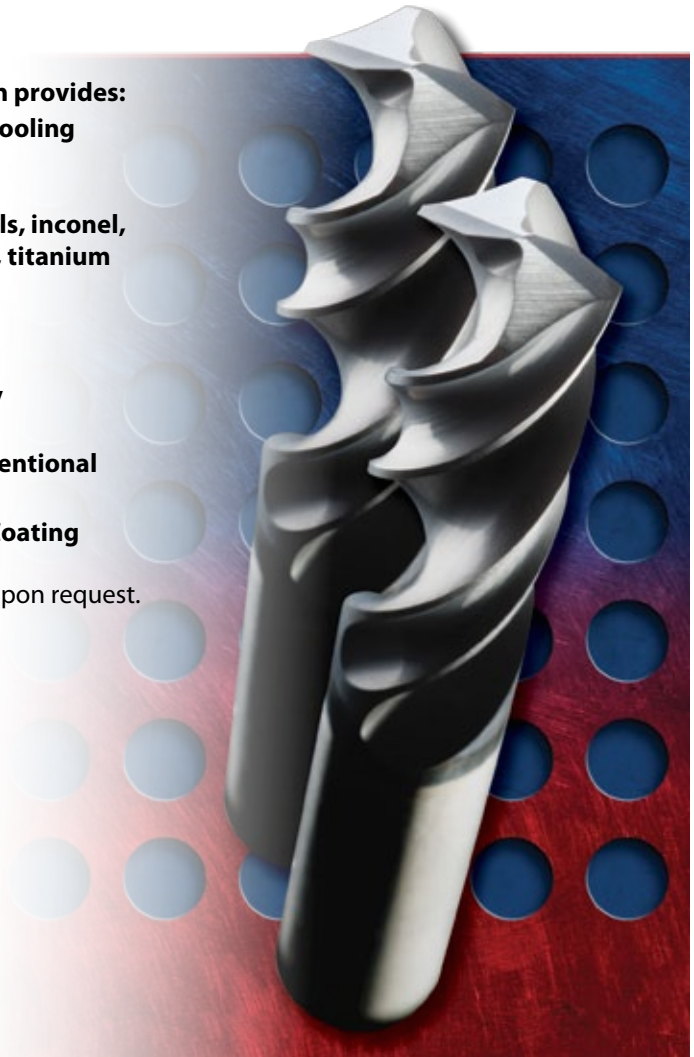
Hi-PerCarb High Performance Double Margin Drills

Increase production rates up to 12 times over conventional carbide drills.

Features & Benefits:

- **Double margin construction provides:**
 - Greater stability & point cooling
 - Improved surface finishes
 - Increased tool life
- **Engineered for alloyed steels, inconel, low carbon, stainless steels, titanium and cast iron**
- **3x Diameter length**
- **5x Diameter length**
- **Eliminates reaming in many applications**
- **Easily resharpened on conventional equipment.**
- **Ti-NAMITE-A® (AlTiN) Tool Coating**

All Ti-NAMITE Coatings available upon request.





Brocas Hi-PerCarb de alto rendimiento de doble margen

Aumente los índices de producción hasta 12 veces en relación con las brocas de carburo convencionales.

Características y ventajas:

- La construcción de doble margen proporciona:
 - Mayor estabilidad y refrigeración de la punta
 - Acabados de superficie mejorados
 - Prolongación de la vida útil de la herramienta
- Diseñadas para aceros aleados, Inconel, aceros de bajo contenido de carbono, aceros inoxidable, titanio y hierro fundido
- Longitud: 3 x diámetro
- Longitud: 5 x diámetro
- Eliminan el escariado en muchas aplicaciones
- Se reaflan fácilmente con equipos convencionales.
- Recubrimiento para herramientas Ti-NAMITE-A® (AlTiN)

Todos los recubrimientos Ti-NAMITE disponibles por pedido.

Forets double marge haute performance Hi-PerCarb

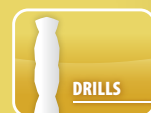
Permet d'avoir des taux de production jusqu'à 12 fois supérieurs à ceux des forets au carbure classiques.

Caractéristiques et avantages :

- La construction double marge offre :
 - Stabilité accrue et meilleur refroidissement ponctuel
 - Meilleure finition des surfaces
 - Meilleure longévité des outils
- Produit conçu pour les alliages d'acier, l'Inconel, l'acier à faible teneur en carbone, l'acier inoxydable, le titane et la fonte
- Longueur 3x diamètre
- Longueur 5x diamètre
- Élimine l'alésage dans plusieurs applications
- Facile à réaffûter sur les équipements classiques.
- Revêtement Ti-NAMITE-A® (AlTiN)

Tous les revêtements Ti-NAMITE sont disponibles sur demande.

DRILLS
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Series 135 3xD



Hi-PerCarb High Performance Double Margin Drills for depths up to 3xD

Serie 135 3xD

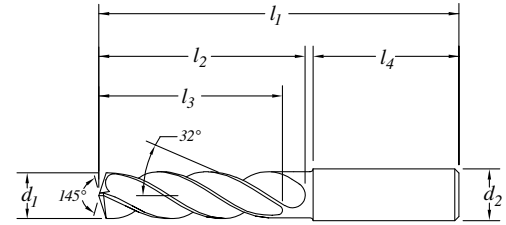


Brocas Hi-PerCarb de alto rendimiento de doble margen para profundidades de hasta 3xD

Série 135 3xD



Forets double marge haute performance Hi-PerCarb pour profondeurs jusqu'à 3xD



Cutting Diameter d_1	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d_2	Overall Length l_1	Flute Length l_2	Min. 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
3,0 mm	0.1181		6mm	62mm	20mm	17mm	36mm	63155
31	0.1200		1/8	2	5/8	9/16	1-1/4	51759
3,1 mm	0.1220		6mm	62mm	20mm	17mm	36mm	63741
1/8	0.1250		1/4	2-1/2	3/4	21/32	1-7/16	51330
3,2 mm	0.1260	M3,5 X 0,35	6mm	62mm	20mm	17mm	36mm	63156
30	0.1285		1/4	2-1/2	3/4	21/32	1-7/16	51278
3,3 mm	0.1299	M4 X 0,7	6mm	62mm	20mm	17mm	36mm	63157
3,4 mm	0.1339		6mm	62mm	20mm	17mm	36mm	63158
29	0.1360	8-32,8-36	1/4	2-1/2	3/4	21/32	1-7/16	51331
3,5 mm	0.1378	M4 X 0,5	6mm	62mm	20mm	17mm	36mm	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
3,6 mm	0.1417	M4 X 0,35	6mm	62mm	20mm	17mm	36mm	63160
27	0.1440		1/4	2-1/2	3/4	21/32	1-7/16	51761
3,7 mm	0.1457	M4.5 X 0,75	6mm	62mm	20mm	17mm	36mm	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
3,8 mm	0.1496		6mm	66mm	24mm	21mm	36mm	63472
24	0.1520	10-28	1/4	2-5/8	7/8	23/32	1-7/16	51763
3,9 mm	0.1535		6mm	66mm	24mm	21mm	36mm	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

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Tolerances (inch)			Tolerances (mm)		
Diameter	d ₁	d ₂	Diameter	d ₁	d ₂
≤ 34	+0.001/+0.005	h6	≤ 3	+0,0025/+0,0127	h6
> 34 – 1/4	+0.002/+0.006	h6	> 3 – 6	+0,0050/+0,0152	h6
> 1/4 – 3/8	+0.002/+0.008	h6	> 6 – 10	+0,0050/+0,0200	h6
> 3/8 – 3/4	+0.003/+0.011	h6	> 10 – 18	+0,0076/+0,0254	h6
> 3/4 – 1	+0.003/+0.011	h6	> 18 – 30	+0,0076/+0,0279	h6

Cutting Diameter d ₁	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d ₂	Overall Length l ₁	Flute Length l ₂	Min.Cleared Length l ₃	Shank Length l ₄	Ti-NAMITE-A (AlTiN) EDP No.
4,0 mm	0.1575	M4,5 X 0,5	6mm	66mm	24mm	21mm	36mm	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
4,1 mm	0.1614		6mm	66mm	24mm	21mm	36mm	63744
4,2 mm	0.1654	M5 / M5 X 0,75	6mm	66mm	24mm	21mm	36mm	63163
19	0.1660		1/4	2-5/8	7/8	23/32	1-7/16	51766
4,3 mm	0.1693		6mm	66mm	24mm	21mm	36mm	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
4,4 mm	0.1732		6mm	66mm	24mm	21mm	36mm	63745
16	0.1770	12-24	1/4	2-5/8	7/8	23/32	1-7/16	51769
4,5 mm	0.1772	M5 X 0,5	6mm	66mm	24mm	21mm	36mm	63165
15	0.1800		1/4	2-5/8	7/8	23/32	1-7/16	51770
4,6 mm	0.1811	12-28	6mm	66mm	24mm	21mm	36mm	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
4,7 mm	0.1850		6mm	66mm	24mm	21mm	36mm	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
4,8 mm	0.1890		6mm	66mm	28mm	24mm	36mm	63167
11	0.1910		1/4	2-5/8	1	53/64	1-7/16	51774
4,9 mm	0.1929		6mm	66mm	28mm	24mm	36mm	63747
10	0.1935	14-20	1/4	2-5/8	1	53/64	1-7/16	51775
9	0.1960		1/4	2-5/8	1	53/64	1-7/16	51776
5,0 mm	0.1969	M6 X 1	6mm	66mm	28mm	24mm	36mm	63168
8	0.1990		1/4	2-5/8	1	53/64	1-7/16	51777
5,1 mm	0.2008		6mm	66mm	28mm	24mm	36mm	63748
7	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
6	0.2040		1/4	2-5/8	1	53/64	1-7/16	51778
5,2 mm	0.2047	M6 X 0,75	6mm	66mm	28mm	24mm	36mm	63749
5	0.2055		1/4	2-5/8	1	53/64	1-7/16	51779
5,25 mm	0.2067		6mm	66mm	28mm	24mm	36mm	63169
5,3 mm	0.2087		6mm	66mm	28mm	24mm	36mm	63170
4	0.2090	1/4-24	1/4	2-5/8	1	53/64	1-7/16	51780
5,4 mm	0.2126		6mm	66mm	28mm	24mm	36mm	63750

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Series 135 3xD



Hi-PerCarb High Performance
Double Margin Drills for depths
up to 3xD

Serie 135 3xD

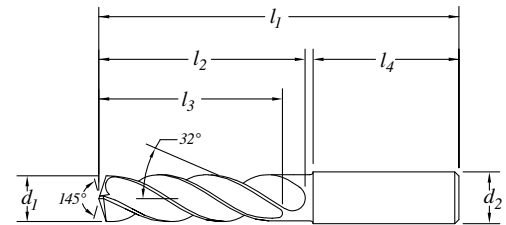


Brocas Hi-PerCarb de alto
rendimiento de doble margen
para profundidades de hasta
3xD

Série 135 3xD



Forets double marge haute
performance Hi-PerCarb pour
profondeurs jusqu'à 3xD



Cutting Diameter d_1	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d_2	Overall Length l_1	Flute Length l_2	Min.Cleared Length l_3	Shank Length l_4	Ti-NAMITE-A (AITiN) EDP No.
3	0.2130	1/4-28	1/4	2-5/8	1	53/64	1-7/16	51340
5,5 mm	0.2165	M6 X 0,5	6mm	66mm	28mm	24mm	36mm	63171
7/32	0.2188	1/4-32	1/4	2-5/8	1	53/64	1-7/16	51341
5,6 mm	0.2205		6mm	66mm	28mm	24mm	36mm	63751
2	0.2210		1/4	2-5/8	1	53/64	1-7/16	51781
5,7 mm	0.2244		6mm	66mm	28mm	24mm	36mm	63752
1	0.2280		1/4	2-5/8	1	53/64	1-7/16	51782
5,8 mm	0.2283		6mm	66mm	28mm	24mm	36mm	63172
5,9 mm	0.2323		6mm	66mm	28mm	24mm	36mm	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
6,0	0.2362	M7 X 1	6mm	66mm	28mm	24mm	36mm	63173
B	0.2380		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51602
6,1 mm	0.2402		8mm	79mm	34mm	28mm	36mm	63754
C	0.2420		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51603
6,2 mm	0.2441		8mm	79mm	34mm	28mm	36mm	63755
D	0.2460		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51604
6,25 mm	0.2461	M7 X 0,75	8mm	79mm	34mm	28mm	36mm	63174
6,3 mm	0.2480		8mm	79mm	34mm	28mm	36mm	63756
1/4	0.2500		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51343
E	0.2500		1/4	3-1/8	1-5/16	1-3/64	1-7/16	51605
6,4 mm	0.2520		8mm	79mm	34mm	28mm	36mm	63175
6,5 mm	0.2559		8mm	79mm	34mm	28mm	36mm	63213
F	0.2570	5/16-18	5/16	3-1/8	1-5/16	1-3/64	1-7/16	51344
6,6 mm	0.2598		8mm	79mm	34mm	28mm	36mm	63757
G	0.2610		5/16	3-1/8	1-5/16	1-3/64	1-7/16	51606
6,7 mm	0.2638		8mm	79mm	34mm	28mm	36mm	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
6,8 mm	0.2677	M8 X 1,25	8mm	79mm	34mm	28mm	36mm	63176
6,9 mm	0.2717		8mm	79mm	34mm	28mm	36mm	63759
I	0.2720	5/16-24	5/16	3-1/8	1-5/16	1-3/64	1-7/16	51346
7,0 mm	0.2756	M8 X 1	8mm	79mm	34mm	28mm	36mm	63177
J	0.2770		5/16	3-1/8	1-5/16	1-3/64	1-7/16	51608
7,1 mm	0.2795		8mm	79mm	41mm	34mm	36mm	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
7,2 mm	0.2835		8mm	79mm	41mm	34mm	36mm	63761
7,25 mm	0.2854	M8 X 0,75	8mm	79mm	41mm	34mm	36mm	63178
7,3 mm	0.2874		8mm	79mm	41mm	34mm	36mm	63762

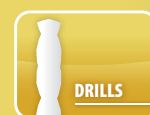
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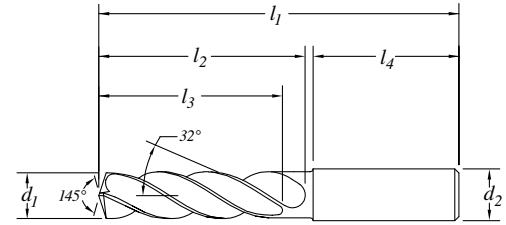


Tolerances (inch)		
Diameter	d ₁	d ₂
≤ 3/4	+ .0001/+ .0005	h6
> 3/4 – 1/4	+ .0002/+ .0006	h6
> 1/4 – 3/8	+ .0002/+ .0008	h6
> 3/8 – 3/4	+ .0003/+ .0011	h6
> 3/4 – 1	+ .0003/+ .0011	h6

Cutting Diameter d ₁	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d ₂	Overall Length l ₁	Flute Length l ₂	Min. Cleared Length l ₃	Shank Length l ₄	Ti-NAMITE-A (AlTiN) EDP No.
L	0.2900		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51610
7,4 mm	0.2913		8mm	79mm	41mm	34mm	36mm	63763
M	0.2950		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51611
7,5 mm	0.2953	M8 X 0,5	8mm	79mm	41mm	34mm	36mm	63179
19/64	0.2969		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51348
7,6 mm	0.2992		8mm	79mm	41mm	34mm	36mm	63764
N	0.3020		5/16	3-1/8	1-9/16	1-3/16	1-7/16	51612
7,7 mm	0.3031		8mm	79mm	41mm	34mm	36mm	63765
7,8 mm	0.3071	M9 X 1,25	8mm	79mm	41mm	34mm	36mm	63180
7,9 mm	0.3110		8mm	79mm	41mm	34mm	36mm	63766
5/16	0.3125	3/8-16	5/16	3-1/8	1-9/16	1-3/16	1-7/16	51349
8,0 mm	0.3150	M9 x 1	8mm	79mm	41mm	34mm	36mm	63181
O	0.3160		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51613
8,1 mm	0.3189		10mm	89mm	47mm	40mm	40mm	63767
8,2 mm	0.3228		10mm	89mm	47mm	40mm	40mm	63768
P	0.3230		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51614
8,3 mm	0.3268		10mm	89mm	47mm	40mm	40mm	63769
21/64	0.3281	3/8-20	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51350
8,4 mm	0.3307		10mm	89mm	47mm	40mm	40mm	63182
Q	0.3320	3/8-24	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51351
8,5 mm	0.3346	M10 X 1,5	10mm	89mm	47mm	40mm	40mm	63183
8,6 mm	0.3386		10mm	89mm	47mm	40mm	40mm	63770
R	0.3390		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51615
8,7 mm	0.3425		10mm	89mm	47mm	40mm	40mm	63771
11/32	0.3438	3/8-32	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51352
8,8 mm	0.3465	M10 X 1,25	10mm	89mm	47mm	40mm	40mm	63184
S	0.3480		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51616
8,9 mm	0.3504		10mm	89mm	47mm	40mm	40mm	63772
9,0 mm	0.3543	M10 X 1	10mm	89mm	47mm	40mm	40mm	63185
T	0.3580		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51617
9,1 mm	0.3583		10mm	89mm	47mm	40mm	40mm	63773
23/64	0.3594		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51353
9,2 mm	0.3622	M10 X 0,75	10mm	89mm	47mm	40mm	40mm	63774
9,25 mm	0.3642		10mm	89mm	47mm	40mm	40mm	63186
9,3 mm	0.3661		10mm	89mm	47mm	40mm	40mm	63775
U	0.3680	7/16-14	3/8	3-1/2	1-27/32	1-37/64	1-9/16	51354
9,4 mm	0.3701		10mm	89mm	47mm	40mm	40mm	63776
9,5 mm	0.3740	M10 X 0,5	10mm	89mm	47mm	40mm	40mm	63187
3/8	0.3750		3/8	3-1/2	1-27/32	1-37/64	1-9/16	51355

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Series 135 3xD



Hi-PerCarb High Performance
Double Margin Drills for depths
up to 3xD

Serie 135 3xD



Brocas Hi-PerCarb de alto
rendimiento de doble margen
para profundidades de hasta
3xD

Série 135 3xD



Forets double marge haute
performance Hi-PerCarb pour
profondeurs jusqu'à 3xD

Cutting Diameter d_1	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d_2	Overall Length l_1	Flute Length l_2	Min. Cleared Length l_3	Shank Length l_4	Ti-NAMITE-A (AITiN) EDP No.
V	0.3770		1/2	3-1/2	1-27/32	1-37/64	1-9/16	51618
9,6 mm	0.3780		10mm	89mm	47mm	40mm	40mm	63777
9,7 mm	0.3819		10mm	89mm	47mm	40mm	40mm	63778
9,8 mm	0.3858		10mm	89mm	47mm	40mm	40mm	63779
W	0.3860		1/2	3-1/2	1-27/32	1-37/64	1-9/16	51619
9,9 mm	0.3898		10mm	89mm	47mm	40mm	40mm	63780
25/64	0.3906	7/16-20	1/2	3-1/2	1-27/32	1-37/64	1-9/16	51356
10,0 mm	0.3937		10mm	89mm	47mm	40mm	40mm	63188
X	0.3970	7/16-24	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51620
10,1 mm	0.3976		12mm	102mm	55mm	45mm	45mm	63781
10,2 mm	0.4016	M12 X 1,75	12mm	102mm	55mm	45mm	45mm	63189
Y	0.4040	7/16-28	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51621
10,3 mm	0.4055		12mm	102mm	55mm	45mm	45mm	63782
13/32	0.4062		1/2	4-1/16	2-3/16	1-51/64	1-49/64	51357
10,4 mm	0.4094		12mm	102mm	55mm	45mm	45mm	63783
Z	0.4130		1/2	4-1/16	2-3/16	1-51/64	1-49/64	51622
10,5 mm	0.4134	M12 X 1,5	12mm	102mm	55mm	45mm	45mm	63190
10,6 mm	0.4173		12mm	102mm	55mm	45mm	45mm	63784
10,7 mm	0.4213		12mm	102mm	55mm	45mm	45mm	63785
27/64	0.4219	1/2-13	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51358
10,8 mm	0.4252	M12 X 1,25	12mm	102mm	55mm	45mm	45mm	63191
10,9 mm	0.4291		12mm	102mm	55mm	45mm	45mm	63786
11,0 mm	0.4331	M12 X 1	12mm	102mm	55mm	45mm	45mm	63192
11,1 mm	0.4370		12mm	102mm	55mm	45mm	45mm	63787
7/16	0.4375	1/4-18 NPT	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51359
11,2 mm	0.4409		12mm	102mm	55mm	45mm	45mm	63788
11,25 mm	0.4429		12mm	102mm	55mm	45mm	45mm	63193
11,3 mm	0.4449		12mm	102mm	55mm	45mm	45mm	63789
11,4 mm	0.4488		12mm	102mm	55mm	45mm	45mm	63790
11,5 mm	0.4528	M12 X 0,5	12mm	102mm	55mm	45mm	45mm	63194
29/64	0.4531	1/2-20	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51360
11,6 mm	0.4567		12mm	102mm	55mm	45mm	45mm	63791
11,7 mm	0.4606		12mm	102mm	55mm	45mm	45mm	63792
11,8 mm	0.4646		12mm	102mm	55mm	45mm	45mm	63793
11,9 mm	0.4685		12mm	102mm	55mm	45mm	45mm	63794
15/32	0.4688	1/2-28	1/2	4-1/16	2-3/16	1-51/64	1-49/64	51361
12,0 mm	0.4724	M14 X 2	12mm	102mm	55mm	45mm	45mm	63195
31/64	0.4844	9/16-12	1/2	4-1/4	2-5/16	1-7/8	1-49/64	51362
12,5 mm	0.4921	M14 X 1,5	14mm	107mm	60mm	49mm	45mm	63196

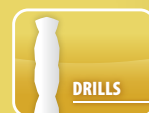
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Tolerances (inch)			Tolerances (mm)		
Diameter	d ₁	d ₂	Diameter	d ₁	d ₂
≤ 3/4	+0.001/+0.005	h6	≤ 3	+0,0025/+0,0127	h6
> 3/4 – 1/4	+0.002/+0.006	h6	> 3 – 6	+0,0050/+0,0152	h6
> 1/4 – 3/8	+0.002/+0.008	h6	> 6 – 10	+0,0050/+0,0200	h6
> 3/8 – 3/4	+0.003/+0.011	h6	> 10 – 18	+0,0076/+0,0254	h6
> 3/4 – 1	+0.003/+0.011	h6	> 18 – 30	+0,0076/+0,0279	h6

Cutting Diameter d ₁	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d ₂	Overall Length l ₁	Flute Length l ₂	Min.Cleared Length l ₃	Shank Length l ₄	Ti-NAMITE-A (AlTiN) EDP No.
1/2	0.5000		1/2	4-1/4	2-5/16	1-7/8	1-49/64	51363
12,8 mm	0.5039	M14 X 1,25	14mm	107mm	60mm	49mm	45mm	63197
13,0 mm	0.5118	M14 X 1	14mm	107mm	60mm	49mm	45mm	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
13,5 mm	0.5315		14mm	107mm	60mm	49mm	45mm	63199
35/64	0.5469	5/8-12	5/8	4-1/4	2-5/16	1-7/8	1-49/64	51783
14,0 mm	0.5512	M16 X 2	14mm	107mm	60mm	49mm	45mm	63200
9/16	0.5625		5/8	4-9/16	2-1/2	2	1-57/64	51366
14,5 mm	0.5709	M16 X 1,5	16mm	115mm	65mm	51mm	48mm	63201
37/64	0.5781	5/8-18	5/8	4-9/16	2-1/2	2	1-57/64	51367
15,0 mm	0.5906	M16 X 1	16mm	115mm	65mm	51mm	48mm	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
15,5 mm	0.6102	M18 X 2,5	16mm	115mm	65mm	51mm	48mm	63203
5/8	0.6250	11/16-16	5/8	4-9/16	2-1/2	2	1-57/64	51368
16,0 mm	0.6299		16mm	115mm	65mm	51mm	48mm	63204
41/64	0.6406	11/16-24	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51786
16,5 mm	0.6496	M18 X 1,5	18mm	123mm	73mm	58mm	48mm	63205
21/32	0.6562	3/4-10	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51369
17,0 mm	0.6693		18mm	123mm	73mm	58mm	48mm	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
17,5 mm	0.6890	M20 X 2,5	18mm	123mm	73mm	58mm	48mm	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
18,0 mm	0.7087		18mm	123mm	73mm	58mm	48mm	63208
23/32	0.7188		3/4	4-7/8	2-3/4	2-5/16	1-57/64	51789
18,5 mm	0.7283	M20 X 1,5	20mm	131mm	79mm	63mm	50mm	63209
47/64	0.7344	13/16-12	3/4	4-7/8	2-3/4	2-5/16	1-57/64	51790
19,0 mm	0.7480		20mm	131mm	79mm	63mm	50mm	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
19,5 mm	0.7677	M22 X 2,5	20mm	131mm	79mm	63mm	50mm	63211
25/32	0.7812		7/8	6	3-11/16	2-11/16	2-1/8	51791
20,0 mm	0.7874		20mm	131mm	79mm	63mm	50mm	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

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Series 135 5xD



Hi-PerCarb High Performance Double Margin Drills for depths up to 5xD

Serie 135 5xD

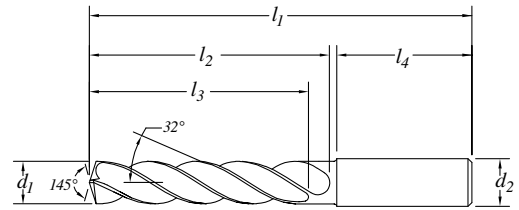


Brocas Hi-PerCarb de alto rendimiento de doble margen para profundidades de hasta 5xD

Série 135 5xD



Forets double marge haute performance Hi-PerCarb pour profondeurs jusqu'à 5xD



Cutting Diameter d_1	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d_2	Overall Length l_1	Flute Length l_2	Min. Cleared Length l_3	Shank Length l_4	Ti-NAMITE-A (AlTiN) EDP No.
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
7	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
5	0.2055		1/4	3-1/4	1-3/4	1-37/64	1-7/16	51590
4	0.2090	1/4-24	1/4	3-1/4	1-3/4	1-37/64	1-7/16	51508
3	0.2130	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)

Diameter	d ₁	d ₂
≤ 3/4	+ .0001/+ .0005	h6
> 3/4 – 1/4	+ .0002/+ .0006	h6
> 1/4 – 3/8	+ .0002/+ .0008	h6
> 3/8 – 3/4	+ .0003/+ .0011	h6

Cutting Diameter d ₁	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d ₂	Overall Length l ₁	Flute Length l ₂	Min.Cleared Length l ₃	Shank Length l ₄	Ti-NAMITE-A (AlTiN) EDP No.
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

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ICe-Carb Internal Coolant Drills for Depths up to 8XD

Features & Benefits:

- **Drilling depths up to 8xD:** Eliminates the need for pecking in most applications
- **Internal coolant** for achieving higher cutting parameters and greater chip control
- **140 degree self-centering point angle**
- **Unique geometry features** that enhance coolant flow and chip removal
- **Corner protection added** for increased tool life
- **Ti-NAMITE-A (AlTiN) coated** for higher thermal stability and greater wear resistance in deep hole drilling
- **Excellent results in Stainless Steel, Alloyed Steel, Cast Iron, Low Carbon Steel, Tool Steel, Inconel, Titanium**





Brocas ICe-Carb con refrigerante interno para profundidades de hasta 8XD

Características y ventajas:

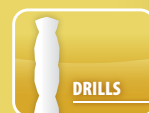
- Profundidades de perforación de hasta 8xD: Eliminan la necesidad de ciclos de perforación y retroceso (pecking) en la mayoría de las aplicaciones
- Refrigerante interno para lograr mejores parámetros de corte y mayor control de las virutas
- Punta autocentrada con un ángulo de 140 grados
- Características geométricas únicas que mejoran el flujo del refrigerante y el arranque de viruta
- Agregado de protección de esquinas para prolongar la vida útil de la herramienta
- Recubiertas con Ti-NAMITE-A (AlTiN) para lograr mayor estabilidad térmica y mayor resistencia al desgaste en la perforación de agujeros profundos
- Excelentes resultados en acero inoxidable, aceros aleados, hierro fundido, acero con bajo contenido de carbono, acero para herramientas, Inconel y titanio

Forets ICe-Carb à refroidissement interne pour profondeurs jusqu'à 8XD

Caractéristiques et avantages :

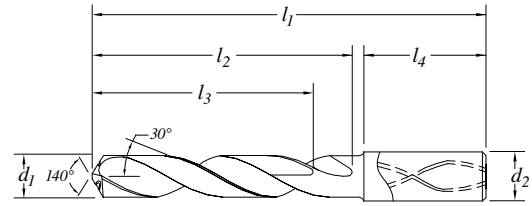
- Profondeurs de perforation jusqu'à 8xD (élimine la nécessité du picotage dans la plupart des applications)
- Refroidissement interne permettant d'avoir de meilleurs paramètres de découpage et un meilleur contrôle des copeaux
- Angle au sommet de 140 degrés avec auto-centrage
- Géométrie unique avec écoulement amélioré du liquide de refroidissement et enlèvement plus efficace des copeaux
- Protection de coin ajoutée pour augmenter la longévité des outils
- Revêtement Ti-NAMITE-A (AlTiN) pour une stabilité thermique accrue et une meilleure résistance à l'usure lors des perforations profondes
- Excellents résultats sur l'acier inoxydable, les alliages d'acier, la fonte, l'acier à faible teneur en carbone, l'acier d'outillage, l'Inconel et le titane

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ICe-Carb Internal Coolant Drills for Depths up to 5xD

Series **140 5xD**



Series 140 5xD



ICe-Carb Internal Coolant Drills for
Depths up to 5xD

Serie 140 5xD



Brocas ICe-Carb con refrigerante
interno para profundidades de hasta
5xD

Série 140 5xD



Forets ICe-Carb à refroidissement
interne pour profondeurs jusqu'à
5xD

Cutting Diameter d_1 mm	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d_2 mm	Overall Length l_1 mm	Flute Length l_2 mm	Min. Cleared Length l_3 mm	Shank Length l_4 mm	Ti-NAMITE-A (AITiN) EDP No.
3,0 mm	0.1181		6	66	28	23	36	63901
3,1 mm	0.1220		6	66	28	23	36	63902
1/8	0.1250		6	66	28	23	36	51901
3,2 mm	0.1260	M3,5 X 0,35	6	66	28	23	36	63903
3,3 mm	0.1299	M4 X 0,7	6	66	28	23	36	63904
3,4 mm	0.1339		6	66	28	23	36	63905
29	0.1360	8-32,8-36	6	66	28	23	36	51902
3,5 mm	0.1378	M4 X 0,5	6	66	28	23	36	63906
9/64	0.1406		6	66	28	23	36	51903
3,6 mm	0.1417	M4 X 0,35	6	66	28	23	36	63907
3,7 mm	0.1457	M4,5 X 0,75	6	66	28	23	36	63908
3,8 mm	0.1496	10-24	6	74	36	29	36	51904
3,9 mm	0.1535		6	74	36	29	36	63909
5/32	0.1562		6	74	36	29	36	51905
4,0 mm	0.1575	M4,5 X 0,5	6	74	36	29	36	63910
21	0.1590	10-32	6	74	36	29	36	51906
4,1 mm	0.1614		6	74	36	29	36	63911
4,2 mm	0.1654	M5 / M5 x 0,75	6	74	36	29	36	63912
4,3 mm	0.1693		6	74	36	29	36	63913
11/64	0.1719		6	74	36	29	36	51907
4,4 mm	0.1732	12-24	6	74	36	29	36	63914
4,5 mm	0.1772	M5 X 0,5	6	74	36	29	36	63915
4,6 mm	0.1811	12-28	6	74	36	29	36	63916
4,7 mm	0.1850	12-32	6	74	36	29	36	63917
3/16	0.1875		6	82	44	35	36	51908
4,8 mm	0.1890	7/32-32	6	82	44	35	36	63918
4,9 mm	0.1929		6	82	44	35	36	63919
5,0 mm	0.1969	M6 X 1	6	82	44	35	36	63920
5,1 mm	0.2008	1/4-20	6	82	44	35	36	63900
13/64	0.2031		6	82	44	35	36	51910
5,2 mm	0.2047	M6 X 0,75	6	82	44	35	36	63921
5,3 mm	0.2087		6	82	44	35	36	63922
5,4 mm	0.2126		6	82	44	35	36	63998
5,5 mm	0.2165	M6 X 0,5	6	82	44	35	36	63923
7/32	0.2188	1/4-32	6	82	44	35	36	51912
5,6 mm	0.2205		6	82	44	35	36	63924

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Diameter	Tolerances (inch)		Diameter	Tolerances (mm)	
	d ₁	d ₂		d ₁	d ₂
≥ 1/8 – 1/4	+0.002/+0.0006	h6	≤ 3	+0,0025/+0,0127	h6
> 1/4 – 3/8	+0.002/+0.0008	h6	> 3 – 6	+0,0050/+0,0152	h6
> 3/8 – 3/4	+0.003/+0.0011	h6	> 6 – 10	+0,0050/+0,0200	h6
			> 10 – 18	+0,0076/+0,0254	h6
			> 18 – 30	+0,0076/+0,0279	h6

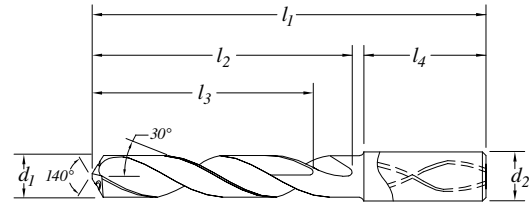
Cutting Diameter d ₁ mm	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d ₂ mm	Overall Length l ₁ mm	Flute Length l ₂ mm	Min. Cleared Length l ₃ mm	Shank Length l ₄ mm	Ti-NAMITE-A (AlTiN) EDP No.
5,7 mm	0.2244		6	82	44	35	36	63925
5,8 mm	0.2283		6	82	44	35	36	63926
5,9 mm	0.2323		6	82	44	35	36	63927
15/64	0.2344		6	82	44	35	36	51913
6,0 mm	0.2362	M7 X 1	6	82	44	35	36	63928
6,1 mm	0.2402		8	91	53	43	36	63929
6,2 mm	0.2441	M7 X 0,75	8	91	53	43	36	63930
6,3 mm	0.2480		8	91	53	43	36	63931
1/4	0.2500		8	91	53	43	36	51914
6,4 mm	0.2520		8	91	53	43	36	63932
6,5 mm	0.2559		8	91	53	43	36	63933
F	0.2570	5/16-18	8	91	53	43	36	51915
6,6 mm	0.2598		8	91	53	43	36	63934
6,7 mm	0.2638		8	91	53	43	36	63935
17/64	0.2657	5/16-20	8	91	53	43	36	51916
6,8 mm	0.2677	M8 X 1,25	8	91	53	43	36	63936
6,9 mm	0.2717	5/16-24	8	91	53	43	36	63999
7,0 mm	0.2756	M8 X 1	8	91	53	43	36	63937
7,1 mm	0.2795		8	91	53	43	36	63938
9/32	0.2812	5/16-32	8	91	53	43	36	51918
7,2 mm	0.2835	M8 X 0,75	8	91	53	43	36	63939
7,3 mm	0.2874		8	91	53	43	36	63940
7,4 mm	0.2913		8	91	53	43	36	63941
7,5 mm	0.2953	M8 X 0,5	8	91	53	43	36	63942
19/64	0.2969		8	91	53	43	36	51919
7,6 mm	0.2992		8	91	53	43	36	63943
7,7 mm	0.3031		8	91	53	43	36	63944
7,8 mm	0.3071	M9 X 1,25	8	91	53	43	36	63945
7,9 mm	0.3110		8	91	53	43	36	63946
5/16	0.3125	3/8-16	8	91	53	43	36	51920
8,0 mm	0.3150	M9 X 1	8	91	53	43	36	63947
8,1 mm	0.3189		10	103	61	49	40	63948
8,2 mm	0.3228		10	103	61	49	40	63949
8,3 mm	0.3268		10	103	61	49	40	63950
21/64	0.3281	3/8-20	10	103	61	49	40	51921
8,4 mm	0.3307		10	103	61	49	40	63951

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ICe-Carb Internal Coolant Drills for Depths up to 5xD

Series **140 5xD**



Series 140 5xD



ICe-Carb Internal Coolant Drills for
Depths up to 5xD

Serie 140 5xD



Brocas ICe-Carb con refrigerante
interno para profundidades de hasta
5xD

Série 140 5xD



Forets ICe-Carb à refroidissement
interne pour profondeurs jusqu'à
5xD

Cutting Diameter d_1 mm	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d_2 mm	Overall Length l_1 mm	Flute Length l_2 mm	Min. Cleared Length l_3 mm	Shank Length l_4 mm	Ti-NAMITE-A (AITiN) EDP No.
Q	0.3320	3/8-24	10	103	61	49	40	51922
8,5 mm	0.3346	M10 X 1,5	10	103	61	49	40	63952
8,6 mm	0.3386		10	103	61	49	40	63953
8,7 mm	0.3425		10	103	61	49	40	63954
11/32	0.3438	3/8-32	10	103	61	49	40	51923
8,8 mm	0.3465	M10 X 1,25	10	103	61	49	40	63955
8,9 mm	0.3504		10	103	61	49	40	63956
9,0 mm	0.3543	M10 X 1	10	103	61	49	40	63957
9,1 mm	0.3583		10	103	61	49	40	63958
23/64	0.3594		10	103	61	49	40	51924
9,2 mm	0.3622	M10 X 0,75	10	103	61	49	40	63959
9,3 mm	0.3661		10	103	61	49	40	63960
U	0.3680	7/16-14	10	103	61	49	40	51925
9,4 mm	0.3701		10	103	61	49	40	63961
9,5 mm	0.3740	M11 / M10 X 0,5	10	103	61	49	40	63962
3/8	0.3750		10	103	61	49	40	51926
9,6 mm	0.3780		10	103	61	49	40	63963
9,7 mm	0.3819		10	103	61	49	40	63964
9,8 mm	0.3858		10	103	61	49	40	63965
9,9 mm	0.3898		10	103	61	49	40	63966
25/64	0.3906	7/16-20	10	103	61	49	40	51927
10,0 mm	0.3937		10	103	61	49	40	63967
10,1 mm	0.3976		12	118	71	56	45	63968
10,2 mm	0.4016	M12 X 1,75	12	118	71	56	45	63969
10,3 mm	0.4055		12	118	71	56	45	63970
13/32	0.4062		12	118	71	56	45	51928
10,4 mm	0.4094		12	118	71	56	45	63971
10,5 mm	0.4134	M12 X 1,5	12	118	71	56	45	63972
10,6 mm	0.4173		12	118	71	56	45	63973
10,7 mm	0.4213		12	118	71	56	45	63974
27/64	0.4219	1/2-13	12	118	71	56	45	51929
10,8 mm	0.4252	M12 X 1,25	12	118	71	56	45	63975
10,9 mm	0.4291		12	118	71	56	45	63976

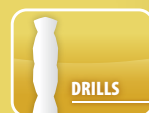
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Diameter	Tolerances (inch)		Diameter	Tolerances (mm)	
	d ₁	d ₂		d ₁	d ₂
≥ 1/8 – 1/4	+0.002/+0.0006	h6	≤ 3	+0,0025/+0,0127	h6
> 1/4 – 3/8	+0.002/+0.0008	h6	> 3 – 6	+0,0050/+0,0152	h6
> 3/8 – 3/4	+0.003/+0.0011	h6	> 6 – 10	+0,0050/+0,0200	h6
			> 10 – 18	+0,0076/+0,0254	h6
			> 18 – 30	+0,0076/+0,0279	h6

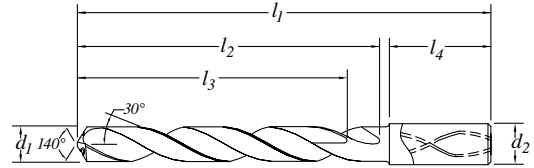
Cutting Diameter d ₁ mm	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d ₂ mm	Overall Length l ₁ mm	Flute Length l ₂ mm	Min. Cleared Length l ₃ mm	Shank Length l ₄ mm	Ti-NAMITE-A (AlTiN) EDP No.
11,0 mm	0.4331	M12 X 1	12	118	71	56	45	63977
11,1 mm	0.4370		12	118	71	56	45	63978
7/16	0.4375	1/4-18NPT	12	118	71	56	45	51930
11,2 mm	0.4409		12	118	71	56	45	63979
11,3 mm	0.4449		12	118	71	56	45	63980
11,4 mm	0.4488		12	118	71	56	45	63981
11,5 mm	0.4528	M12 X 0,5	12	118	71	56	45	64000
11,6 mm	0.4567		12	118	71	56	45	63982
11,7 mm	0.4606		12	118	71	56	45	63983
11,8 mm	0.4646		12	118	71	56	45	63984
11,9 mm	0.4685		12	118	71	56	45	63985
15/32	0.4688	1/2-28	12	118	71	56	45	51932
12,0 mm	0.4724	M14 X 2	12	118	71	56	45	63986
31/64	0.4844	9/16-12	14	124	77	60	45	51933
12,5 mm	0.4921	M14 X 1,5	14	124	77	60	45	63987
1/2	0.5000		14	124	77	60	45	51934
12,8 mm	0.5039	M14 X 1,25	14	124	77	60	45	63988
13,0 mm	0.5118	M14 X 1	14	124	77	60	45	63989
33/64	0.5156	9/16-18	14	124	77	60	45	51935
13,5 mm	0.5315	5/8-11	14	124	77	60	45	64001
13,8 mm	0.5433		14	124	77	60	45	63990
14,0 mm	0.5512	M16 X 2	14	124	77	60	45	63991
9/16	0.5625		16	133	83	63	48	51937
14,5 mm	0.5709	M16 X 1,5	16	133	83	63	48	63992
37/64	0.5781	5/8-18	16	133	83	63	48	51938
14,8 mm	0.5827		16	133	83	63	48	63993
15,0 mm	0.5906	M16 X 1	16	133	83	63	48	63994
15,5 mm	0.6102	M18 X 2,5	16	133	83	63	48	63995
15,8 mm	0.6220		16	133	83	63	48	63996
5/8	0.6250	11/16-16	16	133	83	63	48	51939
16,0 mm	0.6299		16	133	83	63	48	63997
21/32	0.6562	3/4-10	18	143	93	71	48	51940
11/16	0.6875	3/4-16	18	143	93	71	48	51941
3/4	0.7500	13/16-16	20	153	101	77	50	51942

DRILLS
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ICe-Carb Internal Coolant Drills for Depths up to 8xD

Series **140 8xD**



Series 140 8xD



ICe-Carb Internal Coolant Drills for
Depths up to 8xD

Serie 140 8xD



Brocas ICe-Carb con refrigerante
interno para profundidades de hasta
8xD

Série 140 8xD



Forets ICe-Carb à refroidissement
interne pour profondeurs jusqu'à
8xD

Cutting Diameter d_1 mm	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d_2 mm	Overall Length l_1 mm	Flute Length l_2 mm	Min. Cleared Length l_3 mm	Shank Length l_4 mm	Ti-NAMITE-A (AlTiN) EDP No.
3,0 mm	0.1181		6	72	34	29	36	63575
3,1 mm	0.1220		6	72	34	29	36	63576
1/8	0.1250		6	72	34	29	36	51801
3,2 mm	0.1260	M3,5 X 0,35	6	72	34	29	36	63577
3,3 mm	0.1299	M4 X 0,7	6	72	34	29	36	63578
3,4 mm	0.1339		6	72	34	29	36	63579
29	0.1360	8-32,8-36	6	72	34	29	36	51802
3,5 mm	0.1378	M4 X 0,5	6	72	34	29	36	63580
9/64	0.1406		6	72	34	29	36	51803
3,6 mm	0.1417	M4 X 0,35	6	72	34	29	36	63581
3,7 mm	0.1457	M4,5 X 0,75	6	72	34	29	36	63582
3,8 mm	0.1496	10-24	6	81	43	36	36	63583
3,9 mm	0.1535		6	81	43	36	36	63584
5/32	0.1562		6	81	43	36	36	51804
4,0 mm	0.1575	M4,5 X 0,5	6	81	43	36	36	63585
21	0.1590	10-32	6	81	43	36	36	51805
4,1 mm	0.1614		6	81	43	36	36	63586
4,2 mm	0.1654	M5 / M5 X 0,75	6	81	43	36	36	63587
4,3 mm	0.1693		6	81	43	36	36	63588
11/64	0.1719		6	81	43	36	36	51806
4,4 mm	0.1732	12-24	6	81	43	36	36	63589
4,5 mm	0.1772	M5 X 0,5	6	81	43	36	36	63590
4,6 mm	0.1811	12-28	6	81	43	36	36	63591
4,7 mm	0.1850	12-32	6	81	43	36	36	63592
3/16	0.1875		6	95	57	48	36	51807
4,8 mm	0.1890	7/32-32	6	95	57	48	36	63593
4,9 mm	0.1929		6	95	57	48	36	63594
5,0 mm	0.1969	M6 X 1	6	95	57	48	36	63595
5,1 mm	0.2008	1/4-20	6	95	57	48	36	63596
13/64	0.2031		6	95	57	48	36	51808
5,2 mm	0.2047	M6 X 0,75	6	95	57	48	36	63597
5,3 mm	0.2087		6	95	57	48	36	63598
5,4 mm	0.2126		6	95	57	48	36	63599
5,5 mm	0.2165	M6 X 0,5	6	95	57	48	36	63600
7/32	0.2188	1/4-32	6	95	57	48	36	51809
5,6 mm	0.2205		6	95	57	48	36	63601

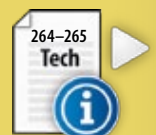
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Diameter	Tolerances (inch)		Diameter	Tolerances (mm)	
	d ₁	d ₂		d ₁	d ₂
≥ 1/8 – 1/4	+0.002/+0.0006	h6	≤ 3	+0,0025/+0,0127	h6
> 1/4 – 3/8	+0.002/+0.0008	h6	> 3 – 6	+0,0050/+0,0152	h6
> 3/8 – 3/4	+0.003/+0.0011	h6	> 6 – 10	+0,0050/+0,0200	h6
			> 10 – 18	+0,0076/+0,0254	h6
			> 18 – 30	+0,0076/+0,0279	h6

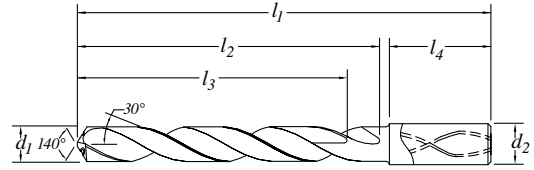
Cutting Diameter d ₁ mm	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d ₂ mm	Overall Length l ₁ mm	Flute Length l ₂ mm	Min. Cleared Length l ₃ mm	Shank Length l ₄ mm	Ti-NAMITE-A (AlTiN) EDP No.
5,7 mm	0.2244		6	95	57	48	36	63602
5,8 mm	0.2283		6	95	57	48	36	63603
5,9 mm	0.2323		6	95	57	48	36	63604
15/64	0.2344		6	95	57	48	36	51810
6,0 mm	0.2362	M7 X 1	6	95	57	48	36	63605
6,1 mm	0.2402		8	114	76	64	36	63606
6,2 mm	0.2441	M7 X 0,75	8	114	76	64	36	63607
6,3 mm	0.2480		8	114	76	64	36	63608
1/4	0.2500		8	114	76	64	36	51811
6,4 mm	0.2520		8	114	76	64	36	63609
6,5 mm	0.2559		8	114	76	64	36	63610
F	0.2570	5/16-18	8	114	76	64	36	51812
6,6 mm	0.2598		8	114	76	64	36	63611
6,7 mm	0.2638		8	114	76	64	36	63612
17/64	0.2657	5/16-20	8	114	76	64	36	51813
6,8 mm	0.2677	M8 X 1,25	8	114	76	64	36	63613
6,9 mm	0.2717		8	114	76	64	36	63614
7,0 mm	0.2756	M8 X 1	8	114	76	64	36	63615
7,1 mm	0.2795		8	114	76	64	36	63616
9/32	0.2812	5/16-32	8	114	76	64	36	51814
7,2 mm	0.2835	M8 X 0,75	8	114	76	64	36	63617
7,3 mm	0.2874		8	114	76	64	36	63618
7,4 mm	0.2913		8	114	76	64	36	63619
7,5 mm	0.2953	M8 X 0,5	8	114	76	64	36	63620
19/64	0.2969		8	114	76	64	36	51815
7,6 mm	0.2992		8	114	76	64	36	63621
7,7 mm	0.3031		8	114	76	64	36	63622
7,8 mm	0.3071	M9 X 1,25	8	114	76	64	36	63623
7,9 mm	0.3110		8	114	76	64	36	63624
5/16	0.3125	3/8-16	8	114	76	64	36	51816
8,0 mm	0.3150	M9 X 1	8	114	76	64	36	63625
8,1 mm	0.3189		10	142	95	80	40	63626
8,2 mm	0.3228		10	142	95	80	40	63627
8,3 mm	0.3268		10	142	95	80	40	63628
21/64	0.3281	3/8-20	10	142	95	80	40	51817
8,4 mm	0.3307		10	142	95	80	40	63629

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ICe-Carb Internal Coolant Drills for Depths up to 8xD

Series **140 8xD**



Series 140 8xD



ICe-Carb Internal Coolant Drills for
Depths up to 8xD

Serie 140 8xD



Brocas ICe-Carb con refrigerante
interno para profundidades de hasta
8xD

Série 140 8xD



Forets ICe-Carb à refroidissement
interne pour profondeurs jusqu'à
8xD

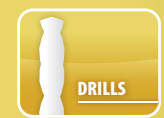
Cutting Diameter d_1 mm	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d_2 mm	Overall Length l_1 mm	Flute Length l_2 mm	Min. Cleared Length l_3 mm	Shank Length l_4 mm	Ti-NAMITE-A (AlTiN) EDP No.
Q	0.3320	3/8-24	10	142	95	80	40	51818
8,5 mm	0.3346	M10 X 1,5	10	142	95	80	40	63630
8,6 mm	0.3386		10	142	95	80	40	63631
8,7 mm	0.3425		10	142	95	80	40	63632
11/32	0.3438	3/8-32	10	142	95	80	40	51819
8,8 mm	0.3465	M10 X 1,25	10	142	95	80	40	63633
8,9 mm	0.3504		10	142	95	80	40	63634
9,0 mm	0.3543	M10 X 1	10	142	95	80	40	63635
9,1 mm	0.3583		10	142	95	80	40	63636
23/64	0.3594		10	142	95	80	40	51820
9,2 mm	0.3622	M10 X 0,75	10	142	95	80	40	63637
9,3 mm	0.3661		10	142	95	80	40	63638
U	0.3680	7/16-14	10	142	95	80	40	51821
9,4 mm	0.3701		10	142	95	80	40	63639
9,5 mm	0.3740	M11 / M10 X 0,5	10	142	95	80	40	63640
3/8	0.3750		10	142	95	80	40	51822
9,6 mm	0.3780		10	142	95	80	40	63641
9,7 mm	0.3819		10	142	95	80	40	63642
9,8 mm	0.3858		10	142	95	80	40	63643
9,9 mm	0.3898		10	142	95	80	40	63644
25/64	0.3906	7/16-20	10	142	95	80	40	51823
10,0 mm	0.3937		10	142	95	80	40	63645
10,1 mm	0.3976		12	162	114	96	45	63646
10,2 mm	0.4016	M12 X 1,75	12	162	114	96	45	63647
10,3 mm	0.4055		12	162	114	96	45	63648
13/32	0.4062		12	162	114	96	45	51824
10,4 mm	0.4094		12	162	114	96	45	63649
10,5 mm	0.4134	M12 X 1,5	12	162	114	96	45	63650
10,6 mm	0.4173		12	162	114	96	45	63651
10,7 mm	0.4213		12	162	114	96	45	63652
27/64	0.4219	1/2-13	12	162	114	96	45	51825
10,8 mm	0.4252	M12 X 1,25	12	162	114	96	45	63653
10,9 mm	0.4291		12	162	114	96	45	63654

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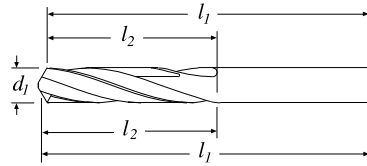
Diameter	Tolerances (inch)		Diameter	Tolerances (mm)	
	d ₁	d ₂		d ₁	d ₂
≥ 1/8 – 1/4	+0.002/+0.0006	h6	≤ 3	+0,0025/+0,0127	h6
> 1/4 – 3/8	+0.002/+0.0008	h6	> 3 – 6	+0,0050/+0,0152	h6
> 3/8 – 3/4	+0.003/+0.0011	h6	> 6 – 10	+0,0050/+0,0200	h6
			> 10 – 18	+0,0076/+0,0254	h6
			> 18 – 30	+0,0076/+0,0279	h6

Cutting Diameter d ₁ mm	Decimal Equivalent	Tap Size Reference Only	Shank Diameter d ₂ mm	Overall Length l ₁ mm	Flute Length l ₂ mm	Min. Cleared Length l ₃ mm	Shank Length l ₄ mm	Ti-NAMITE-A (AlTiN) EDP No.
11,0 mm	0.4331	M12 X 1	12	162	114	96	45	63655
11,1 mm	0.4370		12	162	114	96	45	63656
7/16	0.4375	1/4-18NPT	12	162	114	96	45	51826
11,2 mm	0.4409		12	162	114	96	45	63657
11,3 mm	0.4449		12	162	114	96	45	63658
11,4 mm	0.4488		12	162	114	96	45	63659
11,5 mm	0.4528	M12 X 0,5	12	162	114	96	45	63660
11,6 mm	0.4567		12	162	114	96	45	63661
11,7 mm	0.4606		12	162	114	96	45	63662
11,8 mm	0.4646		12	162	114	96	45	63663
11,9 mm	0.4685		12	162	114	96	45	63664
15/32	0.4688	1/2-28	12	162	114	96	45	51827
12,0 mm	0.4724	M14 X 2	12	162	114	96	45	63665
31/64	0.4844	9/16-12	14	178	133	112	45	51828
12,5 mm	0.4921	M14 X 1,5	14	178	133	112	45	63666
1/2	0.5000		14	178	133	112	45	51829
12,8 mm	0.5039	M14 X 1,25	14	178	133	112	45	63667
13,0 mm	0.5118	M14 X 1	14	178	133	112	45	63668
33/64	0.5156	9/16-18	14	178	133	112	45	51830
13,5 mm	0.5315	5/8-11	14	178	133	112	45	63669
13,8 mm	0.5433		14	178	133	112	45	63670
14,0 mm	0.5512	M16 X 2	14	178	133	112	45	63671
9/16	0.5625		16	203	152	128	48	51831
14,5 mm	0.5709	M16 X 1,5	16	203	152	128	48	63672
37/64	0.5781	5/8-18	16	203	152	128	48	51832
14,8 mm	0.5827		16	203	152	128	48	63673
15,0 mm	0.5906	M16 X 1	16	203	152	128	48	63674
15,5 mm	0.6102	M18 X 2,5	16	203	152	128	48	63675
15,8 mm	0.6220		16	203	152	128	48	63676
5/8	0.6250	11/16-16	16	203	152	128	48	51833
16,0 mm	0.6299		16	203	152	128	48	63677
21/32	0.6562	3/4-10	18	222	171	144	48	51834
11/16	0.6875	3/4-16	18	222	171	144	48	51835
3/4	0.7500	13/16-16	20	243	190	160	50	51836



2 Flute – Regular and Fast Spiral

Fractional & Metric† **101, 125**



101

101 – 2 Flute – 20° Spiral

125 – 2 Flute – 35° Spiral

Micrograin Solid Carbide
Standard Lengths, 118° Four
Facet Drill Point

† 101 Metric – Technical Recommendations: 270

101 – 2 Filos – Hélice 20°

125 – 2 Filos – Hélice 35°

Carburo sólido con micrograno
Longitudes standard, ángulo de punta
118°, afilado frontal a 4 facetas

† 101 Métrica – Recomendaciones Técnicas: 270

101 – 2 Dents – Hélice, 20°

125 – 2 Dents – Hélice, 35°

Carbure monobloc, micrograin
Série courte standard, pointe quatre
faces 118°

† 101 Métrique – Préconisations : 270

Size d_1	Decimal Equiv.	Flute Length l_2	Overall Length l_1	Uncoated		Ti-NAMITE-A (AlTiN)	
				Series 101 EDP No.	Series 125 EDP No.	Series 101 EDP No.	Series 125 EDP No.
80	.0135	3/16	3/4	51080	52080	57076	57214
79	.0145	3/16	3/4	51079	52079	57077	57215
1/64	.0156	3/16	3/4	51101	–	57078	–
78	.0160	3/16	3/4	51078	52078	57079	57216
77	.0180	3/16	3/4	51077	52077	57080	57217
76	.0200	1/4	7/8	51076	52076	57081	57218
75	.0210	1/4	7/8	51075	52075	57082	57219
74	.0225	1/4	7/8	51074	52074	57083	57220
73	.0240	1/4	7/8	51073	52073	57084	57221
72	.0250	5/16	1	51072	52072	57085	57222
71	.0260	5/16	1	51071	52071	57086	57223
0.7 mm	.0276	12 mm	31 mm	61001	–	68268	–
70	.0280	1/2	1-1/4	51070	52070	57087	57224
69	.0292	1/2	1-1/4	51069	52069	57088	57225
68	.0310	1/2	1-1/4	51068	52068	57089	57226
1/32	.0312	1/2	1-1/4	51102	52102	57090	57227
0.8 mm	.0315	12 mm	31 mm	61003	–	68269	–
67	.0320	1/2	1-1/4	51067	52067	57091	57228
66	.0330	1/2	1-1/4	51066	52066	57092	57229
65	.0350	5/8	1-3/8	51065	52065	57093	57230
0.9 mm	.0354	16 mm	35 mm	61005	–	68270	–
64	.0360	5/8	1-3/8	51064	52064	57094	57231
63	.0370	5/8	1-3/8	51063	52063	57095	57232
62	.0380	5/8	1-3/8	51062	52062	57096	57233
61	.0390	5/8	1-3/8	51061	52061	57097	57234
1.0 mm	.0394	12 mm	34 mm	61007	–	68271	–
60	.0400	3/4	1-1/2	51060	52060	57098	57235
59	.0410	3/4	1-1/2	51059	52059	57099	57236
58	.0420	3/4	1-1/2	51058	52058	57100	57237
57	.0430	3/4	1-1/2	51057	52057	57101	57238
1.1 mm	.0433	14 mm	36 mm	61052	–	68294	–
56	.0465	3/4	1-1/2	51056	52056	57102	57239
3/64	.0469	3/4	1-1/2	51103	52103	57103	57240
1.2 mm	.0472	16 mm	38 mm	61053	–	68295	–
1.3 mm	.0512	16 mm	38 mm	61054	–	68296	–
55	.0520	3/4	1-1/2	51055	52055	57104	57241
54	.0550	3/4	1-1/2	51054	52054	57105	57242
1.4 mm	.0551	18 mm	40 mm	61055	–	68297	–
1.5 mm	.0591	18 mm	40 mm	61009	–	68272	–
53	.0595	3/4	1-1/2	51053	52053	57106	57243
*1/16	.0625	3/4	1-1/2	51104	52104	57107	57244
1.6 mm	.0630	20 mm	43 mm	61056	–	68298	–
52	.0635	3/4	1-1/2	51052	52052	57108	57245
1.7 mm	.0669	22 mm	46 mm	61057	–	68299	–
51	.0670	3/4	1-1/2	51051	52051	57109	57246
50	.0700	7/8	1-3/4	51050	52050	57110	57247
1.8 mm	.0709	22 mm	46 mm	61058	–	68300	–
49	.0730	7/8	1-3/4	51049	52049	57111	57248
1.9 mm	.0748	22 mm	46 mm	61059	–	68301	–
48	.0760	7/8	1-3/4	51048	52048	57112	57249
5/64	.0781	7/8	1-3/4	51105	52105	57113	57250
47	.0785	7/8	1-3/4	51047	52047	57114	57251
2.0 mm	.0787	24 mm	49 mm	61011	–	68273	–
46	.0810	7/8	1-3/4	51046	52046	57115	57252
45	.0820	7/8	1-3/4	51045	52045	57116	57253
2.1 mm	.0827	24 mm	49 mm	61060	–	68302	–
44	.0860	1	2	51044	52044	57117	57254
2.2 mm	.0866	27 mm	53 mm	61061	–	68303	–
43	.0890	1	2	51043	52043	57118	57255
2.3 mm	.0906	27 mm	53 mm	61062	–	68304	–

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TOLERANCES (inch)

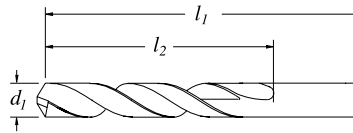
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TOLERANCES (mm)

$$d_1 = +0,0000 / -0,0127$$



125



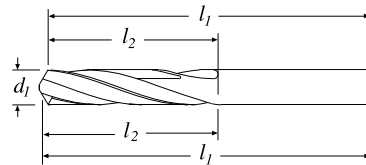
Size d_1	Decimal Equiv.	Flute Length l_2	Overall Length l_1	Uncoated		Ti-NAMITE-A (AlTiN)	
				Series 101 EDP No.	Series 125 EDP No.	Series 101 EDP No.	Series 125 EDP No.
42	.0935	1	2	51042	52042	57119	57256
3/32	.0938	1	2	51106	52106	57120	57257
2.4 mm	.0945	30 mm	57 mm	61063	—	68305	—
41	.0960	1	2	51041	52041	57121	57258
40	.0980	1	2	51040	52040	57122	57259
2.5 mm	.0984	30 mm	57 mm	61013	—	68274	—
39	.0995	1-1/4	2-1/4	51039	52039	57123	57260
38	.1015	1-1/4	2-1/4	51038	52038	57124	57261
2.6 mm	.1024	30 mm	57 mm	61064	—	68306	—
37	.1040	1-1/4	2-1/4	51037	52037	57125	57262
2.7 mm	.1063	33 mm	61 mm	61065	—	68307	—
36	.1065	1-1/4	2-1/4	51036	52036	57126	57263
7/64	.1094	1-1/4	2-1/4	51107	52107	57127	57264
35	.1100	1-1/4	2-1/4	51035	52035	57128	57265
2.8 mm	.1102	33 mm	61 mm	61066	—	68308	—
34	.1110	1-1/4	2-1/4	51034	52034	57129	57266
33	.1130	1-1/4	2-1/4	51033	52033	57130	57267
2.9 mm	.1142	33 mm	61 mm	61067	—	68309	—
32	.1160	1-1/4	2-1/4	51032	52032	57131	57268
3.0 mm	.1181	33 mm	61 mm	61015	—	68275	—
31	.1200	1-1/4	2-1/4	51031	52031	57132	57269
3.1 mm	.1220	36 mm	65 mm	61068	—	68310	—
*1/8	.1250	1-1/4	2-1/4	51108	52108	57133	57270
3.2 mm	.1260	36 mm	65 mm	61069	—	68311	—
30	.1285	1-1/4	2-1/4	51030	52030	57134	57271
3.3 mm	.1299	36 mm	65 mm	61070	—	68312	—
3.4 mm	.1339	39 mm	70 mm	61071	—	68313	—
29	.1360	1-3/8	2-1/4	51029	52029	57135	57272
3.5 mm	.1378	39 mm	70 mm	61017	—	68276	—
28	.1405	1-3/8	2-1/2	51028	52028	57136	57273
9/64	.1406	1-3/8	2-1/2	51109	52109	57137	57274
3.6 mm	.1417	39 mm	70 mm	61072	—	68314	—
27	.1440	1-3/8	2-1/2	51027	52027	57138	57275
3.7 mm	.1457	39 mm	70 mm	61073	—	68315	—
26	.1470	1-3/8	2-1/2	51026	52026	57139	57276
25	.1495	1-3/8	2-1/2	51025	52025	57140	57277
3.8 mm	.1496	43 mm	75 mm	61074	—	68316	—
24	.1520	1-3/8	2-1/2	51024	52024	57141	57278
3.9 mm	.1535	43 mm	75 mm	61075	—	68317	—
23	.1540	1-3/8	2-1/2	51023	52023	57142	57279
5/32	.1562	1-3/8	2-1/2	51110	52110	57143	57280
22	.1570	1-3/8	2-1/2	51022	52022	57144	57281
4.0 mm	.1575	43 mm	75 mm	61019	—	68277	—
21	.1590	1-3/8	2-1/2	51021	52021	57145	57282
20	.1610	1-3/8	2-1/2	51020	52020	57146	57283
4.1 mm	.1614	43 mm	75 mm	61076	—	68318	—
4.2 mm	.1654	43 mm	75 mm	61077	—	68319	—
19	.1660	1-5/8	2-3/4	51019	52019	57147	57284
4.3 mm	.1693	47 mm	80 mm	61078	—	68320	—
18	.1695	1-5/8	2-3/4	51018	52018	57148	57285
11/64	.1719	1-5/8	2-3/4	51111	52111	57149	57286
17	.1730	1-5/8	2-3/4	51017	52017	57150	57287
4.4 mm	.1732	47 mm	80 mm	61079	—	68321	—
16	.1770	1-5/8	2-3/4	51016	52016	57151	57288
4.5 mm	.1772	47 mm	80 mm	61021	—	68278	—
15	.1800	1-5/8	2-3/4	51015	52015	57152	57289
4.6 mm	.1811	47 mm	80 mm	61080	—	68322	—
14	.1820	1-5/8	2-3/4	51014	52014	57153	57290
4.7 mm	.1850	47 mm	80 mm	61081	—	68323	—
13	.1850	1-5/8	2-3/4	51013	52013	57154	57291
*3/16	.1875	1-5/8	2-3/4	51112	52112	57155	57292
4.8 mm	.1890	52 mm	86 mm	61082	—	68324	—

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2 Flute – Regular and Fast Spiral

Fractional & Metric[†] **101, 125**



101

101 – 2 Flute – 20° Spiral

125 – 2 Flute – 35° Spiral

Micrograin Solid Carbide
Standard Lengths, 118° Four
Facet Drill Point

† 101 Metric – Technical Recommendations: 270

101 – 2 Filos – Hélice 20°

125 – 2 Filos – Hélice 35°

Carburo sólido con micrograno
Longitudes standard, ángulo de punta
118°, afilado frontal a 4 facetas

† 101 Métrica – Recomendaciones Técnicas: 270

101 – 2 Dents – Hélice, 20°

125 – 2 Dents – Hélice, 35°

Carbure monobloc, micrograin
Série courte standard, pointe quatre
faces 118°

† 101 Métrique – Préconisations : 270

Size	Decimal Equiv.	Flute Length l ₂	Overall Length l ₁	Uncoated		Ti-NAMITE-A (AlTiN)	
				Series 101 EDP No.	Series 125 EDP No.	Series 101 EDP No.	Series 125 EDP No.
d ₁							
12	.1890	1-5/8	2-3/4	51012	52012	57156	57293
11	.1910	1-5/8	2-3/4	51011	52011	57157	57294
4.9 mm	.1929	52 mm	86 mm	61083	–	68325	–
10	.1935	1-5/8	2-3/4	51010	52010	57158	57295
9	.1960	1-3/4	3	51009	52009	57159	57296
5.0 mm	.1969	52 mm	86 mm	61023	–	68279	–
8	.1990	1-3/4	3	51008	52008	57160	57297
5.1 mm	.2008	52 mm	86 mm	61084	–	68326	–
7	.2010	1-3/4	3	51007	52007	57161	57298
13/64	.2031	1-3/4	3	51113	52113	57162	57299
6	.2040	1-3/4	3	51006	52006	57163	57300
5.2 mm	.2047	52 mm	86 mm	61085	–	68327	–
5	.2055	1-3/4	3	51005	52005	57164	57301
5.3 mm	.2087	52 mm	86 mm	61086	–	68328	–
4	.2090	1-3/4	3	51004	52004	57165	57302
5.4 mm	.2126	57 mm	93 mm	61087	–	68329	–
3	.2130	1-3/4	3	51003	52003	57166	57303
5.5 mm	.2165	57 mm	93 mm	61025	–	68280	–
7/32	.2188	1-3/4	3	51114	52114	57167	57304
5.6 mm	.2205	57 mm	93 mm	61088	–	68330	–
2	.2210	1-3/4	3	51002	52002	57168	57305
5.7 mm	.2244	57 mm	93 mm	61089	–	68331	–
1	.2280	1-3/4	3	51001	52001	57169	57306
5.8 mm	.2283	57 mm	93 mm	61090	–	68332	–
5.9 mm	.2323	57 mm	93 mm	61091	–	68333	–
A	.2340	2	3-1/4	51201	52201	57170	57307
15/64	.2344	2	3-1/4	51115	52115	57171	57308
6.0 mm	.2362	57 mm	93 mm	61027	–	68281	–
B	.2380	2	3-1/4	51202	52202	57172	57309
6.1 mm	.2402	63 mm	101 mm	61092	–	68334	–
C	.2420	2	3-1/4	51203	52203	57173	57310
6.2 mm	.2441	63 mm	101 mm	61093	–	68335	–
D	.2460	2	3-1/4	51204	52204	57174	57311
6.3 mm	.2480	63 mm	101 mm	61094	–	68336	–
*E	.2500	2	3-1/4	51205	52205	57175	57312
1/4	.2500	2	3-1/4	51116	52116	57176	57313
6.4 mm	.2520	63 mm	101 mm	61095	–	68337	–
6.5 mm	.2559	63 mm	101 mm	61029	–	68282	–
F	.2570	2	3-1/4	51206	52206	57177	57314
6.6 mm	.2598	63 mm	101 mm	61096	–	68338	–
G	.2610	2-1/8	3-1/2	51207	52207	57178	57315
6.7 mm	.2638	63 mm	101 mm	61097	–	68339	–
17/64	.2656	2-1/8	3-1/2	51117	52117	57179	57316
H	.2660	2-1/8	3-1/2	51208	52208	57180	57317
6.8 mm	.2677	69 mm	109 mm	61098	–	68340	–
6.9 mm	.2717	69 mm	109 mm	61099	–	68341	–
I	.2720	2-1/8	3-1/2	51209	52209	57181	57318
7.0 mm	.2756	69 mm	109 mm	61031	–	68283	–
J	.2770	2-1/8	3-1/2	51210	52210	57182	57319
7.1 mm	.2795	69 mm	109 mm	61100	–	68342	–
K	.2810	2-1/8	3-1/2	51211	52211	57183	57320
9/32	.2812	2-1/8	3-1/2	51118	52118	57184	57321
7.2 mm	.2835	69 mm	109 mm	61101	–	68343	–
7.3 mm	.2874	69 mm	109 mm	61102	–	68344	–
L	.2900	2-1/8	3-1/2	51212	52212	57185	57322
7.4 mm	.2913	69 mm	109 mm	61103	–	68345	–
M	.2950	2-3/8	3-3/4	51213	52213	57186	57323
7.5 mm	.2953	69 mm	109 mm	61033	–	68284	–
19/64	.2969	2-3/8	3-3/4	51119	52119	57187	57324
7.6 mm	.2992	75 mm	117 mm	61104	–	68346	–

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TOLERANCES (inch)

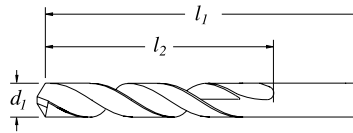
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TOLERANCES (mm)

$d_1 = +0,0000 / -0,0127$

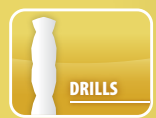


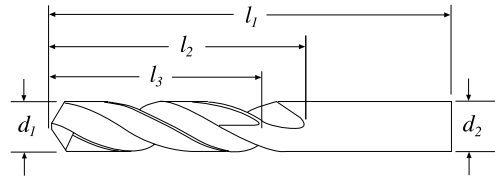
125



Size d_1	Decimal Equiv.	Flute Length l_2	Overall Length l_1	Uncoated		Ti-NAMITE-A (AlTiN)	
				Series 101 EDP No.	Series 125 EDP No.	Series 101 EDP No.	Series 125 EDP No.
N	.3020	2-3/8	3-3/4	51214	52214	57188	57325
7.7 mm	.3031	75 mm	117 mm	61105	—	68347	—
7.8 mm	.3071	75 mm	117 mm	61106	—	68348	—
7.9 mm	.3110	75 mm	117 mm	61107	—	68349	—
*5/16	.3125	2-3/8	3-3/4	51120	52120	57189	57326
8.0 mm	.3150	75 mm	117 mm	61035	—	68285	—
O	.3160	2-3/8	3-3/4	51215	52215	57190	57327
8.1 mm	.3189	75 mm	117 mm	61108	—	68350	—
8.2 mm	.3228	75 mm	117 mm	61109	—	68351	—
P	.3230	2-3/8	3-3/4	51216	52216	57191	57328
8.3 mm	.3268	75 mm	117 mm	61110	—	68352	—
21/64	.3281	2-1/2	4	51121	52121	57192	57329
8.4 mm	.3307	75 mm	117 mm	61111	—	68353	—
Q	.3320	2-1/2	4	51217	52217	57193	57330
8.5 mm	.3346	75 mm	117 mm	61037	—	68286	—
8.6 mm	.3386	81 mm	125 mm	61112	—	68354	—
R	.3390	2-1/2	4	51218	52218	57194	57331
8.7 mm	.3425	81 mm	125 mm	61113	—	68355	—
11/32	.3438	2-1/2	4	51122	52122	57195	57332
8.8 mm	.3465	81 mm	125 mm	61114	—	68356	—
S	.3480	2-1/2	4	51219	52219	57196	57333
8.9 mm	.3504	81 mm	125 mm	61115	—	68357	—
9.0 mm	.3543	81 mm	125 mm	61039	—	68287	—
T	.3580	2-3/4	4-1/4	51220	52220	57197	57334
9.1 mm	.3583	81 mm	125 mm	61116	—	68358	—
23/64	.3594	2-3/4	4-1/4	51123	52123	57198	57335
9.2 mm	.3622	81 mm	125 mm	61117	—	68359	—
9.3 mm	.3661	81 mm	125 mm	61118	—	68360	—
U	.3680	2-3/4	4-1/4	51221	52221	57199	57336
9.4 mm	.3701	81 mm	125 mm	61119	—	68361	—
9.5 mm	.3740	81 mm	125 mm	61041	—	68288	—
*3/8	.3750	2-3/4	4-1/4	51124	52124	57200	57337
V	.3770	2-3/4	4-1/4	51222	52222	57201	57338
9.6 mm	.3780	87 mm	133 mm	61120	—	68362	—
9.7 mm	.3819	87 mm	133 mm	61121	—	68363	—
9.8 mm	.3858	87 mm	133 mm	61122	—	68364	—
W	.3860	2-7/8	4-1/2	51223	52223	57202	57339
9.9 mm	.3898	87 mm	133 mm	61123	—	68365	—
25/64	.3906	2-7/8	4-1/2	51125	52125	57203	57340
10.0 mm	.3937	87 mm	133 mm	61043	—	68289	—
X	.3970	2-7/8	4-1/2	51224	52224	57204	57341
10.2 mm	.4015	87 mm	133 mm	61124	—	68366	—
Y	.4040	2-7/8	4-1/2	51225	52225	57205	57342
13/32	.4062	2-7/8	4-1/2	51126	52126	57206	57343
Z	.4130	2-7/8	4-1/2	51226	52226	57207	57344
10.5 mm	.4134	87 mm	133 mm	61045	—	68290	—
27/64	.4219	2-7/8	4-1/2	51127	52127	57208	57345
11.0 mm	.4331	94 mm	142 mm	61047	—	68291	—
7/16	.4375	2-7/8	4-1/2	51128	52128	57209	57346
11.5 mm	.4528	94 mm	142 mm	61049	—	68292	—
29/64	.4531	3	4-3/4	51129	52129	57210	57347
15/32	.4688	3	4-3/4	51130	52130	57211	57348
12.0 mm	.4724	101 mm	151 mm	61051	—	68293	—
31/64	.4844	3	4-3/4	51131	52131	57212	57349
1/2	.5000	3	4-3/4	51132	52132	57213	57350
				61175	—	57351	—
				—	62175	—	57352

* Series 101 Set
* Series 125 Set





Series 108M



DIN 6539 – Short Length Drills
Micrograin Solid Carbide
Short Length, 145° Four Facet Point,
27° Spiral

Serie 108M



Brocas DIN 6539 serie corta
Metal duro con micrograno
Longitud corta, punta de cuatro
caras y 145°, hélice derecha (27°)

Série 108M



Forets courts – DIN 6539
Carbure monobloc, micrograin
Court–Angle d'entrée à quatre
facettes, 145° – Hélice à droite, 27°

Size	Overall Length	Flute Length	Length of Cut	Uncoated EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
d ₁ mm	l ₁ mm	l ₂ mm	l ₃ mm		
0,5	20	3	–	62001	68643
0,55	21	3,5	–	62003	68644
0,6	21	3,5	–	62005	68645
0,65	22	4	–	62007	68646
0,7	23	4,5	–	62009	68647
0,75	23	4,5	–	62011	68648
0,8	24	5	–	62013	68649
0,85	24	5	–	62015	68650
0,9	25	5,5	–	62017	68651
0,95	25	5,5	–	62019	68652
1,0	26	6	–	62021	68653
1,05	26	6	–	62023	68654
1,1	28	7	–	62025	68655
1,15	28	7	–	62027	68656
1,2	30	8	–	62029	68657
1,25	30	8	–	62031	68658
1,3	30	8	–	62033	68659
1,35	32	9	–	62035	68660
1,4	32	9	–	62037	68661
1,45	32	9	–	62039	68662
1,5	32	9	–	62041	68663
1,6	34	10	–	62043	68664
1,7	34	10	–	62045	68665
1,8	36	11	–	62047	68666
1,9	36	11	–	62049	68667
2,0	38	12	9	62051	68668
2,1	38	12	9	62053	68669
2,2	40	13	10	62055	68670
2,3	40	13	10	62057	68671
2,4	43	14	11	62059	68672
2,5	43	14	11	62061	68673
2,6	43	14	11	62063	68674
2,7	46	16	12	62065	68675
2,8	46	16	12	62067	68676
2,9	46	16	12	62069	68677
3,0	46	16	12	62071	68678
3,1	49	18	14	62073	68679
3,2	49	18	14	62075	68680
3,3	49	18	14	62077	68681
3,4	52	20	15	62079	68682
3,5	52	20	15	62081	68683
3,6	52	20	15	62083	68684
3,7	52	20	15	62085	68685
3,8	55	22	17	62087	68686
3,9	55	22	17	62089	68687
4,0	55	22	17	62091	68688
4,1	55	22	17	62093	68689
4,2	55	22	17	62095	68690

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d TOLERANCES h7

mm	mm
≤ 3	+0,000/–0,010
> 3 – 6	+0,000/–0,012
> 6 – 10	+0,000/–0,015
> 10 – 18	+0,000/–0,018
> 18 – 30	+0,000/–0,021

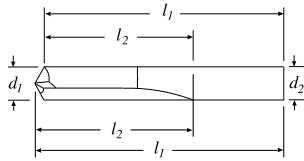
d₂=h6

Size	Overall Length	Flute Length	Length of Cut	Uncoated EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
d ₁ mm	l ₁ mm	l ₂ mm	l ₃ mm		
4,3	58	24	18	62097	68691
4,4	58	24	18	62099	68692
4,5	58	24	18	62101	68693
4,6	58	24	18	62103	68694
4,7	58	24	18	62105	68695
4,8	62	26	20	62107	68696
4,9	62	26	20	62109	68697
5,0	62	26	20	62111	68698
5,1	62	26	20	62113	68699
5,2	62	26	20	62115	68700
5,3	62	26	20	62117	68701
5,4	66	28	21	62119	68702
5,5	66	28	21	62121	68703
5,6	66	28	21	62123	68704
5,7	66	28	21	62125	68705
5,8	66	28	21	62127	68706
5,9	66	28	21	62129	68707
6,0	66	28	21	62131	68708
6,1	70	31	23	62133	68709
6,2	70	31	23	62135	68710
6,3	70	31	23	62137	68711
6,4	70	31	23	62139	68712
6,5	70	31	23	62141	68713
6,8	70	31	23	62142	68603
7,0	74	34	25	62143	68718
7,5	74	34	25	62145	68723
7,8	79	37	27	62146	68604
8,0	79	37	27	62147	68728
8,5	79	37	27	62149	68733
9,0	84	40	29	62151	68738
9,5	84	40	29	62153	68743
9,8	89	43	31	62154	68606
10,0	89	43	31	62155	68748
10,2	89	43	31	62156	68607
10,5	89	43	31	62066	68753
11,0	95	47	33	62157	68758
11,5	95	47	33	62084	68763
11,8	102	51	35	62158	68608
12,0	102	51	35	62159	68768
12,5	102	51	35	62102	68773
13	102	51	35	62112	68778
13,8	107	54	37	62164	68609
14	107	54	37	62116	68780
14,5	111	56	38	62166	68611
14,8	111	56	38	62167	68612
15,0	111	56	38	62168	68613
15,8	115	58	38	62170	68614
16,0	115	58	38	62171	68616

DRILLS
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2 Flute – Single End – Straight Flute



Series 106 – Straight Flute Drills



Micrograin Solid Carbide
For Drilling Hardened Materials –
Straight Flute – 140° Point Angle

Serie 106 – con filos rectos



Carburo sólido con micrograno
Para el mecanizado de materiales
duro – Angulo punta 140°

Série 106 – Forets à arête droite



Carbure monobloc, micrograin
Pour le perçage des matières
trempés – Arête droite – Angle
d'entrée, 140°

Size d_1	Decimal Equiv.	Flute Length l_2	Overall Length l_1	Uncoated EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
1 mm	.0394	6 mm	26 mm	66001	66002
60	.0400	1/2	1-1/2	56060	56269
59	.0410	1/2	1-1/2	56059	56268
58	.0420	1/2	1-1/2	56058	56267
57	.0430	1/2	1-1/2	56057	56266
56	.0465	1/2	1-1/2	56056	56265
3/64	.0469	1/2	1-1/2	56103	56135
55	.0520	1/2	1-1/2	56055	56264
54	.0550	1/2	1-1/2	56054	56263
1,5 mm	.0591	9 mm	32 mm	66003	66004
53	.0595	1/2	1-1/2	56053	56262
1/16	.0625	5/8	1-1/2	56104	56136
52	.0635	11/16	1-11/16	56052	56261
51	.0670	11/16	1-11/16	56051	56260
50	.0700	11/16	1-11/16	56050	56259
49	.0730	11/16	1-11/16	56049	56258
48	.0760	11/16	1-11/16	56048	56257
5/64	.0781	11/16	1-11/16	56105	56137
47	.0785	3/4	1-3/4	56047	56256
2 mm	.0787	12 mm	38 mm	66005	66006
46	.0810	3/4	1-3/4	56046	56255
45	.0820	3/4	1-3/4	56045	56254
44	.0860	3/4	1-3/4	56044	56253
43	.0890	3/4	1-3/4	56043	56252
42	.0935	3/4	1-3/4	56042	56251
3/32	.0938	3/4	1-3/4	56106	56138
41	.0960	13/16	1-13/16	56041	56250
40	.0980	13/16	1-13/16	56040	56249
2,5 mm	.0984	14 mm	43 mm	66007	66008
39	.0995	13/16	1-13/16	56039	56248
38	.1015	13/16	1-13/16	56038	56247
37	.1040	13/16	1-13/16	56037	56246
36	.1065	13/16	1-13/16	56036	56245
7/64	.1094	13/16	1-13/16	56107	56139
35	.1100	7/8	1-7/8	56035	56244
34	.1110	7/8	1-7/8	56034	56243
33	.1130	7/8	1-7/8	56033	56242
32	.1160	7/8	1-7/8	56032	56241
3 mm	.1181	16 mm	46 mm	66009	66010
31	.1200	7/8	1-7/8	56031	56240
1/8	.1250	7/8	1-7/8	56108	56140
30	.1285	15/16	1-15/16	56030	56239
29	.1360	15/16	1-15/16	56029	56238
3,5 mm	.1378	20 mm	52 mm	66011	66012
28	.1405	15/16	1-15/16	56028	56237
9/64	.1406	15/16	1-15/16	56109	56141
27	.1440	1	2-1/16	56027	56236
26	.1470	1	2-1/16	56026	56235
25	.1495	1	2-1/16	56025	56234
24	.1520	1	2-1/16	56024	56233
23	.1540	1	2-1/16	56023	56232
5/32	.1562	1	2-1/16	56110	56142
22	.1570	1-1/16	2-1/8	56022	56231
4 mm	.1575	22 mm	55 mm	66013	66014
21	.1590	1-1/16	2-1/8	56021	56230
20	.1610	1-1/16	2-1/8	56020	56229
19	.1660	1-1/16	2-1/8	56019	56228

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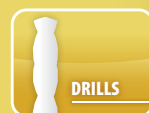
TOLERANCES

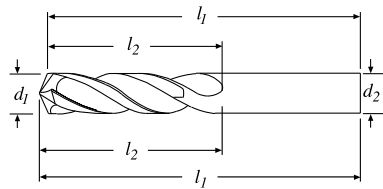
$d_1 = +.0000 - .0005$

$d_2 = h6$

Size d_1	Decimal Equiv.	Flute Length l_2	Overall Length l_1	Uncoated EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
18	.1695	1-1/16	2-1/8	56018	56227
11/64	.1719	1-1/16	2-1/8	56111	56143
17	.1730	1-1/8	2-3/16	56017	56226
16	.1770	1-1/8	2-3/16	56016	56225
4,5 mm	.1772	24 mm	58 mm	66015	66016
15	.1800	1-1/8	2-3/16	56015	56224
14	.1820	1-1/8	2-3/16	56014	56223
13	.1850	1-1/8	2-3/16	56013	56222
3/16	.1875	1-1/8	2-3/16	56112	56144
12	.1890	1-1/8	2-3/16	56012	56221
11	.1910	1-1/8	2-3/16	56011	56220
10	.1935	1-1/8	2-3/16	56010	56219
9	.1960	1-3/16	2-1/4	56009	56218
5 mm	.1969	26 mm	62 mm	66017	66018
8	.1990	1-3/16	2-1/4	56008	56217
7	.2010	1-3/16	2-1/4	56007	56216
13/64	.2031	1-3/16	2-1/4	56113	56145
6	.2040	1-1/4	2-3/8	56006	56215
5	.2055	1-1/4	2-3/8	56005	56214
4	.2090	1-1/4	2-3/8	56004	56213
3	.2130	1-1/4	2-3/8	56003	56212
5,5 mm	.2165	28 mm	66 mm	66019	66020
7/32	.2188	1-1/4	2-3/8	56114	56146
2	.2210	1-5/16	2-7/16	56002	56211
1	.2280	1-5/16	2-7/16	56001	56210
15/64	.2344	1-5/16	2-7/16	56115	56147
6 mm	.2362	28 mm	66 mm	66021	66045
1/4	.2500	1-3/8	2-1/2	56116	56148
6,5 mm	.2559	31 mm	70 mm	66022	66046
17/64	.2656	1-7/16	2-5/8	56117	56149
7 mm	.2756	34 mm	74 mm	66023	66024
9/32	.2812	1-1/2	2-11/16	56118	56150
7,5 mm	.2953	34 mm	74 mm	66025	66026
19/64	.2969	1-9/16	2-3/4	56119	56151
5/16	.3125	1-5/8	2-13/16	56120	56152
8 mm	.3150	37 mm	79 mm	66027	66028
21/64	.3281	1-11/16	2-15/16	56121	56153
8,5 mm	.3346	37 mm	79 mm	66029	66030
11/32	.3438	1-11/16	3	56122	56154
9 mm	.3543	40 mm	84 mm	66031	66032
23/64	.3594	1-3/4	3-1/16	56123	56155
9,5 mm	.3740	40 mm	84 mm	66033	66034
3/8	.3750	1-13/16	3-1/8	56124	56156
25/64	.3906	1-7/8	3-1/4	56125	56157
10 mm	.3937	43 mm	89 mm	66035	66036
13/32	.4062	1-15/16	3-5/16	56126	56158
10,5 mm	.4134	43 mm	89 mm	66037	66038
27/64	.4219	2	3-3/8	56127	56159
11 mm	.4331	47 mm	95 mm	66039	66040
7/16	.4375	2-1/16	3-7/16	56128	56160
11,5 mm	.4528	47 mm	95 mm	66041	66042
29/64	.4531	2-1/8	3-9/16	56129	56161
15/32	.4688	2-1/8	3-5/8	56130	56162
12 mm	.4724	51 mm	102 mm	66043	66044
31/64	.4844	2-3/16	3-11/16	56131	56163
1/2	.5000	2-1/4	3-3/4	56132	56164

DRILLS
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Series 103 – 3 Flute Drills

Micrograin Solid Carbide
For Cast Iron, High Silicon
Aluminum, Alloy Steel and
Nonferrous Materials 150° Point
Angle, 30° Spiral – Drills cast iron,
high silicon aluminum, alloy steel
and nonferrous materials – Greater
hole dimensional accuracy at higher
production rates – Reduces drill
deflection compared to HSS, Cobalt
and other carbide drills

Serie 103 – Brocas de 3 filos

Carburo sólido con micrograno
Para hierro fundido, aluminio con
alto contenido de silicón, aleaciones
de acero y materiales no ferrosos
Ángulo punta 150°, hélice 30° –
Taladro de fundición, aluminio con
alto contenido de silicio, aceros
aleados y materiales no ferrosos –
Mayor precisión de agujero a las más
altas proporciones de producción
– Reducción de la desviación de la
broca en comparación con las brocas
de HSS, de cobalto y otras brocas de
carburo sólido.

Size	Decimal Equiv.	Flute Length	Overall Length	Uncoated EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
d_1		l_2	l_1		
36	.1065	1-1/4	2-1/4	53036	58011
7/64	.1094	1-1/4	2-1/4	53107	58012
35	.1100	1-1/4	2-1/4	53035	58013
34	.1110	1-1/4	2-1/4	53034	58014
33	.1130	1-1/4	2-1/4	53033	58015
32	.1160	1-1/4	2-1/4	53032	58016
3 mm	.1181	16 mm	46 mm	63000	68965
31	.1200	1-1/4	2-1/4	53031	58017
3.1 mm	.1220	18 mm	49 mm	63044	68966
1/8	.1250	1-1/4	2-1/4	53108	58018
3.2 mm	.1260	18 mm	49 mm	63045	68967
30	.1285	1-1/4	2-1/4	53030	58019
3.3 mm	.1299	18 mm	49 mm	63001	68968
3.4 mm	.1339	20 mm	52 mm	63046	68969
29	.1360	1-3/8	2-1/2	53029	58020
3.5 mm	.1378	20 mm	52 mm	63002	68970
28	.1405	1-3/8	2-1/2	53028	58021
9/64	.1406	1-3/8	2-1/2	53109	58022
3.6 mm	.1417	20 mm	52 mm	63047	68971
27	.1440	1-3/8	2-1/2	53027	58023
3.7 mm	.1457	20 mm	52 mm	63003	68972
26	.1470	1-3/8	2-1/2	53026	58024
25	.1495	1-3/8	2-1/2	53025	58025
3.8 mm	.1496	22 mm	55 mm	63048	68973
24	.1520	1-3/8	2-1/2	53024	58026
3.9 mm	.1535	22 mm	55 mm	63049	68974
23	.1540	1-3/8	2-1/2	53023	58027
5/32	.1562	1-3/8	2-1/2	53110	58028
22	.1570	1-3/8	2-1/2	53022	58029
4 mm	.1575	22 mm	55 mm	63004	68975
21	.1590	1-3/8	2-1/2	53021	58030
20	.1610	1-3/8	2-1/2	53020	58031
4.1 mm	.1614	22 mm	55 mm	63050	68976
4.2 mm	.1654	22 mm	55 mm	63005	68977
19	.1660	1-5/8	2-3/4	53019	58032
4.3 mm	.1693	24 mm	58 mm	63051	68978
18	.1695	1-5/8	2-3/4	53018	58033
11/64	.1719	1-5/8	2-3/4	53111	58034
17	.1730	1-5/8	2-3/4	53017	58035
4.4 mm	.1732	24 mm	58 mm	63052	68979
16	.1770	1-5/8	2-3/4	53016	58036
4.5 mm	.1772	24 mm	58 mm	63006	68980
15	.1800	1-5/8	2-3/4	53015	58037
4.6 mm	.1811	24 mm	58 mm	63053	68981
14	.1820	1-5/8	2-3/4	53014	58038
13	.1850	1-5/8	2-3/4	53013	58039
4.7 mm	.1850	26 mm	62 mm	63054	68982
3/16	.1875	1-5/8	2-3/4	53112	58040
12	.1890	1-5/8	2-3/4	53012	58041
4.8 mm	.1890	26 mm	62 mm	63055	68983
11	.1910	1-5/8	2-3/4	53011	58042
4.9 mm	.1929	26 mm	62 mm	63056	68984
10	.1935	1-5/8	2-3/4	53010	58043
9	.1960	1-3/4	3	53009	58044
5 mm	.1969	26 mm	62 mm	63007	68985
8	.1990	1-3/4	3	53008	58045
5.1 mm	.2008	26 mm	62 mm	63057	68986
7	.2010	1-3/4	3	53007	58046
13/64	.2031	1-3/4	3	53113	58047
6	.2040	1-3/4	3	53006	58048
5.2 mm	.2047	26 mm	62 mm	63008	68987

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TOLERANCES

$d_1 = +.0000 - .0005$

$d_2 = h6$

Size d_1	Decimal Equiv.	Flute Length l_2	Overall Length l_1	Uncoated	Ti-NAMITE-A
				EDP No.	(AITiN) EDP No.
5	.2055	1-3/4	3	53005	58049
5.3 mm	.2087	26 mm	62 mm	63058	68988
4	.2090	1-3/4	3	53004	58050
5.4 mm	.2126	28 mm	66 mm	63059	68989
3	.2130	1-3/4	3	53003	58051
5.5 mm	.2165	28 mm	66 mm	63009	68990
7/32	.2188	1-3/4	3	53114	58052
5.6 mm	.2205	28 mm	66 mm	63060	68991
2	.2210	1-3/4	3	53002	58053
5.7 mm	.2244	28 mm	66 mm	63061	68992
1	.2280	1-3/4	3	53001	58054
5.8 mm	.2283	28 mm	66 mm	63062	68993
5.9 mm	.2323	28 mm	66 mm	63063	68994
A	.2340	2	3-1/4	53201	58055
15/64	.2344	2	3-1/4	53115	58056
6 mm	.2362	28 mm	66 mm	63010	68995
B	.2380	2	3-1/4	53202	58057
6.1 mm	.2402	31 mm	70 mm	63064	68996
C	.2420	2	3-1/4	53203	58058
6.2 mm	.2441	31 mm	70 mm	63011	68997
D	.2460	2	3-1/4	53204	58059
6.3 mm	.2480	31 mm	70 mm	63065	68998
E	.2500	2	3-1/4	53205	58060
1/4	.2500	2	3-1/4	53116	58061
6.4 mm	.2520	31 mm	70 mm	63066	68999
6.5 mm	.2559	31 mm	70 mm	63012	69000
F	.2570	2	3-1/4	53206	58062
6.6 mm	.2598	31 mm	70 mm	63067	69001
G	.2610	2-1/8	3-1/2	53207	58063
6.7 mm	.2638	31 mm	70 mm	63068	69002
17/64	.2656	2-1/8	3-1/2	53117	58064
H	.2660	2-1/8	3-1/2	53208	58065
6.8 mm	.2677	34 mm	74 mm	63013	69003
6.9 mm	.2717	34 mm	74 mm	63069	69004
I	.2720	2-1/8	3-1/2	53209	58066
7 mm	.2756	34 mm	74 mm	63014	69005
J	.2770	2-1/8	3-1/2	53210	58067
7.1 mm	.2795	34 mm	74 mm	63070	69006
K	.2810	2-1/8	3-1/2	53211	58068
9/32	.2812	2-1/8	3-1/2	53118	58069
7.2 mm	.2835	34 mm	74 mm	63015	69007
7.3 mm	.2874	34 mm	74 mm	63071	69008
L	.2900	2-1/8	3-1/2	53212	58070
7.4 mm	.2913	34 mm	74 mm	63072	69009
M	.2950	2-3/8	3-3/4	53213	58071
7.5 mm	.2953	34 mm	74 mm	63016	69010
19/64	.2969	2-3/8	3-3/4	53119	58072
7.6 mm	.2992	37 mm	79 mm	63073	69011
N	.3020	2-3/8	3-3/4	53214	58073
7.7 mm	.3031	37 mm	79 mm	63074	69012
7.8 mm	.3071	37 mm	79 mm	63075	69013
7.9 mm	.3110	37 mm	79 mm	63076	69014
5/16	.3125	2-3/8	3-3/4	53120	58074
8 mm	.3150	37 mm	79 mm	63017	69015
O	.3160	2-3/8	3-3/4	53215	58075
8.1 mm	.3189	37 mm	79 mm	63077	69016
8.2 mm	.3228	37 mm	79 mm	63018	69017
P	.3230	2-3/8	3-3/4	53216	58076
8.3 mm	.3268	37 mm	79 mm	63078	69018
21/64	.3281	2-1/2	4	53121	58077
8.4 mm	.3307	37 mm	79 mm	63019	69019

**Série 103 - Forets à
3 arêtes**



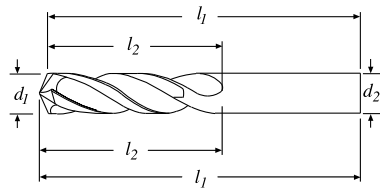
Carbure monobloc, micrograin
Pour fonte, aluminium à grande
teneur en silice, acier allié et
métaux non-ferreux Angle d'entrée,
150° - Hélice, 30° - Forets pour
fonte, aluminium à forte teneur en
silicium, acier allié et métaux non
ferreux - Plus grande précision de
dimension du trou à des vitesses
de production élevées - Réduit la
déviation du foret comparée aux
forets en aciers rapides, au cobalt et
autres forets au carbure.

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continued on next page

3 Flute – Single End



TOLERANCES

$$d_1 = +.0000 - .0005$$

$$d_2 = h6$$



Series 103 – 3 Flute Drills

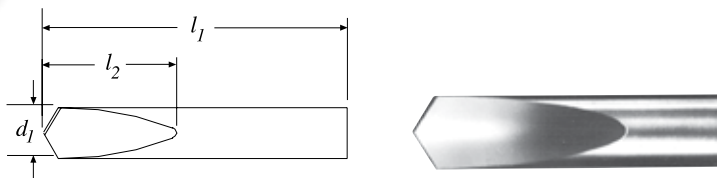
Serie 103 – Brocas de 3 filos

Série 103 – Forets à 3 arêtes

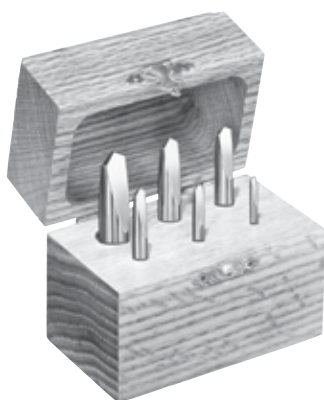
Size d_1	Decimal Equiv.	Flute Length l_2	Overall Length l_1	Uncoated EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
Q	.3320	2-1/2	4	53217	58078
8.5 mm	.3346	37 mm	79 mm	63020	69020
8.6 mm	.3386	40 mm	84 mm	63021	69021
R	.3390	2-1/2	4	53218	58079
8.7 mm	.3425	40 mm	84 mm	63079	69022
11/32	.3438	2-1/2	4	53122	58080
8.8 mm	.3465	40 mm	84 mm	63022	69023
S	.3480	2-1/2	4	53219	58081
8.9 mm	.3504	40 mm	84 mm	63080	69024
9 mm	.3543	40 mm	84 mm	63023	69025
T	.3580	2-3/4	4-1/4	53220	58082
9.1 mm	.3583	40 mm	84 mm	63081	69026
23/64	.3594	2-3/4	4-1/4	53123	58083
9.2 mm	.3622	40 mm	84 mm	63024	69027
9.3 mm	.3661	40 mm	84 mm	63082	69028
U	.3680	2-3/4	4-1/4	53221	58084
9.4 mm	.3701	40 mm	84 mm	63083	69029
9.5 mm	.3740	40 mm	84 mm	63025	69030
3/8	.3750	2-3/4	4-1/4	53124	58085
V	.3770	2-3/4	4-1/4	53222	58086
9.6 mm	.3780	43 mm	89 mm	63084	69031
9.7 mm	.3819	43 mm	89 mm	63085	69032
9.8 mm	.3858	43 mm	89 mm	63086	69033
W	.3860	2-7/8	4-1/2	53223	58087
9.9 mm	.3898	43 mm	89 mm	63087	69034
25/64	.3906	2-7/8	4-1/2	53125	58088
10 mm	.3937	43 mm	89 mm	63026	69035
X	.3970	2-7/8	4-1/2	53224	58089
10.1 mm	.3976	43 mm	89 mm	63088	69036
10.2 mm	.4016	43 mm	89 mm	63027	69037
Y	.4040	2-7/8	4-1/2	53225	58090
13/32	.4062	2-7/8	4-1/2	53126	58091
10.4 mm	.4094	43 mm	89 mm	63028	69038
Z	.4130	2-7/8	4-1/2	53226	58092
10.5 mm	.4134	43 mm	89 mm	63029	69039
10.7 mm	.4213	47 mm	95 mm	63030	69040
27/64	.4219	2-7/8	4-1/2	53127	58093
10.8 mm	.4252	47 mm	95 mm	63031	69041
11 mm	.4331	47 mm	95 mm	63032	69042
7/16	.4375	2-7/8	4-1/2	53128	58094
11.5 mm	.4528	47 mm	95 mm	63033	69043
29/64	.4531	3	4-3/4	53129	58095
15/32	.4688	3	4-3/4	53130	58096
12 mm	.4724	51 mm	102 mm	63034	69044
31/64	.4844	3	4-3/4	53131	58097
12.5 mm	.4921	51 mm	102 mm	63035	69045
1/2	.5000	3	4-3/4	53132	58098
12.8 mm	.5039	51 mm	102 mm	63036	69046
13 mm	.5118	51 mm	102 mm	63089	69047
33/64	.5156	3	4-3/4	53135	58099
13.1 mm	.5157	51 mm	102 mm	63037	69048
13.5 mm	.5315	54 mm	107 mm	63090	69049
14 mm	.5512	54 mm	107 mm	63038	69050
9/16	.5625	3	4-3/4	53136	58100
14.3 mm	.5630	56 mm	111 mm	63039	69051
14.5 mm	.5709	56 mm	111 mm	63040	69052
15 mm	.5906	56 mm	111 mm	63091	69053
5/8	.6250	3-1/2	5-3/4	53133	58101
11/16	.6875	3-1/2	5-3/4	53137	58102
17.5 mm	.6890	62 mm	123 mm	63041	69054
3/4	.7500	4-1/2	5-3/4	53134	58103
19.5 mm	.7677	66 mm	131 mm	63042	69055
20 mm	.7874	66 mm	131 mm	63043	69056



TOLERANCES
 $d_1 = +.0000 - .0005$




Diameter d_1	Flute Length l_2	Overall Length l_1	Uncoated EDP No.
1/32	3/16	1-1/4	54102
1/16	5/16	1-1/2	54104
3/32	7/16	1-1/2	54106
*1/8	1/2	1-1/2	54108
5/32	9/16	2	54110
*3/16	11/16	2	54112
7/32	11/16	2	54114
*1/4	13/16	2	54116
9/32	7/8	2-1/2	54118
*5/16	7/8	2-1/2	54120
11/32	15/16	2-1/2	54122
*3/8	1-1/8	2-1/2	54124
13/32	1-1/8	2-1/2	54126
7/16	1-3/16	2-3/4	54128
15/32	1-3/16	3	54130
*1/2	1-5/16	3	54132
* Series 104 Set			54175



Series 104 – Flat Drill 

Micrograin Solid Carbide
 118° Point Angle

Serie 104 – Brocas Planas 

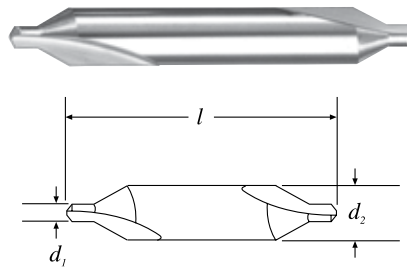
Carburo sólido con micrograno
 Para el mecanizado de materiales
 duro Angulo punta 118°

**Série 104 – Forets à
 langue d’aspic** 

Carbure monobloc, micrograin
 Point à 118°

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TOLERANCES

$d_1 = +.003 - .000$
 $d_2 = -.0001 - .0005$

Series 301 – Combined Drill and Countersink



Micrograin Solid Carbide
60° Included Angle, Double End

Serie 301 – Broca de centros



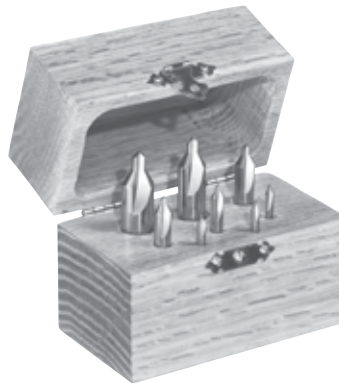
Carburo sólido con micrograno
Angulo doble punta 60°

Série 301 – Forêt à centrer



Carbure monobloc, micrograin
Angle de dégagement, 60°

Sizes	Body Diameter d_2	Drill Diameter d_1	Aprox. Overall Length l	Uncoated EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
*00	1/8	0.025	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	

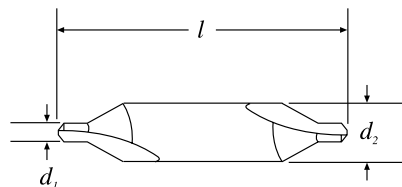


d₁ TOLERANCES


mm	mm
0,5 – 2,5	±0,140–0,000
>2,5 – 5	±0,000–0,012

d₂ TOLERANCES h9

mm	mm
0,5 – 3	±0,000–0,025
>3 – 5	±0,000–0,030



Size	Body Diameter	Overall Length	Uncoated EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
d ₁ mm	d ₂ mm	l mm		
0,5	3,15	20	67005	67035
0,8	3,15	20	67007	67037
1	3,15	31,5	67009	67039
1,25	3,15	31,5	67011	67041
1,6	4	35,5	67013	67043
2	5	40	67015	67045
2,5	6,3	45	67017	67047
3,15	8	50	67019	67049
4	10	56	67021	67051
5	12,5	63	67023	67053

301M DIN 333 – Combined Drill and Countersink 

Micrograin Solid Carbide
60° Included Angle, Double End

301M DIN 333 – Broca de centros 

Carburo sólido con micrograno
Angulo doble punta 60°

301M DIN 333 – Foret à centrer 

Carbure monobloc, micrograin
Angle de dégagement, 60°

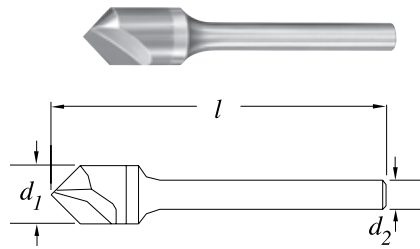
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Countersink – Single Flute – Single End

Fractional Series

601



TOLERANCES

INCLUDED ANGLE = +1°/-1°
 $d_1 = 1/8 - 1/4 = +.0000 - .0005$
 $d_1 = 3/8 - 1 = +.003 - .000$

Series 601 – Single Flute Countersink



Micrograin Solid Carbide
 Eccentric relief design – Use on soft materials

Serie 601 – Avellanador de un filo Countersink



Carburo sólido con micrograno
 Diseño de destalonado excéntrico – utilización en materiales blandos

Série 601 – Foret aléseur à goujure unique



Carbure monobloc, micrograin
 Conception à dépouille excentrique – Utilisation sur matériaux tendres

Series 603 – 3 Flute Countersink



Micrograin Solid Carbide
 Eccentric relief design – Use on general purpose materials

Series 603 – Avellanador de 3 filos



Carburo sólido con micrograno
 Diseño de destalonado excéntrico – utilización en materiales de uso general

Série 603 – Foret aléseur à 3 dents



Carbure monobloc, micrograin
 Conception à dépouille excentrique – Utilisation sur matériaux universels

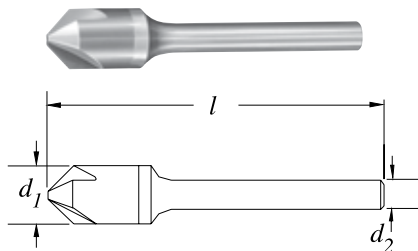
Cutter Diameter d_1	Shank Diameter d_2	Overall Length l	Uncoated		
			60° EDP No.	82° EDP No.	90° EDP No.
1/8	1/8	1-1/2	74001	74101	74201
3/16	3/16	2	74004	74104	74204
1/4	1/4	2	74007	74107	74207
*3/8	1/4	2-13/16	74010	74110	74210
*1/2	1/4	2-7/8	74013	74113	74213
*5/8	3/8	3	74016	74116	74216
*3/4	1/2	3	74019	74119	74219
*1	1/2	3-1/4	74022	74122	74222

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

Countersink – 3 Flute – Single End

Fractional Series

603



TOLERANCES

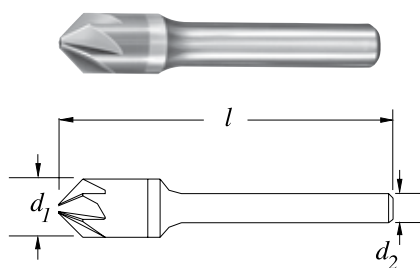
INCLUDED ANGLE = +1°/-1°
 $d_1 = 1/8 - 1/4 = +.0000 - .0005$
 $d_1 = 3/8 - 1 = +.003 - .000$

Cutter Diameter d_1	Shank Diameter d_2	Overall Length l	Uncoated		
			60° EDP No.	82° EDP No.	90° EDP No.
1/8	1/8	1-1/2	74025	74125	74225
3/16	3/16	2	74028	74128	74228
1/4	1/4	2	74031	74131	74231
*3/8	1/4	2-13/16	74034	74134	74234
*1/2	1/4	2-7/8	74037	74137	74237
*5/8	3/8	3	74040	74140	74240
*3/4	1/2	3	74043	74143	74243
*1	1/2	3-1/4	74046	74146	74246

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

TOLERANCES

INCLUDED ANGLE = +1°/-1°
 $d_1 = 1/8 - 1/4 = +.0000 - .0005$
 $d_1 = 3/8 - 1 = +.003 - .000$



Cutter Diameter d_1	Shank Diameter d_2	Overall Length l	60°	Uncoated	90°
			EDP No.	82° EDP No.	EDP No.
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

Series 606 – 6 Flute Countersink



Micrograin Solid Carbide
 Conventional relief design – Use on hardened steel

Serie 606 – Avellanador de 6 filos



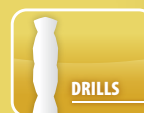
Carburo sólido con micrograno
 Diseño de destalonado excéntrico – utilización en acero templado

Série 606 – Foret aléreur à 6 dents

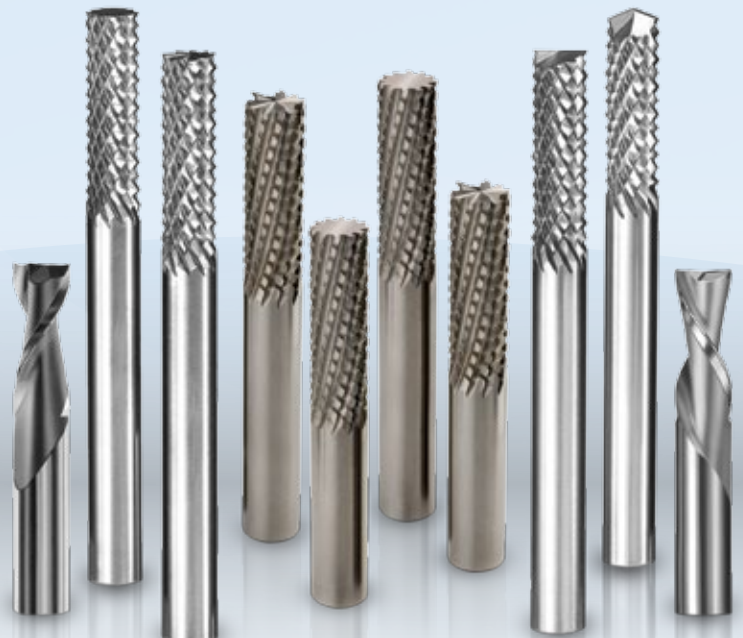
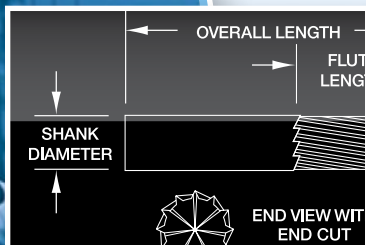
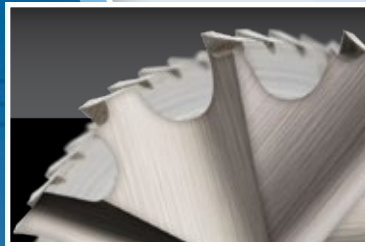


Carbure monobloc, micrograin
 Conception à dépouille excentrique – Utilisation sur acier trempé

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Routers

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2 Flute Single End Square End Left Hand Spiral	22, 22M		173

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Fresas De Contornear de Alto Rendimiento	Series	Includes	Page
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Series 20-CCR

Multi-Flute Carbon-Fiber Composite Routers

Eliminate Fiber Breakout

SGS Series 20-CCR Carbon-Fiber Composite Routers are designed for aerospace cutting applications.

Series 20-CCR reduces fiber breakout in carbon-fiber reinforced polymer materials used in the manufacture of aerospace components.

The unique flute structure provides longer tool life and requires less cutting force.

The Series 20-CCR allows the aerospace industry to achieve better results and maintain higher efficiencies.

Series 20-CCR is available exclusively from SGS Tool Company.

Features & Benefits

Soaring Results in Aerospace Carbon Fiber Composites

- SGS Tool Company's unique fluting form reduces and, in most cases, eliminates fiber breakout.
- Designed for carbon-fiber composites
- Longer tool life
- Less cutting force
- Reduces delamination
- Available with and without end cut
- Both fractional and metric cutting diameters



Fresas de ranuradora multi-filo series 20 para compuestos de fibra de carbono

Elimina la separación de las fibras

Las fresas de ranuradora SGS series 20-CCR para compuestos de fibra de carbono están diseñadas para aplicaciones de corte en la industria aeroespacial.

Las series 20-CCR reducen la separación de las fibras en los materiales polímeros reforzados con fibra de carbono que se utilizan en la fabricación de componentes aeroespaciales.

La estructura única de los canales proporciona una mayor vida útil de la herramienta, y requiere menor fuerza de corte.

Las series 20-CCR permiten a la industria aeroespacial alcanzar mejores resultados y mantener mayor eficiencia.

Las series 20-CCR es suministrada exclusivamente por SGS Tool Company.

Características y ventajas

Resultados espectaculares en compuestos de fibra de carbono para aplicaciones aeroespaciales

- **La forma de los canales, exclusiva de SGS Tool Company, reduce y -en la mayoría de los casos- elimina la separación de las fibras.**
- **Diseñadas para compuestos de fibra de carbono**
- **Mayor vida útil de la herramienta**
- **Menor fuerza de corte**
- **Reducen la delaminación**
- **Disponibles con o sin corte de punta**
- **Diámetros de corte fraccionales y métricos**

Fraises à détourer composites Série 20 en fibres de carbone avec goujures multiples

Élimine les problèmes de rupture de fibres

Fraises à détourer composites SGS Série 20-CCR en fibres de carbone conçues pour les applications de découpage dans l'industrie aérospatiale.

Les fraises à détourer Série 20-CCR réduisent les problèmes de rupture de fibres dans les matériaux polymères renforcés avec des fibres de carbone qui sont utilisés pour fabriquer des composants d'avion.

La structure unique des goujures augmente la longévité des outils et demande moins de force de découpage.

Les fraises à détourer Série 20-CCR permettent aux entreprises aérospatiales d'obtenir de meilleurs résultats et une meilleure efficacité.

La fraise à détourer Série 20-CCR est disponible en exclusivité chez SGS Tool Company.

Caractéristiques et avantages

Résultats extraordinaires sur les matériaux composites avec fibres de carbone de l'industrie aérospatiale

- **Les goujures aux formes uniques de la société SGS Tool Company réduisent et éliminent souvent les ruptures de fibres.**
- **Produit spécialement conçu pour les matériaux composites avec fibres de carbone**
- **Augmente la longévité des outils**
- **Force de découpage moindre**
- **Réduit le délaminage**
- **Disponible avec et sans entaille d'extrémité**
- **Diámetros de découpage fractionnels et métriques**

ROUTERS
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Series 20-CCR • 20M-CCR

Series 20 Multi-Flute Carbon-Fiber Composite Routers

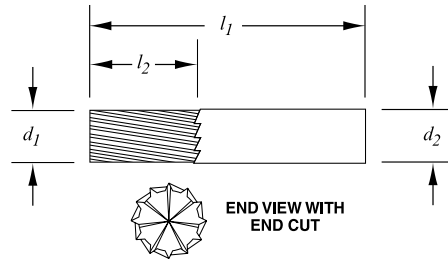
Serie 20-CCR • 20M-CCR

Fresas de ranuradora multi-filo series 20 para compuestos de fibra de carbono

Série 20-CCR • 20M-CCR

Fraises à détourer composites Série 20 en fibres de carbone avec goujures multiples

Multi-Flute Carbon-Fiber Composite Routers



Fractional Series **20-CCR**

TOLERANCES

$$d_1 = +.000 / -.005$$

$$d_2 = h6$$

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	End Style	EDP No.
1/4	1	2-1/2	1/4	No End Cutting	72930
1/4	1	2-1/2	1/4	End Cutting	72947
5/16	1	2-1/2	5/16	No End Cutting	72948
5/16	1	2-1/2	5/16	End Cutting	72949
3/8	1-1/8	2-1/2	3/8	No End Cutting	72950
3/8	1-1/8	2-1/2	3/8	End Cutting	72951
1/2	1-1/2	3-1/2	1/2	No End Cutting	72952
1/2	1-1/2	3-1/2	1/2	End Cutting	72953

TOLERANCES

$$d_1 = +0,00 / -0,13$$

$$d_2 = h6$$

Metric Series **20M-CCR**

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	End Style	EDP No.
6	25	63	6	No End Cutting	82966
6	25	63	6	End Cutting	82967
8	25	63	8	No End Cutting	82968
8	25	63	8	End Cutting	82969
10	28	63	10	No End Cutting	82970
10	28	63	10	End Cutting	82971
12	38	89	12	No End Cutting	82972
12	38	89	12	End Cutting	82973

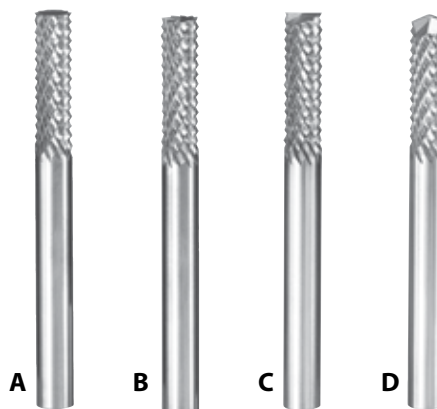
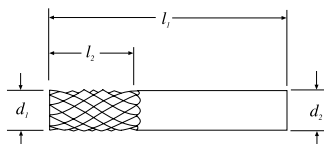


TOLERANCES

$$d_1=1, 1-1=+.000/-0.004$$

$$2-9=+.000/-0.005$$

$$d_2=h6$$

Fiberglass Routers 

Solid Carbide – For Fiberglass And Non-Metallic Materials

STYLE A: No End Cut

STYLE B: Burr End

STYLE C: End Mill End

STYLE D: Drill End

Fresa para fibra de vidrio 

Carburo sólido – Para fibra de vidrio y otros materiales no metálicos.

ESTILO A: Sin corte frontal

ESTILO B: Con punta de lima rotativa

ESTILO C: Con punta de fresa

ESTILO D: Con punta de broca

Fraises pour fibre de verre 

Carbure monobloc – Pour fibres de verre et matières non-métalliques.

Type A: sans taille en bout

Type B: taille en bout comme fraise-lime

Type C: taille en bout comme fraise

Type D: taille en bout comme foret

ROUTERS
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Tool No.	Cutter Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Uncoated	Uncoated	Uncoated
					EDP No.	EDP No.	EDP No.	EDP No.
FGR-1	1/16	3/16	1-1/2	1/8	73001	73015	73030	73045
FGR 1-1	3/32	3/8	1-1/2	1/8	73002	73016	73031	73046
FGR-2	1/8	1/2	1-1/2	1/8	73003	73017	73032	73047
FGR-3	3/16	5/8	2	3/16	73004	73018	73033	73048
FGR-4	3/16	5/8	2	1/4	73005	73019	73034	73049
FGR-5	1/4	3/4	2	1/4	73006	73020	73035	73050
FGR-6	1/4	3/4	2-1/2	1/4	73007	73021	73036	73051
FGR 6-1	1/4	1	3	1/4	73008	73022	73037	73052
FGR-7	5/16	1	2-1/2	5/16	73009	73023	73038	73053
FGR-8	3/8	1	2-1/2	3/8	73010	73024	73039	73054
FGR-9	1/2	1	3	1/2	73011	73025	73040	73055

TOLERANCES

$$d_1=1, 1-1=+0,00/-0,10$$

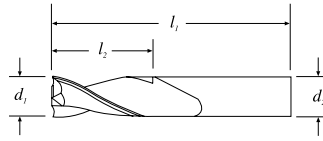
$$2-9=+0,00/-0,13$$

$$d_2=h6$$

Metric Series FGR-M

Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated	Uncoated	Uncoated	Uncoated
					EDP No.	EDP No.	EDP No.	EDP No.
FGR-1M	1,6	5	38	3	83001	83015	83030	83045
FGR 1-1M	2,4	9,5	38	3	83002	83016	83031	83046
FGR-2M	3	12	38	3	83003	83017	83032	83047
FGR-3M	4	16	50	4	83004	83018	83033	83048
FGR-4M	4	16	50	6	83005	83019	83034	83049
FGR-5M	6	19	50	6	83006	83020	83035	83050
FGR-6M	6	19	63	6	83007	83021	83036	83051
FGR 6-1M	6	25	75	6	83008	83022	83037	83052
FGR-7M	8	25	63	8	83009	83023	83038	83053
FGR-8M	10	25	75	10	83010	83024	83039	83054
FGR-9M	12	25	75	12	83011	83025	83040	83055

2 Flute – Single End – Square End Right Hand Spiral



TOLERANCES

$d_1 = +.000 - .003$
 $d_2 = h6$

Series 21 • 21M – Wood Router – Up Cut

Micrograin Solid Carbide – For
Wood, Plastic and Other Nonferrous
Materials – 2 Flute – Right Hand
Spiral – Right Hand Cutting.

Serie 21 • 21M – Fresa para madera – Corte hacia arriba

Carburo sólido con micrograno
– Para madera, plástico y otros
materiales no ferrosos – 2 filos –
hélice a derecha – corte a derecha.

Série 21 • 21M – Fraise pour bois – Coupe ascendante

Carbure monobloc, micrograin –
Pour bois, matières synthétiques
et métaux non-ferreux – Hélice à
droite – Coupe à droite – 2 dents

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.
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

TOLERANCES

$d_1 = +0,000 - 0,08$
 $d_2 = h6$

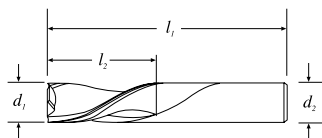
Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.
3	13	50	6	90101
4	16	63	6	90107
5	19	63	6	90109
6	25	63	6	90113
8	25	63	8	90121
10	31	75	10	90129
12	31	75	12	90137



2 Flute – Single End – Square End
Left Hand Spiral

TOLERANCES

$d_1 = +.000 - .003$
 $d_2 = h6$



Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.
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

**Series 22 • 22M –
Wood Router –
Down Cut**



Micrograin Solid Carbide – For Wood, Plastic and Other Nonferrous Materials – 2 Flute – Left Hand Spiral – Right Hand Cutting.

**Serie 22 • 22M –
Fresa para madera –
Corte hacia abajo**



Carburo sólido con micrograno – Para madera, plástico y otros materiales no ferrosos – 2 filos – hélice a izquierdo – corte a derecha.

**Série 22 • 22M –
Fraise pour bois –
Coupe descendante**



Carbure monobloc, micrograin – Pour bois, matières synthétiques et métaux non-ferreux – Hélice à gauche – Coupe à droite – 2 dents

TOLERANCES

$d_1 = +0,000 - 0,08$
 $d_2 = h6$

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.
3	13	50	6	91101
4	16	63	6	91107
5	19	63	6	91109
6	25	63	6	91113
8	25	63	8	91121
10	31	75	10	91129
12	31	75	12	91137



BURS



BURS



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Burs

High Performance Burs	Series	Includes	Page
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Moldmaker, Tool & Die - Brazed & Mini	SA, SA-M - SN, SN-M		220 – 225



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Limas Rotativas en Forma Ovalada	SE, SE-M		190 – 191
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Limas Rotativas en Forma de Árbol Puntiagudo	SG, SG-M		194 – 195
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Limas Rotativas Cónicas con Radio en la Punta	SL, SL-M		202 – 203
Limas Rotativas Cónicas	SM, SM-M		204 – 205
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Juegos de Limas Rotativas	1,1M, 2, 4, 5, 6, 6M, 7, 8, 8M, 16		210 – 215
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Fraises-Limes Forme Cylindrique à Bout Hémisphérique	SC, SC-M		186 – 187
Fraises-Limes de Forme Sphérique	SD, SD-M		188 – 189
Fraises-Limes de Forme Ovale	SE, SE-M		190 – 191
Fraises-Limes en Forme d'ogive à Bout Hémisphérique	SF, SF-M		192 – 193
Fraises-Limes en Forme d'ogive à Bout Pointu	SG, SG-M		194 – 195
Fraises-Limes en Forme de Flamme	SH, SH-M		196 – 197
Fraises-Limes de Forme Conique à 60°	SJ, SJ-M		198 – 199
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Fraises-Limes de Forme Conique à Bout Hémisphérique	SL, SL-M		202 – 203
Fraises-Limes de Forme Conique	SM, SM-M		204 – 205
Fraises-Limes de Forme Conique Inversée	SN, SN-M		206 – 207
G2000	G2000, G2000M		208 – 209
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Omega Burs – Aggressive, Deep Double Cut

Omega Burs from SGS are Deep, Aggressive Double Cut Burs designed to handle your most challenging applications. With a deep, aggressive tooth pattern, Omega Burs allow for improved chip control and rapid stock removal in harder materials...with minimal chatter.



Features & Benefits:

- Enhanced geometry and deep flute configuration for increased tooth strength.
- Longer tool life vs. conventional burs
- Maximum stock removal
- Improved productivity and cost savings

Applications include:

- Mild steels
- Stainless steel
- Cast iron
- Other ferrous metals

Industries:

- Marine & shipbuilding
- Offshore MRO
- Foundries
- Automotive
- Metal fabrication





Fresas Para Cavidad Omega – Corte doble profundo agresivo

Las Omega de SGS son fresas para cavidad de corte doble profundo agresivo, diseñadas para manejar sus aplicaciones más exigentes.

Las fresas para cavidad Omega, con su patrón de dientes profundo y agresivo, permiten un control de virutas mejorado y un arranque de viruta rápido en materiales más duros, con mínimo golpeteo.

Características y ventajas:

- Geometría mejorada y configuración profunda de canales para mejorar la resistencia de los dientes
- Mayor vida útil de la herramienta en relación con las fresas para cavidad convencionales
- Máximo arranque de viruta
- Mejor productividad y ahorro de costos

Las aplicaciones comprenden:

- Aceros dulces
- Acero inoxidable
- Hierro fundido
- Otros metales ferrosos

Industrias:

- Náutica y de construcción naviera
- Mantenimiento, reparaciones y reacondicionamiento (MRO) costa afuera
- Fundiciones
- Automotriz
- Fabricación metálica

Fraises Omega – Double coupe profonde et agressive

Les fraises Omega de SGS sont à double coupe profonde et agressive, elles sont conçues pour satisfaire vos applications les plus exigeantes. Avec leur disposition à dentures profondes et mordantes, les fraises Omega permettent un meilleur contrôle des copeaux et un enlèvement de matière rapide dans des matériaux plus durs...avec un broutage minimal.

Caractéristiques et Avantages:

- Géométrie améliorée et configuration à goujures profondes pour plus de solidité des dentures
- Plus longue durée de service, comparées à des fraises classiques
- Enlèvement de matière maximal
- Meilleure productivité et coûts diminués

Applications Possibles:

- Aciers doux
- Acier inox
- Fonte
- Autres métaux non ferreux

Industries:

- Marine et construction navale
- MRE au large
- Fonderies
- Automobile
- Transformation des métaux





Serie DDC – DDC-M



Omega Burs – Aggressive, Deep Double Cut.

Serie DDC – DDC-M

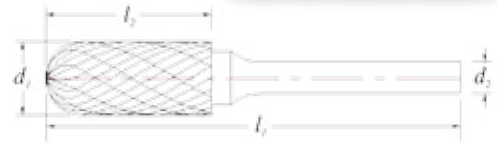


Fresas Para Cavidad Omega – Corte doble profundo agresivo.

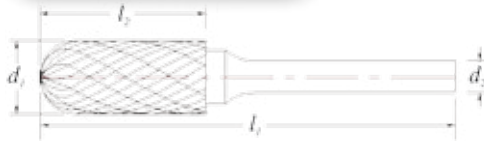
Série DDC – DDC-M



Fraises Omega – Double coupe profonde et agressive.



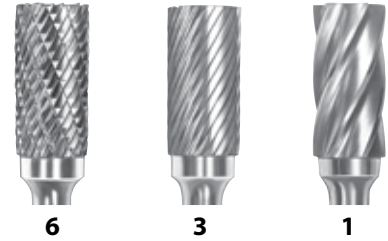
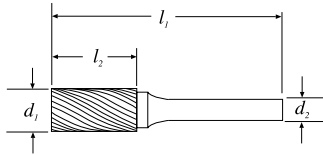
Series	Tool No.	Cutting Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Uncoated EDP	Ti-NAMITE-A (AlTiN) EDP No.
SA	SA-3 DDC	3/8	3/4	1/4	2 1/2	10269	10304
SA	SA-3L6 DDC	3/8	3/4	1/4	6 3/4	10329	10354
SA	SA-5 DDC	1/2	1	1/4	2 3/4	10270	10305
SA	SA-5L6 DDC	1/2	1	1/4	7	10337	10355
SA	SA-5 3/8 DDC	1/2	1	3/8	3	10271	10306
SB	SB-3 DDC	3/8	3/4	1/4	2 1/2	10272	10307
SB	SB-5 DDC	1/2	1	1/4	2 3/4	10273	10308
SB	SB-5 3/8 DDC	1/2	1	3/8	3	10274	10309
SC	SC-3 DDC	3/8	3/4	1/4	2 1/2	10275	10310
SC	SC-3L6 DDC	3/8	3/4	1/4	6 3/4	10338	10356
SC	SC-5 DDC	1/2	1	1/4	2 3/4	10276	10311
SC	SC-5L6 DDC	1/2	1	1/4	7	10339	10357
SC	SC-5 3/8 DDC	1/2	1	3/8	2 3/4	10277	10312
SC	SC-6 3/8 DDC	5/8	1	3/8	3	10278	10313
SD	SD-3 DDC	3/8	15/47	1/4	2 3/50	10279	10314
SD	SD-3L6 DDC	3/8	15/47	1/4	6 5/16	10340	10358
SD	SD-5 DDC	1/2	17/40	1/4	2 1/5	10280	10315
SD	SD-5L6 DDC	1/2	17/40	1/4	6 9/20	10341	10359
SD	SD-5 3/8 DDC	1/2	17/40	3/8	2 9/20	10281	10316
SE	SE-3 DDC	3/8	5/8	1/4	2 19/50	10282	10317
SE	SE-3L6 DDC	3/8	5/8	1/4	6 5/8	10342	10360
SE	SE-5 DDC	1/2	7/8	1/4	2 31/50	10283	10318
SE	SE-5L6 DDC	1/2	7/8	1/4	6 7/8	10343	10361
SE	SE-5 3/8 DDC	1/2	7/8	3/8	2 7/8	10284	10319
SF	SF-3 DDC	3/8	3/4	1/4	2 1/2	10285	10320
SF	SF-3L6 DDC	3/8	3/4	1/4	6 3/4	10344	10362
SF	SF-5 DDC	1/2	1	1/4	2 3/4	10286	10321
SF	SF-5L6 DDC	1/2	1	1/4	7	10345	10363
SF	SF-5 3/8 DDC	1/2	1	3/8	3	10287	10322
SF	SF-6 3/8 DDC	5/8	1	3/8	3	10288	10323
SG	SG-3 DDC	3/8	3/4	1/4	2 1/2	10289	10324
SG	SG-3L6 DDC	3/8	3/4	1/4	6 3/4	10346	10364
SG	SG-5 DDC	1/2	1	1/4	2 3/4	10290	10325
SG	SG-5L6 DDC	1/2	1	1/4	7	10347	10365
SG	SG-5 3/8 DDC	1/2	1	3/8	3	10291	10326
SG	SG-6 3/8 DDC	5/8	1	3/8	3	10292	10327
SH	SH-5 DDC	1/2	1 1/4	1/4	3	10293	10330
SH	SH-5L6 DDC	1/2	1 1/4	1/4	7 1/4	10348	10366
SH	SH-5 3/8 DDC	1/2	1 1/4	3/8	3 1/4	10294	10331
SL	SL-3 DDC	3/8	1 1/16	1/4	2 47/50	10295	10332
SL	SL-3L6 DDC	3/8	1 1/16	1/4	7 1/16	10349	10367
SL	SL-4 DDC	1/2	1 1/8	1/4	3	10296	10333
SL	SL-4L6 DDC	1/2	1 1/8	1/4	7 1/8	10351	10368
SL	SL-4 3/8 DDC	1/2	1 1/8	3/8	3 13/48	10297	10334
SM	SM-5 DDC	1/2	7/8	1/4	2 3/4	10298	10335
SM	SM-5 3/8 DDC	1/2	7/8	3/8	3	10299	10336



Series	Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Uncoated EDP	Ti-NAMITE-A (AlTiN) EDP No.
SA	SA-3M DDC	9,5	19	6	63	20269	20300
SA	SA-3ML6 DDC	9,5	19	6	169	20331	20354
SA	SA-5M DDC	12,7	25	6	69	20270	20301
SA	SA-5ML6 DDC	12,7	25	6	175	20331	20355
SA	SA-5M8 DDC	12,7	25	8	69	20271	20302
SB	SB-3M DDC	9,5	19	6	63	20272	20303
SB	SB-5M DDC	12,7	25	6	69	20273	20304
SB	SB-5M8 DDC	12,7	25	8	69	20274	20305
SC	SC-3M DDC	9,5	19	6	63	20275	20306
SC	SC-3ML6 DDC	9,5	19	6	169	20333	20356
SC	SC-5M DDC	12,7	25	6	69	20276	20307
SC	SC-5ML6 DDC	12,7	25	6	175	20334	20357
SC	SC-5M8 DDC	12,7	25	8	69	20277	20308
SC	SC-6M8 DDC	16,0	25	8	69	20278	20309
SD	SD-3M DDC	9,5	8	6	52	20279	20310
SD	SD-3ML6 DDC	9,5	8	6	158	20335	20358
SD	SD-5M DDC	12,7	11	6	55	20280	20311
SD	SD-5ML6 DDC	12,7	11	6	161	20336	20359
SD	SD-5M8 DDC	12,7	11	8	62	20281	20312
SE	SE-3M DDC	9,5	16	6	60	20282	20313
SE	SE-3ML6 DDC	9,5	16	6	166	20337	20360
SE	SE-5M DDC	12,7	22	6	66	20283	20314
SE	SE-5ML6 DDC	12,7	22	6	172	20338	20361
SE	SE-5M8 DDC	12,7	22	8	69	20284	20315
SF	SF-3M DDC	9,5	19	6	63	20285	20316
SF	SF-3ML6 DDC	9,5	19	6	169	20339	20362
SF	SF-5M DDC	12,7	25	6	69	20286	20317
SF	SF-5ML6 DDC	12,7	25	6	175	20340	20363
SF	SF-5M8 DDC	12,7	25	8	69	20287	20318
SF	SF-6M8 DDC	16,0	25	8	69	20288	20319
SG	SG-3M DDC	9,5	19	6	63	20289	20320
SG	SG-3ML6 DDC	9,5	19	6	169	20341	20364
SG	SG-5M DDC	12,7	25	6	69	20290	20321
SG	SG-5ML6 DDC	12,7	25	6	175	20342	20365
SG	SG-5M8 DDC	12,7	25	8	69	20291	20322
SG	SG-6M8 DDC	16,0	25	8	69	20292	20323
SH	SH-5M DDC	12,7	32	6	76	20293	20324
SH	SH-5ML6 DDC	12,7	32	6	182	20343	20366
SH	SH-5M8 DDC	12,7	32	8	76	20294	20325
SL	SL-3M DDC	9,5	27	6	74	20295	20326
SL	SL-3ML6 DDC	9,5	27	6	177	20344	20367
SL	SL-4M DDC	12,7	28	6	76	20296	20327
SL	SL-4ML6 DDC	12,7	28	6	178	20345	20368
SL	SL-4M8 DDC	12,7	28	8	76	20297	20328
SM	SM-5M DDC	12,7	22	6	69	20298	20329
SM	SM-5M8 DDC	12,7	22	8	69	20299	20330

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Cylinder Shape Burs



Solid Carbide – To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut – Complete Bur Regrind Service Available

* 3/8" / 8 mm shanks optional

Limas rotativas forma cilíndrica



Carburo sólido – Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafilado de limas rotativas

* Mango de 3/8" / 8 mm opcional.

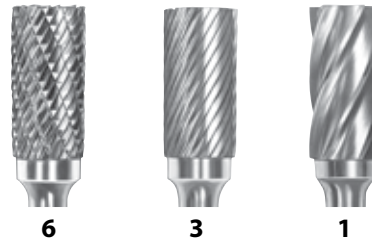
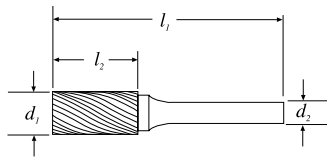
Fraises – Limes forme cylindrique



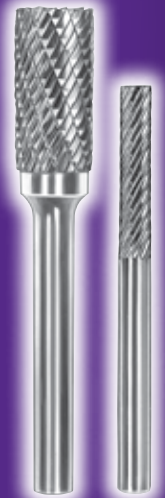
Carbure monobloc – Pour commander les coupes en option 4, 3SP, 2, 5 : indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible

* Queue de 3/8" / 8 mm en option.

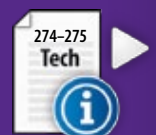
Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut	Single Cut	Nonferrous Cut
					EDP No.	EDP No.	EDP No.
SA-41	1/16	1/4	1/8	1-1/2	10603	10600	–
SA-41L2	1/16	1/4	1/8	2	17103	17100	–
SA-41L3	1/16	1/4	1/8	3	17128	17125	–
SA-61	1/16	1/4	3/32	1-1/4	10753	10750	–
SA-63	3/32	3/8	3/32	1-1/4	10778	10775	–
SA-42	3/32	7/16	1/8	1-1/2	10628	10625	–
SA-42L2	3/32	7/16	1/8	2	17153	17150	–
SA-42L3	3/32	7/16	1/8	3	17178	17175	–
SA-11	1/8	1/2	1/4	2-5/16	10403	10400	–
SA-43	1/8	9/16	1/8	1-1/2	10653	10650	–
SA-43L2	1/8	9/16	1/8	2	17203	17200	–
SA-43L3	1/8	9/16	1/8	3	17228	17225	–
SA-12	1/8	5/8	1/4	2-4/9	10428	10425	–
SA-52	5/32	1/2	1/8	1-1/2	10703	10700	–
SA-13	5/32	5/8	1/4	2	10453	10450	–
SA-81	3/16	1/2	3/16	2	10803	10800	–
SA-53	3/16	1/2	1/8	1-1/2	10728	10725	–
SA-14	3/16	5/8	1/4	2	10478	10475	–
SA-51	1/4	1/2	1/8	2	10678	10675	–
SA-1	1/4	5/8	1/4	2	10003	10000	–
SA-1L	1/4	1	1/4	2	10028	10025	–
SA-1L6	1/4	5/8	1/4	6-1/2	16178	16175	–
SA-1NF	1/4	3/4	1/4	2	–	–	19000
SA-2	5/16	3/4	1/4	2-1/2	10053	10050	–
SA-3	3/8	3/4	1/4	2-1/2	10078	10075	–
SA-3L	3/8	1	1/4	2-3/4	10103	10100	–
SA-3L6	3/8	3/4	1/4	6-3/4	16203	16200	–
SA-3NF	3/8	3/4	1/4	2-1/2	–	–	19002
SA-3X	3/8	1-1/2	1/4	3-1/4	10128	10125	–
SA-4	7/16	1	1/4	2-3/4	10153	10150	–
SA-5	1/2	1	1/4	2-3/4	10178	10175	–
SA-5L6	1/2	1	1/4	7	16228	16225	–
SA-5NF	1/2	1	1/4	2-3/4	–	–	19004
*SA-6	5/8	1	1/4	2-3/4	10203	10200	–
*SA-6NF	5/8	1	1/4	2-3/4	–	–	19006
*SA-15	3/4	1/2	1/4	2-1/4	10503	10500	–
*SA-16	3/4	3/4	1/4	2-1/2	10553	10550	–
*SA-7	3/4	1	1/4	2-3/4	10253	10250	–
SA-7NF	3/4	1	1/4	2-3/4	–	–	19008
SA-7NF3/8	3/4	1	3/8	3	–	–	19010
*SA-8	7/8	1	1/4	2-3/4	10303	10300	–
*SA-9	1	1	1/4	2-3/4	10353	10350	–

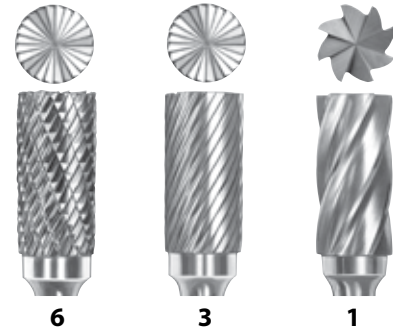
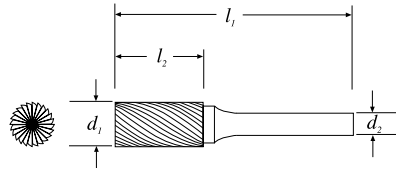


Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm			
					Double Cut EDP No.	Single Cut EDP No.	Nonferrous Cut EDP No.
SA-41M	1,5	6	3	38	20603	20600	–
SA-41ML2	1,5	6	3	50	27103	27100	–
SA-41ML3	1,5	6	3	75	27128	27125	–
SA-42M	2,5	11	3	38	20628	20625	–
SA-42ML2	2,5	11	3	50	27153	27150	–
SA-42ML3	2,5	11	3	75	27178	27175	–
SA-43M	3	14	3	38	20653	20650	–
SA-43ML2	3	14	3	50	27203	27200	–
SA-43ML3	3	14	3	75	27228	27225	–
SA-11M	3	12	6	56	20403	20400	–
SA-12M	3	16	6	60	20428	20425	–
SA-52M	4	12,7	3	38	20703	20700	–
SA-13M	4	16	6	50	20453	20450	–
SA-53M	5	12,7	3	38	20728	20725	–
SA-14M	5	16	6	50	20478	20475	–
SA-1M	6	16	6	50	20003	20000	–
SA-1MNF	6	19	6	50	–	–	29000
SA-1ML	6	25	6	50	20028	20025	–
SA-1ML6	6	12,7	6	162	26178	26175	–
SA-51M	6,3	12,7	3	50	20678	20675	–
SA-2M	8	19	6	63	20053	20050	–
SA-3M	9,5	19	6	63	20078	20075	–
SA-3MNF	9,5	19	6	63	–	–	29002
SA-3ML	9,5	25	6	69	20103	20100	–
SA-3ML6	9,5	19	6	169	26203	26200	–
SA-3MZ	10	20	6	60	29101	29100	–
SA-4M	11	25	6	69	20153	20150	–
SA-5MZ	12	25	6	65	29105	29104	–
SA-5M	12,7	25	6	69	20178	20175	–
SA-5MNF	12,7	25	6	69	–	–	29004
SA-5ML6	12,7	25	6	175	26228	26225	–
*SA-6M	16	25	6	69	20203	20200	–
*SA-6MNF	16	25	6	69	–	–	29006
*SA-7M	19	25	6	69	20253	20250	–
*SA-7MNF	19	25	6	69	–	–	29008
SA-7MNF	19	25	8	69	–	–	29010
*SA-9M	25	25	6	69	20353	20350	–



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Cylinder Shape Burs with End Cut



Solid Carbide

To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut. – Complete Bur Regrind Service Available
* 3/8"/8 mm shanks optional

Limas rotativas en forma cilíndrica con corte frontal



Carburo sólido

Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafilado de limas rotativas

* Mango de 3/8"/8 mm opcional.

Fraises-limes de forme cylindrique avec denture en bout

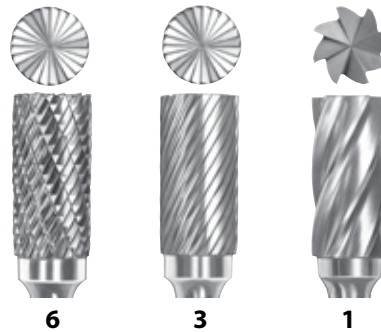
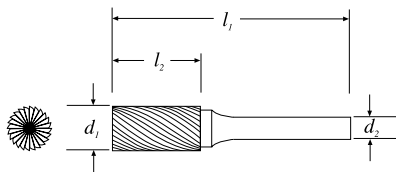


Carbure monobloc

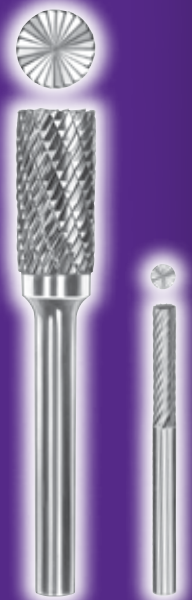
Pour commander les coupes en option 4, 3SP, 2, 5 : indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible

* Queue de 3/8"/8 mm en option.

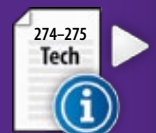
Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut	Single Cut	Nonferrous Cut
					EDP No.	EDP No.	EDP No.
SB-41	1/16	1/4	1/8	1-1/2	11453	11450	–
SB-41L2	1/16	1/4	1/8	2	17253	17250	–
SB-41L3	1/16	1/4	1/8	3	17278	17275	–
SB-42	3/32	7/16	1/8	1-1/2	11478	11475	–
SB-42L2	3/32	7/16	1/8	2	17303	17300	–
SB-42L3	3/32	7/16	1/8	3	17328	17325	–
SB-ECO	1/8	–	1/8	3	–	11525	–
SB-11	1/8	1/2	1/4	2-5/16	11253	11250	–
SB-12	1/8	5/8	1/4	2-4/9	11278	11275	–
SB-43	1/8	9/16	1/8	1-1/2	11503	11500	–
SB-43L2	1/8	9/16	1/8	2	17353	17350	–
SB-43L3	1/8	9/16	1/8	3	17378	17375	–
SB-13	5/32	5/8	1/4	2	11303	11300	–
SB-14	3/16	5/8	1/4	2	10328	10825	–
SB-51	1/4	3/16	1/8	1-11/16	11550	11553	–
SB-1	1/4	5/8	1/4	2	10853	10850	–
SB-1L	1/4	1	1/4	2	10878	10875	–
SB-1NF	1/4	3/4	1/4	2	–	–	19012
SB-2	5/16	3/4	1/4	2-1/2	10903	10900	–
SB-3	3/8	3/4	1/4	2-1/2	10928	10925	–
SB-3L	3/8	1	1/4	2-3/4	10953	10950	–
SB-3NF	3/8	3/4	1/4	2-1/2	–	–	19014
SB-3X	3/8	1-1/2	1/4	3-1/4	10978	10975	–
SB-4	7/16	1	1/4	2-3/4	11003	11000	–
SB-5	1/2	1	1/4	2-3/4	11028	11025	–
SB-5NF	1/2	1	1/4	2-3/4	–	–	19016
*SB-6	5/8	1	1/4	2-3/4	11053	11050	–
*SB-6NF	5/8	1	1/4	2-3/4	–	–	19018
*SB-15	3/4	1/2	1/4	2-1/4	11353	11350	–
*SB-16	3/4	3/4	1/4	2-1/2	11403	11400	–
*SB-7	3/4	1	1/4	2-3/4	11103	11100	–
SB-7NF	3/4	1	1/4	2-3/4	–	–	19020
SB-7NF3/8	3/4	1	3/8	3	–	–	19022
*SB-8	7/8	1	1/4	2-3/4	11153	11150	–
*SB-9	1	1	1/4	2-3/4	11203	11200	–

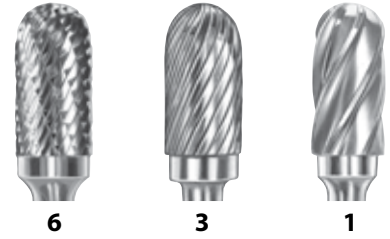
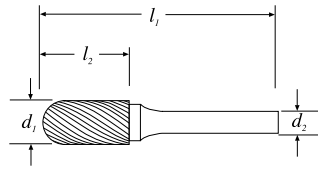


Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Double Cut EDP No.	Single Cut EDP No.	Nonferrous Cut EDP No.
SB-41M	1,5	6	3	38	21453	21450	–
SB-41ML2	1,5	6	3	50	27253	27250	–
SB-41ML3	1,5	6	3	75	27278	27275	–
SB-42M	2,5	11	3	38	21478	21475	–
SB-42ML2	2,5	11	3	50	27303	27300	–
SB-42ML3	2,5	11	3	75	27328	27325	–
SB-ECOM	3	–	3	38	–	21525	–
SB-43M	3	14	3	38	21503	21500	–
SB-43ML2	3	14	3	50	27353	27350	–
SB-43ML3	3	14	3	75	27378	27375	–
SB-11M	3	12	6	56	21253	21250	–
SB-12M	3	16	6	60	21278	21275	–
SB-13M	4	16	6	50	21303	21300	–
SB-14M	5	16	6	50	21328	21325	–
SB-1M	6	16	6	50	20853	20850	–
SB-1MNF	6	19	6	50	–	–	29012
SB-1ML	6	25	6	50	20873	20875	–
SB-51M	6,3	4,7	3	43	21553	21550	–
SB-2M	8	19	6	63	20903	20900	–
SB-3M	9,5	19	6	63	20928	20925	–
SB-3MNF	9,5	19	6	63	–	–	29014
SB-3ML	9,5	25	6	69	20953	20950	–
SB-3MZ	10	20	6	60	29109	29108	–
SB-4M	11	25	6	69	21003	21000	–
SB-5MZ	12	25	6	65	29113	29112	–
SB-5M	12,7	25	6	69	21028	21025	–
SB-5MNF	12,7	25	6	69	–	–	29016
*SB-6M	16	25	6	69	21053	21050	–
*SB-6MNF	16	25	6	69	–	–	29018
*SB-7M	19	25	6	69	21103	21100	–
*SB-7MNF	19	25	6	69	–	–	29020
SB-7MNF	19	25	8	69	–	–	29022
*SB-9M	25	25	6	69	21203	21200	–



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Cylinder Shape Burs with Radius End



Solid Carbide – To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut. – Complete Bur Regrind Service Available
* 3/8"/8 mm shanks optional

Limas rotativas en forma cilíndrica con radio



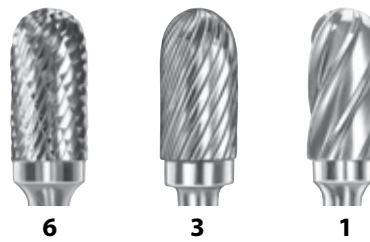
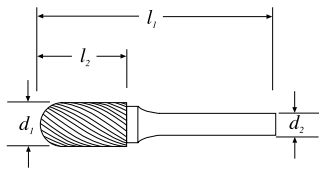
Carburo sólido – Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafileado de limas rotativas
* Mango de 3/8"/8 mm opcional.

Fraises-limes de forme cylindrique à bout hémisphérique

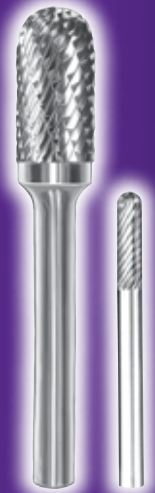


Carbure monobloc – Pour commander les coupes en option 4, 3SP, 2, 5 : indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible
* Queue de 3/8"/8 mm en option.

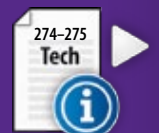
Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.	Nonferrous Cut EDP No.
SC-61	3/32	3/8	3/32	1-1/4	12378	12375	–
SC-41	3/32	7/16	1/8	1-1/2	12253	12250	–
SC-11	1/8	1/2	1/4	2-5/16	12053	12050	–
SC-42	1/8	9/16	1/8	1-1/2	12278	12275	–
SC-42L2	1/8	9/16	1/8	2	17453	17450	–
SC-42L3	1/8	9/16	1/8	3	17478	17475	–
SC-12	1/8	5/8	1/4	2-4/9	12078	12075	–
SC-52	5/32	1/2	1/8	1-1/2	12328	12325	–
SC-13	5/32	5/8	1/4	2	12103	12100	–
SC-81	3/16	1/2	3/16	2	12403	12400	–
SC-53	3/16	1/2	1/8	1-1/2	12353	12350	–
SC-14	3/16	5/8	1/4	2	12128	12125	–
SC-51	1/4	1/2	1/8	2	12303	12300	–
SC-1	1/4	5/8	1/4	2	11703	11700	–
SC-1L	1/4	1	1/4	2	11728	11725	–
SC-1L6	1/4	5/8	1/4	6-1/2	16328	16325	–
SC-1NF	1/4	3/4	1/4	2	–	–	19024
SC-2	5/16	3/4	1/4	2-1/2	11753	11750	–
SC-3	3/8	3/4	1/4	2-1/2	11778	11775	–
SC-3L	3/8	1	1/4	2-3/4	11803	11800	–
SC-3L6	3/8	3/4	1/4	6-3/4	16353	16350	–
SC-3NF	3/8	3/4	1/4	2-1/2	–	–	19026
SC-3X	3/8	1-1/2	1/4	3-1/4	11828	11825	–
SC-4	7/16	1	1/4	2-3/4	11853	11850	–
SC-5	1/2	1	1/4	2-3/4	11878	11875	–
SC-5L6	1/2	1	1/4	7	16378	16375	–
SC-5NF	1/2	1	1/4	2-3/4	–	–	19028
*SC-6	5/8	1	1/4	2-3/4	11903	11900	–
*SC-6NF	5/8	1	1/4	2-3/4	–	–	19030
*SC-15	3/4	1/2	1/4	2-1/4	12153	12150	–
*SC-16	3/4	3/4	1/4	2-1/2	12203	12200	–
*SC-7	3/4	1	1/4	2-3/4	11953	11950	–
SC-7NF	3/4	1	1/4	2-3/4	–	–	19032
SC-7NF3/8	3/4	1	3/8	3	–	–	19034
*SC-9	1	1	1/4	2-3/4	12003	12000	–

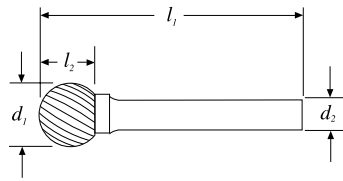


Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Double Cut	Single Cut	Nonferrous Cut
					EDP No.	EDP No.	EDP No.
SC-41M	2,5	11	3	38	22253	22250	–
SC-42M	3	14	3	38	22278	22275	–
SC-42ML2	3	14	3	50	27453	27450	–
SC-42ML3	3	14	3	75	27478	27475	–
SC-11M	3	12	6	56	22053	22050	–
SC-12M	3	16	6	60	22078	22075	–
SC-52M	4	12,7	3	38	22328	22325	–
SC-13M	4	16	6	50	22103	22100	–
SC-53M	5	12,7	3	38	22353	22350	–
SC-14M	5	16	6	50	22128	22125	–
SC-1M	6	16	6	50	21703	21700	–
SC-1MNF	6	19	6	50	–	–	29024
SC-1ML	6	25	6	50	21728	21725	–
SC-1ML6	6	12,7	6	162	26328	26325	–
SC-51M	6,3	12,7	3	50	22303	22300	–
SC-2M	8	19	6	63	21753	21750	–
SC-3M	9,5	19	6	63	21778	21775	–
SC-3MNF	9,5	19	6	63	–	–	29026
SC-3ML	9,5	25	6	69	21803	21800	–
SC-3ML6	9,5	19	6	169	26353	26350	–
SC-3MZ	10	20	6	60	29117	29116	–
SC-4M	11	25	6	69	21853	21850	–
SC-5MZ	12	25	6	65	29121	29120	–
SC-5M	12,7	25	6	69	21878	21875	–
SC-5ML6	12,7	25	6	175	26378	26375	–
SC-5MNF	12,7	25	6	69	–	–	29028
*SC-6M	16	25	6	69	21903	21900	–
*SC-7M	19	25	6	69	21953	21950	–
*SC-7MNF	19	25	6	69	–	–	29032
SC-7MNF	19	25	8	69	–	–	29034
*SC-9M	25	25	6	69	22003	22000	–



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Ball Shape Burs



Solid Carbide – To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut. – Complete Bur Regrind Services Available
* 3/8" / 8 mm shanks optional

Limas rotativas esféricas



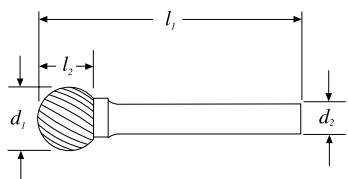
Carburo sólido – Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafilado de limas rotativas
* Mango de 3/8" / 8 mm opcional.

Fraises-limes de forme sphérique



Carbure monobloc – Pour commander les coupes en option 4, 3SP, 2, 5 : indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible
* Queue de 3/8" / 8 mm en option.

Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.	Nonferrous Cut EDP No.
SD-41	3/32	3/32	1/8	1-1/2	12778	12775	–
SD-61	3/32	3/32	3/32	1-1/4	12878	12875	–
SD-11	1/8	3/32	1/4	2	12728	12725	–
SD-42	1/8	1/8	1/8	1-1/2	12803	12800	–
SD-42L2	1/8	1/8	1/8	2	17553	17550	–
SD-42L3	1/8	1/8	1/8	3	17578	17575	–
SD-52	5/32	5/32	1/8	1-1/2	12840	12837	–
SD-14	3/16	1/8	1/4	2	12753	12750	–
SD-81	3/16	5/32	3/16	2	12903	12900	–
SD-53	3/16	5/32	1/8	1-1/2	12853	12850	–
SD-1	1/4	7/32	1/4	2	12453	12450	–
SD-1L6	1/4	7/32	1/4	6-2/9	16403	16400	–
SD-1NF	1/4	7/32	1/4	2	–	–	19036
SD-51	1/4	7/32	1/8	1-3/4	12828	12825	–
SD-2	5/16	1/4	1/4	2	12478	12475	–
SD-3	3/8	5/16	1/4	2-1/16	12503	12500	–
SD-3L6	3/8	5/16	1/4	6-1/3	16428	16425	–
SD-3NF	3/8	5/16	1/4	2-1/16	–	–	19038
SD-4	7/16	3/8	1/4	2-1/7	12528	12525	–
SD-5	1/2	7/16	1/4	2-1/5	12553	12550	–
SD-5L6	1/2	7/16	1/4	6-5/11	16453	16450	–
SD-5NF	1/2	7/16	1/4	2-1/5	–	–	19040
*SD-6	5/8	9/16	1/4	2-1/3	12578	12575	–
*SD-6NF	5/8	9/16	1/4	2-1/3	–	–	19042
*SD-7	3/4	11/16	1/4	2-4/9	12628	12625	–
SD-7NF	3/4	11/16	1/4	2-4/9	–	–	19044
SD-7NF3/8	3/4	11/16	3/8	2-11/16	–	–	19046
*SD-9	1	15/16	1/4	2-2/3	12678	12675	–



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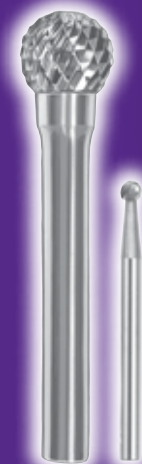


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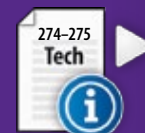


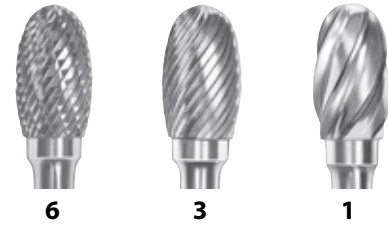
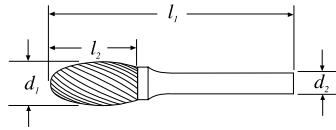
1

Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Double Cut EDP No.	Single Cut EDP No.	Nonferrous Cut EDP No.
SD-41M	2,5	2,3	3	38	22778	22775	–
SD-42M	3	2,8	3	38	22803	22800	–
SD-42ML2	3	2,8	3	50	27553	27550	–
SD-42ML3	3	2,8	3	75	27578	27575	–
SD-11M	3	2,8	6	50	22728	22725	–
SD-52M	4	3,4	3	38	22840	22837	–
SD-53M	5	4,7	3	38	22853	22850	–
SD-14M	5	4	6	50	22753	22750	–
SD-1M	6	5	6	50	22453	22450	–
SD-1ML6	6	5	6	155	26403	26400	–
SD-1MNF	6	5	6	50	–	–	29036
SD-51M	6,3	5	3	44	22828	22825	–
SD-2M	8	6,4	6	50	22478	22475	–
SD-3M	9,5	8	6	52	22503	22500	–
SD-3MNF	9,5	8	6	52	–	–	29038
SD-3ML6	9,5	8	6	158	26428	26425	–
SD-3MZ	10	9	6	49	29125	29124	–
SD-4M	11	9,5	6	54	22528	22525	–
SD-5MZ	12	10,8	6	51	29129	29128	–
SD-5M	12,7	11	6	55	22553	22550	–
SD-5MNF	12,7	11	6	55	–	–	29040
SD-5ML6	12,7	11	6	161	26453	26450	–
*SD-6M	16	14	6	58	22578	22575	–
*SD-6MNF	16	14	6	58	–	–	29042
*SD-7M	19	16	6	62	22628	22625	–
*SD-7MNF	19	16	6	62	–	–	29044
SD-7MNF	19	16	8	62	–	–	29046
*SD-9M	25	21	6	72	22678	22675	–



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Oval Shape Burs



Solid Carbide

To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut – Complete Bur Regrind Service Available
* 3/8"/8 mm shanks optional

Limas rotativas en forma ovalada



Carburo sólido

Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafilado de limas rotativas
* Mango de 3/8"/8 mm opcional.

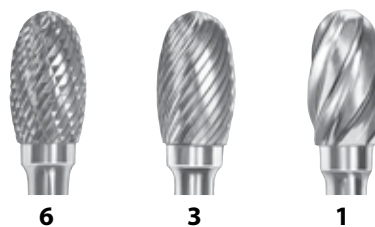
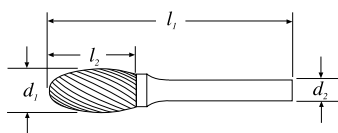
Fraises-limes de forme ovale



Carbure monobloc

Pour commander les coupes en option 4, 3SP, 2, 5 : indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible
* Queue de 3/8"/8 mm en option.

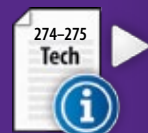
Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.	Nonferrous Cut EDP No.
SE-61	3/32	1/8	3/32	1-1/4	13228	13225	–
SE-41	1/8	7/32	1/8	1-1/2	13153	13150	–
SE-41L2	1/8	7/32	1/8	2	17603	17600	–
SE-41L3	1/8	7/32	1/8	3	17628	17625	–
SE-81	3/16	9/32	3/16	2	13253	13250	–
SE-53	3/16	9/32	1/8	1-1/2	13203	13200	–
SE-11	3/16	5/16	1/4	2	13128	13125	–
SE-1	1/4	3/8	1/4	2	12953	12950	–
SE-1L6	1/4	3/8	1/4	6-3/8	16478	16475	–
SE-51	1/4	3/8	1/8	1-8/9	13178	13175	–
SE-3	3/8	5/8	1/4	2-3/8	12978	12975	–
SE-3L6	3/8	5/8	1/4	6-5/8	16503	16500	–
SE-3NF	3/8	5/8	1/4	2-3/8	–	–	19048
SE-5	1/2	7/8	1/4	2-5/8	13003	13000	–
SE-5L6	1/2	7/8	1/4	6-8/9	16528	16525	–
SE-5NF	1/2	7/8	1/4	2-5/8	–	–	19050
*SE-6	5/8	1	1/4	2-3/4	13028	13025	–
*SE-6NF	5/8	1	1/4	2-3/4	–	–	19052
*SE-7	3/4	1	1/4	2-3/4	13078	13075	–
SE-7NF	3/4	1	1/4	2-3/4	–	–	19054
SE-7NF3/8	3/4	1	3/8	2-3/4	–	–	19056

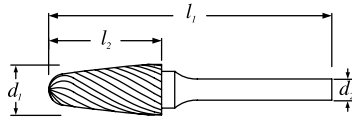


Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Double Cut	Single Cut	Nonferrous Cut
					EDP No.	EDP No.	EDP No.
SE-41M	3	5,5	3	38	23153	23150	–
SE-41ML2	3	5,5	3	50	27603	27600	–
SE-41ML3	3	5,5	3	75	27628	27625	–
SE-53M	5	7,1	3	38	23203	23200	–
SE-1M	6	9,5	6	50	22953	22950	–
SE-1ML6	6	9,5	6	160	26478	26475	–
SE-51M	6,3	9,5	3	47	23178	23175	–
SE-3M	9,5	16	6	60	22978	22975	–
SE-3ML6	9,5	16	6	166	26503	26500	–
SE-3MNF	9,5	16	6	60	–	–	29048
SE-5M	12,7	22	6	66	23003	23000	–
SE-5ML6	12,7	22	6	172	26528	26525	–
SE-5MNF	12,7	22	6	66	–	–	29050
*SE-6M	16	25	6	69	23028	23025	–
*SE-6MNF	16	25	6	69	–	–	29052
*SE-7M	19	25	6	69	23078	23075	–
*SE-7MNF	19	25	6	69	–	–	29054
SE-7MNF	19	25	8	69	–	–	29056



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Tree Shape Burs with Radius End



Solid Carbide – To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut – Complete Bur Regrind Service Available
* 3/8"/8mm shanks optional.

Limas rotativas en forma de árbol



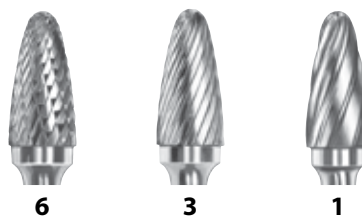
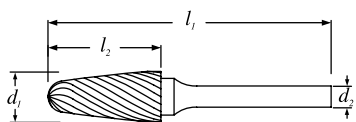
Carburo sólido – Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafileado de limas rotativas
* Mango de 3/8"/8 mm opcional.

Fraises-limes en forme d'ogive à bout hémisphérique



Carbure monobloc – Pour commander les coupes en option 4, 3SP, 2, 5 : indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible
* Queue de 3/8"/8 mm en option.

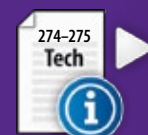
Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.	Nonferrous Cut EDP No.
SF-61	3/32	1/4	3/32	1-1/4	13778	13775	–
SF-41	1/8	1/4	1/8	1-1/2	13678	13675	–
SF-11	1/8	1/2	1/4	2-1/32	13503	13500	–
SF-42	1/8	1/2	1/8	1-1/2	13703	13700	–
SF-42L2	1/8	1/2	1/8	2	17653	17650	–
SF-42L3	1/8	1/2	1/8	3	17678	17675	–
SF-81	3/16	1/2	3/16	2	13803	13800	–
SF-53	3/16	1/2	1/8	1-1/2	13753	13750	–
SF-51	1/4	1/2	1/8	2	13728	13725	–
SF-1	1/4	5/8	1/4	2	13303	13300	–
SF-1L6	1/4	5/8	1/4	6-1/2	16553	16550	–
SF-1NF	1/4	3/4	1/4	2	–	–	19058
SF-3	3/8	3/4	1/4	2-1/2	13328	13325	–
SF-3L6	3/8	3/4	1/4	6-3/4	16578	16575	–
SF-3NF	3/8	3/4	1/4	2-1/2	–	–	19060
SF-4	7/16	1	1/4	2-3/4	13353	13350	–
SF-13	1/2	3/4	1/4	2-1/2	13528	13525	–
SF-5	1/2	1	1/4	2-3/4	13378	13375	–
SF-5L6	1/2	1	1/4	7	16603	16600	–
SF-5NF	1/2	1	1/4	2-3/4	–	–	19062
*SF-6	5/8	1	1/4	2-3/4	13403	13400	–
*SF-6NF	5/8	1	1/4	2-3/4	–	–	19064
*SF-7	3/4	1	1/4	2-3/4	13453	13450	–
*SF-14	3/4	1-1/4	1/4	3	13578	13575	–
SF-14NF	3/4	1-1/4	1/4	3	–	–	19066
SF-14NF3/8	3/4	1-1/4	3/8	3-1/4	–	–	19068
*SF-15	3/4	1-1/4	1/4	3-1/4	13628	13625	–

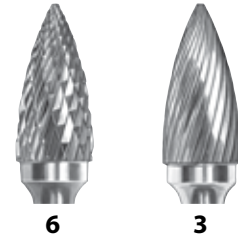
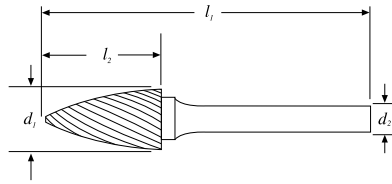


Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Double Cut	Single Cut	Nonferrous Cut
					EDP No.	EDP No.	EDP No.
SF-41M	3	6	3	38	23678	23675	–
SF-42M	3	12,7	3	38	23703	23700	–
SF-11M	3	12,7	6	56	23503	23500	–
SF-42ML2	3	12,7	3	50	27653	27650	–
SF-42ML3	3	12,7	3	75	27678	27675	–
SF-53M	5	12,7	3	38	23753	23750	–
SF-1M	6	16	6	50	23303	23300	–
SF-1ML6	6	12,7	6	163	26553	26550	–
SF-1MNF	6	19	6	50	–	–	29058
SF-51M	6,3	12,7	3	56	23728	23725	–
SF-3M	9,5	19	6	63	23328	23325	–
SF-3ML6	9,5	19	6	169	26578	26575	–
SF-3MNF	9,5	19	6	63	–	–	29060
SF-4M	11	25	6	69	23353	23350	–
SF-5MZ	12	25	6	65	23522	23520	–
SF-13M	12,7	19	6	63	23528	23525	–
SF-5M	12,7	25	6	69	23378	23375	–
SF-5ML6	12,7	25	6	175	26603	26600	–
SF-5MNF	12,7	25	6	69	–	–	29062
*SF-6M	16	25	6	69	23403	23400	–
*SF-6MNF	16	25	6	69	–	–	29064
*SF-7M	19	25	6	69	23453	23450	–
*SF-14M	19	32	6	76	23578	23575	–
*SF-14MNF	19	32	6	76	–	–	29066
SF-14MNF	19	32	8	76	–	–	29068
*SF-15M	19	38	6	82	23628	23625	–



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Tree Shape Burs with Pointed End



Solid Carbide – To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut. – Complete Bur Regrind Service Available
* 3/8"/8 mm shanks optional

Limas rotativas en forma de árbol puntiagudo



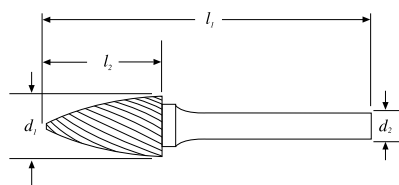
Carburo sólido – Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafileado de limas rotativas
* Mango de 3/8"/8 mm opcional.

Fraises-limes en forme d'ogive à bout pointu



Carbure monobloc – Pour commander les coupes en option 4, 3SP, 2, 5 : indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible
* Queue de 3/8"/8 mm en option.

Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.
SG-61	3/32	1/4	3/32	1-1/4	14303	14300
SG-41	1/8	1/4	1/8	1-1/2	14153	14150
SG-42	1/8	5/16	1/8	1-1/2	14178	14175
SG-43	1/8	3/8	1/8	1-1/2	14203	14200
SG-44	1/8	1/2	1/8	1-1/2	14228	14225
SG-44L2	1/8	1/2	1/8	2	17853	17850
SG-44L3	1/8	1/2	1/8	3	17878	17875
SG-81	3/16	1/2	3/16	2	14328	14325
SG-53	3/16	1/2	1/8	1-1/2	14278	14275
SG-1	1/4	5/8	1/4	2	13853	13850
SG-1L6	1/4	1/2	1/4	6-1/2	16628	16625
SG-51	1/4	1/2	1/8	2	14253	14250
SG-2	5/16	3/4	1/4	2-1/2	13878	13875
SG-3	3/8	3/4	1/4	2-1/2	13903	13900
SG-3L6	3/8	3/4	1/4	6-3/4	16653	16650
SG-13	1/2	3/4	1/4	2-1/2	14053	14050
SG-5	1/2	1	1/4	2-3/4	13928	13925
SG-5L6	1/2	1	1/4	7	16678	16675
*SG-6	5/8	1	1/4	2-3/4	13953	13950
*SG-7	3/4	1	1/4	2-3/4	14003	14000
*SG-15	3/4	1-1/2	1/4	3-1/4	14103	14100



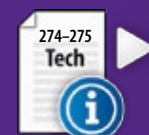
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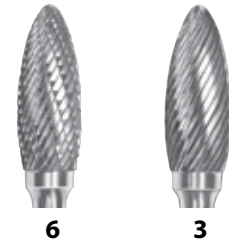
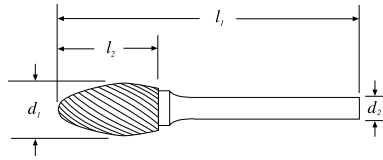
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Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Double Cut EDP No.	Single Cut EDP No.
	d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm		
SG-41M	3	6	3	38	24153	24150
SG-43M	3	9,5	3	38	24203	24200
SG-44M	3	12,7	3	38	24228	24225
SG-44ML2	3	12,7	3	50	27853	27850
SG-44ML3	3	12,7	3	75	27878	27875
SG-53M	5	12,7	3	38	24278	24275
SG-1M	6	16	6	50	23853	23850
SG-1ML6	6	12,7	6	163	26628	26625
SG-51M	6,3	12,7	3	50	24253	24250
SG-2M	8	19	6	63	23878	23875
SG-3M	9,5	19	6	63	23903	23900
SG-3ML6	9,5	19	6	169	26653	26650
SG-3MZ	10	20	6	60	24042	24040
SG-5MZ	12	25	6	65	24046	24045
SG-13M	12,7	19	6	63	24053	24050
SG-5M	12,7	25	6	69	23928	23925
SG-5ML6	12,7	25	6	175	26678	26675
*SG-6M	16	25	6	69	23953	23950
*SG-7M	19	25	6	69	24003	24000
*SG-15M	19	38	6	82	24103	24100



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Flame Shape Burs



Solid Carbide – To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional cut – Complete Bur Regrind Service Available
* 3/8"/8 mm shanks optional

Limas rotativas en forma de llama



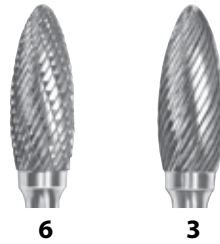
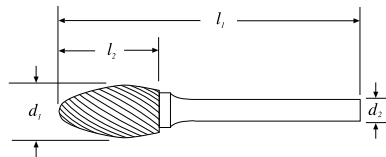
Carburo sólido – Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafilado de limas rotativas
* Mango de 3/8"/8 mm opcional.

Fraises-limes en forme de flamme



Carbure monobloc – Pour commander les coupes en option 4, 3SP, 2, 5 : indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible
* Queue de 3/8"/8 mm en option.

Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.
SH-41	1/8	1/4	1/8	1-1/2	14553	14550
SH-41L2	1/8	1/4	1/8	2	17903	17900
SH-41L3	1/8	1/4	1/8	3	17928	17925
SH-53	3/16	3/8	1/8	1-1/2	14603	14600
SH-1	1/4	5/8	1/4	2	14378	14375
SH-2	5/16	3/4	1/4	2-1/2	14403	14400
SH-2L6	5/16	3/4	1/4	6-3/4	16703	16700
SH-5	1/2	1-1/4	1/4	3	14428	14425
SH-5L6	1/2	1-1/4	1/4	7-1/4	16728	16725
*SH-6	5/8	1-7/16	1/4	3-1/5	14453	14450
*SH-7	3/4	1-5/8	1/4	3-3/8	14503	14500

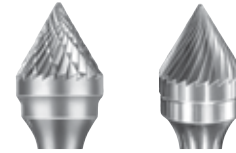
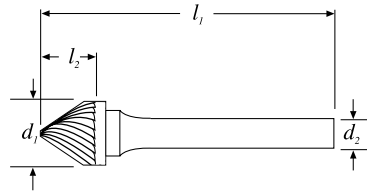


Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Double Cut EDP No.	Single Cut EDP No.
SH-41M	3	6,3	3	38	24553	24550
SH-41ML2	3	6,3	3	50	27903	27900
SH-41ML3	3	6,3	3	75	27928	27925
SH-53M	5	9,5	3	38	24603	24600
SH-2M	8	19	6	63	24403	24400
SH-2ML6	8	19	6	169	26703	26700
SH-5M	12,7	32	6	76	24428	24425
SH-5ML6	12,7	32	6	182	26728	26725
*SH-6M	16	36	6	80	24453	24450
*SH-7M	19	41	6	85	24503	24500



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SJ – 60° Cone Shape Burs

Solid Carbide – To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut. – Complete Bur Regrind Service Available
* 3/8"/8 mm shanks optional

Limas rotativas cónica

Carburo sólido

SJ – Forma cónica a 60°

Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafilado de limas rotativas
* Mango de 3/8"/8 mm opcional.

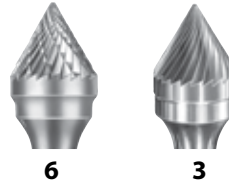
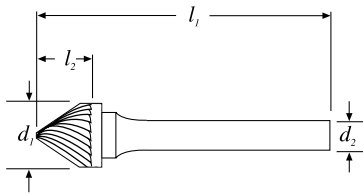
Fraises-limes de forme Conique, à 60°

Carbure monobloc

SJ – Forme conique, 60°

Pour commander les coupes en option 4, 3SP, 2, 5 : indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible
* Queue de 3/8"/8 mm en option.

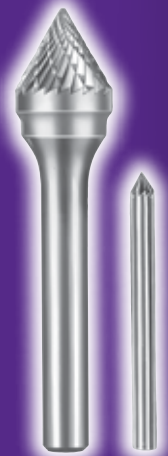
Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.
SJ-42	1/8	3/32	1/8	1-1/2	14903	14900
SJ-1	1/4	3/16	1/4	2	14678	14675
SJ-3	3/8	5/16	1/4	2-1/5	14703	14700
SJ-5	1/2	7/16	1/4	2-1/3	14728	14725
*SJ-6	5/8	9/16	1/4	2-4/9	14753	14750
*SJ-7	3/4	11/16	1/4	2-5/9	14803	14800
*SJ-9	1	15/16	1/4	2-7/9	14853	14850



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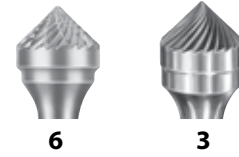
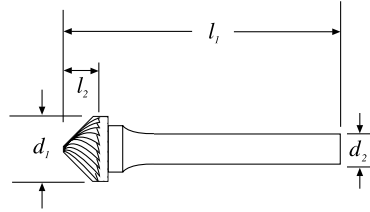
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Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Double Cut EDP No.	Single Cut EDP No.
SJ-42M	3	2,5	3	38	24903	24900
SJ-1M	6	4	6	50	24678	24675
SJ-3M	9,5	8	6	55	24703	24700
SJ-5M	12,7	11	6	58	24728	24725
*SJ-6M	16	14,5	6	61	24753	24750
*SJ-7M	19	17,5	6	65	24803	24800
*SJ-9M	25	24,5	6	68	24853	24850



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SK – 90° Cone Shape Burs

Solid Carbide

To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut. – Complete Bur Regrind Service Available
* 3/8"/8 mm shanks optional

Limas rotativas cónica a 90°

Carburo sólido

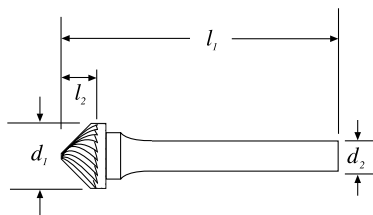
SK – Forma cónica a 90°
Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafilado de limas rotativas
* Mango de 3/8"/8 mm opcional.

Fraises-limes de forme conique, à 90°

Carbure monobloc

SK – Forme conique, 90°
Pour commander les coupes en option 4, 3SP, 2, 5 : indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible
* Queue de 3/8"/8 mm en option.

Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut	Single Cut
					EDP No.	EDP No.
SK-42	1/8	1/16	1/8	1-1/2	15153	15150
SK-1	1/4	1/8	1/4	2	14928	14925
SK-3	3/8	3/16	1/4	2-1/16	14953	14950
SK-5	1/2	1/4	1/4	2-1/9	14978	14975
*SK-6	5/8	5/16	1/4	2-1/4	15003	15000
*SK-7	3/4	3/8	1/4	2-1/3	15053	15050
*SK-9	1	1/2	1/4	2-3/8	15103	15100

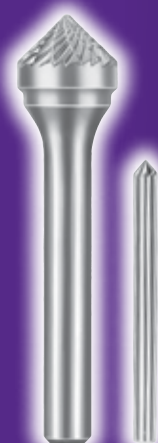


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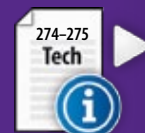


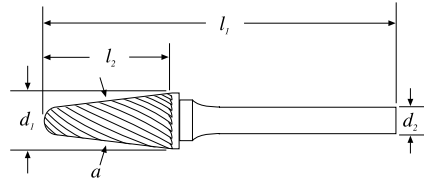
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Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Double Cut	Single Cut
					EDP No.	EDP No.
SK-42M	3	1,5	3	38	25153	25150
SK-1M	6	3	6	50	24928	24925
SK-3M	9,5	4,7	6	52	24953	24950
SK-5M	12,7	6,3	6	54	24978	24975
*SK-6M	16	8	6	57	25003	25000
*SK-7M	19	9,5	6	58	25053	25050
*SK-9M	25	12,7	6	60	25103	25100



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1

Taper with Radius End Burs



Solid Carbide – To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut – Complete Bur Regrind Service Available
* 3/8"/8 mm shanks optional.

Limas rotativas cónicas con radio en la punta



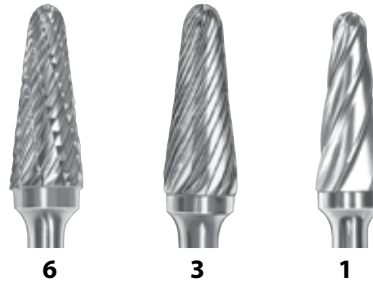
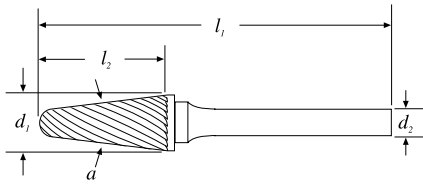
Carburo sólido – Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafileado de limas rotativas
* Mango de 3/8"/8 mm opcional.

Fraises-limes de forme conique, à bout hémisphérique



Carbure monobloc – Pour commander les coupes en option 4, 3SP, 2, 5 : indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible
* Queue de 3/8"/8 mm en option.

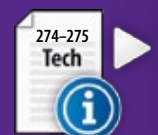
Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Included Angle a	Double Cut EDP No.	Single Cut EDP No.	Nonferrous Cut EDP No.
SL-41	1/8	3/8	1/8	1-1/2	8°	15403	15400	–
SL-42	1/8	1/2	1/8	1-1/2	8°	15428	15425	–
SL-42L2	1/8	1/2	1/8	2	8°	17953	17950	–
SL-42L3	1/8	1/2	1/8	3	8°	17978	17975	–
SL-81	3/16	7/16	3/16	2	14°	15478	15475	–
SL-53	3/16	1/2	1/8	1-1/2	14°	15453	15450	–
SL-1	1/4	5/8	1/4	2	14°	15178	15175	–
SL-1L6	1/4	5/8	1/4	6-3/4	14°	16753	16750	–
SL-2	5/16	7/8	1/4	2-3/4	14°	15203	15200	–
SL-3	3/8	1-1/16	1/4	2-15/16	14°	15228	15225	–
SL-3L6	3/8	1-1/16	1/4	7-2/9	14°	16778	16775	–
SL-3NF	3/8	1-1/16	1/4	2-15/16	14°	–	–	19070
SL-4	1/2	1-1/8	1/4	3	14°	15253	15250	–
SL-4L6	1/2	1-1/8	1/4	7-3/11	14°	16803	16800	–
SL-4NF	1/2	1-1/8	1/4	3	14°	–	–	19072
*SL-5	5/8	1-3/16	1/4	3-1/16	14°	15278	15275	–
*SL-5NF	5/8	1-3/16	1/4	3-1/16	14°	–	–	19074
*SL-6	5/8	1-5/16	1/4	3-1/5	14°	15303	15300	–
*SL-6NF	5/8	1-5/16	1/4	3-1/5	14°	–	–	19076
*SL-7	3/4	1-1/2	1/4	3-3/8	14°	15353	15350	–
SL-7NF	3/4	1-1/2	1/4	3-3/8	14°	–	–	19078
SL-7NF3/8	3/4	1-1/2	3/8	3-5/8	14°	–	–	19080

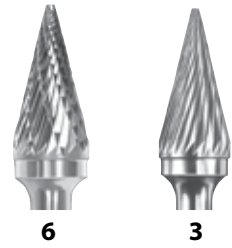
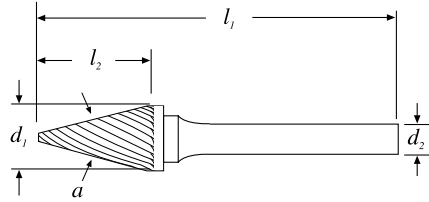


Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Angle a	Double Cut	Single Cut	Nonferrous Cut
						EDP No.	EDP No.	EDP No.
SL-41M	3	9,5	3	38	8°	25403	25400	–
SL-42M	3	12,7	3	38	8°	25428	25425	–
SL-42ML2	3	12,7	3	50	8°	27953	27950	–
SL-42ML3	3	12,7	3	75	8°	27978	27975	–
SL-53M	5	12,7	3	38	14°	25453	25450	–
SL-1M	6	16	6	50	14°	25178	25175	–
SL-1ML6	6	16	6	166	14°	26753	26750	–
SL-2M	8	22	6	69	14°	25203	25200	–
SL-3M	9,5	27	6	74	14°	25228	25225	–
SL-3MNF	9,5	27	6	74	14°	–	–	29070
SL-3ML6	9,5	27	6	177	14°	26778	26775	–
SL-4M	12,7	28	6	76	14°	25253	25250	–
SL-4MNF	12,7	28	6	76	14°	–	–	29072
SL-4ML6	12,7	28	6	178	14°	26803	26800	–
*SL-5M	16	30	6	77	14°	25278	25275	–
*SL-5MNF	16	30	6	77	14°	–	–	29074
*SL-7M	19	38	6	85	14°	25353	25350	–
*SL-7MNF	19	38	6	85	14°	–	–	29078
SL-7MNF	19	38	8	85	14°	–	–	29080



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Cone Shape Burs



Solid Carbide – To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut. – Complete Bur Regrind Service Available
* 3/8"/8 mm shanks optional.

Limas rotativas cónicas



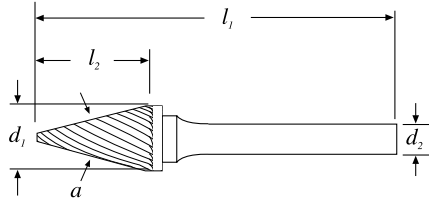
Carburo sólido – Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafilado de limas rotativas
* Mango de 3/8"/8 mm opcional.

Fraises-limes de forme conique



Carbure monobloc – Pour commander les coupes en option 4, 3SP, 2, 5: indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible
* Queue de 3/8"/8 mm en option.

Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Included Angle a	Double Cut EDP No.	Single Cut EDP No.
SM-61	3/32	1/4	3/32	1-1/4	10°	15803	15800
SM-41	1/8	11/32	1/8	1-1/2	12°	15678	15675
SM-42	1/8	7/16	1/8	1-1/2	14°	15703	15700
SM-42L2	1/8	7/16	1/8	2	14°	18053	18050
SM-42L3	1/8	7/16	1/8	3	14°	18078	18075
SM-43	1/8	5/8	1/8	1-1/2	7°	15728	15725
SM-53	3/16	1/2	1/8	1-1/2	16°	15778	15775
SM-1	1/4	1/2	1/4	2	22°	15503	15500
SM-51	1/4	1/2	1/8	2-1/9	22°	15753	15750
SM-2	1/4	3/4	1/4	2	14°	15528	15525
SM-3	1/4	1	1/4	2	10°	15553	15550
SM-4	3/8	5/8	1/4	2-1/2	28°	15578	15575
SM-5	1/2	7/8	1/4	2-3/4	28°	15603	15600
*SM-6	5/8	1	1/4	2-8/9	31°	15628	15625

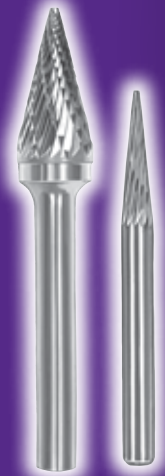


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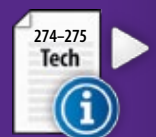


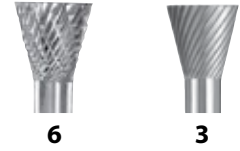
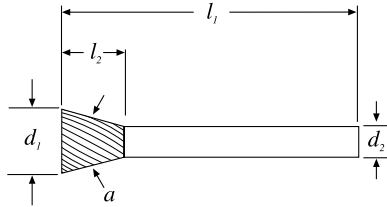
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Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Angle a	Double Cut	Single Cut
	d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm		EDP No.	EDP No.
SM-41M	3	8,9	3	38	12°	25678	25675
SM-42M	3	11	3	38	14°	25703	25700
SM-42ML2	3	11	3	50	14°	28053	28050
SM-42ML3	3	11	3	75	14°	28078	28075
SM-43M	3	16	3	38	7°	25728	25725
SM-53M	5	12,7	3	38	16°	25778	25775
SM-1M	6	12,7	6	50	22°	25503	25500
SM-2M	6	19	6	50	14°	25528	25525
SM-3M	6	25	6	50	10°	25553	25550
SM-51M	6,3	12,7	3	53	22°	25753	25750
SM-4M	9,5	16	6	63	28°	25578	25575
SM-5M	12,7	22	6	69	28°	25603	25600
*SM-6M	16	25	6	73	31°	25628	25625



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Inverted Cone Shape Burs



Solid Carbide – To Order Optional Cuts 4, 3SP, 2, 5 – Specify Quantity, Tool No. & Optional Cut. – Complete Bur Regrind Service Available
* 3/8"/8mm shanks optional.

Limas rotativas cónica invertida



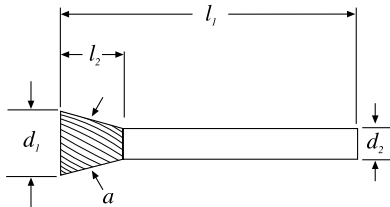
Carburo sólido – Para ordenar cortes opcionales 4, 3SP, 2, y 5 : Especifique la cantidad, no. de herramienta y tipo de corte opcional. – Disponemos de un servicio completo de reafileado de limas rotativas
* Mango de 3/8"/8 mm opcional.

Fraises-limes de forme conique inversée



Carbure monobloc – Pour commander les coupes en option 4, 3SP, 2, 5: indiquer la quantité, le N° d'outil et la coupe. – Service de réaffûtage complet de fraises rotatives disponible
* Queue de 3/8"/8 mm en option.

Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Included Angle a	Double Cut EDP No.	Single Cut EDP No.
SN-41	3/32	1/8	1/8	1-1/2	10°	16028	16025
SN-61	3/32	1/8	3/32	1-1/4	10°	16128	16125
SN-42	1/8	3/16	1/8	1-1/2	10°	16053	16050
SN-81	3/16	1/4	3/16	2	10°	16153	16150
SN-53	3/16	1/4	1/8	1-1/2	10°	16103	16100
SN-51	1/4	1/4	1/8	1-3/4	10°	16078	16075
SN-1	1/4	5/16	1/4	2	10°	15853	15850
SN-2	3/8	3/8	1/4	2-1/9	13°	15878	15875
SN-4	1/2	1/2	1/4	2-1/4	28°	15903	15900
*SN-6	5/8	3/4	1/4	2-1/2	18°	15928	15925
*SN-7	3/4	5/8	1/4	2-3/8	30°	15978	15975

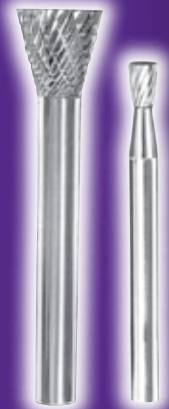


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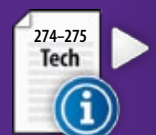


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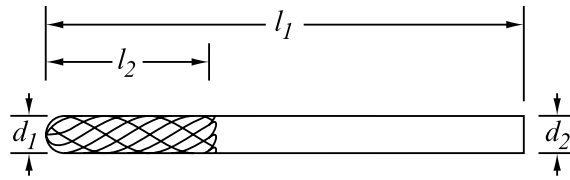
Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Angle a	Double Cut	Single Cut
	d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm		EDP No.	EDP No.
SN-41M	2,5	3	3	38	10°	26028	26025
SN-42M	3	4	3	38	10°	26053	26050
SN-53M	5	6,3	3	38	10°	26103	26100
SN-1M	6	8	6	50	10°	25853	25850
SN-51M	6,3	6	3	44	10°	26078	26075
SN-2M	9,5	9,5	6	53	13°	25878	25875
SN-4M	12,7	12,7	6	57	28°	25903	25900
*SN-6M	16	19	6	63	18°	25928	25925
*SN-7M	19	16	6	60	30°	25978	25975



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G2000 Burs

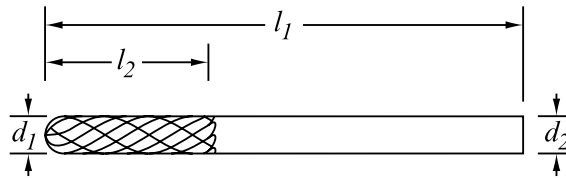


Fractional Series **G2000**

Designed specifically for High Nickel Alloys, Stainless Steel, Titanium, Inconel & Hard-to-Machine Materials.

	Tool No.	Cutter Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated	Ti-NAMITE-A
						EDP No.	(AlTiN) EDP No.
Cylinder Shape	SA-43G D/C	1/8	9/16	1-1/2	1/8	19200	19240
	SA-51G D/C	1/4	1/2	2	1/8	19201	19241
	SA-3G D/C	3/8	3/4	2-1/2	1/4	19203	19243
	SA-5G D/C	1/2	1	2-3/4	1/4	19204	19244
	SA-51G D/C E/C	1/4	1/2	2	1/8	19202	19242
Cylinder Shape with End Cut	SB-43G D/C	1/8	9/16	1-1/2	1/8	19205	19245
Cylinder Shape with Radius End	SC-41G D/C	3/32	7/16	1-1/2	1/8	19206	19246
	SC-42G D/C	1/8	9/16	1-1/2	1/8	19207	19247
	SC-42GL2 D/C	1/8	9/16	2	1/8	19208	19248
	SC-42GL3 D/C	1/8	9/16	3	1/8	19209	19249
	SC-51G D/C	1/4	1/2	2	1/8	19210	19250
	SC-3G D/C	3/8	3/4	2-1/2	1/4	19211	19251
	SC-5G D/C	1/2	1	2-3/4	1/4	19212	19252
Ball Shape	SD-42G D/C	1/8	3/32	1-1/2	1/8	19213	19253
	SD-51G D/C	1/4	7/32	1-3/4	1/8	19214	19254
	SD-3G D/C	3/8	5/16	2-1/16	1/4	19215	19255
	SD-5G D/C	1/2	7/16	2-3/16	1/4	19216	19256
Oval Shape	SE-41G D/C	1/8	7/32	1-1/2	1/8	19217	19257
	SE-51G D/C	1/4	3/8	1-7/8	1/8	19218	19258
	SE-3G D/C	3/8	5/8	2-3/8	1/4	19219	19259
	SE-5G D/C	1/2	7/8	2-5/8	1/4	19220	19260
Tree Shape with Radius End	SF-42G D/C	1/8	1/2	1-1/2	1/8	19221	19261
	SF-42GL2 D/C	1/8	1/2	2	1/8	19222	19262
	SF-51G D/C	1/4	1/2	2	1/8	19223	19263
	SF-3G D/C	3/8	3/4	2-1/2	1/4	19224	19264
	SF-5G D/C	1/2	1	2-3/4	1/4	19225	19265
Tree Shape with Pointed End	SG-42G D/C	1/8	5/16	1-1/2	1/8	19226	19266
	SG-44G D/C	1/8	1/2	1-1/2	1/8	19227	19267
	SG-51G D/C	1/4	1/2	2	1/8	19228	19268
	SG-3G D/C	3/8	3/4	2-1/2	1/4	19229	19269
	SG-5G D/C	1/2	1	2-3/4	1/4	19230	19270
Flame Shape	SH-41G D/C	1/8	1/4	1-1/2	1/8	19231	19271
	SH-5G D/C	1/2	1-1/4	3	1/4	19232	19272
Taper with Radius End	SL-4G D/C	1/2	1-1/8	3	1/4	19233	19273
Cone Shape	SM-42G D/C	1/8	7/16	1-1/2	1/8	19234	19274
	SM-43G D/C	1/8	5/8	1-1/2	1/8	19235	19275
	SM-51G D/C	1/4	1/2	2-1/8	1/8	19236	19276
	SM-5G D/C	1/2	7/8	2-3/4	1/4	19237	19277

G2000 Burs



		Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Uncoated EDP No.
Cylinder Shape		SA-43MG D/C	3,0	14,0	3,0	38,0	29200
		SA-51MG D/C	6,3	12,7	3,0	45,0	29201
		SA-51MG D/C E/C	6,3	12,7	3,0	45,0	29202
Cylinder Shape with End Cut		SB-43MG D/C	3,0	14,0	3,0	38,0	29203
Cylinder Shape with Radius End		SC-41MG D/C	2,3	11,0	3,0	38,0	29204
		SC-41MGL2 D/C	2,3	11,0	3,0	50,0	29205
		SC-42MG D/C	3,0	14,0	3,0	38,0	29206
		SC-42MGL2 D/C	3,0	14,0	3,0	50,0	29207
		SC-42MGL3 D/C	3,0	14,0	3,0	75,0	29208
		SC-51MG D/C	6,3	12,7	3,0	45,0	29209
Ball Shape		SD-42MG D/C	3,0	2,8	3,0	38,0	29210
		SD-51MG D/C	6,3	5,0	3,0	38,0	29224
Oval Shape		SE-41MG D/C	3,0	5,5	3,0	38,0	29225
		SE-51MG D/C	6,3	9,5	3,0	41,0	29211
Tree Shape with Radius End		SF-42MG D/C	3,0	12,7	3,0	38,0	29212
		SF-42MGL2 D/C	3,0	12,7	3,0	50,0	29213
		SF-51MG D/C	6,3	12,7	3,0	45,0	29214
Tree Shape with Pointed End		SG-42MG D/C	3,0	8,0	3,0	38,0	29215
		SG-44MG D/C	3,0	12,7	3,0	38,0	29216
		SG-51MG D/C	6,3	12,7	3,0	45,0	29217
Flame Shape		SH-41MG D/C	3,0	6,3	3,0	38,0	29218
Cone Shape		SM-42MG D/C	3,0	11,0	3,0	38,0	29220
		SM-43MG D/C	3,0	16,0	3,0	38,0	29221
		SM-51MG D/C	6,3	12,7	3,0	48,0	29223



Solid Carbide Miniature Bur Set #1



1/8" Shank Diameter - 1-1/2" Overall Length.

Contains the following twelve 1/8" Burs in a sturdy oak box: SA-42, SA-43, SC-41, SC-42, SD-42, SE-41, SF-42, SG-43, SH-41, SL-42, SM-42, SN-42

Solid Carbide Miniature Bur Set #2

3/32" Shank Diameter - 1-1/4" Overall Length.

Contains the following nine 3/32" Burs in a sturdy oak box: SA-61, SA-63, SC-61, SD-61, SE-61, SF-61, SG-61, SM-61, SN-61

Solid Carbide Miniature Bur Set #4

3/16" Shank Diameter - 2" Overall Length.

Contains the following eight 3/16" Burs in a sturdy oak box: SA-81, SC-81, SD-81, SE-81, SF-81, SG-81, SL-81, SN-81

Juego de caja #1 de limas rotativas miniatura en carburo sólido



Mango de diámetro 1/8" - Longitud total 1-1/2"

Contiene las siguientes nueve rotativas de 1/8" en una caja de madera de roble: SA-42, SA-43, SC-41, SC-42, SD-42, SE-41, SF-42, SG-43, SH-41, SL-42, SM-42, SN-42

Juego de caja #2 de limas rotativas miniatura en carburo sólido

Mango de diámetro 3/32" - Longitud total 1-1/4"

Contiene las siguientes nueve rotativas de 3/32" en una caja de madera de roble: SA-61, SA-63, SC-61, SD-61, SE-61, SF-61, SG-61, SM-61, SN-61

Juego de caja #4 de limas rotativas miniatura en carburo sólido

Mango de diámetro 3/16" - Longitud total 2"

Contiene las siguientes ocho rotativas de 3/16" en una caja de madera de roble: SA-81, SC-81, SD-81, SE-81, SF-81, SG-81, SL-81, SN-81

Jeu de Mini-Fraises rotatives en carbure monobloc N°1



Diamètre de la queue 1/8" - Longueur totale 1-1/2"

Contient les douze fraises rotatives 1/8" suivantes dans un coffret en chêne robuste: SA-42, SA-43, SC-41, SC-42, SD-42, SE-41, SF-42, SG-43, SH-41, SL-42, SM-42, SN-42

Jeu de Mini-Fraises rotatives en carbure monobloc N°2

Diamètre de la queue 3/32" - Longueur totale 1-1/4"

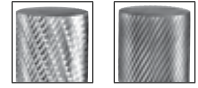
Contient les neuf fraises rotatives 3/32" suivantes dans un coffret en chêne robuste: SA-61, SA-63, SC-61, SD-61, SE-61, SF-61, SG-61, SM-61, SN-61

Jeu de Mini-Fraises rotatives en carbure monobloc N°4

Diamètre de la queue 3/16" - Longueur totale 2"

Contient les huit fraises rotatives 3/16" suivantes dans un coffret en chêne robuste: SA-81, SC-81, SD-81, SE-81, SF-81, SG-81, SL-81, SN-81

Set 1



6

3

Double
Cut
EDP No.

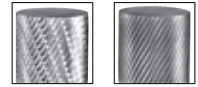
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Single
Cut
EDP No.

18200



Set 2



6

3

Double
Cut
EDP No.

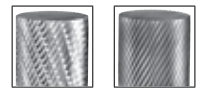
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Single
Cut
EDP No.

18202



Set 4



6

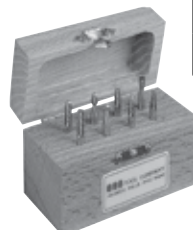
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Double
Cut
EDP No.

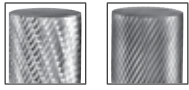
18207

Single
Cut
EDP No.

18206



Set 5



6

3

Double Cut
EDP No.

Single Cut
EDP No.

18209

18208



Miniature Bur Set #5



1/8" Steel Shank Diameter.

Contains the following nine Burs in a sturdy oak box:

SA-51, SB-51, SC-51, SD-51, SE-51, SF-51, SG-51, SM-51, SN-51

Solid Carbide Miniature Bur Set #6

1/4" steel shank diameter

Contains the following eight burs in a sturdy oak box:

SA-5, SC-3, SC-5, SD-5, SF-3, SF-5, SG-3, SL-4

Juego de caja #5 de limas rotativas miniatura



Mango de acero de diámetro 1/8"

Contiene las siguientes nueve rotativas en una caja de madera de roble:

SA-51, SB-51, SC-51, SD-51, SE-51, SF-51, SG-51, SM-51, SN-51

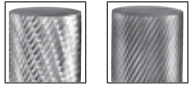
Juego de caja #6 de limas rotativas en carburo sólido

Mango de acero de diámetro 1/4"

Contiene las siguientes ocho rotativas en una caja de madera de roble:

SA-5, SC-3, SC-5, SD-5, SF-3, SF-5, SG-3, SL-4

Set 6



6

3

Double Cut
EDP No.

Single Cut
EDP No.

18211

18210



Jeu de Mini-Fraises rotatives N°5



Queue en acier, diamètre 1/8" - Longueur totale 2"

Contient les neuf fraises rotatives 1/8" suivantes dans un coffret en chêne robuste:

SA-51, SB-51, SC-51, SD-51, SE-51, SF-51, SG-51, SM-51, SN-51

Jeu de Fraises rotatives N°6 - carbure monobloc

Queue en acier, diamètre 1/4"

Contient les huit fraises rotatives dans un coffret en chêne robuste:

SA-5, SC-3, SC-5, SD-5, SF-3, SF-5, SG-3, SL-4

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Solid Carbide Miniature Bur Set #7



1/8" diameter solid carbide shank, 1-1/2" overall length
Contains the following twelve burs in a sturdy oak box:
SA-52, SA-53, SC-52, SC-53, SD-53, SE-53, SF-53, SG-53, SH-53, SL-53, SM-53, SN-53

Extra Long Bur Set #8

1/4" diameter - 6" long steel shank
Contains the following eight burs in a clear/blue acrylic case:
SA-1L6, SA-5L6, SC-1L6, SC-5L6, SD-1L6, SF-1L6, SG-1L6, SL-1L6

Juego de caja #7 de limas rotativas miniatura en carburo sólido



Mango de carburo sólido de diámetro 1/8" - Longitud total 1-1/2"
Contiene las siguientes doce rotativas en una caja de madera de roble:
SA-52, SA-53, SC-52, SC-53, SD-53, SE-53, SF-53, SG-53, SH-53, SL-53, SM-53, SN-53

Juego de Caja #8 de rotativas extra-largas

Mango de diámetro 1/4" - mango largo de acero de 6"
Contiene las siguiente ocho rotativas en una caja de plástico transparente/azul:
SA-1L6, SA-5L6, SC-1L6, SC-5L6, SD-1L6, SF-1L6, SG-1L6, SL-1L6

Jeu de Mini-Fraises rotatives en carbure monobloc N°7

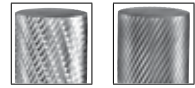


Queue en carbure monobloc, diamètre 1/8", Longueur totale 1-1/2"
Contient les douze fraises rotatives dans un coffret en chêne robuste.
SA-52, SA-53, SC-52, SC-53, SD-53, SE-53, SF-53, SG-53, SH-53, SL-53, SM-53, SN-53

Jeu de Fraises rotatives extra-longues N°8

Queue diamètre 1/4" - queue longue en acier 6"
Contient les huit fraises rotatives dans un étui en acrylique bleu clair:
SA-1L6, SA-5L6, SC-1L6, SC-5L6, SD-1L6, SF-1L6, SG-1L6, SL-1L6

SET 7



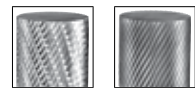
6

3

Double Cut EDP No.	Single Cut EDP No.
18213	18212



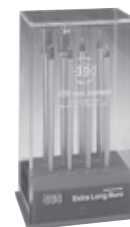
SET 8



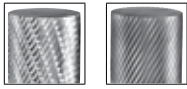
6

3

Double Cut EDP No.	Single Cut EDP No.
18215	18214



SET 16



6

3

Double Cut EDP No.
18217

Single Cut EDP No.
18216



Bur Set #16



1/4" Steel shank diameter

Contains the following sixteen burs in a sturdy oak box: SA-1, SA-3, SA-5, SC-1, SC-3, SC-5, SD-3, SD-5, SE-3, SF-1, SF-3, SF-5, SG-1, SG-3, SL-3, SL-4

Juego de Caja #16 de limas rotativas



Mango de acero de diámetro 1/4"

Contiene las siguiente dieciséis rotativas en una caja de madera de roble:

SA-1, SA-3, SA-5, SC-1, SC-3, SC-5, SD-3, SD-5, SE-3, SF-1, SF-3, SF-5, SG-1, SG-3, SL-3, SL-4

Jeu de Fraises rotatives N°16



Queue en carbure monobloc, diamètre 1/4"

Contient les seize fraises rotatives dans un étui en coffret en chêne robuste:

SA-1, SA-3, SA-5, SC-1, SC-3, SC-5, SD-3, SD-5, SE-3, SF-1, SF-3, SF-5, SG-1, SG-3, SL-3, SL-4

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Solid Carbide Bur Set #6



6 mm steel shank diameter

Contains the following eight burs in a sturdy oak box:

SA-5M, SC-3M, SC-5M, SD-5M, SF-3M, SF-5M, SG-3M, SL-4M

Juego de caja #6 de limas rotativas en carburo sólido



Mango de acero de diámetro 6 mm

Contiene las siguientes ocho rotativas en una caja de madera de roble:

SA-5M, SC-3M, SC-5M, SD-5M, SF-3M, SF-5M, SG-3M, SL-4M

Jeu de Fraises rotatives N°6 - carbure monobloc



Queue en acier, diamètre 6 mm

Contient les huit fraises rotatives dans un coffret en chêne robuste:

SA-5M, SC-3M, SC-5M, SD-5M, SF-3M, SF-5M, SG-3M, SL-4M

SET 6M



6

3

Double Cut
EDP No.
28211

Single Cut
EDP No.
28210



Solid Carbide Miniature Bur Set #1



3 mm Shank Diameter - 38 mm Overall Length.

Contains the following twelve 3 mm Burs in a sturdy oak box: SA-42M, SA-43M, SC-41M, SC-42M, SD-42M, SE-41M, SF-42M, SG-43M, SH-41M, SL-42M, SM-42M, SN-42M

Juego de caja #1 de limas rotativas miniatura en carburo sólido



Mango de diámetro 3 mm - Longitud total 38 mm

Contiene las siguientes nueve rotativas de 3 mm en una caja de madera de roble:

SA-42M, SA-43M, SC-41M, SC-42M, SD-42M, SE-41M, SF-42M, SG-43M, SH-41M, SL-42M, SM-42M, SN-42M

Jeu de Mini-Fraises rotatives en carbure monobloc N°1



Diamètre de la queue 3 mm - Longueur totale 38 mm

Contient les douze fraises rotatives 3 mm suivantes dans un coffret en chêne robuste: SA-42M, SA-43M, SC-41M, SC-42M, SD-42M, SE-41M, SF-42M, SG-43M, SH-41M, SL-42M, SM-42M, SN-42M

SET 1M



6

3

Double Cut
EDP No.
28201

Single Cut
EDP No.
28200



SET 8M



6



3

Double Cut EDP No.
28215

Single Cut EDP No.
28214

**Extra Long Bur Set #8**

6 mm diameter - 152.4 mm long steel shank

Contains the following eight burs in a clear/blue acrylic case:

SA-1ML6, SA-5ML6, SC-1ML6, SC-5ML6, SD-1ML6, SF-1ML6, SG-1ML6, SL-1ML6

Juego de Caja #8 de rotativas extra-largas

Mango de diámetro 6 mm - mango largo de acero de 152,4 mm

Contiene las siguiente ocho rotativas en una caja de plástico transparente/azul:

SA-1ML6, SA-5ML6, SC-1ML6, SC-5ML6, SD-1ML6, SF-1ML6, SG-1ML6, SL-1ML6

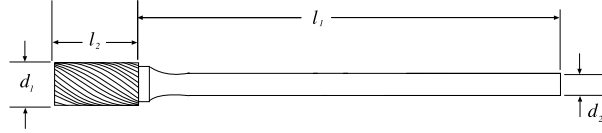
Jeu de Fraises rotatives extra-longues N°8

Queue diamètre 6 mm - queue longue en acier 152,4 mm

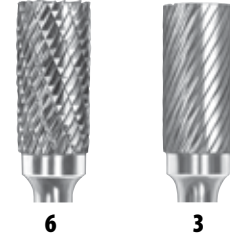
Contient les huit fraises rotatives dans un étui en acrylique bleu clair:

SA-1ML6, SA-5ML6, SC-1ML6, SC-5ML6, SD-1ML6, SF-1ML6, SG-1ML6, SL-1ML6


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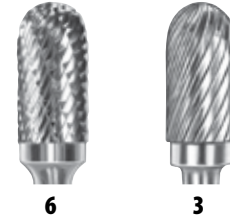



Cylinder Shape
Forma cilíndrica
Forme cylindrique



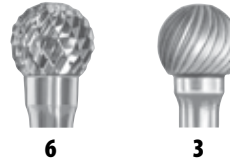
Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.
SA-1L6	1/4	1/2	1/4	6-1/2	16178	16175
SA-3L6	3/8	3/4	1/4	6-3/4	16203	16200
SA-5L6	1/2	1	1/4	7	16228	16225

Cylinder Shape Radius End
Forma cilíndrica Con radio
Forme cylindrique À bout hémisphérique



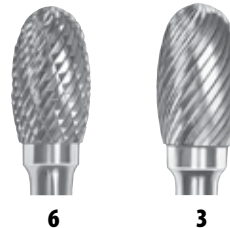
Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.
SC-1L6	1/4	1/2	1/4	6-1/2	16328	16325
SC-3L6	3/8	3/4	1/4	6-3/4	16353	16350
SC-5L6	1/2	1	1/4	7	16378	16375

Ball Shape
Forma esférica
Forme sphérique



Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.
SD-1L6	1/4	7/32	1/4	6-2/9	16403	16400
SD-3L6	3/8	5/16	1/4	6-1/3	16428	16425
SD-5L6	1/2	7/16	1/4	6-4/9	16453	16450

Oval Shape
Forma ovalada
Forme ovale



Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.
SE-1L6	1/4	3/8	1/4	6-3/8	16478	16475
SE-3L6	3/8	5/8	1/4	6-5/8	16503	16500
SE-5L6	1/2	7/8	1/4	6-8/9	16528	16525

Long Shank Burs



Solid Carbide
Special shank lengths are available up to 18"/450 mm long
– Our stocking program on Long Shank Carbide Burs provides quick delivery for solving tough, hard-to-reach deburring areas. – Complete Bur Regrind Service Available

Limas rotativas con mango largo

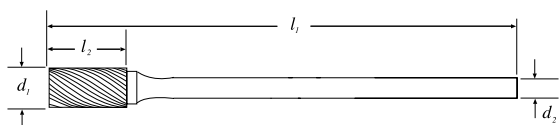


Carburo sólido
Tamaño máximo disponible: 18"/450 mm
– Nuestro programa de disponibilidad de limas rotativas en carburo sólido de mango largo proporciona una entrega rápida para solucionar trabajos complicados en zonas difíciles de alcanzar. – Disponemos de un servicio completo de reafilado de limas rotativas

Fraises-limes à queue longue

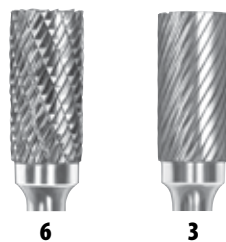


Carbure monobloc
Disponibles jusqu'à 18"/450 mm de long
– Notre programme d'ébauche pour les fraises rotatives en carbure à queue longue permet une livraison rapide permettant de résoudre les problèmes concernant les zones d'ébavurage tenaces et difficiles à atteindre. – Service de réaffûtage complet de fraises rotatives disponible



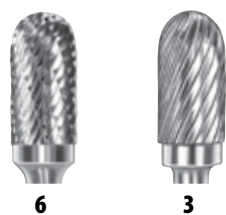
Cylinder Shape
Forma cilíndrica
Forme cylindrique

Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Double Cut EDP No.	Single Cut EDP No.
	d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm		
SA-1ML6	6	12,7	6	162	26178	26175
SA-3ML6	9,5	19	6	169	26203	26200
SA-5ML6	12,7	25	6	175	26228	26225



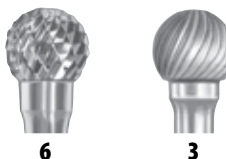
Cylinder Shape Radius End
Forma cilíndrica Con radio
Forme cylindrique À bout hémisphérique

Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Double Cut EDP No.	Single Cut EDP No.
	d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm		
SC-1ML6	6	12,7	6	162	26328	26325
SC-3ML6	9,5	19	6	169	26353	26350
SC-5ML6	12,7	25	6	175	26378	26375



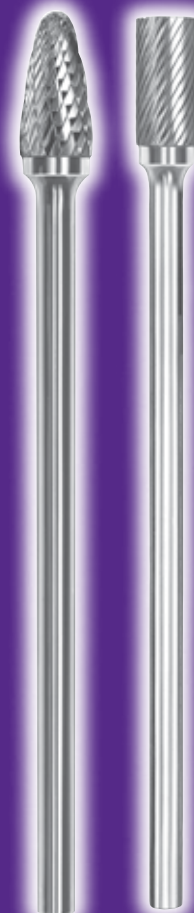
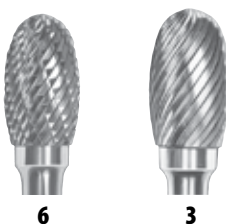
Ball Shape
Forma esférica
Forme sphérique

Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Double Cut EDP No.	Single Cut EDP No.
	d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm		
SD-1ML6	6	5	6	155	26403	26400
SD-3ML6	9,5	8	6	158	26428	26425
SD-5ML6	12,7	11	6	161	26453	26450

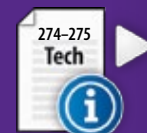


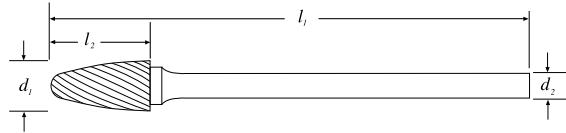
Oval Shape
Forma ovalada
Forme ovale

Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Double Cut EDP No.	Single Cut EDP No.
	d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm		
SE-1ML6	6	9,5	6	160	26478	26475
SE-3ML6	9,5	16	6	166	26503	26500
SE-5ML6	12,7	22	6	172	26528	26525



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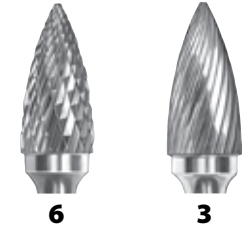


Tree Shape Radius End
Forma de árbol Con radio
Forme d'ogive Bout hémisphérique



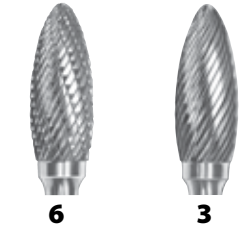
Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.
SF-1L6	1/4	1/2	1/4	6-1/2	16553	16550
SF-3L6	3/8	3/4	1/4	6-3/4	16578	16575
SF-5L6	1/2	1	1/4	7	16603	16600

Tree Shape Pointed End
Forma de árbol
Forme d'ogive À bout pointu



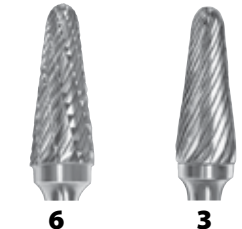
Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.
SG-1L6	1/4	1/2	1/4	6-1/2	16628	16625
SG-3L6	3/8	3/4	1/4	6-3/4	16653	16650
SG-5L6	1/2	1	1/4	7	16678	16675

Flame Shape
Forma de llama
Forme en flamme



Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.
SH-2L6	5/16	3/4	1/4	6-3/4	16703	16700
SH-5L6	1/2	1-1/4	1/4	7-1/4	16728	16725

14° Taper Radius End
Forma cónica a 14° Con radio
Conique, 14° Bout hémisphérique



Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Double Cut EDP No.	Single Cut EDP No.
SL-1L6	1/4	5/8	1/4	6-3/4	16753	16750
SL-3L6	3/8	1-1/16	1/4	7-2/9	16778	16775
SL-4L6	1/2	1-1/8	1/4	7-3/11	16803	16800

Long Shank Burs



Solid Carbide
Special shank lengths are available up to 18"/450 mm long – Our stocking program on Long Shank Carbide Burs provides quick delivery for solving tough, hard-to-reach deburring areas.
Complete Bur Regrind Service Available

Limas rotativas de mango largo

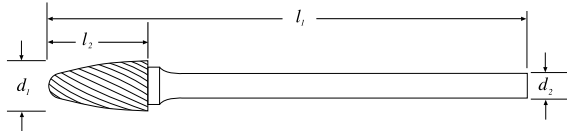


Carburo sólido
Tamaño máximo disponible: 18"/450 mm – Nuestro programa de disponibilidad de limas rotativas en carburo sólido de mango largo proporciona una entrega rápida para solucionar trabajos complicados en zonas difíciles de alcanzar.
Disponemos de un servicio completo de reafilado de limas rotativas

Fraises-limes à queue longue

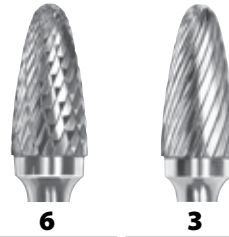


Carbure monobloc
Disponibles jusqu'à 18"/450 mm de long – Notre programme d'ébauche pour les fraises rotatives en carbure à queue longue permet une livraison rapide permettant de résoudre les problèmes concernant les zones d'ébavurage tenaces et difficiles à atteindre.
Service de réaffûtage complet de fraises rotatives disponible



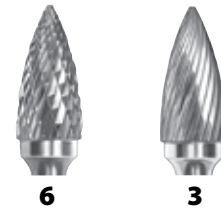
Tree Shape Radius End
Forma de árbol Con radio
Forme d'ogive Bout hémisphérique

Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Double Cut EDP No.	Single Cut EDP No.
	d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm		
SF-1ML6	6	12,7	6	163	26553	26550
SF-3ML6	9,5	19	6	169	26578	26575
SF-5ML6	12,7	25	6	175	26603	26600



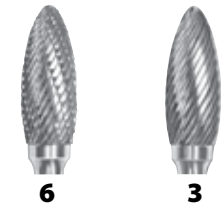
Tree Shape Pointed End
Forma de árbol
Forme d'ogive À bout pointu

Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Double Cut EDP No.	Single Cut EDP No.
	d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm		
SG-1ML6	6	12,7	6	163	26628	26625
SG-3ML6	9,5	19	6	169	26653	26650
SG-5ML6	12,7	25	6	175	26678	26675



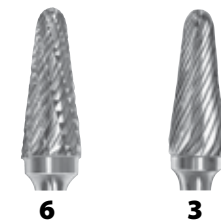
Flame Shape
Forma de llama
Forme en flamme

Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Double Cut EDP No.	Single Cut EDP No.
	d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm		
SH-2ML6	8	19	6	169	26703	26700
SH-5ML6	12,7	32	6	182	26728	26725

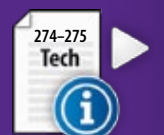


14° Taper Radius End
Forma cónica a 14° Con radio
Conique, 14° Bout hémisphérique

Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Double Cut EDP No.	Single Cut EDP No.
	d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm		
SL-1ML6	6	16	6	166	26753	26750
SL-3ML6	9,5	27	6	177	26778	26775
SL-4ML6	12,7	28	6	178	26803	26800



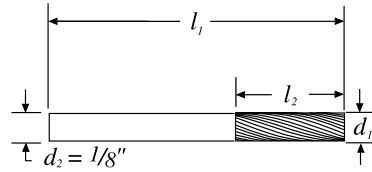
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Burs – Mold, Tool & Die Making

Fractional
Burs

Mold/Die



6 3

Mold, Tool & Die Making Burs



Solid Carbide
Complete Bur Regrind Service
Available

Limas rotativas para moldes, herramientas y matrices



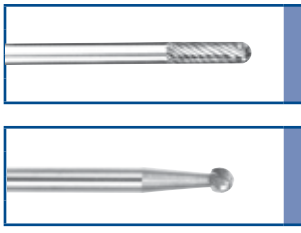
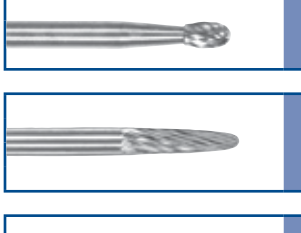
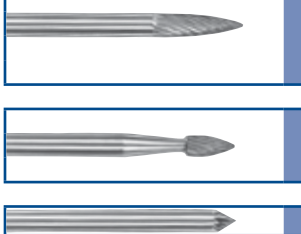
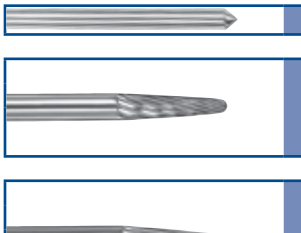
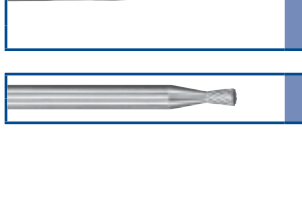


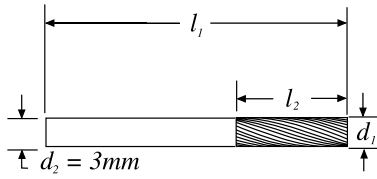
Carburo sólido
Disponemos de un servicio completo
de reafilado de limas rotativas

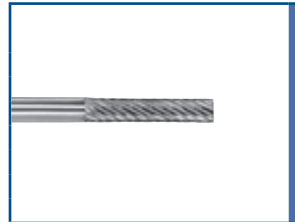
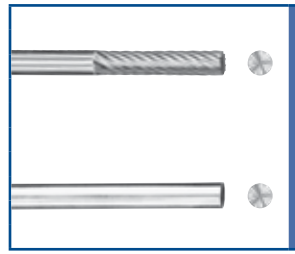








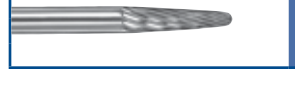
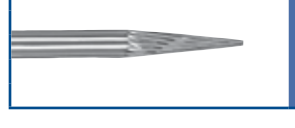

Fraises-limes pour moulistes, outils et matrices



Carbure monobloc
Service de réaffûtage complet de
fraises rotatives disponible

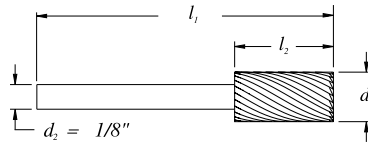
	Tool No.	Cutter Diameter d_1	Length of Cut l_2	Overall Length l_1	Included Angle a	Double	Single
						Cut EDP No.	Cut EDP No.
	SA-41	1/16	1/4	1-1/2	–	10603	10600
	SA-41L2	1/16	1/4	2	–	17103	17100
	SA-41L3	1/16	1/4	3	–	17128	17125
	SA-42	3/32	7/16	1-1/2	–	10628	10625
	SA-42L2	3/32	7/16	2	–	17153	17150
	SA-42L3	3/32	7/16	3	–	17178	17175
	SA-43	1/8	9/16	1-1/2	–	10653	10650
	SA-43L2	1/8	9/16	2	–	17203	17200
	SA-43L3	1/8	9/16	3	–	17228	17225
	SB-41	1/16	1/4	1-1/2	–	11453	11450
	SB-41L2	1/16	1/4	2	–	17253	17250
	SB-41L3	1/16	1/4	3	–	17278	17275
	SB-42	3/32	7/16	1-1/2	–	11478	11475
	SB-42L2	3/32	7/16	2	–	17303	17300
	SB-42L3	3/32	7/16	3	–	17328	17325
	SB-ECO	1/8		1-1/2	–		11525
	SB-43	1/8	9/16	1-1/2	–	11503	11500
	SB-43L2	1/8	9/16	2	–	17353	17350
	SB-43L3	1/8	9/16	3	–	17378	17375
	SC-41	3/32	7/16	1-1/2	–	12253	12250
	SC-42	1/8	9/16	1-1/2	–	12278	12275
	SC-42L2	1/8	9/16	2	–	17453	17450
	SC-42L3	1/8	9/16	3	–	17478	17475
	SD-41	3/32	3/32	1-1/2	–	12778	12775
	SD-42	1/8	1/8	1-1/2	–	12803	12800
	SD-42L2	1/8	1/8	2	–	17553	17550
	SD-42L3	1/8	1/8	3	–	17578	17575
	SE-41	1/8	7/32	1-1/2	–	13153	13150
	SE-41L2	1/8	7/32	2	–	17603	17600
	SE-41L3	1/8	7/32	3	–	17628	17625
	SF-41	1/8	1/4	1-1/2	–	13678	13675
	SF-42	1/8	1/2	1-1/2	–	13703	13700
	SF-42L2	1/8	1/2	2	–	17653	17650
	SF-42L3	1/8	1/2	3	–	17678	17675
	SG-41	1/8	1/4	1-1/2	–	14153	14150
	SG-43	1/8	3/8	1-1/2	–	14203	14200
	SG-44	1/8	1/2	1-1/2	–	14228	14225
	SG-44L2	1/8	1/2	2	–	17853	17850
	SG-44L3	1/8	1/2	3	–	17878	17875
	SH-41	1/8	1/4	1-1/2	–	14553	14550
	SH-41L2	1/8	1/4	2	–	17903	17900
	SH-41L3	1/8	1/4	3	–	17928	17925
	SJ-42	1/8	3/32	1-1/2	60°	14903	14900
	SK-42	1/8	1/16	1-1/2	90°	15153	15150
	SL-41	1/8	3/8	1-1/2	8°	15403	15400
	SL-42	1/8	1/2	1-1/2	8°	15428	15425
	SL-42L2	1/8	1/2	2	8°	17953	17950
	SL-42L3	1/8	1/2	3	8°	17978	17975
	SM-41	1/8	11/32	1-1/2	12°	15678	15675
	SM-42	1/8	7/16	1-1/2	14°	15703	15700
	SM-42L2	1/8	7/16	2	14°	18053	18050
	SM-42L3	1/8	7/16	3	14°	18078	18075
	SM-43	1/8	5/8	1-1/2	7°	15728	15725
	SN-41	3/32	1/8	1-1/2	10°	16028	16025
	SN-42	1/8	3/16	1-1/2	10°	16053	16050



Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Angle α	6	3
						Double Cut EDP No.	Single Cut EDP No.
							
SA-41M	1,5	6	3	38	–	20603	20600
SA-41ML2	1,5	6	3	50	–	27103	27100
SA-41ML3	1,5	6	3	75	–	27128	27125
SA-42M	2,5	11	3	38	–	20628	20625
SA-42ML2	2,5	11	3	50	–	27153	27150
SA-42ML3	2,5	11	3	75	–	27178	27175
SA-43M	3	14	3	38	–	20653	20650
SA-43ML2	3	14	3	50	–	27203	27200
SA-43ML3	3	14	3	75	–	27228	27225
							
SB-41M	1,5	6	3	38	–	21453	21450
SB-41ML2	1,5	6	3	50	–	27253	27250
SB-41ML3	1,5	6	3	75	–	27278	27275
SB-42M	2,5	11	3	38	–	21478	21475
SB-42ML2	2,5	11	3	50	–	27303	27300
SB-42ML3	2,5	11	3	75	–	27328	27325
SB-ECOM	3	–	3	38	–		21525
SB-43M	3	14	3	38	–	21503	21500
SB-43ML2	3	14	3	50	–	27353	27350
SB-43ML3	3	14	3	75	–	27378	27375
							
SC-41M	2,5	11	3	38	–	22253	22250
SC-42M	3	14	3	38	–	22278	22275
SC-42ML2	3	14	3	50	–	27453	27450
SC-42ML3	3	14	3	75	–	27478	27475
							
SD-41M	2,5	2,3	3	38	–	22778	22775
SD-42M	3	2,8	3	38	–	22803	22800
SD-42ML2	3	2,8	3	50	–	27553	27550
SD-42ML3	3	2,8	3	75	–	27578	27575
							
SE-41M	3	5,5	3	38	–	23153	23150
SE-41ML2	3	5,5	3	50	–	27603	27600
SE-41ML3	3	5,5	3	75	–	27628	27625
							
SF-41M	3	6	3	38	–	23678	23675
SF-42M	3	12,7	3	38	–	23703	23700
SF-42ML2	3	12,7	3	50	–	27653	27650
SF-42ML3	3	12,7	3	75	–	27678	27675
							
SG-41M	3	6	3	38	–	24153	24150
SG-43M	3	9,5	3	38	–	24203	24200
SG-44M	3	12,7	3	38	–	24228	24225
SG-44ML2	3	12,7	3	50	–	27853	27850
SG-44ML3	3	12,7	3	75	–	27878	27875
							
SH-41M	3	6,3	3	38	–	24553	24550
SH-41ML2	3	6,3	3	50	–	27903	27900
SH-41ML3	3	6,3	3	75	–	27928	27925
							
SJ-42M	3	2,5	3	38	–	24903	24900
							
SK-42M	3	1,5	3	38	–	25153	25150
							
SL-41M	3	9,5	3	38	8°	25403	25400
SL-42M	3	12,7	3	38	8°	25428	25425
SL-42ML2	3	12,7	3	50	8°	27953	27950
SL-42ML3	3	12,7	3	75	8°	27978	27975
							
SM-41M	3	8,9	3	38	12°	25678	25675
SM-42M	3	11	3	38	14°	25703	25700
SM-42ML2	3	11	3	50	14°	28053	28050
SM-42ML3	3	11	3	75	14°	28078	28075
SM-43M	3	16	3	38	7°	25728	25725
							
SN-41M	2,5	3	3	38	10°	26028	26025
SN-42M	3	4	3	38	10°	26053	26050

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1/4" Head – 1/8" Shank



Mold, Tool & Die Making
Burs



1/4" Head – 1/8" Shank
– Brazed Construction
Complete Bur Regrind Service
Available

Limas rotativas para
moldes, herramientas
y matrices







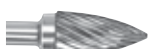




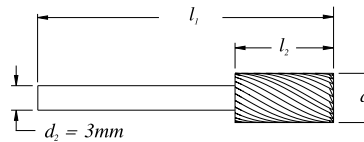
Cabeza de 1/4" – Mango de 1/8" con
construcción de soldadura de bronce
Disponemos de un servicio completo
de reafilado de limas rotativas










Fraises-limes pour mouliste,
outils et matrices



Tête de 1/4" – Queue de 1/8" – Brasées
Service de réaffûtage complet de
fraises rotatives disponible

	Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Included Angle a	Double Cut EDP No. 6	Single Cut EDP No. 3
	SA-51	1/4	1/2	1/8	2	–	10678	10675
	SB-51	1/4	3/16	1/8	1-11/16	–	11553	11550
	SC-51	1/4	1/2	1/8	2	–	12303	12300
	SD-51	1/4	7/32	1/8	1-3/4	–	12828	12825
	SE-51	1/4	3/8	1/8	1-8/9	–	13178	13175
	SF-51	1/4	1/2	1/8	2	–	13728	13725
	SG-51	1/4	1/2	1/8	2	–	14253	14250
	SM-51	1/4	1/2	1/8	2-1/9	22°	15753	15750
	SN-51	1/4	1/4	1/8	1-3/4	10°	16078	16075

**6,3 mm Head – 3 mm Shank**

	Tool No.	Cutting Diameter d_1 mm	Length of Cut l_2 mm	Shank Diameter d_2 mm	Overall Length l_1 mm	Angle a	Cut Type	
							Double Cut EDP No.	Single Cut EDP No.
	SA-51M	6,3	12,7	3	50	–	20678	20675
	SB-51M	6,3	4,7	3	43	–	21553	21550
	SC-51M	6,3	12,7	3	50	–	22303	22300
	SD-51M	6,3	5	3	44	–	22828	22825
	SE-51M	6,3	9,5	3	47	–	23178	23175
	SF-51M	6,3	12,7	3	56	–	23728	23725
	SG-51M	6,3	12,7	3	50	–	24253	24250
	SM-51M	6,3	12,7	3	53	22°	25753	25750
	SN-51M	6,3	6	3	44	10°	26078	26075

**Mold, Tool & Die Making
Burs**

6.3 mm Head - 3 mm Shank -
Brazed Construction
Complete Bur Regrind Service
Available

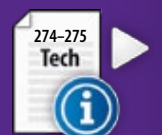
**Limas rotativas para
moldes, herramientas
y matrices**

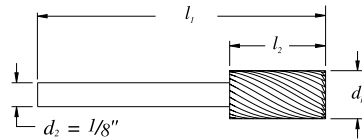
Cabeza de 6,3 mm - Mango de
3 mm con construcción de soldadura
de bronce
Disponemos de un servicio completo
de reafilado de limas rotativas

**Fraises-limes pour mouliste,
outils et matrices**

Tête de 6,3 mm - Queue de 3 mm
- Brasées
Service de réaffûtage complet de
fraises rotatives disponible

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5/32", 3/16" Head – 1/8" Shank



**Mold, Tool & Die Making
Burs**



5/32" – 3/16" Head, 1/8" Shank –
Solid Carbide
Complete Bur Regrind Service
Available

**Limas rotativas para
moldes, herramientas
y matrices**




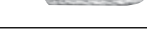











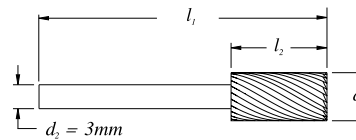
Cabeza de 5/32" – 3/16" – Mango
de 1/8" – Carburo sólido
Disponemos de un servicio completo
de reafilado de limas rotativas





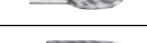




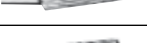



**Fraises-limes pour mouliste,
outils et matrices**



Tête de 5/32" – 3/16" – Queue de
1/8" – Carbure monobloc
Service de réaffûtage complet de
fraises rotatives disponible

	Tool No.	Cutter Diameter d_1	Length of Cut l_2	Shank Diameter d_2	Overall Length l_1	Included Angle a	Double Cut EDP No.	Single Cut EDP No.
	SA-52	5/32	1/2	1/8	1-1/2	–	10703	10700
	SA-53	3/16	1/2	1/8	1-1/2	–	10728	10725
	SC-52	5/32	1/2	1/8	1-1/2	–	12328	12325
	SC-53	3/16	1/2	1/8	1-1/2	–	12353	12350
	SD-52	5/32	5/32	1/8	1-1/2	–	12840	12837
	SD-53	3/16	5/32	1/8	1-1/2	–	12853	12850
	SE-53	3/16	9/32	1/8	1-1/2	–	13203	13200
	SF-53	3/16	1/2	1/8	1-1/2	–	13753	13750
	SG-53	3/16	1/2	1/8	1-1/2	–	14278	14275
	SH-53	3/16	3/8	1/8	1-1/2	–	14603	14600
	SL-53	3/16	1/2	1/2	1-1/2	14°	15453	15450
	SM-53	3/16	1/2	1/8	1-1/2	16°	15778	15775
	SN-53	3/16	1/4	1/8	1-1/2	10°	16103	16100

**5 mm / 4 mm Head – 3 mm Shank**

	Tool No.	Cutting Diameter	Length of Cut	Shank Diameter	Overall Length	Angle a	Double Cut EDP No.	Single Cut EDP No.
		d ₁ mm	l ₂ mm	d ₂ mm	l ₁ mm			
	SA-52M	4	12,7	3	38	–	20703	20700
	SA-53M	5	12,7	3	38	–	20728	20725
	SC-52M	4	12,7	3	38	–	22328	22325
	SC-53M	5	12,7	3	38	–	22353	22350
	SD-52M	4	3,4	3	38	–	22840	22837
	SD-53M	5	4,7	3	38	–	22853	22850
	SE-53M	5	7,1	3	38	–	23203	23200
	SF-53M	5	12,7	3	38	–	23753	23750
	SG-53M	5	12,7	3	38	–	24278	24275
	SH-53M	5	9,5	3	38	–	24603	24600
	SL-53M	5	12,7	3	38	14°	25453	25450
	SM-53M	5	12,7	3	38	16°	25778	25775
	SN-53M	5	6,3	3	38	10°	26103	26100

**Mold, Tool & Die Making
Burs**

5 mm / 4 mm Head, 3 mm Shank –
Solid Carbide
Complete Bur Regrind Service
Available

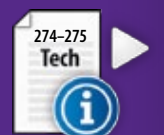
**Limas rotativas para
moldes, herramientas
y matrices**

Cabeza de 5 mm / 4 mm – Mango
de 3 mm – Carburo sólido
Disponemos de un servicio completo
de reafileado de limas rotativas

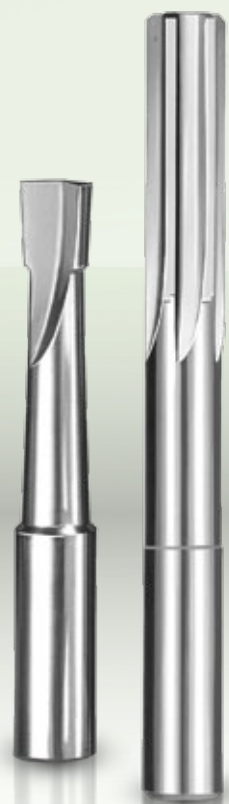
**Fraises-limes pour mouliste,
Soutils et matrices**

Tête de 5 mm / 4 mm – Queue de
3 mm – Carbure monobloc
Service de réaffûtage complet de
fraises rotatives disponible

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MISCELLANEOUS



Miscellaneous

Miscellaneous	Series	Includes	Page
Accu-Reamer Straight Flute Common Shank Short	200		228 – 229
Reamers – Straight Flute	201M		230
Single End Jig Boring Tools	801		231

Varios

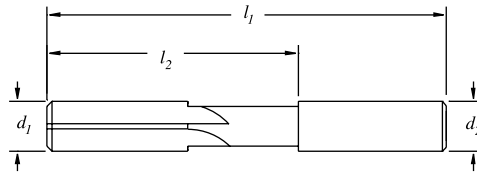
Varios	Series	Includes	Page
Escariadores de Serie Corta – Mango Usual Filos Rectos	200		228 – 229
Escariadores – Diente Recto	201M		230
Herramientas de Mandrinar	801		231

Divers

Divers	Series	Includes	Page
Série Courte – Queue Standard Goujures Droites	200		228 – 229
Alésoirs – Queue Droite	201M		230
Outils à Aléser et Pointer	801		231

MAIN
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Accu-Reamer – Straight Flute



TOLERANCES

$d_1 = +.0002 - .0000$

$d_2 = +.0002 - .0000$

Series 200 • 200M Reamers – Fractional/Decimal

Micrograin Solid Carbide
Short Series Reamer – Common
shank – Straight Flutes –
Right Hand Cutting

Escariadores 200 • 200M – Pulgadas/Milímetros

Carburo sólido con micrograno –
Escariadores de serie corta – mango
usual Filos rectos – corte a derecha

Série 200 Alésours • 200M – Courts/Décimaux

Carbure monobloc micrograin
Série courte – Queue standard
Goujures droites – Coupe à droite

Reamer Diameter d_1	Shank Diameter d_2	Maximum Ream Length l_2	Overall Length l_1	No. of Flutes Z	Uncoated EDP No.
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

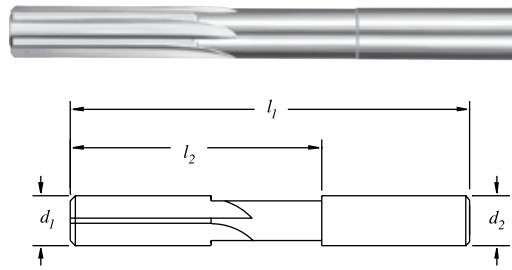
Accu-Reamer – Straight Flute



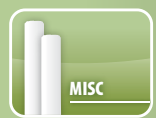
www.sgstool.com

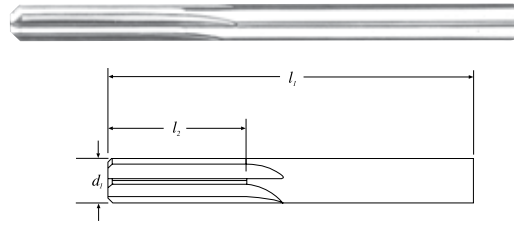
TOLERANCES

$d_1 = +.0002 - .0000$
 $d_2 = +.0002 - .0000$



Reamer Diameter d_1	Shank Diameter d_2	Maximum Ream Length l_2	Overall Length l_1	No. of Flutes Z
.0470 – .0625	1/16	3/4	1-1/2	4
.0626 – .0781	5/64	1	2	4
.0782 – .0938	3/32	1-1/4	2-1/4	4
.0939 – .1094	7/64	1-1/4	2-1/4	4
.1095 – .1250	1/8	1-1/4	2-1/4	4
.1251 – .1406	9/64	1-1/2	2-1/2	4
.1407 – .1563	5/32	1-1/2	2-1/2	4
.1564 – .1719	11/64	1-3/4	2-3/4	4
.1720 – .1875	3/16	1-3/4	2-3/4	4
.1876 – .2031	13/64	2	3	4
.2032 – .2188	7/32	2	3	4
.2189 – .2344	15/64	2	3	4
.2345 – .2500	1/4	2	3	4
.2501 – .2656	17/64	2-1/4	3-1/4	6
.2657 – .2813	9/32	2-1/4	3-1/4	6
.2814 – .2969	19/64	2-1/4	3-1/4	6
.2970 – .3125	5/16	2-1/4	3-1/4	6
.3126 – .3281	21/64	2-3/8	3-1/2	6
.3282 – .3438	11/32	2-3/8	3-1/2	6
.3439 – .3594	23/64	2-3/8	3-1/2	6
.3595 – .3750	3/8	2-3/8	3-1/2	6
.3751 – .3906	25/64	2-7/8	4	6
.3907 – .4063	13/32	2-7/8	4	6
.4064 – .4219	27/64	2-7/8	4	6
.4220 – .4375	7/16	2-7/8	4	6
.4376 – .4531	29/64	2-7/8	4	6
.4532 – .4688	15/32	2-7/8	4	6
.4689 – .4844	31/64	2-7/8	4	6
.4845 – .5000	1/2	2-7/8	4	6





TOLERANCES

d=1mm – 6mm = +0,008–0,000
>6mm – 10mm = +0,011–0,00

201M – Reamers



Micrograin Solid Carbide
Straight Shank, Right Hand Cutting

Series 801 –

Jig Boring Tools



Micrograin Solid Carbide
Straight Flute – Right Hand Cutting
– Straight Shank
*“Minimum Hole Diameter”
dimensions shown are the
minimum hole size which can be
bored.

**“Maximum Depth of Hole”
dimensions shown are the
maximum depth that can be bored.

201M – Escariadores



Metal duro con micrograno
Diente recto, corte a derecha

Herramientas de mandrinar

Serie 801

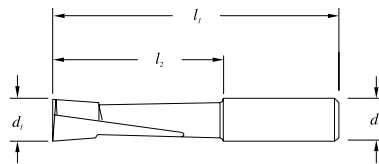


Carburo sólido con micrograno
Filo recto – corte a derecha –
mango cilíndrico
*“Diámetro de agujero mínimo”
en las dimensiones mostradas son
la medida mínima de agujero que
puede ser mandrinado
**“Profundidad máxima de
agujero” en las dimensiones
mostradas son la profundidad
máxima que puede ser mandrinada.

Reamer Diameter d ₁ mm	Overall Length l ₁ mm	Ream Length l ₂ mm	Flutes	EDP No.
1	32	6	4	81001
1,5	38	9,5	4	81003
2	44	12,7	4	81005
2,5	50	12,7	4	81007
3	57	16	4	81009
3,5	63	19	4	81011
4	63	19	4	81013
4,5	70	22	4	81015
5	75	25	4	81017
5,5	75	25	4	81019
6	75	25	4	81021
7	82	28	6	81023
8	82	28	6	81025
9	89	31	6	81027
10	89	31	6	81029

TOLERANCES

$$d_1 = +.0001 - .0004$$



Minimum Hole Diameter* d_1	Maximum Depth of Hole** l_2	Shank Diameter d_2	Overall Length l_1	Uncoated EDP No.
.090	1/2	1/8	1-1/2	75001
.120	5/8	1/8	1-1/2	75002
.150	3/4	3/16	2	75003
.180	1	3/16	2	75004
.210	1-1/4	1/4	2	75005
.240	1-1/4	1/4	2	75006
.270	1-1/4	5/16	2-1/4	75007
.300	1-1/4	5/16	2-1/4	75008
.330	1-1/2	3/8	2-1/2	75009
.360	1-1/2	3/8	2-1/2	75010

201M – Alésiors



Carbure monobloc, micrograin
Queue droite – Coupe à droite

801 Outils à aléser et pointer

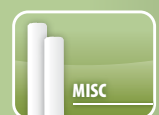


Carbure monobloc micrograin
Goujure droite – Coupe à droite –
Queue cylindrique

* Les dimensions "Diamètre minimum du trou" indiquées représentent la taille de trou minimum qui peut être alésée.

** Les dimensions "Profondeur maximum du trou" indiquées représentent la profondeur maximum qui peut être alésée.

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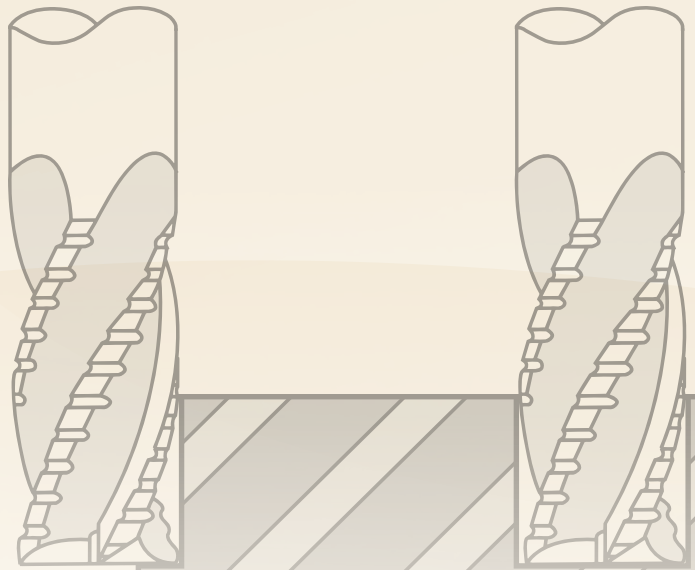
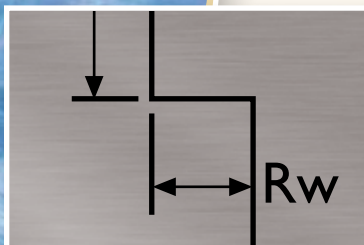
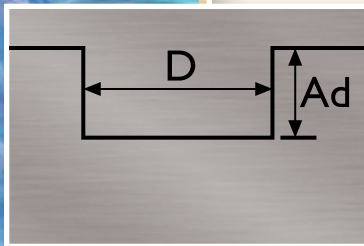
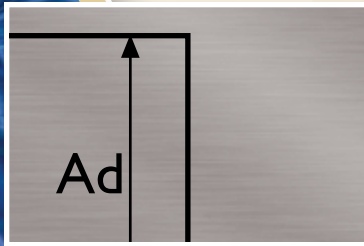


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End Milling Application Tips

(See specific tool series for any additional 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 R_w 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 ($\rightarrow|Rw| \leftarrow$) and Axial Depth (Ad)

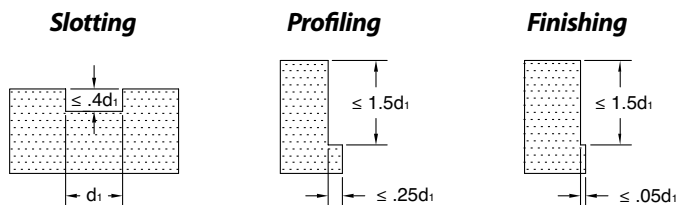
For tapered end mills, base the speed on the largest diameter contacting the workpiece.

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

Cut type for general purpose tools

(To be used unless otherwise shown for specific tool series).



Entry Methods

Pre-Drilled Hole



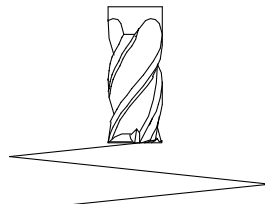
Pre-drilling is the preferred entry method for most applications

Helical



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

Ramp



Plunge



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

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Sugerencias de Aplicación de Fresado

(Para sugerencias adicionales, consulte las series específicas de cada herramienta)

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 ($\rightarrow |Rw| \leftarrow$), y profundidad axial ($\downarrow Ad \uparrow$)

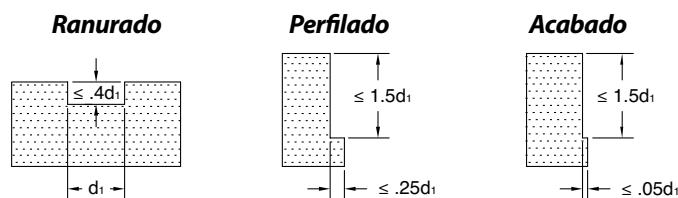
Para las herramientas cónicas, la velocidad se basa en el diámetro mayor de contacto con la pieza, y el avance, con el diámetro menor de contacto con la pieza

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

Tipo de corte para herramientas de uso general

(Para ser utilizadas a menos que sea indicado para Series específicas)



Métodos de entrada

Barreno previo



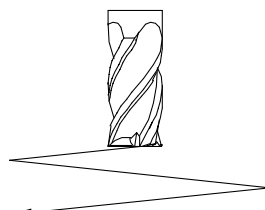
Preferentemente usar un barreno previo como método de entrada para la mayor parte de las aplicaciones.

Interpolado Helicoidal



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

Rampa



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.

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Fraises 2 Tailles : Application Fraisage

(Pour toute application spéciale voir la série d'outils spécifiques)

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, aciers au 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

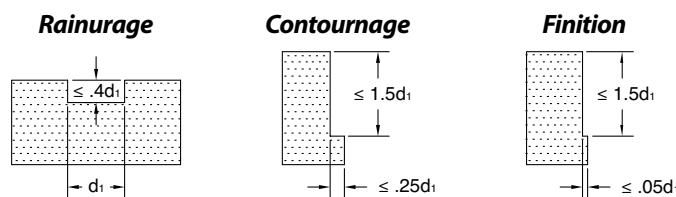
Vitesses & avances pour ces cas d'usinage sont basées sur l'engagement radial ($\rightarrow |ae| \leftarrow$), et axial (\overline{ap})

Pour les fraises coniques, la vitesse est calculée en fonction du plus grand diamètre de contact pièce

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

Usinage general avec outils de bases



Types d'entree matiere

Preperçage



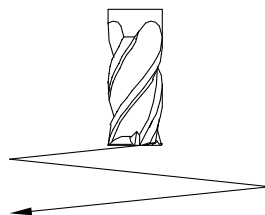
Le pré-perçage est la méthode préférable dans la plupart de applications.

Hélicoïdale



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

Ramping



Plongée



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

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Z-Carb™-AP Speed and Feed Recommendations – Fractional



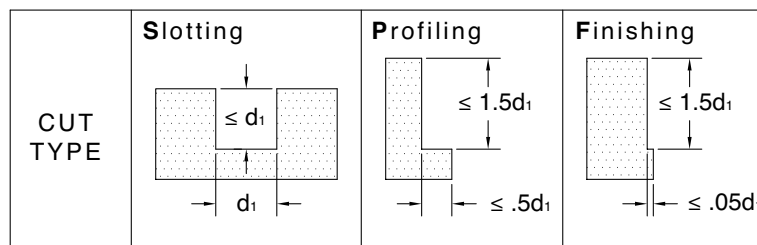
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Z1PCR, Z1PLC, Z1PLB 4-flute	Hardness Bhn	Cut Type	Speed (sfm)	Feed (inch/flute)					
				1/8	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	S	535	0.0020	0.0008	0.0019	0.0025	0.0031	0.0034
		P	640	0.0020	0.0008	0.0019	0.0025	0.0031	0.0034
		F	695	0.0030	0.0013	0.0032	0.0042	0.0052	0.0057
	> 175 ≤ 275	S	440	0.0020	0.0008	0.0019	0.0025	0.0031	0.0034
		P	525	0.0020	0.0008	0.0019	0.0025	0.0031	0.0034
		F	570	0.0030	0.0013	0.0032	0.0042	0.0052	0.0057
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	S	370	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		P	430	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		F	460	0.0030	0.0010	0.0028	0.0038	0.0048	0.0053
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 275	S	190	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		P	210	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		F	230	0.0030	0.0010	0.0028	0.0038	0.0048	0.0053
CAST IRON - GRAY	≤ 200	S	500	0.0025	0.0010	0.0022	0.0028	0.0035	0.0038
		P	580	0.0025	0.0010	0.0022	0.0028	0.0035	0.0038
		F	600	0.0040	0.0017	0.0037	0.0047	0.0058	0.0063
CAST IRON - DUCTILE	≤ 300	S	255	0.0020	0.0008	0.0019	0.0025	0.0031	0.0034
		P	285	0.0020	0.0008	0.0019	0.0025	0.0031	0.0034
		F	305	0.0030	0.0013	0.0032	0.0042	0.0052	0.0057
CAST IRON - MALLEABLE	≤ 300	S	160	0.0020	0.0008	0.0019	0.0025	0.0031	0.0034
		P	180	0.0020	0.0008	0.0019	0.0025	0.0031	0.0034
		F	190	0.0030	0.0013	0.0032	0.0042	0.0052	0.0057
STAINLESS - 300 SERIES 304, 316, 316L, 321, 201, 302, Nitronic 32	≤ 275	S	315	0.0020	0.0008	0.0014	0.0018	0.0027	0.0029
		P	335	0.0020	0.0008	0.0014	0.0018	0.0027	0.0029
		F	355	0.0030	0.0013	0.0023	0.0030	0.0045	0.0048
STAINLESS - 400 SERIES 420, 422, 410, 403, 405, 409, 429, 430, 434	≤ 185	S	440	0.0022	0.0009	0.0016	0.0021	0.0030	0.0032
		P	515	0.0022	0.0009	0.0016	0.0021	0.0030	0.0032
		F	545	0.0040	0.0015	0.0027	0.0035	0.0050	0.0053
STAINLESS - PH SERIES 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	S	265	0.0024	0.0008	0.0015	0.0020	0.0026	0.0028
		P	285	0.0024	0.0008	0.0015	0.0020	0.0026	0.0028
		F	295	0.0025	0.0011	0.0018	0.0025	0.0032	0.0036
TITANIUM TiCode, Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 295	S	300	0.0024	0.0008	0.0015	0.0020	0.0026	0.0028
		P	330	0.0024	0.0008	0.0015	0.0020	0.0026	0.0028
		F	340	0.0032	0.0012	0.0020	0.0026	0.0035	0.0037
HIGH TEMPERATURE ALLOY A-286, Waspalloy, Haynes, Inconel, Rene, Waspalloy	≤ 300	S	80	0.0020	0.0006	0.0012	0.0016	0.0024	0.0026
		P	90	0.0020	0.0006	0.0012	0.0016	0.0024	0.0026
		F	100	0.0028	0.0008	0.0017	0.0023	0.0034	0.0033

RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

*Reduce CUT TYPE and machining rates by 50% for Z1PLC, Z1PLB, Z1MPLC



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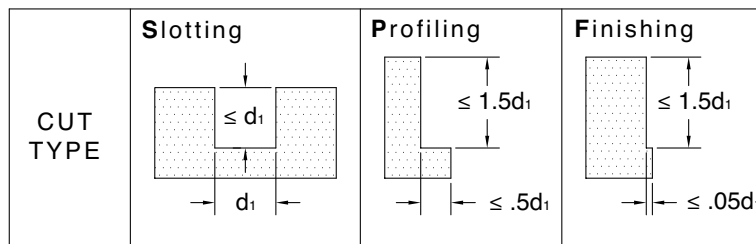


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Z1MPCR, Z1MPLC 4-flute	Hardness Bhn	Cut Type	Speed (m/min)	Feed (mm/flute)					
				3	6	10	12	20	25
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	S	163	0.0051	0.020	0.048	0.064	0.079	0.086
		P	195	0.0051	0.020	0.048	0.064	0.079	0.086
		F	212	0.0076	0.033	0.081	0.107	0.132	0.145
	> 175 ≤ 275	S	134	0.0051	0.020	0.048	0.064	0.079	0.086
		P	160	0.0051	0.020	0.048	0.064	0.079	0.086
		F	174	0.0076	0.033	0.081	0.107	0.132	0.145
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	S	113	0.0046	0.015	0.043	0.058	0.074	0.081
		P	131	0.0046	0.015	0.043	0.058	0.074	0.081
		F	140	0.0076	0.025	0.071	0.097	0.122	0.135
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 275	S	58	0.0046	0.015	0.043	0.058	0.074	0.081
		P	64	0.0046	0.015	0.043	0.058	0.074	0.081
		F	70	0.0076	0.025	0.071	0.097	0.122	0.135
CAST IRON - GRAY	≤ 200	S	152	0.0064	0.025	0.056	0.071	0.089	0.097
		P	177	0.0064	0.025	0.056	0.071	0.089	0.097
		F	183	0.0102	0.043	0.094	0.119	0.147	0.160
CAST IRON - DUCTILE	≤ 300	S	78	0.0051	0.020	0.048	0.064	0.079	0.086
		P	87	0.0051	0.020	0.048	0.064	0.079	0.086
		F	93	0.0076	0.033	0.081	0.107	0.132	0.145
CAST IRON - MALLEABLE	≤ 300	S	49	0.0051	0.020	0.048	0.064	0.079	0.086
		P	55	0.0051	0.020	0.048	0.064	0.079	0.086
		F	58	0.0076	0.033	0.081	0.107	0.132	0.145
STAINLESS - 300 SERIES 304, 316, 316L, 321, 201, 302, Nitronic 32	≤ 275	S	96	0.0051	0.020	0.036	0.046	0.069	0.074
		P	102	0.0051	0.020	0.036	0.046	0.069	0.074
		F	108	0.0076	0.033	0.058	0.076	0.114	0.122
STAINLESS - 400 SERIES 420, 422, 410, 403, 405, 409, 429, 430, 434	≤ 185	S	134	0.0056	0.023	0.041	0.053	0.076	0.081
		P	157	0.0056	0.023	0.041	0.053	0.076	0.081
		F	166	0.0102	0.038	0.069	0.089	0.127	0.135
STAINLESS - PH SERIES 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	S	81	0.0061	0.020	0.038	0.051	0.066	0.071
		P	87	0.0061	0.020	0.038	0.051	0.066	0.071
		F	90	0.0064	0.028	0.046	0.064	0.081	0.091
TITANIUM TiCode, Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 295	S	91	0.0061	0.020	0.038	0.051	0.066	0.071
		P	101	0.0061	0.020	0.038	0.051	0.066	0.071
		F	104	0.0081	0.030	0.051	0.066	0.089	0.094
HIGH TEMPERATURE ALLOY A-286, Waspalloy, Haynes, Inconel, Rene, Waspalloy	≤ 300	S	24	0.0051	0.015	0.030	0.041	0.061	0.066
		P	27	0.0051	0.015	0.030	0.041	0.061	0.066
		F	30	0.0071	0.020	0.043	0.058	0.086	0.084

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

mm/minute = (mm/flute) x number of flutes x RPM



Z-Carb™ Speed and Feed Recommendations – Fractional

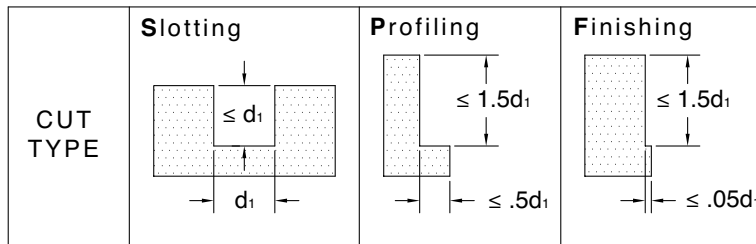


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Z1, Z1B, Z1ACR, Z16C, Z1LC*, Z1LB* 4-flute	Hardness Bhn	Cut Type	Speed (sfm)	Feed (inch/flute)					
				1/8	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	S	535	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		P	640	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		F	695	0.00030	0.0010	0.0028	0.0038	0.0048	0.0053
	> 175 ≤ 275	S	440	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		P	525	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		F	570	0.00030	0.0010	0.0028	0.0038	0.0048	0.0053
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	S	370	0.0017	0.0006	0.0017	0.0022	0.0028	0.0030
		P	430	0.0017	0.0006	0.0017	0.0022	0.0028	0.0030
		F	460	0.00030	0.0010	0.0028	0.0037	0.0047	0.0050
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 275	S	190	0.0017	0.0006	0.0017	0.0022	0.0028	0.0030
		P	210	0.0017	0.0006	0.0017	0.0022	0.0028	0.0030
		F	230	0.00030	0.0010	0.0028	0.0037	0.0047	0.0050
CAST IRON - GRAY	≤ 200	S	500	0.0020	0.0009	0.0020	0.0026	0.0033	0.0035
		P	580	0.0020	0.0009	0.0020	0.0026	0.0033	0.0035
		F	600	0.00030	0.0015	0.0033	0.0043	0.0055	0.0058
CAST IRON - DUCTILE	≤ 300	S	255	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		P	285	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		F	305	0.00030	0.0010	0.0028	0.0038	0.0048	0.0053
CAST IRON - MALLEABLE	≤ 300	S	160	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		P	180	0.0018	0.0006	0.0017	0.0023	0.0029	0.0032
		F	190	0.00030	0.0010	0.0028	0.0038	0.0048	0.0053
STAINLESS - 300 SERIES 304, 316, 316L, 321, 201, 302, Nitronic 32	≤ 275	S	315	0.0016	0.0005	0.0013	0.0017	0.0025	0.0028
		P	335	0.0016	0.0005	0.0013	0.0017	0.0025	0.0028
		F	355	0.00030	0.0008	0.0022	0.0028	0.0042	0.0047
STAINLESS - 400 SERIES 420, 422, 410, 403, 405, 409, 429, 430, 434	≤ 185	S	440	0.0019	0.0008	0.0015	0.0020	0.0027	0.0030
		P	515	0.0019	0.0008	0.0015	0.0020	0.0027	0.0029
		F	545	0.00030	0.0013	0.0025	0.0033	0.0045	0.0050
STAINLESS - PH SERIES 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	S	265	0.0018	0.0007	0.0014	0.0019	0.0026	0.0029
		P	285	0.0018	0.0007	0.0014	0.0019	0.0026	0.0029
		F	295	0.00025	0.0011	0.0018	0.0025	0.0032	0.0036
TITANIUM TiCode, Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 295	S	300	0.0018	0.0007	0.0014	0.0019	0.0026	0.0029
		P	330	0.0018	0.0007	0.0014	0.0019	0.0026	0.0029
		F	340	0.00032	0.0012	0.0020	0.0026	0.0035	0.0037
HIGH TEMPERATURE ALLOY A-286, Waspalloy, Haynes, Inconel, Rene, Waspalloy	≤ 300	S	80	0.0016	0.0004	0.0010	0.0014	0.0022	0.0024
		P	90	0.0016	0.0004	0.0010	0.0014	0.0022	0.0024
		F	100	0.00028	0.0008	0.0017	0.0023	0.0034	0.0033

RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

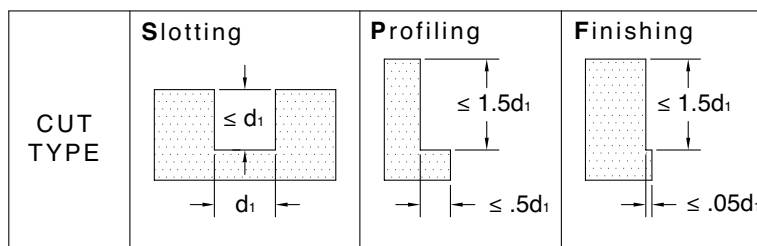




Z1M, Z1MB 4 flute	Hardness Bhn	Cut Type	Speed (m/min)	Feed (mm/flute)					
				3	6	10	12	20	25
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	S	163	0.0046	0.015	0.043	0.058	0.074	0.081
		P	195	0.0046	0.015	0.043	0.058	0.074	0.081
		F	212	0.0076	0.025	0.071	0.097	0.122	0.135
	> 175 ≤ 275	S	134	0.0046	0.015	0.043	0.058	0.074	0.081
		P	160	0.0046	0.015	0.043	0.058	0.074	0.081
		F	174	0.0076	0.025	0.071	0.097	0.122	0.135
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	S	113	0.0043	0.015	0.043	0.056	0.071	0.076
		P	131	0.0043	0.015	0.043	0.056	0.071	0.076
		F	140	0.0076	0.025	0.071	0.094	0.119	0.127
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 275	S	58	0.0043	0.015	0.043	0.056	0.071	0.076
		P	64	0.0043	0.015	0.043	0.056	0.071	0.076
		F	70	0.0076	0.025	0.071	0.094	0.119	0.127
CAST IRON - GRAY	≤ 200	S	152	0.0051	0.023	0.051	0.066	0.084	0.089
		P	177	0.0051	0.023	0.051	0.066	0.084	0.089
		F	183	0.0076	0.038	0.084	0.109	0.140	0.147
CAST IRON - DUCTILE	≤ 300	S	78	0.0046	0.015	0.043	0.058	0.074	0.081
		P	87	0.0046	0.015	0.043	0.058	0.074	0.081
		F	93	0.0076	0.025	0.071	0.097	0.122	0.135
CAST IRON - MALLEABLE	≤ 300	S	49	0.0046	0.015	0.043	0.058	0.074	0.081
		P	55	0.0046	0.015	0.043	0.058	0.074	0.081
		F	58	0.0076	0.025	0.071	0.097	0.122	0.135
STAINLESS - 300 SERIES 304, 316, 316L, 321, 201, 302, Nitronic 32	≤ 275	S	96	0.0041	0.013	0.033	0.043	0.064	0.071
		P	102	0.0041	0.013	0.033	0.043	0.064	0.071
		F	108	0.0076	0.020	0.056	0.071	0.107	0.119
STAINLESS - 400 SERIES 420, 422, 410, 403, 405, 409, 429, 430, 434	≤ 185	S	134	0.0048	0.020	0.038	0.051	0.069	0.076
		P	157	0.0048	0.020	0.038	0.051	0.069	0.074
		F	166	0.0076	0.033	0.064	0.084	0.114	0.127
STAINLESS - PH SERIES 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	S	81	0.0046	0.018	0.036	0.048	0.066	0.074
		P	87	0.0046	0.018	0.036	0.048	0.066	0.074
		F	90	0.0064	0.028	0.046	0.064	0.081	0.091
TITANIUM TiCode, Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 295	S	91	0.0046	0.018	0.036	0.048	0.066	0.074
		P	101	0.0046	0.018	0.036	0.048	0.066	0.074
		F	104	0.0081	0.031	0.051	0.066	0.089	0.094
HIGH TEMPERATURE ALLOY A-286, Waspalloy, Haynes, Inconel, Rene, Waspalloy	≤ 300	S	24	0.0041	0.010	0.025	0.036	0.056	0.061
		P	27	0.0041	0.010	0.025	0.036	0.056	0.061
		F	30	0.0071	0.020	0.043	0.058	0.086	0.084

$RPM = (1000 \times m/min) / (3.14 \times \text{cutting diameter})$

$mm/minute = (mm/flute) \times \text{number of flutes} \times RPM$



Z-Carb™-HTA Speed and Feed Recommendations – Fractional and Metric



Formulas
and
Conversions

ZH1CR 4-flute	Hardness Bhn	Cut Type	Speed (sfm)	Feed (inch/flute)				
				1/4	3/8	1/2	3/4	1
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Udimet, Waspalloy	≤ 300	S	90	0.0013	0.0019	0.0025	0.0038	0.0050
		PH	110	0.0013	0.0019	0.0025	0.0038	0.0050
		PL	130	0.0015	0.0022	0.0029	0.0044	0.0058
	> 300	S	80	0.0005	0.0008	0.0010	0.0015	0.0020
		PH	100	0.0005	0.0008	0.0010	0.0015	0.0020
		PL	120	0.0006	0.0009	0.0012	0.0018	0.0024

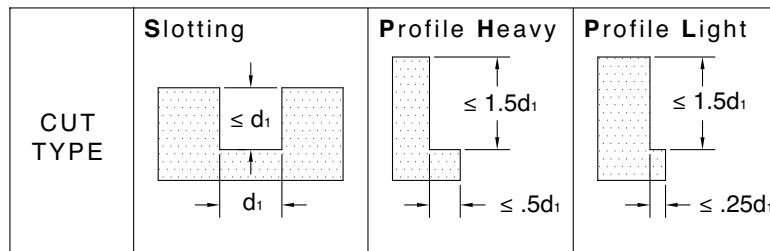
RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

ZH1MCR 4-flute	Hardness Bhn	Cut Type	Speed (m/min)	Feed (mm/flute)				
				6	10	12	20	25
HIGH TEMPERATURE ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Udimet, Waspalloy	≤ 300	S	27	0.032	0.048	0.064	0.095	0.127
		PH	34	0.032	0.048	0.064	0.095	0.127
		PL	40	0.037	0.055	0.074	0.110	0.147
	> 300	S	24	0.013	0.019	0.025	0.038	0.051
		PH	30	0.013	0.019	0.025	0.038	0.051
		PL	37	0.015	0.023	0.030	0.046	0.061

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

mm/minute = (mm/flute) x number of flutes x RPM





ZD1CR 4-flute	Hardness Bhn	Cut Type	Rw	Ad	Speed (sfm)	Feed (inch/flute)					
						1/8	1/4	3/8	1/2	5/8	3/4
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≥ 30-45	S	1D	≤ .5D	215	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038
		P	≤ .5D	≤ 1D	265	0.0009	0.0018	0.0026	0.0035	0.0044	0.0053
		HSP	≤ .1D	≤ .1D	560	0.0011	0.0022	0.0033	0.0044	0.0055	0.0066
	> 45-55	S	1D	≤ .5D	120	0.0005	0.0010	0.0015	0.0020	0.0025	0.0030
		P	≤ .5D	≤ 1D	150	0.0007	0.0014	0.0021	0.0028	0.0035	0.0042
		HSP	≤ .1D	≤ .1D	490	0.0009	0.0018	0.0026	0.0035	0.0044	0.0053
	> 55-60	S	1D	≤ .3D	65	0.0004	0.0008	0.0011	0.0015	0.0019	0.0023
		P	≤ .3D	≤ 1D	80	0.0005	0.0011	0.0016	0.0021	0.0026	0.0032
		HSP	≤ .1D	≤ .1D	250	0.0006	0.0013	0.0019	0.0025	0.0031	0.0038

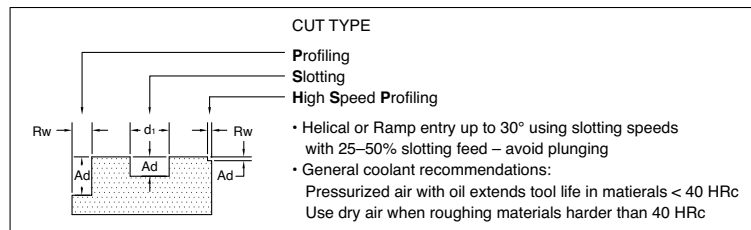
RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

ZD1MCR 4-flute	Hardness Bhn	Cut Type	Rw	Ad	Speed (m/min)	Feed (mm/flute)					
						3	6	10	12	16	20
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≥ 30-45	S	1D	≤ .5D	66	0.016	0.032	0.048	0.064	0.079	0.097
		P	≤ .5D	≤ 1D	81	0.023	0.046	0.066	0.089	0.112	0.135
		HSP	≤ .1D	≤ .1D	171	0.028	0.056	0.084	0.112	0.140	0.168
	> 45-55	S	1D	≤ .5D	37	0.013	0.025	0.038	0.051	0.064	0.076
		P	≤ .5D	≤ 1D	46	0.018	0.036	0.053	0.071	0.089	0.107
		HSP	≤ .1D	≤ .1D	149	0.023	0.046	0.066	0.089	0.112	0.135
	> 55-60	S	1D	≤ .3D	20	0.010	0.020	0.028	0.038	0.048	0.058
		P	≤ .3D	≤ 1D	24	0.013	0.028	0.041	0.053	0.066	0.081
		HSP	≤ .1D	≤ .1D	76	0.015	0.033	0.048	0.064	0.079	0.097

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

mm/minute = (mm/flute) x number of flutes x RPM



TIPOS DE CORTE

Profiling – Perfilado
Slotting – Ranurado
High Speed Profiling – Maquinado de alta velocidad

- Para corte de interpolado helicoidal o rampa hasta 30° utilice la velocidad de ranurado con 25 – 50% del avance – evite el corte de agujero o barrenado
- Recomendaciones generales de refrigerante:
- El aire mezclado con aceite extiende la vida de la herramienta al maquinarse materiales < 40 HRC
- Usar solamente aire seco a presión cuando se desbasten materiales más duros que 40 HRC



TYPE D'USINAGE

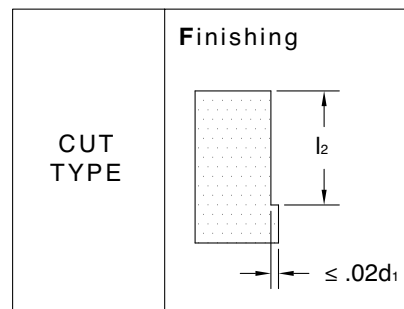
Profiling – Contournage
Slotting – Rainurage
High Speed Profiling – Contournage grande vitesse

- Pour les entrées hélicoïdales ou ramping supérieures à 30°, utiliser les vitesses de rainurage avec des avances diminuées de 25 à 50%.
- Recommandations de lubrification:
- Air comprimé ou émulsion pour les matériaux < 40 HRC
- Air comprimé en cas d'ébauche pour les matériaux jusqu'à 40 HRC

7 4-flute	Hardness Bhn	Cut Type	Speed (sfm)	Feed (inch/flute)					
				1/8	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15	≤ 175	F	550	0.00050	0.0011	0.0017	0.0023	0.0035	0.0041
	> 175 ≤ 275	F	480	0.00040	0.0010	0.0015	0.0020	0.0031	0.0036
ALLOY STEEL 4140, 4150, 4320, 5150	≤ 275	F	400	0.00040	0.0010	0.0015	0.0020	0.0031	0.0036
TOOL STEEL A2, D2, H13, M2, P20, S7	≤ 275	F	360	0.00040	0.0010	0.0015	0.0020	0.0031	0.0036
CAST IRON - GRAY	≤ 200	F	310	0.00060	0.0014	0.0021	0.0027	0.0036	0.0042
CAST IRON - DUCTILE	≤ 300	F	275	0.00040	0.0010	0.0014	0.0019	0.0029	0.0031
CAST IRON - MALLEABLE	≤ 300	F	170	0.00040	0.0010	0.0014	0.0019	0.0029	0.0031
STAINLESS - 300 SERIES 304, 316, 316L, 321, 302	≤ 275	F	280	0.00040	0.0010	0.0014	0.0019	0.0029	0.0031
STAINLESS - 400 SERIES 420, 422, 410, 403, 409	≤ 185	F	400	0.00040	0.0013	0.0019	0.0025	0.0034	0.0040
STAINLESS - PH SERIES 17-4PH, 15-5PH	≤ 325	F	240	0.00040	0.0010	0.0014	0.0019	0.0029	0.0031
TITANIUM TiCode, Ti5Al-5V-5Mo	≤ 295	F	300	0.00040	0.0013	0.0019	0.0025	0.0034	0.0040
HIGH TEMP ALLOY A-286, Inconel, Waspalloy	≤ 300	F	80	0.00040	0.0010	0.0014	0.0019	0.0029	0.0031

$$\text{RPM} = \text{sfm} \times 3.82 / \text{cutting diameter}$$

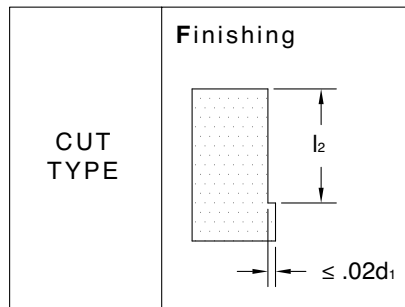
$$\text{IPM} = (\text{inch/flute}) \times \text{number of flutes} \times \text{RPM}$$



7M 4-flute	Hardness Bhn	Cut Type	Speed (m/min)	Feed (mm/flute)					
				3	6	10	12	20	25
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15	≤ 175	F	168	0.0127	0.028	0.043	0.058	0.089	0.104
	> 175 ≤ 275	F	146	0.0102	0.025	0.038	0.051	0.079	0.091
ALLOY STEEL 4140, 4150, 4320, 5150	≤ 275	F	122	0.0102	0.025	0.038	0.051	0.079	0.091
TOOL STEEL A2, D2, H13, M2, P20, S7	≤ 275	F	110	0.0102	0.025	0.038	0.051	0.079	0.091
CAST IRON - GRAY	≤ 200	F	94	0.0152	0.036	0.053	0.069	0.091	0.107
CAST IRON - DUCTILE	≤ 300	F	84	0.0102	0.025	0.036	0.048	0.074	0.079
CAST IRON - MALLEABLE	≤ 300	F	52	0.0102	0.025	0.036	0.048	0.074	0.079
STAINLESS - 300 SERIES 304, 316, 316L, 321, 302	≤ 275	F	85	0.0102	0.025	0.036	0.048	0.074	0.079
STAINLESS - 400 SERIES 420, 422, 410, 403, 409	≤ 185	F	122	0.0102	0.033	0.048	0.064	0.086	0.102
STAINLESS - PH SERIES 17-4PH, 15-5PH	≤ 325	F	73	0.0102	0.025	0.036	0.048	0.074	0.079
TITANIUM TiCode, Ti5Al-5V-5Mo	≤ 295	F	91	0.0102	0.033	0.048	0.064	0.086	0.102
HIGH TEMP ALLOY A-286, Inconel, Waspalloy	≤ 300	F	24	0.0102	0.025	0.036	0.048	0.074	0.079

$RPM = (1000 \times m/min) / (3.14 \times \text{cutting diameter})$

$mm/minute = (mm/flute) \times \text{number of flutes} \times RPM$



V-Carb™ Speed and Feed Recommendations – Fractional and Metric



Five Flute End Mills

Formulas
and
Conversions

55, 55M 5-flute	Hardness Bhn	Cut Type	Short			Regular			Long		
			SFM	m/min	f	SFM	m/min	f	SFM	m/min	f
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	S	345	105	3	345	105	3			
		P	410	125	3	410	125	3			
		SF	550	168	10	550	168	10	685	209	7
		F	685	209	7	685	209	7	685	209	7
	> 175 ≤ 275	S	300	91	2	300	91	2			
		P	360	110	2	360	110	2			
		SF	480	146	8	480	146	8	600	183	6
		F	600	183	6	600	183	6	600	183	6
ALLOY STEEL 4140, 4150, 4320, 5120, 5150, 8630, 86L20, 50100	≤ 275	S	250	76	3	250	76	3			
		P	300	91	3	300	91	3			
		SF	400	122	9	400	122	9	500	152	6
		F	500	152	6	500	152	6	500	152	6
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 275	S	225	69	2	225	69	2			
		P	270	82	2	270	82	2			
		SF	360	110	9	360	110	9	450	137	6
		F	450	137	6	450	137	6	450	137	6
CAST IRON - GRAY	≤ 200	S	195	59	4	195	59	4			
		P	230	70	4	230	70	4			
		SF	310	94	11	310	94	11	385	117	8
		F	385	117	8	385	117	8	385	117	8
CAST IRON - DUCTILE	≤ 300	S	175	53	1	175	53	1			
		P	205	62	1	205	62	1			
		SF	275	84	8	275	84	8	345	105	6
		F	345	105	6	345	105	6	345	105	6
CAST IRON - MALLEABLE	≤ 300	S	110	34	1	110	34	1			
		P	130	40	1	130	40	1			
		SF	170	52	8	170	52	8	215	66	5
		F	215	66	5	215	66	5	215	66	5
STAINLESS - 300 SERIES	≤ 275	S	175	53	1	175	53	1			
		P	210	64	1	210	64	1			
		SF	280	85	8	280	85	8	350	107	6
		F	350	107	6	350	107	6	350	107	6
STAINLESS - 400 SERIES	≤ 185	S	250	76	3	250	76	3			
		P	300	91	3	300	91	3			
		SF	400	122	10	400	122	10	500	152	7
		F	500	152	7	500	152	7	500	152	7
STAINLESS - PH SERIES	≤ 325	S	150	46	1	150	46	1			
		P	180	55	1	180	55	1			
		SF	240	73	7	240	73	7	300	91	4
		F	300	91	4	300	91	4	300	91	4
TITANIUM TiCode, Ti5Al-5V-5Mo Ti6Al4V, Ti-7Al4Mo	≤ 295	S	190	58	3	190	58	3			
		P	225	69	3	225	69	3			
		SF	300	91	10	300	91	10	375	114	7
		F	375	114	7	375	114	7	375	114	7
HIGH TEMPERATURE ALLOY A-286, Inconel, Waspalloy, Rene	≤ 300	S	50	15	2	50	15	2			
		P	60	18	2	60	18	2			
		SF	80	24	9	80	24	9	100	30	6
		F	100	30	6	100	30	6	100	30	6

$$\text{RPM} = \text{sfm} \times 3.82 / \text{cutting diameter}$$

$$\text{RPM} = (1000 \times \text{m/min}) / (3.14 \times \text{cutting diameter})$$

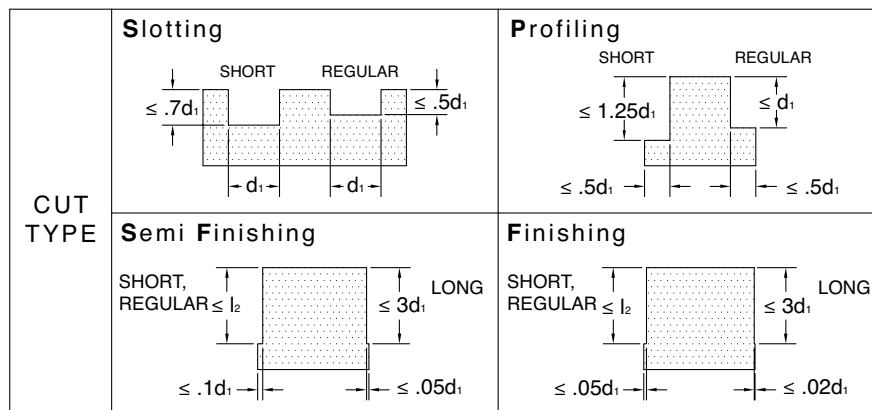
$$\text{IPM} = (\text{inch/flute}) \times \text{number of flutes} \times \text{RPM}$$

$$\text{mm/minute} = (\text{mm/flute}) \times \text{number of flutes} \times \text{RPM}$$



Five Flute End Mills

f	Feed Lookup					
	1/8	1/4 6mm	3/8 10mm	1/2 12mm	3/4 20mm	1
1	0.00025	0.0005	0.0008	0.0010	0.0015	0.0020
		0.0130	0.0190	0.0250	0.0380	
2	0.00030	0.0006	0.0009	0.0012	0.0018	0.0024
		0.0150	0.0230	0.0300	0.0460	
3	0.00035	0.0007	0.0011	0.0014	0.0021	0.0028
		0.0180	0.0270	0.0360	0.0530	
4	0.00040	0.0008	0.0012	0.0016	0.0024	0.0032
		0.0200	0.0300	0.0410	0.0610	
5	0.00045	0.0009	0.0014	0.0018	0.0027	0.0036
		0.0230	0.0340	0.0460	0.0690	
6	0.00050	0.0010	0.0015	0.0020	0.0030	0.0040
		0.0250	0.0380	0.0510	0.0760	
7	0.00060	0.0012	0.0018	0.0024	0.0036	0.0048
		0.0300	0.0460	0.0610	0.0910	
8	0.00070	0.0014	0.0021	0.0028	0.0042	0.0056
		0.0360	0.0530	0.0710	0.1070	
9	0.00080	0.0016	0.0024	0.0032	0.0048	0.0064
		0.0410	0.0610	0.0810	0.1220	
10	0.00090	0.0018	0.0027	0.0036	0.0054	0.0072
		0.0460	0.0690	0.0910	0.1370	
11	0.00100	0.0020	0.0030	0.0040	0.0060	0.0080
		0.0510	0.0760	0.1020	0.1520	



65 3-flute	Hardness Bhn	Cut Type	Speed (sfm)	Feed (inch/flute)					
				1/8	1/4	3/8	1/2	3/4	1
ALLOY STEEL 4140, 4150, 4320, 5120, 5150	≤ 275	S	280	0.00018	0.0006	0.0017	0.0023	0.0029	0.0032
		P	350	0.00018	0.0006	0.0017	0.0023	0.0029	0.0032
STAINLESS - 300 SERIES 304, 316, 316L, 321, 201, 302	≤ 275	S	215	0.00020	0.0008	0.0014	0.0018	0.0027	0.0029
		P	270	0.00020	0.0008	0.0014	0.0018	0.0027	0.0029
STAINLESS - 400 SERIES 420, 422, 410, 403, 405, 409	≤ 185	S	330	0.00018	0.0006	0.0017	0.0023	0.0029	0.0032
		P	410	0.00018	0.0006	0.0017	0.0023	0.0029	0.0032
STAINLESS - PH SERIES 17-4PH, 15-5PH, Custom 450	≤ 325	S	200	0.00020	0.0008	0.0014	0.0018	0.0027	0.0029
		P	245	0.00020	0.0008	0.0014	0.0018	0.0027	0.0029
TITANIUM TiCode, Ti5Al-5V-5Mo	≤ 295	S	220	0.00024	0.0008	0.0015	0.0020	0.0026	0.0028
		P	275	0.00024	0.0008	0.0015	0.0020	0.0026	0.0028
HIGH TEMPERATURE ALLOY A-286, Inconel, Waspalloy	≤ 300	S	60	0.00020	0.0006	0.0012	0.0016	0.0024	0.0026
		P	75	0.00020	0.0006	0.0012	0.0016	0.0024	0.0026

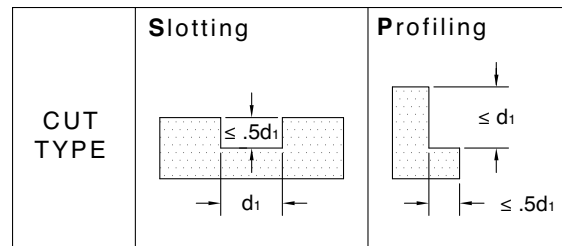
RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

65M 3-flute	Hardness Bhn	Cut Type	Speed (m/min)	Feed (mm/flute)					
				3	6	10	12	20	25
ALLOY STEEL 4140, 4150, 4320, 5120, 5150	≤ 275	S	85	0.0046	0.015	0.043	0.058	0.074	0.081
		P	107	0.0046	0.015	0.043	0.058	0.074	0.081
STAINLESS - 300 SERIES 304, 316, 316L, 321, 201, 302	≤ 275	S	66	0.0051	0.020	0.036	0.046	0.069	0.074
		P	82	0.0051	0.020	0.036	0.046	0.069	0.074
STAINLESS - 400 SERIES 420, 422, 410, 403, 405, 409	≤ 185	S	101	0.0046	0.015	0.043	0.058	0.074	0.081
		P	125	0.0046	0.015	0.043	0.058	0.074	0.081
STAINLESS - PH SERIES 17-4PH, 15-5PH, Custom 450	≤ 325	S	61	0.0051	0.020	0.036	0.046	0.069	0.074
		P	75	0.0051	0.020	0.036	0.046	0.069	0.074
TITANIUM TiCode, Ti5Al-5V-5Mo	≤ 295	S	67	0.0061	0.020	0.038	0.051	0.066	0.071
		P	84	0.0061	0.020	0.038	0.051	0.066	0.071
HIGH TEMPERATURE ALLOY A-286, Inconel, Waspalloy	≤ 300	S	18	0.0051	0.015	0.030	0.041	0.061	0.066
		P	23	0.0051	0.015	0.030	0.041	0.061	0.066

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

mm/minute = (mm/flute) x number of flutes x RPM





56 2-flute	Hardness HRc	Cut Type	Rw	Ad	Speed (sfm)	Feed (inch/flute)							
						1/32	1/16	1/8	3/16	1/4	3/8	1/2	3/4
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 40	ROUGH	≤.4D	≤.1D	625	0.0006	0.0015	0.0030	0.0040	0.0050	0.0080	0.0100	0.0120
		FINISH	≤.4D	≤.03D	950	0.0007	0.0017	0.0033	0.0044	0.0044	0.0088	0.0110	0.0130
	> 40 ≤ 50	ROUGH	≤.4D	≤.05D	750	0.0005	0.0011	0.0023	0.0030	0.0038	0.0060	0.0075	0.0085
		FINISH	≤.4D	≤.02D	1150	0.0006	0.0012	0.0025	0.0033	0.0042	0.0066	0.0082	0.0100
	> 50 ≤ 60	ROUGH	≤.4D	≤.04D	500	0.0004	0.0008	0.0017	0.0023	0.0029	0.0045	0.0057	0.0063
		FINISH	≤.4D	≤.01D	1000	0.0005	0.0009	0.0019	0.0025	0.0032	0.0050	0.0063	0.0071

RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

cuspl height* = (tool diameter / 2) - √((tool diameter)² - pitch²) / 4

pitch = √(4 x (cuspl height x tool diameter) - 4 x (cuspl height)²)

*On flat surface

56M 2-flute	Hardness HRc	Cut Type	Rw	Ad	Speed (m/min)	Feed (mm/flute)							
						1	1.5	3	5	6	10	12	20
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 40	ROUGH	≤.4D	≤.1D	191	0.015	0.038	0.076	0.102	0.127	0.203	0.254	0.305
		FINISH	≤.4D	≤.03D	290	0.018	0.043	0.084	0.112	0.112	0.224	0.279	0.330
	> 40 ≤ 50	ROUGH	≤.4D	≤.05D	229	0.013	0.028	0.058	0.076	0.097	0.152	0.191	0.216
		FINISH	≤.4D	≤.02D	351	0.015	0.030	0.064	0.084	0.107	0.168	0.208	0.254
	> 50 ≤ 60	ROUGH	≤.4D	≤.04D	152	0.010	0.020	0.043	0.058	0.074	0.114	0.145	0.160
		FINISH	≤.4D	≤.01D	305	0.013	0.023	0.048	0.064	0.081	0.127	0.160	0.180

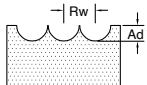
RPM = (1000 x m/min) / (3.14 x cutting diameter)

mm/minute = (mm/flute) x number of flutes x RPM

cuspl height* = (tool diameter / 2) - √((tool diameter)² - pitch²) / 4

pitch = √(4 x (cuspl height x tool diameter) - 4 x (cuspl height)²)

*On flat surface



- Rw = Pitch
- Helical interpolation or ramping are the preferred entry methods – avoid direct plunging
- Speed and feed are based on using the tool tip
- General coolant recommendations:
 - Pressurized air with oil extends tool life in materials < 40 HRc
 - Use dry air when rough or finish milling materials are harder than 40 HRc



• Rw = Paso

- Los métodos recomendados de entrada al corte son, interpolación helicoidal y corte en rampa – evite el corte en agujero o barrenado
- Los rangos de velocidades y avances están basados para usar la punta de la herramienta
- Recomendaciones generales de refrigerante:
 - El aire mezclado con aceite extiende la vida de la herramienta al maquinarse materiales < 40 HRc
 - Usar solamente aire seco a presión para cortes de desbaste o acabado en materiales de mayor dureza de 40 HRc



• Rw = Pas

- L'interpolation hélicoïdale ou la descent en ramping sont préférable pour l'entrée en matière.
- Eviter la plongée directe.
- Les vitesses et avances sont basées sur les recommandations générales des outils.
- Recommandations refroidissement:
 - Air comprimé ou huile soluble pour matériaux < 40 HRC
 - Air sec pour ébauches dans les matériaux jusqu'à 40 HRC

57 6-flute	Hardness Bhn	Cut Type	Rw	Ad	Speed (sfm)	Feed (inch/flute)				
						1/4	5/16	3/8	1/2	
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≥ 30-45	S	1D	≤ .3D	215	0.0013	0.0019	0.0025	0.0031	
		P	≤ .1D	≤ 1.5D	265	0.0018	0.0026	0.0035	0.0044	
		HSP	≤ .04	≤ 1.5D	560	0.0022	0.0033	0.0044	0.0055	
	> 45-55	S	1D	≤ .2D	≤ 1.5D	120	0.0010	0.0015	0.0020	0.0025
		P	≤ .05D	≤ 1.5D	150	0.0014	0.0021	0.0028	0.0035	
		HSP	≤ .04	≤ 1.5D	490	0.0018	0.0026	0.0035	0.0044	
	> 55-60	S	1D	≤ .1D	≤ 1.5D	65	0.0008	0.0011	0.0015	0.0019
		P	≤ .05D	≤ 1.5D	80	0.0011	0.0016	0.0021	0.0026	
		HSP	≤ .01	≤ 1.5D	250	0.0013	0.0019	0.0025	0.0031	
	> 60-65	S	1D	≤ .1D	≤ 1.5D	65	0.0008	0.0011	0.0015	0.0019
		P	≤ .05D	≤ 1.5D	80	0.0011	0.0016	0.0021	0.0026	
		HSP	≤ .01	≤ 1.5D	250	0.0013	0.0019	0.0025	0.0031	

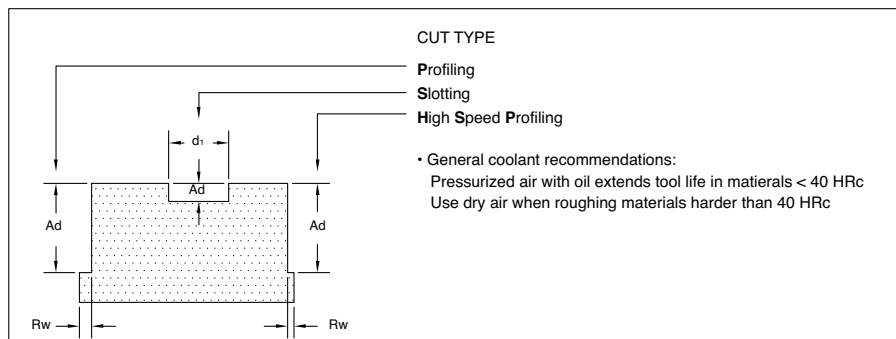
RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

57M 6-flute	Hardness Bhn	Cut Type	Rw	Ad	Speed (m/min)	Feed (mm/flute)				
						6	8	10	12	
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≥ 30-45	S	1D	≤ .3D	66	0.032	0.048	0.064	0.079	
		P	≤ .1D	≤ 1.5D	81	0.046	0.066	0.089	0.112	
		HSP	≤ .04	≤ 1.5D	171	0.056	0.084	0.112	0.140	
	> 45-55	S	1D	≤ .2D	≤ 1.5D	37	0.025	0.038	0.051	0.064
		P	≤ .05D	≤ 1.5D	46	0.036	0.053	0.071	0.089	
		HSP	≤ .04	≤ 1.5D	149	0.046	0.066	0.089	0.112	
	> 55-60	S	1D	≤ .1D	≤ 1.5D	20	0.020	0.028	0.038	0.048
		P	≤ .05D	≤ 1.5D	24	0.028	0.041	0.053	0.066	
		HSP	≤ .01	≤ 1.5D	76	0.033	0.048	0.064	0.079	
	> 60-65	S	1D	≤ .1D	≤ 1.5D	20	0.020	0.028	0.038	0.048
		P	≤ .05D	≤ 1.5D	24	0.028	0.041	0.053	0.066	
		HSP	≤ .01	≤ 1.5D	76	0.033	0.048	0.064	0.079	

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

mm/minute = (mm/flute) x number of flutes x RPM



Speed and Feed Recommendations for Slotting High Performance Aluminum, Non-Ferrous & Non-Metallic Materials: Ski-Carb and S-Carb End Mills



(table is based on standard or stub tools - adjust longer tools accordingly)

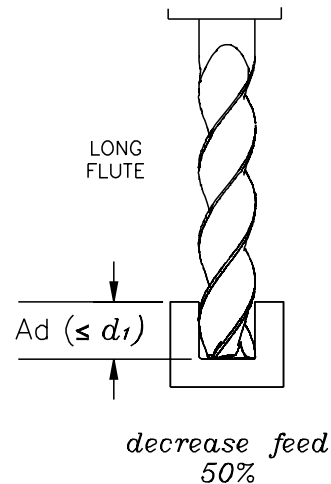
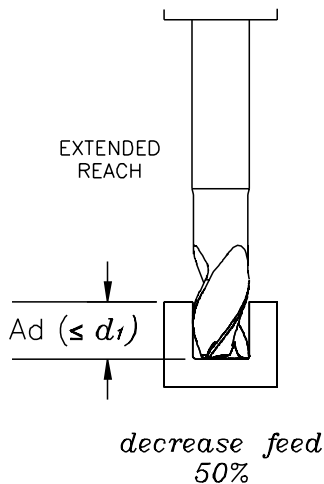
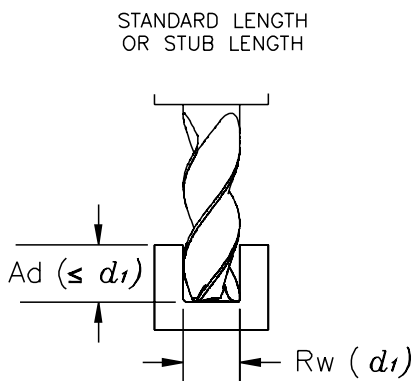


(gama basada en las herramientas estándar o herramientas stub tools - ajustar más las herramientas en consecuencia)



(tableau est basé sur le standard ou sur les outils stub - outils adaptés en longueur en fonction de l'usinage)

Diameter (d1)		Aluminum Alloys 1600-2000 sfm 490-610 m/min		Plastics 1200-1600 sfm 365-490 m/min		Copper Alloys 800-1200 sfm 245-365 m/min		Brass / Bronze 800-1500 sfm 245-455 m/min	
in	mm	in	mm	in	mm	in	mm	in	mm
1/8	3	0.0015	0,04	0.0030	0,08	0.0015	0,04	0.0015	0,04
-	4	-	0,05	-	0,10	-	0,05	-	0,05
3/16	5	0.0025	0,06	0.0050	0,12	0.0025	0,06	0.0025	0,06
1/4	6	0.0030	0,07	0.0060	0,14	0.0030	0,07	0.0030	0,07
5/16	8	0.0040	0,10	0.0080	0,20	0.0040	0,10	0.0040	0,10
3/8	10	0.0050	0,12	0.0010	0,24	0.0050	0,12	0.0050	0,12
1/2	12	0.0060	0,15	0.0120	0,30	0.0060	0,15	0.0060	0,15
-	14	-	0,17	-	0,34	-	0,17	-	0,17
5/8	16	0.0070	0,18	0.0140	0,36	0.0070	0,18	0.0070	0,18
3/4	20	0.0080	0,22	0.0160	0,44	0.0080	0,22	0.0080	0,22
1	25	0.0100	0,25	0.0180	0,46	0.0100	0,25	0.0100	0,25



Speed and Feed Recommendations for Profiling High Performance Aluminum, Non-Ferrous & Non-Metallic Materials: Ski-Carb and S-Carb End Mills

Formulas and Conversions

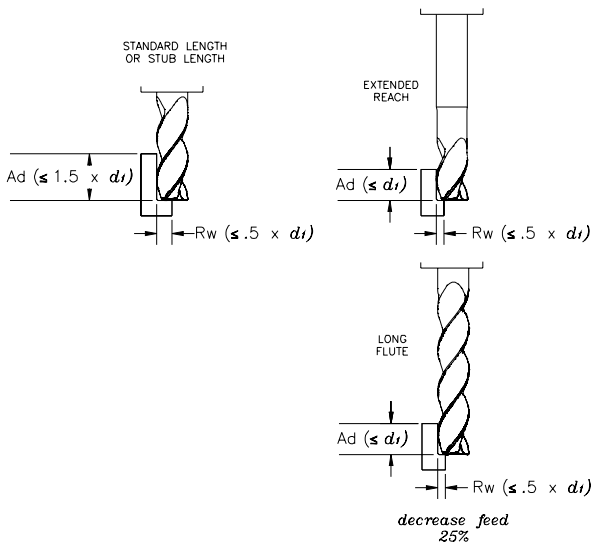


(table is based on standard or stub tools - adjust longer tools accordingly)

(gama basada en las herramientas estándar o herramientas stub tools - ajustar más las herramientas en consecuencia)

(tableau est basé sur le standard ou sur les outils stub - outils adaptés en longueur en fonction de l'usinage)

Diameter (d1)		Aluminum Alloys 1600-2000 sfm 490-610 m/min		Plastics 1200-1600 sfm 365-490 m/min		Copper Alloys 800-1200 sfm 245-365 m/min		Brass / Bronze 800-1500 sfm 245-455 m/min	
		Feed Rate per Tooth							
in	mm	in	mm	in	mm	in	mm	in	mm
1/8	3	0.002	0,05	0.004	0,10	0.002	0,05	0.002	0,05
-	4	-	0,07	-	0,13	-	0,07	-	0,07
3/16	5	0.003	0,08	0.007	0,16	0.003	0,08	0.003	0,08
1/4	6	0.004	0,09	0.008	0,18	0.004	0,09	0.004	0,09
5/16	8	0.005	0,15	0.010	0,26	0.005	0,15	0.005	0,15
3/8	10	0.007	0,16	0.015	0,31	0.007	0,16	0.007	0,16
1/2	12	0.008	0,20	0.016	0,39	0.008	0,20	0.008	0,20
-	14	-	0,22	-	0,44	-	0,22	-	0,22
5/8	16	0.009	0,23	0.018	0,47	0.009	0,23	0.009	0,23
3/4	20	0.010	0,28	0.020	0,57	0.010	0,28	0.010	0,28
1	25	0.013	0,33	0.023	0,60	0.013	0,33	0.013	0,33



Extra Long Flute
(adjust feed based on slotting and profiling tables above)

Recommendations
Additional adjustments to feed and/or cutting depths may be necessary for extra-long flute or reach tools

Extra Largas Flauta
(ajuste de la alimentación sobre la base de las tablas de asignación de fechas y elaboración de perfiles)

Recomendaciones
El ajuste de las condiciones de corte, de las profundidades de mecanización pueden ser necesarias con la utilización de la herramientas extra long

Extra Long Flute
(outil adaptable en fonction de l'opération de rainurage ou de contourage)

Recommandations
Des ajustements supplémentaires avances / profondeurs de passe peuvent être nécessaires lors d'outils extra-longue flûte

EXTRA LONG FLUTE

decrease profiling feed 50%

decrease slotting feed 50%



Recommendations:

- For optimum performance at high RPM, balance the holder / tool assembly
- Lower feed to improve surface finish
- Plunging feed should be decreased to 25% of set feed
- Use sufficient coolant – available with SGS patented Jet Stream technology



Recomendaciones:

- Para un óptimo rendimiento a altas revoluciones, el equilibrio del porta-herramienta / herramienta es necesario.
- Bajas avances son necesarias para mejorar el acabado superficial
- Sumergirse alimentación debe reducirse a 25% de los piensos establecido
- Utiliza suficiente líquido refrigerante – están disponibles con la tecnología Jet Stream registrada por SGS



Recommandations:

- Pour des performances optimales à grande vitesse de rotation, l'ensemble outil/porte outil doit être équilibré.
- Les faibles avances par dent améliorent l'état de surface
- Pour les prises de passe en plongée, l'avance doit être réduite de 25%.
- Utilisez suffisamment de lubrifiant – sont disponibles avec la technologie brevetée « Jet Stream » par SGS

AD, Dia-Carb Fractional	Cut Type		Rw	Ad	Speed (sfm)	Feed (inch/flute)				
						1/8	1/4	5/16	3/8	1/2
NON-FERROUS MATERIALS	Roughing	S	1D	≤ .25D	1300	0.0006	0.0013	0.0020	0.0027	0.0041
		P	≤ .1D	≤ .65D	2000	0.0008	0.0016	0.0025	0.0034	0.0046
		C	≤ .1D	≤ .25D	2000	0.0009	0.0017	0.0027	0.0037	0.0050
	Finishing	S	1D	≤ .03D	3300	0.0006	0.0013	0.0020	0.0027	0.0041
		P	≤ .06D	≤ .45D	5900	0.0008	0.0016	0.0025	0.0034	0.0046
		C	≤ .02D	≤ .03D	5900	0.0009	0.0017	0.0027	0.0037	0.0050

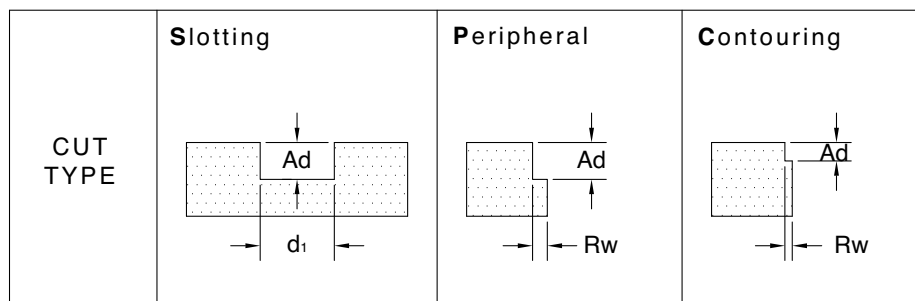
RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

AD, Dia-Carb Metric	Cut Type		Rw	Ad	Speed (m/min)	Feed (mm/flute)				
						3	6	8	10	12
NON-FERROUS MATERIALS	Roughing	S	1D	≤ .25D	396	0.015	0.033	0.051	0.069	0.104
		P	≤ .1D	≤ .65D	610	0.020	0.041	0.064	0.086	0.117
		C	≤ .1D	≤ .25D	610	0.023	0.043	0.069	0.094	0.127
	Finishing	S	1D	≤ .03D	1006	0.015	0.033	0.051	0.069	0.104
		P	≤ .06D	≤ .45D	1798	0.020	0.041	0.064	0.086	0.117
		C	≤ .02D	≤ .03D	1798	0.023	0.043	0.069	0.094	0.127

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

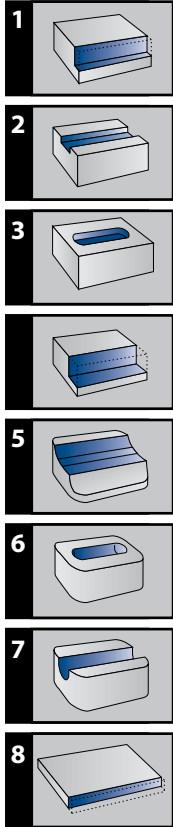
mm/minute = (mm/flute) x number of flutes x RPM



The Machining Applications – Carbide End Mill Selection Guide – Fractional

Aplicaciones mecanizadas Applications d'usinage

Guía de Selección Para Fresas de Carburo Guide de sélection des fraises en carbure



Note: All recommendations should be considered only as a starting point, with possible variations to achieve optimum results.

- 1) Profiling/Finishing Cut: Use 4 Flutes.
- 2) Slotting: Use 3-Flute to resist chatter. Use 2-Flute or Roughing Mill for maximum chip removal.
- 3) Plunge/Slot: Use 2-Flute for maximum chip removal. Use 3-Flute to resist chatter.
- 4) Profiling/Roughing Cut: Use Roughing Mill for rapid material removal.
- 5) Contour Finishing: Use 3-or 4-Flute, Ball End.
- 6) Plunge/Slot Contouring: Use 2-Flute, Ball End for maximum chip removal. Use 3-Flute, Ball End for improved surface finish.
- 7) Contour Slotting: Use 3-Flute, Ball End to resist chatter. Use 2-Flute, Ball End for maximum chip removal.
- 8) Profiling/Thin Material: Use 2 or 4 Straight Flutes.



Se deben considerar las recomendaciones como puntos de partida únicamente, con posibles variaciones, para obtener resultados óptimos.

- 1) Perfilado/cortes para acabado: use de 4 filos.
- 2) Ranurado: use de 3 filos para evitar vibración. use de 2 filos o fresas de desbaste para obtener un máximo desalajamiento de viruta.
- 3) Cajas/Ranurado: use de 2 filos para obtener un máximo desalajamiento de viruta. Use de 3 filos para evitar vibración.
- 4) Perfilado/cortes de acabado: use fresas de desbaste para obtener un desalajamiento rápido del material.
- 5) Acabado de contornos: use de 3 ó 4 filos punta radial.
- 6) Contorneo para hundimiento y ranurado: use de 2 filos punta esférica para obtener un máximo desalajamiento de viruta. Use de 3 filos punta esférica para un mejor acabado de la superficie.
- 7) Ranurado en contorno: use de 3 filos punta esférica para evitar vibracion. Use de 2 filos punta esférica para obtener un máximo desalajo de viruta.
- 8) Perfilado/materiales delgados: use de 2 ó 4 filos rectos.



Les valeurs ci-dessus ne sont données qu'à titre indicatif. Déterminez vous-même la valeur optimale.

- 1) Coupe profilée/ finition: utilisez une fraise à 4 dents.
- 2) Mortaisage: utilisez une fraise à 3 dents pour résister aux vibrations. Pour un enlèvement maximal des copeaux, utilisez une fraise à 2 dents ou une fraise d'ébauche.
- 3) Plongée/ rainure: pour un enlèvement maximal des copeaux, utilisez une fraise à 2 dents. Utilisez une fraise à 3 dents pour résister aux vibrations.
- 4) Coupe profilée/dégrossissage: utilisez une fraise d'ébauche pour enlever la matière rapidement.
- 5) Finition des contours: utilisez une fraise à 3 ou 4 dents, à bout plat.
- 6) Contour en plongée/ rainure: pour un enlèvement maximal des copeaux, utilisez une fraise à 2 dents, à bout hémisphérique. Pour améliorer la finition de surface, utilisez une fraise à 3 dents, à bout hémisphérique.
- 7) Mortaisage des contours: utilisez une fraise à 3 dents, à bout hémisphérique pour résister aux vibrations. Pour un enlèvement maximal des copeaux, utilisez une fraise à 2 dents, à bout hémisphérique.
- 8) Profilage/matière mince: utilisez des fraises à 2 ou 4 dents droites.

End Mill Fresas Fraise	Machining Apps. Aplicac. Mecan. Appl. Usinage	Titanium Inconel	Titanio Inconel	Titan Inconel	Stainless Steel Acero inoxidable Acier inoxydable	Steel Hard-Soft Acero Duro-Suave Acier	Castings Hard-Soft Fundiciones Duro-Suave Fonte	Graphite Grafito Graphite	Brass Latón Laiton	Aluminum Aluminio Aluminium	Plastic Plástico Matière synthétique	Fiberglass Fibra de Vidrio Fibre de verre	Wood Madera Bois
Series 1, 10, 14, 16													
Series 3, 11, 15, 17													
Series 5													
Series 18, 10B, 14B													
Series 3B, 11B, 15B													
Series 5B													
Series 21, 22													
Series 60 60° Helix													
Series 61 Roughing Mills													
Series 62 Roughing Mills													
Series 63 Roughing Mills													

General Purpose End Mills
Speed and Feed Recommendations –
Fractional

General Purpose End Mills Fractional	Hardness Bhn	Cut Type	AlTiN	Speed (sfm)			Feed (inch/flute)								
				TiCN	TiN	NON	1/64	1/32	1/16	1/8	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	S	310	300	290	240	0.0006	0.0012	0.0025	0.005	0.010	0.015	0.020	0.030	0.040
		P	430	415	395	330	0.0007	0.0014	0.0029	0.006	0.012	0.017	0.025	0.035	0.045
		F	645	620	595	495	0.0022	0.0044	0.0089	0.018	0.035	0.055	0.070	0.100	0.140
	> 200 ≤ 300	S	230	220	210	175	0.0004	0.0009	0.0019	0.003	0.008	0.011	0.015	0.023	0.030
		P	315	300	290	240	0.0005	0.0011	0.0021	0.004	0.009	0.013	0.017	0.026	0.034
		F	470	455	435	365	0.0017	0.0034	0.0068	0.014	0.027	0.041	0.054	0.081	0.108
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	S	245	235	225	190	0.0004	0.0009	0.0019	0.003	0.008	0.011	0.015	0.023	0.030
		P	335	325	310	260	0.0005	0.0011	0.0021	0.004	0.009	0.013	0.017	0.026	0.034
		F	500	485	465	390	0.0017	0.0034	0.0068	0.014	0.027	0.041	0.054	0.081	0.108
	> 270 ≤ 370	S	165	160	155	125	0.0003	0.0007	0.0015	0.003	0.006	0.009	0.012	0.018	0.024
		P	230	220	210	175	0.0004	0.0009	0.0018	0.004	0.007	0.011	0.014	0.021	0.028
		F	345	330	315	265	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
> 370 ≤ 450	S	95	90	85	70	0.0003	0.0006	0.0013	0.003	0.005	0.008	0.010	0.015	0.020	
	P	130	125	120	100	0.0004	0.0007	0.0015	0.003	0.006	0.009	0.012	0.018	0.024	
	F	195	185	180	150	0.0011	0.0022	0.0045	0.009	0.018	0.027	0.036	0.054	0.072	
STAINLESS STEEL Free Machining 303, 416, 420F, 430F, 440F	≤ 250	S	285	275	265	220	0.0004	0.0009	0.0019	0.003	0.008	0.011	0.015	0.023	0.030
		P	390	380	360	300	0.0005	0.0011	0.0021	0.004	0.009	0.013	0.017	0.026	0.034
		F	590	565	545	455	0.0017	0.0034	0.0068	0.014	0.027	0.041	0.054	0.081	0.108
	> 250 ≤ 330	S	230	220	210	175	0.0003	0.0007	0.0015	0.003	0.006	0.009	0.012	0.018	0.024
		P	315	300	290	240	0.0004	0.0009	0.0018	0.004	0.007	0.011	0.014	0.021	0.028
		F	470	455	435	360	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
STAINLESS STEEL Difficult 304, 316, 15-5PH, 17,4PH	≤ 200	S	230	220	210	175	0.0004	0.0009	0.0019	0.003	0.008	0.011	0.015	0.023	0.030
		P	315	300	290	240	0.0005	0.0011	0.0021	0.004	0.009	0.013	0.017	0.026	0.034
		F	470	455	435	360	0.0017	0.0034	0.0068	0.014	0.027	0.041	0.054	0.081	0.108
	> 200 ≤ 370	S	170	165	160	130	0.0003	0.0007	0.0015	0.003	0.006	0.009	0.012	0.018	0.024
		P	235	225	220	180	0.0004	0.0009	0.0018	0.004	0.007	0.011	0.014	0.021	0.028
		F	355	340	325	270	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	S	230	220	210	175	0.0004	0.0009	0.0019	0.003	0.008	0.011	0.015	0.023	0.030
		P	315	300	290	240	0.0005	0.0011	0.0021	0.004	0.009	0.013	0.017	0.026	0.034
		F	470	455	435	360	0.0017	0.0034	0.0068	0.014	0.027	0.041	0.054	0.081	0.108
	> 250 ≤ 375	S	140	135	130	110	0.0003	0.0007	0.0015	0.003	0.006	0.009	0.012	0.018	0.024
		P	190	185	180	150	0.0004	0.0009	0.0018	0.004	0.007	0.011	0.014	0.021	0.028
		F	290	280	265	225	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
> 375 ≤ 450	S	75	70	65	55	0.0003	0.0006	0.0013	0.003	0.005	0.008	0.010	0.015	0.020	
	P	100	95	90	75	0.0004	0.0007	0.0015	0.003	0.006	0.009	0.012	0.018	0.024	
	F	150	145	140	115	0.0011	0.0022	0.0045	0.009	0.018	0.027	0.036	0.054	0.072	
HIGH TEMP ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Udimet, Waspalloy	> 220 ≤ 330	S	47	45	43	36	0.0004	0.0009	0.0019	0.003	0.008	0.011	0.015	0.023	0.030
		P	64	62	59	50	0.0005	0.0011	0.0021	0.004	0.009	0.013	0.017	0.026	0.034
		F	97	93	89	74	0.0017	0.0034	0.0068	0.014	0.027	0.041	0.054	0.081	0.108
	> 330 ≤ 420	S	36	35	34	28	0.0004	0.0009	0.0019	0.003	0.008	0.011	0.015	0.023	0.030
		P	50	48	46	39	0.0005	0.0011	0.0021	0.004	0.009	0.013	0.017	0.026	0.034
		F	75	72	69	58	0.0017	0.0034	0.0068	0.014	0.027	0.041	0.054	0.081	0.108
TITANIUM TiCODE, Ti5Al-5V-5Mo-3Cr, Ti6Al4V, Ti-7Al4Mo, Ti8Al1Mo1V	> 280 ≤ 350	S	130	125	120	100	0.0004	0.0009	0.0019	0.003	0.008	0.011	0.015	0.023	0.030
		P	180	170	165	140	0.0005	0.0011	0.0021	0.004	0.009	0.013	0.017	0.026	0.034
		F	180	170	165	140	0.0017	0.0034	0.0068	0.014	0.027	0.041	0.054	0.081	0.108
	≤ 380	S	105	100	95	80	0.0003	0.0007	0.0015	0.003	0.006	0.009	0.012	0.018	0.024
		P	140	135	130	110	0.0004	0.0009	0.0018	0.004	0.007	0.011	0.014	0.021	0.028
		F	215	205	200	165	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
CAST IRON Ductile, Gray, Malleable	≤ 200	S	270	260	250	210	0.0008	0.0016	0.0031	0.006	0.013	0.019	0.025	0.038	0.050
		P	370	360	340	285	0.0009	0.0018	0.0036	0.007	0.015	0.022	0.029	0.044	0.058
		F	555	535	515	430	0.0028	0.0056	0.0111	0.022	0.045	0.067	0.089	0.134	0.178
	> 200 ≤ 330	S	105	100	95	80	0.0004	0.0009	0.0019	0.003	0.008	0.011	0.015	0.023	0.030
		P	145	140	130	110	0.0005	0.0011	0.0021	0.004	0.009	0.013	0.017	0.026	0.034
		F	215	205	200	165	0.0017	0.0034	0.0068	0.014	0.027	0.041	0.054	0.081	0.108
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 150	S	–	–	–	640	0.0012	0.0025	0.0050	0.010	0.020	0.030	0.040	0.060	0.080
		P	–	–	–	880	0.0014	0.0028	0.0056	0.011	0.023	0.034	0.045	0.068	0.090
		F	–	–	–	1320	0.0044	0.0087	0.0175	0.035	0.070	0.105	0.140	0.210	0.280
	≤ 140	S	–	–	–	335	0.0006	0.0012	0.0025	0.005	0.010	0.015	0.020	0.030	0.040
		P	–	–	–	460	0.0007	0.0014	0.0029	0.006	0.012	0.017	0.025	0.035	0.045
		F	–	–	–	700	0.0022	0.0044	0.0089	0.018	0.035	0.055	0.070	0.100	0.140
> 140	S	–	–	–	350	0.0006	0.0012	0.0025	0.005	0.010	0.015	0.020	0.030	0.040	
	P	–	–	–	485	0.0007	0.0014	0.0029	0.006	0.012	0.017	0.025	0.035	0.045	
	F	–	–	–	725	0.0022	0.0044	0.0089	0.018	0.035	0.055	0.070	0.100	0.140	
PLASTIC	S	–	–	–	640	0.0012	0.0025	0.0050	0.010	0.020	0.030	0.040	0.060	0.080	
		P	–	–	–	880	0.0014	0.0028	0.0056	0.011	0.023	0.034	0.045	0.068	0.090
		F	–	–	–	1320	0.0044	0.0087	0.0175	0.035	0.070	0.105	0.140	0.210	0.280
	P	–	–	–	480	0.0011	0.0022	0.0044	0.009	0.018	0.026	0.035	0.053	0.070	
		–	–	–	660	0.0012	0.0025	0.0050	0.010	0.020	0.030	0.040	0.060	0.080	
		–	–	–	990	0.0037	0.0075	0.0150	0.030	0.060	0.090	0.120	0.180	0.240	

RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

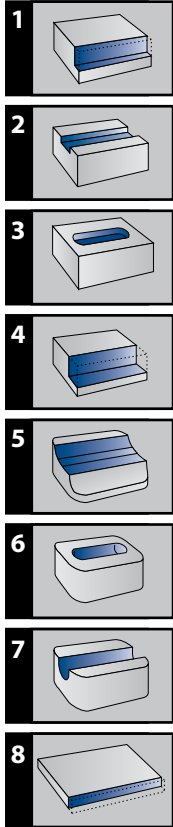
See pages 234–239 for General Milling Guidelines and Application Tips

The Machining Applications – Carbide End Mill Selection Guide – Metric

Formulas
and
Conversions

Aplicaciones mecanizadas Applications d'usage

Guía de Selección Para Fresas de Carburo Guide de sélection des fraises en carbure



Note: All recommendations should be considered only as a starting point, with possible variations to achieve optimum results.

- 1) Profiling/Finishing Cut: Use 4 Flutes.
- 2) Slotting: Use 3-Flute to resist chatter. Use 2-Flute or Roughing Mill for maximum chip removal.
- 3) Plunge/Slot: Use 2-Flute for maximum chip removal. Use 3-Flute to resist chatter.
- 4) Profiling/Roughing Cut: Use Roughing Mill for rapid material removal.
- 5) Contour Finishing: Use 3-or 4-Flute, Ball End.
- 6) Plunge/Slot Contouring: Use 2-Flute, Ball End for maximum chip removal. Use 3-Flute, Ball End for improved surface finish.
- 7) Contour Slotting: Use 3-Flute, Ball End to resist chatter. Use 2-Flute, Ball End for maximum chip removal.
- 8) Profiling/Thin Material: Use 2 or 4 Straight Flutes.



Se deben considerar las recomendaciones como puntos de partida únicamente, con posibles variaciones, para obtener resultados óptimos.

- 1) Perfilado/cortes para acabado: use de 4 filos.
- 2) Ranurado: use de 3 filos para evitar vibración. use de 2 filos o fresas de desbaste para obtener un máximo desalojamiento de viruta.
- 3) Cajas/Ranurado: use de 2 filos para obtener un máximo desalojamiento de viruta. Use de 3 filos para evitar vibración.
- 4) Perfilado/cortes de acabado: use fresas de desbaste para obtener un desalojamiento rápido del material.
- 5) Acabado de contornos: use de 3 ó 4 filos punta radial.
- 6) Contorneo para hundimiento y ranurado: use de 2 filos punta esférica para obtener un máximo desalojamiento de viruta. Use de 3 filos punta esférica para un mejor acabado de la superficie.
- 7) Ranurado en contorno: use de 3 filos punta esférica para evitar vibracion. Use de 2 filos punta esférica para obtener un máximo desalojo de viruta.
- 8) Perfilado/materiales delgados: use de 2 ó 4 filos rectos.



Les valeurs ci-dessus ne sont données qu'à titre indicatif. Déterminez vous-même la valeur optimale.

- 1) Coupe profilée/ finition: utilisez une fraise à 4 dents.
- 2) Mortaisage: utilisez une fraise à 3 dents pour résister aux vibrations. Pour un enlèvement maximal des copeaux, utilisez une fraise à 2 dents ou une fraise d'ébauche.
- 3) Plongée/ rainure: pour un enlèvement maximal des copeaux, utilisez une fraise à 2 dents. Utilisez une fraise à 3 dents pour résister aux vibrations.
- 4) Coupe profilée/dégrossissage: utilisez une fraise d'ébauche pour enlever la matière rapidement.
- 5) Finition des contours: utilisez une fraise à 3 ou 4 dents, à bout plat.
- 6) Contour en plongée/ rainure: pour un enlèvement maximal des copeaux, utilisez une fraise à 2 dents, à bout hémisphérique. Pour améliorer la finition de surface, utilisez une fraise à 3 dents, à bout hémisphérique.
- 7) Mortaisage des contours: utilisez une fraise à 3 dents, à bout hémisphérique pour résister aux vibrations. Pour un enlèvement maximal des copeaux, utilisez une fraise à 2 dents, à bout hémisphérique.
- 8) Profilage/matière mince: utilisez des fraises à 2 ou 4 dents droites.

End Mill Fresas Fraise		Machining Apps. Aplicac. Mecan. Appl. Usinage		Titanium Inconel	Titanio Inconel	Titanium Inconel	Stainless Steel Acero inoxidable Acier inoxydable	Steel Hard-Soft Acero Duro-Suave Acier	Castings Hard-Soft Fundiciones Duro-Suave Fonte	Graphite Grafito Graphite	Brass Latón Laiton	Aluminum Aluminio Aluminium	Plastic Plástico Matière synthétique	Fiberglass Fibra de Vidrio Fibre de verre	Wood Madera Bois
		1	2												
	1M														
	3M														
	5M														
	1MB														
	3MB														
	5MB														
	21M, 22M														
	60M 60° Helix														
	61M														
	62M														
	63M														

General Purpose End Mills

Speed and Feed Recommendations – Metric

General Purpose End Mills Metric	Hardness Bhn	Cut Type	Speed (m/min)				Feed (mm/flute)								
			AlTiN	TiCN	TiN	NON	0.40	0.75	1.5	3	6	10	12	20	25
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 200	S	94	91	88	73	0.0016	0.0032	0.0064	0.013	0.025	0.038	0.051	0.076	0.102
		P	131	126	120	101	0.0018	0.0036	0.0073	0.015	0.029	0.044	0.064	0.088	0.114
		F	197	189	181	151	0.0056	0.0113	0.0225	0.045	0.089	0.140	0.178	0.254	0.356
	> 200 ≤ 300	S	70	67	64	53	0.0010	0.0024	0.0048	0.008	0.019	0.029	0.038	0.057	0.076
		P	96	91	88	73	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
		F	143	139	133	111	0.0043	0.0086	0.0171	0.034	0.069	0.103	0.137	0.206	0.274
> 300 ≤ 420	S	41	40	38	30	0.0008	0.0019	0.0038	0.008	0.015	0.023	0.030	0.046	0.061	
	P	56	55	52	44	0.0011	0.0022	0.0044	0.009	0.018	0.027	0.036	0.053	0.071	
	F	85	82	78	66	0.0034	0.0068	0.0137	0.027	0.055	0.082	0.109	0.164	0.218	
ALLOY STEEL 4140, 4150, 4320, 4340, 5120, 5150, 8630, 86L20, 50100, 52100	≤ 270	S	75	72	69	58	0.0010	0.0024	0.0048	0.008	0.019	0.029	0.038	0.057	0.076
		P	102	99	94	79	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
		F	152	148	142	119	0.0043	0.0086	0.0171	0.034	0.069	0.103	0.137	0.206	0.274
	> 270 ≤ 370	S	50	49	47	38	0.0008	0.0019	0.0038	0.008	0.015	0.023	0.030	0.046	0.061
		P	70	67	64	53	0.0011	0.0022	0.0044	0.009	0.018	0.027	0.036	0.053	0.071
		F	105	101	96	81	0.0034	0.0068	0.0137	0.027	0.055	0.082	0.109	0.164	0.218
> 370 ≤ 450	S	29	27	26	21	0.0008	0.0016	0.0032	0.006	0.013	0.019	0.025	0.038	0.051	
	P	40	38	37	30	0.0010	0.0019	0.0038	0.008	0.015	0.023	0.030	0.046	0.061	
	F	59	56	55	46	0.0029	0.0057	0.0114	0.023	0.046	0.069	0.091	0.137	0.183	
STAINLESS STEEL Free Machining 303, 416, 420F, 430F, 440F	≤ 250	S	87	84	81	67	0.0010	0.0024	0.0048	0.008	0.019	0.029	0.038	0.057	0.076
		P	119	116	110	91	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
		F	180	172	166	139	0.0043	0.0086	0.0171	0.034	0.069	0.103	0.137	0.206	0.274
	> 250 ≤ 330	S	70	67	64	53	0.0008	0.0019	0.0038	0.008	0.015	0.023	0.030	0.046	0.061
		P	96	91	88	73	0.0011	0.0022	0.0044	0.009	0.018	0.027	0.036	0.053	0.071
		F	143	139	133	110	0.0034	0.0068	0.0137	0.027	0.055	0.082	0.109	0.164	0.218
STAINLESS STEEL Difficult 304, 316, 15-5PH, 17,4PH	≤ 200	S	70	67	64	53	0.0010	0.0024	0.0048	0.008	0.019	0.029	0.038	0.057	0.076
		P	96	91	88	73	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
		F	143	139	133	110	0.0043	0.0086	0.0171	0.034	0.069	0.103	0.137	0.206	0.274
	> 200 ≤ 370	S	52	50	49	40	0.0008	0.0019	0.0038	0.008	0.015	0.023	0.030	0.046	0.061
		P	72	69	67	55	0.0011	0.0022	0.0044	0.009	0.018	0.027	0.036	0.053	0.071
		F	108	104	99	82	0.0034	0.0068	0.0137	0.027	0.055	0.082	0.109	0.164	0.218
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 250	S	70	67	64	53	0.0010	0.0024	0.0048	0.008	0.019	0.029	0.038	0.057	0.076
		P	96	91	88	73	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
		F	143	139	133	110	0.0043	0.0086	0.0171	0.034	0.069	0.103	0.137	0.206	0.274
	> 250 ≤ 375	S	43	41	40	34	0.0008	0.0019	0.0038	0.008	0.015	0.023	0.030	0.046	0.061
		P	58	56	55	46	0.0011	0.0022	0.0044	0.009	0.018	0.027	0.036	0.053	0.071
		F	88	85	81	69	0.0034	0.0068	0.0137	0.027	0.055	0.082	0.109	0.164	0.218
> 375 ≤ 450	S	23	21	20	17	0.0008	0.0016	0.0032	0.006	0.013	0.019	0.025	0.038	0.051	
	P	30	29	27	23	0.0010	0.0019	0.0038	0.008	0.015	0.023	0.030	0.046	0.061	
	F	46	44	43	35	0.0029	0.0057	0.0114	0.023	0.046	0.069	0.091	0.137	0.183	
HIGH TEMP ALLOY A-286, Hastelloy, Haynes, Incoloy, Inconel, Rene, Udimet, Waspalloy	> 220 ≤ 330	S	14	14	13	11	0.0010	0.0024	0.0048	0.008	0.019	0.029	0.038	0.057	0.076
		P	20	19	18	15	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
		F	30	28	27	23	0.0043	0.0086	0.0171	0.034	0.069	0.103	0.137	0.206	0.274
	> 330 ≤ 420	S	11	11	10	9	0.0010	0.0024	0.0048	0.008	0.019	0.029	0.038	0.057	0.076
		P	15	15	14	12	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
		F	23	22	21	18	0.0043	0.0086	0.0171	0.034	0.069	0.103	0.137	0.206	0.274
TITANIUM TiCODE, Ti5Al-5V-5Mo-3Cr, Ti6Al4V, Ti-7Al4Mo, Ti8Al1Mo1V	> 280 ≤ 350	S	40	38	37	30	0.0010	0.0024	0.0048	0.008	0.019	0.029	0.038	0.057	0.076
		P	55	52	50	43	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
		F	55	52	50	43	0.0043	0.0086	0.0171	0.034	0.069	0.103	0.137	0.206	0.274
	≤ 380	S	32	30	29	24	0.0008	0.0019	0.0038	0.008	0.015	0.023	0.030	0.046	0.061
		P	43	41	40	34	0.0011	0.0022	0.0044	0.009	0.018	0.027	0.036	0.053	0.071
		F	66	62	61	50	0.0034	0.0068	0.0137	0.027	0.055	0.082	0.109	0.164	0.218
CAST IRON Ductile, Gray, Malleable	≤ 200	S	82	79	76	64	0.0020	0.0040	0.0079	0.016	0.032	0.048	0.064	0.095	0.127
		P	113	110	104	87	0.0023	0.0046	0.0092	0.018	0.037	0.055	0.074	0.110	0.147
		F	169	163	157	131	0.0071	0.0141	0.0283	0.057	0.113	0.170	0.226	0.339	0.452
	> 200 ≤ 330	S	32	30	29	24	0.0010	0.0024	0.0048	0.008	0.019	0.029	0.038	0.057	0.076
		P	44	43	40	34	0.0013	0.0027	0.0054	0.011	0.022	0.032	0.043	0.065	0.086
		F	66	62	61	50	0.0043	0.0086	0.0171	0.034	0.069	0.103	0.137	0.206	0.274
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 150	S	–	–	–	195	0.0032	0.0063	0.0127	0.025	0.051	0.076	0.102	0.152	0.203
		P	–	–	–	268	0.0036	0.0071	0.0143	0.029	0.057	0.086	0.114	0.171	0.229
		F	–	–	–	402	0.0111	0.0222	0.0445	0.089	0.178	0.267	0.356	0.533	0.711
	≤ 140	S	–	–	–	102	0.0016	0.0032	0.0064	0.013	0.025	0.038	0.051	0.076	0.102
		P	–	–	–	140	0.0018	0.0036	0.0073	0.015	0.029	0.044	0.064	0.088	0.114
		F	–	–	–	213	0.0056	0.0113	0.0225	0.045	0.089	0.140	0.178	0.254	0.356
> 140	S	–	–	–	107	0.0016	0.0032	0.0064	0.013	0.025	0.038	0.051	0.076	0.102	
	P	–	–	–	148	0.0018	0.0036	0.0073	0.015	0.029	0.044	0.064	0.088	0.114	
	F	–	–	–	221	0.0056	0.0113	0.0225	0.045	0.089	0.140	0.178	0.254	0.356	
PLASTIC	S	–	–	–	195	0.0032	0.0063	0.0127	0.025	0.051	0.076	0.102	0.152	0.203	
		–	–	–	268	0.0036	0.0071	0.0143	0.029	0.057	0.086	0.114	0.171	0.229	
		–	–	–	402	0.0111	0.0222	0.0445	0.089	0.178	0.267	0.356	0.533	0.711	
	P	–	–	–	146	0.0028	0.0055	0.0111	0.022	0.044	0.067	0.089	0.133	0.178	
		–	–	–	201	0.0032	0.0063	0.0127	0.025	0.051	0.076	0.102	0.152	0.203	
		–	–	–	302	0.0095	0.0190	0.0381	0.076	0.152	0.229	0.305	0.457	0.610	
GRAPHITE	S	–	–	–	195	0.0032	0.0063	0.0127	0.025	0.051	0.076	0.102	0.152	0.203	
		–	–	–	268	0.0036	0.0071	0.0143	0.029	0.057	0.086	0.114	0.171	0.229	
		–	–	–	402	0.0111	0.0222	0.0445	0.089	0.178	0.267	0.356	0.533	0.711	
	P	–													

Series 52/52M and 54/54M Speed and Feed Recommendations – Fractional and Metric

52, 54 2,4 flute	Cut Type	Speed (sfm)	Feed (inch/flute)					
			1/8	1/4	3/8	1/2	3/4	1
ALUMINUM ALLOY	S	1050	0.0008	0.0020	0.0030	0.0040	0.0055	0.0080
	P	1300	0.0010	0.0025	0.0035	0.0050	0.0070	0.0100
	F	2200	0.0015	0.0035	0.0050	0.0065	0.0090	0.0130
PLASTIC	S	800	0.0012	0.0025	0.0035	0.0050	0.0070	0.0100
	P	1000	0.0015	0.0030	0.0045	0.0060	0.0090	0.0120
	F	1700	0.0020	0.0040	0.0060	0.0080	0.0120	0.0160
PLASTIC - GLASS FILLED	S	400	0.0012	0.0025	0.0035	0.0050	0.0070	0.0100
	P	500	0.0015	0.0030	0.0045	0.0060	0.0090	0.0120
	F	850	0.0020	0.0040	0.0060	0.0080	0.0120	0.0160
COPPER ALLOY	S	385	0.0007	0.0012	0.0020	0.0025	0.0035	0.0050
	P	480	0.0008	0.0015	0.0025	0.0030	0.0045	0.0060
	F	800	0.0010	0.0020	0.0035	0.0040	0.0060	0.0080
COPPER NICKEL ALLOY	S	190	0.0007	0.0012	0.0020	0.0025	0.0035	0.0050
	P	240	0.0008	0.0015	0.0025	0.0030	0.0045	0.0060
	F	400	0.0010	0.0020	0.0035	0.0040	0.0060	0.0080

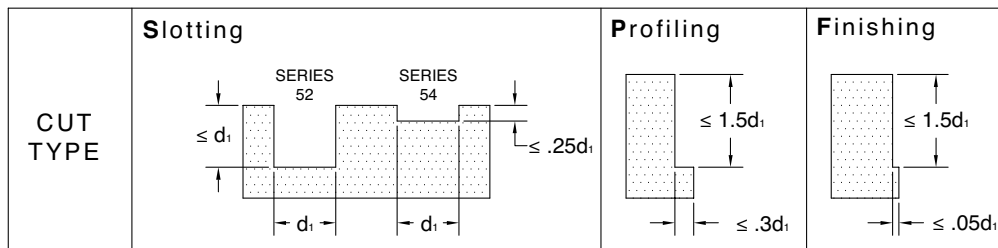
RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

52M, 54M 2,4 flute	Cut Type	Speed (m/min)	Feed (mm/flute)					
			3	6	10	12	20	25
ALUMINUM ALLOY	S	320	0.020	0.051	0.076	0.102	0.140	0.203
	P	396	0.025	0.064	0.089	0.127	0.178	0.254
	F	671	0.038	0.089	0.127	0.165	0.229	0.330
PLASTIC	S	244	0.030	0.064	0.089	0.127	0.178	0.254
	P	305	0.038	0.076	0.114	0.152	0.229	0.305
	F	518	0.051	0.102	0.152	0.203	0.305	0.406
PLASTIC - GLASS FILLED	S	122	0.030	0.064	0.089	0.127	0.178	0.254
	P	152	0.038	0.076	0.114	0.152	0.229	0.305
	F	259	0.051	0.102	0.152	0.203	0.305	0.406
COPPER ALLOY	S	117	0.018	0.030	0.051	0.064	0.089	0.127
	P	146	0.020	0.038	0.064	0.076	0.114	0.152
	F	244	0.025	0.051	0.089	0.102	0.152	0.203
COPPER NICKEL ALLOY	S	58	0.018	0.030	0.051	0.064	0.089	0.127
	P	73	0.020	0.038	0.064	0.076	0.114	0.152
	F	122	0.025	0.051	0.089	0.102	0.152	0.203

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

mm/minute = (mm/flute) x number of flutes x RPM



Series 60 High Spiral Speed and Feed Recommendations – Fractional and Metric

60 3, 4 flute	Hardness Bhn	Cut Type	Speed (sfm)				Feed (inch/flute)					
			AlTiN	TiCN	TiN	non	1/8	1/4	3/8	1/2	3/4	1
STAINLESS STEEL Free Machining 303, 416, 420F, 430F, 440F	≤ 250	P	395	380	365	300	0.0006	0.0013	0.0019	0.0025	0.0038	0.0050
		F	590	565	545	455	0.0014	0.0027	0.0041	0.0054	0.0081	0.0108
	> 250	P	370	360	345	285	0.0005	0.0010	0.0015	0.0020	0.0030	0.0040
		F	560	535	515	430	0.0011	0.0022	0.0032	0.0043	0.0065	0.0086
STAINLESS STEEL Difficult 304, 316, 15-5PH, 17,4PH	≤ 200	P	315	300	290	240	0.0006	0.0013	0.0019	0.0025	0.0038	0.0050
		F	470	455	435	365	0.0014	0.0027	0.0041	0.0054	0.0081	0.0108
	> 200	P	235	225	220	180	0.0005	0.0010	0.0015	0.0020	0.0030	0.0040
		F	355	340	325	270	0.0011	0.0022	0.0032	0.0043	0.0065	0.0086
TITANIUM Ti5Al-5V-5Mo-3Cr, Ti6Al4V, Ti8Al1Mo1V	> 280	P	180	170	165	140	0.0006	0.0013	0.0019	0.0025	0.0038	0.0050
	≤ 350	F	375	360	345	290	0.0014	0.0027	0.0041	0.0054	0.0081	0.0108
	> 350	P	145	140	130	110	0.0005	0.0010	0.0015	0.0020	0.0030	0.0040
	≤ 380	F	215	205	200	165	0.0011	0.0022	0.0032	0.0043	0.0065	0.0086
HIGH TEMP ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	> 200	P	64	62	60	50	0.0005	0.0010	0.0015	0.0020	0.0030	0.0040
	≤ 330	F	97	93	90	75	0.0011	0.0022	0.0032	0.0043	0.0065	0.0086
	> 330	P	50	48	46	39	0.0004	0.0009	0.0013	0.0017	0.0026	0.0034
	≤ 420	F	75	72	70	60	0.0009	0.0018	0.0026	0.0035	0.0053	0.0070

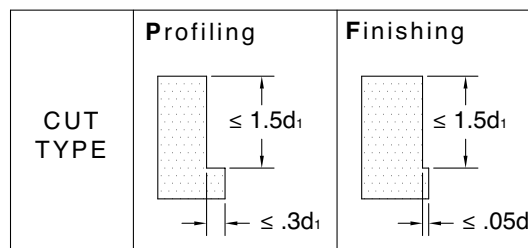
RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

60M 3, 4 flute	Hardness Bhn	Cut Type	Speed (m/min)				Feed (mm/flute)					
			AlTiN	TiCN	TiN	non	3	6	10	12	20	25
STAINLESS STEEL Free Machining 303, 416, 420F, 430F, 440F	≤ 250	P	120	116	111	91	0.016	0.032	0.048	0.064	0.095	0.127
		F	180	172	166	139	0.034	0.069	0.103	0.137	0.206	0.274
	> 250	P	113	110	105	87	0.013	0.025	0.038	0.051	0.076	0.102
		F	171	163	157	131	0.027	0.055	0.082	0.109	0.164	0.218
STAINLESS STEEL Difficult 304, 316, 15-5PH, 17,4PH	≤ 200	P	96	91	88	73	0.016	0.032	0.048	0.064	0.095	0.127
		F	143	139	133	111	0.034	0.069	0.103	0.137	0.206	0.274
	> 200	P	72	69	67	55	0.013	0.025	0.038	0.051	0.076	0.102
		F	108	104	99	82	0.027	0.055	0.082	0.109	0.164	0.218
TITANIUM Ti5Al-5V-5Mo-3Cr, Ti6Al4V, Ti8Al1Mo1V	> 280	P	55	52	50	43	0.016	0.032	0.048	0.064	0.095	0.127
	≤ 350	F	114	110	105	88	0.034	0.069	0.103	0.137	0.206	0.274
	> 350	P	44	43	40	34	0.013	0.025	0.038	0.051	0.076	0.102
	≤ 380	F	66	62	61	50	0.027	0.055	0.082	0.109	0.164	0.218
HIGH TEMP ALLOY A-286, Hastelloy, Incoloy, Inconel, Rene, Waspalloy	> 200	P	20	19	18	15	0.013	0.025	0.038	0.051	0.076	0.102
	≤ 330	F	30	28	27	23	0.027	0.055	0.082	0.109	0.164	0.218
	> 330	P	15	15	14	12	0.011	0.022	0.032	0.043	0.065	0.086
	≤ 420	F	23	22	21	18	0.022	0.044	0.067	0.089	0.133	0.178

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

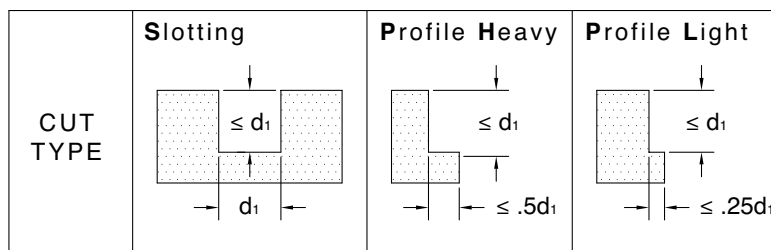
mm/minute = (mm/flute) x number of flutes x RPM



61/62/63 3, 4, 5, 6 flute	Hardness Bhn	Series	Cut Type	Speed (sfm)				Feed (inch/flute)				
				AlTiN	TiCN	TiN	non	1/4	3/8	1/2	3/4	1
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	61	S	400	385	370	–	0.0006	0.0009	0.0013	0.0019	0.0025
			PH	500	480	460	–	0.0009	0.0014	0.0019	0.0028	0.0038
			PL	550	530	500	–	0.0013	0.0019	0.0025	0.0038	0.0050
	> 175 ≤ 275	61	S	330	315	300	–	0.0005	0.0008	0.0010	0.0015	0.0020
			PH	415	400	380	–	0.0008	0.0011	0.0015	0.0023	0.0030
			PL	455	435	420	–	0.0010	0.0015	0.0020	0.0030	0.0040
ALLOY STEEL 4140, 4150, 4320, 5150, 8630, 86L20, 50100	≤ 275	61	S	295	280	270	–	0.0005	0.0008	0.0010	0.0015	0.0020
			PH	365	355	340	–	0.0008	0.0011	0.0015	0.0023	0.0030
			PL	400	390	370	–	0.0010	0.0015	0.0020	0.0030	0.0040
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 275	61	S	275	265	250	–	0.0005	0.0008	0.0010	0.0015	0.0020
			PH	345	330	315	–	0.0008	0.0011	0.0015	0.0023	0.0030
			PL	380	365	350	–	0.0010	0.0015	0.0020	0.0030	0.0040
CAST IRON - GRAY	≤ 200	61	S	395	380	360	–	0.0008	0.0011	0.0015	0.0023	0.0030
			PH	490	475	450	–	0.0011	0.0017	0.0023	0.0034	0.0045
			PL	540	520	500	–	0.0015	0.0023	0.0030	0.0045	0.0060
CAST IRON - DUCTILE	≤ 300	61	S	200	195	185	–	0.0005	0.0008	0.0010	0.0015	0.0020
			PH	110	105	100	–	0.0008	0.0011	0.0015	0.0023	0.0030
			PL	120	115	110	–	0.0010	0.0015	0.0020	0.0030	0.0040
CAST IRON - MALLEABLE	≤ 300	61	S	170	160	155	–	0.0005	0.0008	0.0010	0.0015	0.0020
			PH	210	205	195	–	0.0008	0.0011	0.0015	0.0023	0.0030
			PL	230	225	215	–	0.0010	0.0015	0.0020	0.0030	0.0040
STAINLESS - 300 SERIES 304, 316, 316L, 321, 201, 302, Nitronic 32	≤ 275	62	S	225	215	210	–	0.0005	0.0008	0.0010	0.0015	0.0020
			PH	280	270	260	–	0.0008	0.0011	0.0015	0.0023	0.0030
			PL	310	300	285	–	0.0010	0.0015	0.0020	0.0030	0.0040
STAINLESS - 400 SERIES 420, 422, 410, 403, 405, 409, 429, 430, 434	≤ 185	62	S	345	330	315	–	0.0005	0.0008	0.0010	0.0015	0.0020
			PH	430	415	400	–	0.0008	0.0011	0.0015	0.0023	0.0030
			PL	470	455	435	–	0.0010	0.0015	0.0020	0.0030	0.0040
STAINLESS - PH SERIES 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	62	S	205	200	190	–	0.0005	0.0008	0.0010	0.0015	0.0020
			PH	260	250	240	–	0.0008	0.0011	0.0015	0.0023	0.0030
			PL	280	270	260	–	0.0010	0.0015	0.0020	0.0030	0.0040
TITANIUM TiCode, Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 295	62	S	155	150	145	–	0.0006	0.0009	0.0013	0.0019	0.0025
			PH	195	185	180	–	0.0009	0.0014	0.0019	0.0028	0.0038
			PL	215	205	200	–	0.0013	0.0019	0.0025	0.0038	0.0050
HIGH TEMP ALLOY A-286, Haynes, Inconel, Waspalloy	≤ 300	62	S	56	54	52	–	0.0005	0.0008	0.0010	0.0015	0.0020
			PH	71	67	65	–	0.0008	0.0011	0.0015	0.0023	0.0030
			PL	77	74	71	–	0.0010	0.0015	0.0020	0.0030	0.0040
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 150	63	S	–	–	–	1100	0.0013	0.0019	0.0025	0.0038	0.0050
			PH	–	–	–	1350	0.0019	0.0028	0.0038	0.0056	0.0075
			PL	–	–	–	1500	0.0025	0.0038	0.0050	0.0075	0.0100

RPM = sfm x 3.82 / cutting diameter

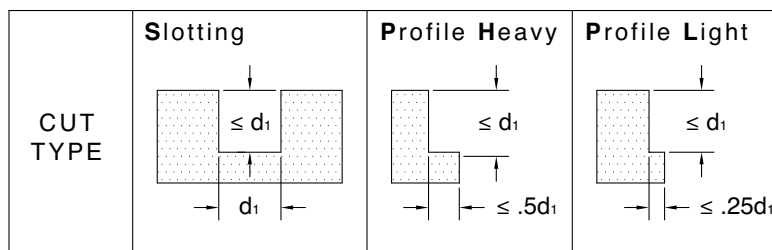
IPM = (inch/flute) x number of flutes x RPM



61M/62M/63M 3, 4, 5, 6 flute	Hardness Bhn	Series	Cut Type	Speed (m/min)				Feed (mm/flute)				
				AlTiN	TiCN	TiN	non	6	10	12	20	25
CARBON STEEL 1018, 1040, 1080, 1090, 10L50, 1140, 1212, 12L15, 1525, 1536	≤ 175	61M	S	122	117	113	–	0.016	0.024	0.032	0.048	0.064
			PH	152	146	140	–	0.024	0.036	0.048	0.071	0.095
			PL	168	162	152	–	0.032	0.048	0.064	0.095	0.127
	> 175 ≤ 275	61M	S	101	96	91	–	0.013	0.019	0.025	0.038	0.051
			PH	126	122	116	–	0.019	0.029	0.038	0.057	0.077
			PL	139	133	128	–	0.025	0.038	0.051	0.076	0.102
ALLOY STEEL 4140, 4150, 4320, 5150, 8630, 86L20, 50100	≤ 275	61M	S	90	85	82	–	0.013	0.019	0.025	0.038	0.051
			PH	111	108	104	–	0.019	0.029	0.038	0.057	0.077
			PL	122	119	113	–	0.025	0.038	0.051	0.076	0.102
TOOL STEEL A2, D2, H13, L2, M2, P20, S7, T15, W2	≤ 275	61M	S	84	81	76	–	0.013	0.019	0.025	0.038	0.051
			PH	105	101	96	–	0.019	0.029	0.038	0.057	0.077
			PL	116	111	107	–	0.025	0.038	0.051	0.076	0.102
CAST IRON - GRAY	≤ 200	61M	S	120	116	110	–	0.019	0.029	0.038	0.057	0.076
			PH	149	145	137	–	0.029	0.043	0.057	0.086	0.114
			PL	165	158	152	–	0.038	0.057	0.076	0.114	0.152
CAST IRON - DUCTILE	≤ 300	61M	S	61	59	56	–	0.013	0.019	0.025	0.038	0.051
			PH	34	32	30	–	0.019	0.029	0.038	0.057	0.077
			PL	37	35	34	–	0.025	0.038	0.051	0.076	0.102
CAST IRON - MALLEABLE	≤ 300	61M	S	52	49	47	–	0.013	0.019	0.025	0.038	0.051
			PH	64	62	59	–	0.019	0.029	0.038	0.057	0.077
			PL	70	69	66	–	0.025	0.038	0.051	0.076	0.102
STAINLESS - 300 SERIES 304, 316, 316L, 321, 201, 302, Nitronic 32	≤ 275	62M	S	69	66	64	–	0.013	0.019	0.025	0.038	0.051
			PH	85	82	79	–	0.019	0.029	0.038	0.057	0.077
			PL	94	91	87	–	0.025	0.038	0.051	0.076	0.102
STAINLESS - 400 SERIES 420, 422, 410, 403, 405, 409, 429, 430, 434	≤ 185	62M	S	105	101	96	–	0.013	0.019	0.025	0.038	0.051
			PH	131	126	122	–	0.019	0.029	0.038	0.057	0.077
			PL	143	139	133	–	0.025	0.038	0.051	0.076	0.102
STAINLESS - PH SERIES 17-4PH, 15-5PH, Custom 450, 16-6PH, PH13-8Mo	≤ 325	62M	S	62	61	58	–	0.013	0.019	0.025	0.038	0.051
			PH	79	76	73	–	0.019	0.029	0.038	0.057	0.077
			PL	85	82	79	–	0.025	0.038	0.051	0.076	0.102
TITANIUM TiCode, Ti5Al-5V-5Mo, Ti6Al4V, Ti-7Al4Mo	≤ 295	62M	S	47	46	44	–	0.016	0.024	0.032	0.048	0.064
			PH	59	56	55	–	0.024	0.036	0.048	0.071	0.095
			PL	66	62	61	–	0.032	0.048	0.064	0.095	0.127
HIGH TEMP ALLOY A-286, Haynes, Inconel, Waspalloy	≤ 300	62M	S	17	16	16	–	0.013	0.019	0.025	0.038	0.051
			PH	22	20	20	–	0.019	0.029	0.038	0.057	0.077
			PL	23	23	22	–	0.025	0.038	0.051	0.076	0.102
ALUMINUM 2017, 2024, 356, 6061, 7075	≤ 150	63M	S	–	–	–	335	0.032	0.048	0.064	0.095	0.127
			PH	–	–	–	411	0.048	0.071	0.095	0.143	0.191
			PL	–	–	–	457	0.064	0.095	0.127	0.191	0.254

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

mm/minute = (mm/flute) x number of flutes x RPM



Hi-PerCarb® Series and ICe-Carb Speed and Feed Recommendations – Fractional and Metric

Formulas
and
Conversions



Material		Speed by Series with Feed Lookup (F)											
		Series 135 - 3D			Series 135 - 5D			Series 140 - 5D			Series 140 - 8D		
Type, Examples	Hardness in BHN	SFM	m/min	F	SFM	m/min	F	SFM	m/min	F	SFM	m/min	F
Carbon Steel	≤ 200	400	122	11	360	110	11	440	134	11	420	128	10
1018, 1040, 1080, 1090, 10L50,	> 200 ≤ 300	350	107	10	310	94	10	380	116	10	370	113	9
1140, 1212, 12L15, 1525, 1536	> 300 ≤ 420	160	49	9	150	46	9	180	55	9	170	52	8
Alloy Steel	≤ 270	300	91	9	270	82	9	330	101	9	320	98	8
4140, 4150, 4320, 4340, 5120,	> 270 ≤ 370	220	67	8	200	61	8	240	73	8	230	70	7
5150, 8630, 86L20, 50100, 52100	> 370 ≤ 450	120	37	6	110	34	6	140	43	6	130	40	5
Stainless Steel - Free Machining	≤ 250	200	61	8	180	55	8	220	67	8	210	64	7
303, 416, 420F, 430F, 440F	> 250 ≤ 330	150	46	7	130	40	7	170	52	7	160	49	6
Stainless Steel	≤ 270	90	27	6	80	24	6	150	46	7	130	40	6
304, 316, 15-5PH, 17-4PH	> 270 ≤ 370	70	21	5	60	18	5	120	37	6	100	30	5
Tool Steel	≤ 250	220	67	8	200	61	8	240	73	8	230	70	7
A2, D2, H13, L2, M2,	> 250 ≤ 330	150	46	6	130	40	6	180	55	6	160	49	5
P20, S7, T15, W2	> 330 ≤ 450	70	21	3	60	18	3	90	27	3	80	24	2
High Temperature Alloy	≤ 220	60	18	3	50	15	3	100	30	3	80	24	2
A-286, Hastelloy, Haynes, Incoly,	> 220 ≤ 330	40	12	2	30	9	2	70	21	2	50	15	1
Inconel, Rene, Udimet, Waspalloy	> 330 ≤ 420	30	9	1	20	6	1	50	15	1	35	11	1
Titanium	≤ 280	120	37	6	100	30	6	200	61	6	180	55	5
TiCODE-12, Ti-5Al-5V-5Mo-3Cr,	> 280 ≤ 350	100	30	5	80	24	5	160	49	5	140	43	4
Ti-6Al4V, Ti-7Al4Mo, Ti-8Al1Mo1V	> 350 ≤ 440	70	21	4	60	18	4	120	37	4	110	34	3
Cast Iron	≤ 200	400	122	13	360	110	13	440	134	13	420	128	12
Ductile, Gray, Malleable	> 200 ≤ 330	250	76	12	230	70	12	280	85	12	270	82	11
Aluminum	≤ 80	700	213	14	630	192	14	770	235	14	730	223	13
2017, 2024, 356, 6061, 7075	> 80	600	183	13	540	165	13	660	201	13	630	192	12
Copper Alloy	≤ 140	500	152	7	450	137	7	550	168	7	520	158	6
Alum Bronze, C110, Muntz Brass	> 140	400	122	7	360	110	7	440	134	7	420	128	6

$$\text{RPM} = (\text{SFM} \times 3.82) / \text{Diameter}$$

$$\text{RPM} = (1000 \times \text{m/min}) / (3.14 \times \text{Diameter})$$



Reductions in Speed and Feed may be necessary when drilling in materials harder than listed.

Reduce feed rates when drilling on angled, radiused or uneven surfaces – in these cases, it is recommended to start with a spot face.

Pilot drills are normally not necessary with Hi-PerCarb or ICe-Carb. However if a pilot drill is used, then:

- The point angle of the pilot drill must be at least 5° greater than the following drill
- The diameter of the pilot drill should be .0008" (0,02mm) larger than the following drill
- The pilot drill depth should be 1-2 x diameters

Peck drilling is not normally recommended with carbide drills. However if a peck cycle is used, the pecks should be approximately 1.5 x diameter and should not fully retract from hole.



Las reducciones de velocidad y los avances pueden ser necesarias cuando en casos de perforación de materiales más duros que los listados.

Reduzca la velocidad cuando se perfora en pendiente, en superficies curvas o irregulares. En estos casos, se recomienda comenzar con un avellanado.

Taladros con pilotos no se requerirán, con el uso de taladros HiPerCarb o ICe-Carb. Sin embargo, si un taladro con piloto se utiliza, entonces:

- El ángulo de la punta de la broca con piloto debe ser de al menos 5° más alta en comparación con el taladro anterior
- El diámetro de perforación debe ser de 0008" (0,02 mm) más grande que agujero anterior
- La profundidad de la perforación debe estar dirigido por 1-2 x diámetro

La perforación con extracción de virutas, no se recomienda con el uso con brocas de metal duro. Sin embargo, si un ciclo de extracción se utiliza, el paso de extracción debe ser aproximadamente de 1,5 veces el diámetro de perforación y que no está completamente fuera del agujero.



Les réductions de vitesses et d'avances peuvent être nécessaires lors du forage dans des matériaux plus difficiles que ceux énumérés.

Réduire les vitesses lors du perçage sur des parties en pente, sur des surfaces arrondies ou irrégulières. Dans ces cas, il est recommandé de commencer par un lamage.

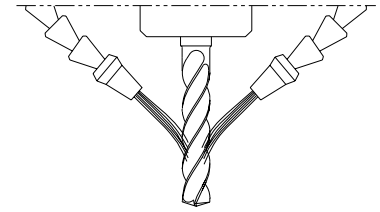
Des forets pilotes ne sont normalement pas nécessaires, de par l'utilisation des forets HiPerCarb ou ICe-Carb. Toutefois, si un foret pilote est utilisé, alors:

- L'angle de pointe du foret pilote doit être d'au moins 5° supérieure par rapport au foret précédent
- Le diamètre du foret doit être, de 0008" (0,02 mm) plus grand que le perçage précédent
- La profondeur de forage piloté doit être de 1-2 x diamètre

Le perçage avec débouillage n'est normalement pas recommandé avec des forets en carbure. Toutefois, si un cycle de débouillage est utilisé, le pas de débouillage doit être environ 1,5 x de diamètre et le foret ne devra pas sortir complètement du trou.

Feed Lookup						
Drill Diameter						
	Inch mm	Inch mm	Inch mm	Inch mm	Inch mm	Inch mm
	.015 - .111 0,4 - 2,5	.118 - .197 3,0 - 5,0	.203 - .316 5,5 - 8,0	.328 - .500 8,5 - 12,0	.512 - .640 13,0 - 16,0	.650 - .875 16,5 - 20,0
F	IPR mm/rev	IPR mm/rev	IPR mm/rev	IPR mm/rev	IPR mm/rev	IPR mm/rev
1	.0006 - .0005 0,0015 - 0,015	.0005 - .0010 0,015 - 0,025	.0010 - .0015 0,025 - 0,040	.0015 - .002 0,040 - 0,05	.002 - .003 0,05 - 0,06	.003 - .004 0,06 - 0,09
2	.0010 - .0005 0,0025 - 0,015	.0005 - .0010 0,015 - 0,025	.0010 - .0020 0,025 - 0,050	.0020 - .003 0,050 - 0,08	.003 - .004 0,08 - 0,10	.004 - .005 0,10 - 0,13
3	.0010 - .0010 0,0025 - 0,025	.0010 - .0015 0,025 - 0,040	.0015 - .0025 0,040 - 0,065	.0025 - .004 0,065 - 0,10	.004 - .005 0,10 - 0,13	.005 - .007 0,13 - 0,18
4	.0015 - .0010 0,0040 - 0,025	.0010 - .0020 0,025 - 0,050	.0020 - .0030 0,050 - 0,075	.0035 - .005 0,050 - 0,13	.005 - .006 0,13 - 0,17	.006 - .009 0,17 - 0,22
5	.0020 - .0015 0,0050 - 0,040	.0015 - .0025 0,040 - 0,065	.0025 - .0040 0,065 - 0,100	.0040 - .006 0,100 - 0,15	.006 - .008 0,15 - 0,19	.008 - .010 0,20 - 0,27
6	.0020 - .0015 0,0050 - 0,040	.0015 - .0030 0,040 - 0,075	.0030 - .0045 0,075 - 0,115	.0045 - .007 0,115 - 0,18	.007 - .009 0,18 - 0,23	.009 - .012 0,23 - 0,30
7	.0025 - .0020 0,0065 - 0,050	.0020 - .0030 0,050 - 0,075	.0030 - .0050 0,075 - 0,125	.0050 - .008 0,125 - 0,20	.008 - .010 0,20 - 0,25	.010 - .014 0,27 - 0,36
8	.0030 - .0020 0,0075 - 0,050	.0025 - .0040 0,065 - 0,100	.0040 - .0065 0,100 - 0,165	.0065 - .010 0,165 - 0,25	.010 - .013 0,25 - 0,33	.013 - .017 0,33 - 0,44
9	.0035 - .0025 0,0090 - 0,065	.0030 - .0050 0,075 - 0,120	.0050 - .0075 0,125 - 0,190	.0080 - .012 0,205 - 0,30	.012 - .015 0,32 - 0,39	.016 - .021 0,39 - 0,53
10	.0040 - .0030 0,0100 - 0,075	.0030 - .0055 0,090 - 0,140	.0055 - .0090 0,140 - 0,230	.0090 - .014 0,230 - 0,36	.014 - .018 0,37 - 0,46	.018 - .025 0,46 - 0,64
11	.0050 - .0035 0,0125 - 0,090	.0040 - .0065 0,100 - 0,165	.0065 - .0100 0,165 - 0,255	.0105 - .016 0,265 - 0,41	.016 - .020 0,42 - 0,52	.021 - .028 0,53 - 0,71
12	.0055 - .0040 0,0140 - 0,100	.0040 - .0070 0,100 - 0,180	.0075 - .0115 0,190 - 0,290	.0120 - .018 0,305 - 0,46	.018 - .023 0,47 - 0,58	.023 - .031 0,60 - 0,80
13	.0060 - .0045 0,0150 - 0,115	.0045 - .0080 0,115 - 0,205	.0080 - .0125 0,205 - 0,320	.0130 - .020 0,330 - 0,51	.020 - .026 0,52 - 0,65	.026 - .035 0,66 - 0,89
14	.0065 - .0050 0,0165 - 0,125	.0050 - .0085 0,125 - 0,215	.0090 - .0140 0,230 - 0,355	.0145 - .022 0,370 - 0,56	.023 - .028 0,57 - 0,71	.029 - .038 0,72 - 0,98

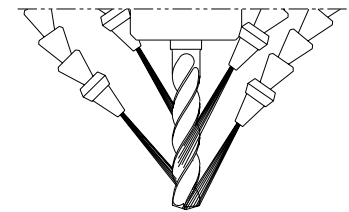
IPM = IPR x RPM mm/min = mm/rev x RPM



Tip – High Velocity/Complete Coverage

Alta velocidad periférica / cobertura completa

Haute vitesse / plage d'utilisation complète

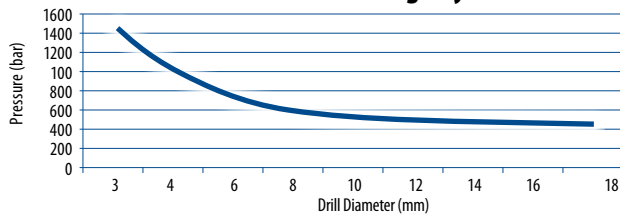


Tip – Low Velocity/No Coverage at Max. Depth

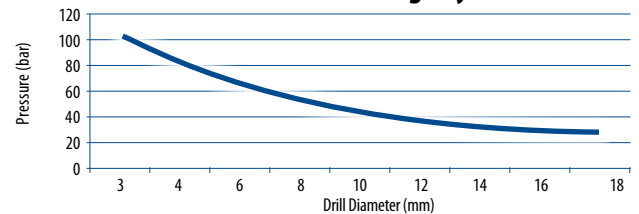
Baja velocidad periférica / En máxima profundidad no hay cobertura

Basse vitesse / Aucune plage d'utilisation à profondeur maximale

Recommended Coolant Pressure Range By Diameter - PSI



Recommended Coolant Pressure Range By Diameter - Bar



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 of 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 also important in order for the coolant to maintain its beneficial properties, but also to avoid a reduction in coolant pressure or the possibility of clogging the coolant channels in coolant through drills.

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.



El líquido refrigerante se utiliza para eliminar las virutas fuera de la zona del mecanizado, para reducir el calor generado durante el proceso de corte y reducir al mínimo las fricciones.

Es importante de optimizar la presión y su dirección para obtener las ventajas del proceso de mecanizado

La aplicación correcta del fluido de corte ayuda a los parámetros de funcionamiento, la velocidad de eliminación de los estados más grandes mejor superficie de vidas menos al azar, los poderes y reducido los tiempos de ciclo de mecanizado más cortos.

La presión es importante, pero lo más importante es la consistencia de la presión sobre la herramienta, un enfriamiento intermitente sobre el carburo, lleva a la dilatación del metal duro y la formación de "microfisuras"

Un mantenimiento adecuado y la filtración de fluidos de corte también es importante para que el fluido de corte pueda mantener sus propiedades lubricantes y de refrigeración, sino también para evitar las caídas de presión del líquido y el riesgo de obstrucción de los canales de refrigeración de los taladros

Reducir el tamaño de la boquilla permite de maximizar los beneficios de la refrigeración, además, el diseño "flauta doble" de la broca HYPER CARB, aumenta la velocidad de corte. Las boquillas alineadas entre la flauta y el borde secundario permite de obtener mejores resultados.



Le liquide de coupe s'emploie pour évacuer les copeaux hors de la zone d'usinage, pour réduire la chaleur générée pendant le processus de coupe et de minimiser les frottements.

Il est important d'optimiser la pression du liquide de refroidissement et sa direction pour obtenir du lubrifiant tous les avantages du processus d'usinage

Une bonne application du fluide de coupe favorise les paramètres de fonctionnement, des débit copeaux plus importants, des états de surface améliorés, des durées de vie moins aléatoires, des puissances d'usinages réduites et des temps de cycle plus courts.

La pression est importante, mais le plus important est la cohérence de la pression sur l'outil, un refroidissement intermittent sur le carbure, mène à la dilatation du substrat et la formation de "microfissures"

Une bonne maintenance et filtration des liquides de coupe est également importante pour que le fluide de coupe puisse maintenir ses propriétés lubrifiantes et refroidissantes, mais aussi pour éviter des chutes de pression du liquide et les risques d'obstruction des canaux de refroidissement des forets à trous d'huile

Réduire la taille de la buse permet de maximiser les avantages du refroidissement, mais grâce à la conception « double goujure » du foret HYPER CARB, celui-ci permet d'augmenter la vitesse de coupe. Les buses alignées entre la goujure secondaire et le listel apportent de meilleurs résultats.

Serie 101, 125 Brocas de carburo sólido
Série 101, 125 Forets carbure monobloc



All recommendations should be considered a starting point, with possible variations to achieve optimum results. Increase the speed 20% when using coated drills.



Todas la recomendaciones deberían ser consideradas como punto de partida, con posibles variaciones para conseguir óptimos resultados. Incrementar la velocidad un 20% al utilizar brocas recubiertas.



Les informations techniques mentionnées sont des valeurs moyennes données à titre indicatif et sont modifiables pour optimiser les résultats. Augmenter la vitesse de 20% lorsque vous utilisez des forets monobloc revêtus.



101, 125						
material	speed in sfm	feed per revolution (in / rev)				
		1/16 – 1/8	> 1/8 – 1/4	> 1/4 – 3/8	> 3/8 – 1/2	> 1/2 – 3/4
Structural Steel / Aceros de construcción / Acier à construction						
< 150 Bhn	315	.0020 – .0031	.0033 – .0039	.0039 – .0059	.0059 – .0079	.0079 – .0098
< 190 Bhn	280	.0020 – .0031	.0033 – .0039	.0039 – .0059	.0059 – .0079	.0079 – .0098
< 250 Bhn	245	.0012 – .0020	.0020 – .0033	.0033 – .0047	.0039 – .0071	.0059 – .0079
Case Hardening Steel / Aceros de cementación y temple / Aciers à cémentation						
< 235 Bhn	260	.0020 – .0031	.0033 – .0039	.0039 – .0059	.0059 – .0079	.0079 – .0098
< 300 Bhn	250	.0012 – .0020	.0020 – .0033	.0033 – .0047	.0039 – .0071	.0059 – .0079
Nitriding Steel / Aceros de nitruración / Aciers à nitruration						
< 300 Bhn	250	.0012 – .0020	.0020 – .0033	.0033 – .0047	.0039 – .0071	.0059 – .0079
< 40 Rc	215	.0012 – .0020	.0020 – .0033	.0033 – .0047	.0039 – .0071	.0059 – .0079
Heat Treatable Steel / Aceros de temple / Acier trempé						
< 200 Bhn	300	.0020 – .0031	.0033 – .0039	.0039 – .0059	.0059 – .0079	.0079 – .0098
< 240 Bhn	260	.0020 – .0031	.0033 – .0039	.0039 – .0059	.0059 – .0079	.0079 – .0098
< 40 Rc	215	.0004 – .0008	.0008 – .0024	.0024 – .0035	.0033 – .0051	.0039 – .0059
< 45 Rc	165	.0004 – .0008	.0008 – .0024	.0024 – .0035	.0033 – .0051	.0039 – .0059
Tool Steel / Aceros de herramientas / Acier à outils						
< 235 Bhn	165	.0004 – .0012	.0008 – .0024	.0020 – .0031	.0030 – .0039	.0031 – .0047
< 300 Bhn	130	.0004 – .0012	.0008 – .0024	.0020 – .0031	.0030 – .0039	.0031 – .0047
< 40 Rc	115	.0004 – .0008	.0006 – .0016	.0014 – .0022	.0018 – .0031	.0030 – .0039
< 45 Rc	100	.0004 – .0008	.0006 – .0016	.0014 – .0022	.0018 – .0031	.0030 – .0039
> 45 Rc	80	.0004 – .0008	.0006 – .0016	.0014 – .0022	.0018 – .0031	.0030 – .0039
Stainless Steel / Acero Inoxidable / Acier inoxydable						
< 200 Bhn	165	.0006 – .0012	.0008 – .0024	.0020 – .0039	.0030 – .0051	.0039 – .0067
< 250 Bhn	100	.0004 – .0008	.0006 – .0016	.0014 – .0022	.0018 – .0031	.0030 – .0039
< 280 Bhn	80	.0004 – .0008	.0006 – .0016	.0014 – .0022	.0018 – .0031	.0030 – .0039
Cast Steel / Aceros de fundición blanda / Fonte tendre						
< 150 Bhn	250	.0008 – .0024	.0020 – .0035	.0028 – .0047	.0035 – .0059	.0039 – .0071
< 190 Bhn	200	.0008 – .0024	.0020 – .0035	.0028 – .0047	.0035 – .0059	.0039 – .0071
> 190 Bhn	130	.0008 – .0024	.0020 – .0035	.0028 – .0047	.0035 – .0059	.0039 – .0071
Cast Steel – Hard / Aceros de fundición dura / Fonte dure						
–	130	.0004 – .0012	.0008 – .0024	.0020 – .0031	.0024 – .0035	.0028 – .0039
High Temp. Alloys / Aceros resistentes a altas temp. / Alliage à haute temp.						
< 200 Bhn	115	.0004 – .0012	.0008 – .0020	.0016 – .0022	.0020 – .0030	.0024 – .0039
< 240 Bhn	75	.0004 – .0012	.0008 – .0020	.0016 – .0022	.0020 – .0030	.0024 – .0039
< 300 Bhn	65	.0004 – .0012	.0008 – .0020	.0016 – .0022	.0020 – .0030	.0024 – .0039
< 40 Rc	60	.0004 – .0008	.0006 – .0016	.0014 – .0018	.0016 – .0024	.0020 – .0031
< 45 Rc	50	.0003 – .0004	.0004 – .0012	.0008 – .0014	.0012 – .0016	.0014 – .0020
> 45 Rc	30	.0003 – .0004	.0004 – .0012	.0008 – .0014	.0012 – .0016	.0014 – .0020
Titanium Alloys / Aleaciones de titanio / Alliage de titane						
< 160 Bhn	130	.0004 – .0012	.0008 – .0020	.0016 – .0022	.0020 – .0030	.0024 – .0039

→ continued on next page

Serie 101, 125 Brocas de carburo sólido

Série 101, 125 Forets carbure monobloc

101, 125						
material	speed in sfm	feed per revolution (in / rev)				
		1/16 – 1/8	> 1/8 – 1/4	> 1/4 – 3/8	> 3/8 – 1/2	> 1/2 – 3/4
< 280 Bhn	100	.0004 – .0008	.0006 – .0016	.0014 – .0018	.0016 – .0024	.0020 – .0031
> 40 Rc	65	.0004 – .0008	.0006 – .0016	.0014 – .0018	.0016 – .0024	.0020 – .0031
Malleable Cast iron / Fundición maleable / Fonte aciérée malléable						
< 200 Bhn	260	.0012 – .0024	.0016 – .0039	.0031 – .0059	.0035 – .0067	.0047 – .0091
> 200 Bhn	200	.0012 – .0024	.0016 – .0039	.0031 – .0059	.0035 – .0067	.0047 – .0091
Gray Cast Iron / Fundición gris / Fonte aciérée grise						
< 200 Bhn	330	.0012 – .0024	.0016 – .0039	.0031 – .0059	.0035 – .0067	.0047 – .0091
> 200 Bhn	260	.0012 – .0024	.0016 – .0039	.0031 – .0059	.0035 – .0067	.0047 – .0091
Copper / Cobre / Cuivre						
< 150 Bhn	260	.0006 – .0012	.0008 – .0024	.0020 – .0031	.0030 – .0035	.0031 – .0047
Copper Alloys – Brittle / Aleación de cobre fragil / Alliage de cuivre - mou						
–	360	.0006 – .0012	.0008 – .0020	.0020 – .0032	.0030 – .0035	.0032 – .0047
Aluminum – Low Silicon / Aluminio – bajo contenido de silicio / Aluminium – faible teneur en silice						
–	600	.0012 – .0020	.0020 – .0049	.0039 – .0071	.0059 – .0079	.0067 – .0118
Aluminum – High Silicon / Aluminio – alto contenido de silicio / Aluminium à forte teneur de silice						
–	360	.0012 – .0020	.0020 – .0049	.0039 – .0071	.0059 – .0079	.0067 – .0118
Magnesium Alloys / Aleaciones de magnesio / Alliage de magnésium						
–	525	.0012 – .0024	.0016 – .0039	.0031 – .0059	.0035 – .0067	.0047 – .0091
Zinc Alloys / Aleaciones de zinc / Alliage de zinc						
–	400	.0012 – .0020	.0020 – .0033	.0033 – .0047	.0039 – .0071	.0059 – .0079
Plastic / Plásticos / Matières Synthétiques						
–	400	.0012 – .0024	.0016 – .0039	.0031 – .0059	.0035 – .0067	.0047 – .0091
Fiber Plastic / Fibra de plástico / Fibre de plastique						
–	330	.0004 – .0008	.0006 – .0016	.0014 – .0022	.0018 – .0031	.0030 – .0039



All recommendations should be considered a starting point, with possible variations to achieve optimum results. Increase the speed 20% when using coated drills.



Todas la recomendaciones deberían ser consideradas como punto de partida, con posibles variaciones para conseguir óptimos resultados. Incrementar la velocidad un 20% al utilizar brocas recubiertas.



Les informations techniques mentionnées sont des valeurs moyennes données à titre indicatif et sont modifiables pour optimiser les résultats. Augmenter la vitesse de 20% lorsque vous utilisez des forets monobloc revêtus.



Condiciones de corte
Conditions de coupe

Serie 103 y 106 Brocas de carburo sólido
Série 103 et 106 Forets carbure monobloc



All recommendations should be considered a starting point, with possible variations to achieve optimum results. Increase the speed 20% when using coated drills.



Todas la recomendaciones deberían ser consideradas como punto de partida, con posibles variaciones para conseguir óptimos resultados. Incrementar la velocidad un 20% cuando se utilicen brocas recubiertas.



Les informations techniques mentionnées sont des valeurs moyennes données à titre indicatif et sont modifiables pour optimiser les résultats. Augmenter la vitesse de 20% lorsque vous utilisez des forets revêtues.



103						
material	speed in sfm	feed per revolution (in / rev)				
		1/8	>1/8 – 1/4	>1/4 – 3/8	>3/8 – 1/2	>1/2 – 3/4
Heat Treatable Steel / Aceros de temple / Acier trempé						
< 200 Bhn	300	.0033 – .0039	.0039 – .0059	.0059 – .0079	.0079 – .0098	.0098 – .0120
< 240 Bhn	260	.0033 – .0039	.0039 – .0059	.0059 – .0079	.0079 – .0098	.0098 – .0120
< 40 Rc	215	.0008 – .0024	.0024 – .0035	.0033 – .0051	.0039 – .0059	.0049 – .0060
< 45 Rc	165	.0008 – .0024	.0024 – .0035	.0033 – .0051	.0039 – .0059	.0049 – .0060
Tool Steel / Aceros de herramientas / Acier à outils						
< 235 Bhn	165	.0008 – .0024	.0020 – .0031	.0030 – .0039	.0031 – .0047	.0047 – .0058
< 300 Bhn	130	.0008 – .0024	.0020 – .0031	.0030 – .0039	.0031 – .0047	.0047 – .0058
< 40 Rc	115	.0006 – .0016	.0014 – .0022	.0018 – .0031	.0030 – .0039	.0039 – .0050
< 45 Rc	100	.0006 – .0016	.0014 – .0022	.0018 – .0031	.0030 – .0039	.0039 – .0050
> 45 Rc	80	.0006 – .0016	.0014 – .0022	.0018 – .0031	.0030 – .0039	.0039 – .0050
Titanium Alloys / Aleaciones de titanio / Alliage de titane						
< 160 Bhn	130	.0008 – .0020	.0016 – .0022	.0020 – .0030	.0024 – .0039	.0040 – .0062
< 280 Bhn	100	.0006 – .0016	.0014 – .0018	.0016 – .0024	.0020 – .0031	.0030 – .0045
> 40 Rc	65	.0006 – .0016	.0014 – .0018	.0016 – .0024	.0020 – .0031	.0030 – .0045
Malleable Cast Iron / Fundición maleable / Fonte aciérée malléable						
< 200 Bhn	260	.0016 – .0039	.0031 – .0059	.0035 – .0067	.0047 – .0091	.0090 – .0110
> 200 Bhn	200	.0016 – .0039	.0031 – .0059	.0035 – .0067	.0047 – .0091	.0090 – .0110
Gray Cast Iron / Fundición Gris / Fonte aciérée grise						
< 200 Bhn	330	.0016 – .0039	.0031 – .0059	.0035 – .0067	.0047 – .0091	.0090 – .0120
> 200 Bhn	260	.0016 – .0039	.0031 – .0059	.0035 – .0067	.0047 – .0091	.0090 – .0120
Copper Alloys – Brittle / Aleación de cobre fragil / Alliage de cuivre - mou						
–	360	.0010 – .0022	.0020 – .0032	.0030 – .0035	.0032 – .0047	.0045 – .0060
Aluminum – High Silicon / Aluminio – alto contenido de silicio / Aluminium à forte teneur de silice						
–	360	.0020 – .0049	.0039 – .0071	.0059 – .0079	.0067 – .0118	.0110 – .0130
Magnesium Alloys / Aleaciones de magnesio / Alliage de magnésium						
–	525	.0016 – .0039	.0031 – .0059	.0035 – .0067	.0047 – .0091	.0090 – .0120

106						
material	speed in sfm	feed per revolution (in / rev)				
		≤ 1/16	>1/16 – 1/8	>1/8 – 1/4	>1/4 – 3/8	>3/8 – 1/2
Tool Steel / Aceros de herramientas / Acier à outils						
> 45 Rc	80	.0002 – .0004	.0004 – .0008	.0006 – .0016	.0014 – .0022	.0018 – .0031
Malleable Cast Iron / Fundición maleable / Fonte aciérée malléable						
< 200 Bhn	260	.0006 – .0012	.0012 – .0024	.0016 – .0039	.0031 – .0059	.0035 – .0067
> 200 Bhn	200	.0006 – .0012	.0012 – .0024	.0016 – .0039	.0031 – .0059	.0035 – .0067
Gray Cast Iron / Fundición Gris / Fonte aciérée grise						
< 200 Bhn	330	.0006 – .0012	.0012 – .0024	.0016 – .0039	.0031 – .0059	.0035 – .0067
> 200 Bhn	260	.0006 – .0012	.0012 – .0024	.0016 – .0039	.0031 – .0059	.0035 – .0067

Serie 103M y 106M Brocas de carburo sólido
Série 103M et 106M Forets carbure monobloc

Condiciones de corte
Conditions de coupe

103M								
material	speed in m/min	feed (mm / rev)					material number	description
		≤3	>3 – 6	>6 – 9,5	>9,5 – 12	>12 – 20		
Heat Treatable Steel / Aceros de temple / Acier trempé								
< 700 N/mm ²	90	0,085 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	0,25 – 0,3	1.0406	C 25
< 900 N/mm ²	80	0,085 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	0,25 – 0,3	1.0540	C 50
< 1200 N/mm ²	65	0,025 – 0,06	0,06 – 0,09	0,085 – 0,13	0,1 – 0,15	0,12 – 0,15	1.5122	37 MnSi 4
< 1400 N/mm ²	50	0,025 – 0,06	0,06 – 0,09	0,085 – 0,13	0,1 – 0,15	0,12 – 0,15	1.6582	34 CrNiMo 6
Tool Steel / Aceros de herramientas / Acier à outil								
< 800 N/mm ²	50	0,02 – 0,06	0,05 – 0,08	0,075 – 0,1	0,08 – 0,12	0,11 – 0,14	–	–
< 1000 N/mm ²	40	0,02 – 0,06	0,05 – 0,08	0,075 – 0,1	0,08 – 0,12	0,11 – 0,14	–	–
< 1200 N/mm ²	35	0,015 – 0,04	0,035 – 0,055	0,045 – 0,08	0,075 – 0,1	0,1 – 0,13	–	–
< 1400 N/mm ²	30	0,015 – 0,04	0,035 – 0,055	0,045 – 0,08	0,075 – 0,1	0,1 – 0,13	–	–
> 1400 N/mm ²	25	0,015 – 0,04	0,035 – 0,055	0,045 – 0,08	0,075 – 0,1	0,1 – 0,13	–	–
Titanium Alloys / Aleaciones de titanio / Alliage de titane								
< 550 N/mm ²	40	0,02 – 0,05	0,04 – 0,055	0,05 – 0,075	0,06 – 0,1	0,1 – 0,16	–	–
< 950 N/mm ²	30	0,015 – 0,04	0,035 – 0,045	0,04 – 0,06	0,05 – 0,08	0,075 – 0,11	–	–
> 1200 N/mm ²	20	0,015 – 0,04	0,035 – 0,045	0,04 – 0,06	0,05 – 0,08	0,075 – 0,11	–	–
Malleable Cast Iron / Fundición maleable / Fonte aciérée malléable								
< 200 HB	80	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17	0,12 – 0,23	0,22 – 0,28	–	–
> 200 HB	60	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17	0,12 – 0,23	0,22 – 0,28	–	–
Gray Cast Iron / Fundición Gris / Fonte aciérée grise								
< 200 HB	100	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17	0,12 – 0,23	0,22 – 0,31	–	–
> 200 HB	80	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17	0,12 – 0,23	0,22 – 0,31	–	–
Copper Alloys – Brittle / Aleaciones de cobre fragiles / Alliage de cuivre - mou								
–	110	0,025 – 0,06	0,05 – 0,08	0,075 – 0,09	0,08 – 0,12	0,11 – 0,15	–	–
Aluminum – High Silicon / Aluminio alto contenido de silicio / Aluminium – haute teneur en silice								
–	110	0,05 – 0,125	0,1 – 0,18	0,15 – 0,2	0,17 – 0,3	0,29 – 0,33	–	–
Magnesium Alloys / Aleaciones de magnesio / Alliage de magnésium								
–	160	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17	0,12 – 0,23	0,22 – 0,31	–	–



All recommendations should be considered a starting point, with possible variations to achieve optimum results. Increase the speed 20% when using coated drills.



Todas las recomendaciones deberían ser consideradas como punto de partida, con posibles variaciones para conseguir óptimos resultados. Incrementar la velocidad un 20% cuando se utilicen brocas recubiertas.



Les informations techniques mentionnées sont des valeurs moyennes données à titre indicatif et sont modifiables pour optimiser les résultats. Augmenter la vitesse de 20% lorsque vous utilisez des forets revêtues.



106M						
material	speed in m/min	feed (mm / rev)				
		≤1,5	>1,5 – 3	>3 – 6	>6 – 9,5	>9,5 – 12
Tool Steel / Aceros de herramientas / Acier à outils						
> 1400 N/mm ²	25	0,005 – 0,01	0,01 – 0,02	0,015 – 0,04	0,035 – 0,055	0,045 – 0,08
Malleable Cast Iron / Fundición maleable / Fonte aciérée malléable						
< 200 HB	80	0,015 – 0,03	0,03 – 0,06	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17
> 200 HB	60	0,015 – 0,03	0,03 – 0,06	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17
Gray Cast Iron / Fundición Gris / Fonte aciérée grise						
< 200 HB	100	0,015 – 0,03	0,03 – 0,06	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17
> 200 HB	80	0,015 – 0,03	0,03 – 0,06	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17

Cutting Conditions Series – 101M, 108M Carbide Drills

– Metric

Condiciones de corte
Conditions de coupe

Serie 101M, 108M Brocas de carburo sólido
Série 101M, 108M Forets carbure monobloc



All recommendations should be considered a starting point, with possible variations to achieve optimum results. Increase the speed 20% when using coated drills.



Todas las recomendaciones deberían ser consideradas como punto de partida, con posibles variaciones para conseguir óptimos resultados. Incrementar la velocidad un 20% cuando se utilicen brocas recubiertas.



Les informations techniques mentionnées sont des valeurs moyennes données à titre indicatif et sont modifiables pour optimiser les résultats. Augmenter la vitesse de 20% lorsque vous utilisez des forets revêtus.



material	speed in m/min	feed (mm / rev)					material number	description
		1-3	>3-6	>6-9	>9-12	>12-20		
Structural Steel / Aceros de construcción / Acier à construction								
< 500 N/mm ²	95	0,05 – 0,08	0,085 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	1.0037	St 37-2
< 650 N/mm ²	85	0,05 – 0,08	0,085 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	1.0050	St 50-2
< 850 N/mm ²	75	0,03 – 0,05	0,05 – 0,085	0,085 – 0,12	0,1 – 0,18	0,15 – 0,2	1.0070	St 70-2
Case Hardening Steel / Aceros de cementación y temple / Aciers à cémentation								
< 800 N/mm ²	80	0,05 – 0,08	0,085 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	1.0301	C 10
< 1000 N/mm ²	75	0,03 – 0,05	0,05 – 0,085	0,085 – 0,12	0,1 – 0,18	0,15 – 0,2	1.7012	13 Cr 2
Nitriding Steel / Aceros de nitruración / Aciers à nitruration								
< 1000 N/mm ²	75	0,03 – 0,05	0,05 – 0,085	0,085 – 0,12	0,1 – 0,18	0,15 – 0,2	1.8509	41 CrAlMo 7
< 1300 N/mm ²	65	0,03 – 0,05	0,05 – 0,085	0,085 – 0,12	0,1 – 0,18	0,15 – 0,2	1.8519	31 CrMoV 9
Heat Treatable Steel / Aceros de temple / Acier trempé								
< 700 N/mm ²	90	0,05 – 0,08	0,085 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	1.0406	C 25
< 900 N/mm ²	80	0,05 – 0,08	0,085 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	1.0540	C 50
< 1200 N/mm ²	65	0,01 – 0,02	0,025 – 0,06	0,06 – 0,09	0,085 – 0,13	0,1 – 0,15	1.5122	37 MnSi 4
< 1400 N/mm ²	50	0,01 – 0,02	0,025 – 0,06	0,06 – 0,09	0,085 – 0,13	0,1 – 0,15	1.6582	34 CrNiMo 6
Tool Steel / Aceros de herramientas / Acier à outils								
< 800 N/mm ²	50	0,01 – 0,03	0,02 – 0,06	0,05 – 0,08	0,075 – 0,1	0,08 – 0,12	–	–
< 1000 N/mm ²	40	0,01 – 0,03	0,02 – 0,06	0,05 – 0,08	0,075 – 0,1	0,08 – 0,12	–	–
< 1200 N/mm ²	35	0,01 – 0,02	0,015 – 0,04	0,035 – 0,055	0,045 – 0,08	0,075 – 0,1	–	–
< 1400 N/mm ²	30	0,01 – 0,02	0,015 – 0,04	0,035 – 0,055	0,045 – 0,08	0,075 – 0,1	–	–
> 1400 N/mm ²	25	0,01 – 0,02	0,015 – 0,04	0,035 – 0,055	0,045 – 0,08	0,075 – 0,1	–	–
Stainless Steel / Acero inoxidable / Acier inoxydable								
< 700 N/mm ²	50	0,015 – 0,03	0,025 – 0,06	0,05 – 0,1	0,075 – 0,13	0,1 – 0,17	1.4301	X 5 CrNi 18 10
< 850 N/mm ²	30	0,01 – 0,02	0,015 – 0,04	0,035 – 0,055	0,045 – 0,08	0,075 – 0,1	1.4006	X 10 Cr 13
< 950 N/mm ²	25	0,01 – 0,02	0,015 – 0,04	0,035 – 0,055	0,045 – 0,08	0,075 – 0,1	1.4122	X 35 CrMo 17
Cast Steel / Aceros de fundición blanda / Fonte tendre								
< 500 N/mm ²	75	0,02 – 0,06	0,05 – 0,09	0,07 – 0,12	0,09 – 0,15	0,1 – 0,18	1.0446	GS-38
< 650 N/mm ²	60	0,02 – 0,06	0,05 – 0,09	0,07 – 0,12	0,09 – 0,15	0,1 – 0,18	1.0553	GS-60
> 650 N/mm ²	40	0,02 – 0,06	0,05 – 0,09	0,07 – 0,12	0,09 – 0,15	0,1 – 0,18	1.0554	GS-70
Cast Steel – Hard / Aceros de fundición dura / Fonte dure								
	40	0,01 – 0,03	0,02 – 0,06	0,05 – 0,08	0,06 – 0,09	0,07 – 0,1	–	–
High Temp. Alloys / Aceros resistentes a altas temp. / Alliage à haute temp.								
< 700 N/mm ²	35	0,01 – 0,03	0,02 – 0,05	0,04 – 0,055	0,05 – 0,075	0,06 – 0,1	2.4816	NiCr 15 Fe
< 900 N/mm ²	23	0,01 – 0,03	0,02 – 0,05	0,04 – 0,055	0,05 – 0,075	0,06 – 0,1	1.4921	X 20 CrMoV 12 1
< 1100 N/mm ²	20	0,01 – 0,03	0,02 – 0,05	0,04 – 0,055	0,05 – 0,075	0,06 – 0,1	1.4911	X 8 CrCoNiMo 10 6
< 1250 N/mm ²	18	0,01 – 0,02	0,015 – 0,04	0,035 – 0,045	0,04 – 0,06	0,05 – 0,08	1.4980	X 5 NiCrTi 26 15
< 1400 N/mm ²	15	0,008 – 0,01	0,01 – 0,03	0,025 – 0,035	0,03 – 0,04	0,035 – 0,05	2.4973	NiCr 19 CoMo
> 1400 N/mm ²	10	0,008 – 0,01	0,01 – 0,03	0,025 – 0,035	0,03 – 0,04	0,035 – 0,05	2.4969	NiCr 20 Co 18 Ti
Titanium Alloys / Aleaciones de titanio / Alliage de titane								
< 550 N/mm ²	40	0,01 – 0,03	0,02 – 0,05	0,04 – 0,055	0,05 – 0,075	0,06 – 0,1	–	–
< 950 N/mm ²	30	0,01 – 0,025	0,015 – 0,04	0,035 – 0,045	0,04 – 0,06	0,05 – 0,08	–	–
> 1200 N/mm ²	20	0,01 – 0,025	0,015 – 0,04	0,035 – 0,045	0,04 – 0,06	0,05 – 0,08	–	–
Malleable Cast Iron / Fundición maleable / Fonte aciérée malléable								
< 200 HB	80	0,03 – 0,06	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17	0,12 – 0,23	–	–
> 200 HB	60	0,03 – 0,06	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17	0,12 – 0,23	–	–
Gray Cast Iron / Fundición gris / Fonte aciérée grise								
< 200 HB	100	0,03 – 0,06	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17	0,12 – 0,23	–	–
> 200 HB	80	0,03 – 0,06	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17	0,12 – 0,23	–	–
Copper / Cobre / Cuivre								
< 500 N/mm ²	80	0,015 – 0,03	0,025 – 0,06	0,05 – 0,08	0,075 – 0,09	0,08 – 0,12	–	–
Copper Alloys – Brittle / Aleación de cobre fragil / Alliage de cuivre – mou								
–	110	0,015 – 0,03	0,025 – 0,06	0,05 – 0,08	0,075 – 0,09	0,08 – 0,12	–	–
Aluminum – Low Silicon / Aluminio – bajo contenido de silicio / Aluminium – faible teneur en silice								
–	180	0,03 – 0,05	0,05 – 0,125	0,1 – 0,18	0,15 – 0,2	0,17 – 0,3	–	–
Aluminum – High Silicon / Aluminio – alto contenido de silicio / Aluminium à forte teneur de silice								
–	110	0,03 – 0,05	0,05 – 0,125	0,1 – 0,18	0,15 – 0,2	0,17 – 0,3	–	–
Magnesium Alloys / Aleaciones de magnesio / Alliage de magnésium								
–	160	0,03 – 0,06	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17	0,12 – 0,23	–	–
Zinc Alloys / Aleaciones de zinc / Alliage de zinc								
–	120	0,03 – 0,05	0,05 – 0,085	0,085 – 0,12	0,1 – 0,18	0,15 – 0,2	–	–
Plastic / Plásticos / Matières Synthétiques								
–	120	0,03 – 0,06	0,04 – 0,1	0,08 – 0,15	0,09 – 0,17	0,12 – 0,23	–	–
Fiber Plastic / Fibra de plástico / Fibre de plastique								
–	100	0,01 – 0,02	0,015 – 0,04	0,035 – 0,055	0,045 – 0,08	0,075 – 0,1	–	–

Series 20-CCR Speed and Feed Recommendations – Fractional and Metric



Series 20 Without Coolant	Diameter	Spindle Speed rpm	Feed Rate ipm
	1/4	5,400 - 9,000	30 - 60
5/16	4,300 - 7,200	30 - 60	
3/8	3,600 - 6,000	30 - 60	
1/2	2,700 - 4,500	30 - 60	

Series 20 With Coolant	Diameter	Spindle Speed rpm	Feed Rate ipm
	1/4	15,000 - 23,000	90 - 120
5/16	12,000 - 18,000	90 - 120	
3/8	10,000 - 15,000	90 - 120	
1/2	7,500 - 12,000	90 - 120	

Series 20M Without Coolant	Diameter	Spindle Speed rpm	Feed Rate (mm/min)
	6	5,800 - 9,600	750 - 1,500
8	4,300 - 7,200	750 - 1,500	
10	3,400 - 5,700	750 - 1,500	
12	2,900 - 4,800	750 - 1,500	

Series 20M With Coolant	Diameter	Spindle Speed rpm	Feed Rate (mm/min)
	6	15,800 - 24,000	2,300 - 3,000
8	12,000 - 18,000	2,300 - 3,000	
10	9,500 - 14,500	2,300 - 3,000	
12	7,900 - 12,000	2,300 - 3,000	

Series 21/21M and 22/22M Speed and Feed Recommendations – Fractional and Metric

21, 22 2 flute	Cut Type	Speed (sfm)	Feed (inch/flute)				
			1/8	1/4	3/8	1/2	3/4
HARDWOOD	S P	1550	0.0008	0.0015	0.0025	0.0030	0.0045
SOFTWOOD	S P	1950	0.0010	0.0020	0.0030	0.0035	0.0055
PLYWOOD	S P	1950	0.0013	0.0025	0.0040	0.0050	0.0075
ALUMINUM	S P	1150	0.0006	0.0015	0.0020	0.0025	0.0040
PLASTIC	S P	1950	0.0008	0.0017	0.0025	0.0035	0.0050

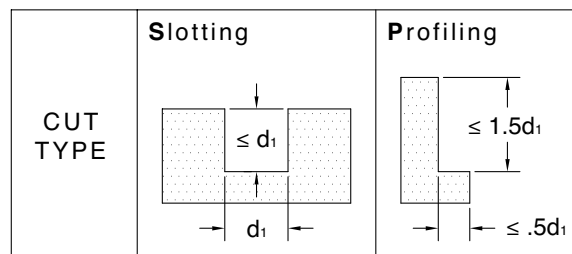
RPM = sfm x 3.82 / cutting diameter

IPM = (inch/flute) x number of flutes x RPM

21M, 22M 2 flute	Cut Type	Speed (m/min)	Feed (mm/flute)				
			3	6	10	12	20
HARDWOOD	S P	470	0.020	0.040	0.065	0.075	0.115
SOFTWOOD	S P	600	0.025	0.050	0.075	0.090	0.140
PLYWOOD	S P	600	0.030	0.065	0.100	0.125	0.190
ALUMINUM	S P	350	0.015	0.040	0.050	0.065	0.100
PLASTIC	S P	600	0.020	0.040	0.065	0.090	0.125

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

mm/minute = (mm/flute) x number of flutes x RPM

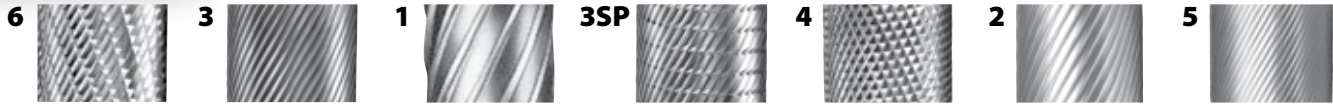


Series FGR
Speed and Feed Recommendations –
Fractional and Metric

FGR	Diameter	Spindle Speed	Feed Rate
		rpm	ipm
	1/16	40,000 - 45,000	40 - 60
	3/32	25,000 - 30,000	45 - 70
	1/8	20,000 - 25,000	45 - 70
	3/16	20,000 - 24,000	35 - 65
	1/4	20,000 - 24,000	35 - 65
	3/8	15,000 - 20,000	30 - 60
	1/2	10,000 - 15,000	20 - 50

FGR-M	Diameter	Spindle Speed	Feed Rate
	mm	rpm	cm/min
	1.6	40,000 - 45,000	100 - 150
	2.4	25,000 - 30,000	115 - 180
	3	20,000 - 25,000	115 - 180
	4	20,000 - 24,000	90 - 165
	6	20,000 - 24,000	90 - 165
	10	15,000 - 20,000	75 - 150
	12	10,000 - 15,000	50 - 125

Recomendaciones para aplicación y velocidad Limas Rotativas de Carburo Recommandations sur l'application et la vitesse Fraises-limes en carbure



Basic Fluting Styles for Carbide Burs

- 6 Double Cut: Efficient stock removal, smaller chips, good finish, excellent control.
- 3 Single Cut: General purpose design, longer chips.
- 1 Nonferrous: Aggressive stock removal.
- 3SP Chip Breaker: Improved stock removal and control over single cut style.
- 4 Diamond Cut: Excellent control, good stock removal, smallest chips.
- 2 Coarse Cut: Improved chip clearance for softer materials, good stock removal.
- 5 Fine Cut: Hard materials, fine finishing where light stock removal is required.

Determining the Proper Cut Style and Speed

- Select your material type along the left side of Chart A.
- Move right to find the recommended cut style(s) and speed range in SFM.
- Select your tool diameter and SFM range on Chart B to determine operating RPM.

Chart A	Recommended Cut Style and Speed Range (SFM)						
	800	1,000	1,200	1,500	1,700	2,000	3,000
Carbon Steel <45 HRc				6 - 3 - 3SP			
Hardened Steel >45 HRc	6 - 3 - 3SP - 5						
Heat Resisting Alloys		6 - 3 - 3SP					
Stainless Steel	6 - 4 - 3SP						
Aluminum Alloys						1	
Brass-Copper-Zinc						6 - 3SP - 2	
Cast Iron <250 Bhn				6 - 3 - 3SP			
Cast Iron >250 Bhn		6 - 3 - 3SP					
Plastics					1 - 2		
Hard Rubber					2		
Fiberglass					4		
Carbon Fiber			6 - 4				



Safety

- The use of eye, face, and ear protection is strongly recommended.
- Burs with shanks longer than 1-3/4 (inch) should be used at 50% of the normal speed.
- Extended shank burs are only recommended for use in well maintained hand held grinders.
- Stabilize extended shank burs by lightly contacting the workpiece prior to starting the grinder.
- Blue discoloring of steel shanks indicates excessive heat due to overuse. Continued use could cause injury.

Application Tips

- Use lubricant or wax to prevent flute loading in soft materials.
- Using the recommended speed prevents premature wear and/or insufficient material removal rates.
- Maintain grinder concentricity to optimize material removal rates and extend bur life.
- Reduce flutes and increase speed in softer materials. Increase flutes and reduce speed in hardened materials.
- Cross cut styles (6, 3SP, 4) generally improve stock removal, control, and reduce chip size.



Estilos básicos de filos en las limas rotativas de carburo sólido

- 6 Doble Corte: Eliminación eficiente de materiales, virutas más cortas, buen acabado, Excelente control.
- 3 Único corte: Para el uso general, virutas mas largas.
- 1 Materiales no ferrosos: Eliminación de materiales mas agresiva.
- 3SP Rompe virutas: Mejora de la eliminación de material y un mejor control a través de un corte simple, virutas mas cortas.
- 4 Corte Diamante: Excelente control, bueno volumen de material mecanizado, virutas mas cortas.
- 2 Durante el corte: La depuración de chips mejorada para materiales blandos y extraer materiales de buena.
- 5 Dientes finas: Para los materiales duros, para el acabado cuando es necesario.

Determinar el tipo adecuado corte y la velocidad

- Seleccione el tipo de material en el lado izquierdo de la tabla A.
- Muévase a la derecha para encontrar el tipo de corte recomendado y el rango de velocidad en sfm.
- Elija el diámetro de la herramienta y la amplitud de la rotación en el cuadro B para determinar la rotación en rpm.



Seguridad

- La protección de los ojos, cara y orejas es muy recomendable.
- Las frisas más larga (1-3/4) deben ser utilizadas al 50% de la velocidad normal.
- El mango largo se recomienda su uso en buen estado en parte inaccesibles.
- Estabilizar la fresa larga con un ligero contacto con la pieza antes de empezar a moler.
- La coloración azulada de los vástagos de acero, indica el recalentamiento debido a la sobreexplotación. Puede dar lugar a fracturas y lesiones.

Sugerencias de aplicación

- Utilice un lubricante o cera para evitar que se pegue el material en la fresa.
- Usando la velocidad recomendada, se evita el desgaste prematuro y/o tasas de fracaso de la remoción de material.
- Mantener la concentricidad de la máquina de moler para optimizar el volumen de remoción de material y prolongar la vida de las frisas.
- Reducir el número de dientes y aumentar la velocidad en materiales blandos. Aumentar del número de dientes y reducir la velocidad en materiales duros.
- Los tipos de corte transversale (6, 3SP, 4) mejoran en general la eliminación de los materiales, el control y el reducimiento del tamaño de las virutas.



Types de dentures de base pour les fraises-limes

- 6 Double Coupe: enlèvement de matière efficace, copeaux plus courts, bonne finition, excellent contrôle.
- 3 Simple coupe: Utilisation d'usage général, copeaux plus longs.
- 1 Non ferreux: Enlèvement matière agressive.
- 3SP Brise copeaux: Amélioration de l'enlèvement de matière et contrôle grâce à la simple coupe, copeaux plus courts.
- 4 Coupe Diamant: Excellent contrôle, bon débit matières usinée, copeaux plus courts.
- 2 Cours de coupe: meilleur dégagement de carte à puce pour les matériaux tendres, enlèvement de matière de bonnes.
- 5 Denture fine: Pour les matériaux durs, pour la finition quand la matière enlevée est nécessaire.

Déterminer le type coupe adéquate et de la vitesse

- Sélectionnez votre type de matériau sur le côté gauche du tableau A.
- Déplacer vers la droite pour trouver le type de coupe recommandé et la plage de vitesse en sfm.
- Choisissez votre diamètre de l'outil et gamme de rotation sur le tableau B pour déterminer la rotation en rpm.

Chart B

Chart B	SFM						
	800	1,000	1,200	1,500	1,700	2,000	3,000
Diameter	RPM						
1/16	49,000	61,000	73,000	92,000	104,000	122,000	183,000
3/32	33,000	41,000	49,000	61,000	69,000	81,000	122,000
1/8	24,000	31,000	37,000	46,000	52,000	61,000	92,000
3/16	16,000	20,000	24,000	31,000	35,000	41,000	61,000
1/4	12,000	15,000	18,000	23,000	26,000	31,000	46,000
5/16	10,000	12,000	15,000	18,000	21,000	24,000	37,000
3/8	8,000	10,000	12,000	15,000	17,000	20,000	31,000
1/2	6,000	8,000	9,000	11,000	13,000	15,000	23,000
5/8	5,000	6,000	7,000	9,000	10,000	12,000	18,000
3/4	4,000	5,000	6,000	8,000	9,000	10,000	15,000
1	3,000	4,000	5,000	6,000	7,000	8,000	11,000



Sécurité

- La protection des yeux, du visage et des oreilles est fortement recommandée.
- Fraises à queue plus longue (1-3/4 pouces) doivent être utilisées à 50% de la vitesse normale.
- Les fraises à queue longue ne sont recommandées pour une utilisation bien maintenues dans partie difficilement accessibles.
- Stabiliser les fraises à queue longue par un léger contact avec la pièce avant de démarrer le meulage.
- La décoloration bleue des queues en acier, indique une chaleur excessive due à la surexploitation. Elle pourrait entraîner des ruptures et des blessures.

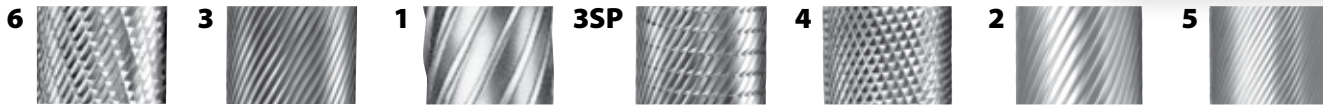
Conseils d'application

- Utiliser un lubrifiant ou de la cire pour empêcher le collage de la matière dans les matériaux tendres.
- En utilisant la vitesse recommandée, cela évite l'usure prématurée et/ou l'insuffisance de taux d'enlèvement de matière.
- Maintenir la concentricité de la meuleuse permet d'optimiser les taux d'enlèvement de matière et de prolonger la durée de vie des fraises.
- Réduire le nombre de dents et augmenter la vitesse dans les matériaux tendres. Augmenter nombre de dents et réduire la vitesse dans les matériaux durs.
- les types de dentures croisées (6, 3SP, 4) améliorent de façon générale l'enlèvement de matière, contrôlent et de réduisent la taille des copeaux.

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Basic Fluting Styles for Carbide Burs

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Determining the Proper Cut Style and Speed

- Select your material type along the left side of Chart A.
- Move right to find the recommended cut style(s) and speed range in M/MIN.
- Select your tool diameter and M/MIN range on Chart B to determine operating RPM.

Chart A

	Recommended Cut Style and Speed Range (M/MIN)						
	250	300	365	450	520	600	915
Carbon Steel <45 HRC					6 - 3 - 3SP		
Hardened Steel >45 HRC	6 - 3 - 3SP - 5						
Heat Resisting Alloys			6 - 3 - 3SP				
Stainless Steel	6 - 4 - 3SP						
Aluminum Alloys						1	
Brass-Copper-Zinc						6 - 3SP - 2	
Cast Iron <250 Bhn					6 - 3 - 3SP		
Cast Iron >250 Bhn			6 - 3 - 3SP				
Plastics						1 - 2	
Hard Rubber						2	
Fiberglass						4	
Carbon Fiber				6 - 4			



Safety

- The use of eye, face, and ear protection is strongly recommended.
- Burs with shanks longer than 1-3/4 (inch) should be used at 50% of the normal speed.
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Application Tips

- Use lubricant or wax to prevent flute loading in soft materials.
- Using the recommended speed prevents premature wear and/or insufficient material removal rates.
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Estilos básicos de filos en las limas rotativas de carburo sólido

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Determinar el tipo adecuado corte y la velocidad

- Seleccione el tipo de material en el lado izquierdo de la tabla A.
- Muévase a la derecha para encontrar el tipo de corte recomendado y el rango de velocidad en M/MIN.
- Elija el diámetro de la herramienta y la amplitud de la rotación en el cuadro B para determinar la rotación en rpm.

Chart B

Diameter	M/MIN						
	250	300	365	450	520	600	915
	RPM						
1,5	49,000	61,000	73,000	92,000	104,000	122,000	183,000
2,5	33,000	41,000	49,000	61,000	69,000	81,000	122,000
3	24,000	31,000	37,000	46,000	52,000	61,000	92,000
5	16,000	20,000	24,000	31,000	35,000	41,000	61,000
6	12,000	15,000	18,000	23,000	26,000	31,000	46,000
8	10,000	12,000	15,000	18,000	21,000	24,000	37,000
10	8,000	10,000	12,000	15,000	17,000	20,000	31,000
12	6,000	8,000	9,000	11,000	13,000	15,000	23,000
16	5,000	6,000	7,000	9,000	10,000	12,000	18,000
19	4,000	5,000	6,000	8,000	9,000	10,000	15,000
25	3,000	4,000	5,000	6,000	7,000	8,000	11,000



Types de dentures de base pour les fraises-limes

- 6 Double Coupe: enlèvement de matière efficace, copeaux plus courts, bonne finition, excellent contrôle.
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Déterminer le type coupe adéquate et de la vitesse

- Sélectionnez votre type de matériau sur le côté gauche du tableau A.
- Déplacer vers la droite pour trouver le type de coupe recommandé et la plage de vitesse en M/MIN.
- Choisissez votre diamètre de l'outil et gamme de rotation sur le tableau B pour déterminer la rotation en rpm.



Sécurité

- La protection des yeux, du visage et des oreilles est fortement recommandée.
- Fraises à queue plus longue (1-3/4 pouces) doivent être utilisées à 50% de la vitesse normale.
- Les fraises à queue longue ne sont recommandées pour une utilisation bien maintenues dans partie difficilement accessibles.
- Stabiliser les fraises à queue longue par un léger contact avec la pièce avant de démarrer le meulage.
- La décoloration bleue des queues en acier, indique une chaleur excessive due à la surexploitation. Elle pourrait entraîner des ruptures et des blessures.

Conseils d'application

- Utiliser un lubrifiant ou de la cire pour empêcher le collage de la matière dans les matériaux tendres.
- En utilisant la vitesse recommandée, cela évite l'usure prématurée et/ou l'insuffisance des taux d'enlèvement de matière.
- Maintenir la concentricité de la meuleuse permet d'optimiser les taux d'enlèvement de matière et de prolonger la durée de vie des fraises.
- Réduire le nombre de dents et augmenter la vitesse dans les matériaux tendres. Augmenter nombre de dents et réduire la vitesse dans les matériaux durs.
- les types de dentures croisées (6, 3SP, 4) améliorent de façon générale l'enlèvement de matière, contrôlent et de réduisent la taille des copeaux.

Condiciones de corte Conditions de coupe

Escariadores de carburo sólido Alésoirs Carbure Monobloc



All recommendations should be considered a starting point, with possible variations to achieve optimum results. Increase the speed 20% when using coated reamers.



Todas la recomendaciones deberían ser consideradas como punto de partida, con posibles variaciones para conseguir óptimos resultados. Incrementar la velocidad un 20% al utilizar escariadores recubiertos.



Les informations techniques mentionnées sont des valeurs moyennes données à titre indicatif et sont modifiables pour optimiser les résultats. Augmenter la vitesse de 20% lorsque vous utilisez des alésoirs monobloc revêtus.

200						
material	speed in sfm	feed per revolution (in / rev)				
		≤ 1/16	>1/16 – 1/8	>1/8 – 1/4	>1/4 – 3/8	>3/8 – 1/2
Structural Steel / Aceros de construcción / Acier à construction						
< 150 Bhn	210	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0090	.0090–.0120
< 190 Bhn	185	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0090	.0090–.0120
< 250 Bhn	165	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0070	.0070–.0100
Case Hardening Steel / Aceros de cementación y temple / Aciers à cémentation						
< 235 Bhn	175	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0090	.0090–.0120
< 300 Bhn	165	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0070	.0070–.0100
Nitriding Steel / Aceros de nitruración / Aciers à nitruration						
< 300 Bhn	165	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0090	.0090–.0120
< 40 Rc	145	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0080	.0080–.0100
Heat Treatable Steel / Aceros de temple / Acier trempé						
< 200 Bhn	200	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100
< 240 Bhn	175	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100
< 40 Rc	145	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100
< 45 Rc	110	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0070	.0070–.0100
Tool Steel / Aceros de herramientas / Acier à outils						
< 235 Bhn	110	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100
< 300 Bhn	85	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100
< 40 Rc	75	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100
< 45 Rc	65	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0070	.0070–.0100
> 45 Rc	55	.0005–.0010	.0010–.0020	.0020–.0030	.0030–.0040	.0040–.0060
Stainless Steel / Acero Inoxidable / Acier inoxydable						
< 200 Bhn	110	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0080	.0080–.0100
< 250 Bhn	65	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0080	.0080–.0100
< 280 Bhn	55	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0080	.0080–.0100
Cast Steel / Aceros de fundición blanda / Fonte tendre						
< 150 Bhn	165	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0090	.0090–.0120
< 190 Bhn	135	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0090	.0090–.0120
> 190 Bhn	85	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0070	.0070–.0100
Cast Steel – Hard / Aceros de fundición dura / Fonte dure						
	130	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0070	.0700–.0100
High Temp. Alloys / Aceros resistentes a altas temp. / Alliage à haute temp.						
< 200 Bhn	75	.0005–.0010	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080
< 240 Bhn	50	.0005–.0010	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080
< 300 Bhn	45	.0005–.0010	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080
< 40 Rc	40	.0005–.0010	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080
< 45 Rc	35	.0005–.0010	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080
> 45 Rc	20	.0005–.0010	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0080

→ continued on next page

Condiciones de corte
Conditions de coupe

Escariadores de carburo sólido
Alésoirs Carbure Monobloc

200						
material	speed in sfm	feed per revolution (in / rev)				
		≤ 1/16	>1/16 – 1/8	>1/8 – 1/4	>1/4 – 3/8	>3/8 – 1/2
Titanium Alloys / Aleaciones de titanio / Alliage de titane						
< 160 Bhn	85	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0090	.0090–.0120
< 280 Bhn	65	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0090	.0090–.0120
> 40 Rc	45	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0070	.0070–.0100
Malleable Cast Iron / Fundición maleable / Fonte aciérée malléable						
< 200 Bhn	175	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0090	.0090–.0120
> 200 Bhn	135	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0070	.0070–.0100
Gray Cast Iron / Fundición Gris / Fonte aciérée grise						
< 200 Bhn	220	.0020–.0030	.0030–.0050	.0050–.0070	.0070–.0100	.0100–.0150
> 200 Bhn	175	.0010–.0020	.0020–.0040	.0040–.0060	.0060–.0090	.0090–.0120
Copper / Cobre / Cuivre						
< 150 Bhn	175	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0080	.0080–.0100
Copper Alloys – Brittle / Aleación de cobre fragil / Alliage de cuivre - mou						
–	240	.0010–.0020	.0020–.0030	.0030–.0050	.0050–.0080	.0080–.0100
Aluminum – Low Silicon / Aluminio – bajo contenido de silicio / Aluminium – faible teneur en silice						
–	400	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100	.0100–.0120
Aluminum – High Silicon / Aluminio – alto contenido de silicio / Aluminium à forte teneur de silice						
–	240	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100	.0100–.0120
Magnesium Alloys / Aleaciones de magnesio / Alliage de magnésium						
–	350	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100	.0100–.0120
Zinc Alloys / Aleaciones de zinc / Alliage de zinc						
–	265	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100	.0100–.0120
Plastic / Plásticos / Matières Synthétiques						
–	265	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100	.0100–.0120
Fiber Plastic / Fibra de plástico / Fibre de plastique						
–	220	.0020–.0040	.0040–.0060	.0060–.0080	.0080–.0100	.0100–.0120



All recommendations should be considered a starting point, with possible variations to achieve optimum results. Increase the speed 20% when using coated reamers.



Todas la recomendaciones deberían ser consideradas como punto de partida, con posibles variaciones para conseguir óptimos resultados. Incrementar la velocidad un 20% al utilizar escariadores recubiertos.



Les informations techniques mentionnées sont des valeurs moyennes données à titre indicatif et sont modifiables pour optimiser les résultats. Augmenter la vitesse de 20% lorsque vous utilisez des alésoirs monobloc revêtues.

Condiciones de corte Conditions de coupe

Escariadores de carburo sólido Alésoirs Carbure Monobloc



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201M						
material	speed in m / min	feed (mm / rev)				
		≤ 1,6	>1,6 – 3	>3 – 6	>6 – 10	>10 – 12
Structural Steel / Aceros de construcción / Acier à construction						
< 500 N/mm ²	64	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,23	0,23 – 0,3
< 650 N/mm ²	56	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,23	0,23 – 0,3
< 850 N/mm ²	50	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,18	0,18 – 0,25
Case Hardening Steel / Aceros de cementación y temple / Aciers à cémentation						
< 800 N/mm ²	53	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,23	0,23 – 0,3
< 1000 N/mm ²	50	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,18	0,18 – 0,25
Nitriding Steel / Aceros de nitruración / Aciers à nitruration						
< 1000 N/mm ²	50	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,23	0,23 – 0,3
< 1300 N/mm ²	45	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,2	0,2 – 0,25
Heat Treatable Steel / Aceros de temple / Acier trempé						
< 700 N/mm ²	61	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25
< 900 N/mm ²	53	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25
< 1200 N/mm ²	45	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25
< 1400 N/mm ²	33	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,18	0,18 – 0,25
Tool Steel / Aceros de herramientas / Acier à outils						
< 800 N/mm ²	33	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25
< 1000 N/mm ²	26	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25
< 1200 N/mm ²	23	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25
< 1400 N/mm ²	20	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,18	0,18 – 0,25
> 1400 N/mm ²	17	0,013 – 0,025	0,025 – 0,05	0,05 – 0,08	0,08 – 0,1	0,1 – 0,15
Stainless Steel / Acero Inoxidable / Acier inoxydable						
< 700 N/mm ²	33	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,2	0,2 – 0,25
< 850 N/mm ²	20	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,2	0,2 – 0,25
< 950 N/mm ²	17	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,2	0,2 – 0,25
Cast Steel / Aceros de fundición blanda / Fonte tendre						
< 500 N/mm ²	50	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,23	0,23 – 0,3
< 650 N/mm ²	41	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,23	0,23 – 0,3
> 650 N/mm ²	26	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,18	0,18 – 0,25
Cast Steel – Hard / Aceros de fundición dura / Fonte dure						
–	40	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,18	0,18 – 0,25
High Temp. Alloys / Aceros resistentes a altas temp. / Alliage à haute temp.						
< 700 N/mm ²	23	0,013 – 0,025	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2
< 900 N/mm ²	15	0,013 – 0,025	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2
< 1100 N/mm ²	14	0,013 – 0,025	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2
< 1250 N/mm ²	12	0,013 – 0,025	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2
< 1400 N/mm ²	11	0,013 – 0,025	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2
> 1400 N/mm ²	6	0,013 – 0,025	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2

→ continued on next page

Condiciones de corte
Conditions de coupe

Escariadores de carburo sólido
Alésoirs Carbure Monobloc

201M						
material	speed in m / min	feed (mm / rev)				
		≤ 1,6	>1,6 – 3	>3 – 6	>6 – 10	>10 – 12
Titanium Alloys / Aleaciones de titanio / Alliage de titane						
< 550 N/mm ²	26	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,23	0,23 – 0,3
< 950 N/mm ²	20	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,23	0,23 – 0,3
> 1200 N/mm ²	14	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,18	0,18 – 0,25
Malleable Cast Iron / Fundición maleable / Fonte aciérée malléable						
< 200 HB	53	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,23	0,23 – 0,3
> 200 HB	41	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,18	0,18 – 0,25
Gray Cast Iron / Fundición Gris / Fonte aciérée grise						
< 200 HB	67	0,05 – 0,08	0,08 – 0,13	0,13 – 0,18	0,18 – 0,25	0,25 – 0,38
> 200 HB	53	0,025 – 0,05	0,05 – 0,1	0,1 – 0,15	0,15 – 0,23	0,23 – 0,3
Copper / Cobre / Cuivre						
< 500 N/mm ²	53	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,2	0,2 – 0,25
Copper Alloys – Brittle / Aleación de cobre fragil / Alliage de cuivre - mou						
–	73	0,025 – 0,05	0,05 – 0,08	0,08 – 0,13	0,13 – 0,2	0,2 – 0,25
Aluminum – Low Silicon / Aluminio – bajo contenido de silicio / Aluminium – faible teneur en silice						
–	122	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	0,25 – 0,3
Aluminum – High Silicon / Aluminio – alto contenido de silicio / Aluminium à forte teneur de silice						
–	73	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	0,25 – 0,3
Magnesium Alloys / Aleaciones de magnesio / Alliage de magnésium						
–	107	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	0,25 – 0,3
Zinc Alloys / Aleaciones de zinc / Alliage de zinc						
–	80	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	0,25 – 0,3
Plastic / Plásticos / Matières Synthétiques						
–	80	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	0,25 – 0,3
Fiber Plastic / Fibra de plástico / Fibre de plastique						
–	67	0,05 – 0,1	0,1 – 0,15	0,15 – 0,2	0,2 – 0,25	0,25 – 0,3



All recommendations should be considered a starting point, with possible variations to achieve optimum results. Increase the speed 20% when using coated reamers.



Todas la recomendaciones deberían ser consideradas como punto de partida, con posibles variaciones para conseguir óptimos resultados. Incrementar la velocidad un 20% al utilizar escariadores recubiertos.



Les informations techniques mentionnées sont des valeurs moyennes données à titre indicatif et sont modifiables pour optimiser les résultats. Augmenter la vitesse de 20% lorsque vous utilisez des alésoirs monobloc revêtues.



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

Metric Formulas

$\text{sfm} = \text{rpm} \times .262 \times \text{cutting diameter}$

$\text{rpm} = \text{sfm} \times 3.82 / \text{cutting diameter}$

$\text{feed (inches per tooth)} = \text{ipm} / (\text{number of teeth} \times \text{rpm})$

$\text{feed (inches / minute)} = \text{inches per tooth} \times \text{number of teeth} \times \text{rpm}$

$\text{feed (inches / minute)} = \text{ipr} \times \text{rpm}$

$\text{feed (inches / revolution)} = \text{ipm} / \text{rpm}$

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

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

$\text{mrr - milling - (in}^3\text{/min)} = \text{width of cut} \times \text{depth of cut} \times \text{ipm}$

$\text{cutting time - drilling - (minutes)} = \text{length} / \text{ipm}$

$\text{m/min} = (3.14 \times \text{cutting diameter} \times \text{rpm}) / 1000$

$\text{rpm} = (1000 \times \text{m} / \text{min}) / (3.14 \times \text{cutting diameter})$

$\text{feed (mm per tooth)} = \text{millimeters per minute} / (\text{number of teeth} \times \text{rpm})$

$\text{feed (mm/minute)} = \text{feed per tooth} \times \text{number of teeth} \times \text{rpm}$

$\text{feed (mm/minute)} = \text{mmr} \times \text{rpm}$

$\text{feed (mm per revolution)} = \text{mmr} / \text{rpm}$

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

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

$\text{mrr - milling - (cm}^3\text{/min)} = (\text{width of cut} \times \text{depth of cut} \times \text{mm/min}) / 1000$

$\text{cutting time - drilling - (minutes)} = \text{length} / \text{mm/min}$

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

$\text{coolant pressure- 1 Bar} = 14.5 \text{ Pounds per Square Inch (PSI)}$

$\text{calculation of coolant pressure- Pounds Per Square Inch (PSI)} = (\text{Horsepower of Pump} \times 1.460) / \text{Gallons per Minute (GPM)}$

$1 \text{ Liter} = 0.254 \text{ Gallons}$

$\text{inch} = \text{millimeters} / 25.4$ $\text{millimeters} = \text{inch} \times 25.4$

$\text{inch tap drill sizes} = \text{major diameter} - ((1.299 \times \% \text{ of thread}) / \text{threads per inch})$

$\text{metric tap drill sizes} = \text{major diameter} - (1.082 \times \text{pitch} \times \% \text{ of thread})$

$\text{inch thread forming drill size- maximum diameter} = \text{basic major diameter} - (3/8 \times \text{number of threads per inch})$

$\text{inch thread forming drill size- minimum diameter} = \text{basic major diameter} - (1/2 \times \text{number of threads per inch})$

$\text{metric thread forming drill size- maximum diameter} = \text{basic major diameter} - (.375 \times \text{pitch})$

$\text{metric thread forming drill size- minimum diameter} = \text{basic major diameter} - (.500 \times \text{pitch})$



Decimal Equivalents



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Fraction - Number - Letter - Metric Sizes

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

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

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

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

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

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

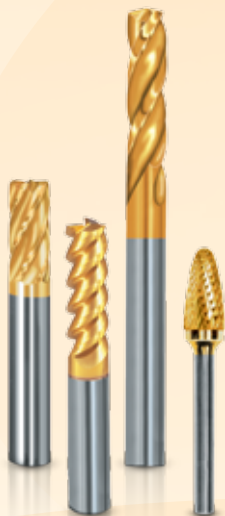
Hardness Conversion Chart

Rockwell Hardness (HRb)	Rockwell Hardness (HRc)	Brinell Hardness (HB)	Vickers Hardness (HV)	Tensile Strength (N/mm ²)	PSI (1000lb/in ²)
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

Formulas
and
Conversions

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Ti-NAMITE



Ti-NAMITE-A



Ti-NAMITE-B



Ti-NAMITE-G

Ti-NAMITE[®]

TOOL COATINGS

Engineered For Performance!

Ti-NAMITE Tool Coatings are specifically engineered for SGS solid carbide rotary tools. This proprietary multi-layering process results in maximized tool life and increased speed and feed rates in any application.



Ti-NAMITE-A[®]

Aluminum Titanium Nitride (AlTiN)

The most abrasion resistant and hardest coating, Ti-NAMITE-A is preferred for high speed and dry cutting and recommended for the machining of cast iron, hardened tool steels up to HRC 60 and other heat resistant alloys.

Recommended for applications in cast iron, high temperature alloys, hardened steels, stainless steels.

Microhardness: 3300HV 0.05

Oxidation Temperature: 800°C – 1472°F

Coefficient of Friction: .45

Thickness: 1 – 4 Microns (based on tool diameter)

Nitruro de aluminio-titanio (AlTiN)

Ti-NAMITE-A, el recubrimiento más duro y de mayor resistencia a la abrasión, es el preferido para corte seco y de alta velocidad, y se recomienda para el maquinado de hierro fundido, aceros para herramientas templados hasta HRC 60, y otras aleaciones resistentes al calor.

Se recomienda para aplicaciones de hierro fundido, aleaciones de alta temperatura, aceros templados y aceros inoxidables.

Microdureza: 3300HV 0.05

Temperatura de oxidación: 800°C – 1472°F

Coefficiente de rozamiento: .45

Espesor: 1 – 4 micrones (en base al diámetro de la herramienta)

Nitruire d'aluminium et de titane (AlTiN)

Le plus résistant et le plus dur de tous les revêtements, le Ti-NAMITE-A est idéal pour les découpages secs à haute vitesse. Il est recommandé pour usiner la fonte, les aciers durcis d'outillage ayant une dureté jusqu'à 60 HRC et divers autres alliages résistants à la chaleur.

Recommandé pour la fonte, les alliages à haute température, les aciers durcis et l'acier inoxydable.

Micro-dureté: 3300HV 0.05

Température d'oxydation : 800°C – 1472°F

Coefficient de friction : 0,45

Épaisseur : 1 – 4 microns (selon le diamètre de l'outil)

Diseñados para máximo rendimiento

Los recubrimientos para herramientas Ti-NAMITE están diseñados específicamente para las herramientas rotativas SGS de carburo sólido. Este proceso multi-capa patentado maximiza la vida útil de la herramienta, y permite mayor velocidad y avance en cualquier aplicación.

Conçus pour performer!

Les revêtements d'outil Ti-NAMITE sont spécifiquement conçus pour les outils rotatifs SGS en carbure massif. Notre processus multicouche exclusif maximise la longévité des outils et permet d'augmenter les vitesses de rotation et d'avance dans toutes les applications.



Ti-NAMITE

Titanium Nitride (TiN)

A general purpose coating allowing higher speeds and longer tool life, Ti-NAMITE is effective in a wide variety of metal cutting operations.

Recommended for general purpose and applications in: stainless steel, medium carbon steel, alloyed steel, copper alloys, brass and bronze.

Microhardness: 2200HV 0.05

Oxidation Temperature: 600°C – 1112°F

Coefficient of Friction: .4 – .65

Thickness: 1 – 4 Microns (based on tool diameter)

Nitruro de titanio (TiN)

Ti-NAMITE, recubrimiento de uso general que permite lograr mayores velocidades y una vida útil más prolongada de la herramienta, es efectivo en una amplia variedad de operaciones de corte de metales.

Se recomienda para uso general y aplicaciones en: acero inoxidable, acero con contenido medio de carbono, acero aleado, aleaciones de cobre, latón y bronce.

Microdureza: 2200HV 0.05

Temperatura de oxidación: 600°C – 1112°F

Coefficiente de rozamiento: .4 – .65

Espesor: 1 – 4 micrones (en base al diámetro de la herramienta)

Nitruure de titane (TiN)

Ce revêtement d'usage général permet d'augmenter la vitesse de rotation et la longévité des outils. Le revêtement Ti-NAMITE est efficace dans une grande variété d'opérations de découpage du métal.

Recommandé pour un usage général et dans les applications suivantes: acier inoxydable, acier à teneur moyenne en carbone, alliages d'acier, alliages de cuivre, laiton et bronze.

Micro-dureté: 2200HV 0.05

Température d'oxydation : 600°C – 1112°F

Coefficient de friction : 0,4 – 0,65

Épaisseur : 1 – 4 microns (selon le diamètre de l'outil)

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Ti-NAMITE-G®

Titanium Carbonitride (TiCN)

A harder, more lubricious coating offering better performance in steels over HRC 40 and aluminum alloys, Ti-NAMITE-C is violet-brown in color.

Recommended for applications in high silicon aluminum alloys, titanium alloys, low carbon steel, alloyed steels.

Microhardness: 3000HV 0.05

Oxidation Temperature: 400°C – 752°F

Coefficient of Friction: .3 – .45

Thickness: 1 – 4 Microns (based on tool diameter)

Carbonitruro de titanio (TiCN)

Ti-NAMITE-C, recubrimiento más duro y más lubricante de color violeta-marrón, ofrece mejor rendimiento en aceros por encima de HRC 40 y aleaciones de aluminio.

Se recomienda para aplicaciones de aleaciones de aluminio con alto contenido de silicio, aleaciones de titanio, acero con bajo contenido de carbono y aceros aleados.

Microdureza: 3000HV 0.05

Temperatura de oxidación: 400°C – 752°F

Coefficiente de rozamiento: .3 – .45

Espesor: 1 – 4 micrones (en base al diámetro de la herramienta)

Carbonitruure de titane (TiCN)

Ce revêtement plus dur et plus lubrique offre de meilleures performances sur l'acier ayant une dureté dépassant 40 HRC et sur les alliages d'aluminium. Le revêtement Ti-NAMITE-C est de couleur brun violet.

Il est recommandé pour les alliages d'aluminium à forte teneur en silicium, les alliages de titane, les aciers à faible teneur en carbone et les alliages d'acier.

Micro-dureté: 3000HV 0.05

Température d'oxydation : 400°C – 752°F

Coefficient de friction : 0,3 – 0,45

Épaisseur : 1 – 4 microns (selon le diamètre de l'outil)



Ti-NAMITE-B®

Titanium DiBoride (TiB₂)

Our toughest coating ever, recommended for use with silicon aluminum alloys and titanium alloys.

Recommended for applications in high silicon aluminum alloys and titanium alloys.

Microhardness: 4000HV

Oxidation Temperature: 850°C – 1562°F

Coefficient of Friction: .45

Thickness: 1 – 2 Microns (based on tool diameter)

Diboruro de titanio (TiB₂)

El más duro de todos nuestros recubrimientos, recomendado para utilizar con aleaciones de aluminio y silicio, y aleaciones de titanio

Se recomienda para aplicaciones de aleaciones de aluminio con alto contenido de silicio y aleaciones de titanio.

Microdureza: 4000HV

Temperatura de oxidación: 850°C – 1562°F

Coefficiente de rozamiento: .45

Espesor: 1 – 2 micrones (en base al diámetro de la herramienta)

Diboride de titane (TiB₂)

Notre revêtement le plus résistant de tous, recommandé pour les alliages d'aluminium et de silicium et les alliages de titane.

Recommandé pour les alliages d'aluminium à forte teneur en silicium et les alliages de titane.

Micro-dureté: 4000HV

Température d'oxydation : 850°C – 1562°F

Coefficient de friction : 0,45

Épaisseur : 1 – 2 microns (selon le diamètre de l'outil)

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/8	.010	32606
/8	.010	32607
/16	.010	32608
/16	.010	32609
/16	.010	
/4		32633
/4		32594
/4		32596
/4		32596
/16		32575
/16		32575
/16		32575
/8		32577
/8		32577
/8		32577
/8		32577
/8		32685
/8	.010	
/16		32633
/16		32594
/2		32595
/2		32596
/2		32597
/2	.050	32575
		32576
	.060	32577
		32578
	.030	32685
	.060	32686
	.030	32598
	.060	32600
	.030	32579
	.060	32581
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10028	182	10324	180	10678	182	11703	186	12628	188	13453	192	14328	194	15425	220
10050	182	10325	180	10678	222	11725	186	12675	188	13500	192	14375	196	15428	202
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10288	180	10361	180	11103	184	12253	220	13003	190	13928	194	14928	200	15753	222
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10290	180	10363	180	11153	184	12275	220	13028	190	13953	194	14953	200	15775	220
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10292	180	10365	180	11203	184	12278	220	13078	190	14003	194	14978	200	15778	224
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10317	180	10628	220	11525	184	12525	188	13350	192	14275	194	15350	202	16078	206
10318	180	10650	182	11525	220	12528	188	13353	192	14275	224	15353	202	16078	222
10319	180	10650	220	11550	184	12550	188	13375	192	14278	194	15400	202	16100	206
10320	180	10653	182	11550	222	12553	188	13378	192	14278	224	15400	220	16100	224

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16703	196	17475	186	18212	212	19223	208	20253	183	20338	181	21028	185	22300	223
16703	218	17475	220	18213	212	19224	208	20269	181	20339	181	21050	185	22303	187
16725	196	17478	186	18214	212	19225	208	20270	181	20340	181	21053	185	22303	223
16725	218	17478	220	18215	212	19226	208	20271	181	20341	181	21100	185	22325	187
16728	196	17550	188	18216	213	19227	208	20272	181	20342	181	21103	185	22325	225
16728	218	17550	220	18217	213	19228	208	20273	181	20343	181	21200	185	22328	187
16750	202	17553	188	19000	182	19229	208	20274	181	20344	181	21203	185	22328	225
16750	218	17553	220	19002	182	19230	208	20275	181	20345	181	21250	185	22350	187
16753	202	17575	188	19004	182	19231	208	20276	181	20350	183	21253	185	22350	225
16753	218	17575	220	19006	182	19232	208	20277	181	20353	183	21275	185	22353	187
16775	202	17578	188	19008	182	19233	208	20278	181	20354	181	21278	185	22353	225
16775	218	17578	220	19010	182	19234	208	20279	181	20355	181	21300	185	22450	189
16778	202	17600	190	19012	184	19235	208	20280	181	20356	181	21303	185	22453	189
16778	218	17600	220	19014	184	19236	208	20281	181	20357	181	21325	185	22475	189
16800	202	17603	190	19016	184	19237	208	20282	181	20358	181	21328	185	22478	189
16800	218	17603	220	19018	184	19240	208	20283	181	20359	181	21450	185	22500	189
16803	202	17625	190	19020	184	19241	208	20284	181	20360	181	21450	221	22503	189
16803	218	17625	220	19022	184	19242	208	20285	181	20361	181	21453	185	22525	189
17100	182	17628	190	19024	186	19243	208	20286	181	20362	181	21453	221	22528	189
17100	220	17628	220	19026	186	19244	208	20287	181	20363	181	21475	185	22550	189
17103	182	17650	192	19028	186	19245	208	20288	181	20364	181	21475	221	22553	189
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