SGS®

Solid Carbide Tools

An ISO 9001 Certified Company

SGS PRODUCT CATALOG

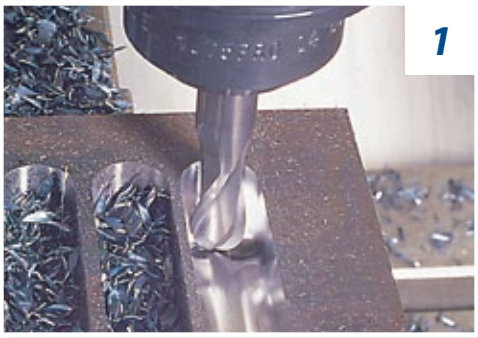
www.sgstool.com

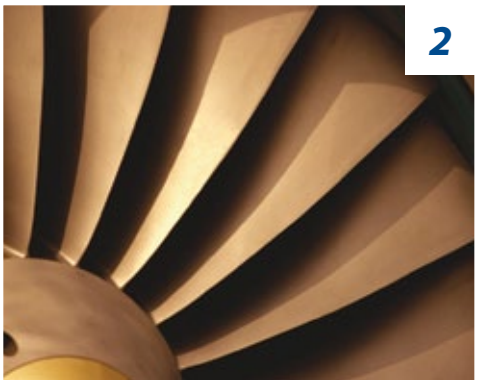
Table of Contents

Table of Contents

Table of Contents

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. Aerospacio
3. Generación de Energía
4. Producción Automovilística
5. Fundición
6. Médico

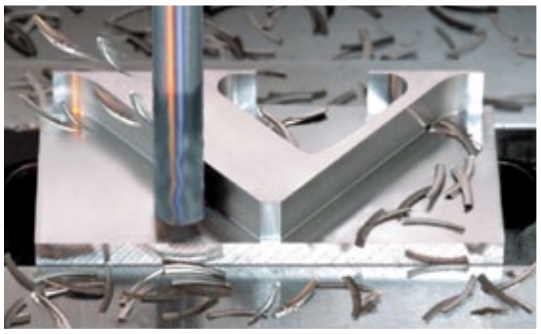
- Plus de 13000 outils stockés en cotes métriques et pouces
- Un réseau de distribution dans plus de 60 pays
- 12 points de vente et de stockage localisés en Europe, Asie et Amérique du Nord

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

High Performance Solid Carbide Tools

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.

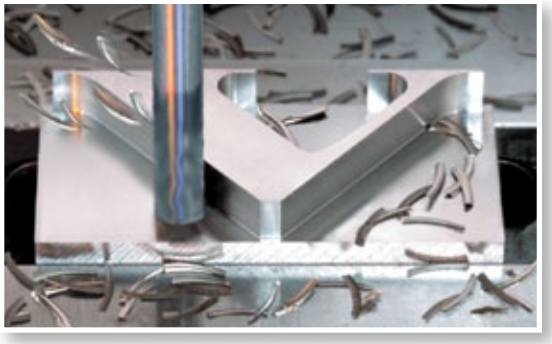


All SGS High Performance Products are coated with our own specially developed Ti-NAMITE PVD Process Tool Coatings. Coatings such as Ti-NAMITE-A Aluminum Titanium Nitride (AlTiN) and Ti-NAMITE-B Titanium Diboride (TiB_2) provide maximized tool life and increased speed and feed rates in any application. Ti-NAMITE Tool Coatings are developed and processed in our own multi-million dollar facility in Munroe Falls, OH USA.

Herramientas de Carburo Sólido de Alto Rendimiento

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.

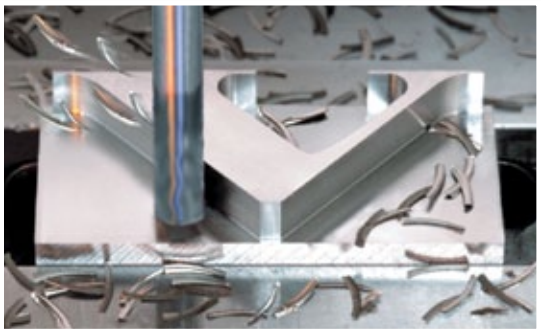


Todos los productos SGS de alto rendimiento están recubiertos por nuestros recubrimientos Ti-Namite PVD, un proceso especial de recubrimientos que hemos desarrollado. Los recubrimientos como el Ti-NAMITE-A de nitruro de aluminio-titanio (AlTiN) y Ti-NAMITE-B de diboruro de titanio (TiB_2) maximizan la 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.

Outils Massifs au Carbure Haute Performance

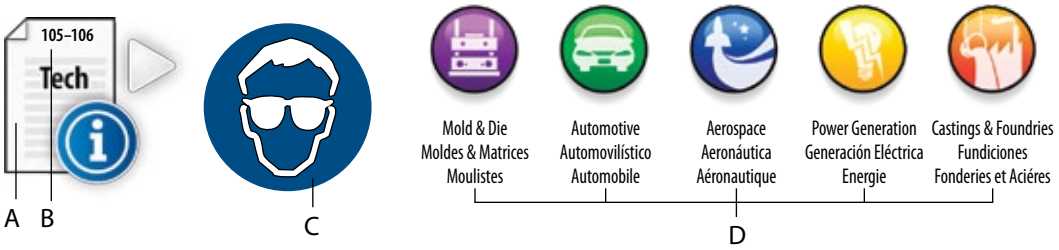
À titre de leader technologique, la société SGS Tool Company s'engage à vous fournir des produits haute performance à la fine pointe de la technologie. Nous relevons tous les défis complexes de l'usinage haute précision, particulièrement dans les secteurs de l'aérospatiale, de l'automobile et de production 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 (TiB_2) 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 catalogo
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 Lunnettes de Sécurite 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 ISA

INDUSTRIAL SUPPLY ASSOCIATION
Linking Channel Partners

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).

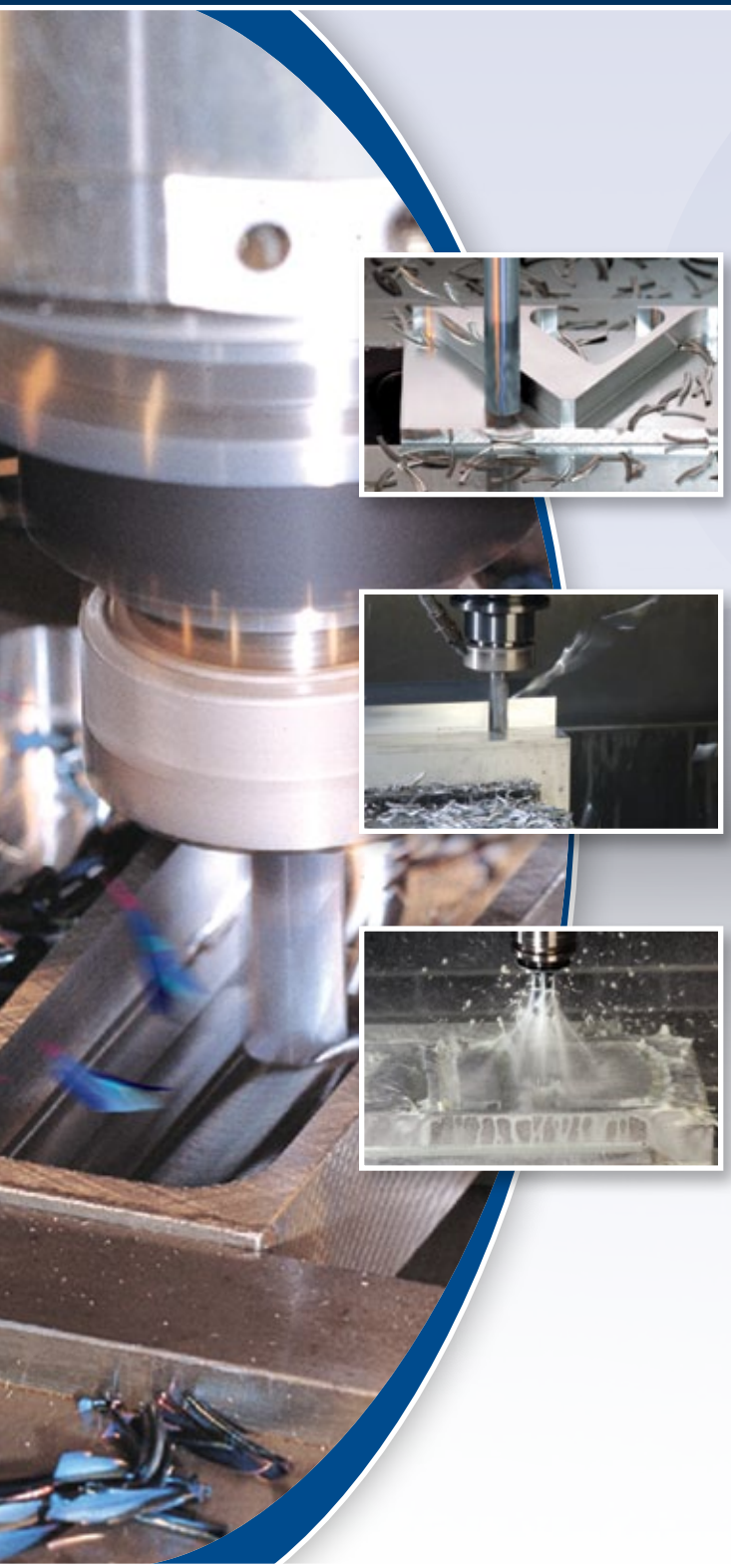
Fondée en 1951, la société SGS est un des leaders de la fabrication de fraises en carbure de tungstène monobloc. SGS et ses filiales sont à même de vous proposer:

- 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

END MILLS



SGS®
Solid Carbide Tools
An ISO 9001 Certified Company

High Performance End Mills

MAIN Table of Contents

End Mills

Herramientas de Carburo Sólido de Alto Rendimiento

MAIN Table of Contents

Fresas Frontales

Outils Massifs au Carbure Haute Performance

MAIN Table of Contents

Fraises

Z-CARB-AP
Patented Variable Rake End Mills

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 Table of Contents

END MILLS

Z-CARB-AP
Patented Variable Rake End Mills

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 típìco, 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.

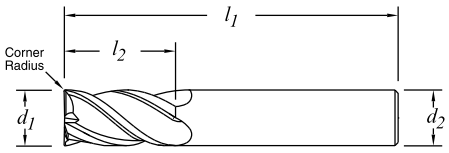
Niveau 1
Un espacement de goujure inégal aide à briser la configuration du rythme créée par le bord de coupe des fraises en bout typiques, ce qui aide à supprimer le développement des harmoniques dommageables.

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.

Z-Carb-AP Patented Variable Rake End Mills

Fractional Series **Z1PCR**



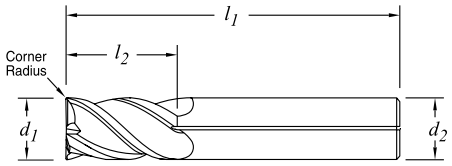
Tolerances (inch)

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

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

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

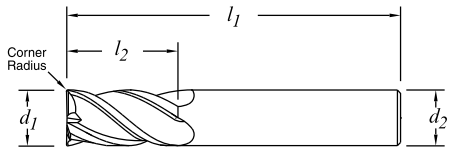
SEE IN ACTION

SEE IN ACTION

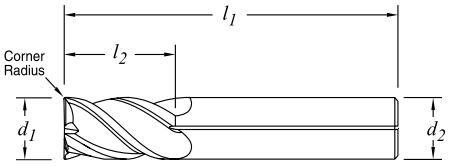
The items on this page have replaced previous series Z1CR.

Tolerances (mm)		
Diameter	**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) EDP No.	Ti-NAMITE-A (AlTiN) EDP No. W/Flat	JetStream 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

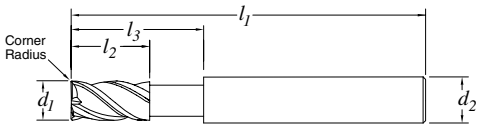


JetStream Corner Radius

The items on this page have replaced previous series Z1MCR.

Z-Carb – AP Patented Variable Rake End Mills

Fractional Series **Z1PLC**



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

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

Series Z1PLC • Z1MPLC
Series Z1PLB

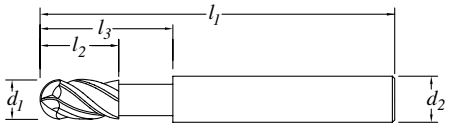
Z-Carb-AP Variable Rake End Mills
Z1PLC/Z1MPLC: 4-Flute – Long Reach with Corner Radius
Z1PLB: 4-Flute – Long Reach Ball End

Serie Z1PLC • Z1MPLC
Serie Z1PLB

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
Série Z1PLB

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



Fractional Series **Z1PLB**

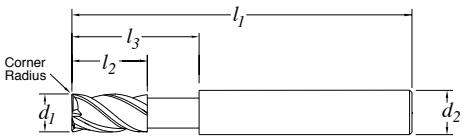
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Reach l_3	Ti-NAMITE-A (AlTiN) EDP No.
1/4	1/2	4	1/4	1-1/4	36480
5/16	13/16	4	5/16	1-5/8	36482
3/8	7/8	5	3/8	1-7/8	36486
7/16	1	6	7/16	2	38490
1/2	1	6	1/2	2-1/4	38492
9/16	1-1/8	6	9/16	2-1/2	38496
5/8	1-1/4	6	5/8	3	36500
3/4	1-1/2	6	3/4	3-1/2	36502
1	1-1/2	6	1	4	36504

240–241 Tech

Z-Carb – AP Patented Variable Rake End Mills

Tolerances (mm)		
Diameter	**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

PATENTED
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**

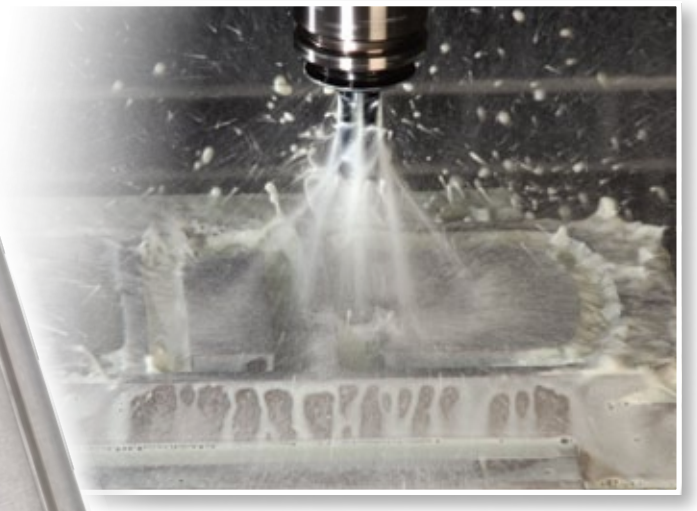
Minimum Tool Deflection:

- **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 Table of Contents

END MILLS

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 desalojo 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 aggressif. 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**

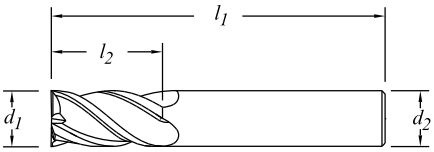
Déflexion d'outil minimale:

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

Matériaux pouvant être fraisés:

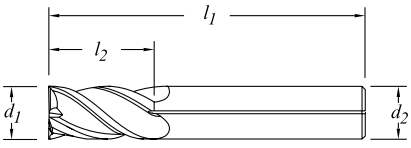
- **Aciers à faible teneur en carbone**
- **Aciers d'outillage**
- **Fonte**
- **Aciers inoxydables**
- **Alliages haute température au titane**

Z-Carb End Mills for Ferrous Applications



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

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



Series Z1 • Z1M

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

Serie Z1 • Z1M

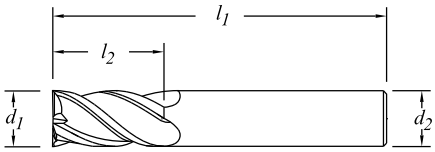
Fresas Z-Carb Para Aplicaciones Ferrosas – 4 filos – Punta plana – Z-Carb con tecnología de refrigerante patentada JetStream

Série Z1 • Z1M

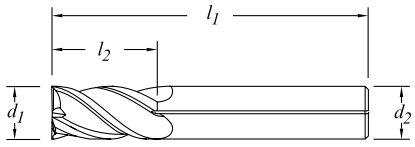
Fraises à queue Z-Carb Pour Applications Ferreuses – 4 goujures – Extrémité carrée – Z-Carb avec technologie brevetée de refroidissement JetStream

Z-Carb End Mills for Ferrous Applications

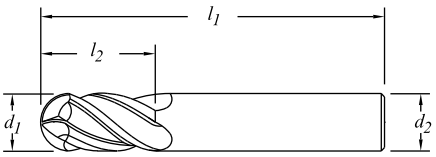
Tolerances (mm)		
Diameter	**d_1**	**d_2**
3 – 6	+0,000/–0,030	h6
> 6 – 10	+0,000/–0,040	h6
> 10 – 25	+0,000/–0,050	h6



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



Z-Carb End Mills for Ferrous Applications



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

Series Z1B • Z1MB

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

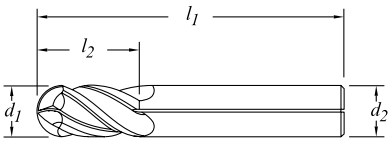
Serie Z1B • Z1MB

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

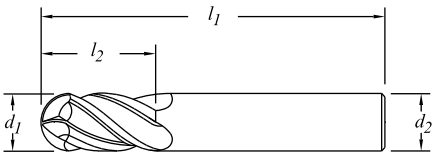
Série Z1B • Z1MB

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

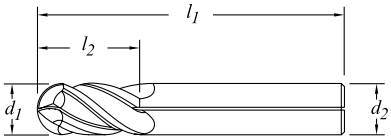
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Ti-NAMITE-A (AlTiN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No. W/Flat	JetStream* EDP No.
1/8	3/8	1-1/2	1/8	36358	–	–
5/32	7/16	2	3/16	36357	–	–
3/16	7/16	2	3/16	36359	–	–
7/32	7/16	2-1/2	1/4	36361	–	–
1/4	1/2	2-1/2	1/4	36344	–	–
1/4	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



Tolerances (mm)		
Diameter	**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

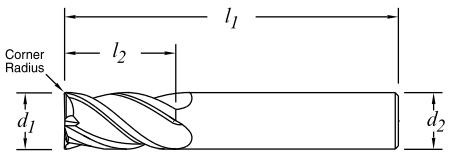


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Ti-NAMITE-A (AlTiN) EDP No.	JetStream* EDP No.
3	8	57	6	46354	–
4	11	57	6	46355	–
5	13	57	6	46356	–
6	13	57	6	46343	–
8	19	63	8	46344	–
10	22	72	10	46345	–
12	26	83	12	46346	–
14	26	83	14	46347	46518
16	32	92	16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



Z-Carb End Mills for Ferrous Applications

Fractional Series **Z1ACR**



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.	Ti-NAMITE-A (AlTiN) 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

continued next page

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

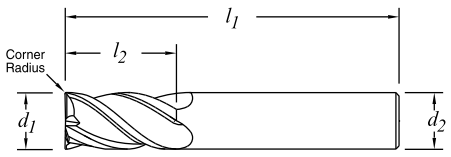
Z-Carb End Mills for Ferrous Applications

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



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
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

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

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

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

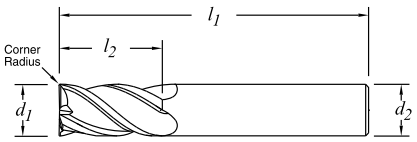
Série Z16CR

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

END MILLS Table of Contents
END MILLS
242–243 Tech

Z-Carb-HTA End Mills for High Temperature Alloys

Fractional Series **ZH1CR**



Tolerances (inch)

Diameter	d_1	d_2
1/4	+.0000 / -.0012	h6
> 1/4-3/8	+.0000 / -.0016	h6
> 3/8-1	+.0000 / -.0020	h6

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

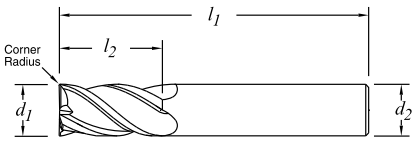
Série ZH1CR • ZH1MCR

Fraises à queue Z-Carb-HTA pour alliages haute temperature – 4 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 Number	Ti-NAMITE-A (AlTiN) 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

Metric Series **ZH1MCR**

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.	Ti-NAMITE-A (AlTiN) 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

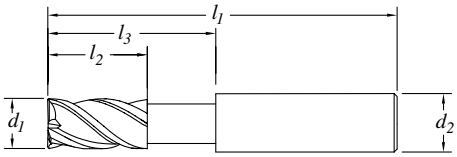
END MILLS Table of Contents

END MILLS

244 Tech

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

Fractional Series **ZD1CR**



Tolerances (inch)

Diameter	d_1	d_2
1/4	+.0000 / -.0012	h6
> 1/4-3/8	+.0000 / -.0016	h6
> 3/8-1	+.0000 / -.0020	h6

Corner Radius Tolerances

+.000 / -.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

Metric Series **ZD1MCR**

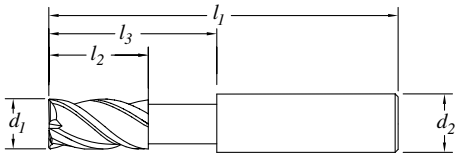
Z-Carb-MD End Mills for Mold & Die Applications

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

END MILLS Table of Contents

END MILLS

245 Tech

SEE IN ACTION

SEE IN ACTION

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**

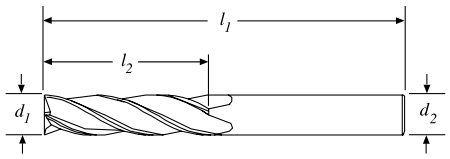
Revêtement Ti-NAMITE-A (AlTiN) haute performance

- **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

Series 7 High Performance End Mills



TOLERANCES

d_1=+0.000/–0.002
d_2=h6

Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Ti-NAMITE-A (AlTiN) EDP No.
1/8	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

Series 7 • 7M

4-Flute – Square End

Serie 7 • 7M

4 Filos – Punta plana

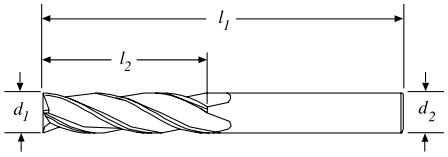
Série 7 • 7M

4 goujures – Extrémité carrée

TOLERANCES

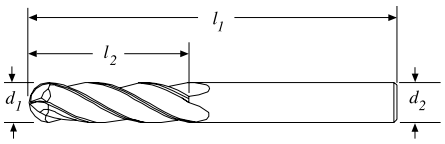
d_1=+0,000/–0,050

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

Series 7 High Performance End Mills



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

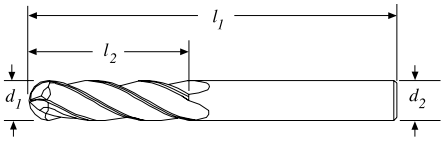
4 goujures – Extrémité sphérique

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

V-CARB™
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.

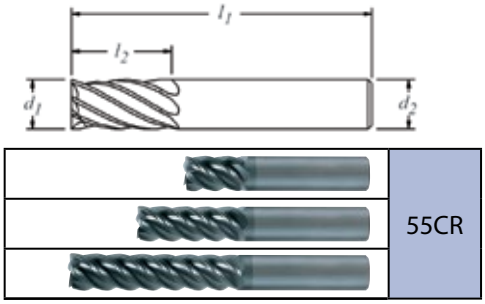
Produit d'excellents résultats dans les applications de fraisage de finition et de semi-finition. S'attaque aux tâches de fraisage profond, notamment de dégrossissage et de rainurage.

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**

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 semiacabad – 5 filos – Radio de esquina

Série 55CR

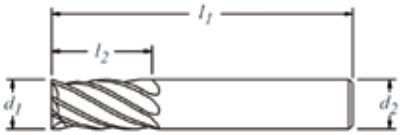
Fraises à rainurer V-Carb 5 goujures pour travaux de finition et de semi-finition – 5 goujures – Rayon de coin

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	–

248–249 Tech

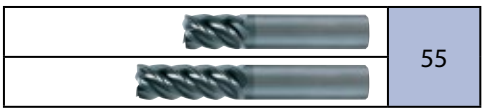
Fractional Series **55**

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



Tolerances (inch)

Diameter	d_1	d_2
1/8 –1	+.0000/–.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
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

Fractional Series **55M**

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 (AlTiN) EDP No.	Ti-NAMITE -A (AlTiN) 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	–

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

END MILLS Table of Contents
END MILLS
248–249 Tech

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

TRI-CARB®
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 filos 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 :

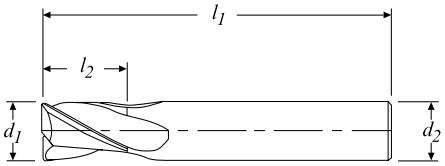
- Productivité accrue
- Meilleure finition des surfaces
- Longévité accrue des outils
- Consommation moindre de liquide de refroidissement
- Fraisage plus précis

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)
- Rigidité maximale
- Géométrie de taille élevée
- Résistance élevée à la rupture transversale

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

Fractional Series **65**



Tolerances (inch)

Diameter	d_1	d_2
1/8 – 1	+.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

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

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® HIGH PERFORMANCE CARBIDE END MILLS

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**

SEE IN ACTION
END MILLS Table of Contents
END MILLS

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

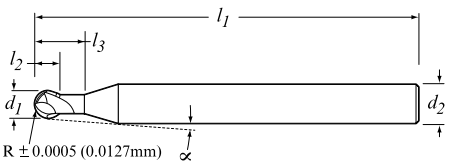
Pour l'usinage de formes à contours complexes sur des moules et des filières en acier durci.

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**

Fractional Series **56B**

Turbo-Carb End Mills for Hardened Mold & Die Applications



Tolerances (inch)		
Diameter	d_1	d_2
1/32 – 3/32	+.0000/–.0010	h6
> 3/32 – 1/4	+.0000/–.0012	h6
> 1/4 – 3/8	+.0000/–.0016	h6
> 3/8 – 3/4	+.0000/–.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	8º 20′	1/16	93272
1/16	1/16	3	1/4	7º 40′	1/8	93273
3/32	3/32	3	1/4	6º 50′	3/16	93274
1/8	1/8	3	1/4	6º	1/4	93275
3/16	3/16	3	1/4	3º 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

Metric Series **56MB**

Tolerances (mm)		
Diameter	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	8º 10′	2	91349
1,5	1,5	76	6	7º 45′	3	91350
2	2	76	6	7º 10′	4	91351
2,5	2,5	76	6	6º 35′	5	91352
3	3	76	6	6º	6	91353
4	4	76	6	4º 30′	8	91354
5	5	89	6	2º 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 Table of Contents
END MILLS
251 Tech

Power-Carb™
HIGH PERFORMANCE CARBIDE END MILLS

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 le 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**

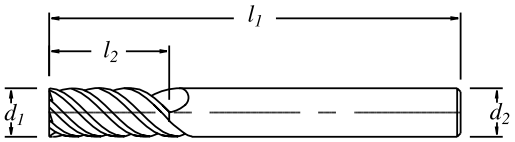
Avantages supplémentaires du fraisage à sec :

- **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.

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

Fractional Series 57



Tolerances (inch)

Diameter	d_1	d_2
1/4	+.0000 / –.0012	h6
5/16	+.0000 / –.0016	h6
3/8	+.0000 / –.0016	h6
1/2	+.0000 / –.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.
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

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

Metric Series 57M

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

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

252 Tech

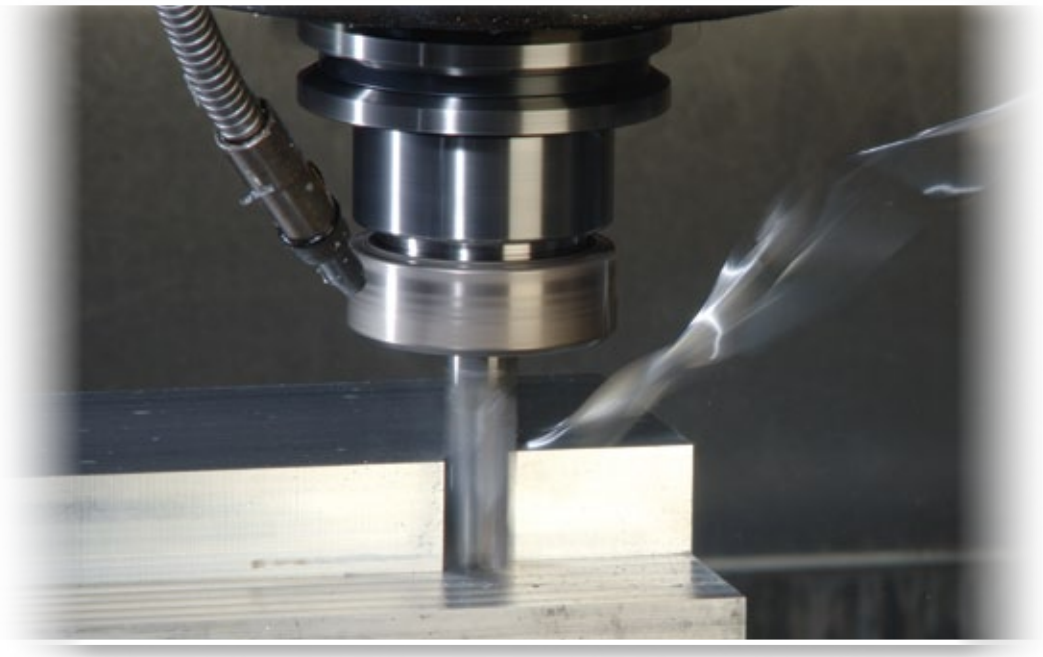
SGS SKI-CARB®

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 Table of Contents

END MILLS

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.

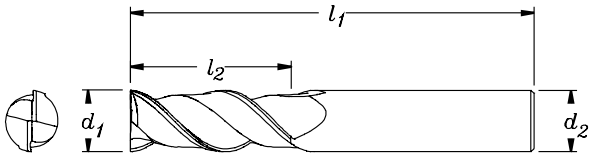
Ski-Carb End Mills for Aluminum & Non-Ferrous Applications

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/–.002



Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Corner Radius* (optional)	Uncoated EDP No. W/Flat	Ti-NAMITE-B (TiB_2) EDP No. W/Flat	Uncoated EDP No. W/O Flat	Ti-NAMITE-B (TiB_2) 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 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 filos

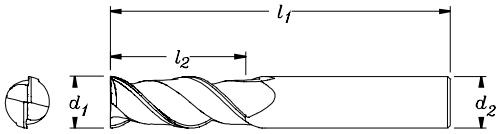
Série 44

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

END MILLS Table of Contents
END MILLS
253 – 254 Tech

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

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

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 EDP No. W/Flat	Ti-NAMITE-B (TiB_2) EDP No. W/Flat	Uncoated EDP No. W/O Flat	Ti-NAMITE-B (TiB_2) 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.

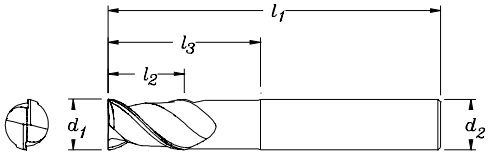
Ski-Carb End Mills for Aluminum & Non-Ferrous Applications

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/–.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 EDP No. W/Flat	Ti-NAMITE-B (TiB_2) EDP No. W/Flat	Uncoated EDP No. W/O Flat	Ti-NAMITE-B (TiB_2) 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.

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

END MILLS Table of Contents
END MILLS
253 -254 Tech

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

CARB
Solid Carbide End Mills for Aluminum

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
- Resharpening service available

Ti-NAMITE-B®

Available with TiB_2 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 advances**
- **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 rectificados con CNC**
- **Se ofrece el servicio de reafilado**

Ti-NAMITE-B®

Disponible con recubrimiento TiB_2 (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)
Coeficiente de rozamiento: 0.45
Espesor: 1 – 2 micrones (en base al diámetro de la herramienta)

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 dimentions 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 calculateur**
- **Service de réaffutage disponible**

Ti-NAMITE-B®

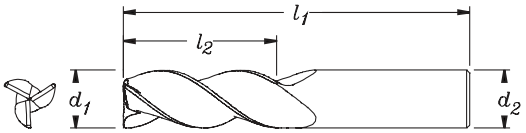
Disponibles avec revêtement TiB_2 (diboride de titane) pour des performances exceptionnelles avec une grande variété d'alliages contenant de l'aluminium et du magnésium.

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)

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

Corner Radius Tolerances (inch)
+.000/–.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 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

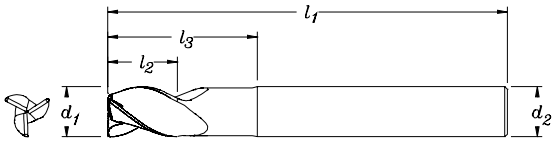
END MILLS Table of Contents

END MILLS

253–254 Tech

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

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

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

continued on next page

SEE IN ACTION

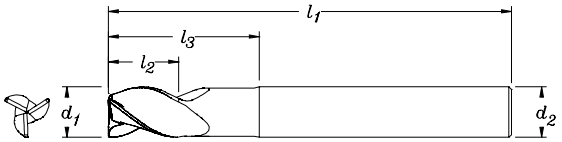
S-Carb 3-Flute End Mills for Aluminum, Non-Ferrous & Non-Metallic Materials

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

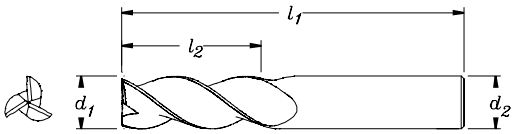
Corner Radius Tolerances (inch)

+.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.
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

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

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

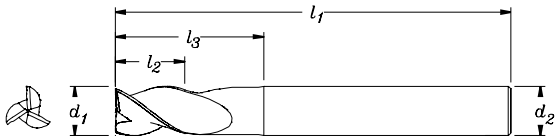
Fraises à queue S-Carb 3 goujures pour l'aluminium, ainsi que les matériaux non ferreux et non métalliques – 3 goujures – Extrémité carrée

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

SEE IN ACTION

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

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



Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Reach l_3	Uncoated EDP No.	Ti-NAMITE-B (TiB_2) 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

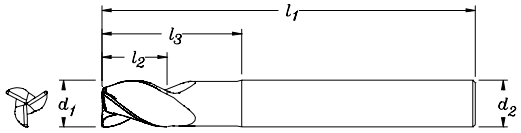
END MILLS Table of Contents

END MILLS

253–254 Tech

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

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

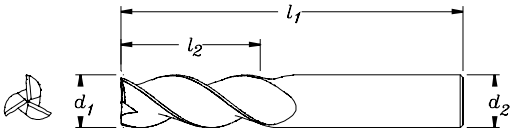
Série 43MCR

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

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

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 EDP No.	Ti-NAMITE-B (TiB_2) 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

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 Table of Contents
END MILLS
253–254 Tech

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

CARB
Solid Carbide End Mills for Aluminum

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-NAMITE-B®

Available with TiB_2 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**

TI-NAMITE-B®

Disponible con recubrimiento TiB_2 (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
Coeficiente 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**

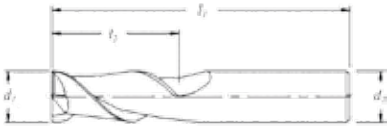
TI-NAMITE-B®

Disponibles avec revêtement TiB_2 (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)

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

Fractional Series **47**



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

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

Metric Series **47M**

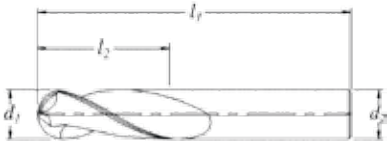
Tolerances (mm)		
Diameter	d_1	d_2
3–25	–0,0025/–0,010	h6

Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated 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

253– 254 Tech

Fractional Series **47B**

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 EDP No.	Ti-NAMITE-B (TiB_2) 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

Metric Series **47MB**

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 EDP No.	Ti-NAMITE-B (TiB_2) 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

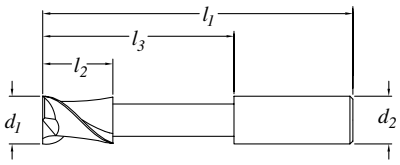
Série 47B • 47MB

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

END MILLS Table of Contents
END MILLS
253 –254 Tech

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

Fractional Series **47ES**



Tolerances (inch)		
Diameter	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 EDP No.	Ti-NAMITE-B (TiB_2) 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

Metric Series **47MES**

Tolerances (mm)		
Diameter	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 EDP No.	Ti-NAMITE-B (TiB_2) 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

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

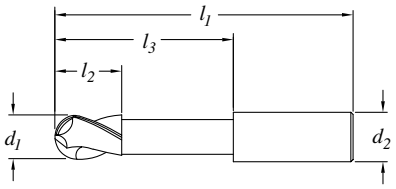
Série 47ES • 47MES

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

253–254 Tech

Fractional Series **47EB**

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



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 EDP No.	Ti-NAMITE-B (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

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 EDP No.	Ti-NAMITE-B (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

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

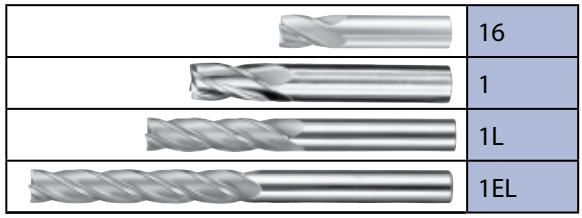
Fresas S-Carb de 2 filos para aluminio, materiales no ferrosos y no metálicos - 2 filos – Punta esférica - Alcance extendido

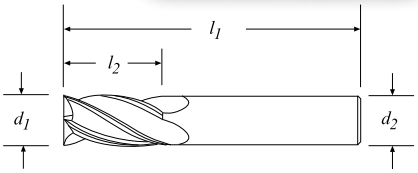
Série 47EB • 47MEB

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

END MILLS Table of Contents
END MILLS
253–254 Tech

4 Flute – Single End – Square End





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 EDP No.	Uncoated EDP No. w/Flat	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No. w/Flat	AD† EDP No.	CVD† EDP No.	Series Number
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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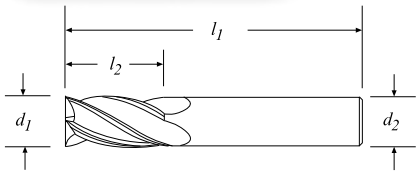
4 Flute – Single End – Square End



TOLERANCES

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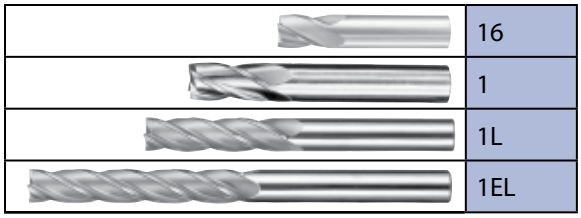
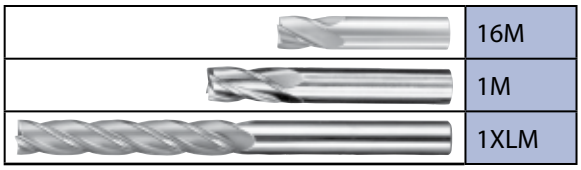


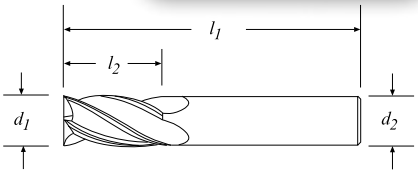
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.	Uncoated EDP No. w/Flat	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No. w/Flat	AD† EDP No.	CVD† EDP No.	Series Number
21/64	1	2-1/2	3/8	30141	–	39141	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 Table of Contents
END MILLS
255–257 Tech

4 Flute – Single End – Square End

Metric Series **1M**





TOLERANCES

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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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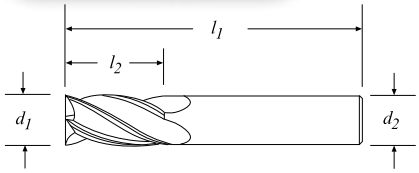
4 Flute – Single End – Square End



TOLERANCES

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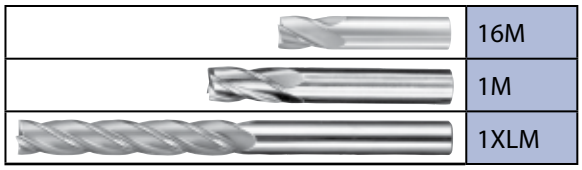
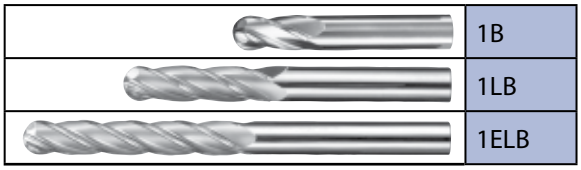
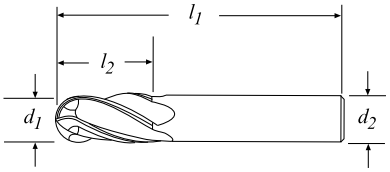


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
10	38	100	10	43125	49393	49406	49419	1XLM
11	19	63	12	41661	49150	49171	49192	16M
11	25	75	12	40161	48514	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 Table of Contents
END MILLS
258–259 Tech

4 Flute – Single End – Ball End





TOLERANCES

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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 EDP No.	Uncoated EDP No. w/Flat	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No. w/Flat	AD† EDP No.	CVD† EDP No.	Series Number
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

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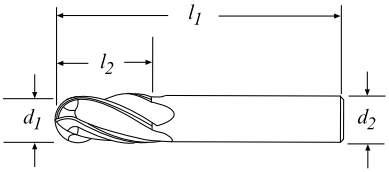
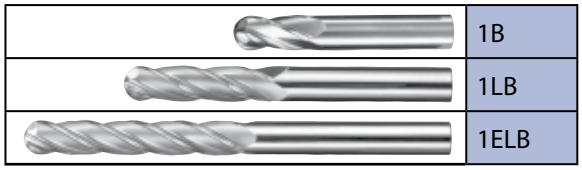
4 Flute – Single End – Ball End





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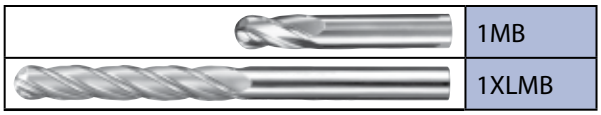
d_1=+.000–.002
d_2=h6

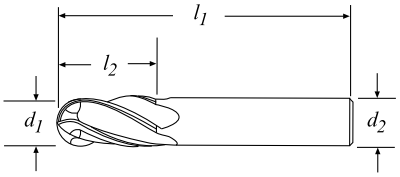
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.	Uncoated EDP No. w/Flat	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No. w/Flat	AD† EDP No.	CVD† EDP No.	Series Number
25/64	1	2-3/4	7/16	30150	–	39150	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

END MILLS Table of Contents
END MILLS
255–257 Tech

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

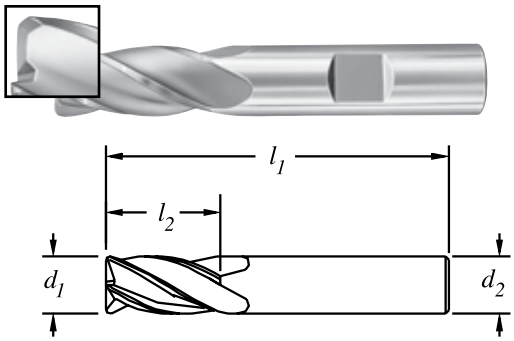
Série 1MB

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 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	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

258–259 Tech

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 0.015 EDP No.	Uncoated 0.020 EDP No.	Uncoated 0.030 EDP No.	Uncoated 0.045 EDP No.	Uncoated 0.060 EDP No.	Uncoated 0.090 EDP No.	Uncoated 0.125 EDP No.	Series Number
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) Ti-NAMITE 0.015 EDP No.	(TiN) Ti-NAMITE 0.020 EDP No.	(TiN) Ti-NAMITE 0.030 EDP No.	(TiN) Ti-NAMITE 0.045 EDP No.	(TiN) Ti-NAMITE 0.060 EDP No.	(TiN) Ti-NAMITE 0.090 EDP No.	(TiN) Ti-NAMITE 0.125 EDP No.	Series Number
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

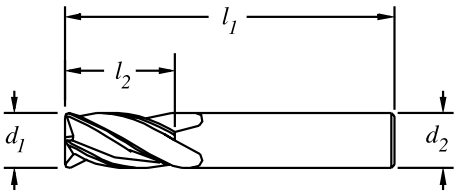
Rayon en bout
Carbure monobloc micrograin
4 dents – Hélice à droite 30° – Coupe à droite – Coupe au centre
* Méplat Weldon sur queue

END MILLS Table of Contents

END MILLS

256–257 Tech

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

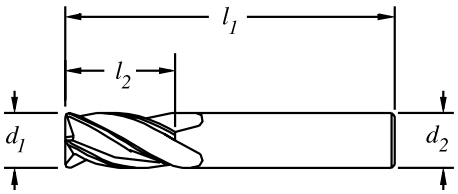
Nominal Cutting Diameter d_1	Actual Cutting Diameter	Shank Diameter d_2	Length of Cut l_2	Overall Length l_1	(TiCN) Ti-NAMITE-C 0.015 EDP No.	(TiCN) Ti-NAMITE-C 0.020 EDP No.	(TiCN) Ti-NAMITE-C 0.030 EDP No.	(TiCN) Ti-NAMITE-C 0.045 EDP No.	(TiCN) Ti-NAMITE-C 0.060 EDP No.	(TiCN) Ti-NAMITE-C 0.090 EDP No.	(TiCN) Ti-NAMITE-C 0.125 EDP No.	Series Number
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) Ti-NAMITE-A 0.015 EDP No.	(AlTiN) Ti-NAMITE-A 0.020 EDP No.	(AlTiN) Ti-NAMITE-A 0.030 EDP No.	(AlTiN) Ti-NAMITE-A 0.045 EDP No.	(AlTiN) Ti-NAMITE-A 0.060 EDP No.	(AlTiN) Ti-NAMITE-A 0.090 EDP No.	(AlTiN) Ti-NAMITE-A 0.125 EDP No.	Series Number
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

256–257 Tech

Metric Series **1MCR**

4 Flute – Single End – Corner Radius

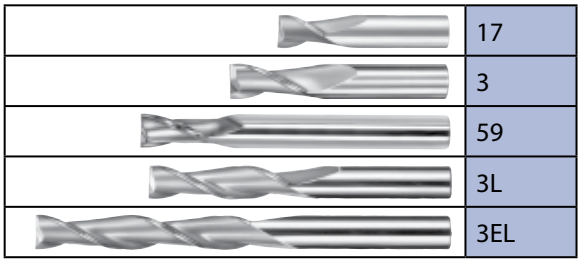


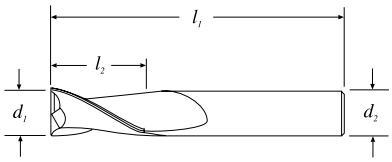
TOLERANCES

d_1=–.001–.002
d_2=h6
r=+.000–.002

Nominal Cutting Diameter d_1 mm	Shank Diameter d_2 mm	Length of Cut l_2 mm	Overall Length l_1 mm	(AlTiN) Ti-NAMITE-A 0,25 EDP No.	(AlTiN) Ti-NAMITE-A 0,50 EDP No.	(AlTiN) Ti-NAMITE-A 0,75 EDP No.	(AlTiN) Ti-NAMITE-A 1,0 EDP No.	(AlTiN) Ti-NAMITE-A 1,5 EDP No.	(AlTiN) Ti-NAMITE-A 2,0 EDP No.	Series Number
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

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 EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	DIA-CARB (CVD)† EDP No.	Series Number
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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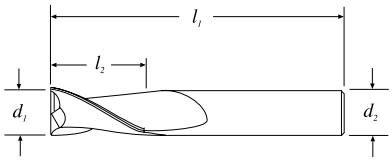
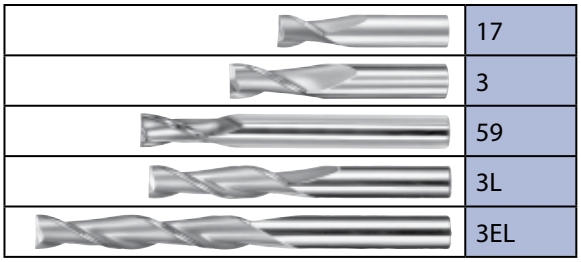
2 Flute – Single End – Square End



TOLERANCES

d_1=+.000–.002
d_2=h6

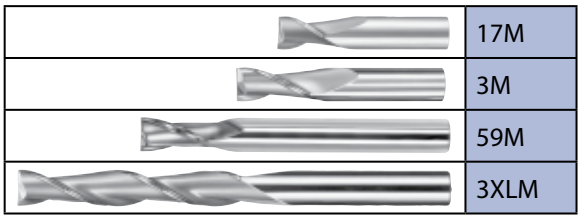


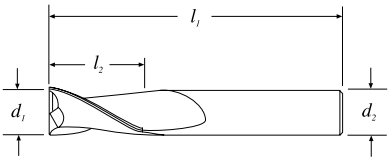
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	DIA-CARB (CVD)† EDP No.	Series Number
5/16	1-5/8	4	5/16	33325	31941	31951	31961	–	3EL
21/64	1	2-1/2	3/8	30341	39341	39541	30451	–	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
* Series 3 Set				30389	39389	39589	30470	–	3

END MILLS Table of Contents
END MILLS
255–257 Tech

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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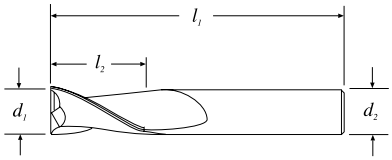
2 Flute – Single End – Square End



TOLERANCES

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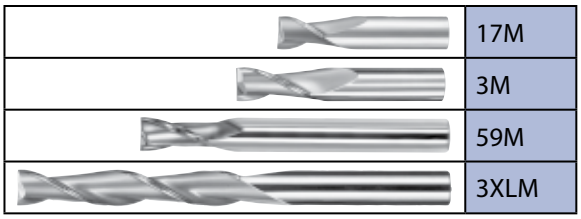
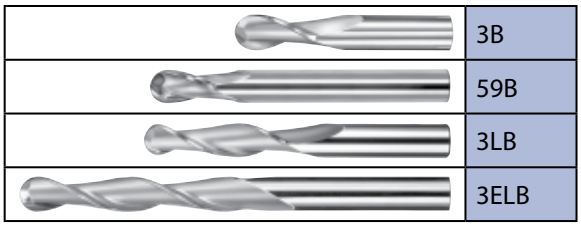
d_2=h6

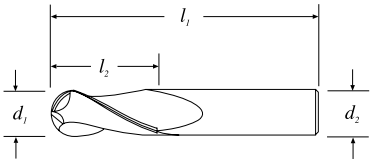


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
10	16	50	10	41757	49275	49296	49317	17M
10	22	75	10	40357	48641	48663	48684	3M
10	25	100	10	43914	43924	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
END MILLS
258–259 Tech

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 EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	DIA-CARB (CVD)† EDP No.	Series Number
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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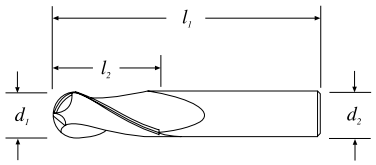
2 Flute – Single End – Ball End



TOLERANCES

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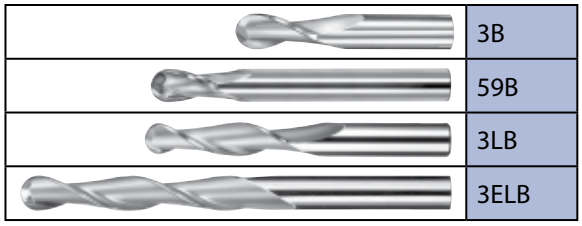
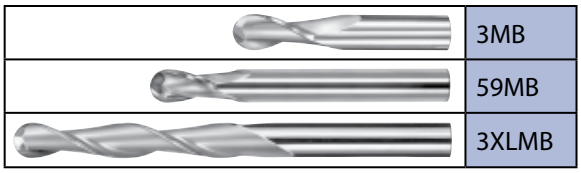


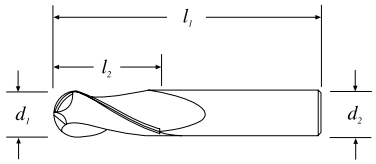
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	DIA-CARB (CVD)† EDP No.	Series Number
21/64	1	2-1/2	3/8	30342	39342	39542	30491	–	3B
11/32	1	2-1/2	3/8	30344	39344	39544	30492	–	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
* Series 3B Set				30390	39390	39590	30600	–	3B

END MILLS Table of Contents
END MILLS
255–257 Tech

2 Flute – Single End – Ball End

Metric Series **3MB**





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

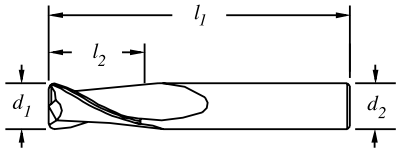
Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	4	38	3	40306	48692	48714	48735	3MB
1,5	4,5	38	3	40310	48693	48715	48736	3MB
2	6,3	38	3	40314	48694	48716	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

258–259 Tech

2 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 0.015 EDP No.	Uncoated 0.020 EDP No.	Uncoated 0.030 EDP No.	Uncoated 0.045 EDP No.	Uncoated 0.060 EDP No.	Uncoated 0.090 EDP No.	Uncoated 0.125 EDP No.	Series Number
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) Ti-NAMITE 0.015 EDP No.	(TiN) Ti-NAMITE 0.020 EDP No.	(TiN) Ti-NAMITE 0.030 EDP No.	(TiN) Ti-NAMITE 0.045 EDP No.	(TiN) Ti-NAMITE 0.060 EDP No.	(TiN) Ti-NAMITE 0.090 EDP No.	(TiN) Ti-NAMITE 0.125 EDP No.	Series Number
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) Ti-NAMITE-C 0.015 EDP No.	(TiCN) Ti-NAMITE-C 0.020 EDP No.	(TiCN) Ti-NAMITE-C 0.030 EDP No.	(TiCN) Ti-NAMITE-C 0.045 EDP No.	(TiCN) Ti-NAMITE-C 0.060 EDP No.	(TiCN) Ti-NAMITE-C 0.090 EDP No.	(TiCN) Ti-NAMITE-C 0.125 EDP No.	Series Number
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) Ti-NAMITE-A 0.015 EDP No.	(AlTiN) Ti-NAMITE-A 0.020 EDP No.	(AlTiN) Ti-NAMITE-A 0.030 EDP No.	(AlTiN) Ti-NAMITE-A 0.045 EDP No.	(AlTiN) Ti-NAMITE-A 0.060 EDP No.	(AlTiN) Ti-NAMITE-A 0.090 EDP No.	(AlTiN) Ti-NAMITE-A 0.125 EDP No.	Series Number
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

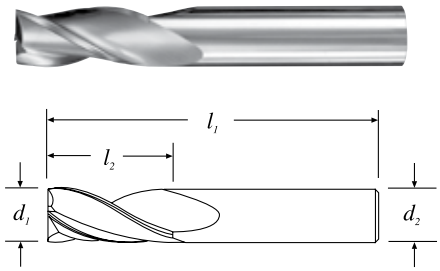
Rayon en bout
Carbure Monobloc Micrograin
2 dents – Hélice à droite 30° – Coupe à droite – Coupe au centre
* Méplat Weldon sur queue

END MILLS Table of Contents

END MILLS

256–257 Tech

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.

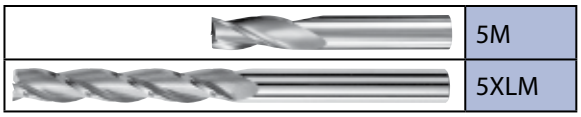
Série 5 • 5M

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

256–257 Tech

3 Flute – Single End – Square End



TOLERANCES

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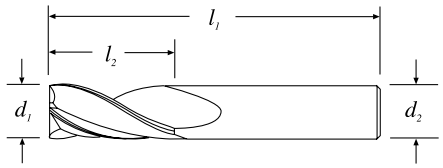
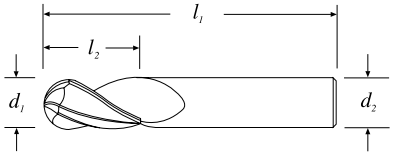


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	4	38	3	40505	48756	48778	48799	5M
1,5	4,5	38	3	40509	48757	48779	48800	5M
2	6,3	38	3	40513	48758	48780	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
END MILLS
258–259 Tech

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

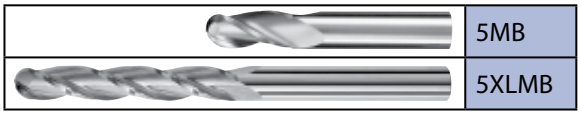
Fraises 3 dents – Bout hémisphérique
Carbure monobloc, micrograin
Hélice à droite, 30° – Coupe à droite – Coupe au centre

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

256–257 Tech

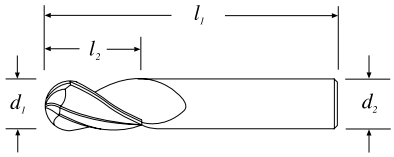
Metric Series **5MB**

3 Flute – Single End – Ball End



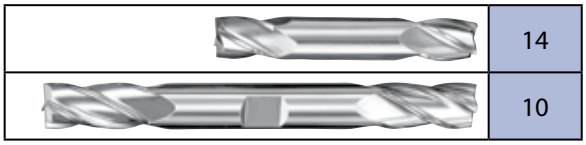
TOLERANCES

d_1=+0,000–0,05
d_2=h6



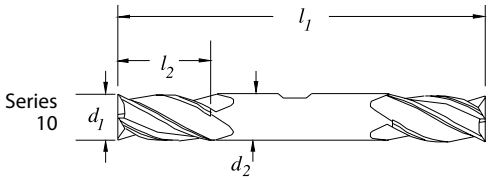
Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	4	38	3	40506	48820	48842	48863	5MB
1,5	4,5	38	3	40510	48821	48843	48864	5MB
2	6,3	38	3	40514	48822	48844	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

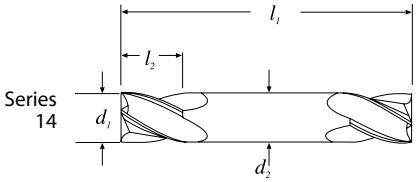
4 Flute – Double End – Square End



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 EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
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

256–257 Tech

4 Flute – Double End – Square End

TOLERANCES

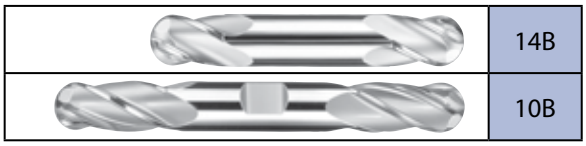
d_1=+0,000–0,05
d_2=h6

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

END MILLS Table of Contents
END MILLS
258–259 Tech

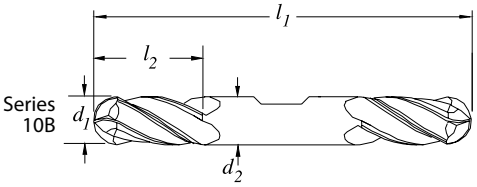
4 Flute – Double End – Ball End

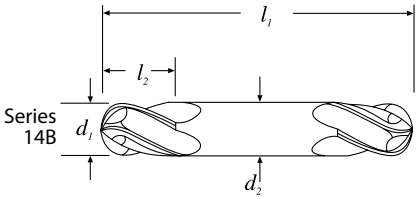
Fractional Series **14B**



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

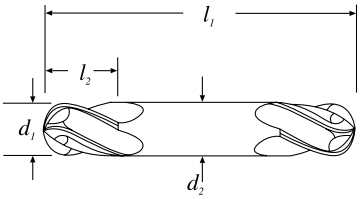
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1/32	1/16	1-1/2	1/8	31402	31442	39602	31218	14B
3/64	3/32	1-1/2	1/8	31404	31444	39604	31219	14B
1/16	1/8	1-1/2	1/8	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

256–257 Tech

4 Flute – Double End – Ball End

TOLERANCES

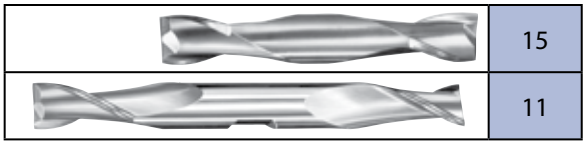
d_1=+0,000–0,05
d_2=h6



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

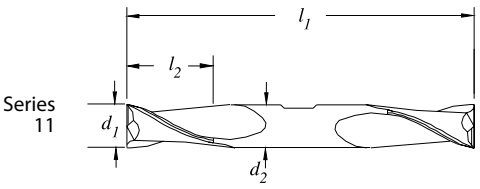
END MILLS Table of Contents
END MILLS
258–259 Tech

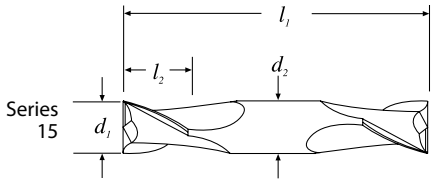
2 Flute – Double End – Square End



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

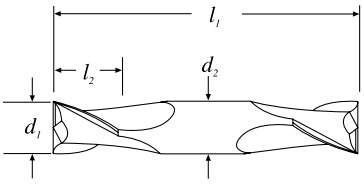
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1/32	1/16	1-1/2	1/8	31501	31541	39651	31316	15
3/64	3/32	1-1/2	1/8	31503	31543	39653	31317	15
1/16	1/8	1-1/2	1/8	31505	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

256–257 Tech

2 Flute – Double End – Square End

TOLERANCES

d_1=+0,000–0,05
d_2=h6

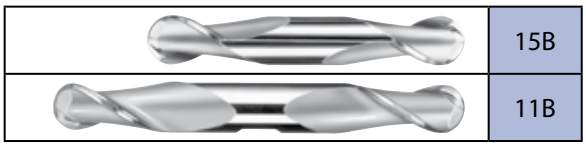


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	2	38	3	41505	49010	49031	49052	15M
1,5	3	38	3	41509	49011	49032	49053	15M
2	4	38	3	41513	49012	49033	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 Table of Contents
END MILLS
258–259 Tech

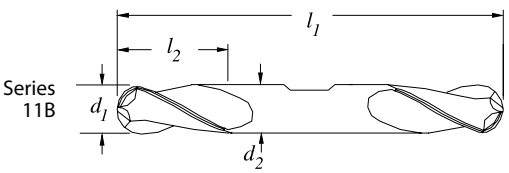
2 Flute – Double End – Ball End

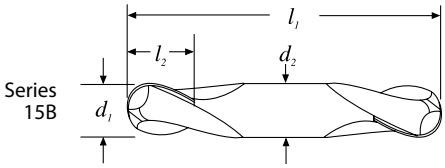
Fractional Series **15B**



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 EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
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

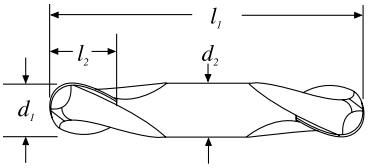
256–257 Tech

Metric Series **15MB**

2 Flute – Double End – Ball End

TOLERANCES

d_1=+0,000–0,05
d_2=h6

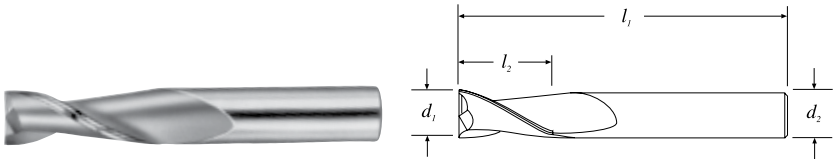


Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.	Series Number
1	2	38	3	41506	49073	49094	49115	15MB
1,5	3	38	3	41510	49074	49095	49116	15MB
2	4	38	3	41514	49075	49096	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 Table of Contents
END MILLS
258–259 Tech

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

Fractional Series **52**



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-C (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 EDP No.	Ti-NAMITE-C (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

Series 52 • 52M
2 Flute – Single End – Square End for Aluminum

Serie 52 • 52M
2 filos – Punta Plana – Para Aluminio

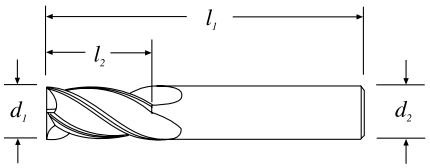
Série 52 • 52M
2 dents – Bout Plat – Pour Aluminium

260 Tech

Fractional Series **54**

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 EDP No.	Ti-NAMITE-C (TiCN) 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

Metric Series **54M**

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-C (TiCN) 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

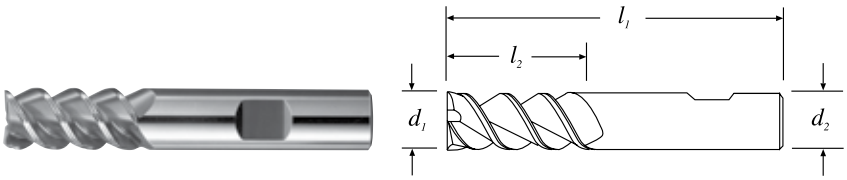
Series 54 • 54M
4 Flute – Single End – Square End for Aluminum

Serie 54 • 54M
4 filos – Punta Plana – Para Aluminio

Série 54 • 54M
4 dents – Bout Plat – Pour Aluminium

END MILLS Table of Contents
END MILLS
260 Tech

3 & 4 Flute – Single End – High 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.	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

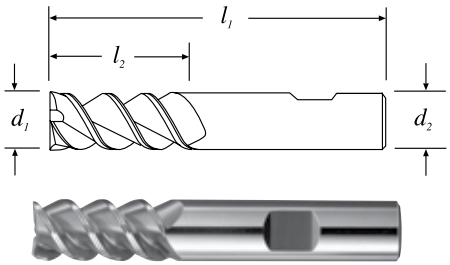
Serie 60 • 60M

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'helice 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 EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) 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 Table of Contents
END MILLS
261 Tech

Roughers – Single End

Metric Series 61, 62, 63

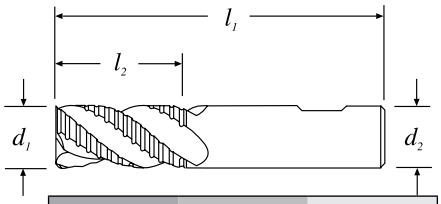
CORNER RADIUS

d_1=1/4 – 5/16 =.045
d_1=3/8 – 1 =.060

TOLERANCES

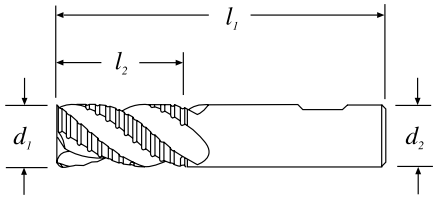
d_1=+.000–.004
d_2=h6

61



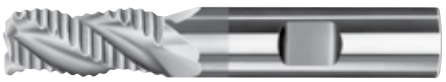
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	No. of Flutes z	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
1/4	3/4	2-1/2	1/4	3	36107	36106	36110
5/16	3/4	2-1/2	5/16	3	36109	36108	36111
3/8	7/8	2-1/2	3/8	3	36113	36112	36114
1/2	1	3	1/2	4	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

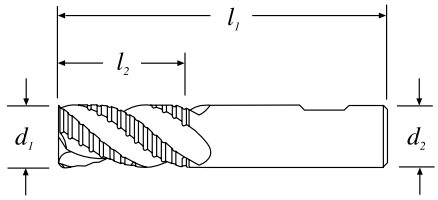
62



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

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, aceroa 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
Matiére "exotiques de l´ère spatiale" telles que titane, inconel, alliage René et Waspaloy.

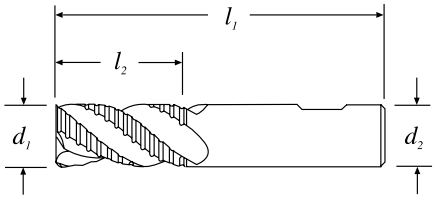
Série 63 • 63M
l´aluminium, du laiton et du cuivre.

TOLERANCES

d_1=+0,000–0,10
d_2=h6

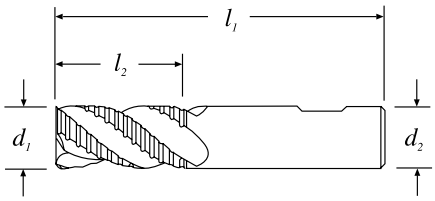
Corner Radius / Radio en punta / Rayon

d_1 = 6mm to 8mm = 1,14
d_1 =10mm to 25mm = 1,52



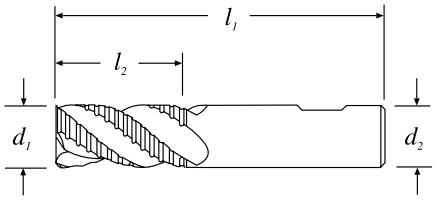
61M

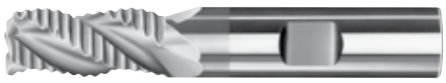
Cutting Diameter d_1 mm	Length of Cut l_2 mm	Overall Length l_1 mm	Shank Diameter d_2 mm	No. of Flutes z	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
6	19	63	6	3	46107	46106	46110
8	19	63	8	3	46109	46108	46111
10	22	72	10	3	46113	46112	46114
12	26	83	12	4	46117	46116	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



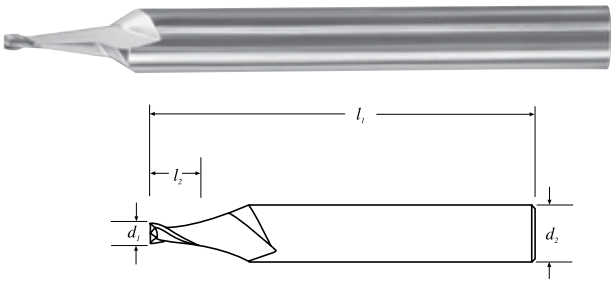


63M

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

2 Flute – Single End – Square End – Micro

Metric Series **MK2**



TOLERANCES

d_1=+/–.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.

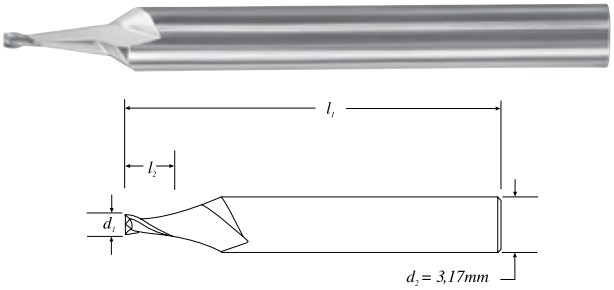
Cutting Diameter d_1	Length of Cut l_2	Overall Length l_1	Shank Diameter d_2	Uncoated EDP No.
0.008	0.012	1-1/2	1/8	39208
0.009	0.014	1-1/2	1/8	39209
0.010	0.015	1-1/2	1/8	39210
0.011	0.017	1-1/2	1/8	39211
0.012	0.018	1-1/2	1/8	39212
0.013	0.020	1-1/2	1/8	39213
0.014	0.021	1-1/2	1/8	39214
0.015	0.023	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

256–257 Tech

2 Flute – Single End – Square End – Micro

TOLERANCES

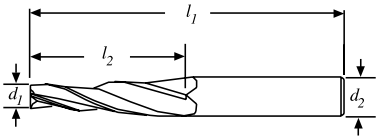
d_1=+/–0,013
d_2=h6



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 Table of Contents
END MILLS
258–259 Tech

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

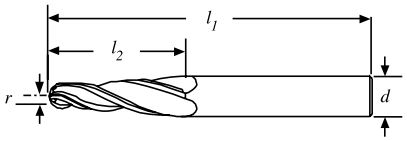
Shank Diameter d_2	Center Line Angle	Small Diameter d_1	Appx. Length of Cut l_2	Overall Length l_1	Uncoated EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) EDP No.
1/4	1°	1/8	1-1/2	3	32301	32370	32302	32345
1/4	1°30´	1/8	1-1/2	3	32303	32371	32304	32346
1/4	2°	1/8	1-1/4	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

256–257 Tech

3 Flute – Single End – Taper Spiral – Ball End

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 EDP No.	Ti-NAMITE (TiN) EDP No.	Ti-NAMITE-C (TiCN) EDP No.	Ti-NAMITE-A (AlTiN) 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

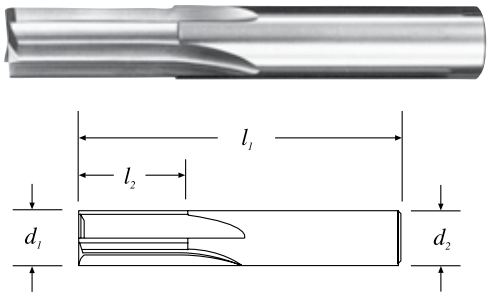
Carbure monobloc micrograin – 3 dents – à bout hémisphérique – Cône hélicoïdal – Queue droite – Coupe à droite

END MILLS Table of Contents

END MILLS

256–257 Tech

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

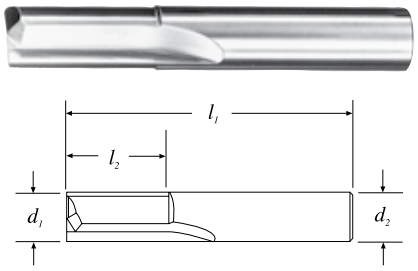
Série 2

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

256–257 Tech

2 Flute – Straight 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 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	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

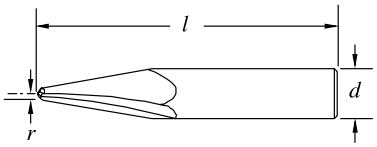
Carburo sólido con micrograno – 2 filos – Filos rectos – Punta plana – Corte a derecha – Corte al centro

Série 4

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

END MILLS Table of Contents
END MILLS
256–257 Tech

2 Flute – Straight Flute – 14° – Single End



TOLERANCES

r=+.0005–.001
d=–.0001–.0004

Radius r	Overall Length l	Shank Diameter d	Uncoated EDP No.	Ti-NAMITE (TiN) 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

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

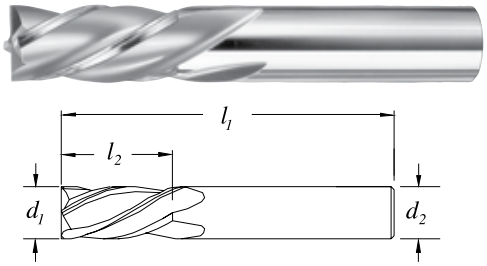
Série 12

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

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

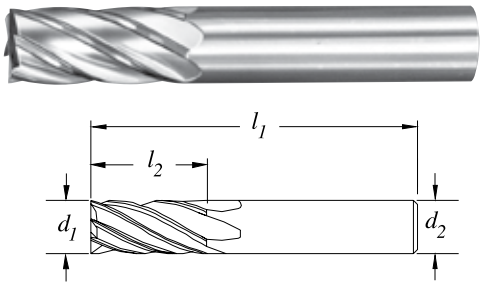
Carburo sólido con micrograno – 4 filos – Punta plana – Hélice a izquierda 30° – Corte a derecha

Série 9

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

END MILLS Table of Contents
END MILLS
256–257 Tech

6 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 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

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

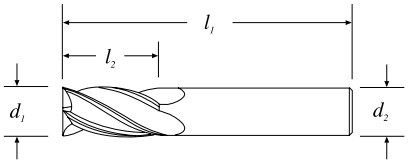
Carbure monobloc, micrograin – 6 dents – Bout plat – Hélice à droite, 30° – Coup à droite

256–257 Tech

End Mill Sets

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

	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 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

END MILLS Table of Contents