Línea de Corte Rotativo

STU SHOPTOOLUSA

Fresas rotativas de carburo

Más que un proveedor, un socio en soluciones de corte

En SHOP TOOL USA / SHOP TOOL FR, no solo ofrecemos herramientas: desarrollamos soluciones de mecanizado personalizadas y eficientes que responden a las necesidades específicas de cada cliente.

Con más de 25 años de experiencia en el sector metalmecánico y el respaldo de alianzas con fabricantes y distribuidores especializados, nos hemos consolidado como un socio confiable y valorado por empresas de todo el mundo.

Nuestra motivación
Creemos firmemente en la mejora continua: innovamos en nuestros productos, optimizamos servicios y formamos permanentemente a nuestro equipo. Esta filosofía nos permite anticiparnos a los retos de nuestros clientes y ayudarlos a competir en mercados cada vez más exigentes.

Hoy somos reconocidos como uno de los principales proveedores de insertos, portaherramientas, brocas y fresas de alto rendimiento, utilizados en sectores estratégicos como la aeronáutica, la automoción y la tecnología médica.

Nuestra especialidad
Fabricamos y suministramos herramientas de precisión y alta durabilidad, desarrolladas con materiales de corte de última generación. Entre nuestras competencias clave destacan:

- Nuevas tecnologías de fresado
- Estrategias innovadoras para el mecanizado de materiales avanzados como titanio, aleaciones de níquel y composites de fibra de carbono.

Más que un proveedor, somos su socio estratégico
En cada proyecto buscamos construir relaciones de largo plazo, aportando no solo herramientas de calidad, sino también conocimiento técnico y soluciones que generan valor real.

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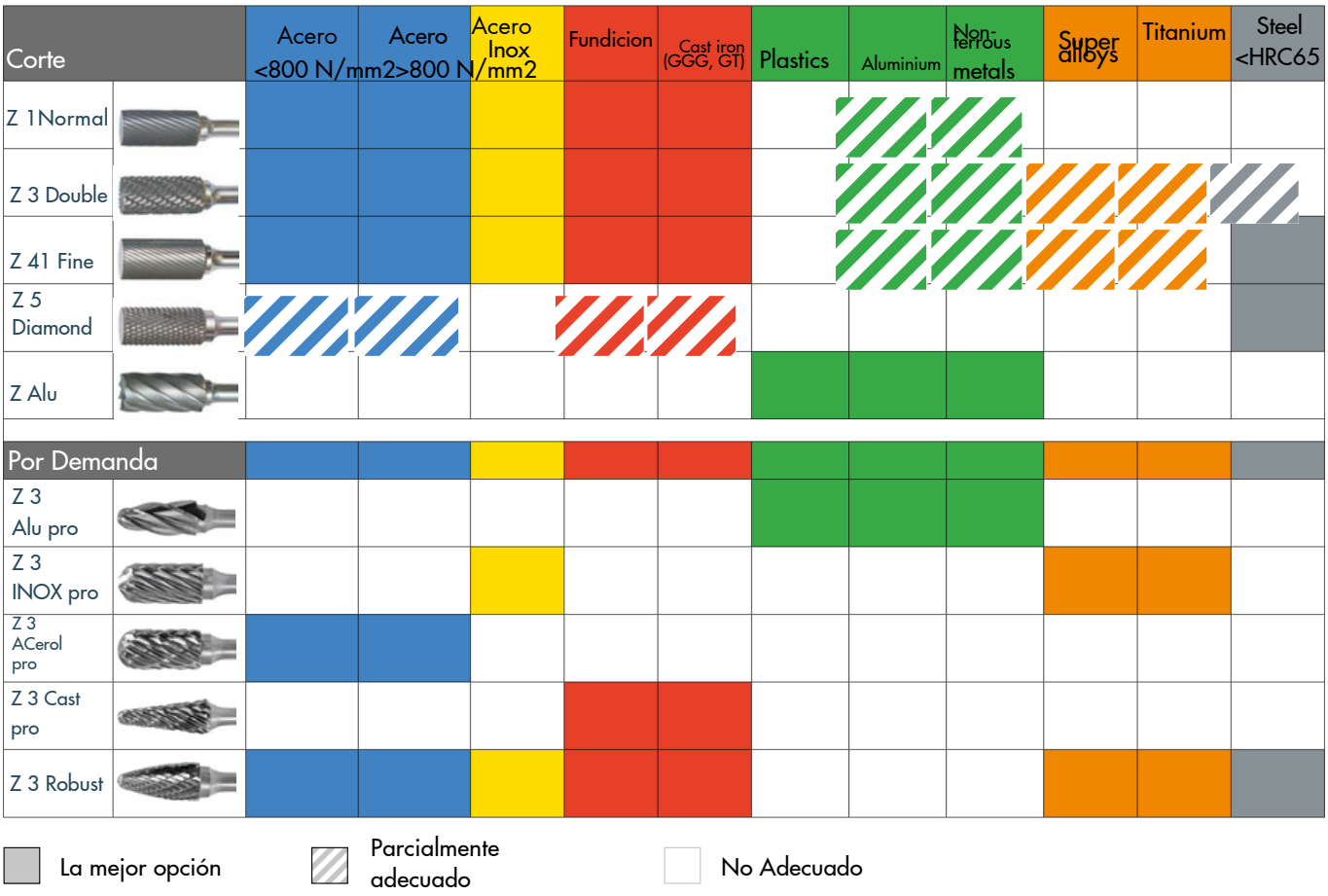
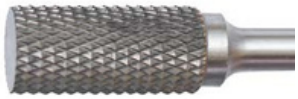
¿Qué corte para qué material?

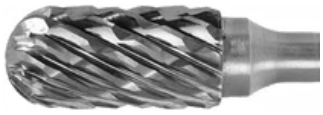
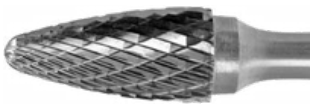


El corte adecuado para cada aplicación

Corte	Campo de aplicación	Beneficios
	**Z 1 Normal** General chamfering, machining, deburring, clean surfaces	Alto rendimiento de corte al mecanizar acero y acero fundido Para superficies lisas y uniformes
	**Z 3 Double** Mecanizado general, desbarbado, chaflanado, superficies limpias, acabado superficial	Alto rendimiento de corte al mecanizar acero y acero fundido Para superficies lisas y uniformes. Óptima manejabilidad y control Rendimiento de fresado suave gracias corte optimizado
	**Z 41 Fine** Trabajos generales, desbarbado, chaflanado, mejor acabado superficial	Alto rendimiento de corte al mecanizar acero y acero fundido Mejor acabado superficial que Z 1
	**Z 5 Diamond** Desbarbado y ajuste trabajos de corrección en aceros duros	Buena vida útil de la herramienta Rendimiento de fresado suave
	**Z Alu** Mecanizado general, desbarbado, chaflanado, superficies limpias	Geometría optimizada para aluminio Alto rendimiento de corte Rendimiento de fresado suave

Nuestros cortes especiales de un vistazo

Para nuestros cortes especiales, nos enfocamos especialmente en la geometría específica para cada material. Como resultado, las fresas ofrecen un rendimiento de corte excepcional y los mejores acabados superficiales en cada material

Corte	Campo de aplicación	Beneficios
	**Z 3 Alu pro** Mecanizado general, desbarbado, chaflanado, superficies limpias	Geometría optimizada para aluminio, con aristas de corte pulidas para obtener las mejores superficies posibles Alto rendimiento de corte al mecanizar aluminio. Máximo control y facilidad de manejo Rendimiento de fresado suave gracias a un corte optimizado para el material
	**Z 3 INOX pro** Mecanizado general, desbarbado, chaflanado, superficies limpias	Geometría optimizada para acero inoxidable materiales de alta temperatura Alto rendimiento de corte para mejor acabado Máximo control y facilidad de manejo Rendimiento de fresado suave gracias a un corte optimizado para el material
	**Z 3 Steel pro** Mecanizado general, desbarbado, chaflanado, superficies limpias	Geometría optimizada para acero Alto rendimiento de corte para mejor acabado Máximo control y facilidad de manejo Rendimiento de fresado suave gracias a un corte optimizado para el material
	**Z 3 Cast pro** Mecanizado general, desbarbado, chaflanado, mejor acabado superficial	Geometría optimizada para fundición Alto rendimiento de corte para mejor acabado Máximo control y facilidad de manejo Rendimiento de fresado suave gracias a un corte optimizado para el material
	**Z 3 Robust** Mecanizado general, desbarbado, chaflanado, superficies limpias, acabado superficial	Geometría optimizada para condiciones severas Muy alto rendimiento de corte para acero, acero fundido, fundición y aleaciones de alta temperatura. Para mejores superficies Óptima manejabilidad y control Rendimiento de fresado suave gracias a un corte optimizado para el material

Ventajas de producto

	Product	Reference		Suitabiltity	Page
	ZYA	Forma cilíndrica, sin corte frontal	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond · Z Alu	P M K N S H	14
	ZYA-S	Forma cilíndrica, con corte frontal	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond · Z Alu	P M K N S H	15
	WRC	Forma cilíndrica con punta esférica	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond · Z Alu	P M K N S H	16
	KUD	Forma esférica	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond · Z Alu	P M K N S H	17
	TRE	Forma ovalada	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond · Z Alu	P M K N S H	18
	RBF	Forma de árbol con punta esférica	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond · Z Alu	P M K N S H	19
	SPG	Forma de árbol puntiagud	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond	P M K N S H	20
	HMB	Forma de llama	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond	P M K N S H	21
	KSJ	Forma de cono 60°	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond	P M K N S H	22
	KSK	Forma de cono 90°	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond	P M K N S H	23
	SKM	Forma de cono puntiagudo	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond · Z Alu	P M K N S H	24
	WKN	Cono invertido, sin corte frontal	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond	P M K N S H	25
	KEL	Forma de cono con punta esférica	Z1 Normal · Z3 Double · Z41 Fine · Z5 Diamond · Z Alu	P M K N S H	26

Al utilizar fresas de vástago largo, consulte las instrucciones de seguridad en la página 13

Cortes especiales

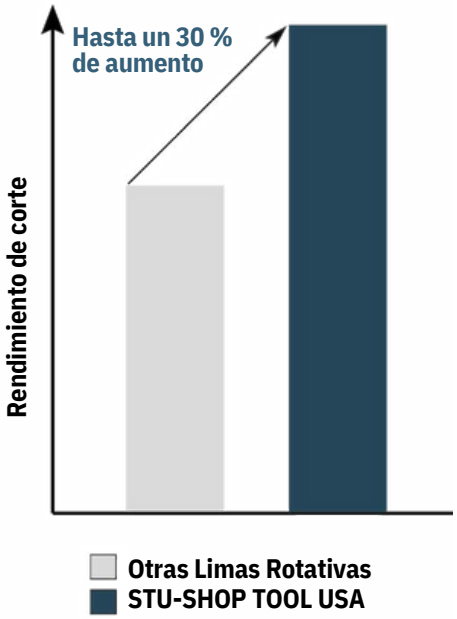
	Product	Reference		Suitabiltity	Page
	H10	Cilíndrica con radio	Z1 Normal Z3 Double	P M K N S H	28
	H10	Radius Shape Cylinder	Z3 Double	P M K N S H	29
	H11	Forma cilíndrico-cónica	Z1 Normal Z3 Double	P M K N S H	30
	H11	Cilíndrica con conicidad	Z3 Double	P M K N S H	31
	H12	Forma cónica	Z1 Normal Z3 Double	P M K N S H	32
	H12	Forma cilíndrica, con radio en las esquinas	Z3 Double	P M K N S H	33

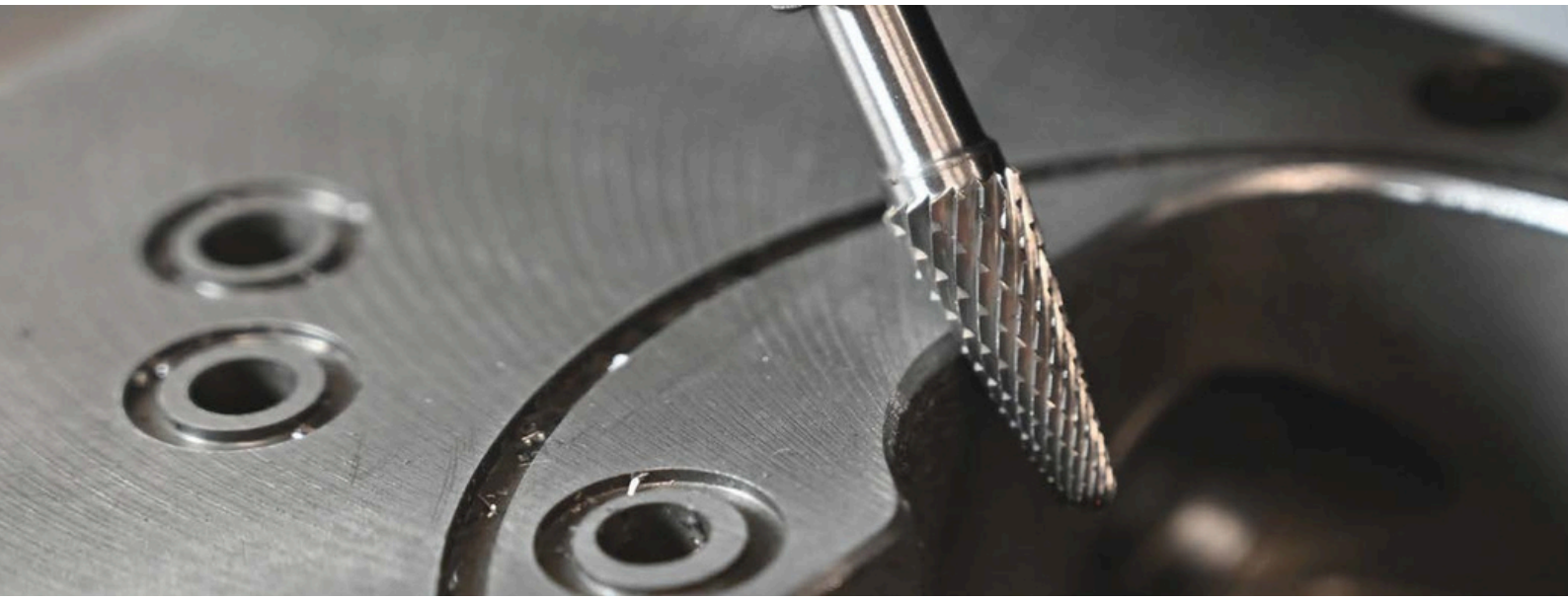
Nuestra amplia gama de productos para cualquier tipo de mecanizado

La Línea Rotativa ofrece una amplia gama de fresas. Ponemos a su disposición la herramienta ideal para casi cualquier tarea de mecanizado: desde cortes para aluminio hasta cortes diamantados, en diferentes diámetros, longitudes y diseños. Nuestras fresas se utilizan en múltiples sectores, como fundiciones, células de desbarbado en producción en serie, matricería, aeronáutica y medicina.
Las fresas son perfectas para desbarbar, chaflanar, alisar y para mecanizar superficies o cordones de soldadura.
Qué herramienta se adapta mejor a sus necesidades dependerá siempre de las condiciones específicas de su aplicación.

Esto es en lo que puede confiar

En nuestras herramientas damos máxima prioridad a una calidad constante y superior.
Nuestras fresas de carburo garantizan una excelente vida útil y acabados de superficie óptimos en una amplia gama de aplicaciones.
Gracias a la perfecta combinación entre geometría y corte, usted obtiene siempre los mejores resultados





¿Qué hace destacar nuestras fresas?

Corte

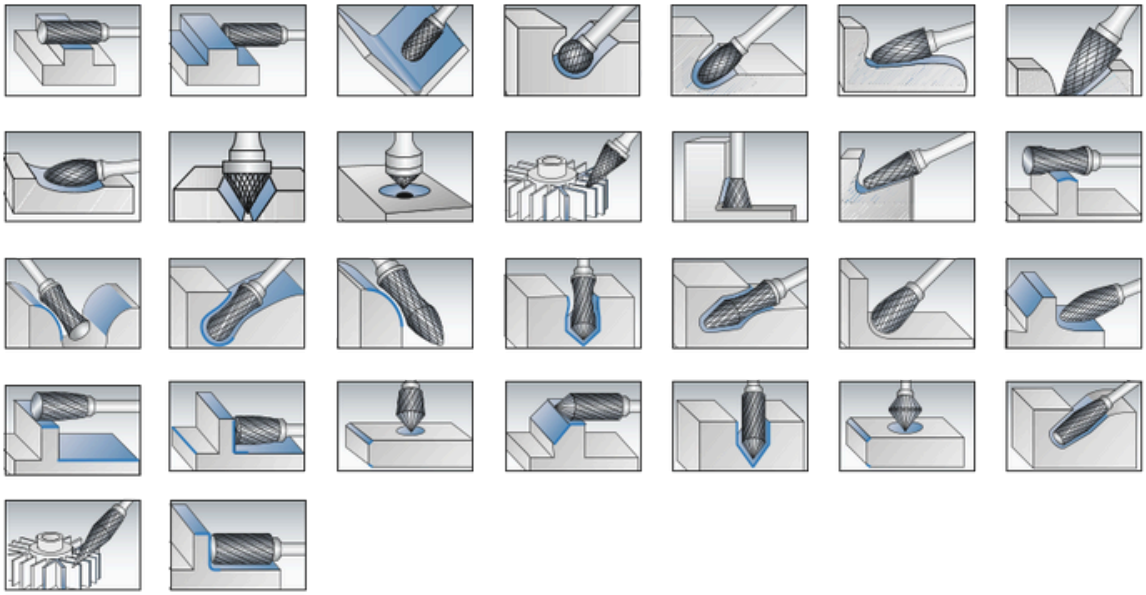
Cada material exige un tipo de corte específico.

En nuestro programa estándar ofrecemos distintas opciones que permiten mecanizar con máxima eficiencia aluminio, acero fundido o materiales endurecidos (consulte el resumen en la página 4). La geometría de cada herramienta está diseñada para la aplicación correspondiente, garantizando un rendimiento de corte óptimo y una excelente manejabilidad.

Forma y aplicación

Además del tipo de corte, la forma es otro factor clave para lograr resultados perfectos.

Por ello ofrecemos todas las formas y longitudes más comunes, desde modelos cilíndricos hasta geometrías combinadas.



Nuestros diseños de longitud extra están marcados con este icono L.

Recubrimiento

Nuestras fresas se fabrican sin recubrimiento por diseño. Bajo pedido, es posible suministrarlas con distintos acabados Recubrimientos de alto rendimiento. Para obtener mejores resultados y una mayor vida útil de la herramienta, ofrecemos diferentes recubrimientos según la aplicación. Póngase en contacto con nosotros, estaremos encantados de asesorarle.

Otros diseños bajo pedido

Además de nuestra gama estándar, ofrecemos otros tipos de corte bajo pedido. También suministramos fresas para aplicaciones como el mecanizado de materiales de alta temperatura, fundición o en condiciones severas.

Formas o cortes especiales para garantizar que ninguna parte quede sin mecanizar

Si nuestro programa de catálogo no tiene lo que busca, fabricaremos la herramienta adecuada y el tipo de corte ideal para cumplir con sus requisitos específicos. Algunas formas especiales ya están disponibles en nuestro catálogo, por ejemplo:

Cilíndrica con radio
Cilíndrica cónica
Cónica
Cilíndrica con radio en las esquinas

Experiencia en fabricación de herramientas

Contamos con una amplia trayectoria en el desarrollo de herramientas de precisión para aplicaciones de mecanizado. Esta experiencia nos permite ofrecerle soluciones especiales a la medida de sus necesidades: en algunos casos basta con una ligera adaptación de nuestras herramientas estándar, y en otros podemos llevar a cabo desarrollos totalmente nuevos sin que represente un reto para nosotros.

Asesoría experta para todos sus procesos

Estaremos encantados de asesorarle sobre cómo optimizar sus procesos de mecanizado o de trabajar junto a usted en el desarrollo de estrategias de mecanizado. No dude en ponerse en contacto con nosotros.

Reafilado para una excelente rentabilidad

Nuestras fresas de carburo son sinónimo de alta calidad y rendimiento.
Para que aproveche al máximo la rentabilidad de sus herramientas, ofrecemos un servicio profesional de reafilado, sin importar el fabricante.
Nuestros especialistas revisan cada pedido y determinan si la reacondicionación es viable.
La herramienta reacondicionada garantiza la máxima fiabilidad en el proceso, con una vida útil y un rendimiento prácticamente iguales a los originales.

Lo que gana con nosotros, de un vistazo

- Amplia gama de fresas para todas las aplicaciones estándar
- Óptima manejabilidad combinada con una alta tasa de arranque de material
- Menor desgaste mecánico gracias a geometrías y tipos de corte optimizados para una amplia variedad de materiales
- Excelentes acabados superficiales mediante fresado en concordancia
  Las aplicaciones más exigentes requieren soluciones especiales a medida
- Todo en una sola fuente: ya sea herramienta, estrategia o reafilado.

Recomendaciones para el mejor funcionamiento posible

Directions for use

- To avoidvibrations, the tools should be used on drives that are as powerful as possible and have an elastically mounted spindle
- For economical use, always work in the upper range of our recommended speed.
- Speeds that are too high or too low may reduce performance and lead to broken teeth or severe wear
- Use the burs with the shortest possible overhang
- Ensure constant movement with only light pressure
- To achieve smooth surfaces, we recommend milling the last passes in synchronous operation.

Performance recommendation for tool drives*:

Ø range (mm)	Watt	Speed (U/min)
1.0 – 4.0	60 – 190	35.000 – 100.000
5.0 – 8.0	200 – 290	15.000 – 60.000
9.0 – 14.0	300 – 490	6.000 – 35.000
15.0 – 18.0	500 – 990	4.000 – 25.000
19.0 – 25.0	1.000 – 2.000	3.000 – 20.000

* These values are only a recommendation on how to maximise the efficiency of the burs.

Recommended tool drives

- Flexible shaftdrives
- Straight grinder
- Robot
- Machine tools

Recommended speed

For selectingtheoptimal speed, we have included it on the relevant page:

1. Select the material you want to process
2. Then select the required bur diameter

Instrucciones de seguridad

- Utilice un máximo de 1/3 del diámetro de la fresa para garantizar un fresado suave.
- En ningún caso el vástago o la hélice deben tornarse azules o incandescentes.
- Desconecte el enchufe de la red antes de cambiar la fresa para evitar una rotación involuntaria.
- Asegúrese de que nada (como ropa o cabello) pueda quedar atrapado en la transmisión de la herramienta o en la fresa.
- Utilice siempre equipo de protección personal durante la operación (gafas de seguridad, protección auditiva y guantes).

Recomendaciones para el mejor uso posible de vástagos largos

Velocidad para fresas de vástago largo (rpm)		Cabeza Ø					
Velocidad máxima a	Largo Mango	3	6	8	10	12	16
Marcha en vacío	75 mm	max. 10,000					
	200 mm		max. 8,000	max. 5,000	max. 3,000	max. 2,500	max. 2,000
Contacto con la pieza de trabajo	75 mm	max. 35,000					
	200 mm		max. 16,000	max. 10,000	max. 8,000	max. 6,000	max. 5,000

Modo de empleo

⚠ **PRECAUCIÓN: ¡Para las fresas largas se aplican otros parámetros y procedimientos de corte! Cuanto mayor sea el error de descentramiento y más largo el voladizo, menor debe ser la velocidad seleccionada.**

Parámetros de corte recomendados para fresas de vástago largo:

El estado de su fresadora también tiene un gran impacto en el resultado. En general, trabaje únicamente con máquinas que funcionen correctamente. Asegúrese de mantener siempre el control de su fresadora.

Instrucciones de trabajo para fresas con vástago largo:

1. Comience a velocidad de ralentí (ver arriba) al poner la herramienta en contacto con la pieza de trabajo.(Razón: a altas velocidades y con voladizos largos, incluso un ligero desequilibrio puede provocar que la fresa se doble).
2. Acelere hasta la velocidad de trabajo completa (ver tabla) únicamente cuando la herramienta esté en contacto con la pieza de trabajo.
(Razón: gracias al contacto y a la presión en una dirección determinada, la fresa se estabiliza puede oscilar).
3. Antes de retirar la herramienta de la pieza de trabajo, reduzca primero la velocidad nuevamente a velocidad de ralentí.
4. Al introducir la herramienta en taladros, por ejemplo, colóquela en posición sin velocidad de rotación y, a continuación, siga el mismo procedimiento de los pasos 1 a 3.
(Razón: existe el riesgo de que la fresa se atasque o golpee accidentalmente la pieza, lo que podría provocar un retroceso).

ZYA


Z1 Normal

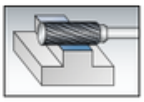

Z3 Doble


Z41 Fino

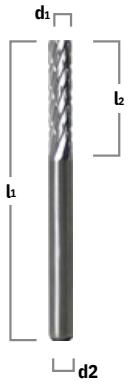

Z5 Diamante


Z Alu

HM

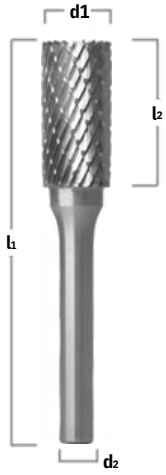


Forma cilíndrica, sin corte frontal, Tipo ZYA



Mango Ø 3 mm

	d1 mm	d2 mm	l2 mm	l1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
	1.5	3	6	38	H5011	H5013	H50141	7.69	H5015	9.32
	2.5	3	11	38	H5021	H5023	H50241	7.69	H5025	9.32
	3.0	3	13	38	H5031	H5033	H50341	7.69	H5035	9.32
L	3.0	3	14	75	H503L1	H503L3	–	12.88	–	–
	4.0	3	12	38	H5041	H5043	H50441	16.24	H5045	16.24
	5.0	3	12	38	H5051	H5053	H50541	16.24	–	–
	6.0	3	13	51	H5061	H5063	H50641	11.06	H5065	13.28
	6.0	3	7	38	H5071	H5073	–	11.06	–	–



Mango Ø 6 mm

d1 mm	d2 mm	l2 mm	l1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
4.0	6	16	51	H60001	H60003	H600041	11.52	H60005	13.78	–	–
6.0	6	16	51	H60011	H60013	H600141	11.52	H60015	13.78	H6001Alu	18.56
8.0	6	20	64	H60031	H60033	H600341	15.09	H60035	17.99	H6003Alu	18.78
10.0	6	20	64	H60051	H60053	H600541	16.24	H60055	19.48	H6005Alu	20.24
11.0	6	25	70	H60061	H60063	H600641	19.29	H60065	23.22	H6006Alu	24.09
12.0	6	25	70	H60071	H60073	H600741	25.32	H60075	30.42	H6007Alu	31.60
16.0	6	25	70	H60081	H60083	H600841	31.91	H60085	38.19	H6008Alu	39.79
19.0	6	25	70	H60091	H60093	H600941	47.37	H60095	56.82	H6009Alu	59.15
25.0	6	25	70	H60101	H60103	H601041	66.20	H60105	79.42	H6010Alu	82.70

Mango Ø 8 mm

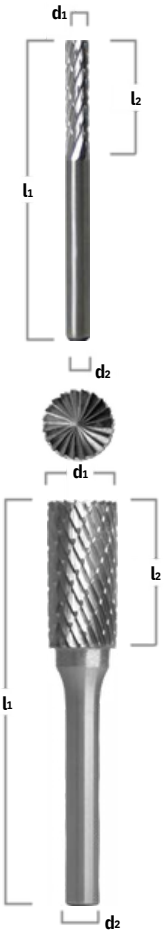
d1 mm	d2 mm	l2 mm	l1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
12.0	8	25	70	H60071S8	H60073S8	H600741S8	25.32	H60075S8	30.42	H6007AluS8	31.60
16.0	8	25	70	H60081S8	H60083S8	H600841S8	31.91	H60085S8	38.19	H6008AluS8	39.79
19.0	8	25	70	H60091S8	H60093S8	H600941S8	47.37	H60095S8	56.82	H6009AluS8	59.15
25.0	8	25	70	H60101S8	H60103S8	H601041S8	66.20	H60105S8	79.42	H6010AluS8	82.70

Velocidad recomendada (r.p.m.)

Head Ø (mm)	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

Z YA-S

Forma cilíndrica, con corte frontal, Tipo ZYA-S



Mango Ø 3 mm

d_1	d_2	l_2	l_1	Part No.				Part No.	
mm	mm	mm	mm	Z 1 Normal	Z 3 Double	Z 41 Fine	€/pc.	Z 5 Diamond	€/pc.
1.5	3	5	38	H50111	H50113	–	11.86	–	–
2.5	3	11	38	H50211	H50213	–	11.86	–	–
3.0	3	14	38	H50311	H50313	H503141	8.49	H50315	10.23
4.0	3	12	38	H50411	H50413	–	22.73	–	–
5.0	3	12	38	H50511	H50513	–	22.73	–	–
6.0	3	13	51	H50611	H50613	H506141	14.36	H50615	17.22
6.0	3	7	38	H50711	H50713	–	14.36	–	–

Mango Ø 6 mm

d_1	d_2	l_2	l_1	Part No.				Part No.		Part No.	
mm	mm	mm	mm	Z 1 Normal	Z 3 Double	Z 41 Fine	€/pc.	Z 5 Diamond	€/pc.	Z Alu	€/pc.
4.0	6	16	51	H6001	H6003	H60041	12.50	H6005	15.01	–	–
6.0	6	16	51	H6011	H6013	H60141	12.50	H6015	15.01	H601Alu	20.13
8.0	6	20	64	H6031	H6033	H60341	16.63	H6035	19.87	H603Alu	24.02
10.0	6	20	64	H6051	H6053	H60541	17.80	H6055	21.36	H605Alu	20.52
11.0	6	25	70	H6061	H6063	H60641	21.16	H6065	25.49	–	–
12.0	6	25	70	H6071	H6073	H60741	27.82	H6075	33.34	H607Alu	31.50
16.0	6	25	70	H6081	H6083	H60841	34.89	H6085	41.94	H608Alu	39.68
19.0	6	25	70	H6091	H6093	H60941	52.16	H6095	62.52	–	–
25.0	6	25	70	H6101	H6103	H61041	72.89	H6105	87.44	–	–

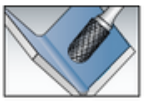
Mango Ø 8 mm

d_1	d_2	l_2	l_1	Part No.				Part No.		Part No.	
mm	mm	mm	mm	Z 1 Normal	Z 3 Double	Z 41 Fine	€/pc.	Z 5 Diamond	€/pc.	Z Alu	€/pc.
12.0	8	25	70	H6071S8	H6073S8	H60741S8	27.82	H6075S8	33.34	H607AluS8	31.50
16.0	8	25	70	H6081S8	H6083S8	H60841S8	34.89	H6085S8	41.94	H608AluS8	39.68
19.0	8	25	70	H6091S8	H6093S8	H60941S8	52.16	H6095S8	62.52	–	–

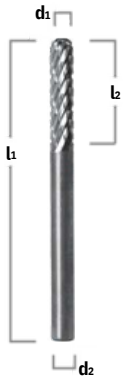
Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

WRC

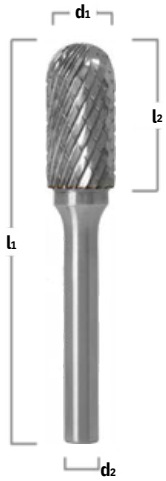


Forma cilíndrica con punta esférica, Tipo WRC



Mango Ø 3 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Z 3 Double	Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
2.5	3	11	38	H5111	H5113	H51141	7.69	H5115	9.32
3.0	3	13	38	H5121	H5123	H51241	7.69	H5125	9.32
3.0	3	14	75	H512L1	H512L3	–	12.88	–	–
4.0	3	12	38	H5131	H5133	H51341	16.24	H5135	18.95
5.0	3	12	38	H5141	H5143	–	16.24	–	–
6.0	3	13	51	H5151	H5153	H51541	11.78	H5155	14.03



Mango Ø 6 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Z 3 Double	Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
	4.0	6	16	51	H61101	H61103	H611041	13.40	H61105	16.05	–	–
	6.0	6	16	51	H6111	H6113	H61141	13.40	H6115	16.05	H611Alu	28.62
L	6.0	6	16	200	H611L1	H611L3	–	23.10	–	–	–	–
	8.0	6	18	63	H6131	H6133	H61341	17.33	H6135	20.77	–	–
L	8.0	6	20	200	H613L1	H613L3	–	28.03	–	–	–	–
	10.0	6	20	65	H6151	H6153	H61541	18.78	H6155	22.58	H615Alu	23.56
	11.0	6	25	70	H61501	H61503	H615041	21.22	H61505	25.49	–	–
	10.0	6	38	83	H6161	H6163	H61641	23.37	H6165	28.03	–	–
L	10.0	6	20	200	H615L1	H615L3	–	28.42	–	–	–	–
	12.0	6	25	70	H6171	H6173	H61741	28.42	H6175	33.98	H617Alu	35.46
L	12.0	6	25	200	H617L1	H617L3	–	43.62	–	–	–	–
	16.0	6	25	70	H6181	H6183	H61841	37.09	H6185	44.46	H618Alu	46.28
L	16.0	6	25	200	H618L1	H618L3	–	59.03	–	–	–	–
	19.0	6	25	70	H6191	H6193	H61941	53.07	H6195	63.69	H619Alu	66.27
	25.0	6	25	70	H61901	H61903	H619041	77.53	H61905	93.07	–	–

Mango Ø 8 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Z 3 Double	Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
L	10.0	8	20	200	H615L1S8	H615L3S8	–	28.42	–	–	–	–
	12.0	8	25	70	H6171S8	H6173S8	H61741S8	28.42	H6175S8	33.98	H617AluS8	35.46
L	12.0	8	25	200	H617L1S8	H617L3S8	–	43.62	–	–	–	–
	16.0	8	25	70	H6181S8	H6183S8	H61841S8	37.09	H6185S8	44.46	H618AluS8	46.28
	19.0	8	25	70	H6191S8	H6193S8	H61941S8	53.07	H6195S8	63.69	H619AluS8	66.27

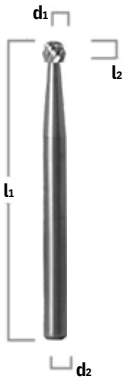
Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

KUD

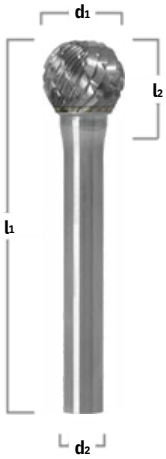
Z1 Normal | Z3 Double | Z41 Fine | Z5 Diamond | Z Alu | HM

Forma esférica, Tipo KUD



Mango Ø 3 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
	1.0	3	1	38	H5721	H5723	–	14.07	–	–
	1.5	3	1.5	38	H5731	H5733	–	14.69	–	–
	2.0	3	1.8	38	H5741	H5743	–	14.69	–	–
	2.5	3	2.5	38	H5751	H5753	H57541	7.69	H5755	9.32
	3.0	3	2.8	38	H5761	H5763	H57641	7.69	H5765	9.32
L	3.0	3	2.8	75	H576L1	H576L3	–	12.88	–	–
	5.0	3	4	43	H5771	H5773	H57741	11.46	H5775	13.78
	6.0	3	5	44	H5781	H5783	H57841	11.06	H5785	13.28



Mango Ø 6 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
	3.0	6	3	51	H6701	H6703	H67041	12.37	H6705	14.88	–	–
	6.0	6	5	51	H6711	H6713	H67141	13.73	H6715	16.56	H671Alu	15.41
L	6.0	6	5	200	H671L1	H671L3	–	23.22	–	–	–	–
	8.0	6	7	52	H6731	H6733	H67341	13.73	H6735	16.56	–	–
L	8.0	6	7	200	H673L1	H673L3	–	23.74	–	–	–	–
	10.0	6	9	52	H6751	H6753	H67541	14.88	H6755	17.80	H675Alu	22.51
L	10.0	6	9	200	H675L1	H675L3	–	24.72	–	–	–	–
	12.0	6	11	56	H6771	H6773	H67741	20.24	H6775	24.33	H677Alu	25.43
L	12.0	6	11	200	H677L1	H677L3	–	28.42	–	–	–	–
	16.0	6	14	59	H6791	H6793	H67941	24.66	H6795	29.57	H679Alu	30.93
L	16.0	6	14	200	H679L1	H679L3	–	53.91	–	–	–	–
	19.0	6	17	62	H6801	H6803	H68041	34.10	H6805	40.96	H680Alu	42.70
	25.0	6	24	68	H68011	H68013	H680141	58.65	H68015	70.42	–	–

Mango Ø 8 mm

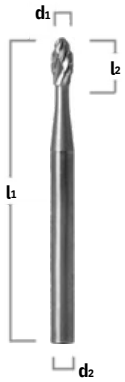
	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
L	10.0	8	10	200	H675L1S8	H675L3S8	–	24.72	–	–	–	–
	12.0	8	11	56	H6771S8	H6773S8	H67741S8	20.24	H6775S8	24.33	H677AluS8	25.43
L	12.0	8	11	200	H677L1S8	H677L3S8	–	28.42	–	–	–	–
	16.0	8	14	59	H6791S8	H6793S8	H67941S8	24.66	H6795S8	29.57	H679AluS8	30.93
L	16.0	8	14	200	H679L1S8	H679L3S8	–	53.91	–	–	–	–
	19.0	8	17	62	H6801S8	H6803S8	H68041S8	34.10	H6805S8	40.96	H680AluS8	42.70

Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

TRE

Forma ovalada, Tipo TRE



Mango Ø 3 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
	3.0	3	6	38	H5451	H5453	H54541	7.69	H5455	9.32
L	3.0	3	6	75	H545L1	H545L3	–	12.88	–	–
	5.0	3	7	38	H5461	H5463	H54641	16.24	–	–
	6.0	3	9	48	H5471	H5473	H54741	11.06	H5475	13.28

Mango Ø 6 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
	6.0	6	10	51	H6411	H6413	H64141	15.54	H6415	18.50	–	–
L	6.0	6	10	200	H641L1	H641L3	–	24.47	–	–	–	–
	8.0	6	16	60	H6421	H6423	H64241	17.86	H6425	21.42	–	–
L	8.0	6	16	200	H642L1	H642L3	–	28.03	–	–	–	–
	10.0	6	20	60	H6431	H6433	H64341	18.50	H6435	22.27	H643Alu	22.51
L	10.0	6	20	200	H643L1	H643L3	–	30.15	–	–	–	–
	12.0	6	25	67	H6451	H6453	H64541	27.18	H6455	31.65	H645Alu	33.02
L	12.0	6	25	200	H645L1	H645L3	–	41.74	–	–	–	–
	16.0	6	25	70	H6471	H6473	H64741	40.25	H6475	46.93	H647Alu	48.87
	19.0	6	25	70	H6491	H6493	H64941	50.66	H6495	59.09	H649Alu	61.48

Mango Ø 8 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
L1	10.0	8	20	200	H643L1S8	H643L3S8	–	30.15	–	–	–	–
	12.0	8	22	67	H6451S8	H6453S8	H64541S8	27.18	H6455S8	31.65	H645AluS8	33.02
L	12.0	8	25	200	H645L1S8	H645L3S8	–	41.74	–	–	–	–
	16.0	8	25	70	H6471S8	H6473S8	H64741S8	40.25	H6475S8	46.93	H647AluS8	48.87
	19.0	8	25	70	H6491S8	H6493S8	H64941S8	50.66	H6495S8	59.09	H649AluS8	61.48

Velocidad recomendada (r.p.m.)

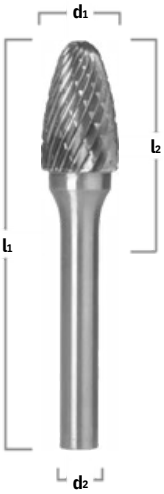
Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

RBF

Forma de árbol con punta esférica, Tipo RBF

Mango Ø 3 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
2.0	3	6	38	H5341	H5343	H53441	7.69	H5345	9.32
3.0	3	6	38	H5351	H5353	H53541	7.69	H5355	9.32
3.0	3	13	38	H5361	H5363	H53641	7.69	H5365	9.32
5.0	3	12	38	H5371	H5373	H53741	16.24	–	–
6.0	3	13	51	H5381	H5383	H53841	11.06	H5385	13.28



Mango Ø 6 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
	6.0	6	18	51	H6311	H6313	H63141	13.91	H6315	16.77	–	–
L	6.0	6	18	200	H631L1	H631L3	–	23.05	–	–	–	–
	8.0	6	18	64	H6331	H6333	H63341	16.63	H6335	19.87	–	–
L	8.0	6	20	200	H633L1	H633L3	–	28.03	–	–	–	–
	10.0	6	20	64	H6351	H6353	H63541	17.68	H6355	21.22	H635Alu	22.06
L	10.0	6	20	200	H635L1	H635L3	–	28.42	–	–	–	–
	12.0	6	20	64	H6361	H6363	H63641	26.08	H6365	31.33	–	–
	12.0	6	25	70	H6371	H6373	H63741	27.97	H6375	33.60	H637Alu	32.62
L	12.0	6	25	200	H637L1	H637L3	–	43.62	–	–	–	–
	16.0	6	25	70	H6381	H6383	H63841	35.99	H6385	43.23	H638Alu	44.97
	19.0	6	25	70	H6391	H6393	H63941	47.30	H6395	56.88	–	–

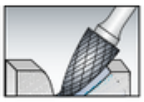
Mango Ø 8 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
L	10.0	8	20	200	H635L1S8	H635L3S8	–	28.42	–	–	–	–
	12.0	8	25	70	H6371S8	H6373S8	H63741S8	27.97	H6375S8	33.60	H637AluS8	32.62
L	12.0	8	25	200	H637L1S8	H637L3S8	–	43.62	–	–	–	–
	16.0	8	25	70	H6381S8	H6383S8	H63841S8	35.99	H6385S8	43.23	H638AluS8	44.97
	19.0	8	25	70	H6391S8	H6393S8	H63941S8	47.30	H6395S8	56.88	–	–

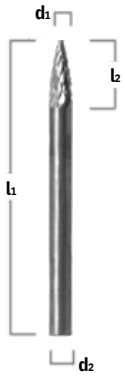
Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

SPG

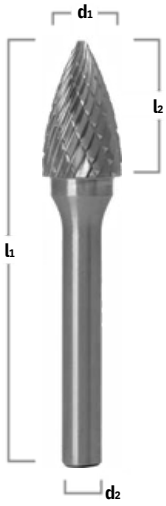
HM


Forma de árbol puntiaguda, Tipo SPG



Mango Ø 3 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
	2.5	3	6	38	H5241	H5243	H52441	7.69	H5245	9.32
	3.0	3	6	38	H5251	H5253	H52541	7.69	H5255	9.32
	3.0	3	8	38	H5261	H5263	H52641	7.69	H5265	9.32
L	3.0	3	8	75	H526L1	H526L3	–	12.88	–	–
	3.0	3	10	38	H5271	H5273	H52741	7.69	H5275	9.32
L	3.0	3	10	75	H527L1	H527L3	–	12.88	–	–
	3.0	3	13	38	H52711	H52713	H527141	7.69	H52715	9.32
L	3.0	3	13	75	H5271L1	H5271L3	–	12.88	–	–
	5.0	3	12	38	H5281	H5283	–	16.24	–	–
	6.0	3	13	51	H5291	H5293	H52941	11.26	H5295	13.28



Mango Ø 6 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
	6.0	6	18	51	H6211	H6213	H62141	13.91	H6215	16.77
L	6.0	6	18	200	H621L1	H621L3	–	23.81	–	–
	8.0	6	18	64	H6221	H6223	H62241	15.41	H6225	18.50
L	8.0	6	18	200	H622L1	H622L3	–	28.42	–	–
	10.0	6	20	64	H6231	H6233	H62341	18.90	H6235	22.58
L	10.0	6	20	200	H623L1	H623L3	–	31.50	–	–
	12.0	6	20	64	H6261	H6263	H62641	25.63	H6265	30.75
	12.0	6	25	70	H6271	H6273	H62741	27.88	H6275	33.41
L	12.0	6	25	200	H627L1	H627L3	–	41.29	–	–
	16.0	6	25	70	H6281	H6283	H62841	35.66	H6285	42.79
	19.0	6	25	70	H6291	H6293	H62941	47.30	H6295	56.82

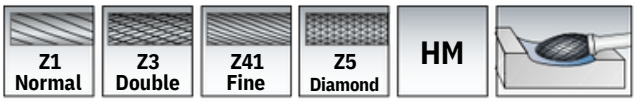
MangoØ8 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
L	10.0	8	20	200	H623L1S8	H623L3S8	–	31.50	–	–
	12.0	8	25	70	H6271S8	H6273S8	H62741S8	27.88	H6275S8	33.41
L	12.0	8	25	200	H627L1S8	H627L3S8	–	41.29	–	–
	16.0	8	25	70	H6281S8	H6283S8	H62841S8	35.66	H6285S8	42.79
	19.0	8	25	70	H6291S8	H6293S8	H62941S8	47.30	H6295S8	56.82

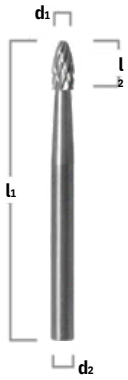
Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

HMB

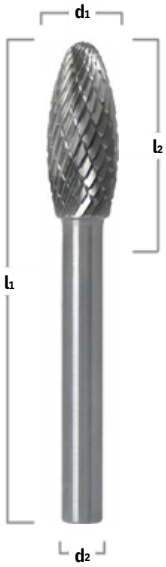


Forma de llama, Tipo HMB



Mango Ø 3 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
	3.0	3	6	38	H5551	H5553	H55541	7.69	H5555	9.32
L	3.0	3	6	75	H555L1	H555L3	–	12.88	–	–
	5.0	3	10	38	H5561	H5563	–	16.24	–	–
	6.0	3	13	43	H5571	H5573	H55741	19.73	–	–



Mango Ø 6 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
	6.0	6	18	51	H6811	H6813	H68141	16.39	H6815	19.73
L	6.0	6	18	200	H681L1	H681L3	–	27.70	–	–
	8.0	6	20	64	H6831	H6833	H68341	18.50	H6835	22.21
L	8.0	6	20	200	H683L1	H683L3	–	31.71	–	–
	10.0	6	25	64	H6851	H6853	–	26.92	H6855	32.29
L	10.0	6	25	200	H685L1	H685L3	–	36.96	–	–
	12.0	6	32	76	H6871	H6873	H68741	37.80	H6875	45.24
L	12.0	6	32	200	H687L1	H687L3	–	59.03	–	–
	16.0	6	36	81	H6881	H6883	H68841	52.16	H6885	62.52
	19.0	6	42	86	H6891	H6893	H68941	66.20	H6895	79.42

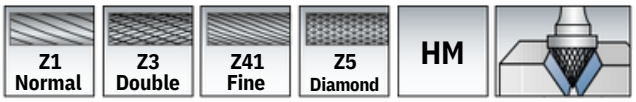
Mango Ø 8 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
L	10.0	8	25	200	H685L1S8	H685L3S8	–	36.96	–	–
L	12.0	8	32	200	H687L1S8	H687L3S8	–	59.03	–	–
	16.0	8	36	81	H6881S8	H6883S8	H68841S8	52.16	H6885S8	62.52
	19.0	8	42	86	H6891S8	H6893S8	H68941S8	66.20	H6895S8	79.42

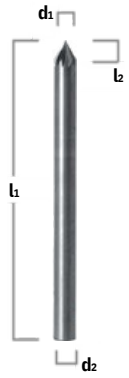
Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

KSJ

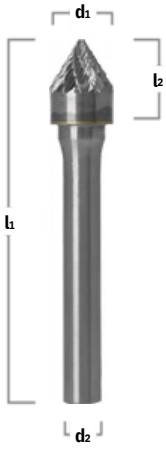


Forma cónica 60°, Tipo KSJ



Mango Ø 3 mm

d_1	d_2	l_2	l_1	Part No.				Part No.	
				Z 1 Normal	Z 3 Double	Z 41 Fine	€/pc.	Z 5 Diamond	€/pc.
mm	mm	mm	mm						
3.0	3	2	38	H5901	H5903	H59041	7.69	H5905	9.32



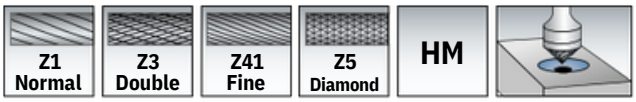
Mango Ø 6 mm

d_1	d_2	l_2	l_1	Part No.				Part No.	
				Z 1 Normal	Z 3 Double	Z 41 Fine	€/pc.	Z 5 Diamond	€/pc.
mm	mm	mm	mm						
6.0	6	5	51	H6611	H6613	H66141	12.37	H6615	14.88
10.0	6	8	52	H66201	H66203	H662041	16.05	H66205	19.36
13.0	6	11	56	H66211	H66213	H662141	19.60	H66215	23.56
16.0	6	14	59	H6651	H6653	H66541	26.08	H6655	31.33
19.0	6	18	62	H66501	H66503	H665041	34.42	H66505	41.29
25.0	6	24	68	H66511	H66513	H665141	55.01	H66515	65.97

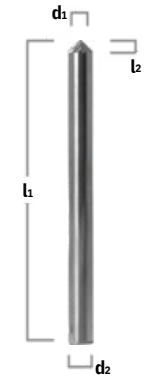
Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

KSK

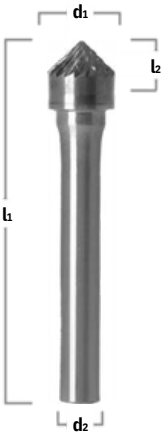


Forma cónica 90°, Tipo KSK



Mango Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			€/pc.	Part No.	€/pc.
				Z 1 Normal	Z 3 Double	Z 41 Fine		Z 5 Diamond	
mm	mm	mm	mm						
3.0	3	2	38	H5911	H5913	H59141	7.69	H5915	9.32



Mango Ø 6 mm

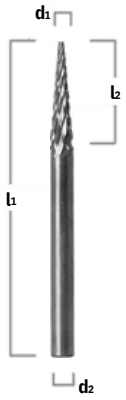
d_1	d_2	l_2	l_1	Part No.			€/pc.	Part No.	€/pc.
				Z 1 Normal	Z 3 Double	Z 41 Fine		Z 5 Diamond	
mm	mm	mm	mm						
6.0	6	3	51	H6631	H6633	H66341	12.37	H6635	14.88
10.0	6	5	49	H66401	H66403	H664041	16.05	H66405	19.36
13.0	6	6	51	H66411	H66413	H664141	19.60	H66415	23.56
16.0	6	8	52	H6671	H6673	H66741	26.08	H6675	31.33
19.0	6	10	54	H66701	H66703	H667041	34.42	H66705	41.29
25.0	6	13	57	H66711	H66713	H667141	55.01	H66715	65.97

Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

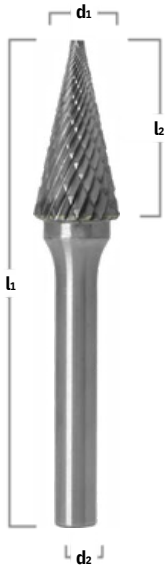
SKM

Forma de cono puntiagudo, Tipo SKM



Mango Ø 3 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
	2.0	3	8	38	H5941	H5943	H59441	7.69	H5945	9.32
	3.0	3	10	38	H5951	H5953	H59541	7.69	H5955	9.32
	3.0	3	13	38	H5961	H5963	H59641	7.69	H5965	9.32
L	3.0	3	11	75	H596L1	H596L3	–	12.88	–	–
	3.0	3	16	38	H5971	H5973	H59741	7.69	H5975	9.32
	6.0	3	13	51	H5991	H5993	H59941	11.06	H5995	13.28



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
6.0	6	13	51	H6511	H6513	H65141	13.59	H6515	16.39	–	–
6.0	6	20	51	H65101	H65103	H651041	14.36	H65105	17.22	–	–
6.0	6	25	51	H6521	H6523	H65241	15.33	H6525	18.38	–	–
10.0	6	19	64	H6551	H6553	H65541	22.51	H6555	27.11	–	–
12.0	6	25	70	H6571	H6573	H65741	28.28	H6575	35.34	H657Alu	35.34
16.0	6	25	73	H6581	H6583	H65841	38.38	H6585	46.14	–	–

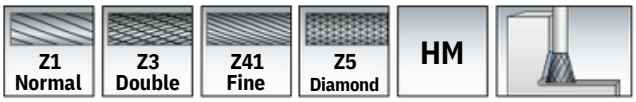
Mango Ø 8 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
12.0	8	25	70	H6571S8	H6573S8	H65741S8	28.28	H6575S8	35.34	H657AluS8	35.34
16.0	8	25	73	H6581S8	H6583S8	H65841S8	38.38	H6585S8	46.14	–	–

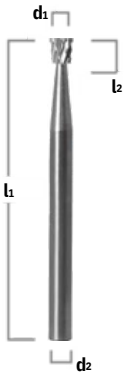
Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

WKN

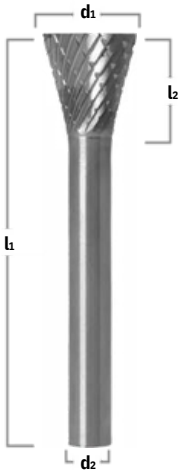


Forma de cono invertido, sin corte frontal, Tipo WKN



Mango Ø 3 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
2.5	3	3	38	H5801	H5803	H58041	7.69	H5805	9.32
3.0	3	3	38	H5811	H5813	H58141	7.69	H5815	9.32
3.0	3	7	38	H58111	H58113	–	7.69	–	–
5.0	3	5	38	H5821	H5823	–	16.24	–	–
6.0	3	6	44	H5831	H5833	H58341	11.06	H5835	13.28
6.0	3	8	44	H58311	H58313	–	15.92	–	–



Mango Ø 6 mm

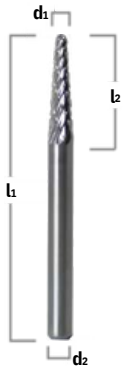
d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
6.0	6	6	51	H66001	H66003	H660041	13.78	H66005	16.63
10.0	6	10	54	H66011	H66013	H660141	20.01	H66015	24.02
13.0	6	13	64	H66021	H66023	H660241	28.15	H66025	33.84
16.0	6	19	64	H66031	H66033	H660341	36.17	H66035	43.43

Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

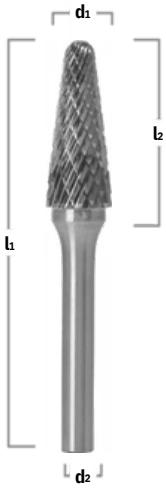
KEL

Forma de cono con punta esférica, Tipo KEL



Mango Ø 3 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.
	3.0	3	10	38	H5601	H5603	H56041	7.69	H5605	9.32
	3.0	3	13	38	H5611	H5613	H56141	7.69	H5615	9.32
L	3.0	3	13	75	H561L1	H561L3	–	12.95	–	–
	5.0	3	13	38	H5621	H5623	–	16.24	–	–



Mango Ø 6 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
	6.0	6	16	51	H6911	H6913	H69141	14.82	H6915	17.74	–	–
L	6.0	6	16	200	H691L1	H691L3	–	23.05	–	–	–	–
	8.0	6	22	67	H6931	H6933	H69341	20.07	H6935	24.09	–	–
L	8.0	6	22	200	H693L1	H693L3	–	31.60	–	–	–	–
	10.0	6	27	71	H6951	H6953	H69541	23.22	H6955	27.88	H695Alu	28.15
L	10.0	6	27	200	H695L1	H695L3	–	36.37	–	–	–	–
	12.0	6	30	73	H6971	H6973	H69741	28.34	H6975	34.04	H697Alu	34.42
L	12.0	6	30	200	H697L1	H697L3	–	41.36	–	–	–	–
	16.0	6	30	78	H6991	H6993	H69941	55.73	H6995	66.99	H699Alu	67.76
	19.0	6	38	83	H69901	H69903	H699041	73.01	H69905	87.63	H6990Alu	89.31

Mango Ø 8 mm

	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	Part No. Z 3 Double	Part No. Z 41 Fine	€/pc.	Part No. Z 5 Diamond	€/pc.	Part No. Z Alu	€/pc.
L	10.0	8	30	200	H695L1S8	H695L3S8	–	36.37	–	–	–	–
	12.0	8	30	73	H6971S8	H6973S8	H69741S8	28.34	H6975S8	34.04	H697AluS8	34.42
L	12.0	8	30	200	H697L1S8	H697L3S8	–	41.36	–	–	–	–
	20.0	8	38	83	H69901S8	H69903S8	H699041S8	73.01	H69905S8	87.63	H6990AluS8	89.31

Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

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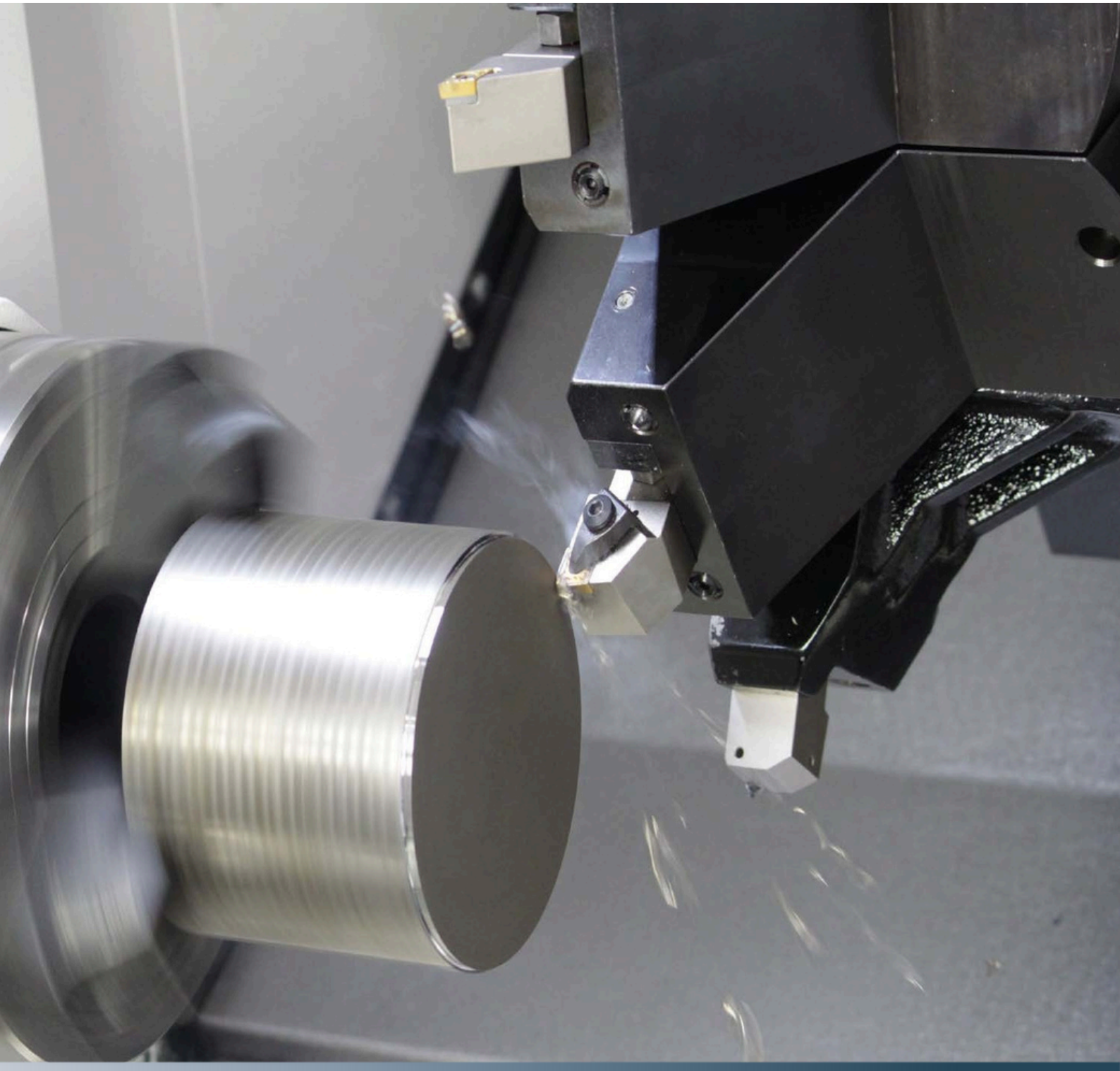

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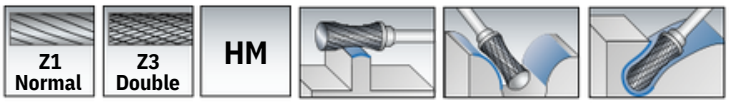
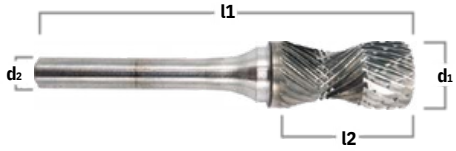
H10



Forma cilíndrica con radio



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	25	70	H1003	48.24

Forma cilíndrica con radio y corte frontal

Mango Ø 6 mm

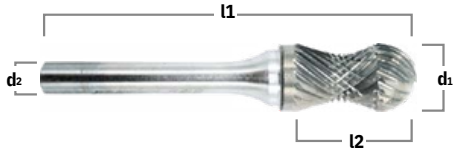
d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	25	70	H1013	50.69

Forma cilíndrica con radio, esférica, sin corte frontal

Mango Ø 6mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	€/pc.
12.7	6	25	70	H1021	45.16

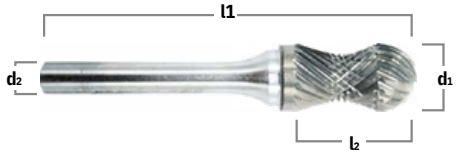
Forma cilíndrica con radio, esférica, con corte frontal



Mango Ø 6mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	€/pc.
12.7	6	25	70	H1031	47.01

Forma cilíndrica con radio, esférica, con corte frontal



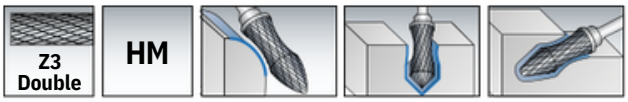
Mango Ø 6mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	25	70	H1043	48.85

Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

H10



Forma cilíndrica con radio, punta esférica

Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	25	70	H1053	53.17

Forma cilíndrica con radio, árbol puntiagudo

MangoØ6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	35	80	H1063	53.17

Radius Shape Cylinder, Taper 60°

Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	31	76	H1073	58.68

Forma cilíndrica con radio, cónica 90°

Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	28	73	H1083	56.23

Radius Shape Cylinder, Ball-Nosed Cone

Mango Ø 6mm

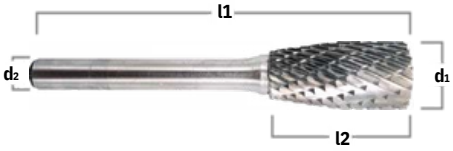
d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	35	80	H1093	56.84

Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

H11

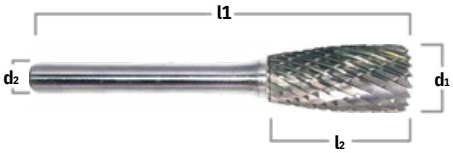
Forma cilíndrica, con radio en las esquinas



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	25	70	H1103	42.91

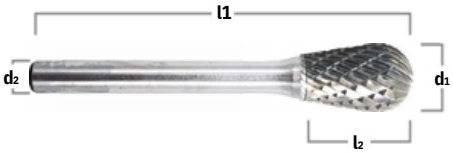
Forma cilíndrico-cónica, con corte frontal



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	25	70	H1113	44.64

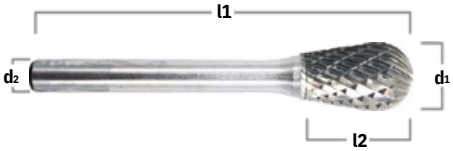
Corte de Bola



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	€/pc.
12.7	6	20	65	H1121	38.85

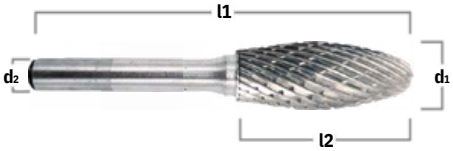
COrte de Bola



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	20	65	H1133	40.00

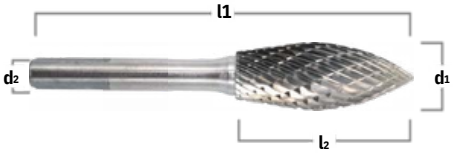
Forma de árbol con punta esférica



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	32	77	H1143	50.94

Pointed Tree Shape



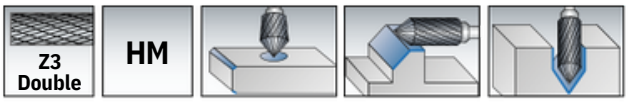
Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	32	77	H1153	50.94

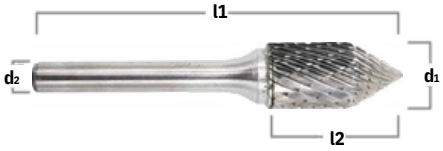
Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

H11



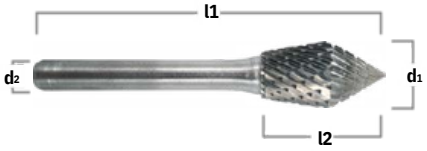
Cilíndrica, cónica 60°



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	25	70	H1163	44.64

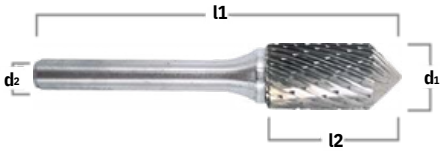
Cilíndrica, cónica 60°



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	23	68	H1173	44.64

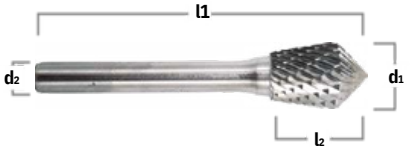
Cilíndrica, cónica 90°



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	25	70	H1183	44.64

Cilíndrica, cónica 90°



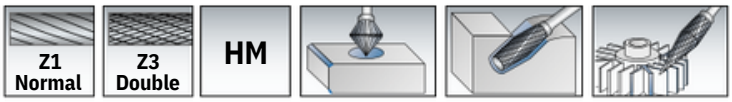
Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	18	64	H1193	44.75

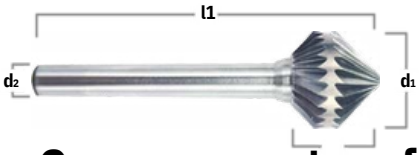
Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

H12



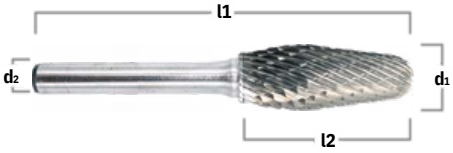
Forma cónica 90°



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 1 Normal	€/pc.
16	6	15	60	H1201	41.97

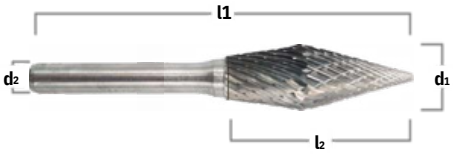
Cono con punta esférica



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	32	77	H1213	50.38

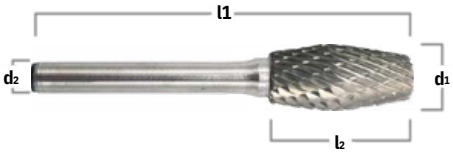
Forma de cono puntiagudo



Mango Ø 6 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	35	80	H1223	53.83

Formas cónicas



Mango Ø 6 mm

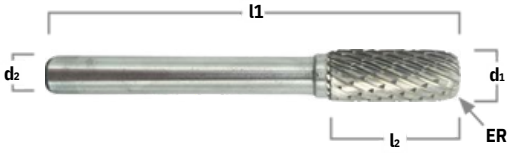
d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
12.7	6	25	70	H1233	47.50

Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

H12

Forma cilíndrica, con radio en las esquinas



Mango Ø 3 mm

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part No. Z 3 Double	€/pc.
3	3	14	38	H1243	19.62
6	6	18	50	H1253	31.20
8	6	20	64	H1263	22.06
9.5	6	19	64	H1273	25.41
12.7	6	25	70	H1283	44.33
16	6	25	70	H1293	56.39

Velocidad recomendada (r.p.m.)

Head Ø	1	2	3	4	5	6	8	10	12	13	14	16	19	25
Acero	75,000 – 100,000	70,000 – 95,000	53,000 – 85,000	40,000 – 80,000	30,000 – 65,000	25,000 – 55,000	20,000 – 40,000	16,000 – 32,000	13,000 – 27,000	12,000 – 25,000	11,000 – 23,000	10,000 – 20,000	8,000 – 17,000	6,000 – 13,000
Acero inoxidable	70,000 – 100,000	65,000 – 90,000	40,000 – 60,000	30,000 – 45,000	25,000 – 35,000	20,000 – 30,000	15,000 – 25,000	13,000 – 18,000	12,000 – 15,000	11,000 – 14,000	10,000 – 13,000	8,000 – 12,000	7,000 – 10,000	5,000 – 7,000
Cast iron and Cast steel	80,000 – 100,000	55,000 – 95,000	40,000 – 90,000	30,000 – 70,000	25,000 – 60,000	20,000 – 50,000	15,000 – 35,000	11,000 – 29,000	9,000 – 24,000	9,000 – 22,000	8,000 – 20,000	7,000 – 18,000	6,000 – 15,000	5,000 – 11,000
Plásticos, aluminio y metales no ferrosos	80,000 – 100,000	75,000 – 95,000	70,000 – 90,000	50,000 – 85,000	40,000 – 75,000	35,000 – 65,000	25,000 – 50,000	21,000 – 38,000	17,000 – 32,000	16,000 – 29,000	15,000 – 27,000	13,000 – 24,000	11,000 – 20,000	8,000 – 15,000
Súper aleaciones y titanio	75,000 – 100,000	35,000 – 70,000	25,000 – 45,000	20,000 – 35,000	15,000 – 30,000	12,000 – 23,000	9,000 – 17,000	7,000 – 14,000	6,000 – 12,000	6,000 – 11,000	5,000 – 10,000	5,000 – 9,000	4,000 – 7,000	3,000 – 6,000
Aceros endurecidos	75,000 – 100,000	35,000 – 85,000	25,000 – 60,000	20,000 – 45,000	15,000 – 35,000	12,000 – 29,000	9,000 – 22,000	7,000 – 18,000	6,000 – 15,000	6,000 – 13,000	5,000 – 12,000	5,000 – 11,000	4,000 – 9,000	3,000 – 7,000

Reafilado para una excelente rentabilidad

En STU-SHOP TOOL USA creemos que cada herramienta debe rendir como el primer día.
Nuestras fresas de carburo están diseñadas para ofrecer calidad y precisión, y con nuestro servicio profesional de reafilado puede prolongar su vida útil al máximo, reduciendo costes y mejorando la rentabilidad de sus procesos.
Reafilar con nosotros es una inversión inteligente: nuestros expertos analizan cada herramienta y determinan si el reacondicionamiento es viable, garantizando un rendimiento confiable, cercano al de una pieza nueva.
De esta manera obtiene un mayor retorno de su inversión, más productividad y la seguridad de trabajar con un socio que se preocupa por la continuidad de su producción.

Precios para reacondicionamiento

Part No.	Head Ø	Price € Reconditioning	Part No.	Head Ø	Preis € Reconditioning
HMSN 1-3	1.0 – 3.0	3.69	HMSA 24	2.0 – 3.9	5.38
HMSN 3.1-6	3.1 – 6.0	5.83	HMSA 47	4.0 – 6.9	8.41
HMSN 6.1-10	6.1 – 10.0	9.52	HMSA 710	7.0 – 9.9	13.55
HMSN 10.1-14.0	10.1 – 14.0	12.43	HMSA 1014	10.0 – 13.9	15.29
HMSN 14.1-18.0	14.1 – 18.0	19.63	HMSA 1418	14.0 – 17.9	22.62
HMSN 18.1-20.0	18.1 – 20.0	22.66	HMSA 1825	18.0 – 24.9	26.24
HMSN 20.1-25.0	20.1 – 25.0	26.68	HMSA 2530	25.0 – 29.9	31.74

Notas

STU SHOPTOOLUSA
Quality Cutting Tool www.shoptoolusa.com

Shopping Tool Machinery Corp.
1691 W 37Th St STE 26 Hialeah FL 33012-
United States.
Phone: +1 (786) 753-7547
Email: sales@shoptoolusa.com
Web: www.shoptoolusa.com

STU-SHOP TOOL USA
1China, Guangdong Province, Shenzhen, Baoan, 西乡街道2栋A单元5楼银田西发雍启科技园
Phone: +1 (786) 753-7547
Email: sales@shoptoolusa.com
Web: www.shoptoolusa.com

SHOP TOOL USA FR SAS
231 rue Saint-Honore 75001 - Paris
France.
Phone: +33 6 56 83 20 18
Email: dperez@shoptoolusafr.com
Web: www.shoptoolusafr.com

Our sales partner: