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2026

Honeycomb Tools

Herramientas para mecanizado de panal de abeja



Ultrasonic Tools

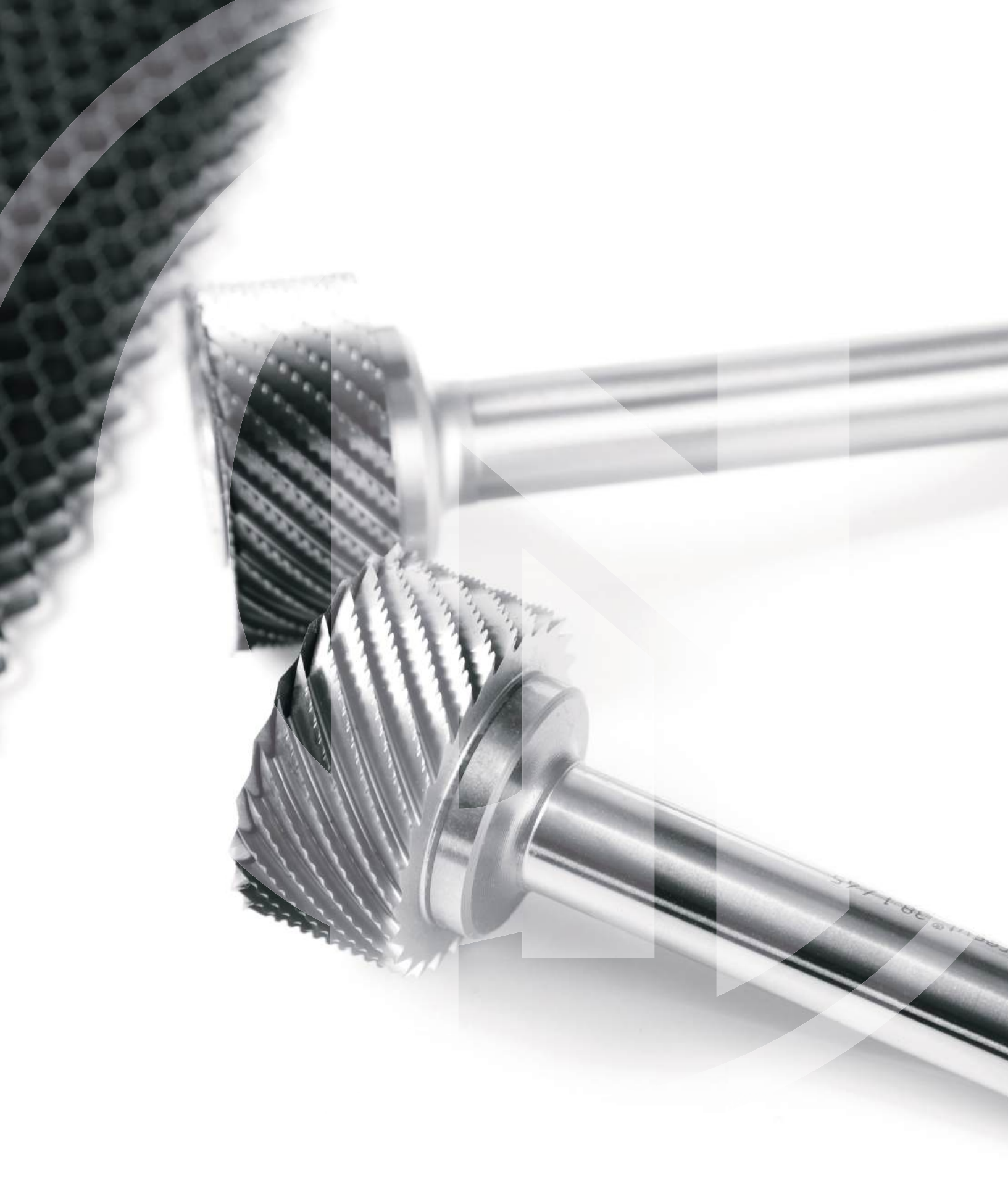
Herramientas ultrasónicas



Panel Tools

Herramientas para mecanizado de paneles





Customized Precision since 1906

Precision in fourth generation

Precisión en cuarta generación

SPECIALIZATION FOR MORE THAN 120 YEARS

Gustav Neuhäuser founded the company in 1906 with the vision of crafting high-precision cutting tools for metalworking. For more than a century, we have been developing competent solutions FOR and WITH our customers for their machining requirements.

Highly specialized unique and standard tools, perfectly adapted to their respective machining task, form the center of our innovations and services.

Our team of qualified specialists continuously develops the technical specifications of our tools to optimize performance.

ESPECIALIZACIÓN DURANTE MÁS DE 120 AÑOS

Gustav Neuhäuser fundó la empresa en 1906 con el objetivo de fabricar herramientas de corte de alta precisión para el trabajo en metal. Durante más de un siglo, hemos desarrollado soluciones competentes PARA y CON nuestros clientes para satisfacer sus requisitos de mecanizado.

El centro de nuestras innovaciones y servicios lo constituyen herramientas altamente especializadas y estándar, adaptadas perfectamente a su respectiva tarea de mecanizado.

Nuestro equipo de especialistas cualificados desarrolla continuamente las especificaciones técnicas de nuestras herramientas con el fin de optimizar el rendimiento.

Cutting tools from specialists

Herramientas de corte de especialistas



HIGH-END SOLUTIONS FOR YOUR REQUIREMENTS

Customer-specific tools are our specialty: Are you looking for a tool in dimensions which are not listed in a catalog? Or do you need support to optimize the performance of your process in terms of surface, tool life and machining time? NEUHÄUSER is at your disposal with its extensive knowledge of cutting materials, coatings and cutting geometries. All with the aim of finding the most economical solution for your cutting, slot milling or profile milling process.

Our application engineers will support and advise you during the planning phase of your process. This is how we develop your precision cutting tool together with you – perfectly matched to your process.

SOLUCIONES DE ALTA GAMA PARA SATISFACER SUS REQUISITOS

Nuestra especialidad son herramientas específicas para el cliente: ¿Está buscando una herramienta en unas dimensiones que no se indican en el catálogo? ¿O bien necesita ayuda para optimizar el rendimiento de su proceso en cuanto a superficie, vida útil de la herramienta y tiempo de mecanizado? NEUHÄUSER está a su disposición con sus amplios conocimientos en materiales de corte, recubrimientos y geometrías de corte. Todo ello con la finalidad de encontrar la solución más rentable para su proceso de corte, de fresado de ranuras o de fresado de perfiles.

Nuestros ingenieros de aplicaciones le ayudarán y asesorarán durante la fase de planificación de su proceso. Así es cómo desarrollamos su herramienta de corte de precisión junto con usted, perfectamente adaptada a su proceso.

OUR HIGH-END-TOOLS:

- made of selected carbides, high speed and cobalt steels
- toothed with innovative cutting edge geometries
- coated with PVD or CVD coatings
- manufactured on high-precision CNC grinding centers
- in combination with an optimal heat treatment

Our sales representatives and technicians are at your service for your individual specialist advice.

PRODUCTION WITH COMPETENCE

With many years of experience, our own mechanical engineering and continuous development of our employees form the basis for a precise implementation of your requirements via tools with the highest precision. Based on our extensive stock of raw materials and semi-finished products, we can guarantee you short and reliable delivery times.

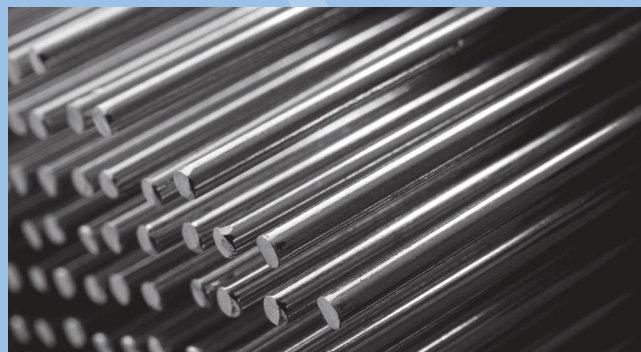
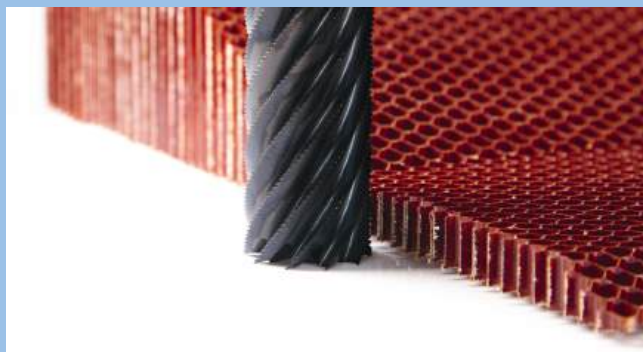
NUESTRAS HERRAMIENTAS DE ALTA GAMA:

- fabricadas con carburos seleccionados, aceros de alta velocidad y aceros aleados con cobalto
- dentados con geometrías innovadoras
- con recubrimientos de PVD o CVD
- fabricadas en centros de mecanizado CNC de alta precisión
- en combinación con un tratamiento térmico óptimo

Nuestros representantes de ventas y técnicos están a su entera disposición para ofrecerle asesoramiento experto personalizado.

FABRICACIÓN COMPETENTE

Con muchos años de experiencia, nuestra propia ingeniería mecánica y el desarrollo continuo de nuestros empleados constituyen la base de una implementación precisa de sus requisitos mediante herramientas con la máxima precisión. Sobre la base de nuestro gran stock de materias primas y productos semiacabados, podemos garantizarle tiempos de suministro breves y fiables.



PRECISION IN TOOLS

PRECISIÓN EN HERRAMIENTAS DE CORTE



PRECISION THROUGH INNOVATION

State-of-the-art and extremely flexible machines for the manufacture of precision tool series of any batch size produced in our production center in Prüm.

Our design department creates the best production conditions through individualized and automated machines that deliver the highest level of efficiency. Optimal conditions for tomorrow's cutting edge geometry.

PRECISIÓN A TRAVÉS DE LA INNOVACIÓN

Máquinas de altas prestaciones y muy fiables para la fabricación de herramientas de precisión en serie en cualquier tamaño manufacturadas en nuestro centro de producción en Prüm.

Nuestro departamento de diseño crea las mejores condiciones de producción mediante máquinas personalizadas y automatizadas que proporcionan el máximo nivel de eficiencia. Condiciones óptimas para la fabricación de herramientas de corte en geometrías innovadoras.

OPTIMUM HARDNESS

– IN-HOUSE VACUUM HARDENING SYSTEMS

Precisely controlled vacuum hardening guarantees a reliable setting of the tool hardness and toughness and thus lays the foundation for the wear resistance of our high-speed and cobalt steel tools.

DUREZA ÓPTIMA – SISTEMAS DE TEMPLE EN VACÍO PROPIOS EN LA EMPRESA

El temple en vacío controlado con precisión garantiza un ajuste fiable de la dureza y la resistencia de la herramienta, lo que sienta la base para la resistencia al desgaste de nuestras herramientas de corte de alta velocidad y de aceros aleados al cobalto.



COATINGS: AGAINST WEAR AND ADHESION

Modern PVD and CVD coatings can significantly increase the efficiency of cutting tools. But which coating is the right one? Depending on the workpiece material to be machined and other process conditions, we can provide a large portfolio of different coatings to minimize wear and friction. We'll gladly advise you.

RECUBRIMIENTOS: CONTRA EL DESGASTE Y LA ADHESIÓN

Los modernos recubrimientos de PVD (deposición física de vapor) o CVD (deposición química de vapor) pueden aumentar considerablemente la eficacia de las herramientas de corte. ¿Pero qué recubrimiento es el adecuado? En función del material de la pieza de trabajo que debe mecanizarse y otras condiciones del proceso, podemos ofrecer una amplia gama de distintos recubrimientos para minimizar el desgaste y la fricción.

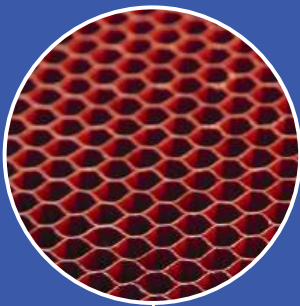
Estaremos encantados de asesorarle.

Our precision cutting tools

Nuestras herramientas de corte de precisión

Honeycomb Tools

Herramientas para mecanizado de panal de abeja



Ultrasonic Tools

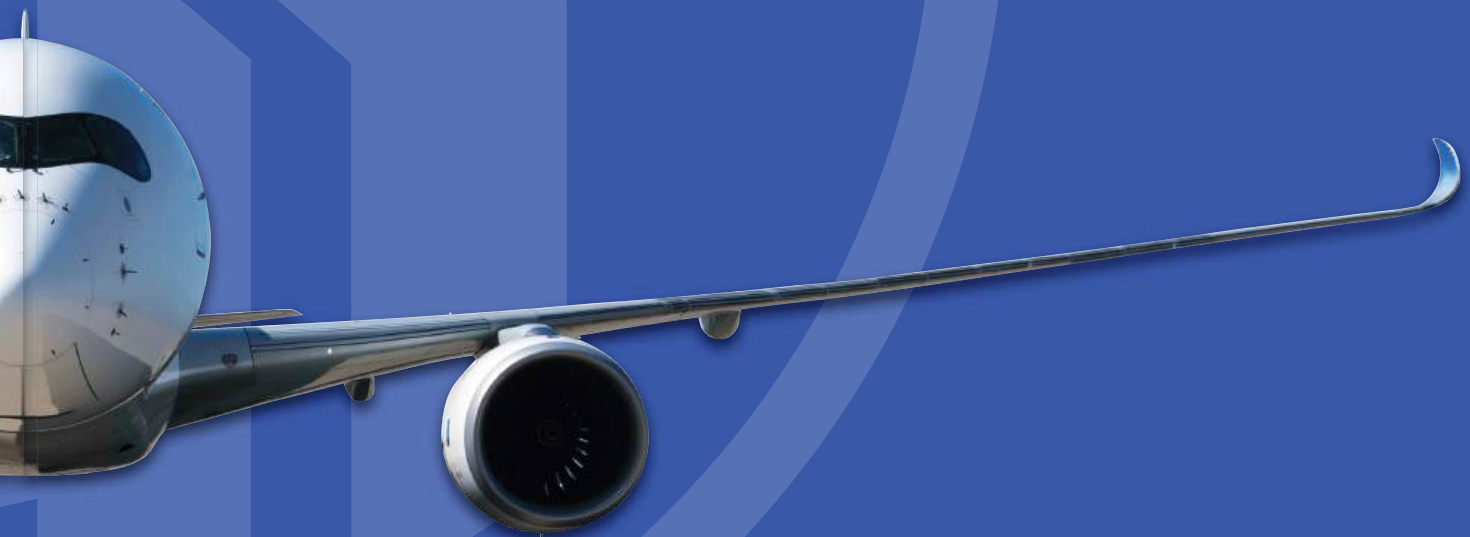
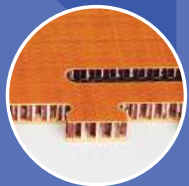
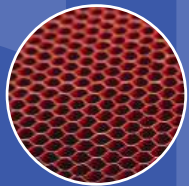
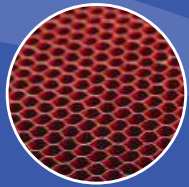
Herramientas ultrasónicas



Panel Tools

Herramientas para mecanizado de paneles





Applications around the world

Aplicaciones en todo el mundo



NEUHÄUSER Präzisionswerkzeuge GmbH is a sales, development and production center that serves all markets in Europe, Asia, Africa and South America. NEUHAEUSER USA Inc. in Springfield, Ohio, is a 100% subsidiary of NEUHÄUSER Präzisionswerkzeuge GmbH and serves the American market. This ensures optimal support for all customers.

Together with our sales partners, we offer you direct and competent contact partners for your individual requirements on site.

NEUHÄUSER Präzisionswerkzeuge GmbH es un centro de ventas, desarrollo y producción que suministra a todos los mercados de Europa, Asia, África y América del Sur. NEUHAEUSER USA Inc. en Springfield, Ohio, es una filial al 100 % de NEUHÄUSER Präzisionswerkzeuge GmbH y opera en el mercado estadounidense. De este modo, se garantiza un soporte óptimo para todos los clientes.

Junto con nuestros socios de ventas, le ofrecemos socios de contacto directos y competentes para sus requisitos individuales in situ.



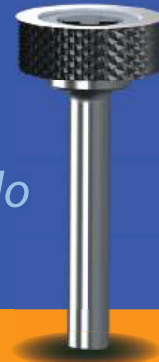
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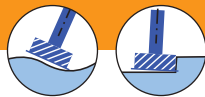
Appendix
Anexo

Recommendations for tool selection

Recomendaciones para la selección de la herramienta

Core Cut

3D-Milling (Roughing · Finishing) · Face Milling
Fresado 3D (Desbaste · Acabado) · Fresado de superficies



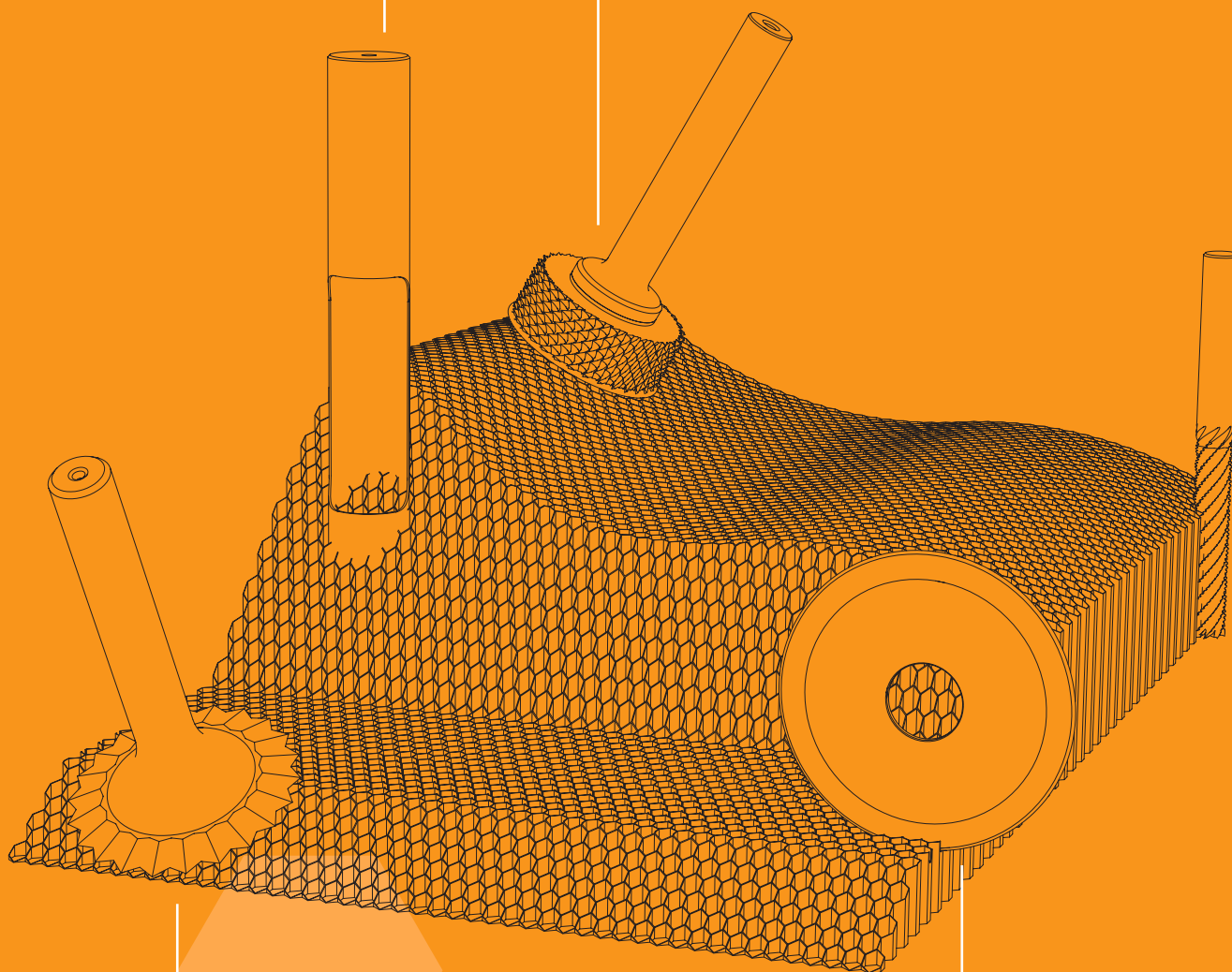
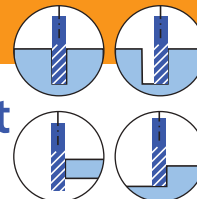
Hollow Drill

Drilling · Nibbling
Broca hueca para taladrar



Profile Cut

Trimming · Roughing ·
Pocketing · Drilling
*Recantado · Desbaste ·
Cajeras · Taladrado*



Valve Type Cut

Chamfering · Trimming · Finishing
Chafilán · Recantado · Acabado



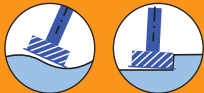
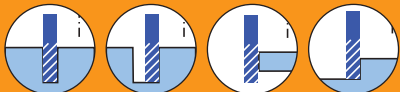
Drain Cut

Slotting of Aramid- and Aluminum Core
Ranurado de núcleo de aramida y aluminio



Honeycomb Tools

Herramientas para mecanizado de panal de abeja

product-type tipo de producto		Application aplicación	page página
Core Cut			12–33
Valve Type Cut			34–47
Profile Cut			48–49
Drain Cut			50–53
Hollow Drill			54–55

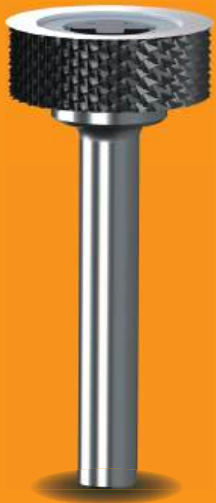
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Honeycomb Tools
Herramientas para
mecanizado de panal de abeja

SPECIAL DIMENSIONS OR SPECIAL APPLICATIONS?

Talk to us. We are happy to manufacture custom-made products for you in regard to tool dimensions, tooth geometries, interfaces, cutting materials and coatings.

DIMENSIONES ESPECIALES O APLICACIONES ESPECIALES?

Póngase en contacto con nosotros. Estaremos encantados de fabricar productos personalizados para usted en cuanto a las dimensiones de la herramienta, las geometrías del dentado, las interfaces, los materiales de corte y los recubrimientos.



Core Cut Overview

Visión general del Core Cut

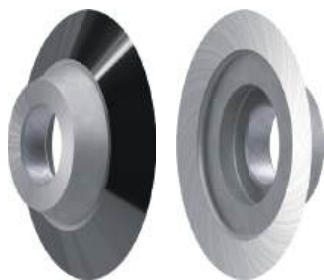
- Modular Tooling-System for 5-axis-machining of Honeycomb material
 - flexible Combination of material-specific designed Front-End-Tools and Shredders
 - For Roughing and Finishing of 3D-surfaces
- *Sistema modular de herramientas de corte para mecanizado de panal de abeja con 5 ejes*
 - *Combinación flexible de cuchillas de disco y trituradoras diseñadas específicamente*
 - *para desbaste y acabado de superficies 3D*



Core Cut Overview

Visión general del Core Cut

Front-End-Tools / Cuchillas de disco



Solid Carbide Knife **S smooth**
Cuchillas de metal duro **S liso**



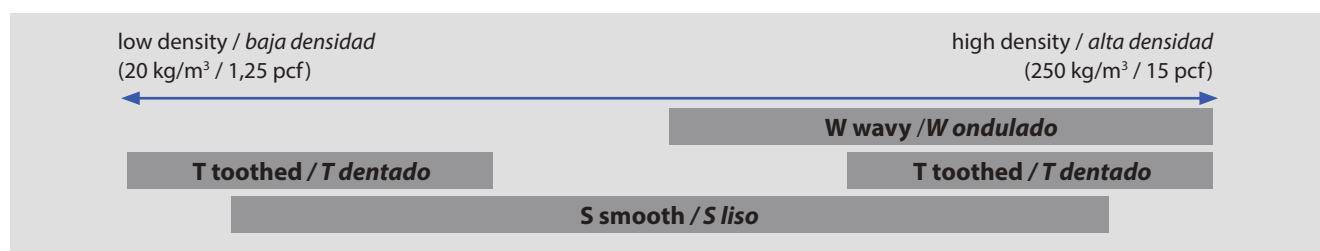
Solid Carbide Knife **T toothed**
Cuchillas de metal duro **T dentado**



Solid Carbide Knife **W wavy**
Cuchillas de metal duro **W ondulado**

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Honeycomb Tools
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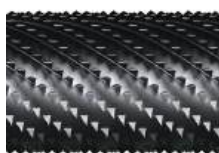
Usage of Front-End-Tools / Uso de cuchilla de disco



Shredders / Fresas trituradoras



Standard toothing
dentado estándar

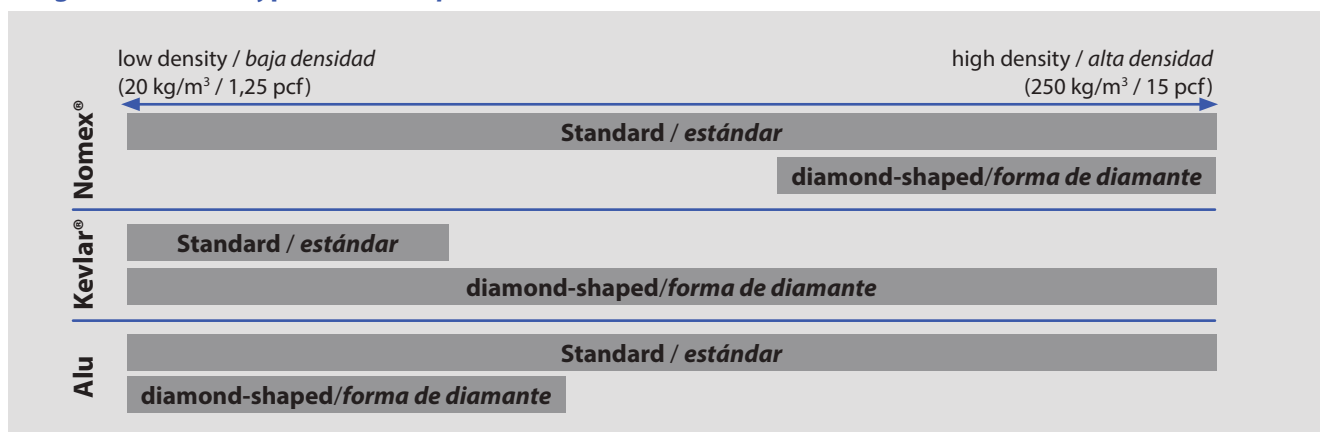


fine diamond-shaped toothing
dentado fino en forma
de diamante



coarse diamond-shaped toothing
dentado grueso en forma
de diamante

Usage of Shredder Types / Uso de tipos de fresas trituradoras



Core Cut Overview

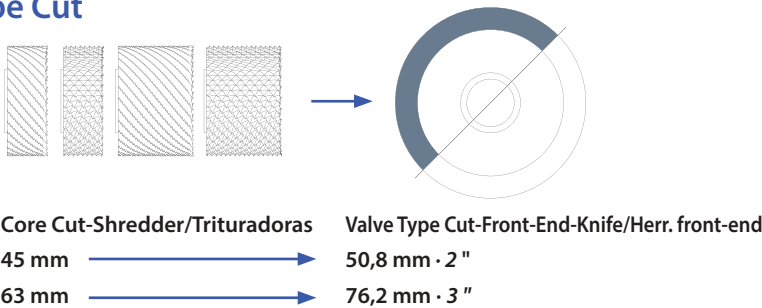
Visión general del Core Cut

Ø in mm Ø in inch		10 0.394	12,7 ½	19,05 ¾	25,4 1	38,1 1½	45 1.772	50,8 2	63 2.480	76,2 3
Front-End-Tools Solid Carbide Knives / <i>Herramientas front-end cuchilla de metal duro</i>										
S	Alcodur	●	●	●	●	●	●	●	●	●
T	Alcodur				●	●	●	●	●	●
W	Alcodur				●	●	●	●	●	●
S	–	●	●	●	●	●	●	●	●	●
T	–				●	●	●	●	●	●
W	–				●	●	●	●	●	●
Core Cut Shredders / <i>Trituradoras</i>										
Standard estándar	short corto	Alcodur	●	●		●	●	●	●	
diam.-shaped forma de diamante	short corto	Alcodur				●	●	●	●	
Standard estándar	long largo	Alcodur			●	●	●		●	●
coarse diam.-shaped grueso forma de diamante	long largo	Alcodur			●	●	●		●	
fine diam.-shaped fino forma de diamante	long largo	Alcodur			●	●				
Core Cut Shank-Sets incl. screw and wrench * / <i>Sets de mangos incl. tornillo y llave *</i>										
Ø ½ "	short corto					●	●	●	●	
Ø ⅝ "	short corto					●	●	●	●	
Ø 16 mm	short corto		Ø 10 to 25,4 mm (½"):				●	●	●	●
Ø 20 mm	short corto		Shank is included in Shredder				●	●	●	●
Ø ½ "	long largo		Ø 10 a 25,4 mm (½"):				●		●	●
Ø ⅝ "	long largo		El mango está incluido en el triturador				●		●	●
Ø 16 mm	long largo						●		●	●
Ø 20 mm	long largo						●		●	●
* instead of the wrench it is possible to use a torque wrench. The needed adapters are listed under "Accessories" in each case. * En lugar de la llave inglesa es posible utilizar una llave de torsión dinamométrica. Los adaptadores necesarios se enumeran en "Accesorios" en cada caso.										
Note: Shank-Sets short version Core Cut 38,1 / 45 identical; Shank-Sets short version Core Cut-50,8 / 63 identical; Shank-Sets long version Core Cut 63 / 76,2 identical Nota: Sets de mangos versión corta Core Cut 38,1 / 45 idéntico; Sets de mangos versión corta Core Cut-50,8 / 63 idéntico; Sets de mangos versión larga Core Cut 63 / 76,2 idéntico										

Adapter-Set Core Cut + Valve Type Cut

for Combination of Core Cut-Shredders
with Valve Type Cut-Front-End-Knives
for increased undercut, options:

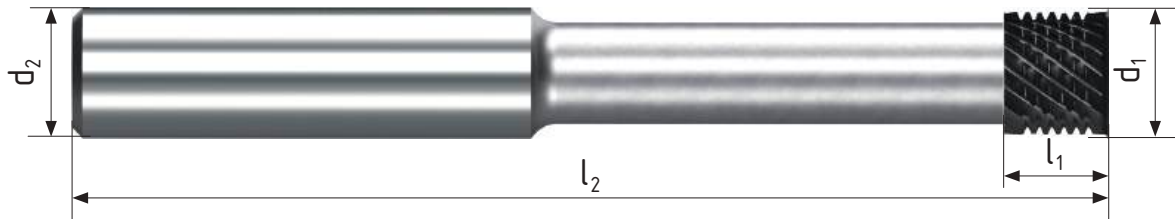
para combinación de trituradoras de corte de
núcleo con cuchillas de corte de tipo válvula-
frontal para un mayor corte, opciones:



Core Cut Overview

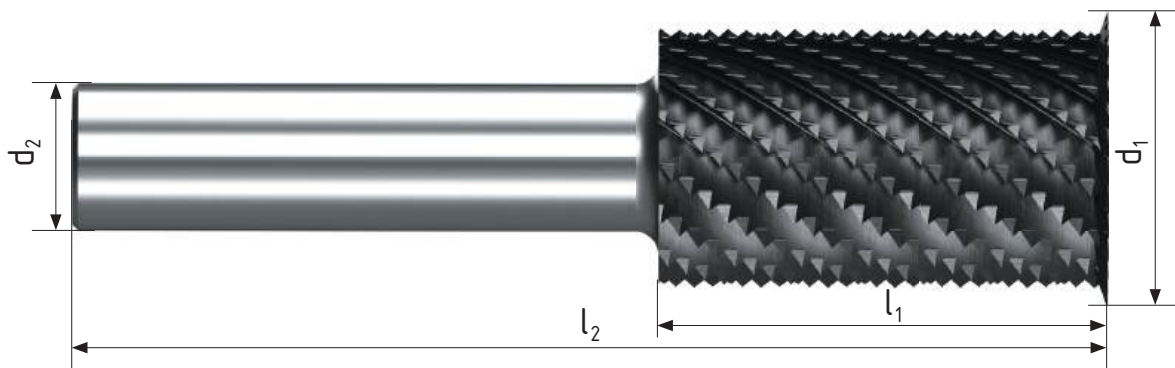
Visión general del Core Cut

- **2 parts from 10 to 19,05 mm**
Shank-Shredder and knife screw



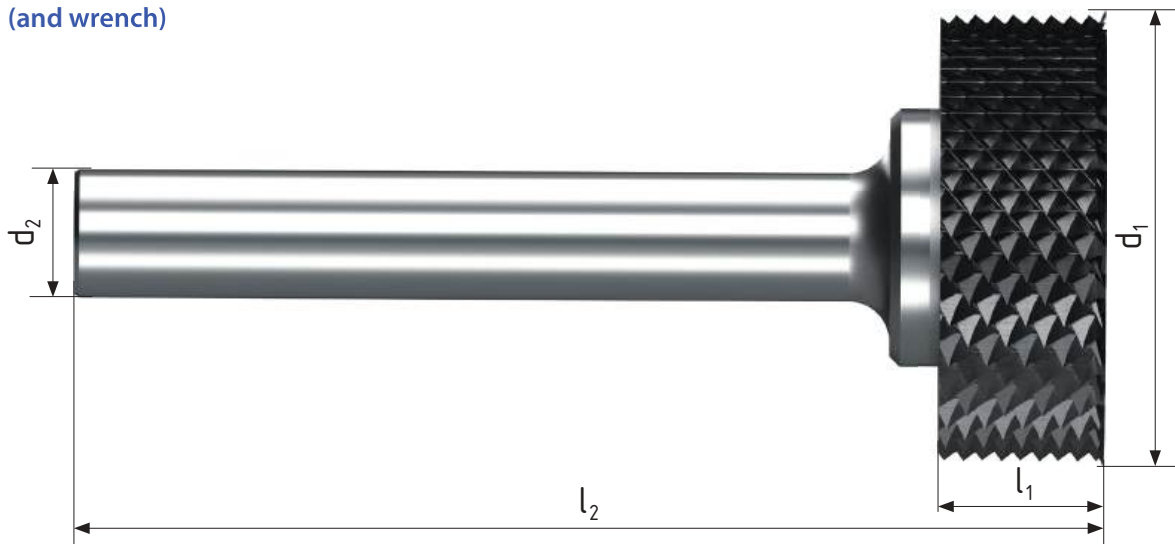
- **2 partes desde 10 hasta 19,05 mm**
Fresas trituradoras y tornillos para cuchillas

- **3 parts at 25,4 mm**
Shank-Shredder, knife, screw (and wrench)



- **3 partes de 25,4 mm**
Fresas trituradoras, cuchilla y tornillo (y llave)

- **4 parts at 38,1 mm**
long and short version
Shank, shredder, front-end tool, screw
(and wrench)



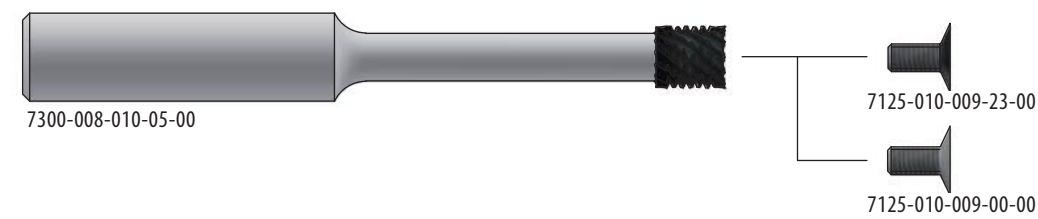
- **4 partes de 38,1 mm**
versión larga y corta
mango, trituradoras, cuchilla, tornillo (y llave)

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d₁ Cutting-Ø / Ø de corte
d₂ Shank-Ø / Ø de mango

l₁ Length of Cut / Longitud de corte
l₂ Over-all-Length / Longitud total

Core Cut · 10 mm · 0.394 "



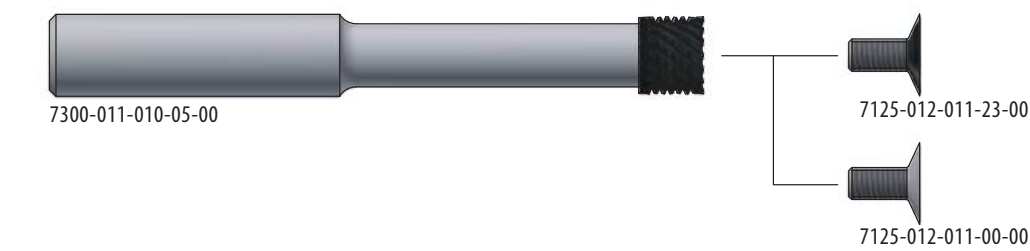
Front-End-Knives with thread / Cuchilla de disco con rosca

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	mat.	Item-No. num. de art.
10 mm 0.394 "	S	 Alcodur	SC MD	7125-010-009-23-00
10 mm 0.394 "	S	 -	SC MD	7125-010-009-00-00

Shank-Shredder / Fresas trituradoras

toothing dentado		coating recubrimiento		d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	ℓ ₂ * OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.
Standard toothing dentado estándar		Alcodur	mm inch	8,9 0.35	10 0.394	101,6 4	12,7 ½	HSS-Co	7300-008-010-05-00

Core Cut · 12,7 mm · ½ "



Front-End-Knives with thread / Cuchilla de disco con rosca

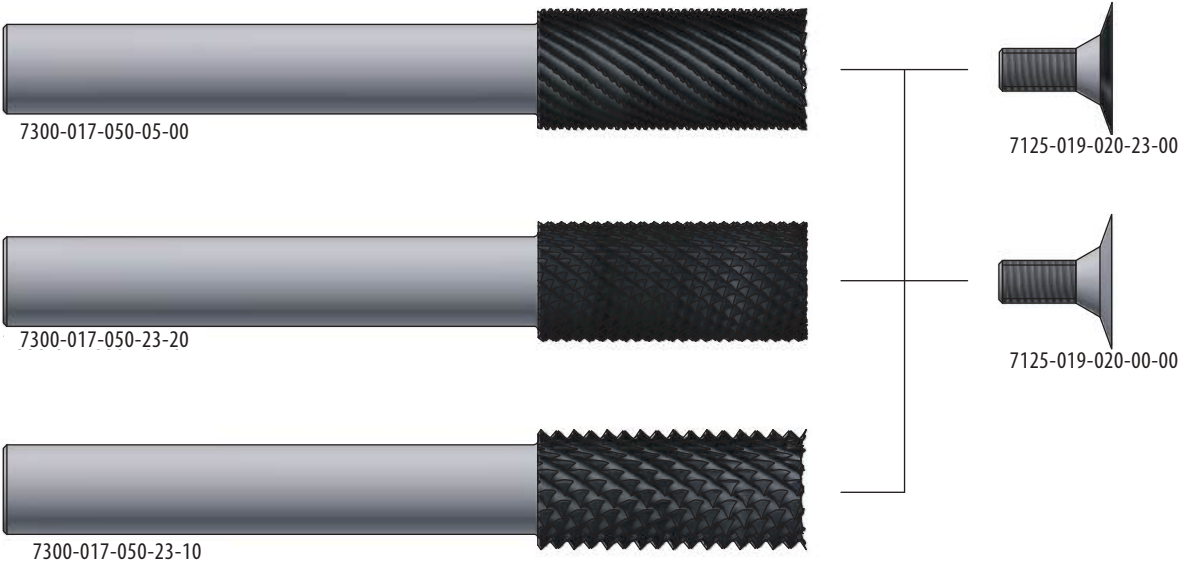
d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	mat.	Item-No. num. de art.
12,7 mm ½ "	S	 Alcodur	SC MD	7125-012-011-23-00
12,7 mm ½ "	S	 -	SC MD	7125-012-011-00-00

Shank-Shredders / Fresas trituradoras

toothing dentado		coating recubrimiento		d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	ℓ ₂ * OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.
Standard toothing dentado estándar		Alcodur	mm inch	11,9 0.469	10 0.394	101,6 4	12,7 ½	HSS-Co	7300-011-010-05-00

Alcodur = Diamond-Like-Coating · SC = Solid Carbide / MD = Metal Duro · HSS-Co = High Speed Steel · LOC = Length of Cut / LDC = Longitud de corte
* Over-all-Length assembled / Longitud total ensamblado

Core Cut • 19,05 mm • 3/4 "



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Herramientas para
mecanizado de panel de abeja

Front-End-Knives with thread / Cuchilla de disco con rosca

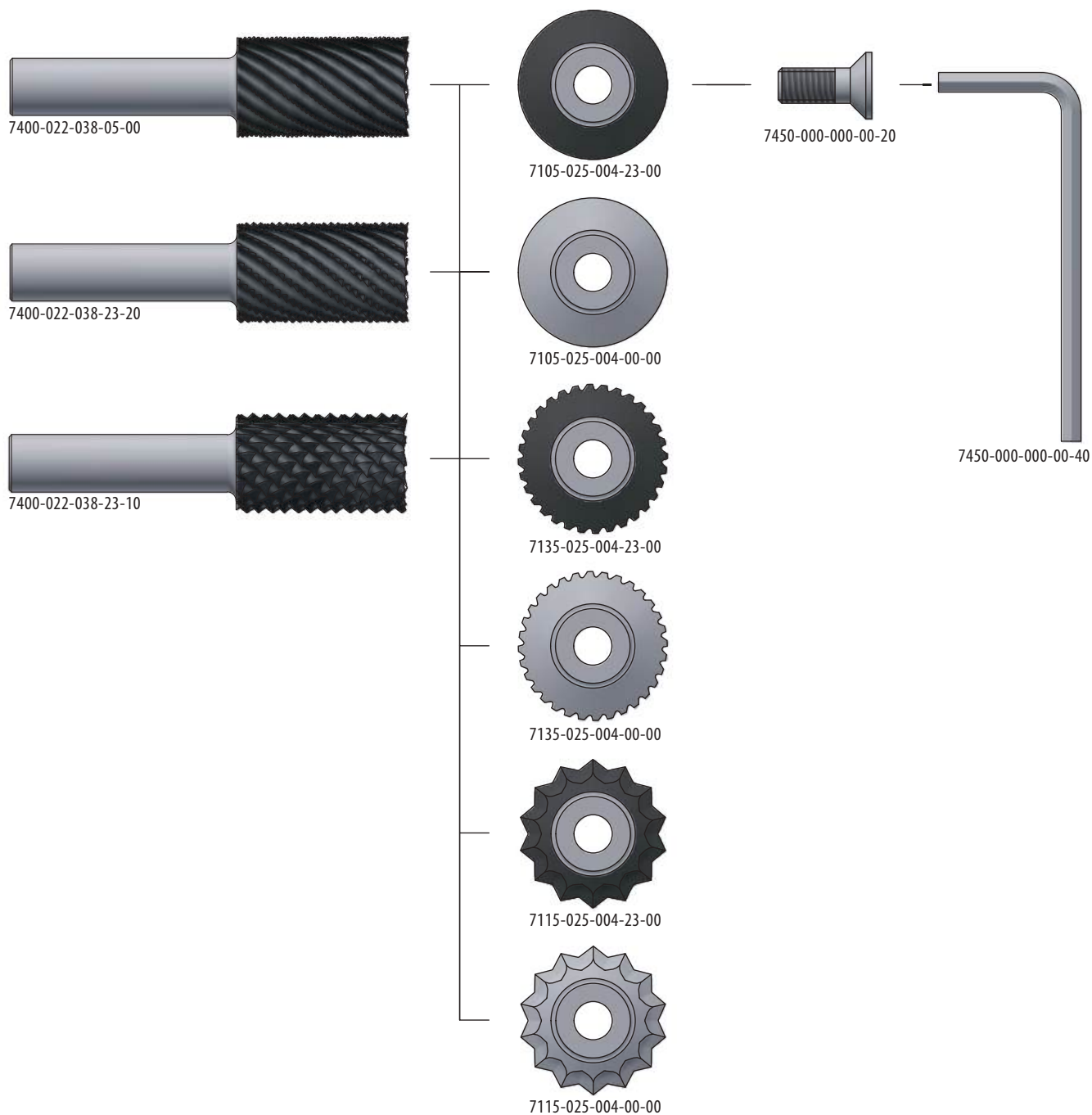
d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	mat.	Item-No. num. de art.
19,05 mm 3/4 "	S	Alcodur	SC MD	7125-019-020-23-00
19,05 mm 3/4 "	S	—	SC MD	7125-019-020-00-00

Shank-Shredders / Fresas trituradoras

toothing dentado		coating recubrimiento		d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	ℓ ₂ * OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.
Standard toothing dentado estándar		Alcodur	mm inch	17 0.669	38,1 1 ½	114,3 4 ½	12,7 ½	HSS-Co	7300-017-050-05-00
fine diamond-shaped teeth dentado fino forma diam.		Alcodur	mm inch	17 0.669	38,1 1 ½	114,3 4 ½	12,7 ½	HSS-Co	7300-017-050-23-20
coarse diamond-shaped teeth dentado grueso forma diam.		Alcodur	mm inch	17 0.669	38,1 1 ½	114,3 4 ½	12,7 ½	HSS-Co	7300-017-050-23-10

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro • HSS-Co = High Speed Steel • LOC = Length of Cut / LDC = Longitud de corte
* Over-all-Length assembled / Longitud total ensamblado

Core Cut · 25,4 mm · 1 "



Core Cut · 25,4 mm · 1 "

Front-End-Knives / Cuchilla de disco

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	mat.	Item-No. num. de art.
25,4 mm 1 "	S	 Alcodur	SC MD	7105-025-004-23-00
25,4 mm 1 "	S	 -	SC MD	7105-025-004-00-00
25,4 mm 1 "	T	 Alcodur	SC MD	7135-025-004-23-00
25,4 mm 1 "	T	 -	SC MD	7135-025-004-00-00
25,4 mm 1 "	W	 Alcodur	SC MD	7115-025-004-23-00
25,4 mm 1 "	W	 -	SC MD	7115-025-004-00-00

1
Honeycomb Tools
Herramientas para
mecanizado de panel de abeja

Shank-Shredder-Sets incl. screw & wrench / Sets de fresas trituradoras con tornillo y llave

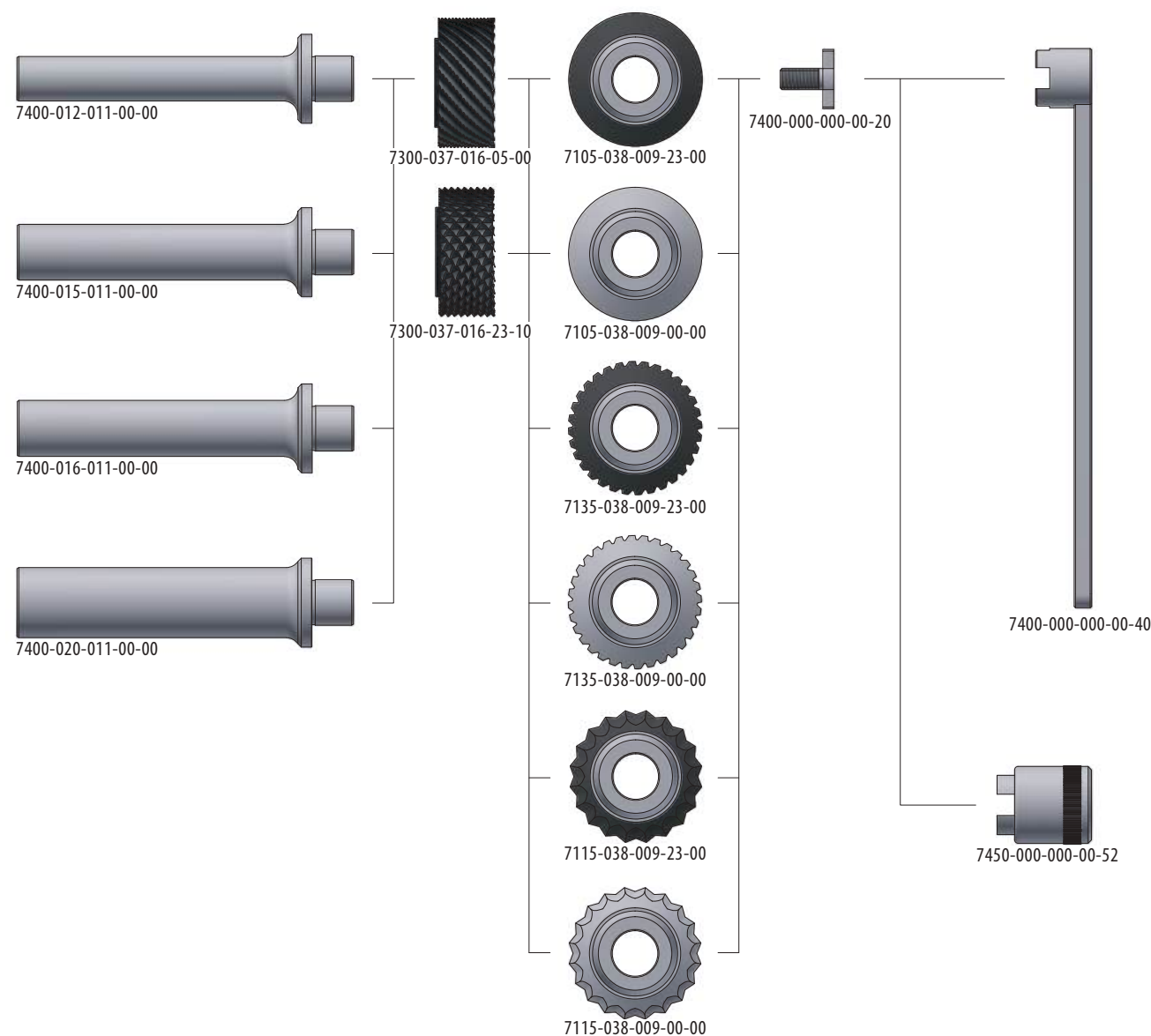
toothing dentado	coating recubrimiento	d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	ℓ ₂ * OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.
Standard toothing dentado estándar	 Alcodur	mm inch	22,225 7/8	38,1 1 1/2	88,9 3 1/2	12,7 1/2	HSS-Co 7400-022-038-05-00
fine diamond-shaped teeth dentado fino forma diam.	 Alcodur	mm inch	22,225 7/8	38,1 1 1/2	88,9 3 1/2	12,7 1/2	HSS-Co 7400-022-038-23-20
coarse diamond-shaped teeth dentado grueso forma diam.	 Alcodur	mm inch	22,225 7/8	38,1 1 1/2	88,9 3 1/2	12,7 1/2	HSS-Co 7400-022-038-23-10

Single components / Componentes individuales

Shank-Shredder Fresas trituradoras	coating recubrimiento	d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	ℓ ₂ * OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.
Standard toothing dentado estándar	 Alcodur	mm inch	22,225 7/8	38,1 1 1/2	88,9 3 1/2	12,7 1/2	HSS-Co 7300-022-038-05-00
fine diamond-shaped teeth dentado fino forma diam.	 Alcodur	mm inch	22,225 7/8	38,1 1 1/2	88,9 3 1/2	12,7 1/2	HSS-Co 7300-022-038-23-20
coarse diamond-shaped teeth dentado grueso forma diam.	 Alcodur	mm inch	22,225 7/8	38,1 1 1/2	88,9 3 1/2	12,7 1/2	HSS-Co 7300-022-038-23-10
Accessories Accesorios							Item-No. num. de art.
Screw Tornillo							7450-000-000-00-20
Allen wrench (SW 4) Llave allen (SW 4)							7450-000-000-00-40

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro • HSS-Co = High Speed Steel • LOC = Length of Cut / LDC = Longitud de corte
* Over-all-Length assembled / Longitud total ensamblado

Core Cut · 38,1 mm · 1 ½ "



Front-End-Knives / Cuchilla de disco

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	mat.	Item-No. num. de art.
38,1 mm 1 ½ "	S	Alcodur	SC MD	7105-038-009-23-00
38,1 mm 1 ½ "	S	–	SC MD	7105-038-009-00-00
38,1 mm 1 ½ "	T	Alcodur	SC MD	7135-038-009-23-00
38,1 mm 1 ½ "	T	–	SC MD	7135-038-009-00-00
38,1 mm 1 ½ "	W	Alcodur	SC MD	7115-038-009-23-00
38,1 mm 1 ½ "	W	–	SC MD	7115-038-009-00-00

Core Cut • 38,1 mm • 1 1/2 "

Shredders / Fresas trituradoras

toothings dentado		coating recubrimiento		d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	mat.	Item-No. num. de art.
Standard toothings dentado estándar		Alcodur	mm inch	37 1.457	16 0.63	HSS-Co	7300-037-016-05-00
diamond-shaped teeth dentado forma diam.		Alcodur	mm inch	37 1.457	16 0.63	HSS-Co	7300-037-016-23-10

Shank Sets incl. screw & wrench / Sets de mangos con tornillo y llave

d ₂ Shank-Ø Ø mango			ℓ ₂ * OAL Longitud total	Item-No. num. de art.
12,7 mm 1/2 "	mm inch		101,6 4	7400-012-011-00-00
15,875 mm 5/8 "	mm inch		101,6 4	7400-015-011-00-00
16 mm 0.63 "	mm inch		101,6 4	7400-016-011-00-00
20 mm 0.7874 "	mm inch		101,6 4	7400-020-011-00-00

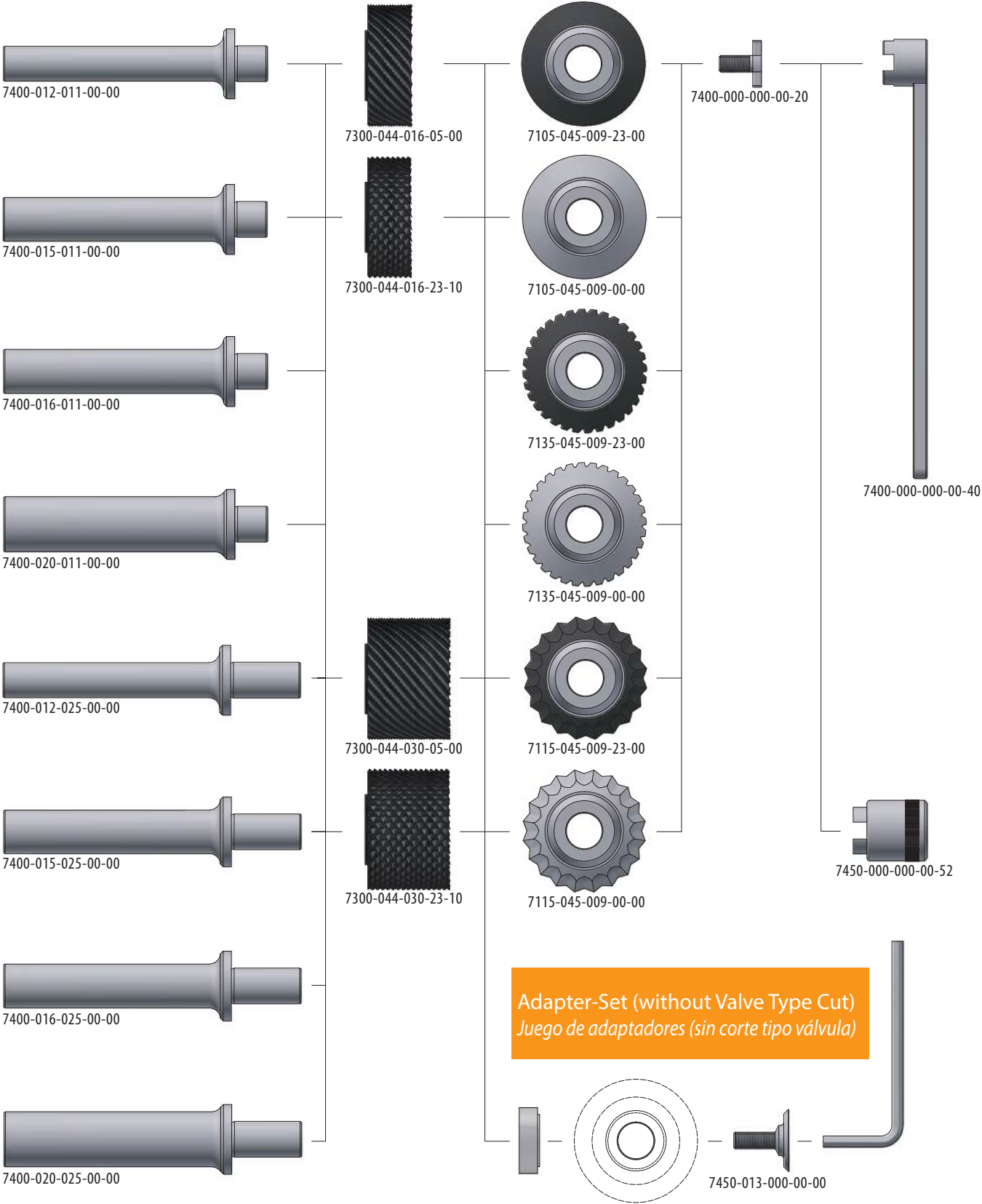
Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
Screw Tornillo	7400-000-000-00-20
Wrench Llave	7400-000-000-00-40
1/2"-Torque wrench adapter for screw Llave para tornillo de 1/2 "	7450-000-000-00-52
Reduction for torque wrench adapter from 1/2" to 3/8" Llave reductora de 1/2" a 3/8"	7450-000-000-00-54

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Honeycomb Tools
Herramientas para
mecanizado de panel de abeja

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro • HSS-Co = High Speed Steel • LOC = Length of Cut / LDC = Longitud de corte
* Over-all-Length assembled / Longitud total ensamblado

Core Cut · 45 mm · 1.772 "



Core Cut • 45 mm • 1.772 "

Front-End-Knives / Cuchilla de disco

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	mat.	Item-No. num. de art.
45 mm 1.772 "	S	 Alcodur	SC MD	7105-045-009-23-00
45 mm 1.772 "	S	 –	SC MD	7105-045-009-00-00
45 mm 1.772 "	T	 Alcodur	SC MD	7135-045-009-23-00
45 mm 1.772 "	T	 –	SC MD	7135-045-009-00-00
45 mm 1.772 "	W	 Alcodur	SC MD	7115-045-009-23-00
45 mm 1.772 "	W	 –	SC MD	7115-045-009-00-00

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Honeycomb Tools
Herramientas para
mecanizado de panel de abeja

Shredders short / Fresas trituradoras cortas

toothing <i>dentado</i>		coating <i>recubrimiento</i>		d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	mat.	Item-No. <i>num. de art.</i>
Standard toothing <i>dentado estándar</i>		Alcodur	mm <i>inch</i>	44 <i>1.732</i>	16 <i>0.63</i>	HSS-Co	7300-044-016-05-00
diamond-shaped teeth <i>dentado forma diam.</i>		Alcodur	mm <i>inch</i>	44 <i>1.732</i>	16 <i>0.63</i>	HSS-Co	7300-044-016-23-10

Shank-Sets short incl. accessories / Sets de mangos cortos incl. accesorios

d ₂ short version / versión corta Shank-Ø Ø mango	coating recubrimiento	ℓ ₂ * OAL Longitud total	Item-No. num. de art.
12,7 mm ½ "	mm inch	101,6 4	7400-012-011-00-00
15,875 mm ⅝ "	mm inch	101,6 4	7400-015-011-00-00
16 mm 0.63 "	mm inch	101,6 4	7400-016-011-00-00
20 mm 0.7874 "	mm inch	101,6 4	7400-020-011-00-00

Adapter-Set / Juego de adaptadores

for combination of Core Cut-Shredders and Valve Type Cut-Front-End-Tools para la combinación de trituradoras de corte de núcleo y herramientas de corte de tipo válvula-frontal	Item-No. num. de art.
Set for Core Cut 45 mm and Valve Type Cut 50,8 mm (consisting of washer, screw and wrench) Set de corte de núcleo 45 mm y válvula de 50,8 mm (que consta de arandela, tornillo y llave inglesa)	7450-013-000-00-00

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro • HSS-Co = High Speed Steel • LOC = Length of Cut / LDC = Longitud de corte
* Over-all-Length assembled / Longitud total ensamblado

Core Cut · 45 mm · 1.772 "

Shredders long / Fresas trituradoras largas

toothing dentado		coating recubrimiento		d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	mat.	Item-No. num. de art.
Standard toothing dentado estándar		Alcodur	mm inch	44 1.732	30 1.181	HSS-Co	7300-044-030-05-00
diamond-shaped teeth dentado forma diam.		Alcodur	mm inch	44 1.732	30 1.181	HSS-Co	7300-044-030-23-10

Shank-Sets long incl. accessories / Sets de mangos largos incl. accesorios

d ₂ long version / versión larga Shank-Ø Ø mango			ℓ ₂ * OAL Longitud total	Item-No. num. de art.
12,7 mm ½ "	mm inch		114,3 4 ½	7400-012-025-00-00
15,875 mm ⅝ "	mm inch		114,3 4 ½	7400-015-025-00-00
16 mm 0.63 "	mm inch		114,3 4 ½	7400-016-025-00-00
20 mm 0.7874 "	mm inch		114,3 4 ½	7400-020-025-00-00

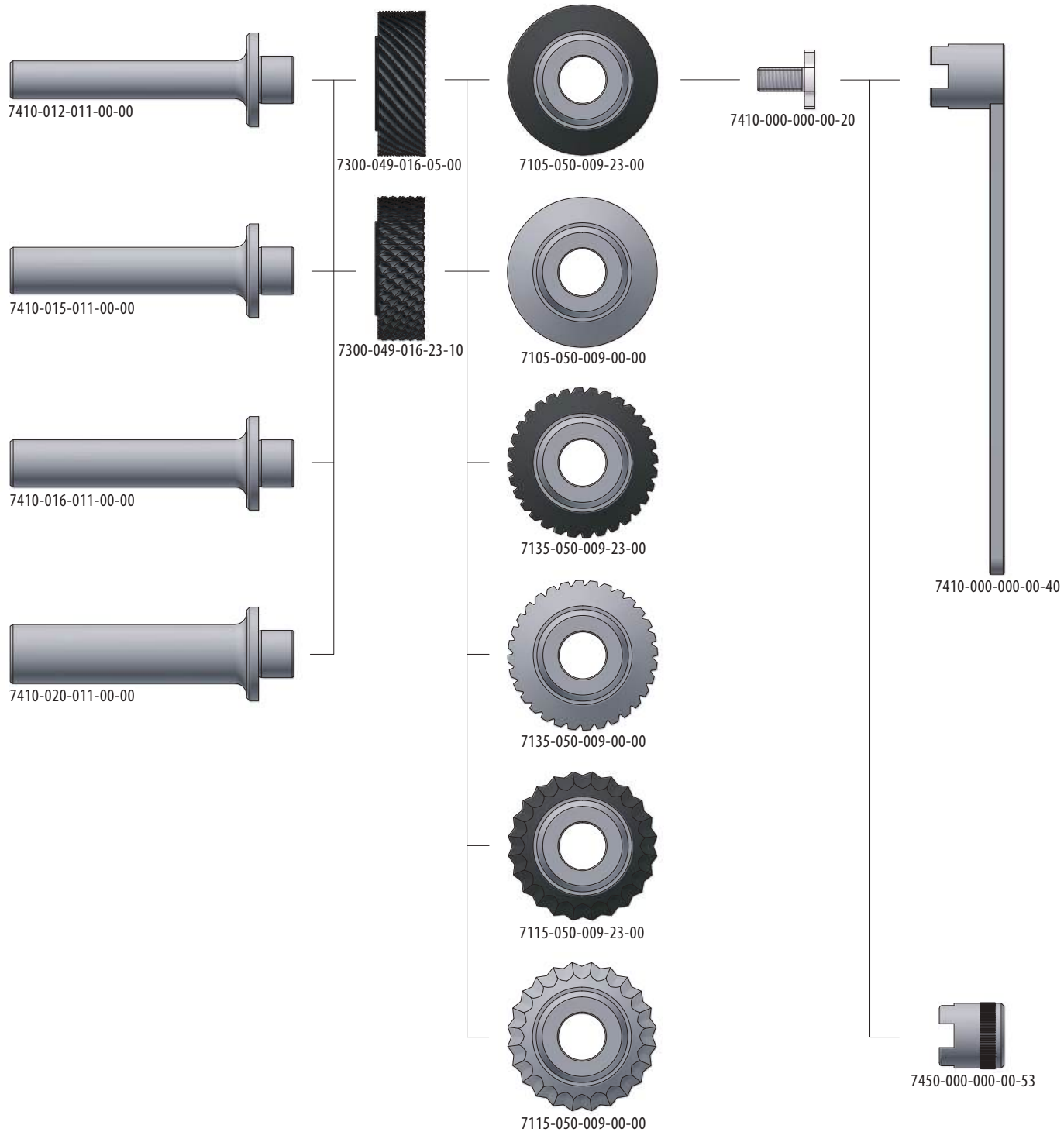
Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
Screw Tornillo	7400-000-000-00-20
Wrench Llave	7400-000-000-00-40
½"-Torque wrench adapter for screw Llave para tornillo de ½"	7450-000-000-00-52
Reduction for torque wrench adapter from ½" to ⅜" Llave reductora de ½" a ⅜"	7450-000-000-00-54

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro • HSS-Co = High Speed Steel • LOC = Length of Cut / LDC = Longitud de corte
* Over-all-Length assembled / Longitud total ensamblado



Core Cut · 50,8 mm · 2 "



Core Cut • 50,8 mm • 2 "

Front-End-Knife / Cuchilla de disco

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	mat.	Item-No. num. de art.
50,8 mm 2 "	S	 Alcodur	SC MD	7105-050-009-23-00
50,8 mm 2 "	S	 -	SC MD	7105-050-009-00-00
50,8 mm 2 "	T	 Alcodur	SC MD	7135-050-009-23-00
50,8 mm 2 "	T	 -	SC MD	7135-050-009-00-00
50,8 mm 2 "	W	 Alcodur	SC MD	7115-050-009-23-00
50,8 mm 2 "	W	 -	SC MD	7115-050-009-00-00

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Honeycomb Tools
Herramientas para
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Shredders / Fresas trituradoras

toothing <i>dentado</i>		coating <i>recubrimiento</i>		d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	mat.	Item-No. <i>num. de art.</i>
Standard toothing <i>dentado estándar</i>		Alcodur	mm <i>inch</i>	49 <i>1.929</i>	16 <i>0.63</i>	HSS-Co	7300-049-016-05-00
diamond-shaped teeth <i>dentado forma diam.</i>		Alcodur	mm <i>inch</i>	49 <i>1.929</i>	16 <i>0.63</i>	HSS-Co	7300-049-016-23-10

Shank Sets incl. screw & wrench / Sets de mangos con tornillo y llave

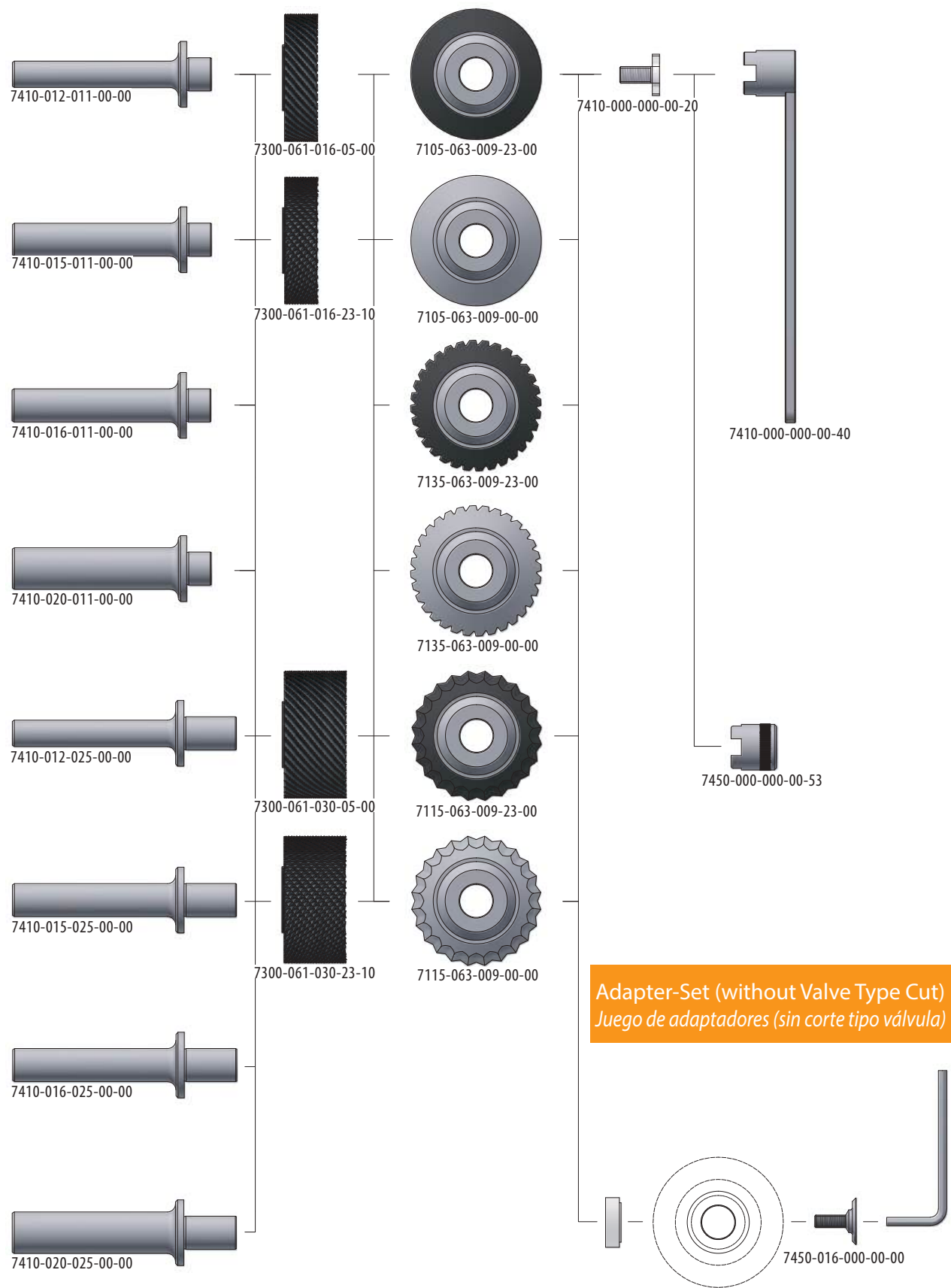
d ₂ Shank-Ø Ø mango	coating recubrimiento	ℓ ₂ * OAL Longitud total	Item-No. num. de art.
12,7 mm ½ "	mm inch	101,6 4	7410-012-011-00-00
15,875 mm ⅝ "	mm inch	101,6 4	7410-015-011-00-00
16 mm 0.63 "	mm inch	101,6 4	7410-016-011-00-00
20 mm 0.7874 "	mm inch	101,6 4	7410-020-011-00-00

Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
Screw Tornillo	7410-000-000-00-20
Wrench Llave	7410-000-000-00-40
½"-Torque wrench adapter for screw Llave para tornillo de ½ "	7450-000-000-00-53
Reduction for torque wrench adapter from ½ " to ⅜ " Llave reductora de ½ " a ⅜ "	7450-000-000-00-54

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro • HSS-Co = High Speed Steel • LOC = Length of Cut / LDC = Longitud de corte
* Over-all-Length assembled / Longitud total ensamblado

Core Cut · 63 mm · 2.480 "



Core Cut • 63 mm • 2.480 "

Front-End-Knives / Cuchilla de disco

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	mat.	Item-No. num. de art.
63 mm 2.480 "	S	 Alcodur	SC MD	7105-063-009-23-00
63 mm 2.480 "	S	 -	SC MD	7105-063-009-00-00
63 mm 2.480 "	T	 Alcodur	SC MD	7135-063-009-23-00
63 mm 2.480 "	T	 -	SC MD	7135-063-009-00-00
63 mm 2.480 "	W	 Alcodur	SC MD	7115-063-009-23-00
63 mm 2.480 "	W	 -	SC MD	7115-063-009-00-00

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Honeycomb Tools
Herramientas para
mecanizado de panel de abeja

Shredders short / Fresas trituradoras cortas

toothing <i>dentado</i>		coating <i>recubrimiento</i>		d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	mat.	Item-No. <i>num. de art.</i>
Standard toothing <i>dentado estándar</i>		Alcodur	mm inch	61,5 2.421	16 0.63	HSS-Co	7300-061-016-05-00
diamond-shaped teeth <i>dentado forma diam.</i>		Alcodur	mm inch	61,5 2.421	16 0.63	HSS-Co	7300-061-016-23-10

Shank-Sets short incl. accessories / Sets de mangos cortos incl. accesorios

d2 short version / versión corta Shank-Ø Ø mango		ℓ2* OAL Longitud total	Item-No. num. de art.
12,7 mm ½ "	mm inch	101,6 4	7410-012-011-00-00
15,875 mm ⅝ "	mm inch	101,6 4	7410-015-011-00-00
16 mm 0.63 "	mm inch	101,6 4	7410-016-011-00-00
20 mm 0.7874 "	mm inch	101,6 4	7410-020-011-00-00

Adapter-Set / Juego de adaptadores

for combination of Core Cut-Shredders and Valve Type Cut-Front-End-Tools para la combinación de trituradoras de corte de núcleo y herramientas de corte de tipo válvula-frontal	Item-No. num. de art.
Set for Core Cut 63 mm and Valve Type Cut 76,2 mm / 3 " (consisting of washer, screw and wrench) Set de corte de núcleo 63 mm y válvula de 76,2 mm (que consta de arandela, tornillo y llave inglesa)	7450-016-000-00-00

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro • HSS-Co = High Speed Steel • LOC = Length of Cut / LDC = Longitud de corte
* Over-all-Length assembled / Longitud total ensamblado

Core Cut · 63 mm · 2.480 "

Shredders long / Fresas trituradoras largas

toothings <i>dentado</i>		coating <i>recubrimiento</i>		d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	mat.	Item-No. <i>num. de art.</i>
Standard toothings <i>dentado estándar</i>		Alcodur	mm <i>inch</i>	61,5 2.421	30 1.181	HSS-Co	7300-061-030-05-00
diamond-shaped teeth <i>dentado forma diam.</i>		Alcodur	mm <i>inch</i>	61,5 2.421	30 1.181	HSS-Co	7300-061-030-23-10

Shank-Sets long incl. accessories / Sets de mangos largos incl. accesorios

d ₂ long version / <i>versión larga</i> Shank-Ø Ø mango			ℓ ₂ * OAL Longitud total	Item-No. <i>num. de art.</i>
12,7 mm <i>½ "</i>	mm <i>inch</i>		114,3 4 ½	7410-012-025-00-00
15,875 mm <i>⅝ "</i>	mm <i>inch</i>		114,3 4 ½	7410-015-025-00-00
16 mm <i>0.63 "</i>	mm <i>inch</i>		114,3 4 ½	7410-016-025-00-00
20 mm <i>0.7874 "</i>	mm <i>inch</i>		114,3 4 ½	7410-020-025-00-00

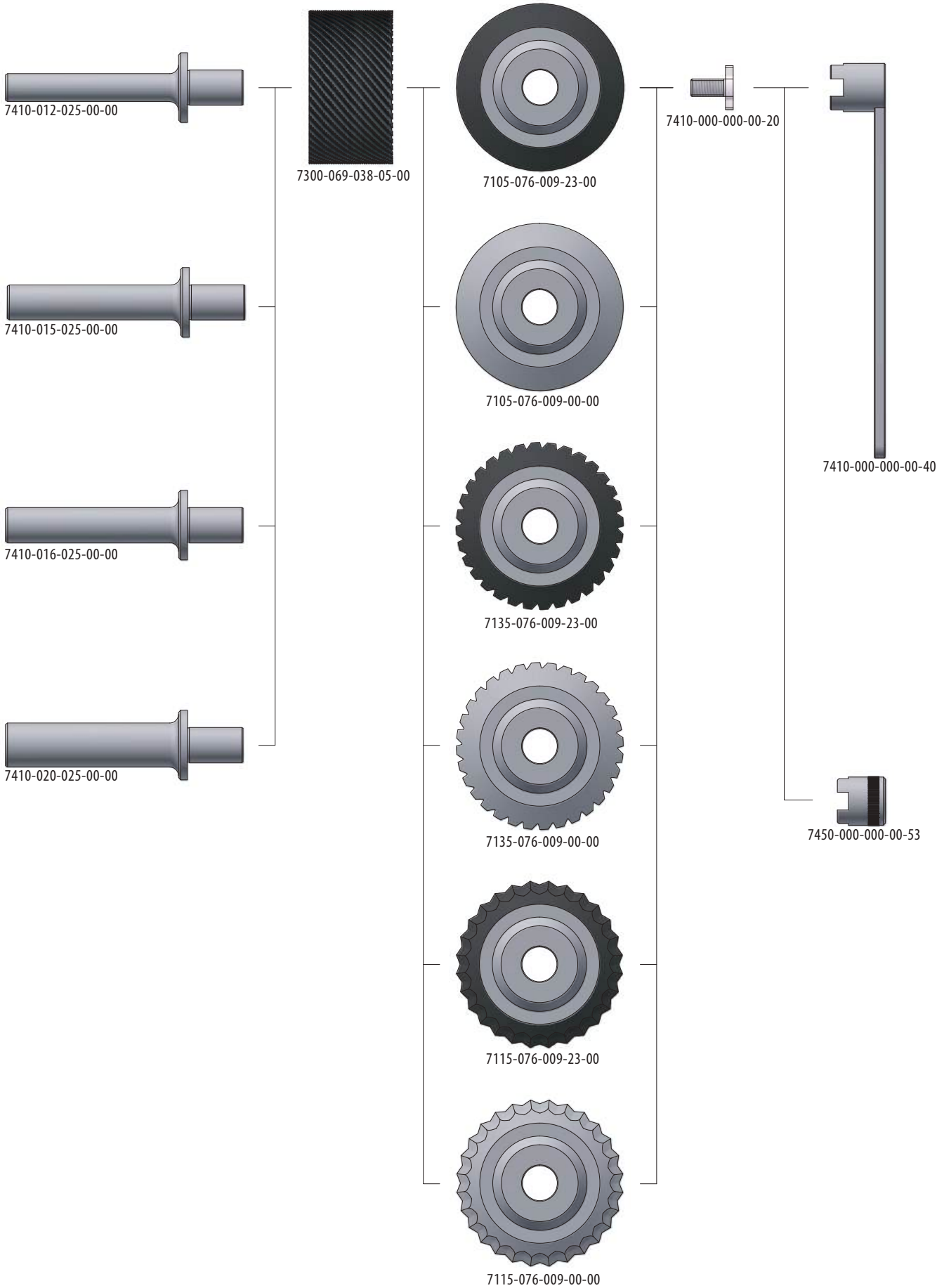
Single components / Componentes individuales

Accessories <i>Accesorios</i>	Item-No. <i>num. de art.</i>
Screw <i>Tornillo</i>	7410-000-000-00-20
Wrench <i>Llave</i>	7410-000-000-00-40
½"-Torque wrench adapter for screw <i>Llave para tornillo de ½"</i>	7450-000-000-00-53
Reduction for torque wrench adapter from ½" to ⅝" <i>Llave reductora de ½" a ⅝"</i>	7450-000-000-00-54

Alcodur = Diamond-Like-Coating · SC = Solid Carbide / MD = Metal Duro · HSS-Co = High Speed Steel · LOC = Length of Cut / LDC = Longitud de corte
* Over-all-Length assembled / Longitud total ensamblado



Core Cut · 76,2 mm · 3 "



Core Cut • 76,2 mm • 3 "

Front-End-Knives / Cuchillas de disco

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	mat.	Item-No. num. de art.
76,2 mm 3 "	S	 Alcodur	SC MD	7105-076-009-23-00
76,2 mm 3 "	S	 -	SC MD	7105-076-009-00-00
76,2 mm 3 "	T	 Alcodur	SC MD	7135-076-009-23-00
76,2 mm 3 "	T	 -	SC MD	7135-076-009-00-00
76,2 mm 3 "	W	 Alcodur	SC MD	7115-076-009-23-00
76,2 mm 3 "	W	 -	SC MD	7115-076-009-00-00

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Honeycomb Tools
Herramientas para
mecanizado de panal de abeja

Shredders / Fresas trituradoras

toothing dentado		coating recubrimiento		d ₁ Cutting-Ø Ø de corte	ℓ ₁ Length of Cut Longitud de corte	mat.	Item-No. num. de art.
Standard toothing dentado estándar		Alcodur	mm inch	69,58 2.739	38,1 1 ½	HSS-Co	7300-069-038-05-00

Shank Sets incl. screw & wrench / Sets de mangos con tornillo y llave

d ₂ Shank-Ø Ø mango		ℓ ₂ * OAL Longitud total	Item-No. num. de art.
12,7 mm 1/2 "	mm inch	113,681 4.476	7410-012-025-00-00
15,875 mm 5/8 "	mm inch	113,681 4.476	7410-015-025-00-00
16 mm 0.63 "	mm inch	113,681 4.476	7410-016-025-00-00
20 mm 0.7874 "	mm inch	113,681 4.476	7410-020-025-00-00

Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
Screw Tornillo	7410-000-000-00-20
Wrench Llave	7410-000-000-00-40
½"-Torque wrench adapter for screw Llave para tornillo de ½"	7450-000-000-00-53
Reduction for torque wrench adapter from ½" to ¾" Llave reductora de ½" a ¾"	7450-000-000-00-54

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro • HSS-Co = High Speed Steel • LOC = Length of Cut / LDC = Longitud de corte
* Over-all-Length assembled / Longitud total ensamblado

Valve Type Cut Overview

Visión general del Valve Type Cut

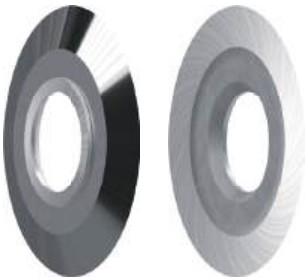
- for Finishing, Chamfering and Trimming of Honeycomb-material
- Combination of Front-End-Knife and Valve-shaped Shank
- *Set para acabado, biselado-chaflán y recorte de material de panal*
- *Combinación de cuchilla de corte y vástago en forma de válvula*



Valve Type Cut Overview

Visión general del Valve Type Cut

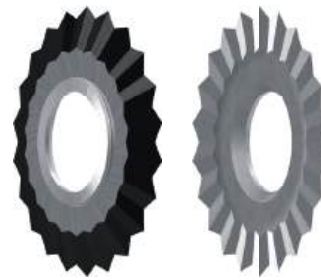
Front-End-Tools / Cuchillas de disco



Solid Carbide Knife **S smooth**
Cuchillas de metal duro **S liso**



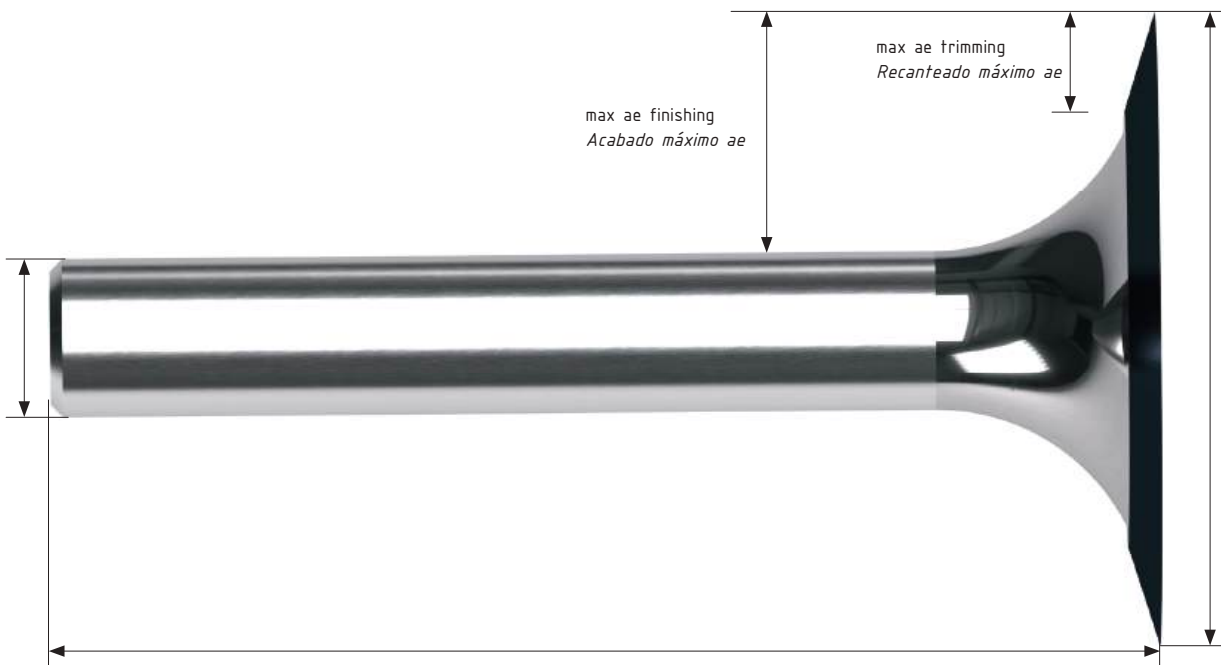
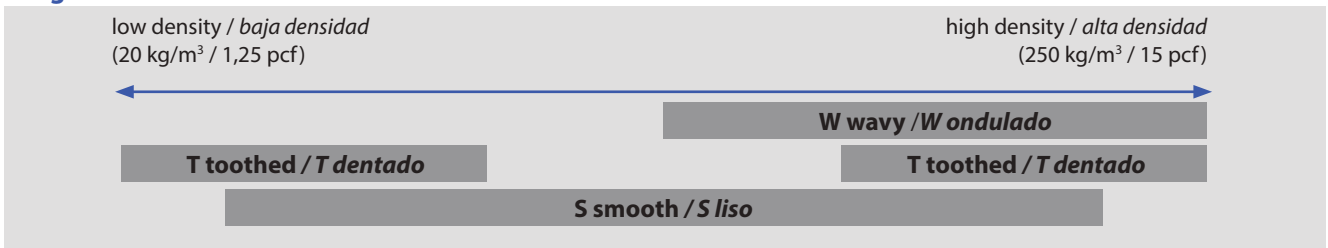
Solid Carbide Knife **T toothed**
Cuchillas de metal duro **T dentado**



Solid Carbide Knife **W wavy**
Cuchillas de metal duro **W ondulado**

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Honeycomb Tools
Herramientas para
mecanizado de panal de abeja

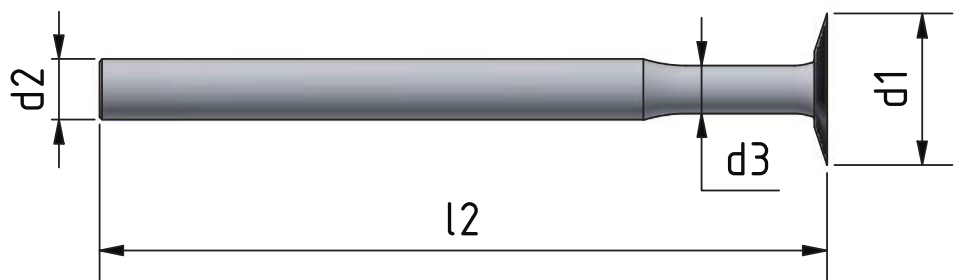
Usage of Front-End-Tools / Uso de cuchillas de disco



d₁ Cutting-Ø / Ø de corte
d₂ Shank-Ø / Ø de mango

l₁ Length of Cut / Longitud de corte
l₂ Over-all-Length / Longitud total

Valve Type Cut · 5 mm · 0.1969 "



Front-End-Knive with shank / Cuchilla de disco con mango

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	max ae	d ₂ Shank-Ø Ø mango	l ₂ OAL Long. total	d ₃ Neck-Ø Ø cuello	mat.	Item-No. num. de art.
5 mm 0.1969 "	S	Alcodur	mm inch 1,50 0.059	3,175 1/8	76,2 3	2 0.0787	SC MD	7175-005-000-23-00



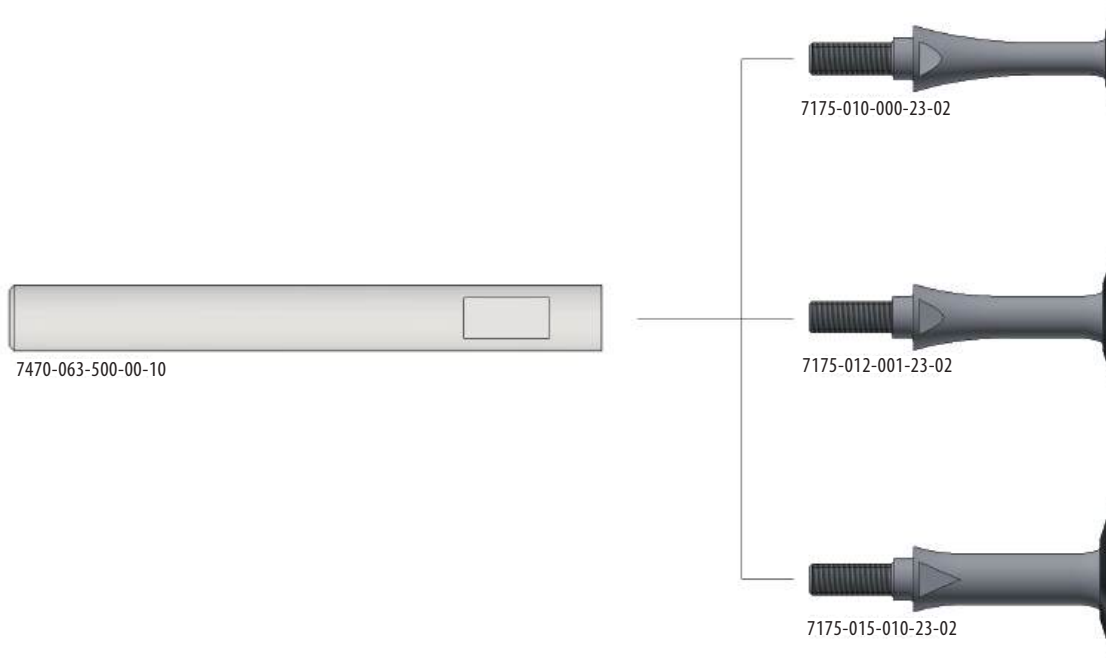
Alcodur = Diamond-Like-Coating · SC = Solid Carbide / MD = Metal Duro
Over-all-Length / Longitud total

Valve Type Cut

• 10 mm – 15,875 mm • 0.3937" – 5/8"

new
nuevo

1
Honeycomb Tools
Herramientas para
mecanizado de panel de abeja



Front-End-Knives / Cuchillas de disco

d ₁ Cutting-Ø Ø de corte	type tipo		coating recubrimiento		max ae		mat.	Item-No. num. de art.
10 mm 0.3937 "	S		Alcodur	mm inch	2,5 0.098		SC MD	7175-010-000-23-02
12,7 mm ½ "	S		Alcodur	mm inch	3,85 0.152		SC MD	7175-012-001-23-02
15,875 mm ⅝ "	S		Alcodur	mm inch	5,44 0.2141		SC MD	7175-015-010-23-02

Shank / Mango

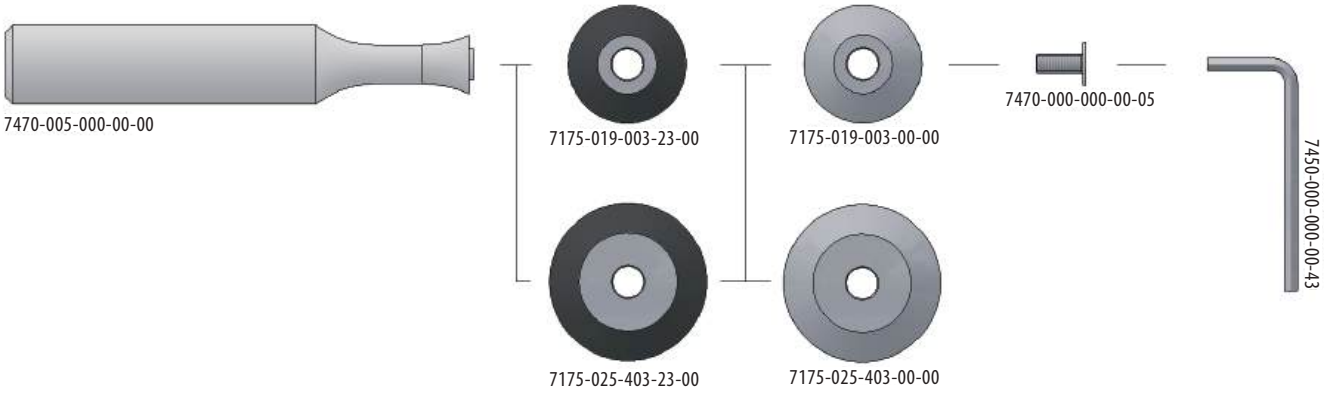
d ₂ Shank-Ø Ø mango		ℓ ₂ * OAL Longitud total	Item-No. num. de art.
6,35 mm	mm	76,2	7470-063-500-00-10
¼ "	inch	3	

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro

* Over-all-Length assembled / Longitud total ensamblado

Valve Type Cut

• 19,05 mm – 25,4 mm • 3/4 " – 1 "



Front-End-Knives / Cuchillas de disco

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	max ae	mat.	Item-No. num. de art.
19,05 mm ¾ "	S	Alcodur	mm inch	6,35 ¼	SC MD 7175-019-003-23-00
19,05 mm ¾ "	S	–	mm inch	6,35 ¼	SC MD 7175-019-003-00-00
25,4 mm 1 "	S	Alcodur	mm inch	9,53 0.375	SC MD 7175-025-403-23-00
25,4 mm 1 "	S	–	mm inch	9,53 0.375	SC MD 7175-025-403-00-00

Shank Set incl. screw & wrench / Set de mango con tornillo y llave

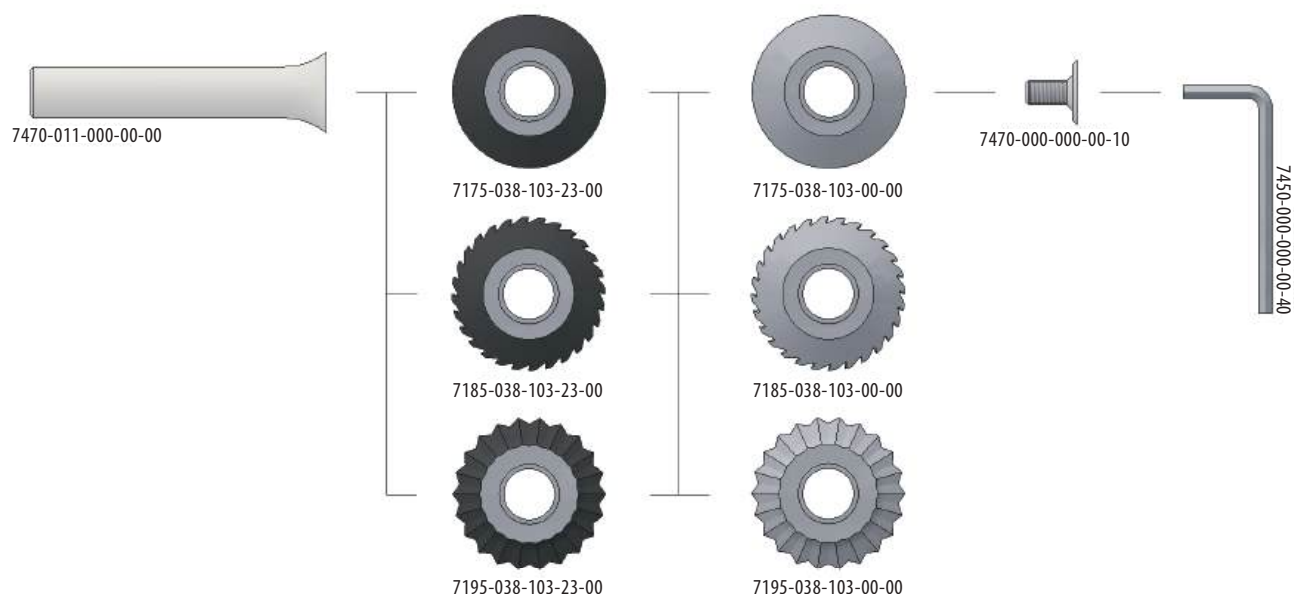
d ₂ Shank-Ø Ø mango	ℓ ₂ * OAL Longitud total	Item-No. num. de art.
12,7 mm ½ "	mm inch	77 3.031 7470-005-000-00-00

Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
Mounting Screw tornillo de montaje	7470-000-000-00-05
Allen wrench (SW 2) Llave allen (SW 2)	7450-000-000-00-43

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro
* Over-all-Length assembled / Longitud total ensamblado

Valve Type Cut · 38,1 mm · 1 ½ "



1
Honeycomb Tools
Herramientas para
mecanizado de panel de abeja

Front-End-Knives / Cuchillas de disco

d ₁ Cutting-Ø Ø de corte	type tipo		coating recubrimiento		max ae Trimming Recanteado	max ae Finishing Acabado	mat.	Item-No. num. de art.
38,1 mm 1 ½ "	S		Alcodur	mm inch	9,05 0.356	12,7 ½	SC MD	7175-038-103-23-00
38,1 mm 1 ½ "	S		–	mm inch	9,05 0.356	12,7 ½	SC MD	7175-038-103-00-00
38,1 mm 1 ½ "	T		Alcodur	mm inch	9,05 0.356	12,7 ½	SC MD	7185-038-103-23-00
38,1 mm 1 ½ "	T		–	mm inch	9,05 0.356	12,7 ½	SC MD	7185-038-103-00-00
38,1 mm 1 ½ "	W		Alcodur	mm inch	9,05 0.356	12,7 ½	SC MD	7195-038-103-23-00
38,1 mm 1 ½ "	W		–	mm inch	9,05 0.356	12,7 ½	SC MD	7195-038-103-00-00

Shank Set incl. screw & wrench / Set de mango con tornillo y llave

dz Shank-Ø Ø mango		ℓ ₂ * OAL Longitud total	Item-No. num. de art.
12,7 mm	mm	76,2	7470-011-000-00-00
½ "	inch	3	

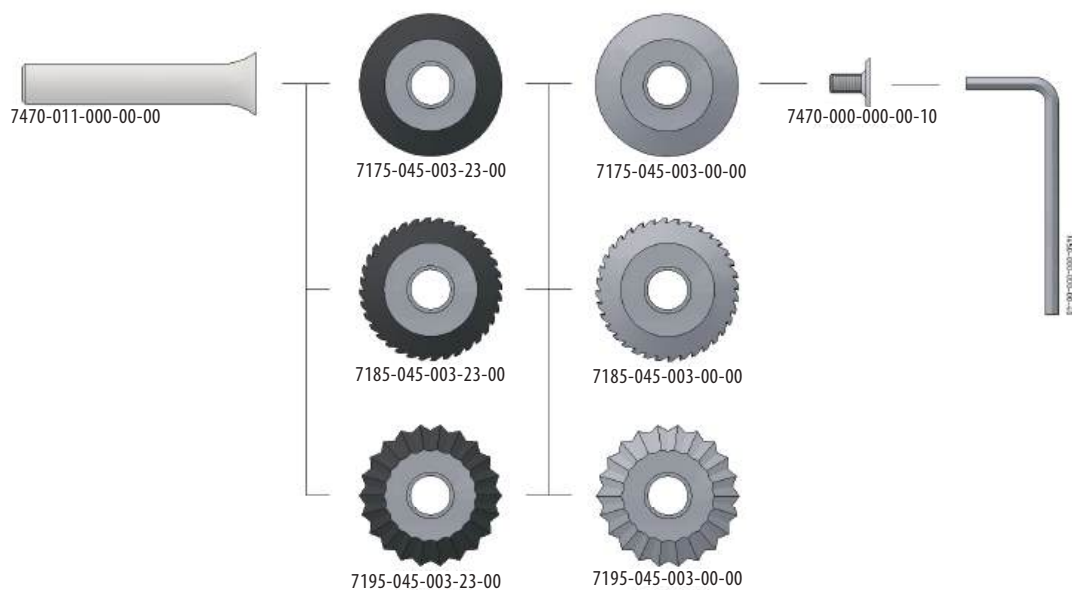
Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
Mounting Screw tornillo de montaje	7470-000-000-00-10
Allen wrench (SW 4) Llave allen (SW 4)	7450-000-000-00-40

Alcodur = Diamond-Like-Coating · SC = Solid Carbide / MD = Metal Duro
* Over-all-Length assembled / Longitud total ensamblado

Valve Type Cut · 45 mm · 1.772 "

new
nuevo



Front-End-Knives / Cuchillas de disco

d ₁ Cutting-Ø Ø de corte	type tipo		coating recubrimiento		max ae Trimming Recantado	max ae Finishing Acabado	mat.	Item-No. num. de art.
45 mm 1.772"	S		Alcodur	mm inch	12,5 0.492	16,15 0.636	SC MD	7175-045-003-23-00
45 mm 1.772 "	S		–	mm inch	12,5 0.492	16,15 0.636	SC MD	7175-045-003-00-00
45 mm 1.772 "	T		Alcodur	mm inch	12,5 0.492	16,15 0.636	SC MD	7185-045-003-23-00
45 mm 1.772 "	T		–	mm inch	12,5 0.492	16,15 0.636	SC MD	7185-045-003-00-00
45 mm 1.772 "	W		Alcodur	mm inch	12,5 0.492	16,15 0.636	SC MD	7195-045-003-23-00
45 mm 1.772 "	W		–	mm inch	12,5 0.492	16,15 0.636	SC MD	7195-045-003-00-00

Shank Set incl. screw & wrench / Set de mango con tornillo y llave

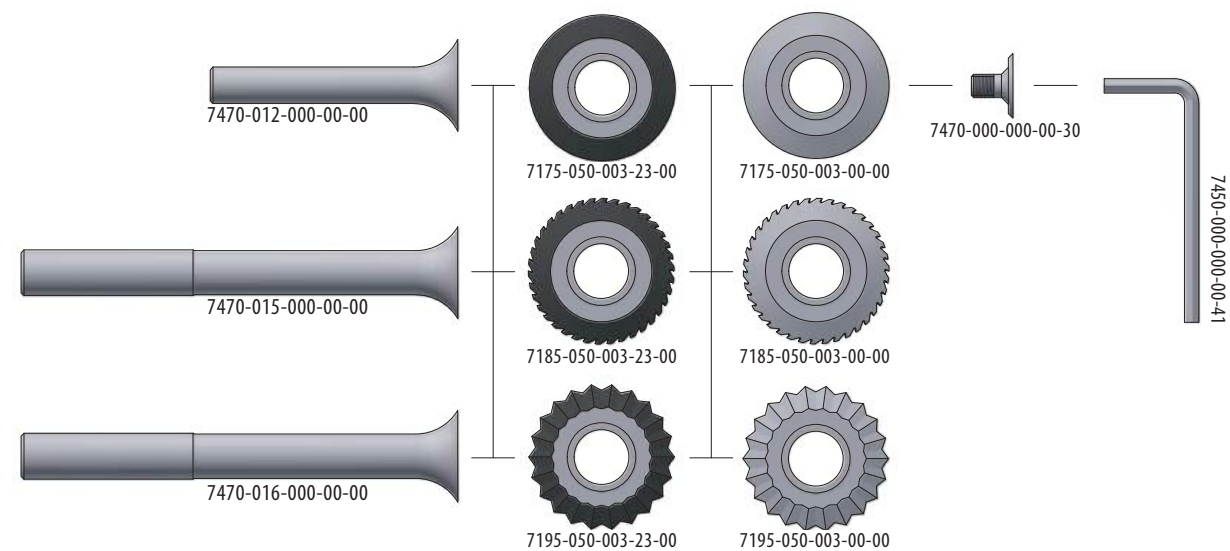
d ₂ Shank-Ø Ø mango		ℓ ₂ * OAL Longitud total	Item-No. num. de art.
12,7 mm	mm	75,8	7470-011-000-00-00
½ "	inch	2.984	

Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
Mounting Screw tornillo de montaje	7470-000-000-00-10
Allen wrench (SW 4) Llave allen (SW 4)	7450-000-000-00-40

Alcodur = Diamond-Like-Coating · SC = Solid Carbide / MD = Metal Duro
* Over-all-Length assembled / Longitud total ensamblado

Valve Type Cut · 50,8 mm · 2 "



1
Honeycomb Tools
Herramientas para
mecanizado de panel de abeja

Front-End-Knives / Cuchillas de disco

d1 Cutting-Ø Ø de corte	type tipo		coating recubrimiento		max ae Trimming Recanteado	max ae Finishing Acabado	mat.	Item-No. num. de art.
50,8 mm 2 "	S		Alcodur	mm inch	9,4 0.37	19,05 ¾	SC MD	7175-050-003-23-00
50,8 mm 2 "	S		–	mm inch	9,4 0.37	19,05 ¾	SC MD	7175-050-003-00-00
50,8 mm 2 "	T		Alcodur	mm inch	9,4 0.37	19,05 ¾	SC MD	7185-050-003-23-00
50,8 mm 2 "	T		–	mm inch	9,4 0.37	19,05 ¾	SC MD	7185-050-003-00-00
50,8 mm 2 "	W		Alcodur	mm inch	9,4 0.37	19,05 ¾	SC MD	7195-050-003-23-00
50,8 mm 2 "	W		–	mm inch	9,4 0.37	19,05 ¾	SC MD	7195-050-003-00-00

Shank Sets incl. screw & wrench / Sets de mangos con tornillo y llave

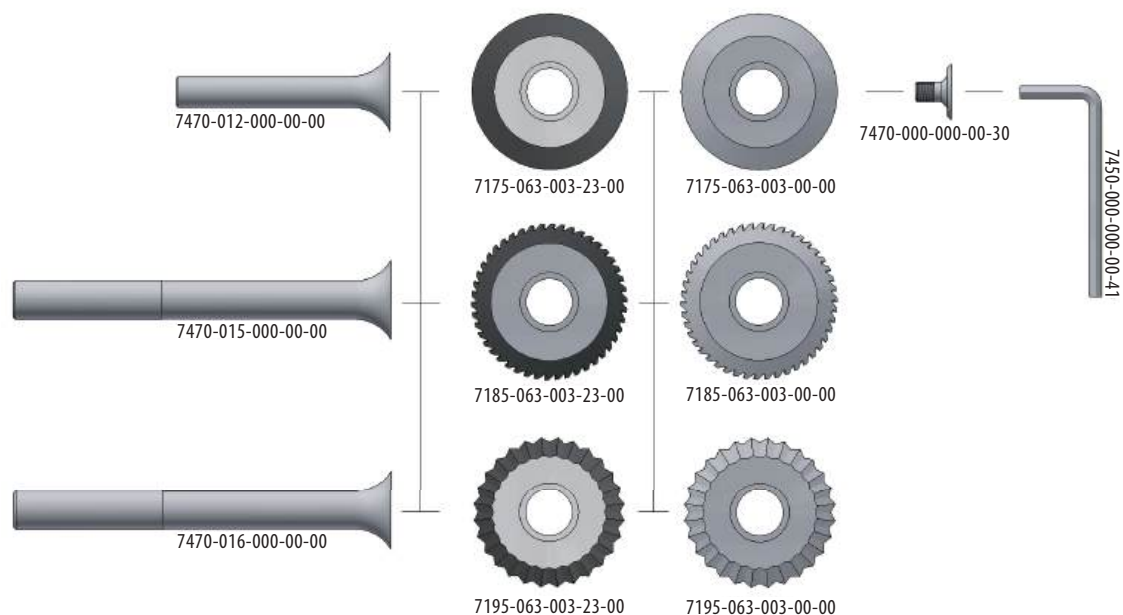
d ₂ Shank-Ø Ø mango		ℓ ₂ * OAL Longitud total	Item-No. num. de art.
12,7 mm ½ "	mm inch	88,9 3 ½	7470-012-000-00-00
15,875 mm ⅝ "	mm inch	154,9 6.1	7470-015-000-00-00
16 mm 0.63 "	mm inch	154,9 6.1	7470-016-000-00-00

Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
Mounting Screw tornillo de montaje	7470-000-000-00-30
Allen wrench (SW 5) Llave allen (SW 5)	7450-000-000-00-41

Alcodur = Diamond-Like-Coating · SC = Solid Carbide / MD = Metal Duro
* Over-all-Length assembled / Longitud total ensamblado

Valve Type Cut • 63mm • 2.480 "



Front-End-Knives / Cuchillas de disco

d1 Cutting-Ø Ø de corte	type tipo		coating recubrimiento		max ae Trimming Recantado	max ae Finishing Acabado	mat.	Item-No. num. de art.
63 mm 2.480 "	S		Alcodur	mm inch	15,5 0.610	23,56 0.928	SC MD	7175-063-003-23-00
63 mm 2.480 "	S		–	mm inch	15,5 0.610	23,56 0.928	SC MD	7175-063-003-00-00
63 mm 2.480 "	T		Alcodur	mm inch	15,5 0.610	23,56 0.928	SC MD	7185-063-003-23-00
63 mm 2.480 "	T		–	mm inch	15,5 0.610	23,56 0.928	SC MD	7185-063-003-00-00
63 mm 2.480 "	W		Alcodur	mm inch	15,5 0.610	23,56 0.928	SC MD	7195-063-003-23-00
63 mm 2.480 "	W		–	mm inch	15,5 0.610	23,56 0.928	SC MD	7195-063-003-00-00

Shank Sets incl. screw & wrench / Sets de mangos con tornillo y llave

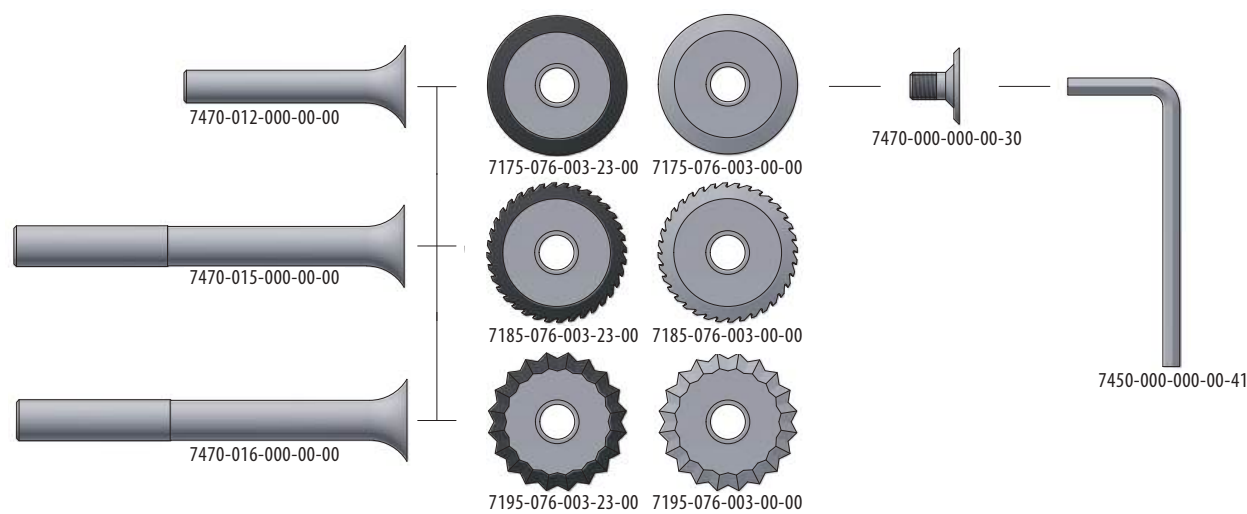
d ₂ Shank-Ø Ø mango		ℓ ₂ * OAL Longitud total	Item-No. num. de art.
12,7 mm ½ "	mm inch	89,2 3.512	7470-012-000-00-00
15,875 mm ⅝ "	mm inch	155,2 6.11	7470-015-000-00-00
16 mm 0.63 "	mm inch	155,2 6.11	7470-016-000-00-00

Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
Mounting Screw tornillo de montaje	7470-000-000-00-30
Allen wrench (SW 5) Llave allen (SW 5)	7450-000-000-00-41

Alcodur = Diamond-Like-Coating / SC = Solid Carbide / MD = Metal Duro
* Over-all-Length assembled / Longitud total ensamblado

Valve Type Cut · 76,2 mm · 3 "



1
Honeycomb Tools
Herramientas para
mecanizado de panel de abeja

Front-End-Knives / Cuchillas de disco

d1 Cutting-Ø Ø de corte	type tipo	coating recubrimiento	max ae Trimming Recanteado	max ae Finishing Acabado	mat.	Item-No. num. de art.
76,2 mm 3 "	S	Alcodur	mm inch	22,1 0.87	31,75 1 ¼	SC MD 7175-076-003-23-00
76,2 mm 3 "	S	-	mm inch	22,1 0.87	31,75 1 ¼	SC MD 7175-076-003-00-00
76,2 mm 3 "	T	Alcodur	mm inch	22,1 0.87	31,75 1 ¼	SC MD 7185-076-003-23-00
76,2 mm 3 "	T	-	mm inch	22,1 0.87	31,75 1 ¼	SC MD 7185-076-003-00-00
76,2 mm 3 "	W	Alcodur	mm inch	22,1 0.87	31,75 1 ¼	SC MD 7195-076-003-23-00
76,2 mm 3 "	W	-	mm inch	22,1 0.87	31,75 1 ¼	SC MD 7195-076-003-00-00

Shank Sets incl. screw & wrench / Sets de mangos con tornillo y llave

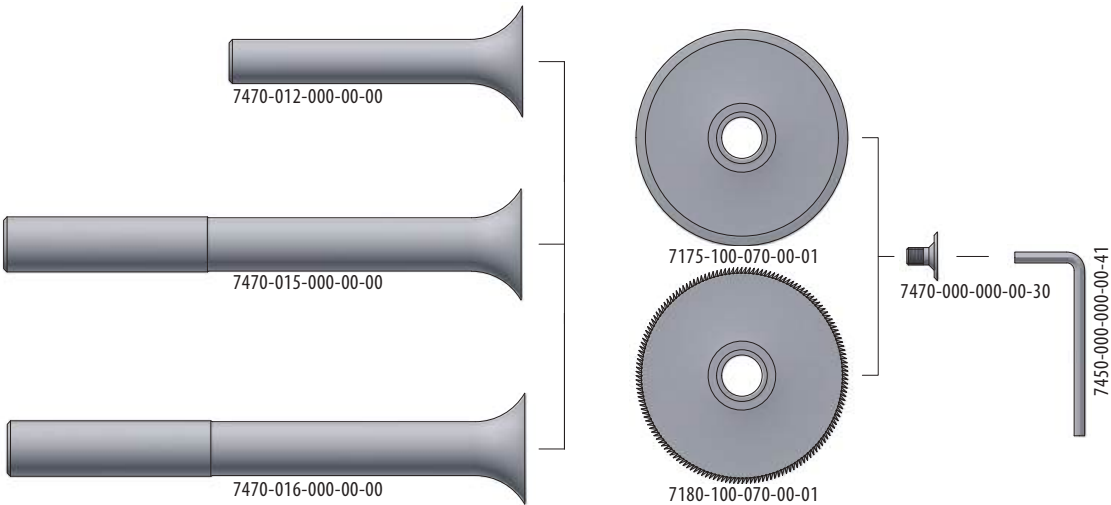
d2 Shank-Ø Ø mango	ℓ2* OAL Longitud total	Item-No. num. de art.
12,7 mm ½ "	mm inch	89,2 3.512 7470-012-000-00-00
15,875 mm ⅝ "	mm inch	155,2 6.1 7470-015-000-00-00
16 mm 0.63 "	mm inch	155,2 6.1 7470-016-000-00-00

Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
Mounting Screw tornillo de montaje	7470-000-000-00-30
Allen wrench (SW 5) Llave allen (SW 5)	7450-000-000-00-41

Alcodur = Diamond-Like-Coating / SC = Solid Carbide / MD = Metal Duro
* Over-all-Length assembled / Longitud total ensamblado

Valve Type Cut · 100 mm · 3.937 "



Front-End-Knives / Cuchillas de disco

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	max ae Trimming Recanteado	max ae Finishing Acabado	mat.	Item-No. num. de art.
100 mm 3.937 "	S	- mm inch	34 1.3386	43,65 1.7185	HSS	7175-100-070-00-01
100 mm 3.937 "	T	- mm inch	34 1.3386	43,65 1.7185	HSS	7180-100-070-00-01

Shank Sets incl. screw & wrench / Sets de mangos con tornillo y llave

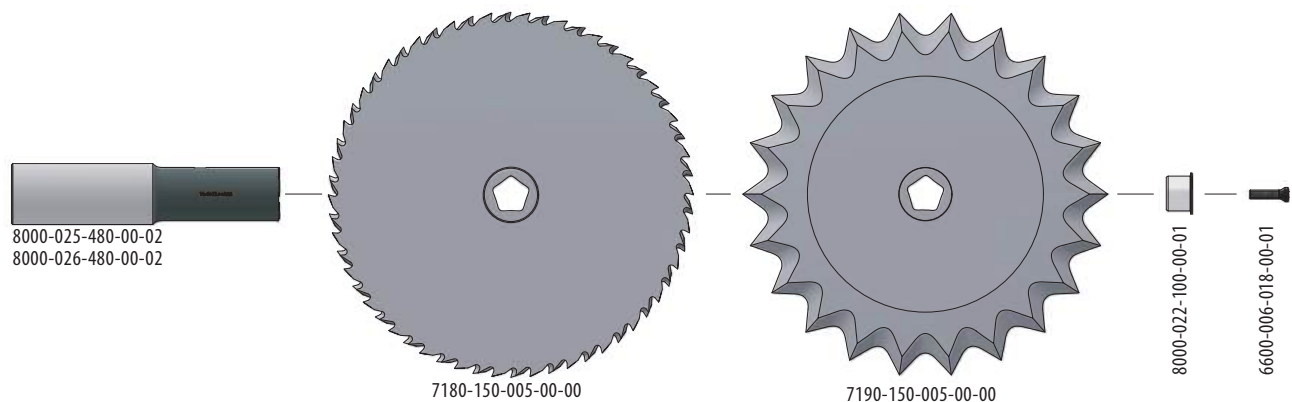
d ₂ Shank-Ø Ø mango	ℓ ₂ * OAL Longitud total	Item-No. num. de art.
12,7 mm ½ "	mm inch88,9 3 ½	7470-012-000-00-00
15,875 mm ⅝ "	mm inch154,9 6.1	7470-015-000-00-00
16 mm 0.63 "	mm inch154,9 6.1	7470-016-000-00-00

Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
Mounting Screw tornillo de montaje	7470-000-000-00-30
Allen wrench (SW 5) Llave allen (SW 5)	7450-000-000-00-41

HSS = High Speed Steel
* Over-all-Length assembled / Longitud total ensamblado

Valve Type Cut · 150 mm · 5.9055 "



Front-End-Knives / Cuchillas de disco

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	ℓ ₁ Length of Cut Longitud de corte	max ae Trimming Recantado	max ae Finishing Acabado	mat.	Item-No. num. de art.
150 mm 5.9055 "	T		– mm inch	1,5 0.059	42,5 1.6732	42,5 1.6732	HSS 7180-150-005-00-00
150 mm 5.9055 "	W		– mm inch	–	42,5 1.6732	42,5 1.6732	HSS 7190-150-005-00-00

Shank Sets incl. screw & wrench / Sets de mangos con tornillo y llave

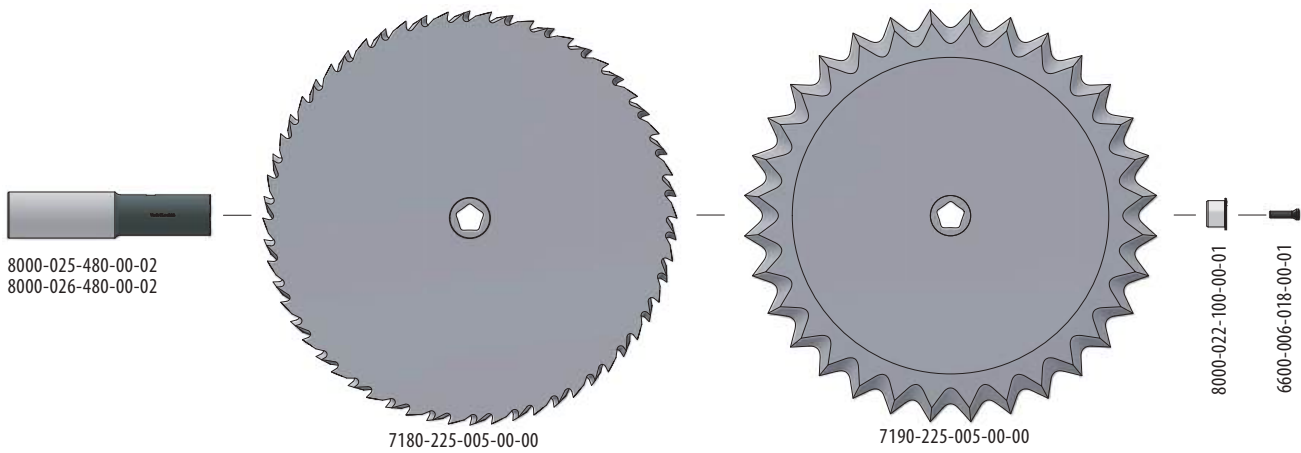
d ₂ Shank-Ø Ø mango	ℓ ₂ * OAL Longitud total	Item-No. num. de art.
25 mm 0.984 "	mm inch	110 4.33 8000-025-480-00-02
25,4 mm 1 "	mm inch	110 4.33 8000-026-480-00-02

Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
2x IPC-Pin 2x Perno	8000-022-100-00-01
Screw Tornillo	6600-006-018-00-01
Torque Screwdriver Destornillador dinamométrico	6600-057-000-00-01
PrecisionBit for Torx PrecisionBit para Torx	6600-0T2-500-00-01

HSS = High Speed Steel
* Over-all-Length assembled / Longitud total ensamblado

Valve Type Cut · 225 mm · 8.858 "



Front-End-Knives / Cuchillas de disco

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento	ℓ ₁ Length of Cut Longitud de corte	max ae Trimming Recanteado	max ae Finishing Acabado	mat.	Item-No. num. de art.
225 mm 8.858 "	T		– mm inch	2,5 0.098	80 3.150	80 3.150	HSS 7180-225-005-00-00
225 mm 8.858 "	W		– mm inch	–	80 3.150	80 3.150	HSS 7190-225-005-00-00

Shank Sets incl. screw & wrench / Sets de mangos con tornillo y llave

d ₂ Shank-Ø Ø mango	ℓ ₂ * OAL Longitud total	Item-No. num. de art.
25 mm 0.984 "	mm inch	110 4.33 8000-025-480-00-02
25,4 mm 1 "	mm inch	110 4.33 8000-026-480-00-02

Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
2x IPC-Pin 2x Perno	8000-022-100-00-01
Screw Tornillo	6600-006-018-00-01
Torque Screwdriver Destornillador dinamométrico	6600-057-000-00-01
PrecisionBit for Torx PrecisionBit para Torx	6600-0T2-500-00-01

HSS = High Speed Steel
* Over-all-Length assembled / Longitud total ensamblado

1

Honeycomb Tools
Herramientas para
mecanizado de panal de abeja

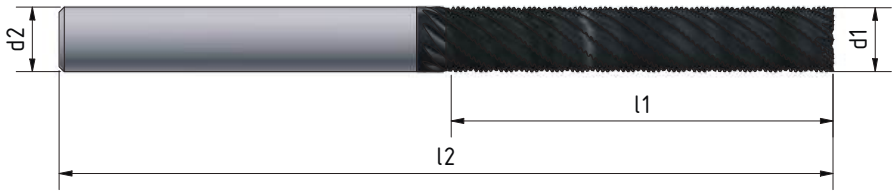
Profile Cut

Profile Cut

- End Mills for Trimming, Pocketing and Roughing of aramid- and aluminum-honeycombs
- *Fresas de perfilar para recantado, cajas y desbaste de panales de aramida y aluminio*



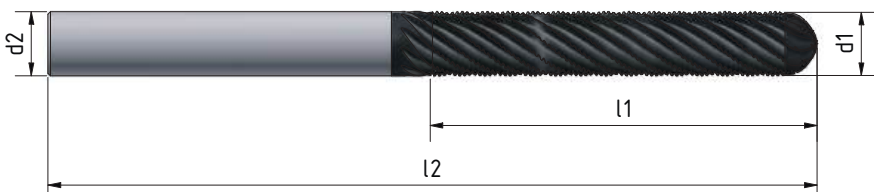
Profile Cut



Profile Cut center cutting end teeth / Profile Cut con punta tangencial

d ₁ Cutting-Ø Ø de corte	type tipo		coating recubrimiento		ℓ ₁ Length of Cut Longitud de corte	ℓ ₂ OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.
6,35 mm ¼ "	CC		Alcodur	mm inch	19,05 ¾	76,2 3	6,35 ¼	SC MD	7365-006-019-23-30
6,35 mm ¼ "	CC		Alcodur	mm inch	25,4 1	76,2 3	6,35 ¼	SC MD	7365-006-025-23-30
9,525 mm ⅜ "	CC		Alcodur	mm inch	25,4 1	76,2 3	9,525 ⅜	SC MD	7365-009-025-23-30
9,525 mm ⅜ "	CC		Alcodur	mm inch	50,8 2	101,6 4	9,525 ⅜	SC MD	7365-009-050-23-30
12,7 mm ½ "	CC		Alcodur	mm inch	50,8 2	101,6 4	12,7 ½	SC MD	7365-012-050-23-30
12,7 mm ½ "	CC		Alcodur	mm inch	76,2 3	152,4 6	12,7 ½	SC MD	7365-012-076-23-30
19,05 mm ¾ "	CC		Alcodur	mm inch	76,2 3	152,4 6	19,05 ¾	SC MD	7365-019-076-23-30
25,4 mm 1 "	CC		Alcodur	mm inch	50,8 2	101,6 4	25,4 1	SC MD	7365-025-050-23-30
25,4 mm 1 "	CC		Alcodur	mm inch	76,2 3	152,4 6	25,4 1	SC MD	7365-025-076-23-30

1
Honeycomb Tools
Herramientas para
mecanizado de panel de abeja



Profile Cut Ball Nose / Profile Cut con punta redonda

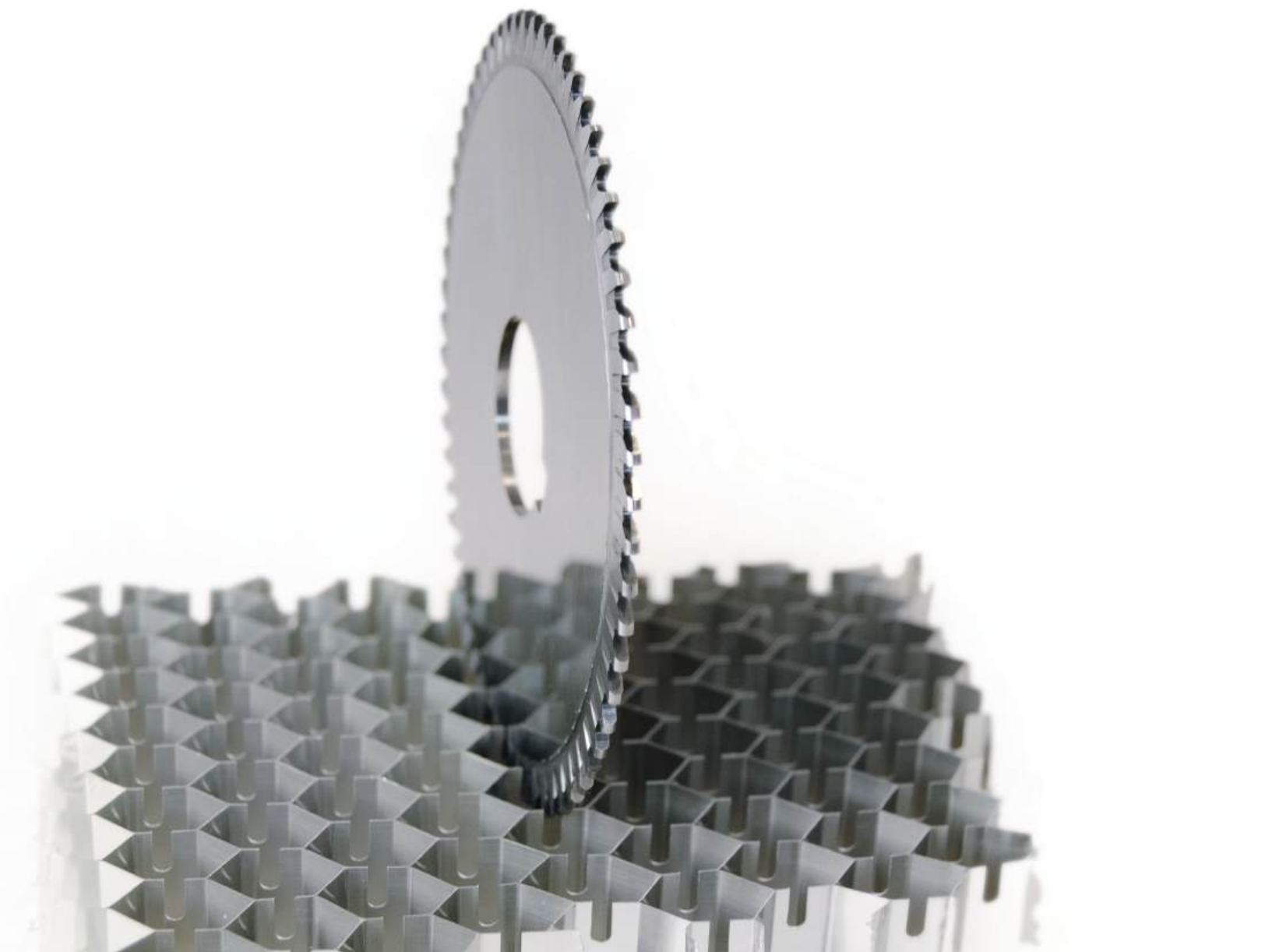
d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento		ℓ ₁ Length of Cut Longitud de corte	ℓ ₂ OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.	
6,35 mm ¼ "	BN		Alcodur	mm inch	50,8 2	152,4 6	6,35 ¼	SC MD	7365-006-050-23-31
12,7 mm ½ "	BN		Alcodur	mm inch	76,2 3	152,4 6	12,7 ½	SC MD	7365-012-076-23-31

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro
LOC = Length of Cut / LDC = Longitud de corte • OAL = Over-all-Length / Longitud total • BN = Ball Nose

Drain Cut Overview

Visión general del Drain Cut

- Circular Tools for slotting honeycombs
- type AR for aramid-honeycombs
- type AL for aluminum-honeycombs
- *Fresas circulares para ranurar panales:*
- *tipo AR para panales de aramida*
- *tipo AL para panales de aluminio*



Drain Cut · AR

- Diamond-plated tools
for slotting aramid-honeycombs
in expanded condition
- Discos de corte de diamante
electrodepositado para ranurar
panales de aramida en condiciones
de expansión

1

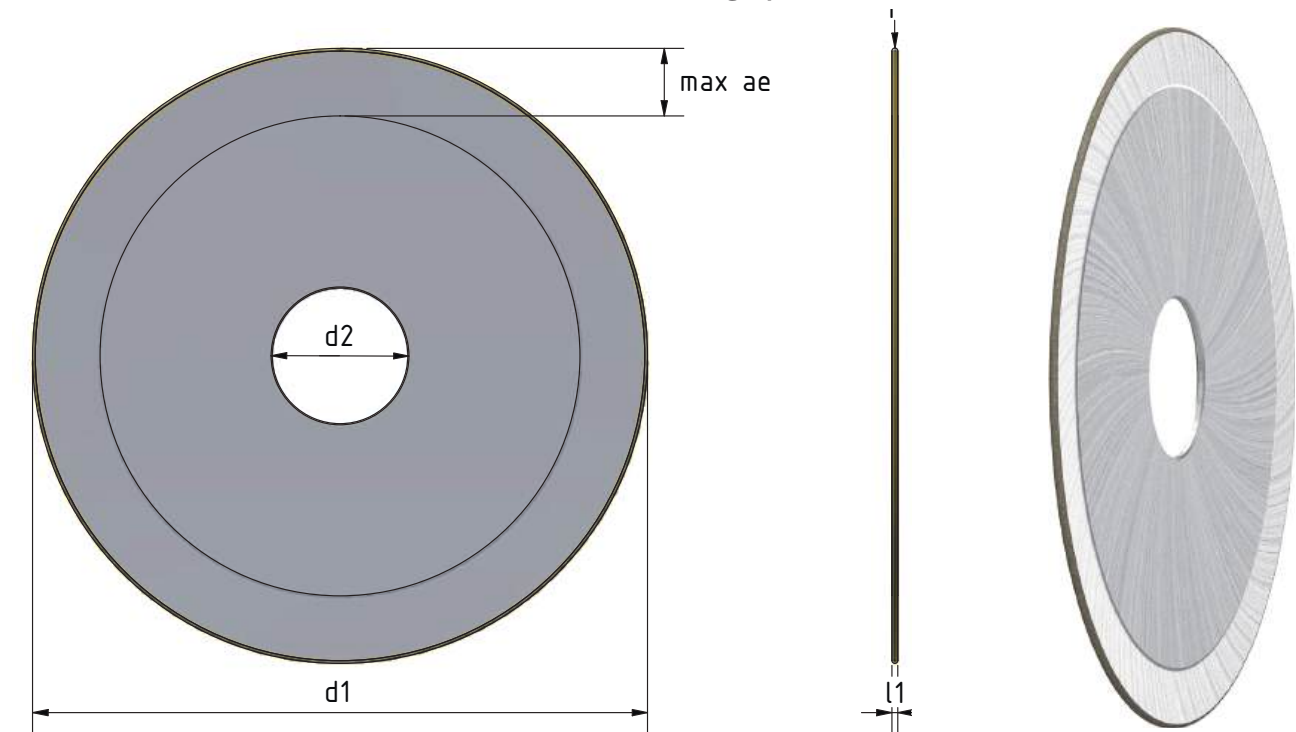
Honeycomb Tools
Herramientas para
mecanizado de panal de abeja

Drain Cut · AR

d ₁ Outer-Ø Ø exterior	d ₂ Arbor hole-Ø Ø de la rosca		ℓ ₁ Cutting width Ancho de corte	max ae	r Radius Radio	mat.	Group-Item-No. num. de art.
63 mm 2.480 "	16 0.630	mm inch	customized personalizado	customized personalizado	customized personalizado	DIA	7140-063-000-00-00
80 mm 3.150 "	16 0.630	mm inch	customized personalizado	customized personalizado	customized personalizado	DIA	7140-080-000-00-00
100 mm 3.937 "	22 0.866	mm inch	customized personalizado	customized personalizado	customized personalizado	DIA	7140-100-000-00-00
101,6 mm 4 "	25,4 1	mm inch	customized personalizado	customized personalizado	customized personalizado	DIA	7140-101-000-00-00

Due to different demands the tools are produced to your individual sizes.
Please inform us about the required cutting width, depth of cut, radius and group-item-no.

Debido a las diferentes demandas de los clientes, las herramientas se pueden construir a medida. Por favor, infórmenos sobre el ancho de corte requerido, la profundidad de corte, el radio y el número de referencia del grupo.



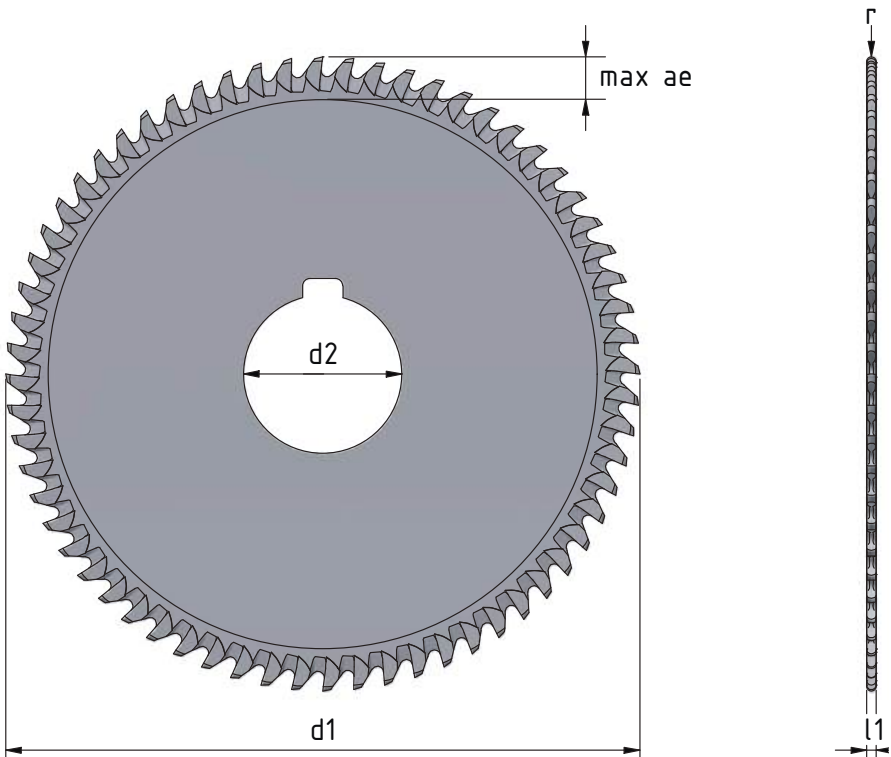
DIA = galvanic diamond-plated / corte diamantadas

Drain Cut · AL

- Solid Carbide Radius Cutter for Slotting of unexpanded aluminum-honeycombs
- *Disco de corte de metal duro para ranurado de panales de aluminio sin extensión*



Drain Cut · AL



1
Honeycomb Tools
Herramientas para
mecanizado de panel de abeja

Drain Cut · AL

d ₁ Outer-Ø Ø exterior	d ₂ Arbor hole-Ø Ø de la rosca		l ₁ Cutting width Ancho de corte	max ae	r Radius Radio	mat.	Group-Item-No. num. de art.
63 mm 2.480 "	16 0.630	mm inch	customized personalizado	customized personalizado	customized personalizado	SC MD	7145-063-000-00-00
80 mm 3.150 "	16 0.630	mm inch	customized personalizado	customized personalizado	customized personalizado	SC MD	7145-080-000-00-00
100 mm 3.937 "	22 0.866	mm inch	customized personalizado	customized personalizado	customized personalizado	SC MD	7145-100-000-00-00
101,6 mm 4 "	25,4 1	mm inch	customized personalizado	customized personalizado	customized personalizado	SC MD	7145-101-000-00-00

Due to different demands the tools are produced to your individual sizes.

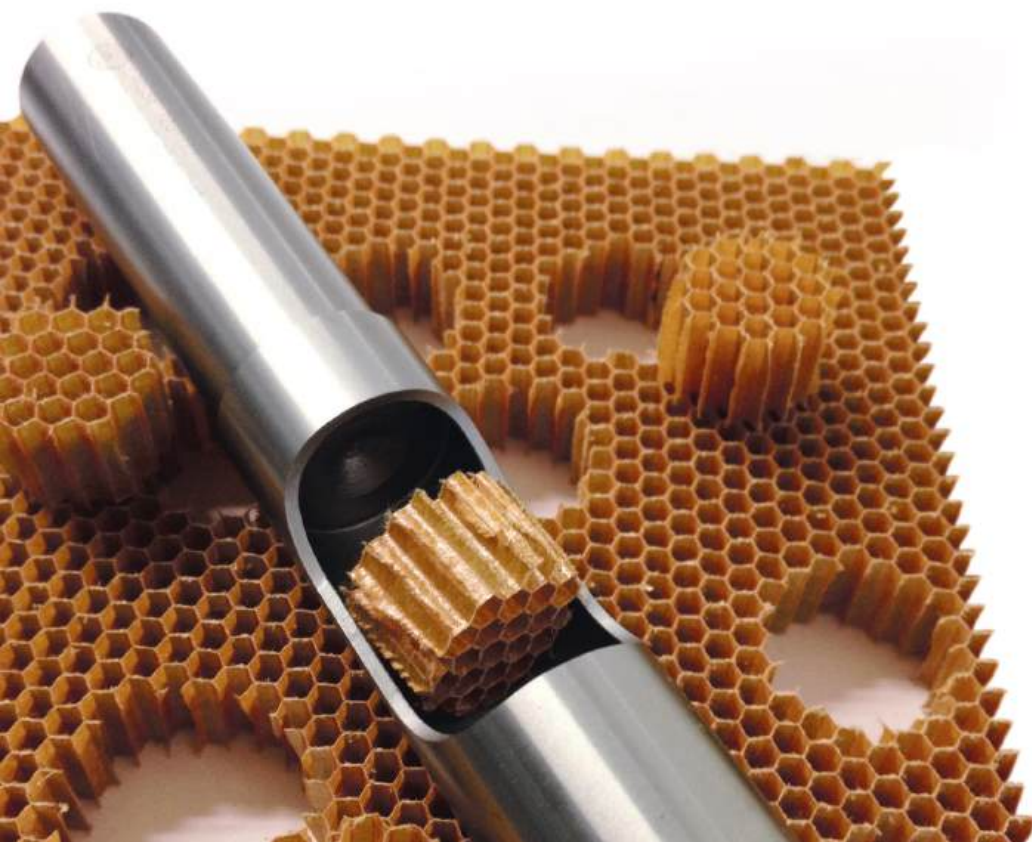
Please inform us about the required cutting width, depth of cut, radius and group-item-no.

Debido a las diferentes demandas de los clientes, las herramientas se pueden construir a medida. Por favor, infórmenos sobre el ancho de corte requerido, la profundidad de corte, el radio y el número de referencia del grupo.

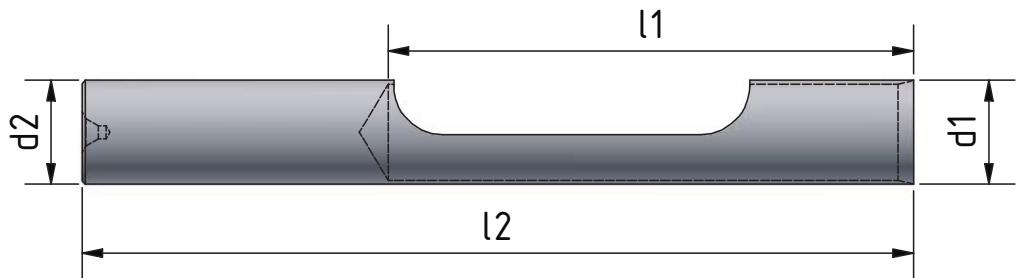
SC = Solid Carbide / MD = Metal Duro

Hollow Drill

- Special tool for clean and dust-free cuts
 - For Drilling and Nibbling of Honeycombs
 - Custom sizes on request
 - For drilling holes in panels with a cover skin thickness of up to 0.6 mm
- *Herramienta especial para cortes limpios y sin polvo (Brocas huecas)*
 - *Para taladrar panales*
 - *Tamaños personalizados bajo petición*
 - *Para taladrar agujeros en paneles con un grosor de la capa superior de hasta 0,6 mm*



Hollow Drill



Hollow Drill

d ₁ Cutting-Ø Ø de corte	coating recubrimiento		l ₁ Length of Cut Longitud de corte	l ₂ OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.
6,35 mm ¼ "	–	mm inch	63,5 2 ½	101,6 4	6,35 ¼	HSS	7160-006-063-00-00
9,525 mm ⅜ "	–	mm inch	63,5 2 ½	101,6 4	9,525 ⅜	HSS	7160-009-063-00-00
12,7 mm ½ "	–	mm inch	50,8 2	101,6 4	12,7 ½	HSS	7160-012-050-00-00
12,7 mm ½ "	–	mm inch	63,5 2 ½	101,6 4	12,7 ½	HSS	7160-012-063-00-00
19,05 mm ¾ "	–	mm inch	76,2 3	127 5	19,05 ¾	HSS	7160-019-076-00-00
25,4 mm 1 "	–	mm inch	76,2 3	127 5	25,4 1	HSS	7160-025-076-00-00
50,8 mm 2 "	–	mm inch	76,2 3	127 5	25,4 1	HSS	7160-050-076-00-00
76,2 mm 3 "	–	mm inch	76,2 3	127 5	25,4 1	HSS	7160-076-076-00-00

1
Honeycomb Tools
Herramientas para
mecanizado de panel de abeja



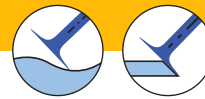
HSS = High Speed Steel
LOC = Length of Cut / LDC = Longitud de corte • OAL = Over-all-Length / Longitud total

Recommendations for tool selection

Recomendaciones para la selección de la herramienta

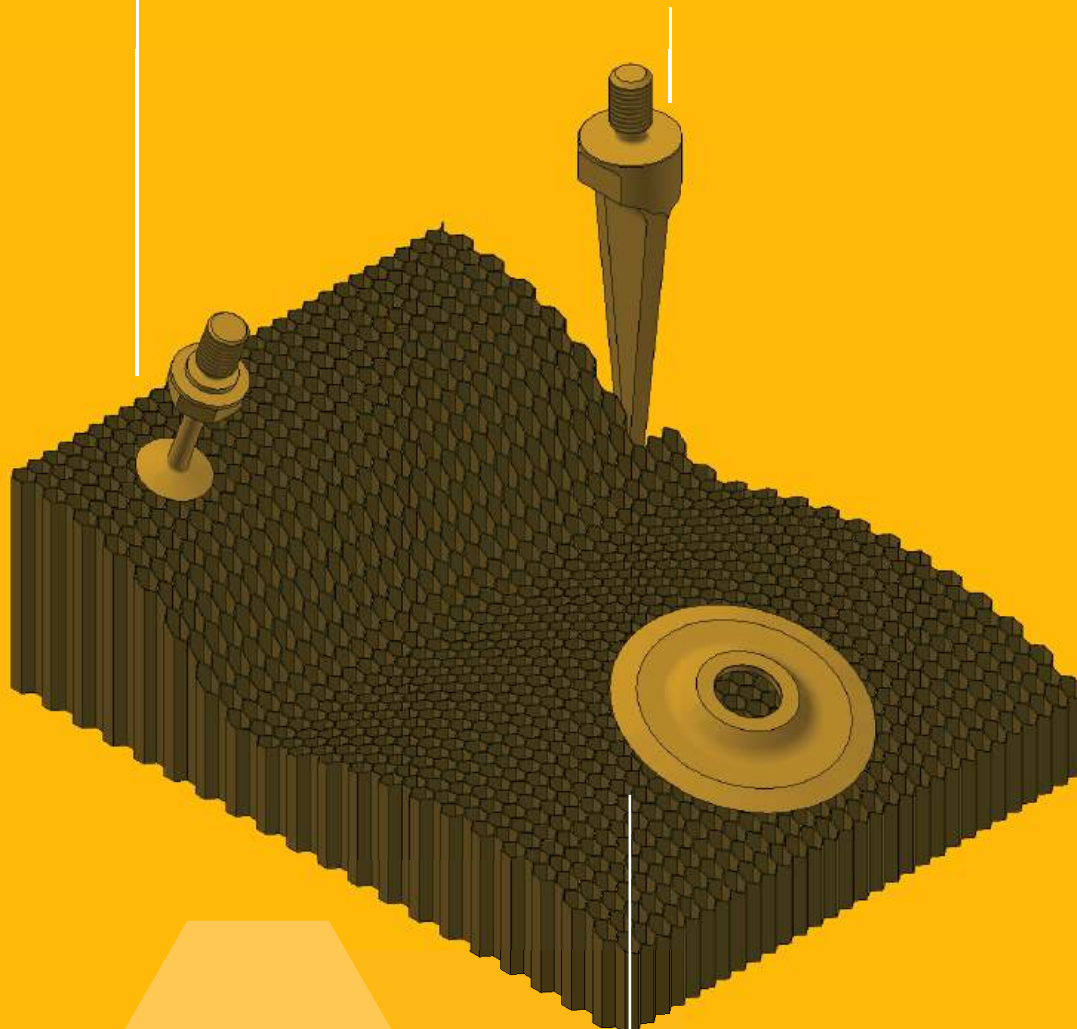
Ultrasonic-Circularknife-screw

3D-Machining · Finishing · Chamfering
Mecanizado 3D · Acabado · Chaflanado



Ultrasonic-Knife

Trimming · Pocketing · Chamfering · Cut-off Operations
Recanteado · Mecanizado de bolsillos · Chaflanado · Corte



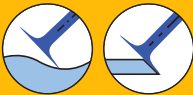
Ultrasonic-Circularknife

3D-Machining · Finishing · Face Milling · Chamfering
Mecanizado 3D · Acabado · Planeado · Chaflanado



Ultrasonic Tools

Herramientas ultrasónicas

product-type tipo de producto		Application aplicación	page página
Ultrasonic-Knife	new nuevo		59
Ultrasonic-Circularknife-screw	new nuevo		60
Ultrasonic-Circularknife	new nuevo		61

SPECIAL DIMENSIONS OR SPECIAL APPLICATIONS?

Talk to us. We are happy to manufacture custom-made products for you in regard to tool dimensions, tooth geometries, interfaces, cutting materials and coatings.

DIMENSIONES ESPECIALES O APLICACIONES ESPECIALES?

Póngase en contacto con nosotros. Estaremos encantados de fabricar productos personalizados para usted en cuanto a las dimensiones de la herramienta, las geometrías del dentado, las interfaces, los materiales de corte y los recubrimientos.



Ultrasonic Tools for Honeycomb Machining

Herramientas ultrasónicas para mecanizado de panal de abeja

Machining honeycomb structures places the highest demands on precision, material protection, and process reliability. With ultrasonic cutters, we offer a high-end, high-performance solution for sensitive lightweight materials such as Nomex®, aluminum, or Kevlar honeycomb.

The different tool systems were developed in close cooperation with leading machine manufacturers and stand for maximum performance and process reliability.

WHAT IS ULTRASONIC MACHINING?

In ultrasonic machining, the tool operates at high-frequency vibrations (typically 20–40 kHz). These vibrations enable an almost force-free cutting process, making the technology ideal for thin-walled, unstable, or fiber-reinforced materials.

ADVANTAGES COMPARED TO CONVENTIONAL MACHINING

- **Tear-free cutting edges**
Extremely low cutting forces minimize delamination as well as fiber and cell structure breakouts.
- **Highest precision**
Even complex geometries and demanding machining operations can be realized with excellent repeatability and accuracy.
- **Low-dust machining**
The process-related reduction in particle generation significantly lowers the effort required for extraction and cleaning.
- **Monolithic tool design**
Our tools are of monolithic construction and completely free of brazed or joined cutting elements. This eliminates potentially damping or unstable brazed joints, ensuring direct force transmission, low-vibration machining behavior, and consistently high cutting quality throughout the entire tool life.

REQUIREMENTS

To fully exploit the potential of ultrasonic machining, the following requirements must be met:

- **Ultrasonic-capable spindle or module:** Can be integrated into existing CNC systems.
- **Specialized tools:** Optimized for frequency, material, and specific machining tasks.

La mecanización de estructuras tipo panal de abeja plantea las máximas exigencias en cuanto a precisión, protección del material y fiabilidad del proceso. Con el mecanizado por ultrasonidos ofrecemos una solución de alta gama y alto rendimiento para materiales ligeros sensibles como los honeycombs de Nomex®, aluminio o Kevlar. Los sistemas de herramientas especialmente desarrollados se crean en estrecha colaboración con fabricantes líderes de maquinaria y representan el máximo rendimiento y la máxima seguridad del proceso.

¿QUÉ ES EL MECANIZADO ULTRASÓNICO?

En el mecanizado por ultrasonidos, la herramienta se excita mediante vibraciones de alta frecuencia (normalmente entre 20 y 40 kHz). Estas vibraciones permiten un mecanizado prácticamente sin esfuerzo de corte, lo que hace que el proceso sea ideal para materiales de pared delgada, estructuras inestables o materiales reforzados con fibra.

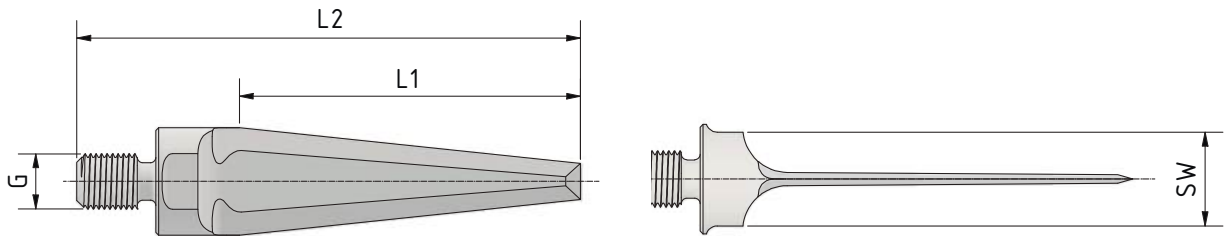
VENTAJAS FRENTE A LOS MÉTODOS CONVENCIONALES

- **Bordes de corte sin desgarros**
Las fuerzas de corte extremadamente reducidas minimizan la delaminación, así como los desprendimientos de fibras y de la estructura celular.
- **Máxima precisión**
Incluso las geometrías complejas, los contornos delicados y los mecanizados más exigentes pueden realizarse de forma reproducible y con una precisión dimensional constante.
- **Mecanizado con baja generación de polvo**
La reducción de partículas inherente al proceso disminuye las necesidades de extracción y limpieza.
- **Diseño monolítico de la herramienta**
Nuestras herramientas presentan una construcción monolítica y prescinden por completo de elementos de corte soldados o ensamblados. De este modo se eliminan posibles uniones soldadas que podrían provocar amortiguación o inestabilidad, garantizando una transmisión directa de la fuerza, un mecanizado con bajas vibraciones y una calidad de corte constantemente elevada durante toda la vida útil de la herramienta.

REQUISITOS PARA SU UTILIZACIÓN

- Para que el mecanizado por ultrasonidos pueda desarrollar todo su potencial, es necesario cumplir los siguientes requisitos:
- **Husillo o módulo compatible con ultrasonidos:** integrable en sistemas CNC existentes.
- **Herramientas especiales:** adaptadas a la frecuencia, al material y a la aplicación de mecanizado.

Ultrasonic-Knife / Cuchillo ultrasónico



ℓ_1 Length of Cut Longitud de corte	type tipo		ℓ_2 OAL Longitud total	SW	G	mat.	Item-No. num. de art.
25 mm 0.984 "	SCS	mm inch	45 1.772	13 0.512	M10x1	SC MD	5905-014-034-00-01
50 mm 1.969 "	SCS	mm inch	78 3.071	16 0.63	M10x1	SC MD	5905-019-064-00-01
77 mm 3.031 "	SCS	mm inch	105 4.134	16 0.63	M10x1	SC MD	5905-019-090-00-01
25 mm 0.984 "	FM & SM	mm inch	45 1.772	13 0.512	$\frac{5}{16}$ " - 24	SC MD	5905-014-034-00-02
78 mm 3.071 "	FM & SM	mm inch	106 4.173	16 0.63	$\frac{5}{16}$ " - 24	SC MD	5905-012-079-00-01

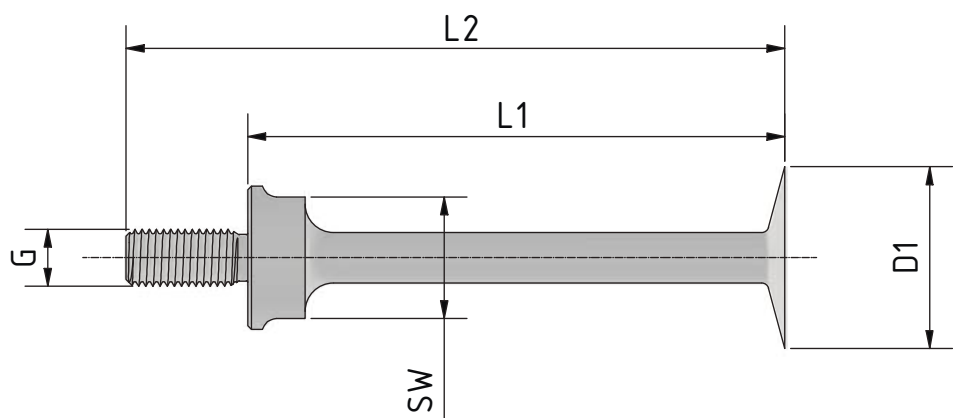
2

Ultrasonic Tools
Herramientas
ultrasónicas



SC = Solid Carbide / MD = Metal Duro
SCS = Sonicut System / FM & SM = GFM and Sonimat System / SW = across flats (AF) / G = thread

Ultrasonic-Circularknife-screw / Tornillo de cuchilla circular ultrasónica



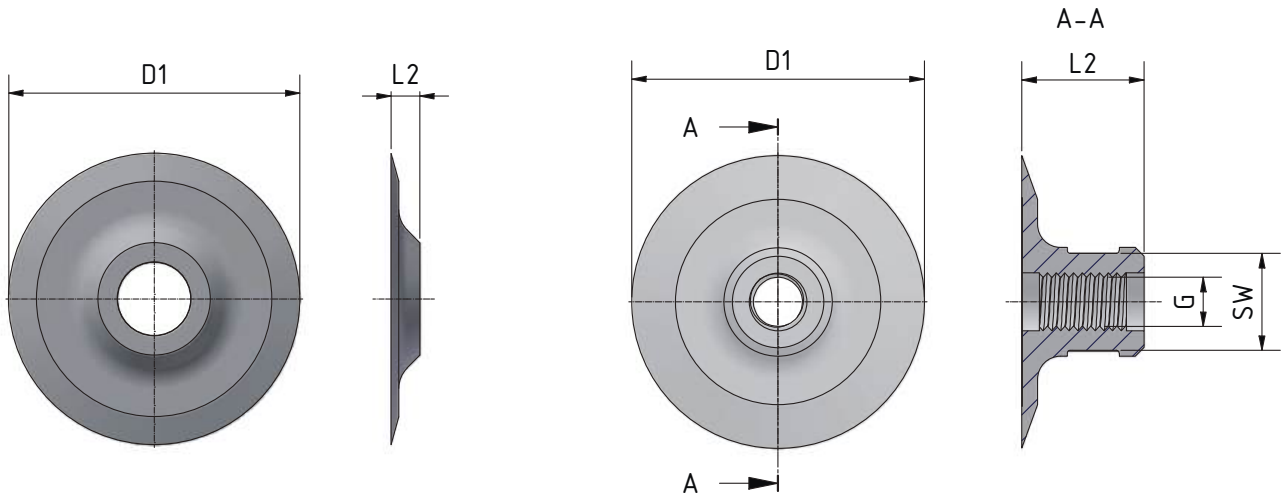
ℓ_1 Length of Cut Longitud de corte	type tipo		d_1 Cutting-Ø Ø de corte	ℓ_2 OAL Longitud total	SW	G	mat.	Item-No. num. de art.
28 mm 1.102 "	SCS	mm inch	15 0.591	42 1.654	13 0.512	M10x1	SC MD	5905-015-002-00-03
28 mm 1.102 "	FM & SM	mm inch	15 0.591	42 1.654	12,7 ½	⅝" - 24	SC MD	5905-015-002-00-02
36 mm 1.417 "	FM & SM	mm inch	25,4 1	50 1.969	12,7 ½	⅝" - 24	SC MD	5905-025-402-00-01



SC = Solid Carbide / MD = Metal Duro
 SCS = Sonicut System / FM & SM = GFM and Sonimat System / SW = across flats (AF) / G = thread

Ultrasonic-Circularknife / Cuchilla circular ultrasónica

new
nuevo



d ₁ Cutting-Ø Ø de corte	type tipo		ℓ ₂ OAL Longitud total	SW	G	mat.	Item-No. num. de art.
50,8 mm 2"	SCS	mm inch	21 0.827	17 0.669	M10x1,5	HSS	1900-050-210-00-22
50,8 mm 2"	FM & SM	mm inch	5 0.197	-	-	HSS	1900-051-500-05-01
50,8 mm 2"	SM	mm inch	5 0.197	-	-	HSS	1900-050-500-00-05

2

Ultrasonic Tools
Herramientas
ultrasónicas



HSS = High Speed Steel
SCS = Sonicut System / FM & SM = GFM and Sonimat System / SM = Sonimat System / SW = across flats (AF) / G = thread

Recommendations for tool selection

Recomendaciones para la selección de la herramienta

Panel Cut

Trimming · Drilling · Pocketing
Recantado · Taladrado · Cajeras



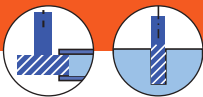
Skin Cut

Cutting skins
Corte de pieles



Decorating Cut

Undercutting skins
Corte de pieles por la parte inferior



Under Cut

Lateral Undercutting skins
Pieles con corte lateral



Pot Cut

Trimming · Pocketing · Drilling of potted sections
Recantado · Cajeras · Taladrado de secciones potting



Panel Tools

Herramientas para mecanizado de paneles

product-type tipo de producto	Application aplicación	page página
Panel Cut		64–66
Skin Cut		67
Pot Cut		68
Decoring Cut		69/70
Under Cut	 new nuevo	71

3
Panel Tools
Herramientas para
mecanizado de paneles

SPECIAL DIMENSIONS OR SPECIAL APPLICATIONS?

Talk to us. We are happy to manufacture custom-made products for you in regard to tool dimensions, tooth geometries, interfaces, cutting materials and coatings.

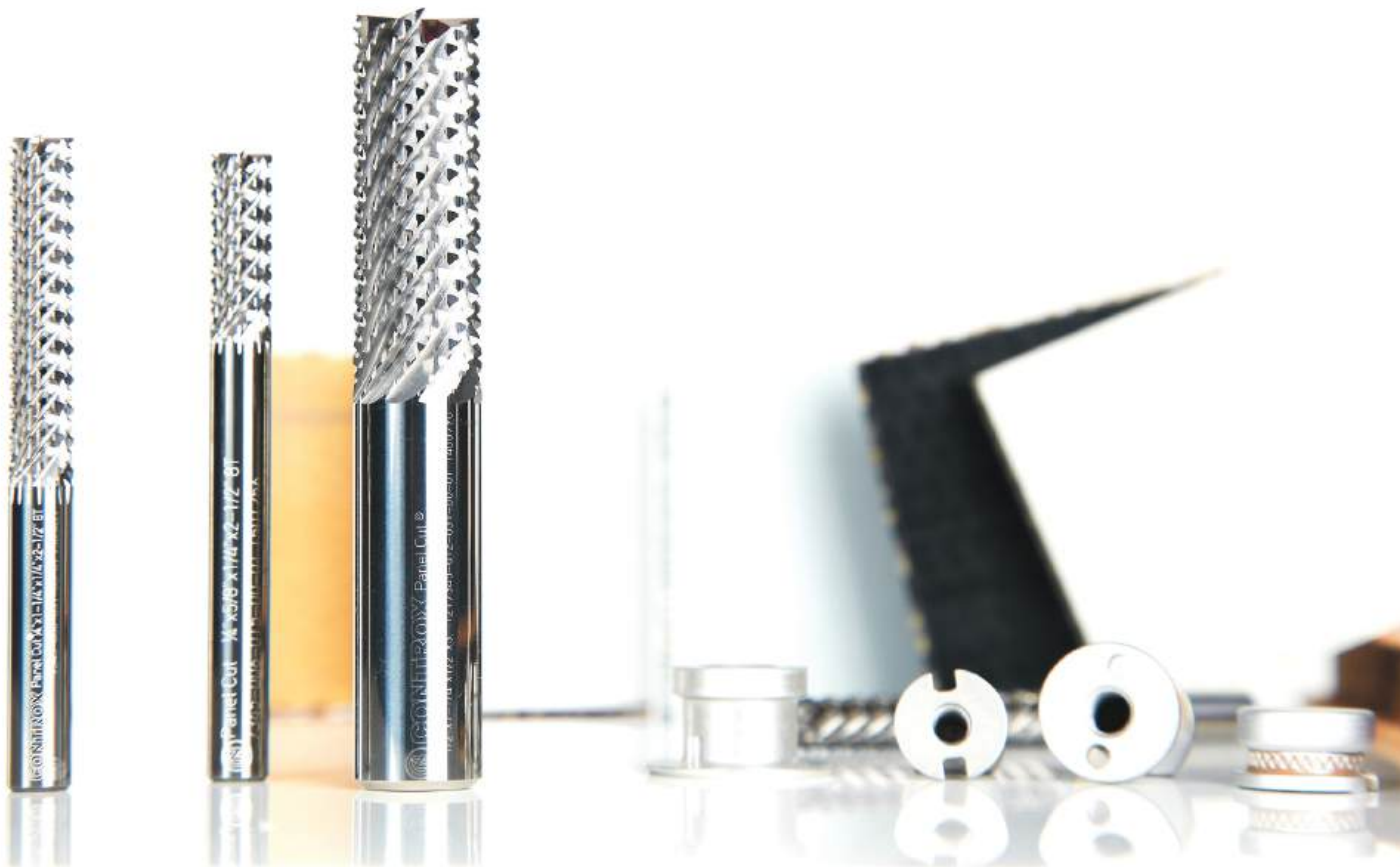
DIMENSIONES ESPECIALES O APLICACIONES ESPECIALES?

Póngase en contacto con nosotros. Estaremos encantados de fabricar productos personalizados para usted en cuanto a las dimensiones de la herramienta, las geometrías del dentado, las interfaces, los materiales de corte y los recubrimientos.



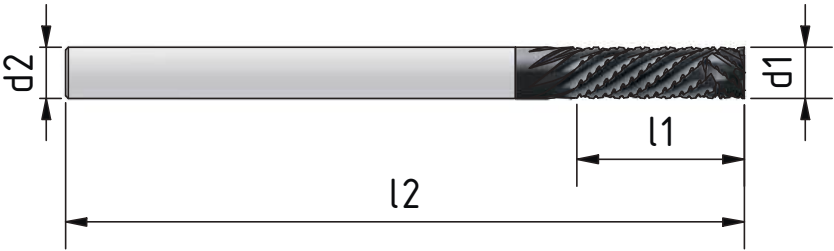
Panel Cut

- Shank Tools with end teeth for Trimming, Drilling and Pocket Milling of Sandwich Panels with Composite Skins
- *Fresas para recantar, recortar, taladrar y fresar cajas en paneles sándwich con pieles de composite*
- Note: For the machining of Sandwich-Panels with aluminum-skin the **Profile Cut** is suggested (see page 48/49).
- *Nota: Para el mecanizado de paneles sándwich con piel de aluminio se sugiere el Profile Cut (ver página 48/49).*



Panel Cut CS

- Specially developed to create a particularly clean surface on the deck skins
- Especialmente desarrollado para crear una superficie especialmente limpia en las cubiertas.



Panel Cut CS

d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento		ℓ ₁ Length of Cut Longitud de corte	ℓ ₂ OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.
6 mm 0.236 "	CS	Alcodur	mm inch	20 0.787	80 3.15	6 0.236	SC MD	7340-006-020-00-01
6,35 mm ¼ "	CS	Alcodur	mm inch	15,875 0.625	76,2 3	6,35 ¼	SC MD	7340-006-015-00-01
6,35 mm ¼ "	CS	Alcodur	mm inch	38,1 1 ½	101,6 4	6,35 ¼	SC MD	7340-006-031-00-01
12,7 mm ½ "	CS	Alcodur	mm inch	36,9 1.453	101,6 4	12,7 ½	SC MD	7340-012-031-00-01

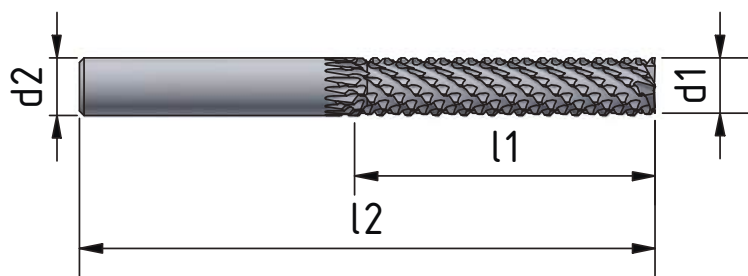


3

Panel Tools
Herramientas para
mecanizado de paneles

CS = Compression Style • SC = Solid Carbide / MD = Metal Duro
LOC = Length of Cut / LDC = Longitud de corte • OAL = Over-all-Length / Longitud total

Panel Cut DT



Panel Cut DT

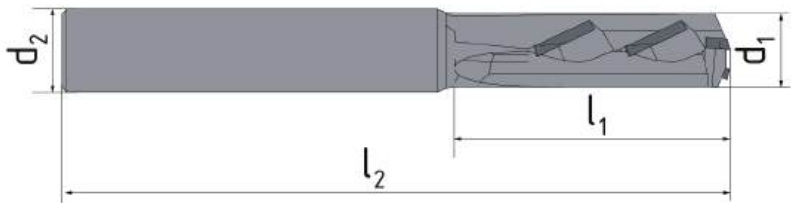
d ₁ Cutting-Ø Ø de corte	type tipo	coating recubrimiento		ℓ ₁ Length of Cut Longitud de corte	ℓ ₂ OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.
6 mm 0.236 "	DT	-	mm inch	20 0.787	64 2.52	6 0.236	SC MD	7345-006-020-00-01
6,35 mm ¼ "	DT	-	mm inch	15,875 ⅝	63,5 2 ½	6,35 ¼	SC MD	7345-006-015-00-01
6,35 mm ¼ "	DT	-	mm inch	31,75 1 ¼	63,5 2 ½	6,35 ¼	SC MD	7345-006-031-00-01
12,7 mm ½ "	DT	-	mm inch	31,75 1 ¼	76,2 3	12,7 ½	SC MD	7345-012-031-00-01



DT = Diamond Toothed • SC = Solid Carbide / MD = Metal Duro
 LOC = Length of Cut / LDC = Longitud de corte • OAL = Over-all-Length / Longitud total

Skin Cut

- PCD-End Mill for cutting composite skins
- Fresas con plaquitas de diamante PCD para fresar pieles de composite



Skin Cut

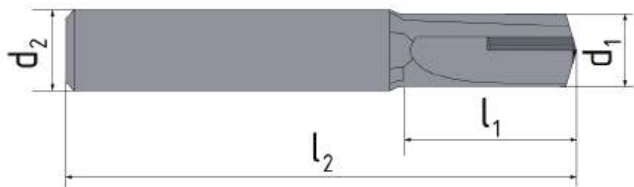
d ₁ Cutting-Ø Ø de corte		l ₁ Length of Cut Longitud de corte	l ₂ OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.
8 mm 0.315 "	mm inch	18 0.708	64 2.519	8 0.315	PCD PCD	7385-008-018-00-01
9,525 mm 3/8 "	mm inch	18 0.708	68 2.677	9,525 3/8	PCD PCD	7385-009-018-00-01
10 mm 0.394 "	mm inch	18 0.708	68 2.677	10 0.394	PCD PCD	7385-010-018-00-01
12 mm 0.472 "	mm inch	18 0.708	73 2.874	12 0.472	PCD PCD	7385-012-018-00-01



SC = Solid Carbide / MD = Metal Duro • PCD = Polycrystalline Diamond
LOC = Length of Cut / LDC = Longitud de corte • OAL = Over-all-Length

Pot Cut

- PCD-End Mill for the machining of Panels with Potting
- *Fresas con plaquitas de diamante para mecanizado de paneles con potting*



Pot Cut

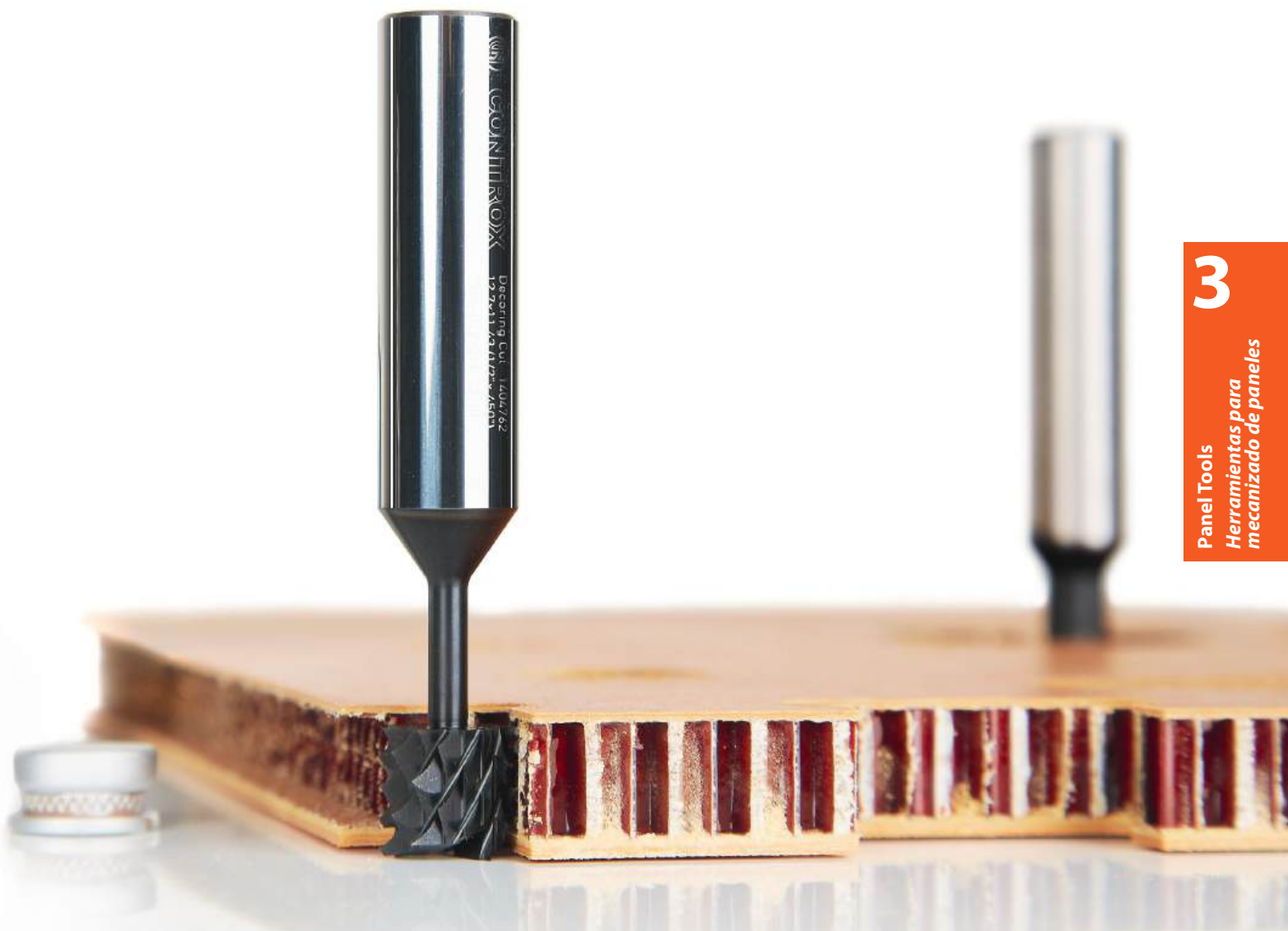
d ₁ Cutting-Ø Ø de corte		l ₁ Length of Cut Longitud de corte	l ₂ OAL Longitud total	d ₂ Shank-Ø Ø mango	mat.	Item-No. num. de art.
6 mm 0.236 "	mm inch	10 0.394	52 2.047	6 0.236	PCD PCD	7395-006-010-00-01
6,35 mm ¼ "	mm inch	10 0.394	52 2.047	6,35 ¼	PCD PCD	7395-006-010-00-02
8 mm 0.315 "	mm inch	10 0.394	61 2.402	8 0.315	PCD PCD	7395-008-010-00-01
8 mm 0.315 "	mm inch	20 0.787	69 2.717	8 0.315	PCD PCD	7395-008-020-00-01
9,525 mm ⅜ "	mm inch	10 0.394	61 2.402	9,525 ⅜	PCD PCD	7395-009-010-00-01
9,525 mm ⅜ "	mm inch	20 0.787	72 2.835	9,525 ⅜	PCD PCD	7395-009-020-00-01
10 mm 0.394 "	mm inch	10 0.394	63 2.480	10 0.394	PCD PCD	7395-010-010-00-01
10 mm 0.394 "	mm inch	20 0.787	72 2.835	10 0.394	PCD PCD	7395-010-020-00-01



SC = Solid Carbide / MD = Metal Duro
LOC = Length of Cut / LDC = Longitud de corte • OAL = Over-all-Length

Decorating Cut

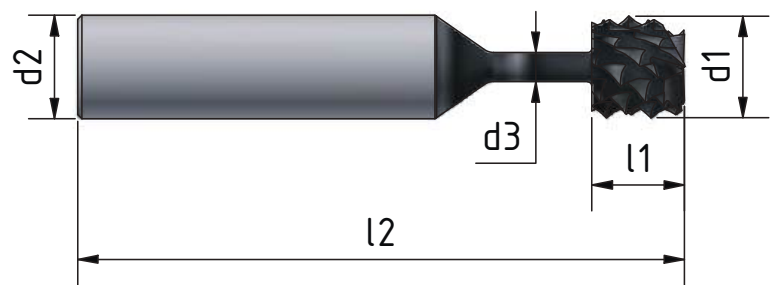
- Cutting Tool for undercutting of Composite-Sandwich-Panels
- Tool-Diameters suitable to Standard-Insert-Diameters
- *Herramienta de corte para socavar paneles sandwich con pieles de composite*
- *Diámetros de herramienta adecuados para diámetros de inserción estándar*



3

Panel Tools
Herramientas para
mecanizado de paneles

Decoring Cut

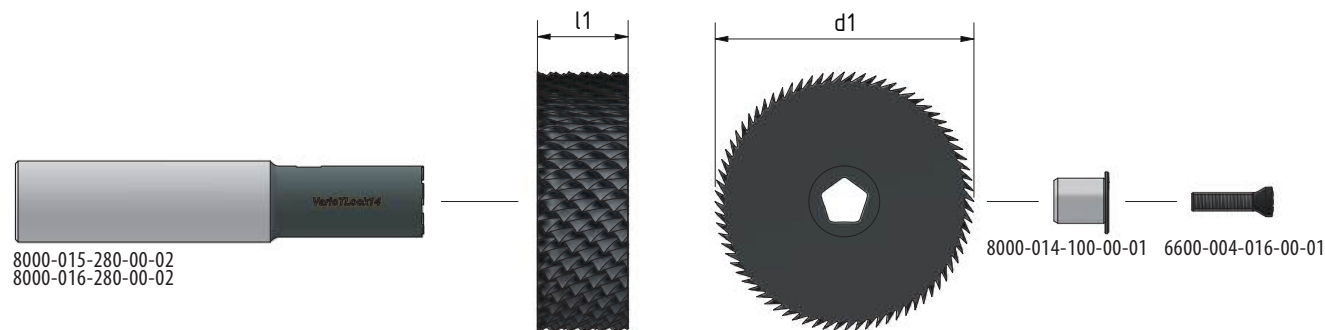


Decoring Cut

d ₁ Cutting-Ø Ø de corte	Panel width Gros. de panel	coating recubrimiento		ℓ ₁ Length of Cut Longitud de corte	ℓ ₂ OAL Longitud total	d ₂ Shank-Ø Ø mango	d ₃ Neck-Ø Ø cuello	mat.	Item-No. num. de art.
11,113 mm 7/16 "	6,35 1/4	Alcodur	mm inch	5,08 0.2	68,5 2.7	12,7 1/2	3,556 0.14	SC MD	7335-011-005-23-01
11,113 mm 7/16 "	12,7 1/2	Alcodur	mm inch	11,43 0.45	74,5 2.93	12,7 1/2	3,556 0.14	SC MD	7335-011-011-23-01
11,51 mm 0.453 "	6,35 1/4	Alcodur	mm inch	5,08 0.2	68,5 2.7	12,7 1/2	3,556 0.14	SC MD	7335-011-005-23-02
11,51 mm 0.453 "	12,7 1/2	Alcodur	mm inch	11,43 0.45	74,5 2.93	12,7 1/2	3,556 0.14	SC MD	7335-011-011-23-02
12,7 mm 1/2 "	6,35 1/4	Alcodur	mm inch	5,08 0.2	68,5 2.7	12,7 1/2	3,556 0.14	SC MD	7335-012-005-23-01
12,7 mm 1/2 "	12,7 1/2	Alcodur	mm inch	11,43 0.45	74,5 2.93	12,7 1/2	3,556 0.14	SC MD	7335-012-011-23-01
14,224 mm 0.56 "	6,35 1/4	Alcodur	mm inch	5,08 0.2	68,5 2.7	12,7 1/2	4,572 0.18	SC MD	7335-014-005-23-01
14,224 mm 0.56 "	12,7 1/2	Alcodur	mm inch	11,43 0.45	74,5 2.93	12,7 1/2	4,572 0.18	SC MD	7335-014-011-23-01
14,99 mm 0.59 "	6,35 1/4	Alcodur	mm inch	5,08 0.2	68,5 2.7	12,7 1/2	4,572 0.18	SC MD	7335-014-005-23-02
14,99 mm 0.59 "	12,7 1/2	Alcodur	mm inch	11,43 0.45	74,5 2.93	12,7 1/2	4,572 0.18	SC MD	7335-014-011-23-02
20,638 mm 13/16 "	6,35 1/4	Alcodur	mm inch	5,08 0.2	68,5 2.7	12,7 1/2	7,938 5/16	HSS-Co	7330-020-005-23-01
20,638 mm 13/16 "	12,7 1/2	Alcodur	mm inch	11,43 0.45	74,5 2.93	12,7 1/2	7,938 5/16	HSS-Co	7330-020-011-23-01
20,638 mm 13/16 "	19,05 3/4	Alcodur	mm inch	17,78 0.7	81 3.19	12,7 1/2	7,938 5/16	HSS-Co	7330-020-017-23-01

Alcodur = Diamond-Like-Coating • SC = Solid Carbide / MD = Metal Duro • HSS-Co = High Speed Steel
LOC = Length of Cut / LDC = Longitud de corte • OAL = Over-all-Length / Longitud total

Under Cut



Under Cut

d1 Cutting-Ø Ø de corte	Panel width Gros. de panel	Coating Recubrimiento		ℓ1 Length of Cut Longitud de corte	max ae	mat.	Item-No. num. de art.
50,8 mm 2 "	6,35 ¼	Alcodur	mm inch	5,08 0.2	18 0.709	HSS-Co	7355-050-005-23-01
50,8 mm 2 "	12,7 ½	Alcodur	mm inch	11,43 0.45	18 0.709	HSS-Co	7355-050-011-23-01
50,8 mm 2 "	19,05 ¾	Alcodur	mm inch	17,78 0.7	18 0.709	HSS-Co	7355-050-017-23-01
100 mm 3,937"	6,35 ¼	Alcodur	mm inch	5,08 0.2	42,6 1.676	HSS-Co	7355-100-005-23-01
100 mm 3,937"	12,7 ½	Alcodur	mm inch	11,43 0.45	42,6 1.676	HSS-Co	7355-100-011-23-01
100 mm 3,937 "	19,05 ¾	Alcodur	mm inch	17,78 0.7	42,6 1.676	HSS-Co	7355-100-017-23-01

Shank-Sets incl. accessories / Sets de mangos con accesorios

d2 Shank-Ø Ø mango		ℓ2* OAL Longitud total	Item-No. num. de art.
15,875 mm ⅝ "	mm inch	80 3.15	8000-015-280-00-02
16 mm 0.63 "	mm inch	80 3.15	8000-016-280-00-02

Single components / Componentes individuales

Accessories Accesorios	Item-No. num. de art.
2x IPC-Pin 2x Perno	8000-014-100-00-01
Screw Tornillo	6600-004-016-00-01
Torque Screwdriver Destornillador dinamométrico	6600-042-000-00-01
PrecisionBit for Torx PrecisionBit para Torx	6600-0T1-500-00-01

HSS-Co = High Speed Steel
LOC = Length of Cut / LDC = Longitud de corte • OAL = Over-all-Length / Longitud total

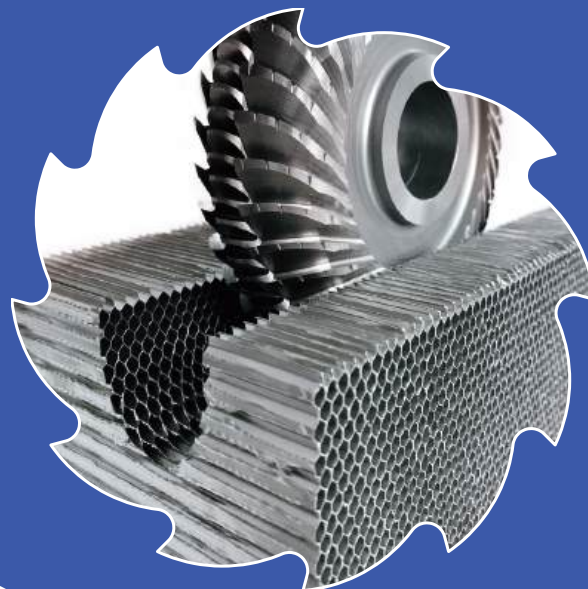
3
Panel Tools
Herramientas para
mecanizado de paneles

Special applications

Aplicaciones especiales

Optimized tools
for serial productions

*Herramientas
optimizadas para
producciones en serie*



SPECIAL DIMENSIONS OR SPECIAL APPLICATIONS?

Talk to us. We are happy to manufacture custom-made products for you in regard to tool dimensions, tooth geometries, interfaces, cutting materials and coatings.

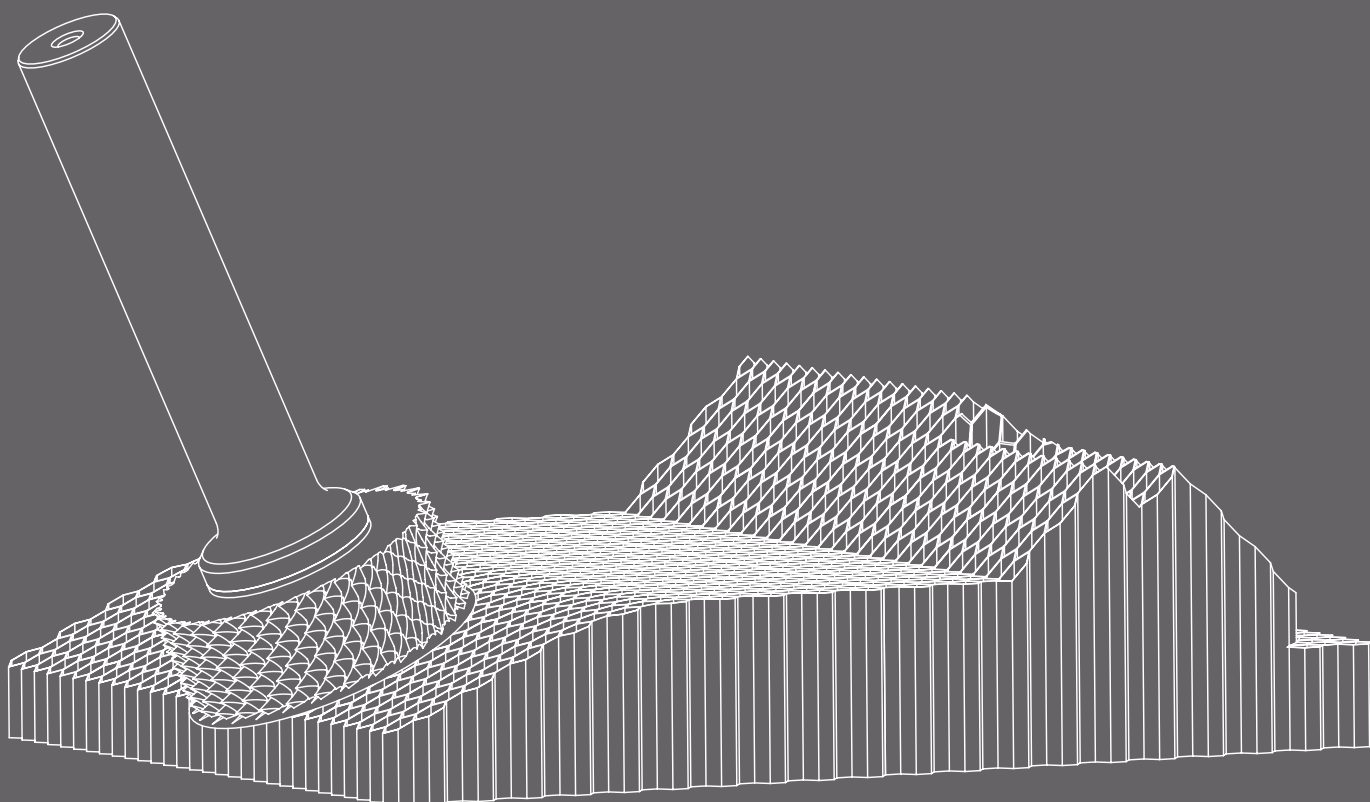
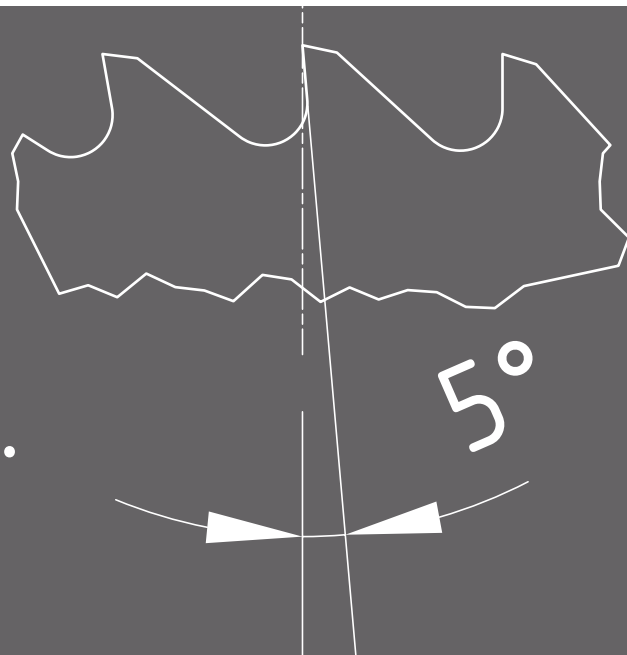
DIMENSIONES ESPECIALES O APLICACIONES ESPECIALES?

Póngase en contacto con nosotros. Estaremos encantados de fabricar productos personalizados para usted en cuanto a las dimensiones de la herramienta, las geometrías del dentado, las interfaces, los materiales de corte y los recubrimientos.

Technical Data & Explanations

Datos técnicos & Explicaciones

$$V_c = \frac{d \times \pi \times n}{1000} \text{ m/min.}$$



4

Appendix
Anexo

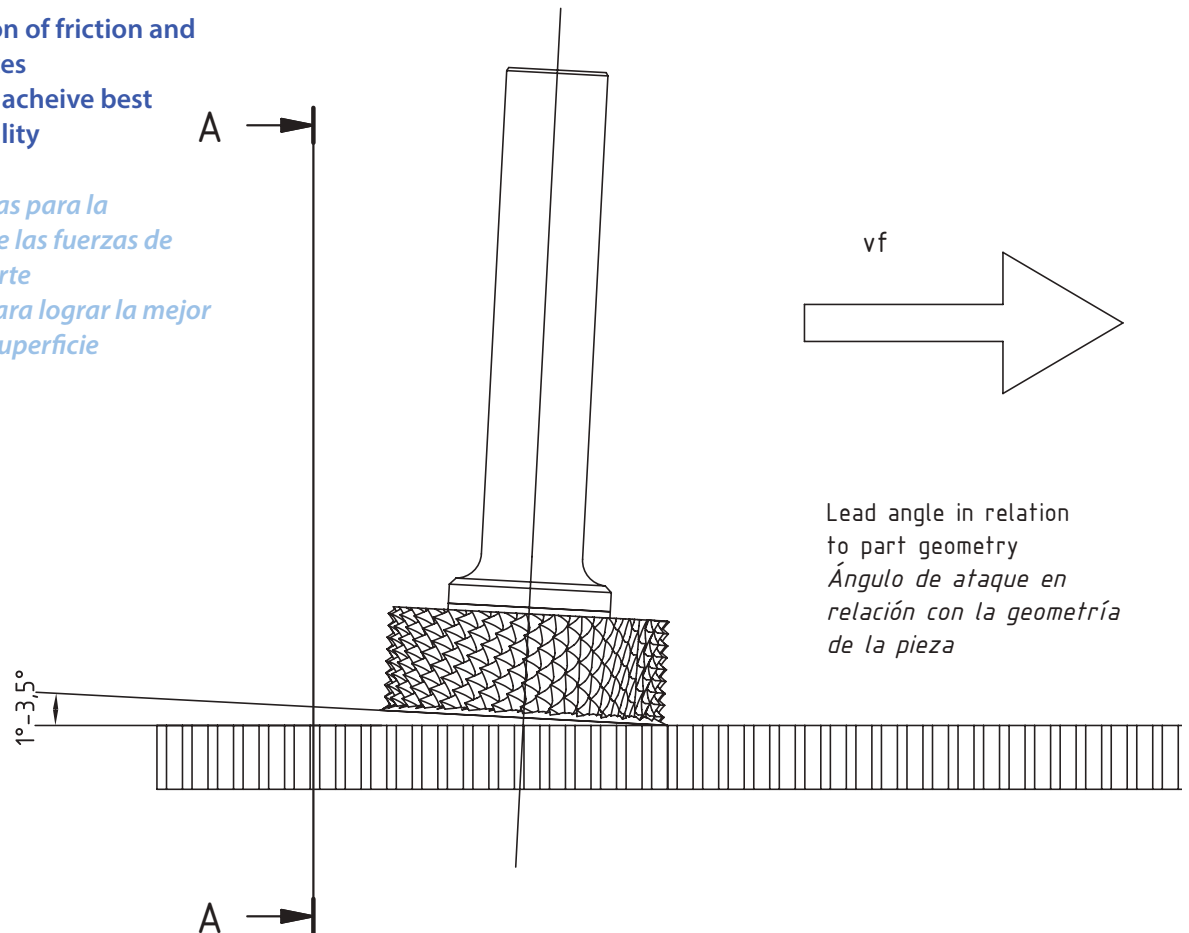
Cutting strategy Core Cut

Estrategia de corte Core Cut

Lead angle in feed direction 1 to 3.5°

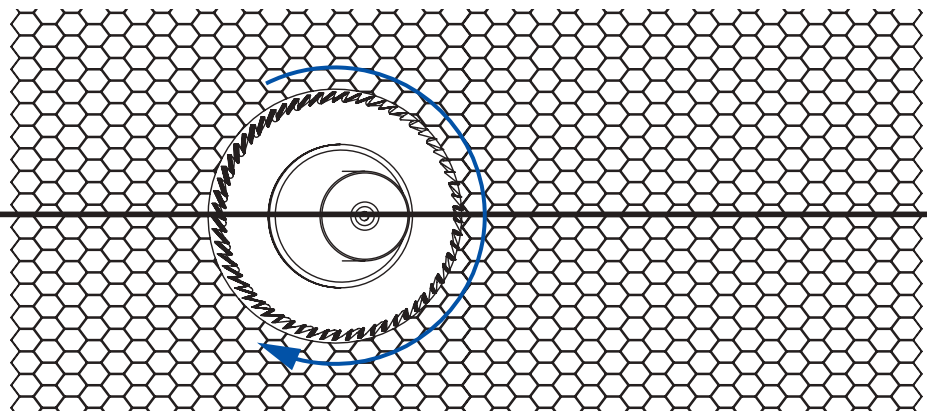
Ángulo de avance en dirección de alimentación de 1 a 3,5°

- for reduction of friction and cutting forces
- required to achieve best surface quality
- *Herramientas para la reducción de las fuerzas de fricción y corte*
- *necesario para lograr la mejor calidad de superficie*



conventional-
cutting-side
*Lado de corte
convencional*

climb-
cutting-side
*Lado de corte
de elevación*

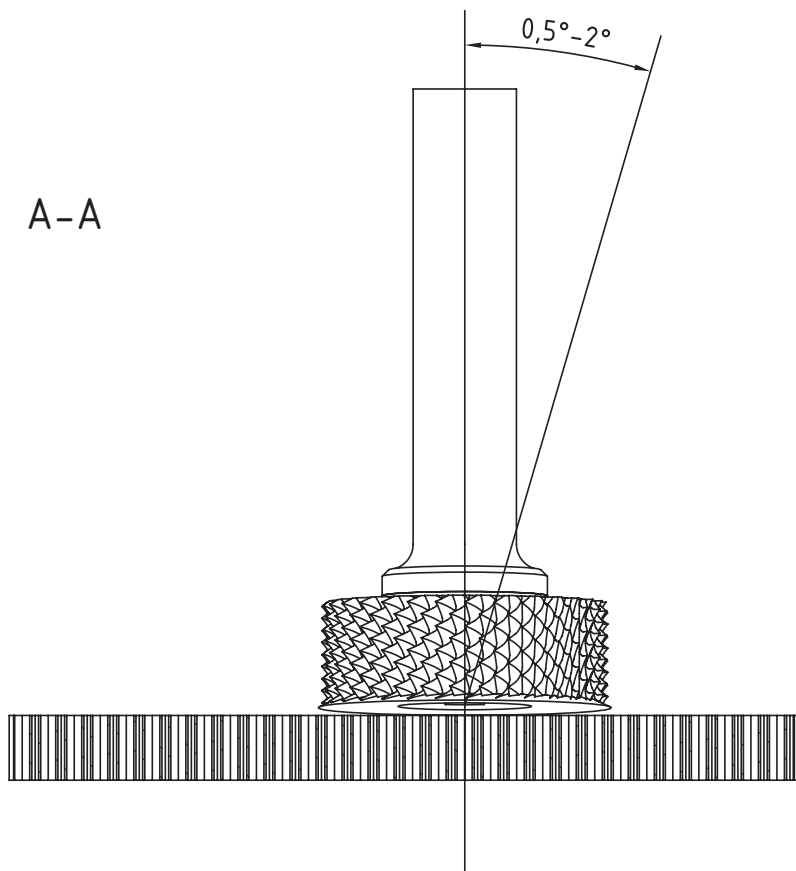


Cutting strategy Core Cut

Estrategia de corte Core Cut

Tilt angles in climb milling direction 0.5 to 2°

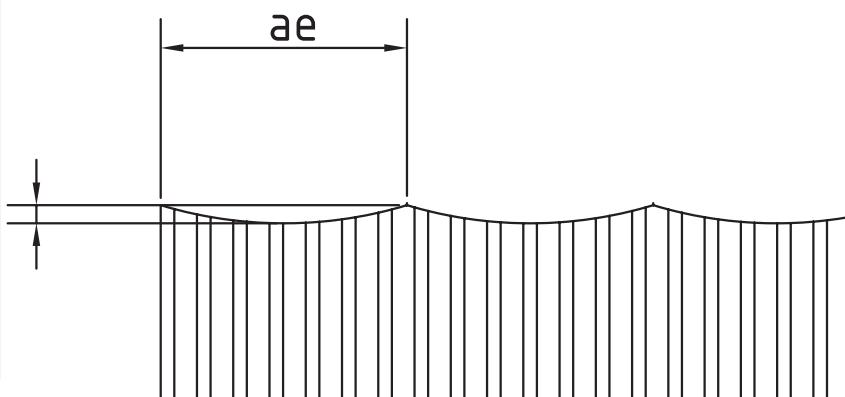
Ángulos de inclinación en dirección de fresado de elevación $0,5$ a 2°



- to direct the cutting forces downwards
- for light honeycomb or in case of fragile connection to the machine table
- Herramientas para dirigir las fuerzas de corte hacia abajo
- para panal de abeja ligero o en caso de conexión frágil a la mesa de la máquina

Influences of tilt angles to the surface-shape t

Influencias de los ángulos de inclinación a la herramienta en función de la superficie



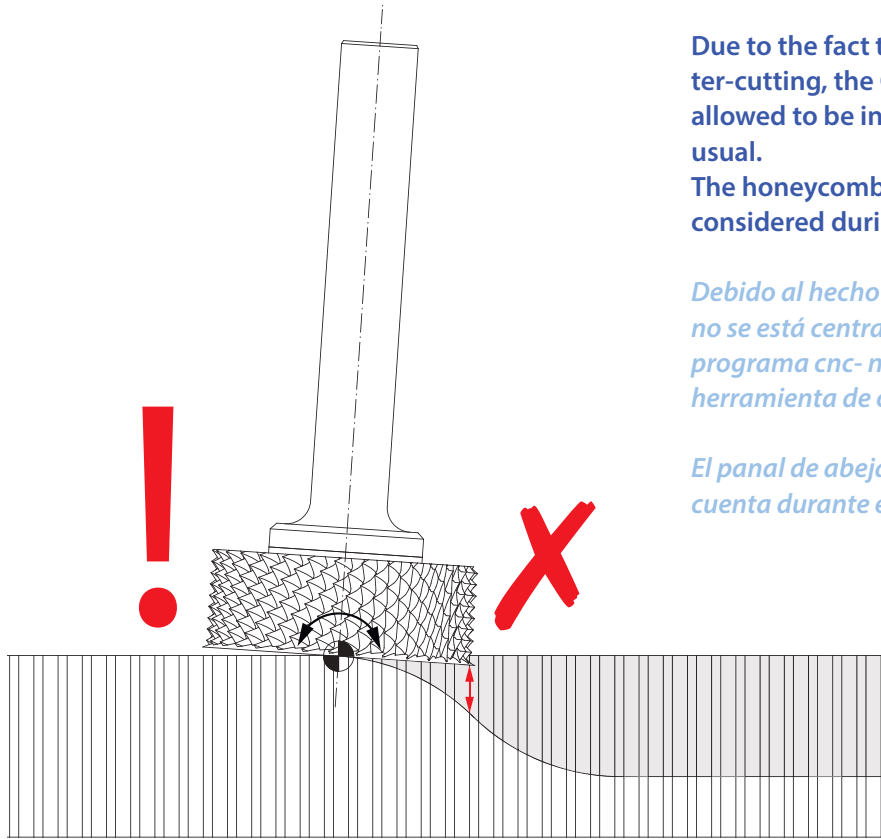
- Minimization of the influence by reduced stepover (ae) and usage of large diameters
- Minimización de la influencia por reducción de la escala (ae) y uso de grandes diámetros

Cutting strategy Core Cut

Estrategia de corte Core Cut

Reference-Point for CNC-Programming

Punto de referencia para la programación CNC

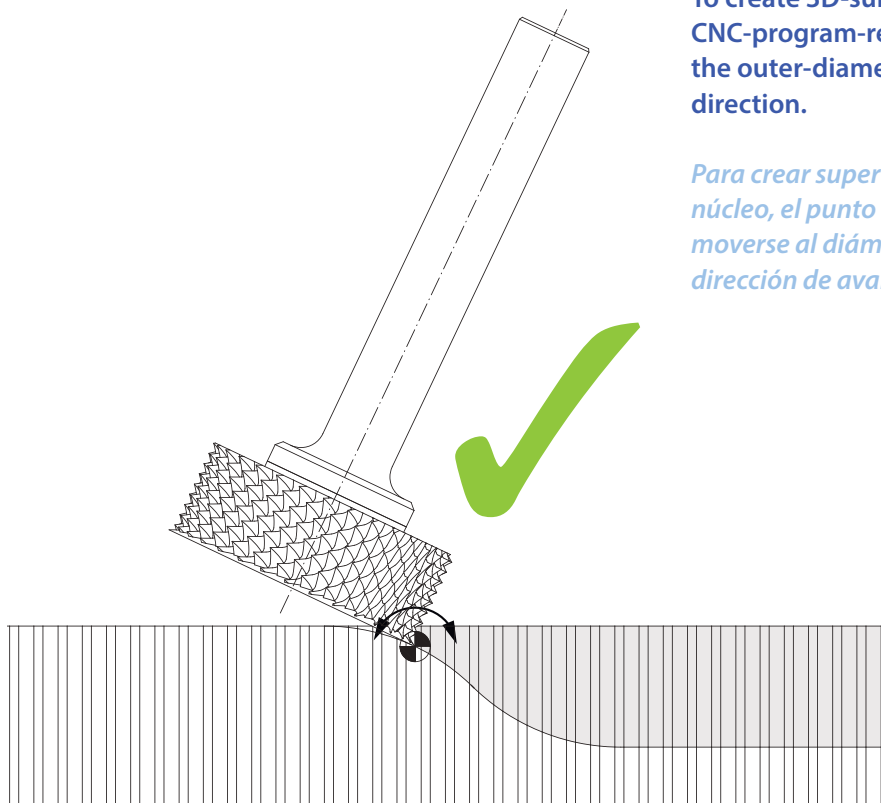


Due to the fact that the Core Cut-System is not center-cutting, the CNC-program-reference-point is not allowed to be in the center of the cutting tool – as usual.

The honeycomb is getting compressed, if this is not considered during the machining of 3D-surfaces.

Debido al hecho de que el sistema de corte de núcleo no se está centrando, el punto de referencia del programa cnc- no permite estar en el centro de la herramienta de corte – como de costumbre.

El panel de abeja se comprimirá, si esto no se tiene en cuenta durante el mecanizado de superficies 3D.



To create 3D-surfaces with the Core Cut-System the CNC-program-reference-point has to be moved to the outer-diameter of the front-end-knife in feed direction.

Para crear superficies 3D con el sistema de corte de núcleo, el punto de referencia del programa CNC debe moverse al diámetro exterior del cuchillo frontal en dirección de avance.

Cutting strategy Core Cut

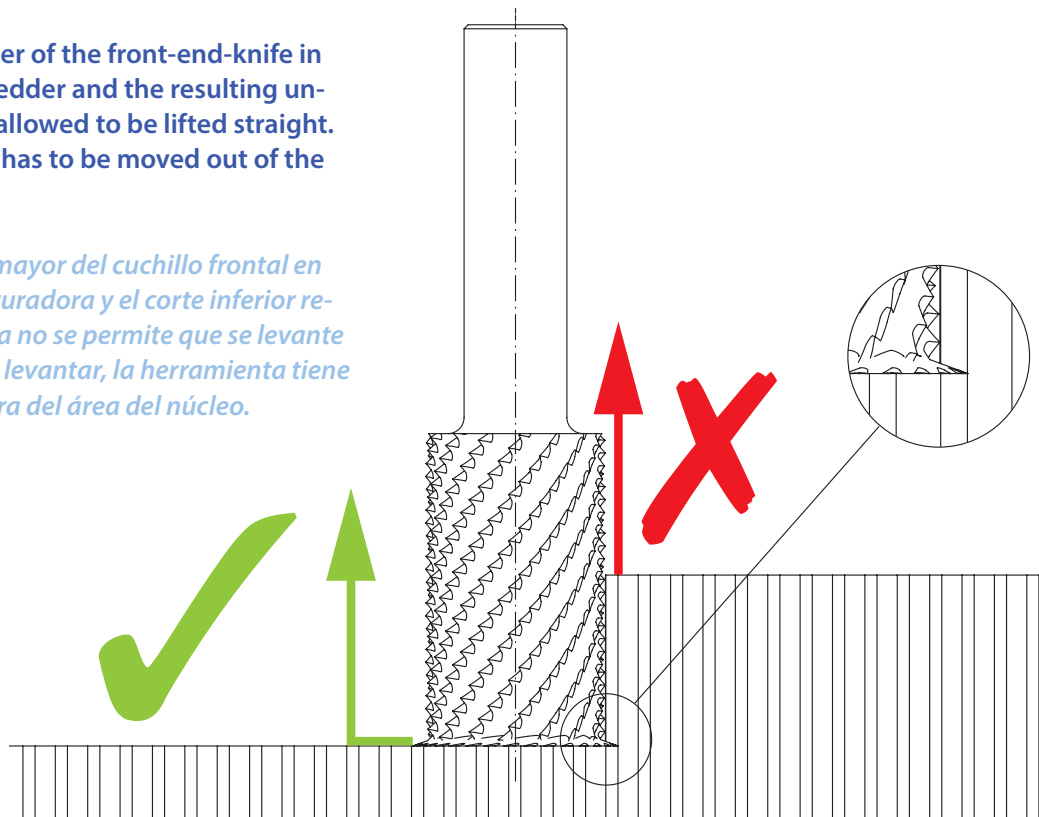
Estrategia de corte Core Cut

Lifting the tool from the workpiece

Elevación de la herramienta de la pieza a mecanizar

Due to a larger diameter of the front-end-knife in comparison to the shredder and the resulting undercut, the tool is not allowed to be lifted straight. Before lifting, the tool has to be moved out of the core.

Debido a un diámetro mayor del cuchillo frontal en comparación con la trituradora y el corte inferior resultante, la herramienta no se permite que se levante directamente. Antes de levantar, la herramienta tiene que ser desplazada fuera del área del núcleo.



ADVICES:

By the publication of this catalogue, all former editions become invalid.

Reprint of this catalogue – also extracts only – is allowed only with our explicit permission.

Considering the continual technical improvements of our tools, we reserve the right to modify the selection in our catalogue. If a required tool is not available for this reason, we will quote you a substitute of equal or better technological standard. If you have any questions, please contact our sales department.

CONSEJOS:

Al publicar este catálogo, todas las ediciones anteriores dejan de tener validez.

La reimpresión de este catálogo, incluso solo en un extracto, solo se permite con nuestro permiso explícito.

Teniendo en cuenta las mejoras técnicas continuas de nuestras herramientas, nos reservamos el derecho de modificar la selección en nuestro catálogo. Si por este motivo una herramienta necesaria no está disponible, le ofertaremos un reemplazo con un estándar tecnológico igual o mejor. Si tiene cualquier pregunta, póngase en contacto con nuestro departamento de ventas.

Terms of Delivery

I. General Information

1. Any and all deliveries made and services provided are subject to the Terms of Delivery at hand as well as to separate contractual agreements possibly concluded. Any deviating terms of purchase of the Buyer shall not become a constituent element of the contract even in case of order acceptance. A contract shall be established – for lack of specific agreement – with the written order confirmation of the Seller.
2. The Seller reserves property and copyrights for samples, cost estimates, drawings and similar information of physical and non-physical nature – also in electronic form; these may not be disclosed to third parties. The Seller undertakes not to disclose information and documents identified as confidential by the Buyer to third parties without his written consent.
3. Samples shall be supplied only against charges.
4. Verbal supplementary agreements do not exist. Modifications require written form in order to be effective.

II. Price and Payment

1. The prices – for lack of specific agreement – shall be ex works and do not include packaging. The quoted price of products does not include duty, tariffs, taxes or similar charges, which shall be borne by the Buyer, unless otherwise agreed upon in writing.
2. For lack of specific agreement, payment shall be effected immediately following delivery to the account of the Seller and without any deduction. The respective quantity delivered shall be charged.
3. The Buyer shall have the right to retain payments or to offset these against counterpayments only to the extent that his counterclaims are undisputed and determined legally binding.

III. Period of Delivery, Default in Delivery

1. The Period of Delivery results from the agreements entered into between the contracting parties. The prerequisite for compliance by the Seller is that any and all commercial and technical questions have been clarified between the contracting parties and that the Buyer has complied with any and all obligations under his responsibility, such as e.g. the procurement of the certificates or authorizations required by the authorities or performance of a down payment. Should this not be the case, the Period of Delivery will be extended appropriately. This shall not apply to the extent that the Seller is responsible for the delay.
2. Adherence to the Period of Delivery shall be subject to correct and on-time delivery to us on the part of our suppliers. The Seller shall inform the Buyer about emerging delays as soon as possible.
3. The Period of Delivery shall be deemed to have been complied with if the delivery item has left the factory of the Seller or if readiness for shipment has been announced.
4. In case that the shipment is delayed upon request of the Buyer, the Seller shall be entitled to otherwise dispose of the delivery item after fixing a reasonable deadline and its fruitless expiry and to supply the Buyer subject to a reasonably extended period. In case that the shipment is delayed on account of reasons for which the Buyer is responsible, the costs incurred as a result of such delay shall be charged to the Buyer, beginning one month after announcement of the readiness for shipment of the delivery item.
5. In case that non-compliance with the Period of Delivery is to be attributed to force majeure, labor disputes or other events beyond the sphere of influence of the Seller, the Period of Delivery shall reasonably be extended. The Seller shall inform the Buyer of the beginning and end of such circumstances as soon as possible.
6. In case that delivery is rendered entirely impossible or economically unreasonable for the Seller as a result of force majeure, labor disputes or other events beyond the sphere of influence of the Seller, the Seller shall have the right to either wholly or partially resign from the contract. Claims for damages of the Buyer on account of such resignation are excluded. If the Seller intends to make use of his right of resignation, he shall inform the Buyer immediately upon identification of the implications of such event. This shall also apply if an extension of the Period of Delivery has initially been agreed upon with the Buyer.
7. The Buyer may resign from the contract without fixing a time limit if complete performance is ultimately rendered impossible for the Seller prior to the transfer of risk. The Buyer may furthermore resign from the contract if execution of part of the delivery is rendered impossible for an order and if the Buyer has a legitimate interest to reject a part delivery. If this is not the case, the Buyer shall have to pay the contract price for the respective part delivery. The same shall apply in case of an inability of the Seller. In all other cases, Paragraph VII.2. "Liability" shall apply. In case that the impossibility or inability occurs during the default in acceptance or if the Buyer is alone or predominantly responsible for the circumstances, he shall be obliged to the performance of quid pro quo.
8. In case that the Buyer fixes a reasonable deadline for performance after the due date – taking into consideration the statutory exceptions – and if this deadline is not complied with, the Buyer shall be entitled to resignation within the scope of statutory provisions. Upon request of the Seller he undertakes to declare within a reasonable time whether he intends to make use of his right of resignation. Further claims from Default in Delivery are exclusively governed by Paragraph VII.2. hereunder.

IV. Transfer of Risk, Acceptance

1. The risk shall be transferred to the Buyer whenever the delivery item has left the factory, namely also if part deliveries are performed or if the Seller has undertaken other services, such as e.g. the forwarding expenses or shipment.
2. In case that delivery is delayed or not undertaken as a result of circumstances not to be attributed to the Seller, the risk shall be transferred to the Buyer at the day the readiness for shipment is announced. The Seller undertakes to effect insurance as requested by the Buyer at the expense of the Buyer.
3. Part deliveries shall be permissible to the extent reasonable for the Buyer.

V. Reservation of Proprietary Rights

1. The Seller reserves the proprietary right for the delivery item until any and all claims of the Seller versus the Buyer arising from the business relations have been settled, including future claims, also arising from contracts concluded simultaneously or subsequently. This shall also apply if individual or all claims of the Seller were entered into a current account and the balance has been determined and acknowledged. In case of behavior of the Buyer contrary to the terms of contract, particularly in case of default in payment, the Seller shall be entitled to withdrawal of the delivery item after overdue notification and the Buyer shall have the obligation to surrender the delivery item. The Buyer is obliged to immediately notify the Seller in case of seizure or other interventions of third parties.
2. The Buyer is entitled to resell the delivery item in ordinary course of business. He, however, already today cedes to the Seller any and all claims arising from the resale versus purchaser or third parties. The Buyer is entitled to collection of said claims also after cession. The authorization of the Seller for collection of the claims on his own is not affected by this. The Seller, however, undertakes not to collect the claims as long as the Buyer properly complies with his payment obligations or the authorization to collect has not been revoked or no application for the opening of insolvency procedures has been filed. The Seller may otherwise request for the Buyer to disclose the claims ceded and their debtor, providing all information required for collection, handing over all documents pertaining to this, and informing the debtors of the cession, unless already performed by the Seller. In case that the delivery item is resold together with merchandise that is not the property of the Seller, the claim of the Seller versus the purchaser shall be deemed to be ceded in the amount of the contract price agreed between Seller and Buyer.
3. The Buyer shall not be entitled to pledge or transfer as security the delivery item.
4. The Buyer hereby grants to the Seller a security interest in the products sold hereunder to secure payment of the price of such products and agrees, and appoints the Seller, its agent, to take all such action and to execute all such documents and instruments as may be necessary or reasonably requested by the Seller to perfect and continue perfected the Seller's security interest hereunder.
5. The Seller shall be entitled to insure the delivery item at the expense of the Buyer against theft, breakage, fire, water, and other damages, unless the Buyer has demonstrably obtained such insurance coverage on his own.
6. If, in connection with the payment of the contract price, a liability of the Seller is established for a bill-of-exchange the reservation of proprietary rights including its special forms agreed upon or other securities agreed upon to secure payment shall not expire before the bill-of-exchange has been honored by the Buyer as debtor.
7. The application for the opening of insolvency procedures shall entitle the Seller to resign from the contract and demand immediate return of the delivery item.

VI. Claims from Defects

The Seller shall warrant material defects and deficiencies in title of the delivery under exclusion of further claims – subject to Paragraph VII "Liability" – as follows:

Material Defects

1. All those parts are to be reworked or replaced by parts free of defects – which is at the discretion of the Seller – free of charge, which turn out to be defective on account of circumstances that have occurred prior to the transfer of risk. The Seller is to be informed in writing immediately whenever such defects are determined. Parts replaced shall become the property of the Seller.
2. Upon agreement with the Seller, the Buyer shall grant the Seller the time and opportunity required in order to perform any and all rework and substitute deliveries, which the Seller deems necessary, with the Seller otherwise exempted from liability for the resulting consequences. It is only in urgent cases where the operational safety is jeopardized and/or as defense against disproportionate damages – in which cases immediate notification of the Seller is mandatory – that the Buyer has the right to eliminate the defect himself or have the defect eliminated by third parties and demand compensation for expenditures incurred.
3. Regarding the direct costs resulting from rework and/or substitute delivery, the Seller shall bear the costs for the replacement part including shipment – to the extent that the complaint proves justified. In all other cases the Buyer shall bear the costs.
4. Within the scope of statutory provisions, the Buyer has the right to resign from the contract if the Seller – taking into account the statutory exceptions

– has allowed a reasonable time fixed for rework or substitute delivery on account of material defect to expire fruitlessly.
In case of only insubstantial defects, the Buyer only has the right for a reduction of the contract price. The right for a reduction of the contract price is otherwise excluded.

Further claims are determined by Paragraph VII.2. hereunder.

5. No liability is assumed particularly in the following cases:
 - Unsuitable or improper use, incorrect installation and/or commissioning by Buyer or third parties, natural wear, erroneous and negligent handling, improper maintenance, unsuitable operating materials, chemical, electro-chemical or electrical impact – to the extent that they are not the responsibility of the Seller.
 - The Seller shall assume liability for defects of the material supplied by the Buyer only if the defects could have been identified, had professional diligence been applied.
 - In case of manufacturing based on drawings of the Buyer, the Seller shall assume liability only for execution in accordance with the drawings.
- 5a. If special tools are ordered, the actual delivery quantity is allowed to either exceed or undershoot the order quantity by approx. 10 % or a minimum of 2 units, as required.
6. In case that the Buyer or third parties perform improper rework, the Seller shall not assume any liability for the consequences that result. The same shall apply for modifications of the delivery item made without prior consent of the Seller.

Deficiencies in Title

7. The Buyer shall assume the sole responsibility for documents such as drawings, gauges, samples or the like to be submitted by the Buyer. It is the Buyer's responsibility to ensure that the workshop drawings submitted by the Buyer do not violate the copyrights of third parties. The Seller has no obligation vis-à-vis the Buyer to investigate if the submission of quotes on the basis of workshop drawings submitted to the Seller constitutes any violation of copyrights of third parties. Should a liability of the Seller nevertheless result from constitutive facts, the Buyer shall indemnify and hold harmless the Seller.

VII. Seller's Liability, Disclaimer of Liability

1. In case that the delivery item cannot be used by the Buyer in accordance with its contractual purpose by fault of the Seller as a result of negligent or incorrect execution of proposals submitted and consultations performed prior to or following the conclusion of the contract or by violation of other secondary contractual obligations – particularly instructions for operation and maintenance of the delivery item – the stipulations contained in Paragraphs VI and VII.2. shall apply under the exclusion of further claims of the Buyer.
2. The Seller shall assume liability for damages not established on the delivery item as such – on whatever legal grounds – only
 - a) in case of intent,
 - b) in case of gross negligence of the proprietor / institutions or senior executives,
 - c) in case of intentional or negligent violation of life, body and/or health,
 - d) in case of maliciously concealed defects,
 - e) in case of defects of the delivery item, to the extent that liability is assumed for personal injury or damage to property for privately used items in accordance with the German Product Liability Act (Produkthaftungsgesetz). In case of culpable breach of material contractual obligations, the Seller shall also assume liability in case of gross negligence of non-executive employees and minor negligence, in the latter case limited to reasonable, foreseeable typical contract damage.
 Further claims are excluded.
3. The Seller shall not be subject to any other obligations or liabilities, whether arising out of breach of contract, warranty, tort (including negligence and strict liability) or other theories of law, with respect to products sold or services rendered by the Seller or undertakings, acts or omissions relating thereto. Under no circumstances will the Seller be liable for any incidental or consequential damages, or for any other loss, damage or expense of any kind,

including loss of profits, arising in connection with the contract or with the use or liability to use the Seller's products furnished under this contract.

VIII. Statute of Limitations

Any and all claims of the Buyer – on whatever legal grounds – come under the statutes of limitation in 12 months. The statutory time limits shall apply for claims for damages in accordance with Paragraph VII.2. a – e.

IX. Special Conditions for Machining Contracts (completion, reprocessing, modification or restoration of tools)

The following shall apply for machining contracts as a supplement to/deviating from the Terms of Delivery:

1. The subcontractor shall not assume any liability for the behavior of material submitted. His claim for remuneration remains unaffected.
2. Should the material become unusable during the machining by fault of the subcontractor, his claim for remuneration for the service rendered shall lapse. The claim for damages of the Buyer shall be governed by Paragraph VII.2. hereunder.

X. Return Policy

1. A Return Goods Authorization (RGA) number must be obtained before returning items.
2. Call 1-800-558-8966 to request a Return Goods Authorization (RGA) number. Be sure to write your RGA number on the shipping label. Returns will not be accepted unless accompanied by this number
3. Please include a copy of your invoice or packing slip.
4. Claims for discrepancies in shipment must be made within 7 days of receipt of merchandise or they will not be accepted.
5. Only items in unused condition and in undamaged, sealed original container may be returned within 30 days of the invoice date
 - 15% Restock fee, an order of equal/greater value will reduce the restock fee to 5%
 - After 30 days / less than 6 month from the invoice date
 - 30% Restock fee, an order of equal/greater value will reduce the restock to 20%
6. Freight must be prepaid
7. Special orders, modified items, used items and obsolete items cannot be returned.
8. A maximum of two stock returns per year is allowed.
9. The stock return cannot exceed 10% of the past 12 month sales.
10. All stock returns must be approved by the National Sales Management.

Any deviation from the above Policy must be authorized in writing by the National Sales Management

This policy supersedes all previous policies and is effective March 13.2017

XI. Applicable Law, Place of Jurisdiction, Place of Performance

1. German Substantive Law under the exclusion of UN Purchasing Law shall apply for any and all legal relations between Seller and Buyer.
2. Should disputes arise from or in connection with the contract at hand, the parties shall first attempt to reach an out-of-court settlement. Should this not be possible, disputes shall be ultimately decided by a Court of Arbitration in accordance with the Arbitrary Court Regulation of the German Institution for Arbitration (DIS), excluding the regular legal process. The decision shall be taken by three arbitrators, with each of the two parties appointing one arbitrator and the third arbitrator selected by the two arbitrators appointed. Arbitration procedures shall be in German language and performed at the corporate seat of the exporter.
3. Place of Performance shall be 54595 Prüm, Germany.

Any and all deliveries performed shall exclusively be based on our Terms of Delivery. We hereby object to any and all contrary terms of purchase.

TERMS OF DELIVERY FOR REPAIR OF TOOLS AND OTHER CONTRACT JOBS

- The costs for tool repair and contract grinding are charged on basis of real time consumption.
- The price for tool repair and contract grinding depends mainly on quantities. If quantities mentioned in our quotation or order confirmation are not achieved we may charge a higher price for lower quantities.
- All costs and risks for transports are chargeable to the buyer.
- Contract jobs are to be payed on delivery without deduction.
- Risk for scrap on tool repairs or other contract jobs must be taken by the buyer.
- If scrap is caused by ourselves costs for contract work will not be charged. Under no circumstance we will refund scrapped parts.
- Apart from that our terms and conditions will apply.

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