

CNC MILLING TOOLS



vhf

CREATING PERFECTION



Welcome to vhf!

For more than 30 years, we at vhf are living a vision: *Creating Perfection*. For our customers, we go the proverbial extra mile and do our utmost every day to create the perfect tools for you.

I am proud to present you the new catalog in its fresh and modern look. Thanks to the clear structure, you will now find your way around the extensive vhf tool portfolio even better than before. There is a particularly useful tool for this purpose on pages 22 and 23: Here we have compiled a **clear recommendation matrix** for you, where you can see at a glance which tool is suitable for which material and how well. No matter for which machining task you need our tools – what they all have in common is the uncompromisingly high quality standard we set for them.

Our friendly and competent vhf tool team is always available to answer your questions. We will be pleased to advise you!

Frank Benzinger
Chief Executive Officer

MILLING CUTTERS	
ENGRAVING TOOLS	
DEBURRING TOOLS	
ROUTER BITS	
THREAD CUTTERS	
DRILLS	
DIAMOND TOOLS	
LANCES AND KNIVES	
ACCESSORIES	

0 GE NE RAL

General Information

Passion for perfection for over 30 years	6
Development and production	8
Expert advice	14
Order online with free delivery	15
Fast Delivery	15
Trade fairs	16
Carbide and diamond tools	17
Coatings	18
Signs and symbols	21
NEW! Recommendation matrix on tools and materials	22

1 SINGLE TOOTH CUTTERS

Single tooth cutters

Single tooth cutters Varius®	28
Single tooth cutters Varius® with left-hand twist	31
Single tooth cutters with polished flute	32
Single tooth cutters, polished, with left-hand twist	35
Single tooth cutters with hawk beak profile	36
Single tooth cutters with undercut	39
Single tooth cutters with face radius	40
V-slot cutters for aluminium composites	41

2 DOUBLE TOOTH CUTTERS

Double tooth cutters

Double tooth cutters Varius®	44
Double tooth cutters with polished flute	46
Double tooth cutters for stainless steel	47
Double tooth cutters with fishtail	48
Double tooth cutters for aluminium	50
Double tooth cutters for wood	52
Double tooth cutters with face radius	53
Rub out cutters	54

3 MULTI- TOOTH CUTTERS

Multi-tooth cutters

Triple tooth cutters Varius®	58
Triple tooth cutters for foam	60
Triple tooth cutters for stainless steel	61
Four tooth cutters Varius®	62

4 COM POSITE CUTTERS

Composite cutters

Composite cutters, finely toothed	66
Composite cutters, finely toothed with chip breaker	67
Composite cutters, medium-toothed	68
Composite cutters, coarsely toothed	69
PCB outline cutters, diamond-toothed	70
PCB outline cutters, spiral-toothed	71
Honeycomb cutters, spiral-fluted	72

5 EN GRAVING TOOLS

Engraving tools

Gravers	78
Box gravers	81
Isolation engraving tools	82
Engraver's milling cutters for stainless steel	83
Engraver's milling cutters for acrylic	84
Semi-finished gravers	86

	MILLING CUTTERS	ENGRAVING TOOLS	DEBURRING TOOLS	ROUTER BITS	THREAD CUTTERS	DRILLS	DIAMOND TOOLS	LANCES AND KNIVES	ACCESSORIES
6 DEBURRING TOOLS	Deburring tools								
	Deburring tools	90							
	Deburring tools with quadrant	91							
7 ROUTER BITS	Router bits								
	V-slot cutters	94							
	V-slot cutters for aluminium composites	95							
	Long hole slot cutters	96							
	Slot cutters	97							
	Chamfering cutters	98							
	Cutters with quadrant	99							
	Radius cutters	100							
	Triple tooth surface milling cutters	101							
8 THREAD CUTTERS	Thread cutters								
	Thread whirling cutters	106							
	Circular thread cutters	108							
9 DRILLS	Drills								
	Drills with 3 mm shank	112							
	Drills with 6 mm shank	114							
10 DIAMOND TOOLS	Diamond tools								
	PCD polishing cutters	118							
	MCD polishing cutters	119							
	PCD polishing gravers	120							
	MCD polishing gravers	121							
	PCD single tooth cutters	122							
	PCD double tooth cutters	123							
	CVD cutters	124							
11 LANCES AND KNIVES	Lances and knives								
	Lances for oscillating tangential cutting head	128							
	Lances for tangential cutting head	128							
	Knives for drag knife unit	129							
	Knives for universal head	129							
	Knives for XtraUnit	129							
12 ACCESSORIES	Accessories								
	Vacuum fleece and cutting mats	134							
	Special adhesive film	134							
	Stop rings	135							
	Reducing bushes	135							
	Coolants	136							
	More accessories in the vhf shop	137							
13 APPENDIX	Appendix								
	Using tools	140							
	The right number of teeth	140							
	Setting the machining parameters	140							
	Choice of the milling direction	140							
	Setting the immersion depth	141							
	Cooling/lubrication	141							
	What to do in case of problems?	141							
	Your contact to vhf	142							



PASSION FOR PERFECTION FOR OVER 30 YEARS

vhf camfacture AG is a worldwide leading manufacturer of CNC milling machines and tools for the industry, sign making and the dental sector. Our company can meanwhile benefit from more than 30 years of experience in machining technology.

Currently, vhf employs more than 300 employees worldwide and is growing steadily. On the vhf campus in Ammerbuch, not far from Stuttgart, the entire manufacturing process from development to production to the global distribution into the world takes place. The production of our CNC milling tools is performed on state-of-the-art production facilities – of which we would like to give you a small insight on the following pages.

Highest customer satisfaction is always vhf's claim: From the development of the cutting edge geometries to the production and complex test series, everything is done in-house at vhf.

The quality management system applied at vhf according to the DIN ISO 9001:2015 standard underlines this. But sustainable responsibility goes beyond that: our company generates a part of its energy demand itself. In addition, we use hydropower from the region and thus use 100% green electricity.

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES



MILLING
CUTTERS

ENGRAVING
TOOLS

DEBURRING
TOOLS

ROUTER
BITS

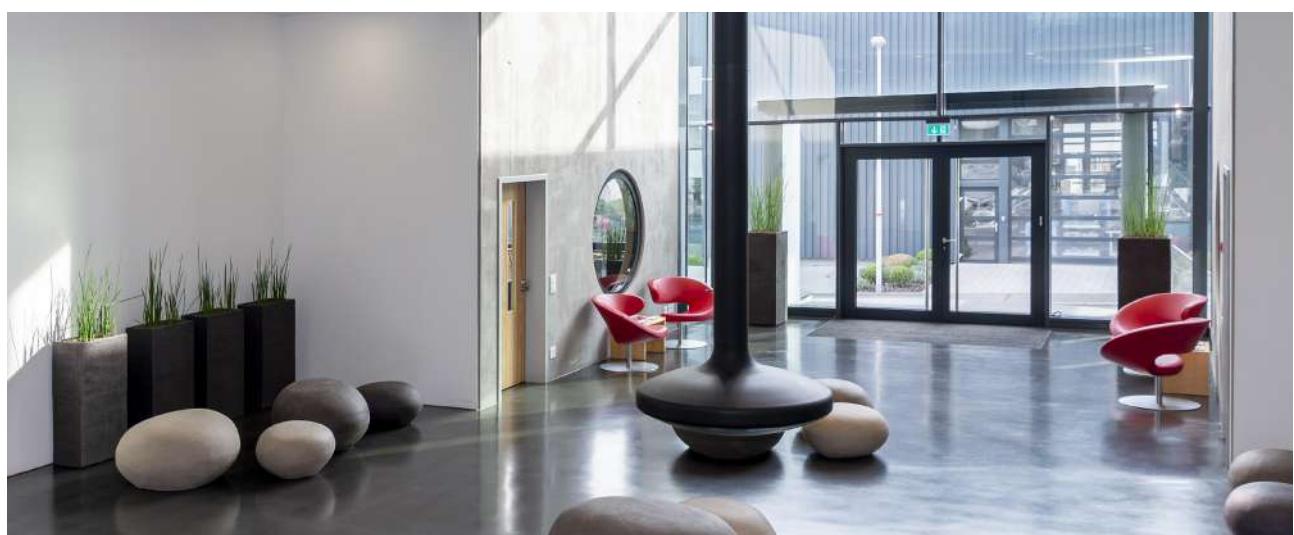
THREAD
CUTTERS

DRILLS

DIAMOND
TOOLS

LANCES
AND KNIVES

ACCESSORIES



MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

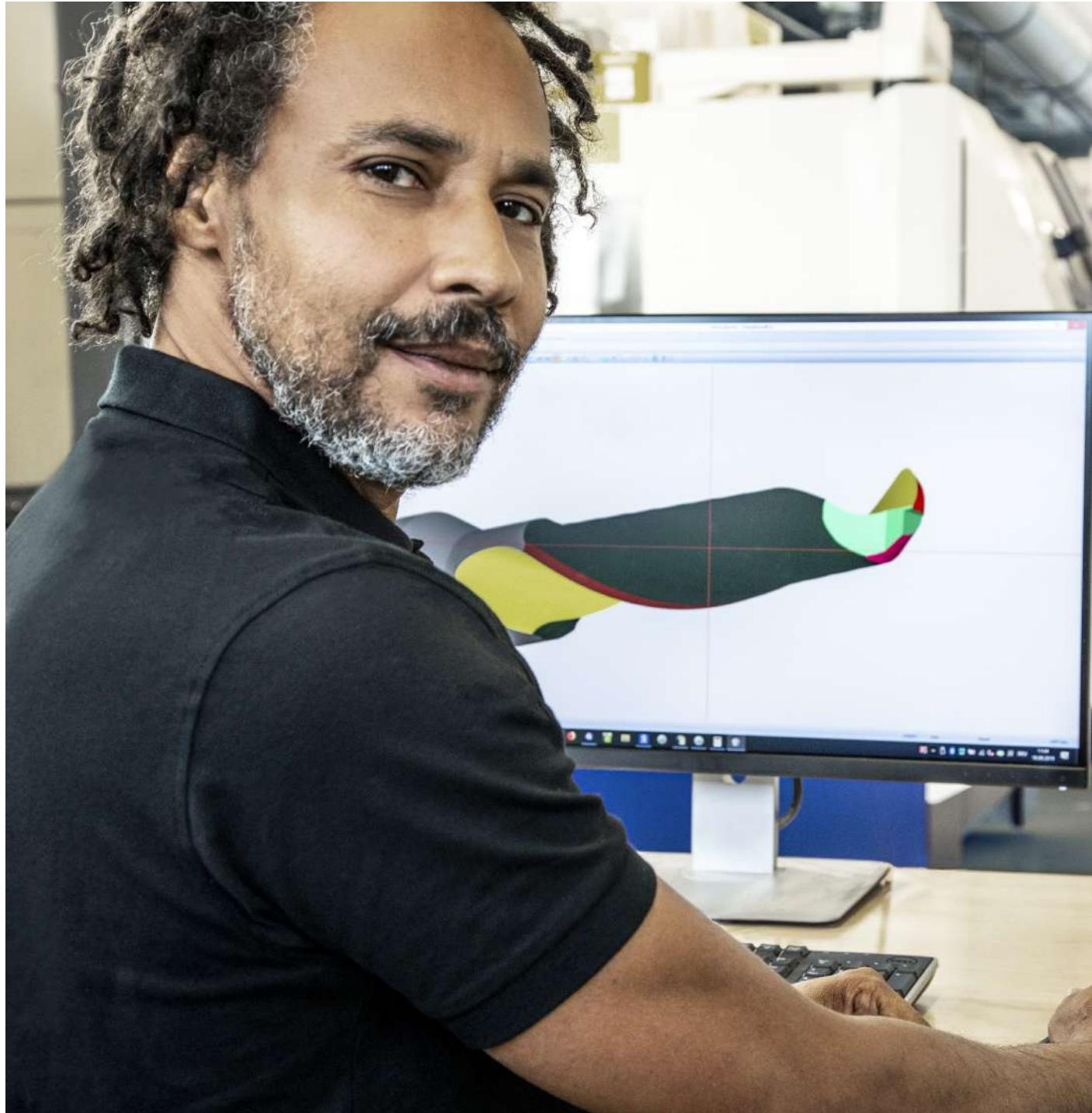
THREAD CUTTERS

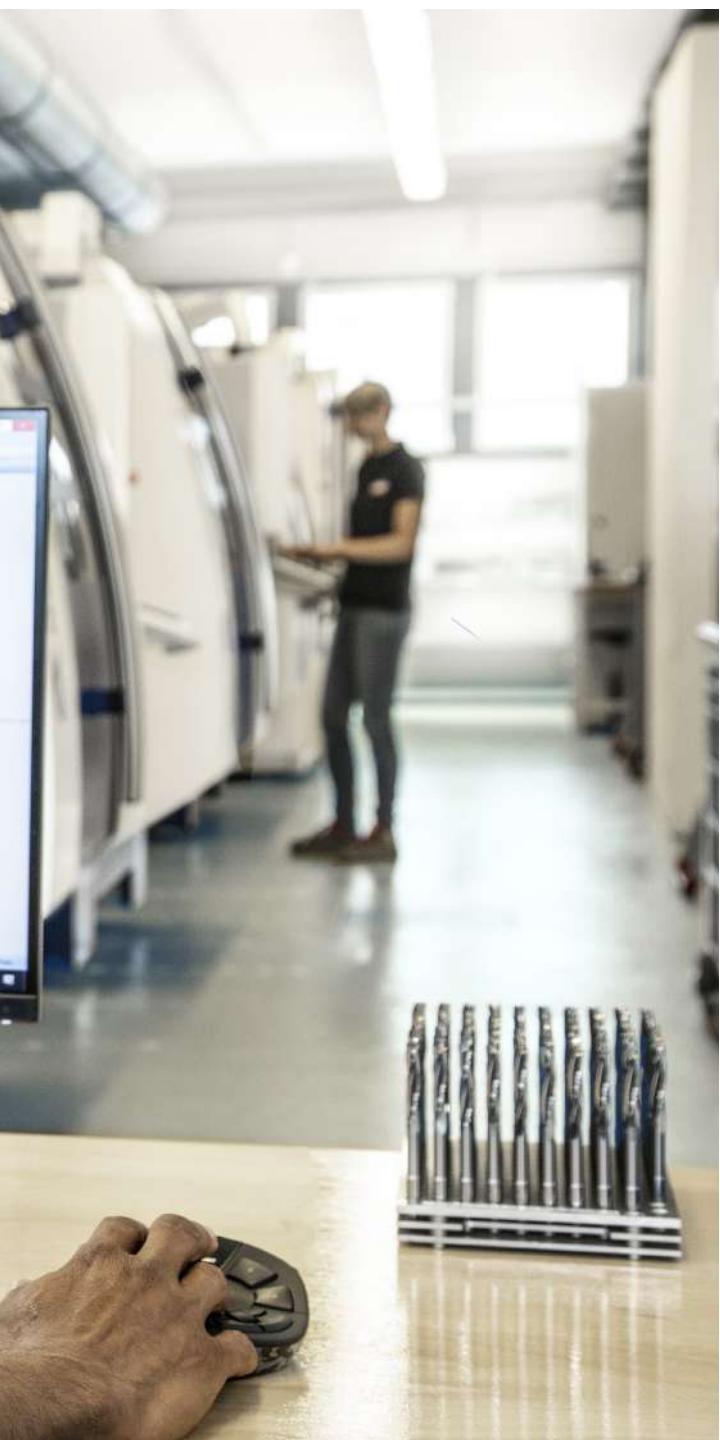
DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES





DEVELOPMENT AND PRODUCTION FROM ONE SOURCE

The vhf tool experts develop sophisticated cutting edge geometries in order to exactly adjust the tools to different materials and machining strategies. Powerful simulators allow them to three-dimensionally display the tools as well as visualize the machine movements

These standard and special tools will be manufactured on most modern six- and seven-axis precision grinding centers. These guarantee optimal conditions for the production of complex tools with highest quality.

For our tools, we exclusively use ultra finest grain or super finest grain carbides of German origin. Thus, you will always get an absolutely high-quality tool for your tasks that you can rely on 100%. Promised!

- ◀ Qualified vhf employees design and optimize our tools. They can draw on decades of know-how.

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

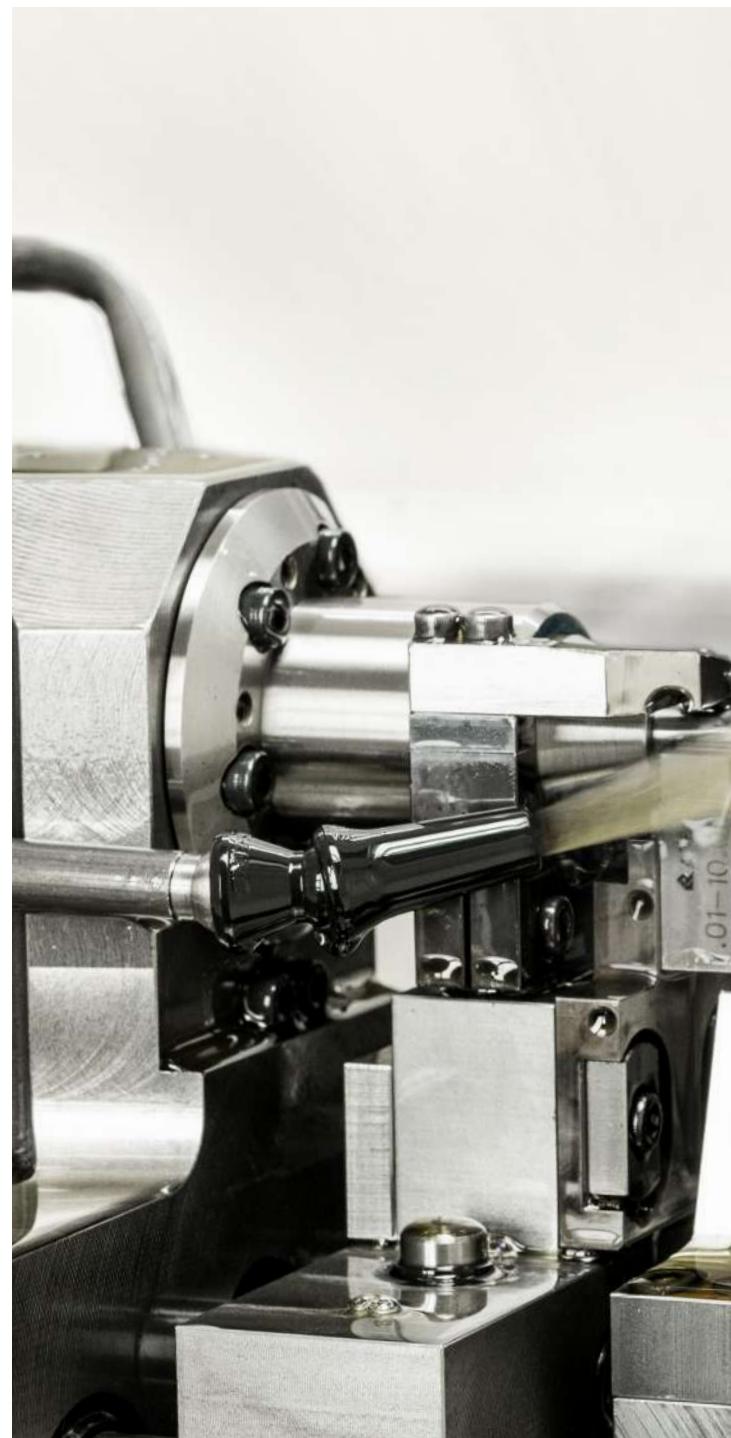
DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

*Economical,
clean, accurate –
tool production in
state-of-the-art
precision grinding
centers.*

Our highly qualified employees control the fully automated manufacturing process of vhf tools.



MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES



MILLING
CUTTERS

ENGRAVING
TOOLS

DEBURRING
TOOLS

ROUTER
BITS

THREAD
CUTTERS

DRILLS

DIAMOND
TOOLS

LANCES
AND KNIVES

ACCESSORIES



MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES



Controlled quality

The manufactured tools are inspected by a CNC measuring machine with four cameras and a measured value resolution of $0.25 \mu\text{m}$ to guarantee the highest quality. Thanks to this non-contact complete measurement, we can reliably control the production process. Maximum precision is our top priority – so that our customers achieve the best machining results.

We also regularly test the performance and quality of our tools in practice. Because at vhf, we produce numerous machine parts for our CNC milling machines in-house with our own tools. Thus, we do not only check the quality, but we also have the incentive to optimize our tools continuously. Using our own products is also part of Creating Perfection.

MILLING
CUTTERS

ENGRAVING
TOOLS

DEBURRING
TOOLS

ROUTER
BITS

THREAD
CUTTERS

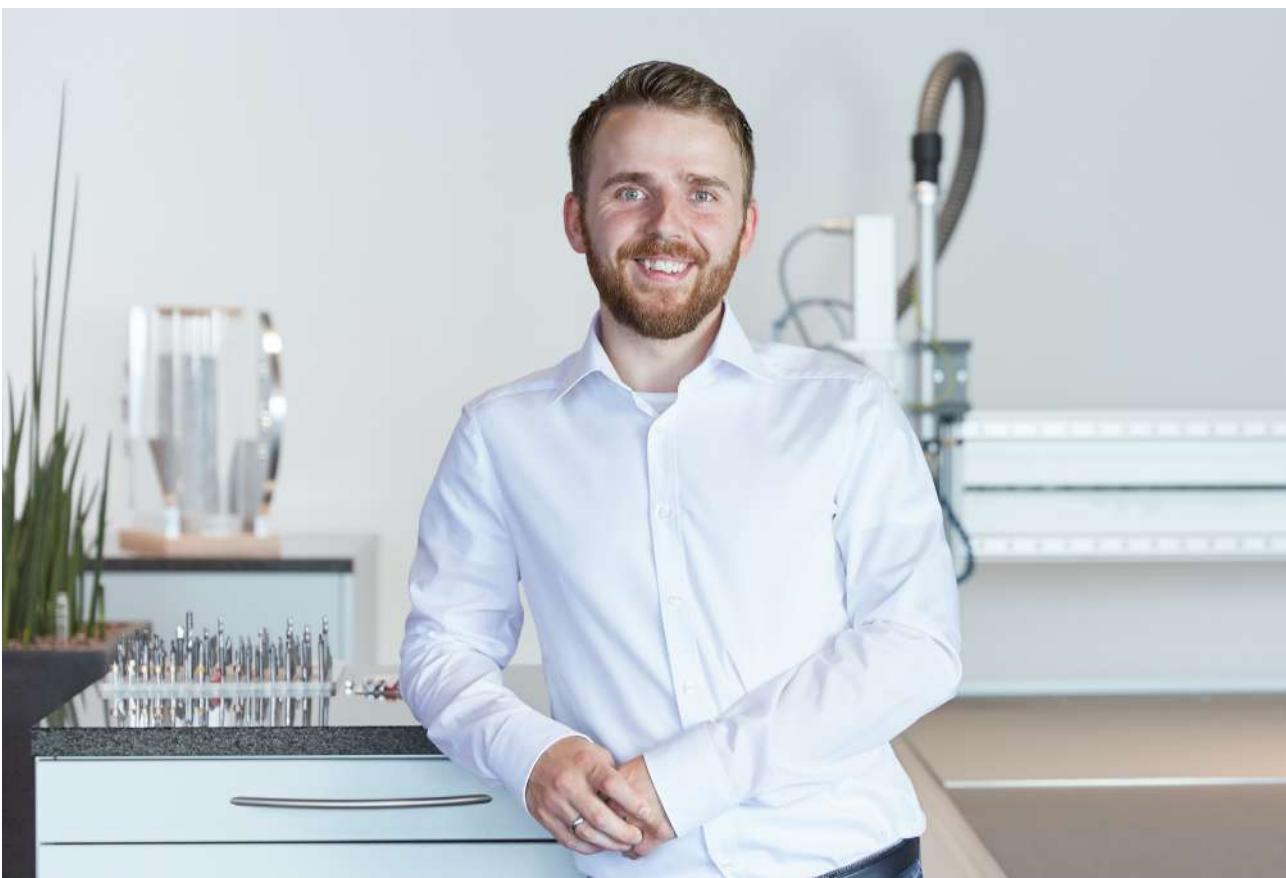
DRILLS

DIAMOND
TOOLS

LANCES
AND KNIVES

ACCESSORIES

EXPERT ADVICE



Can we support you?

We will be pleased to assist you with the tool selection as well as with the machining parameters of your vhf tools. Contact us and benefit from our broad experience.

Would you like a little more?

Do you have a great demand for a certain kind of tool? In this case, we can agree on annual purchase quantities of all tools from this catalog at an attractive price. Ask for an individual offer if you are interested in annual orders or single orders of large quantities.

Custom-made tools – tools for special tasks

Are you missing a certain geometry in our product range? We can produce several kinds of tools exactly according to your specifications. Just contact our tool sales department and we will check our possibilities in a timely manner.

Take advantage of personal advice from our milling tool specialists:

+49 7032 97097 430

tools@vhf.de



ORDER ONLINE WITH FREE DELIVERY

shop.vhf.de – fast and comfortable

You can navigate very quickly and purposefully through our extensive range of tools and accessories in the vhf shop at shop.vhf.de.



Free of shipping costs for Germany, the EU and Switzerland



More than 250,000 tools always on stock



Advanced search by machining type, material and tool geometry



Ordering with just a few clicks, e.g. by direct entry of article numbers



FAST DELIVERY

Ordered today, tomorrow in use.

If you place an order before noon you will usually receive the tools within the following periods:

- Germany: 24 hours
- EU: 48 to 72 hours | worldwide: 5 to 15 days

Of course, deliveries by express or courier service are possible at a surcharge.

You would like to order by phone, fax or e-mail?
Then place your order at:

- +49 7032 97097 400 (fax: 490)
- order@vhf.de

Please note that free delivery is only possible for orders placed at shop.vhf.de

TERMS OF DELIVERY

	Minimum-order value	Minimum quantity surcharge	Shipping costs <31kg ordering by phone/e-mail/fax	Shipping costs <31kg ordering online
Germany	€ 75	€ 10	5.80 €	free
EU	€ 200	€ 25	16.80 €	free
Switzerland	€ 250	€ 35	16.80 €	free
World	€ 300	€ 45	custom calculation, dep. on weight & country (at least € 44.80)	

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

TRADE FAIRS



MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

Milling tools in action

We exhibit our carbide and diamond tools each year at numerous trade fairs with a wide range of topics.

We would be pleased to welcome you to one of them, where you can see many tools live in action on our CNC milling machines. You can contact us for information on the current trade fair dates, or you can find them directly at vhf.de

Visit us and experience the vhf tools live in action on our milling machines at numerous trade fairs.



CARBIDE AND DIAMOND TOOLS



Due to its extraordinary features, tools made of carbide metal are far superior to those made of high speed steel (HSS) and you benefit from significantly higher cutting speeds and tool lifes. Carbide is a material consisting of various originally powdered hard materials that are

baked, i.e. sintered, under high pressure and at high temperatures to form a solid body. Our precision tools are ground from the rods created in this way. The composition of the carbide is always optimized for the application – just like our cutting edge geometries.



Diamond is even much harder than carbide. The carbide tools with diamond attachment which are offered by vhf have a multiple of the endurance. We use three sorts of diamonds: Monocrystalline diamonds (MCD) consist of pure carbon and are extremely resistant to wear. Although they have been produced synthetically, they have the same characteristics as natural diamonds and

are excellent for polishing acrylic glass to a high gloss. Depending on the type, polycrystalline diamonds (PCD) can be used for milling or polishing. CVD thick film plates are built up in thin layers by Chemical Vapor Deposition (CVD) and provide an extremely smooth and sharp cutting edge for highest surface qualities.

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

STRONG COATINGS: THE STRATUM SERIES FROM VHF

Carbide tools are often additionally hard-coated when used in machining. Our coatings, which are precisely matched to the respective material, offer you maximum

wear protection and you benefit from a significantly longer tool life.

STRATUM AS

Type	PVD coating
Material	TiB ₂
Coating thickness	2.0 µm ± 0.7
vhf tools	single tooth cutters with hawk beak, double tooth cutters for aluminium

- great hardness; excellent protection against wear
- prevents the formation of built-up edges
- reduces the friction at the cutting face and facilitates the chip flow
- especially designed for high performance milling of aluminium



STRATUM
AS

STRATUM IX



- extremely hard and smooth
- especially for machining stainless steel

STRATUM IX

Type	PVD coating
Material	TiAlN/TiSiN
Coating thickness	3.0 µm ± 1.0
vhf tools	triple tooth cutters for stainless steel

STRATUM HL

Type	PVD coating
Material	AlTiN
Coating thickness	3.0 µm ± 1.0
vhf tools	four tooth cutters Varius®

- excellent hardness
- almost free from internal stress
- for stainless steel, cast iron and materials which are difficult to machine
- especially for roughing



STRATUM
HL

STRATUM TN	
Type	PVD-Schicht
Material	TiAlN
Coating thickness	3.0 µm ± 1.0 (1.5 µm ± 0.5)
vhf tools	engraver's milling cutters and double tooth cutters for stainless steel; double, triple and four tooth cutters Varius®, deburring tools, thread whirling cutters

- all-round coating wide application field
- for roughing and finishing tasks

STRATUM
TNSTRATUM
DLC

- abrasion-resistant carbon layer
- for dry machining
- ideal for machining solid wood and laminates
- affordable alternative to diamond coating

STRATUM DLC

STRATUM MS	
Type	CVD coating
Material	diamond
Coating thickness	3.0 µm ± 1.0
vhf tools	single tooth cutters Varius®

- high-end multilayer coating
- smooth surfaces
- long tool life
- relatively thin – the cutting edges will nearly not be rounded off
- for non-ferrous metals and wood

STRATUM
MSSTRATUM
DIA

- multilayer coating
- best possible price/performance ratio
- optimized for almost all tasks in the field of printed circuit board production

STRATUM DIA

Type	CVD coating
Material	diamond
Coating thickness	9.0 µm ± 3.0
vhf tools	PCB outline cutters diamond-toothed and spiral-toothed

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES



MILLING
CUTTERS

ENGRAVING
TOOLS

DEBURRING
TOOLS

ROUTER
BITS

THREAD
CUTTERS

DRILLS

DIAMOND
TOOLS

LANCES
AND KNIVES

ACCESSORIES

SIGNS AND SYMBOLS

Characteristics

	cutting edge type: cylinder, conus, radius, chamfer, torus, quadrant		top angle 90°		milling direction/ cutting direction
	number of cutting edges/ X = staggered tooth system		lead angle of the spiral flute 30°		type of coating

Dimensioning

D1	cutting edge diameter/head diameter	L1	total length
D2	shank diameter	L2	cutting edge length/max. immersion depth
D3	engraving width/bottom width	L3	undercut/bisecting depth/distance side clamping area
α	top angle	L4	drill tip/radius concave
β	chamfering angle		

Material suitability

	PMMA PVC foams, PVC hard PP, PC, PE/PS foams		soft aluminium hard aluminium brass		construction steel stainless steel
	HPL aluminium composites GRP/CRP circuit boards		soft wood hard wood MDF/multiplex		

*** very well suitable | ** well suitable | * suitable

you find our new suggestion matrix on
tools and materials on the next page

MILLING
CUTTERSENGRAVING
TOOLSDEBURRING
TOOLSROUTER
BITSTHREAD
CUTTERS

DRILLS

DIAMOND
TOOLSLANCES
AND KNIVES

ACCESSORIES

MATERIALS

TOOLS

from
page

plastics

		PMMA	PVC foam	PVC hard	PP	PC	PE PS	foams
MILLING CUTTERS	Single tooth cutters Varius®	28	**	**	***	***	**	**
ENGRAVING TOOLS	Single tooth cutters Varius® – STRATUM DLC	30	*	*	*	*	*	*
DEBURRING TOOLS	Single tooth cutters Varius® – STRATUM MS	30						
ROUTER BITS	Single tooth cutters Varius® with left-hand twist	31	**	**	***	***	**	**
THREAD CUTTERS	Single tooth cutters with polished flute	32	***	***	**	**	***	***
DRILLS	Single tooth cutters, polished, with left-hand twist	35	***	***	**	**	***	***
DIAMOND TOOLS	Single tooth cutters with hawk beak profile	36	*	*	*	*	*	*
LANCES AND KNIVES	Single tooth cutters, hawk beak profile – STRATUM AS	38						
ACCESSORIES	Single tooth cutters with undercut	39	*	*	*	*	*	*
	Single tooth cutters with face radius	40	***	***	***	***	***	***
	V-slot cutters for aluminium composites	41						
	V-slot cutters for alumin. composites – STRATUM DLC	41						
	Double tooth cutters Varius®	44						
	Double tooth cutters with polished flute	46	***	***	***	***	***	***
	Double tooth cutters for stainless steel	47						
	Double tooth cutters with fishtail	48		*	*	*	*	*
	Double tooth cutters for aluminium – all types	50						
	Double tooth cutters for wood	52						
	Double tooth cutters with face radius	53	***	***	***	***	***	***
	Rub out cutters	54						
	Triple tooth cutters Varius®	58						
	Triple tooth cutters for foam	60						***
	Triple tooth cutters for stainless steel	61						
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	Isolation engraving tools	82						
	Engraver's milling cutters for stainless steel	83						
	Engraver's milling cutters for acrylic	84	***	***	***	***	***	***
	Deburring tools	90	*	*	*	*	*	*
	Deburring tools with quadrant	91	***	***	***	***	***	***
	V-slot cutters	94	**	**	**	**	**	**
	V-slot cutters for aluminium composites	95						
	Long hole slot cutters	96	**	**	**	**	**	**
	Slot cutters	97	**	**	**	**	**	**
	Chamfering cutters	98	**	**	**	**	**	**
	Cutters with quadrant	99	**	**	**	**	**	**
	Radius cutters	100	**	**	**	**	**	**
	Triple tooth surface milling cutters	101	***	***	***	***	***	**
	Thread whirling cutters	106	***	***	***	***	***	*
	Thread whirling cutters – STRATUM TN	107						
	Circular thread cutters	108	***	***	***	***	***	*
	Drills with 3 mm shank	112	***	***	***	***	***	***
	Drills with 6 mm shank	114	***	***	***	***	***	***
	PCD polishing cutters	118	***					
	MCD polishing cutters	119	***					
	PCD polishing gravers	120	***					
	MCD polishing gravers	121	***					
	PCD single tooth cutters	122		*	*	*		
	PCD double tooth cutters	123		*	*	*		
	CVD cutters	124		*	*	*		

*** very well suitable | ** well suitable | * suitable

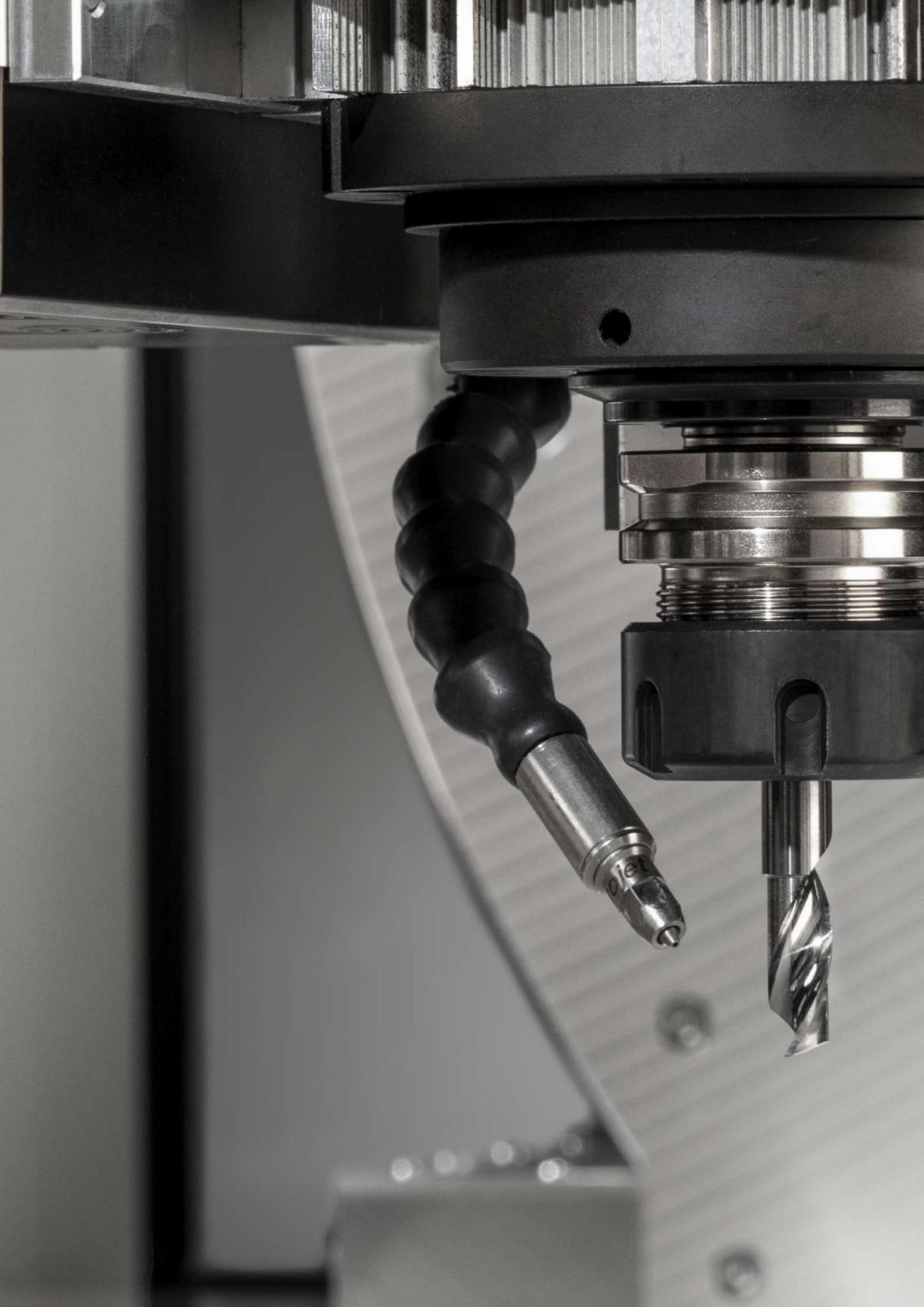
RECOMMENDATION MATRIX

non-ferrous metals			ferrous metals		composites				wood			MILLING CUTTERS
alumin. soft	alumin. hard	brass	constr. steel	stainless steel	HPL	alumin. compos.	GRP CRP	circuit boards	soft wood	hard wood	MDF multiplex	
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¹ Suitable for tool machines and machining centers that have lower speeds available at high torque.





A TRADEMARK TO WHICH YOU WILL REMAIN LOYAL:
THE SINGLE TOOTH CUTTER VARIUS® FROM VHF.

1



SINGLE TOOTH CUTTERS

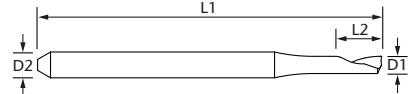
On the following pages you will find an impressive range of single tooth cutters – in about 300 different geometries! Especially for wood, plastics and non-ferrous metals; also with left-hand twist.

- **SINGLE TOOTH CUTTERS VARIUS®**
- **SINGLE TOOTH CUTTERS VARIUS® WITH LEFT-HAND TWIST**
- **SINGLE TOOTH CUTTERS WITH POLISHED FLUTE**
- **SINGLE TOOTH CUTTERS, POLISHED, WITH LEFT-HAND TWIST**
- **SINGLE TOOTH CUTTERS WITH HAWK BEAK PROFILE**
- **SINGLE TOOTH CUTTERS WITH UNDERCUT**
- **SINGLE TOOTH CUTTERS WITH FACE RADIUS**
- **V-SLOT CUTTERS FOR ALUMINIUM COMPOSITES**



SINGLE TOOTH CUTTERS VARIUS®

- universally applicable
- specialist for aluminium composites
- uncoated version very well suitable for plastics
- STRATUM DLC coating for increased tool life
- STRATUM MS coating for especially long tool life
- exclusive own brand



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
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uncoated tools

PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard	brass	HPL	alumin. compos.	soft wood	hard wood	MDF multiplex
**	**	***	***	**	**	**	*	**	**	***	***	***	***

ES-SC-0020-3-006-40	0.20	3	0.6	40	26.90	25.56	24.21	22.87	21.52
ES-SC-0050-3-015-40	0.50	3	1.5	40	22.80	21.66	20.52	19.38	18.24
ES-SC-0060-3-030-40	0.60	3	3.0	40	18.50	17.58	16.65	15.73	14.80
ES-SC-0070-3-040-40	0.70	3	4.0	40	18.70	17.77	16.83	15.90	14.96
ES-SC-0080-3-040-40	0.80	3	4.0	40	18.70	17.77	16.83	15.90	14.96

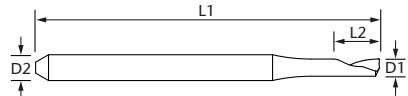
with edge chamfer 0.05 mm × 45°

ES-SC-0100-3-030-40	1.00	3	3.0	40	18.50	17.58	16.65	15.73	14.80
ES-SC-0100-3-050-40	1.00	3	5.0	40	18.70	17.77	16.83	15.90	14.96
ES-SC-0100-6-050-40	1.00	6	5.0	40	22.80	21.66	20.52	19.38	18.24
ES-SC-0150-3-050-40	1.50	3	5.0	40	18.70	17.77	16.83	15.90	14.96
ES-SC-0150-6-050-40	1.50	6	5.0	40	22.80	21.66	20.52	19.38	18.24
ES-SC-0180-3-070-40	1.80	3	7.0	40	18.70	17.77	16.83	15.90	14.96

SINGLE TOOTH CUTTERS

Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49	SINGLE TOOTH CUTTERS
uncoated tools										
with edge chamfer 0.05 mm × 45°										
ES-SC-0200-3-050-40	2.00	3	5.0	40	18.50	17.58	16.65	15.73	14.80	ENGRAVING TOOLS
ES-SC-0200-3-080-40	2.00	3	8.0	40	18.70	17.77	16.83	15.90	14.96	
ES-SC-0200-4-070-40	2.00	4	7.0	40	20.70	19.67	18.63	17.60	16.56	
ES-SC-0200-6-050-40	2.00	6	5.0	40	22.80	21.66	20.52	19.38	18.24	
ES-SC-0200-6-070-40	2.00	6	7.0	40	23.80	22.61	21.42	20.23	19.04	
ES-SC-0250-3-100-40	2.50	3	10.0	40	18.70	17.77	16.83	15.90	14.96	
ES-SC-0250-6-100-50	2.50	6	10.0	50	23.80	22.61	21.42	20.23	19.04	
ES-SC-0300-3-050-40	3.00	3	5.0	40	14.60	13.87	13.14	12.41	11.68	DEBURRING TOOLS
ES-SC-0300-3-100-40	3.00	3	10.0	40	15.60	14.82	14.04	13.26	12.48	
ES-SC-0300-3-120-40	3.00	3	12.0	40	16.60	15.77	14.94	14.11	13.28	
ES-SC-0300-4-100-40	3.00	4	10.0	40	20.70	19.67	18.63	17.60	16.56	
ES-SC-0300-6-050-40	3.00	6	5.0	40	21.70	20.62	19.53	18.45	17.36	
ES-SC-0300-6-080-50	3.00	6	8.0	50	22.80	21.66	20.52	19.38	18.24	
ES-SC-0300-6-100-50	3.00	6	10.0	50	23.80	22.61	21.42	20.23	19.04	
ES-SC-0300-6-120-50	3.00	6	12.0	50	24.80	23.56	22.32	21.08	19.84	
ES-SC-0350-6-140-50	3.50	6	14.0	50	24.80	23.56	22.32	21.08	19.84	
ES-SC-0400-4-060-40	4.00	4	6.0	40	17.60	16.72	15.84	14.96	14.08	ROUTER BITS
ES-SC-0400-4-100-40	4.00	4	10.0	40	18.60	17.67	16.74	15.81	14.88	
ES-SC-0400-4-140-50	4.00	4	14.0	50	19.70	18.72	17.73	16.75	15.76	
ES-SC-0400-4-220-60	4.00	4	22.0	60	21.70	20.62	19.53	18.45	17.36	
ES-SC-0400-6-060-40	4.00	6	6.0	40	22.80	21.66	20.52	19.38	18.24	
ES-SC-0400-6-120-50	4.00	6	12.0	50	23.80	22.61	21.42	20.23	19.04	
ES-SC-0400-6-180-60	4.00	6	18.0	60	24.90	23.66	22.41	21.17	19.92	
with edge chamfer 0.10 mm × 45°										
ES-SC-0500-5-120-50	5.00	5	12.0	50	20.60	19.57	18.54	17.51	16.48	DRILLS
ES-SC-0500-5-160-60	5.00	5	16.0	60	21.70	20.62	19.53	18.45	17.36	
ES-SC-0500-6-070-40	5.00	6	7.0	40	22.80	21.66	20.52	19.38	18.24	
ES-SC-0500-6-140-50	5.00	6	14.0	50	24.40	23.18	21.96	20.74	19.52	
ES-SC-0600-6-050-40	6.00	6	5.0	40	20.60	19.57	18.54	17.51	16.48	
ES-SC-0600-6-080-40	6.00	6	8.0	40	21.70	20.62	19.53	18.45	17.36	
ES-SC-0600-6-140-50	6.00	6	14.0	50	22.80	21.66	20.52	19.38	18.24	
ES-SC-0600-6-200-60	6.00	6	20.0	60	23.80	22.61	21.42	20.23	19.04	
ES-SC-0600-6-250-60	6.00	6	25.0	60	24.80	23.56	22.32	21.08	19.84	
ES-SC-0600-6-350-75	6.00	6	35.0	75	30.00	28.50	27.00	25.50	24.00	
ES-SC-0800-8-140-50	8.00	8	14.0	50	26.90	25.56	24.21	22.87	21.52	DIAMOND TOOLS
ES-SC-0800-8-200-60	8.00	8	20.0	60	29.90	28.41	26.91	25.42	23.92	
ES-SC-0800-8-250-75	8.00	8	25.0	75	34.10	32.40	30.69	28.99	27.28	
ES-SC-0800-8-350-85	8.00	8	35.0	85	42.40	40.28	38.16	36.04	33.92	
with edge chamfer 0.15 mm × 45°										
ES-SC-1000-10-140-50	10.00	10	14.0	50	39.30	37.34	35.37	33.41	31.44	LANCES AND KNIVES
ES-SC-1000-10-250-75	10.00	10	25.0	75	44.50	42.28	40.05	37.83	35.60	
ES-SC-1000-10-280-75	10.00	10	28.0	75	46.60	44.27	41.94	39.61	37.28	
ES-SC-1200-12-250-75	12.00	12	25.0	75	54.90	52.16	49.41	46.67	43.92	ACCESSORIES

continued on the next page ...

**CONTINUATION
SINGLE TOOTH CUTTERS VARIUS®**


Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
tools with STRATUM DLC coating									
PMMA	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard	brass	HPL	alumin. compos.
*	*	*	*	*	**	**	***	**	***
ES-SC-0100-3-030-40-DLC	1.00	3	3.0	40	25.80	24.51	23.22	21.93	20.64
ES-SC-0100-6-050-40-DLC	1.00	6	5.0	40	30.10	28.60	27.09	25.59	24.08
ES-SC-0150-3-050-40-DLC	1.50	3	5.0	40	26.00	24.70	23.40	22.10	20.80
ES-SC-0150-6-050-40-DLC	1.50	6	5.0	40	30.10	28.60	27.09	25.59	24.08
ES-SC-0200-6-050-40-DLC	2.00	6	5.0	40	29.80	28.31	26.82	25.33	23.84
ES-SC-0200-6-070-40-DLC	2.00	6	7.0	40	31.10	29.55	27.99	26.44	24.88
ES-SC-0300-3-100-40-DLC	3.00	3	10.0	40	22.90	21.76	20.61	19.47	18.32
ES-SC-0300-6-050-40-DLC	3.00	6	5.0	40	29.00	27.55	26.10	24.65	23.20
ES-SC-0300-6-080-50-DLC	3.00	6	8.0	50	30.10	28.60	27.09	25.59	24.08
ES-SC-0300-6-100-50-DLC	3.00	6	10.0	50	31.10	29.55	27.99	26.44	24.88
ES-SC-0300-6-120-50-DLC	3.00	6	12.0	50	32.10	30.50	28.89	27.29	25.68
ES-SC-0350-6-140-50-DLC	3.50	6	14.0	50	32.10	30.50	28.89	27.29	25.68
ES-SC-0400-4-140-50-DLC	4.00	4	14.0	50	27.00	25.65	24.30	22.95	21.60
ES-SC-0400-6-060-40-DLC	4.00	6	6.0	40	30.10	28.60	27.09	25.59	24.08
ES-SC-0400-6-120-50-DLC	4.00	6	12.0	50	31.10	29.55	27.99	26.44	24.88
ES-SC-0400-6-180-60-DLC	4.00	6	18.0	60	32.20	30.59	28.98	27.37	25.76
ES-SC-0500-5-160-60-DLC	5.00	5	16.0	60	29.00	27.55	26.10	24.65	23.20
ES-SC-0500-6-070-40-DLC	5.00	6	7.0	40	30.10	28.60	27.09	25.59	24.08
ES-SC-0500-6-140-50-DLC	5.00	6	14.0	50	31.70	30.12	28.53	26.95	25.36
ES-SC-0600-6-050-40-DLC	6.00	6	5.0	40	27.90	26.51	25.11	23.72	22.32
ES-SC-0600-6-080-40-DLC	6.00	6	8.0	40	29.00	27.55	26.10	24.65	23.20
ES-SC-0600-6-140-50-DLC	6.00	6	14.0	50	30.10	28.60	27.09	25.59	24.08
ES-SC-0600-6-200-60-DLC	6.00	6	20.0	60	31.10	29.55	27.99	26.44	24.88
ES-SC-0600-6-250-60-DLC	6.00	6	25.0	60	32.10	30.50	28.89	27.29	25.68
ES-SC-0800-8-140-50-DLC	8.00	8	14.0	50	36.20	34.39	32.58	30.77	28.96
ES-SC-0800-8-200-60-DLC	8.00	8	20.0	60	39.20	37.24	35.28	33.32	31.36
ES-SC-0800-8-250-75-DLC	8.00	8	25.0	75	43.40	41.23	39.06	36.89	34.72
ES-SC-1000-10-250-75-DLC	10.00	10	25.0	75	53.80	51.11	48.42	45.73	43.04

all tools with edge chamfer: 0.05 mm × 45° for D1 ≥ 1.00 mm | 0.10 mm × 45° for D1 ≥ 5.00 mm | 0.15 mm × 45° for D1 ≥ 10.00 mm

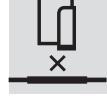
tools with STRATUM MS coating*

alumin. soft	alumin. hard	brass	HPL	alumin. compos.	soft wood	hard wood	MDF multiplex					
**	**	***	**	***	***	***	***					
ES-SC-0300-3-100-40-MS	3.00	3	10.0	40	31.10	29.55	27.99	26.44	24.88			
ES-SC-0400-4-140-50-MS	4.00	4	14.0	50	42.40	40.28	38.16	36.04	33.92			
ES-SC-0600-6-140-50-MS	6.00	6	14.0	50	52.80	50.16	47.52	44.88	42.24			
ES-SC-0800-8-220-60-MS	8.00	8	22.0	60	74.50	70.78	67.05	63.33	59.60			

all tools with edge chamfer: 0.05 mm × 45° for D1 ≥ 3.00 mm | 0.10 mm × 45° for D1 ≥ 6.00 mm

*** Info:**

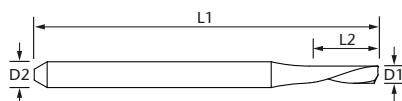
Since the diamond layer is electrically insulating, calibration with measuring systems that require electrical contact is not possible.





SINGLE TOOTH CUTTERS VARIUS® WITH LEFT-HAND TWIST

- the left-hand twist presses the chips downwards; the tool is right-cutting like all vh tools
- ideal for working on thin materials or such which tend to fray easily
- especially for milling works on a vacuum table with low holding force
- particularly suitable for aluminium, wood, thermosetting plastics and thermoplastics



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49				
PMMA **	PVC foam **	PVC hard ***	PP ***	PC **	PE PS **	alumin. soft **	brass *	HPL **	alumin. compos. ***	soft wood ***	hard wood **	MDF multiplex ***	
with edge chamfer 0.05 mm × 45°													
ES-SC-LD-0100-3-050-40	1.00	3	5.0	40	19.90	18.91	17.91	16.92	15.92				
ES-SC-LD-0150-3-050-40	1.50	3	5.0	40	19.70	18.72	17.73	16.75	15.76				
ES-SC-LD-0200-3-080-40	2.00	3	8.0	40	19.70	18.72	17.73	16.75	15.76				
ES-SC-LD-0300-3-100-40	3.00	3	10.0	40	19.50	18.53	17.55	16.58	15.60				
ES-SC-LD-0300-6-100-50	3.00	6	10.0	50	25.00	23.75	22.50	21.25	20.00				
ES-SC-LD-0400-4-120-50	4.00	4	12.0	50	21.70	20.62	19.53	18.45	17.36				
ES-SC-LD-0400-6-120-50	4.00	6	12.0	50	25.00	23.75	22.50	21.25	20.00				
with edge chamfer 0.10 mm × 45°													
ES-SC-LD-0500-5-160-60	5.00	5	16.0	60	24.70	23.47	22.23	21.00	19.76				
ES-SC-LD-0600-6-140-50	6.00	6	14.0	50	24.70	23.47	22.23	21.00	19.76				
ES-SC-LD-0600-6-220-60	6.00	6	22.0	60	25.90	24.61	23.31	22.02	20.72				
ES-SC-LD-0800-8-220-75	8.00	8	22.0	75	36.00	34.20	32.40	30.60	28.80				

SINGLE TOOTH CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

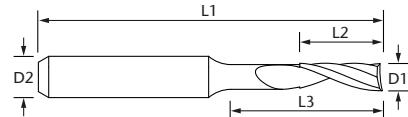
ACCESSORIES

SINGLE TOOTH CUTTERS
ENGRAVING TOOLS
DEBURRING TOOLS
ROUTER BITS
THREAD CUTTERS
DRILLS
DIAMOND TOOLS
LANCES AND KNIVES
ACCESSORIES



SINGLE TOOTH CUTTERS WITH POLISHED FLUTE

- mirror finished polished flute
- very good chip clearance
- extremely sharp
- available with undercut
- especially for acrylic glass and other thermoplastics



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
PMMA ***	PVC foam ***	PVC hard **	PP **	PC ***	PE PS ***	alumin. soft *	alumin. compos. *	soft wood *	MDF multiplex *	
ES-PS-0100-3-040-40	1.00	3	4.0			40	24.80	23.56	22.32	21.08
ES-PS-0100-6-050-50	1.00	6	5.0			50	28.10	26.70	25.29	23.89
ES-PS-0150-3-060-40	1.50	3	6.0			40	24.80	23.56	22.32	21.08
ES-PS-0200-2-080-30	2.00	2	8.0			30	20.10	19.10	18.09	17.09
ES-PS-0200-3-050-40	2.00	3	5.0			40	24.80	23.56	22.32	21.08
ES-PS-0200-3-080-30	2.00	3	8.0			30	24.80	23.56	22.32	21.08
ES-PS-0200-3-080-40	2.00	3	8.0			40	25.10	23.85	22.59	21.34
ES-PS-0200-3-090-40	2.00	3	9.0			40	25.10	23.85	22.59	21.34
ES-PS-0200-3-110-40	2.00	3	11.0			40	25.20	23.94	22.68	21.42
ES-PS-0200-6-050-50	2.00	6	5.0			50	27.90	26.51	25.11	23.72
ES-PS-0200-6-080-50	2.00	6	8.0			50	29.10	27.65	26.19	24.74
ES-PS-0250-3-100-40	2.50	3	10.0			40	25.10	23.85	22.59	21.34

SINGLE TOOTH CUTTERS

Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49	SINGLE TOOTH CUTTERS
ES-PS-0300-3-080-40	3.00	3	8.0		40	18.60	17.67	16.74	15.81	14.88	ENGRAVING TOOLS
ES-PS-0300-3-100-30	3.00	3	10.0		30	19.30	18.34	17.37	16.41	15.44	
ES-PS-0300-3-120-40	3.00	3	12.0		40	20.70	19.67	18.63	17.60	16.56	
ES-PS-0300-3-120-60	3.00	3	12.0		60	21.70	20.62	19.53	18.45	17.36	
ES-PS-0300-3-160-50	3.00	3	16.0		50	22.80	21.66	20.52	19.38	18.24	
ES-PS-0300-3-220-60	3.00	3	22.0		60	23.80	22.61	21.42	20.23	19.04	
ES-PS-0300-4-120-50	3.00	4	12.0		50	25.10	23.85	22.59	21.34	20.08	
ES-PS-0300-6-080-50	3.00	6	8.0		50	28.10	26.70	25.29	23.89	22.48	
ES-PS-0300-6-100-50	3.00	6	10.0		50	29.10	27.65	26.19	24.74	23.28	
ES-PS-0300-6-120-50	3.00	6	12.0		50	30.10	28.60	27.09	25.59	24.08	
ES-PS-0300-6-160-50	3.00	6	16.0		50	32.10	30.50	28.89	27.29	25.68	
ES-PS-0300-6-220-60	3.00	6	22.0		60	33.10	31.45	29.79	28.14	26.48	
ES-PS-0400-4-080-40	4.00	4	8.0		40	19.70	18.72	17.73	16.75	15.76	
ES-PS-0400-4-120-50	4.00	4	12.0		50	21.70	20.62	19.53	18.45	17.36	
ES-PS-0400-4-160-50	4.00	4	16.0		50	23.80	22.61	21.42	20.23	19.04	
ES-PS-0400-4-220-60	4.00	4	22.0		60	25.90	24.61	23.31	22.02	20.72	
ES-PS-0400-4-320-70	4.00	4	32.0		70	27.90	26.51	25.11	23.72	22.32	
ES-PS-0400-6-060-50	4.00	6	6.0		50	27.10	25.75	24.39	23.04	21.68	
ES-PS-0400-6-080-50	4.00	6	8.0		50	28.10	26.70	25.29	23.89	22.48	
ES-PS-0400-6-100-50	4.00	6	10.0		50	29.10	27.65	26.19	24.74	23.28	
ES-PS-0400-6-120-50	4.00	6	12.0		50	30.10	28.60	27.09	25.59	24.08	
ES-PS-0400-6-160-50	4.00	6	16.0		50	32.10	30.50	28.89	27.29	25.68	
ES-PS-0400-6-220-60	4.00	6	22.0		60	33.10	31.45	29.79	28.14	26.48	
ES-PS-0500-5-120-50	5.00	5	12.0		50	22.80	21.66	20.52	19.38	18.24	
ES-PS-0500-5-160-60	5.00	5	16.0		60	24.80	23.56	22.32	21.08	19.84	
ES-PS-0500-5-320-70	5.00	5	32.0		70	31.10	29.55	27.99	26.44	24.88	
ES-PS-0500-6-140-50	5.00	6	14.0		50	29.10	27.65	26.19	24.74	23.28	
ES-PS-0500-6-220-60	5.00	6	22.0		60	33.10	31.45	29.79	28.14	26.48	
ES-PS-0600-6-100-50	6.00	6	10.0		50	23.80	22.61	21.42	20.23	19.04	
ES-PS-0600-6-140-50	6.00	6	14.0		50	25.90	24.61	23.31	22.02	20.72	
ES-PS-0600-6-220-60	6.00	6	22.0		60	27.90	26.51	25.11	23.72	22.32	
ES-PS-0600-6-320-70	6.00	6	32.0		70	34.20	32.49	30.78	29.07	27.36	
ES-PS-0600-6-420-80	6.00	6	42.0		80	39.30	37.34	35.37	33.41	31.44	
ES-PS-0800-8-140-50	8.00	8	14.0		50	37.30	35.44	33.57	31.71	29.84	
ES-PS-0800-8-220-60	8.00	8	22.0		60	42.40	40.28	38.16	36.04	33.92	
ES-PS-0800-8-320-70	8.00	8	32.0		70	47.60	45.22	42.84	40.46	38.08	
ES-PS-0800-8-420-80	8.00	8	42.0		80	52.80	50.16	47.52	44.88	42.24	
ES-PS-1000-10-140-60	10.00	10	14.0		60	44.50	42.28	40.05	37.83	35.60	
ES-PS-1000-10-220-70	10.00	10	22.0		70	49.70	47.22	44.73	42.25	39.76	
ES-PS-1000-10-320-75	10.00	10	32.0		75	54.90	52.16	49.41	46.67	43.92	
ES-PS-1200-12-220-70	12.00	12	22.0		70	61.10	58.05	54.99	51.94	48.88	
ES-PS-1200-12-320-100	12.00	12	32.0		100	66.20	62.89	59.58	56.27	52.96	
ES-PS-1200-12-420-100	12.00	12	42.0		100	82.80	78.66	74.52	70.38	66.24	

continued on the next page ...

Practical tip:

If the tool has finished its lifetime and is no longer sharp enough for milling acrylic glass, you can still use it for machining aluminium composite plates or similar materials.

SINGLE TOOTH CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

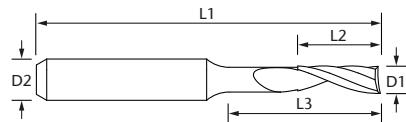
ROUTER BITS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

CONTINUATION
SINGLE TOOTH CUTTERS WITH POLISHED FLUTE


Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	alumin. compos.	soft wood	MDF multiplex	
tools with undercut										
ES-PS-0100-6-050-0120-50	1.00	6	5.0	12.0	50	30.30	28.79	27.27	25.76	24.24
ES-PS-0200-6-080-0160-50	2.00	6	8.0	16.0	50	30.10	28.60	27.09	25.59	24.08
ES-PS-0300-6-100-0220-50	3.00	6	10.0	22.0	50	30.10	28.60	27.09	25.59	24.08
ES-PS-0400-6-120-0220-50	4.00	6	12.0	22.0	50	29.90	28.41	26.91	25.42	23.92
ES-PS-0500-6-140-0220-50	5.00	6	14.0	22.0	50	29.90	28.41	26.91	25.42	23.92
ES-PS-0600-6-140-0220-50	6.00	6	14.0	22.0	50	26.90	25.56	24.21	22.87	21.52
ES-PS-0600-6-420-0650-100	6.00	6	42.0	65.0	100	52.80	50.16	47.52	44.88	42.24
ES-PS-0800-8-140-0220-50	8.00	8	14.0	22.0	50	38.30	36.39	34.47	32.56	30.64
ES-PS-0800-8-220-0420-75	8.00	8	22.0	42.0	75	45.50	43.23	40.95	38.68	36.40
ES-PS-1000-10-140-0220-60	10.00	10	14.0	22.0	60	45.50	43.23	40.95	38.68	36.40
ES-PS-1000-10-220-0320-70	10.00	10	22.0	32.0	70	50.70	48.17	45.63	43.10	40.56
ES-PS-1000-10-220-0420-75	10.00	10	22.0	42.0	75	52.80	50.16	47.52	44.88	42.24

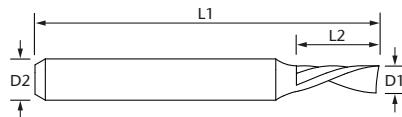
Practical tip:

If the tool has finished its lifetime and is no longer sharp enough for milling acrylic glass, you can still use it for machining aluminium composite plates or similar materials.



SINGLE TOOTH CUTTERS, POLISHED, WITH LEFT-HAND TWIST

- mirror finished polished flute
- very sharp cutting edge
- especially for milling works on a vacuum table with low holding force
- against fraying of the material
- especially suitable for acrylic glass and other thermoplastics, particularly with thin material thickness



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
PMMA ***	PVC foam ***	PVC hard **	PP **	PC ***	PE PS ***	alumin. soft *	soft wood *		
ES-PS-LD-0100-3-040-40	1.00	3	4.0	40	26.10	24.80	23.49	22.19	20.88
ES-PS-LD-0150-3-060-40	1.50	3	6.0	40	26.10	24.80	23.49	22.19	20.88
ES-PS-LD-0200-3-080-40	2.00	3	8.0	40	26.10	24.80	23.49	22.19	20.88
ES-PS-LD-0300-3-100-30	3.00	3	10.0	30	20.70	19.67	18.63	17.60	16.56
ES-PS-LD-0300-3-120-40	3.00	3	12.0	40	21.70	20.62	19.53	18.45	17.36
ES-PS-LD-0300-6-120-50	3.00	6	12.0	50	32.10	30.50	28.89	27.29	25.68
ES-PS-LD-0400-4-120-50	4.00	4	12.0	50	22.80	21.66	20.52	19.38	18.24
ES-PS-LD-0400-4-220-60	4.00	4	22.0	60	26.90	25.56	24.21	22.87	21.52
ES-PS-LD-0400-6-120-50	4.00	6	12.0	50	32.10	30.50	28.89	27.29	25.68
ES-PS-LD-0500-5-160-60	5.00	5	16.0	60	25.90	24.61	23.31	22.02	20.72
ES-PS-LD-0600-6-220-60	6.00	6	22.0	60	29.00	27.55	26.10	24.65	23.20
ES-PS-LD-0800-8-220-60	8.00	8	22.0	60	43.50	41.33	39.15	36.98	34.80
ES-PS-LD-0800-8-320-70	8.00	8	32.0	70	48.60	46.17	43.74	41.31	38.88
ES-PS-LD-1000-10-300-100	10.00	10	30.0	100	56.90	54.06	51.21	48.37	45.52

SINGLE TOOTH CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

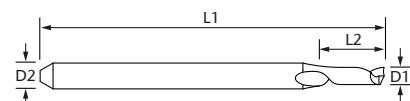
LANCES AND KNIVES

ACCESSORIES



SINGLE TOOTH CUTTERS WITH HAWK BEAK PROFILE

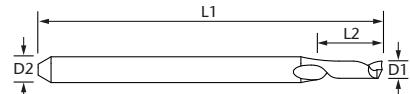
- low risk of clogging due to very sharp, exposed cutting edge with large flute
- special milling cutter for aluminium and other non-ferrous metals
- the hawk beak at the tip facilitates straight immersion
- the high-performance coating STRATUM AS increases the tool life and prevents the caking of aluminium chips



	Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
uncoated tools										
	PMMA	*	PVC foam	*	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard
						*	*	*	***	**
									brass	
									alumin. compos.	
									soft wood	*
with edge chamfer 0.05 mm x 45°										
	ES-HB-0100-3-030-40	1.00	3	3.0	40	19.50	18.53	17.55	16.58	15.60
	ES-HB-0100-3-050-40	1.00	3	5.0	40	19.70	18.72	17.73	16.75	15.76
	ES-HB-0100-6-050-40	1.00	6	5.0	40	23.90	22.71	21.51	20.32	19.12
	ES-HB-0150-3-050-40	1.50	3	5.0	40	19.70	18.72	17.73	16.75	15.76
	ES-HB-0200-3-050-40	2.00	3	5.0	40	19.50	18.53	17.55	16.58	15.60
	ES-HB-0200-3-060-40	2.00	3	6.0	40	19.50	18.53	17.55	16.58	15.60
	ES-HB-0200-3-080-40	2.00	3	8.0	40	19.90	18.91	17.91	16.92	15.92
	ES-HB-0200-4-070-40	2.00	4	7.0	40	21.70	20.62	19.53	18.45	17.36
	ES-HB-0200-6-050-40	2.00	6	5.0	40	23.70	22.52	21.33	20.15	18.96
	ES-HB-0200-6-070-40	2.00	6	7.0	40	24.80	23.56	22.32	21.08	19.84
	ES-HB-0250-3-100-40	2.50	3	10.0	40	19.90	18.91	17.91	16.92	15.92

SINGLE TOOTH CUTTERS

Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49	SINGLE TOOTH CUTTERS	
										ENGRAVING TOOLS	
										DEBURRING TOOLS	
uncoated tools											
with edge chamfer 0.05 mm × 45°											
ES-HB-0300-3-060-40	3.00	3	6.0	40	15.50	14.73	13.95	13.18	12.40	ROUTER BITS	
ES-HB-0300-3-100-40	3.00	3	10.0	40	16.60	15.77	14.94	14.11	13.28		
ES-HB-0300-3-120-40	3.00	3	12.0	40	17.60	16.72	15.84	14.96	14.08		
ES-HB-0300-4-100-40	3.00	4	10.0	40	21.70	20.62	19.53	18.45	17.36		
ES-HB-0300-6-050-40	3.00	6	5.0	40	22.80	21.66	20.52	19.38	18.24		
ES-HB-0300-6-080-50	3.00	6	8.0	50	23.80	22.61	21.42	20.23	19.04		
ES-HB-0300-6-100-50	3.00	6	10.0	50	24.80	23.56	22.32	21.08	19.84		
ES-HB-0300-6-120-50	3.00	6	12.0	50	25.90	24.61	23.31	22.02	20.72		
ES-HB-0400-4-060-40	4.00	4	6.0	40	18.40	17.48	16.56	15.64	14.72		
ES-HB-0400-4-100-40	4.00	4	10.0	40	19.50	18.53	17.55	16.58	15.60		
ES-HB-0400-4-140-50	4.00	4	14.0	50	20.60	19.57	18.54	17.51	16.48		
ES-HB-0400-4-220-60	4.00	4	22.0	60	22.80	21.66	20.52	19.38	18.24		
ES-HB-0400-6-060-40	4.00	6	6.0	40	23.80	22.61	21.42	20.23	19.04		
ES-HB-0400-6-120-50	4.00	6	12.0	50	24.80	23.56	22.32	21.08	19.84		
ES-HB-0400-6-180-60	4.00	6	18.0	60	26.00	24.70	23.40	22.10	20.80		
with edge chamfer 0.10 mm × 45°											
ES-HB-0500-5-160-60	5.00	5	16.0	60	22.80	21.66	20.52	19.38	18.24	THREAD CUTTERS	
ES-HB-0500-6-070-40	5.00	6	7.0	40	23.80	22.61	21.42	20.23	19.04		
ES-HB-0500-6-140-50	5.00	6	14.0	50	24.80	23.56	22.32	21.08	19.84		
ES-HB-0600-6-060-40	6.00	6	6.0	40	21.70	20.62	19.53	18.45	17.36		
ES-HB-0600-6-090-40	6.00	6	9.0	40	23.70	22.52	21.33	20.15	18.96		
ES-HB-0600-6-110-50	6.00	6	11.0	50	24.80	23.56	22.32	21.08	19.84		
ES-HB-0600-6-140-50	6.00	6	14.0	50	23.90	22.71	21.51	20.32	19.12		
ES-HB-0600-6-160-50	6.00	6	16.0	50	24.10	22.90	21.69	20.49	19.28		
ES-HB-0600-6-200-60	6.00	6	20.0	60	24.80	23.56	22.32	21.08	19.84		
ES-HB-0600-6-210-60	6.00	6	21.0	60	25.00	23.75	22.50	21.25	20.00		
ES-HB-0600-6-250-60	6.00	6	25.0	60	25.50	24.23	22.95	21.68	20.40		
ES-HB-0800-8-060-40	8.00	8	6.0	40	26.90	25.56	24.21	22.87	21.52		
ES-HB-0800-8-140-50	8.00	8	14.0	50	29.00	27.55	26.10	24.65	23.20		
ES-HB-0800-8-200-60	8.00	8	20.0	60	31.10	29.55	27.99	26.44	24.88		
ES-HB-0800-8-250-75	8.00	8	25.0	75	34.20	32.49	30.78	29.07	27.36		
ES-HB-0800-8-350-85	8.00	8	35.0	85	44.50	42.28	40.05	37.83	35.60		
with edge chamfer 0.15 mm × 45°											
ES-HB-1000-10-140-50	10.00	10	14.0	50	41.40	39.33	37.26	35.19	33.12	DIAMOND TOOLS	
ES-HB-1000-10-250-75	10.00	10	25.0	75	46.60	44.27	41.94	39.61	37.28		
ES-HB-1200-12-250-75	12.00	12	25.0	75	58.00	55.10	52.20	49.30	46.40		
continued on the next page ...											

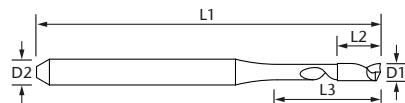
CONTINUATION
SINGLE TOOTH CUTTERS WITH HAWK BEAK PROFILE


	Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
tools with STRATUM AS coating										
		alumin. soft	alumin. hard	brass	alumin. compos.					
with edge chamfer 0.05 mm × 45°										
DEBURRING TOOLS	ES-HB-0200-3-060-40-AS	2.00	3	6.0	40	24.70	23.47	22.23	21.00	19.76
	ES-HB-0200-3-080-40-AS	2.00	3	8.0	40	25.10	23.85	22.59	21.34	20.08
	ES-HB-0200-6-050-40-AS	2.00	6	5.0	40	28.90	27.46	26.01	24.57	23.12
	ES-HB-0200-6-070-40-AS	2.00	6	7.0	40	30.00	28.50	27.00	25.50	24.00
	ES-HB-0300-3-060-40-AS	3.00	3	6.0	40	20.70	19.67	18.63	17.60	16.56
	ES-HB-0300-3-100-40-AS	3.00	3	10.0	40	21.80	20.71	19.62	18.53	17.44
	ES-HB-0300-6-050-40-AS	3.00	6	5.0	40	28.00	26.60	25.20	23.80	22.40
	ES-HB-0300-6-080-50-AS	3.00	6	8.0	50	29.00	27.55	26.10	24.65	23.20
	ES-HB-0300-6-100-50-AS	3.00	6	10.0	50	30.00	28.50	27.00	25.50	24.00
	ES-HB-0300-6-120-50-AS	3.00	6	12.0	50	31.10	29.55	27.99	26.44	24.88
	ES-HB-0400-4-060-40-AS	4.00	4	6.0	40	23.60	22.42	21.24	20.06	18.88
	ES-HB-0400-4-140-50-AS	4.00	4	14.0	50	25.80	24.51	23.22	21.93	20.64
	ES-HB-0400-4-220-60-AS	4.00	4	22.0	60	28.00	26.60	25.20	23.80	22.40
	ES-HB-0400-6-060-40-AS	4.00	6	6.0	40	29.00	27.55	26.10	24.65	23.20
	ES-HB-0400-6-120-50-AS	4.00	6	12.0	50	30.00	28.50	27.00	25.50	24.00
	ES-HB-0400-6-180-60-AS	4.00	6	18.0	60	31.20	29.64	28.08	26.52	24.96
with edge chamfer 0.10 mm × 45°										
ROUTER BITS	ES-HB-0500-6-070-40-AS	5.00	6	7.0	40	29.00	27.55	26.10	24.65	23.20
	ES-HB-0500-6-140-50-AS	5.00	6	14.0	50	30.00	28.50	27.00	25.50	24.00
	ES-HB-0600-6-060-40-AS	6.00	6	6.0	40	26.90	25.56	24.21	22.87	21.52
	ES-HB-0600-6-090-40-AS	6.00	6	9.0	40	28.90	27.46	26.01	24.57	23.12
	ES-HB-0600-6-110-50-AS	6.00	6	11.0	50	30.00	28.50	27.00	25.50	24.00
	ES-HB-0600-6-140-50-AS	6.00	6	14.0	50	29.10	27.65	26.19	24.74	23.28
	ES-HB-0600-6-200-60-AS	6.00	6	20.0	60	30.00	28.50	27.00	25.50	24.00
	ES-HB-0600-6-210-60-AS	6.00	6	21.0	60	30.20	28.69	27.18	25.67	24.16
	ES-HB-0600-6-250-60-AS	6.00	6	25.0	60	30.70	29.17	27.63	26.10	24.56
	ES-HB-0800-8-060-40-AS	8.00	8	6.0	40	36.20	34.39	32.58	30.77	28.96
DIAMOND TOOLS	ES-HB-0800-8-140-50-AS	8.00	8	14.0	50	38.30	36.39	34.47	32.56	30.64
	ES-HB-0800-8-200-60-AS	8.00	8	20.0	60	40.40	38.38	36.36	34.34	32.32
	ES-HB-0800-8-250-75-AS	8.00	8	25.0	75	43.40	41.23	39.06	36.89	34.72
	with edge chamfer 0.15 mm × 45°									
LANCES AND KNIVES	ES-HB-1000-10-250-75-AS	10.00	10	25.0	75	55.90	53.11	50.31	47.52	44.72



SINGLE TOOTH CUTTERS WITH UNDERCUT

- easy immersion due to hawk beak profile
- great stability due to short spiralization of the cutting edge
- for milling very deep slots
- especially for aluminium, also in the form of profile material



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard	brass	soft wood	MDF multiplex
*	*	*	*	*	*	***	**	**	*	*
ES-HB-FS-0100-3-050-0100-40	1.00	3	5.0	10.0	40	21.80	20.71	19.62	18.53	17.44
ES-HB-FS-0150-3-050-0100-40	1.50	3	5.0	10.0	40	21.60	20.52	19.44	18.36	17.28
ES-HB-FS-0200-3-050-0120-40	2.00	3	5.0	12.0	40	21.60	20.52	19.44	18.36	17.28
ES-HB-FS-0200-6-050-0120-50	2.00	6	5.0	12.0	50	25.90	24.61	23.31	22.02	20.72
ES-HB-FS-0300-3-050-0220-50	3.00	3	5.0	22.0	50	21.60	20.52	19.44	18.36	17.28
ES-HB-FS-0300-6-050-0220-50	3.00	6	5.0	22.0	50	25.90	24.61	23.31	22.02	20.72
ES-HB-FS-0400-4-080-0220-50	4.00	4	8.0	22.0	50	21.80	20.71	19.62	18.53	17.44
ES-HB-FS-0400-4-080-0320-60	4.00	4	8.0	32.0	60	23.80	22.61	21.42	20.23	19.04
ES-HB-FS-0400-6-080-0220-50	4.00	6	8.0	22.0	50	25.90	24.61	23.31	22.02	20.72
ES-HB-FS-0500-6-140-0220-50	5.00	6	14.0	22.0	50	26.10	24.80	23.49	22.19	20.88
ES-HB-FS-0500-6-140-0320-60	5.00	6	14.0	32.0	60	26.90	25.56	24.21	22.87	21.52
ES-HB-FS-0600-6-140-0220-50	6.00	6	14.0	22.0	50	25.80	24.51	23.22	21.93	20.64
ES-HB-FS-0600-6-140-0320-60	6.00	6	14.0	32.0	60	26.70	25.37	24.03	22.70	21.36
ES-HB-FS-0600-6-140-0420-70	6.00	6	14.0	42.0	70	27.90	26.51	25.11	23.72	22.32
ES-HB-FS-0800-8-140-0420-75	8.00	8	14.0	42.0	75	36.00	34.20	32.40	30.60	28.80
ES-HB-FS-0800-8-140-0520-85	8.00	8	14.0	52.0	85	38.10	36.20	34.29	32.39	30.48
ES-HB-FS-0800-8-220-0620-100	8.00	8	22.0	62.0	100	40.20	38.19	36.18	34.17	32.16
ES-HB-FS-1000-10-250-0420-75	10.00	10	25.0	42.0	75	50.70	48.17	45.63	43.10	40.56

all tools with edge chamfer: 0.05 mm × 45° for $D1 \geq 1.00$ mm | 0.10 mm × 45° for $D1 \geq 5.00$ mm | 0.15 mm × 45° for $D1 \geq 10.00$ mm

SINGLE TOOTH CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

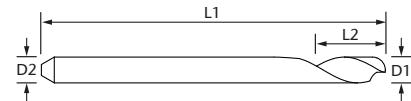
LANCES AND KNIVES

ACCESSORIES



SINGLE TOOTH CUTTERS WITH FACE RADIUS

- especially for model and mold making as well as 3D machining
- good chip clearance due to radial relief grinding and its large flute
- especially suitable for aluminum, thermosetting plastics and thermoplastics as well as wood



	Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2–4	-10 % 5–9	-15 % 10–19	-20 % 20–49	
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	brass	HPL	soft wood	hard wood	MDF multiplex
***	***	***	***	***	***	***	*	**	***	**	***
ES-SCR-0100-3-050-40	1.00	3	5.0	40	22.80	21.66	20.52	19.38	18.24		
ES-SCR-0100-6-050-40	1.00	6	5.0	40	26.90	25.56	24.21	22.87	21.52		
ES-SCR-0200-3-080-40	2.00	3	8.0	40	22.80	21.66	20.52	19.38	18.24		
ES-SCR-0200-6-070-40	2.00	6	7.0	40	26.90	25.56	24.21	22.87	21.52		
ES-SCR-0300-3-100-40	3.00	3	10.0	40	22.80	21.66	20.52	19.38	18.24		
ES-SCR-0300-6-100-50	3.00	6	10.0	50	26.90	25.56	24.21	22.87	21.52		
ES-SCR-0400-4-120-50	4.00	4	12.0	50	24.80	23.56	22.32	21.08	19.84		
ES-SCR-0400-6-120-50	4.00	6	12.0	50	26.90	25.56	24.21	22.87	21.52		
ES-SCR-0500-6-140-50	5.00	6	14.0	50	26.90	25.56	24.21	22.87	21.52		
ES-SCR-0600-6-140-50	6.00	6	14.0	50	26.90	25.56	24.21	22.87	21.52		
ES-SCR-0800-8-200-60	8.00	8	20.0	60	39.30	37.34	35.37	33.41	31.44		
ES-SCR-1000-10-220-75	10.00	10	22.0	75	51.80	49.21	46.62	44.03	41.44		



SINGLE TOOTH CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

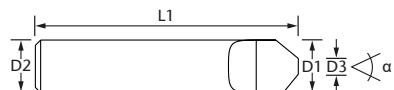
DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

V-SLOT CUTTERS FOR ALUMINIUM COMPOSITES

- extra balanced, so it runs very smoothly
- for rectangular bendings in materials of up to 4 mm thickness
- high feed rates possible
- with STRATUM DLC coating for increased tool life and for harder types of aluminium
- refurbishing available (uncoated tools)



Article no.	α	D1 (mm)	D3 (mm)	D2 (mm)	L1 (mm)	Price in €	-5 % 2–4	-10 % 5–9	-15 % 10–19	-20 % 20–49
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uncoated tools

alumin. soft	brass	alumin. compos.	*	*	***					
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ES-AV-090-1000-180-6-50	90°	10.00	1.80	6	50	63.10	59.95	56.79	53.64	50.48
ES-AV-090-1000-180-10-50	90°	10.00	1.80	10	50	51.80	49.21	46.62	44.03	41.44
ES-AV-090-1000-300-6-50	90°	10.00	3.00	6	50	63.10	59.95	56.79	53.64	50.48
ES-AV-090-1000-300-10-50	90°	10.00	3.00	10	50	51.80	49.21	46.62	44.03	41.44

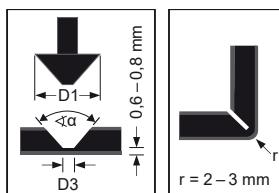
tools with STRATUM DLC coating

alumin. soft	alumin. hard	brass	alumin. compos.	*	**	***				
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ES-AV-090-1000-300-6-50-DLC	90°	10.00	3.00	6	50	74.10	70.40	66.69	62.99	59.28
ES-AV-090-1000-300-10-50-DLC	90°	10.00	3.00	10	50	62.80	59.66	56.52	53.38	50.24

Practical tip:

The bottom width (D3) of this tool is 1.8 or 3 mm. It determines the later bending radius (r). Please note that there has to remain a rest of 0.6 to 0.8 mm of the plate which must not be milled.



2



DOUBLE TOOTH CUTTERS

More than 120 tools for materials of medium hardness. You will also find very special grindings for certain materials among them.

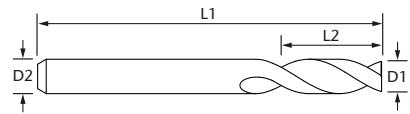
- **DOUBLE TOOTH CUTTERS VARIUS®**
- **DOUBLE TOOTH CUTTERS WITH POLISHED FLUTE**
- **DOUBLE TOOTH CUTTERS FOR STAINLESS STEEL**
- **DOUBLE TOOTH CUTTERS WITH FISHTAIL**
- **DOUBLE TOOTH CUTTERS FOR ALUMINIUM**
- **DOUBLE TOOTH CUTTERS FOR WOOD**
- **DOUBLE TOOTH CUTTERS WITH FACE RADIUS**
- **RUB OUT CUTTERS**



DOUBLE TOOTH CUTTERS VARIUS®

- exclusive own brand
- universally applicable
- with edge chamfer from 5 mm cutting edge diameter
- STRATUM TN coating

- for different sorts of aluminium, brass, construction or cementation steel
- cooling lubricant required for machining construction or cementation steel



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2–4	-10% 5–9	-15% 10–19	-20% 20–49
alumin. soft ***	alumin. hard ***	brass ***	constr. steel ***	HPL *	alumin. compos. *	soft wood *	hard wood *	MDF multiplex *	
tools with STRATUM TN coating									
ZS-SC-0020-3-006-40-TN	0.20	3	0.6	40	26.90	25.56	24.21	22.87	21.52
ZS-SC-0050-3-015-40-TN	0.50	3	1.5	40	22.80	21.66	20.52	19.38	18.24
ZS-SC-0100-3-030-40-TN	1.00	3	3.0	40	18.80	17.86	16.92	15.98	15.04
ZS-SC-0150-3-045-40-TN	1.50	3	4.5	40	18.80	17.86	16.92	15.98	15.04
ZS-SC-0200-3-060-40-TN	2.00	3	6.0	40	18.80	17.86	16.92	15.98	15.04
ZS-SC-0200-3-090-40-TN	2.00	3	9.0	40	18.80	17.86	16.92	15.98	15.04
ZS-SC-0200-6-070-50-TN	2.00	6	7.0	50	23.00	21.85	20.70	19.55	18.40
ZS-SC-0250-3-050-40-TN	2.50	3	5.0	40	18.60	17.67	16.74	15.81	14.88
ZS-SC-0300-3-090-40-TN	3.00	3	9.0	40	18.70	17.77	16.83	15.90	14.96
ZS-SC-0300-3-120-40-TN	3.00	3	12.0	40	18.90	17.96	17.01	16.07	15.12
ZS-SC-0300-6-070-50-TN	3.00	6	7.0	50	22.80	21.66	20.52	19.38	18.24
ZS-SC-0400-4-120-50-TN	4.00	4	12.0	50	18.60	17.67	16.74	15.81	14.88
ZS-SC-0400-6-080-50-TN	4.00	6	8.0	50	22.80	21.66	20.52	19.38	18.24

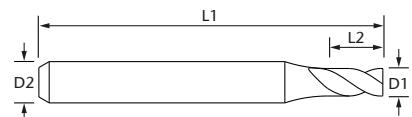
DOUBLE TOOTH CUTTERS

Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49	DOUBLE TOOTH CUTTERS
tools with STRATUM TN coating, edge chamfer 0.20 mm × 45°										
ZS-SC-0500-6-150-50-TN	5.00	6	15.0	50	23.80	22.61	21.42	20.23	19.04	ENGRAVING TOOLS
ZS-SC-0600-6-120-50-TN	6.00	6	12.0	50	22.80	21.66	20.52	19.38	18.24	DEBURRING TOOLS
ZS-SC-0600-6-180-60-TN	6.00	6	18.0	60	23.80	22.61	21.42	20.23	19.04	ROUTER BITS
ZS-SC-0800-8-120-50-TN	8.00	8	12.0	50	26.90	25.56	24.21	22.87	21.52	THREAD CUTTERS
ZS-SC-0800-8-220-60-TN	8.00	8	22.0	60	31.10	29.55	27.99	26.44	24.88	DRILLS
ZS-SC-1000-10-120-50-TN	10.00	10	12.0	50	39.30	37.34	35.37	33.41	31.44	DIAMOND TOOLS
ZS-SC-1000-10-220-75-TN	10.00	10	22.0	75	44.50	42.28	40.05	37.83	35.60	LANCES AND KNIVES
ZS-SC-1000-10-280-75-TN	10.00	10	28.0	75	46.60	44.27	41.94	39.61	37.28	ACCESSORIES



DOUBLE TOOTH CUTTERS WITH POLISHED FLUTE

- extremely sharp cutting edges with a high-end finishing
- runs very smoothly due to its two cutting edges
- radial relief grinding
- for acrylic glass and other thermoplastics

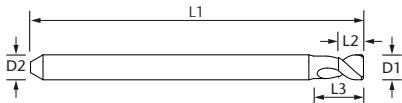


Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
PMMA ***	PVC foam ***	PVC hard ***	PP ***	PC ***	PE PS ***	alumin. soft *	soft wood *	MDF multiplex *	
with edge chamfer 0.15 mm × 45°									
ZS-PS-0300-6-120-50	3.00	6	12.0	50	39.40	37.43	35.46	33.49	31.52
ZS-PS-0400-6-120-50	4.00	6	12.0	50	39.10	37.15	35.19	33.24	31.28
ZS-PS-0600-6-140-50	6.00	6	14.0	50	35.20	33.44	31.68	29.92	28.16
ZS-PS-0600-6-220-60	6.00	6	22.0	60	39.30	37.34	35.37	33.41	31.44
with edge chamfer 0.25 mm × 45°									
ZS-PS-0800-8-220-60	8.00	8	22.0	60	42.40	40.28	38.16	36.04	33.92



DOUBLE TOOTH CUTTERS FOR STAINLESS STEEL

- increased wear resistance due to its edge radius
- short cutting edge facilitates a high stiffness
- undercut for machining deeper slots
- for steel and stainless steel
- STRATUM TN coating
- cooling with an appropriate cooling lubricant necessary



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
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constr. steel	stainless steel
**	***

tools with STRATUM TN coating

with edge radius 0.10 mm

ZS-ED-0090-3-009-0018-40-TN	0.90	3	0.9	1.8	40	19.70	18.72	17.73	16.75	15.76
ZS-ED-0100-3-010-0020-40-TN	1.00	3	1.0	2.0	40	19.70	18.72	17.73	16.75	15.76
ZS-ED-0150-3-015-0030-40-TN	1.50	3	1.5	3.0	40	19.70	18.72	17.73	16.75	15.76

with edge radius 0.20 mm

ZS-ED-0200-3-020-0040-40-TN	2.00	3	2.0	4.0	40	19.70	18.72	17.73	16.75	15.76
ZS-ED-0250-3-025-0050-40-TN	2.50	3	2.5	5.0	40	19.70	18.72	17.73	16.75	15.76

with edge radius 0.25 mm

ZS-ED-0300-3-030-0060-40-TN	3.00	3	3.0	6.0	40	19.70	18.72	17.73	16.75	15.76
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DOUBLE TOOTH CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

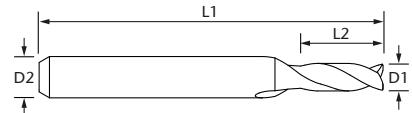
LANCES AND KNIVES

ACCESSORIES



DOUBLE TOOTH CUTTERS WITH FISHTAIL

- easy immersion due to fishtail grinding
- four area grinding for plane-milling surfaces (from 4 mm shank diameter)
- versatile use
- 3 mm shanks equipped with stop ring; distance from tool tip to back of ring: 21 mm
- for non-ferrous metals, plastics, wood and composites



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
PVC foam *	PVC hard *	PP *	PC *	PE PS *	alumin. soft *	alumin. hard *	brass *	HPL **	GRP CRP **
tools with stop rings									
ZS-FS-0030-3-015-38	0.30	3	1.5	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0040-3-020-38	0.40	3	2.0	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0050-3-030-38	0.50	3	3.0	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0060-3-030-38	0.60	3	3.0	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0080-3-050-38	0.80	3	5.0	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0100-3-050-38	1.00	3	5.0	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0120-3-050-38	1.20	3	5.0	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0140-3-060-38	1.40	3	6.0	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0150-3-060-38	1.50	3	6.0	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0160-3-060-38	1.60	3	6.0	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0200-3-090-38	2.00	3	9.0	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0240-3-100-38	2.40	3	10.0	38	9.80	9.31	8.82	8.33	7.84
ZS-FS-0300-3-120-38	3.00	3	12.0	38	9.80	9.31	8.82	8.33	7.84

Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49	DOUBLE TOOTH CUTTERS
tools with four area grinding										
ZS-FS-0300-6-120-50	3.00	6	12.0	50	18.60	17.67	16.74	15.81	14.88	ENGRAVING TOOLS
ZS-FS-0400-4-120-50	4.00	4	12.0	50	15.50	14.73	13.95	13.18	12.40	DEBURRING TOOLS
ZS-FS-0400-4-220-60	4.00	4	22.0	60	18.60	17.67	16.74	15.81	14.88	ROUTER BITS
ZS-FS-0400-6-120-50	4.00	6	12.0	50	18.60	17.67	16.74	15.81	14.88	THREAD CUTTERS
ZS-FS-0400-6-220-60	4.00	6	22.0	60	21.70	20.62	19.53	18.45	17.36	DRILLS
ZS-FS-0500-6-120-50	5.00	6	12.0	50	18.60	17.67	16.74	15.81	14.88	DIAMOND TOOLS
ZS-FS-0600-6-120-50	6.00	6	12.0	50	18.60	17.67	16.74	15.81	14.88	LANCES AND KNIVES
ZS-FS-0600-6-220-60	6.00	6	22.0	60	21.70	20.62	19.53	18.45	17.36	ACCESORIES
ZS-FS-0600-6-320-70	6.00	6	32.0	70	24.80	23.56	22.32	21.08	19.84	
ZS-FS-0800-8-220-60	8.00	8	22.0	60	25.90	24.61	23.31	22.02	20.72	
ZS-FS-0800-8-320-75	8.00	8	32.0	75	30.00	28.50	27.00	25.50	24.00	

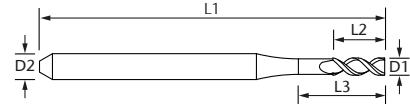
Practical tip:

When you are machining abrasive materials and they should be milled through completely, please take care that the fishtail grinding will fully immerse into the run-out material (vacuum fleece etc.), as it is most susceptible to wear.



DOUBLE TOOTH CUTTERS FOR ALUMINIUM

- flatter spiralization for especially smooth edges of cut
- especially for harder aluminium and other non-ferrous metals
- some types available with undercut
- ideal for trimming
- the high-performance coating STRATUM AS increases the tool life and prevents the caking of aluminium chips



	Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
	alumin. soft	alumin. hard	brass								
uncoated tools											
	ZS-AL-0100-3-030-40	1.00	3	3.0		40	17.60	16.72	15.84	14.96	14.08
	ZS-AL-0150-3-045-40	1.50	3	4.5		40	17.60	16.72	15.84	14.96	14.08
	ZS-AL-0200-3-060-40	2.00	3	6.0		40	17.60	16.72	15.84	14.96	14.08
	ZS-AL-0200-6-060-50	2.00	6	6.0		50	21.70	20.62	19.53	18.45	17.36
	ZS-AL-0250-3-075-40	2.50	3	7.5		40	17.60	16.72	15.84	14.96	14.08
	ZS-AL-0300-3-090-40	3.00	3	9.0		40	17.60	16.72	15.84	14.96	14.08
	ZS-AL-0300-6-090-50	3.00	6	9.0		50	21.70	20.62	19.53	18.45	17.36
	ZS-AL-0400-4-120-50	4.00	4	12.0		50	17.60	16.72	15.84	14.96	14.08
	ZS-AL-0400-6-120-50	4.00	6	12.0		50	21.70	20.62	19.53	18.45	17.36
	ZS-AL-0500-6-150-50	5.00	6	15.0		50	21.70	20.62	19.53	18.45	17.36
	ZS-AL-0600-6-120-50	6.00	6	12.0		50	21.70	20.62	19.53	18.45	17.36
	ZS-AL-0600-6-180-60	6.00	6	18.0		60	23.80	22.61	21.42	20.23	19.04
	ZS-AL-0800-8-140-50	8.00	8	14.0		50	27.90	26.51	25.11	23.72	22.32
	ZS-AL-0800-8-250-75	8.00	8	25.0		75	33.10	31.45	29.79	28.14	26.48

Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49	DOUBLE TOOTH CUTTERS
uncoated tools with undercut											
ZS-AL-0100-3-030-0050-40	1.00	3	3.0	5.0	40	19.70	18.72	17.73	16.75	15.76	ENGRAVING TOOLS
ZS-AL-0150-3-045-0075-40	1.50	3	4.5	7.5	40	19.70	18.72	17.73	16.75	15.76	DEBURNING TOOLS
ZS-AL-0200-3-060-0100-40	2.00	3	6.0	10.0	40	19.70	18.72	17.73	16.75	15.76	ROUTER BITS
ZS-AL-0250-3-075-0125-40	2.50	3	7.5	12.5	40	19.70	18.72	17.73	16.75	15.76	THREAD CUTTERS
tools with STRATUM AS coating											
ZS-AL-0100-3-030-40-AS	1.00	3	3.0		40	22.80	21.66	20.52	19.38	18.24	DRILLS
ZS-AL-0200-6-060-50-AS	2.00	6	6.0		50	26.90	25.56	24.21	22.87	21.52	DIAMOND TOOLS
ZS-AL-0300-3-090-40-AS	3.00	3	9.0		40	22.80	21.66	20.52	19.38	18.24	LANCES AND KNIVES
ZS-AL-0300-6-090-50-AS	3.00	6	9.0		50	26.90	25.56	24.21	22.87	21.52	ACCESORIES
ZS-AL-0400-4-120-50-AS	4.00	4	12.0		50	22.80	21.66	20.52	19.38	18.24	
ZS-AL-0400-6-120-50-AS	4.00	6	12.0		50	26.90	25.56	24.21	22.87	21.52	
ZS-AL-0500-6-150-50-AS	5.00	6	15.0		50	26.90	25.56	24.21	22.87	21.52	
ZS-AL-0600-6-120-50-AS	6.00	6	12.0		50	26.90	25.56	24.21	22.87	21.52	
ZS-AL-0600-6-180-60-AS	6.00	6	18.0		60	29.00	27.55	26.10	24.65	23.20	
ZS-AL-0800-8-140-50-AS	8.00	8	14.0		50	37.20	35.34	33.48	31.62	29.76	
ZS-AL-0800-8-250-75-AS	8.00	8	25.0		75	42.40	40.28	38.16	36.04	33.92	

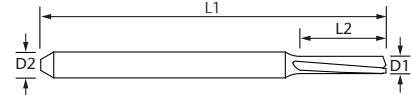
Info:

Suitable for tool machines and machining centers that have lower speeds available at high torque.



DOUBLE TOOTH CUTTERS FOR WOOD

- nearly straightly slotted
- ideal for wood and all sorts of laminates
- low drag forces prevent fraying
- STRATUM DLC coating

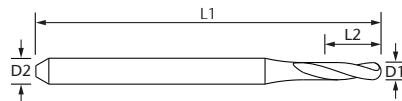


Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
HPL ***	soft wood ***	hard wood ***	MDF multiplex ***						
tools with STRATUM DLC coating									
ZS-WO-0200-3-100-40-DLC	2.00	3	10.0	40	23.80	22.61	21.42	20.23	19.04
ZS-WO-0300-3-120-40-DLC	3.00	3	12.0	40	23.80	22.61	21.42	20.23	19.04
ZS-WO-0300-6-120-50-DLC	3.00	6	12.0	50	28.30	26.89	25.47	24.06	22.64
ZS-WO-0400-4-120-50-DLC	4.00	4	12.0	50	23.80	22.61	21.42	20.23	19.04
ZS-WO-0400-4-220-60-DLC	4.00	4	22.0	60	27.90	26.51	25.11	23.72	22.32
ZS-WO-0400-6-120-50-DLC	4.00	6	12.0	50	28.10	26.70	25.29	23.89	22.48
ZS-WO-0500-6-120-50-DLC	5.00	6	12.0	50	27.90	26.51	25.11	23.72	22.32
ZS-WO-0600-6-120-50-DLC	6.00	6	12.0	50	27.70	26.32	24.93	23.55	22.16
ZS-WO-0600-6-220-60-DLC	6.00	6	22.0	60	32.10	30.50	28.89	27.29	25.68
ZS-WO-0600-6-320-70-DLC	6.00	6	32.0	70	37.30	35.44	33.57	31.71	29.84
ZS-WO-0800-8-220-60-DLC	8.00	8	22.0	60	41.40	39.33	37.26	35.19	33.12
ZS-WO-0800-8-320-75-DLC	8.00	8	32.0	75	43.50	41.33	39.15	36.98	34.80
ZS-WO-0800-8-420-85-DLC	8.00	8	42.0	85	48.60	46.17	43.74	41.31	38.88
ZS-WO-1000-10-220-70-DLC	10.00	10	22.0	70	50.70	48.17	45.63	43.10	40.56
ZS-WO-1000-10-320-75-DLC	10.00	10	32.0	75	53.80	51.11	48.42	45.73	43.04



DOUBLE TOOTH CUTTERS WITH FACE RADIUS

- semi-circular rounded tip
- especially for model, tool and mold making as well as 3D machining
- for aluminium and other non-ferrous metals, wood as well as thermosetting plastics and thermoplastics



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49				
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard	brass	HPL	soft wood	hard wood	MDF multiplex	
***	***	***	***	***	***	***	***	***	***	***	***	***	
ZS-SCR-0100-3-050-40	1.00	3	5.0	40	19.70	18.72	17.73	16.75	15.76				
ZS-SCR-0150-3-060-40	1.50	3	6.0	40	19.70	18.72	17.73	16.75	15.76				
ZS-SCR-0200-3-090-40	2.00	3	9.0	40	19.70	18.72	17.73	16.75	15.76				
ZS-SCR-0250-3-100-40	2.50	3	10.0	40	19.70	18.72	17.73	16.75	15.76				
ZS-SCR-0300-3-120-40	3.00	3	12.0	40	19.30	18.34	17.37	16.41	15.44				
ZS-SCR-0300-3-250-60	3.00	3	25.0	60	24.80	23.56	22.32	21.08	19.84				
ZS-SCR-0400-4-120-50	4.00	4	12.0	50	19.90	18.91	17.91	16.92	15.92				
ZS-SCR-0400-4-250-60	4.00	4	25.0	60	24.80	23.56	22.32	21.08	19.84				
ZS-SCR-0600-6-160-50	6.00	6	16.0	50	26.90	25.56	24.21	22.87	21.52				
ZS-SCR-0600-6-300-70	6.00	6	30.0	70	38.30	36.39	34.47	32.56	30.64				
ZS-SCR-0800-8-200-60	8.00	8	20.0	60	38.30	36.39	34.47	32.56	30.64				
ZS-SCR-0800-8-350-75	8.00	8	35.0	75	48.60	46.17	43.74	41.31	38.88				
ZS-SCR-1000-10-220-75	10.00	10	22.0	75	54.90	52.16	49.41	46.67	43.92				
ZS-SCR-1000-10-450-100	10.00	10	45.0	100	66.20	62.89	59.58	56.27	52.96				
ZS-SCR-1200-12-220-75	12.00	12	22.0	75	76.60	72.77	68.94	65.11	61.28				
ZS-SCR-1200-12-450-100	12.00	12	45.0	100	88.00	83.60	79.20	74.80	70.40				

DOUBLE TOOTH CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

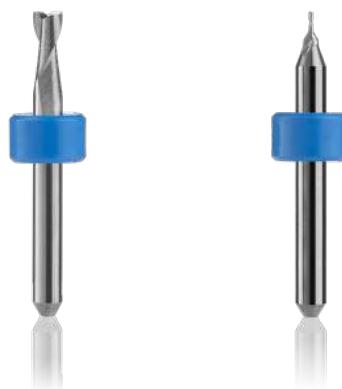
DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

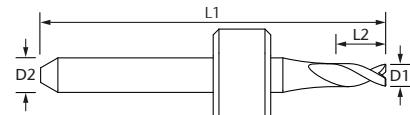
ACCESSORIES

DOUBLE TOOTH CUTTERS
ENCRAVING TOOLS
DEBURRING TOOLS
ROUTER BITS
THREAD CUTTERS
DRILLS
DIAMOND TOOLS
LANCES AND KNIVES
ACCESSORIES



RUB OUT CUTTERS

- greater stability due to shortened cutting edge
- very easy immersion due to fishtail grinding
- especially for rub out areas of printed circuit boards
- four area grinding enables very plane surfaces
- equipped with stop ring; distance from tool tip to back of ring: 15 mm



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
alumin. soft	alumin. hard	brass	circuit boards						
*	*	*	***						
RO-0050-3-015-30	0.50	3	1.5	30	10.40	9.88	9.36	8.84	8.32
RO-0100-3-025-30	1.00	3	2.5	30	10.40	9.88	9.36	8.84	8.32
RO-0200-3-045-30	2.00	3	4.5	30	10.40	9.88	9.36	8.84	8.32
RO-0300-3-065-30	3.00	3	6.5	30	10.40	9.88	9.36	8.84	8.32

DOUBLE TOOTH CUTTERS

DOUBLE TOOTH CUTTERS	ENGRAVING TOOLS	DEBURNING TOOLS	ROUTER BITS	THREAD CUTTERS	DRILLS	DIAMOND TOOLS	LANCES AND KNIVES	ACCESSORIES
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3



MULTI-TOOTH CUTTERS

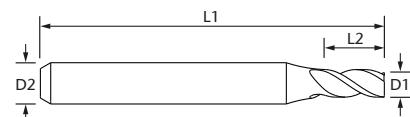
In addition to universally applicable triple and four tooth cutters, we offer an extra-long triple tooth cutter for foams and a triple tooth cutter for stainless steel with an especially short cutting edge for particularly effective machining.

- **TRIPLE TOOTH CUTTERS VARIUS®**
- **TRIPLE TOOTH CUTTERS FOR FOAM**
- **TRIPLE TOOTH CUTTERS FOR STAINLESS STEEL**
- **FOUR TOOTH CUTTERS VARIUS®**



TRIPLE TOOTH CUTTERS VARIUS®

- exclusive own brand
- especially suitable for milling tool steel
- with edge chamfer (from 5 mm cutting edge diameter)
- center-cutting
- STRATUM TN coating
- cooling with an appropriate cooling lubricant necessary



	Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
DIAMOND TOOLS	alumin. hard	*	brass	constr. steel	stainless steel					
tools with STRATUM TN coating										
LANCES AND KNIVES	DS-SC-0100-3-030-40-TN	1.00	3	3.0	40	19.70	18.72	17.73	16.75	15.76
	DS-SC-0150-3-045-40-TN	1.50	3	4.5	40	19.70	18.72	17.73	16.75	15.76
	DS-SC-0200-3-060-40-TN	2.00	3	6.0	40	19.70	18.72	17.73	16.75	15.76
	DS-SC-0200-3-090-40-TN	2.00	3	9.0	40	19.70	18.72	17.73	16.75	15.76
	DS-SC-0200-6-070-50-TN	2.00	6	7.0	50	23.80	22.61	21.42	20.23	19.04
	DS-SC-0300-3-090-40-TN	3.00	3	9.0	40	19.70	18.72	17.73	16.75	15.76
	DS-SC-0300-3-120-40-TN	3.00	3	12.0	40	19.70	18.72	17.73	16.75	15.76
	DS-SC-0300-6-070-50-TN	3.00	6	7.0	50	23.80	22.61	21.42	20.23	19.04
ACCESSORIES	DS-SC-0400-4-120-50-TN	4.00	4	12.0	50	19.70	18.72	17.73	16.75	15.76
	DS-SC-0400-6-080-50-TN	4.00	6	8.0	50	23.80	22.61	21.42	20.23	19.04

Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
tools with STRATUM TN coating, edge chamfer 0.20 mm × 45°									
DS-SC-0500-6-100-50-TN	5.00	6	10.0	50	23.80	22.61	21.42	20.23	19.04
DS-SC-0500-6-150-50-TN	5.00	6	15.0	50	24.80	23.56	22.32	21.08	19.84
DS-SC-0600-6-120-50-TN	6.00	6	12.0	50	23.80	22.61	21.42	20.23	19.04
DS-SC-0600-6-180-60-TN	6.00	6	18.0	60	24.80	23.56	22.32	21.08	19.84
DS-SC-0800-8-120-50-TN	8.00	8	12.0	50	27.90	26.51	25.11	23.72	22.32
DS-SC-0800-8-220-60-TN	8.00	8	22.0	60	32.10	30.50	28.89	27.29	25.68
DS-SC-1000-10-120-50-TN	10.00	10	12.0	50	40.40	38.38	36.36	34.34	32.32
DS-SC-1000-10-220-75-TN	10.00	10	22.0	75	45.50	43.23	40.95	38.68	36.40
DS-SC-1200-12-220-75-TN	12.00	12	22.0	75	55.90	53.11	50.31	47.52	44.72

MULTI-TOOTH CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

Info:

Suitable for tool machines and machining centers that have lower speeds available at high torque.

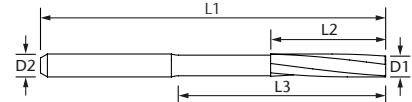


TRIPLE TOOTH CUTTERS FOR FOAM

- especially steep spiralization for an efficient clearance of chip-pings
- optimized against fraying of the vertical edges
- ideal for suitcases insertions

Practical tip:

- set a fill overlapping of at least 25 % for your milling works
- clean the cutting edge with an acetone-based cleaner or in an ultrasonic bath

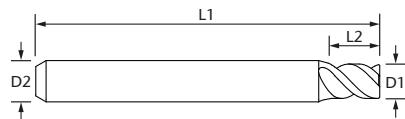


Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
foams										
tools with edge chamfer 0.10 mm × 45°										
DS-FO-0300-3-120-0200-50	3.00	3	12.0	20.0	50	25.90	24.61	23.31	22.02	20.72
DS-FO-0300-3-200-0450-75	3.00	3	20.0	45.0	75	31.10	29.55	27.99	26.44	24.88
DS-FO-0400-4-300-0450-75	4.00	4	30.0	45.0	75	42.40	40.28	38.16	36.04	33.92
DS-FO-0500-5-250-0450-75	5.00	5	25.0	45.0	75	42.40	40.28	38.16	36.04	33.92
DS-FO-0600-6-250-0450-75	6.00	6	25.0	45.0	75	47.60	45.22	42.84	40.46	38.08
DS-FO-0600-6-400-0700-100	6.00	6	40.0	70.0	100	59.00	56.05	53.10	50.15	47.20
DS-FO-0800-8-250-0450-75	8.00	8	25.0	45.0	75	64.20	60.99	57.78	54.57	51.36
DS-FO-0800-8-400-0700-100	8.00	8	40.0	70.0	100	69.30	65.84	62.37	58.91	55.44
DS-FO-0800-8-400-1150-150	8.00	8	40.0	115.0	150	74.50	70.78	67.05	63.33	59.60
DS-FO-1000-10-400-0700-100	10.00	10	40.0	70.0	100	88.00	83.60	79.20	74.80	70.40
DS-FO-1000-10-500-0850-120	10.00	10	50.0	85.0	120	98.30	93.39	88.47	83.56	78.64
DS-FO-1000-10-500-1150-150	10.00	10	50.0	115.0	150	109.70	104.22	98.73	93.25	87.76
DS-FO-1200-12-500-0850-125	12.00	12	50.0	85.0	125	145.90	138.61	131.31	124.02	116.72
DS-FO-1200-12-500-1150-150	12.00	12	50.0	115.0	150	151.10	143.55	135.99	128.44	120.88



TRIPLE TOOTH CUTTERS FOR STAINLESS STEEL

- very short cutting edge for greater stability
- for milling of steel and stainless steel
- with STRATUM IX coating
- especially flat spiralization reduces the abrasive force on the workpiece
- cooling with an appropriate cooling lubricant necessary



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
constr. steel **	stainless steel ***								

tools with STRATUM IX coating

with edge chamfer 0.075 mm × 45°

DS-ED-0100-4-020-50-IX	1.00	4	2.0	50	36.20	34.39	32.58	30.77	28.96
DS-ED-0150-4-030-50-IX	1.50	4	3.0	50	36.20	34.39	32.58	30.77	28.96
DS-ED-0200-4-030-50-IX	2.00	4	3.0	50	36.00	34.20	32.40	30.60	28.80

with edge chamfer 0.10 mm × 45°

DS-ED-0250-4-030-50-IX	2.50	4	3.0	50	35.80	34.01	32.22	30.43	28.64
DS-ED-0300-6-045-57-IX	3.00	6	4.5	57	38.30	36.39	34.47	32.56	30.64

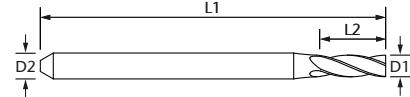
with edge chamfer 0.15 mm × 45°

DS-ED-0400-6-060-57-IX	4.00	6	6.0	57	38.30	36.39	34.47	32.56	30.64
DS-ED-0500-6-070-57-IX	5.00	6	7.0	57	38.30	36.39	34.47	32.56	30.64
DS-ED-0600-8-080-63-IX	6.00	8	8.0	63	42.40	40.28	38.16	36.04	33.92



FOUR TOOTH CUTTERS VARIUS®

- exclusive own brand
- center-cutting
- for tempered steel, cast, etc.
- with STRATUM TN coating for increased tool life
- the STRATUM HL coating is especially suitable for very hard types of steel
- cooling with an appropriate cooling lubricant necessary



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
constr. steel	stainless steel	***	*						
tools with STRATUM TN coating									
VS-SC-0050-3-015-40-TN	0.50	3	1.5	40	23.80	22.61	21.42	20.23	19.04
VS-SC-0100-3-030-40-TN	1.00	3	3.0	40	19.70	18.72	17.73	16.75	15.76
VS-SC-0150-3-045-40-TN	1.50	3	4.5	40	19.70	18.72	17.73	16.75	15.76
VS-SC-0200-3-060-40-TN	2.00	3	6.0	40	19.70	18.72	17.73	16.75	15.76
VS-SC-0250-3-075-40-TN	2.50	3	7.5	40	19.70	18.72	17.73	16.75	15.76
VS-SC-0300-3-090-40-TN	3.00	3	9.0	40	19.70	18.72	17.73	16.75	15.76
VS-SC-0300-3-120-40-TN	3.00	3	12.0	40	20.00	19.00	18.00	17.00	16.00
VS-SC-0400-4-120-50-TN	4.00	4	12.0	50	20.70	19.67	18.63	17.60	16.56
additionally with edge chamfer 0.20 mm × 45°									
VS-SC-0500-6-150-50-TN	5.00	6	15.0	50	24.80	23.56	22.32	21.08	19.84
VS-SC-0600-6-180-60-TN	6.00	6	18.0	60	24.80	23.56	22.32	21.08	19.84
VS-SC-0800-8-220-60-TN	8.00	8	22.0	60	32.10	30.50	28.89	27.29	25.68
VS-SC-1000-10-220-75-TN	10.00	10	22.0	75	45.50	43.23	40.95	38.68	36.40

Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49	MULTI-TOOTH CUTTERS
tools with STRATUM HL coating										
VS-SC-0300-6-070-50-HL	3.00	6	7.0	50	25.00	23.75	22.50	21.25	20.00	ENGRAVING TOOLS
VS-SC-0400-6-080-50-HL	4.00	6	8.0	50	24.70	23.47	22.23	21.00	19.76	DEBURRING TOOLS
additionally with edge chamfer 0.20 mm × 45°										
VS-SC-0500-6-100-50-HL	5.00	6	10.0	50	24.40	23.18	21.96	20.74	19.52	ROUTER BITS
VS-SC-0600-6-120-50-HL	6.00	6	12.0	50	24.40	23.18	21.96	20.74	19.52	THREAD CUTTERS
VS-SC-0800-8-120-50-HL	8.00	8	12.0	50	29.00	27.55	26.10	24.65	23.20	DRILLS

4



COMPOSITE CUTTERS

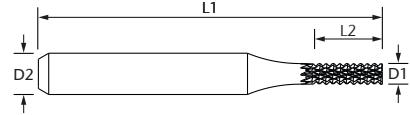
We offer a whole series of special milling cutters with cross cut, diamond or spiral toothing for highly abrasive materials like GRP/CRP or honeycomb plates.

- **COMPOSITE CUTTERS, FINELY TOOTHED**
- **COMPOSITE CUTTERS, FINELY TOOTHED WITH CHIP-BREAKER**
- **COMPOSITE CUTTERS, MEDIUM-TOOTHED**
- **COMPOSITE CUTTERS, COARSELY TOOTHED**
- **PCB OUTLINE CUTTERS, DIAMOND-TOOTHED**
- **PCB OUTLINE CUTTERS, SPIRAL-TOOTHED**
- **HONEYCOMB CUTTERS, SPIRAL-FLUTED**



COMPOSITE CUTTERS, FINELY TOOTHED

- for GRP/CRP materials with a medium (30–60%) to high fiber amount (> 60%)
- no delamination of material layers
- fine-staggered tooth system of 10 to 14 micro-teeth rows
- double-tooth face grinding with four areas

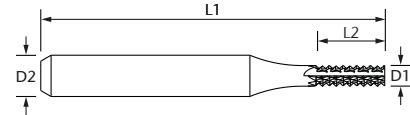


	Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
	GRP CRP	circuit boards	***	**						
DIAMOND TOOLS	LK-F-0300-3-090-40	3.00	3	9.0	40	16.60	15.77	14.94	14.11	13.28
	LK-F-0300-3-120-40	3.00	3	12.0	40	17.10	16.25	15.39	14.54	13.68
	LK-F-0300-3-160-50	3.00	3	16.0	50	17.60	16.72	15.84	14.96	14.08
	LK-F-0300-6-120-50	3.00	6	12.0	50	25.90	24.61	23.31	22.02	20.72
	LK-F-0300-6-160-50	3.00	6	16.0	50	26.90	25.56	24.21	22.87	21.52
	LK-F-0400-4-100-40	4.00	4	10.0	40	18.60	17.67	16.74	15.81	14.88
	LK-F-0400-4-220-60	4.00	4	22.0	60	21.70	20.62	19.53	18.45	17.36
	LK-F-0400-6-120-50	4.00	6	12.0	50	25.90	24.61	23.31	22.02	20.72
	LK-F-0400-6-160-50	4.00	6	16.0	50	26.90	25.56	24.21	22.87	21.52
	LK-F-0500-6-140-50	5.00	6	14.0	50	26.90	25.56	24.21	22.87	21.52
	LK-F-0500-6-220-60	5.00	6	22.0	60	29.00	27.55	26.10	24.65	23.20
	LK-F-0600-6-140-50	6.00	6	14.0	50	25.90	24.61	23.31	22.02	20.72
	LK-F-0600-6-220-60	6.00	6	22.0	60	29.50	28.03	26.55	25.08	23.60
	LK-F-0600-6-320-70	6.00	6	32.0	70	33.10	31.45	29.79	28.14	26.48
	LK-F-0800-8-220-60	8.00	8	22.0	60	42.40	40.28	38.16	36.04	33.92
	LK-F-0800-8-320-75	8.00	8	32.0	75	46.60	44.27	41.94	39.61	37.28



COMPOSITE CUTTERS, FINELY TOOTHED WITH CHIP BREAKER

- for GRP/CRP materials with a medium (30–60%) to high fiber amount (> 60%)
- no delamination of material layers
- fine-staggered tooth system of 10 to 14 micro-teeth rows with integrated chip breaker flute
- double-tooth face grinding with four areas



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
GRP CRP	circuit boards	***	**						
LK-FSB-0300-3-060-40	3.00	3	6.0	40	18.10	17.20	16.29	15.39	14.48
LK-FSB-0300-3-090-40	3.00	3	9.0	40	18.60	17.67	16.74	15.81	14.88
LK-FSB-0300-3-120-40	3.00	3	12.0	40	19.10	18.15	17.19	16.24	15.28
LK-FSB-0300-3-160-50	3.00	3	16.0	50	19.70	18.72	17.73	16.75	15.76
LK-FSB-0300-6-120-50	3.00	6	12.0	50	27.90	26.51	25.11	23.72	22.32
LK-FSB-0300-6-160-50	3.00	6	16.0	50	29.00	27.55	26.10	24.65	23.20
LK-FSB-0400-4-060-40	4.00	4	6.0	40	19.70	18.72	17.73	16.75	15.76
LK-FSB-0400-4-100-40	4.00	4	10.0	40	20.20	19.19	18.18	17.17	16.16
LK-FSB-0400-4-140-50	4.00	4	14.0	50	20.70	19.67	18.63	17.60	16.56
LK-FSB-0400-4-180-50	4.00	4	18.0	50	21.20	20.14	19.08	18.02	16.96
LK-FSB-0400-4-220-60	4.00	4	22.0	60	21.70	20.62	19.53	18.45	17.36
LK-FSB-0400-6-120-50	4.00	6	12.0	50	27.90	26.51	25.11	23.72	22.32
LK-FSB-0500-5-160-60	5.00	5	16.0	60	26.90	25.56	24.21	22.87	21.52
LK-FSB-0500-6-140-50	5.00	6	14.0	50	29.00	27.55	26.10	24.65	23.20
LK-FSB-0600-6-140-50	6.00	6	14.0	50	31.10	29.55	27.99	26.44	24.88
LK-FSB-0600-6-220-60	6.00	6	22.0	60	33.10	31.45	29.79	28.14	26.48
LK-FSB-0800-8-220-60	8.00	8	22.0	60	42.40	40.28	38.16	36.04	33.92
LK-FSB-0800-8-320-75	8.00	8	32.0	75	44.50	42.28	40.05	37.83	35.60

COMPOSITE CUTTERS

ENGRAVING
TOOLSDEBURRING
TOOLSROUTER
BITSTHREAD
CUTTERS

DRILLS

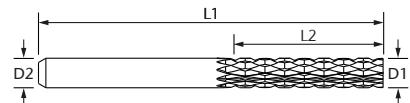
DIAMOND
TOOLSLANCES
AND KNIVES

ACCESSORIES



COMPOSITE CUTTERS, MEDIUM-TOOTHED

- for GRP/CRP materials with a low fiber amount (< 30%) to medium fiber amount (30–60%)
- double-tooth face grinding with four areas
- medium-staggered tooth system of eight to twelve micro-teeth rows
- shears off the fibers of the composite materials very accurately

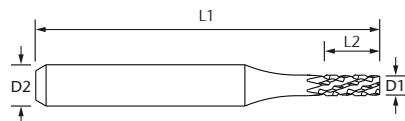


	Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2–4	-10 % 5–9	-15 % 10–19	-20 % 20–49
	GRP CRP	circuit boards	***	**						
	LK-M-0300-3-090-40	3.00	3	9.0	40	16.60	15.77	14.94	14.11	13.28
	LK-M-0300-3-120-40	3.00	3	12.0	40	17.10	16.25	15.39	14.54	13.68
	LK-M-0300-3-160-50	3.00	3	16.0	50	17.60	16.72	15.84	14.96	14.08
	LK-M-0300-6-120-50	3.00	6	12.0	50	25.90	24.61	23.31	22.02	20.72
	LK-M-0300-6-160-50	3.00	6	16.0	50	26.90	25.56	24.21	22.87	21.52
	LK-M-0400-4-100-40	4.00	4	10.0	40	18.60	17.67	16.74	15.81	14.88
	LK-M-0400-4-220-60	4.00	4	22.0	60	21.70	20.62	19.53	18.45	17.36
	LK-M-0400-6-120-50	4.00	6	12.0	50	25.90	24.61	23.31	22.02	20.72
	LK-M-0400-6-160-50	4.00	6	16.0	50	26.90	25.56	24.21	22.87	21.52
	LK-M-0500-6-140-50	5.00	6	14.0	50	26.90	25.56	24.21	22.87	21.52
	LK-M-0500-6-220-60	5.00	6	22.0	60	29.00	27.55	26.10	24.65	23.20
	LK-M-0600-6-140-50	6.00	6	14.0	50	25.90	24.61	23.31	22.02	20.72
	LK-M-0600-6-220-60	6.00	6	22.0	60	29.50	28.03	26.55	25.08	23.60
	LK-M-0600-6-320-70	6.00	6	32.0	70	33.10	31.45	29.79	28.14	26.48
	LK-M-0800-8-220-60	8.00	8	22.0	60	40.40	38.38	36.36	34.34	32.32
	LK-M-0800-8-320-75	8.00	8	32.0	75	44.50	42.28	40.05	37.83	35.60



COMPOSITE CUTTERS, COARSELY TOOTHED

- for GRP/CRP materials with a low fiber amount (< 30%), for semi-finished fiber matrix products
- shears off the fibers of the composite materials accurately
- coarse-staggered tooth system of six to eight micro-teeth rows
- double-tooth face grinding with four areas



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
GRP CRP ***	circuit boards **								
LK-G-0300-3-090-40	3.00	3	9.0	40	16.60	15.77	14.94	14.11	13.28
LK-G-0300-3-120-40	3.00	3	12.0	40	17.10	16.25	15.39	14.54	13.68
LK-G-0300-3-160-50	3.00	3	16.0	50	17.60	16.72	15.84	14.96	14.08
LK-G-0300-6-120-50	3.00	6	12.0	50	25.90	24.61	23.31	22.02	20.72
LK-G-0300-6-160-50	3.00	6	16.0	50	26.90	25.56	24.21	22.87	21.52
LK-G-0400-4-100-40	4.00	4	10.0	40	18.60	17.67	16.74	15.81	14.88
LK-G-0400-4-220-60	4.00	4	22.0	60	21.70	20.62	19.53	18.45	17.36
LK-G-0400-6-120-50	4.00	6	12.0	50	25.90	24.61	23.31	22.02	20.72
LK-G-0400-6-160-50	4.00	6	16.0	50	26.90	25.56	24.21	22.87	21.52
LK-G-0500-6-140-50	5.00	6	14.0	50	26.90	25.56	24.21	22.87	21.52
LK-G-0500-6-220-60	5.00	6	22.0	60	29.00	27.55	26.10	24.65	23.20
LK-G-0600-6-140-50	6.00	6	14.0	50	25.90	24.61	23.31	22.02	20.72
LK-G-0600-6-220-60	6.00	6	22.0	60	29.50	28.03	26.55	25.08	23.60
LK-G-0600-6-320-70	6.00	6	32.0	70	33.10	31.45	29.79	28.14	26.48
LK-G-0800-8-220-60	8.00	8	22.0	60	40.40	38.38	36.36	34.34	32.32
LK-G-0800-8-320-75	8.00	8	32.0	75	44.50	42.28	40.05	37.83	35.60

COMPOSITE CUTTERS

ENGRAVING
TOOLSDEBURRING
TOOLSROUTER
BITSTHREAD
CUTTERS

DRILLS

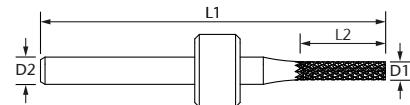
DIAMOND
TOOLSLANCES
AND KNIVES

ACCESSORIES



PCB OUTLINE CUTTERS, DIAMOND-TOOTHED

- very good tool life due to diamond-toothing
- fishtail grinding at the tool tip
- ideal for printed circuit boards and GRP/CRP materials
- equipped with stop ring; distance from tool tip to back of ring: 21 mm
- with STRATUM DIA coating for especially long tool life



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2–4	-10 % 5–9	-15 % 10–19	-20 % 20–49
GRP CRP ***	circuit boards ***								
uncoated tools									
LK-0080-3-050-38	0.80	3	5.0	38	9.80	9.31	8.82	8.33	7.84
LK-0100-3-050-38	1.00	3	5.0	38	9.80	9.31	8.82	8.33	7.84
LK-0160-3-085-38	1.60	3	8.5	38	9.80	9.31	8.82	8.33	7.84
LK-0200-3-090-38	2.00	3	9.0	38	9.80	9.31	8.82	8.33	7.84
LK-0300-3-105-38	3.00	3	10.5	38	9.80	9.31	8.82	8.33	7.84
tools with STRATUM DIA coating*									
LK-0100-3-050-38-DIA	1.00	3	5.0	38	19.70	18.72	17.73	16.75	15.76
LK-0200-3-090-38-DIA	2.00	3	9.0	38	19.70	18.72	17.73	16.75	15.76
LK-0300-3-105-38-DIA	3.00	3	10.5	38	19.70	18.72	17.73	16.75	15.76

Practical tip:

When you are machining abrasive materials and they should be milled through completely, please take care that the fishtail grinding will fully immerse into the run-out material (vacuum fleece etc.), as it is most susceptible to wear.

*Info:

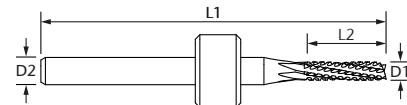
Since the diamond layer is electrically insulating, calibration with measuring systems that require electrical contact is not possible.





PCB OUTLINE CUTTERS, SPIRAL-TOOTHED

- very good chip clearance due to spiral-toothing
- fishtail grinding at the tool tip
- ideal for printed circuit boards and GRP/CRP materials
- equipped with stop ring; distance from tool tip to back of ring: 21 mm
- with STRATUM DIA coating for especially long tool life



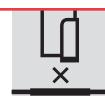
Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
GRP CRP ***	circuit boards ***								
uncoated tools									
LK-SV-0100-3-050-38	1.00	3	5.0	38	9.80	9.31	8.82	8.33	7.84
LK-SV-0200-3-090-38	2.00	3	9.0	38	9.80	9.31	8.82	8.33	7.84
LK-SV-0300-3-090-38	3.00	3	9.0	38	9.80	9.31	8.82	8.33	7.84
tools with STRATUM DIA coating*									
LK-SV-0100-3-050-38-DIA	1.00	3	5.0	38	19.70	18.72	17.73	16.75	15.76
LK-SV-0200-3-090-38-DIA	2.00	3	9.0	38	19.70	18.72	17.73	16.75	15.76
LK-SV-0300-3-090-38-DIA	3.00	3	9.0	38	19.70	18.72	17.73	16.75	15.76

Practical tip:

When you are machining abrasive materials and they should be milled through completely, please take care that the fishtail grinding will fully immerse into the run-out material (vacuum fleece etc.), as it is most susceptible to wear.

*Info:

Since the diamond layer is electrically insulating, calibration with measuring systems that require electrical contact is not possible.



COMPOSITE CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

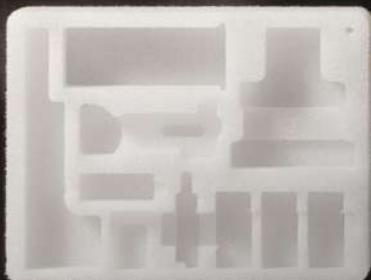
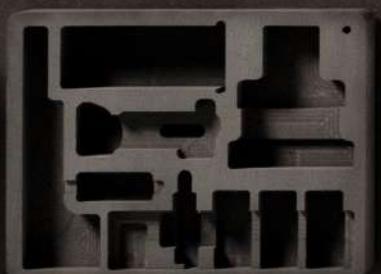
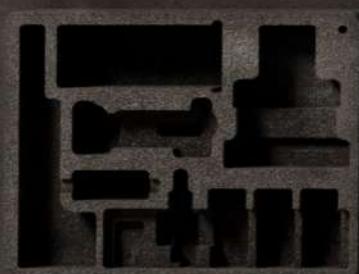
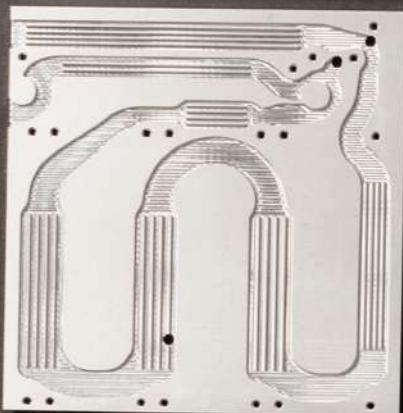
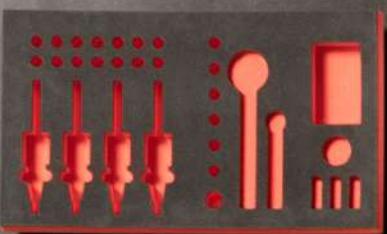


HONEYCOMB CUTTERS, SPIRAL-FLUTED

- six tooth cutter with opposed chip breakers
- optimal immersion due to a center-crossing tooth
- no delamination of material layers
- steep spiralization exerts only a slight tractive force on the workpiece
- for honeycomb plates, aramid fibre reinforced plastics and GRP/CRP materials

	Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
DIAMOND TOOLS	PMMA **	PVC foam **	PVC hard **	PP **	PC **	PE PS **	GRP CRP **			
	LK-HCS-0300-3-120-40	3.00	3	12.0	40	19.10	18.15	17.19	16.24	15.28
	LK-HCS-0300-3-160-50	3.00	3	16.0	50	19.70	18.72	17.73	16.75	15.76
	LK-HCS-0300-6-120-50	3.00	6	12.0	50	25.90	24.61	23.31	22.02	20.72
	LK-HCS-0300-6-160-50	3.00	6	16.0	50	26.90	25.56	24.21	22.87	21.52
	LK-HCS-0400-4-140-50	4.00	4	14.0	50	21.70	20.62	19.53	18.45	17.36
	LK-HCS-0400-4-220-60	4.00	4	22.0	60	23.80	22.61	21.42	20.23	19.04
	LK-HCS-0400-6-120-50	4.00	6	12.0	50	25.90	24.61	23.31	22.02	20.72
	LK-HCS-0600-6-140-50	6.00	6	14.0	50	31.10	29.55	27.99	26.44	24.88
	LK-HCS-0600-6-220-60	6.00	6	22.0	60	34.20	32.49	30.78	29.07	27.36
	LK-HCS-0600-6-320-70	6.00	6	32.0	70	36.20	34.39	32.58	30.77	28.96
	LK-HCS-0800-8-320-75	8.00	8	32.0	75	45.50	43.23	40.95	38.68	36.40

COMPOSITE CUTTERS	ENGRAVING TOOLS	DEBURRING TOOLS	ROUTER BITS	THREAD CUTTERS	DRILLS	DIAMOND TOOLS	LANCES AND KNIVES	ACCESSORIES
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**ENDLESS POSSIBILITIES.
WITH ORIGINAL TOOLS FROM VHF.**

5



ENGRAVING TOOLS

vhf offers gravers and engraver's milling cutters with a wide range of sizes and top angles for machining materials from plastics to stainless steel. Gravers with a shank diameter from 6 mm on are balanced by default. On top of that, there is a special tool for engraving isolation channels on printed circuit boards.

- **GRAVERS**

- **BOX GRAVERS**

- **ISOLATION ENGRAVING TOOLS**

- **ENGRAVER'S MILLING CUTTERS FOR STAINLESS STEEL**

- **ENGRAVER'S MILLING CUTTERS FOR ACRYLIC**

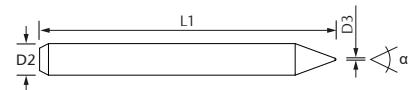
- **SEMI-FINISHED GRAVERS**



GRAVERS

- with balance grinding (from 6 mm shank diameter and top angle of 36°)
- 3 mm shanks equipped with stop ring; distance from tool tip to back of ring: 21 mm

- four different top angles available
- the immersion depth determines the engraving width



Article no.	α	D3 (mm)	D2 (mm)	L1 (mm)	Price in €	-5 % 2–4	-10 % 5–9	-15 % 10–19	-20 % 20–49				
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard	brass	alumin. compos.	circuit boards	soft wood	hard wood	MDF multiplex
**	**	**	**	**	**	***	**	**	***	*	***	**	***
GS-015-010-3-40		15°	0.10	3	40	12.00	11.40	10.80	10.20	9.60			
GS-015-020-3-40		15°	0.20	3	40	12.00	11.40	10.80	10.20	9.60			
GS-015-030-3-40		15°	0.30	3	40	12.00	11.40	10.80	10.20	9.60			
GS-015-030-6-30		15°	0.30	6	30	18.00	17.10	16.20	15.30	14.40			
GS-015-040-3-40		15°	0.40	3	40	12.00	11.40	10.80	10.20	9.60			
GS-015-050-3-40		15°	0.50	3	40	12.00	11.40	10.80	10.20	9.60			
GS-015-050-6-30		15°	0.50	6	30	18.00	17.10	16.20	15.30	14.40			
GS-015-070-3-40		15°	0.70	3	40	12.00	11.40	10.80	10.20	9.60			
GS-015-100-3-40		15°	1.00	3	40	12.00	11.40	10.80	10.20	9.60			

Practical tip:

When engraving without workpiece levelling, we recommend our special 15° gravers.

Article no.	α	D3 (mm)	D2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
GS-036-010-3-40	36°	0.10	3	40	12.00	11.40	10.80	10.20	9.60
GS-036-010-4-40	36°	0.10	4	40	14.00	13.30	12.60	11.90	11.20
GS-036-010-6-40	36°	0.10	6	40	18.00	17.10	16.20	15.30	14.40
GS-036-020-3-40	36°	0.20	3	40	12.00	11.40	10.80	10.20	9.60
GS-036-020-4-40	36°	0.20	4	40	14.00	13.30	12.60	11.90	11.20
GS-036-020-6-40	36°	0.20	6	40	18.00	17.10	16.20	15.30	14.40
GS-036-030-3-40	36°	0.30	3	40	12.00	11.40	10.80	10.20	9.60
GS-036-030-4-40	36°	0.30	4	40	14.00	13.30	12.60	11.90	11.20
GS-036-030-6-40	36°	0.30	6	40	18.00	17.10	16.20	15.30	14.40
GS-036-040-3-40	36°	0.40	3	40	12.00	11.40	10.80	10.20	9.60
GS-036-040-4-40	36°	0.40	4	40	14.00	13.30	12.60	11.90	11.20
GS-036-040-6-40	36°	0.40	6	40	18.00	17.10	16.20	15.30	14.40
GS-036-050-3-40	36°	0.50	3	40	12.00	11.40	10.80	10.20	9.60
GS-036-050-4-40	36°	0.50	4	40	14.00	13.30	12.60	11.90	11.20
GS-036-050-6-40	36°	0.50	6	40	18.00	17.10	16.20	15.30	14.40
GS-036-070-3-40	36°	0.70	3	40	12.00	11.40	10.80	10.20	9.60
GS-036-070-4-40	36°	0.70	4	40	14.00	13.30	12.60	11.90	11.20
GS-036-070-6-40	36°	0.70	6	40	18.00	17.10	16.20	15.30	14.40
GS-036-100-3-40	36°	1.00	3	40	12.00	11.40	10.80	10.20	9.60
GS-036-100-4-40	36°	1.00	4	40	14.00	13.30	12.60	11.90	11.20
GS-036-100-6-40	36°	1.00	6	40	18.00	17.10	16.20	15.30	14.40
GS-060-010-3-40	60°	0.10	3	40	12.00	11.40	10.80	10.20	9.60
GS-060-010-4-40	60°	0.10	4	40	14.00	13.30	12.60	11.90	11.20
GS-060-010-6-40	60°	0.10	6	40	18.00	17.10	16.20	15.30	14.40
GS-060-020-3-40	60°	0.20	3	40	12.00	11.40	10.80	10.20	9.60
GS-060-020-4-40	60°	0.20	4	40	14.00	13.30	12.60	11.90	11.20
GS-060-020-6-40	60°	0.20	6	40	18.00	17.10	16.20	15.30	14.40
GS-060-030-3-40	60°	0.30	3	40	12.00	11.40	10.80	10.20	9.60
GS-060-030-4-40	60°	0.30	4	40	14.00	13.30	12.60	11.90	11.20
GS-060-030-6-40	60°	0.30	6	40	18.00	17.10	16.20	15.30	14.40
GS-060-040-3-40	60°	0.40	3	40	12.00	11.40	10.80	10.20	9.60
GS-060-040-4-40	60°	0.40	4	40	14.00	13.30	12.60	11.90	11.20
GS-060-040-6-40	60°	0.40	6	40	18.00	17.10	16.20	15.30	14.40
GS-060-050-3-40	60°	0.50	3	40	12.00	11.40	10.80	10.20	9.60
GS-060-050-4-40	60°	0.50	4	40	14.00	13.30	12.60	11.90	11.20
GS-060-050-6-40	60°	0.50	6	40	18.00	17.10	16.20	15.30	14.40
GS-060-070-3-40	60°	0.70	3	40	12.00	11.40	10.80	10.20	9.60
GS-060-070-4-40	60°	0.70	4	40	14.00	13.30	12.60	11.90	11.20
GS-060-070-6-40	60°	0.70	6	40	18.00	17.10	16.20	15.30	14.40
GS-060-100-3-40	60°	1.00	3	40	12.00	11.40	10.80	10.20	9.60
GS-060-100-4-40	60°	1.00	4	40	14.00	13.30	12.60	11.90	11.20
GS-060-100-6-40	60°	1.00	6	40	18.00	17.10	16.20	15.30	14.40

continued on the next page...

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

THREAD CUTTERS

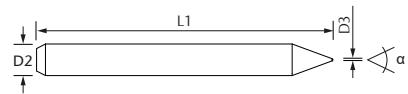
DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

CONTINUATION GRAVERS



Article no.	α	D3 (mm)	D2 (mm)	L1 (mm)	Price in €	-5 % 2–4	-10 % 5–9	-15 % 10–19	-20 % 20–49
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard	brass	alumin. compos.
**	**	**	**	**	***	**	**	**	***
GS-090-010-3-40	90°	0.10	3	40	12.00	11.40	10.80	10.20	9.60
GS-090-010-4-40	90°	0.10	4	40	14.00	13.30	12.60	11.90	11.20
GS-090-010-6-40	90°	0.10	6	40	18.00	17.10	16.20	15.30	14.40
GS-090-020-3-40	90°	0.20	3	40	12.00	11.40	10.80	10.20	9.60
GS-090-020-4-40	90°	0.20	4	40	14.00	13.30	12.60	11.90	11.20
GS-090-020-6-40	90°	0.20	6	40	18.00	17.10	16.20	15.30	14.40
GS-090-030-3-40	90°	0.30	3	40	12.00	11.40	10.80	10.20	9.60
GS-090-030-4-40	90°	0.30	4	40	14.00	13.30	12.60	11.90	11.20
GS-090-030-6-40	90°	0.30	6	40	18.00	17.10	16.20	15.30	14.40
GS-090-040-3-40	90°	0.40	3	40	12.00	11.40	10.80	10.20	9.60
GS-090-040-4-40	90°	0.40	4	40	14.00	13.30	12.60	11.90	11.20
GS-090-040-6-40	90°	0.40	6	40	18.00	17.10	16.20	15.30	14.40
GS-090-050-3-40	90°	0.50	3	40	12.00	11.40	10.80	10.20	9.60
GS-090-050-4-40	90°	0.50	4	40	14.00	13.30	12.60	11.90	11.20
GS-090-050-6-40	90°	0.50	6	40	18.00	17.10	16.20	15.30	14.40
GS-090-070-3-40	90°	0.70	3	40	12.00	11.40	10.80	10.20	9.60
GS-090-070-4-40	90°	0.70	4	40	14.00	13.30	12.60	11.90	11.20
GS-090-070-6-40	90°	0.70	6	40	18.00	17.10	16.20	15.30	14.40
GS-090-100-3-40	90°	1.00	3	40	12.00	11.40	10.80	10.20	9.60
GS-090-100-4-40	90°	1.00	4	40	14.00	13.30	12.60	11.90	11.20
GS-090-100-6-40	90°	1.00	6	40	18.00	17.10	16.20	15.30	14.40

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

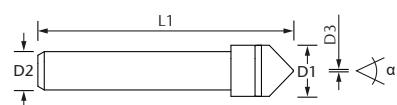
LANCES AND KNIVES

ACCESSORIES



BOX GRAVERS

- for producing boxes or light boxes etc.
- the oversize of 2° equals tolerances and offers space for glue
- with balance grinding (from 6 mm shank diameter)
- for bevelling: the material will be cut through nearly completely and then bent up under heating; alternatively you can completely mill through



Article no.	α	D1 (mm)	D3 (mm)	D2 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard	alumin. compos.		
***	***	***	***	***	***	**	*	*		
GS-092-0300-010-3-40	92°	3.00	0.10	3	40	13.50	12.83	12.15	11.48	10.80
GS-092-0400-020-4-40	92°	4.00	0.20	4	40	15.50	14.73	13.95	13.18	12.40
GS-092-0600-020-6-40	92°	6.00	0.20	6	40	19.70	18.72	17.73	16.75	15.76
GS-092-0800-030-6-50	92°	8.00	0.30	6	50	43.50	41.33	39.15	36.98	34.80
GS-092-0800-030-8-50	92°	8.00	0.30	8	50	38.30	36.39	34.47	32.56	30.64
GS-092-1000-040-6-50	92°	10.00	0.40	6	50	60.00	57.00	54.00	51.00	48.00
GS-092-1000-040-10-50	92°	10.00	0.40	10	50	48.60	46.17	43.74	41.31	38.88
GS-092-1200-050-12-50	92°	12.00	0.50	12	50	60.00	57.00	54.00	51.00	48.00

Info:

For bendings in aluminium composite plates, you find a special tool on page 41.



MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

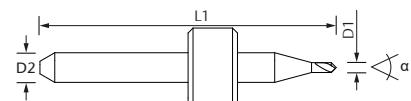
LANCES AND KNIVES

ACCESSORIES



ISOLATION ENGRAVING TOOLS

- equipped with stop ring; 15 mm distance from tool tip to back of ring (for L1 = 30 mm) respectively 21 mm (for L1 = 40 mm)
- conic tapered tool tip from 0.05 to 1.0 mm
- 90° top angle
- for burr-free and finely cleared out milling channels
- for isolation engraving of printed circuit board prototypes

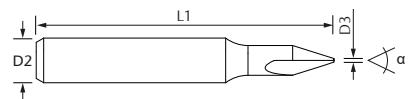


	Article no.	α	D1 (mm)	D2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
DIAMOND TOOLS	circuit boards ***									
	RS-ISO-090-3-30	90°	1.00	3	30	10.40	9.88	9.36	8.84	8.32
	RS-ISO-090-3-40	90°	1.00	3	40	10.40	9.88	9.36	8.84	8.32



ENGRAVER'S MILLING CUTTERS FOR STAINLESS STEEL

- manufactured as three-quarter carbide rod for stability reasons
- short cutting edge and stable cutting edge geometry
- 0.2 and 0.4 mm engraving width
- two different top angles
- for steel and stainless steel
- with STRATUM TN coating
- cooling with appropriate cooling lubricant necessary



Article no.	α	D3 (mm)	D2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
alumin. soft	alumin. hard	brass	constr. steel	stainless steel					
*	*	**	***	***					
tools with STRATUM TN coating									
GF-035V-020-3-40-TN	35°	0.20	3	40	21.70	20.62	19.53	18.45	17.36
GF-035V-020-4-40-TN	35°	0.20	4	40	23.80	22.61	21.42	20.23	19.04
GF-035V-020-6-40-TN	35°	0.20	6	40	27.90	26.51	25.11	23.72	22.32
GF-035V-040-3-40-TN	35°	0.40	3	40	21.70	20.62	19.53	18.45	17.36
GF-035V-040-4-40-TN	35°	0.40	4	40	23.80	22.61	21.42	20.23	19.04
GF-035V-040-6-40-TN	35°	0.40	6	40	27.90	26.51	25.11	23.72	22.32
GF-060V-020-3-40-TN	60°	0.20	3	40	21.70	20.62	19.53	18.45	17.36
GF-060V-020-4-40-TN	60°	0.20	4	40	23.80	22.61	21.42	20.23	19.04
GF-060V-020-6-40-TN	60°	0.20	6	40	27.90	26.51	25.11	23.72	22.32
GF-060V-040-3-40-TN	60°	0.40	3	40	21.70	20.62	19.53	18.45	17.36
GF-060V-040-4-40-TN	60°	0.40	4	40	23.80	22.61	21.42	20.23	19.04
GF-060V-040-6-40-TN	60°	0.40	6	40	27.90	26.51	25.11	23.72	22.32

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

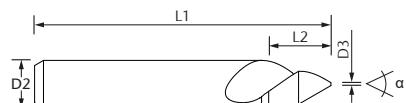
LANCES AND KNIVES

ACCESSORIES



ENGRAVER'S MILLING CUTTERS FOR ACRYLIC

- available with three different top angles
- conic tools with an additional polished spiral flute
- tools with 8 mm shank have a partly cylindric cutting edge
- especially for engraving acrylic glass and other plastics, but also for wood and non-ferrous metals



Article no.	α	D3 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49							
							PMMA ***	PVC foam ***	PVC hard ***	PP ***	PC ***	PE PS ***	alumin. soft *	alumin. compos. *	soft wood *	hard wood *	MDF multiplex *
GF-030K-020-3-40	30°	0.20	3		40	19.70	18.72	17.73	16.75	15.76							
GF-030K-020-4-40	30°	0.20	4		40	21.70	20.62	19.53	18.45	17.36							
GF-030K-020-6-40	30°	0.20	6		40	25.90	24.61	23.31	22.02	20.72							
GF-030K-050-3-40	30°	0.50	3		40	19.70	18.72	17.73	16.75	15.76							
GF-030K-050-4-40	30°	0.50	4		40	21.70	20.62	19.53	18.45	17.36							
GF-030K-050-6-40	30°	0.50	6		40	25.90	24.61	23.31	22.02	20.72							
GF-030K-050-8-0220-60	30°	0.50	8	22.0	60	41.40	39.33	37.26	35.19	33.12							
GF-030K-070-3-40	30°	0.70	3		40	19.70	18.72	17.73	16.75	15.76							
GF-030K-070-4-40	30°	0.70	4		40	21.70	20.62	19.53	18.45	17.36							
GF-030K-070-6-40	30°	0.70	6		40	25.90	24.61	23.31	22.02	20.72							

Article no.	α	D3 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2–4	-10 % 5–9	-15 % 10–19	-20 % 20–49
GF-060K-020-3-40	60°	0.20	3		40	19.70	18.72	17.73	16.75	15.76
GF-060K-020-4-40	60°	0.20	4		40	21.70	20.62	19.53	18.45	17.36
GF-060K-020-6-40	60°	0.20	6		40	25.90	24.61	23.31	22.02	20.72
GF-060K-050-3-40	60°	0.50	3		40	19.70	18.72	17.73	16.75	15.76
GF-060K-050-4-40	60°	0.50	4		40	21.70	20.62	19.53	18.45	17.36
GF-060K-050-6-40	60°	0.50	6		40	25.90	24.61	23.31	22.02	20.72
GF-060K-050-8-0120-50	60°	0.50	8	12.0	50	41.40	39.33	37.26	35.19	33.12
GF-060K-070-3-40	60°	0.70	3		40	19.70	18.72	17.73	16.75	15.76
GF-060K-070-4-40	60°	0.70	4		40	21.70	20.62	19.53	18.45	17.36
GF-060K-070-6-40	60°	0.70	6		40	25.90	24.61	23.31	22.02	20.72
GF-090K-020-3-40	90°	0.20	3		40	19.70	18.72	17.73	16.75	15.76
GF-090K-020-4-40	90°	0.20	4		40	21.70	20.62	19.53	18.45	17.36
GF-090K-020-6-40	90°	0.20	6		40	25.90	24.61	23.31	22.02	20.72
GF-090K-050-3-40	90°	0.50	3		40	19.70	18.72	17.73	16.75	15.76
GF-090K-050-4-40	90°	0.50	4		40	21.70	20.62	19.53	18.45	17.36
GF-090K-050-6-40	90°	0.50	6		40	25.90	24.61	23.31	22.02	20.72
GF-090K-050-8-0120-50	90°	0.50	8	12.0	50	41.40	39.33	37.26	35.19	33.12
GF-090K-070-3-40	90°	0.70	3		40	19.70	18.72	17.73	16.75	15.76
GF-090K-070-4-40	90°	0.70	4		40	21.70	20.62	19.53	18.45	17.36
GF-090K-070-6-40	90°	0.70	6		40	25.90	24.61	23.31	22.02	20.72

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

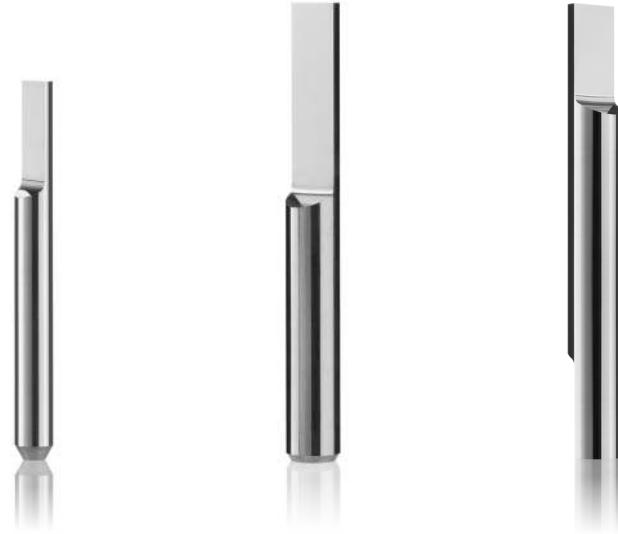
THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES



SEMI-FINISHED GRAVERS

- semi-finished gravers with preground profile
- you can finish them according to your needs
- the halving area is located 0.02 mm over the center
- please note: these are not directly usable tools



Article no.	D2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
single-halved								
GS-HZ-3-10-40	3	10	40	6.20	5.89	5.58	5.27	4.96
GS-HZ-4-10-40	4	10	40	7.80	7.41	7.02	6.63	6.24
GS-HZ-4-15-50	4	15	50	9.80	9.31	8.82	8.33	7.84
GS-HZ-6-10-40	6	10	40	9.30	8.84	8.37	7.91	7.44
GS-HZ-6-15-50	6	15	50	11.40	10.83	10.26	9.69	9.12
GS-HZ-6-20-50	6	20	50	12.40	11.78	11.16	10.54	9.92
double-halved								
GS-HZ-D-4-10-50	4	10	50	11.40	10.83	10.26	9.69	9.12
GS-HZ-D-6-10-50	6	10	50	14.50	13.78	13.05	12.33	11.60

MILLING CUTTERS	ENGRAVING TOOLS	DEBURRING TOOLS	ROUTER BITS	THREAD CUTTERS	DRILLS	DIAMOND TOOLS	LANCES AND KNIVES	ACCESSORIES
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6



MILLING
CUTTERSENGRAVING
TOOLSDEBURRING
TOOLSROUTER
BITSTHREAD
CUTTERS

DRILLS

DIAMOND
TOOLSLANCES
AND KNIVES

ACCESSORIES

DEBURRING TOOLS

These tools can be used for deburring, countersinking, chamfering and edge-working of non-ferrous metals and plastics. They are available with top angles of 60°, 90° and 120° and a quadrant grinding.

■ DEBURRING TOOLS

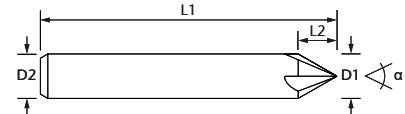
■ DEBURRING TOOLS WITH QUADRANT



DEBURRING TOOLS

- four cutting edges as standard; from 10 mm cutting edge diameters five cutting edges
- ideal for quickly deburring or chamfering
- three different top angles

- with STRATUM TN coating
- for machining steel and other ferrous metals an appropriate lubricant for cooling is necessary



Article no.	α	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49	
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard	brass	constr. steel	stainless steel	HPL

tools with STRATUM TN coating

EG-060-0400-6-034-40-TN	60°	4.00	6	3.4	40	24.80	23.56	22.32	21.08	19.84
EG-060-0600-6-052-40-TN	60°	6.00	6	5.2	40	24.80	23.56	22.32	21.08	19.84
EG-060-0800-8-069-50-TN	60°	8.00	8	6.9	50	36.20	34.39	32.58	30.77	28.96
EG-060-1000-10-086-50-TN	60°	10.00	10	8.6	50	44.50	42.28	40.05	37.83	35.60
EG-090-0200-4-010-100-50-TN*	90°	2.00	4	1.0	50	22.80	21.66	20.52	19.38	18.24
EG-090-0300-6-015-40-TN	90°	3.00	6	1.5	40	24.80	23.56	22.32	21.08	19.84
EG-090-0400-4-020-40-TN	90°	4.00	4	2.0	40	20.70	19.67	18.63	17.60	16.56
EG-090-0400-4-020-60-TN	90°	4.00	4	2.0	60	22.80	21.66	20.52	19.38	18.24
EG-090-0400-6-020-40-TN	90°	4.00	6	2.0	40	24.80	23.56	22.32	21.08	19.84
EG-090-0600-6-030-40-TN	90°	6.00	6	3.0	40	24.80	23.56	22.32	21.08	19.84
EG-090-0800-8-040-50-TN	90°	8.00	8	4.0	50	36.20	34.39	32.58	30.77	28.96
EG-090-1000-6-050-50-TN	90°	10.00	6	5.0	50	54.90	52.16	49.41	46.67	43.92
EG-090-1000-10-050-50-TN	90°	10.00	10	5.0	50	44.50	42.28	40.05	37.83	35.60
EG-090-1200-12-060-50-TN	90°	12.00	12	6.0	50	54.90	52.16	49.41	46.67	43.92
EG-120-0600-6-017-40-TN	120°	6.00	6	1.7	40	24.80	23.56	22.32	21.08	19.84
EG-120-0800-8-023-50-TN	120°	8.00	8	2.3	50	36.20	34.39	32.58	30.77	28.96
EG-120-1000-10-028-50-TN	120°	10.00	10	2.8	50	44.50	42.28	40.05	37.83	35.60

* with undercut 10.0 mm



MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

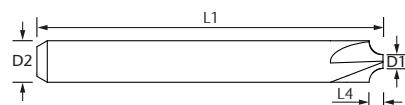
DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

DEBURRING TOOLS WITH QUADRANT

- for round chamferings in plastics or non-ferrous metals
- smooth round chamferings due to quadrant grinding
- different radii available



Article no.	L4 (mm)	D1 (mm)	D2 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49				
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard	brass	HPL	alumin. compos.	soft wood	hard wood	MDF multiplex
***	***	***	***	***	***	***	*	*	*	**	*	*	*
EG-R05-0500-6-50		0.5	5.00	6	50	23.80	22.61	21.42	20.23	19.04			
EG-R10-0400-6-50		1.0	4.00	6	50	23.80	22.61	21.42	20.23	19.04			
EG-R15-0300-6-50		1.5	3.00	6	50	23.80	22.61	21.42	20.23	19.04			
EG-R20-0200-6-50		2.0	2.00	6	50	23.80	22.61	21.42	20.23	19.04			
EG-R25-0300-8-50		2.5	3.00	8	50	35.20	33.44	31.68	29.92	28.16			
EG-R30-0200-8-50		3.0	2.00	8	50	35.20	33.44	31.68	29.92	28.16			
EG-R35-0300-10-50		3.5	3.00	10	50	47.60	45.22	42.84	40.46	38.08			
EG-R40-0200-10-50		4.0	2.00	10	50	47.60	45.22	42.84	40.46	38.08			

7



ROUTER BITS

Router bits are mostly used for machining wood. However, due to their carbide cutting edges they are also very well suitable for working on other kinds of materials like plastics.

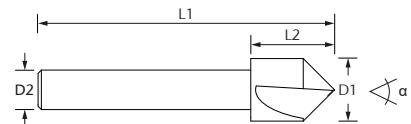
The router bits are available as different types for chamfering or bevelling, for milling slots and concave or convex radii, and for surface milling. The Orange Tools™ are manufactured by CMT, an experienced specialist for woodworking tools. The paint serves also as non-stick coating to prevent that resins and impurities may accumulate at the cutting edge.

- **V-SLOT CUTTERS**
- **V-SLOT CUTTERS FOR ALUMINIUM COMPOSITES**
- **LONG HOLE SLOT CUTTERS**
- **SLOT CUTTERS**
- **CHAMFERING CUTTERS**
- **CUTTERS WITH QUADRANT**
- **RADIUS CUTTERS**
- **TRIPLE TOOTH SURFACE MILLING CUTTERS**



V-SLOT CUTTERS

- massive steel body with integrated carbide cutting edges
- types with two or three cutting edges
- additional cylindric part of the cutting edge (tools with 90° top angle)
- for milling (decoration) slots, chamfering and engraving



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49												
PMMA	**	PVC foam	**	PVC hard	**	PP	**	PC	**	PE PS	**	alumin. soft	*	HPL	*	soft wood	***	hard wood	***	MDF multiplex	***
RB-VN-060-1270-6-110-57	12.70	6	11.0	57	38.90	36.96	35.01	33.07	31.12	RB-VN-060-1270-8-110-57	12.70	8	11.0	57	38.90	36.96	35.01	33.07	31.12		

α = 60° top angle, triple tooth cutters

RB-VN-060-1270-6-110-57	12.70	6	11.0	57	38.90	36.96	35.01	33.07	31.12
RB-VN-060-1270-8-110-57	12.70	8	11.0	57	38.90	36.96	35.01	33.07	31.12

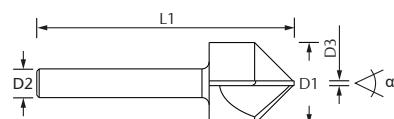
α = 90° top angle, double tooth cutters

RB-VN-090-0950-6-127-45	9.50	6	12.7	45	32.60	30.97	29.34	27.71	26.08
RB-VN-090-0950-8-127-45	9.50	8	12.7	45	32.60	30.97	29.34	27.71	26.08
RB-VN-090-1270-6-127-45	12.70	6	12.7	45	30.50	28.98	27.45	25.93	24.40
RB-VN-090-1270-8-127-45	12.70	8	12.7	45	30.50	28.98	27.45	25.93	24.40
RB-VN-090-1600-8-127-53	16.00	8	12.7	53	36.80	34.96	33.12	31.28	29.44
RB-VN-090-1900-6-160-56	19.00	6	16.0	56	36.80	34.96	33.12	31.28	29.44
RB-VN-090-3170-8-160-64	31.70	8	16.0	64	59.90	56.91	53.91	50.92	47.92
RB-VN-090-3800-8-190-64	38.00	8	19.0	64	65.10	61.85	58.59	55.34	52.08



V-SLOT CUTTERS FOR ALUMINIUM COMPOSITES

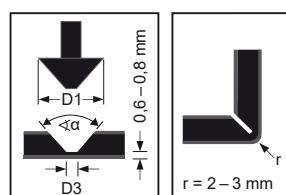
- massive steel body with an integrated double-cutting carbide cutting edge
- for rectangular or acute-angled bendings, depending on the top angle
- the 90° tool is suitable for materials up to 6 mm thickness; the 135° tool is suitable for materials up to 4 mm thickness



Article no.	α	D1 (mm)	D3 (mm)	D2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
alumin. compos. ***										
RB-AV-090-1800-6-59	90°	18.00	3.00	6	59	51.50	48.93	46.35	43.78	41.20
RB-AV-090-1800-8-59	90°	18.00	3.00	8	59	51.50	48.93	46.35	43.78	41.20
RB-AV-135-1800-6-59	135°	18.00	2.00	6	59	51.50	48.93	46.35	43.78	41.20
RB-AV-135-1800-8-59	135°	18.00	2.00	8	59	51.50	48.93	46.35	43.78	41.20

Practical tip:

The bottom width (D3) of the milling cutter determines the later bending radius (r). Please note that there has to remain a rest of 0.6 to 0.8 mm of the plate which must not be milled.

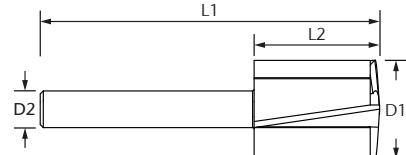


MILLING CUTTERS
ENGRAVING TOOLS
DEBURRING TOOLS
ROUTER BITS
THREAD CUTTERS
DRILLS
DIAMOND TOOLS
LANCES AND KNIVES
ACCESSORIES



LONG HOLE SLOT CUTTERS

- massive steel body with two integrated carbide cutting edges
- straightly slotted to prevent fraying out of the material
- negative cutting angle for perfectly even surfaces
- especially suitable for machining solid wood and sheet material

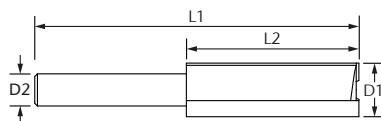


Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49	
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	HPL	soft wood	hard wood	MDF multiplex
**	**	**	**	**	*	*	*	***	***	***
RB-LN-1600-6-190-54	16.00	6	19.0	54	25.20	23.94	22.68	21.42	20.16	
RB-LN-1600-8-190-54	16.00	8	19.0	54	25.20	23.94	22.68	21.42	20.16	
RB-LN-1800-6-160-48	18.00	6	16.0	48	27.30	25.94	24.57	23.21	21.84	
RB-LN-1800-8-160-48	18.00	8	16.0	48	27.30	25.94	24.57	23.21	21.84	
RB-LN-2000-6-160-48	20.00	6	16.0	48	29.40	27.93	26.46	24.99	23.52	
RB-LN-2000-8-160-48	20.00	8	16.0	48	29.40	27.93	26.46	24.99	23.52	



SLOT CUTTERS

- massive steel body with two integrated carbide cutting edges
- straightly slotted to prevent fraying out of the material
- for milling plane surfaces, notches and tongue-and-groove joint



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49				
PMMA **	PVC foam **	PVC hard **	PP **	PC **	PE PS **	alumin. soft *	HPL *	soft wood ***	hard wood ***	MDF multiplex ***			
RB-NF-1000-6-317-60	10.00	6	31.7	60	31.50	29.93	28.35	26.78	25.20				
RB-NF-1000-8-317-60	10.00	8	31.7	60	31.50	29.93	28.35	26.78	25.20				
RB-NF-1200-6-317-60	12.00	6	31.7	60	31.50	29.93	28.35	26.78	25.20				
RB-NF-1200-8-317-60	12.00	8	31.7	60	31.50	29.93	28.35	26.78	25.20				
RB-NF-1500-6-317-66	15.00	6	31.7	66	35.70	33.92	32.13	30.35	28.56				
RB-NF-1500-8-317-66	15.00	8	31.7	66	35.70	33.92	32.13	30.35	28.56				
RB-NF-1600-6-317-66	16.00	6	31.7	66	35.70	33.92	32.13	30.35	28.56				
RB-NF-1600-8-317-66	16.00	8	31.7	66	35.70	33.92	32.13	30.35	28.56				

Practical tip:

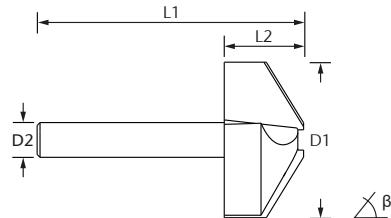
This milling cutter is ideal for large-area plane-milling of the surface of vacuum tables.



CHAMFERING CUTTERS

- for chamfering edges
- massive steel body with two integrated carbide cutting edges

- available with three different chamfering angles

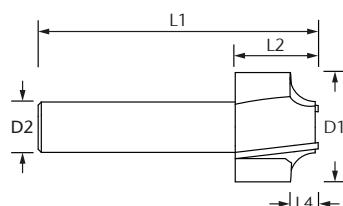


Article no.	β	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	HPL	soft wood	hard wood	MDF multiplex
**	**	**	**	**	**	*	*	***	***	***
RB-AF-015-2400-6-140-46	15°	24.00	6	14.0	46	27.30	25.94	24.57	23.21	21.84
RB-AF-015-2400-8-140-46	15°	24.00	8	14.0	46	27.30	25.94	24.57	23.21	21.84
RB-AF-030-2600-6-127-45	30°	26.00	6	12.7	45	27.30	25.94	24.57	23.21	21.84
RB-AF-030-2600-8-127-45	30°	26.00	8	12.7	45	27.30	25.94	24.57	23.21	21.84
RB-AF-045-2500-6-080-41	45°	25.00	6	8.0	41	27.30	25.94	24.57	23.21	21.84
RB-AF-045-2500-8-080-41	45°	25.00	8	8.0	41	27.30	25.94	24.57	23.21	21.84



CUTTERS WITH QUADRANT

- massive steel body with two integrated carbide cutting edges
- concave quadrant grinding
- a front and a cylindric part of the cutting edge
- for accurately rounded convex edges or internal profiles



Article no.	L4 (mm)	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	HPL	soft wood	hard wood	MDF multiplex
**	**	**	**	**	**	*	*	***	***	***
RB-VK-R40-1900-8-44	4.0	19.00	8	12.0	44	34.70	32.97	31.23	29.50	27.76
RB-VK-R50-2100-8-44	5.0	21.00	8	12.0	44	34.70	32.97	31.23	29.50	27.76
RB-VK-R60-2300-8-44	6.0	23.00	8	12.0	44	37.80	35.91	34.02	32.13	30.24
RB-VK-R80-2860-8-45	8.0	28.60	8	12.7	45	41.00	38.95	36.90	34.85	32.80
RB-VK-R95-3170-8-46	9.5	31.70	8	14.0	46	41.00	38.95	36.90	34.85	32.80

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

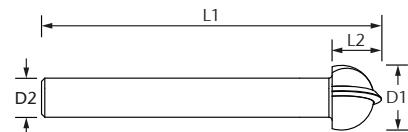
LANCES AND KNIVES

ACCESSORIES



RADIUS CUTTERS

- from 9.5 mm cutting edge diameter (D1) solid steel body with two integrated carbide cutting edges
- semi-circular tool tip for milling rounded concave slots



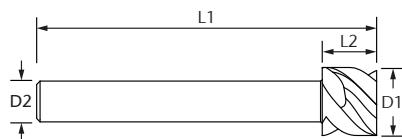
Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49			
PMMA **	PVC foam **	PVC hard **	PP **	PC **	PE PS **	alumin. soft *	HPL *	soft wood ***	hard wood ***	MDF multiplex ***		
RB-RF-0320-6-095-51*	3.20	6	9.5	51	31.50	29.93	28.35	26.78	25.20			
RB-RF-0600-6-127-51*	6.00	6	12.7	51	31.50	29.93	28.35	26.78	25.20			
RB-RF-0950-6-064-51	9.50	6	6.4	51	31.50	29.93	28.35	26.78	25.20			
RB-RF-1270-6-095-51	12.70	6	9.5	51	31.50	29.93	28.35	26.78	25.20			
RB-RF-1270-8-095-51	12.70	8	9.5	51	31.50	29.93	28.35	26.78	25.20			
RB-RF-1580-6-095-51	15.80	6	9.5	51	33.60	31.92	30.24	28.56	26.88			
RB-RF-1580-8-095-51	15.80	8	9.5	51	33.60	31.92	30.24	28.56	26.88			
RB-RF-1900-6-115-51	19.00	6	11.5	51	35.70	33.92	32.13	30.35	28.56			
RB-RF-1900-8-115-51	19.00	8	11.5	51	35.70	33.92	32.13	30.35	28.56			

* Radius cutters with a cutting edge diameter (D1) of up to 6 mm are made of solid carbide.



TRIPLE TOOTH SURFACE MILLING CUTTERS

- ideal for an efficient surface milling of larger areas of wood, plastics and aluminium
- edge radius of 0.5 mm
- massive steel shank with a carbide head soldered on it
- refurbishing available (only D1 = 20 mm and 30 mm)



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49				
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard	HPL	soft wood	hard wood	MDF multiplex		
***	***	***	***	***	**	***	**	**	***	***	***		
RB-DS-1000-6-080-50	10.00	6	8.0	50	30.20	28.69	27.18	25.67	24.16				
RB-DS-1200-6-080-50	12.00	6	8.0	50	40.40	38.38	36.36	34.34	32.32				
RB-DS-1400-10-080-50	14.00	10	8.0	50	50.70	48.17	45.63	43.10	40.56				
RB-DS-1600-10-080-50	16.00	10	8.0	50	61.10	58.05	54.99	51.94	48.88				
RB-DS-1800-10-080-50	18.00	10	8.0	50	71.40	67.83	64.26	60.69	57.12				
RB-DS-2000-10-080-50	20.00	10	8.0	50	81.80	77.71	73.62	69.53	65.44				
RB-DS-3000-12-080-50	30.00	12	8.0	50	92.10	87.50	82.89	78.29	73.68				

Practical tip:

This milling cutter is ideal for large-area plane-milling of the surface of vacuum tables.



ALL MACHINES DESERVE PERFECT TOOLS.
WELCOME TO VHF.



8



THREAD CUTTERS

You can choose between thread whirling cutters and circular thread cutters. For the thread whirling cutters you will need a pre-drilled hole. The circular thread cutters drill the hole and cut the thread in the same working cycle.

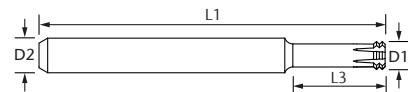
■ THREAD WHIRLING CUTTERS

■ CIRCULAR THREAD CUTTERS



THREAD WHIRLING CUTTERS

- two rows of teeth
- threads will be machined down to the bottom of the pre-drilled (tapped blind) hole
- for machining aluminium, steel and other ferrous metals, an appropriate lubricant for cooling is necessary
- for metric standard threads
- very deep threads possible due to long undercut
- suitable for especially small threads from M 1
- with STRATUM TN coating for increased tool life



Article no.	Thread	D1 (mm)	D2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
uncoated tools										
GW-M01-0073-3-032-40	M 1	0.73	3	3.2	40	58.00	55.10	52.20	49.30	46.40
GW-M02-0155-3-064-40	M 2	1.55	3	6.4	40	58.00	55.10	52.20	49.30	46.40
GW-M02.5-0200-3-080-40	M 2.5	2.00	3	8.0	40	58.00	55.10	52.20	49.30	46.40
GW-M03-0244-4-096-40	M 3	2.44	4	9.6	40	63.10	59.95	56.79	53.64	50.48
GW-M04-0320-4-128-40	M 4	3.20	4	12.8	40	63.10	59.95	56.79	53.64	50.48
GW-M05-0400-6-160-60	M 5	4.00	6	16.0	60	73.50	69.83	66.15	62.48	58.80
GW-M06-0485-6-192-60	M 6	4.85	6	19.2	60	73.50	69.83	66.15	62.48	58.80
GW-M08-0650-8-256-75	M 8	6.50	8	25.6	75	84.90	80.66	76.41	72.17	67.92
GW-M10-0790-8-320-75	M 10	7.90	8	32.0	75	84.90	80.66	76.41	72.17	67.92

Article no.	Thread	D1 (mm)	D2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
tools with STRATUM TN coating										
alumin. soft	alumin. hard	brass	constr. steel	stainless steel	HPL					
***	***	**	***	***	**					
GW-M01-0073-3-032-40-TN	M 1	0.73	3	3.2	40	63.30	60.14	56.97	53.81	50.64
GW-M02-0155-3-064-40-TN	M 2	1.55	3	6.4	40	63.30	60.14	56.97	53.81	50.64
GW-M02.5-0200-3-080-40-TN	M 2.5	2.00	3	8.0	40	63.30	60.14	56.97	53.81	50.64
GW-M03-0244-4-096-40-TN	M 3	2.44	4	9.6	40	68.40	64.98	61.56	58.14	54.72
GW-M04-0320-4-128-40-TN	M 4	3.20	4	12.8	40	68.40	64.98	61.56	58.14	54.72
GW-M05-0400-6-160-60-TN	M 5	4.00	6	16.0	60	79.80	75.81	71.82	67.83	63.84
GW-M06-0485-6-192-60-TN	M 6	4.85	6	19.2	60	79.80	75.81	71.82	67.83	63.84
GW-M08-0650-8-256-75-TN	M 8	6.50	8	25.6	75	91.20	86.64	82.08	77.52	72.96
GW-M10-0790-8-320-75-TN	M 10	7.90	8	32.0	75	91.20	86.64	82.08	77.52	72.96

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

Info:

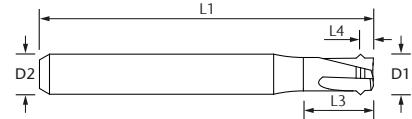
Please note that both, controller and production software, must be able to perform a helix movement.





CIRCULAR THREAD CUTTERS

- two tools in one
- special tip grinding for drilling the tap hole and cutting the thread in the same working cycle (up to 2 × D1)
- for metric standard threads
- each thread cutter (except M 6) can be used for producing several thread sizes



Article no.	Thread	D1 (mm)	D2 (mm)	L4 (mm)	L3 (mm)	L1 (mm)	Price in €	-5% 2–4	-10% 5–9	-15% 10–19	-20% 20–49
PMMA	PVC foam	PVC hard	PP	PC	PE PS	alumin. soft	alumin. hard	brass	alumin. compos.		
***	***	***	***	***	*	***	*	*	*		
BGF-M02.5-M03	M 2.5 – M 3	2.00	6	0.68	4.68	50	67.30	63.94	60.57	57.21	53.84
BGF-M04-M05	M 4 – M 5	3.15	6	1.30	11.80	50	67.30	63.94	60.57	57.21	53.84
BGF-M06	M 6	4.80	6	1.30	11.80	50	67.30	63.94	60.57	57.21	53.84
BGF-M08-M10	M 8 – M 10	5.90	6	2.30	12.80	50	67.30	63.94	60.57	57.21	53.84
BGF-M12-M16	M 12 – M 16	5.90	6	2.30	12.80	50	67.30	63.94	60.57	57.21	53.84
BGF-MKV	MCG*	5.90	6	2.30	12.80	50	67.30	63.94	60.57	57.21	53.84
BGF-PG07-PG48	PG 7 – PG 48	5.90	6	5.60	14.10	50	67.30	63.94	60.57	57.21	53.84

* MCG = metric cable gland

Info:

Please note that both, controller and production software, must be able to perform a helix movement.



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ACCESSORIES

9



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ACCESSORIES

DRILLS

Our drills are suitable for materials like plastics, non-ferrous metals and printed circuit boards. A comprehensive selection of over 100 drills is available here – starting from a cutting edge diameter of 0.2 mm.

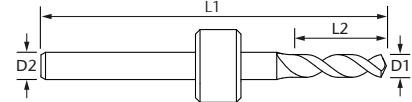
■ DRILLS WITH 3 MM SHANK

■ DRILLS WITH 6 MM SHANK



DRILLS WITH 3 MM SHANK

- especially for non-ferrous metals, plastics and printed circuit boards
- two different top angles depending on cutting edge diameter
- with stop ring (up to 3 mm cutting edge diameter); distance from tool tip to back of ring: 21 mm



	Article no.	for thread	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49		
DIAMOND TOOLS	PMMA ***	PVC foam ***	PVC hard ***	PP ***	PC ***	PE PS ***	alumin. soft ***	alumin. hard **	brass *	HPL *	alumin. compos. **	GRP CRP **	circuit boards ***
LANCES AND KNIVES	130° top angle, 32° torsion												
	LB-0020-3-035-38		0.20	3	3.5	38	5.00	4.75	4.50	4.25	4.00		
	LB-0030-3-035-38		0.30	3	3.5	38	5.00	4.75	4.50	4.25	4.00		
	LB-0040-3-055-38		0.40	3	5.5	38	4.50	4.28	4.05	3.83	3.60		
	LB-0050-3-070-38		0.50	3	7.0	38	4.50	4.28	4.05	3.83	3.60		
	LB-0060-3-070-38		0.60	3	7.0	38	4.50	4.28	4.05	3.83	3.60		
	LB-0070-3-105-38		0.70	3	10.5	38	4.50	4.28	4.05	3.83	3.60		
	LB-0080-3-105-38		0.80	3	10.5	38	4.50	4.28	4.05	3.83	3.60		
	LB-0090-3-105-38		0.90	3	10.5	38	4.50	4.28	4.05	3.83	3.60		
	LB-0100-3-105-38		1.00	3	10.5	38	4.50	4.28	4.05	3.83	3.60		
	LB-0110-3-105-38		1.10	3	10.5	38	4.50	4.28	4.05	3.83	3.60		
	LB-0120-3-105-38		1.20	3	10.5	38	4.50	4.28	4.05	3.83	3.60		
	LB-0130-3-105-38		1.30	3	10.5	38	4.50	4.28	4.05	3.83	3.60		

Article no.	for thread	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
130° top angle, 32° torsion										
LB-0140-3-105-38		1.40	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0150-3-105-38		1.50	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0160-3-105-38	M 2	1.60	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0170-3-105-38		1.70	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0180-3-105-38		1.80	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0190-3-105-38		1.90	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0200-3-105-38		2.00	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0210-3-105-38	M 2.5	2.10	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0220-3-105-38		2.20	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0230-3-105-38		2.30	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0240-3-105-38		2.40	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0250-3-105-38	M 3	2.50	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0260-3-105-38		2.60	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0270-3-105-38		2.70	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0280-3-105-38		2.80	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0290-3-105-38	M 3.5	2.90	3	10.5	38	4.50	4.28	4.05	3.83	3.60
LB-0300-3-105-38		3.00	3	10.5	38	4.50	4.28	4.05	3.83	3.60
165° top angle, 30° torsion										
LB-0310-3-120-38		3.10	3	12.0	38	9.50	9.03	8.55	8.08	7.60
LB-0320-3-120-38		3.20	3	12.0	38	9.50	9.03	8.55	8.08	7.60
LB-0330-3-120-38	M 4	3.30	3	12.0	38	9.50	9.03	8.55	8.08	7.60
LB-0340-3-120-38		3.40	3	12.0	38	9.50	9.03	8.55	8.08	7.60
LB-0350-3-120-38		3.50	3	12.0	38	9.50	9.03	8.55	8.08	7.60
LB-0360-3-120-38		3.60	3	12.0	38	11.00	10.45	9.90	9.35	8.80
LB-0370-3-120-38	M 4.5	3.70	3	12.0	38	11.00	10.45	9.90	9.35	8.80
LB-0380-3-120-38		3.80	3	12.0	38	11.00	10.45	9.90	9.35	8.80
LB-0390-3-120-38		3.90	3	12.0	38	11.00	10.45	9.90	9.35	8.80
LB-0400-3-120-38		4.00	3	12.0	38	11.00	10.45	9.90	9.35	8.80
LB-0410-3-120-38		4.10	3	12.0	38	11.00	10.45	9.90	9.35	8.80
LB-0420-3-120-38	M 5	4.20	3	12.0	38	11.00	10.45	9.90	9.35	8.80
LB-0430-3-120-38		4.30	3	12.0	38	11.00	10.45	9.90	9.35	8.80
LB-0440-3-120-38		4.40	3	12.0	38	11.00	10.45	9.90	9.35	8.80
LB-0450-3-120-38		4.50	3	12.0	38	11.00	10.45	9.90	9.35	8.80
LB-0460-3-120-38		4.60	3	12.0	38	13.00	12.35	11.70	11.05	10.40
LB-0470-3-120-38		4.70	3	12.0	38	13.00	12.35	11.70	11.05	10.40
LB-0480-3-120-38		4.80	3	12.0	38	13.00	12.35	11.70	11.05	10.40
LB-0490-3-120-38		4.90	3	12.0	38	13.00	12.35	11.70	11.05	10.40
LB-0500-3-120-38	M 6	5.00	3	12.0	38	13.00	12.35	11.70	11.05	10.40
LB-0510-3-120-38		5.10	3	12.0	38	14.50	13.78	13.05	12.33	11.60
LB-0520-3-120-38		5.20	3	12.0	38	14.50	13.78	13.05	12.33	11.60
LB-0530-3-120-38		5.30	3	12.0	38	14.50	13.78	13.05	12.33	11.60
LB-0540-3-120-38		5.40	3	12.0	38	14.50	13.78	13.05	12.33	11.60
LB-0550-3-120-38		5.50	3	12.0	38	14.50	13.78	13.05	12.33	11.60
LB-0560-3-120-38		5.60	3	12.0	38	16.00	15.20	14.40	13.60	12.80
LB-0570-3-120-38		5.70	3	12.0	38	16.00	15.20	14.40	13.60	12.80
LB-0580-3-120-38		5.80	3	12.0	38	16.00	15.20	14.40	13.60	12.80
LB-0590-3-120-38		5.90	3	12.0	38	16.00	15.20	14.40	13.60	12.80
LB-0600-3-120-38		6.00	3	12.0	38	16.00	15.20	14.40	13.60	12.80
LB-0650-3-120-38		6.50	3	12.0	38	17.50	16.63	15.75	14.88	14.00

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

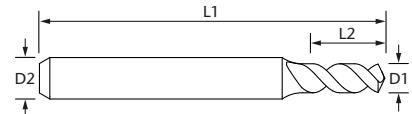
LANCES AND KNIVES

ACCESSORIES



DRILLS WITH 6 MM SHANK

- for drilling non-ferrous metals or thermosetting plastics and thermoplastics, as well as composites
- polished flutes reduce the risk of built-up edges and clogging of chips
- four-facet grinding with polished radius thinning of the chisel edge enables a very good centering



Article no.	for thread	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
130° top angle, short type										
KB-0160-6-120-50	M 2	1.60	6	12.0	50	18.60	17.67	16.74	15.81	14.88
KB-0200-6-120-50		2.00	6	12.0	50	18.60	17.67	16.74	15.81	14.88
KB-0210-6-120-50	M 2.5	2.10	6	12.0	50	18.60	17.67	16.74	15.81	14.88
KB-0250-6-120-50	M 3	2.50	6	12.0	50	18.60	17.67	16.74	15.81	14.88
KB-0290-6-120-50	M 3.5	2.90	6	12.0	50	18.60	17.67	16.74	15.81	14.88
KB-0300-6-120-50		3.00	6	12.0	50	18.60	17.67	16.74	15.81	14.88
KB-0330-6-120-50	M 4	3.30	6	12.0	50	18.60	17.67	16.74	15.81	14.88
KB-0370-6-120-50	M 4.5	3.70	6	12.0	50	18.60	17.67	16.74	15.81	14.88
KB-0400-6-120-50		4.00	6	12.0	50	18.60	17.67	16.74	15.81	14.88
KB-0420-6-120-50	M 5	4.20	6	12.0	50	18.60	17.67	16.74	15.81	14.88
KB-0500-6-120-50	M 6	5.00	6	12.0	50	18.60	17.67	16.74	15.81	14.88
KB-0600-6-120-50		6.00	6	12.0	50	18.60	17.67	16.74	15.81	14.88

Article no.	for thread	D1 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5 % 2–4	-10 % 5–9	-15 % 10–19	-20 % 20–49
130° top angle, long type										
KB-0300-6-220-60		3.00	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0310-6-220-60		3.10	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0320-6-220-60		3.20	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0330-6-220-60	M 4	3.30	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0340-6-220-60		3.40	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0350-6-220-60		3.50	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0360-6-220-60		3.60	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0370-6-220-60	M 4.5	3.70	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0380-6-220-60		3.80	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0390-6-220-60		3.90	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0400-6-220-60		4.00	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0410-6-220-60		4.10	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0420-6-220-60	M 5	4.20	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0430-6-220-60		4.30	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0440-6-220-60		4.40	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0450-6-220-60		4.50	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0460-6-220-60		4.60	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0470-6-220-60		4.70	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0480-6-220-60		4.80	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0490-6-220-60		4.90	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0500-6-220-60	M 6	5.00	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0510-6-220-60		5.10	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0520-6-220-60		5.20	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0530-6-220-60		5.30	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0540-6-220-60		5.40	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0550-6-220-60		5.50	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0560-6-220-60		5.60	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0570-6-220-60		5.70	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0580-6-220-60		5.80	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0590-6-220-60		5.90	6	22.0	60	21.70	20.62	19.53	18.45	17.36
KB-0600-6-220-60		6.00	6	22.0	60	21.70	20.62	19.53	18.45	17.36

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

10



MILLING
CUTTERSENGRAVING
TOOLSDEBURRING
TOOLSROUTER
BITSTHREAD
CUTTERS

DRILLS

DIAMOND
TOOLSLANCES
AND KNIVES

ACCESSORIES

DIAMOND TOOLS

Our single and double tooth cutters of polycrystalline diamonds and CVD thick film plates have a very high tool life and can be used without cooling. Additionally we offer polishing tools for acrylic glass made of monocrystalline and polycrystalline diamonds.

All diamond tools are regrindable for several times. Please send us your tools for regrinding individually wrapped. Prices for the regrinding service are available on request.

■ PCD POLISHING CUTTERS

■ MCD POLISHING CUTTERS

■ PCD POLISHING GRAVERS

■ MCD POLISHING GRAVERS

■ PCD SINGLE TOOTH CUTTERS

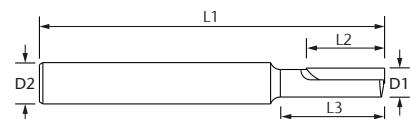
■ PCD DOUBLE TOOTH CUTTERS

■ CVD CUTTERS



PCD POLISHING CUTTERS

- carbide shank with polycrystalline diamond; center-cutting
- extra long cutting edges polish also very thick plates in one cycle
- for polishing acrylic glass edges and pockets of any contour
- after preparation with a regular milling cutter, you can remove 0.10 – 0.14 mm of the material per working cycle with this tool
- regrindable for several times



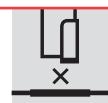
Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5% 2–4	-10% 5–9	-15% 10–19	-20% 20–49
PMMA ***										
PKD-PF-0400-6-100-0150-50	4.00	6	10.0	15.0	50	543.00	515.85	488.70	461.55	434.40
PKD-PF-0600-6-140-0180-50	6.00	6	14.0	18.0	50	585.00	555.75	526.50	497.25	468.00
PKD-PF-0800-8-180-0220-50	8.00	8	18.0	22.0	50	626.00	594.70	563.40	532.10	500.80
PKD-PF-1000-10-220-0260-60	10.00	10	22.0	26.0	60	668.00	634.60	601.20	567.80	534.40

Practical tip:

You will achieve the best polishing results if you do not remove more than 0.05 – 0.07 mm of material from the milled edges per step.

Info:

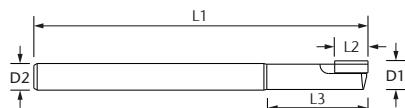
Since the diamond plate is electrically insulating, calibration with measuring systems that require electrical contact is not possible.





MCD POLISHING CUTTERS

- carbide shank with monocrystalline diamond of pure carbon
- glassy polishing edges (depending on machine)
- polishing of pockets with increased fill overlapping
- cuts sideways as well as downwards
- polishing acrylic glass edges and pockets of any contour
- regrindable for several times



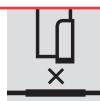
Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
PMMA										
with edge chamfer 0.15 mm × 45°										
MKD-PF-0400-4-050-0150-50	4.00	4	5.0	15.0	50	714.00	678.30	642.60	606.90	571.20
MKD-PF-0400-4-060-0150-50	4.00	4	6.0	15.0	50	807.00	766.65	726.30	685.95	645.60
MKD-PF-0600-6-050-0220-50	6.00	6	5.0	22.0	50	895.00	850.25	805.50	760.75	716.00
MKD-PF-0600-6-060-0250-57	6.00	6	6.0	25.0	57	994.00	944.30	894.60	844.90	795.20
MKD-PF-0600-6-080-0220-50	6.00	6	8.0	22.0	50	1,330.00	1,263.50	1,197.00	1,130.50	1,064.00

Practical tip:

You will achieve the best polishing results if you do not remove more than 0.05 – 0.07 mm of material from the milled edges per step.

Info:

Since the diamond plate is electrically insulating, calibration with measuring systems that require electrical contact is not possible.



MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

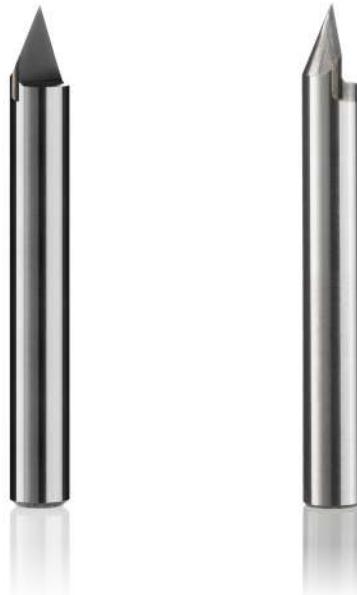
THREAD CUTTERS

DRILLS

DIAMOND TOOLS

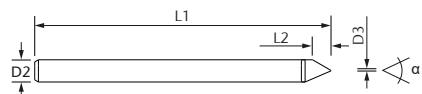
LANCES AND KNIVES

ACCESORIES



PCD POLISHING GRAVERS

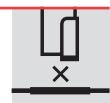
- carbide shank with polycrystalline diamond
- top angles of 60° and 90°
- up to an immersion depth of about 0.1 – 0.2 mm you can engrave directly
- up to the maximum engraving depth you have to pre-engrave with a regular graver
- for polishing chamfers or engravings in acrylic glass
- regrindable for several times



Article no.	α	D3 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2–4	-10% 5–9	-15% 10–19	-20% 20–49
PMMA ***										
PKD-PS-060-020-6-50	60°	0.20	6	4.5	50	357.00	339.15	321.30	303.45	285.60
PKD-PS-090-010-6-50	90°	0.10	6	2.5	50	357.00	339.15	321.30	303.45	285.60

Info:

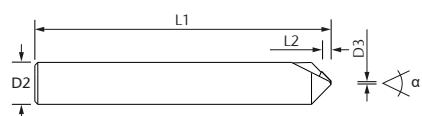
Since the diamond plate is electrically insulating, calibration with measuring systems that require electrical contact is not possible.





MCD POLISHING GRAVERS

- carbide shank with monocrystalline diamond for crystal clear engravings (depending on machine)
- top angles of 60° and 90°
- up to an immersion depth of about 0.1 – 0.2 mm you can engrave directly
- up to the maximum engraving depth of approximately 2 mm you have to pre-engrave with a regular graver
- for polishing chamfers or engravings in acrylic glass
- regrindable for several times



Article no.	α	D3 (mm)	D2 (mm)	L2 (mm)	L1 (mm)	Price in €	-5% 2–4	-10% 5–9	-15% 10–19	-20% 20–49
PMMA ***										
MKD-PS-060-030-4-50	60°	0.30	4	2.0	50	615.00	584.25	553.50	522.75	492.00
MKD-PS-060-030-6-50	60°	0.30	6	2.0	50	615.00	584.25	553.50	522.75	492.00
MKD-PS-090-030-4-50	90°	0.30	4	2.0	50	615.00	584.25	553.50	522.75	492.00
MKD-PS-090-030-6-50	90°	0.30	6	2.0	50	615.00	584.25	553.50	522.75	492.00

Info:

Since the diamond plate is electrically insulating, calibration with measuring systems that require electrical contact is not possible.



MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

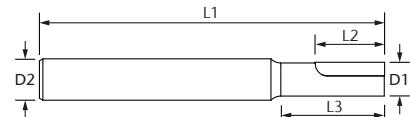
LANCES AND KNIVES

ACCESSORIES



PCD SINGLE TOOTH CUTTERS

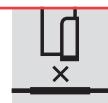
- carbide shank equipped with one polycrystalline diamond; center-cutting
- very fine granulation and extremely hard
- very long tool life
- especially for plastics which do not tend to smear and for non-ferrous metals
- regrindable for several times



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
	PVC hard	PP	PC	alumin. soft	HPL	GRP CRP				
PKD-ES-0300-3-050-0080-40	3.00	3	5.0	8.0	40	140.00	133.00	126.00	119.00	112.00
PKD-ES-0300-3-100-0130-40	3.00	3	10.0	13.0	40	166.00	157.70	149.40	141.10	132.80
PKD-ES-0300-6-035-0055-42	3.00	6	3.5	5.5	42	129.00	122.55	116.10	109.65	103.20
PKD-ES-0400-4-080-0110-50	4.00	4	8.0	11.0	50	166.00	157.70	149.40	141.10	132.80
PKD-ES-0400-4-140-0170-50	4.00	4	14.0	17.0	50	186.00	176.70	167.40	158.10	148.80
PKD-ES-0500-6-100-0150-50	5.00	6	10.0	15.0	50	202.00	191.90	181.80	171.70	161.60
PKD-ES-0600-6-100-0150-50	6.00	6	10.0	15.0	50	202.00	191.90	181.80	171.70	161.60
PKD-ES-0600-6-200-0250-50	6.00	6	20.0	25.0	50	274.00	260.30	246.60	232.90	219.20
PKD-ES-0800-8-100-0150-50	8.00	8	10.0	15.0	50	233.00	221.35	209.70	198.05	186.40
PKD-ES-0800-8-200-0250-60	8.00	8	20.0	25.0	60	326.00	309.70	293.40	277.10	260.80

Info:

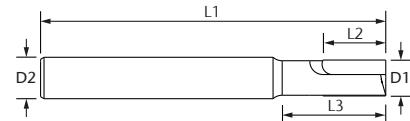
Since the diamond plate is electrically insulating, calibration with measuring systems that require electrical contact is not possible.





PCD DOUBLE TOOTH CUTTERS

- carbide shank equipped with two cutting plates of polycrystalline diamond; center-cutting
- best surface qualities
- very long tool life
- for machining aluminium without cooling
- also for reinforced plastics and composites
- regrindable for several times



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5% 2-4	-10% 5-9	-15% 10-19	-20% 20-49
PVC hard	PP	PC	alumin. soft	HPL	GRP CRP					
*	*	*	*	**	***					
PKD-ZS-0500-6-100-0150-50	5.00	6	10.0	15.0	50	305.00	289.75	274.50	259.25	244.00
PKD-ZS-0600-6-100-0150-50	6.00	6	10.0	15.0	50	305.00	289.75	274.50	259.25	244.00
PKD-ZS-0600-6-200-0250-50	6.00	6	20.0	25.0	50	357.00	339.15	321.30	303.45	285.60
PKD-ZS-0800-8-100-0150-50	8.00	8	10.0	15.0	50	336.00	319.20	302.40	285.60	268.80
PKD-ZS-0800-8-200-0250-60	8.00	8	20.0	25.0	60	409.00	388.55	368.10	347.65	327.20

Info:

Since the diamond plate is electrically insulating, calibration with measuring systems that require electrical contact is not possible.



MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

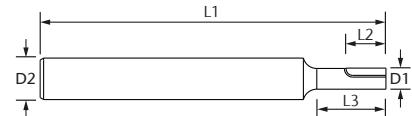
LANCES AND KNIVES

ACCESSORIES



CVD CUTTERS

- carbide shank equipped with one or two CVD cutting plates; center-cutting
- very homogeneous diamond structure and an extremely smooth cutting edge
- regrindable for several times
- greater hardness and resistance to wear than PCD tools
- ideal for abrasive materials like GRP/CRP, but also for aluminum and plastics which do not tend to smear



Article no.	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
PVC hard * PP * PC * alumin. soft * HPL ** GRP CRP ***										

CVD single tooth cutter

CVD-ES-0300-6-050-0100-50	3.00	6	5.0	10.0	50	264.00	250.80	237.60	224.40	211.20
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CVD double tooth cutters

CVD-ZS-0400-6-060-0120-50	4.00	6	6.0	12.0	50	347.00	329.65	312.30	294.95	277.60
CVD-ZS-0600-6-100-0140-50	6.00	6	10.0	14.0	50	388.00	368.60	349.20	329.80	310.40
CVD-ZS-0800-8-120-0160-50	8.00	8	12.0	16.0	50	440.00	418.00	396.00	374.00	352.00
CVD-ZS-1000-10-080-0180-60	10.00	10	8.0	18.0	60	440.00	418.00	396.00	374.00	352.00

Info:

Since the diamond plate is electrically insulating, calibration with measuring systems that require electrical contact is not possible.



MILLING CUTTERS	ENGRAVING TOOLS	DEBURRING TOOLS	ROUTER BITS	THREAD CUTTERS	DRILLS	DIAMOND TOOLS	LANCES AND KNIVES	ACCESSORIES
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11



LANCES AND KNIVES

For all materials which can be better cut than milled, we offer various lances and knives up to 70 mm cutting edge length which can be used with vhf cutting heads.

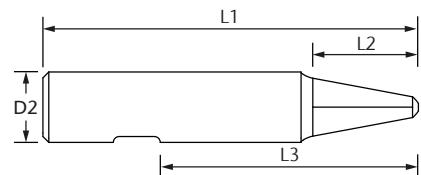
- **LANCES FOR OSCILLATING TANGENTIAL CUTTING HEAD**
- **LANCES FOR TANGENTIAL CUTTING HEAD**
- **KNIVES FOR DRAG KNIFE UNIT**
- **KNIVES FOR UNIVERSAL HEAD**
- **KNIVES FOR XtraUnit**



LANCES

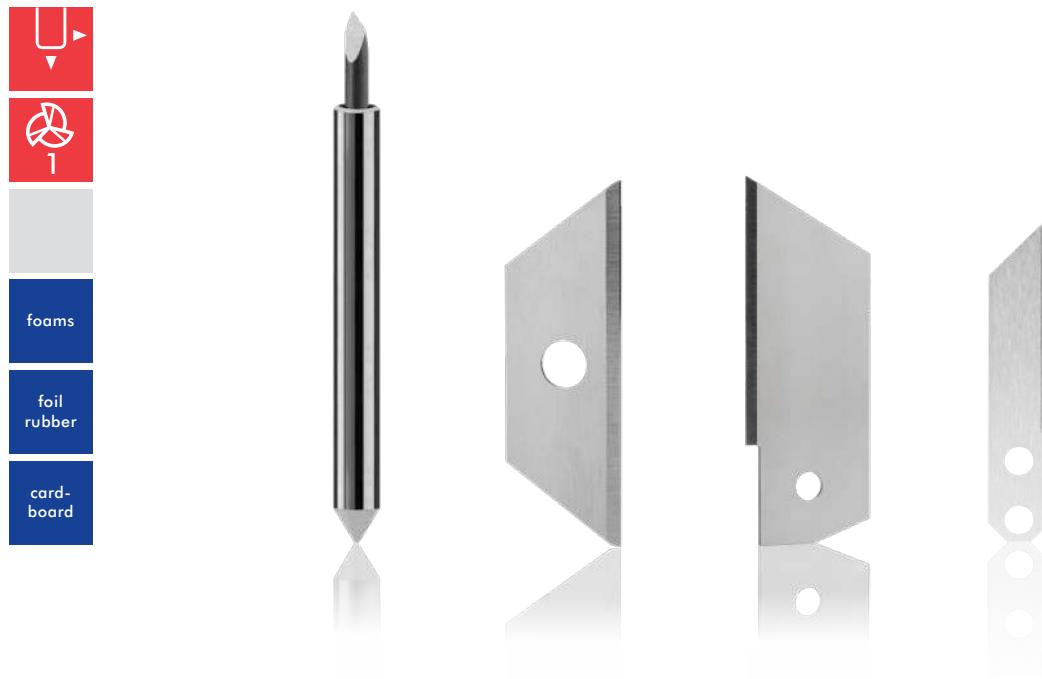
- especially for the vhf oscillating tangential head; for materials which can be better cut than milled
- the lance for the tangential cutting head is especially suitable for foil cutting

- especially thin for cutting narrow curve radii; single-edged
- application fields: cardboard, foams, softer sandwich materials
- side clamping area in cutting direction



Article no.	Type	D2 (mm)	L2 (mm)	L3 (mm)	L1 (mm)	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19	-20 % 20-49
lances for oscillating tangential cutting head										
HL-OT-05ES	extra thin	6	5.0	10.0	18	34.20	32.49	30.78	29.07	27.36
HL-OT-10ES	extra thin	6	10.0	15.0	23	41.40	39.33	37.26	35.19	33.12
HL-OT-12ES	extra thin	6	12.0	17.0	25	44.50	42.28	40.05	37.83	35.60
HL-OT-15ES	extra thin	6	15.0	20.0	28	48.60	46.17	43.74	41.31	38.88
HL-OT-20ES	extra thin	6	20.0	25.0	33	55.90	53.11	50.31	47.52	44.72
HL-OT-27ES	extra thin	6	27.0	32.0	40	66.20	62.89	59.58	56.27	52.96
HL-OT-50 ¹		6	50.0	57.0	65	133.50	126.83	120.15	113.48	106.80
HL-OT-70 ¹		6	70.0	75.0	83	164.60	156.37	148.14	139.91	131.68
lance for tangential cutting head + kiss-cut attachment of the multi unit and the XtraUnit										
HL-T-2.5-55	55° cutting edge	6	1.6	17.0	27	34.20	32.49	30.78	29.07	27.36

¹ Please note that you can use only lances with a cutting edge length of up to 27 mm in the oscillating tangential cutting head of a multi unit if you are working with the universal head at the same time.



KNIVES

- standard knife for vhf drag knife units – ideal for foils with carrier layer
- trapeze knife with 2 and 5 mm for vhf straight cutting attachment
- V-cut knife for 45° diagonal cutting for vhf V-cut attachment
- knife for vhf multi unit/universal head
- knife for XtraUnit for V-cut or straight cut

Article no.	Type	Price in €	-5% 2–4	-10% 5–9	-15% 10–19	-20% 20–49
knife for drag knife unit						
HL-SM-STD	standard drag knife	33.10	31.45	29.79	28.14	26.48
knives for universal head						
MUK-SC-02	trapeze knife – for straight cutting attachment, 2 and 5 mm (10 pieces)	5.20	4.94	4.68	4.42	4.16
MUK-SC-25	standing knife 25 mm (10 pieces)	10.40	9.88	9.36	8.84	8.32
MUK-VC	V-cut knife (5 pieces)	61.10	58.05	54.99	51.94	48.88
knives for XtraUnit						
X-VC-16	V-cut knife, immersion depth 16 mm, cutting edge length 29.5 mm	36.00	34.20	32.40	30.60	28.80
X-VC-2.5-10	knife for straight cut and V-cut, immersion depth 2.5 mm, 5 mm and 10 mm cutting edge length 19.5 mm	29.00	27.55	26.10	24.65	23.20

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

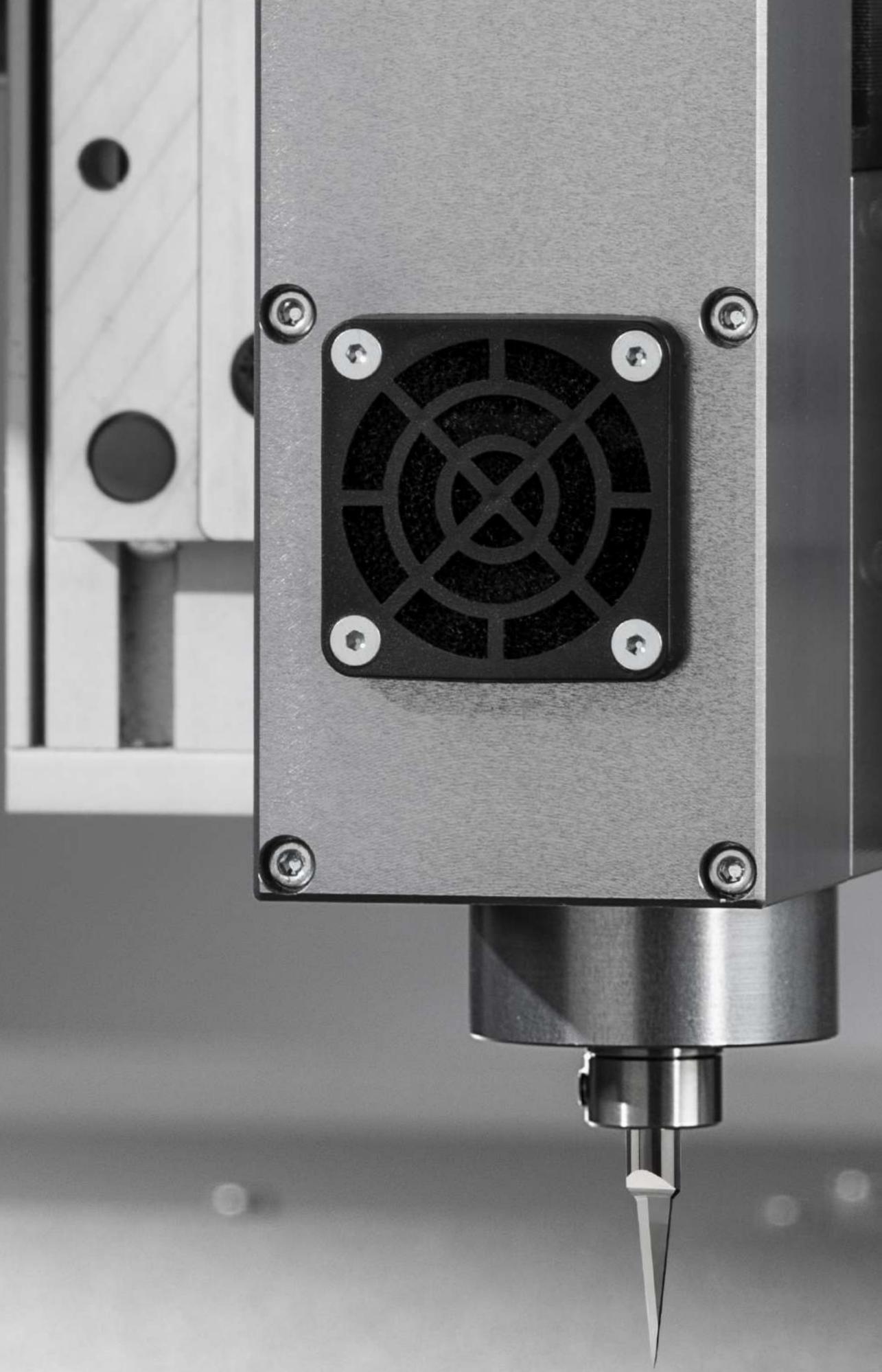
THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES





SO THAT YOUR PROJECTS DO NOT STAND ON A
KNIFE EDGE. QUALITY TOOLS BY VHF.

12



ACCESSORIES

In this section you will find vacuum fleece and cutting mats, adhesive film, stop rings, reducing bushes for the usage of smaller tools in bigger collet chucks as well as coolants.

- **VACUUM FLEECE AND CUTTING MATS**
- **SPECIAL ADHESIVE FILM**
- **STOP RINGS**
- **REDUCING BUSHES**
- **COOLANTS**

You can also find this and other accessories in our online store at shop.vhf.de



VACUUM FLEECE AND CUTTING MATS

- special, foamed material which is permeable to air
- vacuum fleece: extra thin type with a thickness of 1 mm and especially great holding force is particularly suitable for machining smaller workpieces; type with a thickness of 2 mm has a longer durability

- workpieces will still be fixed safely even if some areas of the table remain uncovered
- vacuum cutting mats: for all cutting applications; yields only very little when the vacuum is turned on

Article no.	Description	Price in €	-5% 2–9	-10% 10–14	-15% 15–29	-25% ≥ 30
vacuum fleece from the roll, charged per linear meter						
ET-SV-VV-01-R1	1 mm thickness, 1 m width	13.00	12.35	11.70	11.05	9.75
ET-SV-VV-02-R05	2 mm thickness, 0.5 m width	11.50	10.93	10.35	9.78	8.63
ET-SV-VV-02-R1	2 mm thickness, 1 m width	21.50	20.43	19.35	18.28	16.13
vacuum fleece, cut into squares						
ET-SV-VV-02-05	2 mm thickness, 500 x 500 mm packaging unit 5 pieces	34.00	32.30	30.60	28.90	25.50
Article no.	Description	Price in €	-5% 2–4	-10% 5–9	-15% 10–19	-20% 20–49
vacuum cutting mats, cut into pieces						
ET-SVT-VSU-1015	2.5 mm thickness, 1,020 x 1,520 mm	92.00	87.40	82.80	78.20	73.60
ET-SVT-VSU-1020	2.5 mm thickness, 1,020 x 2,020 mm	118.00	112.10	106.20	100.30	94.40



SPECIAL ADHESIVE FILM

- for fixing workpieces directly on the polystyrene surface or a similar surface
- especially thin (80 µm thickness)

Article no.	Description	Price in €	-5% 2–4	-10% 5–9	-15% 10–19
ET-XF-DX1	special adhesive film DX 1, 25 m x 50 cm – regular adhesive force	145.00	137.75	130.50	123.25
ET-XF-DX2	special adhesive film DX 2, 25 m x 50 cm – double adhesive force	145.00	137.75	130.50	123.25



STOP RINGS

- stop rings made of brass (AR-...N) are designed for the tool fittings of a high frequency spindle tool changer
- plastic stop rings (AR-300K) are suitable for changing the tools manually
- optional ringing set for equipping tools with stop rings; the set consists of a ringing plate and a steel pin punch – all you need is a small hammer.

Article no.	Int. Ø	Ext. Ø	Height	PU	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19
AR-300K	3 mm	7.7 mm	4.9 mm	20 pcs.	4.50	4.28	4.05	3.83
AR-300N	3 mm	10.6 mm	6.5 mm	5 pcs.	11.00	10.45	9.90	9.35
AR-400N	4 mm	10.6 mm	6.5 mm	5 pcs.	11.00	10.45	9.90	9.35
AR-500N	5 mm	10.6 mm	6.5 mm	5 pcs.	11.00	10.45	9.90	9.35
AR-600N	6 mm	10.6 mm	6.5 mm	5 pcs.	11.00	10.45	9.90	9.35
AR-600N-9	6 mm	9.0 mm	5.5 mm	5 pcs.	11.00	10.45	9.90	9.35

Article no.	Description	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19
AR-BP-SET	ringing set (10.6 mm) with pin punch	18.00	17.10	16.20	15.30
AR-BP-SET-9	ringing set (9 mm) with pin punch	18.00	17.10	16.20	15.30



REDUCING BUSHES

- e.g. clamping a tool with a shank diameter of 4 mm into a collet chuck with a diameter of 6 mm when you use the reducing bush RH-46
- for clamping tools with a smaller shank diameter into a larger collet chuck

Article no.	Int. Ø	Ext. Ø	Length	Price in €	-5 % 2-4	-10 % 5-9	-15 % 10-19
RH-36	3 mm	6 mm	20 mm	16.00	15.20	14.40	13.60
RH-46	4 mm	6 mm	20 mm	16.00	15.20	14.40	13.60

MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES



COOLANTS

- for some kinds of materials, it is absolutely necessary to use a cooling lubricant
- for better results and an extended tool life for engraving or milling

	Article no.	Description	Application	Usage in*	Price in €	-10% 5–9	-15% 10–19	-20% ≥20
ET-MK-AT		cooling lubricant AquaTec® (1 liter) water-soluble application concentration 6–7%	for milling, drilling, cutting steel	CSU	20.50	18.45	17.43	16.40
ET-MK-ALUN		spray lubricant ALU-N (1 liter)	for milling, cutting, sawing non-ferrous metals	CSU	11.50	10.35	9.78	9.20
ET-MK-ALUN-5L		spray lubricant ALU-N (5 liters)	as above	CSU	44.00	39.60	37.40	35.20
ET-MK-WSP20		special lubricant WSP 20 (1 liter)	for working on non-ferrous metals and steel	MQL	29.00	26.10	24.65	23.20
ET-MK-WSP20-5L		special lubricant WSP 20 (5 liters)	as above	MQL	118.00	106.20	100.30	94.40
239117		cooling lubricant Tec Liquid Pro (1 liter) water-soluble application concentration 5 %	for working on non-ferrous metals and steel/stainless steel	CSU MQL	19.00	17.10	16.15	15.20
239118		cooling lubricant Tec Liquid Pro (5 liters)	as above	CSU MQL	89.00	80.10	75.65	71.20

* CSU = cooling and spraying unit | MQL = minimum quantity lubrication unit

MORE ACCESSORIES IN THE VHF SHOP

■ collet chucks



■ clamping devices



■ suction shoes



■ cap nuts



■ pneumat. clamping devices



■ lubricants



■ jaw, hook and pin wrenches



■ vises



■ cleaners



■ cones



■ polystyrene stripes, adhesive



■ accessories for suction units



■ tool fittings



■ slide nuts for T-slots



■ vacuum suction units



■ service sets for collet chucks



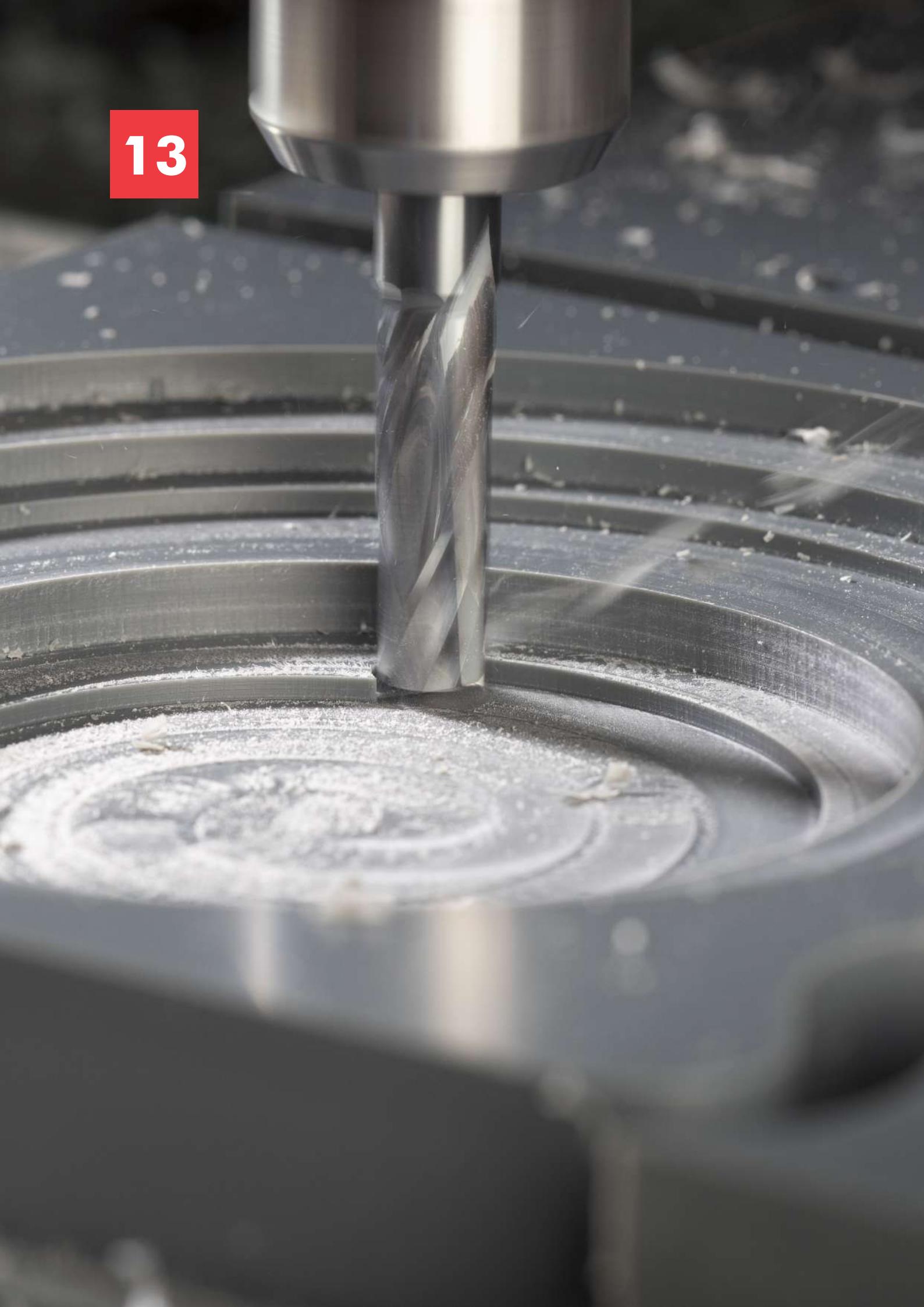
■ vacuum adapter mats



MILLING CUTTERS
ENGRAVING TOOLS
DEBURRING TOOLS
ROUTER BITS
THREAD CUTTERS
DRILLS
DIAMOND TOOLS
LANCES AND KNIVES
ACCESORIES

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13



MILLING CUTTERS

ENGRAVING TOOLS

DEBURRING TOOLS

ROUTER BITS

THREAD CUTTERS

DRILLS

DIAMOND TOOLS

LANCES AND KNIVES

ACCESSORIES

APPENDIX

In this section you will find helpful practical tips and information on the use of tools.

■ USING TOOLS

■ THE RIGHT NUMBER OF TEETH

■ SETTING THE MACHINING PARAMETERS

■ CHOICE OF THE MILLING DIRECTION

■ SETTING THE IMMERSION DEPTH

■ COOLING/LUBRICATION

■ WHAT TO DO IN CASE OF PROBLEMS?

■ YOUR CONTACT TO VHF

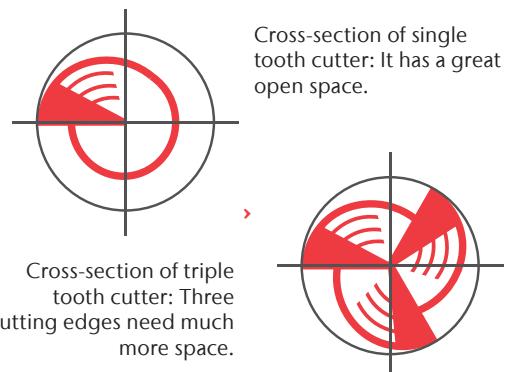
USING TOOLS

- Always choose a milling cutter which is suitable for the material which you process. Please note the corresponding icons and more detailed information in the description texts and use our recommendation matrix on page 22.
- The cutting edge length of the tool should be as short as possible and as long as necessary. It should be clamped as deep as possible into the collet chuck.
- If your material is not listed, select the material from the corresponding main category (plastics, non-ferrous metals, ...) that most closely matches your material in terms of hardness.

plastics	non-ferr. metals
***	***
ferrous metals	compo-sites
***	***
wood	

THE RIGHT NUMBER OF TEETH

- Single tooth cutters offer the largest open space in the chip flute and thus counteract the clogging of the cutter by material chips; so they have the lowest risk of clogging.
- The more cutting edges a milling tool has, the more the open space decreases, but at the same time, the wear is distributed over several cutting edges. The cutter also runs rounder and the surface becomes smoother.
- For plastics and non-ferrous metals, the single tooth cutter is the best option. A double tooth cutter is recommended when you are working on thermosetting plastics or harder sorts of aluminum. We recommend multi-tooth cutters almost exclusively for ferrous material.



SETTING THE MACHINING PARAMETERS

Given the multitude of parameters that interact with each other, it is not possible to provide general information about the tool parameters, so here are just a few general tips. **In any case, you must comply with all safety and security regulations of the machine!**

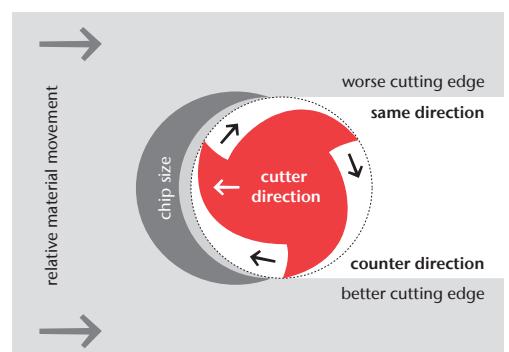
- In order to set optimal values for lowering speed, immersion depth, feed rate, and spindle speed when machining your workpieces, a large number of factors play a role, which you will find in the adjacent guiding questions.
- When you set the operational parameters, you should approach from the safe side, so you should choose at first for most materials a lower lowering speed, immersion depth and feed rate and then increase them gradually.

Guiding questions:

- › What material is the workpiece made of?
- › How is the workpiece fixed?
- › Type of coolant/lubricant?
- › Power/maximum rotational speed of the spindle?
- › Minimum/maximum feed rate of the machine?
- › Stiffness of the machine?

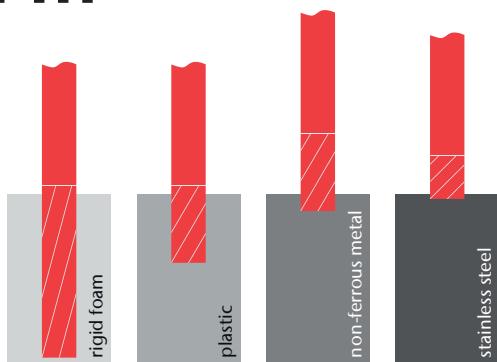
CHOICE OF THE MILLING DIRECTION

- The cutting edge runs in the counter direction as well as in most parts of the same direction against massive material. However, immediately before the exit, there is not much material left. So the last bit will often be rather torn off instead of being cleanly cut. Therefore the counter direction becomes smoother than the same direction.
- Thus we recommend to mill internal contours clockwise and external contours counterclockwise.
- However, a comparison is always recommended, as the effect varies depending on the machine, material and tool geometry.



SETTING THE IMMERSION DEPTH

- The immersion depth depends on the power of your spindle and on the stiffness of your machine. In case of doubt: When you mill deeper slots it is better to remove the material in several steps.
- General guidelines for the relationship of immersion depth and cutting edge diameter:
 - rigid foam up to 5-fold diameter
 - plastics (acrylic glass, etc.) up to 2-fold diameter
 - aluminium up to 0.5-fold diameter
 - steel up to 0.3-fold diameter
 - stainless steel up to 0.2-fold diameter.



COOLING/LUBRICATION

- The cooling with air or lubricant improves the surface quality and prolongs the tool life. If cooling is not possible, the recommended minimum values for rotational speed should be adhered to; the feed rate, however, should not be set too slow. In this case, the heat dissipation will be made by the chips, otherwise there is a risk of excessive heat generation.
- Recommended coolants/lubricants:
 - Aluminium: spray lubricant ALU-N or minimum quantity lubricant WSP 20 or Tec Liquid Pro
 - Steel/stainless steel: emulsion of spray lubricant AquaTec® and water or minimum quantity lubricant WSP 20 or Tec Liquid Pro
 - Plastics/acrylic glass: dry processing with chip extraction or cooling with compressed air.



WHAT TO DO IN CASE OF PROBLEMS?

- Melting of plastics: Reduce the rotational speed and increase the feed rate at the same time.
- Plugged milling cutter: Reduce immersion depth and avoid heat generation.
- Burr formation: Increase the cooling or increase the feed rate and reduce rotational speed and removal rate at the same time.
- Tool breakage: Reduce the feed rate and/or the immersion depth; check the collet chuck.
- If your machine permits only lower rates of feed than it would be possible according to tool and material data, you should reduce feed rate and rotational speed accordingly.



Ask us!

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