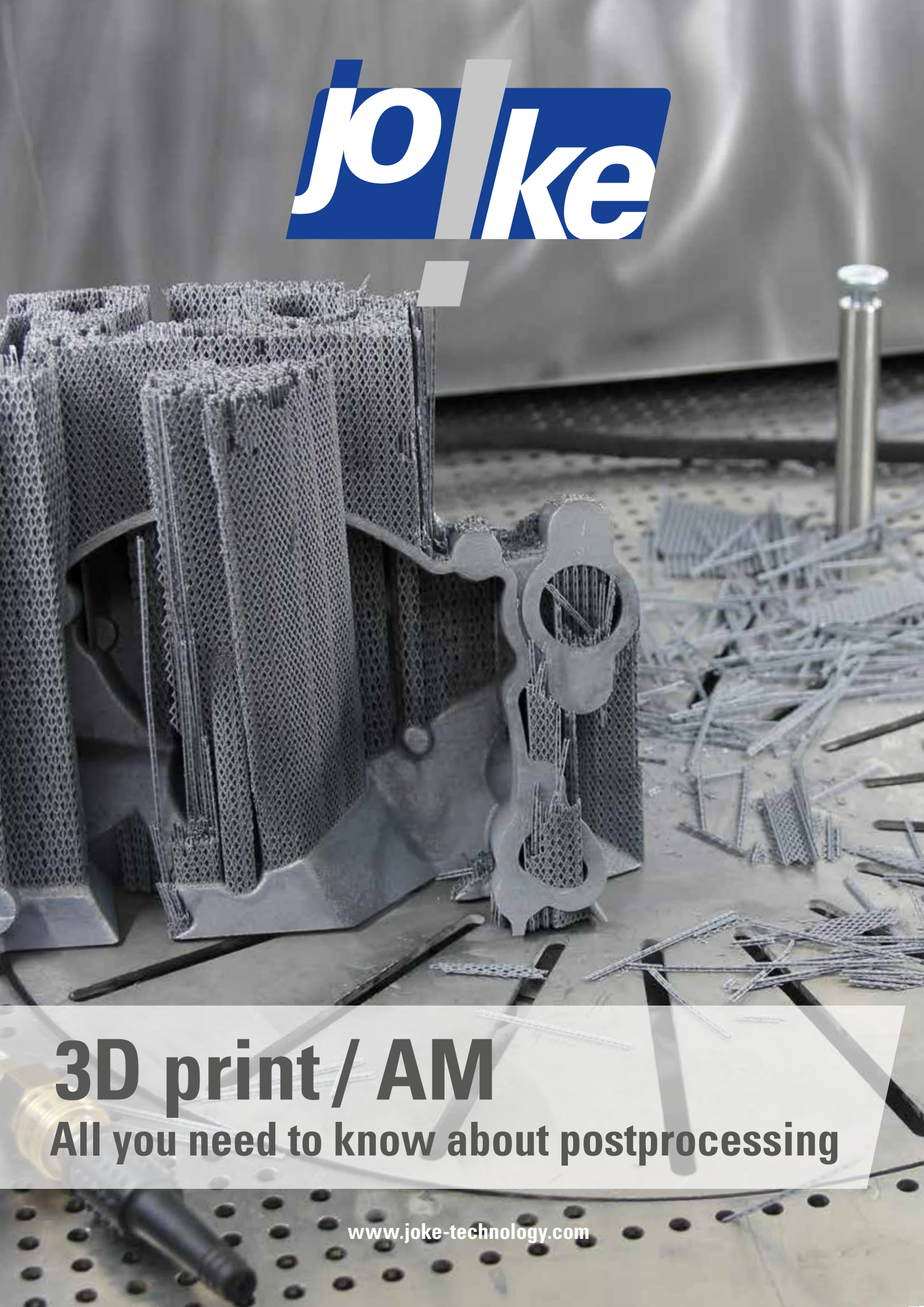


3D print / AM

All you need to know about postprocessing

www.joke-technology.com

The complete range for 3D postprocessing

Additive manufacturing" processes have become indispensable in today's world. They are becoming more and more important every day. One problem often remains however - postprocessing – as well as the eternal questions

- How do I remove the support structures quickly and easily without damaging the mould?
- What is the quickest and most effective way of achieving my desired surface?
- How do I process moulds that are difficult to access?
- How do I protect myself against residual powder and dust?
- How do I deal with reactive substances safely?

In our "3D/AM postprocessing" guide, we take a detailed look at the individual working stages and present you with the right devices and tools, especially for post-processing additively manufactured parts. In addition, you will find in our ENESKApostprocess a worldwide unique workstation for safe and complete post-processing.

These topics often require professional assistance.
You can reach us during business hours on phone +49 (0) 22 04 / 8 39-0 and via e-mail sales@joke.de.

We are looking forward to hearing from you!

Yours sincerely,

Frank Westerhoff
Head of Export

Content

Risks for users

User protection is a crucial challenge in additive manufacturing and its reworking. During postprocessing, residual powder, dust and chips are regularly released. Depending on the material used, the risks are enormous as they cannot only be **extremely harmful to health** but also **explosive**.

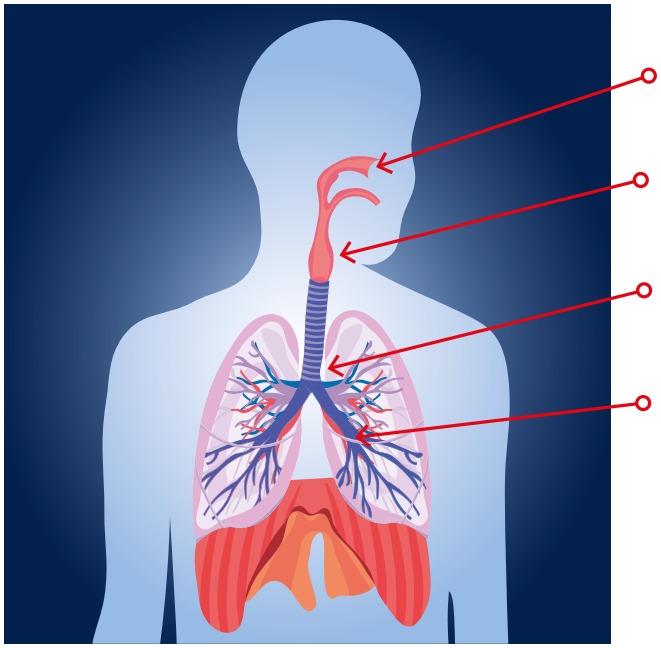
With the ENESKApostprocess, joke has set itself the task of developing a single workstation for all stages of manual reworking - all with **full protection against the aforementioned risks.**

The workstation provides a **completely enclosed work area**, equipped with electrical and pneumatic tools as well as powerful suction devices. It can be supplemented with a wide range of tools and accessories, so that the right tool is always on hand and the station can be fully adapted to individual needs and requirements.

Safe working instead of silicosis
The respirable dusts released during postprocessing are implicated among other aspects in **cancerous, respiratory and cardiovascular diseases**. That is why the spacious working area of the ENESKApostprocess is completely encased and enclosed. Equipped with safe extraction and filtering equipment, no dust or chips can escape from the protected area. There is an approximately ten-second post-suction phase before the unit can be opened - only then is the system unlocked and the finished workpiece can be removed. The station therefore obeys important “golden rules” of accident prevention for dust control - for example, extraction directly at the point of origin.

Preventing explosions and deflagrations
Particularly with reactive substances, such as titanium and aluminium, **explosions and fires may occur simply through friction of individual particles.** Therefore, all components of the ENESKApostprocess are completely earthed to prevent spark discharge. An integrated moisture separator is optionally available for highly reactive substances. The extraction system achieves an impressive output of 350 m³/h and its suction power is further enhanced by the side channel compressor. In addition, a compressed-air gun assists cleaning in concealed corners. This means that the fine dusts can be reliably removed from really all crevices and openings in a workpiece without the risk of explosion.

Sites at which fine dust attack the airways:
The smaller the particles, the deeper they penetrate into the pulmonary system where they enter the bloodstream!



Site of attack	particle size
Nose and pharynx	5 - 10 µm
Trachea	3 -5 µm
Bronchi bronchioles	2 - 3 µm 1 - 2 µm
Alveoli (pulmonary vesicle)	0.1 - 1 µm

ENESKApostprocess
Safety postprocessing

The standard of safety during manual postprocessing is inadequate in many companies. Protective suits are often only worn during individual working stages and are of no help against the risk of deflagration. Moreover, the working areas are not protected from invisible airborne dusts, which are usually underestimated. This is precisely where ENESKApostprocess from joke can help you.

Particular caution is required when processing reactive materials. In this case, it is not only the dusts that can ignite through friction; the material is also highly flammable and therefore carries higher risks of explosion and deflagration. A special moisture extractor with 5-fold filtration and explosion protection according to ATEX standard guarantees safe work. An integrated liquid bath binds the reactive particles which are thus unable to develop their explosive effect.

Titanium or aluminium are the common materials that most users recognised as reactive, but many alloys also have references to minimum ignition energy of less than one mJ in their data sheets.

Are you not sure? We will be pleased to advise you.

	Design	Order No.	Price from 1 piece
ENESKApostprocess incl. extraction with wet separator for reactive materials			
 • Suitable for materials with a minimum ignition energy above one mJ • With explosion protection according to ATEX standard • Moisture separator suitable for zone 22 • 5-fold filtration • Extraction capacity / volumetric flow: max. 350 m^3/h • Incl. FSX automatic fine dust measuring system (for further information, see order no. 0 210 306) • Materials to be processed: incl. among others aluminium and titanium	-	**0 210 010**	59800.00 €
	With height adjustment	**0 210 012**	62300.00 €

Technical data

	ENESKApostprocess
Weight:	580 kg (order no. 0 210 000) 600 kg (order no. 0 210 010)
Dimensions of the working chamber (W x D x H):	940 x 790 x 250-600 mm
Device dimensions (W x D x H):	1.300 x 1.500 x 1.790 mm (0 210 012 1.300 x 1.500 x 1640/1940 mm (0 210 012
Lighting:	ca. 5,000 K / ca. 3,300 lm, dimmable
Supply voltage:	400 V / 16 A, 50 / 60 Hz, ca. 4 kW

Further voltage variants on request.

ENESKApostprocess
Safety postprocessing

This variant of ENESKApostprocess was developed for the processing of non-reactive materials. However, respirable dusts are also an issue with steel, stainless steel and Inconel. The ENESKApostprocess helps enormously in this case and protects you and your colleagues from hazardous particles. Wearing cumbersome protective suits is also no longer required.

A large working chamber of approx. 0.75 m² offers sufficient space even for the largest 3D-produced workpieces. There are numerous possibilities for connecting various tools simultaneously at the same workplace – whether pneumatic or electric.

Dimmable light, a large glass front and ergonomically shaped hand apertures make everyday work very pleasant.

	Design	Order No.	Price from 1 piece
ENESKApostprocess incl. extraction for non-reactive materials			
 Special features of the ENESKApostprocess incl. extraction for non-reactive materials: • Dry extractor with explosion protection according to ATEX standard • Triple filtration • Extraction capacity / volumetric flow: max. 350 m³/h • Optionally with FSX automatic fine dust measuring system (more Information see order no. 0 210 306 • Materials to be processed: incl. among others, steel, stainless steel, Inconel and various plastics	-	**0 210 000**	47800.00 €
	With height adjustment	**0 210 003**	50300.00 €

Accessories / spare parts

	Order No.	Price from 1 piece
ENESKApostprocess automatic fine dust measurement FSX		
 The FSX automatic fine dust measuring system from joke is to be included in the order for your ENESKApostprocess! The FSX cannot be retrofitted! • Precise dust measurement – independent of gas velocity or particle charge • No external purge air unit required as it is integrated in the unit (option) • Low cost and maintenance due to self-monitoring • Independent measuring device • Automatic monitoring of zero and reference point • Robust and compact design • No moving parts in the duct	**0 210 306**	8200.00 €

Comparison of the variants

ENESKApostprocess or **reactive** substances (order no. **0 210 010**)	ENESKApostprocess for **non-reactive** substances (order no. **0 210 000**)
Extraction system suitable for continuous operation, for extracting **flammable dusts** – MIE ≥ 1 mJ	Extraction system suitable for continuous operation, for extracting **dusts** – MIE ≥ 1 mJ
5-fold filtration, including moisture separator, suitable for zone 22 ATEX II 3D c T 125 °C, 5-fold filtration, removal efficiency: 99.95%	**33-fold filtration, removal efficiency: 99.95%**
Exchangeable, stainless steel collection tank with **drain cock, inert oil (approx. 30 L)**, tank capacity 100 litres	Exchangeable, stainless steel collection tank, tank capacity 100 litres
M star-shaped filter, antistatic with manual cleaning	M star-shaped filter, antistatic with manual cleaning
H14 filter cassette, antistatic	H14 filter cassette, antistatic
Wet filter cassette, earthed	–
Filter bag MC K4 microfibre, antistatic	–

ENESKApostprocess

Advantages at a glance

- High standard of safety
- No risk of explosion or deflagration
- No permanent damage due to respirable dust
- No need for additional protective clothing
- Ergonomic working and simple operation
- Many options for connecting various tools – either pneumatic or electric.

Work steps that you can perform

- Removal of residual powder
- Separation from the substrate material
- Removal of support structures
- Deburring
- Coarse surface finishing
- Fine surface finishing
- Finish

Materials that you can process

- Steel
- Stainless steel
- Aluminium
- Titanium
- Carbon
- Inconel
- Brass
- Ceramic
- PEEK
- POM
- Plastics
- Rubber-like materials
- Gypsum
- and many more

Use belt grinder

Use hand-filing machine

Use hand-filing machine

Demonstration ENESKApostprocess

Would you like a date for a personal demonstration?

We are out and about every day in Germany and some neighbouring countries. You can test our system with your workpieces on your premises. We have everything on board!

Would you like a personal demonstration?
Mr. Fielenbach will be glad to arrange the next possible appointment with you.
You can contact him at **+49 2204 839-749** or by e-mail at **m.fielenbach@joke.de.**

You will find **additional devices** and tools for postprocessing in our shop at:
www.joke-technology.com/3d-shop

Drives and accessories

ENESKAmicro - a sound basis for optimum surface results

Selection of the correct drive plays a crucial role in processing the widest range of materials. Especially in the case of materials such as titanium, stainless steel or nickel-based alloys, a high working speed with an equally high and constant torque is required. Fluctuating speeds are otherwise negatively transferred to the surface to be processed.

With the ENESKAmicro motor system, we combine these high motor outputs with highly ergonomic handpieces for the most diverse applications in additive manufacturing. Particularly through the multitude of handpieces and their possible combinations, the ENESKAmicro provides the optimum basis for covering everything ranging from removal of the support structure to finishing.

Regardless of whether work is performed according to the SLM (Selective Laser Melting), SLS (Selective Laser Sintering) or FDM (Fused Deposition Modelling) method, the joke drives allow quick and efficient removal of the support structure and provide the surface with the requisite surface characteristics. The high level of true running accuracy combined with a high tool clamping force allows precise work, even with complex geometries.

With the adaptable angle handpieces and linear filing devices, hard-to-reach areas and a wide variety of surfaces are easily accessible.

P.S. You already have handpieces or motors that you have been using on another micromotor system up to now and would like to continue to do so?
No Problem! The majority of handpieces & motors, even from other manufacturers, can also be connected to the ENESKAmicro system! Consult us!

ENESKAmicro 600
Sets

The new standard for grinding, polishing, milling and deburring

ENESKAmicro – the unbeatable all-round talent
The in-house development by joke sets standards for micromotor systems. What is unique about this series is its system-wide and downwards compatibility as well as extreme power.
Higher final speed, more power, higher clamping force for the handpieces, 100% Made in Germany, touch display, USB interface and high level of true running are just some of the highlights of this extraordinary system.
This not only enables its use in many new application areas, such as aerospace and 3D printing, but also in conventional toolmaking and mould building or in medical engineering.
Simple to operate with the touch display
The core component of the ENESKAmicro is the intelligent control unit. Intelligent because it automatically detects which micromotor is connected, whether from the joke family or a third-party manufacturer. The individual settings can be saved on the touch display with station keys. The speed input can be set via a finely adjusted rotary knob or optionally via a foot switch. The slim design and low centre of gravity make for high stability. The control unit dispenses with fans or slots – which means less noise pollution for the user and it is also dust-protected (according to IP 54).
The newly developed handpieces achieve a higher clamping force than similar devices on the market. Created by a combination of spring and lever force that keeps the tool in position even at high speeds. The high-precision grinding of all axes and the installation of the latest-generation bearings enable a high level of true running to within less than 0.01 millimetres. Further advantages are the on/off switch directly on the motor and the toolless quick-clamping function. This saves time and guarantees precise, low-vibration and fatigue-free work. The joke team has developed handpieces with a longer XL axis for hard-to-reach areas in workpieces.

The ENESKAmicro offers a genuine alternative to many compressed-air systems.

The facts speak for themselves:
- Tremendously high cost advantage compared to expensive compressed-air
- Remarkably high-speed, variably adjustable
- Low-vibration work
- Quick tool changes without external aids
- Low noise pollution

		Order No.	Price from 1 set
ENESKAmicro 600 set 2.5			
	The set contains the following components: 1 x ENESKAmicro 600 control unit (order no. 0 011 201) 1 x ENESKAmicro COMPACT HT60, Motor incl. Handpiece Power (order no. 0 011 409) 1 x ENESKAmicro Motorcable HT, 1.8 m (order no. 0 011 402) 1 x ENESKAmicro Collet Type EMA, Ø 3 mm (order no. 0 011 413) 1 x ENESKAmicro handpiece support HT, white (order no. 0 011 109)	**0 011 220**	2133.00 €

Details on the motors from page 12.

100%
Made in GERMANY

ENESKAmicro 600
Sets

	Order No.	Price from 1 set
ENESKAmicro 600 set 2.14		
 The set contains the following components: 1 x ENESKAmicro 600 control unit (order no. 0 011 201) 1 x ENESKAmicro COMPACT HT60 SMALL, motor incl. rapid-chuck head (order no. 0 011 469) 1 x ENESKAmicro motor cable HT, 1.8 m (order no. 0 011 402) 1 x ENESKAmicro collet type EMA, Ø 3 mm (order no. 0 011 413) 1 x ENESKAmicro handpiece support, white (order no. 0 011 109) *Details on the motors from page 12.*	**0 011 270**	1998.00 €

	Order No.	Price from 1 set
ENESKAmicro 600 set 2.20		
 The set contains the following components: 1 x ENESKAmicro 600 control unit (order no. 0 011 201) 1 x ENESKAmicro motor COMPACT JEM 50C incl. rapid-chuck handpiece and motor cabel (order no. 0 100 001) 1 x ENESKAmicro handpiece support, black (order no. 0 011 110) *Details on the motors from page 12.*	**0 011 280**	2259.00 €

	Order No.	Price from 1 set
ENESKAmicro 600 set 2.21		
 The set contains the following components: 1 x ENESKAmicro 600 control unit (order no. 0 011 201) 1 x ENESKAmicro motor JEM 40R (order no. 0 100 002-0) 1 x ENESKAmicro motor cable JEM 40R, 1.85 m (order no. 0 100 031) 1 x ENESKAmicro handpiece support, black (order no. 0 011 110) 1 x ENESKA rapid-chuck handpiece JIR 40R (order no. 0 100 005) incl. collet type JIR, Ø 3 mm *Details on the motors from page 12.*	**0 011 285**	2189.00 €

ENESKAmicro 600
Sets

	Order No.	Price from 1 set
ENESKAmicro 600 set 2.22		
 The set contains the following components: 1 x ENESKAmicro 600 control unit (order no. 0 011 201) 1 x ENESKAmicro motor JEM 20R (order no. 0 100 003-0) 1 x ENESKAmicro motor cable JEM 20R, 1.85 m (order no. 0 100 032) 1 x ENESKAmicro handpiece support, black (order no. 0 011 110) 1 x ENESKA rapid-chuck handpiece JIR 40R (order no. 0 100 005) incl. collet type JIR, Ø 3 mm	**0 011 290**	2229.00 €

Details on the motors from page 12.

	Order No.	Price from 1 set
ENESKAmicro 600 set 2.23		
 The set contains the following components: 1 x ENESKAmicro 600 control unit (order no. 0 011 201) 1 x ENESKAmicro motor JEM 40R (order no. 0 100 002-0) 1 x ENESKAmicro motor cable JEM 40R, 1.85 m (order no. 0 100 031) 1 x ENESKAmicro handpiece support, black (order no. 0 011 110)	**0 011 295**	1847.00 €

Details on the motors from page 12.

	Order No.	Price from 1 set
ENESKAmicro 600 set 2.24		
 The set contains the following components: 1 x ENESKAmicro 600 control unit (order no. 0 011 201) 1 x ENESKAmicro motor JEM 20R (order no. 0 100 003-0) 1 x ENESKAmicro motor cable JEM 20R, 1.85 m (order no. 0 100 032) 1 x ENESKAmicro handpiece support, black (order no. 0 011 110)	**0 011 299**	1879.00 €

Details on the motors from page 12.

ENESKAmicro handpieces and motors

3rd Generation

	Order No.	Price from 1 piece
ENESKAmicro COMPACT JEM 50C, motor incl. rapid-chuck handpiece and motor cable		
	**0 100 001**	1220.00 €

The fast runner
The range is rounded off with the JEM 50C. Owing to its compact design, it offers perfectly quiet running and extremely high concentricity. With its high speed of up to 50,000 rpm, it is perfectly suited for all applications with tools that require high speeds, such as milling cutters and the like. Integrated high-quality collets Ø 3 mm for frequent tool changes.

ENESKAmicro COMPACT JEM 50C • motor incl. rapid chuck motor cable • brushless DC motor

Output:	200 watts
Rotation speed range:	1,000 - 50,000 1/min
Torque:	8.4 N cm
Dimensions:	Ø 27.5 mm x 137.6 mm (without coupling)
Weight:	215 g (without motor cable)
Switch:	on motor cable

	Order No.	Price from 1 piece
ENESKAmicro motor JEM 40R, up to 40,000 rpm, incl. motor cable		
	**0 100 002**	710.00 €

The fine finisher
The JEM 40R is the perfect choice for light work that requires handpieces that are both fine and delicate. Ideal for use in jewellery working, for example.

ENESKAmicro JEM 40R, brushless AC motor with max. 40,000 rpm • incl. motor cable • rapid-Change coupling

Output:	84 watts
Rotation speed range:	1,000 - 40,000 1/min
Torque:	4.0 N cm
Dimensions:	Ø 25 mm x 71.4 mm
Weight:	100 g (without motor cable)
Switch:	on motor cable

	Order No.	Price from 1 piece
ENESKAmicro motor JEM 20R, up to 20,000 rpm, incl. motor cable		
	**0 100 003**	750.00 €

The worker
With the JEM 20R, joke addresses users who mainly work in the low speed range (up to 20,000 rpm), but require a particularly high torque. It is precisely these users who usually come up against performance limits with conventional motors.
Speed fluctuations, which occur with most motors, are directly reflected in the grinding or polishing pattern and result in problems. The new JEM 20R provides a torque that makes such problems a thing of the past. The constant-speed motor guarantees an absolutely clean and harmonious microsection, even with challenging tasks.

ENESKAmicro JEM 20R, brushless AC motor with max. 20,000 rpm • incl. motor cable • Rapid-Change coupling

Output:	73 watts
Rotation speed range:	1,000 - 20,000 1/min
Torque:	5.0 N cm
Dimensions:	Ø 27.5 mm x 78.1 mm
Weight:	145 g (without motor cable)
Switch:	on motor cable

ENESKAmicro handpieces and motors
3rd Generation

		Order No.	Price from 1 piece
ENESKAmicro quick-release handpiece JIR 40R			
	Collet: Ø 3 mm in scope of delivery Speed: max. 40,000 r/min Dimensions: Ø 26 mm x 90 mm Concentricity: ± 0.01 mm Weight: 112 g	**0 100 005**	450.00 €

		Order No.	Price from 1 piece
ENESKAmicro handpiece JBMXLH 40R			
	With extended shank 126 mm Collet: Ø 3 mm in scope of delivery Speed: max. 40,000 r/min Dimensions: Ø 12.6 mm / Ø 21.8 mm x 198.5 mm Concentricity: ± 0.01 mm Weight: 152 g	**0 100 006L**	576.00 €

		Order No.	Price from 1 piece
ENESKAmicro handpiece JEHG 20R, heavy-duty			
	Collet: Ø 6 mm in scope of delivery Speed: max. 20,000 r/min Dimensions: Ø 22.5 mm x 99.5 mm Concentricity: ± 0.01 mm Weight: 141 g	**0 100 007**	420.00 €

ENESKAmicro mini hand filing machine JMH 20R
for linear processing

		Order No.	Price from 1 piece
ENESKAmicro mini hand filing machine JMH 20R			
	Tool holder: max. Ø 3.2 mm Stroke length: 1.0 mm Max. Strokes: 12,000 rpm Max. Speed input: 20,000 rpm Dimensions: Ø 21.8 x 125.0 mm Weight: 142 g	**0 100 009**	700.00 €

ENESKAmicro 600

3rd Generation - angle heads - for reaching concealed corners

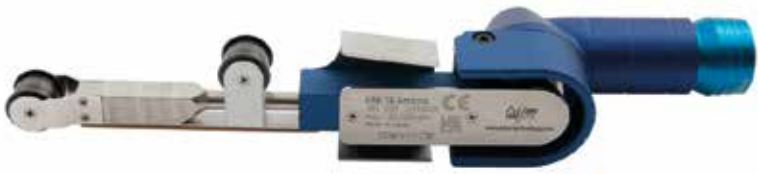
			Order No.	Price from 1 piece
ENESKAmicro angle handpiece JEAH 60 20R				
	Collet:	Ø 3 mm in scope of delivery	**0 100 011**	420.00 €
	Speed:	max. 20,000 r/min		
	Concentricity:	± 0.01 mm		
	Dimensions:	Ø 22.5 mm x 80.8 mm (head: Ø 15.9 mm)		
	Weight:	91 g		

			Order No.	Price from 1 piece
ENESKAmicro angle handpiece JERA 90 20R				
	Collet:	Ø 3 mm included	**0 100 004**	420.00 €
	Speed:	max. 20,000 r/min, reversal of the direction of rotation		
	Concentricity:	± 0.01 mm		
	Dimensions:	Ø 21.8 x 73 mm		
	Weight:	92 g		
	Vibration:	2.5 m / s²		
	Noise level:	70 dB		

ENESKAmicro belt grinder JBS 20R

for processing flat and curved surfaces

			Order No.	Price from 1 piece
ENESKAmicro belt grinder JBS 20R				
	Speed:	max. 20,000 r/min	**0 100 008**	700.00 €
	for Beltsize:	4 mm / 6 mm / 8 mm without guide, changeable handling		
	Weight:	227 g		



	Dimensions	Grit size	Packing quantity	Order No.	Price from 1 pack	Price from 10 packs
Grinding belts						
Corundum						
	6 x 300 mm	120	10 pieces	**0 401 540**	12.65 €	11.59 €
		240	10 pieces	**0 401 541**	12.92 €	11.83 €
		400	10 pieces	**0 401 542**	12.92 €	11.83 €
		320	10 pieces	**0 401 545**	13.29 €	12.51 €
		500	10 pieces	**0 401 549**	15.21 €	13.81 €
		600	10 pieces	**0 401 547**	14.87 €	13.56 €
Zirconium corundum						
	6 x 300 mm	80	10 pieces	**0 401 543**	13.18 €	12.09 €
		120	10 pieces	**0 401 544**	13.18 €	12.09 €

ENESKAmicro reduction gear JERG 2
3rd Generation

			Order No.	Price from 1 piece
ENESKAmicro reduction gear JERG 2				
	Reduction ratio: Speed range: Collet:	4:1 up to 40,000 1/min Ø 3 mm	**0 100 010**	420.00 €

ENESKAmicro COMPACT HT60-D6
the powerful variant for your tools with a Ø 6 mm shank

			Design	Order No.	Price from 1 piece
ENESKAmicro COMPACT HT60-D6					
	• With collet Ø 6 mm • Brushless DC motor BLDC • On-off switch located on the micromotor		Incl. motor cable 1.8 m and fan	**0 011 429**	828.00 €
	Motor speed: Output: Weight: Dimensions (D x L): Concentricity: Collet type:	up to max. 50,000 rpm 8.9 N cm at 280 W 0.475 kg Ø 30 x 180 mm < +/– 0.01 mm EMB			

Air belt grinder
ENESKAair G1000

The latest generation compressed-air grinder
- 100,000 rpm during oil-free operation
- Extremely compact construction incl. ceramic ball bearings
- Stainless steel construction throughout with rotary valve
- Replacement spare motor, easy replacement on site
- Quiet-running with very low vibration

			Order No.	Price from 1 piece
Compressed-air grinder ENESKAair G1000				
	Speed:	100.000 1/min	**0 751 100**	499.00 €
	Power:	63 Watts		
	Air pressure:	max. 6.3 bars		
	Air consumption:	170 l/min		
	Exhaust air:	backwards		
	Noise level:	70 dB(A)		
	Vibration:	< 2.5 m/s²		
	Dimension:	Ø 21 x 129 mm		
	Weight:	150 g		
	Lubrication:	oilfree		
	Scope of delivery:	Tube package (2 m) with connection nipple R1/4“, collet Ø 3 mm, tool set		

Compressed-air filing machine
LFC 11

Compressed-air filing machine LFC 11
The high-speed allrounder (12,000 strokes/min). Ideal for grinding, filing, polishing, cutting, sawing and also deburring larger areas as well as for support removal in the additive area. A continuously adjustable stroke length (between 2 and 11 mm) enables this device to be used for both coarse and fine working. The bare machine is available, but also a case, complete with tools and accessories.

			Order No.	1 piece	Price from 1 set
Compressed-air filing machine LFC 11					
	No. of strokes:	6,000 – 12,000 strokes/min	**0 750 980**	1475.00 €	-
	Stroke length:	2 – 11 mm, continuously adjustable			
	Output:	300 W			
	Air pressure:	6.3 bar			
	Air consumption:	230 l/min			
	Noise level:	74 dB(A), ISO 15744			
	Vibration:	2.2 m/s², K = 0.8 m/s² according to EN ISO 28927-8			
	Dimensions:	280 x 60 mm			
	Weight:	830 g			
	Lubrication:	continuously by oil mist			
	Scope of supply:	1 x tool holder Ø 4 mm, 1 x counter-holder, 1 x hose unit (supply and exhaust air, silencer)			

Air belt grinder
MBS 20 DH

Small, handy and powerful – that best describes the new compressed-air minibelt grinder from joke. With a weight of just 570 g, it lies comfortably in the hand. So the second hand is free to move the workpiece into the ideal position.

The grinding belt is ideally suitable for deburring, grinding and finishing work. The workpieces can be optimally freed from burrs and cleaned. No matter what the radius, the joke grinding belt contacts the workpiece perfectly, and with a little sensitivity of touch achieves a fine, satin-textured surface.

The width of the belt can be selected between 6 mm and 12 mm. A wide range of belts is available, from a coarse grinding belt to a fleece belt for finishing work. Belts are easily replaced with just one action.

	Air belt grinder joke MBS 20 DH
Air pressure	approx. 6 bar
Air consumption	590 l/min
Air consumption	590 l/min
Exhaust air	to the front
Weight	570 g
Lubrication	continuously 1–2 drops / min oil mist
Order No.	**0 750 871**
Price	941.00 €

Removal of support structures

Removal of support structures

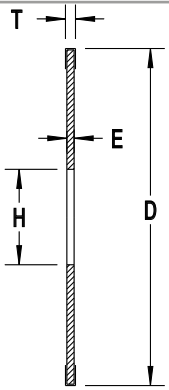
First of all, the support structures must be removed quickly and effectively. Accurate work using precise tools, right from the outset, saves time-consuming and expensive working hours during postprocessing. Metals and non-ferrous metals do not always make it easy for us in everyday life. Machining can get very tough with the wrong tool.

Materials that are difficult to machine are best processed using **diamond tools**. Super-hard diamond cutting material is excellently suited for short-chipping materials. The tremendous hardness has many advantages, e.g. long service life as well as geometric and dimensional stability and therefore allows processing of the hardest materials such as **Inconel and Titanium**.
With conventional steels and stainless steels, **solid carbide circular saw blades** are used to free the tool from supports more easily than with conventional tools.

Diamond cut-off discs
for a clean cut

Diamond cut-off discs, galvanic bonding
A clean, fast cut is what you want when machining your workpieces. That is exactly what you get with the diamond cut-off discs.
We recommend both grit sizes: D 181 for normal to fine cutting tasks and D 356 (very coarse) for extreme cases in which high temperatures need to be dissipated, e.g. with Inconel and plastics.

Please note that you need a suitable cut-off disc receptacle with a carbide shank for this tool!

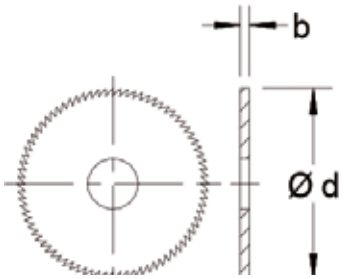
	Dimensions	Drilling dimension	Blade thickness	Grit size	Matching-receptacles	Order No.	Price from 1 piece	Price from 5 pieces
Diamond cut-off discs, galvanic bonding								
	Ø 32 x 1.45 mm	8 mm	1.0 mm	D 181	TA8	**0 561 617**	42.27 €	31.96 €
	Ø 32 x 1.75 mm	8 mm	1.0 mm	D 356	TA8	**0 561 618**	42.27 €	31.96 €

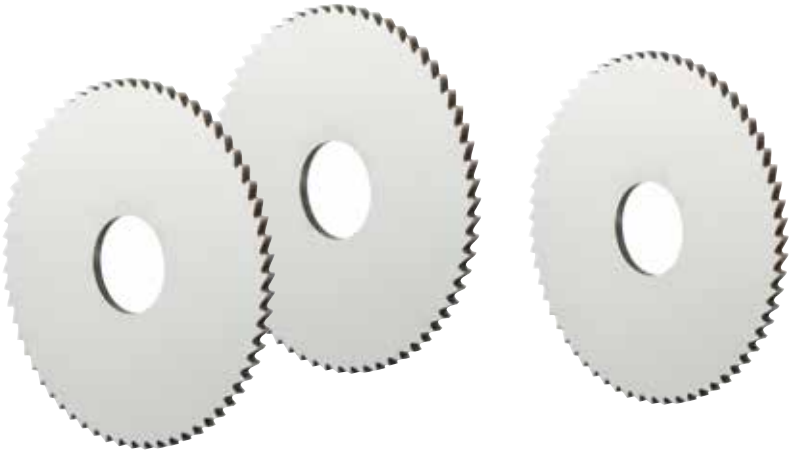
A cut-off disc receptacle is required for this tool (see next page).

Solid carbide circular saw blades
the effective alternative to conventional tools

Solid carbide circular saw blades
The solid carbide circular saw blades are high quality products with a precision cut and lateral hollow grinding by the mirror-grinding process for slotting and separating. The cutting speed can be increased 3 to 4-fold by using solid carbide circular saw blades in comparison to HSS saw blades. Furthermore, high-strength materials with 800 – 1,200 N/mm² and abrasive materials can be readily processed (e.g. tungsten copper, copper, aluminium, stainless steel, titanium, cast iron, brass, bronze, thermoplastics and duroplastics).

	Nom. Ø x cutting width	Material	Drilling dimension	Design	Order No.	Price from 1 piece
Solid carbide circular saw blades						
	Ø 30 x 0.4 mm	solid carbide	8 mm	80 teeth	**0 500 384**	29.56 €
	Ø 30 x 0.8 mm	solid carbide	8 mm	64 teeth	**0 500 386**	37.99 €



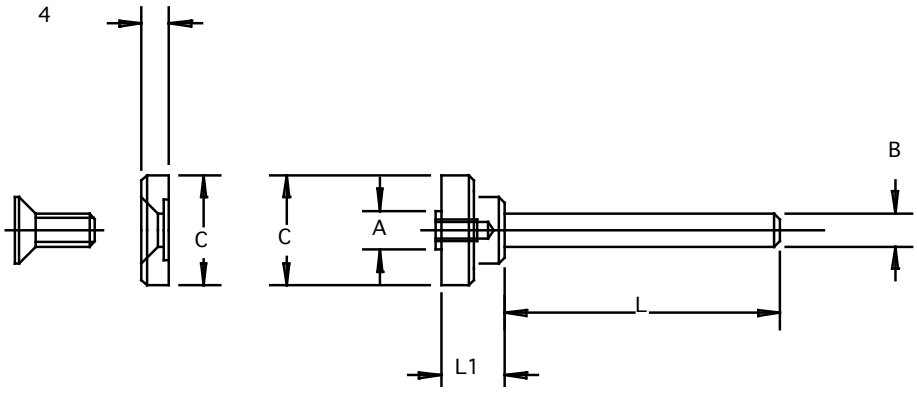


A cut-off disc receptacle is required for this tool.

Cut-off disc receptacles
with carbide metal shank

	for bore dimensions	Head dimensions	Shank dimensions	Type	Order No.	Price from 1 piece
Cut-off disc receptacles with carbide metal shank						
	8 mm	Ø 12 mm	Ø 3 x 45 mm	TA8	**0 561 947**	64.54 €
		Ø 12 mm	Ø 6 x 45 mm	TA8	**0 561 948**	66.22 €

further selection at www.joke-technology.com



Coarse surface finishing

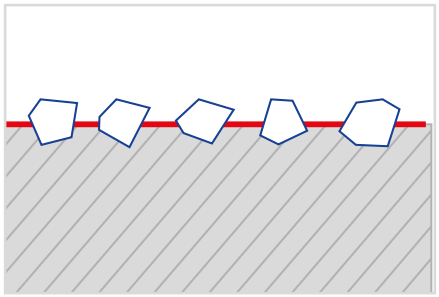
Coarse surface finishing

As with any activity, preparatory work needs to be carried out prior to surface finishing. The more precise this is, the less effort is required for rough work and finishing.

Especially when machining hard materials, tools with long service lives and maximum cutting performance are required. With the products listed on the following pages, you are well equipped for any type of material.

Vacuum brazed tools are particularly noteworthy here. The advantages of this new bond at a glance.

very high stock removal, owing to greater grain protrusion



The grit is directly welded to the base material.

cooler cut owing to larger chip spaces

Diamond grinding points, vacuum brazed
for good stock removal

Diamond grinding points vacuum-brazed bonding
The vacuum-brazed bonding provides a much better adhesion of grits to the carrier thanks to direct fusing.
These tools are particularly suited for fibre glass reinforced materials GFR and CFR plastics (in aircraft construction and shipbuilding), tungsten carbide green components (unsintered carbide), ceramics (i. e. valve cover rings for car engines), coal products (i. e. brake discs, carbon brushes), cast materials.

Benefits of this new bonding:
- Very good stock removal thanks to higher grit protrusion
- Allows production of more complex forms, e. g. inner radiuses
- Markedly better grit retention force
- Cooler grinding thanks to larger chipping spaces

	Order No.	Price from 1 set
Set diamond grinding points, vacuum brazed, shank Ø 3 mm		
 The set consists of the following ten diamond grinding points with a vacuum brazed bond in addition to a grit size of D 427, shank Ø 3 x 55 mm: • Cylinder, Ø 7 x 7 mm (order no. 0 563 037) • Rounded cylinder, Ø 4 x 7 mm, R = 2 (order no. 0 563 038) • Rounded cylinder, Ø 6 x 10 mm, R = 3 (order no. 0 563 039) • Ball, Ø 6 mm (order no. 0 563 040) • Ball, Ø 7 mm (order no. 0 563 041) • Pointed cone, Ø 6 x 4 mm, 60° (order no. 0 563 035) • Pointed cone, Ø 6 x 10 mm, 30° (order no. 0 563 036) • Rounded cone, Ø 4 / 1 x 10 mm, 14°, R = 0.5 (order no. 0 563 033) • Rounded cone, Ø 6 / 3 x 10 mm, 20°, R = 1.5 (order no. 0 563 034) • Rounded cone, Ø 7 / 3 x 7 mm, 36°, R = 1.5 (order no. 0 563 032)	**0 563 003**	179.00 €

	Order No.	Price from 1 set
Set diamond grinding points, vacuum brazed, shank Ø 6 mm		
 The set consists of the following ten diamond grinding points with a vacuum brazed bond in addition to a grit size of D 427, shank Ø 6 x 60 mm: • Rounded cone, Ø 6 / 1 x 19 mm, 15°, R = 0,50 (order no. 0 563 042) • flame-shaped, Ø 8 x 14 mm (order no. 0 563 043) • Pointed cone, Ø 9 x 4,5 mm, 90° (order no. 0 563 044) • Pointed cone, Ø 7 x 6 mm, 60° (order no. 0 563 045) • Cylinder, Ø 8 x 20 mm (order no. 0 563 046) • Cylinder, Ø 10 x 24 mm, S.-Ø 6 x 65 mm (order no. 0 563 047) • Rounded cylinder, Ø 6 x 31 mm, R = 3, S.-Ø 6 x 65 mm (order no. 0 563 048) • Ball, Ø 6 mm (order no. 0 563 049) • Ball, Ø 8 mm (order no. 0 563 050) • Ball, Ø 12 mm (order no. 0 563 051)	**0 563 005**	186.00 €

Ultrafine tungsten carbide milling burs
for an effective, clean grind

Ultrafine tungsten carbide milling burs for an effective, clean grind
As with any activity, preparatory work needs to be carried out prior to surface finishing. The more precise this is, the less effort is required for reworking and finishing. Especially when machining hard materials, tools with long service lives and maximum cutting performance are required.
Ultrafine tungsten carbide milling burs are designed for very fine surface finishing. They are characterised by good stock removal and at the same time good surface quality. Almost all materials up to a hardness of 65 HRC can be worked. These milling burs are also perfect for applications in which normal grinding points would be suitable, yet greater stock removal is required. This product series is frequently used for punching and cutting tools in toolmaking and mould building.

	Order No.	Price from 1 set
Set of carbide milling cutters, ultrafine cut, shank Ø 3 mm		
 Contents: • 1 milling cutter, cylinder, Ø 2 x 11 mm (order no. 0 527 510) • 1 milling cutter, cylinder, Ø 3 x 14 mm (order no. 0 527 511) • 1 milling cutter, rounded cylinder, Ø 2 x 11 mm (order no. 0 527 520) • 1 milling cutter, rounded cylinder, Ø 3 x 14 mm (order no. 0 527 521) • 1 milling cutter, ball, Ø 2 mm (order no. 0 527 530) • 1 milling cutter, ball, Ø 3 mm (order no. 0 527 531) • 1 milling cutter, ball, Ø 4 mm (order no. 0 527 532) • 1 milling cutter, tree shape, Ø 3 x 6 mm (order no. 0 527 540) • 1 milling cutter, tree shape, Ø 3 x 14 mm (order no. 0 527 541) • 1 milling cutter, tree shape with pointed end, Ø 3 x 14 mm (order no. 0 527 550)	**0 527 560**	194.00 €

	Order No.	Price from 1 set
Set of carbide milling cutters, ultrafine cut, shank Ø 6 mm		
 Contents: • 1 milling cutter, cylinder, Ø 6 x 16 mm (order no. 0 527 514) • 1 milling cutter, rounded cylinder, Ø 6 x 16 mm (order no. 0 527 524) • 1 milling cutter, ball, Ø 10 mm (order no. 0 527 534) • 1 milling cutter, tree shape with pointed end, Ø 6 x 18 mm (order no. 0 527 552) • 1 milling cutter, tree shape with pointed end, Ø 12 x 30 mm (order no. 0 527 553) • 1 milling cutter, pointed cone, Ø 12 x 25 mm (order no. 0 527 584)	**0 527 570**	181.00 €

AlCrN-coated milling points
for hard materials

AlCrN-coated milling points for hard materials
AlCrN stands for aluminium chromium nitride and is a coating in which chromium has been replaced with titanium, thus achieving significantly higher performance. The coating thickness of 1 to 4 µm, a hardness of 3500 HV and temperature stability up to 1200 °C convince with strength, resistance and the associated service life when using the milling cutter. This high-performance coating is ideal for titanium, high-temperature alloys and steels that are difficult to machine.

	Order No.	Price from 1 set
Set of carbide milling cutters, AlCrN-coated, shank Ø 3 mm		
 Contents: • 1 milling cutter, cylinder, Ø 3 x 14 mm (order no. 0 501 720) • 1 milling cutter, rounded cylinder, Ø 3 x 14 mm (order no. 0 501 730) • 1 milling cutter, ball, Ø 3 mm (order no. 0 501 740) • 1 milling cutter, tree shape, Ø 3 x 12,7 mm (order no. 0 501 750) • 1 milling cutter, tree shape with pointed end, Ø 3 x 12,7 mm (order no. 0 501 760) • 1 milling cutter, flame-shaped, Ø 3 x 6,3 mm (order no. 0 501 770)	**0 501 710**	68.16 €

Milling cutters with coarse cut
for aluminium processing

Coarse-toothed milling burs for processing aluminium and non-ferrous metals
Milling burs for processing aluminium and non-ferrous metals have coarse toothing. They are suitable for processing non-ferrous metals, aluminium, copper, brass and plastic. They are also optimally suited for milling work (deburring, weld seam processing, contours etc.).

	Order No.	Price from 1 set	5 sets
Set of milling cutters for processing aluminium, shank Ø 3 mm			
 Contents: • 1milling cutter, cylinder, end cut, Ø 3 x 14 mm (order no. 0 526 063) • 1 milling cutter, rounded cylinder, Ø 3 x 14 mm (order no. 0 526 065) • 1 milling cutter, sphere, Ø 3 mm (order no. 0 526 067) • 1 milling cutter, drop, Ø 3 x 6 mm (order no. 0 526 070) • 1 milling cutter, tree, Ø 3 x 14 mm (order no. 0 526 072) • 1 milling cutter, tree with pointed end, Ø 3 x 14 mm (order no. 0 526 074) • 1 milling cutter, round cone, Ø 3 x 14 mm (order no. 0 526 076) • 1 milling cutter, pointed cone, Ø 3 x 11 mm (order no. 0 526 078)	**0 526 080**	68.75 €	66.96 €

Fine postprocessing

Choosing the right postprocessing technique

What happens when the support structures have been removed, but the workpiece needs to be given a better surface? There are many possibilities here. Two alternatives worth recommending are grinding and blasting.

Grinding / “pre-polishing”

Grinding is a metal-cutting production process for precise and final machining of workpieces. It can be used manually or on grinding machines. As with all cutting methods, excess material is removed in the form of chips. The edges of the microscopically small, hard, mineral crystals in the grinding tool function as blades in this case.

Polishing is a machining process for various different materials. The polishing grit contained in the polishing compound mechanically cuts into the surface. The polishing process often comprises several stages. The polishing time is mainly determined by the initial state (preliminary grinding), the performance of the polishing agent used and the selected process parameters such as contact pressure and speed as well as the desired final surface.

Blasting

Blasting is a surface finishing method in which blasting shot is projected at high speed on to the workpieces. The blasting result essential depends on the type of blasting shot selected, in addition to various machine types and configuration parameters.

In machine types, we at joke, differentiate between injector and pressure blasting systems, which differ significantly in their performance.

Selection of the blasting shot is a crucial factor in governing the application. Ranging from refining and hardening the surface, including cleaning and deburring, to rapid and aggressive stock removal.

VORTEX grinding points
for hard materials

Set of VORTEX® blue grinding points
The set is ideally suited for processing hard materials that are difficult to machine, such as titanium, Inconel, etc. The patented high performance grit is ideal for rapid stock removal and reduces processing times.

The following versions are available:
- Wheel version (slightly flexible)
- Cylinder version (firm)

	Order No.	Price from 1 set
Set of grinding points VORTEX®-blue		
 The set consists of the following five coarse-grit, hard grinding points with a shank Ø 3 x 40 mm: • Wheel, Ø 25 x 3 mm (order no. 0 571 904) • Wheel, Ø 30 x 3 mm (order no. 0 571 900) • Cylinder, Ø 5 x 13 mm (order no. 0 571 901) • Cylinder, Ø 6 x 13 mm (order no. 0 571 902) • Cylinder, Ø 10 x 12 mm (order no. 0 571 903)	**0 571 915**	28.50 €

	Order No.	Price from 1 set
Set of grinding points VORTEX® blue		
 The set consists of the following three coarse-grit, hard grinding points with a shank Ø 6 x 40 mm: • Cylinder, Ø 10 x 20 mm (order no. 0 571 920) • Cylinder, Ø 13 x 20 mm (order no. 0 571 921) • Cylinder, Ø 20 x 25 mm (order no. 0 571 922)	**0 571 925**	38.48 €

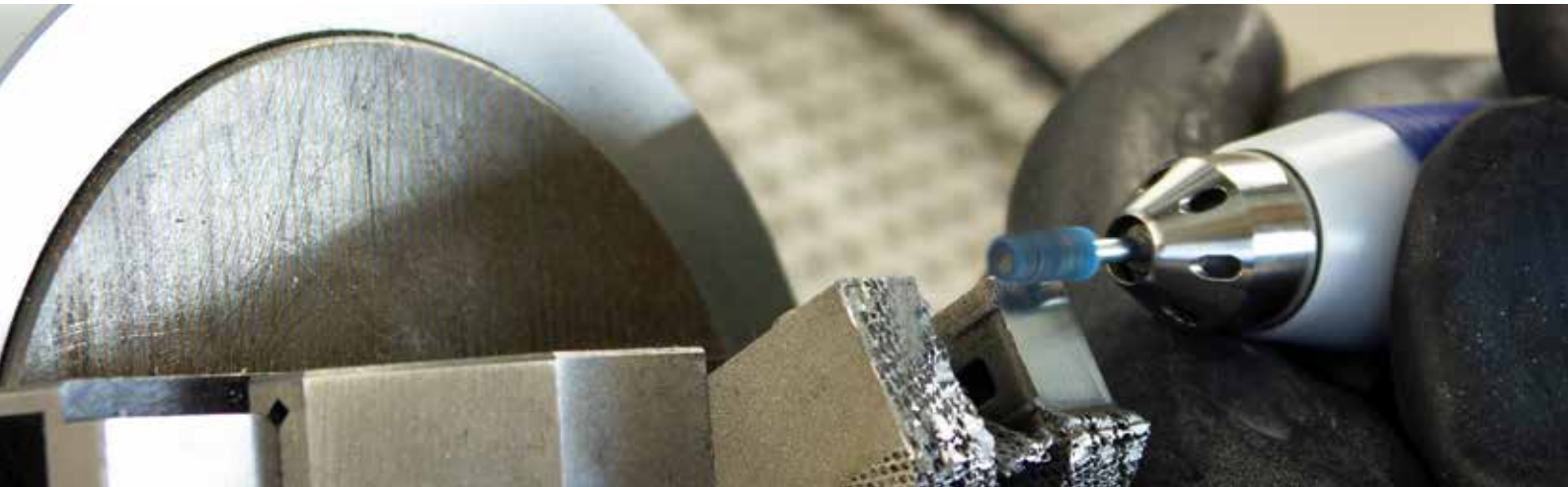
Grinding points AWCO
ideal for harder materials

Grinding points AWCO
The ideal points for regrinding repair weldings. Produced from ceramic bond with a mixture of white high-grade corundum and blue ceramic sintered corundum. This material combination results in extraordinarily high chip removal rates with an excellent service life.

The advantages:
- cool cutting owing to friability of the grit mixture
- high stock removal rates with a very good service life
- self-sharpening effect of the sintered corundum for consistent stock removal rates

		Order No.	Price from 1 set
Set of grinding points AWCO			
	The set consists of the following twelve grinding points with a shank Ø 3 x 40 mm: • Cylinder, Ø 2 x 5 mm, grit size 80, (order no. 0 542 424) • Cylinder, Ø 3 x 6 mm, grit size 80, (order no. 0 542 427) • Cylinder, Ø 4 x 8 mm, grit size 80, (order no. 0 542 430) • Cylinder, Ø 5 x 10 mm , grit size 80, (order no. 0 542 433) • Cylinder, Ø 6 x 13 mm, grit size 60, (order no.-Nr. 0 542 436) • Cylinder, Ø 8 x 6 mm, grit size 60, (order no. 0 542 440) • Tree with pointed end, Ø 3 x 6 mm, grit size 80 (order no. 0 542 455) • Tree with pointed end, Ø 4 x 8 mm, grit size 80 (order no. 0 542 458) • Wheel, Ø 13 x 3 mm, grit size 60 (order no. 0 542 443) • Wheel, Ø 20 x 6 mm, grit size 60 (order no. 0 542 445) • Ball, Ø 3 mm, grit size 80 (order no. 0 542 447) • Ball, Ø 6 mm, grit size 80 (order no. 0 542 449)	**0 542 420**	31.41 €

		Order No.	Price from 1 set
Set of grinding points AWCO			
	The set consists of the following ten grinding points with a grit size of 46 and a shank Ø 6 x 40 mm: • Cylinder, Ø 8 x 16 mm, (order no. 0 542 471) • Cylinder, Ø 10 x 13 mm, (order no. 0 542 473) • Cylinder, Ø 10 x 20 mm, (order no. 0 542 475) • Cylinder, Ø 13 x 25 mm, (order no. 0 542 477) • Cylinder, Ø 16 x 20 mm, (order no. 0 542 479) • Cylinder, Ø 13 x 32 mm, (order no. 0 542 481) • Cylinder, Ø 20 x 25 mm, (order no. 0 542 483) • Cylinder, Ø 20 x 40 mm, (order no. 0 542 485) • Ball, Ø 13 mm, (order no. 0 542 491) • Tree shape with pointed end, Ø 13 x 20 mm, (order no. 0 542 494)	**0 542 470**	31.57 €



Grinding points SiC-Alu
for aluminium processing

Grinding points SiC-Alu
These grinding points were especially developed for processing aluminium. The high plasticity of aluminium means that if the wrong grinding points are used, “smearing” and “clogging” of the tool occurs.

Owing to their special structural configuration, extremely long service lives are achieved, as the pores of the points do not become clogged during processing. The selfsharpening effect is enhanced by the special impregnation of these grinding points.

Particularly suitable for:
- non-ferrous metals (especially aluminium)
- hard-chromium plated steels
- high and highest-alloyed steels

Also suitable for:
- tempered and hardened steels
- soft non-ferrous metals

	Head dimensions	Grit size	Shank dimensions	Cutting speed max.	Packing quantity	Order No.	Price from 1 piece	Price from 20 pieces	Price from 50 pieces
SiC-Alu grinding points, shank Ø 3 x 30 mm									
cylinder									
	Ø 4 x 8 mm	80	Ø 3 x 30 mm	50 m/s	10 pieces	**0 542 501**	2.35 €	2.18 €	2.02 €
	Ø 5 x 10 mm	80	Ø 3 x 30 mm	50 m/s	10 pieces	**0 542 502**	2.35 €	2.18 €	2.02 €
	Ø 6 x 10 mm	80	Ø 3 x 30 mm	50 m/s	10 pieces	**0 542 503**	2.31 €	2.15 €	1.99 €
	Ø 8 x 10 mm	80	Ø 3 x 30 mm	50 m/s	10 pieces	**0 542 504**	2.37 €	2.22 €	2.04 €
	Ø 10 x 10 mm	80	Ø 3 x 30 mm	50 m/s	10 pieces	**0 542 505**	2.37 €	2.22 €	2.04 €
SiC-Alu grinding points,shank Ø 6 x 40 mm									
cylinder									
	Ø 10 x 13 mm	80	Ø 6 x 40 mm	50 m/s	10 pieces	**0 542 506**	2.33 €	2.16 €	2.00 €
	Ø 16 x 32 mm	80	Ø 6 x 40 mm	50 m/s	10 pieces	**0 542 511**	3.13 €	2.91 €	2.69 €
	Ø 20 x 25 mm	80	Ø 6 x 40 mm	50 m/s	10 pieces	**0 542 513**	3.06 €	2.83 €	2.62 €

matching set

	Grit size	Order No.	Price from 1 set
Set of grinding points SiC-Alu			
The set consists of the following five cylindrical grinding points with a grit size of SiC 80, shank Ø 3 x 30 mm:	K 80	**0 542 530**	19.15 €

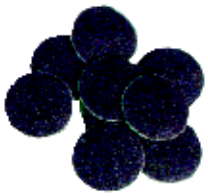
- Cylinder, Ø 4 x 8 mm (order no. 0 542 501)
- Cylinder, Ø 5 x 10 mm (order no. 0 542 502)
- Cylinder, Ø 6 x 10 mm (order no. 0 542 503)
- Cylinder, Ø 8 x 10 mm (order no. 0 542 504)
- Cylinder, Ø 10 x 10 mm (order no. 0 542 505)

The grinding points are particularly suitable for processing aluminium and hard chrome-plated steels as well as high-alloy and ultra high alloy steels. They are also suitable for annealed and hardened steels and for soft non-ferrous metals.

Abrasive discs ROTAFLEX
corundum, self-adhesive

For elastic grinding in combination with the suitable rubber holders.

Cutting speed Vmax: 13 m/sec.

	Dimensions	Grit size	Type	Rotation speed max.	Packing quantity	Order No.	Price from 1 pack	5 packs	10 packs
ROTAFLEX abrasive discs									
	Ø 12 mm	50	R 0	20000 1/min	50 pieces	**0 544 111**	3.31 €	3.18 €	3.05 €
		60	R 0	20000 1/min	50 pieces	**0 544 112**	3.70 €	3.18 €	2.98 €
		80	R 0	20000 1/min	50 pieces	**0 544 113**	3.19 €	3.11 €	2.98 €
		120	R 0	20000 1/min	50 pieces	**0 544 114**	3.63 €	3.09 €	2.96 €
		150	R 0	20000 1/min	50 pieces	**0 544 115**	3.63 €	3.09 €	2.96 €
		180	R 0	20000 1/min	50 pieces	**0 544 116**	3.63 €	3.09 €	2.96 €
		240	R 0	20000 1/min	50 pieces	**0 544 117**	3.17 €	3.09 €	2.96 €
		320	R 0	20000 1/min	50 pieces	**0 544 118**	3.63 €	3.09 €	2.96 €
		400	R 0	20000 1/min	50 pieces	**0 544 119**	3.63 €	3.09 €	2.96 €
		600	R 0	20000 1/min	50 pieces	**0 544 174**	3.70 €	3.18 €	3.04 €
	Ø 20 mm	50	R 1	12000 1/min	50 pieces	**0 544 121**	5.36 €	5.23 €	4.96 €
		60	R 1	12000 1/min	50 pieces	**0 544 122**	6.51 €	5.20 €	4.91 €
		80	R 1	12000 1/min	50 pieces	**0 544 123**	6.30 €	5.11 €	4.83 €
		120	R 1	12000 1/min	50 pieces	**0 544 124**	6.30 €	5.11 €	4.83 €
		150	R 1	12000 1/min	50 pieces	**0 544 125**	6.30 €	5.11 €	4.83 €
		180	R 1	12000 1/min	50 pieces	**0 544 126**	6.30 €	5.11 €	4.83 €
		240	R 1	12000 1/min	50 pieces	**0 544 127**	5.20 €	5.11 €	4.83 €
		320	R 1	12000 1/min	50 pieces	**0 544 128**	6.30 €	5.11 €	4.83 €
		400	R 1	12000 1/min	50 pieces	**0 544 129**	6.30 €	5.11 €	4.83 €
		600	R 1	12000 1/min	50 pieces	**0 544 175**	4.64 €	3.89 €	3.65 €
	Ø 33 mm	50	R 2	7500 1/min	50 pieces	**0 544 131**	8.47 €	8.35 €	7.93 €
		60	R 2	7500 1/min	50 pieces	**0 544 132**	9.66 €	8.24 €	7.93 €
		80	R 2	7500 1/min	50 pieces	**0 544 133**	8.22 €	8.14 €	7.72 €
		120	R 2	7500 1/min	50 pieces	**0 544 134**	9.29 €	8.03 €	7.72 €
		150	R 2	7500 1/min	50 pieces	**0 544 135**	9.29 €	8.03 €	7.72 €
		180	R 2	7500 1/min	50 pieces	**0 544 136**	9.29 €	8.03 €	7.72 €
		240	R 2	7500 1/min	50 pieces	**0 544 137**	8.12 €	8.03 €	7.72 €
		320	R 2	7500 1/min	50 pieces	**0 544 138**	9.29 €	8.03 €	7.72 €
		400	R 2	7500 1/min	50 pieces	**0 544 139**	9.29 €	8.03 €	7.72 €
		600	R 2	7500 1/min	50 pieces	**0 544 176**	6.93 €	5.36 €	5.08 €

Accessories / spare parts

Produktbild	Dimen-sions	Shank dimensions	Type	Suitable abra-sive discs	Order No.	Price from 1 piece	5 pieces	10 pieces
Rubber holder ROTAFLEX								
	Ø 10 mm	Ø 3 x 26 mm	RK 0	R 0	**0 544 101**	3.86 €	3.61 €	3.35 €
	Ø 18 mm	Ø 2.35 x 26 mm	RK 1	R 1	**0 544 102**	3.84 €	3.58 €	3.34 €
		Ø 3 x 26 mm	RK 1	R 1	**0 544 103**	3.81 €	3.48 €	3.21 €
	Ø 30 mm	Ø 3 x 26 mm	RK 2	R 2	**0 544 104**	4.12 €	3.83 €	3.56 €

Abrasive discs ROTAFLEX
corundum, with Velcro fastening

The matching rubber holders for abrasive discs with Velcro fastening. Unlike conventional stick-on discs, the rubber holder can be reused once the disc is worn out. Cutting speed Vmax: 20 m/sec.

	Dimensions	Shank dimensions	Order No.	Price from 1 piece	Price from 5 pieces
Rubber holders with Velcro fastening					
	Ø 18 mm	Ø 3 x 30 mm	**0 544 010**	13.88 €	12.84 €
	Ø 30 mm	Ø 3 x 30 mm	**0 544 020**	16.49 €	14.92 €
		Ø 6 x 40 mm	**0 544 030**	16.73 €	15.25 €

Abrasive discs ROTAFLEX
Silicon carbide, self-adhesive

The silicon carbide abrasive discs are ideal for processing aluminium, copper, bronze, titanium, high-alloyed steels and fibrereinforced plastics. Optimally suited for the aeronautical industry and in areas where only SiC is allowed.

Use with and without coolant/lubricant!

Cutting speed Vmax: 13 m/sec.

	Dimensions	Grit size	Type	Rotation speed max.	Packing quantity	Order No.	Price from 1 pack	Price from 3 packs
Abrasive discs ROTAFLEX								
	Ø 30 mm	80	CPC 871	8500 1/min	250 pieces	**0 530 660**	28.11 €	24.80 €
		120	CPC 871	8500 1/min	250 pieces	**0 530 662**	24.48 €	24.06 €
		240	CPA 871	8500 1/min	250 pieces	**0 530 666**	24.48 €	23.04 €
		320	CPA 871	8500 1/min	250 pieces	**0 530 668**	24.48 €	22.71 €
		500	CPA 871	8500 1/min	250 pieces	**0 530 671**	24.48 €	22.71 €
		800	CPA 871	8500 1/min	250 pieces	**0 530 673**	24.48 €	22.71 €
		1000	CPA 871	8500 1/min	250 pieces	**0 530 674**	24.45 €	22.70 €
		1200	CPA 871	8500 1/min	250 pieces	**0 530 675**	24.48 €	22.71 €

NEW!

ENESKArecoat 85

Tungsten carbide coating unit

For any kind of support or demonstration please contact us.

We will be pleased to help you!

Fabian Bickenbach
Product Manager Welding Technology
Tel. +49 (0) 160 / 28 96 641
Mail: f.bickenbach@joke.de

ENESKArecoat 85 is used to coat severely stressed surfaces quickly and easily. A carbide coating is applied by burning a tungsten carbide electrode at 2800 degrees Celsius, which achieves a maximum surface hardness of 82 HR 30 N.

The process is particularly suitable for tools, devices and surfaces that need to be especially **tough, hard and wear-resistant**. In the field of additive manufacturing, surfaces that will be subject to particular stress later on can be reinforced using the process. This means that the pressure time can be shortened, as only an average density can be produced instead of the maximum density

This process is especially suitable for tools, devices and surfaces that have to be especially tough, hard and wear-resistant – such as punching and bending tools. In comparison to the previous model, the ENESKArecoat 85 achieves a higher maximum coat thickness by now having an up to 30 percent higher maximum working voltage of 54 volts. The specially controlled ignition spark and the higher vibration frequency of 120 Hertz allow working up to 20 percent faster and give an even better surface result. This also prevents burning out of the electrodes, which reduces usage costs. Furthermore, in comparison to the previous model, larger electrodes can be used, which expand the possible range of uses.

Properties of the tungsten carbide coatt
The layer applied combines joins perfectly with the steel and adheres in such a way that it withstands almost any mechanical stress. Blows, bending, stretching or compressive strains are incapable of detaching the coating. This can only be done by grinding or special sand blasting; it can, however, be relapped with diamond or silicon carbide. The steel beneath is not softened by the coating but increases in hardness in the upper zone. In the case of certain steel alloys the tungsten carbide layer even penetrates into the base material. The coating produces a hardness of up to 82 HR 30N, without the workpiece undergoing any change or distortion since the depositing process is practically cold. The coating possesses a high degree of heat resistance. The surface is uniform and shows no directional texture. With good saturation, it achieves a mean roughness of 2-9 µm.

Examples of applications
- Hardness coating of tools or wear parts to extend service life.
- Post hardening of additively manufactured parts
- Coating of smooth surfaces in order to achieve greater adhesion through the structure of the layer

Grinding points, sets
universal helpers

	Order No.	Price from 1 set
Set of grinding points, fibre-laminated		

This range contains following seven soft bonded fibre-laminated polishing points in grit size 80, shank dimensions 3 x 40 mm:

- Cylinder, Ø 6 x 6 mm (order no. 0 545 612)
- Cylinder, Ø 6 x 13 mm (order no. 0 545 615)
- Cylinder, Ø 10 x 19 mm (order no. 0 545 619)
- Cylinder, Ø 13 x 13 mm (order no. 0 545 622)
- Sphere, Ø 13 mm (order no. 0 545 609)
- Pointed Cone, Ø 10 x 19 mm (order no. 0 545 607)
- Cone, Ø 13 x 19 mm (order no. 0 545 603)

These polishing points are suitable for polishing aluminium and for deburring due to a low material removal.

0 545 690 | 37.24 €

	Order No.	Price from 1 set
Set of grinding points, fibre-laminated		

This range contains following seven hard bonded fibre-laminated polishing points in grit size 80, shank dimensions 3 x 40mm:

- Cylinder, Ø 6 x 6 mm (order no. 0 545 611)
- Cylinder, Ø 6 x 13 mm (order no. 0 545 614)
- Cylinder, Ø 10 x 19 mm (order no. 0 545 618)
- Cylinder, Ø 13 x 13 mm (order no. 0 545 621)
- Sphere, Ø 13 mm (order no. 0 545 627)
- Pointed Cone, Ø 10 x 19 mm (order no. 0 545 606)
- Cone, Ø 13 x 19 mm (order no. 0 545 602)

These polishing points are suitable for fine surfaces due to a high material removal.

0 545 695 | 37.24 €

Tool system CRATEX®
for different surfaces

The assortment for tool and mould makers. The bond is made of chemical rubber. In contrast to hard grinding wheels, the CRATEX® bond has a unique cushioned action ensuring soft, smooth and free cutting. With harder materials, CRATEX® yields a clean, polishable cut, free from corrugation and discoloration. CRATEX® grinds and polishes soft materials and plastics without tearing. It resists clogging and smearing and does not result in any glassy points.

CRATEX® can be used for dry and wet grinding. The tools are insensitive to all common grinding cooling media and rust protectors and to oil. Even more gentle work can be achieved in conjunction with polishing pastes.

Typical applications:
Smoothing and polishing of casting moulds, dies and other production tools, smoothing of edges on punched or sheared parts or glass, lapping of welded seams after rough grinding: sharpening of cutting dies, deburring and smoothing of plastic workpieces, reworking injection channels; polishing of moulds.

The advantages at a glance:
- flexible and adaptable
- clean, discoloration-free polished section
- for all metals, non-ferrous metals and plastics
- grinding, polishing, deburring and smoothing
- four different grit sizes

CRATEX® tools are available in four standard grit sizes, which each have a different colour for ease of differentiation:

(C) Coarse – dark green – grit size 40
For coarse grinding and deburring. Cuts rapidly without clogging. CRATEX® C is used for soft materials such as brass, copper and aluminium and leaves a clean, smooth surface after rough casting

(M) Medium – dark brown – grit size 90
For light deburring and for general finishing, yielding a surface quality between preliminary grinding and polishing. CRATEX® M is recommended for the working states following rough grinding of brass, copper, aluminium and stainless steel, etc. It is eminently suitable for polishing of moulds and for performing general finishing work.

(F) Fine – light brown – grit size120
A fine, needle-sharp grit size for polishing. A clean, polished surface is achieved very rapidly using this grit size. Particularly suitable for highalloyed steels, gold and other noble metals, for which a good surface is required.

(XF) Extra fine – light green – grit size 240
A microfine grit for achievement of a high gloss polish or final polishing on all metals.

		Order No.	Price from 1 set
CRATEX® Set 778, 68 pieces			
	Contents in plastic storage case: 8 CRATEX® points shape 4 8 CRATEX® points shape 6 8 CRATEX® points shape 8 8 CRATEX® points shape 10 8 CRATEX® points shape 11 8 CRATEX® points shape 12 8 CRATEX® points shape 14 8 CRATEX® points shape 15 equally assorted in the four CRATEX® grit sizes 2 point mounting shanks shape 12 (Ø 3 mm) 2 point mounting shanks shape 13 (Ø 3 mm)	**0 545 291**	125.23 €

Tool system CRATEX®
Sets

	Order No.	Price from 1 set
CRATEX® Set 777, 84 pieces		
 Contents in plastic storage case: 8 CRATEX® wheels shape 2 16 CRATEX® points shape 6 16 CRATEX® points shape 8 8 CRATEX® points shape 10 8 CRATEX® wheels shape 54 16 CRATEX® wheels shape 74 8 CRATEX® wheels shape 86 equally assorted in the four CRATEX® grit sizes 2 point mounting shanks shape 22 (Ø 3 mm) 2 point mounting shanks shape 12 (Ø 3 mm)	**0 545 292**	105.31 €

Diamond grinding point sets
rapid results for the highest demands

Diamond grinding point sets
With these sets, you will always have the right diamond grinding point at hand – at an unbeatable price.

Grit size D 107 for head Ø up to 2.5 mm
Grit size D 126 for head Ø more than 2.5 mm

	Order No.	Price from 1 set
Diamond grinding point set (30 pieces), shank Ø 3 mm		
 The set contains 30 diamond grinding points in cylinder, rounded cylinder, sphere, trapezium, rounded cone, tree with pointed end and pointed cone shapes.	**0 403 551**	75.61 €

	Order No.	Price from 1 set
Diamond grinding point set (10 pieces), shank Ø 6 mm		
 The set contains 10 diamond grinding points in shapes: pointed cone Ø 6 x 25 mm, 10°, tree with pointed end Ø 6,5 x 22 mm, cone Ø 8/4 x 15 mm, pointed cone shapes Ø 8 x 15 mm, 30°, wheel Ø 10 x 1,2 mm, Cylindrical with radius Ø 6,5 x 15 mm, trapeze Ø 8 x 5,5 mm, 20°, cylinder Ø 8 x 15 mm, sphere Ø 8 mm, rounded arch Ø 8 x 15 mm, D126, total length 60 mm, content: 10 pieces	**0 403 551-6**	84.96 €

Fine blasting units

Series “eco”- universal blasting unit

Fine blasting units “eco” series
The new, budget-priced entry level blasting unit offering professional quality for workshop and factory. It is highly recommended for deburring, derusting, cleaning, roughening, matting, descaling and removing of lacquer. This unit offers modern technology with many practical features at an attractive price.

Highlights:
- Compact, space-saving design
- Integrated dust exhaust for perfect visibility during the blasting process
- Blasting shot is processed in a closed loop, i. e. only dust etc. is removed, the blasting shot is recycled
- High-performance filter cartridge (up to 8 m² filter space)
- Large window
- Adjustable blasting pressure via pressure regulator
- Easy exchange of blasting shot thanks to steep funnel
- Grid with high loading capacity
- Integrated safety device
- LED work chamber illumination
- Easy self-installation of the optional equipment, even as retrofitting

	Fine blasting unit mikromat 50 eco
Working chamber dimensions (W x D x H)	approx. 500 x 450 x 470 mm
Device dimensions (W x H x D)	approx. 705 x 760 x 1,520 mm
Visual field	400 x 280 mm
Load bearing capacity of work area	50 kg
Air consumption	approx. 700 l/min at 7 bars
Compressed-air connection	Rapid-release coupling 1/2“
Compressed-air adjustment range	0.5 – 10 bars
Fan output	approx. 350 m³/h
Filter area	4.0 m²
Lighting	LED
Weight	approx. 85 kg
Number of filter cartridges	1
Supply voltage	230 V / 50–60 Hz Euro plug
Number of dust bags	1
Scope of delivery	Blasting nozzle made of hardened steel (Ø 7 mm), safety switch (no blasting shot supply when hood open), pressure controller with water separator, foot switch for starting and stopping the blasting process
Order No.	**0 951 100-8**
Price	4,079.00 €

Tabletop fine blasting device
microjet - compact table-top unit

Tabletop fine blasting device joke-microjet
The microjet is a blasting device developed for surface treatment of metals. Particularly suitable for removing residues and oxide layers or when using glass beads for polishing the precious metal surfaces

Highlights:
- Depending on equipment, a choice of one, two or three blasting shots is available during work
- Handpiece can be used with a Ø 0.8, 1 or 1.2 mm fine blasting nozzle
- Wide viewing window with easily replaceable protective film
- Steel housing with stove-enamel finish
- Pneumatic foot switch
- Tank with 2 kg capacity (approx. 1 litre)
- Compact, space-saving construction
- Switches for light and external extractor provided

	Tabletop fine blasting device joke-microjet 2, cabin with 2 blasting shot container
Device dimensions (W x H x D)	approx. 380 x 570 x 280 mm
Air consumption	max. 80 l/min at max. 6 bars
Compressed-air adjustment range	0,5 – 6 bar
Lighting	9 W (fluorescent tubes in housing)
Weight	approx. 11 kg
Supply voltage	230 V, 50/60 Hz
Scope of delivery	2 handpieces with Ø 1.2 mm blasting nozzle made of hardened steel, foot switch, 1 container respectively for blasting shot of grit size 90–120 µm and 150–250 µm (switchable), compressed air controller with filter and gloves (installed)
Order No.	**0 951 220**
Price	1,362.00 €

There are many possibilities:

The microjet 2 is supplied as standard with the above-mentioned blasting shot container and blasting nozzles. Other blasting shot container combinations or version with only one or three containers are possible.

Blasting shot container combinations		• Blasting shot and blasting nozzle:	
70 - 40 µm	GPF	glass beads	Ø 0.8 mm
110 - 70 µm	GPF	glass beads	Ø 1.0 mm
200 - 100 µm	GPM	glass beads	Ø 1.2 mm

Blasting shot
The right blasting shot for each application. Almost all blasting shots offer you a choice between the handy 5-litre canister and the economical sack containing 25 kg.
A wide selection is available at sales@joke.de.

Finishing

The finish polish

Finishing involves the final processing stages to improve the surface – either for technical or purely aesthetic purposes.

Depending on the material, tool and processing technique, surface results ranging from linear to mirror polishing can be achieved. The first steps towards a shine are accomplished by using grinding files and/or abrasive cloths.

If the surface is to be polished to a shine, polishing felts are used in combination with diamond compounds. Gradually better and increasingly brilliant surface results can be obtained by step-by-step use of the compounds from coarse to fine

It should be noted that the surface must be cleaned before using a finer compound and a new felt must be used to avoid any residues of coarser compound being introduced into the process.

Elastic grinding files
for preliminary polishing

Rubber-bonded grinding files joke PU-DIA
Synthetic diamond grits bonded in polyurethane (PU). Excellent stock removal performance on hardened surfaces and also the correct medium of choice for removing erosion structures. Owing to the elastic bond, these tools also adapt very well to the widest array of contours without any risk of breaking. Two dimensions in each of six grit sizes as standard (others on request!).

Use: wet/dry with water, fluid or oil.

Tip: make your own grinding files.
The joke Pu-Dia's can be simply cut to size and adapted.

	Dimensions	Grit size	Colour	Order No.	Price from 1 piece	Price from 5 pieces
Elastic grinding files joke PU-DIA						
rectangular						
	20 x 20 x 100 mm	D 3	green	**0 545 811**	28.37 €	24.88 €
		D 9	red	**0 545 812**	28.37 €	24.88 €

Use with and without coolant/lubricant!

Padded abrasive cloth
intelligent abrasive for finishing

The somewhat different kind of abrasive. The grinding crystals are accommodated in an elastic latex layer on a fabric base. The crystals move flexibly during grinding and always optimally align themselves in relation to the surface; the stock removal level constantly remains flat. The result is a completely smooth surface on almost all materials: metal, plastics, glass, wood, lacquer or stone. Practically all smooth surfaces can be superfine ground. In doing so, it is possible to work with a considerably coarser grit size than usual and markedly finer surfaces result all the same. Comparatively large grinding crystals and the flexible carrier material prevent scratches on the workpiece, since no adherence of the grinding crystals occurs as a result of dust particle accumulation.

		Order No.	Price from 1 set
Set of padded abrasive cloth MX			
	One sheet per grit size respectively	**0 401 650**	111.07 €

What advantages does "padded grinding" offer?
- Up to 15 times longer service life
- Markedly finer microsection than with conventional abrasives for the same grit size
- Grit size 400 corresponds to the surface roughness of P 2500 grit despite high stock removal!
- Delayed friction, hence less heat generation
- Large crystals
- No built-up edges

Fleece polishing wheels
shank Ø 3 x 40 mm

Polishing wheels and abrasive fleece
Foamed polishing wheels are highly dimensionally stable and are usedin grooves and for edge processing. Abrasive fleece may be used wet and dry for deburring, matting and improving surfaces. They are characterised by a cool, soft cut. Owing to their elasticity, they adapt well to the surface contours. Use on all steels, non-ferrous metals, aluminium and plastics.

	Head dimensions	Hard-ness	Shank dimensions	Rotation speed max.	Packing quantity	Order No.	Price from 1 piece	Price from 50 pieces
Abrasive fleece, shank Ø 3 mm, triple-layer								
extra coarse								
For deburring, derusting, etc. • firm grade	Ø 22 x 13 mm	hard	Ø 3 x 40 mm	10000 1/min	10 pieces	**0 572 309**	3.11 €	2.70 €
	Ø 25 x 17 mm	hard	Ø 3 x 40 mm	10000 1/min	10 pieces	**0 572 310**	3.14 €	2.73 €
	Ø 30 x 17 mm	hard	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 572 311**	3.25 €	2.83 €
very coarse								
Ideally suited for all metals. High stock removal on aluminium, gold and silver. • very coarse grade	Ø 22 x 13 mm	medium	Ø 3 x 40 mm	10000 1/min	10 pieces	**0 570 966**	3.26 €	2.91 €
	Ø 30 x 17 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 570 940**	3.21 €	2.88 €
	Ø 40 x 22 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 570 945**	3.58 €	3.19 €
coarse								
For processing all materials, ideal for removing small scratches, for deburring on hard metals	Ø 22 x 13 mm	medium	Ø 3 x 40 mm	10000 1/min	10 pieces	**0 570 967**	3.06 €	2.65 €
	Ø 30 x 17 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 570 941**	3.08 €	2.71 €
	Ø 40 x 22 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 570 946**	3.47 €	3.03 €
medium								
Very well suited for processing aluminium and stainless steel. • very firm grade	Ø 22 x 13 mm	very hard	Ø 3 x 40 mm	10000 1/min	10 pieces	**0 572 315**	3.18 €	2.77 €
	Ø 25 x 17 mm	very hard	Ø 3 x 40 mm	10000 1/min	10 pieces	**0 572 316**	3.27 €	2.85 €
	Ø 30 x 17 mm	very hard	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 572 317**	3.34 €	2.94 €
	Ø 22 x 13 mm	medium	Ø 3 x 40 mm	10000 1/min	10 pieces	**0 570 968**	3.06 €	2.65 €
	Ø 30 x 17 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 570 942**	3.50 €	2.64 €
	Ø 40 x 22 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 570 947**	3.47 €	3.03 €
fine								
For processing all metals, highly versatile.	Ø 30 x 17 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 570 943**	3.08 €	2.71 €
For processing all metals, highly versatile.	Ø 40 x 22 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 570 948**	3.47 €	3.03 €

Hardness
extra hard = K 60
hard = K 80
medium = K 180
fine = K 240
very fine = K 400
ultra fine = K 1000

Fleece polishing wheels
shank Ø 3 x 40 mm

		Head dimensions	Hard-ness	Shank dimensions	Rotation speed max.	Packing quantity	Order No.	Price from 1 piece	Price from 50 pieces
very fine (SIC)									
	Using this grinding fleece results in a slight shine. Ideal for aluminium, stain-less steels, etc..	Ø 22 x 13 mm	medium	Ø 3 x 40 mm	10000 1/min	10 pieces	**0 572 301**	2.87 €	2.47 €
		Ø 25 x 17 mm	medium	Ø 3 x 40 mm	10000 1/min	10 pieces	**0 572 302**	2.94 €	2.53 €
		Ø 30 x 17 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 572 303**	2.97 €	2.63 €
ultrafine									
	Very fine grinding nylon and grit. Ideal for proces-sing gold, silver, brass, copper and aluminium.	Ø 22 x 13 mm	soft	Ø 3 x 40 mm	10000 1/min	10 pieces	**0 572 305**	3.15 €	2.73 €
		Ø 30 x 17 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 570 958**	3.43 €	3.02 €
without grit									
	Grinding nylon without grit, ideal in combination with diamond compounds or also other polishing compounds.	Ø 22 x 13 mm	medium	Ø 3 x 40 mm	10000 1/min	10 pieces	**0 570 970**	2.98 €	2.64 €
		Ø 30 x 17 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 570 944**	2.89 €	2.57 €
		Ø 30 x 17 mm	hard	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 572 306**	3.08 €	2.67 €
		Ø 40 x 22 mm	medium	Ø 3 x 40 mm	8000 1/min	10 pieces	**0 570 949**	3.21 €	2.88 €

For any kind of support or demonstration please contact us.
We will be pleased to help you!

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