

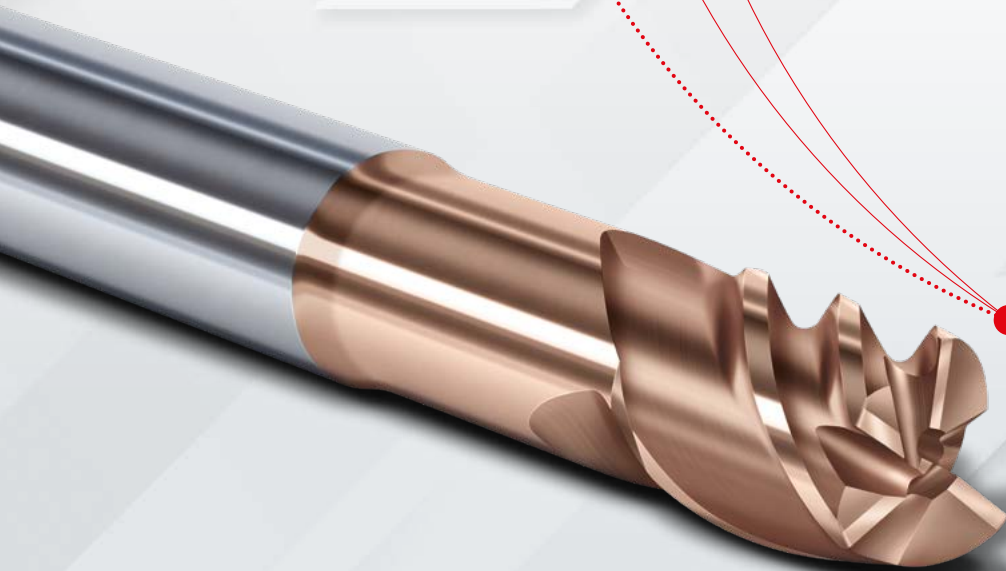
passion  
for precision

fraisa

## **NX face-finishing milling cutter**

Finishing plane surfaces to perfection

**NEW**



Available online

**FRAISA**  
**ToolExpert® 2.0**

# **NX** technology: For surface qualities below Ra 0.1 µm

FRAISA's **NX face-finishing cutter** is the latest innovation in finishing. The new milling cutter mills plane surfaces that are both visually and measurably of top quality. The secret lies in its axially and radially offset finish-cutting edge. Thanks to this offset, the finish-cutting edge cuts a precisely defined cross-section of chip measuring just a few hundredths of a millimeter. The finish-cutting edge is designed exactly for this chip cross-section and produces brilliant surface qualities.

[ 2 ] The **NX face-finishing cutter** enables you to machine parts to surface roughness qualities of **Ra < 0.1 µm**. For many parts, this eliminates any need for a further process step as **grinding is no longer necessary**. The great advantage: The part can be finished in the same process on the same machine, saving considerable cost and time.

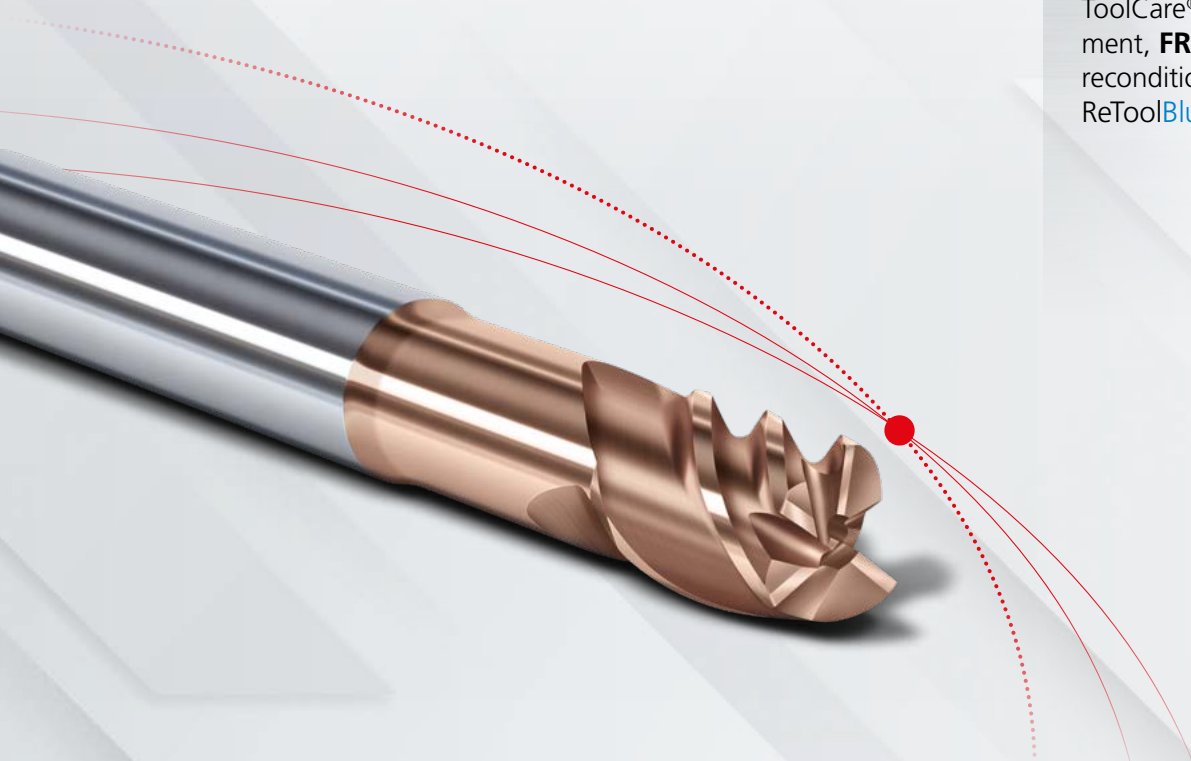
The **NX face-finishing cutter** has been designed so that even small, unavoidable radial deflections of the tool do not affect the machining result.

Since a perfect transition is often desired between the base and the wall, the **NX face-finishing cutter** also has short cutting edges at its circumference, so that step-free transitions can be created.

If you **value** outstanding surface roughness qualities or want to embellish visible components, you will be amazed by what FRAISA's new **NX** technology has to offer.

## The advantages:

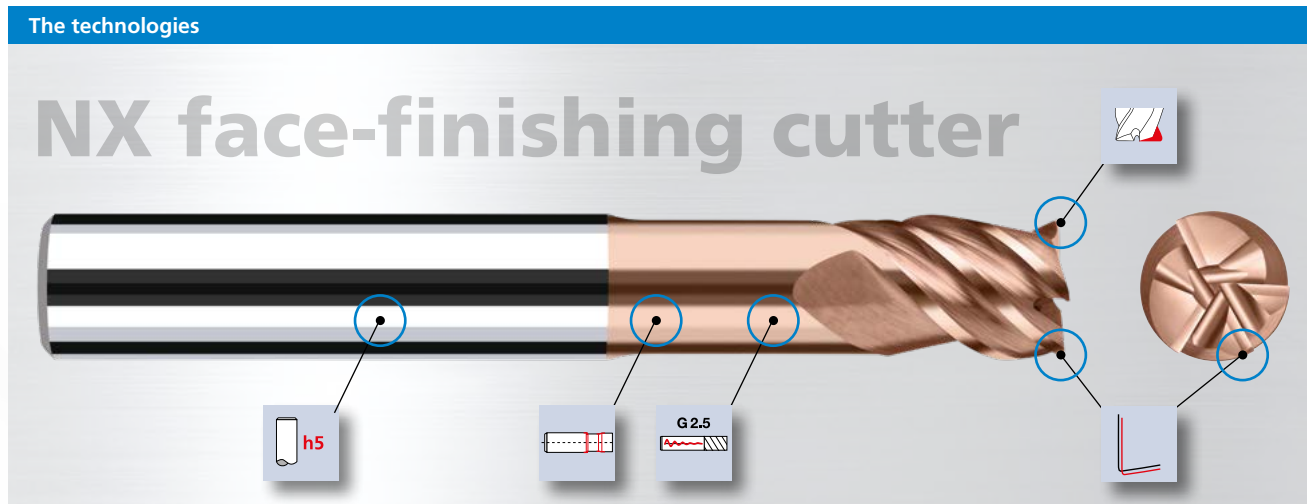
- **Top surface quality**  
Visually and measurably much better surface roughness quality than with conventional tools
- **Reduced process costs**  
Times for finishing processes such as grinding or polishing are cut significantly
- **Easy to use**  
Tools can be used for normal 2D facing or for pocket milling
- **FRAISA ToolExpert® 2.0 cutting data calculator** for quick and easy provision of cutting data
- **Ideal life cycle** with FRAISA ToolCare® tool management, **FRAISA ReTool®** tool reconditioning, and FRAISA ReToolBlue tool recycling



# The technologies of the NX face-finishing

New feature combines with tried and trusted: The new technology of cutters with a face-finishing cutting edge is characterized by the fact that an additional cutting

edge is ground between the existing ones. Thanks to the high-precision shank, the smooth transitions and fine balancing, the tool functions superbly.



**Milling tool with a partially polished blade**

- Reinforcement of the exposed cutting corner
- Absorption of high cutting forces

**Smooth transitions**

- The shaft-neck-cutting edge transitions are fitted with smooth gradients and radii
- Improved tool rigidity and therefore less radial deflection
- Minimal step formation with several infeed depths
- Higher mechanical load and therefore improved performance

**G 2.5 Finely balanced tools**

- Finely balanced tools at least G2.5 at  $n = 20,000$  rpm or permissible residual imbalance  $< 1$  gmm
- Reduction or elimination of the balancing process in the case of finely balanced clamping devices
- Improved surface quality as a result of increased running smoothness and fewer vibrations
- Increase in the service life of the machine spindle

**h5 Milling tool with shank of h5 tolerance**

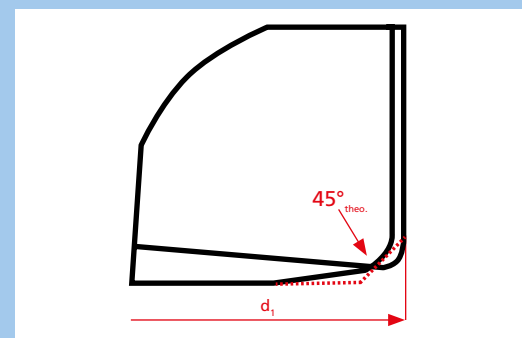
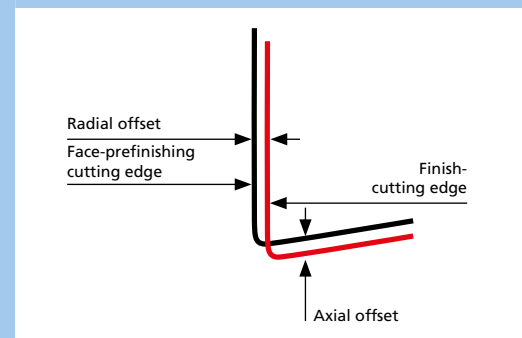
- High concentric and eccentric precision
- Optimal for modern precision chucks

**Face-finishing cutting edge**

- Tool with special cutting edge for face finishing
- Top quality plane surfaces can be machined

Tools with the face-finishing cutting edge have a theoretical  $45^\circ$  chamfer ( $45^\circ_{\text{theo}}$ ). This value is indicated for each diameter in the data table of the catalog page and is indicated as the tool chamfer for CNC/CAM programming. During machining, however, a minimal amount of rest material is produced due to the difference of  $45^\circ_{\text{theo}}$  to the effective tool contour.

(Observe the application related tips.)





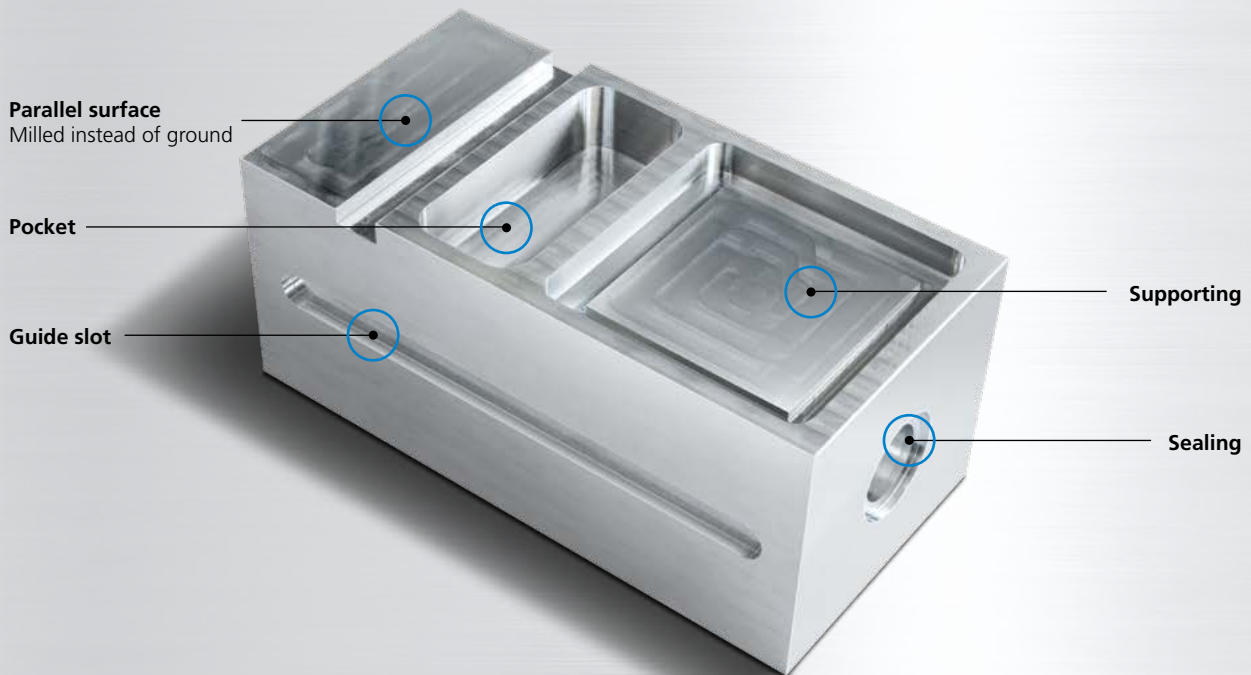
# NX face-finishing cutter for the very best surface quality – visually and measurably

## Choosing the right strategy

If you want to obtain surface finishes of the highest quality, it is crucial you choose the right strategy. The following requirements should be taken into account:

- ✓ Fluid movements, the tool should never stand still
- ✓ No sharp corners if possible
- ✓ Reduce the feed rate in corners

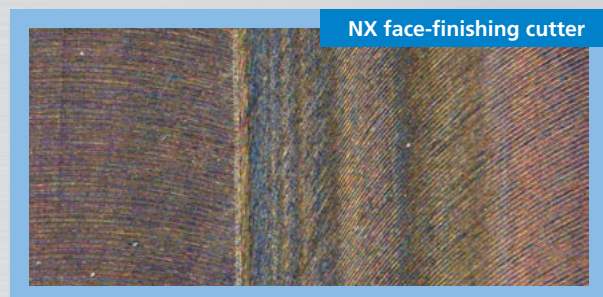
Can be used flexibly for various applications:  
All marked surfaces were machined using the NX face-finishing cutter.



## Comparison of surfaces



**Material:** Stainless steel 1.4301, Ra: 0.35  $\mu\text{m}$ , Rz: 1.73  $\mu\text{m}$



**Material:** Stainless steel 1.4301, Ra: 0.11  $\mu\text{m}$ , Rz: 0.62  $\mu\text{m}$

# Application tips for tools with a face-finishing cutting edge

## Pocket machining

The right workflow is important to minimize the amount of rest material in the corners of a pocket or step. Our product developers therefore recommend prefinishing after roughing and then finishing the base first before the wall.

The **NX face-finishing cutter** will mill the base and the wall together. Machining of the base is then complete. The wall still has a minimal allowance and is then finished with a finishing tool.

Example workflow			
	Tool	Wall allowance	Base allowance
<b>Roughing</b>	P8201.450 (MFC)	+0.25 mm	+0.25 mm
<b>Pre-finishing</b>	P8201.450 (MFC)	+0.10 mm	+0.10 mm
<b>Finishing base/wall</b>	P8502.450 (NX face-finishing cutter)	+0.02 mm	+0.00 mm
<b>Super-finishing wall</b>	P15250.450 (Multicut XF)	+0.00 mm	+0.02 mm

After machining with NX

Finished pocket

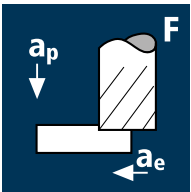






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## Measuring the tools

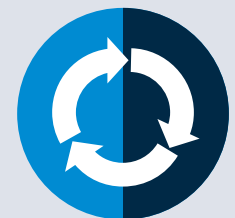
When measuring the tool on the machine using a laser, it is very important to specify the correct tool offset. To measure the diameter, a length offset  $L_{off}$  of at least  $h$  must be specified – FRAISA recommends an  $L_{off}$  of 1–2 mm.

Machining precision also requires taking a close look at the radius offset. Why? The lowest point of the tool is not at the cutting-edge corner, but a few tenths of a millimeter towards the center. A radial offset  $R_{off}$  of  $c$  must therefore be specified in the tool table.

Radial cutting depth $ae_{max}$ for plane surfaces with tools with a face-finishing cutting edge				
$d_1$ [mm]	$h$ [mm]	$b$ [mm]	$c$ [mm]	$ae_{max}$ [mm]
3	0.02	0.10	0.20	2.60
4	0.02	0.10	0.20	3.60
5	0.02	0.10	0.20	4.60
6	0.02	0.10	0.20	5.60
8	0.03	0.20	0.35	7.30
10	0.03	0.20	0.35	9.30
12	0.04	0.30	0.50	11.00
16	0.04	0.30	0.50	15.00

Application	Material	d1 [mm]	z	v <sub>c</sub> [m/min]	f <sub>c</sub> [mm]	a <sub>p</sub> [mm]	a <sub>e</sub> [mm]	n [min <sup>-1</sup> ]	v <sub>f</sub> [mm/min]
	Hardened tool steel 42 - 48 HRC  	3.00	4	180	0.005	0.050	1.800	19100	380
		4.00	4	180	0.006	0.050	2.400	14325	345
		5.00	4	180	0.007	0.075	3.000	11460	320
		6.00	4	180	0.008	0.075	3.600	9550	305
		8.00	4	180	0.009	0.100	4.800	7160	260
		10.00	4	180	0.010	0.100	6.000	5730	230
		12.00	4	180	0.011	0.150	7.200	4775	210
16.00	4	180	0.013	0.150	9.600	3580	185		
	Hardened tool steel 48 - 52 HRC  	3.00	4	180	0.005	0.050	1.800	19100	380
		4.00	4	180	0.006	0.050	2.400	14325	345
		5.00	4	180	0.007	0.075	3.000	11460	320
		6.00	4	180	0.008	0.075	3.600	9550	305
		8.00	4	180	0.009	0.100	4.800	7160	260
		10.00	4	180	0.010	0.100	6.000	5730	230
		12.00	4	180	0.011	0.150	7.200	4775	210
16.00	4	180	0.013	0.150	9.600	3580	185		
	Hardened tool steel 52 - 56 HRC  	3.00	4	160	0.005	0.050	1.800	16975	340
		4.00	4	160	0.006	0.050	2.400	12730	305
		5.00	4	160	0.007	0.075	3.000	10185	285
		6.00	4	160	0.008	0.075	3.600	8490	270
		8.00	4	160	0.009	0.100	4.800	6365	230
		10.00	4	160	0.010	0.100	6.000	5095	205
		12.00	4	160	0.011	0.150	7.200	4245	185
16.00	4	160	0.013	0.150	9.600	3185	165		
	Titanium alloys > 300 HB [Ti6Al4V]  	3.00	4	125	0.005	0.050	1.800	13265	265
		4.00	4	125	0.006	0.050	2.400	9945	240
		5.00	4	125	0.007	0.075	3.000	7960	225
		6.00	4	125	0.008	0.075	3.600	6630	210
		8.00	4	125	0.009	0.100	4.800	4975	180
		10.00	4	125	0.010	0.100	6.000	3980	160
		12.00	4	125	0.011	0.150	7.200	3315	145
16.00	4	125	0.013	0.150	9.600	2485	130		
	Inox normal [Cr-Ni/1.4301] [Cr-Ni-Mo/1.4571]  	3.00	4	250	0.005	0.050	1.800	26525	530
		4.00	4	250	0.006	0.050	2.400	19895	475
		5.00	4	250	0.007	0.075	3.000	15915	445
		6.00	4	250	0.008	0.075	3.600	13265	425
		8.00	4	250	0.009	0.100	4.800	9945	360
		10.00	4	250	0.010	0.100	6.000	7960	320
		12.00	4	250	0.011	0.150	7.200	6630	290
16.00	4	250	0.013	0.150	9.600	4975	260		
	Wrought aluminium Construction aluminium  	3.00	4	280	0.006	0.050	1.800	29710	715
		4.00	4	370	0.007	0.050	2.400	29445	825
		5.00	4	400	0.008	0.075	3.250	25465	815
		6.00	4	400	0.010	0.075	3.900	21220	850
		8.00	4	450	0.012	0.100	5.600	17905	860
		10.00	4	450	0.015	0.100	7.000	14325	860
		12.00	4	500	0.018	0.150	8.400	13265	955
16.00	4	500	0.020	0.150	11.200	9945	795		

## FRAISA ReTool® – Industrial tool reconditioning with performance guarantee



FRAISA ReTool® offers an all-round service that restores your used tools to their original performance level and optimizes your processes. FRAISA and third-party tools are reconditioned using the very latest technology – and in a resource-friendly way. The outcome: mint-condition tools as productive as they were the first day they were used. And to make things even better, your level of investment is lower than if you were to buy new tools, you increase your productivity and you save costs.

### Over 30 years' experience in tool reconditioning:

Our competence center in Germany is Europe's largest service center for carbide milling tools.



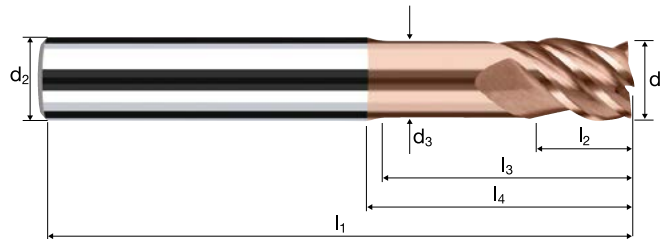
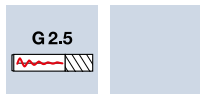
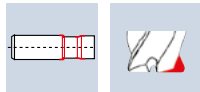
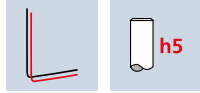
Video on our  
service product:  
FRAISA ReTool®

# Cylindrical end mills NX

Face finishing, normal version with neck



HM  
XA     λ 45°  
          γ 10°



new!



			<b>Rm</b> 1300-1500	<b>HRC</b> 48-56			<b>Inox</b> Stainless	<b>Ti</b> Titanium	<b>Aluminium</b> <b>Copper</b>
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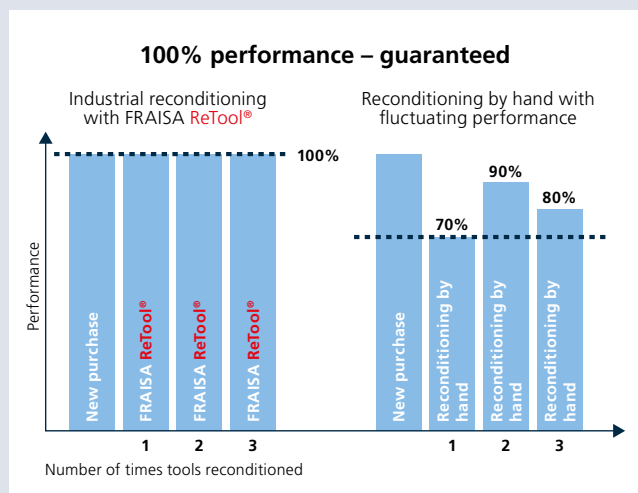
Example: Order-N°.											DURO-Si	
											H8502	
Ø Code	d <sub>1</sub> e8	d <sub>2</sub> h5	d <sub>3</sub>	l <sub>1</sub>	l <sub>2</sub>	l <sub>3</sub>	l <sub>4</sub>	45°	α	z		
180	3.00	6.00	2.80	57	4.00	14.00	20.37	0.10	4.5°	4	●	
220	4.00	6.00	3.70	57	5.00	16.00	20.82	0.10	3.0°	4	●	
260	5.00	6.00	4.60	57	6.00	18.00	21.27	0.10	1.5°	4	●	
300	6.00	6.00	5.50	57	7.00	18.15	20.00	0.10	0.0°	4	●	
391	8.00	8.00	7.40	63	9.00	23.63	26.00	0.15	0.0°	4	●	
450	10.00	10.00	9.20	72	11.00	27.99	31.00	0.15	0.0°	4	●	
501	12.00	12.00	11.00	83	13.00	33.29	37.00	0.20	0.0°	4	●	
610	16.00	16.00	15.00	92	17.00	38.73	43.00	0.20	0.0°	4	●	

[ 7 ]

## FRAISA ReTool® – a performance guarantee founded on integrated development of the tools and the reconditioning process

We guarantee that following their reconditioning with **FRAISA ReTool®**, your used tools will be restored to the original performance level they had when new. Our ability to provide this performance guarantee is a priority of our team of experts right from very early on in product development.

That's why the development of the reconditioning process is an integral part of the development phase, alongside the actual product tests and calculating the cutting data. Strict rules apply: the **FRAISA ReTool®** process is approved only if we are able to fulfil our performance guarantee 100%.





Scan this QR code to access more information about the FRAISA GROUP.



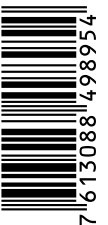
The fastest way to our E-Shop.

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