

passion
for precision



Microcut – Smart design

Stability in its most beautiful form



FRAISA
ToolExpert®

Microcut – focuses on the essentials

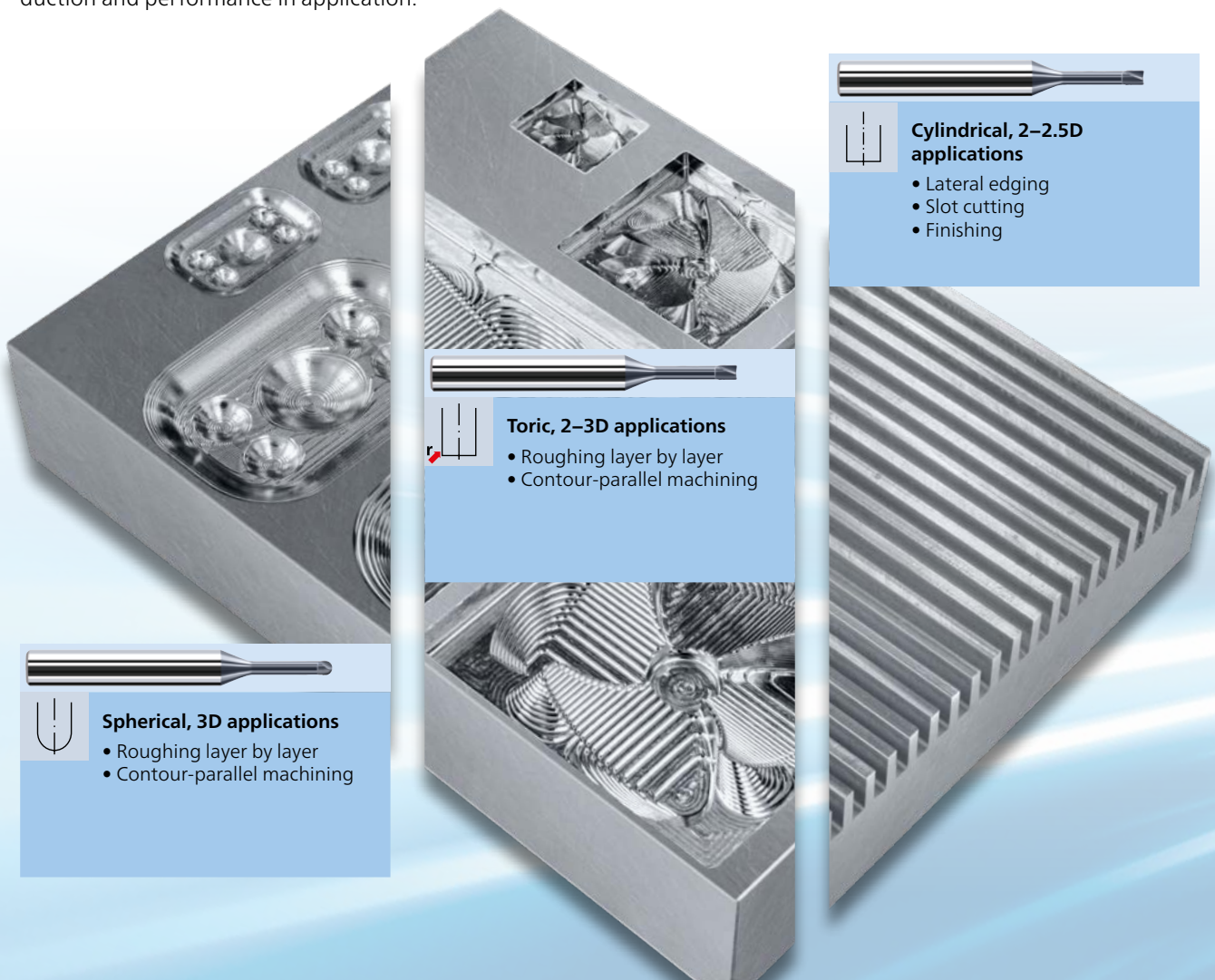
FRAISA's new **Microcut** tools offer the perfect solution for every challenge faced when the cost of machining materials in the hardness range up to 55 HRC has to be kept low. This generation of **Microcut** microtools guarantees cost-effective machining of two- and three-dimensional contours in mold and tool making, as well as in medical technology and the watch industry. The tools have been developed in order to expand FRAISA's portfolio to include an alternative, extremely economical tool for machining steels and non-ferrous alloys. The clincher: The design of these **Microcut** milling cutters is minimalist, which has resulted in increased stability.

The new ellipsoid technology has opened up completely new design horizons in the production of **Microcut** tools. A perfect example of how to combine economy in production and performance in application.

The geometry of the tool has been minimized to focus on the basic functional elements. The shank diameter of $d_2 = 4$ mm, with a tolerance of h4, also ensures greater precision and stable milling performance.

This specially developed geometry also offers the advantage that even extremely small-diameter tools can be produced precisely using laser technology. There are no process forces that prevent tight tolerances, like when grinding. Concentricity errors are reduced to a minimum with this manufacturing process. As a result, all diameters $d_1 < 1$ mm of **Microcut** milling cutter are produced with a laser.

[2]

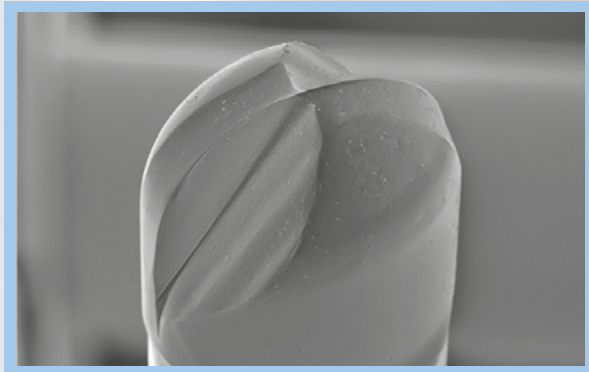


Microcut – technically innovative and extremely economical

Microcut is the solution for cost-effective production of complex component geometries in medium- to high-strength materials. The tools of the **Microcut** series achieve their outstanding stability and economy by concentrating on the basics. Because it only takes three operations on the tool to produce the perfect cutting edge geometry, only the material that really needs to be is removed from the tool, so that the cutter is as robust as it possibly can be.

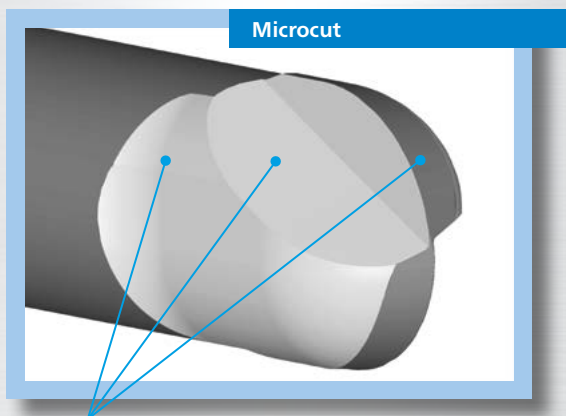
Impressive performance: The new **Microcut** tools show their inherent strength when used to machine materials with a hardness of up to 55 HRC. The proven X-AL coating and super-hard substrate HM XA guarantee excellent wear resistance in roughing and finishing operations. Cost-efficiency is guaranteed by the new **Microcut** tool concept.

Microcut

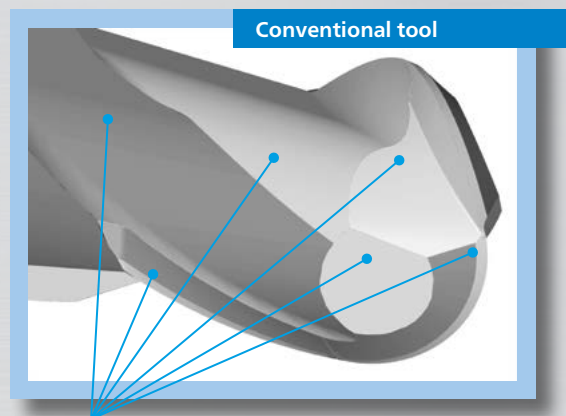


Scanning electron microscope (SEM) image of a lasered spherical head tool (X6844)

Cutting edge geometry



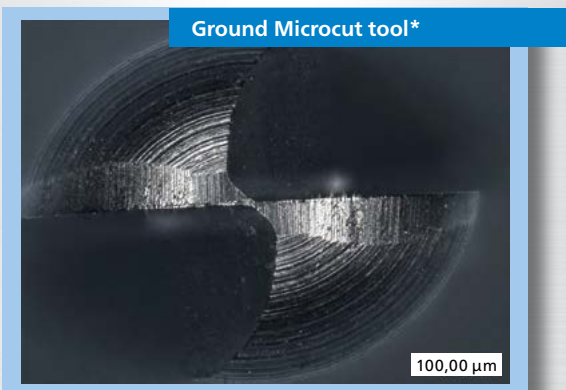
3 grinds per cutting edge



6 grinds per cutting edge

[3]

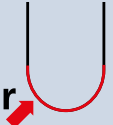
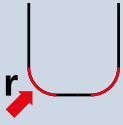
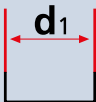
HSC roughing of spherical balls



Tool dia. 1 mm, $n = 49,300$ rpm (v_c , max. = 160 m/min), $v_f = 2,465$ mm/min ($f_z = 0.025$ mm/z), $a_p = 0.054$ mm, $a_e = 0.2$ mm, mat. AISI 304, $l_3 = 5$ mm

* Result after 90 minutes

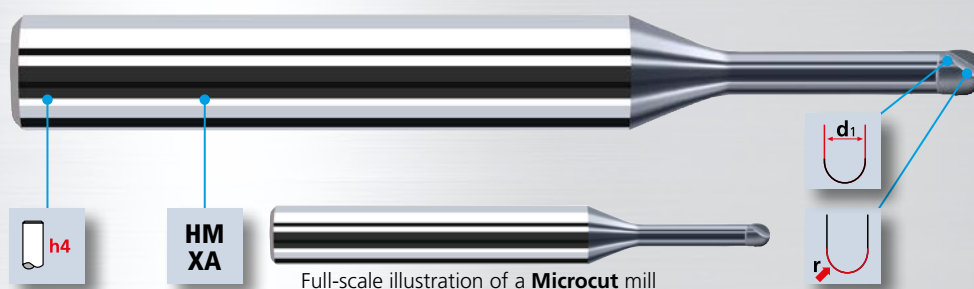
Microcut – cost-efficiency with top performance




Microcut range	Ball nose end mills 2 teeth Tol. r ± 0.005 mm	Corner radius end mills 2 teeth Tol. r $0/+0.01$ mm	Cylindrical end mills 2 teeth 45° protective chamfer with tool dia. ≥ 1 mm
			
Cylindrical neck Shank dia. 4 mm (h4)	Dia. 0.2–3.0 mm 1xd–20xd No. of items: 62	Dia. 0.4–3.0 mm 1xd–8xd r 0.1/0.2 mm No. of items: 40	Dia. 0.2–3.0 mm 1xd–20xd No. of items: 62

[4]

Microcut ball nose end mills

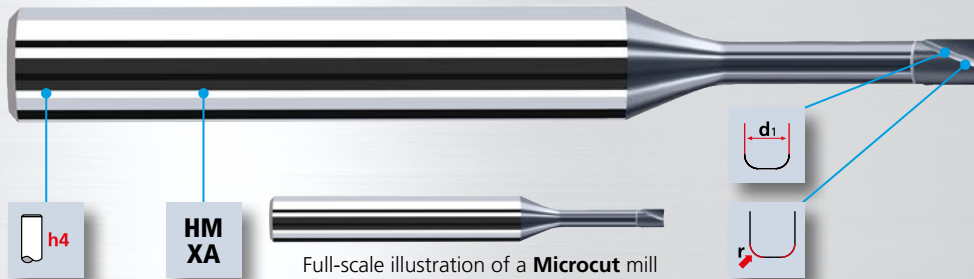
Spherical



 4 mm precision shank with h4 tolerance	 High-precision radius tolerance of ± 0.005 mm
<ul style="list-style-type: none"> High concentricity for best component qualities Ideal for modern precision tool holders 	<ul style="list-style-type: none"> Specially configured position tolerances simplify programming and safe completion of the final contour High-precision tolerance zone for great dimensional accuracy
HM XA XA carbide	 High-precision diameter
<ul style="list-style-type: none"> Excellent ductility with a very high hardness reduces the risk of chipping and increases process reliability 	<ul style="list-style-type: none"> High-precision tolerance zone across 180° of the ball for great dimensional accuracy Easy adjustability and exact measurement of the tool in the machine

Microcut corner radius end mills

Toric



4 mm precision shank with h4 tolerance

- High concentricity for best component qualities
- Ideal for modern precision tool holders



Corner radius end mill with a highly precise radius tolerance

- Specially designed tolerances simplify the programming and the secure finish of the end contour
- Highly precise tolerance field for high dimensional accuracy



XA carbide

- Excellent ductility with a very high hardness reduces the risk of chipping and increases process reliability



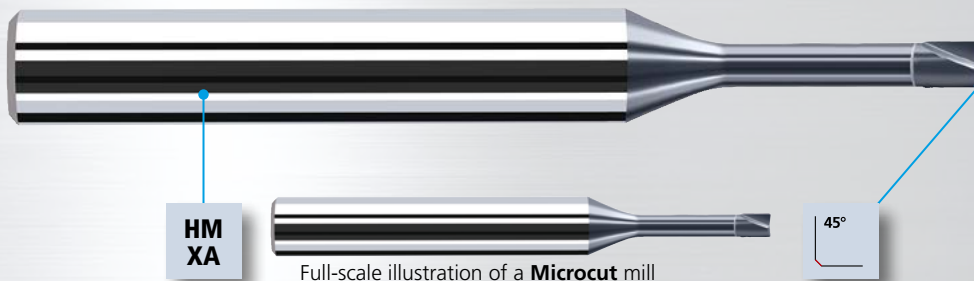
Corner radius end mill with a highly precise diameter tolerance

- Specially designed bearing tolerances simplify the programming and the secure finish of the end contour
- Highly precise tolerance field for high dimensional accuracy

[5]

Microcut cylindrical end mills

Cylindrical



XA carbide

- Excellent ductility with a very high hardness reduces the risk of chipping and increases process reliability



45° protective chamfer with tool dia. ≥ 1 mm

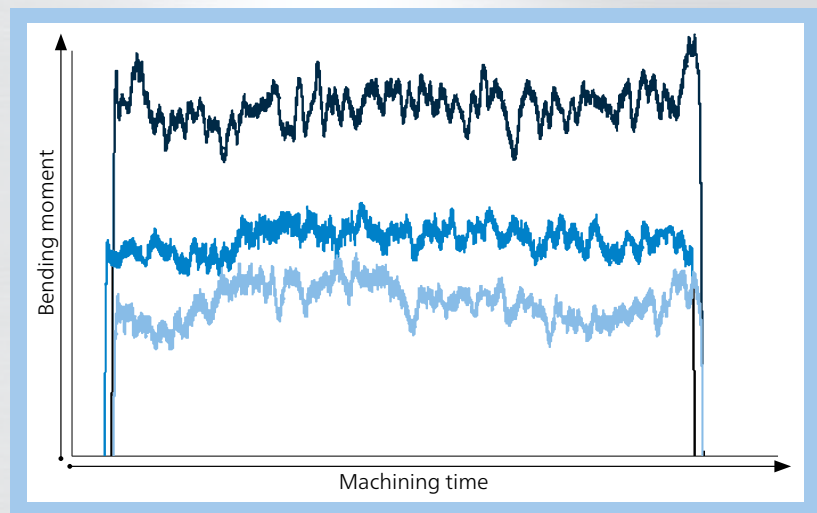
- The corner between the front side blade and the circumference blade has a protective chamfer of 45°
- The size of the protective chamfer is stated for each diameter in the data table on the catalogue page

New cutting data for our microtool family

Special component geometries have been developed for each type of tool – cylindrical, toric, and spherical – in order to calculate and optimally coordinate the cutting data for each machining strategy. A large number of test points form the basis of the new high-quality cutting data. Combined with state-of-the-art measurement technology and underlying algorithmic structures, reliable and practical cutting data can be determined for our customers.

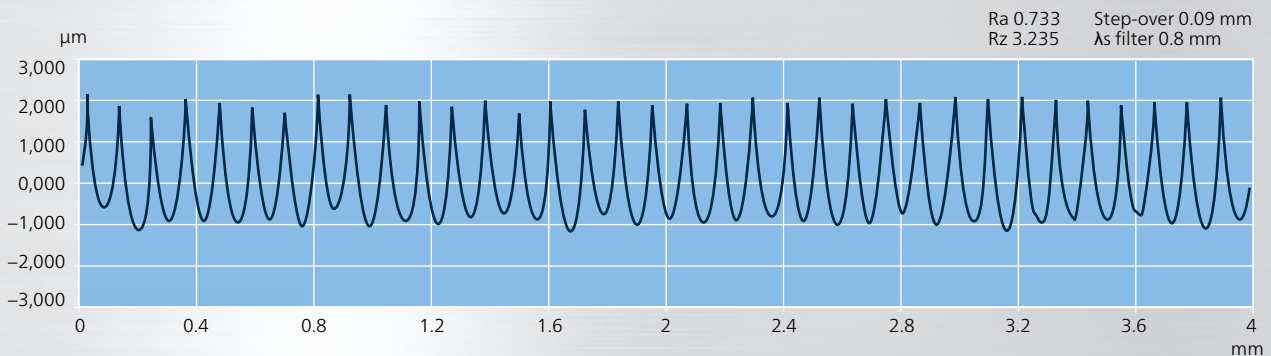
[6]

Graph of bending moments

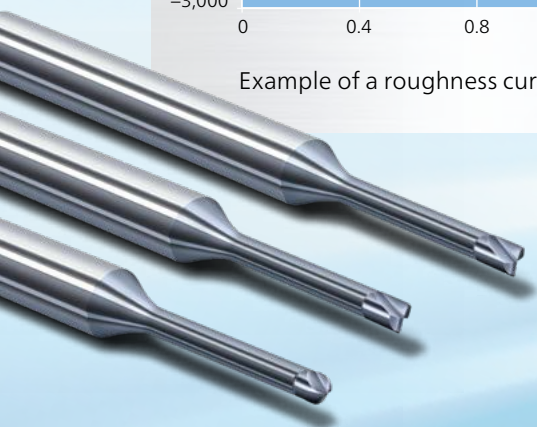


— X6832100 (Spherical dia. 1, 1xd) — X6840100 (Spherical dia. 1, 5xd)
— X6846100 (Spherical dia. 1, 10xd)

Roughness curve



Example of a roughness curve for a part produced with **Microcut** milling cutters



FRAISA ToolExpert® – the innovative online tool for your production

In the age of Industry 4.0, it's all about working productively and precisely at all times. To achieve this, FRAISA develops not only high-quality and versatile tools, but also innovative software solutions, such as the new ToolExpert.

This user-friendly online tool delivers perfectly coordinated, tool- and material-specific cutting data for production purposes – and the perfect basis for optimum usage of FRAISA tools: quick and easy.

To this end, FRAISA experts determine the optimum operating points in comprehensive tests carried out at the company's own application centers. All factors involved are taken into account and the optimal data is then bundled in the new ToolExpert and continuously expanded.

When it comes to using the tools, this means you:

- ✓ Find the optimum operating parameters quickly and reliably
- ✓ Use perfectly coordinated tool- and material-specific cutting data
- ✓ Download CAD data for selected tools

FRAISA ToolExpert® offers many advantages:

- **Precise:** Find perfectly coordinated, tool- and material-specific cutting data
- **Simple:** Access data online at any time and from anywhere without software downloads
- **Quick:** Find application parameters with a just few clicks and without registering
- **Order function:** Order the tool you want directly from our E-shop via a link
- **Flexible:** Search for tools or materials to be machined as required
- **Comprehensive:** Call up cutting data for FRAISA tools from a database of more than 11,000 materials
- **User-friendly:** Work intuitively thanks to the new, responsive design

[7]



Microcut – first-class milling tools with a comprehensive service package

FRAISA's new **Microcut** range not only offers optimum tools for precision milling of medium- and high-strength parts, but also includes services that go far beyond this and ensure the greatest possible level of efficiency in production processes and production runs.

MAXIMUM CUSTOMER VALUE

✓ Maximum **precision** and best **component quality**

✓ Maximum **cost-performance ratio, process reliability, and reproducibility**

✓ **Reduced costs**

✓ Increased **productivity**

TECHNOLOGY

- **Tolerances** for balls ± 0.005 mm
- **4 mm high-precision shanks** with h4 tolerance for best component qualities
- Optimized suitability for **3-axis, 3+2-axis** and **5-axis** milling

APPLICATION

- **High availability** and **easy ordering**, with next-day delivery throughout Europe and stocked inventory in the United States
- **FRAISA ToolExpert®**: Accurate and reliable **application data** for every tool available online
- **CAD data** available on website
- Maximum efficiency for **roughing** and **finishing** on materials up to 55 HRC

SERVICE

- **FRAISA ToolCare® 2.1**: management, procurement, and information system for tools
- **FRAISA ConcepTool**: custom-made special tools
- **FRAISA ToolSchool**: initial and continuous training



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