passion
for precision

fraisa

MicroX – The clever solution for high-precision micro-milling

Cutting
data calculator
ToolExpert

The MicroX success story in four dimensions

We are presenting our **attractive MicroX range** in a greatly expanded form – a success story in four dimensions!

This product range, now expanded to almost **500** items in diameters ranging from 0.1 to 3.0 mm, sets **new benchmarks** with respect to **performance, completeness and simple and quick tool selection**, opening up new options for high-precision micro-milling.

With the **four perfectly coordinated dimensions "Range," "Technology," "Service," and "Application," MicroX** offers a clever solution for **maximum customer value** in finishing and superfinishing.

Technology

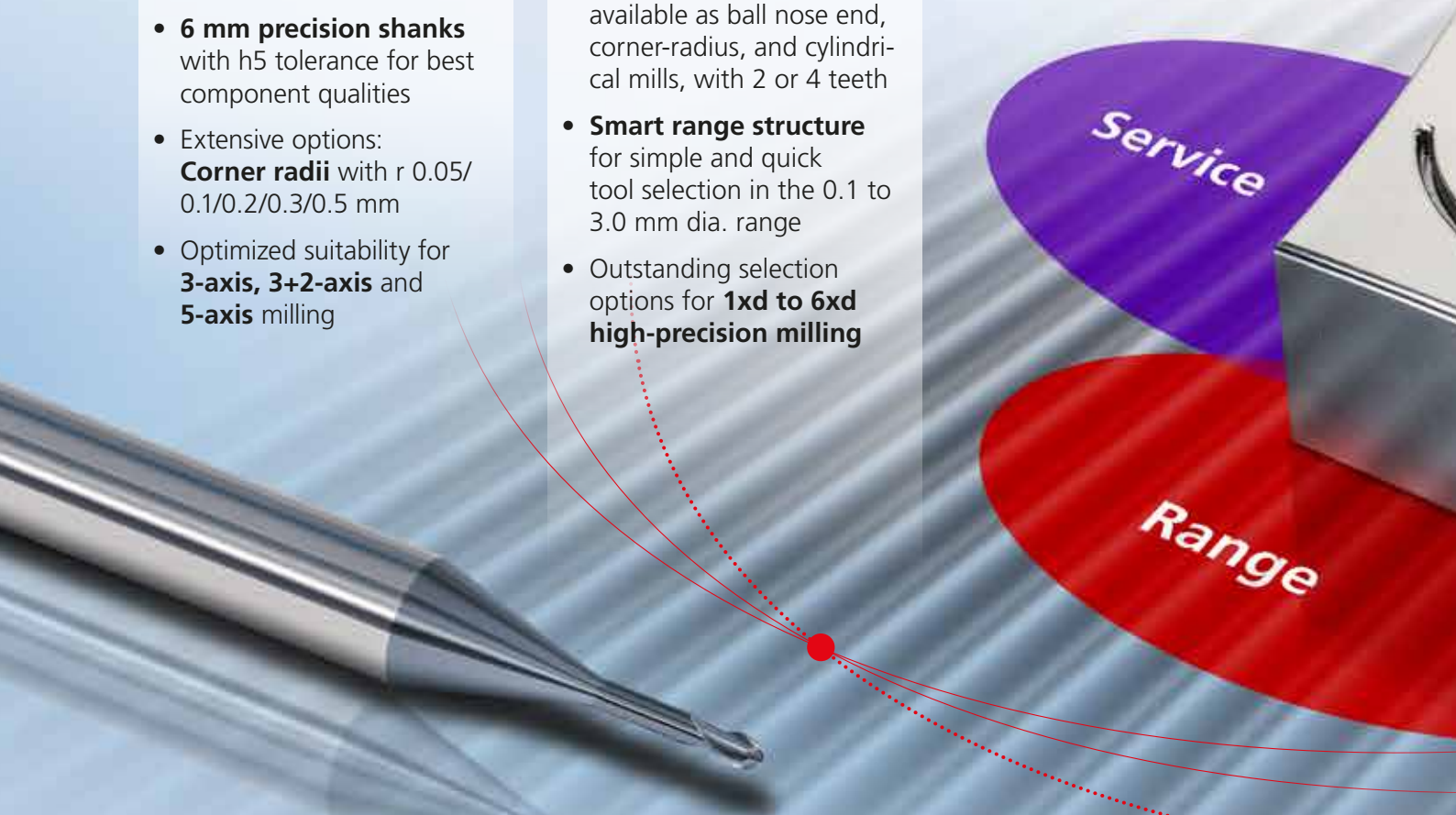
- **Tolerances** for balls +/–0.005 mm and corner radii 0/+0.01 mm
- **6 mm precision shanks** with h5 tolerance for best component qualities
- Extensive options: **Corner radii** with r 0.05/ 0.1/0.2/0.3/0.5 mm
- Optimized suitability for **3-axis, 3+2-axis** and **5-axis** milling

Range

- First-rate selection: **478 different micro cutters from 1xd to 20xd**, available as ball nose end, corner-radius, and cylindrical mills, with 2 or 4 teeth
- **Smart range structure** for simple and quick tool selection in the 0.1 to 3.0 mm dia. range
- Outstanding selection options for **1xd to 6xd high-precision milling**

Service

- **ToolCare 2.1**: management, procurement, and information system for tools
- **ConcepTool:** custom-made special tools
- **ToolSchool:** initial and continuous training
- **FRAISA ReTool®:** Industrial tool reconditioning with performance guarantee



Maximum customer value

- Maximum **precision** and best **component quality**
- Maximum **performance, process reliability,** and **reproducibility**
- **Reduced costs**
- Increased **productivity**

RESULT

Application

Technology

Application

- **High availability** and **easy ordering**, with next-day delivery throughout Europe
- **ToolExpert:** Accurate and reliable **application data** for every tool available online
- **CAD data** available on website
- Maximum efficiency for **finishing and super-finishing** in steels from 40 to 60 HRC

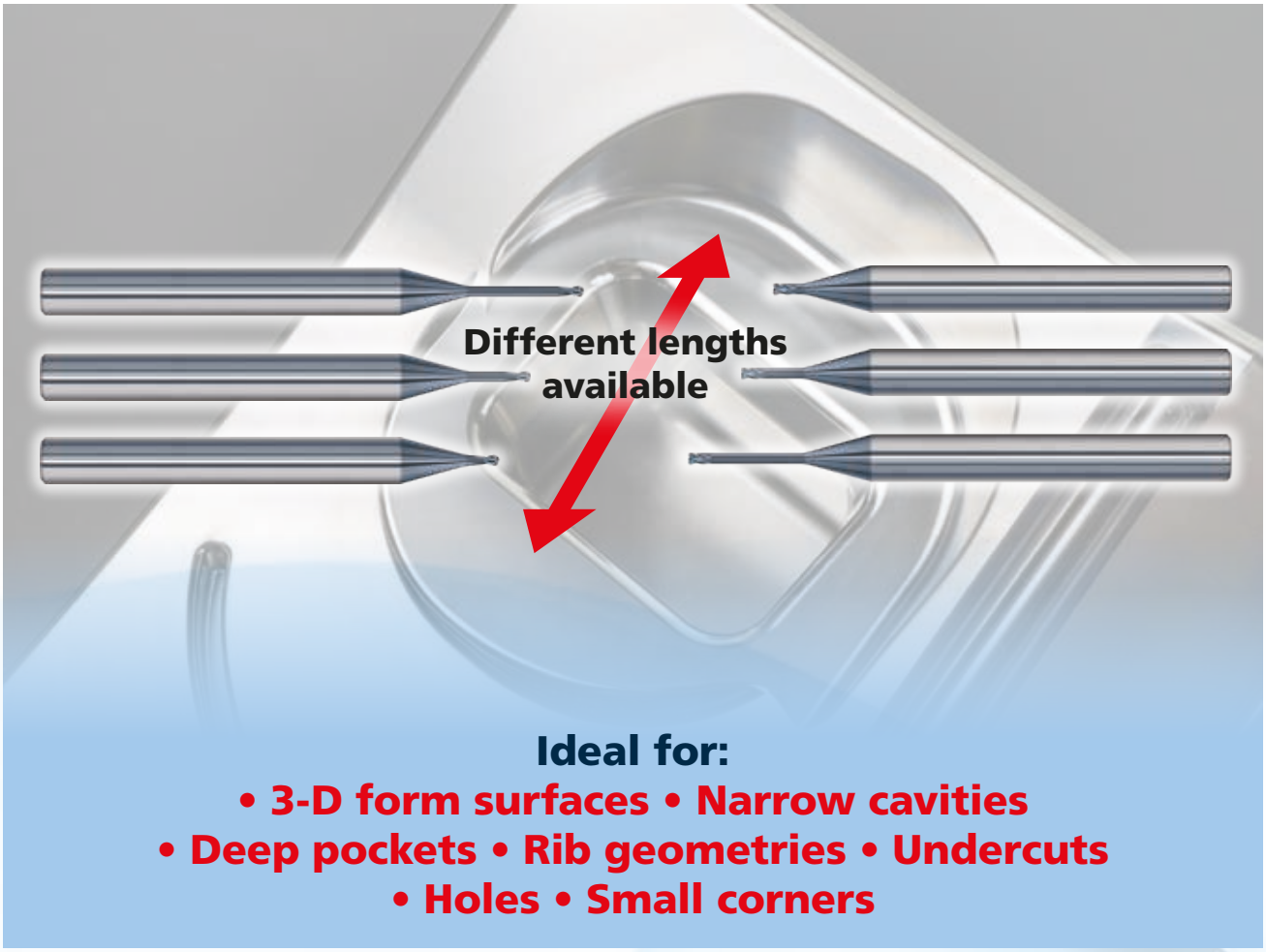
478 different micro cutters for first-rate tool selection

With **MicroX**, FRAISA offers an **innovative tool solution** for **cost-effective** production of complex geometric components.

Optimum surface qualities must be archieved and the machining of challenging geometries must also be guaranteed as the dimensional accuracy of the workpiece. The **MicroX** range, which has been expanded to almost 500 different items, offers an outstanding selection from which to choose and ensures that the **ideal tool variant** is available within the length and diameter range (l/d) from 1xd to 20xd. Especially for **high-precision milling** between **1xd and 6xd,** FRAISA has set new standards with over 270 items for maximum customer choice.

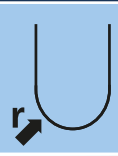
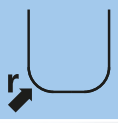
MicroX tools are ideally suited to machining steels in the strength range Rm = 850 N/mm² to 60 HRC as well as stainless steels and titanium.

Rm	Rm	Rm	Rm	HRC	HRC	HRC	Inox	Ti	Cobalt-Chrome Copper
< 850	850-1100	1100-1300	1300-1500	48-56	56-60	> 60	Stainless	Titanium	



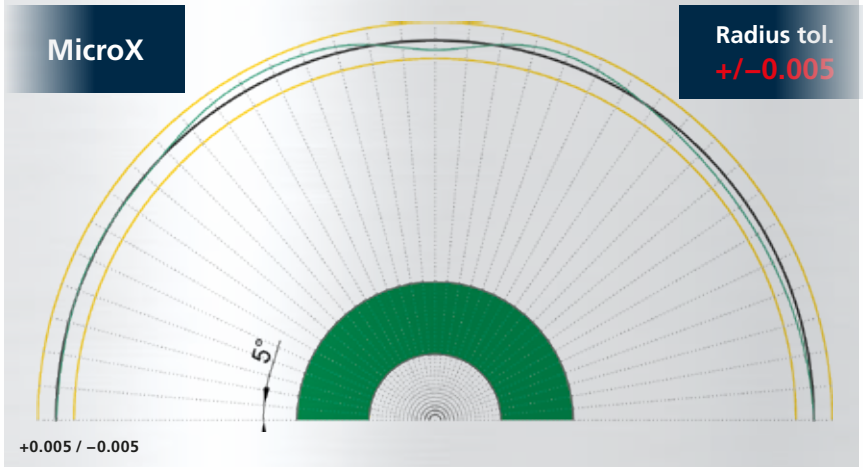
Ideal for:
• 3-D form surfaces • Narrow cavities
• Deep pockets • Rib geometries • Undercuts
• Holes • Small corners

With its expanded range, **MicroX** now offers 478 different options. The following product pages give further details about the items available.

MicroX range		Cylindrical neck Shank dia. 6 mm (h5)	Conical neck 0.9° Shank dia. 6 mm (h5)
Ball nose end mills No. of teeth: 2 Tol. r +/– 0.005 mm		Ø 0.1–3.0 mm 1xd–10xd **No. of items: 135**	Ø 0.5–3.0 mm 6xd–20xd **No. of items: 50**
Corner radius mill No. of teeth: 2 Tol. r 0/+0.01 mm		Ø 0.2–3.0 mm 2xd–10xd r 0.05/0.1/0.2/0.3/0.5 mm **No. of items: 117**	Ø 0.5–3.0 mm 6xd–20xd r 0.1/0.2/0.5 mm **No. of items: 66**
Corner radius mill No. of teeth: 4 Tol. r 0/+0.01 mm		Ø 0.5–3.0 mm 3xd/5xd r 0.1/0.2/0.5 mm **No. of items: 22**	–
Cylindrical mill No. of teeth: 2		Ø 0.1–3.0 mm 1xd–10xd **No. of items: 88**	–

Maximum precision and efficiency in finishing and superfinishing

Measuring method for MicroX ball nose end mills

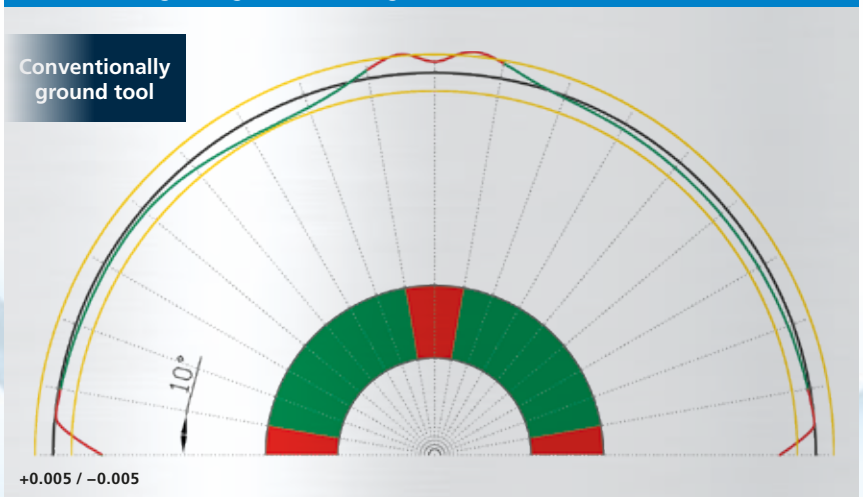


MicroX ball nose end mills have a radius tolerance of +/–0.005 mm.

In order to really achieve this high level of precision, a measuring method is required that can measure the entire cutting edge over 180°. The radius is measured at 5° intervals: from 0° to 180°.

This ensures a level of precision that is within tolerance across the entire ball. The shank ground to tolerance zone h5 also significantly reduces the concentricity error and further increases the precision of the component.

Conventional grinding and measuring method



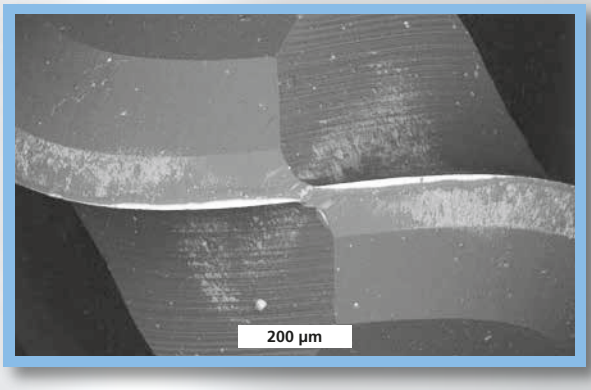
Conventional measuring methods, on the other hand, generally measure only from 10° to 80° and from 100° to 170° in order to exclude the difficult-to-grind transitions between the radius and curved cutting edge and the center errors.

When such tools are used on conventional 3-axis machines, steep tapers and even bottom surfaces cannot be finished with sufficient contour accuracy.

Maximum performance

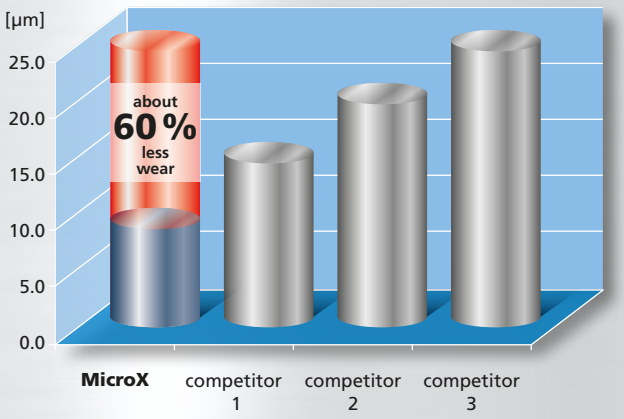
Thanks to the perfect coordination of the technical elements of the tools – carbide substrate, hard coating, micro and macro geometry – as well as an optimized CAM milling strategy, **MicroX** provides outstanding performance and component quality with maximum process reliability. Flank wear after 64 minutes milling is only 8 µm!

MicroX after 64 min in operation
Scanning electron microscope (SEM) image



Tool: X6562100
Material: 1.2343 (54 HRC), vf = 3'000 mm/min, n = 50'000 rpm, ap = 0.20 mm, ae = 0.03 mm, Tool-Ø 1.0 mm / 3xd

Average flank wear [µm] after 64 min in operation



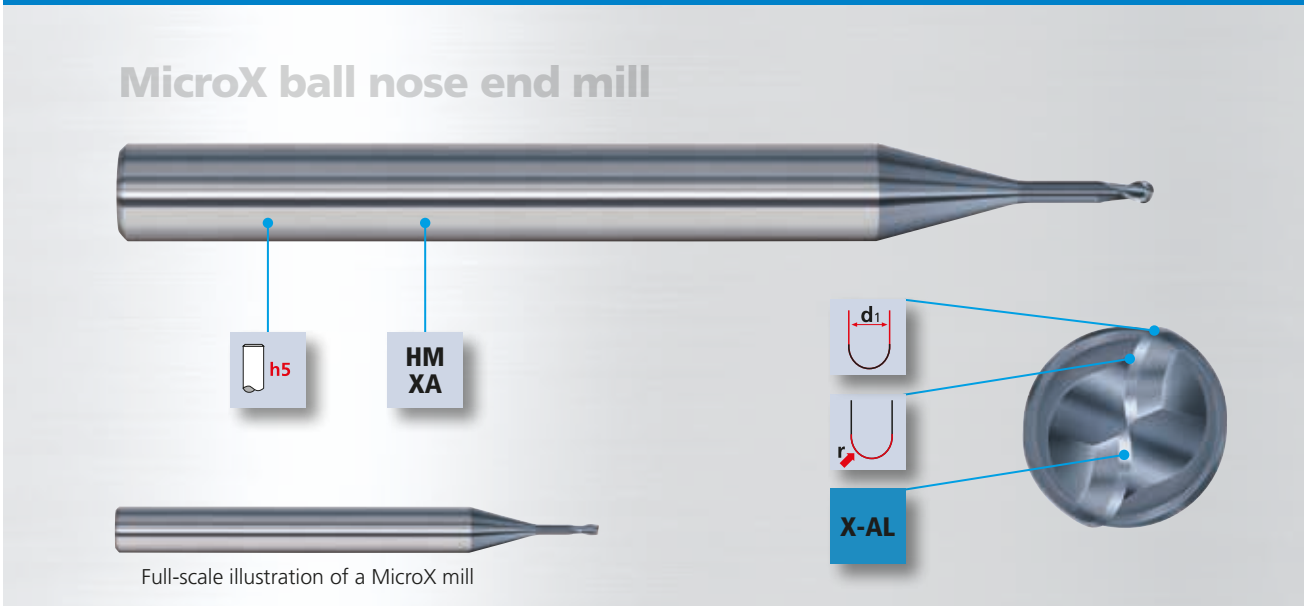
FRAISA is one of the Top 3 milling tool manufacturers in the German-speaking tool and mold-making industry.

This is based on a study carried out in Germany, Switzerland, and Austria in 2017 by the Werkzeugbau Akademie Aachen (WBA), in which more than 200 tool and mold makers took part.

Precision-milled spherical balls (Ø = 5 mm)

Cutting-edge technology
for maximum productivity

MicroX ball nose end mill



Full-scale illustration of a MicroX mill

6 mm precision shank with h5 tolerance
- High concentricity for best component qualities
- Ideal for modern precision tool holders

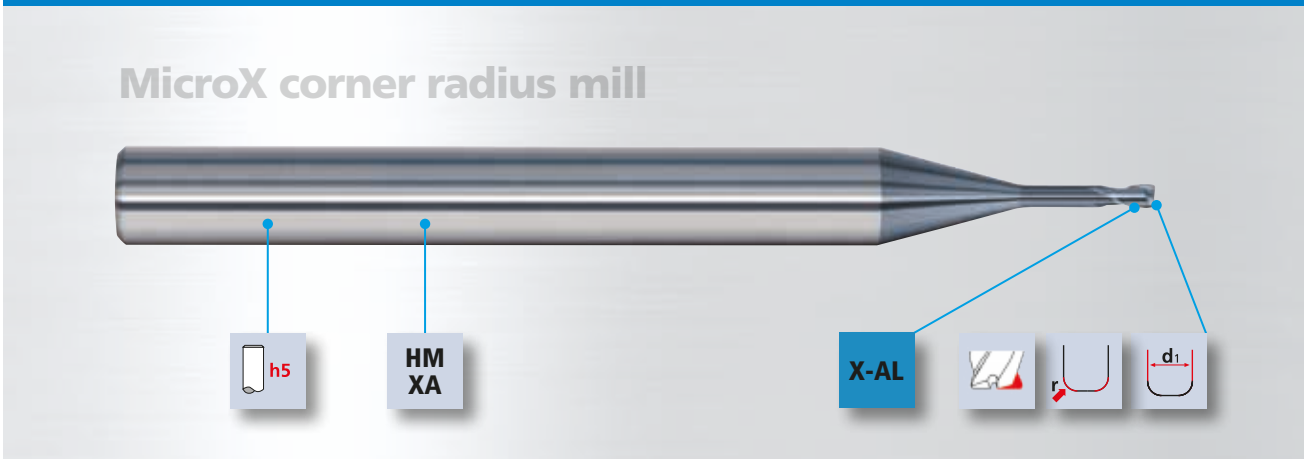
High-precision radius tolerance of +/–0.005 mm
- Specially configured position tolerances simplify programming and safe completion of the final contour
- High-precision tolerance zone for great dimensional accuracy

X-AL heavy-duty coating
- Highly wear-resistant coating based on AlCrN, perfect for machining hardened steels

High-precision diameter
- High-precision tolerance zone across 180° of the ball for great dimensional accuracy
- Easy adjustability and exact measurement of the tool in the machine

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

MicroX corner radius mill (with 2 or 4 teeth)



h5

6 mm precision shank with h5 tolerance

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

High-precision radius tolerance of 0/+0.01 mm

- Specially configured position tolerances simplify programming and safe completion of the final contour
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X-AL

X-AL heavy-duty coating

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High-precision diameter

- Specially configured position tolerances simplify programming and safe completion of the final contour
- Easy adjustability and exact measurement of the tool in the machine

HM XA

XA carbide

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

Milling tool with polished teeth

- Reinforcement of the exposed cutting edge
- Increases tool life and process reliability

MicroX cylindrical mill

Where is it possible to ask questions concerning the product?

If you have any questions, please send an email to **mail.ch@fraisa.com**. You may also directly contact our local customer consultant.

The FRAISA application engineers will be happy to advise you.

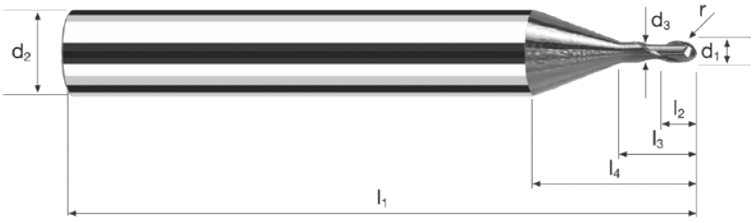
For further information, please refer to **fraisa.com.**

MicroX ball nose end mill

6 mm dia. shank, cylindrical neck, 2 teeth

X-Generation

HM XA	λ 30° γ-10°
h5	
d_1	r



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	Cobalt-Chrome Copper

d_1 ↓	l/d ratio (l_3/d_1) → 1	2	2.5	3	3.5	4	4.5	5	6	7	8	9	10
	X6560	X6561	X6581	X6562	X6582	X6563	X6583	X6564	X6565	X6579	X6566	X6567	X6568
0.1	010	010	010	010	010	010	010	010					
0.2	020	020	020	020	020	020	020	020	020	020	020	020	020
0.3	030	030	030	030	030	030	030	030	030	030	030	030	030
0.4	040	040	040	040	040	040	040	040	040	040	040	040	040
0.5	050	050	050	050	050	050	050	050	050	050	050	050	050
0.6	060	060	060	060	060	060	060	060	060	060	060	060	060
0.8	080	080	080	080	080	080	080	080	080	080	080	080	080
1.0	100	100	100	100	100	100	100	100	100	100	100	100	100
1.2				108				108			108		108
1.5	120	120		120		120		120	120	120	120	120	120
2.0	140	140		140		140		140	140	140	140	140	140
2.3				152				152					
2.5				160				160			160		160
2.8				172				172					
3.0				180				180			180		180

All tools X-AL-coated.

Order no.: X 6562 180

Coating | Item no. | Dia. code

The fastest way to get more information is to scan this QR code.

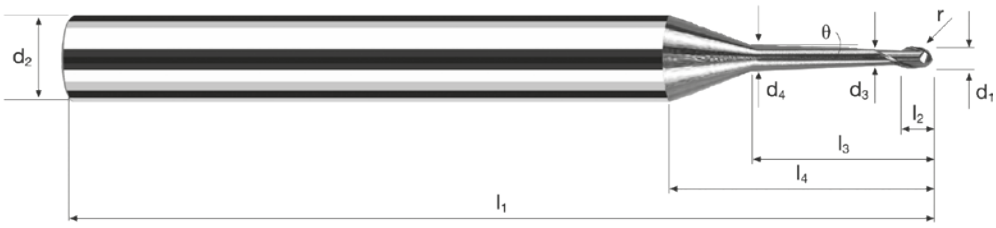
For detailed information, see catalog.

MicroX ball nose end mill

6 mm dia. shank, conical neck 0.9°, 2 teeth

X-Generation X

HM XA	λ 30° γ -10°
h5	
d_1	r



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	Cobalt-Chrome Copper

d_1 ↓	l/d ratio (l_3/d_1) → 6	8	10	12	15	20
	X6765	X6766	X6768	X6770	X6772	X6774
0.5	050	050	050	050	050	050
0.6	060	060	060	060	060	060
0.8	080	080	080	080	080	080
1.0	100	100	100	100	100	100
1.2		108	108	108	108	
1.5	120	120	120	120	120	120
2.0	140	140	140	140	140	140
2.5		160	160	160	160	160
3.0		180	180	180	180	180

All tools X-AL-coated.

Order no.: X 6766 180

Coating | Item no. | Dia. code

The fastest way to get more information is to scan this QR code.

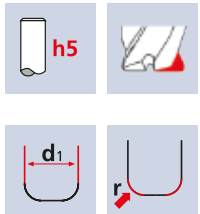
For detailed information, see catalog.

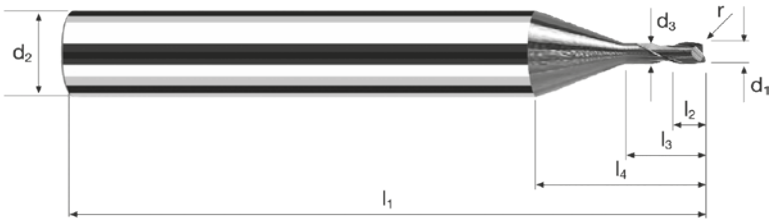
MicroX corner radius mill

6 mm dia. shank, cylindrical neck, 2 teeth

X-Generation X

HM XA	λ 25° γ -10°





Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	Cobalt-Chrome Copper

d_1 ↓	l/d ratio (l_3/d_1) → 2	3	4	5	6	8	10
	X6531	X6532	X6533	X6534	X6535	X6536	X6538
				r 0.05			
0.2	020	020	020	020	020	020	020
0.4	040	040	040	040	040	040	040
0.5	048	048	048	048	048	048	048
				r 0.10			
0.4	042	042	042	042	042	042	042
0.5	050	050	050	050	050	050	050
0.6	060	060	060	060	060	060	060
0.8	080	080	080	080	080	080	080
1.0	098	098	098	098	098	098	098
				r 0.20			
0.8	082	082	082	082	082	082	082
1.0	100	100	100	100	100	100	100
1.2		108		108		108	
1.5	120	120	120	120	120	120	120
2.0	140	140	140	140	140	140	140
2.5		160		160		160	160
3.0		180		180		180	180
				r 0.30			
1.0	101	101	101	101	101	101	101
				r 0.50			
2.0	145	145	145	145	145	145	145
2.5		165		165		165	165
3.0		185		185		185	185

All tools X-AL-coated.

Order no.: X 6532 185

Coating | Item no. | Dia. code

For detailed information, see catalog.

The fastest way to get more information is to scan this QR code.

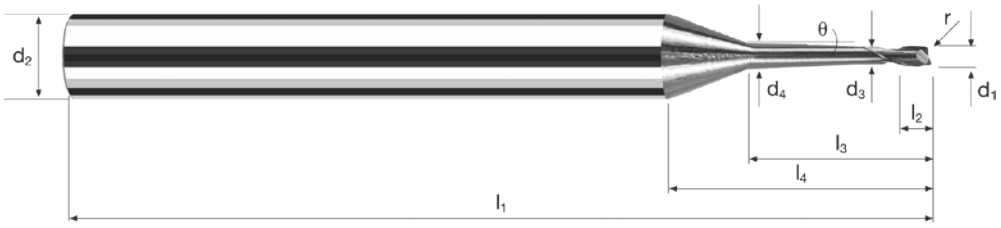
MicroX corner radius mill

6 mm dia. shank, conical neck 0.9°, 2 teeth

X-Generation X

HM XA	λ 25° γ -10°

h5



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	Cobalt-Chrome Copper

d_1 ↓	l/d ratio (l_3/d_1) → 6	8	10	12	15	20
	X6735	X6736	X6738	X6740	X6742	X6744
	r 0.10					
0.5	050	050	050	050	050	050
0.6	060	060	060	060	060	060
0.8	080	080	080	080	080	080
	r 0.20					
1.0	100	100	100	100	100	100
1.2		108	108	108	108	
1.5	120	120	120	120	120	120
2.0	140	140	140	140	140	140
2.5		160	160	160	160	160
3.0		180	180	180	180	180
	r 0.50					
2.0	145	145	145	145	145	145
2.5		165	165	165	165	165
3.0		185	185	185	185	185

All tools X-AL-coated.

Order no.: X 6736 185

Coating | Item no. | Dia. code

The fastest way to get more information is to scan this QR code.

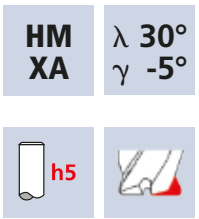
For detailed information, see catalog.

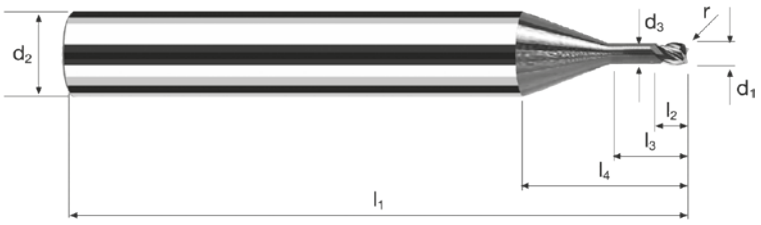
MicroX corner radius mill

6 mm dia. shank, cylindrical neck, 4 teeth

X-Generation X

HM XA	λ 30° γ -5°





	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60		Ti Titanium	Cobalt-Chrome Copper

d_1 ↓	l/d ratio (l_3/d_1) → 3	5
	X6632	X6634
	r 0.10	
0,5	050	050
0,8	080	080
	r 0.20	
1,0	100	100
1,2	108	108
1,5	120	120
2,0	140	140
2,5	160	160
3,0	180	180
	r 0.50	
2,0	145	145
2,5	165	165
3,0	185	185

All tools X-AL-coated.

Order no.: X 6632 185

Coating | Item no. | Dia. code

The fastest way to get more information is to scan this QR code.

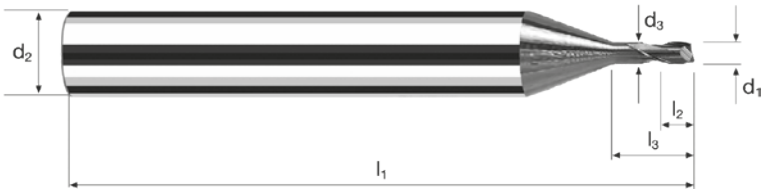
For detailed information, see catalog.

MicroX cylindrical mill

6 mm dia. shank, cylindrical neck, 2 teeth

X-Generation

HM XA	λ 25° γ -10°



Rm < 850	Rm 850-1100	Rm 1100-1300	Rm 1300-1500	HRC 48-56	HRC 56-60	HRC > 60	Inox Stainless	Ti Titanium	Cobalt-Chrome Copper

d_1 ↓	l/d ratio (l_3/d_1) → 1	2	3	4	5	6	8	10
	X6500	X6501	X6502	X6503	X6504	X6505	X6506	X6508
0.1	010	010	010	010	010			
0.2	020	020	020	020	020	020	020	020
0.3	030	030	030	030	030	030	030	030
0.4	040	040	040	040	040	040	040	040
0.5	050	050	050	050	050	050	050	050
0.6	060	060	060	060	060	060	060	060
0.8	080	080	080	080	080	080	080	080
1.0	100	100	100	100	100	100	100	100
1.2			108		108		108	
1.5	120	120	120	120	120	120	120	120
2.0	140	140	140	140	140	140	140	140
2.5			160		160		160	160
3.0			180		180		180	180

All tools X-AL-coated.

Order no.: X 6502 180

Coating | Item no. | Dia. code

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For detailed information, see catalog.

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