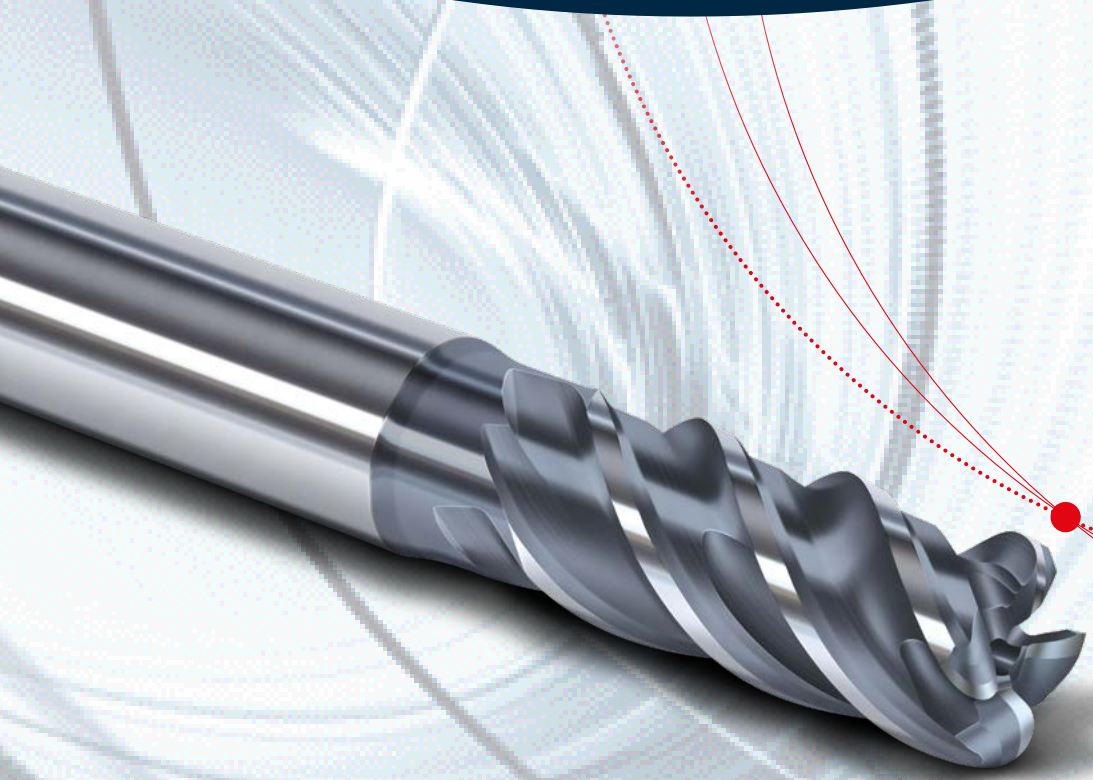
passion
for precision

fraisa

Multi-Functional Cutting MFC-R

The solution for 3D machining!

NEW



Enhanced cutting
data calculator
ToolExpert
MFC

Multifunctionality as the key factor for simplifying the entire production process

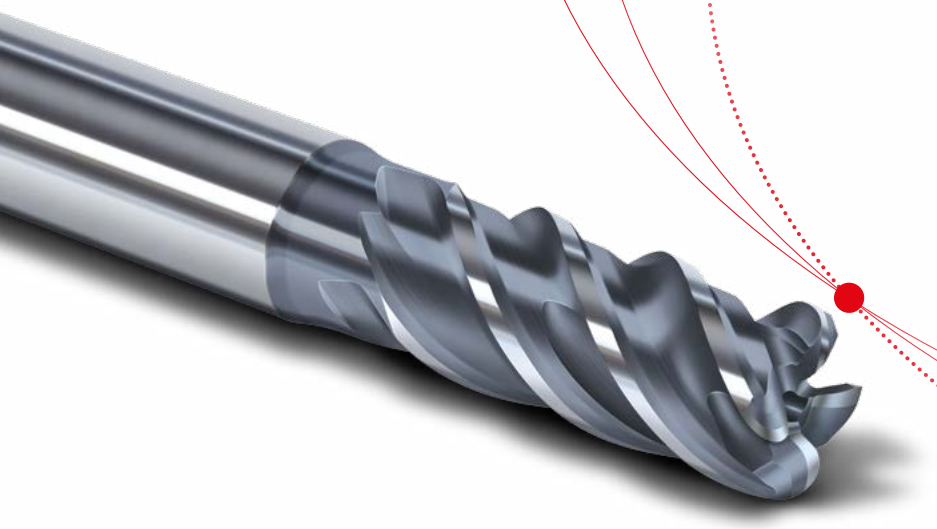
The multi-functional **MFC-R (MB-RNVDS) tools** with **10° cutting angle** launched autumn 2017 are extremely popular. Thanks to the expansion of the range of **tools with corner radius, MFC-R**, up to 132 different application areas can now be covered.
By combining the **most productive applications,** a 3D part can **be finished** – up to and including pre-finishing – **using just one tool!** Inventory and machine setup costs, as well as tool change times, are significantly reduced and **production costs are sustainably reduced. ToolExpert MFC is a reliable implementation aid!**

The cutting profile of the new **MFC-R (MB-RNVDS)** tools has been designed with a positive edge. A **cutting angle of 10° and a conditioned cutting edge** result in a soft and low-vibration cut that in turn **minimizes machining forces, power consumption and torque input.**

The double groove and the continuous polished teeth, from which the corner radius tools also benefit, enable very effective chip removal, so that the **thermal and mechanical loads remain low.** This relieves the load on the important corner radius at the tool face and facilitates a remarkably long tool life in 3D machining.

The new geometry also reveals its full performance potential **in HDC and HPC milling.** Supported by **ToolExpert MFC**, the **MFC-R** tool family has grown to include **three new individual applications,** so that the multi-functionality of the tools can be fully utilized. In addition, **ToolExpert MFC** now provides an excellent overview of the wide range of applications for this truly **unique MFC tool family.**

Thanks to reliable and application-based cutting data, CAM strategies can be implemented faster and setup times for the workpieces can be minimized.



The benefits:

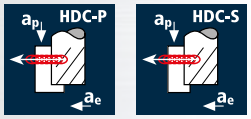
- **Simplification of the production process!** More time to take care of professional CAD-CAM implementation
- **Reduced logistics and inventory costs** because one tool can be used for many productive applications
- **Shorter machine setup times** thanks to a much reduced variety of tool variants
- **Reduced capital commitment** for tools and tool holders
- **High process reliability** due to guaranteed chip removal via a central air and cooling channel
- **Lower loads and energy consumption** thanks to positive cutting edge geometry and optimum chip removal
- **Coordinated program cycles and superior performance** because ToolExpert MFC supplies precise application data
- **Optimum life cycle** with FRAISA ReTool® tool reconditioning and ReToolBlue recycling

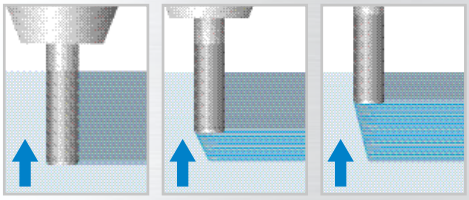
The new individual applications for 3D machining!

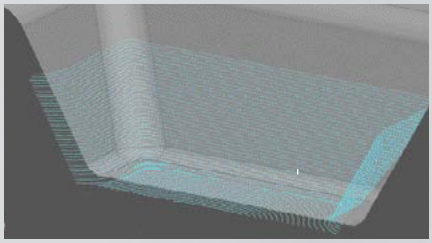
The newly added individual applications enable extremely efficient and reliable machining of 3-dimensional workpieces. Process cycles precisely matched to the tool are also suitable for replacing insert tools. The big advantage is simply the fact that the **entire machining process for semi-finished products, up to and including pre-finishing, can be carried out using just a single MFC-R tool!**

Depending on the workpiece, the CAM programmer can cleverly combine the necessary individual applications: The main volume of the 3D part is first removed using the HDC milling strategy. The remaining material is then roughened away by means of HFC or HSC milling, after which the switch is made to pre-finishing by HSC milling. All cutting data necessary for the individual applications described below have been determined by testing and are stored in **ToolExpert MFC.**

Individual application	Milling strategy	Tool path
HDC roughing (High **Dynamic** Cutting)	ap steps: from bottom to top	

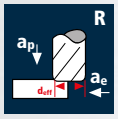


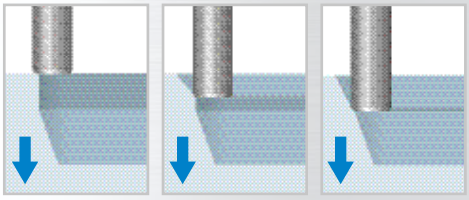


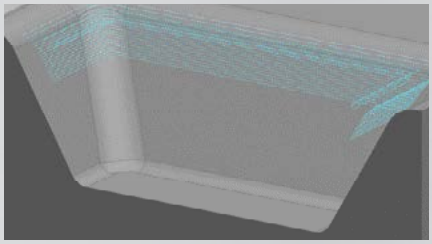


HDC roughing (high-dynamic cutting): starting with high ap infeed rates up to a maximum ap = cutting edge length l2. When the 3D contour is reached, ap is reduced step by step, layer by layer (ap step-ups). This procedure is repeated until a depth of approx. 0.7 x d1 is reached. As of this depth, FRAISA no longer recommends the HDC strategy as the HFC or HSC strategy is more suitable.

HFC roughing (High **Feed** Cutting)	ap steps: from top to bottom	
HSC roughing (High **Speed** Cutting)		

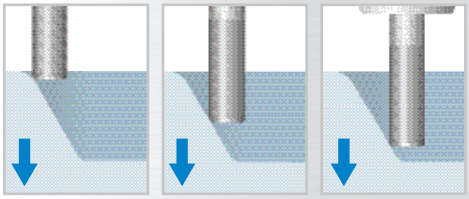


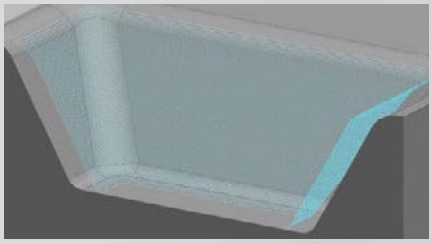




HFC or HSC roughing: The remaining material is now removed down to a depth of approx. 0.7 x d1 using an HFC or HSC milling strategy. For HFC milling, large corner radii are selected, so that this strategy – with high feed rates – provides the maximum material removal rate. HSC milling requires less machine dynamics and can be used with all corner radius variants.

HSC pre-finishing: (High **Speed** Cutting)	ap steps: from top to bottom	





HSC pre-finishing: This strategy is very well suited to preparing for finishing and is performed with low axial infeed rates. The previously roughened area is smoothed and is ready for subsequent operations (heat treatment or finishing).

Take a look at the new individual applications for 3D machining in this video!

The advantages of our MFC-R over conventional milling cutters are compelling on all fronts

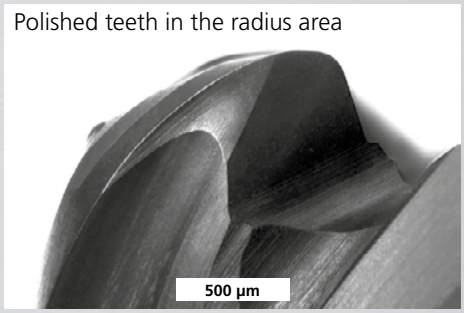
The tool technology for 3D machining!

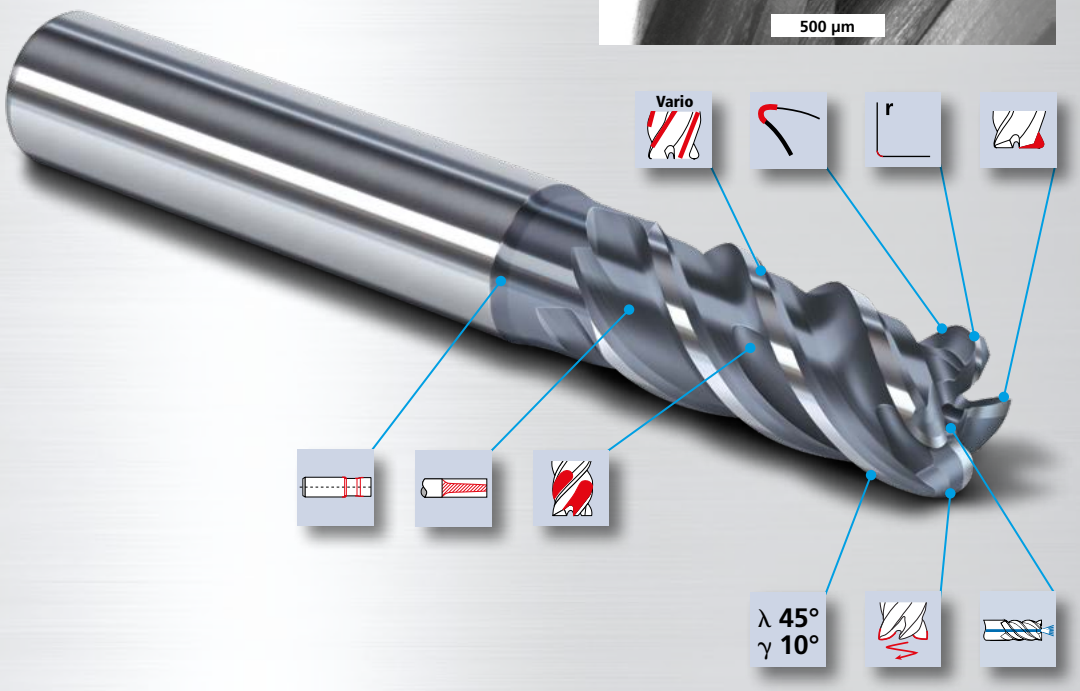
MFC-R tools are available with a range of corner radii. The large r/d1 variants are particularly suitable for HFC machining. This machining strategy combines all the advantages, so that the amount of residual material in the workpiece is smaller due to the corner radius and the final contour can be approached more smoothly.

To guarantee wear resistance, all MFC tools are equipped with a single pass-ground end cutting face in the radius area and cutting edge conditioning to withstand the highest levels of mechanical and thermal load.

The technologies

MFC-R





Milling tool with increasing core diameter

- Improved tool rigidity and less deflection of the tool
- Superior performance for infeed ap
- Better workpiece accuracy thanks to less tool deflection

Smooth transitions

- The transitions between the shaft, neck and cutting edge have smooth gradients and radii
- Improved tool rigidity and therefore less radial deflection
- Higher mechanical resistance for better performance

Tools with polished teeth

- Reinforcement of the exposed cutting edge
- Absorption of higher cutting forces

Milling tool with variable helix angle

- Minimization of oscillation and vibration
- Increased material removal rate and tool life

High-performance penetration edge

- Easy-cutting, high-performance penetration edge for high penetration angles
- Higher performance, longer tool life and improved process reliability for penetration
- High functionality with ToolExpert-HelixRamp cutting data

Milling tool with stepped groove

- Enlargement of the flute
- Optimized chip removal
- High axial and radial infeed rates possible

Milling tools with special edge conditioning

- Conditioning of the main cutting edge for greater cutting-edge stability
- Increased mechanical and thermal loading of the cutting edge
- Overall lengthening of tool life

Tools with a central air and cooling channel

- The tool has a central, continuous bore as an air and cooling channel
- Perfect chip removal, especially at inner contours
- Better cooling of the cutting edge. This improves thermal and mechanical resistance and opens up options for a wider range of materials.

Where is it possible to ask questions concerning the product?

If you have any question, please send an email to **info@fraisausa.com.** You may also directly contact our local customer consultant.

The FRAISA application engineers will be happy to advise you.

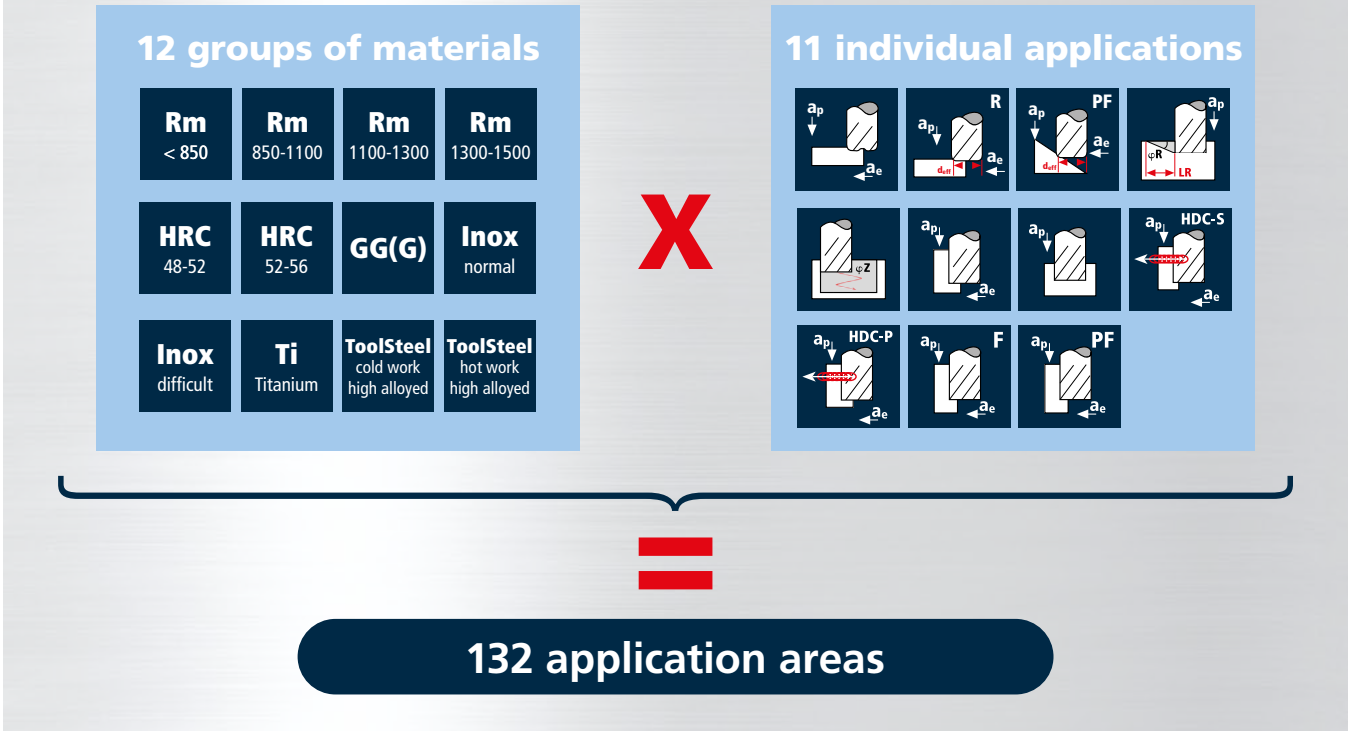
For further information, please refer to **fraisa.com**

New application areas for 3D machining!

MFC-R – now up to 132 application areas with MFC-R tool technology

The unique multi-functionality of the new **MFC-R** tools covers twelve groups of materials, each of which can be combined with eleven specific applications. Thanks to the corner radius, it is possible to use **HFC** (High **Feed** Cutting) and **HSC** (High **Speed** Cutting) strategies, which are the most productive solutions for machining certain parts. In combination with **HDC** (High **Dynamic** Cutting), workpieces of a wide variety of materials and tempering conditions can be machined extremely efficiently.

MFC multi-functionality – the solution for successful production



Enhanced cutting data calculator
ToolExpert MFC

Go here to find the cutting data for all groups pf materials and individual applications.

Corner radius end mills MFC

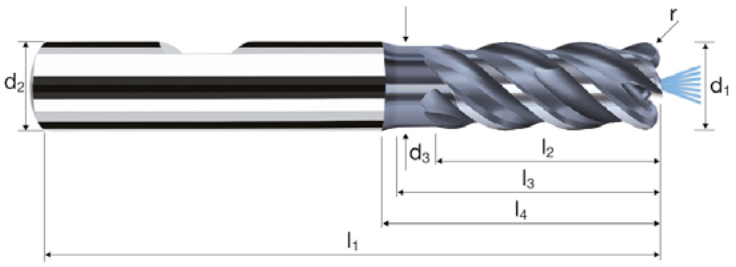
Smooth-edged, normal version with short neck
High-performance penetration edge with central air/cooling channel

X-Generation

HM MG10 | **λ 45° γ 10°**

Vario

new!



Roughing HPC

Roughing HDC

Finishing

HRC < 24	HRC 24-34	HRC 34-42	HRC 42-48	HRC 48-56			Inox Stainless	Ti Titanium	Cast Iron Tool Steel

Order-N°	d_1 e8	d_2 h5	d_3	l_1	l_2	l_3	l_4	r 0/+0.03	α	fl	POLYCHROM
P8107218	4	6	3.7	57	8	16.00	20.82	0.2	3.0°	4	●
P8107258	5	6	4.6	57	10	18.00	21.27	0.2	1.5°	4	●
P8107297	6	6	5.5	57	12	18.15	20.00	0.2	0.0°	4	●
P8107385	8	8	7.4	63	19	23.63	26.00	0.2	0.0°	4	●
P8107445	10	10	9.2	72	23	27.99	31.00	0.2	0.0°	4	●
P8107496	12	12	11.0	83	27	33.29	37.00	0.2	0.0°	4	●
P8107605	16	16	15.0	92	32	38.73	43.00	0.2	0.0°	4	●
P8107220	4	6	3.7	57	8	16.00	20.82	0.5	3.0°	4	●
P8107260	5	6	4.6	57	10	18.00	21.27	0.5	1.5°	4	●
P8107300	6	6	5.5	57	12	18.15	20.00	0.5	0.0°	4	●
P8107388	8	8	7.4	63	19	23.63	26.00	0.5	0.0°	4	●
P8107448	10	10	9.2	72	23	27.99	31.00	0.5	0.0°	4	●
P8107498	12	12	11.0	83	27	33.29	37.00	0.5	0.0°	4	●
P8107606	16	16	15.0	92	32	38.73	43.00	0.5	0.0°	4	●
P8107302	6	6	5.5	57	12	18.15	20.00	1.0	0.0°	4	●
P8107391	8	8	7.4	63	19	23.63	26.00	1.0	0.0°	4	●
P8107450	10	10	9.2	72	23	27.99	31.00	1.0	0.0°	4	●
P8107501	12	12	11.0	83	27	33.29	37.00	1.0	0.0°	4	●
P8107608	16	16	15.0	92	32	38.73	43.00	1.0	0.0°	4	●
P8107393	8	8	7.4	63	19	23.63	26.00	1.5	0.0°	4	●
P8107453	10	10	9.2	72	23	27.99	31.00	1.5	0.0°	4	●
P8107503	12	12	11.0	83	27	33.29	37.00	1.5	0.0°	4	●
P8107610	16	16	15.0	92	32	38.73	43.00	1.5	0.0°	4	●

Corner radius end mills MFC

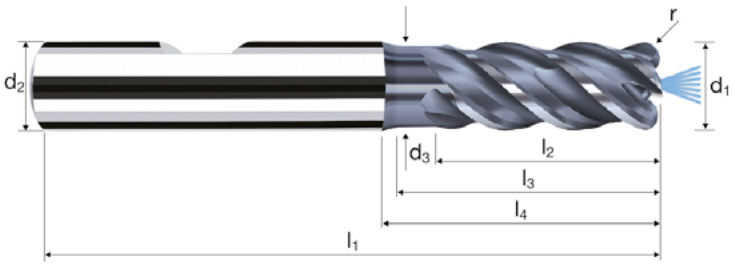
Smooth-edged, normal version with short neck
High-performance penetration edge with central air/cooling channel

X-Generation

HM MG10

λ 45° γ 10°

Vario



new!

Roughing HPC

Roughing HDC

Finishing

HRC < 24	HRC 24-34	HRC 34-42	HRC 42-48	HRC 48-56			Inox Stainless	Ti Titanium	Cast Iron Tool Steel

[8]

Order-N°	d_1 e8	d_2 h5	d_3	l_1	l_2	l_3	l_4	r 0/+0.03	α		fl	POLYCHROM
P8107455	10	10	9.2	72	23	27.99	31.00	2.0	0.0°		4	●
P8107505	12	12	11.0	83	27	33.29	37.00	2.0	0.0°		4	●
P8107611	16	16	15.0	92	32	38.73	43.00	2.0	0.0°		4	●
P8107506	12	12	11.0	83	27	33.29	37.00	2.5	0.0°		4	●
P8207218	4	6	3.7	57	8	16.00	20.82	0.2	3.0°	◆	4	●
P8207258	5	6	4.6	57	10	18.00	21.27	0.2	1.5°	◆	4	●
P8207297	6	6	5.5	57	12	18.15	20.00	0.2	0.0°	◆	4	●
P8207385	8	8	7.4	63	19	23.63	26.00	0.2	0.0°	◆	4	●
P8207445	10	10	9.2	72	23	27.99	31.00	0.2	0.0°	◆	4	●
P8207496	12	12	11.0	83	27	33.29	37.00	0.2	0.0°	◆	4	●
P8207605	16	16	15.0	92	32	38.73	43.00	0.2	0.0°	◆	4	●
P8207220	4	6	3.7	57	8	16.00	20.82	0.5	3.0°	◆	4	●
P8207260	5	6	4.6	57	10	18.00	21.27	0.5	1.5°	◆	4	●
P8207300	6	6	5.5	57	12	18.15	20.00	0.5	0.0°	◆	4	●
P8207388	8	8	7.4	63	19	23.63	26.00	0.5	0.0°	◆	4	●
P8207448	10	10	9.2	72	23	27.99	31.00	0.5	0.0°	◆	4	●
P8207498	12	12	11.0	83	27	33.29	37.00	0.5	0.0°	◆	4	●
P8207606	16	16	15.0	92	32	38.73	43.00	0.5	0.0°	◆	4	●

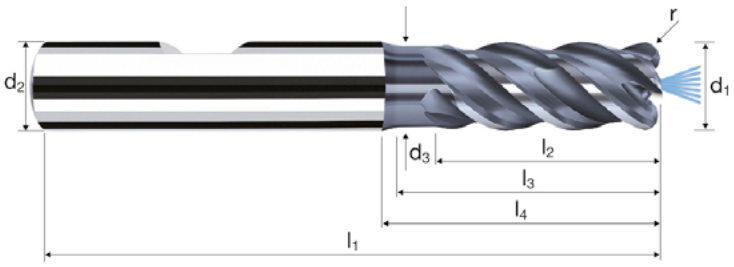
Corner radius end mills MFC

Smooth-edged, normal version with short neck
High-performance penetration edge with central air/cooling channel

X-Generation X

HM MG10 | **λ 45° γ 10°**

Vario



new!

Roughing HPC

Roughing HDC

Finishing

HRC < 24	HRC 24-34	HRC 34-42	HRC 42-48	HRC 48-56			Inox Stainless	Ti Titanium	Cast Iron Tool Steel

Order-N°	d_1 e8	d_2 h5	d_3	l_1	l_2	l_3	l_4	r 0/+0.03	α		fl	POLYCHROM
P8207302	6	6	5.5	57	12	18.15	20.00	1.0	0.0°	◆	4	●
P8207391	8	8	7.4	63	19	23.63	26.00	1.0	0.0°	◆	4	●
P8207450	10	10	9.2	72	23	27.99	31.00	1.0	0.0°	◆	4	●
P8207501	12	12	11.0	83	27	33.29	37.00	1.0	0.0°	◆	4	●
P8207608	16	16	15.0	92	32	38.73	43.00	1.0	0.0°	◆	4	●
P8207393	8	8	7.4	63	19	23.63	26.00	1.5	0.0°	◆	4	●
P8207453	10	10	9.2	72	23	27.99	31.00	1.5	0.0°	◆	4	●
P8207503	12	12	11.0	83	27	33.29	37.00	1.5	0.0°	◆	4	●
P8207610	16	16	15.0	92	32	38.73	43.00	1.5	0.0°	◆	4	●
P8207455	10	10	9.2	72	23	27.99	31.00	2.0	0.0°	◆	4	●
P8207505	12	12	11.0	83	27	33.29	37.00	2.0	0.0°	◆	4	●
P8207611	16	16	15.0	92	32	38.73	43.00	2.0	0.0°	◆	4	●
P8207506	12	12	11.0	83	27	33.29	37.00	2.5	0.0°	◆	4	●

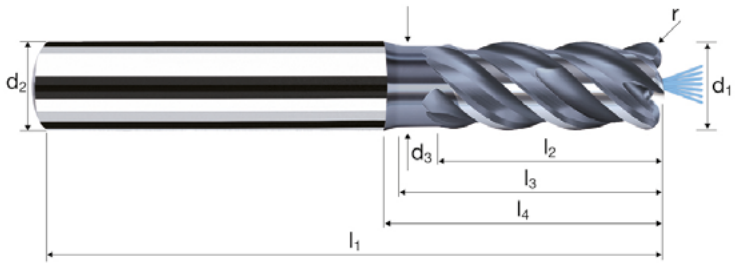
Corner radius end mills MFC

Smooth-edged, standard length with short neck
High-performance penetration edge with central air/cooling channel

X-Generation

HM MG10 | **λ 45° γ 10°**

Vario



new!

Roughing HPC

Roughing HDC

Finishing

HRC < 24 | **HRC** 24-34 | **HRC** 34-42 | **HRC** 42-48 | **HRC** 48-56 | **Inox** Stainless | **Ti** Titanium | **Cast Iron Tool Steel**

[10]

Order-N°	d_1 e8	d_2 h5	d_3	l_1	l_2	l_3	l_4	r	α	fl	POLYCHROM
P98107254	3/16	1/4	0.170	2 1/4	3/8	0.625	0.800	0.020	2.5°	4	●
P98107256	3/16	1/4	0.170	2 1/4	3/8	0.625	0.800	0.030	2.5°	4	●
P98107314	1/4	1/4	0.225	2 1/4	1/2	0.670	0.750	0.020	0.0°	4	●
P98107316	1/4	1/4	0.225	2 1/4	1/2	0.670	0.750	0.030	0.0°	4	●
P98107372	5/16	5/16	0.290	2 1/2	5/8	0.905	1.000	0.020	0.0°	4	●
P98107376	5/16	5/16	0.290	2 1/2	5/8	0.905	1.000	0.060	0.0°	4	●
P98107432	3/8	3/8	0.345	2 3/4	3/4	1.010	1.125	0.020	0.0°	4	●
P98107436	3/8	3/8	0.345	2 3/4	3/4	1.010	1.125	0.060	0.0°	4	●
P98107530	1/2	1/2	0.460	3 1/4	1	1.225	1.375	0.030	0.0°	4	●
P98107534	1/2	1/2	0.460	3 1/4	1	1.225	1.375	0.090	0.0°	4	●
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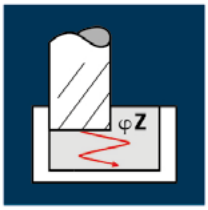
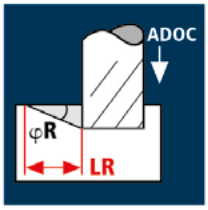
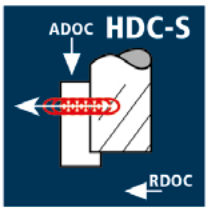
P98107652	3/4	3/4	0.710	4	1 3/8	1.695	1.875	0.060	0.0°	4	●
P98107656	3/4	3/4	0.710	4	1 3/8	1.695	1.875	0.120	0.0°	4	●

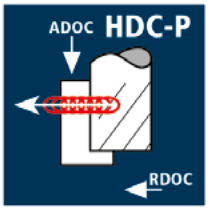
Clamping flat is available by special request.

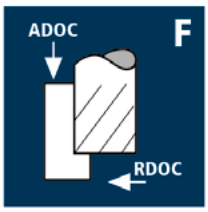
Application



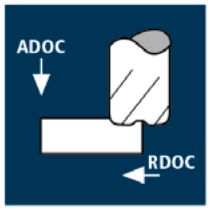


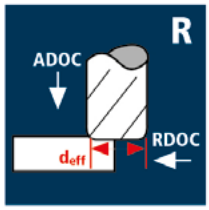


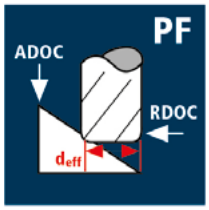




New application areas for 3D machining!







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