

passion  
for precision

fraisa

## **MFC Multifunctional High-performance Milling**

Wide range of applications and materials  
with machining depths of up to 6.3xd

**NEW**

**new!**



**FRAISA**  
**ToolExpert®**

# MFC – simplification of the entire production process through multifunctionality

Multifunctional **MFC tools** from FRAISA have a significant status within the industry. Due to its high level of acceptance in the marketplace, the **MFC tool family** has been continuously developed and expanded, so that machining in up to **154 different application areas** is now possible. By using **MFC tools**, then, you benefit greatly from lower inventory and tooling costs as well as shorter tool change times. This guarantees a reduction in your production costs.

The latest addition to the range now includes an **extra-long version** with a cutting edge length of **6.3xd**. In combination with the High Dynamic Cutting (HDC) strategy, the tools realize their enormous performance potential. Thanks to their very robustly designed cutting corner geometry, they are excellent for plunging into a workpiece and then using the entire length of the cutting edge to mill out the component.

The **corner radius** variant, now also available in the **medium-long** version, enables you to cover most application areas. By combining the most productive use cases, you can machine a 3D part through to pre-finishing with just a single tool.

The cutting profile of the **MFC tools** has been designed with a positive edge and results in a soft and low-vibration cut that in turn reduces machining forces, power consumption and torque input.

As always, the online cutting data software **FRAISA Tool-Expert®** reliably helps you to set up the machining process. Many new application possibilities have been added, so that the cutting data calculator now provides an excellent overview of the broad range of uses of the **MFC tool family**.

## The advantages of the MFC tool family

- **Simplification of the production process** – more time for professional CAD-CAM implementation
- **Reduced logistics and inventory costs** because one tool can be used for many different 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** thanks to guaranteed chip removal via a central air and cooling channel
- **Lower loads and reduced energy consumption** thanks to positive cutting edge geometry
- **Coordinated program cycles and superior performance** thanks to precise application data in FRAISA ToolExpert®
- **Optimum life cycle** thanks to FRAISA ToolCare® tool management, FRAISA **ReTool®** tool reconditioning and FRAISA ReTool**Blue** recycling

# Competitive edge: using state-of-the-art CAD-CAM systems

State-of-the-art CAD-CAM systems enable a multitude of different machining strategies. They are also responsible for assigning the type of application and the milling strategy for the component to be machined.

High Dynamic Cutting (HDC, aka trochoidal milling) has been implemented in many CAD-CAM systems. This process offers significant economic advantages and is an effective alternative to High Performance Cutting (HPC) and High Feed Cutting (HFC).



A real competitive advantage is being able to determine the optimum machining strategy in respect of productivity, safety, quality, and machine environment. The programmer's own knowledge of the possibilities offered by their infrastructure also plays a crucial role. In order to further improve coordination between the infrastructure and use of CAD-CAM systems, FRAISA includes this key element in its webinars and product documentation.

## FRAISA ToolExpert® – the innovative online cutting data tool

Perfectly coordinated tool- and material-specific cutting data are also fundamental to optimum tool usage. That's why FRAISA experts determine the optimum operating points in comprehensive tests carried out at our own application centers. All factors involved are taken into account, so that all data can be bundled and made available to you in FRAISA ToolExpert®.

## 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
- **Secure:** direct import of cutting data through the integration of an XML or JSON interface

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## NEW! Take advantage of our new webshop

- All information about new **promotions**, **FRAISA ReTool® prices**, stock levels and availability at a glance
- **XML data** and **DXF/STP files** for downloading
- Clear structure, modern layout and user-friendly interface

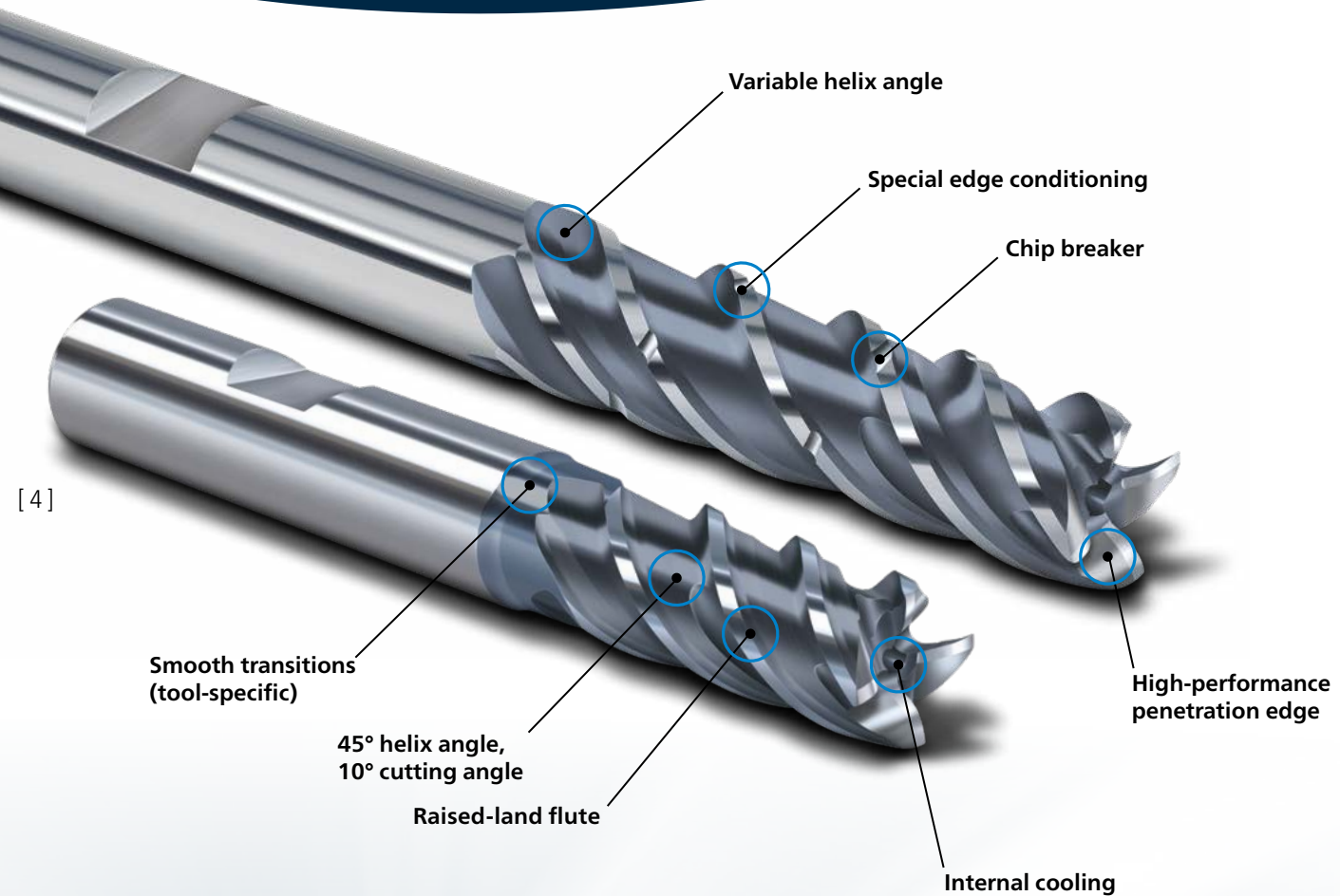


Order simply and quickly from our webshop.





## Standard and medium-long versions: maximum performance and process reliability



- ✓ Maximum chip removal rate, tool life, and process reliability
- ✓ Extremely rapid penetration
- ✓ Smooth and low-vibration cut
- ✓ Reduced machining forces (25%), power consumption and torque input (20%)

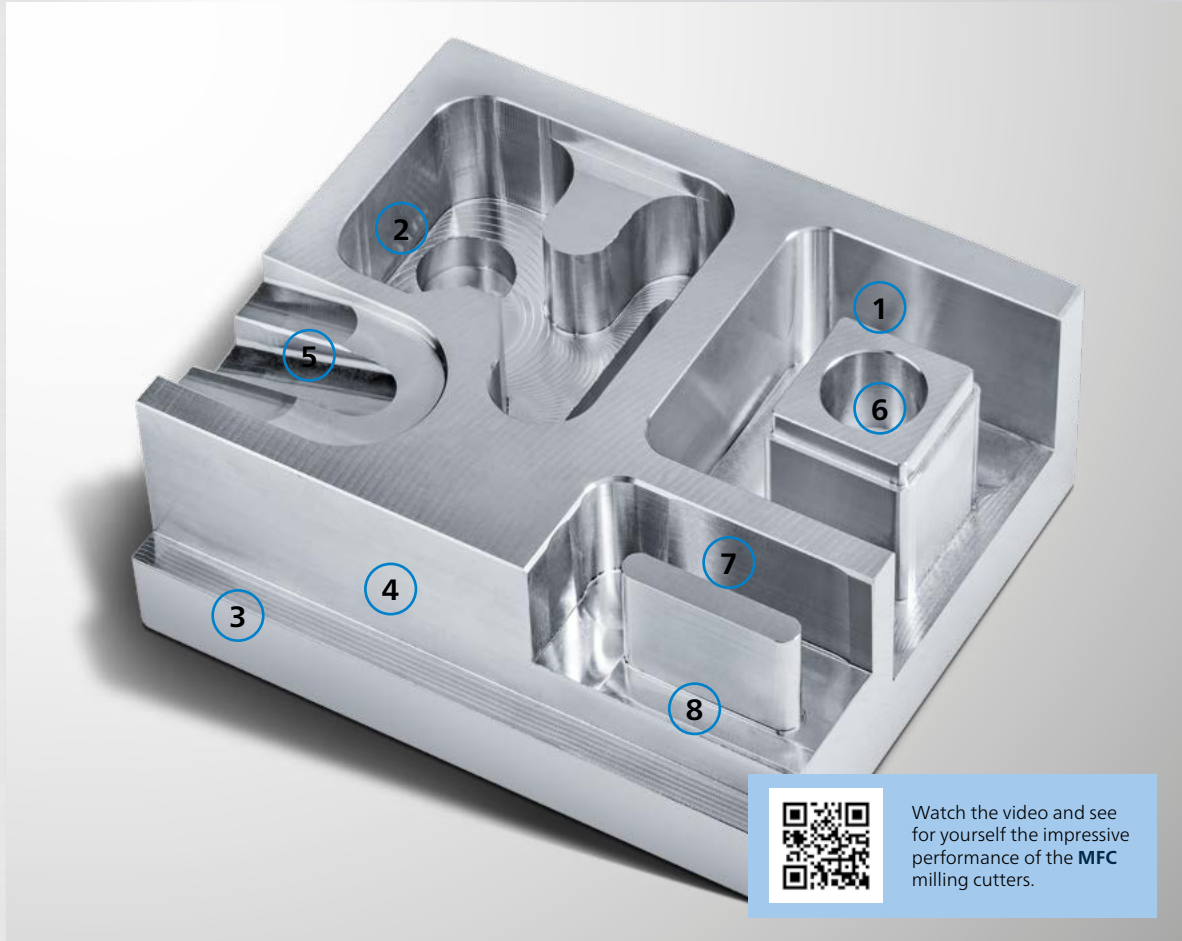
- ✓ Suitable for HPC, HDC, penetration and finishing
- ✓ Wide range of materials and applications
- ✓ Sustainable thanks to FRAISA ReTool®
- ✓ Verified application data in FRAISA ToolExpert®

## Machining a workpiece – example

**MFC tools** can be used to mill thin-walled or poorly chucked components. At the same time, the tool technologies reduce energy consumption and put less load on

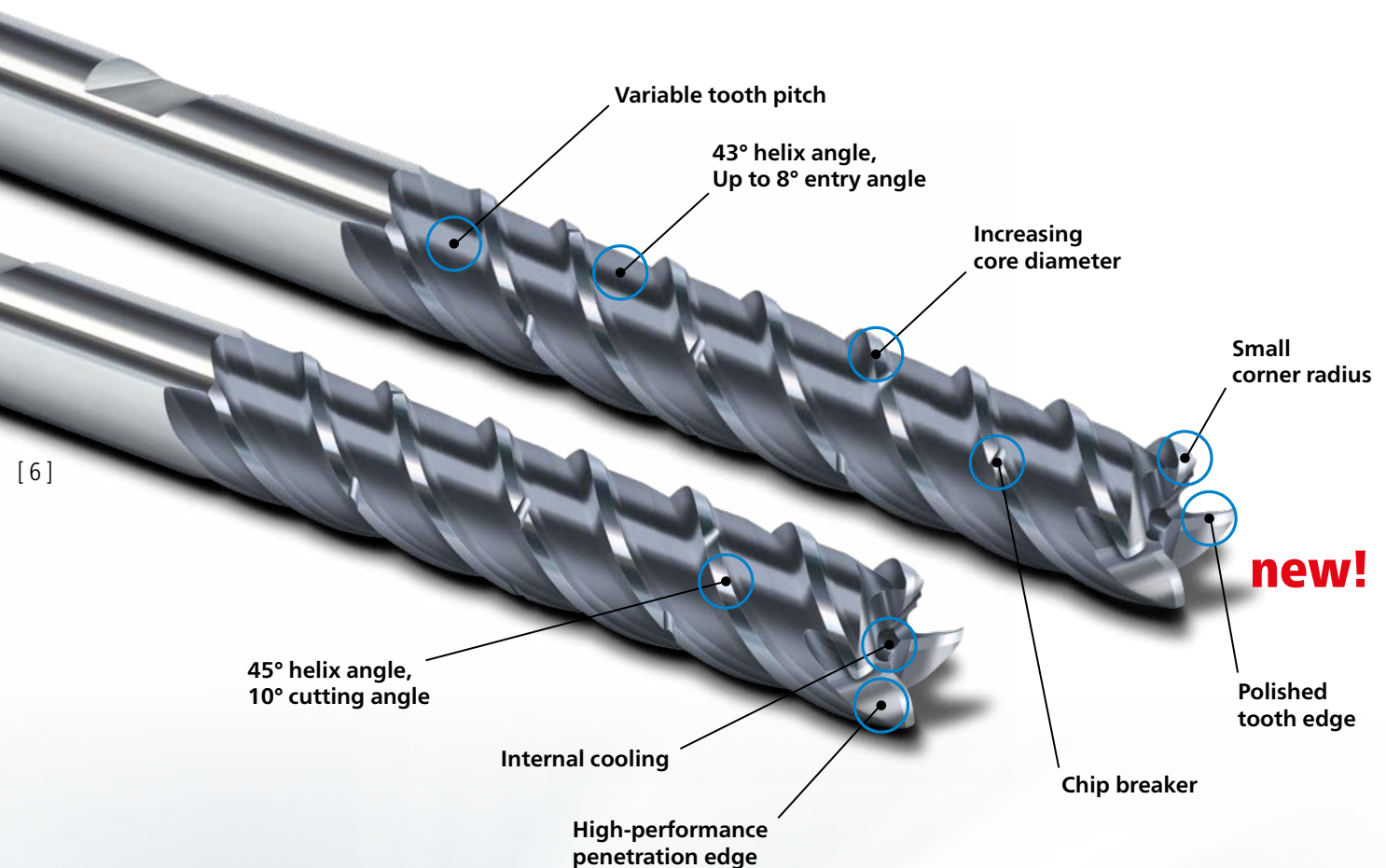
the spindle, making machining with **MFC tools** even more efficient.

### The application areas



HDC roughing		Penetration		Tools	
1	<p><b>HDC-S</b></p> <p><b>Tool 2</b> <math>d_1 = 8 \text{ mm}</math> <math>a_p = 26 \text{ mm}</math> <math>a_e = 0.6 \text{ mm}</math></p>	5	<p><b>Tool 1</b> <math>d_1 = 10 \text{ mm}</math> <math>\phi R = 20^\circ</math></p>	<p><b>Tool 1</b> P8201.450 MFC IKZ z4 Standard version</p> <p><b>Tool 2</b> P8211.391 MFC IKZ z4 Medium-long version</p>	
2	<p><b>HDC-P</b></p> <p><b>Tool 1</b> <math>d_1 = 10 \text{ mm}</math> <math>a_p = 20 \text{ mm}</math> <math>a_e = 2 \text{ mm}</math></p>	6	<p><b>Tool 2</b> <math>d_1 = 8 \text{ mm}</math> <math>\phi Z = 12^\circ</math> <math>a_p = 20 \text{ mm}</math></p>		
Finishing		HPC roughing			
3	<p><b>PF</b></p> <p><b>Tool 2</b> <math>d_1 = 8 \text{ mm}</math> <math>a_p = 26 \text{ mm}</math></p>	7	<p><b>Tool 1</b> <math>d_1 = 10 \text{ mm}</math> <math>a_p = 18 \text{ mm}</math></p>		
4	<p><b>F</b></p>	8	<p><b>Tool 2</b> <math>d_1 = 8 \text{ mm}</math> <math>a_p = 20 \text{ mm}</math></p>		

## Extra-long versions 5.2xd and 6.3xd: penetration and milling with large machining depths



✓ Extremely high chip removal rates in  
HDC-S machining

✓ Wider range of applications for complete  
machining

✓ Machining depths of up to 6.3xd

✓ Suitable for HDC and finishing  
to depths of up to 6.3xd

✓ Sustainable thanks to FRAISA **ReTool®**

✓ Verified application data in  
FRAISA ToolExpert®



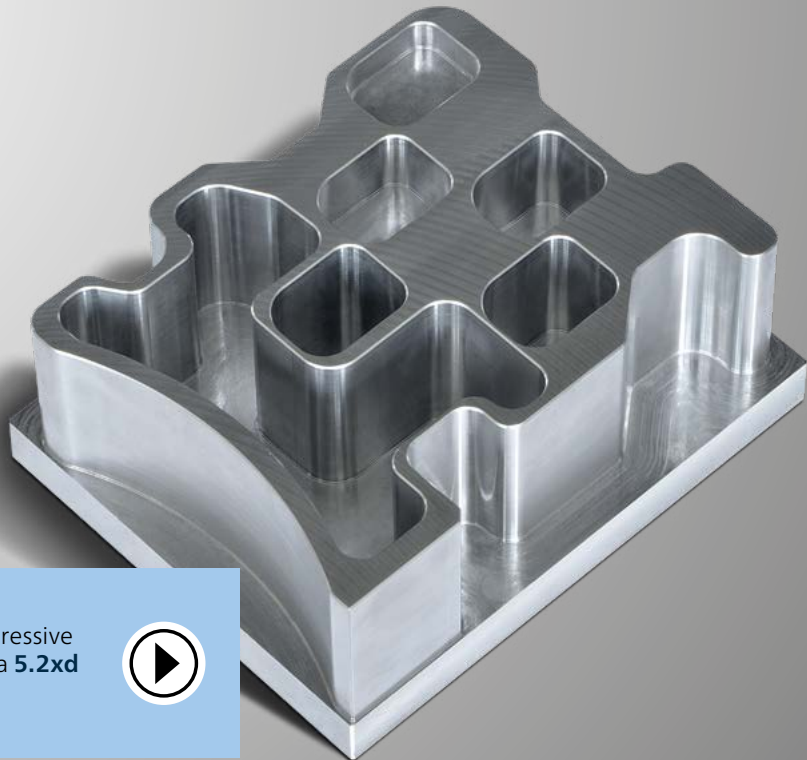
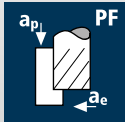
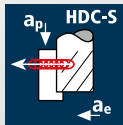
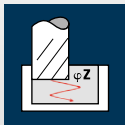
## Machining a workpiece – example

The components pictured were machined using just one tool of a length of 5.2xd and 6.3xd respectively. The machining operations performed involved penetration, HDC-S milling and finishing to produce an internal contour.

The cutting data can be easily found in FRAISA ToolExpert® and transferred to the CAM system.

### Component milled completely using an MFC 5.2xd cutter

Material: 1.2738 Rm = 1000 N/mm<sup>2</sup>  
 Tool: P8221.300  
 $d_1 = 6$  mm and machining depth = 30 mm  
 Penetration with  $\phi Z$  angle = 10°  
 HDC-S roughing and  $a_e = 0.3 \cdot d_1$   
 Chip removal rate = 69 cm<sup>3</sup>/min (!)  
 Pre-finishing and finishing with  $a_e = 0.1$  mm



Discover the impressive performance of a **5.2xd MFC tool**.



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### Component milled completely using an MFC 6.3xd cutter

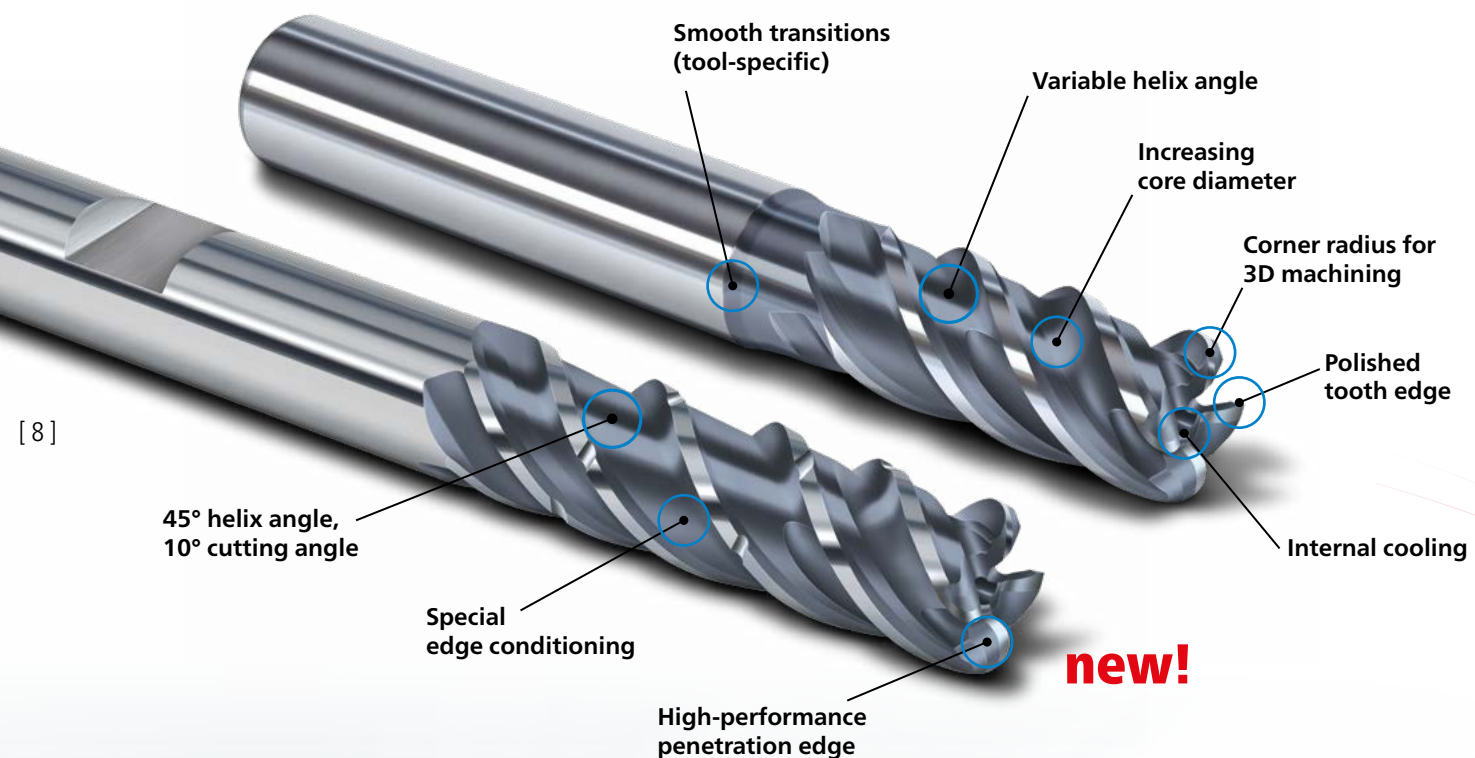
Material: 1.2738 Rm = 1050 N/mm<sup>2</sup>  
 Tool: P8222.300  
 $d_1 = 6$  mm, machining depth = 36 mm (exterior geometry) and 38 mm (internal geometry)  
 HDC-S roughing with  $a_e = 2.5\% = 0.15$  mm  
 Penetration with  $\phi Z$  angle = 10°  
 Pre-finishing with  $a_e = 0.11$  mm  
 Finishing with  $a_e = 0.07$  mm



See our **MFC 6.3xd** in action.



# Standard & medium-long versions with corner radius: big advantages compared to conventional milling cutters



✓ Excellent for HFC machining

✓ Robust against mechanical and thermal loads

✓ Machining of three-dimensional workpieces

✓ 3D machining of a component through to pre-finishing

✓ Sustainable thanks to FRAISA ReTool®

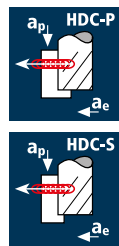
✓ Verified application data in FRAISA ToolExpert®



## New individual applications

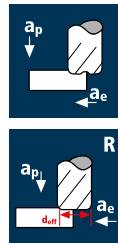
Extremely efficient and reliable machining of 3-dimensional workpieces has been made possible by new individual applications. Process cycles precisely matched to the tool are also suitable for replacing insert tools. The big advantage: **The entire machining process from the semifinished product through to pre-finishing can be performed using just a single MFC tool.**

The necessary individual applications can be combined by the CAM programmer in the best possible way to suit the workpiece. The main volume of workpiece material is first removed using the HDC milling strategy. The remaining material is then roughened away by means of HFC or HSC milling, which is then followed by pre-finishing by HSC milling. **FRAISA ToolExpert®** contains all the cutting data required for the individual applications described below.



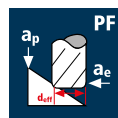
### HDC roughing

- High  $a_p$  infeed rates up to a maximum  $a_p = \text{cutting edge length } l_2$
- When the 3D contour is reached,  $a_p$  is reduced step by step, layer by layer ( $a_p$  step-ups, from bottom to top)
- Procedure is repeated until a depth of approx.  $0.7x d_1$  is reached



### HFC roughing (High Feed Cutting) or HSC roughing (High Speed Cutting)

- Remaining material is removed down to a depth of approx.  $0.7x d_1$  using HFC or HSC milling strategy ( $a_p$  step-down: from top to bottom)
- HFC milling: large corner radii with high feed rates for maximum material removal rate
- HSC milling: requires less machine dynamics; can be used with all corner radius variants  $> 0.2 \text{ mm}$



### HSC pre-finishing (High Speed Cutting)

- Very well suited to preparing for finishing
- Performed with low axial infeed rate
- Previously roughened area is smoothed and is ready for subsequent operations (heat treatment or finishing)



Watch the new applications for 3D machining in our video!



## MFC tool family:

104 articles with a simple and universal structure

End milling tools for steel, stainless steel, titanium and nickel  
Smooth-edged, cylindrical

### Normal version

N° 8101 / 8201



MFC



Roughing HPC	<input type="checkbox"/>	d, 4 – 20
Roughing HDC	<input type="checkbox"/>	r
Finishing	<input type="checkbox"/>	

<b>Rm</b>
<850-1500

<b>HRC</b>
48-56

<b>Inox</b>
Ti

### Medium length version

N° 8111 / 8211



MFC



Roughing HPC	<input type="checkbox"/>	d, 4 – 20
Roughing HDC	<input type="checkbox"/>	r
Finishing	<input type="checkbox"/>	

<b>Rm</b>
<850-1500

<b>HRC</b>
48-56

<b>Inox</b>
Ti

### 5.2xd version

N° 8121 / 8221



MFC



Roughing HPC	<input type="checkbox"/>	d, 6 – 20
Roughing HDC	<input type="checkbox"/>	r
Finishing	<input type="checkbox"/>	

<b>Rm</b>
<850-1500

<b>HRC</b>
48-56

<b>Inox</b>
Ti

### 6.3xd version

N° 8122 / 8222

**new!**



MFC



Roughing HPC	<input type="checkbox"/>	d, 6 – 20
Roughing HDC	<input type="checkbox"/>	r
Finishing	<input type="checkbox"/>	

<b>Rm</b>
<850-1500

<b>Inox</b>
Stainless

<b>Ti</b>
Titanium

End milling tools for steel, stainless steel, titanium, and nickel  
Smooth-edged, with corner radius

### Normal version

N° 8107 / 8207



MFC



Roughing HPC	<input type="checkbox"/>	r 0.2, 0.5,
Roughing HDC	<input type="checkbox"/>	1.0, 1.5,
Finishing	<input type="checkbox"/>	2.0, 2.5

<b>Rm</b>
<850-1500

<b>HRC</b>
48-56

<b>Inox</b>
Ti

### Medium length version

N° 8117 / 8217



MFC



Roughing HPC	<input type="checkbox"/>	r 0.2, 0.5,
Roughing HDC	<input type="checkbox"/>	1.0, 1.5,
Finishing	<input type="checkbox"/>	2.0, 2.5

<b>Rm</b>
<850-1500

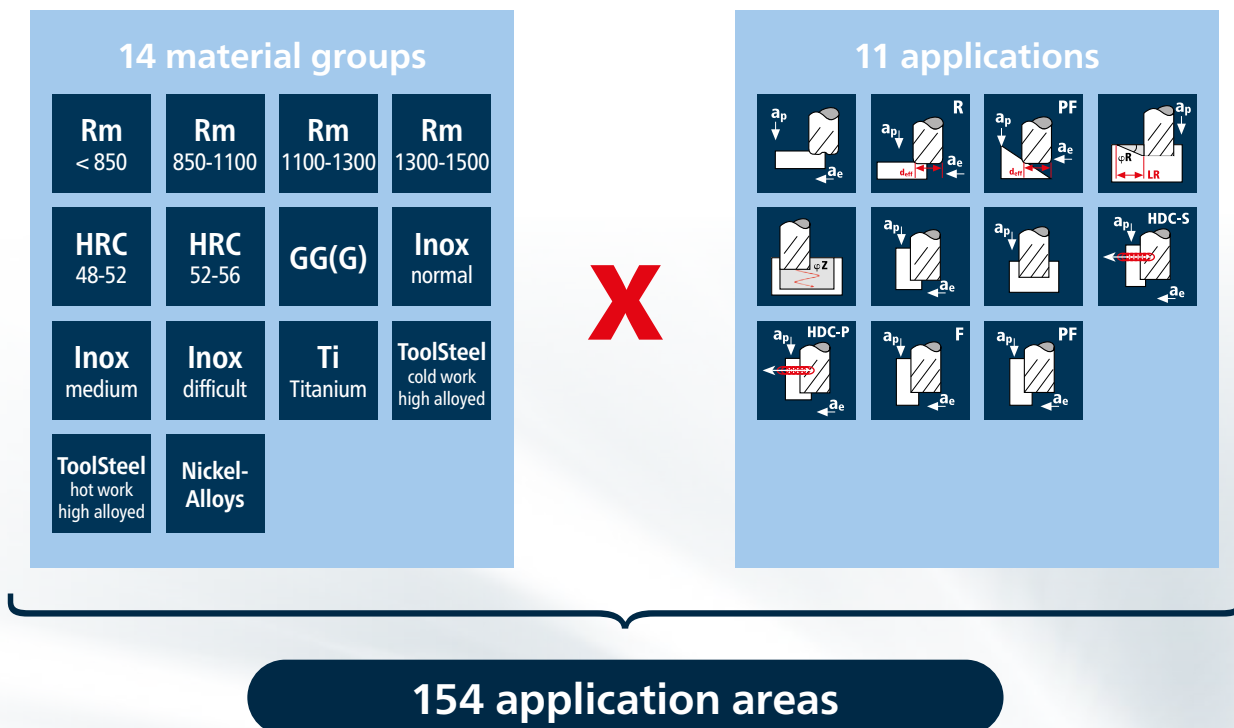
<b>HRC</b>
48-56

<b>Inox</b>
Ti

## Up to 154 application areas

The unique multifunctionality of the **MFC tools** covers 14 groups of materials, each of which can be combined with 11 specific applications. Thanks to the corner radius, it is possible to use HFC (High Feed Cutting) and HSC (High Speed Cutting) milling strategies, which are the most productive solutions for machining certain areas of workpieces. In combination with the HDC (High Dynamic Cutting) strategy, you can machine workpieces of a wide variety of materials and tempering conditions extremely efficiently.

The extra-long version of **MFC tools** with a cutting edge length of 6.3xd can be used extremely productively with the HDC strategy as well as for finishing. The specially designed chip breakers and the internal coolant supply ensure high process reliability during penetration. To achieve the highest chip removal rates, use the standard and medium-long versions of the **MFC tools**.



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## 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 35 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®**





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