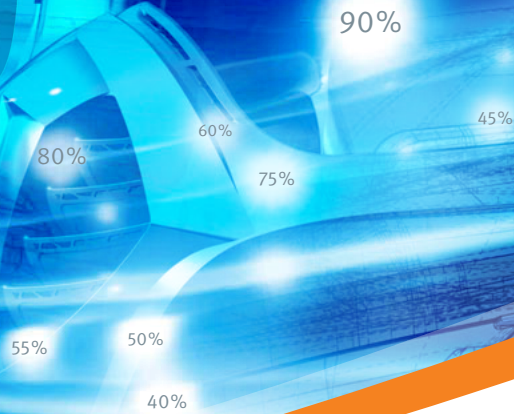


hyperMILL®

MAXX Machining



Performance strategies
Roughing, finishing
and drilling

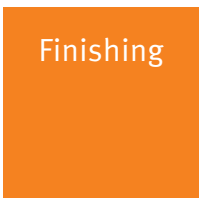
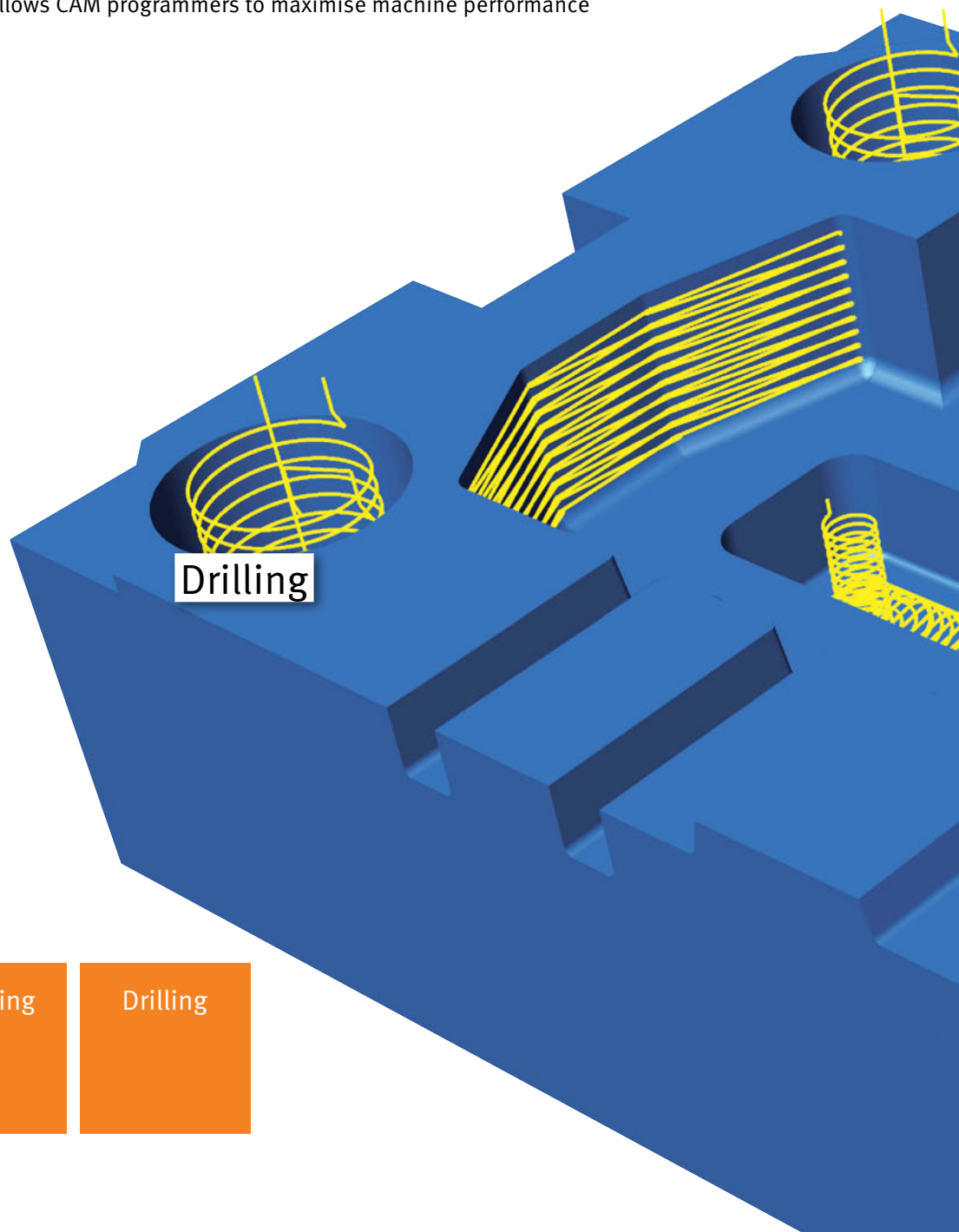
PERFORMANCE

 **OPEN MIND**
THE CAM FORCE

Performance, Performance, Performance

Speed is more crucial than ever these days. This is why OPEN MIND developed *hyperMILL*® MAXX Machining, the comprehensive high-performance solution for roughing, finishing and drilling. Trochoidal tool paths ensure extremely fast material removal. Innovative strategies for barrel cutters allow for finishing in record time. Milling tools tilted in cutting mode can quickly and easily drill holes in hard material without the need for a predrilled hole.

These unique solutions from OPEN MIND save enormous amounts of time while ensuring the same high quality. This allows CAM programmers to maximise machine performance for any application.

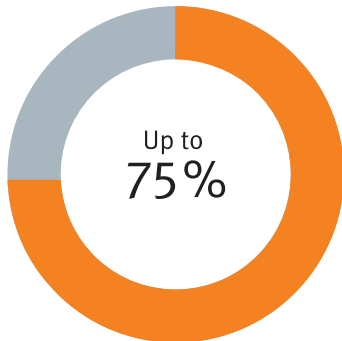


hyperMILL[®]

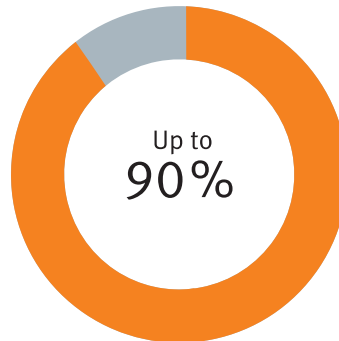
MAXX Machining

ADVANTAGES

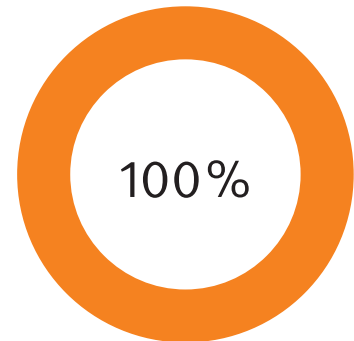
- Highly efficient
- Perfect surfaces
- Tool-friendly
- Simple to program



Time savings
for roughing



Time savings
for finishing



Process safety

POSSIBLE APPLICATIONS:

- Tool and mould manufacturing
- Production Machining
- Aerospace
- Automotive
- Motor sports
- Energy industries

Finishing

Roughing

“Our tool life has improved by 500 per cent. This is why we believe in doing everything with *hyperMILL*® MAXX Machining. It’s the best way forward!”

**Roland Mascke, CNC programmer
at Werkzeugbau Gebr. Kemmerich GmbH & Co. KG**



MAXXimum roughing

The roughing module in *hyperMILL*® MAXX Machining offers solutions for high-performance cutting (HPC) with spiral and trochoidal tool movements. The package combines optimal milling paths, maximum material removal and the shortest possible machining times.

**5axis shape
offset roughing**
HPC machining of
arched surfaces with a
constant allowance

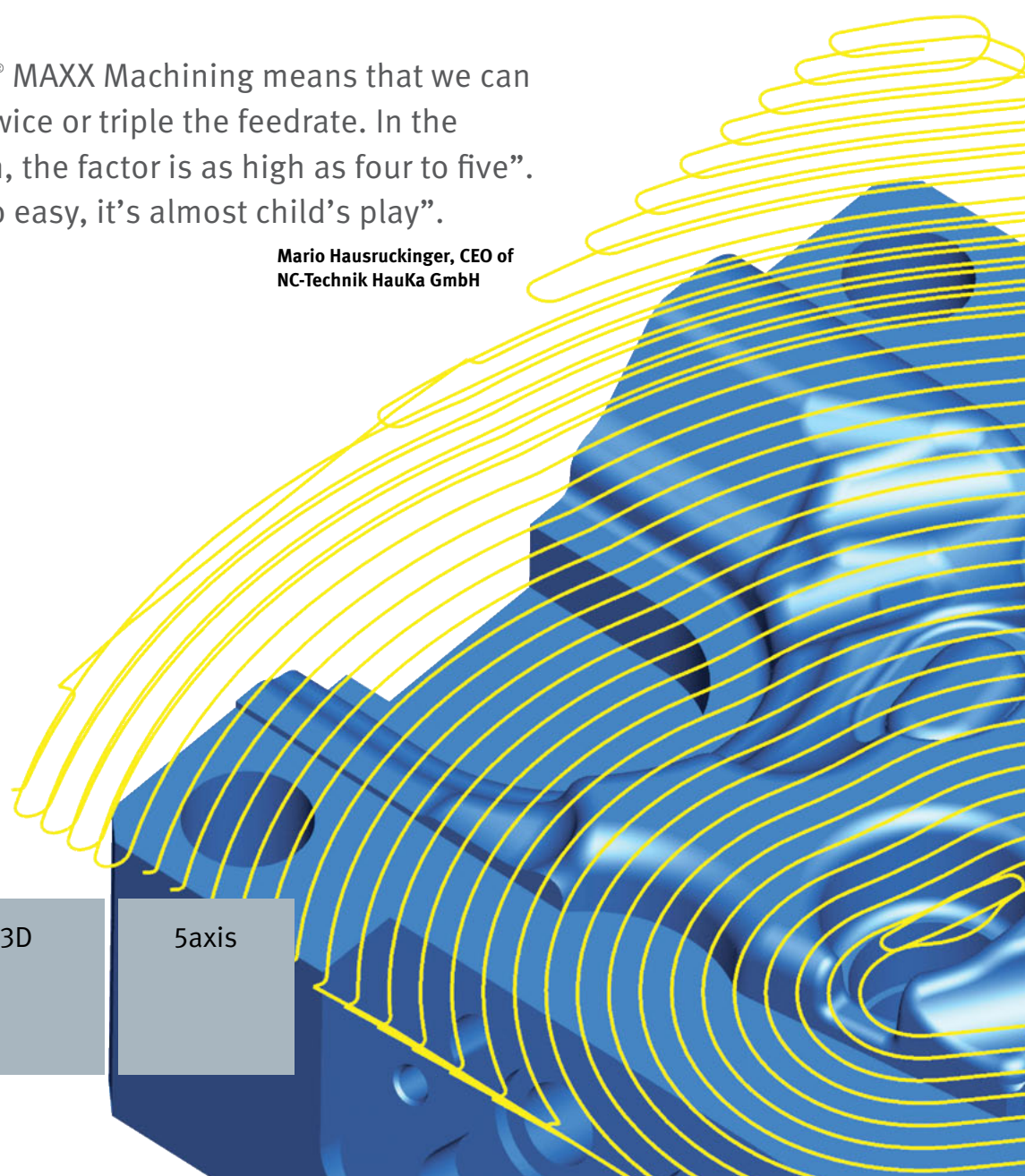
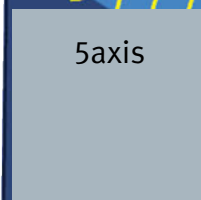
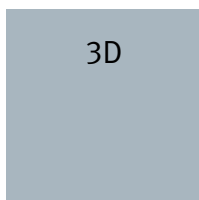
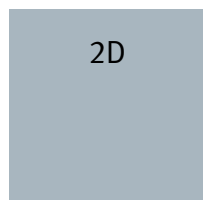
HPC tool paths for maximum roughing results

The roughing module is a comprehensive, high-performance package for creating spiral and trochoidal tool paths. Significantly increased material removal rate allows for extremely fast machining. At the same time, there is much less stress on the tools and machines. 2D, 3D and 5axis roughing jobs can be performed very easily, and above all, very quickly.

The module is based on VoluMill™, a tried-and-tested best-in-class HPC technology from Celeritive Technologies as well as on highly efficient special developments from OPEN MIND.

“Using *hyperMILL*® MAXX Machining means that we can rough steel with twice or triple the feedrate. In the case of aluminium, the factor is as high as four to five”. Programming is so easy, it’s almost child’s play”.

**Mario Hausruckinger, CEO of
NC-Technik HauKa GmbH**



Advantages

- Reduced machining times
- Extended tool life
- Machining that is easier on the tool and the machine
- Machine potential is fully exploited
- Simple to program

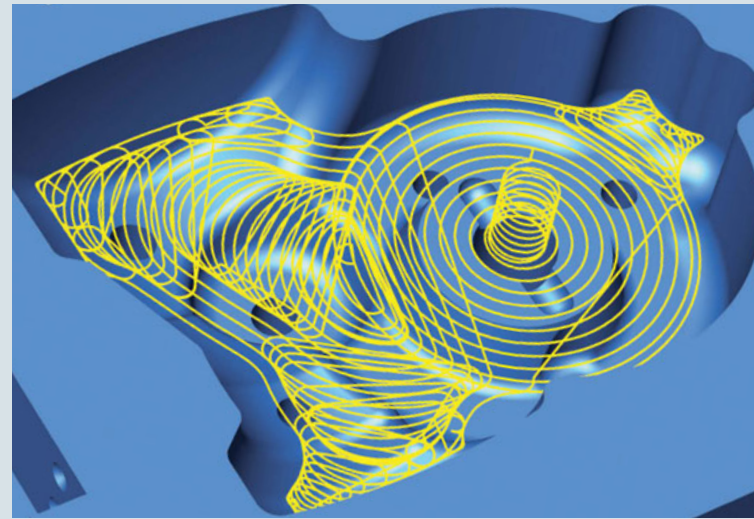
Optimisation options

■ Maximum reduction in machining times

hyperMILL® MAXX Machining reduces milling times significantly when compared with conventional roughing. Intelligent division into spiral and trochoidal tool paths allows for high-volume material removal.

■ Maximised tool life

Full cuts are prevented with *hyperMILL*® MAXX Machining. Stress on the tool is reduced, significantly extending tool life, especially when harder materials are involved.



Features

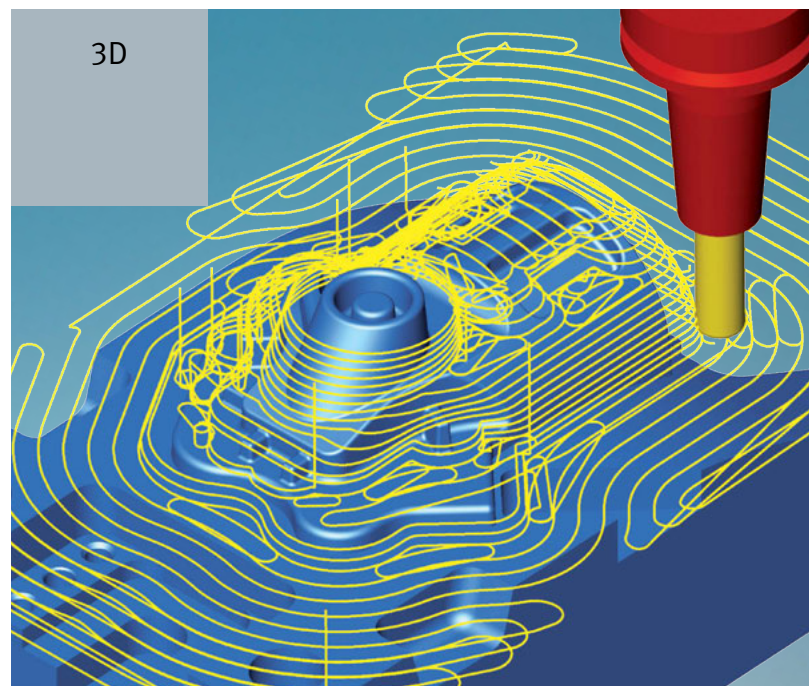
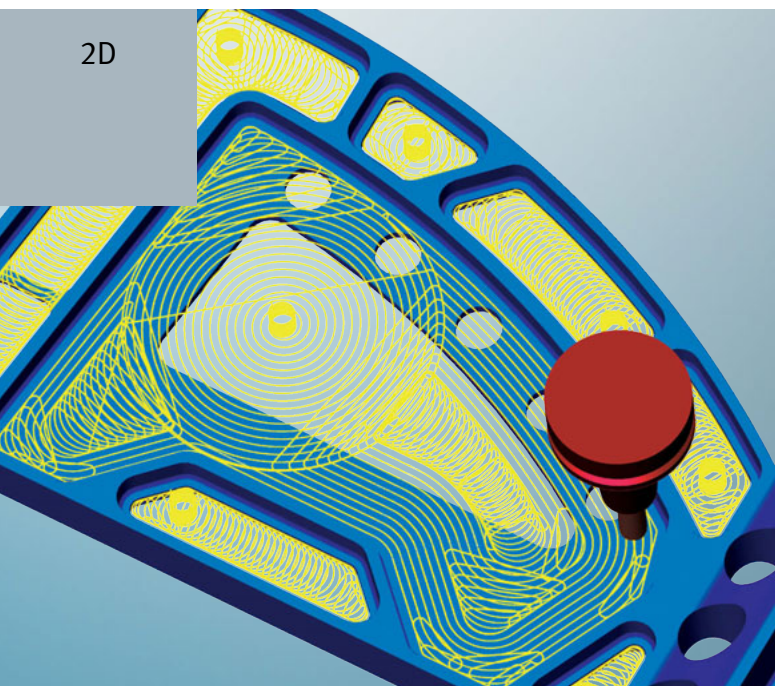
- Creation of spiral and trochoidal-like tool paths for 2D, 3D and 5axis simultaneous machining
- Intelligent feedrate adjustment
- Fast repositioning in high-speed mode, with the tool being raised slightly off the bottom
- Full cuts and abrupt changes in direction are prevented
- Intelligent division of cuts during 3D machining
- High-volume material removal in next to no time, even with tough workpieces
- Full control of machining parameters: Machining values can be customised
- No post-processor adjustments required
- Uses proven HPC technology



High performance for all machining situations

Users have maximum programming freedom for 2D, 3D or 5axis machining. Optimal cutting conditions combined with large Z stepdowns ensure extremely efficient 2D machining of grooves, pockets and prismatic workpieces. During 3D machining, *hyperMILL*® MAXX Machining optimally divides the component geometry into different planes. Intelligent design and sequence ensures time and path-optimised machining of these planes.

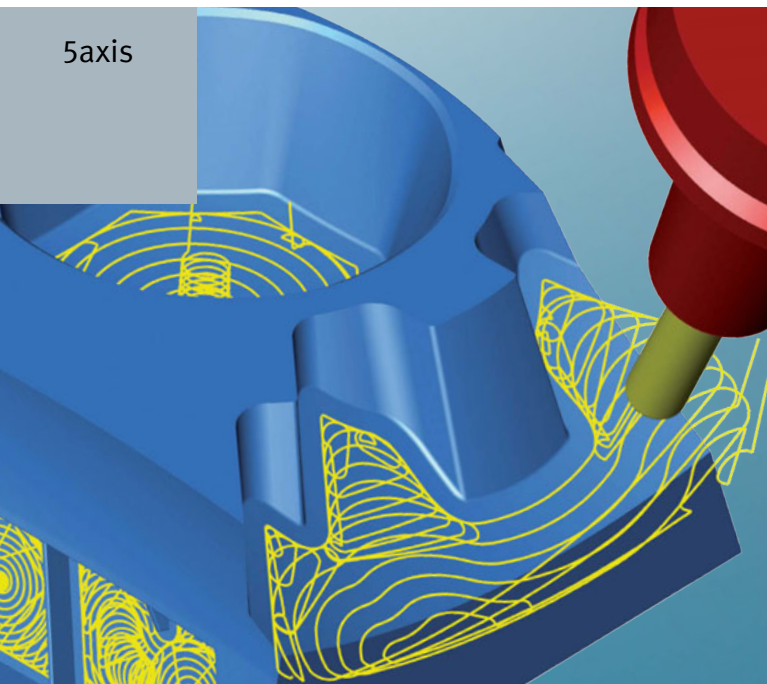
Given its pioneering role in 5axis machining, it was clear that OPEN MIND had to offer something really special for 5axis machining: a comprehensive 5axis HPC package. With the solution, trochoidal-like paths can be mapped to curved component surfaces in a unique fashion.



***hyperMILL*® MAXX Machining: One of the most extensive and**

“When it comes to materials that are difficult to machine, we achieve high-volume material removal in HPC machining thanks to a large stepdown depth with small lateral stepover and maximum feedrates. *hyperMILL*® MAXX Machining ensures that the tool load remains constant, even in corners, and that the tool life of milling tools is fully maxed out.”

Dr. Christian Wilkening, CEO of
5AXperformance GmbH



■ Intelligent feedrate adjustment

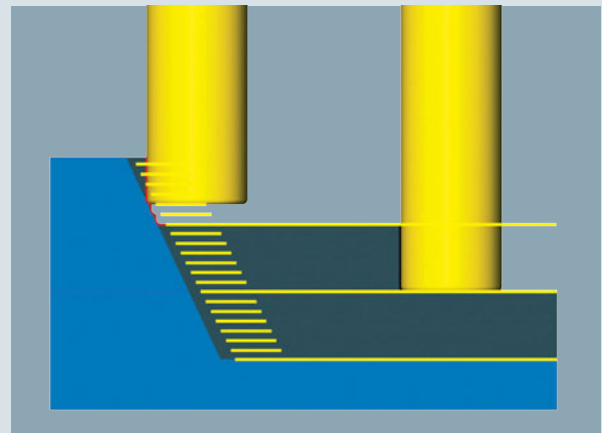
Special automated functions analyse the local component conditions – wrapping and speed at the edges – and automatically adjust the feedrates along the toolpath.

■ Maximum stock removal rate

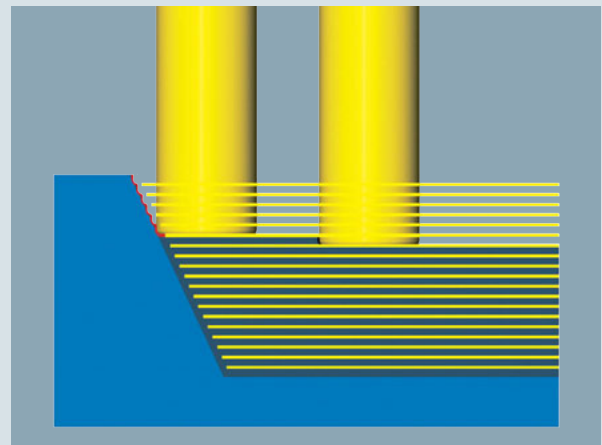
hyperMILL® MAXX Machining allows users to define minimum and maximum feedrates for different machining situations such as during the approach, the plunge and for the actual machining in the plane. This way, the average working feedrate is increased. At the same time, this helps to prevent feedrates that are too low. It is possible to achieve a maximum stock removal rate thanks to machining using climb milling and the dynamic adjustment of the feedrate to the existing cutting conditions.

■ Intelligent division of cuts

hyperMILL® MAXX Machining automatically recognises a machining situation with different planes and adjusts to the situation optimally. Material is removed with maximum stepdown depth; the remaining material is then removed from the bottom up in defined intermediate steps.



HPC machining with large step-downs and intermediate steps

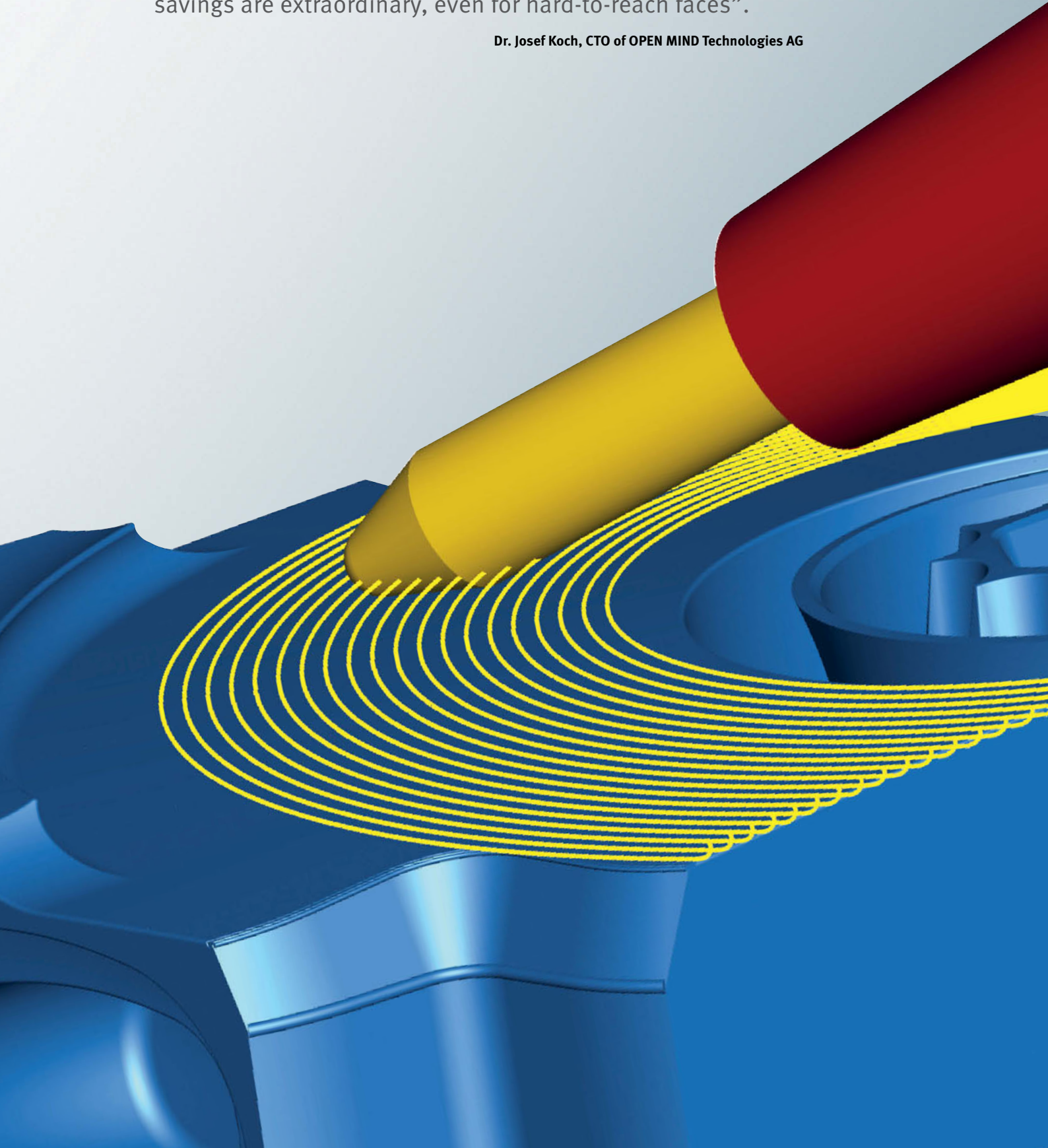


Conventional machining mode with minimal step-downs

powerful HPC packages in the world

“For over 50 years, everyone thought they knew the best way to mill plane faces. OPEN MIND has now developed an innovative and highly efficient method for finishing planes. The potential savings are extraordinary, even for hard-to-reach faces”.

Dr. Josef Koch, CTO of OPEN MIND Technologies AG



MAXXimum finishing

The finishing module in *hyperMILL*® MAXX Machining is the solution for highly efficient semi-finishing and finishing of planes and any continuous faces with barrel cutters. These strategies allow for much larger spaces between paths compared to conventional methods. At the same time, surface quality is the same or even much better.

Finishing of an any continuous face

Highly efficient machining with large step-over distances and excellent finish

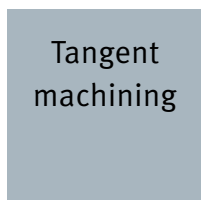
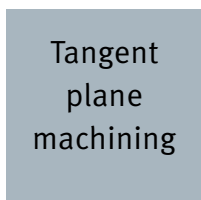
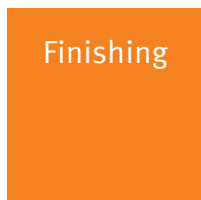
Finishing, reinvented

As one of the first CAM manufacturers, OPEN MIND has not only perfected 5axis machining, we have also focused on finishing using special milling tools and have developed a totally unique package for this type of finishing. The finishing module in *hyperMILL*® MAXX Machining offers high-performance strategies for the finishing of planes and any continuous faces using different types of barrel cutters. Huge time savings and excellent surface quality are achieved thanks to the special cutting geometry of the tools as well as perfectly tailored CAM strategies.

■ **hyperMILL® MAXX Machining supports barrel cutters**

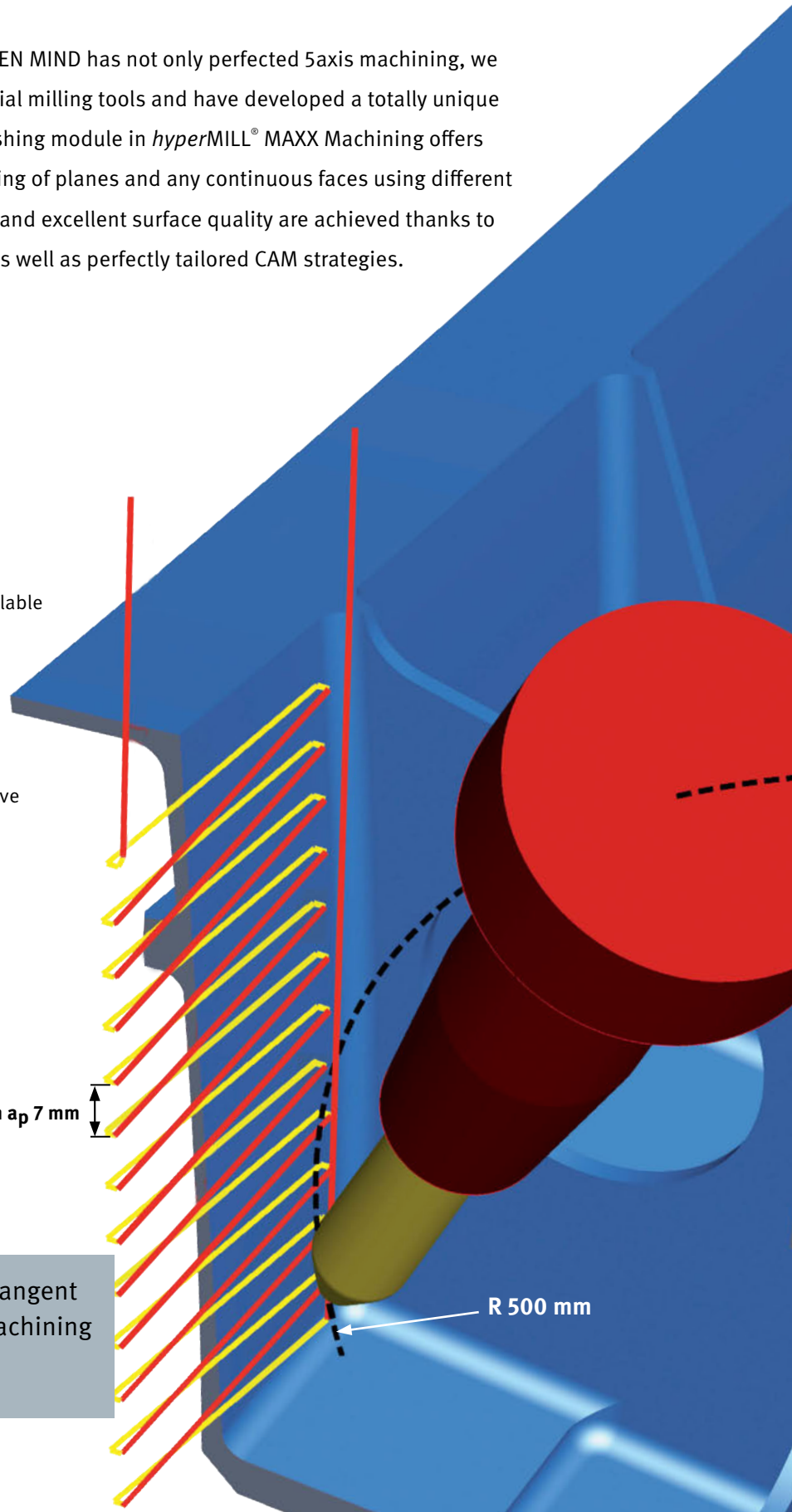
The different cutter types are available in many 5axis cycles:

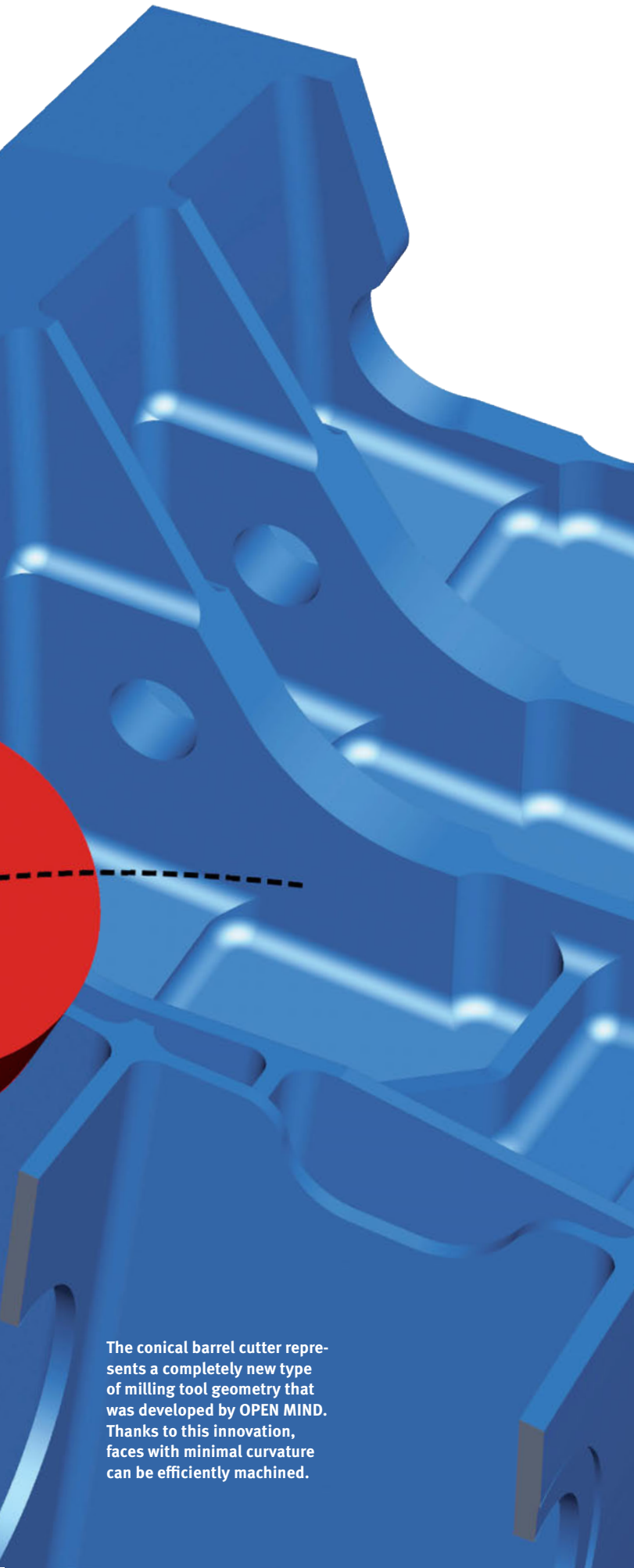
- Tangent plane machining
- Tangent machining
- 5axis rework machining
- 5axis machining for impellers, blisks and turbine blades
- 5axis swarf cutting with one curve



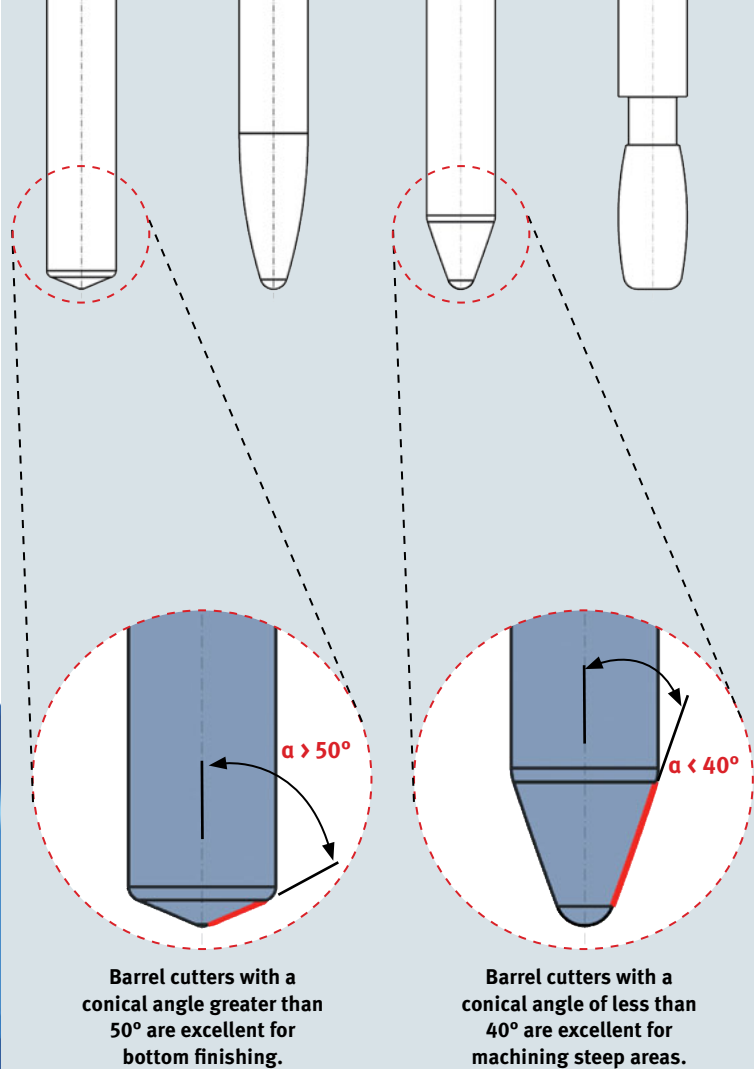
Step-down a_p 7 mm

R 500 mm





The conical barrel cutter represents a completely new type of milling tool geometry that was developed by OPEN MIND. Thanks to this innovation, faces with minimal curvature can be efficiently machined.



Barrel cutters

Barrel-shaped tools use a section of the circumference, allowing for very large radii. For example, the compact design of the tools allows for a cutting radius of 500 mm.

Advantages

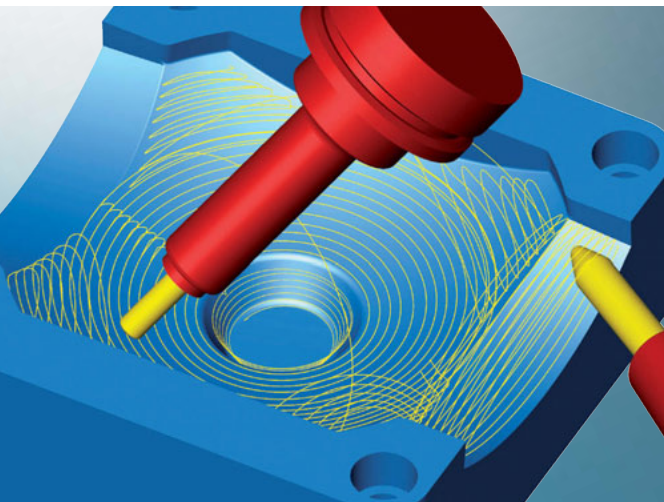
- Barrel cutters enable a greater step-over distance with the same theoretical scallop height
- Efficient production thanks to shorter machining times with the same or better surface quality
- Increased tool life while simultaneously reducing the number of tools required
- Tolerance deviations due to heat warping at the tool are reduced to a minimum
- Axial deviations of the machine are smoothed
- Simple tool definition in *hyperMILL*®
- Full mapping of barrel cutters, even during the simulation
- Barrel cutters with ball mill tips can be simultaneously used as barrel cutters and ball mills

Performance boost for finishing

OPEN MIND developed the innovative tangent plane machining and tangent machining strategies especially for plane and on any continuous faces machining applications. Compared to conventional methods, time savings of up to 90 per cent can be achieved when a conical barrel cutter is used. Both strategies take advantage of the tool shape in order to achieve perfect surfaces for finish machining. Intelligent automated functions ensure optimum tool orientation and fit. In this way, even hard-to-reach areas can be efficiently machined.

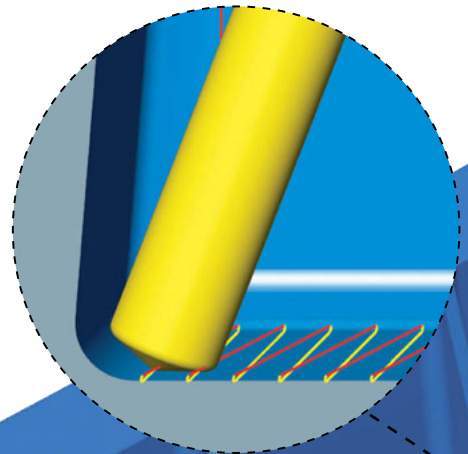
Easy selection of surfaces makes for a user-friendly experience. 5axis tool paths are automatically generated and checked for collisions when the user clicks on the faces to be machined.

Time saved during finishing: up to 90%



Tangent machining

Any continuous faces can be machined very efficient with the use of the conical barrel cutter

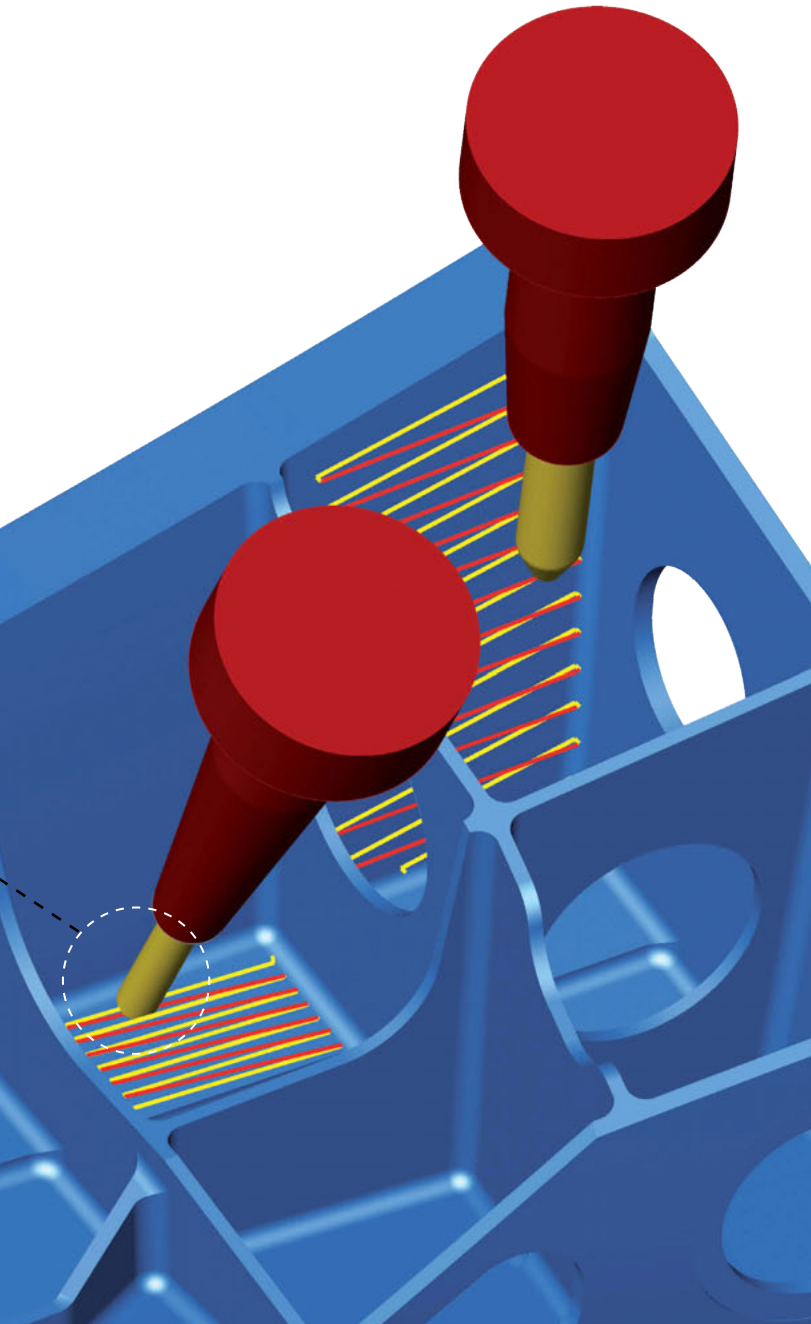


Bottom machining

Bottom surfaces with undercut situations and edge areas of high walls or pocket bottoms can be optimally machined using the **tangent plane machining** strategy

Features

- Especially for machining steep or flat planes: Strategy for tangent plane machining with conical barrel cutters
- Fully automated machining of any continuous faces
- Efficient and reliable finishing strategies
- Hard-to-reach areas can be optimally machined. For example, bottoms of pockets and levels with fillets can be milled.
- Much greater step-over distances with the same theoretical scallop height
- Reduced number of tools

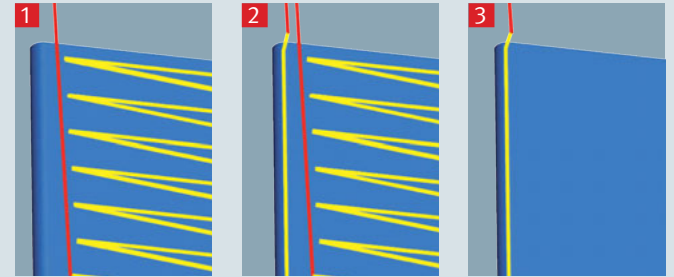


Tangent plane machining

Strategies

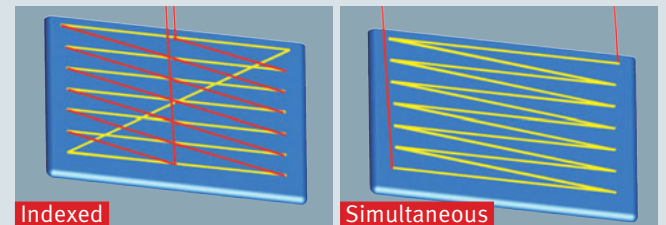
The following machining strategies are available for tangent plane machining:

- (1) Machining the face
- (2) Machining the face with limit
- (3) Machining the limit



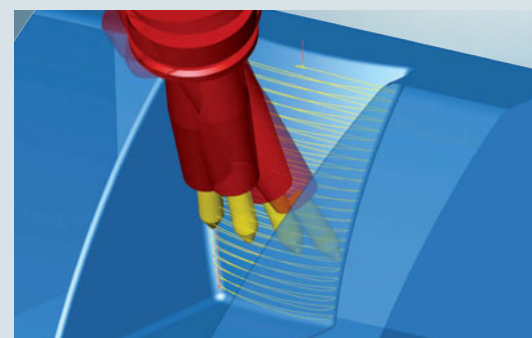
Machining

Two modes are available for this strategy. The indexed machining divides the surface into specific areas with different orientations. A high level of surface quality between the orientations is achieved thanks to a defined overlap. When machining simultaneously the entire face undergoes 5axis simultaneous machining. 5axis simultaneous machining is especially efficient with dynamic machines.



Tangent machining

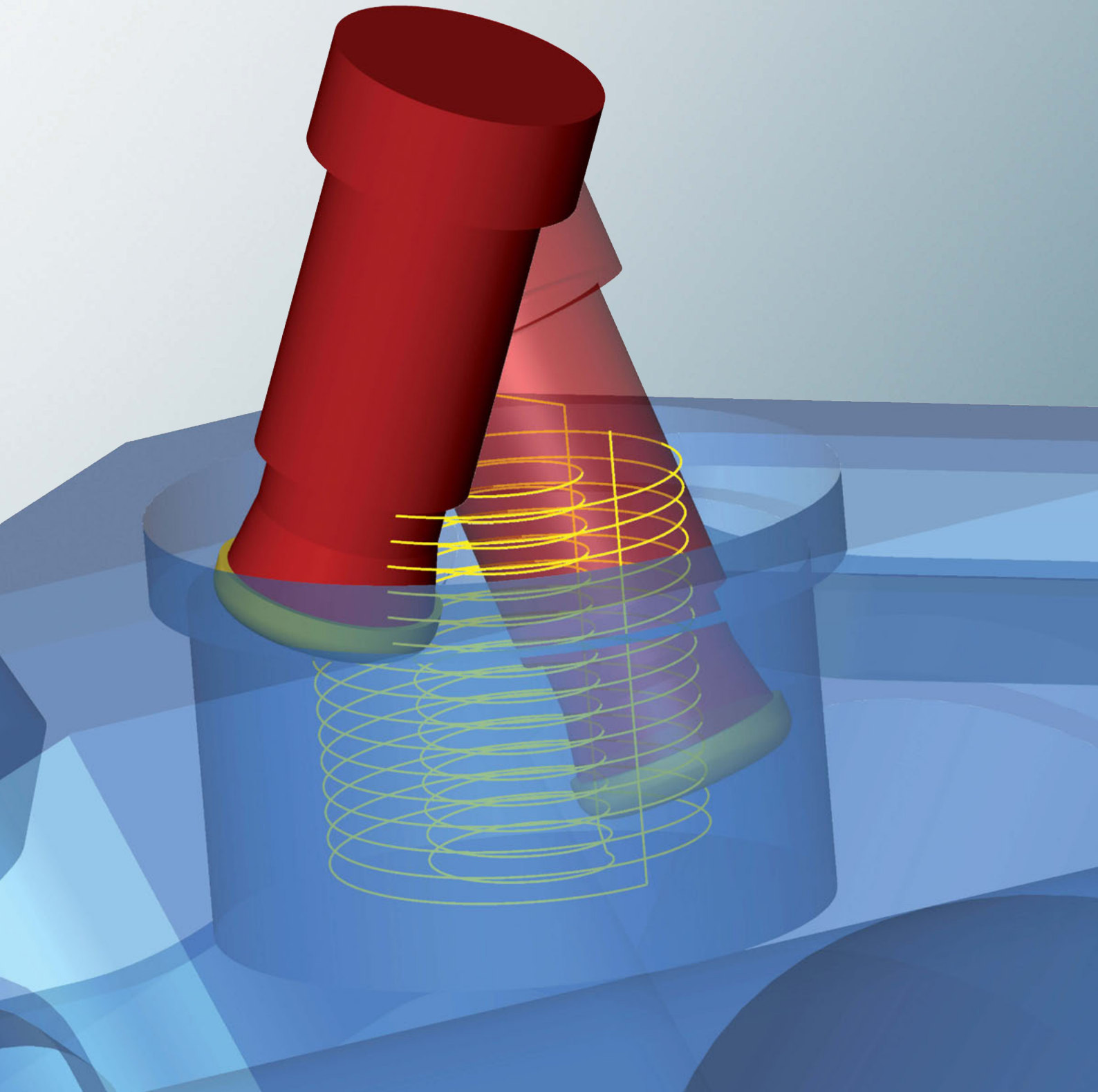
Simple selection of component surfaces for Z-level and ISO machining. The cycle creates the toolpaths fully automatically without a special contour selection. In collision areas, the tool tilts upwards away from the contact point or guiding angle.



Automatic collision avoidance

“There’s no better method for removing high chip volumes in such a short amount of time. Yet another example of the superiority of 5axis simultaneous machining for such a seemingly simple task”.

Dr. Josef Koch, CTO of OPEN MIND Technologies AG



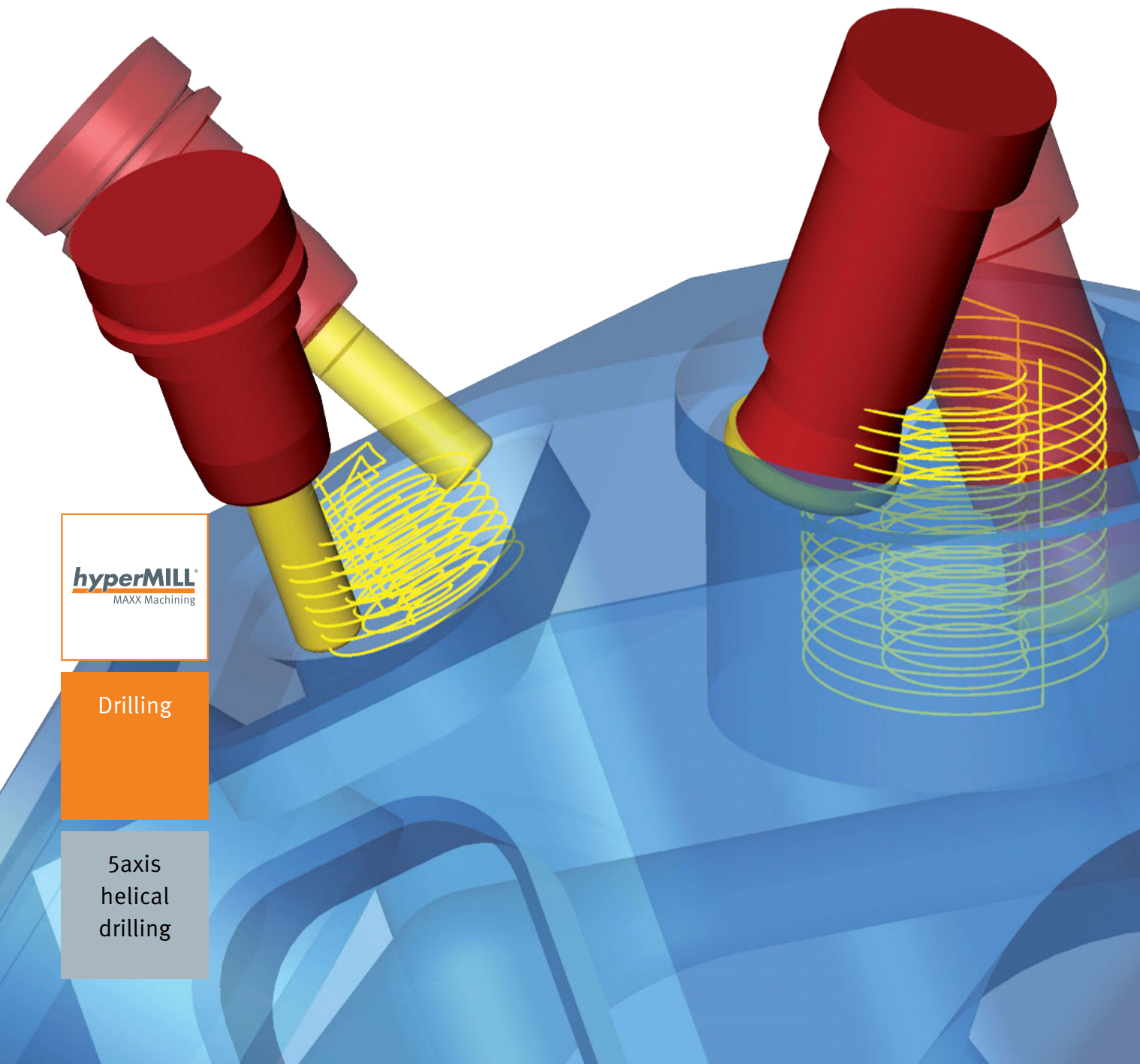
MAXXimum drilling

5axis helical drilling involves helical tilt milling. The milling tool is tilted in cutting direction. Collision with the hole wall is avoided with a secondary tilt. This strategy is excellent for making an opening cut when roughing deep cavities. The material is removed from a circular pocket in a highly efficient and tool-friendly fashion.

5axis helical drilling
Highly efficient roughing
of a circular pocket using
a milling cutter

Drilling has never been faster

Helical tool paths are generated with the helical drilling cycle. Thanks to this 5axis simultaneous machining strategy, milling tools that are not centre cutting can also be used. The tool plunges into the material quickly, without the need for predrilling. Intelligent setting of the milling tool's orientation based on 5 axes enables efficient and especially tool-friendly machining with safe removal of the shavings. This cycle is particularly well suited to materials that are difficult to cut.



hyperMILL[®]
MAXX Machining

Drilling

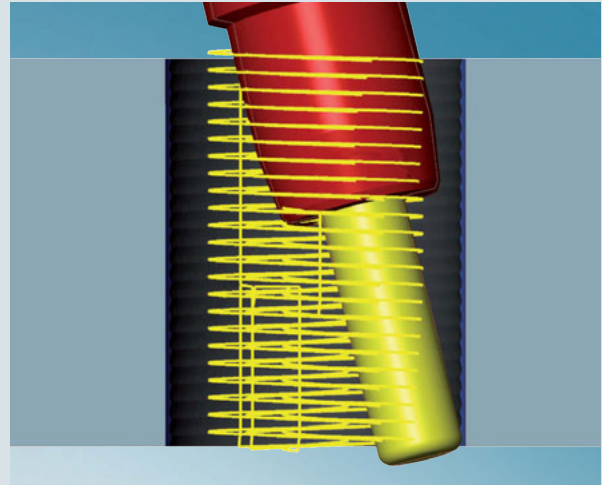
5axis
helical
drilling

Features

- Fast and efficient material removal, especially for tough materials
- Excellent for opening deep cavities using large milling heads
- No predrilling necessary
- Tool-friendly
- Safe removal of chips, even in deep drill holes
- Also suitable for milling tools that are not centre cutting
- Strategy is as easy as programming a drill hole

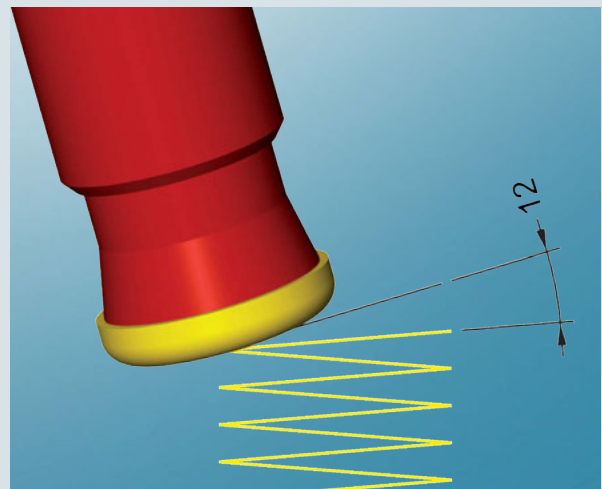
■ Process reliability

MAXXimum safety thanks to fully automatic collision avoidance feature



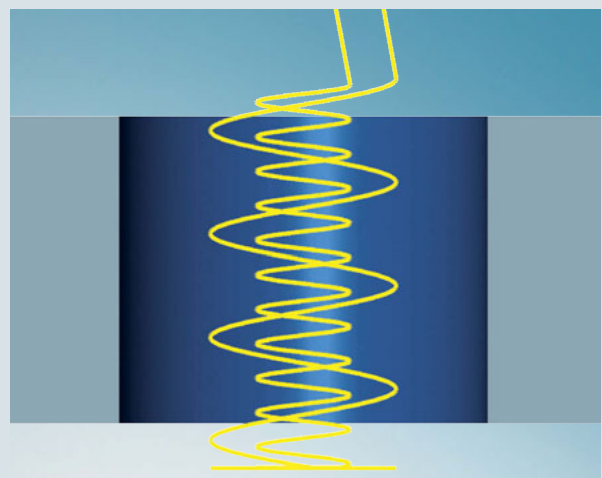
■ Lead angle

In contrast to conventional 3D machining, a lead angle allows for use of milling tools that are not centre cutting



■ Automatic pitch adjustment

In the event of a collision, this function automatically adjusts the pitch until collision-free machining is ensured.



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 Machining Roughing – HPC
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We push machining to the limit