hyperMILL®

MILL-TURN Machining

Mill-Turn Strategies

OPEN MIND
THE CAM FORCE

For Efficient complete Machining:
*hyper*MILL® MILL-TURN Machining

Milling and turning in one user interface

*hyper*MILL® MILL-TURN Machining is a comprehensive mill-turn module developed for highly efficient machining. It is completely integrated in the base application and can be accessed via the same interface, thus delivering all milling and turning strategies in a single GUI. This provides highly convenient access to the advantages of a modern mill-turn machine for complete machining in one setup. All milling and turning strategies can be combined as desired, resulting in a fully flexible production process. Modern simulations and reliable collision monitoring ensure safe machining.

hyperMILL®
MILL-TURN Machining

MILL-TURN

rollFEED®
Turning

Seamlessly integrated

With the integration in *hyper*MILL®, all mill-turn strategies as well as all 2.5D, 3D, and 5-axis milling strategies are available from a single user interface. This means that all turning and milling strategies can be freely combined with one another. The user has a large degree of flexibility in selecting the best possible machining strategy.

Stock tracking across all operations

Stock tracking, is calculated for all turning and milling operations. Each operation draws on a stock for which the preceding machining steps have already been taken into account. Operators benefit from best-in-class processing precision.

One postprocessor for milling and turning

A postprocessor individually adapted to the utilized machines, controllers, and components generates the NC codes for turning and milling operations in one NC program.

Simulation and collision checking

The reliable simulation of milling and turning operations ensures safe machining. The collision check can account for the model, stock, tool, machine, and clamping device.

Comprehensive tool database

The shared tool database can be used for turning, milling, and drilling tools and therefore enables standardized tool management. The complete description of the cutting and holder geometry as well as the position delivers all data needed for a fully automated collision check.
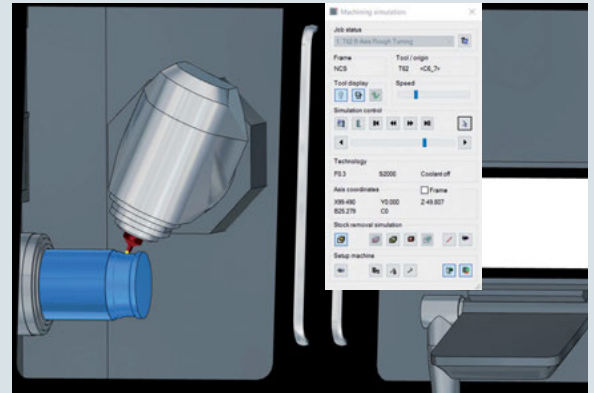
*hyper*MILL® TOOL Builder

The *hyper*MILL® TOOL Builder utility allows users to quickly and easily create holders for machining in *hyper*MILL®. An intuitive wizard provides an interface for directly importing tool holder data from supplier catalogs in IGES or STEP format. The holders, extensions, and turning tool holders generated can be assembled into an NC tool in the *hyper*MILL® tool database. This allows complex and collision-checked holders to be mapped in *hyper*MILL® with every detail.
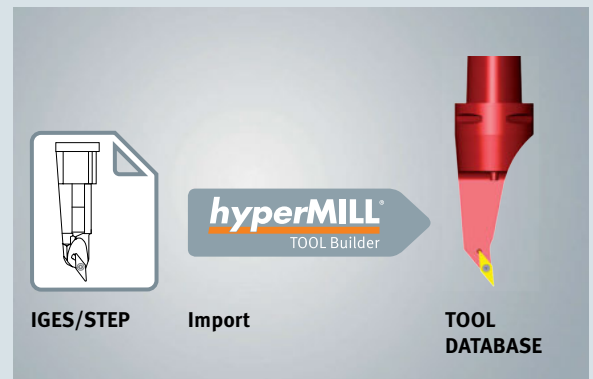
Even more performance

*hyper*MILL® MILL-TURN Machining delivers a tool for highly efficient mill-turn machining. In addition to conventional turning strategies, users can draw on the 3-axis simultaneous turning and rollFEED® Turning process from Vandurit.
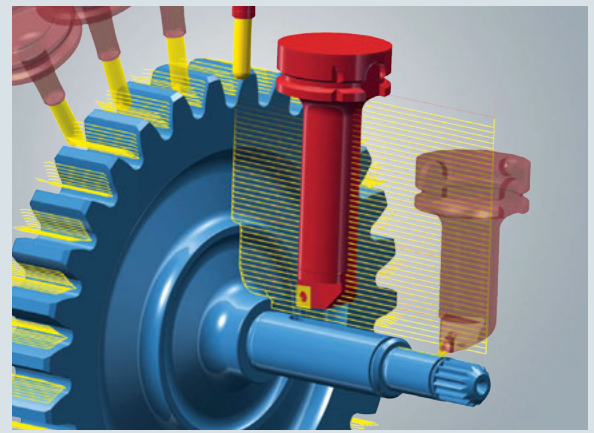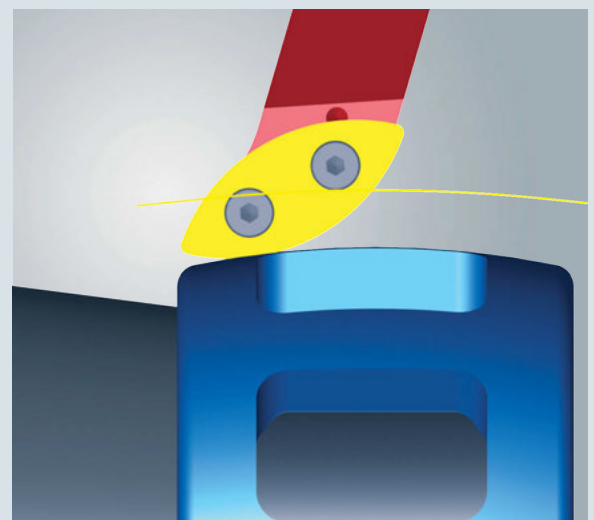
Complete machining on a single machine

Reliable machine simulation

IGES/STEP **Import** **TOOL DATABASE**

*hyper*MILL® **TOOL Builder**

Highly efficient turning:
Strategies for rollFEED® Turning from Vandurit

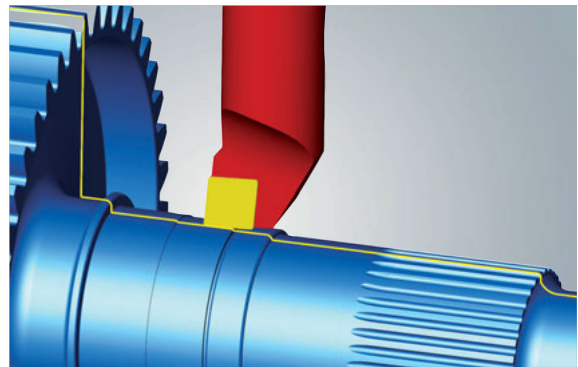# Turning Strategies

Comprehensive turning strategies

The *hyper*MILL® MILL-TURN Machining module supports the programming of any common turning strategy on mill-turn machines. The function range also includes special strategies such as 3-axis simultaneous turning for roughing and finishing using a swivel head on the third axis.

**Free combination of turning and milling operations**

All turning strategies can be combined with the efficient *hyper*MILL® milling strategies, which ensures outstanding flexibility and efficiency accessed from a single user interface.
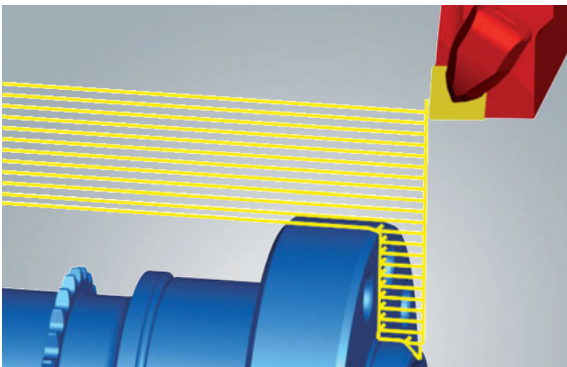

Roughing: Roughing can be used for interior, exterior, and front face machining with an axial or radial feed. When processing materials that are difficult to machine, a chip break can be used.


Finishing: Finishing is used to finish the roughed faces. The strategy is suitable for exterior and interior machining and can account for falling contours and undercuts.
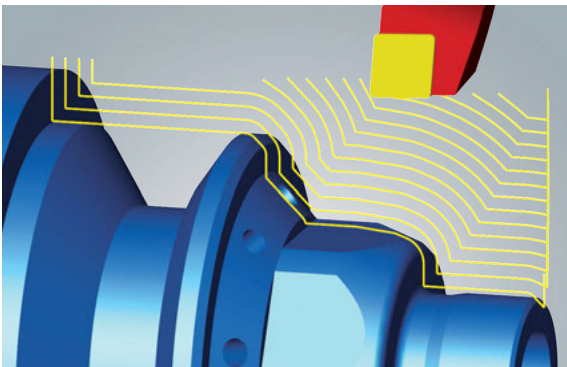

Contour-parallel roughing: This strategy allows for rough turning stock of any shape parallel to the contour. It results in a consistent offset during the subsequent finishing step.
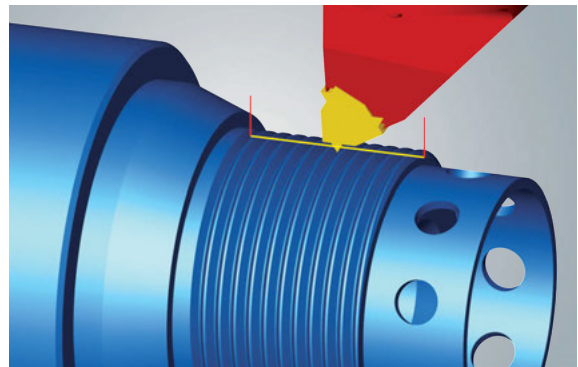

Thread cutting: This strategy is used for turning external and internal threads with a constant pitch. This makes it possible to produce single- or multiple-start cylindrical or cone-shaped external and internal threads.
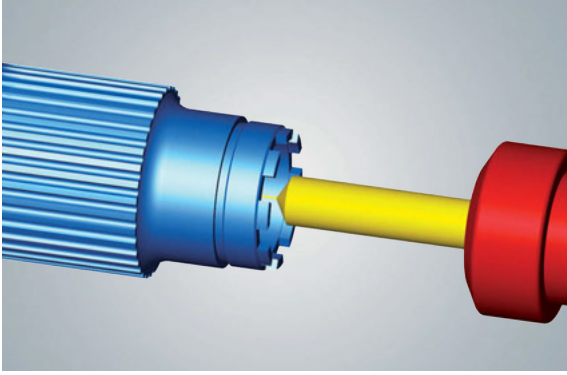
Drilling: Drilling along the rotary axis with a fixed drill. Options include centering, simple drilling, and reaming. Tapping and deep hole drilling are also supported.
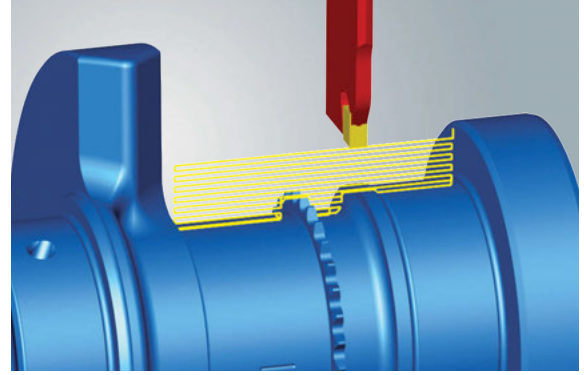

Groove turning: Following radial infeed, the grooving tool removes material axially. Zigzag machining is also possible.
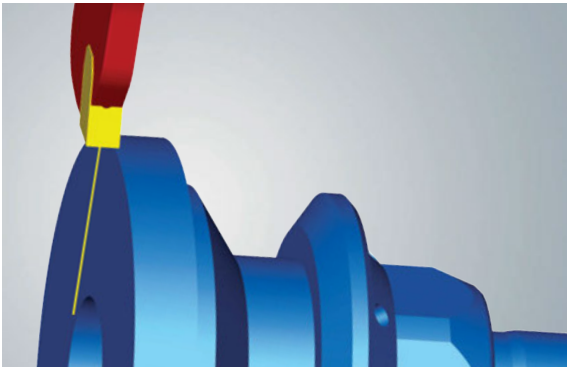

Parting: This strategy is used to part the component from the raw material. As an option, it is possible to chamfer the workpiece.
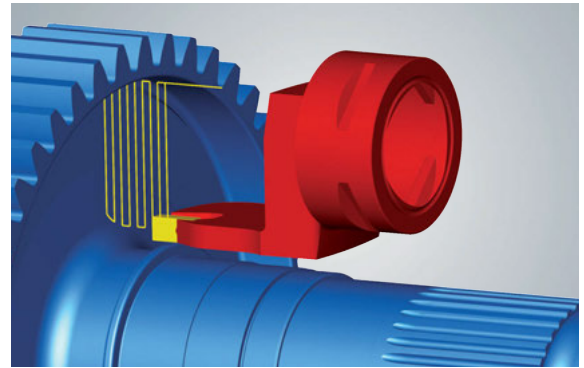

Face groove turning: Following axial infeed, the grooving tool removes material radially. Zigzag machining is also possible.
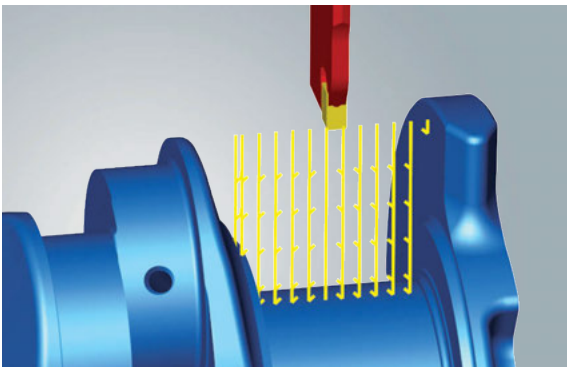
Grooving: Radial grooves and shoulders can be roughed in a plunging movement. The strategy also supports ramped approach movements and chip break machining.
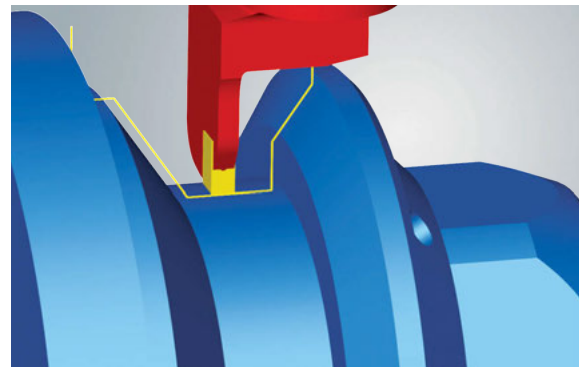
Groove finishing: Radial grooves and shoulders can be finished using this strategy. There are various approach and retract macros that can be freely combined.
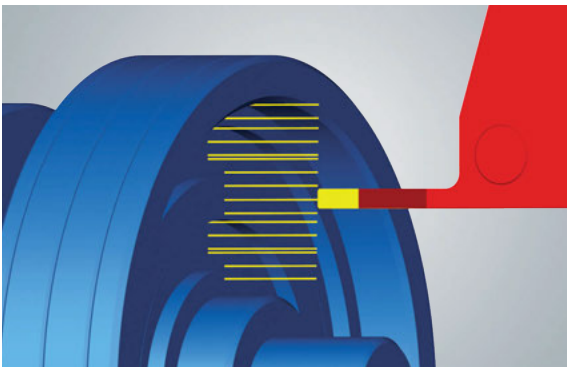
Face groove plunging: When this strategy is applied, the tool plunges axially into the stock to create grooves and shoulders. Both the infeed direction and a chip break can be defined for this strategy.

Face groove finishing: This strategy is used to finish axially aligned grooves and shoulders with a grooving tool.

3-Axis Simultaneous Turning

Efficient and flexible turning

Simultaneous machining further boosts the mill-turning efficiency of machines with a swivel head on the third axis. Complex workpiece geometries can be machined in a single operation by simultaneously adapting the approach angle during turning.

Simultaneous turning programmed with ease

Two special strategies for simultaneous roughing and finishing make programming both simple and reliable. Here, synchronization lines are used to control the movement of the third axis. The simultaneous movement of the third axis is calculated automatically between the synchronization lines.

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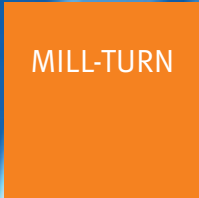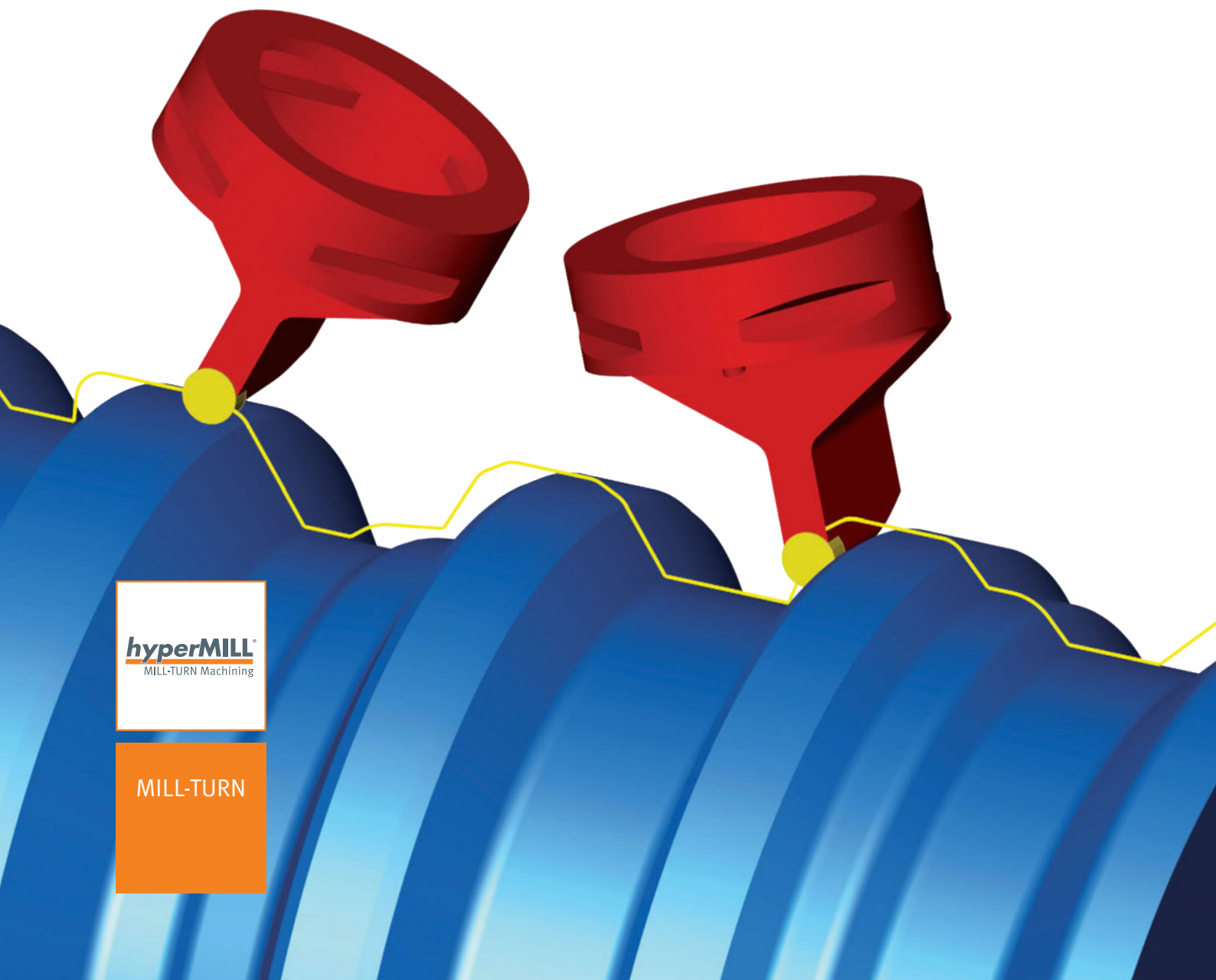
Features

- Process complex contours in a single operation
- Optimal tool utilization
- Increased tool life
- Fewer tool changes
- Easy to program
- For machines with a swivel head on the third axis
- Fully checked for collisions
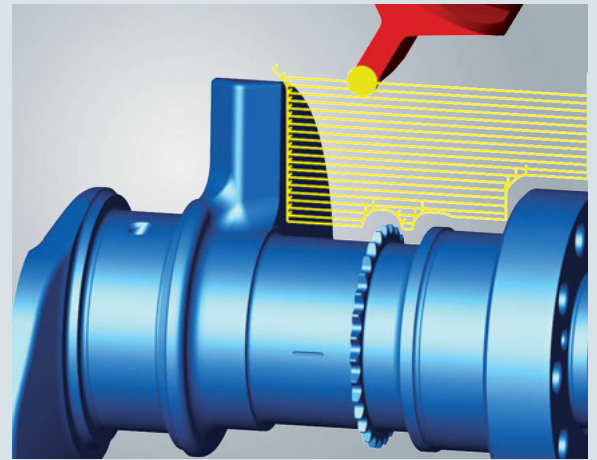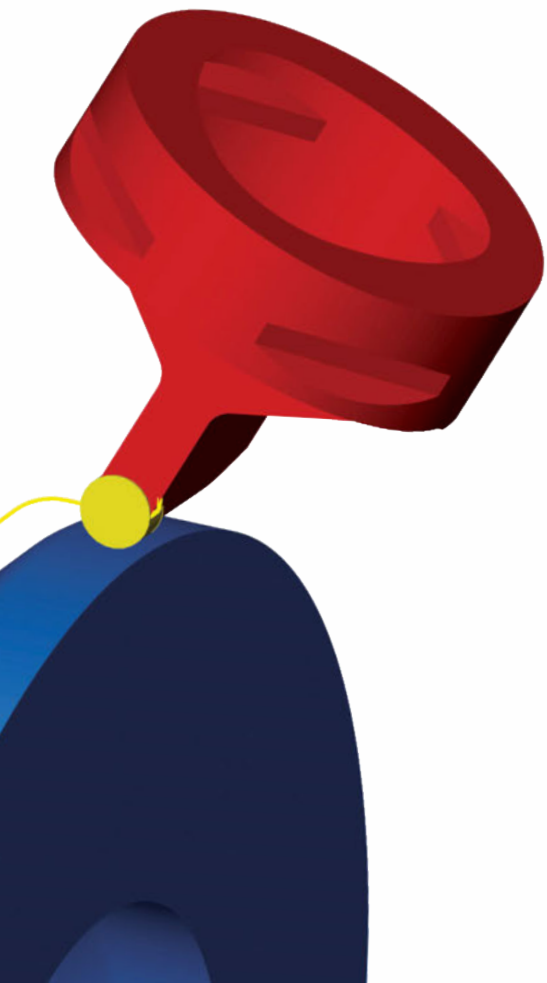
Roughing: The innovative approach, which involves using a simultaneous third axis during roughing, offers the user many benefits. The flexible tool orientation ensures that the insert is optimally utilized and also helps to extend the tool life.
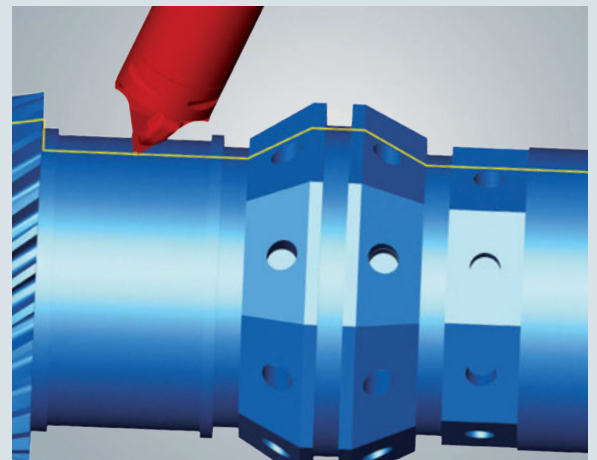
Finishing: The simultaneous movement of the third axis allows complex contours to be finished in a single operation. This means that tool changes that were previously required due to limited access or undercut can be avoided.
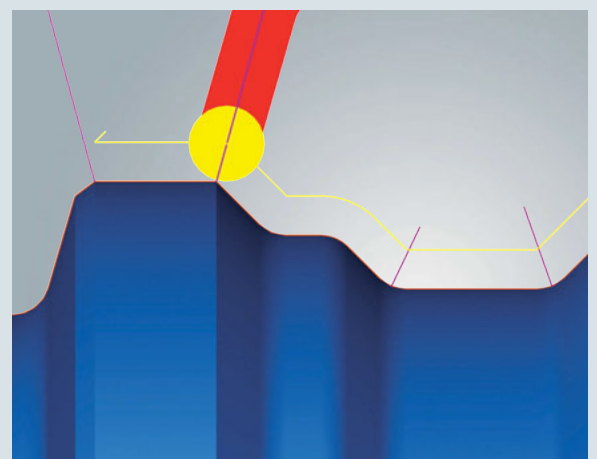
Simple to program: Synchronization lines allow users to define the simultaneous tilting movement. The tilt angle of the third axis is calculated and adjusted automatically between the synchronization lines.

High performance for turning

Time savings plus extended tool life

The proven concept of trochoidal milling has been successfully applied to turning. *hyper*MILL® allows the technology to be quickly and easily applied to all turning parts. Round inserts can be optimally used thanks to the trochoidal toolpaths. The connecting paths between the individual toolpaths as well as their approach and retract movements are optimally adapted to the respective machining application. This reduces the machining time and also extends the tool life. In addition, smooth machine movements reduce the load on the individual axes of the machine tool.

This module, which is fully integrated in *hyper*MILL®, is based on VoluTurn™, a proven best-in-class HPC technology from Celeritive®.
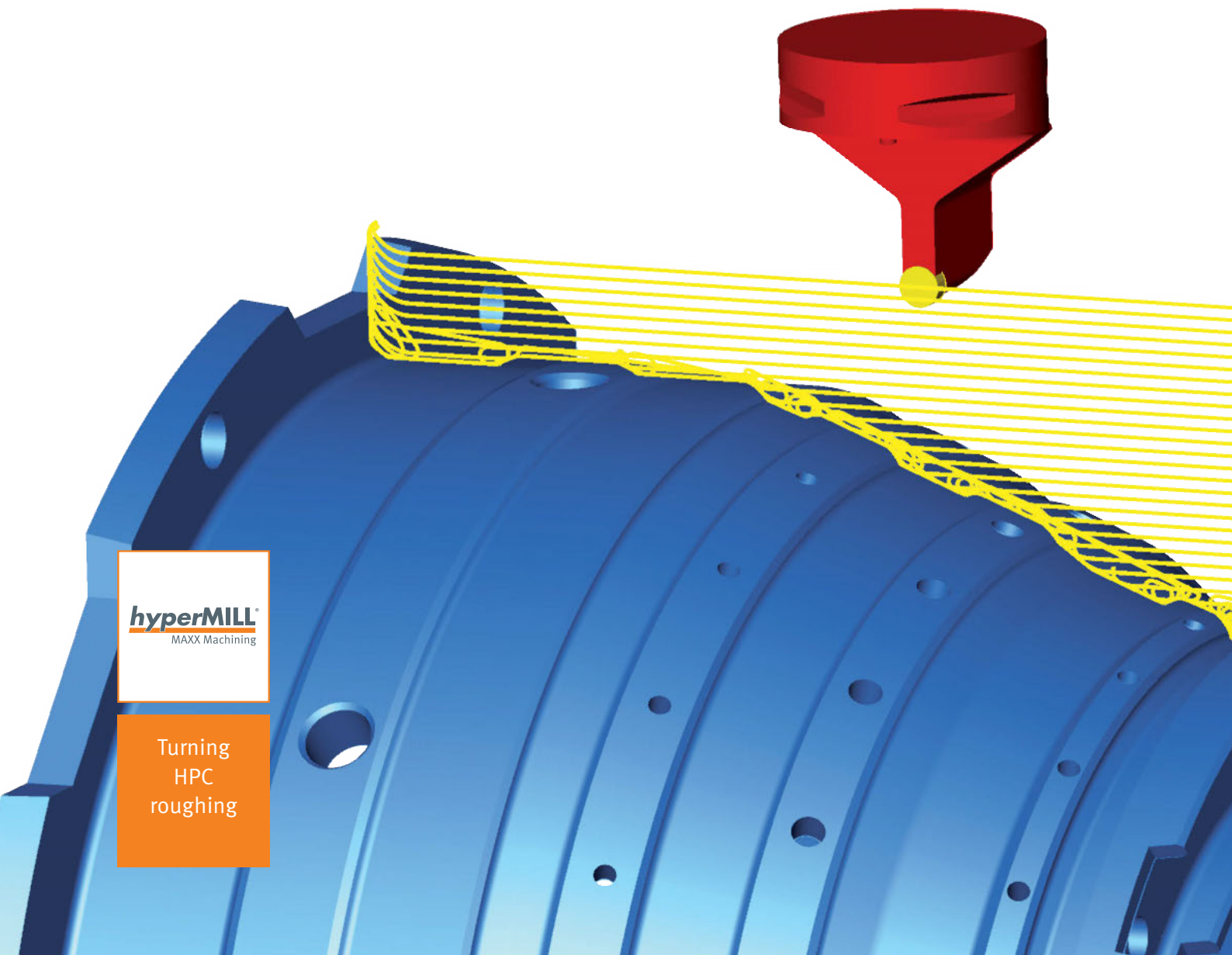
hyperMILL®
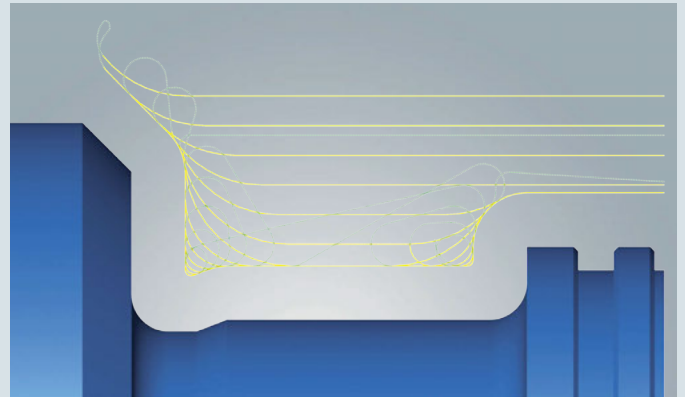MAXX Machining

Turning
HPC
roughing

Advantages

- Increased process reliability
- Increased tool life
- High material removal
- Reduced number of tools needed
- Tool-friendly machining
- Simple to program

■ Trochoidal toolpaths

Intelligent algorithms calculate toolpaths that correspond to a trochoidal shape. The connecting paths between the individual paths as well as the approach and retract movements are perfectly harmonized. Optimized feedrates provide maximum speed.

■ Infeed strategies

Machining can take place with one-way or zig-zag movements. It is possible to select a linear or ramp-like movement for the infeed. Depending on the machining application, this means that the inserts can always be optimally used and fully exploited.

Linear movement a_p

Ramp-like movement a_p
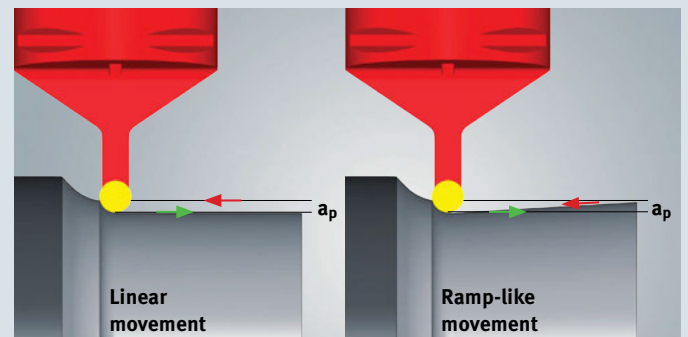
■ Simple programming

After the contours to be machined have been selected, *hyper*MILL® automatically generates the toolpaths for roughing. The time-consuming generation of individual cutting contours in the CAD system is not necessary. The tool and holder are fully collision checked.

■ Tool life

Smooth approach and retract movements, and a changing contact point help to extend the tool life. Furthermore, the improved chip break behavior has a positive impact on process reliability. These effects are even more noticeable in materials that are particularly difficult to machine.
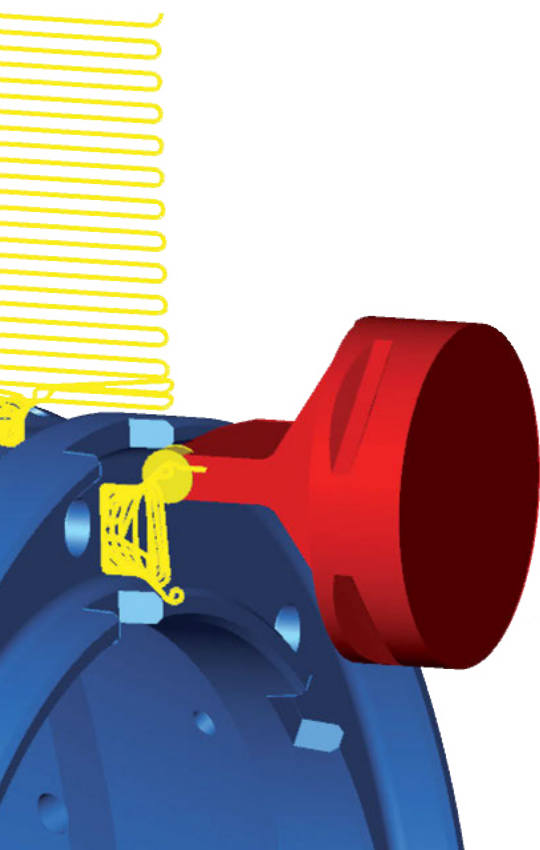
Highly Efficient Turning

Turning faster than ever!

Thanks to the innovative rollFEED® inserts from Vandurit and the perfectly adapted *hyper*MILL® rollFEED® Turning strategy, flawless workpiece contours can be achieved in no time at all.

How the process works

This unique turning method is based on the tool's cutting edge rolling off the workpiece surface – which can have any contour. Large insert radii enable high feedrates during machining. The horizontal swiveling of the B axis is simultaneously compensated for by the X and Z axes to produce the cutting movement.

Machining grooves with a single tool

For the machining of grooves, the strategy automatically guides the tool from the first to the second plane surface via the cylinder face. This enables highly efficient machining with a single tool in a single movement, and thanks to the combination of roll and turn movements, even workpieces with large radii can be machined reliably.

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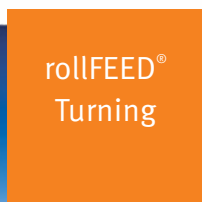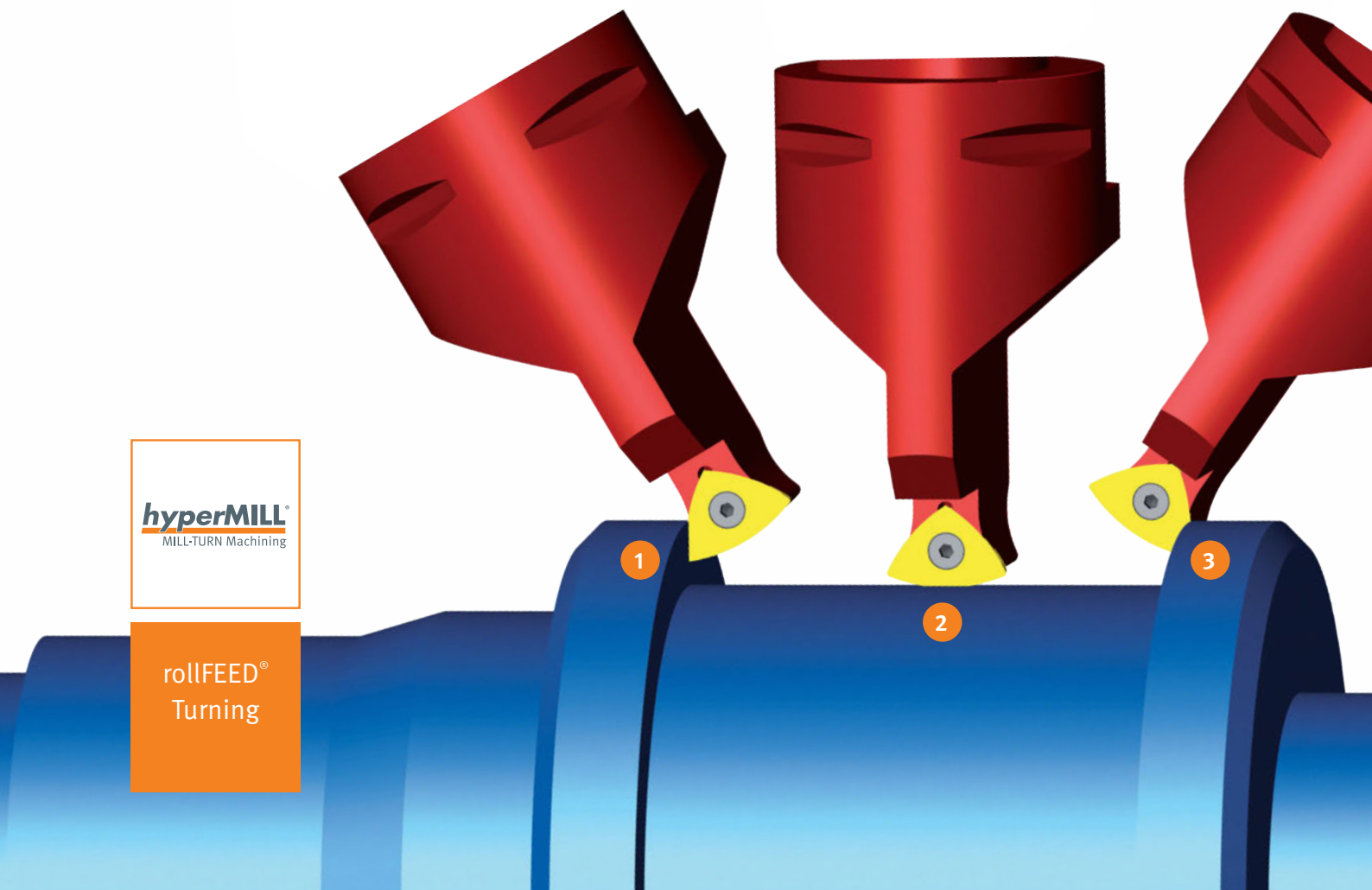
rollFEED®
Turning

Features

- Highly efficient process
- Generate twist free surfaces on demand
- Easy to program
- Fewer tool changes
- Integrate undercuts into the roll-off movement
- MILL-turn machines with a third axis only require the rollFEED® tool system and inserts
- Upgrades available for existing machines based on the rollFEED® drive unit

Areas of application

- Machining of any material
- Use any type of cutting material
- ID as well as OD machining
- Numerous possible applications: plane and cylindrical surfaces, convex and concave faces, grooves, and inclinations

1 Side rolling
2 Bottom rolling
3 Side rolling

rollfeed® TURNING
by vandurit

Exclusive partnership

In collaboration with Vandurit, OPEN MIND has developed an exclusive and perfectly matched CAM strategy for Vandurit's innovative new rollFEED® turning process.

T insert   X insert
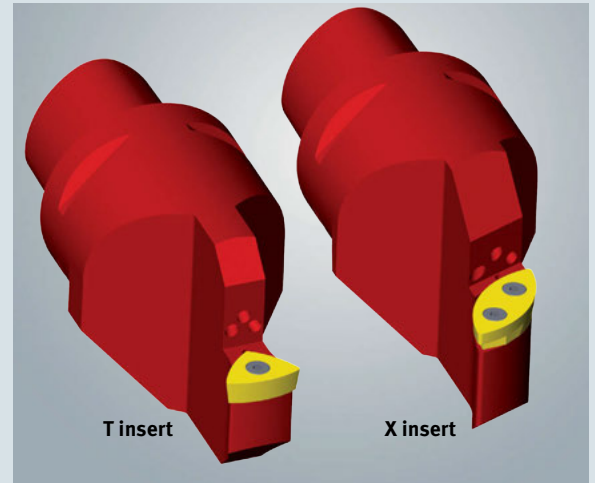
rollFEED® tool system and insertsn

Only two rollFEED® turning insert geometries are required for turning operations. These can be programmed using the rollFEED® strategy. The rollFEED® QuickChange tool system features specially developed seats for holding the unique rollFEED® inserts.
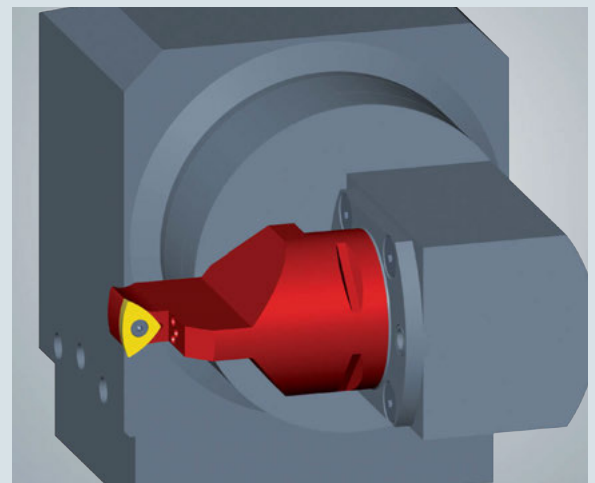
rollFEED® drive unit

The rollFEED® drive unit is mounted as a third axis on the turning machine's revolver, and it is used just like a driven tool. Mill-turn machines with a tilting axis do not need the rollFEED® drive unit.

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We push machining to the limit

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