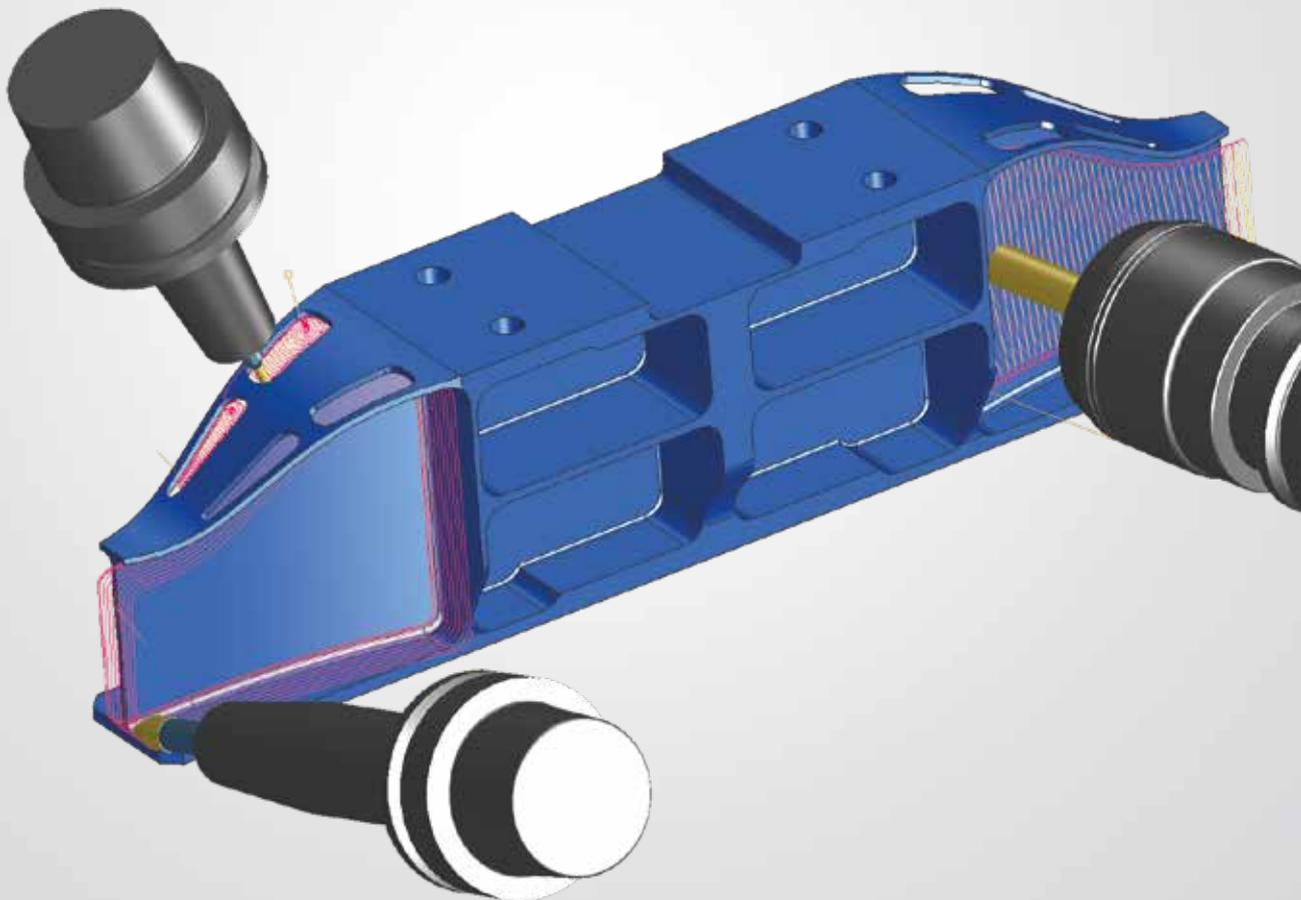


Tebis 5-axis milling

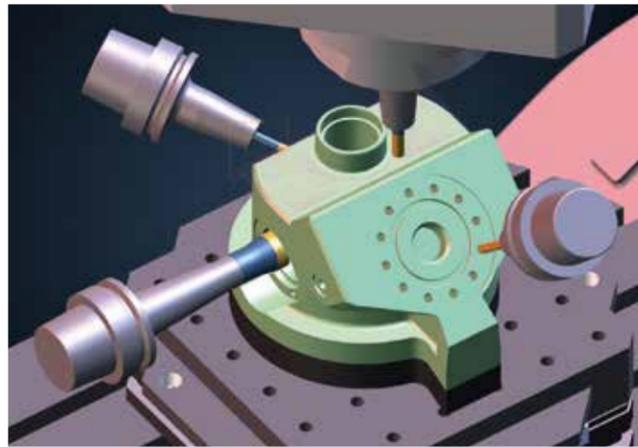
Simple, fast, and reliable



In Tebis, all multi-axis machining operations performed on milling, turning and turning/milling machines as well as with robots can be very easily planned and calculated without collisions. Integrated machine kinematics ensure automatic creation of homogeneous toolpaths with tilt direction checking and low tool wear.

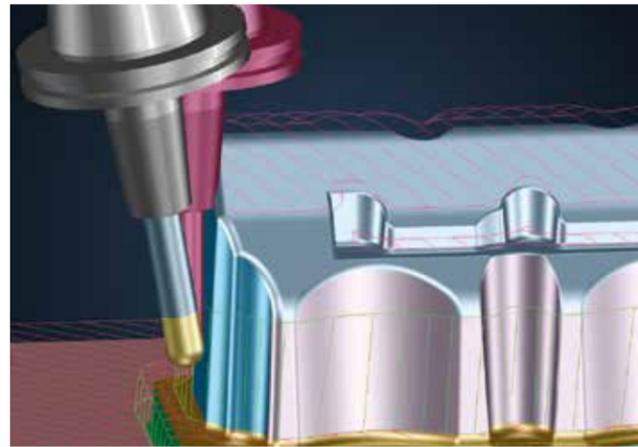
5-sided machining with positionable axes

The machining task, the complexity of the part and the available machines are crucial for selecting the appropriate machining strategy. With Tebis, performing multi-sided machining operations without reclamping is completely reliable.



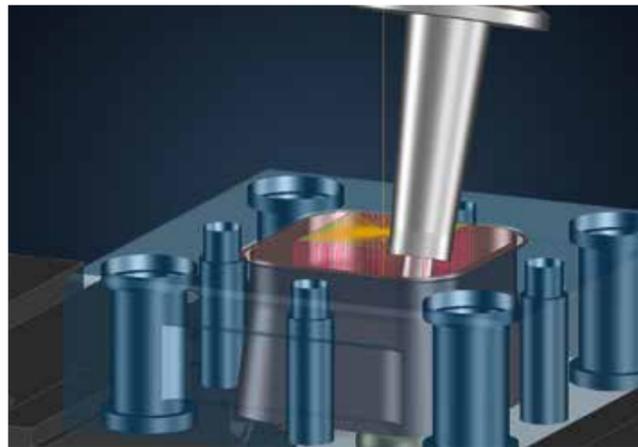
2.5D multi-sided machining

The tool can be easily positioned for any number of levels for machining 2.5D ruled geometries. In combination with feature-based automated 2.5D machining, you can thus generate a complete 5-sided machining operation quickly and with little effort within a single NC program.



3+2-axis multi-sided machining

3+2-axis milling programs can be easily generated in Tebis: The procedure is always the same whether programming 3-axis or 3+2-axis programs. Another advantage: The tilt direction can always be adjusted interactively enabling you to remain flexible despite the high degree of automation.

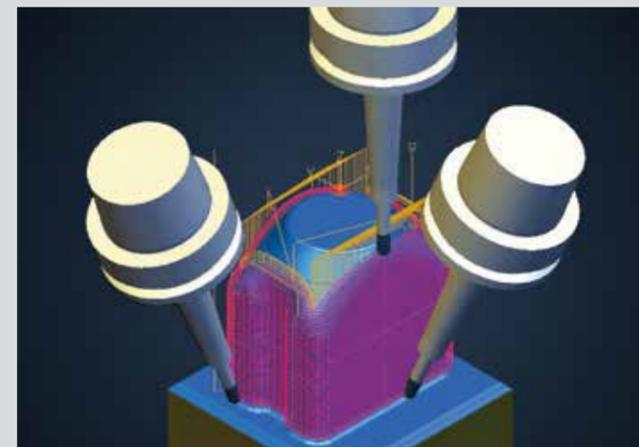


3+2-axis multi-sided machining of undercut areas

In multi-sided machining of undercut areas, you can use key and ball cutters and achieve a very high surface quality with the shortest possible tools. The part can be completely machined in a single setup. This machining method is also suitable for 5-axis simultaneous milling of undercut pockets and breakthroughs as well as for flow passages and impellers.

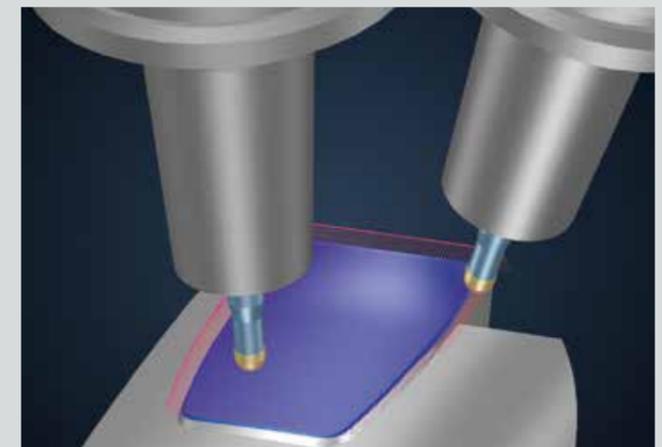
5-axis simultaneous avoidance milling

Simultaneous 5-axis avoidance milling is very convenient: With no additional effort at all, you can generate 3+2-axis NC programs with fixed positionable axes for individual milling areas. The subsequent conversion to simultaneous 5-axis programs is fully automatic. The tool tilt direction is optimized – always accounting for machine kinematics.



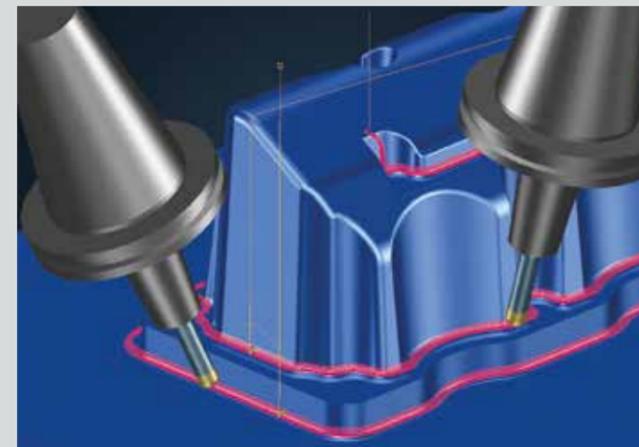
Automatic collision avoidance

Collisions of the tool holder with the part are detected during calculation and automatically avoided in 5-axis simultaneous machining. This allows for excellent machining of electrodes and parts with deep cavities and steep walls, for example, with short tools.



5-axis simultaneous finishing of free-form surfaces

In addition to the collision avoidance, these functions can also be used reasonably in other areas. For specific part areas – such as free-form surfaces in the visible area, the machining of which requires a frequent orientation change of the tool – manufacturing with fixed tilt directions is frequently at the expense of surface quality due to unfavorable cutting conditions. An expedient solution is to compensate this with dynamic 5-axis tool movements.



Optimal residual stock machining

If desired, you can decide at the end whether to remove residual stock by 3+2-axis machining with positionable axes or by 5-axis simultaneous machining. Tebis performs high-precision calculation of the remaining residual stock. Depending on the machining situation, you can interactively position the tool using positionable axes or enable the fully automatic calculation of 5-axis simultaneous toolpaths.

5-axis simultaneous machining

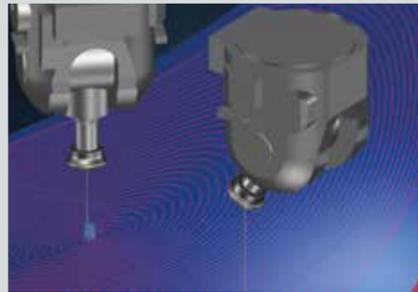
Unlike any other milling method, high-quality surfaces are created quickly and efficiently with 5-axis simultaneous machining on modern high-performance machines. The main advantage for users: They do not have to give any thought to the direction from which machining is to be performed. With Tebis, the entire process is extremely easy, reliable and even faster – parts can be manufactured completely automatically with suitable special functions. The possibility of machining between any vectors is also very practical: You can check the tilt direction with the integrated preview during programming and can adjust it interactively.

The best solution for every machining task:

Each function is tailored to specific machining tasks and only includes those parameters that are actually needed, which keeps programming as simple as possible.

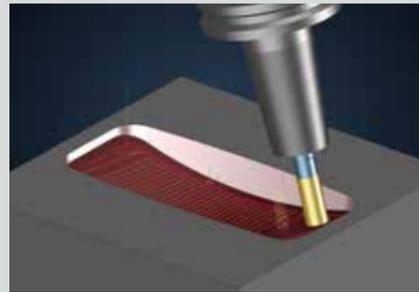
- Adaptive or contour-parallel reroughing of free-form surfaces and pockets
- Contour-parallel roughing of pockets and slot geometries for rotational parts
- HSC milling with ball cutters
- Surface milling of simple and complex free-form surfaces with a lead angle
- Side milling of planar and constant-curvature flank surfaces, such as with circular segment cutters
- Side milling of complex free-form surfaces
- Surface and side milling of curves
- Engraving

Roughing functions for typical geometries



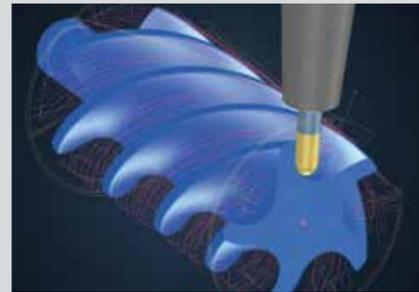
Roughing of free-form surfaces

The "NC5ax / MSurf" function is suitable for all those who want to take advantage, with minimal effort, of the benefits of 5-axis simultaneous machining when roughing free-form surfaces. There are many examples, including in die manufacturing, where often large free-form surfaces with few cavity fractions must be manufactured. Just select the surfaces and blank and you're ready to start. The function provides the adaptive and contour-parallel path layout.



High-efficiency adaptive roughing of free-form pockets

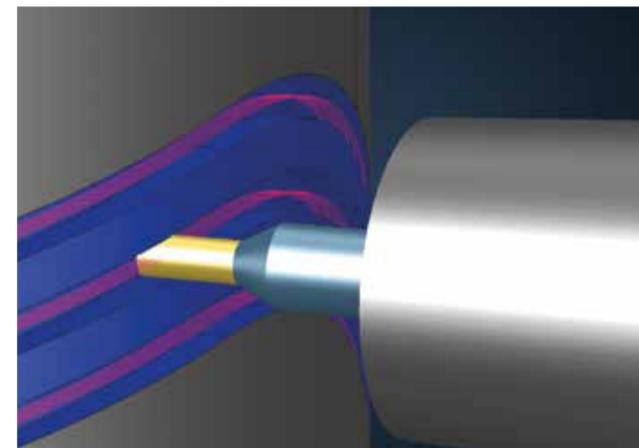
The "NC5ax / MPocket" function is exactly matched to 5-axis simultaneous roughing of part areas with many cavity fractions. Adaptive and contour-parallel milling strategies are integrated. High-performance HPC tools can machine high volumes of material very quickly, especially in adaptive roughing.



Roughing of rotational parts

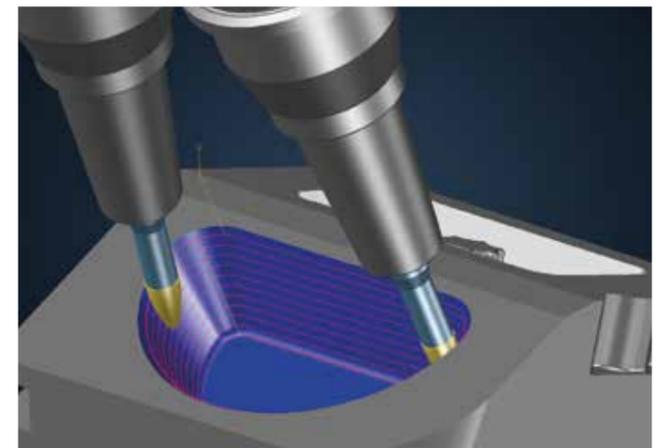
The "NC5ax / MRadial" function is ideal for fast NC programming of 5-axis simultaneous toolpaths for roughing pocket and slot geometries in rotational parts: You can again just select surfaces and the blank and machine the part with a contour-parallel path layout.

5-axis curve milling



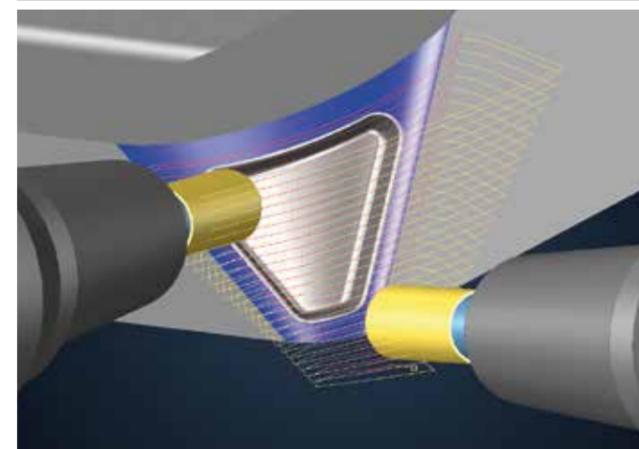
Perform 5-axis simultaneous milling along any contours, accounting for part and protected surfaces. This method is suitable for scribing in model manufacturing, for example. Collisions can be avoided with automatic avoidance strategies or by specifically selecting the tool tilt direction. The required guide curves can be very easily prepared with exactly coordinated Tebis CAD functions. It is also possible to develop engraving paths directly on the part surface using special strategies.

5-axis side milling



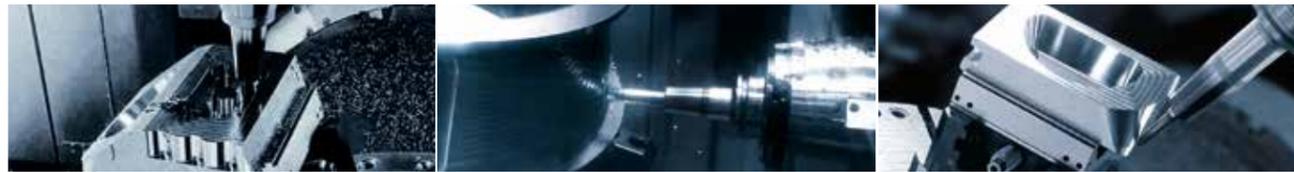
You can manufacture all forms of flank surfaces under ideal cutting conditions and reduce machining time with optimal downfeed: This allows material to be removed in layers with smaller lateral stepover, protecting the tool. This is especially advantageous for machining with circle segment cutters with barrel geometry: Tool tilt direction is precisely adapted to the geometry.

5-axis surface milling



Tebis creates NC paths directly on the surface. This allows you to achieve outstanding surface qualities with HSC milling (high speed cutting). You can position your tool with a lateral tilt as well as a positive or negative lead angle and thus ensure optimal machining conditions, even for complex parts across surfaces.

Tebis supports all modern high-performance tools



Roughing with HPC cutters (high-performance cutting)

- High-efficiency adaptive roughing of steep areas with large depth of cut without full-cut machining

Roughing and prefinishing with HFC cutters (high-feed cutting)

- Use high-feed cutters on modern HFC milling machines with very high feed rates and cutting speeds to machine large volumes of material

Finishing with circular-segment cutters

- Efficiently finish planes and free-form surfaces of superior quality using large radii and path distances

Tebis gives you a double speed advantage in finishing with circular-segment cutters:
Connected milling areas can now be machined in a single operation with no extra design effort: Select the surfaces, display the milling area and start the calculation.

What our customers are saying

“After we purchased a 5-axis machine, we looked for an appropriate software solution and discovered that Tebis is also the best solution for 5-axis applications.”

Belmiro Teixeira, Managing Partner,
Irmamolde
Portugal

Using Tebis, we have developed a very reliable and highly efficient machining process for our 5-axis technology.

Gunnar Persson, responsible for
work preparation and production engineering,
MV USAB
Sweden

Tebis gives us the maximum benefit from our FZ 33 Compact 5-axis CNC gantry milling machine.

Kaspar Hürlimann, Managing Director,
Formbar AG
Switzerland

5-Axis milling with Tebis: Simple, fast, and reliable

✓ Simple ...

- Based on templates and automated NC programming
- NC programming largely identical for all machining types
- Special functions for specialized manufacturing tasks and specific part areas
- Milling multiple surfaces with no extra design effort
- Simple milling between vectors
- Interactive analyzing and optimizing the tool tilt direction
- All roughing and finishing strategies integrated
- Functions precisely coordinated for manufacturing preparation, like for guide curves and center curves

✓ Fast ...

- Simple NC programming means fast NC programming
- Optimal manufacturing of every area
- Combining any Tebis machining types as desired for the best possible results
 - Multi-sided machining with positionable axes
 - 2.5D multi-sided machining
 - 3+2-axis multi-sided machining
 - Avoidance milling
 - 5-axis simultaneous machining
- Optimal support for modern high-performance cutters such as HPC, HFC and circular-segment cutters

✓ Reliable ...

- Completely collision-checked NC programs including all machining components
- For all milling machines including robots

Tebis
Technische Informationssysteme
Aktiengesellschaft
Einsteinstr. 39
82152 Martinsried/Planegg
Germany
Tel. +49/89/81803-0

info@tebis.com
www.tebis.com

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document are the property of
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Tebis America Inc.
400 E. Big Beaver Rd.
Troy, MI 48083
USA
Tel. +1/248/5240430
info-america@tebis.com

Tebis China Co. Ltd.
88 Keyuan Road
Zhangjiang Hi-tech Park
Tower 2, Unit 726, 7th floor
Pudong
201203 Shanghai
People's Republic of China
Tel. +86/21/2898-6980
info-china@tebis.com

Tebis France SARL
96, Bd. M. Vivier-Merle
69003 Lyon
France
Tel. +33/4/7291-2151
info-france@tebis.com

Tebis Iberia, S.L.
Avda. Dr. Severo Ochoa, 36
28100 Alcobendas (Madrid)
Spain
Tel. +34/916624354
info-iberia@tebis.com

Tebis Italia S.r.l.
Via Ferrero 29/31
10098 Cascine Vica Rivoli TO
Italy
Tel. +39/011/5368100
info-italia@tebis.com

Tebis Portugal Unipessoal, Lda.
Estrada de Leiria, 233
Edificio Cristal Park – Loja D
2430-527 Marinha Grande
Portugal
Tel. +351/244/093-048
info-portugal@tebis.com

Tebis Scandinavia AB
Backa Bergögatan 18
SE-42246 Hisings Backa
Sweden
Tel. +46/31/700-1740
info-scandinavia@tebis.com

Tebis (UK) Ltd.
Coventry Univ. Technology Park
Puma Way
Coventry CV1 2TT
United Kingdom
Tel. +44/2476/236-413
info-uk@tebis.com