hyperCAD®s

CAD for CAM

## OPEN MIND
THE CAM FORCE

In a class of its own among CAD systems

Only a high-end CAM developer can do CAD for CAM. With this in mind, Open Mind Technologies AG – known as an innovative pioneer – developed a new CAD system from scratch that is perfectly matched to *hyper*MILL®. The system has its own 3D CAD kernel from OPEN MIND. The result is a unique CAD system for CAM programmers that is very easy to learn and that vastly accelerates NC programming processes.

*hyper*CAD®-S fully exploits the performance offered by contemporary hardware systems to create digital manufacturing data. The advanced and extremely powerful 64-bit system is the perfect solution for mastering many of the daily challenges that arise when working with meshes, faces and solids to create precise components and tools. Large volumes of imported data can be prepared for subsequent NC programming easily, quickly and safely and completely independently from the original CAD system. *hyper*CAD®-S is pure 'CAD for CAM'.
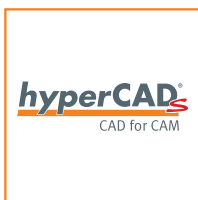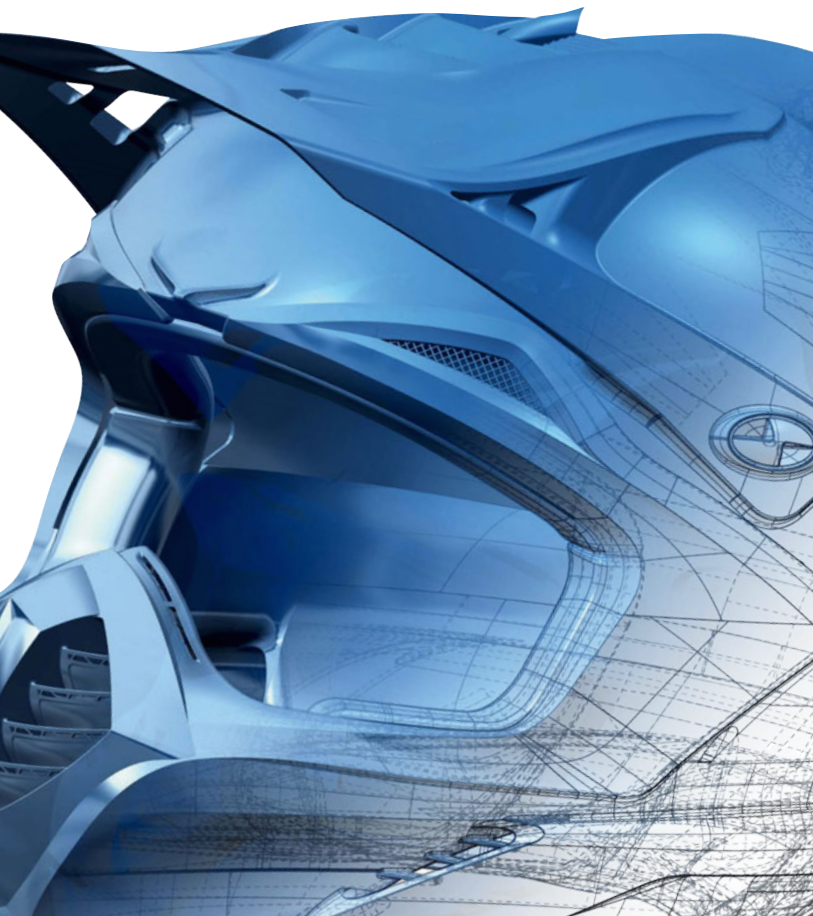
| Interfaces | Geometric Engine | Solids | Mesh | Deformation |

> **"At last we've got a CAD system for CAM programmers!"**
>
> **Stefan Nagel, Deputy Managing Director of Kiefer Werkzeug- und Vorrichtungsbau, Pfullingen**

Features

- CAD for CAM
- 64-bit multi-application
- Top performance
- Optimal ergonomics
- Highly intuitive
- Optimal hardware utilisation

CAD for CAM

CAM programmers use CAD systems differently from most engineers and designers. *hyper*CAD®-S is therefore designed entirely to meet the demands of CAM users. Efficient CAM programming is of primary importance and perfectly supported by the CAD system.

- **Customisable filter functions:** In addition to familiar properties such as layer and colour, the most common geometric and system properties are available as user-defined filters.
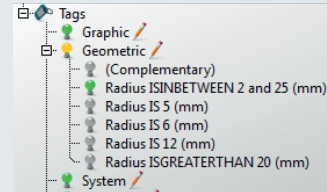
Keyword navigation: Graphic entities can be linked using tags, similar to keywords. This makes it easy to filter all the information about the CAD model. For example: 'All faces with a radius between 2 and 20 mm'.
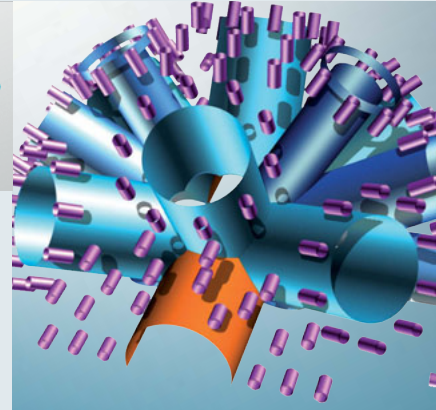
- **Intelligent entity management:** Toolpaths, polygon meshes, point clouds, rectangles – the inclusion of CAM-relevant entities in the CAD kernel speeds up processes greatly.

- **Multi-application mode:** An integrated 64-bit system and IDE-style interface enable opening any number of documents each in its own application. Multiple models can be processed and calculated at the same time.

- **Smooth data exchange:** comprehensive interface package. **Import:** <u>Standard</u>: IGES, STEP, STL, DXF/DWG, Parasolid®, point cloud, *hyper*CAD®. <u>Direkt</u>: CATIA V4® and V5®, Autodesk® Inventor®, Siemens NX®, SOLIDWORKS, PTC® Creo. **Export:** IGES, STEP, STL, DXF/DWG, point cloud and *hyper*CAD®.

- **Intuitive operation:** Self-explanatory icons and a highly transparent user interface without any hidden functions secure and accelerate operating procedures.

- **All languages:** Available in all the same language versions as *hyper*MILL®.

Geometric Engine –
the right CAD basis from the start

Every CAM programmer is familiar with the standard CAD tasks of selecting, adding, deleting, modifying, showing and hiding faces, curves and points. Users expect top-quality results from the ruled, filling and offset faces that they create. *hyper*CAD®-S offers all this and much more. OPEN MIND took great care when developing the CAD innovation to adapt the range of CAD functions to meet the real needs of CAM programmers rather than designers.

Instead of relying on numerous distributed submenus (as is the case in conventional design systems), *hyper*CAD®-S uses central, user-friendly dialogues with large icons. Smart selection mechanisms and innovative, freely definable filter functions make it considerably easier to use geometric entities for subsequent programming. Imported geometry can be cleaned quickly if needed using standard surface modifying tools.

Close holes From limits
Rotational face Along a guiding line
Plane FACES Fill face
Ruled face Limited plane
From cutting curves Trim
Linear extrusion
Offset Invert orientation
Shape contour Project
Penetration Splines
Isoparametric CURVES Split
Machine interpolation control points Join
Lengthen/shorten From limits
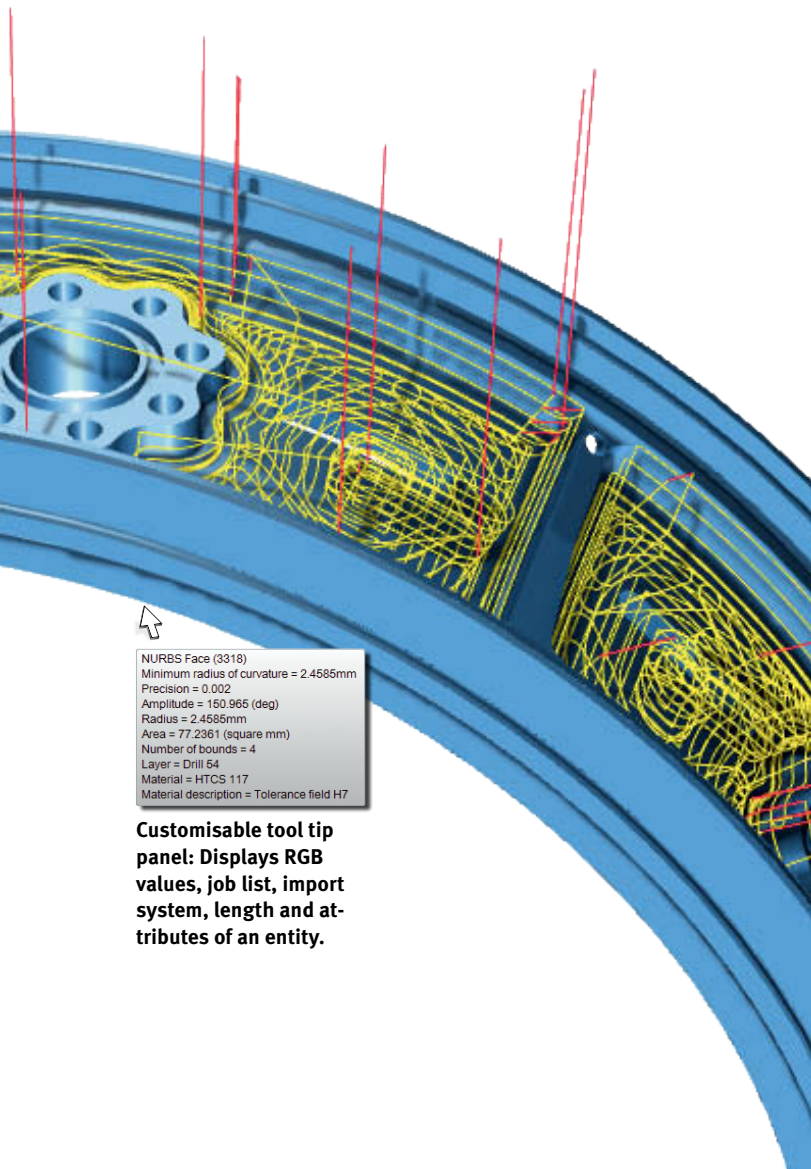2D/3D spiral Adjust
Join Trim automatically
Centres curves
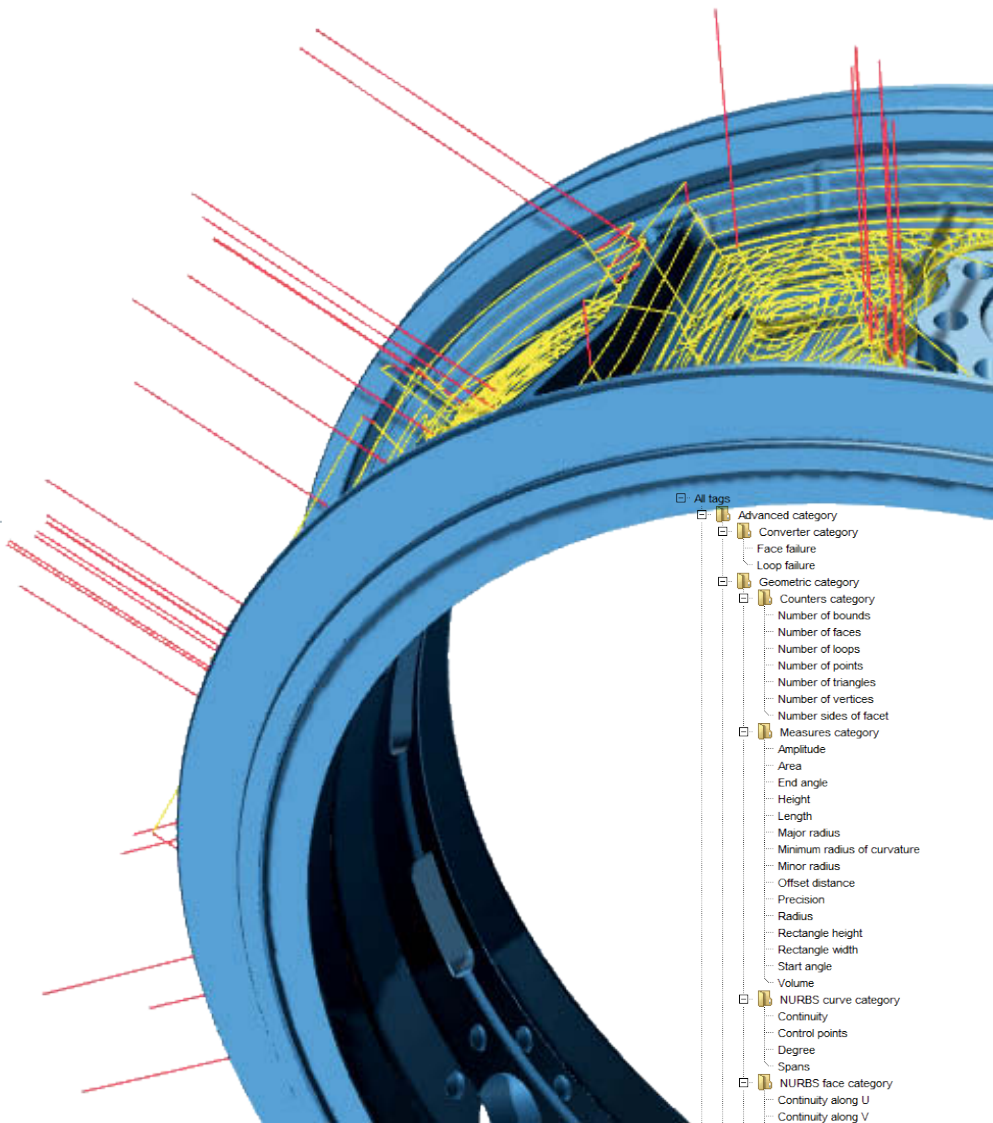
- **Fully compatible with *hyper*CAD®:** It goes without saying that *hyper*CAD®-S is compatible with *hyper*CAD®. All versions are fully supported: E3, E2 and GKD files, job lists and entity selection.

- **A new way to navigate:** Powerful navigation and selection functions provide support for working with large models.
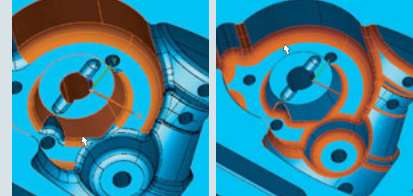
- **Fast repairs and modifications:** As every CAM programmer knows, most imported external data records contain errors. *hyper*CAD®-S therefore contains a number of repair functions designed to speed up subsequent CAM processes. Geometry areas can also be easily edited at any time.

- **Comparing geometries:** A fast geometry comparison immediately shows where exactly new versions of customer components have changed.
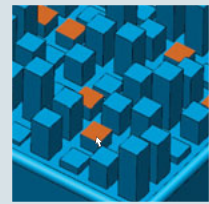
Coaxial **Fillets**

Coplanar **Tangential**

Smart selector technology for faces and skins: various selection options for curves: 'from...to' chain selection and for faces: tangential, limited, coaxial, coplanar, fillets and chamfers.
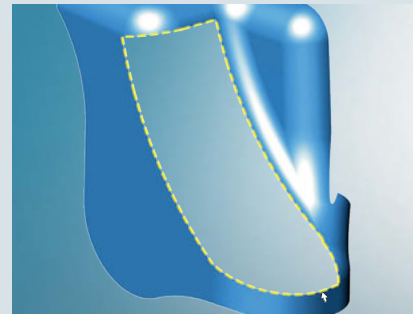
Planar and non-planar filling faces: Faces that are to be filled can be automatically closed – at face edges as well.
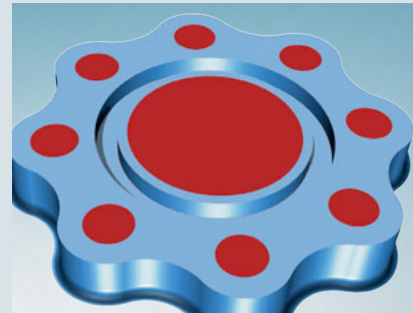
Multiple work planes: It is possible to define multiple work planes. Saved work planes make it easy to perform transformations. They can also be imported to other files at any time.
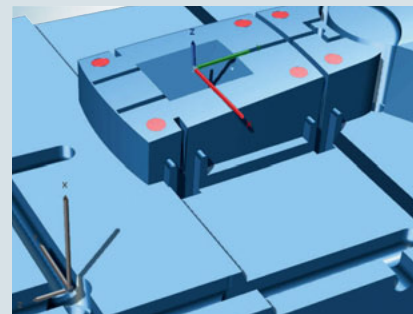
Standard preparation for milling: It is easy to create frequently required building, extension, machining and stop faces in a structured manner. This is also the case with boundary and guide curves as well as construction aids, planes and axis systems.
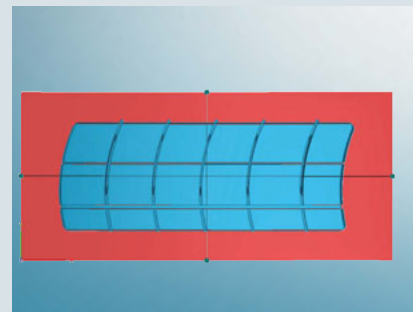
Practical analysis functions: The analysis functions allow draft areas and highly complex geometries to be located quickly and reliably. This enables assessing the quality of an existing component immediately. Problems are recognised quickly.

NURBS Face (3318)
Minimum radius of curvature = 2.4585mm
Precision = 0.002
Amplitude = 150.965 (deg)
Radius = 2.4585mm
Area = 77.2361 (square mm)
Number of bounds = 4
Layer = Drill 54
Material = HTCS 117
Material description = Tolerance field H7

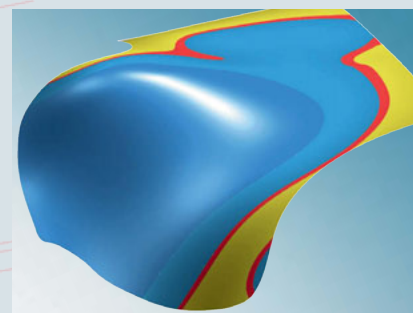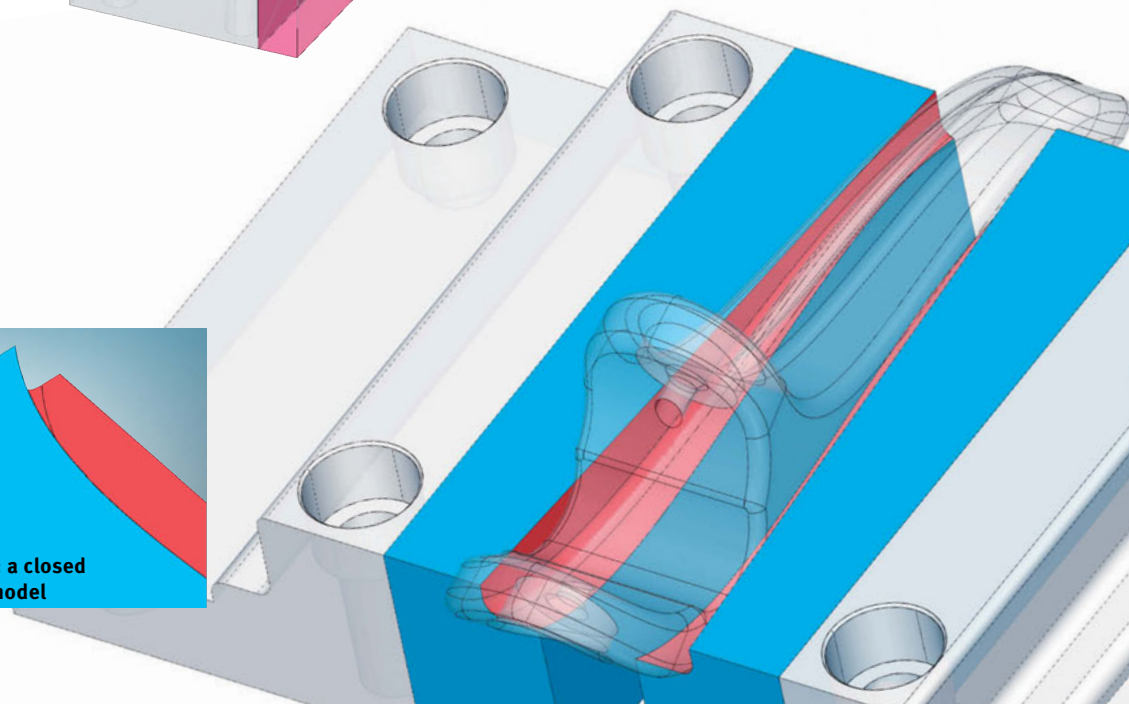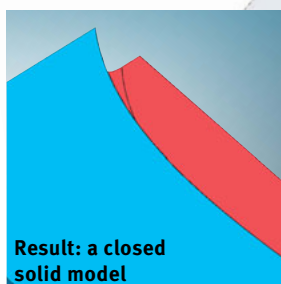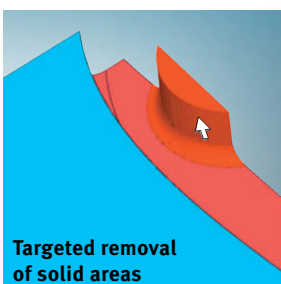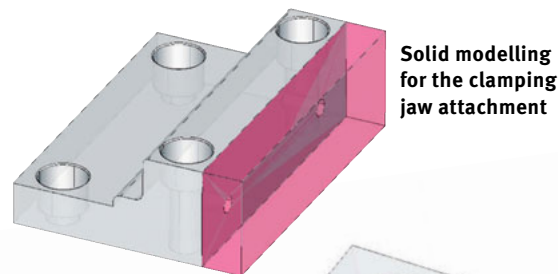**Customisable tool tip panel: Displays RGB values, job list, import system, length and attributes of an entity.**

Solids – efficient solid modelling

*hyper*CAD®-S Solids – the module for solid modelling – was, of course, also developed primarily for CAM programmers. In contrast to engineers and designers, this group requires features without a history tree during solid modelling. Why make it complicated if doing it directly is quicker? With the innovative approach to direct modelling offered by *hyper*CAD®-S Solids, solid modelling becomes a real joy: After the faces or features of a solid model have been selected, the position and shape of the faces of the solid model can be modified in real time simply by dragging handles and manipulators. And the best thing is that direct modelling does not only work with native data but also with external data that have been imported and have no feature history information.
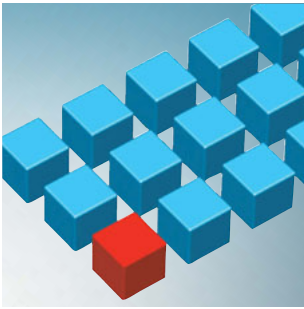
The *hyper*CAD®-S Solids module allows all solid models to be reliably imported, created, converted, modified and combined. Working with solid models becomes noticeably easier and much more intuitive: Chamfers, fillets and holes can be directly moved, reduced, enlarged or deleted by means of recognised features. The use of existing features and associated functionalities allows CAM programmers who work with faces and solids to be more productive and flexible.
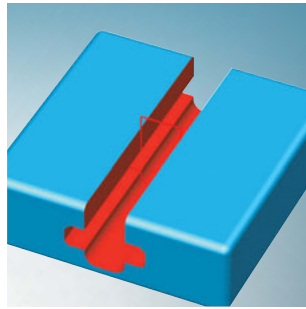
**Solid modelling
for the clamping
jaw attachment**

Features

- Direct modelling
- Numerous features
- More convenient
- Addes flexibility

**Targeted removal
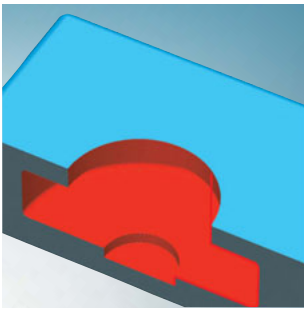of solid areas**

**Result: a closed
solid model**
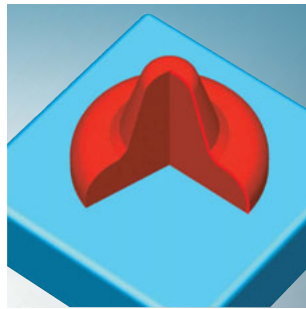
Standard features

Pattern

Linear slot

Rotational slot

Rotational protrusion

- **Reliable import of external data:** When external data are imported, they are handled in the same way as native CAD data. All construction data, such as sketches, faces, single parts or complete machining groups, are transferred and can be modified, if required.

- **Numerous standard features:** Basic structures, linear extrusions, rotational solids, linear and rotation slots, pockets, simple and complex holes, patterns, chamfers and fillets can be created.
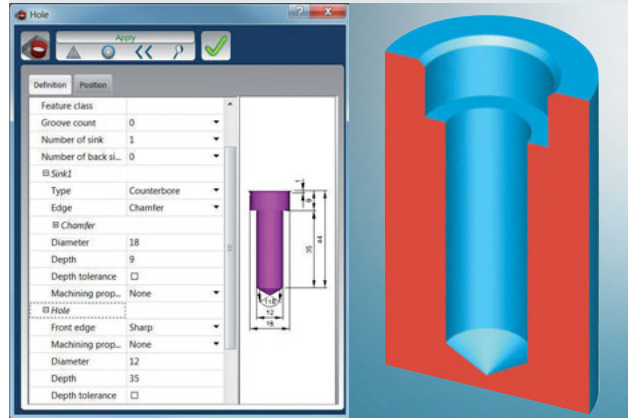

- **Time-saving zone feature:** The zone feature also allows creating user-specific features. Zones can be transformed, copied, deleted or also selected with *hyper*MILL®.

- **Creating solid models from faces:** All it takes is a few clicks to create solid models quickly from closed face formations – and vice versa.

- **Working conveniently with features:** Features that have been created have no history and are not arranged in any particular way. They are stored in the model tree for easy selection. The faces of features can be moved using drag-and-drop operations, in order, for example, to reposition holes. After direct modelling, the shape is recalculated automatically by the system. A wide range of functions are available for machining the features: Delete, mirror, arrange as pattern, offset, move, scale and break.

- **Reliable feature recognition:** Double-clicking an imported face starts the feature recognition. Fillets and chamfers that are recognised are created automatically as features whose dimensions can then be modified again with a smart click.

- **All Boolean operations:** Union, Difference, Intersection and Split.
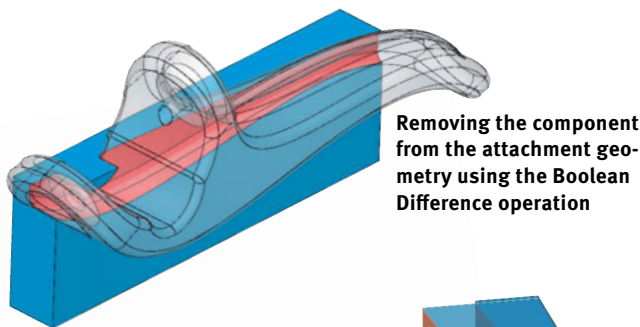
Removing the component from the attachment geometry using the Boolean Difference operation

Direct modelling to widen the attachment
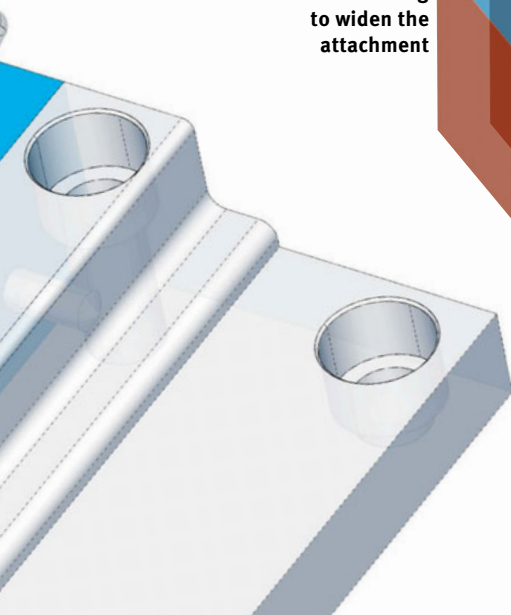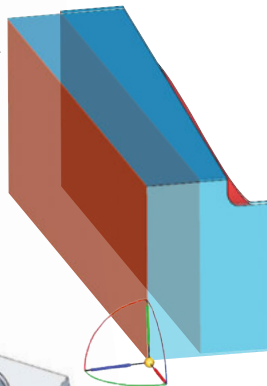
Mesh – Preparing meshes quickly for milling

Scanned, forged and cast parts, clay models and moulds: 3D surface scanners have a wide range of uses. 3D scanners offer precise, high-resolution, full views of 3D objects, mostly combined with a large quantity of data.

The main task of the CAM programmer is to generate a perfect basis for milling a mesh very quickly from a set of scanned data. In order to achieve the best possible milling results, the CAM programmer can use *hyper*CAD®-S Mesh to repair any possible mesh deviations very quickly, perform metrological analyses and checks and prepare meshes conveniently for milling. Six new functions are available for machining meshes.
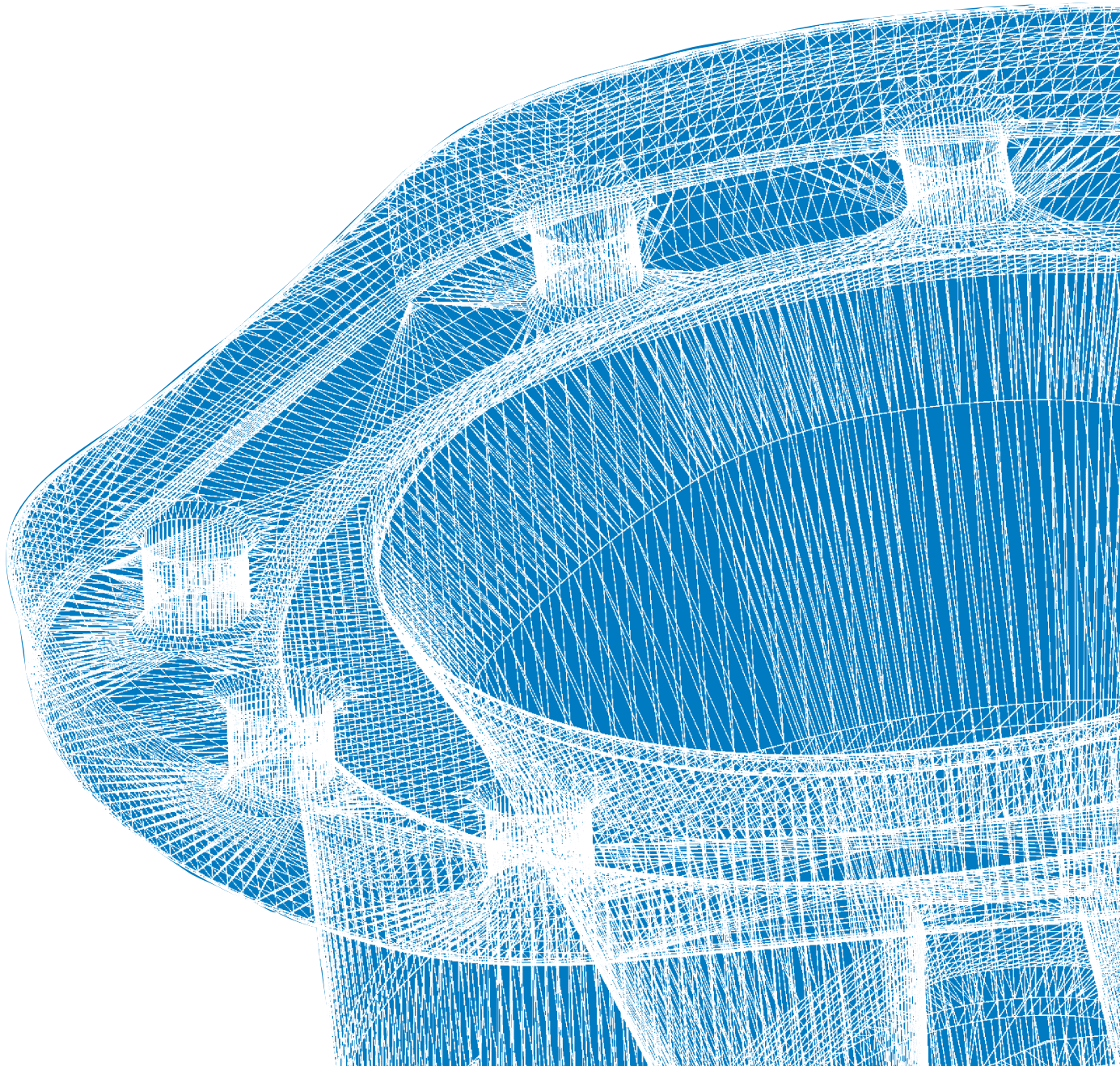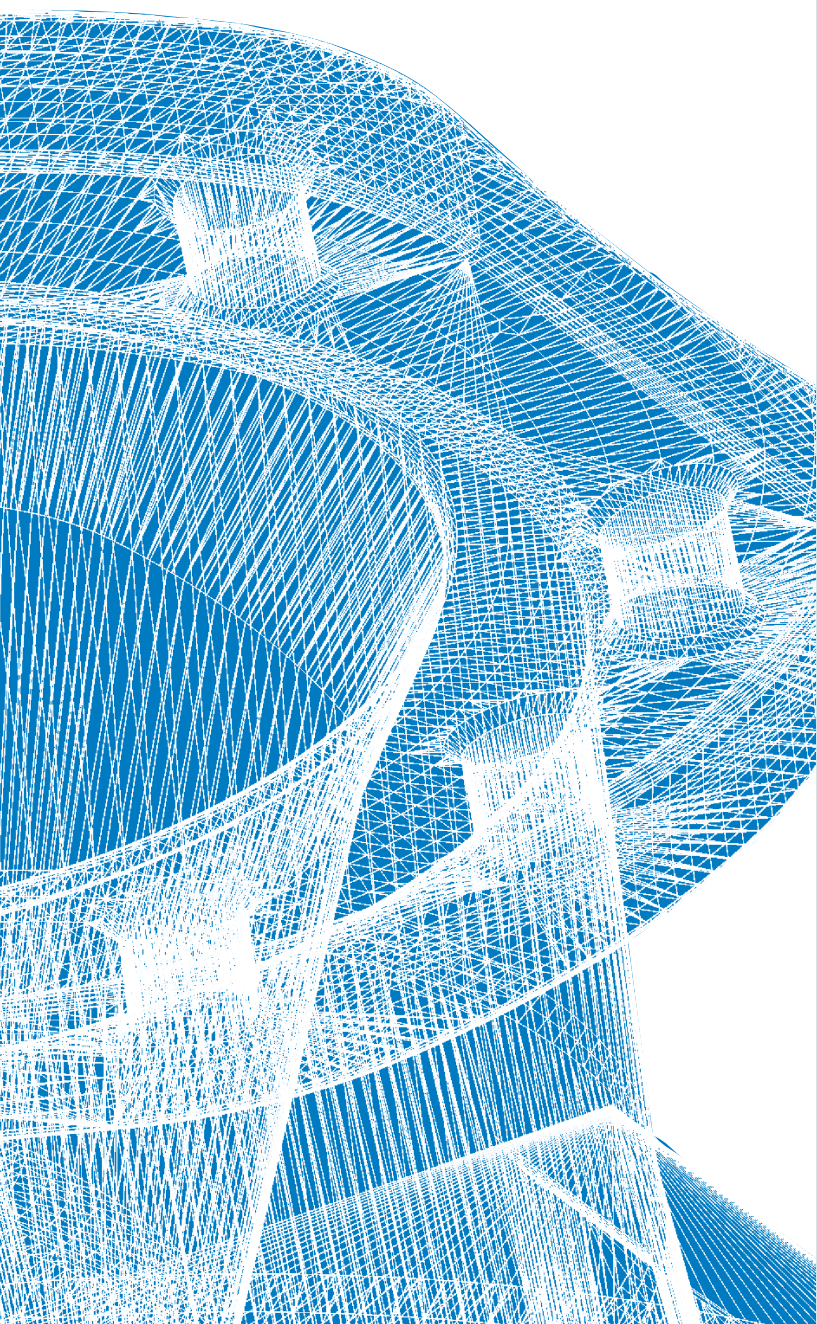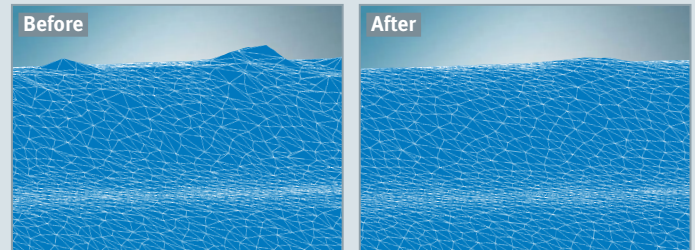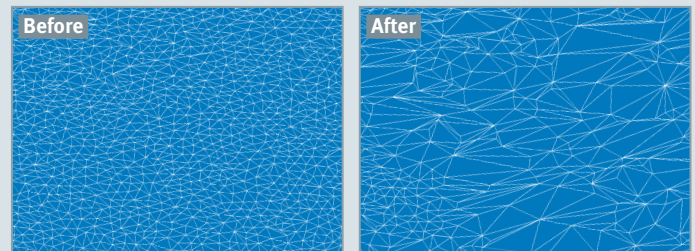
Mesh functionalities

■ Smooth meshes
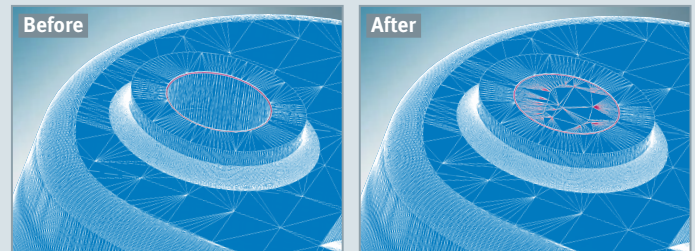This function allows the user to smooth meshes in order to repair deviations.

Before / After

■ Decimate meshes
This function allows the user to reduce the mesh density while retaining the geometry properties. The reduced data volume helps to accelerate the model calculation.

Before / After

■ Fill mesh areas
This provides a simple and convenient way to close holes in meshes.

Before / After

■ Separate mesh clusters
This function allows the user to delete meshes that are not connected.

■ Mesh from faces
A mesh can be generated from faces, open and closed solids.

■ Split meshes
Mesh elements can be split using a planar entity. All the cut triangles are regenerated to ensure that a smooth cut is achieved.

# *hyper*CAD®-S deformation – targeted deformation of geometries

The targeted deformation of geometries is an important requirement placed on CAD systems by design and CAM programming. CAM users need to be able to deform geometries so that they can produce variants and complex geometries as quickly as possible. Experienced CAM programmers modify geometries in order, for example, to overbend tools or manufacture precision parts.

In *hyper*CAD®-S, the Deformation module is used to deform all geometries in accordance with their requirements. This powerful modification tool allows modifying global and local component areas in a way that would be very costly using traditional modelling techniques.

Go faster to the desired end geometry!

Features

- Schnell Fast and simple
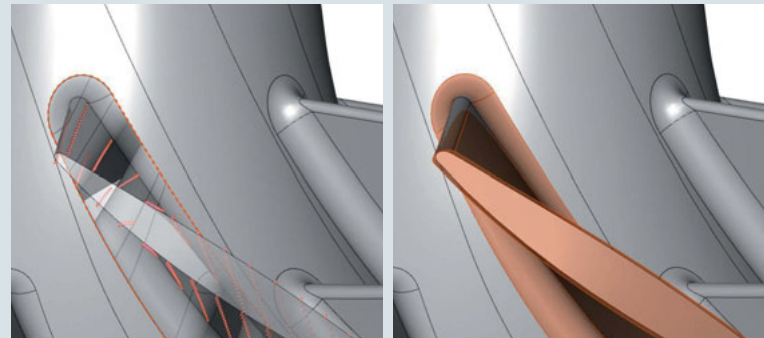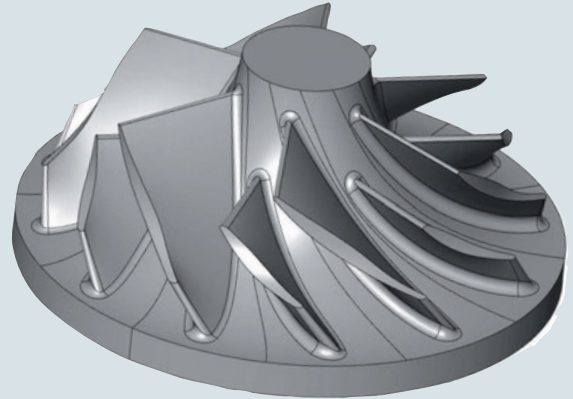- Deform entities
- Volumetric deformation

3

2
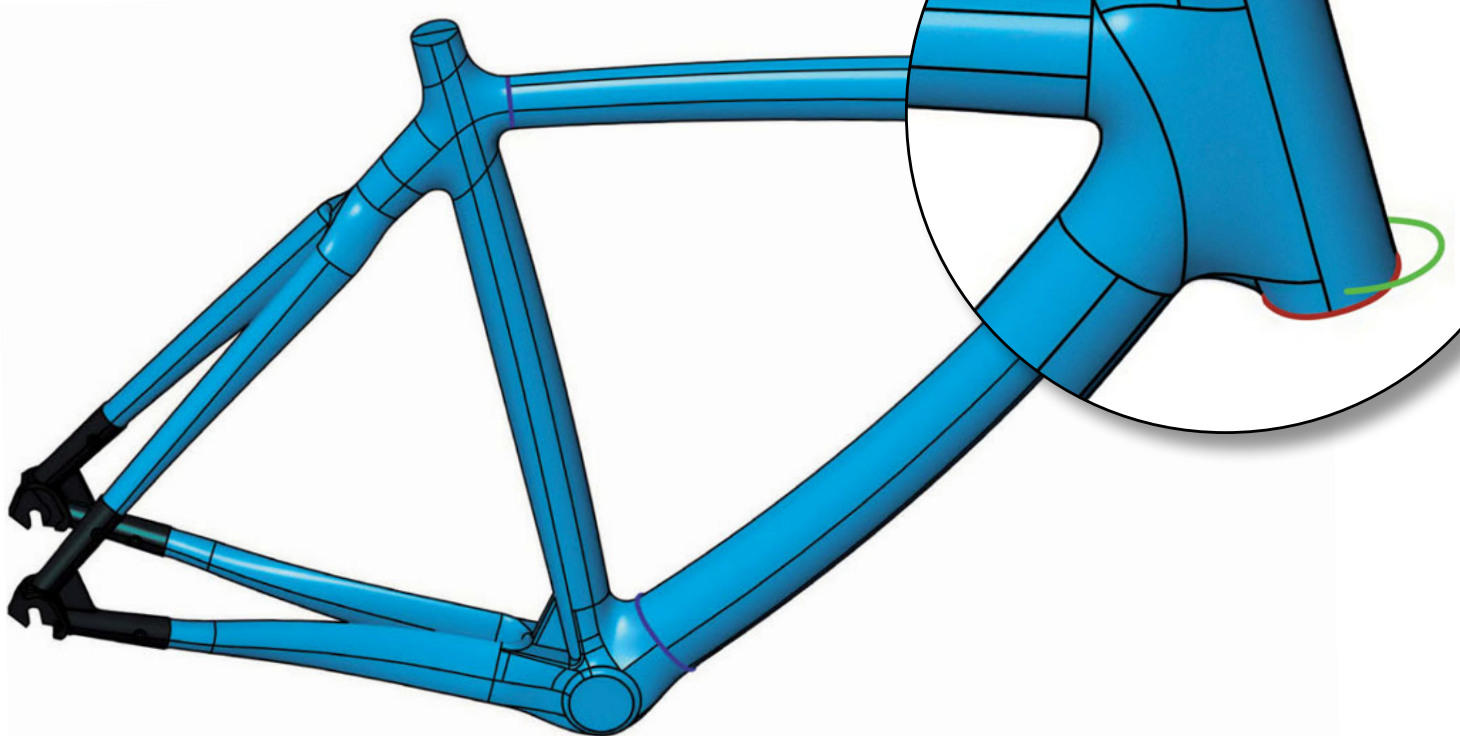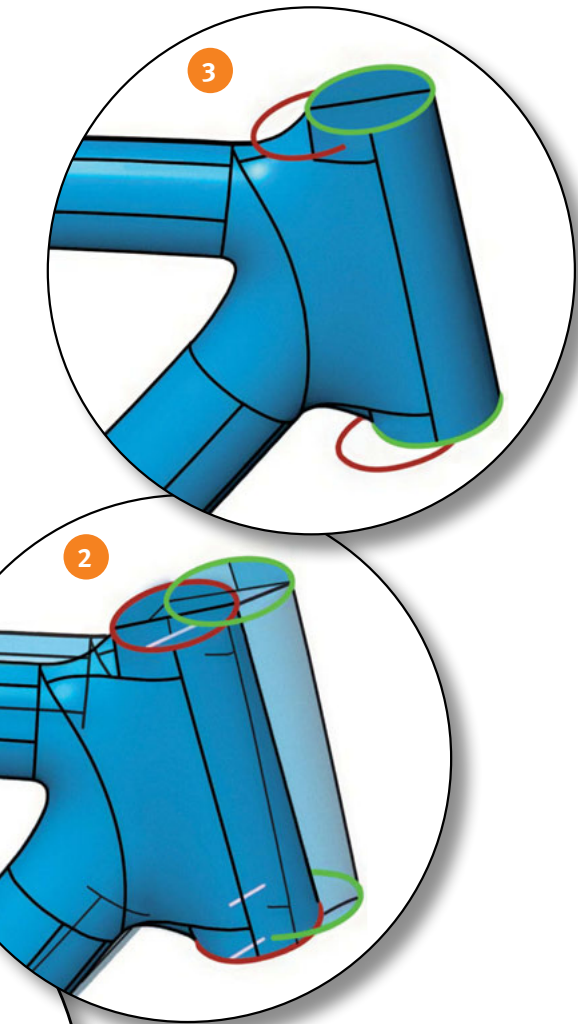
■ **Volumetric deformation:**
Starting from an initial face,
selected entities (faces,
curves, points, point clouds
and meshes) are deformed
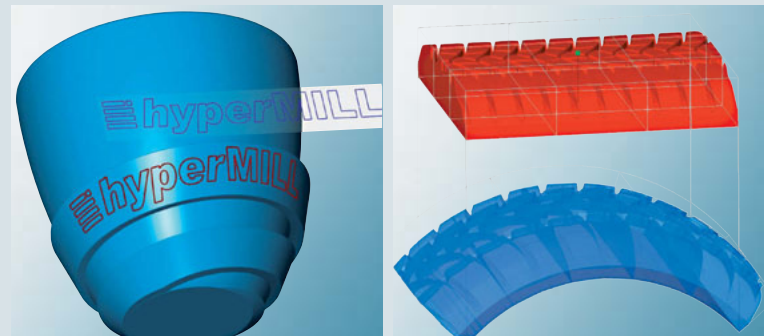volumetrically to a target face.

**Italian bike
on YouTube**

Application areas

■ **Compensating for manufacturing variations:** Application of
manufacturing variations to produce precision parts.

■ **Creating complex geometries:** Transferring a 2D logo or a tread
pattern to a 3D geometry using volumetric deformation.

■ **Deforming entities:** Starting from start contours or points,
selected entities such as faces, curves, points, point
clouds and meshes (green) are deformed to target con-
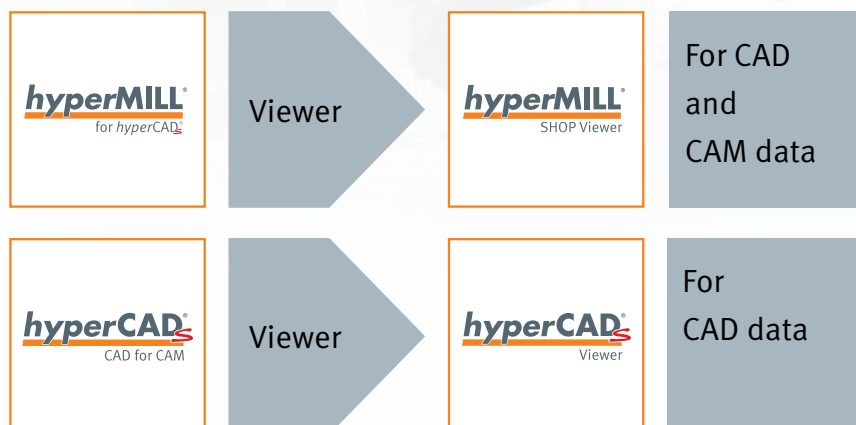tours or points (red). Areas can also be fixed here.

Before   After
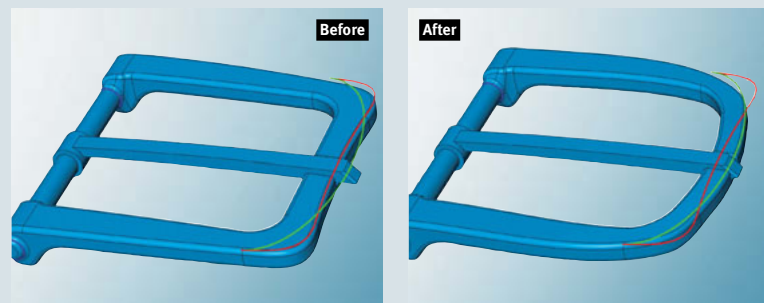
Viewer for CAD and CAM files:
more transparency, fewer errors.

*hyper*CAD®-S Viewer is available for *hyper*CAD®-S. This makes it possible to view CAD files. *hyper*MILL®
SHOP Viewer is also available for *hyper*CAD®-S. This makes it possible to view CAM data from *hyper*MILL®.
*hyper*CAD®-S Viewer is ideal for departments that simply want to take a brief look at their CAD data, for
example, in job planning or quote calculation. *hyper*CAD®-S Viewer optionally offers all current direct inter-
faces and tried-and-tested neutral data formats.

*hyper*MILL® SHOP Viewer not only allows the user to view CAD data; they can also view CAM data from
*hyper*MILL®. This extends the options that are available to machine operators as, until now, only the NC
programs were available to them for set-ups. With *hyper*MILL® SHOP Viewer – the visualisation solution
for the workshop – data that is relevant to production can be visualised and simulated directly next to the
machine. Every manufacturing operation can be checked in detail on the monitor before the set-up. This
results in a far better understanding of the actual manufacturing process than before and the machine
operator can apply their manufacturing expertise more effectively.

Simple and fast display,
analysis and documentation of CAM/CAD data.

hyperMILL® for *hyperCAD*®	Viewer	**hyperMILL**® SHOP Viewer	For CAD and CAM data
hyperCAD®ₛ CAD for CAM	Viewer	**hyperCAD**®ₛ Viewer	For CAD data

Fast access: *hyper*CAD®-S Viewer allows quick access to the geometry and component structure.
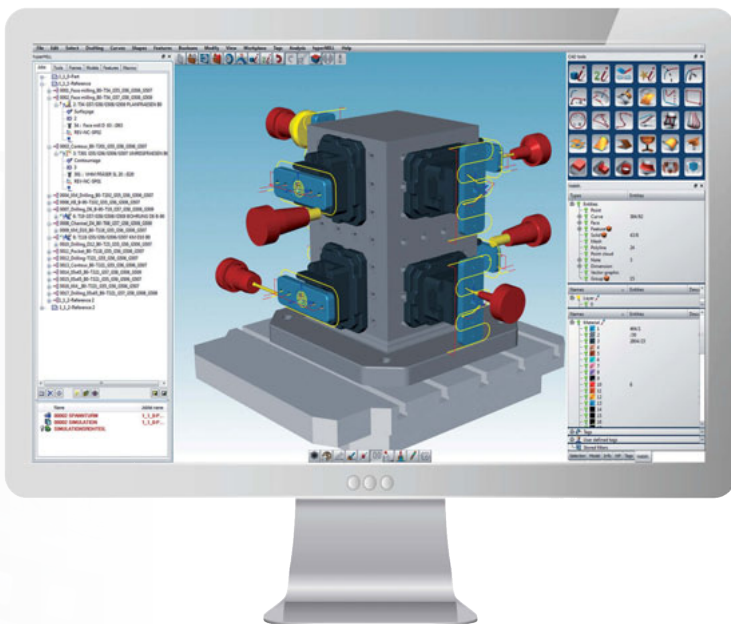
Increased process reliability: *hyper*MILL® SHOP Viewer allows experienced machine operators to recognise possible errors early on before the start of manufacturing using virtual process analyses.

Features: *hyper*CAD®-S Viewer

- **Target groups:** The Viewer is particularly used in departments that simply want to take a brief look at their CAD data, for example, in job planning or quote calculation.

- **CAD interfaces:** The Viewer supports an extensive package of import interfaces: *hyper*CAD® files, IGES, STEP, DXF/DWG, point cloud, Parasolid® and optional Catia V4® and V5®, Autodesk® Inventor®, Siemens NX®, SOLIDWORKS, PTC® Creo.

Features: *hyper*MILL® SHOP Viewer

- **Target group:** Machine operators can better leverage their in-depth manufacturing knowledge with *hyper*MILL® SHOP Viewer. Machining processes and parameters can be confirmed on the computer rather than adding risk to the machine tool or machined part.

- **Application area:** *hyper*MILL® SHOP Viewer is designed for quick access in the manufacturing environment during the post-CAM programming phase.

- **Simulating manufacturing processes:** The traceability of NC programs is noticeably improved through the toolpath simulation, the material removal simulation and the internal machine simulation. The manufacturing processes with the corresponding clamping status can be safely simulated starting with the stockmodel.

- **Verifying details:** Display of all elements and parameters (geometry, features and toolpaths) as in *hyper*MILL®. With a few clicks, the operator can measure and check the toolpaths on the machine, for example.

- **Improved communication:** Detailed information about *hyper*MILL® jobs are immediately and consistently available for all parties involved in the manufacturing process.

- **Fast access:** *hyper*MILL® SHOP Viewer allows quick access to all manufacturing data, as well as to the geometry and component structure.

- **Practical:** The SHOP Viewer file contains optional configuration files such as the machine model, postprocessor and POF files. This ensures that the project data is easily opened on all *hyper*MILL® SHOP Viewer workstations, without the need for any special setup.

# Electrode – Fast electrode derivation and programming

Sharp-edged and difficult-to-mill component areas are die-sunk with electrodes. The die sinking process requires suitable electrodes that need to first be constructed, then programmed and then finally milled. Without the *hyper*CAD®-S electrode module, realising this manufacturing process would take a great deal of construction and programming.

A few short steps to constructing an electrode

The electrode module largely automates the construction process in *hyper*CAD®-S. Seamless technology and component data transfers in *hyper*MILL® also ensure fast, reliable programming. The entire process is so highly supported that programmers can carry it out with just a few clicks, without requiring any construction knowledge.

Highlights in creating electrodes

The programmer selects the faces to be eroded on the component geometry. The module creates corresponding collision-free electrodes, which means that, when necessary, it automatically ensures extension of the electrode faces and the derivation of raw material and holders. Seamless transfer into the *hyper*MILL® CAM system is based on the geometry as well as the technological information. The programmer selects the electrodes to be programmed at this point and starts the programming using further technology definitions. If there are machining macros in place, the programming is carried out automatically.

hyperCAD®
CAD for CAM

Electrode

Geometry derivation → Electrode creation → Programming
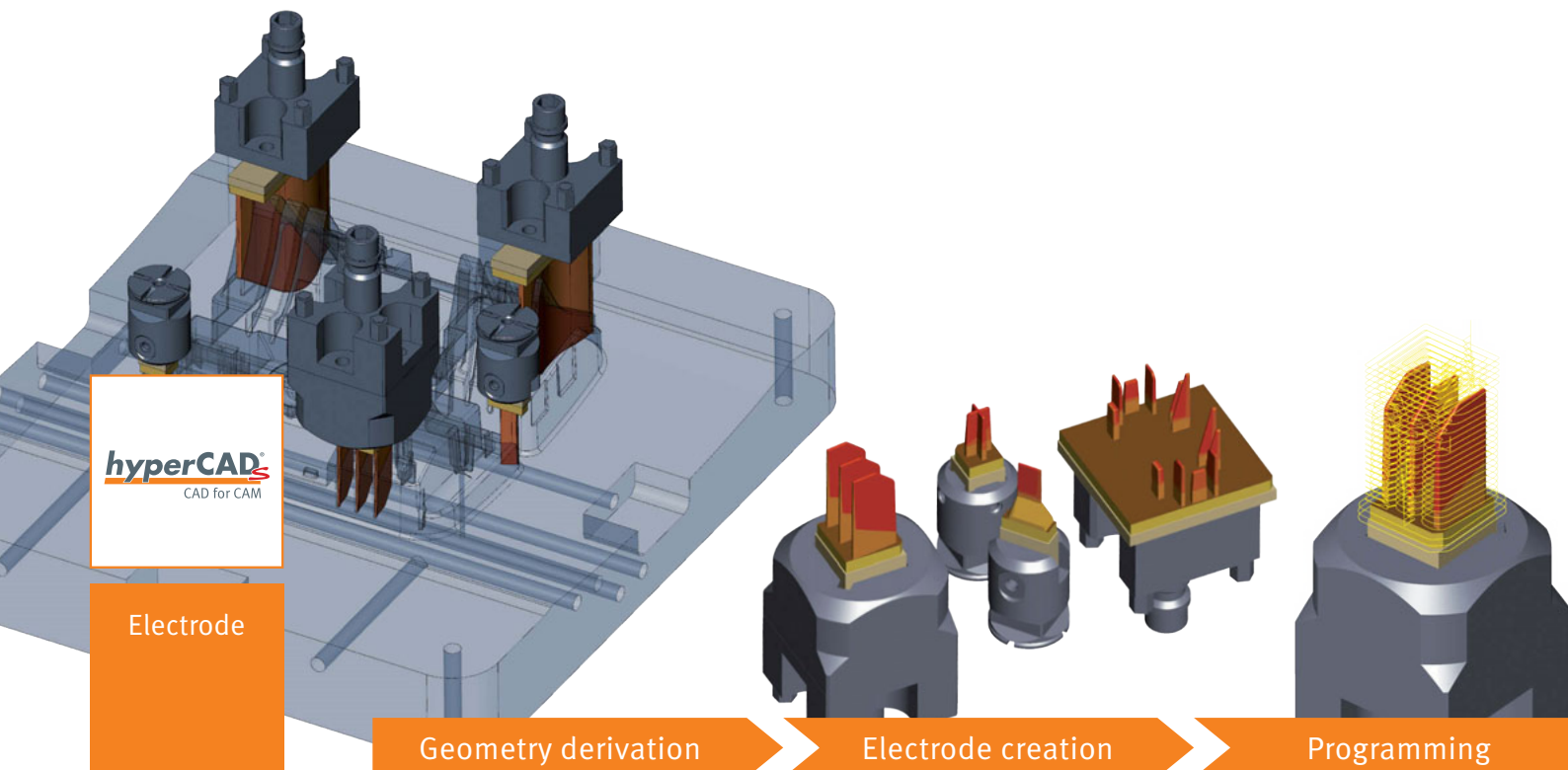
Features

- Suitable for solid and face models
- Geometry selection through face and contour selection
- Automatic extension of electrode geometry
- Holes in the geometry can be automatically closed
- Measuring markers for the electrode
- Automatic colour and layer definition for the individual electrode areas
- Automatic raw material and holder selection with best fit option for optimal alignment
- Automatic stock calculation and collision avoidance
- Electrode reference as chamfer or radius
- Detailed reports
- Incorporation of manually created electrode geometries into the automated process
- Automatic calculation of the minimum rib distance
- Automatic calculation of the length and adjustment options for the length of useless raw material
- Fast programming in *hyper*MILL®:
  All technology data, such as the spark gap, stock size and positional reference, are automatically transferred in *hyper*MILL®. The programming work can even be further automated using machining macros.
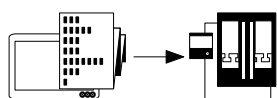
Electrode module functions:

■ Colour coding
User-specific colour information is automatically applied to the geometry areas of the electrode.

- Contact face
- Erosion face
- Tangential extension
- Linear extension
- Measuring marker
- Raw material
- Electrode holder
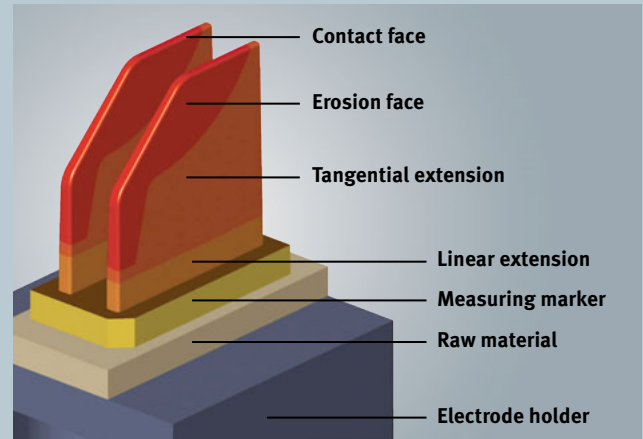
■ Geometry extension
Automatic tangential or linear extension of the electrode geometry. Angle extension is also available for stabilisation.

- Tangential extension
- Linear extension
- Angle extension
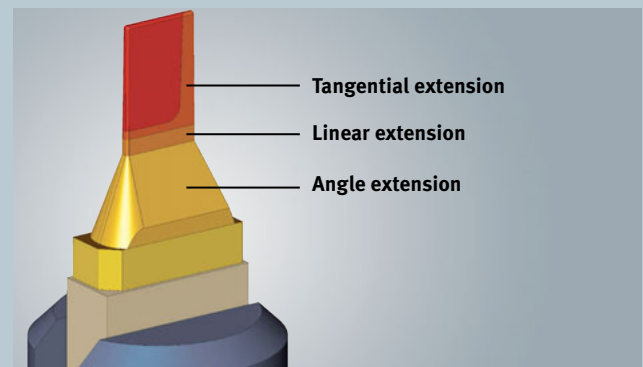
■ Production report
A print view with technological information or electrode and raw material reports can be issued for each individual electrode.

Milling program → EDM

OPEN MIND Technologies AG is represented worldwide with own subsidiaries and through competent partners and is a member of the Mensch und Maschine technology group, www.mum.de

www.openmind-tech.com

OPEN MIND
THE CAM FORCE

We push machining to the limit