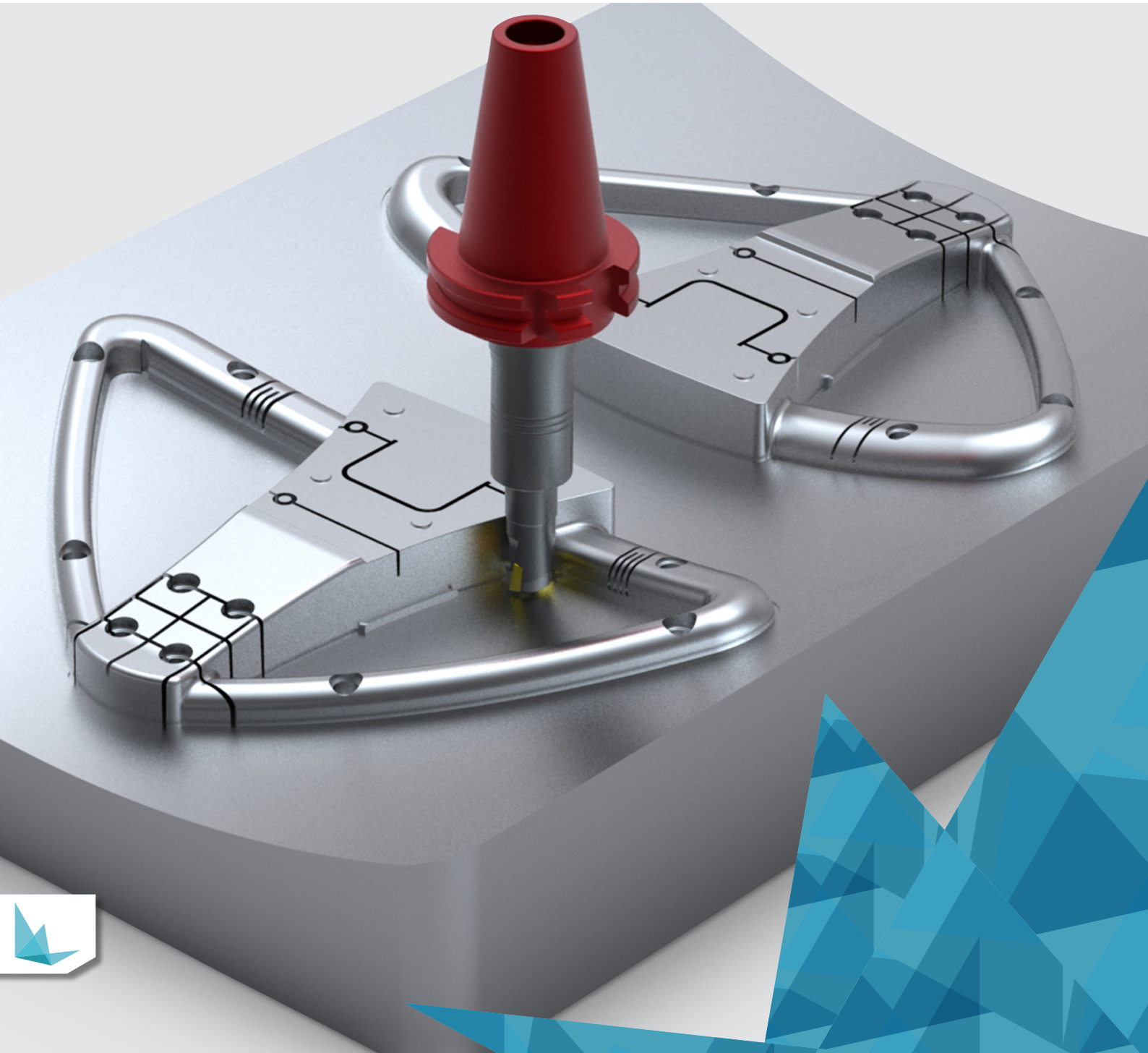
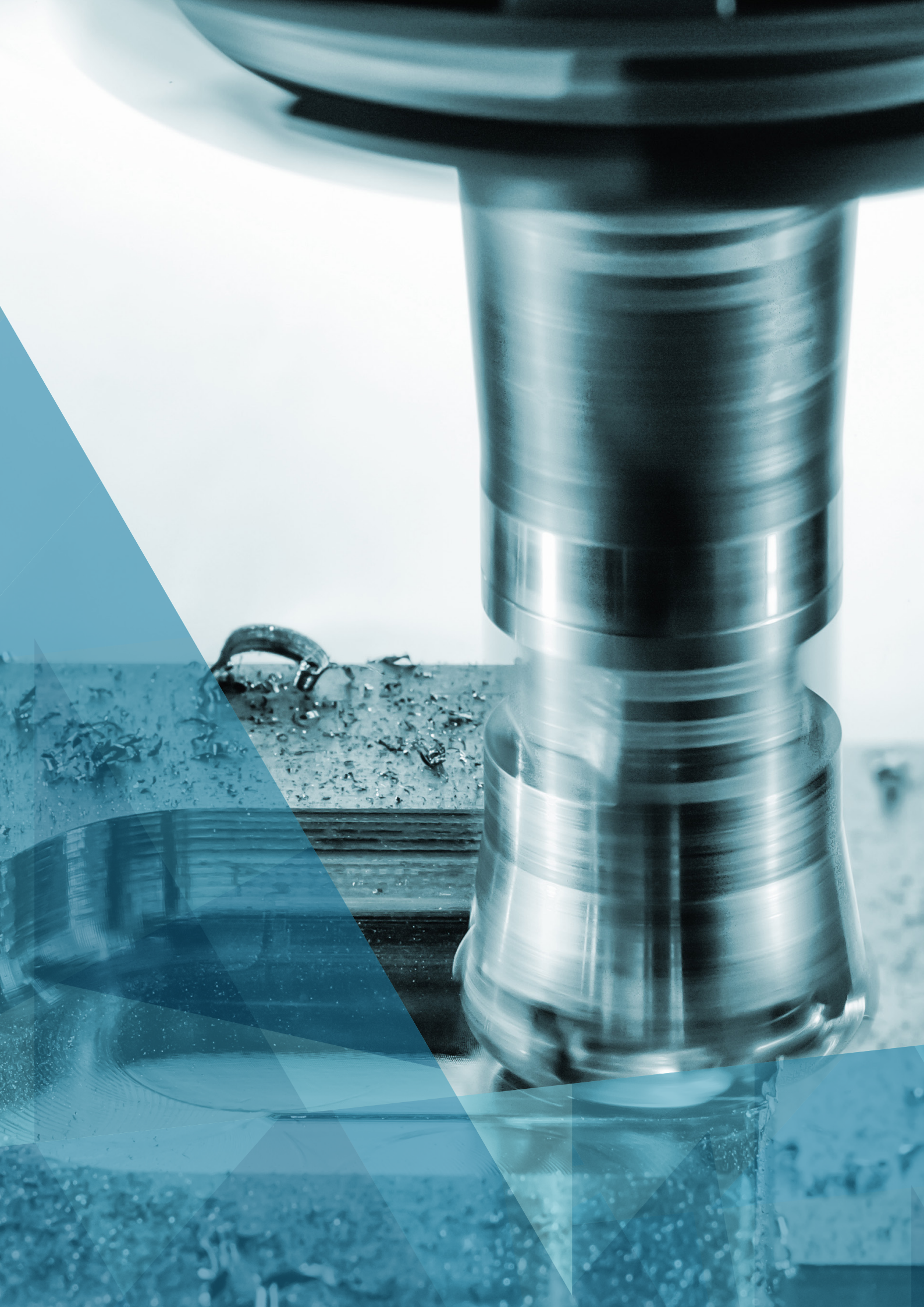
HEXAGON
MANUFACTURING INTELLIGENCE

PRODUCT BROCHURE

NC MACHINING

CAD/CAM/CAE SOFTWARE FOR DESIGN & MANUFACTURE





THE MODULAR CAD/CAM/CAE SYSTEM FOR DESIGN & MANUFACTURE

Hexagon Manufacturing Intelligence has been providing world class CAD/CAM solutions since 1988. VISI Machining offers all you need to increase productivity, maximise cutting capacity and reduce delivery times. VISI creates intelligent toolpaths on the most complex 3D parts. Dedicated high speed milling techniques and built-in smoothing algorithms create highly efficient NC code, reducing cycle times on your machine, and continuously producing high quality components.

Construction
VISI 2D CAD
VISI 3D Surface Modelling
VISI 3D Solid Modelling
Reverse Engineering

Die Making
VISI Progress (Unfolding & strip design)
VISI Progress (Tool design)
VISI Blank (Blank development)
VISI Blank (Flange unfolding)

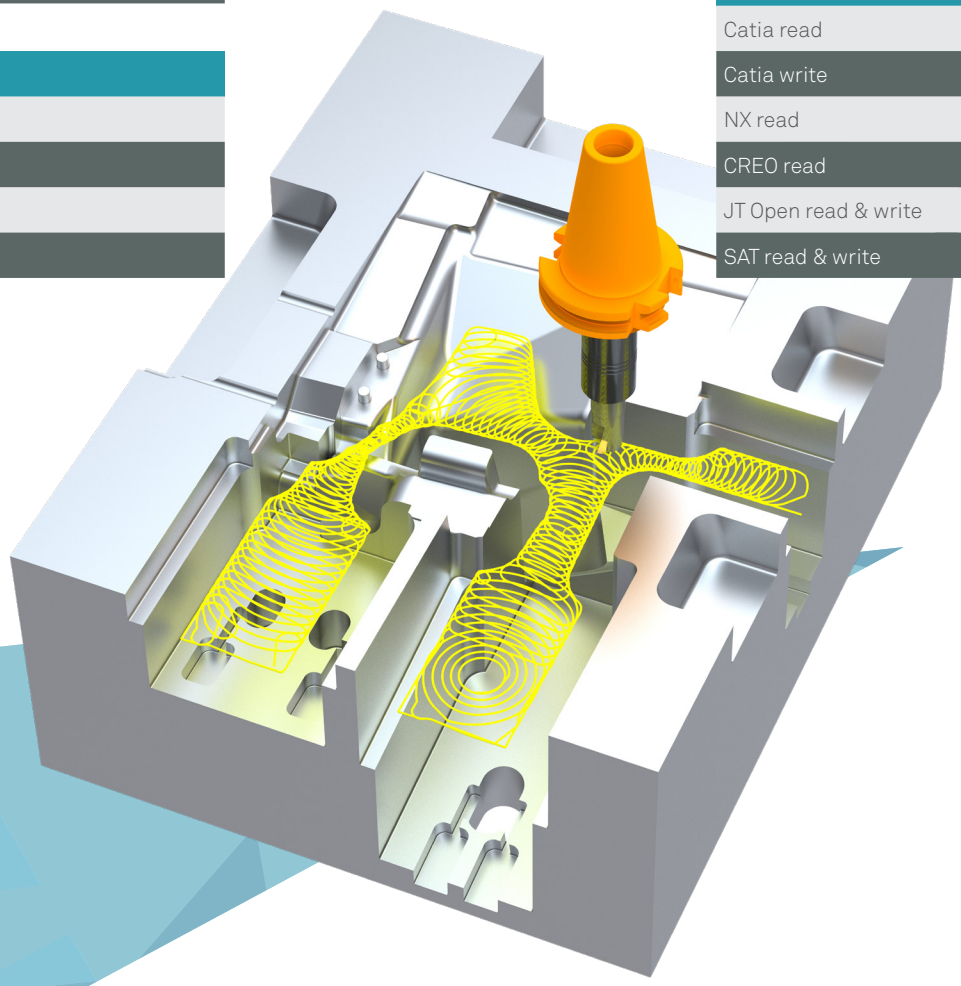
Mould Making
VISI Flow
VISI Analysis
VISI Electrode
VISI Mould

NC Programming
VISI Machining 2.5-Axis
VISI Machining 3-Axis
VISI Machining 5-Axis
VISI Compass Technology
VISI PEPS-Wire (Wire EDM)

Additional Modules
VISI PDM
VISI Viewer

Standard CAD interfaces
STEP
GES
VDA
Parasolid
DWG, DXF
Solid Works
Solid Edge
Inventor

Extra CAD Interfaces
Catia read
Catia write
NX read
CREO read
JT Open read & write
SAT read & write




Electrode Annotation Plotview System Window Machining Wire Mould Progress Standard Elements Flow ?
CAM Navigator
Project: Project1 ENB
Defined faces groups
Machine: DMU85_MB - DMU85_"1
Tool-crib: Default Local Library
CAM-setup5 (C:0.000,A:-90.000)
Adapt roughing C : T18 - Bullnose - D:50 R:0.8
Adapt roughing Contour offset applied: T18 - Bullnose
CAM-setup6 (C:180.000,A:-90.000)
Adapt roughing C : T18 - Bullnose - D:50 R:0.8
Adapt roughing Contour offset applied: T18 - Bullnose
Side 1 CAM wpl (C:0.000,A:0.000)
Adapt roughing: T19 - Bullnose - D:25 R:0.8
Roughing hyb <Hybrid>: T20 - Convex Tip cutter
Planar <Spiral>: T21 - Bullnose - D:16 R:1
Waterline <Z level>: T22 - Ballnose - D:10
Waterline <Z level> C : T22 - Ballnose
Raster <Zigzag>: T22 - Ballnose - D:10
Raster <Zigzag> C : T22 - Ballnose
CAM-setup5 (C:0.000,A:-90.000)
Adapt roughing C : T19 - Bullnose - D:25 R:0.8
CAM-setup6 (C:180.000,A:-90.000)
Adapt roughing C : T19 - Bullnose - D:25 R:0.8
Toggle
Absolut XY Top
View ABS
bearb form
LS: 1.00 PS: 1.00
Units: MM
X= -1170.599 Y= -1641.678 Z= 0000.000

VISI MODELLING

2D AND 3D CAD

VISI Modelling provides a robust and powerful solid and surface modelling platform based around the industry standard Parasolid® kernel. Combined with Hexagon's surface technology, model analysis and 2D design, VISI Modelling offers complete flexibility to construct, edit or repair the most complex 3D data.

2D CONSTRUCTION

- Extensive construction techniques
- All geometries such as points, lines, circles, splines, profiles
- Trimming, moving, scaling, rotating and mirroring of elements
- Form and position tolerances, surface specifications
- Full dimensioning / measuring functions

3D SOLID MODELLING

- Dynamic Direct Modelling
- Simple generation of solids
- Feature manager
- Wall thickness analysis
- Model kinematics
- Exploded view
- Drawing creation
- Bill of materials

3D SURFACE MODELLING

- Hybrid solid and surface modelling kernel
- Closure of surface set to solid model
- Comprehensive repair functions
- Creation of complex surface geometry
- Multiple surface types such as ruled, sweep, draft, drape, lofted, pipe, drive & shape, capping, fillet, parting plane, and tangential.

CAD INTERFACES

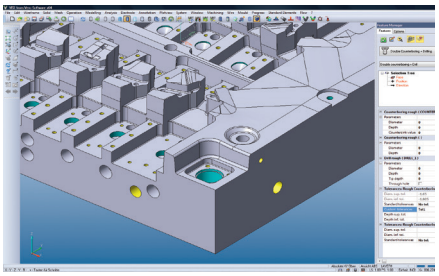
For the import and export of CAD data, the following interfaces are available:

STEP	STL	Catia
IGES	Solid Works	NX
VDA-FS	Solid Edge	PTC / Creo
PARASOLID	Inventor	JT Open
DWG, DXF		SAT

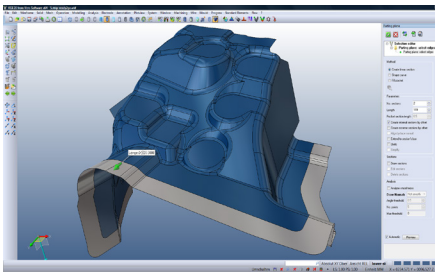
VISI ANALYSIS

The geometry analysis functionality and CAD for CAM tools within VISI are especially useful for effective NC programming. **Important functions include:**

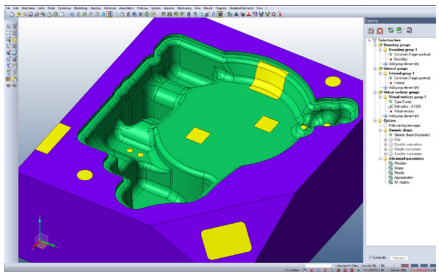
- Model comparison for design changes
- Model curvature & min/max radii analysis
- Hole capping
- Model thicknes
- Draft analysis
- Surface extension / run off face construction



Hole construction with Feature Manager & automated CAM processing



CAD for CAM functionality such as surface extension and dynamic run-off face construction



CAD for CAM functionality such as fillet radii analysis, feature removal, and complex hole capping

VISI MACHINING

2.5-AXIS & FEATURE RECOGNITION

VISI Machining provides a practical, intuitive and simple solution for 2D programming including positional indexing. Geometry based feature recognition can select both wireframe and solid features, automatically creating reliable milling and drill cycle toolpaths.

GENERAL FEATURES

- Tool, extensions and tool holder libraries
- Obstacle Management
- Full CNC kinematic simulation with material removal
- Multi-sided machining with automatic reversal of the cutting direction
- NC Report as HTML or XLS file

FEATURE RECOGNITION

The feature recognition engine evaluates the model topology and automatically detects manufacturing features with the correct drilling cycles and milling routines applied. The following feature types are recognised:

- Drilling: centre drilling, tapping, reaming, boring, helical milling, thread milling and mill drill cycles
- Pockets: open, rectangular, circular, irregular and rounded
- Bosses: rectangular, circular, irregular and rounded
- Complex Features: multi-step pockets with taper and fillet radii

DRILLING

- Recognition of hole and pocket features from all directions for automatic multi-face processing
- User-defined complex cycles
- Deep-hole drilling with feed-rate reduction for hole intersections
- Support for CNC canned cycles

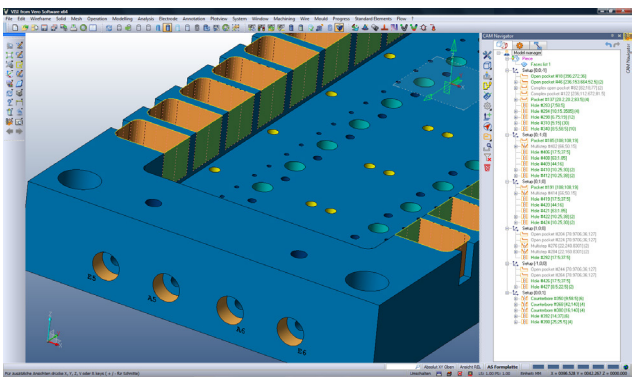
MILLING

- Milling with radius compensation
- 2.5D milling for complex features - extrusion, revolution or sweep
- Pocketing with multi-level nested pockets
- Automatic residual stock detection
- Spiral or zigzag face milling
- Milling by successive passes starting away from the material, gradually moving inwards

VISI COMPASS TECHNOLOGY

Compass Technology is an engine that uses **rules-based manufacturing methods** to produce intelligent CAM cycles for model features. Milling data such as cutting method, tool diameter, step over / step down; and drilling parameters such as pecking method, or the need to use counterbore or pocketing cycles for larger hole diameters can all be driven by the feature topology. Simple adaptation of the compass rules to customer-specific manufacturing methods can result in significant time savings and error reduction. Deployment of proven company standards will guarantee manufacturing consistency across any job, and any operator.

- CAM data read directly from VISI Mould and VISI Progress component libraries
- Automatic generation of machining programs for drilling cycles, profiling and pocketing operations
- Diameters, depths and drilling parameters read directly from the model eliminate the possibility of MDI errors
- Optimisation of the toolpath movement ensures the shortest distance for tool travel and reduces cycle times offering maximum productivity



Auto-recognition of drilling and pocket features in any direction

VISI MACHINING

3 + 2-AXIS MACHINING

VISI Machining 3D is the module for machining complex 3D solids, surfaces, and STL models. The operator can choose from a variety of features and machining strategies which include dedicated high-speed milling techniques and built in smoothing algorithms to create highly efficient NC code.

GENERAL FEATURES

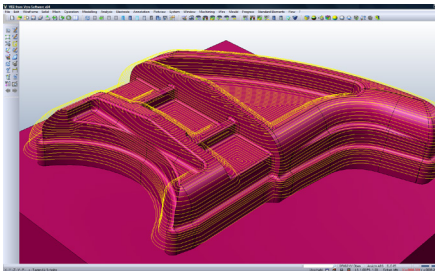
- Tool, extensions and tool holder libraries
- Full CNC kinematic simulation with material removal
- Tool path limit control using angle deviation, coordinates, profiles and check-surfaces
- Dynamic incremental stock updates
- Complete collision check for tool and tool holder
- High speed optimised toolpath movements
- Fast toolpath calculation times with multi-threading processor support
- Customisable post processors
- Toolpath templates for part families
- Smooth point distribution

3D BASE STRATEGIES

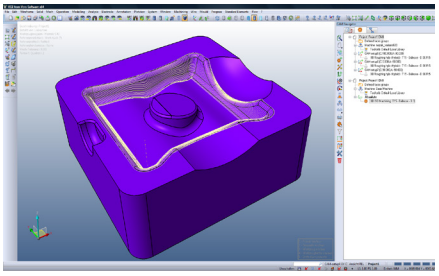
- Multiple roughing techniques
- Rest material roughing
- Parallel cuts (copy milling)
- Constant Z finishing
- Helical finishing
- Rest material finishing (calculation based on a reference tool)

3D PRO STRATEGIES

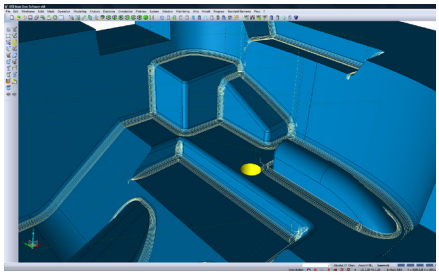
- Adaptive, trochoidal-shaped rough machining
- Deep cavity roughing strategies which support multiple tool lengths / tool extensions
- Rib machining - Combined roughing and finishing on the same Z plane for thin ribbed geometry such as electrodes
- Combined finishing strategies for steep and shallow areas
- 3D constant stepover finishing
- Residual material finishing - Calculation based on a residual stock model or reference tool diameter
- Spiral / Radial finishing
- 3D curve machining
- ISO-Machining for single or multi-surface selections. Extremely useful for fillet radii or picking out small areas without having to machine the entire component
- Pencil milling
- Flat surface machining of planar surfaces



Finishing cycle for steep and shallow areas



3D constant stepover for high quality surface finish



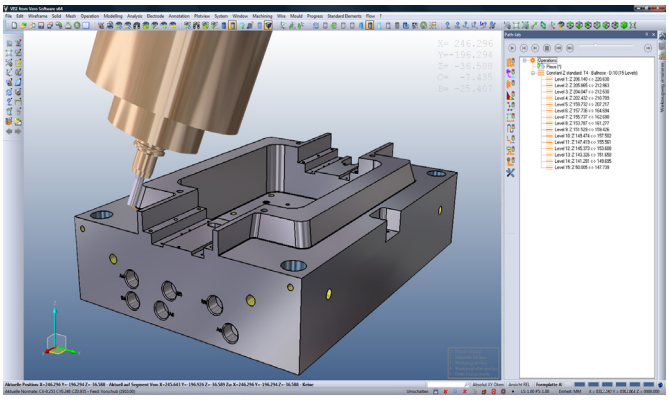
3D rest machining of fine details such as small fillet radii

VISI MACHINING

3-AXIS TO 5-AXIS CONVERSION

All 3D toolpaths can be converted to 5-axis operations which dramatically increases the number of strategies available to cover any machining scenario. The 5-axis conversion provides intelligent collision detection and will automatically tilt away from the piece only when required. Benefits include the use of shorter, more rigid cutters, higher feed rates, and improved surface finish. Auto Tilting will put 5-axis machining into the hands of people who've never used it before whilst keeping cutting efficiency at a maximum

- Extremely easy to use
- Short programming times
- High quality surface finish
- Full gouge protection with tool & tool holder



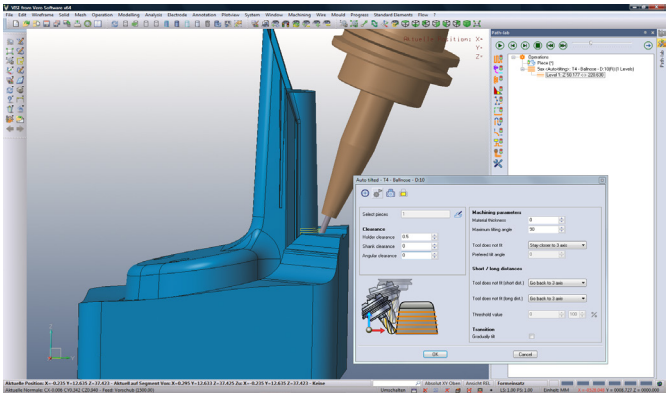
5-Axis flank milling

VISI MACHINING

5-AXIS SIMULTANEOUS MACHINING

This module is used for complex parts with deep cavities, high and steep surfaces, undercuts and small radii. Generally, this would involve the use of tool extensions or longer tools which would increase the risk of deflection and provide a poor surface finish.

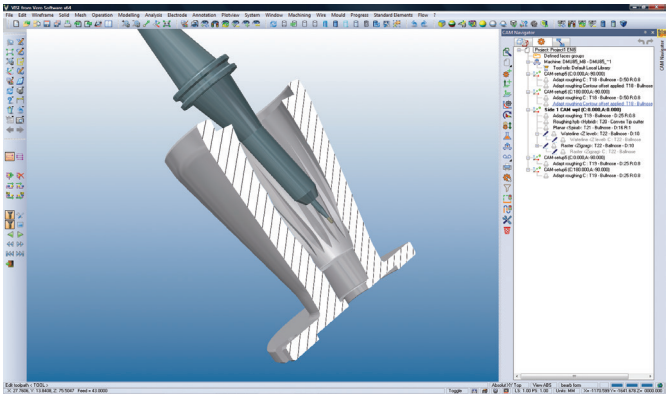
By approaching from a different angle, the user can benefit from the use of shorter tools, increasing tool rigidity. As a result, a constant chip load and higher cutting speed can be achieved which will ultimately increase tool life and produce a high-quality surface finish.



Auto-Tilting - The system requires only minimal input

5-AXIS MACHINING STRATEGIES

- Finishing and roughing
- Constant Z (waterline)
- Parallel cuts (copy milling)
- Between two guide curves
- 5-Axis trimming
- Turbine / Impeller / blisk machining
- Intelligent toolpath editing
- Synchronisation curve support for tool movement
- control
- Full gouge protection with tool & tool holder



5-Axis Machining for deep cavities

HEXAGON
MANUFACTURING INTELLIGENCE

Hexagon Manufacturing Intelligence helps industrial manufacturers develop the disruptive technologies of today and the life-changing products of tomorrow. As a leading metrology and manufacturing solution specialist, our expertise in sensing, thinking and acting – the collection, analysis and active use of measurement data – gives our customers the confidence to increase production speed and accelerate productivity while enhancing product quality.

Through a network of local service centres, production facilities and commercial operations across five continents, we are shaping smart change in manufacturing to build a world where quality drives productivity. For more information, visit **HexagonMI.com**.

Hexagon Manufacturing Intelligence is part of Hexagon (Nasdaq Stockholm: HEXA B; **hexagon.com**), a leading global provider of information technologies that drive quality and productivity across geospatial and industrial enterprise applications.

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- 3D LASER SCANNING
- SENSORS
- PORTABLE MEASURING ARMS
- SERVICES
- LASER TRACKERS & STATIONS
- MULTISENSOR & OPTICAL SYSTEMS
- WHITE LIGHT SCANNERS
- METROLOGY SOFTWARE SOLUTIONS
- CAD / CAM
- STATISTICAL PROCESS CONTROL
- AUTOMATED APPLICATIONS
- MICROMETERS, CALIPERS AND GAUGES
- DESIGN AND COSTING SOFTWARE