



# COMPANY PRESENTATION

*THE GROUP OF COMPANIES REICHENBACHER-HAMUEL  
WITHIN THE SCHERDELGROUP*

# CONTENTS

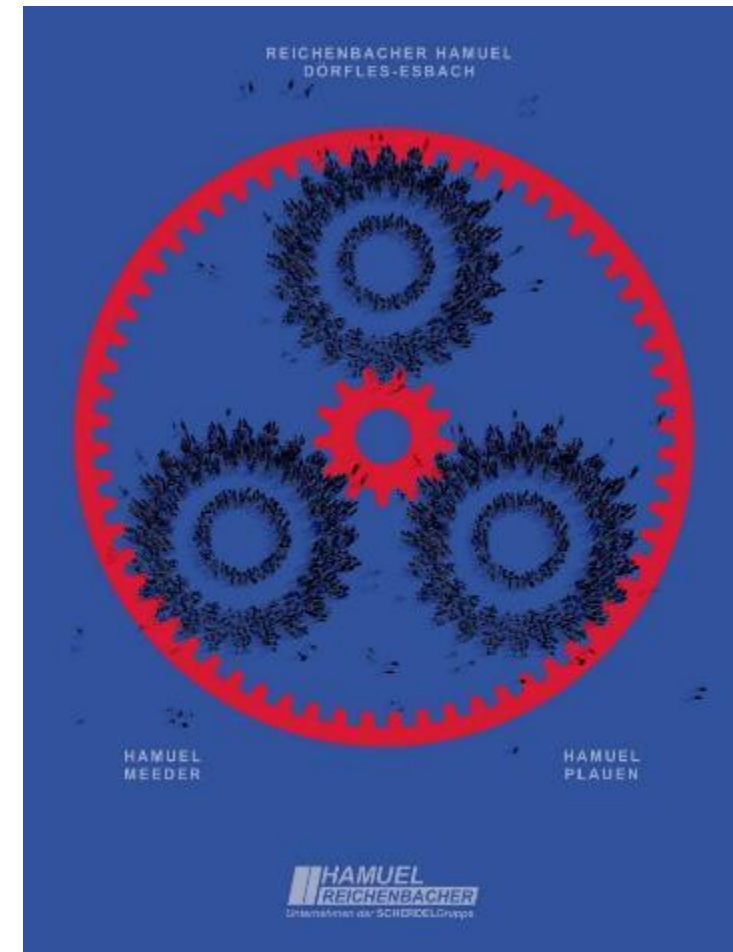
*SCHERDEL*

*REICHENBACHER DÖRFLES-ESBACH*

*HAMUEL PLAUEN*

*HAMUEL MEEDER*

*QUALITY & SERVICE*



# SCHERDEL

*AT A GLANCE*

**SCHERDEL** is a fast-growing independent family business with more than 125 years of tradition (1890 – 2015) in the production of technical springs.

**SCHERDEL** stands for innovative solutions based on wire, tube and strip forming.

**SCHERDEL** offers early and extensive research and development services and is a supplier for OEMs und system manufacturers.

**SCHERDEL** offers a comprehensive portfolio of forming techniques, joining and assembly technology, via mechanical engineering and tool making, up to surface technology.

**SCHERDEL** is represented internationally with production sites in eleven countries on three continents.

**SCHERDEL** has about 6,000 employees in 42 producer plants.

**GERMANY:**

Berlin,  
Chemnitz,  
Coburg,  
Erlangen,  
Marienberg,  
Marktrewitz,  
Plauen,  
Röslau,  
Seiffhennersdorf,  
Treuen,  
Waldershof,  
Zwickau

**Europe:**

France: l'Arbresie, Beauvais  
Portugal: S.J. da Madeira  
Russia: Kaluga  
Slovakia: Myjava  
Czech Republik: Bor

**America:**

Brasil: Sorocaba  
Mexico: Silao  
USA: Muskegon

**Asia:**

China: Anqing, Huzhou  
Japan: Nagoya  
India: Jaipur

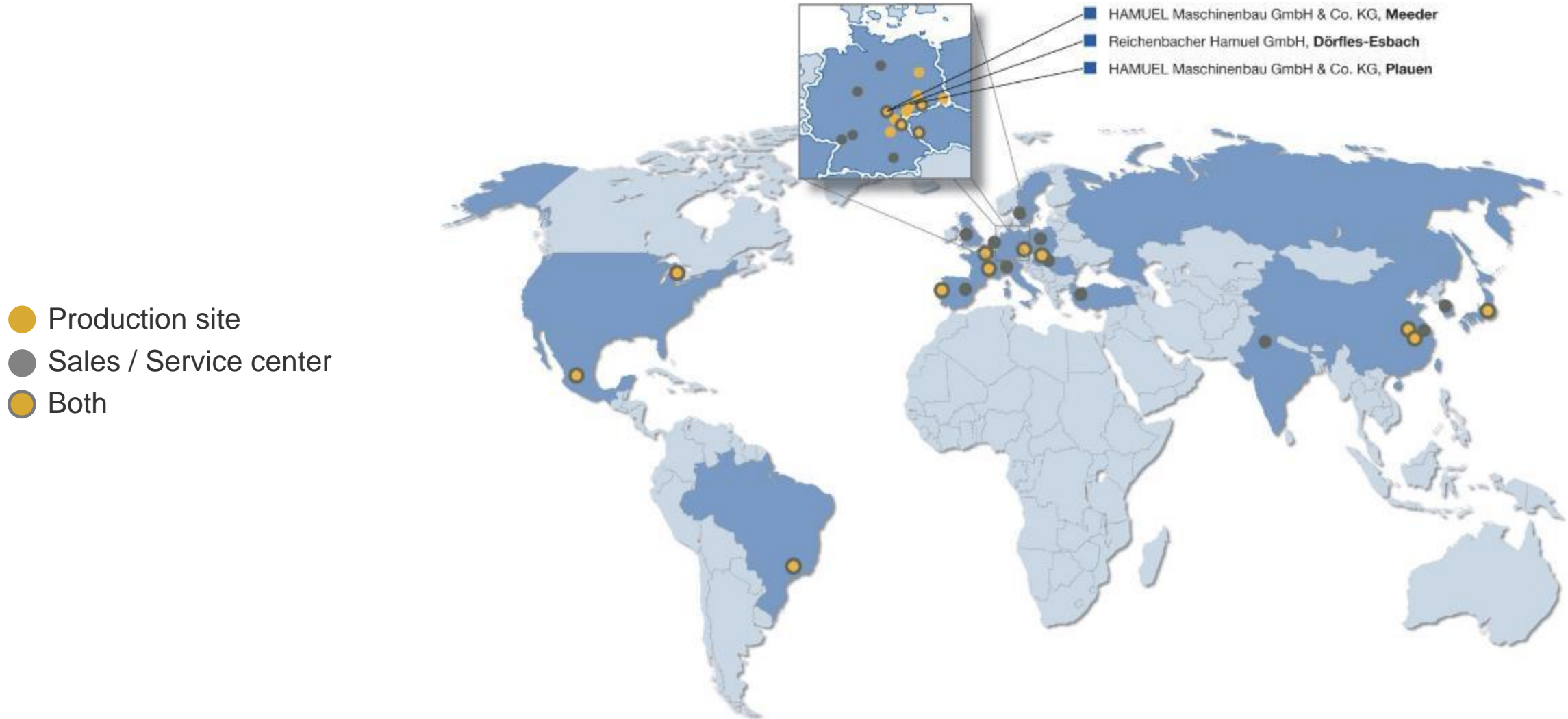


**12**   
countries

**32**   
locations

**42**   
production plants

approx. **6,000**   
employees worldwide



**Automotive industry**



**Competence**  
Drive motor

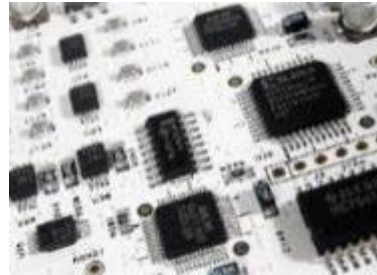


**Competence**  
Body, brakes, chassis

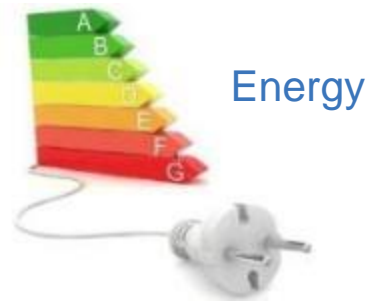


**Competence**  
Car interior **E-mobility**

**Electronic industry**



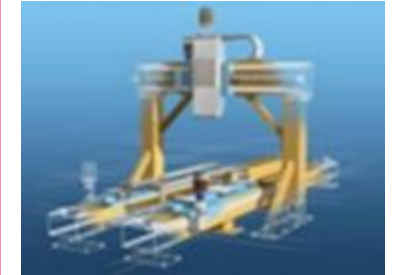
**Leisure industry**



**Medical engineering**



**Mechanical engineering**



# THE GROUP OF COMPANIES

*REICHENBACHER-HAMUEL*



1



**HAMUEL Maschinenbau  
GmbH & Co. KG**  
Industriestraße 6  
D-96484 Meeder

2



**HAMUEL Maschinenbau  
Plauen GmbH & Co. KG**  
Hans-Sachs-Straße 28  
D-08525 Plauen

3



**Reichenbacher Hamuel  
GmbH**  
Rosenauer Straße 32  
D-96487 Dörfles-Esbach

# HAMUEL MASCHINENBAU MEEDER

# MILLING MACHINES



**HSTM 150 S2**



**HSTM 150 HD**



**HSTM Serie XL, HD**



**HSTM 1000 HD Hybrid**



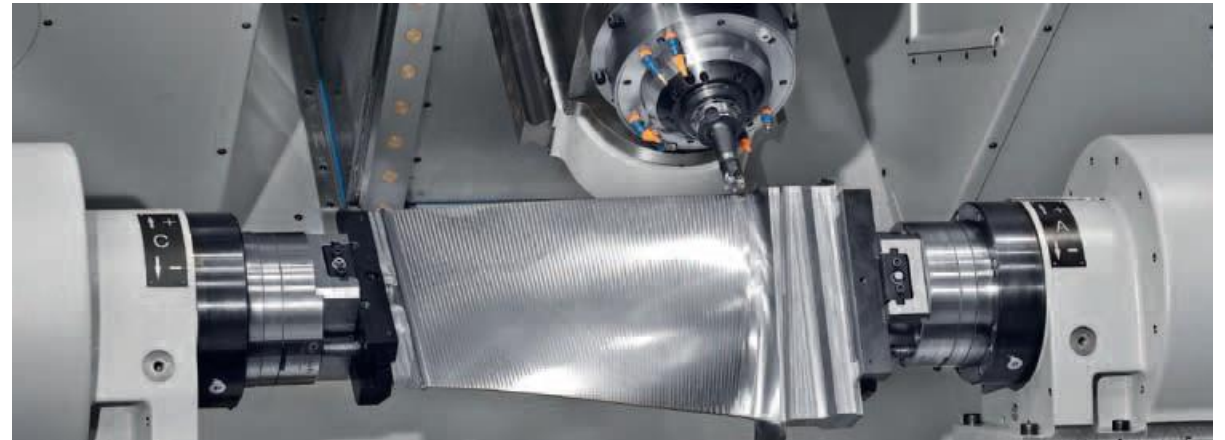
**HSTM 150 HD Hybrid**



**HSTM 1500 XL Blik**

**At present, HSTM-machines are  
in use in:**

- China
- Germany
- India
- Croatia
- Mexico
- Austria
- Poland
- Russia
- Switzerland
- UK
- the U.S.A.



### Advantages in machining with a

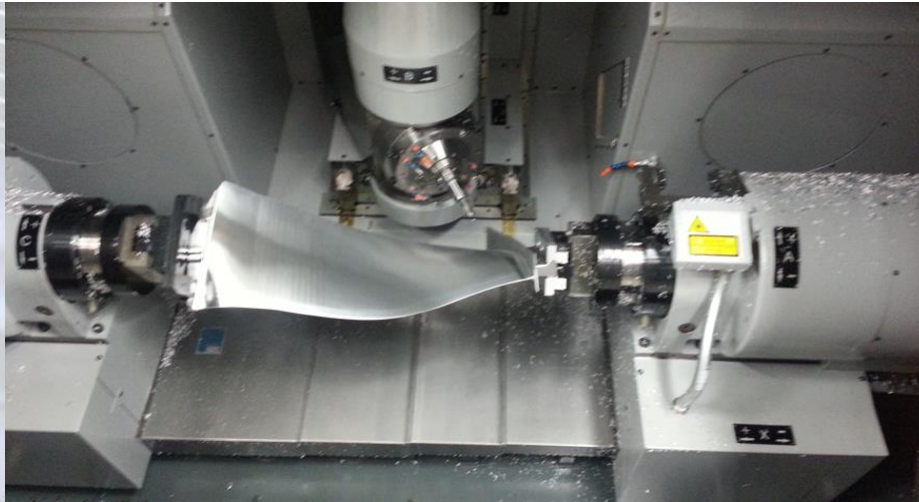
#### HAMUEL machine:

- Flexibility
- High accuracies
- Cost savings
- Blisk and blade in a single machine
- Blisk-blades accessible for the tool from both sides
- Innovative chip concept
- Space-saving by smaller footprint



## MILLING APPLICATION EXAMPLES

HAMUEL MASCHINENBAU GMBH & CO. KG – ADVANCE BY EXPERIENCE



**Airfoil length : 780 mm**  
**Airfoil with : 375 mm**  
**Material : Aluminium**  
**Workpiece : Fan Blade for A320 Aero Engine**  
**Machine : HSTM1500**



**Airfoil length : 450 mm**  
**Airfoil with : 340 mm**  
**Material : Titanium**  
**Workpiece : Turbine Blade Aero Engine**  
**Machine : HSTM 700HD**

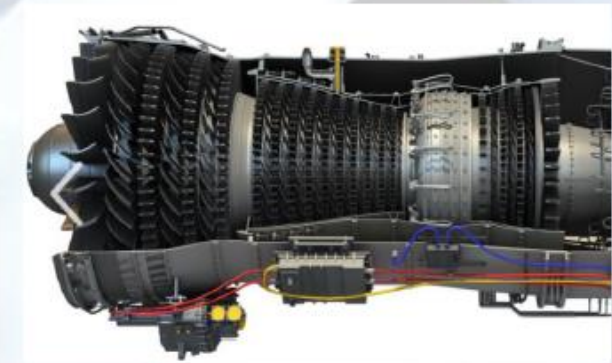
## MILLING APPLICATION EXAMPLES

HAMUEL MASCHINENBAU GMBH & CO. KG – ADVANCE BY EXPERIENCE



**Airfoil length : 200 mm**  
**Airfoil with : 60 mm**  
**Material : Titanium**

**Workpiece : Turbine Blade Aero Engine**  
**Machine : HSTM150HD**



**Airfoil length : 80 mm**  
**Airfoil with : 25 mm**  
**Material : Titanium / Inconel**  
**Workpiece : Turbine Blade Aero Engine**  
**Machine : HSTM 150HD with Turning Option**



## MILLING APPLICATION EXAMPLES

HAMUEL MASCHINENBAU GMBH & CO. KG – ADVANCE BY EXPERIENCE



**Airfoil length : 200 mm**  
**Airfoil with : 30 mm**  
**Material : Gamma Titanium Aluminide**  
**Ti-48Al-2Nb-2C**

**Workpiece : Turbine Blade Gas Turbine**  
**Machine : HSTM150S2**



**Airfoil length : 150 mm**  
**Airfoil with : 45 mm**  
**Material : Titanium**

**Workpiece : Turbine Blade Aero Engine**  
**Application: Adaptive Milling Snubber Transition**  
**Machine : HSTM150S2**



## MILLING APPLICATION EXAMPLES

HAMUEL MASCHINENBAU GMBH & CO. KG – ADVANCE BY EXPERIENCE



**Airfoil length : 930 mm**

**Airfoil with : 320 mm**

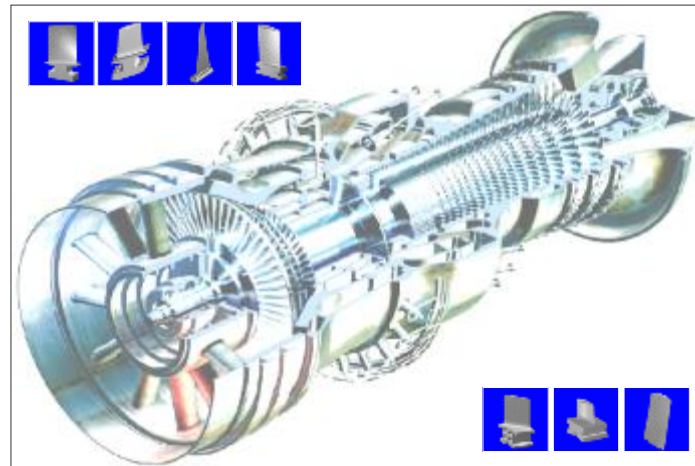
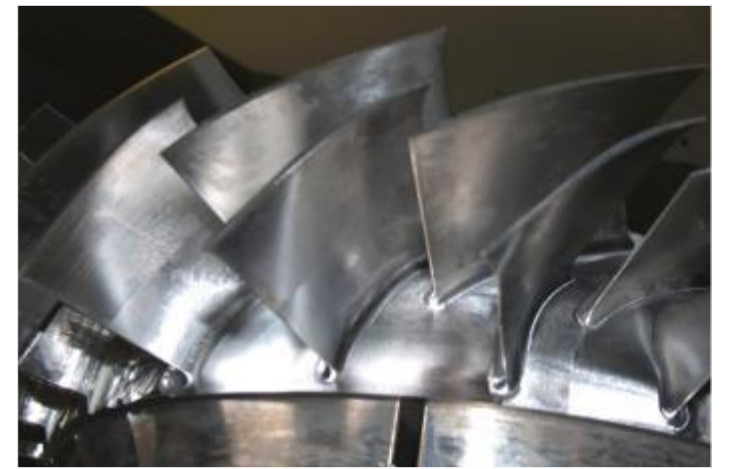
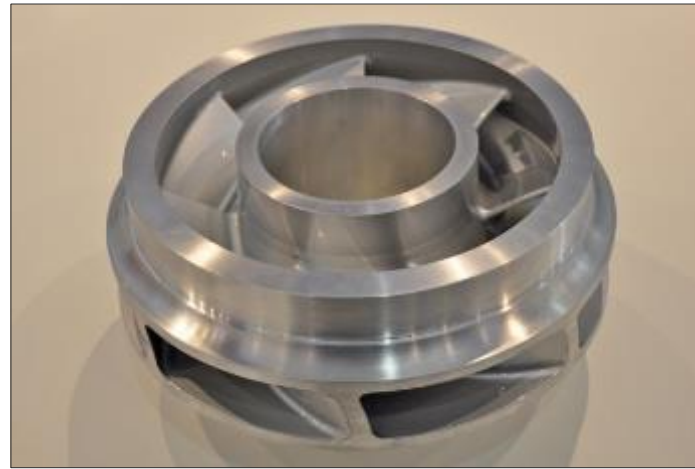
**Workpiece : Turbine Blade for  
Steam Turbine**

**Machine : HSTM1000**



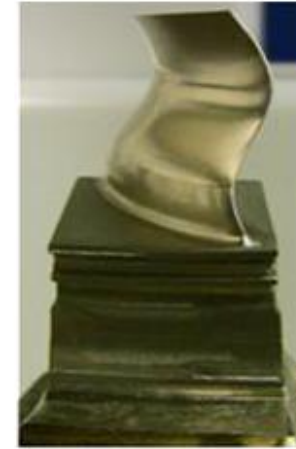
# MILLING APPLICATION EXAMPLES

HAMUEL MASCHINENBAU GMBH & CO. KG – ADVANCE BY EXPERIENCE



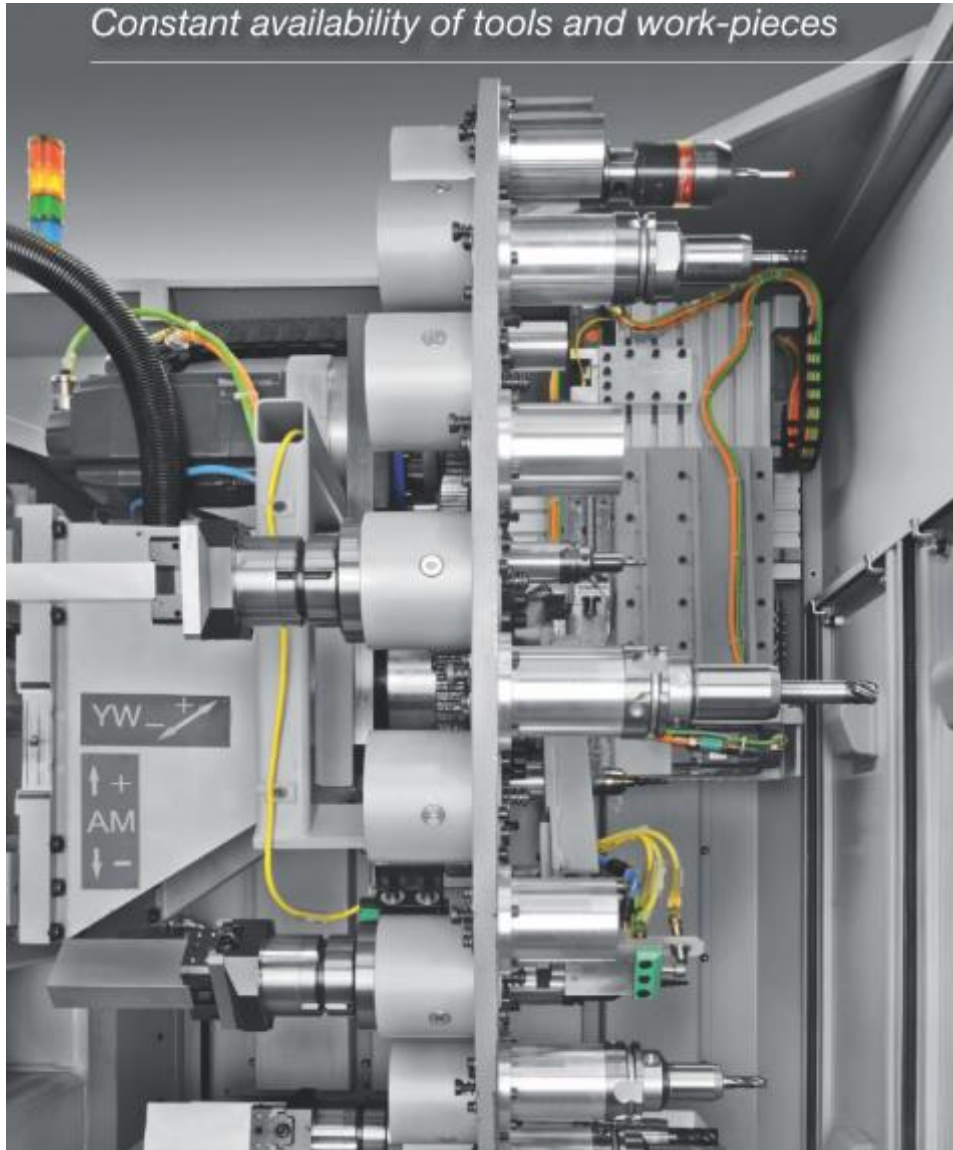
## FURTHER PARTS

HAMUEL MASCHINENBAU GMBH & CO. KG – ADVANCE BY EXPERIENCE



# AUTOMATION

*Constant availability of tools and work-pieces*



*Utmost process reliability*

**Tool / work-piece magazine**

The magazine is a disc with a standard capacity of 20 tools and 20 work-pieces. The operator can load and unload them while machining is in progress. Here, the safety-interlock of the access opening will be released upon a demand from the operator, while at the same time the access from the machine side to the magazine will be blocked – and vice versa.

**Tool changer with double gripper**

The patented changer is equipped with a spring-loaded double gripper with the purpose of taking the tools and the work-pieces from the magazine to the milling spindle and back again during primary processing time.

**A-axis (Rotary axis for work-piece)**

Direct drive (torque motor) free from backlash equipped with direct measuring system. Standard HSK 63 interface for clamping devices and the screw-in fixing with indexing bolt for the correct positioning of the devices.

**B-axis (Pivot axis for tool)**

The tool axis B is equipped with a direct drive (torque motor) free from backlash and with a direct measuring system.

**CNC-control system Siemens 840 D solution line**

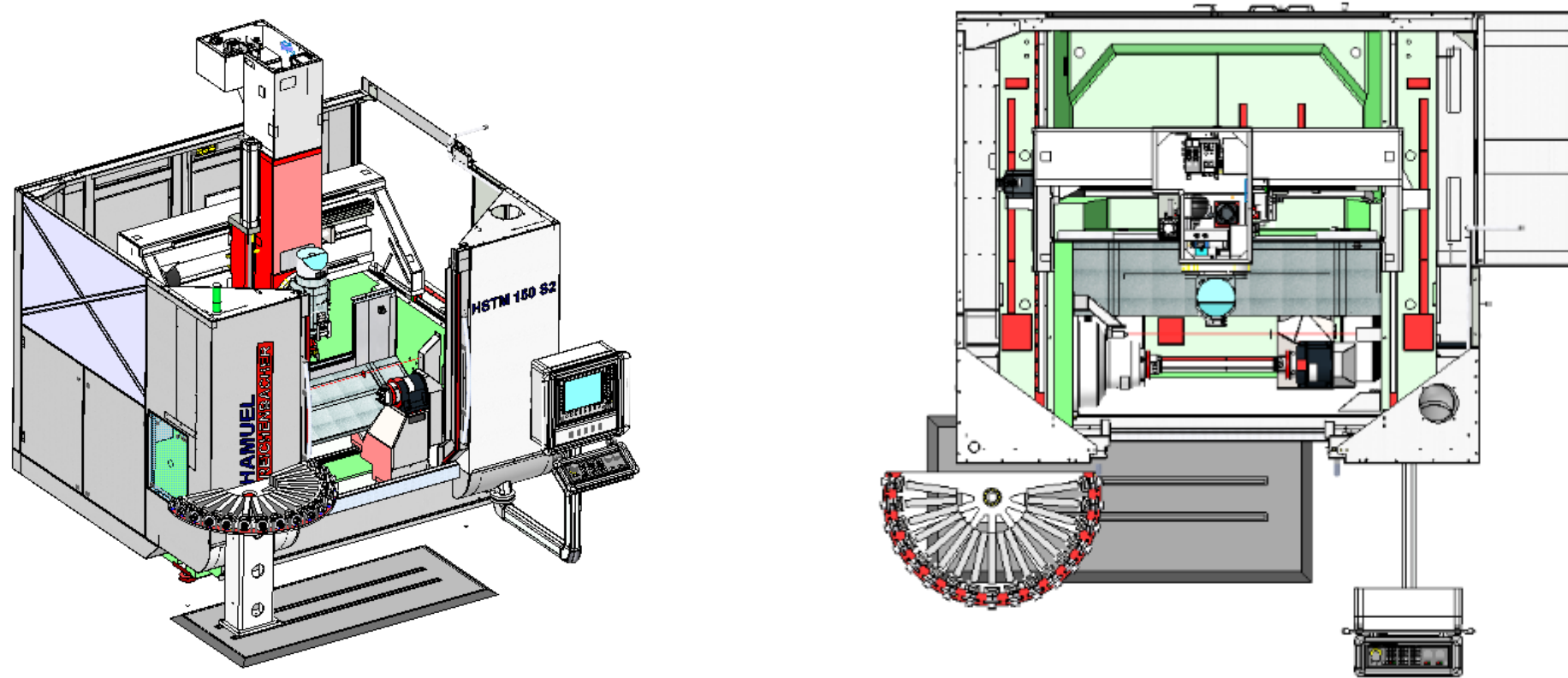
CNC-system with PLC integrated to control all automatic sequences. Design for the simultaneous multi-axes control of the axes X, Y, Z, A, B and of the counter-spindle (C-axis).

**Integrated Workpiece Loading System HSTM 150HD**



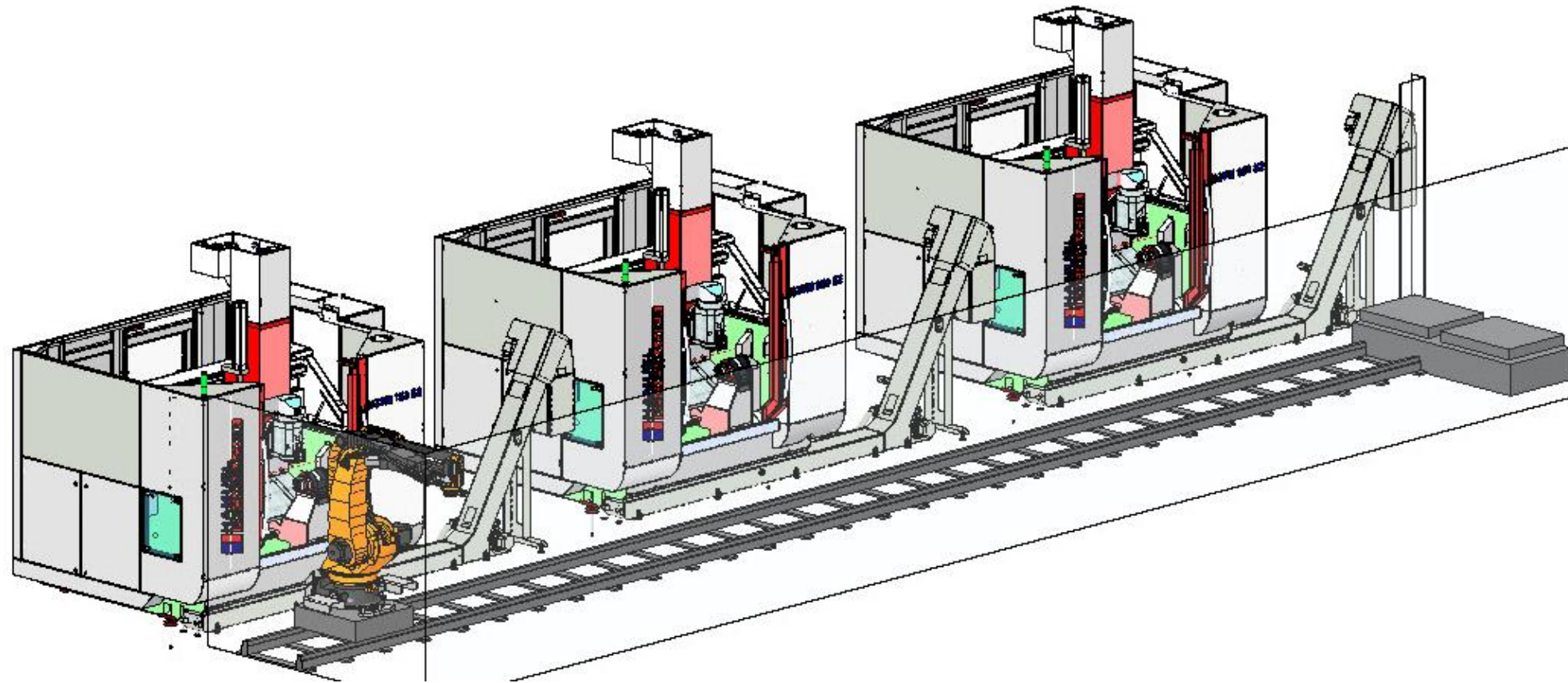


Customized Workpiece Loading System with Chain Magazine

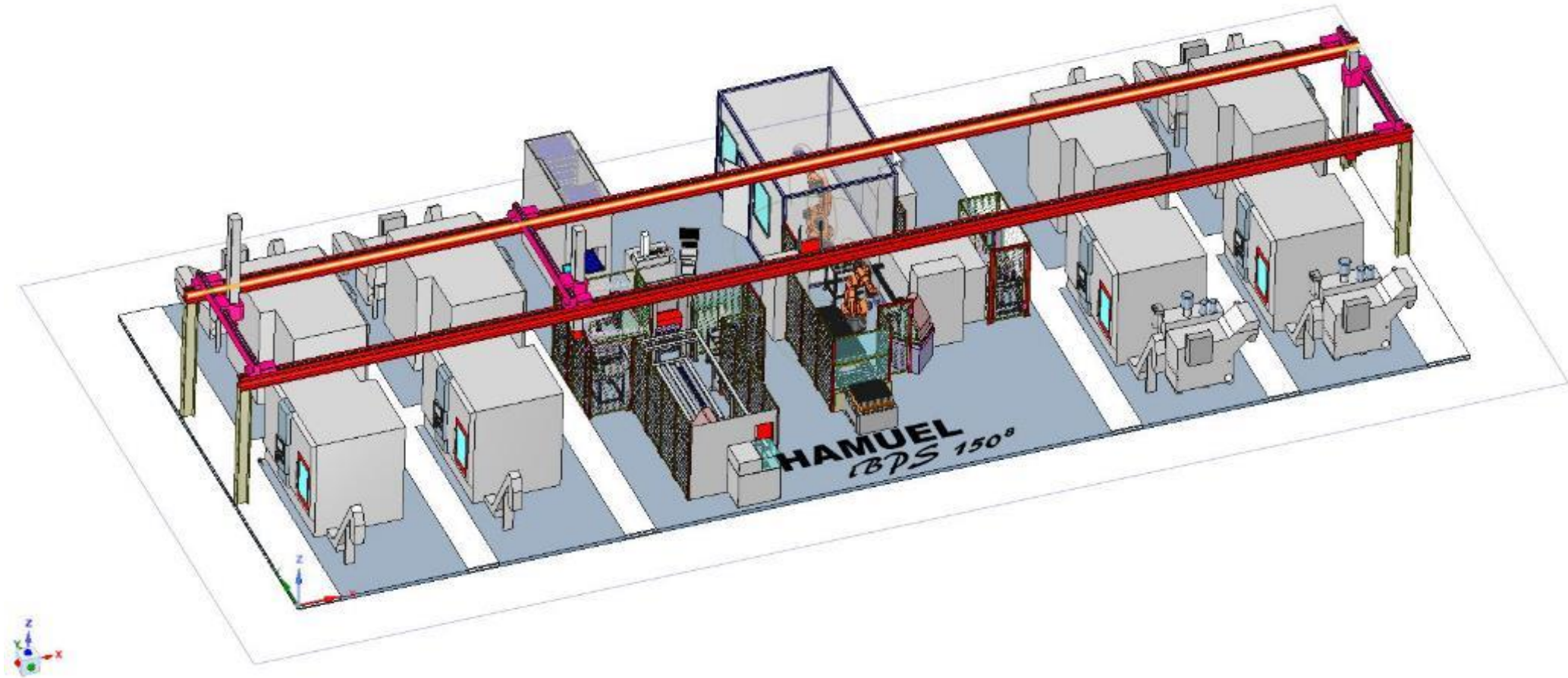


Front Workpiece Loading System with Magazine Disk



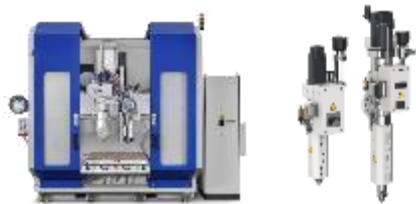
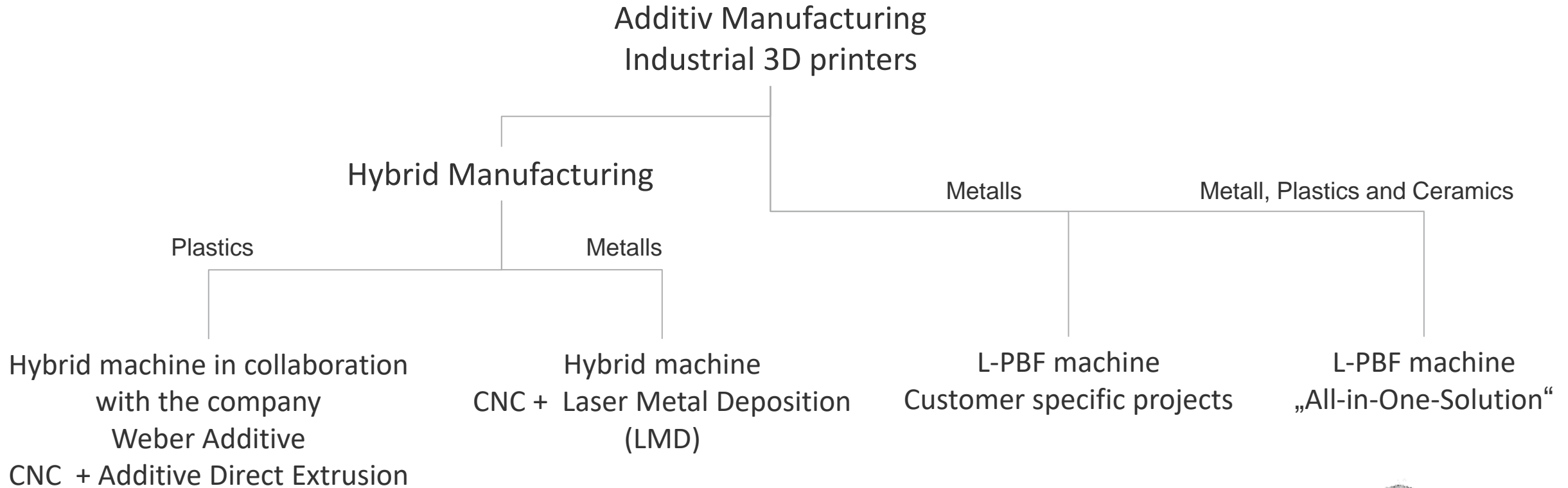


Customized Workpiece Loading System by a 6 Axis Robot



**Fully Automated - FMS**

# ADDITIVE MANUFACTURING



Hybrid machine in collaboration with the company Weber Additive  
 CNC + Additive Direct Extrusion



Hybrid machine CNC + Laser Metal Deposition (LMD)



L-PBF machine Customer specific projects

800x800x500 mm



L-PBF machine „All-in-One-Solution“

\*coming soon  
 200x200x500 mm  
 300x300x500 mm  
 400x400x500 mm

## A new access to efficient manufacturing

HAMUEL has combined his high precise machine tools HSTM with:

- adaptive machining: the additive manufacturing technology  
Laser Powder Cladding (LMD)  
for deposition of new material at the damaged area
- 3D measuring and scanning in addition with a software for automated  
adaptive machining ensures to achieve even the highest requirements  
for repaired turbine components



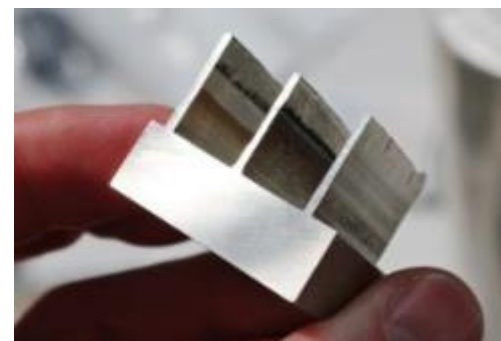
**HSTM 150 HD Hybrid**



**HSTM 1000 HD Hybrid**

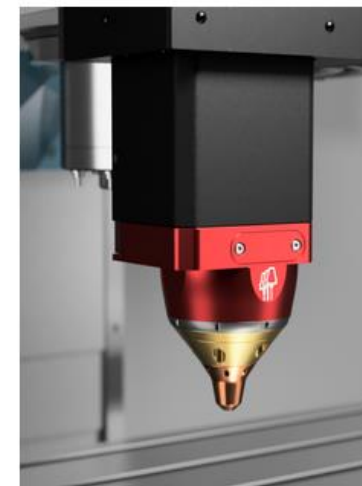
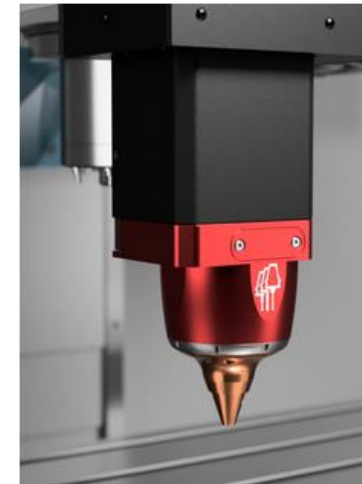
**The combination of various  
manufacturing processes in  
a single machine:**

- 5-axes HSC-turn-milling
- 3D laser cladding
- 3D scanning
- Deburring and polishing
- Laser marking
- Complete machining in a single clamping operation



## Cladding Heads:

- Different deposition rates
- Different nozzle configuration
- Multiple heads usable
- Customized Cladding Heads



## Melt Pool Measuring

This feature is divided into

- Melt pool Size (MPS)
- Heat map

MPS can be in the following states

- OFF
- Monitoring
- Adjustment

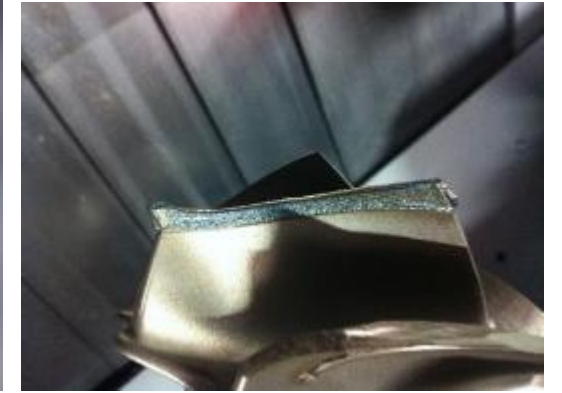
Heat Map can be in the following states

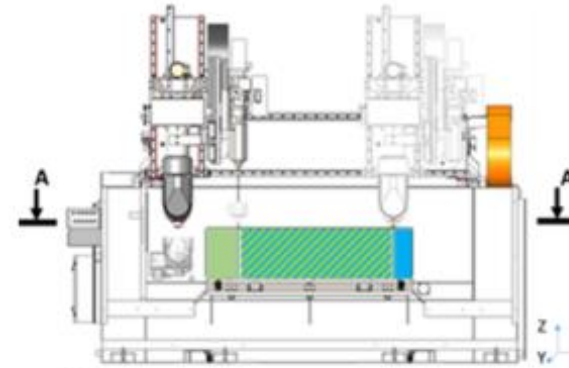
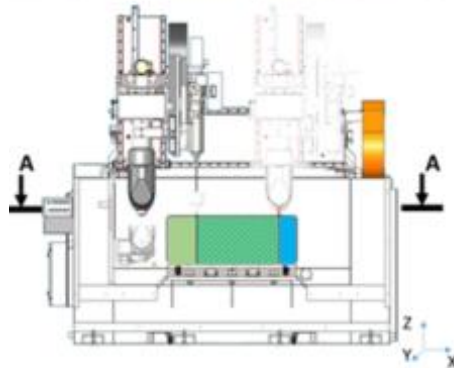
- OFF
- Monitoring
- Adjustment





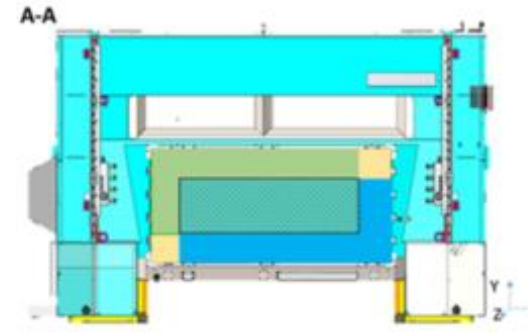
**Examples:**





A-A

A-A

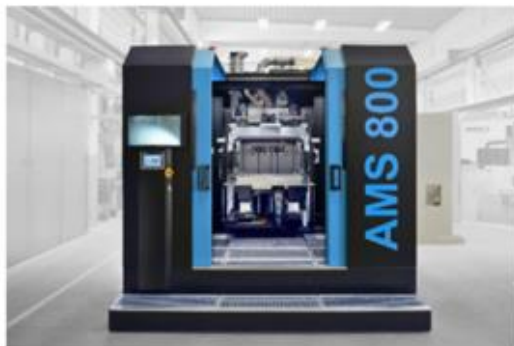
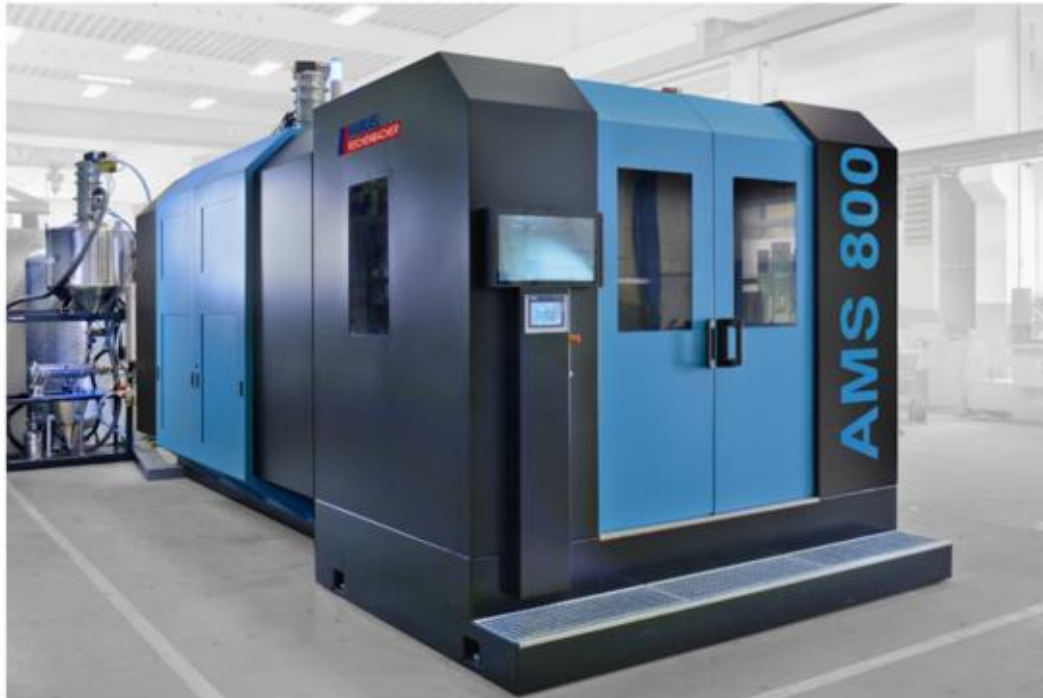


| Color                     | Function           | Unit |
|---------------------------|--------------------|------|
| Blue                      | Printing           | mm   |
| X                         |                    | 735  |
| Y                         |                    | 708  |
| Z                         |                    | 650  |
| Green                     | Milling            |      |
| X                         |                    | 700  |
| Y                         |                    | 750  |
| Z                         |                    | 650  |
| Green with diagonal lines | Printing + Milling |      |
| X                         |                    | 435  |
| Y                         |                    | 458  |
| Z                         |                    | 400* |

| Color                     | Function           | Unit |
|---------------------------|--------------------|------|
| Blue                      | Printing           | mm   |
| X                         |                    | 1635 |
| Y                         |                    | 1008 |
| Z                         |                    | 650  |
| Green                     | Milling            |      |
| X                         |                    | 1600 |
| Y                         |                    | 1050 |
| Z                         |                    | 650  |
| Green with diagonal lines | Printing + Milling |      |
| X                         |                    | 1335 |
| Y                         |                    | 758  |
| Z                         |                    | 400* |

19.10.2021

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**Specifications**

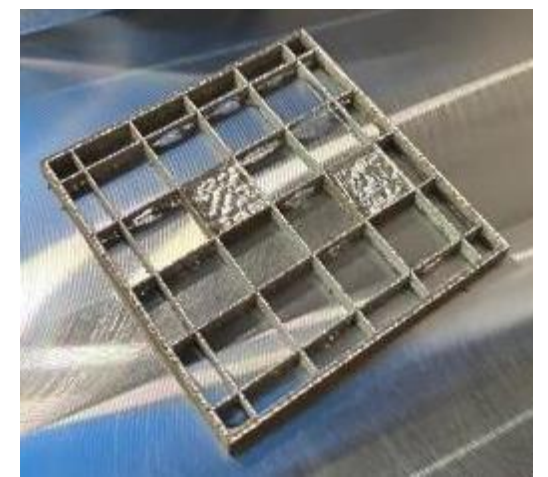
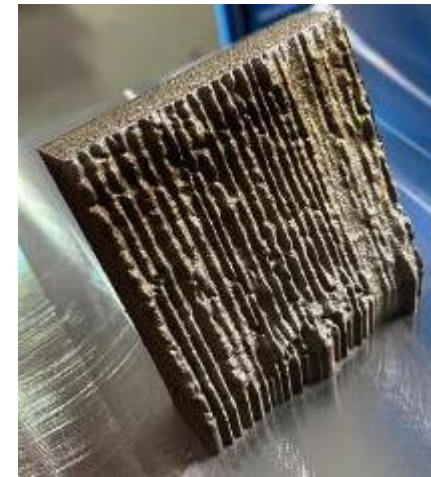
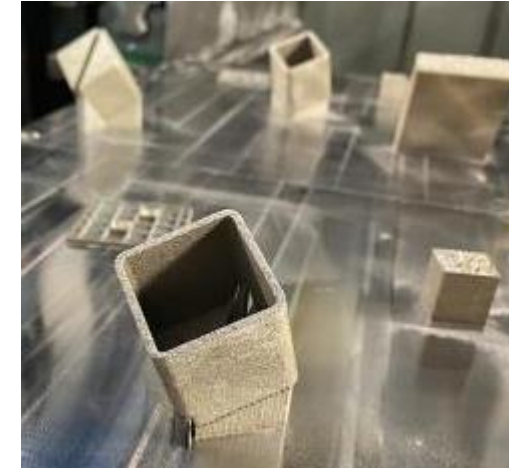
|                    |                        |
|--------------------|------------------------|
| Build volume (XYZ) | 800x800x500 mm         |
| Laser power type   | 4 x 1 kW / Fiber laser |
| Laser wavelength   | 1030-1090 nm           |
| Layer thickness    | up to 120 µm           |
| Scanning speed     | up to 30 m/s           |
| Focus diameter     | 70-500 µm variable     |

**Space requirements**

|                        |                   |
|------------------------|-------------------|
| Dimensions (W x D x H) | 2840x6100x3411 mm |
|------------------------|-------------------|

**Accessories/peripherals**

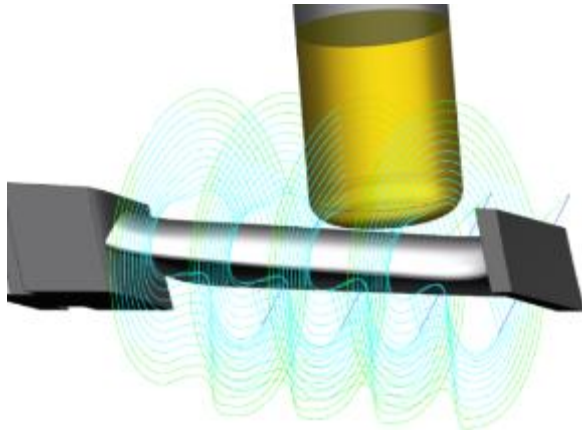
|                          |  |
|--------------------------|--|
| Material                 | Fe-based alloys                        |
| Material loading         | semi-automated                         |
| Handling                 | automated                              |
| Inert gas supply         | N2-generator external                  |
| Powder supply            | Powder management module               |
| Filtering system         | Filter management module               |
| E-Connection/power input | 400 Volt 3NPE, 63 A, 50/60 Hz, 7-10 kW |



# HAMUEL MASCHINENBAU GMBH & CO. KG

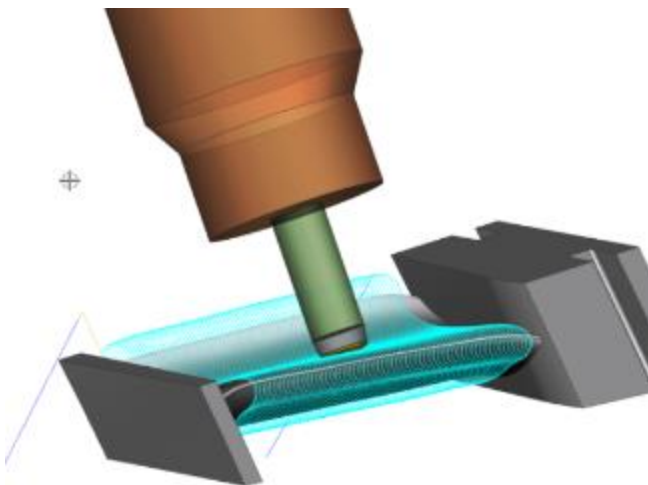
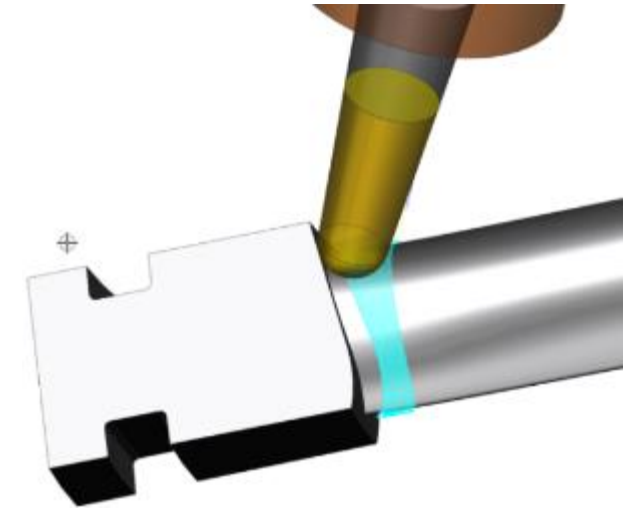
*CAD/CAM SOFTWARE*

## Overview CAM functions



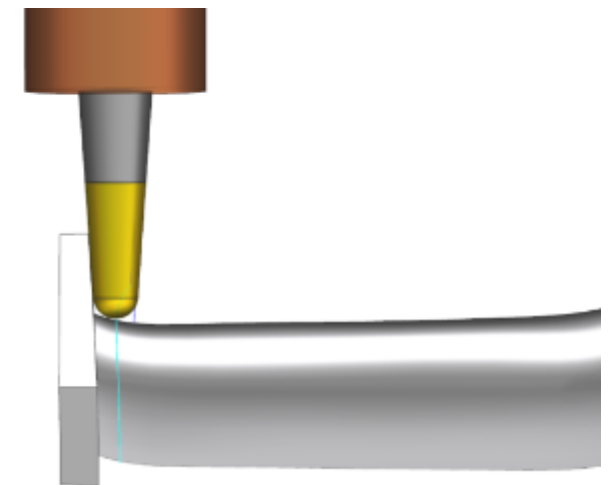
4-Axis  
roughing from  
blank to profile

4 and 5-Axis  
finishing of  
the transition



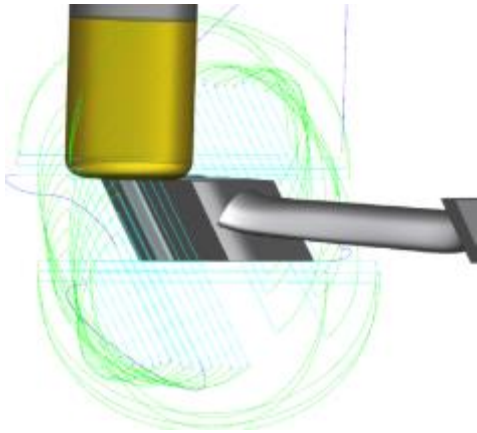
5-Axis  
finishing of  
the profile

5-Axis flank and  
point milling of  
the platform



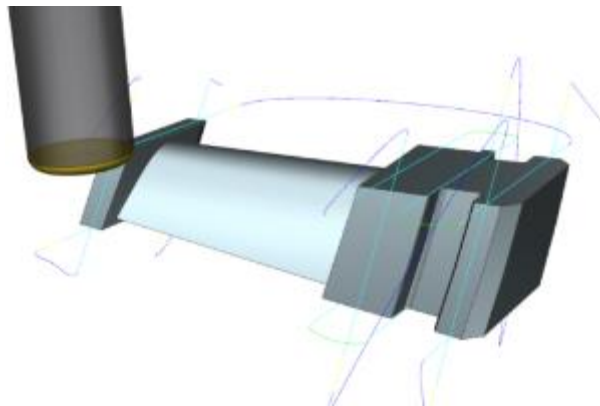
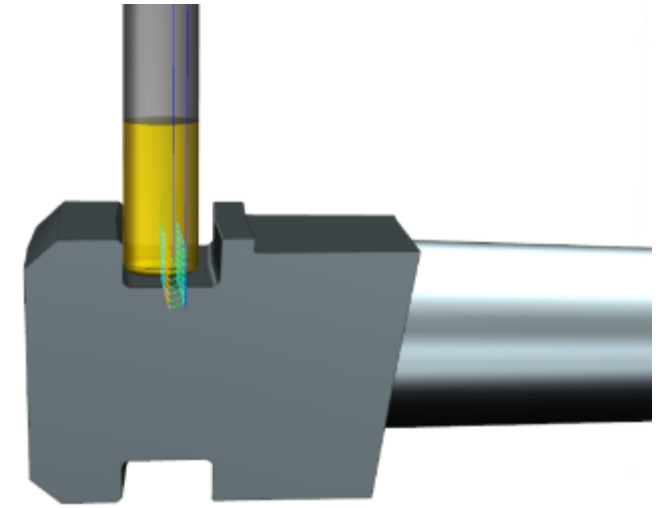
## Profile milling operations for roughing and finishing

## Overview CAM functions



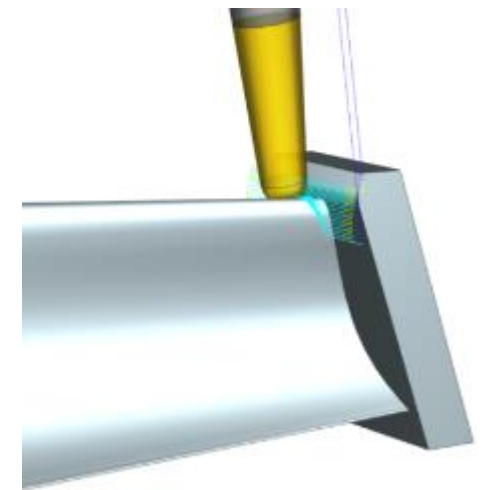
Roughing from blank to profile

Roughing and finishing of slot and cut out geometries



Finishing of the rhombic surfaces

Milling of bellmouth geometries



## Root milling operations for roughing and finishing

# ASSEMBLY OF BASIC MACHINE UNITS



**Advantages:**

- Cost-cutting in procurement
- Reduction in manufacturing and assembly depth
- Optimization of logistics processes
- Completion by MineralCast frames from company Sutter
- Welded structures, prototypes, cabin construction, commissioning, etc.
- Everything from one source!



# OUR CUSTOMERS

# OUR CUSTOMERS

TURBO MACHINERY

MORE THAN 260 HSTM MACHINES WORLDWIDE



Elblag / PL  
Karlovac / HR  
Birr / CH  
Beijing / CHN



AVIC Shenyang Liming Aero-Engine

AVIC Xian Aero.Engine, Xian,

AVIC Chengdu Aircraft Industry Group



Heilongjiang Dongheng  
Trading Co. Ltd.

# OUR CUSTOMERS

## AUTOMOTIVE AND AIRCRAFT CONSTRUCTION



# OUR CUSTOMERS

## MACHINING OF PLASTICS AND COMPOSITES



# OUR CUSTOMERS

MANUFACTURERS OF WINDOWS, DOORS, STAIRCASES AND FURNITURE



**THANK YOU VERY MUCH FOR  
YOUR ATTENTION!**