

HSC-5-axes turn-mill machining of turbo components

**HSC-turn-milling center
HSTM 150 S2**

**HAMUEL
REICHENBACHER**
Members of the SCHERDELgroup

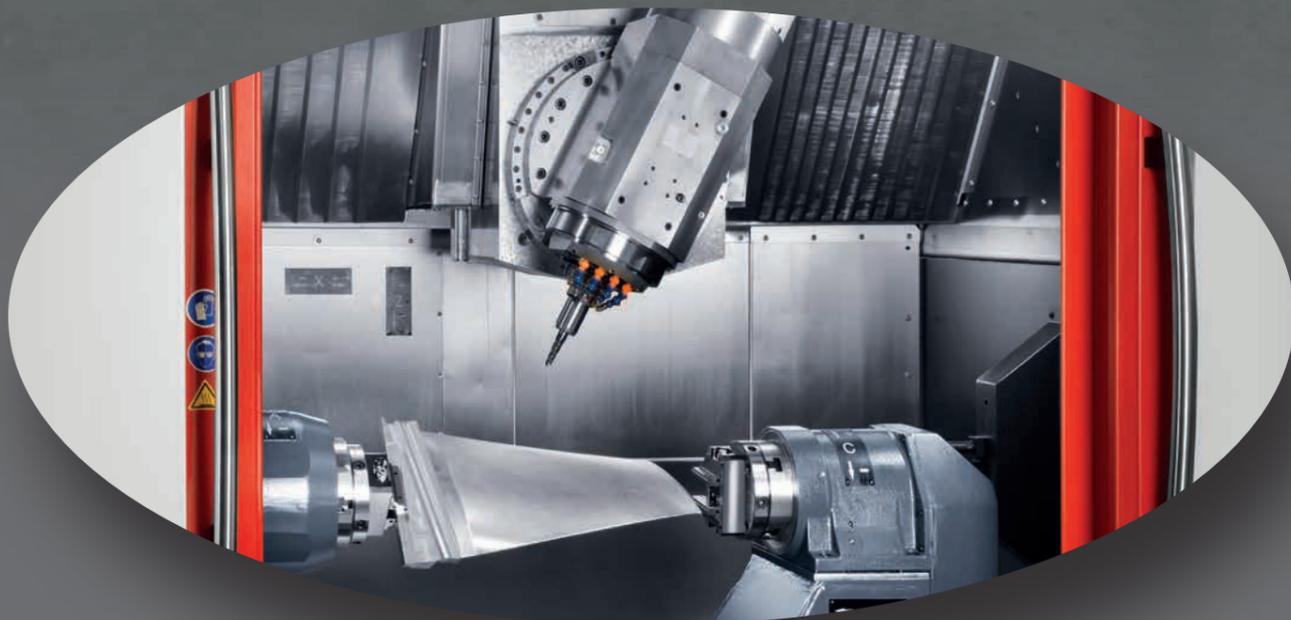


High-quality components Know-how
Low-vibration design
Versatile Experience **Efficient** Power

The HSC-turn-milling machine serves for challenging machining operations in the range up to 800 mm between work-piece spindle and counter-spindle (or tailstock as an alternative). Even the one-sided machining of blisks with outer ring or closed blisks at 100° will be possible for reasons of the asymmetric pivot range of the B-axis.

These features permit innovative solutions:

- Mineral cast machine base for unequaled vibration absorption and rigidity paired with extreme acceleration
- Necessity of only one type of machine for all types of turbo components, i.e. blades (with extended length), as well as blisks (with greater B-axis pivot range)
- Direct operator access to the work-piece and the working area
- Qualification for integration into automation concepts and into existing or future shop floor organization
- Small footprint; one crane-hook machine; no extra width in transportation



Blisk machining

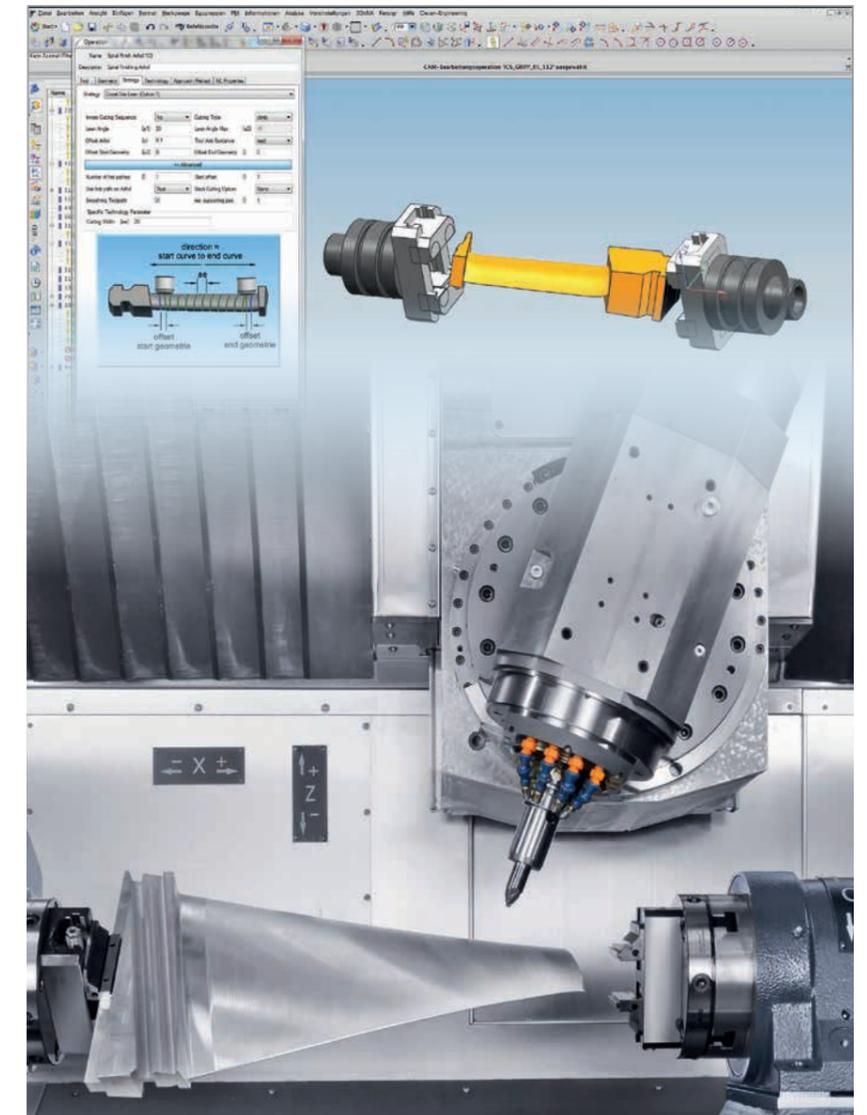


Blade machining

High-precision 5-axes machining of your components

The turn-milling center featuring a horizontal part arrangement is especially suited for the machining of turbine and compressor blades, blisks or radial compressors. Here, the configuration of the working area ensures optimum mass distribution, as well as good visibility of the machining situation.

The machine meets the highest demands of modern blade machining, where the attainable accuracies and surface qualities are concerned. Its sturdiness and rigidity, along with the integrated HSC-support, warrant for utmost productivity. The compact machine design permits its quick and flexible installation at the customer factory – without any special requirements regarding the foundation.



Highly profitable innovations

The specific demands made by our customers are always at the center of our activities. This is why we sometimes choose an unconventional approach, meaning that we follow an individual path and thus often reach extraordinary solutions. Almost 100 years of continuous success in the market can always be attributed to more than one reason alone.

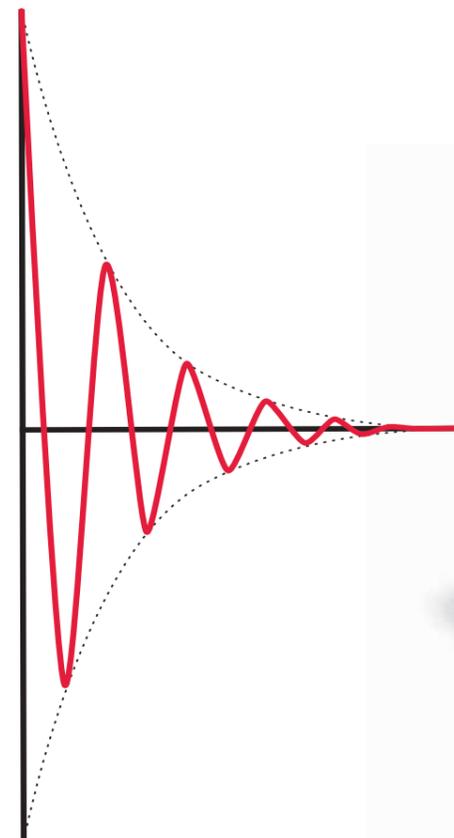
**HAMUEL MineralCast
Special characteristics of the series**

The new precision in mechanical engineering

The convincing features of the series are in its form stability, as well as its heat and temperature resistance. Moreover, mineral cast components are resistant to corrosion, ageing, weather, water, chemicals and aggressive agents.

Reduced vibrations for high-precision machining

A considerable improvement in the machining process can be obtained owing to the excellent damping behavior of mineral castings. This has the following effects: better surfaces after component machining, less tool wear due to reduced vibrations, as well as a higher cutting capacity. The use of mineral castings will give you a benefit of more than a 30 per cent improvement in damping characteristics.



HAMUEL system process know-how

You will get from us the complete process know-how for the manufacture of your components, i.e. planning and production from one source! This comprises of the technology for an optimum flexible clamping system for the component, the specific software for NC-programming, the measuring technology for in-progress and external measuring, the handling technology in the machine and in a manufacturing cell, as well as of various finishing methods.

Software – a cornerstone of our success

An optimum interaction between the machine and the specifically established CAD/CAM-software is of great significance for the production of turbine blades. Our software is based on renowned CAD/CAM-systems. However, in addition we have integrated important features to considerably simplify the manufacturing process, as well as the part programming. This means that you will definitely benefit from a reduction in programming time of up to 45 per cent, and from a similar reduction in machining time.



Your advantages in short:

- Excellent surface quality owing to the rigid, low-vibration design
- Separation of work-piece (A, C, U) and tool axes (X, Y, Z, B) for utmost machine dynamics
- Identical kinematic and dynamic conditions for the X-, Y- and Z-axis
- Very good chip removal from the working area
- Quick installation and commissioning: one crane-hook machine
- Maximum acceleration values up to 1g
- Mineral cast machine bed for excellent damping
- Execution of all operating and control elements as per the latest state of the art



High work-piece quality and accuracy, economic operating and maintenance factors as well as optimized production conditions support the user's goal to buttress his technology leadership on his market.

A-axis (Rotary axis for work-piece)

Direct drive (torque motor) free from backlash equipped with direct measuring system. Work piece interface: based on zero point system for all kinds of clamping elements and fixtures.

C-axis (counter-spindle) with CNC-controlled U-axis

As an option, the counter-spindle can replace the tailstock and be used for supporting and clamping a work-piece (turbine blade) during finishing. The counter-spindle is mounted on a slide and can thus be displaced independently from the A-axis for clamping and un-clamping the work-piece (U-axis).

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 840D 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).

HSTM standards:

- Sturdy machine bed from mineral cast material
- Roller guide-ways in all axes
- Tool changer
- Low-pressure lubricant supply with paper band filter
- Control cabinet with air-conditioning
- Central lubrication system

HSTM options:

- High-pressure cooling through spindle
- Tool and work-piece measuring
- Rotoclear window
- Minimum quantity lubrication

HSTM 150 S2 design

The machine consists of a one-piece machine base, where all the components are arranged in an optimum way for machining horizontally clamped work-pieces. Standard interfaces at the rotary axes and peripheral components are essential features of this machine designed for utmost productivity.

Machine dimensions HSTM 150 S2	
Length x width x height	Approx. 3,900 x 2,750 x 3,100 mm
Weight	Approx. 16 metric tons
Working area	
Travel (X x Y x Z) Milling area:	X 800 mm Y 450 mm Z 465 mm
Tool change: Y total travel	1,115 mm
Milling spindle	
Speed range	16,000 rpm
Rated speed	4,200 rpm
Spindle power (S1)	28 kW
Spindle torque (S1)	63 Nm
Travel speeds	
X-axis	65 m/min
Y-axis	65 m/min
Z-axis	65 m/min
B-axis	100 rpm
A-axis	240 rpm
C-axis (option)	240 rpm
Positioning accuracy per VDI / DGQ 3441	
X-axis	0,004 / 0,0032 mm
Y-axis	0,004 / 0,0032 mm
Z-axis	0,004 / 0,0032 mm
B-axis	6 / 4 sec
A-axis	6 / 4 sec
C-axis (option)	6 / 4 sec

Details are subject to change due to product development.



**Local roots,
worldwide presence**

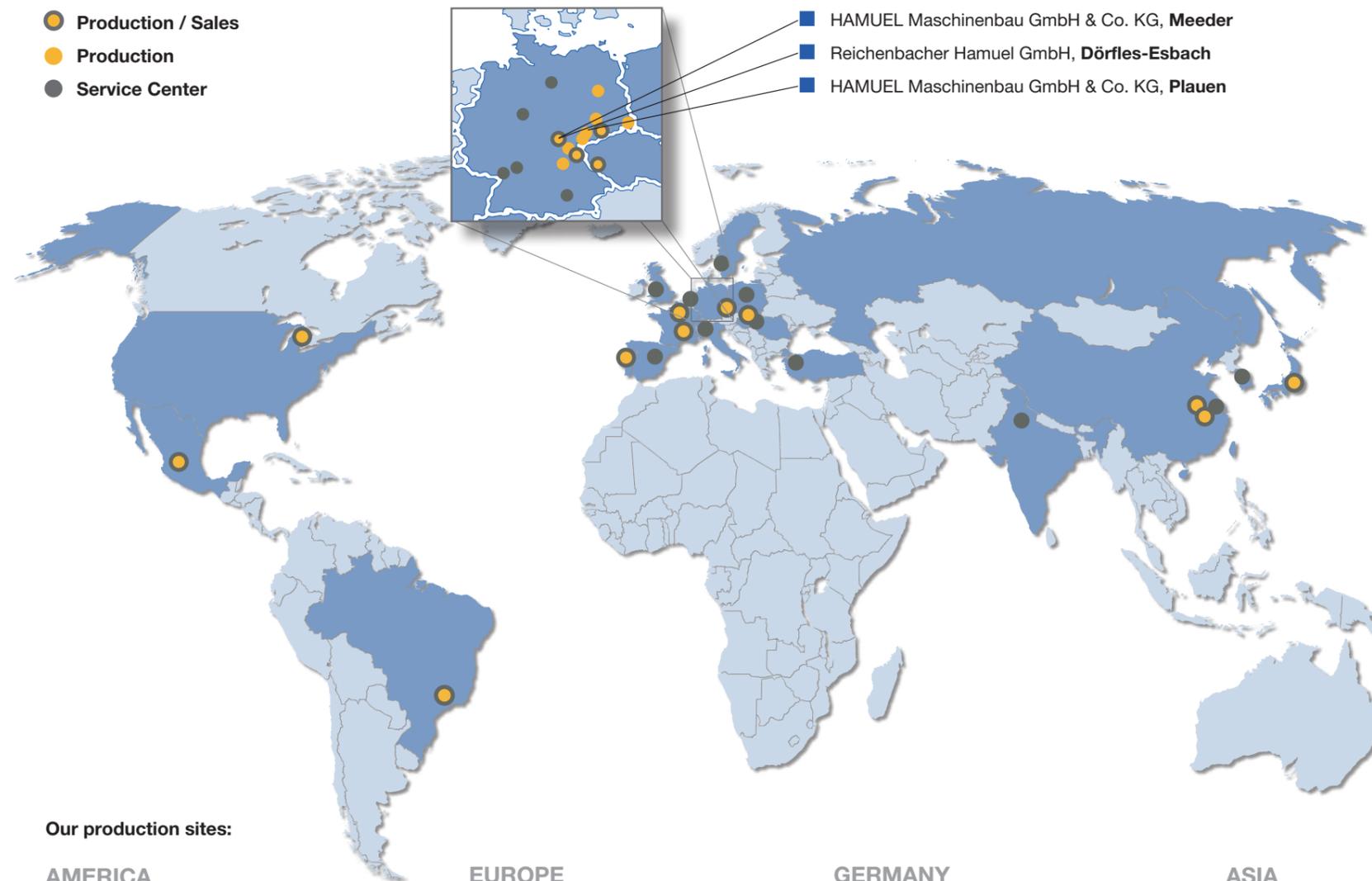
The SCHERDEL group of companies with its headquarters at Marktredwitz in the North-East of Bavaria has gone global featuring 34 locations with 45 production sites and more than 6,300 employees. The members of the SCHERDEL group offer to the market a wide range of products and services, while the individual companies are operating flexibly and autonomously in the market.

Each of these companies can resort to the longstanding experience and the know-how of the other members of the group. This results in precious synergies that will not only save the customer's time and money, but also present him with entirely new perspectives.

Only in the fields of mechanical and plant engineering, as well as tool manufacture, the SCHERDEL group employs more than 700 people. Our customers appreciate the strong synergies inherent in our group of companies, as in accordance with the "full-service-principle", they provide them with comprehensive solutions to their problems.



- Production / Sales
- Production
- Service Center



Our production sites:

AMERICA

- Brazil, Sorocaba
- Mexico, Silao
- USA, Muskegon

EUROPE

- France, L'Arbresle
- France, Beauvais
- Portugal, S. J. da Madeira
- Russia, Kaluga
- Slovakia, Myjava
- Czech Republic, Bor

GERMANY

- Berlin
- Chemnitz
- Coburg
- Erlangen
- Marktredwitz and its region
- Marienberg
- Plauen
- Röslau
- Seiffennersdorf
- Treuen

ASIA

- China, Anqing
- China, Huzhou
- Japan, Aichi



The REICHENBACHER-HAMUEL group of companies

The HAMUEL Maschinenbau GmbH & Co. KG is part of the Reichenbacher-Hamuel group of companies. The other companies are the Reichenbacher Hamuel GmbH, as well as the HAMUEL Maschinenbau Plauen GmbH & Co. KG. These three companies operate under the name of Reichenbacher-Hamuel.

Almost 100 years of experience in mechanical engineering, as well as around 40 years of know-how in CNC-machining are self-explanatory: nearly 5,000 CNC-machines produced by this group are in use in the most diverse industries all over the world. Many in-house developments and patents document the great inventive capacity of this group of companies.

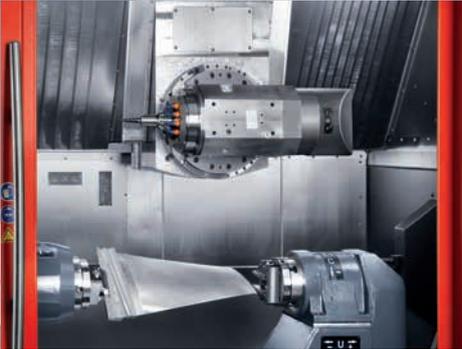
Our products:

- **HSC-TURN-MILLING CENTRES**
- Machining centres
- Multi-technology milling machines
- Component manufacturing
- Software
- Machine installation
- Retrofit





**Splendid view to witness the process
also with high pressure coolant**



**Extremely wide swivel range
of the milling spindle**



**Many tool pockets
and high speed tool change**

