

Next Generation

Maximilian Thoma takes over the responsibility for the HerkulesGroup companies in the 4th generation

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The state-of-the-art production facility is being successively put into operation in Siegen

Industry Reports

WaldrichSiegen machines in Mining, Energy Technology and Engine Production

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TM 125 compact boring mill: The advantages of a table-type boring mill with the flexibility of a compact machining center

Strong Concepts for a Strong Future



Herkules in the 4th Generation

After 42 successful years at the helm of the company, Christoph Thoma has handed over the reins to his son Maximilian Thoma.



When Christoph Thoma was appointed CEO of Maschinenfabrik Herkules on December 16, 1978, he was responsible for 270 employees producing mainly roll grinders for German and Central European customers. Today, around 1,500 employees work in the companies of the HerkulesGroup, which under his leadership has developed into a globally established specialist for large machine tools in the fields of grinding, texturing, turning, milling and drilling.

In addition to its headquarters in Siegen, the HerkulesGroup is always close to its customers, both nationally and internationally, with numerous production and service locations. Christoph Thoma was responsible for the expansion of techno-

logical market leadership as a core objective for the company. Future-oriented electronic measuring systems and machine controls were developed for the high-precision machines and new sales markets were opened up internationally. In 2004, Christoph Thoma acquired the Waldrich companies in Chicago and integrated the milling machine specialist WaldrichSiegen into the HerkulesGroup. In order to be able to set up an autonomous position with in-house developments and in-house production of as many components as possible, other companies from the special machine construction sector were integrated in the ensuing years.

With the decision of the largest investment in the company's more than 100-year history, Christoph Thoma most recently set the course for the return of WaldrichSiegen from the Burbach location to Siegen, where WaldrichSiegen was originally founded 182 years ago. In the ultra-modern production and administration complex in the Eisenhüttenstraße, which was built in 2020, the two companies will be able to utilize even more synergies from a close proximity in order to continue to develop the HerkulesGroup dynamically in the world market.

At the end of 2020, after 42 years at the helm of the company, Christoph Thoma handed over operational management to his son Maximilian Thoma. To prepare for his new role, Maximilian Thoma previously spent 6 years as President and COO of Herkules Maschinenfabrik in Meuselwitz, Germany, where he headed up the modern manufacturing facility in Thuringia, which employs 300 people. As "Chairman of the Board", Christoph Thoma will continue to accompany the destiny of the group and will be available for consultation.

Investments

WaldrichSiegen has a new XXL Production Facility

With the largest investment in the company's history, the HerkulesGroup has built a new production facility for WaldrichSiegen. After 60 years at the Burbach location, WaldrichSiegen is thus returning to Siegen, where the company was founded 182 years ago.

Over the past two years, a modern production and administration complex of impressive dimensions has been built opposite the Herkules machine factory, the headquarters of the HerkulesGroup companies. At almost 250 m long, 32 m wide and 24 m high, the new production building creates over 8,000 m² of space for a state-of-the-art production facility. As early as Spring 2021, the first production machines from WaldrichSiegen in Burbach were moved to the new location in order to successively put the new facility into production operation.

Directly in front of the production facility, a new administration complex has also been built, providing a further 3,500 m² of office space in addition to the existing 1,800 m² at Herkules Maschinenfabrik, in order to bring the technical and administrative employees within the HerkulesGroup even closer together.





Impressive dimensions – The XXL heavy-duty machine tools from WaldrichSiegen will be built in the new production facility in the future



The training center in Siegen offers apprentices a modern environment



More Synergies and Sustainability

Shorter communication channels, closer spatial working of management, improved logistics and centralization of parts production ensure numerous optimizations and synergies to generate further growth in the Group.

Machines and fully automated production plants up to 16 m high and individual parts weighing up to 160 t can be assembled in the new production facility. The optimized production and assembly processes further increase the high quality and at the same time shorten the time required to build the machines. Ultimately, this also benefits customers from numerous industries worldwide.

But it is not only the dimensions of the building project that set standards – sustainability goals have also been taken into account in many details during the planning phase. For example, the facade walls of the building, constructed using the sandwich Isopanel method, guarantee excellent thermal insulation, while the roof is prepared for the installation of a 4,000 m² photovoltaic system. In addition to a modern air-to-water heat pump in the industrial plant, the production facility is also equipped with a highly efficient concrete core cooling system for the floor slab. This ensures economical and environmentally friendly air conditioning of the building.

Even Better Training

By locating the two companies in Siegen, the apprenticeship area, which has always been focused on by Herkules and WaldrichSiegen, is also developing sustainably. In a new and state-of-the-art equipped training center, apprenticeships are provided in 10 different professions and after successful completion of the apprenticeship, the group of companies promises a job and thus a secure future.

The portfolio expansion with large boring mills is a further step for dynamic growth for WaldrichSiegen, the specialist and world market leader for customized heavy-duty machine tools in the fields of milling, turning, drilling, grinding and texturing.

“WaldrichSiegen will develop and produce its high-performance and high-precision machine tools at the new location in an infrastructure perfectly equipped for this purpose.”

Marco Tannert

President & COO of WaldrichSiegen

WaldrichSiegen Machines for the Production of Mining and Quarrying Equipment

Enormous machining bandwidths of different workpieces require flexible and universally usable machine tools. Thanks to customized complete solutions from WaldrichSiegen, this is not a problem.



Mining and Quarrying Machinery

The manufacturing of machines for underground and surface mining as well as for the transport, mining and processing of rock, ore, salt and waste material often requires the precise and rapid machining of individual parts and workpieces in the smallest batch sizes in order to rectify material damage at an early stage and reduce downtimes.

Here, the productivity of the machine tools is of crucial importance. Because only flexible and universally usable machines make it possible to cover the enormous range of workpieces that need to be machined, such as excavator arms, booms or undercarriages. By using the turning, drilling and milling machines from WaldrichSiegen and the Union brand, our customers always achieve the best possible result.

Complete Modernization at JSC Kopeysk Machine-Building Plant

The ProfiMill *compact* with clearance widths of between 2,700 mm and 4,200 mm is the ideal gantry milling machine for all machining applications involving small and medium-sized workpieces. The Russian machine building plant JSC “Kopeysk Machine-Building Plant (KMB)”, Russia’s largest manufacturer of processing plants and mining machinery, has opted completely for machines from WaldrichSiegen for the complete modernization of its large mechanical parts production and has acquired two ProfiMill *compact* machines with 79 kW milling power, one machine in gantry and one in double table design, and six Union boring mills of the PR series with 162 and 180 mm boring spindle diameters – a customized complete solution from a single source.

KMB has a clear objective: To continuously increase capacity and quality. Through an existing customer contact and three existing boring mills, KMB was familiar with the quality of the machines.

For the customer, the flexibility in the customer-specific machine design of the ProfiMill *compact* and also the use of common parts for cost-effective stocking of spare parts were important. The quality of the service and the machines were the key factors for the customer to decide in favor of WaldrichSiegen – and this outstanding quality was also offered to the customer 100%.



The ProfiMill *compact* is ideally suited for machining small- and medium-sized workpieces

Optimally Adapted Boring Mill Despite Challenging Space Concept

The Canadian manufacturer of drilling and transport systems for mining and battery-powered electric vehicles for underground mining, Prairie Machine and Parts Mfg. Ltd, have purchased a Union brand PCR 150 hydrostatic horizontal boring and milling machine.

What at first sounds like a relatively normal order turned out to be a real challenge as early as the planning stage. Due to the limited space conditions in the workshop, there had to be very close cooperation not only with the customer but also with the workshop and foundation builders regarding the dimensions and the installation of the machine, which took several weeks. In the end, our experts developed a solution that is perfectly adapted to the available space on site and still meets all the requirements in terms of occupational safety and performance 100%.

The machine impresses with its hydrostatic guiding system in all machine axes. The horizontal floor-type boring mill is also equipped with a Fanuc control system and two additional floor plates at the left and right of the roto-traversing table, on which workpieces with a total weight of up to 25 t can be machined efficiently and quickly. The travel of the column is 9,000 mm in the X-axis. The headstock can be raised to a height of 3,000 mm, using hydrostatic guides. The ram has a travel of 1,100 mm, and the boring spindle adds an additional 750 mm of plunging depth. The machine also has two machining attachments, a UC-V 45 milling head and a facing and boring head, which can be picked up quickly and efficiently in the pickup station on the floor plate.

This is the second Union machine for Prairie Machines. The customer was ultimately won over by the quality of the boring mill already purchased and the on-site service provided by our Herkules USA subsidiary in North America.



The PR series horizontal boring and milling machines are the ideal machine tools for machining large components

The machine concept of the ProfiTurn V offers fully automated solution strategies, e.g. with tool and attachment changer or pallet systems for more efficient loading with workpieces.



First ProfiTurn V for the Production and Repair of Spare Parts in the XXL Vehicle Sector

For our Russian customer LLC Torgoviy Dom Trade-KNK, owner and operator of large dump trucks used in coal mines and repaired and maintained in the in-house service center, we have completed a fully automated project. In the course of company development and expansion, Trade-KNK has set itself the goal of offering a wider range of services to other Russian operators of XXL vehicles, including the production of original spare parts. To ensure automated production and repair of a wide range of spare parts, the customer needed high-quality and flexible machines. Thus, the logical choice was made for our ProfiTurn V.

The ProfiTurn V is the solution for flexible machining of complex workpieces



**Energy Technology
(Power Plants and Wind Power)**

Regardless of whether it is a matter of energy production or generation using wind power or a power plant, workpieces and drives for wind turbines, turbine plants and generators must be precisely machined both as a whole and in parts. For this purpose, the machine tools used must be adapted to the respective machining task and the spatial conditions at the customer's site. In close cooperation with our customers, the WaldrichSiegen and Union product lines are perfectly tailored to the requirements of the energy industry and always offer the right machine solution.

Optimal Product Line for the Energy Industry

Machine components in the energy industry are often exposed to extreme conditions and high forces. Machine solutions from WaldrichSiegen ensure reliable machining and maximum precision – for a flawless end result.

**Dongfang Electric Corporation
Impressed by the Performance of
WaldrichSiegen Machines**

Dongfang Electric Wuhan (DFWH) is a long-standing customer of WaldrichSiegen and part of Dongfang Electric Corporation (DEC), one of the world's leading producers of equipment and products for electrical power generation. The products of DFWH require the highest machining precision. Accordingly, the decision was made in favor of a machine from the ProfiMill series. The technical specifications are impressive with 68 kW power, a table size of 6,000 × 4,000 mm, a clearance width of 5,000 mm and machine components that are optimally tailored to the customer's requirements.

The group of companies already has several horizontal turning machines of the ProfiTurn H series and another ProfiMill in operation and appreciates the reliable quality and long service life of the WaldrichSiegen machines. The impressive performance data of the new ProfiMill compared to the competition in combination with the positive experience gained with the existing machines were the most important decision factors for the renewed investment.

**Horizontal Lathe Excels
in the High-Precision Range**

With the order to build the ProfiTurn H 1750/75 horizontal lathe for Harbin Electric Machinery Co., one of the leading Chinese manufacturers of electrical machinery and equipment in the energy sector, WaldrichSiegen sets a new standard in large-part machining.

The machine processes workpieces with a diameter of 1,750 mm, a length of 12,500 mm and a total weight of 75 t. The production of the rotor and generator shafts requires that tolerances smaller than 5 µm be maintained in radial and axial runout with equally large diameters and high workpiece weights. The design and construction of the main bear-

ings and the one-piece cast housing of the headstock ensure maximum stability and rigidity throughout the machining process. The ProfiTurn H is also equipped with hydrostatic guideways in the X- and Z-axes as well as hydrostatic steady rest jaws.

The ProfiTurn H is already the third machine of this type for Harbin Electric. The extremely precise machining as well as the high quality and reliability of the machines already operating in the plant have convinced Harbin Electric to once again invest in a machine from WaldrichSiegen.



The ProfiTurn H excels in quality and accurate machining results

Highest Efficiency and Precision in 5-axis Machining

KSB Nuclear Pumps and Valves Co., Ltd. with headquarters in Shanghai is a manufacturer of pumps, valves, ball valves and butterfly valves and a specialist in the field of conventional power generation. In order to meet the special manufacturing requirements of the customer, WaldrichSiegen has reached a new level in the field of 5-axis machining with the Union boring mill KCS 150. The overall dimensions of the boring mill in cross bed design with travels of 3,500 × 2,500 × 2,500 mm and an NC reversible clamp with a diameter of 1,250 mm with integrated rotating A-axis enable precise positioning and machining of large and complex workpieces from different angles. Programming is done using CAM software with 3D simulation to check for collisions within the entire tool path and a corresponding postprocessor.

The boring mill is also equipped with an automatic tool and milling head changer for a fast and efficient change of 3 milling heads and 120 tool pockets. This enables the customer to manufacture complex workpieces, such as impellers, in-house without having to rely on an external supplier.



The Union boring mill KCS 150 reaches a new level in the field of 5-axis machining

Performance that convinces:
WaldrichSiegen machines are always
optimally tailored to customer-specific
production requirements.

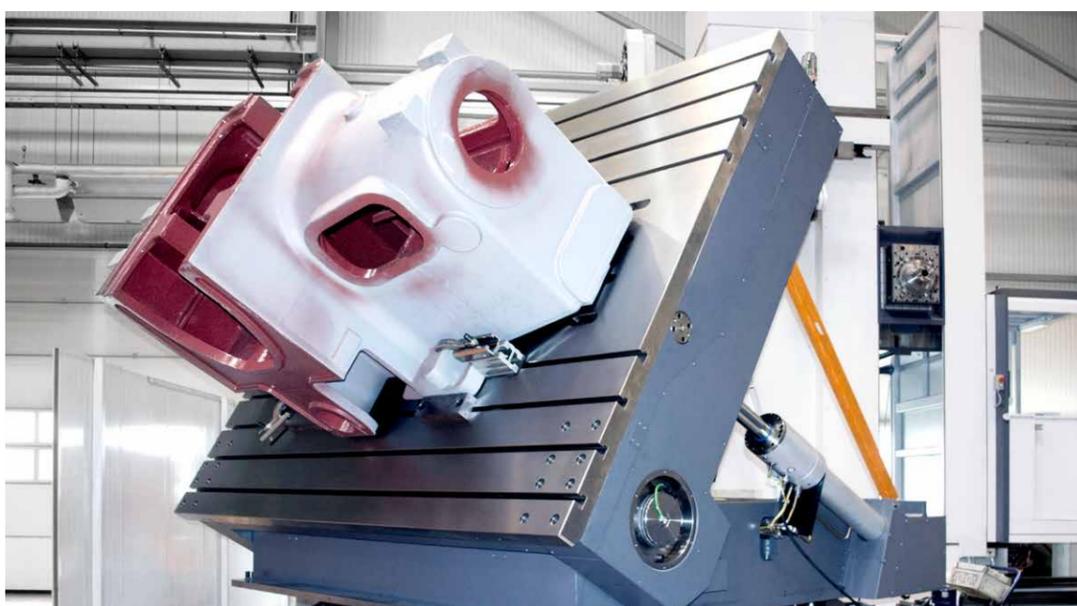
PR II 180 with Special Table Design for Hub Machining

WaldrichSiegen has delivered a PR II 180 horizontal boring and milling machine with a special table design to our Polish customer PPU Metalmor, a contract manufacturer focusing on the production of large parts for shipbuilding, energy and wind power technology and gear manufacturing.

For the machining of wind turbine hubs, the customer required a special table that is not only rotatable and movable, but also tiltable. The hub connects the rotor blades of the wind turbine to the generator and transmits the power to the rotor shaft. To machine the inclined surfaces, the workpiece must be tilted up to 15° in the direction of the tool.

The PR II 180 is equipped with a Siemens control and fully hydrostatic guideways. The overall dimensions of the machine as well as the travels of 8,000 mm in the X-axis, 4,500 mm in the Y-axis and 1,100 mm in the Z-axis allow highly flexible machining of workpieces up to 40 t on the rotary/traversing/tilting table and the two additional plate areas. The boring spindle itself has a travel of 750 mm and a diameter of 180 mm.

For a high level of automation, the boring mill is also equipped with a tool changer with 40 tool pockets and three milling heads. In addition to a T 130/1, the PR II 180 is already the second boring mill for Metalmor.



The tilting table design enables optimum workpiece machining on all sides

Gantry Milling Machines for Engine Production

Efficient and precise: The WaldrichSiegen ProfiMill series combines innovative technologies and highest machining quality.

Thirteen ProfiMill Gantry Milling Machines for the Weichai Group

WaldrichSiegen was able to assert itself in the highly competitive market with its quality and precision and has been able to win four orders in recent years for a total of thirteen gantry milling machines of the ProfiMill Series for the Chinese Weichai Holding Group Co., Ltd., some of them also equipped with pallet changing systems.

The latest order for the subsidiary Weichai Heavy Machinery Co., Ltd. comprises seven identical ProfiMill gantry milling machines with a clearance width of 2,750 mm, 320 tool pockets, up to 10 different milling heads and a milling power of

76 kW for the highly demanding machining of engine blocks for diesel engines. It was of great importance for the company to purchase all machines from WaldrichSiegen, as the customer relies on and trusts in the networked systems and Industry 4.0 solutions. The machines are equipped with extensive sensor technology for machine and process monitoring and are integrated into the customer's Intelligent Manufacturing System. As a highly qualified partner for long-term service and low costs for stocking standard spare parts, WaldrichSiegen ensures maximum productivity in the Weichai Group companies and precise long-term accuracy of the machines.





The ProfiMill Series is the optimal solution for complex and customer-specific machining tasks, both technologically and ecologically.

Engine Production

Maximum precision and a perfectly machined surface are key criteria for ensuring the longevity of marine engines and keeping wear on individual machine components as low as possible. Only flexible and universally usable machines make it possible to cover the enormous range of workpieces that have to be machined.

The ProfiMill is the perfect machine for processing medium to large workpieces with maximum precision and performance: Hydrostatic guideways for high dynamic rigidity and a masterhead interface for a wide variety of milling heads provide flexibility, high-performance machining and a high level of cost-effectiveness that exceeds all requirements. Complex large parts are efficiently machined by the gantry milling machine. The modular design offers a wider machining spectrum and thus more extensive options for individual adaptations.

Smart Technology for a Smart Project

With its groundbreaking “Smart Technology Hub” project, WÄRTSILÄ Finland Oy, a specialist in marine engines, is investing in the construction of a new technology center for the development and production of highly efficient heavy-duty engines, and is relying on the high quality and innovative strength of WaldrichSiegen in this regard.

Our ProfiMill gantry milling machine in gantry design with a pallet changing system and additional plate area in the second work area is integrated into the customer’s Flexible Manufacturing System (FMS) as part of the fully automated production. The ProfiMill is supplied with

the 3,000 × 8,000 mm pallets, which hold workpieces weighing up to 60 t, via rail and automated guided vehicles (AGV) and a total of 10 pallet set-up and storage stations. The ProfiMill is equipped with an automatic shuttle system for a total of 12 milling heads as well as an automatic tool changing system in rack design with 300 tool pockets, including operating robot and connected tool taper cleaning system. The machine control system is a Siemens 840 D sl with an extended WaldrichSiegen diagnostic system, Omative performance monitoring and optimization, and an Industry 4.0 or Smart Factory-capable data connection to the customer systems via OPC UA – for intelligent and flexible production of tomorrow.



A wide range of accessories allows high machining flexibility

WaldrichSiegen as Lifetime Service Partner

Precision results over decades

WaldrichSiegen is a specialist in the development and production of heavy-duty machine tools in the four areas of milling, turning, grinding and texturing that demand the highest levels of precision, efficiency and reliability – not only on delivery but for decades to come.

Our specialists take into account not only the wishes and requirements of our customers during the design phase, but also the performance data of the machine – for an energy-efficient, low-maintenance and service-friendly life cycle.

The maintenance and innovative modernization of all delivered machines over decades is a matter of course for WaldrichSiegen. It includes the comprehensive and timely supply of spare parts and service as well as, if reasonable or necessary, the partial or complete overhaul of our machines. WaldrichSiegen even modernizes machines from other manufacturers.



The tailor-made WaldrichSiegen service offer:

- Maintenance/servicing
- Repairs
- Spare parts supply
- Predictive maintenance
- Assembly/disassembly and machine relocations
- Modernizations/complete overhauls
- Worldwide service network

Our commitment:
Optimal machine configurations and technological concepts from a single source for the best possible customer service.



Value Added Services:

- Technological consultation
- Concept
- Training
- Emergency service
- Individual service contracts



Modernization of the World's Largest Lathe ProfiTurn H

Another success story for WaldrichSiegen in this regard comes from North America. There, the largest lathe in the world, a ProfiTurn H with a turning diameter of 7,000 mm and a workpiece length of up to 25,000 mm, which was used there for the efficient machining of turbine rotors for power plants, was not only modernized, but was also relocated.

In addition to the relocation and installation of the machine in France, an upgrade of the machine control system has also been carried out. Also, the electrical components were adapted to the European power grid and local conditions. We thus ensure the optimum solution for our customer even under complex conditions.



Upgrade and relocation of the world's largest lathe optimizes manufacturing capacity at the new location in France

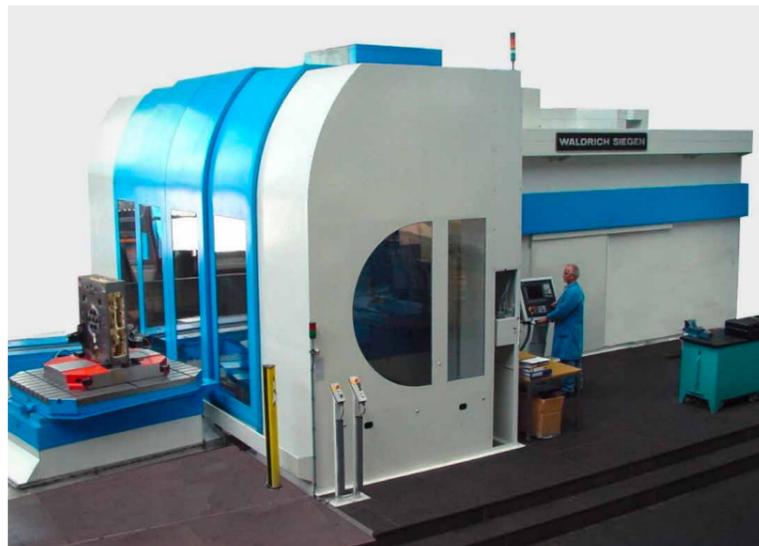
High Precision Machining Center μ PM 1,500 Modernized and Relocated by WaldrichSiegen

Index-Werke GmbH & Co. KG Hahn & Tessky in Esslingen, a manufacturer of single and multi-spindle automatic lathes as well as turning, milling and grinding centers, has been working with a WaldrichSiegen μ PM 1,500 horizontal high-precision machining center for the high-precision finish machining of the core components of multi-spindle automatic lathes since 2003. Thanks to excellent care and maintenance, the machine is still in excellent condition after having been in continuous production use for 17 years and still achieves the highest machining accuracies.

In the course of production restructuring, the machine has now been successfully relocated by WaldrichSiegen within the production site in Deizisau. At the same time, an extensive modernization of the machine components was carried out at the WaldrichSiegen facility to ensure accuracy and availability for the coming production years.

In addition to classic wear parts, ball screws, linear encoders, all hydraulic and hydrostatic lines as well as pumps and cables of the fully hydrostatic machining center were replaced. Furthermore, a new tool management system with RFID tool identification system and a high-precision measuring probe were retrofitted.

In the Summer 2021, the modernized machine was returned to production after successful machining of the test workpieces. There, it continues to form the core of the high-precision machining of headstocks and still reliably achieves machining accuracies in the μ m range.



Extensive upgrades to the μ PM 1,500 horizontal high-precision machining center from WaldrichSiegen

Boring Mill and Machining Center Combined – Union TM 125

The advantages of a table-type boring mill with the flexibility of a compact machining center are perfectly combined in the Union TM 125.



Technical Data TM 125

Column (X-axis)	2,000 mm
Headstock (Y-axis):	1,600 mm
Table (Z-axis):	1,000 mm
Boring spindle (W-axis):	600 mm
Boring spindle diameter:	125 mm
Drive power:	34 kW
Speed of rotation:	max. 6,000 rpm
Torque:	max. 1,433 Nm
Table setup area:	1,600 × 1,600 mm

Based on the T Series, the Union TM 125 compact boring mill impresses with its side column and boring spindle (125 mm) with longer travels, greater degrees of freedom and high capacity for table loading. The TM 125 machines medium-heavy workpieces up to 10 t and has a work area of 2,500 × 2,000 × 1,600 mm. The compact boring mill combines the advantages of a classic boring mill with the features of a machining center and thus also offers smaller companies a wide range of machining operations at a comparatively low investment cost and a small footprint.

In terms of location, the Monolith™ design of the machine bed makes the TM 125 exceptionally flexible, as the foundation-free installation also allows the machine to be relocated at a later date. The thermally stable and torsionally rigid machine bed is of sandwich construction with a welded and ribbed upper section, fiber-reinforced high-performance mineral concrete and a base plate made of steel and special damping elements. Vibrations are thus effectively damped and the space required for installation is reduced.

TMG 125 for positioning accuracies below 5 µm

As a high-precision development derived from the TM 125, the TMG 125 precision boring mill, which achieves immense accuracy advantages thanks to a special thermal management system is now available. With continuous cooling of the guideways, water-cooled axis drive motors and a water-cooled hollow spindle, the heat input into the frame components is kept to a minimum.

The up-to-date control technology enables the machine structure to be maintained at a constant temperature level. In addition, built-in sensors detect the heat input at sensitive points such as the boring spindle, so that differences resulting from temperature fluctuations can be appropriately compensated by the control system. The result: A machine with excellent thermostable properties and outstanding precision for machining small and medium-sized workpieces.

No comparable high-performance machine available on the market

The sum of these positive features also won over the Finnish customer Nomet Oy, a contract manufacturing company that will produce high-quality one-offs and small batches with the TM 125. Equipped with an automatic pallet changing system with 2 pallets, an automatic tool changer with robot and space for 280 tools as well as an automatic attachment changer, the Finnish company is ideally equipped for all machining tasks with the TM 125.

In addition, a lateral milling head, 3D tool measurement and video monitoring of the work area will be used for the TM 125, which Nomet Oy has not found in this combination on any other machine currently on the market that would meet the necessary performance requirements for machining workpieces.



The thermal management of the TMG 125 ensures lowest machining tolerances



Automated tool change for high machining speed