

Setting New Standards

PR and PCR – Heavy-duty machine processing in highest efficiency

Industry Reports

WaldrichSiegen machines in research and development, contract manufacturing, plastic extrusions and moulding and automotive

Milling Head Production

Inner-company manufacturing as the heart of the group

Customer Event in July

Open House was complete success

Complex Machines and Optimized Solutions



Complex Machines in Research and Development (R&D)

In the field of basic research, highly accurate and very complex machines and equipment are required, which are able to withstand extreme requirements within the scope of unique experiments and research.



Thanks to flexible and technologically innovative machine concepts, the UNION brand boring mills enable the optimal machining of mass produced and custom workpieces down to the smallest detail.

The UNION P-Series – Modular Concept for a Wide Range of Machining Tasks

In the manufacture of our P-series horizontal boring and milling machines in traveling column design a versatile and flexible modular system makes optimal implementation of many different customer requirements in the energy industry, mining, or even for the production of gearbox housings and crane jib parts possible – For customized and individual solution concepts from a single source.

From the high-performance basic version of the P-series for machining XXL workpieces, to the PR-series with movable RAM – WaldrichSiegen horizontal boring and milling machines achieve excellent results, covering almost everything from heavy-duty machining to precise surface finishes.

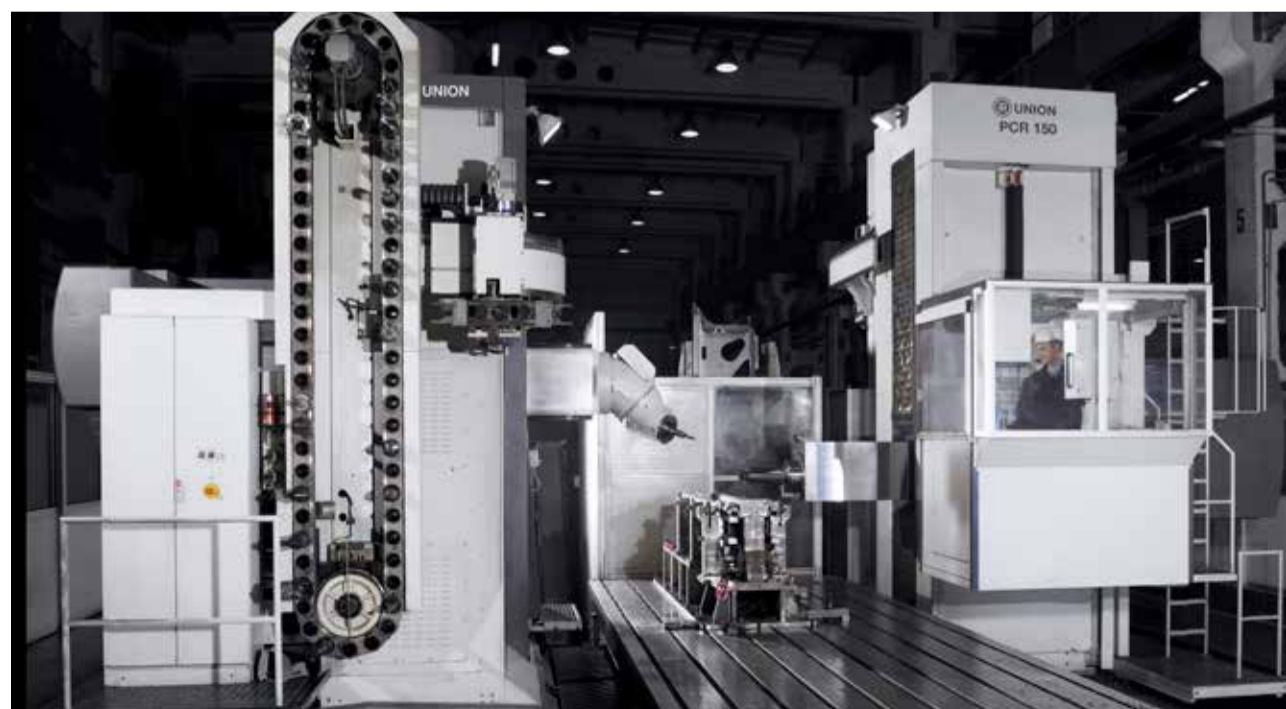
Performance and Precision that Set Standards

But not only the high flexibility of machine types is convincing, also the achieved performance ranges with equally high precision is unique on the market. “The PR-series is equipped with threefold sag compensation for greater accuracy during the machining process,” explains Heiko Gahr, Sales and Project Manager at WaldrichSiegen. “With this, we effectively absorb both spindle sag, RAM deflection and column tilt without additional mechanical or hydraulic weight compensation, so that the accuracies required by the customer can always be precisely achieved when machining surfaces and boring deep in the workpiece.” In addition, the stable machine components, such as the column and the solid machine bed with hydrostatic guides, ensure vibration-free operation and thus smooth movement of the tool for achieving highly quality surfaces.

The extensive speed range additionally enhances the performance: Both the P and PR-series machines can reach up to 4,000 rpm, and accordingly can thus machine the workpieces quickly and economically.

Powerful Equipment for a Wide Range of Applications

In addition to a comprehensive range of standard equipment, including among other things, the heavily ribbed cast iron column with reinforced outer walls, well-dimensioned guideways, and vibration-damping, heavily ribbed cast iron parts, the P-series boring and milling machines are also available with a wide range of different equipment options.



The horizontal boring mills in floor-plate design of the UNION brand provide the utmost precision during finishing operations, and at the same time allow powerful heavy-duty cutting during roughing operations



PR and PCR – Efficient and Flexible

With boring spindle diameters ranging from 130 mm to 180 mm (PR II) and up to 262 mm (PR III), the PR-series is ideally suited for machining large and complex workpieces with changing machining requirements, where the main focus is on efficiency and shortened machining times. Innovative rotary, sliding and tilting tables allow the position to be changed quickly for effective and smooth 5-sided machining of the workpiece. The extended RAM (Z-axis) as well as the possibility to additionally extend the boring spindle (W-axis) allow surfaces and bores deep inside the workpiece to be machined.

The PCR-series also offers the option of automatic tool and attachment change via a pick-up station. With special attachment units, the machine can be quickly adapted to different machining tasks. The boring spindles work with high precision (tolerances < 0.01 mm) and are both low-wear and corrosion-resistant.

The machines of the PR-series can be perfectly adapted to the particular application utilizing the available space within the production area

Europe's Largest Organization for Nuclear Research Puts its Faith in a UNION PCR 150

Physicists and engineers at CERN use purpose-built particle accelerators and detectors to study the basic building blocks of matter – So-called elementary particles. In order to make the machining of these highly accurate and extremely sensitive equipment parts as efficient as possible, the European Organization for Nuclear Research (CERN) has purchased a UNION PCR 150 horizontal boring and milling machine.

The CERN machine is optimally tailored to the customer's high requirements: It can bore and mill as well as face turn and is equipped with hydrostatic guides in all axes. Furthermore, it is equipped with a DV 45 rotary and positioning table with a workpiece setup area of 2,500 × 3,000 mm and a permissible loading weight of up to 45 t, as well as travels of 4,000 mm in the X-axis, 2,500 mm in the Y-axis and 1,500 mm in the Z-axis.

For reliable and precise machining of the required 3D geometries of the components, the boring mill is also equipped with an infinitely positionable dual-axis NC fork milling head. This allows even very complex shaped surfaces and components to be machined efficiently.

No Time Wasted with our Remote Maintenance Service

However, it was not only the technology of the machine that convinced our customer, but also the modern and comprehensive service we offer. A remote maintenance system integrated into the machine provides reliable troubleshooting support and fault rectification, saving technicians and fitters the costly trip to the job site. This in turn means less downtime and a faster return to production for our customers.



Optimized Solutions for Extrusion and Plastics (Injection Molding Machines)

Extrusion is a shaping process that is mainly used for thermoplastics. It is one of the most widespread processes in the plastics processing industry and is often used in the mass production of plastic parts of various lengths and shapes in particular.



In order to be able to produce the wide range of high-quality extrudates, a wide variety of high-performance components must be manufactured precisely and reliably. The standardized and special boring and milling operations of the UNION boring mills and the generously dimensioned machine dimensions of the ProfiMill series from WaldrichSiegen are therefore the optimal technical solution for manufacturers of extrusion machines and plants.

Enormous Flexibility for Maximum Vertical Integration

KraussMaffei Extrusion GmbH, a manufacturer of machines and systems for extruded products such as compounds, pipes, films and sheets made of plastic and tires, hoses, profiles and webs made of rubber, purchased a UNION KC 130 boring mill in cross-bed design from WaldrichSiegen for its new plant in Hanover Laatzen. The boring mill impresses with its massive structure and exceptional configuration flexibility in terms of size and equipment, which is partly due to the manufacturing of the individual components and systems within the HerkulesGroup. Different customer requirements can thus be implemented quickly and easily.

The boring mill is technically designed in a way that, in addition to the wide range of standardized boring and milling operations, special deep-hole drilling operations (ejector drilling method) can be carried out on the machine precisely and customized. The high cooling lubricant pressure required for this does not require an external high-pressure pump, but could be adapted to the customer's cooling lubricant system.

The robust machine column in cast design in combination with the advanced spindle bearing ensures an extremely high rigidity to achieve the highest accuracies during the machining process.



The machine has travels of 2,500 × 2,000 × 2,100 mm (X, Y, Z). Different tools can be changed fast and precise due a flexible tool changing system with 80 places.

The customer can easily integrate the boring mill into his in-house Smart Factory

network via a corresponding interface and thus has access to all relevant data (utilization, tool life, tool monitoring, condition monitoring, etc.) of the boring mill, which ensures high availability of the machine.



The WaldrichSiegen ProfiMill portal milling machine line setting standards in the market with regard to precision and performance

Intelligent Turnkey Manufacturing System for Sustainability in the Smart Factory

Based on a trade show contact from 2019, we were able to win KraussMaffei Technologies GmbH from Munich as a new customer for an order for two fully automated ProfiMill 4500/103-TP portal milling machines with pallet changer and flexible manufacturing system.

For the production of injection molding machines with a clamping force of up to 6,000 t, powerful, robust and highly precise machine tools are required for the machining of large components. Therefore, both machines with a length of 25.30 m each are designed with fully hydrostatic main axes. Despite the impressive dimension of more than 70 m total length of the machining center and a milling power of more than 100 kW, both machines convince with highest long-term accuracy in the machining of plane surfaces (0.02 mm) and column bores (≤ 0.01 mm) as well as a flexible and fully automated machine concept developed especially for our customer.

Above all, the smart overall concept and the productivity of the entire plant in conjunction with the high energy efficiency of the production had a decisive influence on the purchase decision. WaldrichSiegen is rightly allowed to bear the "Energy efficiency made in Germany" logo of the BMWi.

The flexible manufacturing system (FMS) enables low-manpower 24/7 production with a fully monitored machining process and seamless interaction of all internal and external systems, including the WaldrichSiegen diagnostic system, the high-pressure coolant system for single-lip drills and drill breakage monitoring as well as camera system and Omative performance monitoring. The fully automated pallet changing system consists of six external setup/buffer stations and a total of 8 pallets (4,000 × 4,500 mm) with a maximum load capacity of 100 t and is equipped with an automated guided vehicle (AGV). Both machines are connected to a common rack-type tool magazine with a total of 608 tool pockets which is also prepared for automated tool loading and unloading via an automated guided vehicle (AGV).

WaldrichSiegen is executing the turnkey project for the highly complex production system as general contractor and will hand over the machines to the new customer plant in Parsdorf next year. For KraussMaffei Technologies, the start of production with the new ProfiMill will also mark the beginning of permanent energy and CO² savings in the production of injection molding machines.



Contract Manufacturing

Contract manufacturing is used across a wide range of industries. It offers the possibility of outsourcing certain manufacturing processes from within the company, thereby achieving greater economic efficiency. In order to be optimally equipped for a wide range of workpieces, machines are required that can be used flexibly and universally for both heavy-duty machining and high-precision finish machining and that can be programmed directly on site for the new machining orders.

Adaptable Product Portfolio for the Contract Manufacturing

The WaldrichSiegen product range includes a wide range of machine tools that can be flexibly adapted to the most diverse machining tasks in the contract manufacturing sector.

Raahen Konepajatyö Oy Optimizes its Machine Park with a Horizontal Boring Mill PCR II 150

Convinced by the durability, reliability and quality of WaldrichSiegen machines, Raahen Konepajatyö Oy from Finland has decided to purchase a UNION brand PCR II 150 floor plate-type boring mill.

Raahen Konepajatyö Oy is a contract manufacturer specializing in the machining of large components for the mining and paper industries, among others. The main criterion for investing in a new UNION boring mill was to manufacture large steel and welded frames while maximizing flexibility.

With a boring spindle diameter of 150 mm and a maximum torque of 2,750 Nm, the machine is ideally suited for machining large and complex workpieces with changing machining requirements, where the focus is primarily on high efficiency and shortened machining times. With travels of 12,000 mm in the X-axis, 5,000 mm in the Y-axis and 1,500 mm in the Z-axis, as well as a DV45 rotary and positioning table, an additional generously dimensioned floor plate (10,000 × 2,000 mm) and an UC-U 50 NC universal milling head, the machining of large workpieces with complex requirements and low tolerances will no longer be a challenge in the future.

Not only different workpiece sizes, but also different machining methods are flexibly covered. This is made possible by the UC-U50 NC universal milling head, which can be continuously swiveled in two directions and is manufactured in-house. It can be positioned quickly and with absolute precision on the various machining planes – A basic requirement for machining of a wide variety of workpieces.

Efficient and Flexible: SEVERT Roboter- und Positioniertechnik once again buys a UNION Boring Mill

SEVERT Roboter- und Positioniertechnik manufactures manually controlled positioners, robot peripherals and complete robot systems as well as custom systems and fixtures in the field of welding technology and custom machine construction. To machine particularly large

workpieces and components, which at SEVERT can reach from 500 kg to an impressive 80 t in weight, our customer from North Rhine-Westphalia once again places his trust in the reliability and quality of UNION brand horizontal boring and milling machines and purchases a hydrostatic boring mill PCR II 150.

The machine excels with travels of 12,000 mm in the X-axis, 5,500 mm in the Y-axis and 1,750 mm in the Z-axis. The RAM deflection that occurs when large workpieces are being machined is perfectly balanced by two hydraulically controlled tie rods in the slide.

The tilting of the Y-slide is also optimally compensated for thanks to our load-dependent hydrostatics and independent ball screws.

The controlled hydrostatics prevent temperature changes and thus thermally caused geometric deformations on the machine. In addition, the boring mill does not need a counterweight in the machine column but runs with two independent ball screws: They are used for precise positioning of the workpiece carriers and ensure high precision and positioning accuracy despite high feed rates and dynamic loads.

Two vertical milling heads UC-V45 and UC-V15 as well as a universal milling head UC-U40 are used to ideally cover the wide product range as well as the constantly changing machining requirements. The machine is also equipped with a DV80 rotary positioning table and an 8,000 × 3,000 mm floor plate.



Flexible and Scalable Machines for the Automotive Industry

From product development through the prototype phase to mass production of complex assemblies – Companies rely on flexible and scalable systems and machines for the production of external supplier parts within the automotive industry. WaldrichSiegen therefore offers a flexible product portfolio that is optimally tailored to the manufacturing process and meets the stringent requirements of the automotive industry in every respect.



The horizontal drilling and milling machines of the T-series in tabletop design are optimally adaptable to any application thanks to extensive options and special equipment

New UNION Table-Type Boring Mill of the T-Series for Mercedes-Benz State-of-the-Art Production Plant

The open-top models of the Mercedes-Benz Sprinter have been manufactured in Ludwigsfelde since 2006. A completely new production line with state-of-the-art automated production equipment was set up for the new product. For the prototype production of the chassis on site, Mercedes-Benz Ludwigsfelde GmbH relies on the quality and reliability of the UNION boring mill TC 130 in table design.

The UNION brand T-series is used worldwide where absolute precision and efficiency as well as high quality standards are required. The T-series machines are the ideal technical solution: 5-axis controlled machines for efficient multi-sided machining of medium-heavy workpieces up to 10 tons in weight. The solid construction of the wide 4-way bed and cast iron column combine robust design and high rigidity, for high precision results with virtually vibration-free operation. The internally ribbed column dampens vibration and at the same time, prevents distortions.

An axial-radial cylindrical roller bearing also guarantees precise, backlash-free support of the workpiece on the rotating clamping table with a setup area of

1,250 × 1,600 mm. High cutting performance of the boring mill is achieved by the hydraulic segment clamping system.

With the TC 130 horizontal boring machine, Mercedes-Benz in Ludwigsfelde can process workpieces with travels of 2,000 mm in the X-axis, 2,000 mm in the Y-axis and 1,500 mm in the Z-axis, thus providing enormous flexibility in the machining process and a high vertical range of manufacture for our customer.

In addition, the machine is equipped with the Heidenhain TNC640 V11 SP2 control for OCM milling operations, for highly

WaldrichSiegen is responsible for the development, manufacturing and sale of UNION quality products within the globally operating HerkulesGroup. All core components, such as headstocks and spindles, are manufactured within the HerkulesGroup companies to guarantee the highest quality and precision.

efficient workpiece- and tool-friendly cutting processes of the sometimes very complex components. Contours are defined once in the NC program and can then be used for all machining steps, without time-consuming programming work: The tool paths to be traversed are completely taken over by the control to enable optimum travels and to optimally ensure both the engagement angle and chip volume and the required pressure.

The machine was installed on site and initial start-up was done by our experts.

Greatest Possible Machining Flexibility in the Defense and Security Industry

Precise, powerful and reliable machine tools are needed to manufacture parts such as turbine drives, ship engines, propeller shafts and generators for drive technologies. The UNION brand boring mills and ProfiTurn V-series vertical lathes from WaldrichSiegen enable the manufacture and machining of a wide variety of parts and machine components for both finish machining and heavy-duty cutting for the greatest possible flexibility in a diverse range of manufacturing processes.



Tailor-Made Machine Concept and Outstanding Performance

For the production of various workpieces and parts for the American Navy, our new customer counts on the quality, precision and reliability of WaldrichSiegen machines and has therefore upgraded its machine park with a ProfiTurn V 4500/60-Y vertical lathe.

The ProfiTurn V-series sets standards in the market in terms of precision and performance. The hydrostatic guides in all machine axes ensure excellent damping properties, even during heavy-duty cutting. A clear, modular machine program covers a complete spectrum of standard models for a wide range of applications.

The customer can easily machine parts with a height of 6,000 mm and a weight of up to 60 t. The travel on the Y-axis, which is equipped with an additional hydraulic clamping device, is 2,500 mm. The turning diameter is 4,500 mm.

To ensure significantly improved tracking of the machining process in close proximity to the tool engagement point, the ram which has an extension travel of 3,500 mm, has an integrated interface that can be used to connect an additional camera so that machining inside the workpiece can also be monitored with ease.

Thanks to the higher number of hydrostatic pockets for the Z-axis, the WaldrichSiegen machine delivers significantly more milling power than competitor's products, even with the ram fully extended, enabling faster machining of customer workpieces while maintaining the precision.

To meet the ever-changing requirements of the customers to be supplied, there is also the option of using a universal milling head, which can be implemented at any time thanks to the masterhead interface.

In addition, the machine is equipped with an uninterruptible power supply (UPS) to prevent damage to the component and/or the machine in the event of a power failure.



The ProfiTurn V vertical lathe excels in precision, efficiency and reliability. Characteristics WaldrichSiegen has been renowned for, for decades



The table-type horizontal boring mills of the T-series are perfectly designed for the effective multi-side machining of medium-sized workpieces



The Future of Modern Shipbuilding – WaldrichSiegen Wins Customers in the UK with Quality and Performance

More than 80 percent of global trade is handled by ship, and the trend is rising. At the same time, the demands placed on modern ships in terms of equipment, efficiency and size, which have to deliver top performance as well as withstand the toughest environments, are growing.

In order to guarantee the best possible quality in the single-part production of components with nickel, aluminum, bronze and other alloys for innovative shipbuilding solutions, our new British customer MacTaggart Scott, a specialist in military shipbuilding, in particular for the elevators, lifting platforms, catapults and deceleration devices of the Royal Navy's aircraft carriers, has decided to purchase a UNION TCU150 table-type boring machine. The boring mill is equipped with automatic tool changer,

vertical milling head and integrated cross slide with NC-U axis.

The T-series is ideal for machining medium-heavy workpieces in particular. The heavily ribbed cast iron column and the wide, welded bed create the best conditions for maximum precision. The internally ribbed cast iron column dampens vibrations and effectively prevents distortion of the machine parts.

The boring mill is equipped with a 43 kW boring spindle with a diameter of 150 mm, a maximum torque of 1,800 Nm and a table with a workpiece setup area of 1,800 × 2,000 mm and 10 t maximum load. Travels are 2,500 mm in the X-axis, 2,000 mm in the Y-axis and 1,500 mm in the Z-axis. Additional flexibility during the turning process is provided by the integrated cross slide with NC-controlled U-axis and a travel of 200 mm.

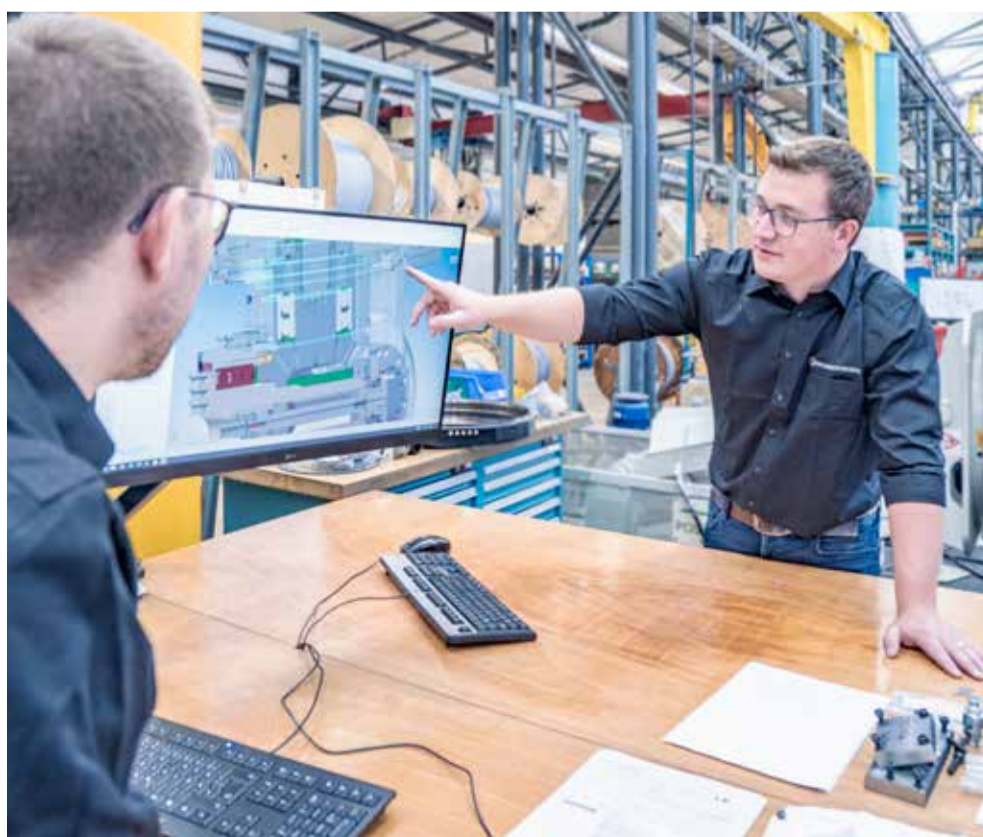
A wide range of accessories contributes to the overall flexibility during all steps of the manufacturing process



Milling Head Production within the HerkulesGroup

Inter-Company Manufacturing as the Heart of the Group

As team leader of a total of 35 excellently trained employees who manufacture milling carriages and headstocks for HerkulesGroup machines, every day is a new and exciting challenge. The department forms the heart of our machines and is the cornerstone for maximum flexibility, precision and availability. Our customers worldwide benefit from our experience in design as well as from the complete in-house production, assembly and quality control of the milling heads, which clause high-quality precision boring mills and milling machines.





Mr. Stöckermann, how did you decide to join WaldrichSiegen?

Stöckermann: In 2010, I did a school internship in the “apprentice crew” of WaldrichSiegen in Burbach. I started out as a mechatronics technician, but I realized pretty quickly that this profession didn't suit me. When I switched to industrial mechanics, it was immediately clear to me that this was the profession I wanted to learn.

Was it always your goal to work in a managerial position?

Stöckermann: When I had my dream job in the bag after my apprenticeship, it was clear to me relatively early on that I wanted more. That's why I did my industrial master's certificate right after my apprenticeship and set the course for a future in a management position.

What do you particularly appreciate about your work?

Stöckermann: Every order is exciting, every angle head a new challenge. As a matter of principle, we only manufacture our milling heads to meet individual customer requirements; we don't have any standard solutions. This makes the work interesting and exciting every day anew, because no two orders are the same, as every milling head is a new design.

What orders appeal to you the most?

Stöckermann: Actually, the jobs with universal milling heads are always the most exciting. It is the most complex milling head within our product line due to the additional, swiveling axis, which covers a machining area from 0° to 117.5°.

What has changed for your department as a result of WaldrichSiegen's move from Burbach to Siegen?

Stöckermann: Above all, the digitalization of the workstations has allowed us to work even more effectively and quickly since the move. With design software, we can view the angle heads as a 3D model as a whole or each component separately. This has the advantage that

every employee can look at the model of a head without the help of the design department in order to see, for example, holes for fluids and to see whether they are closed with plugs or remain open.

Another improvement is the shorter coordination and work paths between the companies. Milling head assembly is, if you will, a department that does not deliver a product directly to the customer, but first to our colleagues. Our customers are therefore primarily our colleagues from Herkules and WaldrichSiegen. Now that the two big players in turning, milling, boring, grinding and texturing in Siegen are quite literally, directly opposite each other, we can make corrections and adjustments more quickly and flexibly.

Isn't that difficult when your own colleagues are your customers?

Stöckermann: On the contrary, it's actually a very good thing. Direct feedback gives us the opportunity to constantly improve our work and thus the product. We benefit from this just as much as the customers, who ultimately receive a finished machine from us that meets with their complete satisfaction.



**Carsten Stöckermann (26),
Milling Head Assembly Team Leader**

2012:

Joined the WaldrichSiegen company and began his apprenticeship as an industrial mechanic

2016-2018:

Professional training as an industrial master craftsman, specializing in metal

Since 2018:

Team leader carriage assembly

Since 2020:

Team leader angle head and carriage assembly

Since 2022:

Component assembly manager

Cutting-Edge Technology and Professional Expertise at First Hand

Open House at WaldrichSiegen a complete success!



On July 20th, 2022, WaldrichSiegen finally opened its doors again for customers from all over Europe. A first-class program awaited them in the impressive factory hall newly built at the site in Siegen. In the course of several technical presentations, our specialists presented both the latest technologies and the extensive product range offered by WaldrichSiegen, which is individually designed and customized for a wide variety of applications. Finally, guided tours through the production rounded off the program.

Our sales staff and experts from machine development and design department answered detailed technical questions and offered the opportunity to experience two fully automated portal milling machines of the ProfiMill 4500/103-TP-series with pallet changing and production control system as well as various UNION boring mills of our high-precision and high-performance P/PR-series at close range.

With the best weather, great mood and cold drinks, the barbecue event in the evening provided a pleasant setting for an exchange in a relaxed atmosphere and a fitting end to a successful day!



Good discussions, insightful questions and a guided tour through the production hall – On this day, no questions or wishes remained unanswered with our customers