International magazine

Issue 1/2026

The mold & die journal

Machine tools | Standards | EDM technology | Accessories | 85088

Fachverlag Möller • Neustr. 163 • D-42553 Velbert • Phone: +49/2053/981250 • www.mold-magazine.com • 14th Year • Jan/Feb/March 2026

HASCO
hot runner

H1210/...

Wiring test device

Convenient and efficient testing of electrical connections

The handy wiring test device H1210/… reliably and unmistakably identifies heating elements, temperature sensors, ground faults, and other defects.

- ML7“ touchscreen with colour display
- Battery operation (approx. 6h running time) – no mains connection necessary
- Export: .csv/.xlsx / Screenshot via USB
- Measuring result in < 5 seconds
- Software update via USB stick possible

www.hasco.com

Built to Control.

Impression EUROGUSS 2026 (Picture: NürnbergMesse)

EUROGUSS 2026 showcases die casting as an enabler of modern industries

Upbeat mood prevails at EUROGUSS 2026: The trade fair, which took place in Nuremberg from 13 to 15 January 2026, impressively reaffirmed its role as the leading platform for the international die casting sector.

Upbeat mood prevails at EUROGUSS 2026: The trade fair, which took place in Nuremberg from 13 to 15 January 2026, impressively reaffirmed its role as the leading platform for the international die casting sector. The 722 exhibitors from 37 countries presented their capabilities and showed the around 15,000 experts how innovatively and effectively the industry is embracing transformation as an opportunity. Die castings are an integral part of modern value creation – in the fields of mobility, infrastructure, and industrial applications. Aluminium, magnesium and zinc die casting facilitate the cost-efficient serial production of highly complex geometries. This makes die casting the key enabler for both traditional and new applications and market segments, as EUROGUSS has shown.

Occupying six exhibition halls for the first time, EUROGUSS was larger than ever. As it celebrated its 30th anniversary, it delivered impressive proof that it is far more than just a conventional trade fair. It is a leading exhibition, knowledge platform, and key gathering for an industry that is realigning itself technologically, structurally, and strategically.

Phuong Anh Do, who is responsible for the ongoing strategic and conceptual development of the event brand, was impressed by the show: “Three days of live die casting and a mood that has been consistently upbeat: I am thrilled by how the industry is working together to shape the future of die casting in Europe. EUROGUSS is a successful concept that unites the entire die casting value creation chain, including foundries, to drive innovation.”

You can find the whole text on page 32-35.

TABLE OF CONTENTS

January / February / March 2026

Technical Essays

Technical Essays

User Reports

Designing molds safely 10

42 Economical drilling done smart

Prototypes from the powder bed 46

36 Runtime cut by over a week

User Reports

Fair Reports

Management change at SCHUNK

SCHUNK SE & Co. KG is initiating a planned change in its management team: Falk Bäurle assumed the role of COO/CFO on December 1, 2025. The CSO position will be newly filled by Karl Heckl on April 1, 2026.

SCHUNK is setting the course for the future with a carefully prepared management transition. Dr. Sebastian Hesse (CFO) and Johannes Ketterer (COO/CSO), both of whom began their professional careers at SCHUNK after completing their studies, progressed through various roles to become members of the Management Board. After many successful years, they are now handing over their responsibilities to new leadership.

Dr. Sebastian Hesse stepped down from the Management Board on September 30, 2025, after 13 years with the company, at his own request and for personal reasons. “It was an exciting and fulfilling time, during which I was able to achieve a lot together with a strong team. I am grateful for the trust placed in me over all these years,” said Sebastian Hesse.

Johannes Ketterer left his position as COO/CSO on December 1, 2025, after 12 years at SCHUNK to join his family business. As a new member of the Board of Directors, he will continue to provide strategic guidance to SCHUNK and actively contribute to the company’s development. “The strong team and sense of unity at SCHUNK are truly special. I am therefore pleased to remain part of the team in a different role,” emphasized Johannes Ketterer.

Falk Bäurle assumed the role of COO/CFO on December 1, 2025. He brings extensive experience in international leadership positions. Most recently, he served as CFO at BBS Automation GmbH, a subsidiary of the DÜRR Group. The new dual role creates additional synergies, strengthens international collaboration, and enables SCHUNK to respond even more effectively to market requirements. The CSO position will be assumed by Karl Heckl on April 1, 2026. Previously, he served as CSO at the company U.I. Lapp GmbH. With his broad sales and industry experience, he will further develop SCHUNK’s international sales strategy, drive growth programs in future-oriented industries, and strengthen the brand in a forward-looking and market-focused way. Together with Kristina I. Schunk as CEO and Chair of the Management Board and Timo Gessmann as CTO, they will form the Management Board of SCHUNK. “I would like to thank Mr. Hesse and Mr. Ketterer for their consistently trusting collaboration and their enthusiasm in advancing our company together with a strong team over many years. With clarity, strong commitment, and great foresight, they have decisively shaped the course of the company’s development,” emphasized Kristina I. Schunk. At the same time, she is looking ahead and, together with Timo Gessmann, is excited about the collaboration in the new management team: “With Falk Bäurle and Karl Heckl, we are bringing two internationally experienced executives on board who will set new impulses, decisively exploit market potential, and further develop our position as a technology pioneer for our global customers and partners.”

Falk Bäurle assumed the dual role of Chief Operating Officer (COO) and Chief Financial Officer (CFO) at SCHUNK effective December 1

On April 1, 2026, Karl Heckl will be the new Chief Sales Officer (CSO) responsible for the sales organization of SCHUNK SE & Co. KG (Pictures: SCHUNK SE & Co. KG)

Generation Change at WITTMANN in Benelux

WITTMANN BATTENFELD Benelux N.V. based in Holsbeek, Belgium, implemented a generation change in its top management at the end of the year 2025. Michel van der Motten, Managing Director of the Austrian WITTMANN Group’s sales and service subsidiary for 31 years, has retired. His successor is Mark Verveer.

Mark Verveer is the new Managing Director of WITTMANN BATTENFELD Benelux based in Belgium (Picture: WITTMANN)

MASTERING HIGH-FEED MILLING

MATERIAL REMOVAL RATE IN A NEW DIMENSION

With our milling tools, HORN is redefining efficiency. Reduced machine load, extended tool life, maximum metal removal rate: **EXPLORE HORN.**

Explore HORN high-feed milling processes now

horn-group.com

Quick and clean mould change thanks to HASCO locking cylinder

A leading Chinese company in the medical sector operates a plant in Shenzhen specialising in mouldmaking and injection moulding of components for breathing machines. For more than ten years, the company has relied on standardised components from HASCO and has successfully been using HASCO positive locking cylinders Z2302/… for the liquid silicone rubber (LSR) moulding of respiratory masks.

Locking cylinder Z2302/…

The company's main products are breathing machines, including CPAP and BiPAP machines, masks, and accessories for the treatment of, for example, sleep apnoea, as well as hospital applications. The Shenzhen plant specialises in breathing masks such as advanced mask designs, full-face, minimal-contact, pillow and paediatric masks. In most cases, these products are made from polycarbonate and liquid silicone rubber.

The company not only produces and assembles respiratory masks, but also manufactures the moulds for LSR processing in-house. If a mask consists of thermoplastic components, such as polycarbonate, and LSR sections, pre-fabricated thermoplastic parts are inserted into the LSR mould.

Around 60 of the 900 employees at the Shenzhen factory work in the tool shop. The masks are supplied directly to the global market and to hospitals.

Using a total of 200 LSR injection moulding machines, ranging from 1,000 to 3,000 kN, located in Shenzhen and at a plant in Costa Rica, the company produces approximately five million masks per year. Production typically uses two- and four-cavity moulds, as well as 16- and 32-cavity moulds. Typical cycle times range from one to two minutes.

"For more than ten years, we have been using HASCO products," says the company's Tooling Manager, "including components for temperature control systems, ejectors, guiding elements and hydraulic cylinders. We are very satisfied." In particular, he appreciates the competitive pricing, short lead times and consistently high quality. "In China, it is difficult or even impossible to obtain comparable components," he adds.

For LSR processing, the customer is now also using HASCO's positive locking cylinders Z2302/… to operate valves, cores and similar components. In the past, conventional locking cylinders were significantly larger and had to be mounted on the platen. During mould changeovers, these cylinders had to be removed, which often led to leakage and additional work.

HASCO's positive locking cylinder Z2302/… is very compact and can be installed directly into the mould. As a result, the cylinders do not need to be removed during mould changes. This not only prevents leakage but also significantly reduces mould changeover time, resulting in cost savings. While a mould change previously took around one hour due to the disassembly of conventional locking cylinders, it now takes only a few minutes, as the Tooling Manager explains.

"Even if we operate 'only' 20 different moulds across our 200 machines, the moulds have to be changed about once a month. This is done for quality inspections and to clean off a type of patina build-up," he explains. In addition, because the mould assemblies are more compact overall, smaller injection moulding machines can often be used.

The robust design of the positive locking cylinders, combined with precise final-position sensing via proximity switches, ensures secure locking of the piston rod and makes them suitable for use with core pullers and mould slides. Operating temperatures of up to 180 °C make them ideal for LSR processing.

The positive locking cylinder features optimised seals and is easy to install. The integrated positive locking mechanism eliminates the need for a separate locking device on the mould. The cylinder can be mounted using either the HASCO flange Z2310/... or the HASCO groove-nut set Z2311/..., which also allows fine adjustment.

As the Tooling Manager is highly convinced of the compact HASCO locking cylinders, he plans to use them in all new LSR moulds, including replacement moulds for older tools that will be phased out after five to six years of service.

He is also keen to learn about other new HASCO developments. For example, he plans to use the HASCO Identity Check for the clear identification of HASCO original products. "Of course, we will visit this customer regularly to introduce all our new products," promises Louis Yu, CEO of HASCO Trading (Shenzhen).

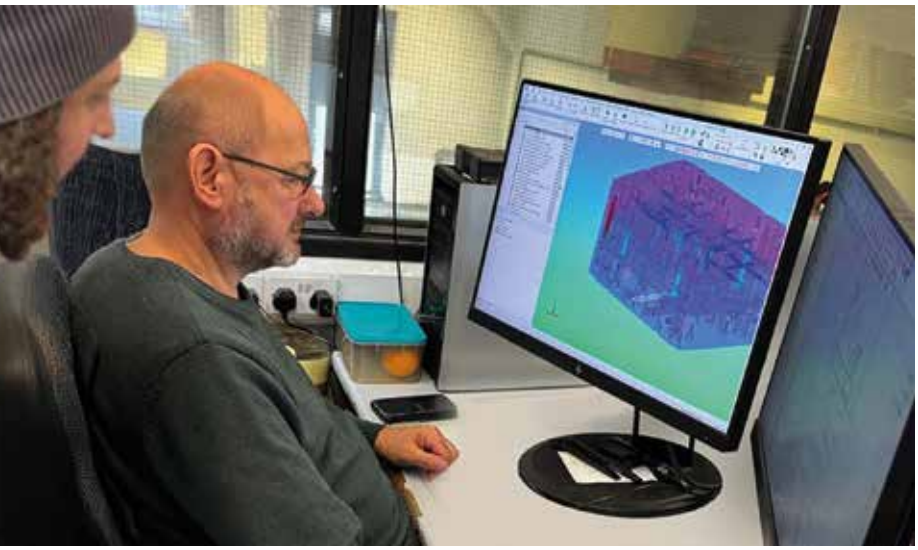
More information: www.hasco.com

The HASCO team and the satisfied customer exchanging experiences on the use of the locking cylinder Z2302/... (Pictures: HASCO)

Precision moldmaker ComplexaHPE designs complex tooling for the medical industry with help from Cimatron

Designing molds safely

Formed in 2021 as an engineering excellence group by Managing Director Paul McHugh, the company combines the expertise of Complexatools – a mold designer and manufacturer founded in 1987 – with that of High Precision Engineering (HPE) Limited, an engineering and manufacturing specialist founded in 1996.



Designers Jack Bunting (standing) and Richard Capener investigate a mold design

"Over the years, we've accumulated extensive industry knowledge that can be applied to every aspect of mold design and manufacturing," McHugh said.

ComplexaHPE employs a team of roughly 46 personnel who turn out precision molds from sites in Glossop, Ashton, and Rochdale – areas with rich manufacturing heritage. Since its inception, the company has used Cimatron CAD software to design sophisticated tools capable of molding flawless parts from challenging materials and withstanding the rigors of high-volume production. The complex class 101 medical molds the company designs and manufactures produce components like laboratory equipment, surgical instruments, diagnostic devices, and implants such as knee joints.

"Cimatron has a lot of features that specifically help with mold design," said Designer Jack Bunting, who has used Cimatron for more than 12 years. Among features noted for being especially helpful is a wizard that enables users to jumpstart design by simply entering information into a standard data form.

"Once you've worked out how you want to create the tool around the part, it gives you the first step for creating the base of the tool, which can be done in as little as five minutes," Bunting said. "I tell the system the number of plates I want on the fixed and moving halves and assign the plates a specific size and thickness. From there, I just click a button, and it uses that information to create a 3D model."

Designer Richard Capener, who has used Cimatron for over 20 years, automates laborious data entry to significantly reduce design time and opportunity for error. Leveraging Cimatron's flexibility, Capener adapted configuration files to ensure important part data is automatically linked to part drawings.

"The software works the way you want it to work, rather than just as a standard package," Capener said. "You can develop a configuration that picks up detailed attributes when you create text within a drawing so that it assigns attributes — like type of steel and surface finish — to the parts you've drawn."

> We can put the new model into our existing tool design and then update the entire model in a way that saves a lot of time... that's a process I don't think other software could do as easily.
> **Jack Bunting, designer, ComplexaHPE**

> The software works the way you want it to work, rather than just as a standard package.
> **Richard Capener, Konstrukteur, ComplexaHPE**

Solid and surface modeling

Dedicated mold-design tools that simplify intricate modeling tasks provide designers at ComplexaHPE with the control they need to fine-tune complicated geometry.

Cimatron enables designers to work in both surfaces and solids, which is helpful when designing complex surfaces and working with models that include challenging radii – such as those on chamfers and fillets – and multiple radii that connect at varying angles.

"I generally work in solids, but if there is an especially complicated radius that I want to remove, or problems with the CAD we received

from the customer, I have the option of addressing those issues by switching to surfaces," Bunting said. "I can create a surface to be joined up with other surfaces, stitch them together, and switch back to working with a solid model. The ability to work with surfaces allows more fine tuning of complicated models."

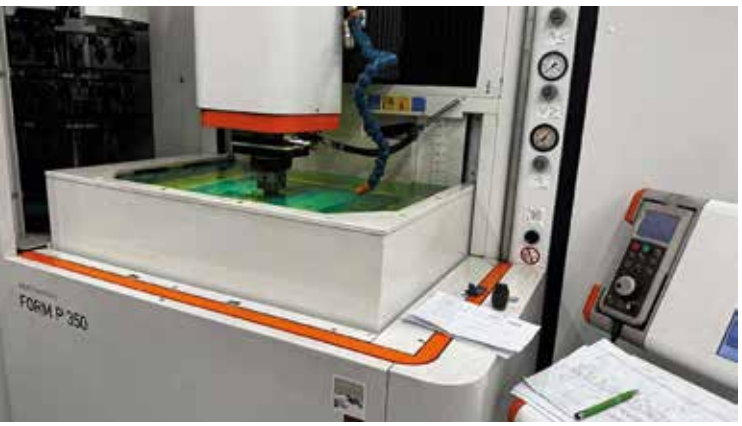
Applied to producing medical components, Cimatron's surface modeling capabilities can be especially helpful with unique surfaces, such as models of knee implants that reflect the complexity of human bones.

"The software provides all of the solid modeling commands, but you can also generate faces and create all sorts of different shapes," Capener said. "It gives you the facility to manipulate a surface — to bend it and shape it to whatever degree is needed."

Analysis and visualization

The ability to visualize tooling in its entirety and analyze mold performance throughout the design process is critical to efficient design. As such, Cimatron's directional analysis technology helps designers at ComplexaHPE manage undercuts by color-coding solid models to clearly display the directions in which various areas of the final component will be pulled when the tool is opened.

"Using the directional analysis tool, you can see instantly from the color coding if there will be a problem with an undercut or if an undercut has a split direction," Bunting said. "It's going to let me know if the part's not going to come away from the side of the tool."



ComplexaHPE personnel Will Ramsey (standing) and Neil Russell discuss a project

Cimatron enables users to customize their design environment by creating their own parameters and setting color-coded alerts, so they know when those parameters are exceeded.

(Pictures: Cimatron)

"I work with an offset so that anything that's less than five millimeters away from a cooling channel will be highlighted in red — and you can set that offset to whatever you choose," Capener said. "It's not always possible to remain within that ideal distance, and the system will clearly show me when I don't."

Tooling modification

ComplexaHPE's lengthy track record for successfully producing high-precision tooling means that the company works with a large share of repeat customers. When tasked with making modifications to existing customer designs, Cimatron helps to simplify the innately complicated process.

"We can put the new model into our existing tool design and then update the entire model in a way that saves a lot of time," Bunting said. "The software makes it easy to update the rest of the tool faces to that new part without a lot of manual effort — and that's a process I don't think other software could do as easily."

Cimatron helps experienced designers like Bunting and Capener achieve greater efficiency with everyday tasks and confidence when working on one-of-a-kind challenges.

> The software is very quick at doing certain things that only mold designers would need it for. It's very specialized for this industry, and that's why I like it.
> **Jack Bunting, designer, ComplexaHPE**

New system for grooving and parting off

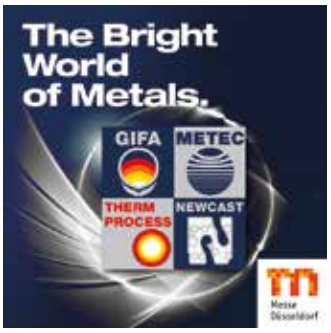
S234 – this is the name of the newly developed parting system that Horn has developed especially for large grooving depths. The double-edged system enables a maximum depth of cut of 33 mm (1.300"). This means that diameters up to 65 mm (2.560") can be parted off reliably and economically. The combination of high grooving depths, rigid clamping, high-performance chip breaker geometry and internal cooling makes the system extremely attractive in terms of price/performance ratio.

The inserts are available in cutting widths of 2 mm (0.079”) and 3 mm (0.118"). The corner radii are 0.2 mm (0.008") and 0.3 mm (0.012”) respectively. The sintered EN geometry ensures reliable chip removal. Depending on the material to be machined, the inserts are available in AS45 and IG65 grades. Square shank holders in sizes 20 mm x 20 mm (0.787 x 0.787") and 25 mm x 25 mm (0.984 x 0.984") ensure stable clamping. Horn also offers reinforced grooving blades and tool holders for the modular parting and grooving system. All types are equipped with internal coolant supply.

Horn offers reinforced grooving blades and tool holders for the modular parting and grooving system. All types are equipped with internal coolant supply

S234 – this is the name of the newly developed parting system that Horn has developed especially for large grooving depths (Pictures: HORN/Sauermann)

Registration for GIFA, METEC, THERMPROCESS and NEWCAST 2027 is open



Four world-leading trade fairs, one common goal: shaping the future of the global metals and foundry industry. From 21 to 25 June 2027, "The Bright World of Metals" in Düsseldorf will bring together international market leaders, hidden champions and newcomers – from iron and steel to aluminium and other non-ferrous metals. The focus will be on the key topics facing the industry: sustainability and decarbonisation, digitalisation and automation, resource efficiency and the circular economy, young talent, and global networking and knowledge transfer. These topics will shape the programme, the exhibition areas and the forums forming the framework for innovation, transformation and the future viability of the international metals and foundry industry. Companies can now register online to secure their place: https://www.gifa.com/gifa_online_application, https://www.metec-tradefair.com/metec_online_application, https://www.thermprocess-online.com/thermprocess_online_application, https://www.newcast.com/newcast_online_application

The impact of the trade fair quartet on the industry was already evident back in 2023: 2,200 exhibitors from 56 countries, 63,300 trade visitors from 116 nations, with 58% of visitors being decision-makers and 68% of visitors coming from abroad. Following the restrictions during the pandemic, GIFA, METEC, THERMPROCESS and NEWCAST were among the world's most successful capital goods trade fairs, able to maintain their position as leading global events and showcases for innovations and sustainable solutions holding their own on the international stage. "GIFA, METEC, THERMPROCESS

and NEWCAST bring together companies and decision-makers, innovations and markets. Those exhibiting in Düsseldorf in 2027 will not only position themselves technologically, but will also become part of a platform that actively drives change in the industry. At the same time, participating companies will benefit from our global expertise and the eleven international trade fairs of the 'Bright World of Metals'," explains Malte Seifert, Director Metals & Autonomous Technologies at Messe Düsseldorf.

Four world-leading trade fairs – a joint industry summit

The trade fair quartet brings together leading international trade fairs which together create a global stage for technologies, trends and encounters in the metal industry. As the world's leading trade fair, GIFA presents the entire spectrum of foundry technology – from innovative casting processes and additive manufacturing to resource-efficient production solutions. A wide range of materials and technological innovations in mechanical and plant engineering round off the offering. METEC is the central platform for metallurgy, metal production and processing, focusing on sustainable processes along the entire value chain – from green steel, aluminium and copper to recycling. THERMPROCESS presents forward-looking solutions for industrial heat treatment and, as a global innovation platform, drives the transformation of thermal process technologies – from electrification and hydrogen to energy-efficient fuel systems. NEWCAST focuses on innovative precision-casting products and lightweight construction solutions. It reflects the dynamics of modern manufacturing offering a showcase for the industry's innovative strength.

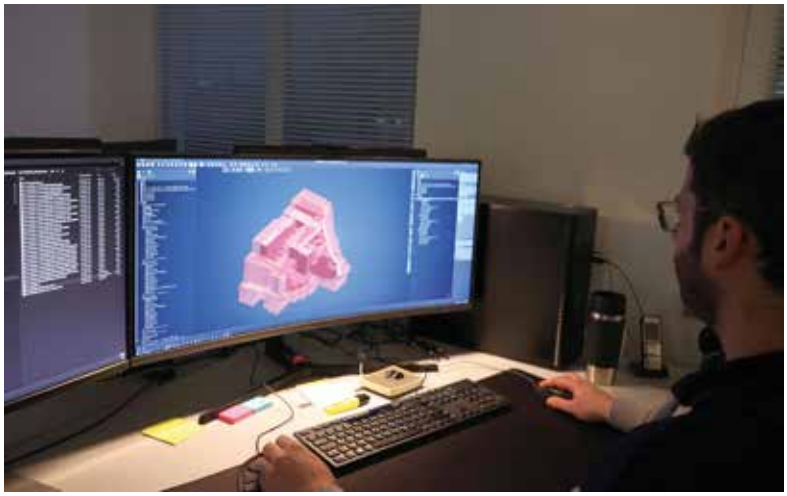
Globally networked – with trade fairs and partners worldwide

This global orientation forms the backbone of the "Bright World of Metals". In addition to the world's leading trade fairs in Düsseldorf, numerous international events strengthen the international presence and knowledge transfer between markets. Events such as ANKIROS and ALUEXPO in Istanbul, METEC India in Mumbai, GIFA/METEC Indonesia in Jakarta, GIFA/METEC Southeast Asia in Bangkok, THERMPROCESS China in Shanghai, GIFA Mexico in Monterrey, GIFA/METEC Middle East Africa in Cairo and GIFA/METEC Saudi Arabia in Riyadh, a network is being created that connects innovations around the globe and brings new impetus to the industry. A new addition is the cooperation with Inter Foundry in Coimbatore, India, starting in 2026.

(Picture: Messe Düsseldorf, Constanze Tillmann)

CAM system opens up new options for model maker from Osnabrück

Modellbau Schäfer is a frontrunner in providing a wide variety of precision parts, and not just for the automotive industry. The model makers in Osnabrück, Germany, rely on Tebis 4.1 for their CAM system. For roughly 35 years, this software package has been providing programs for safe operations that enable the precision specialists to produce a wide range of high-quality products.



The user concept in Tebis 4.1 is highly intuitive. Those responsible at Schäfer Modellbau were able to recruit their new programmers from the team of machine operators. Much of what had to be done manually in the past is now included in the programs (Picture: Pergler Media)

The common denominator of the parts produced at Modellbau Schäfer is that they're generally highly complex and place the highest demands on precision and surface quality. Whether it's a 1:1 model of a car or an airplane, a fully operational concept vehicle, a data control model or a 3D-printed door handle, the model makers in Osnabrück are known for uncompromising quality and absolute adherence to deadlines. The experts are also sought-after contacts for classic car conversions and for customizing vehicles.

For over 100 years, Modellbau Schäfer in Osnabrück, Germany, has exemplified the implementation of complex models and gauges. The high degree of vertical integration and modern machinery enable the production of high-precision products in the shortest possible time (Picture: Schäfer Modellbau)

The company has a traditional background among suppliers to the automotive industry. "We've made a good name for ourselves here. For over 100 years, Modellbau Schäfer has exemplified the implementation of complex models, prototypes and gauges for nearly all well-known manufacturers," explains Maik Ostermann, Deputy Head of Production at Schäfer. "However, the situation for automotive industry suppliers in this country has become difficult in recent years. We're therefore increasingly working for other industrial sectors and have positioned ourselves flexibly for this purpose."

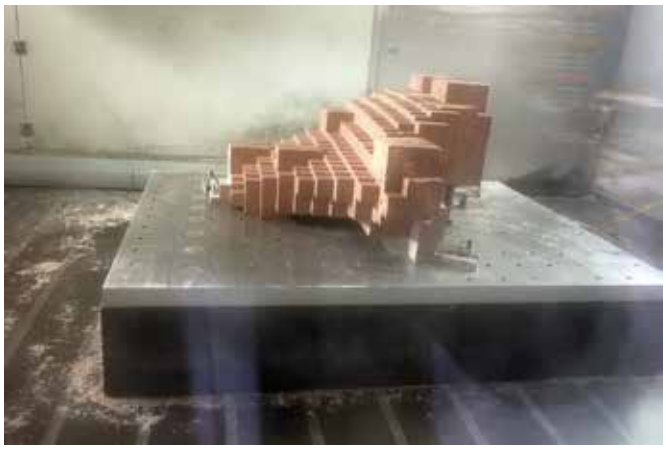
Powerful machinery, even for large dimensions

It helps to have a high-performance machine pool. Among other things, Schäfer's machinists have access to three high-performance Fooke Endura gantry milling machines (Endura 905, Endura 704 and Endura 705) as well as machining centers from Fidia (two Fidia G996 machines with rotating/tilt tables and one D321) and a Zayer Memphis machine with a Fidia milling head. This is a total of seven high-performance machines that are operated in two shifts.

The production expert describes the possibilities: "We can easily process parts in sizes up to 5,000 x 2,500 x 1,500 mm with our machines." "We sometimes mill entire cars on the machines. Although we do have to move things around a bit. But that's routine work for model builders. In principle, we have everything we need to handle even larger-scale projects smoothly and to our high-quality standards in our own production facilities."

The mold makers primarily process model boards and other relevant plastics on their machinery, as along with aluminum alloys, tool steels and composite materials. The experts sometimes machine other materials like hardwood for special parts and models, but this is currently more the exception than the rule.

The mold makers primarily process model boards and other relevant plastics on their machinery, as along with aluminum alloys, tool steels and composite materials. The experts sometimes also machine other materials like hardwood (Picture: Pergler Media)



The model makers have an external supplier prepare the blanks precisely to their specifications. The measured parts are also available in the form of digital twins. This allows the programmers to obtain valid results in simulations (Picture: Pergler Media)

Flexible use of software in all areas

The CAD/CAM specialists work in all areas in the company. Catia is often used for design, due to specifications from car manufacturers. "Otherwise, we rely entirely on Tebis," Ostermann reveals. "And it's been this way right from the start. We've been using this program package since 1989, and we were probably one of the first Tebis users in our region. We were there at the beginning with Tebis. It was never a one-way street: The software has also incorporated quite a bit of Schäfer expertise. And we're still involved in a lively exchange with the developers at Tebis to this day."

The ability of the software to efficiently process even highly complex geometries has predestined it for model and mold making tasks. But it goes far beyond that. "Tebis is also ideally suited for a number of other tasks like closing surfaces. Tebis is our tool of choice for this task, because this software package has always been able to do this much faster than all the others." Along with the sophisticated programming, the programmers at Schäfer also see the user guidance as a major plus; it's modified for each task and permits the use of different working methods.

Intuitive operation

"For us, Tebis is the program of choice for CAD/CAM tasks in all areas of the company," Ostermann explains. "Its many options and intuitive operation make it highly flexible and suitable for a wide range of parts. Tebis has grown with our company and with our requirements over the years – as we have grown with Tebis."

The model and mold makers use many modules to meet their needs – from 5-axis simultaneous milling and 2.5D machining to the trimming module and collision checking. Most recently, and especially with the introduction of Tebis 4.1, the focus has increasingly been on programming with features and templates.

Feature recognition simplifies programming

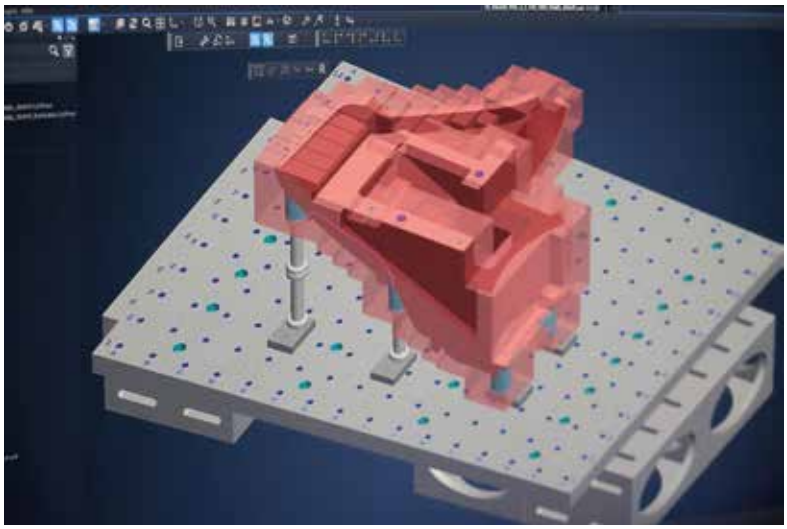
"A bumper is always a bumper," Ostermann affirms. "Although the individual products often look very different from one another in the end. But the material, the stepover, the machining strategy – all this remains essentially the same. We can use feature identification to determine key features and then use templates to efficiently convert these to executable programs."

Routine tasks that are repeatedly performed –such as positioning holes for

Profile

Schäfer GmbH & Co. KG

For over 100 years, Modellbau Schäfer in Osnabrück, Germany, has exemplified the implementation of complex models and gauges. The high degree of vertical integration and modern machinery enable the production of high-precision products in the shortest possible time. The 200 employees at three locations have distinguished themselves with their great flexibility, extensive expertise and a high level of commitment. The company's scope of services extends from project planning and design to classic mold, gauge and model manufacturing and to CNC machining and additive manufacturing. Another mainstay is vehicle conversion: Among other things, the experts here modify classic cars, electrify cars and customize vehicles.

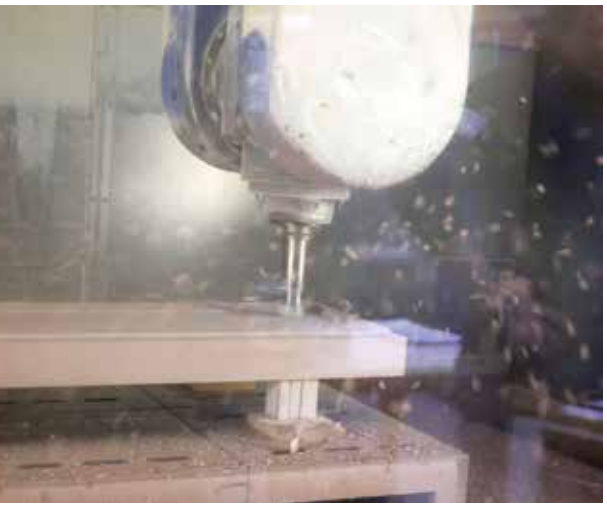


The setup situation on the machines is standardized. This enables the fast, easy and highly precise setup of blanks and workpieces with the zero-point clamping system. However, the model makers have found that zero-point clamping doesn't pay in all machining cases (Picture: Pergler Media)

clamping systems, creating fill surfaces for roughing, and generating blanks–can be seamlessly integrated into rule-based CAD templates. The software can use this CAD data for automated CAM programming. All the programmer has to do is select the part and specify the machining direction. Tebis does all the rest. The user remains flexible and can quickly and easily modify parameters like the length, radius and direction of elements with a mouse click.

Checking is better – but always with the right data

Other program features that the model makers at Schäfer have been using more and more since the introduction of Tebis 4.1 are virtual machines and digital twins. Because Schäfer generally works with lot sizes of 1, every machining operation has to be right the very first time. The programs must therefore run reliably and especially with no risk of collisions. This means that no program is run on the machine without first having been simulated and safely checked for collision-free operation.



The model makers can easily process parts in sizes up to 5,000 x 2,500 x 1,500 mm with their machines. They sometimes mill entire cars on the machines. In principle, they have everything they need to handle even larger-scale projects smoothly and to their high-quality standards in their own production facilities (Picture: Pergler Media)

Precise simulation is becoming increasingly important, especially with increasing automation. This is also because the programmers rely on the automatically generated toolpaths for the detected features and don't check them again separately. "For the most part, the operators had also previously changed the tools on the machines manually", Ostermann reports. "We now rely on automatic tool changes, and the standard models are no longer enough for this. Even small deviations can have fatal consequences."

Precisely measuring machines to avoid nasty surprises

The Tebis experts precisely measured each machine again so that the actual data also matched the models. "There were relevant deviations in the machining heads, in particular: for example, a tip on the spindle that wasn't present in the original digital model. Nor were the hoses all where they should have been based on the model. We're now on the safe side with the newly measured digital twins, and we can reliably check for collisions in the simulation."
All clamping devices on the machine are also precisely measured and digitally recorded. "We installed columns on the machines, some movable and some fixed," the Deputy Production Head explains. "We clamp plates on these columns to set up the blank. A fixed grid and zero-point clamping systems provide for fast setup for most parts. Zero-point clamping doesn't pay off for every part." The Tebis experts also provided support for setting up the comprehensive tool libraries that contain all of the machining tools, including

Focus

Working with NC templates

When working with NC templates, the programmers use company-specific process libraries that contain all the machines, including controls, tools and clamping devices, in the form of individually prepared digital objects. The Tebis software accesses these libraries. The company's unique production environment is represented by the virtual machines and the clamping device and tool libraries, as well as the data for the measured blanks. The optimized manufacturing knowledge from the company is also stored in NC templates; this is where the expertise of the programmers and machinists is saved. The company's expertise has been systematically prepared in Tebis, which enables standardized work and automation in NC programming.

Hardwood is currently more the exception than the rule in the Osnabrück model manufacturing shop. However, the milling and drilling tools are stored in the library along with the geometry and cutting data for this material. This makes it very easy to implement programming with the optimal parameters (Picture: Pergler Media)

their geometries and cutting data. These libraries are another important prerequisite for digitalized processes.

More programming effort for significantly faster throughput

If the programmers intensively use the Tebis functions for automated programming and are therefore largely relieved from routine work, programming times should actually be significantly shorter. “It's actually the opposite,” Ostermann reveals. “Our work method has changed significantly with the increase in automation. The programs have become significantly more complex. So programming also takes longer. We have to be very precise to start with and work very carefully, and we need to account for many factors in order for everything to go well afterwards.”
That’s because of the completely different way of working. “For example, in the past our operators followed machining live and also changed the tools manually, and then they restarted the machining process,” Ostermann recalls. “The situation is now completely different: The machining operations are prepared in the evening and the parts are finished the next morning. We achieved our goal with

Perspective

Looking beyond one's own horizon

Of course, a production manager usually knows at least roughly where there’s room for optimization in their area. What needs to be addressed and where measures for improvement are overdue. But these are often only highlights: We can be blind by our day-to-day operations to a critical view of the big picture. Statements like “It actually works great the way it is!” and “It's always worked well in the past” are then often the final blow to optimization projects. And this is where a critical perspective from the outside can help, offered by experts who aren’t wearing blinders. For example, the Tebis Consulting experts for process optimization, increasing efficiency and improving productivity now know exactly where to start and what measures have to be consistently implemented to ensure the complete success of an optimization project. And finally, everyone can benefit from the company's increased competitiveness.

Richard Pergler

The machinists need to set up their workpieces in exactly the same way as the programmers created them in the CAM program. Standardized setup positions and a zero-point clamping system enable quick, highly precise and safe setup (Picture: Pergler Media)

The devil is often in the details: The digital twin supplied by the machine manufacturer didn't account for the small spindle tip on the right. The programmer therefore sees this as "air" and as usable space. Remeasurement of the machine by Tebis ensures that the real and virtual worlds are again aligned and that the tip is accounted for in the collision analysis (Picture: Pergler Media)

careful programming that accounts for all eventualities in advance. Our machines are running significantly faster and more safely. And they're much better utilized than before."

Maik Ostermann, Deputy Head of Production at Schäfer: We developed a solution with our partners from Tebis and Tebis Consulting that creates new possibilities for us, improves our flexibility, and above all gives us significantly longer machine run times. We now manufacture much faster and more safely. And that's a very nice result." (Picture: Pergler Media)

More machine run time with fewer operators

Where we previously had seven operators for the seven machines that are operated in two shifts at Schäfer, four to five operators are now sufficient, despite the significantly increased throughput. "No jobs were lost – on the contrary, we were able to train some of the machine operators to be good programmers. This means that we can also make very good use of our new potential and easily handle the increased programming workload."

The transition to Tebis 4.1 was very well prepared. The model makers also took the opportunity to scrutinize its overall processes along with the experts from Tebis subsidiary Tebis Consulting. "Working with those responsible at Schäfer, they examined all the processes and structures from the top down and looked very closely at how things are done here. They then worked out corresponding recommendations for action," Ostermann reports. "In principle, we already knew in advance where the problem points were. We also knew we had to do something about it – but we didn't know exactly what. What we worked out with Tebis Consulting is goal-oriented and really takes us further."

A costly transition pays off

The actual transition was quite complex. It was more than a simple software update. It was a conversion of the entire process chain in the company. For example, new software was required for the Fidia machines. "That all went very well, because we'd prepared ourselves intensively and the Tebis implementer responded very thoroughly to our requests, our work methods and our ideas. He got our people involved and included them right from the start."

The operators, some of whom had been skeptical and were quite anxious about the transition, are now convinced. "Nobody wants to go back to the old way of doing things," the manufacturing expert affirms. "Workplace quality has improved significantly, and the work itself is more pleasant and stress-free. And we're going to continue in this direction. We want to keep improving in the near future, especial in the area of multiple setups. We developed a solution with our partners from Tebis and Tebis Consulting that creates new possibilities for us, improves our flexibility, and above all gives us significantly longer machine run times. And it all works very smoothly. We now manufacture much faster – and more safely. And that's a very nice result."

Richard Pergler

The machining tools are stored in libraries along with their geometry and cutting data. Individually optimized machining parameters are also stored for different materials. Optimal executable programs can now be quickly created (Picture: Pergler Media)

Customised plates and bars for tool, mould and machine construction

Meusburger places the spotlight on its extensive range of plates and bars. The standard parts manufacturer presents a perfectly coordinated portfolio that meets the highest quality standards and offers impressively fast availability.

One of Meusburger's key promises is the outstanding quality of its products. All plates are 100% manufactured in Austria. Highly automated production facilities and thoroughly trained personnel ensure manufacturing precision in the µ range. The basis for the high quality is the careful preparation of the materials. Right at the start, the sheet metal undergoes spectral analysis and a strength test. Subsequently, stress-relieving heat treatment in the in-house furnaces ensures low-deformation processing of the materials. This careful and reliable process is carried out to save customers time and money.

Thanks to extensive storage facilities at headquarters and the largest central standard parts warehouse, Meusburger guarantees the continuous availability of its products. The majority of the plates and bars can be dispatched directly from stock, which means what customers order today is immediately dispatched. Meusburger also has an impressively diverse range, with plates in more than 30 different materials ranging from hot-work steel and steel for case hardening to powder metallurgical steel and carbide. In addition, the plates are available in various sizes and eight different standardised variations that are optimally aligned to customer requirements.

Standard or custom: Solutions for every requirement

Meusburger customers can choose between high-quality standard plates, which are immediately available and ready for use, and individually customised solutions. Customisation is made easy using the plate configurator offered by Meusburger. In just a few steps, customers can create their desired plate by precisely adjusting material, dimensions and tolerances, and whether square or round plates, even the most demanding projects can be realised. Features such as a check of entered values in the background, a material selection wizard, and interactive selection tables with illustrations provide help during the configuration. The eight standardised variations (variation 1 to 8) cover a wide range of defined machining options, from roughing or finishing to raw materials in custom dimensions. Thanks to optimised production processes, special plates are usually ready for shipping after three working days.

Meusburger customers can choose between high-quality standard plates, which are immediately available and ready for use, and individually customised solutions

Comprehensive range complemented by bars and personal consultation

In addition to plates, Meusburger also offers universally usable bars in various dimensions and materials, which are available directly from stock. The material selection wizard helps customers choose the right material. Meusburger also offers personal consultation in order to find the optimal solution for every application.

Learn more at:
www.meusburger.com/plates-bars

(Pictures: Meusburger)

New five-axis machining center

Despite double the size, the same component quality

The fog has lifted at EMO 2025. The Kern Fortis HD five-axis machining center offers the familiar high Kern precision in a new dimension

For years, customers have been asking for larger parts in Kern quality. The new Kern Fortis HD five-axis machining center addresses this request and will be available for larger parts with the highest precision as of spring 2026. While the external dimensions only grow about 50 percent compared to the Kern Micro HD, the generous machining space allows twice the travel.

Eight years ago, the Kern team began to realize the dream of achieving the incredible accuracy of the Micro HD five-axis machining center in other dimensions, up to twice as large. Now the dream has become reality and has a name: Kern Fortis HD. Introduced for the first time at EMO 2025; delivery will be possible from mid-2026 onwards. Among others, industries such as mold and die as well as many different shops can now benefit from Kern's experience and achieve unknown results.

Kern Managing Director Simon Eickholt is excited about the innovation. Nevertheless, he explains matter-of-factly: "The Fortis HD is not only visually very close to our Micro HD. It was also the template for our developers in terms of technology and usability, so to speak, and has correspondingly many similarities." He then adds more emotionally: "I still find it unbelievable that we have succeeded in transferring the unrivalled precision achieved with travels and many other components to parts that are about twice as large. Because it's not like we just take the Kern Micro HD times two. The Kern Fortis works according to the same principles but is ultimately a completely new machine."

Kern accuracy despite a new dimension

To give a face to the part size, travel distances and "unrivalled precision" in particular: Parts for the Fortis HD may have a diameter of up to 565 mm (22 inch) and be 350 mm (14 inch) high (Micro HD: D = 350 mm (14 inch), H = 200 mm (8 inch)). The travels are: X = 780 mm (31 inch), Y = 420 mm (17 inch) and Z = 450 mm (18 inch) (Micro HD: 350 mm (14 inch), 220 mm (9 inch) , 250 mm (10 inch)). The machine has a footprint of 4.07 m (13 ft) x 3.05 m (10 ft) and a height of 3.48 m (11 ft) (Micro HD: 2.65 m (9 ft) x 1.7 m (6ft) and H = 2.65 m (9 ft)).

As far as part accuracy is concerned, the Fortis HD proves the same results as the Micro HD despite being almost twice the size. The basis for this lies, among other things, in the positional accuracy of the linear axes. Measurements proved that the values of the two machines are almost identical. Circular shape tests confirmed accuracies of less than 1 µm for the Fortis with the same travel – and even in serial production. The Kern team is convinced that no other 5-axle machine of this size can do this to date.

It is also important for applications that the

Kern Fortis HD achieves not only best accuracies but also large chip removal volumes of up to 1 l/min in steel. Crucially, in addition to an HSK 40 tool spindle, an HSK 63 version is also available, which can accommodate tools up to 200 mm (8 in) in diameter and 390 mm (15 in) in length.
Both spindles are designed by the Kern development partner Fischer as CSC spindles (Compact Shaft Cooling). In other words, the integrated shaft cooling ensures that otherwise necessary break-in times are minimized – if needed at all. In addition, the spindle remains thermally stable even at maximum speed and load, which is important for tool holders and tools. This way, users always achieve reliable milling processes with high removal rates during roughing and with mirror-smooth surfaces during finishing.

Highlights:
Micro-gap hydrostatics and temperature management

However, a few more technical highlights are essential for the high performance and precision, which have been transferred to the Fortis and further developed in the style of the Micro HD. For example, the developers around project manager Christian Maier have equipped all linear axes with direct drives and Kern's patented microgap hydrostatics. The engineer explains: “The small gap achieves best stiffness and damping properties, which ensures the highest surface quality and accuracy on the workpiece.” At the same time, the integral design in combination with linear motors makes the drives particularly robust and reduces energy consumption by about 80 percent compared to conventional hydrostatic systems.
Temperature management is just as important for the reliable precision. According to studies, influence of temperature is responsible for around 70 percent of all accuracy errors in the high-precision range. “Since we have a significantly larger machining space, more moving masses and more power in the machine with the Fortis HD than with the Micro HD, it is even more important to get rid of the temperature directly at the points where it is generated,”explains Maier, making it clear that the implementation was a particular challenge, but ultimately it was a perfect success.
This means that the temperature management of the Fortis HD perfectly compensates the higher heat of the individual components. Similar to the Micro HD, the linear motors are cooled and integrated into the hydrostatic linear axis system. This already minimizes heat input. In addition, the structures such as the swivel axis, linear axes and spindle are also cooled by an extremely precisely controlled temperature management system with a volume flow of up to 260 l/min. Christian Maier explains: “In this way, we manage to keep the temperature in the Fortis steady at only +/- 0.05° Kelvin.”
Another particularly charming solution is the

Christian Maier, project manager (left), and Simon Eickholt, Managing Director at Kern Microtechnik, are excited about the successful result: “Our Kern Fortis HD achieves the same accuracy on a part as the the Kern Micro HD although it is twice the size.”

Since the Fortis HD has two doors, the machine is easy to access and the well-arranged interior provides a great view

The large workspace of the Kern Fortis HD provides approximately twice the travel distances compared to the Kern Micro HD, which means parts with a diameter of up to 565 mm (22 inch) and a height of 350 mm (14 inch) can easily be machined (Pictures: Kern Microtechnik GmbH)

hybrid unit, which is necessary for the hydrostatic axes and temperature management. The developers have integrated it directly into the housing of the Fortis HD, so it does not require any additional space.

Highest productivity and cutting performance

In addition to the demanding adaptations to the changed dimensions, project manager Maier and his team have also implemented some completely new approaches. For example, they considered the higher chip volume of the new machining center. The axes are completely enclosed and are thus very well protected. With a new design of the machining room, scraper belt conveyors and a belt filter system are used to reliably remove the chips. Of particular interest to the operator: The Fortis HD now has a two-part access door that can be slid open to the left and right side. This makes it easier for the operator to load and set up the machine and also offers perfect accessibility and visibility.

As of this year, both machines, the Kern Micro HD and the Fortis HD will be delivered with the new TNC7 controller from Heidenhain. This ensures both – best technical stability and user-friendliness. The program structure corresponds to the usual picture, and existing programs can usually be easily transferred with only minor adjustments.

Years of testing

Many test runs for customers proved that the new developments in the Kern Fortis HD not only sound good in theory but also work in the real world. Managing Director Simon Eickholt is thrilled: “Several times we received feedback that we achieve better results with our Fortis after only short run-in phases than our customers manage with their most precise existing machines. Even though they had already gone through months of improvements.” Feedback that suggests high demand and confirms the Kern boss in his basic believe, because: “We are always very close to the market, and our developments are based on the needs of our customers. Whatever is technologically possible, we do it.”

Kern Fortis HD in a nutshell

- Footprint: L x W x H: 4.07 m (13 ft) x 3.05 m (10 ft) x 3.48 m (11 ft).
- Axis travel: X = 780 mm (31 inch), Y = 420 mm (17 inch), Z = 450 mm (18 inch)
- Part size (max): 565 mm (22 inch) diameter, 350 mm (14 inch) height
- CSC (Compact Shaft Cooling) tool spindle: HSK E40 for tools up to 70 mm (2.75 inch) in diameter and 245 mm (10 inch) in length.
- or HSK A63 for tools up to 190 mm (7.5inch) in diameter and 390 mm (15 inch) in length.
- X, Y and Z axis: Direct drives with microgap hydrostatics
- B- and C-axis: torque drives with rolling bearings
- Advanced active temperature management in all linear axes, rotary/swivel axes, drive, machine base and spindle.
- Heidenhain control TNC 7

Solid carbide circular milling cutters for smooth slotting and grooving

Gühring is adding a powerful solid carbide circular milling cutter to its grooving tool range. The tool not only scores with perfect surface qualities and long tool lives, but also impresses with significantly smoother running compared to the competition. For maximum cost-effectiveness when milling slots and internal contours.

The new solid carbide circular milling cutter is a reliable all-rounder for slotting and grooving on machining centres or lathes. Thanks to its optimised coating, the tool can be used in almost all materials, while the higher number of teeth ensures a longer tool life.

Powerful and efficient: feed rates increased by 78 %

The solid carbide circular milling cutter features an innovative geometry: the combination of positive chip and axis angles, innovative uneven pitch and large chip spaces ensures maximum running smoothness and low cutting forces. This allows higher cutting parameters to be achieved and machining times to be reduced. And all this without compromise: users also benefit from excellent results in terms of surface quality.

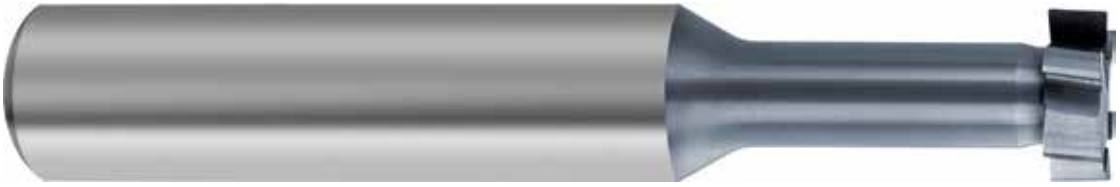
Excellent chip removal ensures a reliable process

The circular milling cutter ensures short, controlled chip breaking, which guarantees optimal chip removal. For this reason, the tool ensures a reliable process when turning and milling internal contours with high cutting data and longer tool lives – making it an efficient alternative to groove turning.

Strong as standard, flexible as a special design

The circular milling cutters are available in all common designs and dimensions as standard, which means that users benefit from fast delivery times. Furthermore, the circular milling cutters are designed with application-oriented undersizes (e.g. d1 = 7.8 mm for holes with a diameter of 8 mm), which allows holes and internal radii to be machined close to contour and effectively. To meet individual requirements for the workpiece or process, Gühring also offers circular milling cutters as special designs with corresponding contours and dimensions.

New Solid carbide circular milling cutters (Pictures: Gühring)



MAPAL presents successful solutions on the market

Maximum impact with minimal effort – paths to greater productivity

MAPAL has developed standard processes for the industrial production of strategic components. On that basis, these tool solutions are modified according to requirements, to help customers boost their productivity. Success stories from various market segments show just how well this works.

Five tools – instead of previously seven – for machining spool bores: Smart process design helped MAPAL reduce cycle time by 40%

Productivity is boosted when the same effect is achieved with less effort, or if a greater yield is achieved with the same effort. If more is achieved with less effort, you've reached the peak of boosted productivity: maximum effect for minimal effort. For instance, this might involve the use of fewer tools, which allow higher quantities to be produced in the same amount of time.

Adapted solutions for hydraulics

In the fluid power market segment, for instance, MAPAL can draw on a model process for machining the spool bore in hydraulic valve housings. This bore always has a similar design in hydraulic systems for construction machines, agricultural machines and others. In order to be able to control different oil circuits via the spool position, the bore in which it moves must be very precise. MAPAL generally pilots this bore with a solid carbide drill first and then prepares it with a boring tool for finishing.

Three cutting edges for high feed rates

In this case, MAPAL doesn't just offer one particular solution, but adapts the general tool selection to the respective circumstances. For the hydraulic control of the drive for an excavator, for instance, a pilot drill with three cutting edges was selected. This enabled a high feed rate in the GG25 casting material used for this component. The solid carbide boring tool, which also has three cutting edges, then performs roughing and finishing very efficiently in one machining step, thus reducing process costs. By transitioning from the tools previously used from another manufacturer to the MAPAL process, the customer was able to reduce machining time from 70 to less than 10 seconds. At 3,000 components per month, this meant savings of over 50 hours' machining time – i.e., much higher productivity without using more tools.

Enhancing productivity with existing machinery

Adapting the process to the existing machine set-up was the focus of another hydraulics project, which also involved spool bores. In this case, the customer often faced large production volumes, making a highest-possible productivity essential for efficient manufacturing. Investment in new machinery was out of the question, however, due to the volatile economic situation. For MAPAL, the challenge therefore lay in achieving a gain in productivity on the existing machine. The aim was a secure process with a reduced cycle time.

The model process could not be applied directly, because it requires the use of a special solid carbide drill for pre-machining in the machining step that follows countersinking. However, the machine did not have sufficient

capacity for this drill. Accordingly, MAPAL replaced the drilling specified in the model process with circular milling, which requires less torque. Two additional tools are then used for circular milling of the control edges in the spool bore. MAPAL's guide pad technology is used for finishing, ensuring the best circularity and surface quality. Instead of the seven tools that the customer was using in their previous process, production is now carried out with just five. This allowed cycle time to be reduced by 40%, resulting in savings of 1,250 working hours for an annual manufacturing quantity of 30,000 components. Costs were reduced accordingly: The customer saves EUR 14,000 every year.

Higher output for electric motors

With the rise of electromobility, MAPAL was able to quickly offer a solution for machining the stator housing using the generic component approach. The focus of this process, which has been established for several years now, is high-precision manufacturing using fine boring tools. As the market matures, it is changing. Motors are now being built in larger quantities for vehicles in the mid-range segment. Accordingly, the industry's desire for greater productivity is growing, too. Initially, it is less about the cutting data achieved than about the adjustment effort for the tools, which should be reduced for the production of larger series. MAPAL has responded to the changing requirements and now offers a solution with HPR400 technology for finishing. The tools with PCD inserts are not to be set. Unlike the blades of a fine boring tool, they can simply be inserted and tightened with the correct torque. In addition to eliminating the need for setting, the new solution also boasts double the machining speeds, as eight inserts are now used instead of the previous four. Overall, the process delivers higher output with less effort, thus leading to a significant increase in productivity.

MAPAL's model process specifies the use of guide pad technology for this machining step. And this is still justified, as the tolerances specified by premium manufacturers for some models cannot be achieved using other methods. Thin-walled components that are difficult to clamp also need a fine boring tool that exerts less cutting pressure.

Machining millions of rivet holes with maximum consistency

Final assembly in aircraft construction calls for productivity and high quality in equal measure. When the segments of a commercial aircraft are drilled with millions of bores for riveted connections, the continuous accuracy of the machining operations, which are mainly carried out using hand-held machines, is a challenge. Depending on the connection, the bores need chamfering, countersinking or simple deburring.

MAPAL's spotfacing tools with microstop cages constitute a depth stop and ensure that the same result is achieved irrespective of the worker involved. The tool manufacturer handles the pre-configuration so that nothing else needs to be adjusted in manufacturing. With different cutting materials, the spotfacing tools with microstop cages are suitable for machining aluminium, CFRP or titanium. Customer-specific colour coding prevents tools from being mixed up and errors in the process. Optionally, dust extraction can be carried out directly on the tool.

In addition to rivet preparation, mirroring or metallising the area around bores on aircraft's outer skin is another case for a spotfacing tool with microstop cage. In this process, paint is deliberately removed to ensure electrical conductivity between the parts and thus protection in the event of a lightning strike. The spotfacing tools with microstop cages demonstrate that very good effects can be achieved even with supposedly simple tools: Preventing errors in the process also contributes to higher productivity.

Automotive, aerospace or fluid power – smart solutions and close contact to the customer often open up huge potential for productivity. As a technology partner, MAPAL offers its customers comprehensive advice and support encompassing all technologies with the aim of achieving the required result and more.

High productivity in finish machining of stator housings for electromobility: HPR400 technology dispenses with insert setting and offers very high machining speeds (Pictures: ©MAPAL)

GROB In-House Exhibition 2026

GROB-WERKE invites you to its major in-house exhibition in Mindelheim from March 17 to 20, 2026. The in-house exhibition will be dedicated to the company's 100th anniversary and will combine a look back at its history with the latest innovations in the field of universal machines, automation, and digitalization. Visitors can look forward to exciting product premieres, tours of state-of-the-art production halls, and an exhibition area that brings GROB's century-long development to life.

At the 2026 in-house exhibition, visitors will be able to experience over 40 machines live – from universal machining centers to solutions for machining technology and electromobility to additive manufacturing. Four special areas are dedicated to current growth markets: Semiconductor, Aerospace & Defense, Energy Technology, and Die & Mold. Over 70 guided tours through 14 production halls showcase the Bavarian machine manufacturer's vertical range of manufacture and process expertise. More than 60 exhibitors from the fields of tool technology, clamping devices, CAD/CAM, and digital simulation will complement GROB's anniversary trade fair program. Specialist areas such as GROB Service, customer training courses at the GROB Technical Academy, and the new and quality checked used machine center round off the program and make the in-house exhibition a real platform for exchange and innovation.

A special highlight: the historical area "#100GROB". Here, visitors can trace GROB's development from a "small" machine tool manufacturer to a global system provider – including original machine exhibits and documentation from the company's 100-year history.

Premieres with real added value

In addition to the special areas, the GROB in-house exhibition offers three product premieres:

- The GP1350 5-axis portal milling machining center opens up new possibilities for machining large workpieces. High rigidity and the large work area make it particularly interesting for die and mold industry, energy technology, and the aviation industry.
- The GRC-M60 robot cell complements GROB's modular automation world and impresses with its flexibility and easy integration into existing manufacturing systems.
- With the specially developed MES/MOM system "GROB COSERA", the entire flow of parts on the shop floor is digitally controlled and recorded – a step that significantly increases transparency, efficiency, and process reliability.

GP1350 5-axis portal milling machining center

Liquid Metal Printing GMP300

"Our in-house exhibition connects our past with the future of manufacturing – showcasing GROB's more than 100 years of expertise," says Christian Müller, CSO at GROB. "We present solutions that are technologically advanced and at the same time deliver real benefits for our customers – from increased efficiency and process reliability to complete traceability."

Strategic look ahead

With its combination of technological prowess, historical experience, and direct exchange with customers, GROB is sending a clear signal: production technology today can be sustainable, efficient, and highly precise – and the company is actively shaping this future. The 2026 in-house exhibition offers the opportunity to experience innovations live and discover the production of tomorrow today. Secure your ticket now at https://event.grobgroup.com/hausmesse/en/.

GROB in-house exhibition 2026 at a glance

- Date: March 17–20, 2026, Mindelheim
- 100 years of GROB: Historical exhibition area "#100GROB"
- Over 40 machines: From universal machines, machining technology, e-mobility, and additive manufacturing
- Special areas: Semiconductor, aerospace & defense, energy technology, and die & mold
- Premieres: GP1350 5-axis portal milling machining center, GROB GRC-M60 robot cell, GROB Cosera (MES/MOM system)
- Tours: Over 70 guided tours in 14 production halls
- Exhibitors: More than 60 exhibitors

(Pictures: GROB-WERKE)

For half a century, the city of Mindelheim has been the headquarters and heart of the GROB Group

The international tooling industry came together at the ISTMA Europe Meeting 2025 in Berlin

Customer view of tool and mold making / automotive trends / common European spirit as the basis for cooperation

On November 3 and 4, the European toolmaking industry gathered in Berlin for the ISTMA Europe Meeting. Around 120 participants from 18 national associations accepted the invitation of the Association of German Tool and Mold Makers (VDWF), which acted as host and organizer. Member associations of ISTMA Europe and their companies were not the only ones to attend; actors from research and the most important customer industries were also present. At the heart of the event was the desire to network, the future outlook and the question of how Europe can position itself more strongly in global competition.

Around 120 participants from 18 European national associations and from all over the world came together at the Fraunhofer IPK premises

Research meets application meets the market

The venue for the event was the Fraunhofer Institute for Production Systems and Design Technology IPK — a place that represents high-tech innovation not only symbolically, but in a very real and concrete way.

In his presentation, Stephan Berz, President of ISTMA Europe and brand ambassador of the VDWF, explained the program and highlighted the economic prospects and transformation processes in the tooling industry

The reports from ISTMA and the presentations of the individual national associations of toolmakers given on Monday, the first day of the event, were followed by a two-hour guided tour of the institute. Participants were given exclusive insights into cutting-edge research projects on precision technologies, automation and digitization. In the process, a lively exchange provided great inputs from all sides on how such innovations could be transferred to industrial production and where new business areas could be opened up with the toolmakers' know-how – for example, in optical applications or in fluid management. "The event saw three worlds come together: research, users and customers," says Stephan Berz, President of ISTMA Europe and brand ambassador of the VDWF. "Each of these groups was able to contribute and take something with them. That was very valuable."

Berz provided additional insights with the presentation of the Automotive Tooling Forecast—a market study of the automotive industry, as the largest customer of tool technology in Europe. The study provides a structured overview of upcoming vehicle projects up to 2028 and the resulting tool requirements for 2026. The study, which was presented at the event for the first time, will be published twice a year and is intended to provide tool makers with actionable market data "as real added value," according to Berz.

ISTMA Global gains a new partner with Knarr, represented at the event by Jürgen Bobretzky (right) and Jan Kramer (center)

The customer perspective in toolmaking

The second day of the event focused on the lectures with panel discussions: Customer representatives from the automotive industry, logistics and white goods sectors contributed their views on tool and mold making. They described their requirements, their challenges, and what they expect from the industry in the future. ”This view from the outside was very helpful,” emphasizes Stephan Berz. “The question was raised of how we as toolmakers create added value, make it visible and consistently communicate it in our customer industries.”
For VDWF President Prof. Thomas Seul, it was an event of unexpected insights: “I have discovered real ‘shooting stars’ – perspectives I hadn’t thought about before, which then suddenly flashed up and brought an ‘aha!’ moment.” His conclusion: “Technologically speaking, Europe has a strong tool and mold making industry. But project management and strategic positioning clearly need to catch up.”

European tooling is growing together

During the “Berlin Backstage” program, networking also dominated the time in between the conference agenda – for example, during a visit to a classic car exhibition, an evening tour of the city on the Spree river, a visit to the Bundestag, a meal together or a nightcap on the TV tower. “We created an atmosphere in which people could meet and talk. This gave rise to real trust—the basis of any cooperation,” says Prof. Thomas Seul. “This became quite clear during the shared bus journeys: It got quite messy – in the best sense of the word. Everyone talked with and to each other – regardless of their origin, language or job title. That's when I thought to myself: This is where European tooling is growing together.”

Europe and China: Learning instead of frustration

Another central theme of the event – whether on stage or in personal interactions – was competition with China. But rather than a sweeping atmosphere of negativity, quite a different notion dominated. The key message: Europe should not make the mistake of condemning China for its rise and falling into inactive sulking. Rather, it is important to examine the success factors in a constructive manner – and to draw our own conclusions from them. “You don't punish the winning team in football – you analyze how they won. Then next time it will be you on the winning podium,” says Stephan Berz succinctly.
This is precisely why many European toolmakers are looking forward to the upcoming ISTMA World Conference 2026 in Shanghai with great interest. The event will not only be a global industry gathering, but also an important opportunity to better understand the Chinese market first-hand. “Anyone who is willing to learn will surely be able to gain important ideas for their own future there,” says Berz, further promoting the event.

Making a difference together

The ISTMA Europe Meeting 2025 has shown quite clearly that while the challenges are great, European tool and mold makers are ready to face them together. What counts is the will to cooperate between companies — across Europe — the will to develop and to look beyond one’s own horizon. Stephan Berz summarizes: “ISTMA has taken a new path: Our central task now is to create a platform for mutual trust. Berlin was the right place at the right time. The spark is now there — now it's time to start the fire. On that note: let’s make some noise!”

Ralf Dürrwächter, Managing Director of the VDWF. The association was this year’s host of the ISTMA Europe Meeting

Experiencing political government with a twist: Visit to the glass dome of the Bundestag (Pictures: VDWF)

Impressions EUROGUSS 2026 (Pictures: NürnbergMesse)

EUROGUSS 2026 showcases die casting as an enabler of modern industries

Upbeat mood prevails at EUROGUSS 2026: The trade fair, which took place in Nuremberg from 13 to 15 January 2026, impressively reaffirmed its role as the leading platform for the international die casting sector.

EUROGUSS

Upbeat mood prevails at EUROGUSS 2026: The trade fair, which took place in Nuremberg from 13 to 15 January 2026, impressively reaffirmed its role as the leading platform for the international die casting sector. The 722 exhibitors from 37 countries presented their capabilities and showed the around 15,000 experts how innovatively and effectively the industry is embracing transformation as an opportunity. Die castings are an integral part of modern value creation – in the fields of mobility, infrastructure, and industrial applications. Aluminium, magnesium and zinc die casting facilitate the cost-efficient serial production of highly complex geometries. This makes die casting the key enabler for both traditional and new applications and market segments, as EUROGUSS has shown.

Occupying six exhibition halls for the first time, EUROGUSS was larger than ever. As it celebrated its 30th anniversary, it delivered impressive proof that it is far more than just a conventional trade fair. It is a leading exhibition, knowledge platform, and key gathering for an industry that is realigning itself technologically, structurally, and strategically. Phuong Anh Do, who is responsible for the ongoing strategic and conceptual develop-

ment of the event brand, was impressed by the show: “Three days of live die casting and a mood that has been consistently upbeat: I am thrilled by how the industry is working together to shape the future of die casting in Europe. EUROGUSS is a successful concept that unites the entire die casting value creation chain, including foundries, to drive innovation.”

Satisfied exhibitors and visitors

At EUROGUSS 2026, 722 German and international exhibitors showcased their products and services across the die casting supply chain to an engaged audience of industry professionals. Almost one in three exhibitors, and around half of the some 15,000 visitors, came from outside Germany. Visitors from Italy, Austria, Poland, the Czech Republic, Turkey, and Switzerland were especially well-represented in Nuremberg. However, there was also immense global interest in the European market from visitors who had travelled from North America, India, and Asia. Alongside OEMs and Tier 1 suppliers, the event also attracted manufacturers and users from various sectors, including electrical engineering, energy technology, DIY, plumbing, home and garden, medical technology, communication technology, aerospace, and lifestyle products. EUROGUSS is distinguished by technical excellence, engineering ingenuity, and process expertise, as evidenced by the numerous executives, development managers and investment decision-makers in attendance. “We are delighted by the calibre of the visitors. We had high-ranking decision-makers visit our stand, and the response was excellent,” says Aulbach Pressenbau. Kira Jülicher, CEO of COURS GmbH & Co. KG, sums up EUROGUSS in one sentence and praises the atmosphere: “Metal industry innovations from across Europe in one place. I am impressed by the many stands and other display areas, and by the considerable creativity demonstrated by participating companies at EUROGUSS as well as their openness to making new contacts with both suppliers and customers.”

EUROGUSS as an enabler for the business of the future

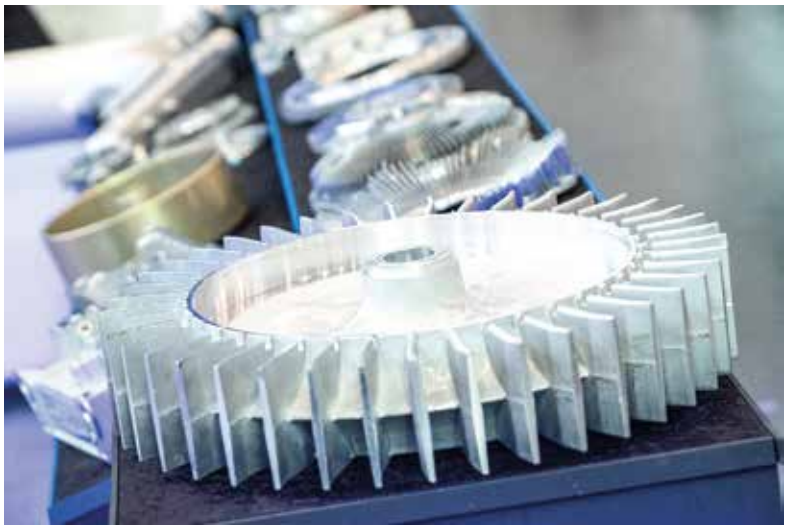
For three whole days, EUROGUSS focused on both established and new areas of application for die casting, covering aspects such as megacasting, AI-supported manufacturing, material innovations, lightweight construction, quality assurance, highly automated production cells, or recycling.

Megacasting: Megacasting represents a

momentous change in die casting technology and enables extremely large and complex components to be manufactured in a single operation. This is achieved with machines that have a clamping force of more than 6,000 tons. By using massive, high-pressure die casting machines to produce large, single-part aluminium structures, megacasting is replacing conventional manufacturing methods that weld hundreds of smaller components to one another. This approach offers considerable opportunities to reduce the number of parts, streamline assembly, and improve cost efficiency and structural performance, especially in automotive applications. This technology

has the potential to facilitate the rapid further development of European marques and ensure their competitiveness in a challenging market environment. Thanks to ongoing innovations in simulation, automation and digitalisation, hybrid manufacturing approaches, machine size, alloy development, tooling, and more sustainable recycling strategies, megacasting can be expected to extend its reach into additional vehicle segments and industrial applications.

Digitalisation and AI: The increasing requirements for quality and consistency in die casting necessitate an ongoing, adaptable and data-driven process management. AI-driven approaches create new opportunities to improve quality assurance and make processes more efficient – especially in megacasting. "The focus is not on the technology as such but on the measurable effects: reduced downtimes, less scrap, improved energy efficiency, and faster learning across processes and locations," notes Simon Schmidt, Project Manager at the Fraunhofer Institute for Manufacturing Technology and Advanced Materials (IFAM). With practical examples from the industry, EUROGUSS showed how processes are digitalised and innovative solutions devised through creative thinking. Michael Heuser, Senior Scientist at IFAM, stresses the benefits of the growing level of automation in die casting: "The actual benefit of using AI is in data enrichment. We are shifting away from simply monitoring processes to proactively optimising them in real time using AI technology. In future, AI will autonomously optimise casting processes to maximize resource efficiency and minimize scrap rates. As a result, digital transformation will play a crucial role in improving the competitiveness and sustainability of the entire die casting industry."



Rheocasting: Trade fair visitors were able to experience innovative die casting technologies like the rheocasting process first-hand. They learned how this casting technology is pushing the boundaries of conventional processes and tapping into new opportunities for lightweight construction, material efficiency and industrial application, thanks to the manufacture of parts with high strength, low porosity and excellent surface quality. Especially in the automotive, aerospace and e-mobility sectors, there is a growing demand for lightweight, efficient and sustainable components – and rheocasting delivers the right solutions. Fabian Niklas, founder and Managing Director of CASTING-CAMPUS GmbH, explains: "Rheocasting, an extension of the die casting process using a semi-solid metal, allows the range of applications to be considerably expanded – with properties that provide a distinct competitive advantage. The process technology is already available; all that is needed is to adapt the dies to the process and alloy used. It's a market that, once established, will offer excellent margins."

EUROGUSS showcases innovative strength

Traditionally, the German Die Casting Conference, which celebrated its 25th round this year, has been held at EUROGUSS in partnership with the event's institutional sponsor, the Association of German Die Casting Foundries (VDD). Regarded as the most important German-speaking die casting conference, it offered in-depth knowledge transfer on all three days of the event in

around 30 presentations, discussions, and best practice examples. Following the remarkable success of the contest in 2022 and 2024, EUROGUSS organised the European Die Casting Competition for the third time in association with the Association of German Die Casting Foundries (VDD), the fair's institutional sponsor. The competition showcases the diverse applications, innovative strength, high quality standard and capabilities of die casting as a forming process using aluminium, magnesium and zinc.

In the Speakers' Corner at the heart of the trade fair action, the 47 practice-based presentations explored the event's focus topics. Over the three days of the fair, an audience of more than 3,000 people learned about the latest developments in sustainability and circular economy, mega/giga casting, digitalisation and AI, innovation, HR issues, and supporting young talent.

An industry that is actively shaping progress and the future will always be dependent on the next generation of well-trained recruits. And this is something that EUROGUSS actively supports. At the Young Talent Day, students, young professionals and companies came together to present innovations, raise the profile of young talent, and encourage dialogue about the future of the industry. Young researchers were also honoured with the EUROGUSS Talent Award, which recognises the work of graduates and their outstanding

final papers on die casting-related topics. This year's award was won by Selina Freygang from Friedrich Alexander University Erlangen-Nürnberg/AUDI AG.

Save the date:

The next EUROGUSS will be held in Nuremberg from 18 to 20 January 2028. In the interim, the die casting community will gather worldwide at various EUROGUSS Family events: The Executive Circle, for example, will reconvene in Paris on 1 and 2 July 2026. ALUCAST will take place in New Delhi from 10 to 12 December 2026, while EUROGUSS MEXICO will be held in Guadalajara from 16 to 18 November 2027.

In use at toolcraft since 2024: the Kern Micro HD five-axis precision machining center equipped with a grinding package

Kern Micro HD makes toolmaking at toolcraft AG even more productive

Runtime cut by over a week

As a supplier to highly demanding industries such as aerospace and medical technology, toolcraft knows what the highest accuracy means. To keep pace with growing demands in toolmaking, the company made another investment in 2024, choosing the five-axis premium Kern Micro HD machining center. The Supervisory Board, the Executive Board, the team leader and the employees agree: “We couldn't have done better – with the machine and our partnership with Kern.”

From founder to chairman of the supervisory board – Bernd Krebs has always kept a watchful eye on his company, toolcraft AG, since 1989. About five years ago, he placed the operational business in younger, equally experienced hands as part of the change of name to a public limited company (see box). As a result, the company has continued to grow steadily and now employs nearly 500 people. With high-precision machining, additive manufacturing, robotics and automation as well as injection molding and toolmaking based in Spalt near Nuremberg – with 90 employees – toolcraft has a wide range of innovative services in its portfolio.

For Bernd Krebs, the company’s strong culture of motivation and trust is a key driver of its positive development. He is convinced: “Employees only reach their full potential and contribute ideas that truly move us forward when the working atmosphere is right.” This success is reflected not only in strong results

despite generally challenging conditions, but also in the friendly faces of employees throughout the company.
Johannes Herzog, team leader in toolmaking, also appreciates the great environment at toolcraft. In addition, the trained tool mechanic and industrial foreman underlines the innovative attitude of his employer: “Bernd Krebs and our board members always listen closely when it comes to investments in modern technology that make us better.”

Kern Micro HD has been in focus for a long time

This was confirmed not least in 2024, when a major investment was made in the field of toolmaking with the high-precision Kern Micro HD five-axis center. A well-considered step. For a good ten years, there has been a regular exchange with Kern area sales manager Barbara Bergmann. Since the market launch of the Kern Micro HD in 2019, the contact has intensified further. Manys visits to Kern in Eschenlohe included. They were impressed by what Johannes Herzog and his colleagues saw there: “The employees there are just as motivated as they are here. There is respectful interaction with each other and a noticeably good working atmosphere. That left us with a really good feeling every time.”
After the demonstration of the Micro HD in applications technology, it quickly became clear that this precision five-axis center is the best possible solution for toolcraft toolmaking. The only small downside: The machinable part size did not quite fit. “If we could use pallets of 320 x 320 mm (12.6 x 12.6 inch), that would be perfect. But once we realized that the compact Micro HD can machine individual parts up to a diameter of 350 mm (13.8 inch) and also includes jig grinding, our last doubts were dispelled.”

Johannes Herzog, team leader and responsible for milling technology in toolmaking (left), and Barbara Bergmann, area sales manager at Kern, are pleased with the successful cooperation, which leads to perfect results

Creative solution for confined spaces

The decision was made in March 2024, and the Kern Micro HD went into operation a good five months later. Due to the cramped space in the Spalter tool shop, some adaptation work was still necessary during this time. To name just one: The spindle cooling unit, which is normally located separately on the floor or on the hybrid unit, was placed above the belt filter by means of a special design by the Kern designers. This means that the entire machine, including automation and necessary accessibility, only needs around 5 x 5 m² (16.5 x 16.5 sqft).

A special design for the spindle cooling unit has helped to integrate the Kern Micro HD into toolcraft's tool and mold making process: it is not placed next to the machine or on top of the hybrid unit (as is usually the case), but above the belt filter

The highly qualified operators at toolcraft have chosen the Kern Micro HD as their favorite workplace – not least because access to the machine is possible at any time without restrictions, despite the existing automation. This is where Johannes Schwab finalizes his program and sets up the machine

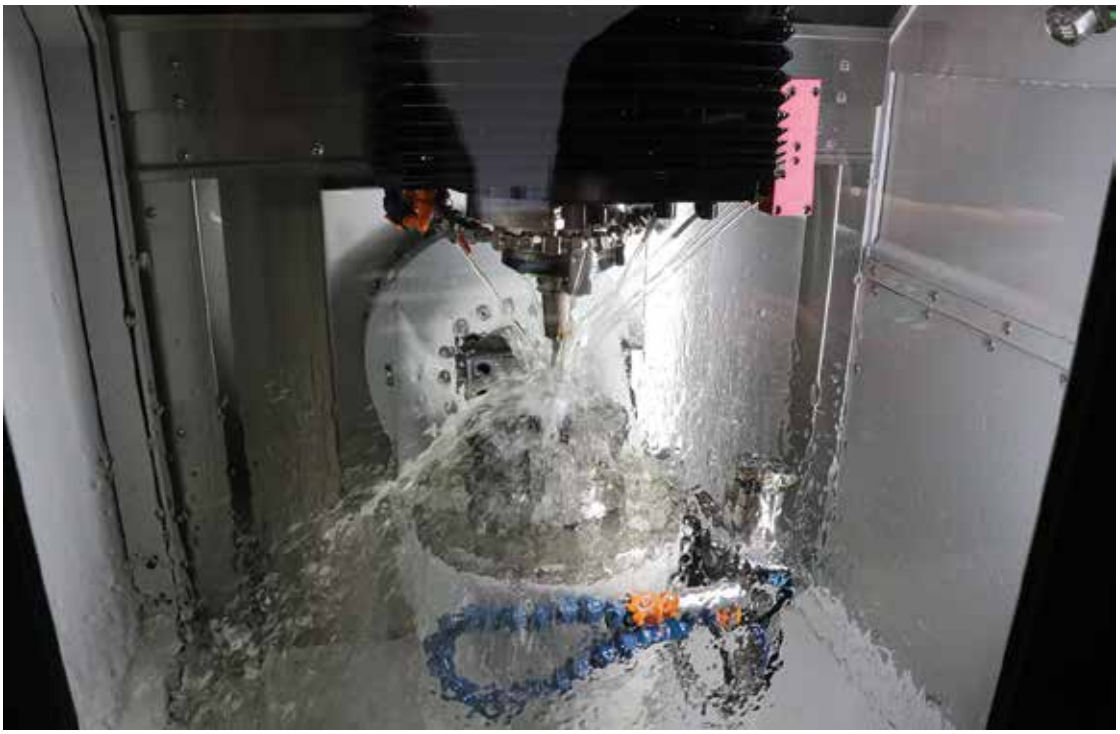
After the program starts, machine operator Matthias Grän takes a short look at the machining of the part. After that, the fully automated Kern Micro HD with grinding package can also work without operators for more than 150 hours if required

A team that likes to work together and is crucial for the successful use of Kern Micro HD in toolcraft's toolmaking (from left to right): Team leader Johannes Herzog, trained operator Johannes Schwab, trained operator Matthias Grän (all toolcraft) and Kern area sales manager Barbara Bergmann

For Johannes Herzog, this is just one of many proofs of the exceptionally good cooperation with Kern. He explains: “The technological superiority of the machine is one thing. Together with Kern Microtechnik's always supportive application technology engineers, the offer is unbeatable.”
At toolcraft, 90 percent hard contour parts are milled and grounded with the Kern Micro HD. The range of materials is wide-ranging: mainly steels, but also stainless steel, titanium, copper, HSS and carbide. For electrodes, the machine is only used when exceptionally good surfaces are required.
In general, quality requirements in tool and mold making are often extreme. toolcraft sometimes requires surfaces of Ra = 0.015 µm and accuracies in the range of 1.5 µm. According to Herzog, the integrated grinding option plays a decisive role in achieving these values reliably: “For us, the focus is primarily on accuracy. Every reduced µm on the part saves us costs and runtime.” Especially with burr-prone tools for liquid silicone, we can use the Micro HD to jig grind ejectors and core holes. With this "hon" grind in the bores, wear on the ejectors is also significantly reduced.

Extremely reduced runtimes in the manufacturing process

Herzog highlights the significant process optimizations achieved with the Kern Micro HD. His team used to machine average parts in six or seven steps. After roughing on a five-axis milling machine, it was time for hardening. Then for five-sided surface grinding. This was followed by further milling with two clampings, before holes were drilled via wire EDM and then die-sinking EDM’ing represented the end of the manufacturing cycle. Even after this cycle was done, manual rework was often indispensable.



High-precision milling and grinding with oil on the Kern Micro HD brings the highest accuracies in the tolerance range of up to 1.5 µm to the workpiece

"Today, we need two to three steps less – for example, the time-consuming surface grinding," says Johannes Herzog happily. After roughing and hardening, the part is completely milled with the Kern Micro HD in just two clampings, including external dimensions and jig grinded holes. If it cannot be produced by milling and jig grinding, die-sinking EDM and wire EDM are then carried out. Manual reworking is hardly ever necessary.

"We are reducing our runtime by at least one week," says the team leader, quantifying the process improvements. Using the example of a slide valve, he specifies: "By eliminating surface grinding, we save around four hours of machine time, and about the same with wire EDM. In addition, we need less working time, because our employees used to have to consider each part, program it and clamp it." At first, this does not sound like more than a week of runtime improvement. But if you take into account that all manufacturing stations at toolcraft are well utilized, it quickly becomes clear that capacity peaks can also lead to waiting times for the parts before the next machining step.

The jig grinding tool before machining

toolcraft AG, Georgensgmünd, …

… was founded in 1989 by Bernd Krebs and today employs around 500 people. In 2020, the company became an AG (Aktiengesellschaft; stock corporation) and the owner moved to the supervisory board as chairman. Since then, the board members Christoph Hauck (Technology and Sales), Karlheinz Nüßlein (Human Resources and Production) and Marc Volkhardt (Finance) have been responsible for the operational business. Its business areas include high-precision machining, additive manufacturing, robotics and automation, as well as injection molding and toolmaking.
toolcraft is based in Spalt with 90 employees and offers complete solutions for molded and injection molded parts, especially in the small and micro parts sector. These are used in a wide variety of industries, including medical fields. toolcraft's other important customer industries include aerospace, the semiconductor industry, automotive and special machine construction.

toolcraft AG
Handelsstraße 1,
91166 Georgensgmünd, Germany
Phone: +49 9172 6956-0
E-Mail: toolcraft@toolcraft.de
www.toolcraft.de

The fully automated Kern Micro HD can easily handle weekend shifts without operators. Depending on the workpiece and requirements, even more than 150 hours of maching are possible without employee intervention

Temperature management, micro-gap technology and grinding make the difference

When asked what makes the Kern Micro HD different from other five-axis precision machining centers, Johannes Herzog sees several factors. He emphasizes one in particular: "The temperature management of the entire machine in combination with the 45,000 rpm, wave-cooled spindle is unique." In addition, there is the microgap technology patented by Kern in all linear axes, which Johannes Herzog and Kern sales consultant Barbara Bergmann emphasize equally. The engineer adds: "Our developers have managed to combine all these individual innovations perfectly." Bergmann mentions the possibility of milling with oil as another advantage – especially when working with the grinding option: "This further increases the reliability of the process and provides best machining results for a wide variety of materials."

To maximize machine utilization, toolcraft has equipped its Kern Micro HD with an Erowa ERC-80 automation system. The line can accommodate 11 ITS50/72 pallets and 48 ITS148 pallets. Runtimes of over 150 hours are therefore no longer uncommon. 24/7 operation without operators is thus almost feasible – even over weekend shifts. Employees can therefore normally rely on a single-shift operation with peace of mind. This is a not insignificant advantage when looking for smart specialists.

With the Kern Micro HD, toolcraft can produce a wide variety of workpieces. What they all have in common is the highest precision (Pictures: Kern Microtechnik GmbH)

Compact plug-in insert for 12 control zones

Anyone involved in mouldmaking who has to work in a limited space knows that every millimetre counts. With the HASCO plug insert H12294/... for 12 control zones, the available space can be optimally utilised – without any compromises as regards the performance. Despite the high connection density, the maximum load capacity of 16A is completely retained. Large, complicated connection boxes are replaced by a compact, convenient solution. The mounted housing corresponds to the previous 6-zone variants.
A major advantage is that only half the bulkhead mounted housing is needed. Especially for small, compact moulds or also for large multi-cavity injection moulding tools, in which it commonly happens that the connection boxes stick out from the mould and cause problems during assembly, this plug insert provides the perfect solution.

Reliable connection through the crimp technology

The cables are fixed by means of a crimp connection. Whereas the wires are compressed permanently and reliably in the pins, they can be removed from the plug at all times with the necessary tool and thus be rewired. The crimp technology thus offers a fast variation of the wiring, which guarantees safety, reliability and long life.

All from a single source

To go with the plug insert, HASCO Hot Runner supplies the optimally coordinated cables – if required also as a connecting cable with compact pin assignment on the one side and the usual wiring on the other. This means that the existing control technology can still be used without problem – without modifications and without compromises.
Should a different wiring standard be desired, this can simply be entered in when the order is placed. HASCO Hot Runner produces this connecting cable – like the entire cable portfolio – specially customised for the customer.
With this innovative product combination, HASCO Hot Runner offers a well-conceived, space-saving solution that makes day-to-day production more efficient and less expensive thanks to the approx. 75 % less wiring time – and that with the customary high HASCO quality.

Plug insert H12294/...
(Picture: HASCO)

Migrated manufacturing in the area of drilling at the company Zerspanungstechnik Mangner GmbH entirely to MAPAL's TTD replaceable head drill system (from left): Uwe Rein (Regional Sales Manager, MAPAL), Dominik Geßner (Production Manager, Mangner) and Mike Mangner (Managing Director, Mangner)

MAPAL fulfils requirements for the tool and mouldmaking industry

Economical drilling done smart

The secret to the success of the machining company Zerspanungstechnik Mangner GmbH in Bad Laasphe, Germany, is targeted investment in optimisation. Drilling has been made more efficient thanks to a large tool package from MAPAL. The package is made up of 110 TTD replaceable head drills along with a big stock of solid carbide heads.

When Mike Mangner started his company in a small rented hall in 2013, tools still had to be changed by hand. The young company developed quickly. Just one year later, the company bought its current and set up the first Hermle machines. As a traditional contract manufacturer, most of Mangner's customers come from the tool and mouldmaking industry. The company offers them services like pressure die casting, sand casting and

Mangner mostly uses Hermle machining centres for manufacturing. Programming takes place directly at the machine

modelmaking. Most of the work is destined for the automotive industry. Besides this, parts are also produced for general machine engineering. Mangner's customers come from all over Germany, but above all from their region.

In the meanwhile, 15 machining centres can be found on their shop floor, above all from Hermle. From the smallest 5-axis machine to the machining centre for components as large as 1 x 1 m, they cover a wide spectrum of components. There are about two machines for every operator. Programming takes place directly at their workplaces. Mike Mangner's optimisation philosophy involves having many identical machines in operation. A next step in the standardisation process involves making available as many of the same tools as possible for these machines. "With this concept, we are in a strong position and can employ our operators flexibly," Mike Mangner explains.

Examining the drill head of a TTD tool (from left): Dominik Geßner (Production Manager, Mangner), Uwe Rein (Regional Sales Manager, MAPAL), Mario Schäfer, (Assistant Production Manager, Mangner) and Mike Mangner (Managing Director, Mangner)

Hirth serration from MAPAL enables high torque

Dominik Geßner switched to Mangner as a production manager two years ago, bringing along his experience and contacts. MAPAL and their Regional Sales Manager Uwe Rein was among them. Geßner advocated the use of TTD replaceable head drills, which he had come to know and appreciate over the years.

The TTD replaceable head drill is the primary application for the TTS (Torque Transfer System) interface. The interface owes its stability to the radially arranged Hirth serration with 12 or 18 teeth, depending on the diameter of the adapted solid-carbide drill head being used. Due to the serration's form closure, variable geometries of the replaceable head are possible. In addition, optimal torque transfer and high radial run-out and change-over accuracy are ensured.

The replaceable drill head is secured by a threaded pin affixed to the side of the tool holder. This allows the drill bit to be changed directly in the machine. The positioning aid integrated in the serration ensures that the chip flutes and coolant transfer from the tool holder to the replaceable drill head match. With its cutting-edge geometry, the drill head has a quality and performance level similar to solid carbide drills.

Machining time reduced

"The true advantage of these drills comes into play in hardened materials, which it can machine reliably," Geßner reports.

The large tool package from MAPAL for Mangner includes a total of 110 TTD replaceable head drills with diameters from 12 to 45 mm and lengths of up to 12xD

"We achieve a long tool life here, which reduces our throughput of drill bits." At Mangner, bores used to take place prior to hardening. By eliminating the need for an additional clamping step, set-up time has been reduced. This increases efficiency in manufacturing, thereby providing the company with added value. The previously used tool system had a particular weak point: if a solid-carbide drill head broke off, the drill bit holder was usually also damaged. In Geßner's experience, this has never happened with MAPAL. After breakage, work could always continue with a new drill head, limiting any resulting damage. "I primarily considered changing the tool system from a cost perspective," says Mike Mangner, explaining why he chose MAPAL.

The Hirth serration of the TTD drill from MAPAL ensures the drill heads sit very securely. This enables optimal torque transfer as well as high changeover and radial run-out accuracies (Pictures: ©MAPAL)

More economical and sustainable

Mangner uses the drills above all to pilot deep bores as well as complete bores for cooling, so-called coolant boost. While the normal lead geometry of the cutting edge is 140°, MAPAL also offers variants for special applications. A 180° tip can execute countersink bores, for example, which would otherwise only be possible with a milling cutter. Ball-nose drills enable radii at the end. Geßner reports that if handled with care, the drill heads can be reground up to three times by MAPAL. "This is very sustainable and lowers the average price per tool."

The tool package delivered by MAPAL includes diameters from 12 to 45 mm, whereby the tool lengths are 3xD, 5xD, 8xD and 12xD. "We cover a certain diameter range with replacement head drills in increments of tenths," Geßner specifies. "The tools would be unaffordable with drills made entirely of solid carbide." The many sizes reflect the various requirements of manufacturing. Series of up to 100 parts are rare here. Typical lot sizes are between one and 10 pieces. The material is often heat-resistant 1.2343 steel, but special materials, steel with varying degrees of hardness and aluminium are also processed. After the successful deployment of TTD drills, the cooperation between Mangner and MAPAL is set to continue. Reamers are already in use. Test finishing with milling cutters is also taking place. Uwe Rein thinks that high-feed cutting could be the next step.

Short profile MAPAL Dr. Kress SE & Co. KG

MAPAL Dr. Kress SE & Co. KG is one of the leading international suppliers of precision tools and complete processes for the machining of practically all materials. The company founded in 1950 supplies leading customers from the automotive and aerospace industries, from machine engineering and from the die and mould making industry. With its innovations the family-owned company sets trends and standards in production and machining technology. MAPAL sees itself as a technology partner, supporting its customers with the development of efficient and resource-conserving machining processes using individual tool concepts.

Realise EDM task reliably and precision

The manufacture of high quality injection moulds requires the highest precision, especially in key processes such as EDM. Meusburger offers a wide range of products available from stock which enable users to master all the challenges of electrode production and sinker and wire EDM at the highest level. With a focus on quality, availability and efficiency, Meusburger supports customers in being able to realise almost every EDM task reliably and with precision.

Precision production of electrodes is a key step in the manufacture of injection moulds and determines the quality of the final product. Meusburger offers a wide range of products for accurate and efficient machining, which includes special tool holders (steep taper and hollow shank taper systems) for secure and accurate tool retention, reliable milling cutters for machining electrodes, and high-quality electrode holders for secure fixing. Practical EDM accessories complete the range to ensure maximum precision and efficiency in electrode production.

Efficient sinker and wire EDM with the right components

- **Sinker EDM:** This manufacturing technology is specially optimised for hardened workpieces. High-quality electrode holder systems, clamping elements and materials are crucial for stable positioning and optimal transmission of the electrical conductivity.
- **Wire EDM:** The right clamping equipment is essential for machining workpieces with complex shapes. Meusburger's clamping systems are optimally tailored to the requirements of wire EDM. They securely hold the workpiece in place, reduce vibrations and help to improve machining quality.

High-quality materials for every requirement

Meusburger offers an extensive range of EDM copper and EDM graphite in various formats and material qualities, guaranteed to be highly precise and available immediately from stock:

- **EDM graphite** (e.g. Q40, Q60, Q70) is characterised by the surface quality that can be achieved, depending on the pore size. Especially fine-grained types with low porosity enable very fine results (better than 16 VDI/0.63 Ra). Despite its lower thermal conductivity compared to copper, graphite remains dimensionally stable even under thermal stress.

- **EDM copper** is the first choice when it comes to the highest surface quality requirements, due to its non-porous and uniform structure. It offers excellent electrical conductivity and high thermal conductivity, which quickly dissipates heat and protects both the tool and the workpiece.
- **Tungsten copper** (WCu) is a compound material that combines the hardness and wear resistance of tungsten with the high conductivity of copper. It is used as a high-performance electrode material when conventional copper alloys reach their limits.

To optimise the ordering process, Meusburger offers an intuitive configurator for EDM accessories in its portal (Picture: Meusburger)

Easy configuration of accessories

To optimise the ordering process, Meusburger offers an intuitive configurator for EDM accessories in its portal. Customers can quickly and efficiently assemble EDM copper, graphite electrodes, rod electrodes and graphite cuts according to their requirements. Operation is simple and allows direct input into the dimensional drawing. A clear overview of all technical specifications, immediate price and availability information, and direct access to CAD data make the procurement of EDM components more efficient than ever before. Learn more: www.meusburger.com/edm

Prototypes from the powder bed

Bionic structures, internal cooling channels and filigree grid designs – where conventional machining reaches its limits, the world of 3D printing begins for Melotte. The subsidiary of the Picanol Group has been active in tool and mold making since 1965, but has also been focusing on the additive manufacturing of metallic components since 2007 – as the first company in Belgium and one of the pioneers in Europe. The entry into the then still young technology initially took place on powder bed machines from REALIZER. DMG MORI took over the manufacturer in 2017 and became a full-service provider in the machining of metallic components. Due to the positive experience with the predecessor models, Melotte then also invested in further developments – in 2017 in a LASERTEC 30 SLM and in 2024 in a LASERTEC 30 DUAL SLM.

Thomas Vandenberghe (left), SLM engineer at Melotte and Peter Perremans, CEO Melotte

New markets thanks to additive manufacturing

"We were able to open up new markets with prototypes and small batch sizes in particular thanks to additive manufacturing," says Peter Perremans, CEO of Melotte, looking back on the company's successful business development. Today, the company manufactures highly complex components for industries such as semiconductors, pharmaceuticals, mechanical engineering, electronics and petrochemicals. The biggest advantage: almost limitless design freedom. Designers can implement new ideas and fundamentally optimize existing components. Melotte supports them right from the start - with expertise that covers the entire manufacturing process. This is because additively manufactured workpieces often require post-processing: milling, turning, grinding or eroding are standard here.

Redesign of hydraulic blocks and cooling channels

Peter Perremans uses the example of a hydraulic block to illustrate the additive approach: "Instead of a solid block with straight holes, we can use 3D printing to freely determine the course of the fluid channels, which improves the function and drastically reduces the weight of the component." Lightweight construction is a decisive factor in the Aviation & Space sector, among others, but stability must also be taken into account. "We could produce wall thicknesses of just 0.5 mm on the LASERTEC SLM machines, but this is not enough for some applications."
Thomas Vandenberghe, SLM engineer at Melotte, gives another example of successful redesign with cooling channels for lithographic systems from ASML: "On the LASERTEC 30 DUAL SLM, we can freely define the geometry of these parts and thus optimally adapt them to their later function." In order to produce these variant-rich small series economically, Melotte places as many of the components as possible on one of the 300 x 300 mm build plates. Peter Perremans also sees a sustainable aspect in such newly conceived solutions: "The bionic design of these components requires significantly less material than conventionally manufactured components that are milled from solid material." This supports a resource-saving approach to production.

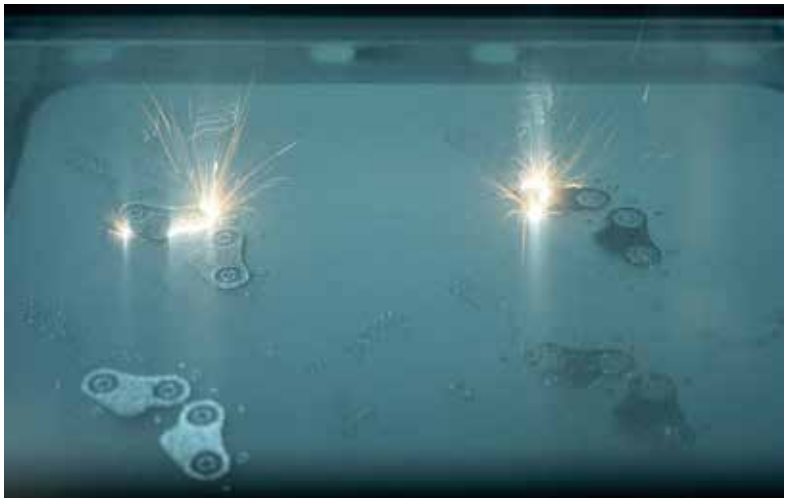
High-precision and 80 percent more productive

Melotte's decision to invest in another LASERTEC SLM machine in 2024 is partly due to the positive experience with the pre-

vious models. On the other hand, Thomas Vandenberghe was also impressed by the potential of the LASERTEC 30 DUAL SLM: “Equipped with two 600 watt lasers, the machine is up to 80 percent more productive.” DMG MORI has also further improved the optics module. “The focus diameter of 80 µm offers very high precision, which allows us to produce extremely fine grid structures with good surfaces, for example. This means we always get the best component quality.”

Convenient powder handling with rePLUG exchangeable module

On the LASERTEC 30 SLM and the newer LASERTEC 30 DUAL SLM, Melotte mainly produces components made of stainless steel and titanium alloys. According to Peter Perremans, the consistent use of the same material reduces the effort involved in cleaning: “Customers such as ASML expect absolutely unmixed products without residues of a different material. In this case, all lines must also be cleaned when changing materials.” Should this ever be necessary, DMG MORI has a convenient solution with the rePLUG change module, which enables a contamination-free changeover between different materials in under two hours. “We can provide replenishment with the same material in just a few minutes.”



Equipped with two 600 watt lasers, the LASERTEC 30 DUAL SLM is up to 80 percent more productive than its predecessor

Diversity of materials in additive manufacturing

The continuous development of powder bed machines has meant that almost all metal alloys can be used today. “The trick is to hit the optimum melting point of the material with the laser,” says Thomas Vandenberghe. Today, more powerful lasers and increasingly precise control of the process mean that even aluminum and copper can be printed without any problems. “Scans show that the density of the components is in no way inferior to that of the solid material, so we can guarantee optimum quality at all times.” The

The LASERTEC 30 DUAL SLM is operated via an intuitive touch-screen control system

The LASERTEC SLM models allow contamination-free material changes in less than two hours

quality of the metal powder is also crucial for this. DMG MORI cooperates with selected DMQP partners (DMG MORI Qualified Products) who manufacture high-quality powders and also supply customers such as Melotte directly.

Broadly positioned for the future

Thanks to additive manufacturing, Melotte has evolved from a traditional tool and mould maker into a highly specialized manufacturing partner that also drives innovation in prototype construction. The economic development of the target industries determines where innovations are most in demand. “One year the focus is noticeably on the semiconductor sector, another year the demand from the pharmaceutical industry is greater,” says Peter Perremans, describing the fast-moving business. However, this does not play a major role for the work with the LASERTEC SLM machines. “Our focus is on highly complex parts and small quantities. With the help of metallic 3D printing, we can use our expertise profitably in precisely this area.”

Melotte was able to sustainably optimize a previously milled component with cooling channels as part of additive manufacturing through intelligent redesign, as well as a valve block that is now considerably lighter

Melotte was able to sustainably optimize a previously milled component with cooling channels as part of additive manufacturing through intelligent redesign, as well as a valve block that is now considerably lighter

On the LASERTEC 30 DUAL SLM, Melotte realizes components with the finest grid structures

(Pictures: DMG MORI)

Innovative machining solutions for P and M steels set new standards

Standardised chip breaker geometry for long-chipping steel materials

Machining long-chipping steel materials like stainless steels has always been a challenge. With the development of a new, standardised chip breaker geometry for fine boring blades, MAPAL has achieved a crucial breakthrough that has both technical and economic benefits.

In metal machining, chip formation plays a key role in process reliability, tool life and surface quality. Controlled chip formation is particularly crucial to the fine machining of unalloyed, alloyed and stainless steels.

MAPAL has presented a brand-new approach to chip breaking for fine boring tools at this year's EMO in Hanover, Germany. It combines a precisely defined lead and rake angle geometry with optimally adapted cutting data and cutting depths. This precise adaptation enables perfect chip formation, even for challenging materials. The result: optimal chip removal, reduced heat development and much greater process stability.

The benefits of this technology can be seen not only in the quality of the finished workpieces, but in the cost-effectiveness of manufacturing. Less machine downtime and tool wear and greater dimensional accuracy make this approach a real leap forward in machining technology.

Chip breakers are not a new invention – but the idea of implementing standardisation for long-chipping steel materials in fine boring is. The chip breaker geometry developed by MAPAL combines decades of experience in this area with a clear focus on cost-effectiveness and user orientation. Until now, MAPAL has used chip breaker technologies for custom solutions. With the innovation presented at EMO 2025, the company is taking a big step towards standardisation and efficiency.

The fine boring blades with chip breaker geometry for unalloyed, alloyed and stainless steels are now available from stock with defined geometries and coatings.

Chip breaker geometry for long-chipping materials: Precisely defined lead and rake angle geometry, combined with adapted cutting data and depths, enables perfect chip formation for long-chipping steel materials (Pictures: ©MAPAL)

Blade with chip breaking: The newly developed chip breaker technology not only enhances the quality of the machined workpieces – it also boosts the cost-effectiveness of production through low tool wear and machine downtime as well as high dimensional accuracy

Adaptive coolant pressure control (Picture: IFW)

Research Project with OPEN MIND

Another step to intelligent coolant control

A follow up project by the Institute of Production Engineering and Machine Tools at Leibniz University Hannover (IFW) together with OPEN MIND Technologies AG has taken the idea of energy savings through demand-based coolant supply one significant step further. In collaboration with Kennametal Inc. and DMG MORI, the partners have developed a method that derives the required coolant flow directly from the material removal rate calculated in CAM planning and integrates this information into the NC code. The adaptive coolant supply programmed with *hyper*MILL® has achieved energy savings of approximately 82 percent.

The study focused on developing a cycle time and tool specific method for planning coolant delivery directly in the CAM system. This includes the output of an adapted NC code for milling and drilling operations. This approach has the potential to build upon the existing adaptive coolant supply technology from DMG MORI. The project covered coolant demand modeling, integration into the *hyper*MILL® CAM software, and validation on the DMG MORI DMU 40 eVo linear machining center.

Modeling

The coolant demand model was based on the observation that rising material removal rates typically lead to higher levels of heat and chip generation, both of which must be removed from the contact zone. This simplified assumption provides a robust and tool specific method for calculating coolant demand using standard CAM data. Reference data for each tool's maximum material removal rate was provided by Kennametal. Pressure,

flow rate, and electrical power consumption of the coolant pump were recorded, and characteristic curves were created to reflect the hydraulic conditions for each tool.

Programming

To implement the variable coolant flow along the toolpath within the CAM environment, *hyper*MILL®'s Python API was used. During stock removal simulation, the system analyzes the cutting parameters for each machining line and combines them with tool specific metadata to calculate the material removal rate. The IFW module then determines the corresponding coolant flow. A smoothing routine is applied before extending the NC data with the commands for flow control, which helps prevent abrupt changes.

Verification

For validation, a demonstrator part made of 11SMn30+C free cutting steel was machined on a DMG MORI DMU 40 eVo linear with milling, drilling, tapping, and broaching all applied. Instead of controlling the coolant flow line by line, the tests used an average flow per machining step, which proved to be effective. The pump's energy consumption was recorded through the frequency converter. Compared with a conventional machining process, the adaptive method achieved energy savings of around 82 percent while maintaining the same quality of results. The CAM based solution also offers high flexibility. Users can deactivate the adaptive mode whenever the mechanical flushing effect of the coolant is required, for example during drilling. The methodology will now be further developed and researched, with the goal of making it available for additional tool types, machining processes, and materials.

The results of the study were published by Prof. Dr. Berend Denkena, Dr. Marc André Dittrich, Dr. Klaas Maximilian Heide, Dr. Alexander Krödel Worbes, Andreas Lieber, and Talash Malek (M. Sc.). The study was also published by Martin Winkler in issue 09/2025 of the German VDI Z journal under the title "Coolant Demand Planning Directly from the CAM System".

Greater flexibility for international users

Mono nozzles now also available with radii in inches

With the expansion of its successful range of hot runner nozzles, HASCO is now offering an even broader selection and greater precision for injection moulding applications worldwide. The proven mono-shot Single Shot H6300/… and Vario Shot H6200/… ranges are now available not only in metric sizes but also in inch sizes, specifically ¾" and ½". In this way, HASCO is responding directly to the requirements of international markets and providing a practical solution for customers working to US and UK standards. The nozzles can be ordered directly ex stock from the webshop, with no special configuration required.

Both mono-shot ranges are renowned for their outstanding temperature control and excellent functionality. They are designed for a wide variety of injection moulding applications and enable the economical production of small and medium-sized mouldings with maximum precision. With the introduction of the inch versions, users benefit from an even wider selection of tailor-made solutions, while maintaining the high level of process reliability and quality that customers expect from HASCO.

HASCO's extensive hot runner portfolio offers the right nozzle for every application – whether for demanding needle valve solutions, compact installation spaces or particularly wear-resistant requirements. The modular systems ensure maximum flexibility, ease of servicing and long service life.

By adding inch nozzle radii to its range, HASCO once again underlines its commitment to providing customer-specific solutions for the global market. The new mono-shot types are available with immediate effect from the HASCO webshop.

(Picture: HASCO)

Hendrick Motorsports manufactures cylinder blocks, among other things, on GROB universal machines

From 17 hours to 1

Now Hendrick Motorsports revolutionized cylinder block machining

To meet increasing demands, Hendrick Motorsports relies on state-of-the-art manufacturing technologies from GROB. With the universal machining centers G350a and G550a, the racing team has drastically reduced its machining times – from up to 17 hours to less than one hour – while further improving precision and repeatability. This technological leap has not only transformed production processes but also provided crucial advantages on the racetrack.

At Hendrick Motorsports, it was recognized early on that the production of key engine components required a significant increase in precision. “
It quickly became clear that we needed to improve accuracy on some of our most critical parts. That’s when we started exploring different options and came across GROB,” recalls Scott Maxim, Vice President of Powertrain at Hendrick Motorsports.
“The differences between winning and losing are now measured by the thousandths of a second,” Maxim continued. “Which means precision and repeatability are crucial in staying ahead of our competition. And much like our advanced metrology partnership, GROB has given us an advantage in this area.” The decision fell on GROB universal machines – two G350a and one G550a – with resounding success.

Flexible machining with maximum accuracy

The production process starts with cast blanks supplied by General Motors. These undergo complex machining operations such as surfacing, drilling, threading, and grooving. The transition areas in the cylinder head, where gas exchange occurs around the valves, between the combustion chamber, intake and exhaust channels, are particularly challenging. “This is exactly where GROB

technology shows its strengths. The machines are reliable and precise. Combined with the Siemens control system, machining is now more transparent and easier to manage," explains Jay Grubbs, CNC programmer at Hendrick Motorsports.

Workpiece machining with maximum tool length

A key advantage lies in tool handling: collisions with fixtures are now a thing of the past. "Thanks to the tunnel concept, the tool completely moves out of the workspace. The workpiece can be freely moved—without risk," says Michael Tummond, Engine Engineering Manager at Hendrick Motorsports. The special axis concept of the GROB universal machines allows the full tool length to be used in every axis position, even with the largest workpieces—a benefit for Hendrick Motorsports. "The true 5-axis machining with GROB is unexpectedly straightforward," says Grubbs.

Massive time savings and higher quality

A highlight is the dramatic reduction in machining times for cylinder blocks. Previously, the complete production process from raw casting to finished part took 15 to 17 hours and required multiple setups. With GROB technology, all of this is now completed with a single setup in less than an hour. "We achieve time savings – and with even higher precision," summarizes Michael Tummond.

The first two series of race cylinder heads have already been produced – with outstanding accuracy and repeatability. "It is impressive to watch the G550a machining an engine block. It moves the workpiece with incredible ease, at high speed, and with the utmost precision," says Maxim.

Stable processes through close collaboration

In addition to the machine technology, collaboration with GROB engineers was critical. "Developing the fixtures together allowed us to achieve stable and consistent setups. The improved clamping was key to taking the quality and precision of our parts to a new level," recalls Maxim.

With the investment in GROB universal machines, Hendrick Motorsports has taken a significant step forward: more precision, shorter machining times, and outstanding reliability. "The care we put into our work is directly reflected in the performance of the machines. That's exactly why investing in GROB for the critical components that directly impact on-track performance was the right decision for us," concludes Scott Maxim.

The G550a has significantly reduced processing time at Hendrick Motorsports (Pictures: GROB-WERKE)

Handtmann pioneers die-cast aluminium wheels

High-pressure die casting enables lighter wheels with improved CO_2 performance and driving dynamics

Albert Handtmann Metallgusswerk GmbH & Co. KG has developed its die-casting processes to enable, for the first time, the production of complete aluminium wheels using high-pressure die casting (HPDC). The new light-performance wheels are up to 20 percent lighter than conventional low-pressure die-cast wheels, opening a market segment previously considered unattainable for HPDC. With this step, the Handtmann Group positions itself as a full-range solution provider for lightweight aluminium components and sets new benchmarks for the wheel and automotive industries. OEMs, wheel manufacturers, fleet operators and end customers benefit from a reduced CO_2 footprint, enhanced driving dynamics and significantly greater design freedom. In battery-electric vehicles, the reduced wheel mass also contributes to a measurable increase in driving range. The new aluminium wheels made their public debut at Euroguss 2026 in Nuremberg. Series production readiness is planned for the course of 2026.

The newly developed casting system demonstrates Handtmann's comprehensive development expertise in the light-metal industry. The entire process – from the initial concept through the design of the casting system to series production – was developed and implemented in-house.

The wheel blanks are produced in series using HPDC at Handtmann. Subsequent processes such as machining, coating and quality assurance are carried out by the partner company Cevher Group, which has decades of experience in the wheel industry.

Both partners have aligned the complete process chain to the requirements of the automotive industry. "By introducing this technology, we are opening the automotive wheel segment to high-pressure die casting for the first time and, at the same time, laying the foundation to transfer this process to other components in the future. This allows us to set new standards in both the light-metal and automotive industries," says Dirk Seckler, Co-CEO of Handtmann Leichtmetallguss.

The new light-performance wheels are up to 20 percent lighter than conventional low-pressure die-cast wheels

(Picture: Albert Handtmann Metallgusswerk)

HPDC as a key technology for efficient wheel production

At the core of the innovation is high-pressure die casting, a process long established for the cost-efficient production of large-volume aluminium components. For the first time, Handtmann is applying HPDC to the manufacture of complete aluminium wheels – until now a domain reserved exclusively for low-pressure die casting.

In HPDC, molten aluminium is injected into a precisely engineered die under very high pressure within milliseconds and solidifies under applied pressure. This enables the production of complex, thin-walled components with high dimensional accuracy and excellent surface quality in large volumes. Short filling times, high clamping forces and automated process control ensure high productivity, while near-net-shape casting reduces the need for downstream machining.

For Handtmann, HPDC therefore forms the basis for manufacturing structurally relevant aluminium components such as wheels with high productivity at scale. At the same time, the process supports OEMs and wheel manufacturers in reducing CO_2 emissions and realising aerodynamically optimised designs.

New design freedom for OEMs

Reducing CO_2 emissions is a key objective for vehicle manufacturers, both in production and during vehicle operation. The new HPDC wheel addresses these requirements through lower mass and aerodynamically optimised geometries that reduce air resistance and increase vehicle range, particularly in electric cars.

"Thanks to the enhanced design freedom offered by HPDC and the minimal distortion inherent in the die-casting process, we can realise wheel designs that were simply not feasible with conventional methods. This will appeal equally to designers and car enthusiasts. In addition, the often-required aerodynamic cover becomes unnecessary, further reducing weight and cost," says Andreas Würzer, Head of Technical Development.

Advantages for end customers and fleet operators

End customers benefit from a lightweight wheel that improves handling through reduced unsprung mass. The combination of attractive design, enhanced driving dynamics and more sustainable production increases overall vehicle performance. Fleet operators – including logistics providers, car-sharing services and corporate mobility fleets – also benefit from the efficiency gains. Lower energy or fuel consumption improves operating costs, while the improved CO_2 balance can be directly leveraged for sustainability reporting and certification requirements.

Management change at HASCO: Markus Büngers becomes new CEO

With effect from 1 January 2026, Markus Büngers has taken over the position of CEO of HASCO Hasenclever GmbH + Co. KG. Following the departure of the long-standing CEO, Christoph Ehrlich, in the summer of 2025, Thomas Karazmann initially assumed responsibility for managing the company and, during this transition phase, ensured HASCO's strategic continuity and operational stability.

In his previous role as Executive Vice President Finance & Administration, Markus Büngers was continuously involved in the strategic and operational aspects of all departments and thus played a decisive role in shaping the company's ongoing global development. He stands for continuity, technical expertise and strategic reliability.

Thomas Karazmann is confident that his successor will continue to drive HASCO's strategic development. "I am delighted that we have been able to appoint Markus Büngers as the person we absolutely wanted to take on the role of CEO. He is an experienced manager who knows HASCO very well and, thanks to his previous roles at renowned industrial companies, has extensive international management experience. With him, HASCO is in the best possible hands."

Markus Büngers is equally optimistic about his new role: "I would like to thank everyone most sincerely for the trust they have placed in me to actively shape HASCO's future in this important role. The challenges are great, but so is our confidence. HASCO has enormous strengths, excellent employees with a wide range of skills, and a clear, shared vision. We will consistently build on these strengths through dedicated hard work for the benefit of our customers."

Markus Büngers is the new CEO at HASCO (Picture: HASCO)

With this management change at the beginning of the year, HASCO has laid the foundations for stable, future-oriented development and, in Markus Büngers, has chosen a manager who knows the company extremely well and embodies its values.

Sophisticated automation solution with raw part and pallet handling

One customer, one pen and one thought: “I would like to load blanks automatically.” What began as an idea and a sketch became a sophisticated automation solution at Pavese and EROWA – with raw part and pallet handling in one, automated clamping and fully integrated process control. A story about courage, doers and machines that think for themselves.

EROWA Robot Six with combined pallet and raw part handling

How EROWA and Pavese AG are rethinking automation together – The idea

Daniele Pavese, Managing Director of Pavese AG, does not believe in half measures. Anyone who talks to him immediately senses the urge to improve – in every detail. His wish: a more efficient manufacturing future.
The man is serious. And anyone who knows him knows that here others make compromises, Pavese is just starting to warm up: “I want to load pallets AND raw parts automatically – and clamping the raw part on pallets at the same time.” Why?

Andreas Tassone, Sales Manager EROWA AG Switzerland
Daniele Pavese, Managing Director Pavese AG

If these processes are automated, several problems can be solved at the same time: Firstly, no one has to manually clamp raw parts anymore. Secondly – and this is the key aspect of this process – a check is carried out before unloading to determine whether any reworking of the finished part is required.
For this purpose, the inspection process is integrated into the higher-level control system and automated: Palletized workpieces are fed to the measuring machine in a flexible and non-linear automated manner – and checked overnight. This relieves our bottleneck – in-process measuring.
It is precisely these steps that need to be integrated into a joint process. New territory for EROWA: “Our systems were precise, efficient and intelligent – but the handling of raw parts? Uncharted territory.” But if you never question boundaries, you never move forward.

Vision meets development power: a cell that can do everything

In 2022 Pavese explores potential partners. By 2023 it is clear: The project is feasible with EROWA. The interdisciplinary project team at EROWA is the perfect sparring partner: critical, clear, creative. Together, they develop a solution that breaks new ground – but is so robust that it can become the customized EROWA standard for many others.

“I don‘t want a run-of-the-mill solution. I want processes that suit us.”

The managing director of Pavese AG approached EROWA with this clear requirement – and did not simply make a technical request: “It was an invitation to leave our comfort zone and rethink the potential of our automation and software,” says project manager EROWA.
But the solution had to be standardized, reproducible and easy to implement – without compromise. A system that can be retrofitted

and updated over decades, even in the event of changes or software updates. Durable, adaptable, future-proof.
Today, Pavese works with a unique cell – modular, scalable and completely sophisticated:

- Blank and pallet handling combined
- Automated clamping of blanks
- In-process measurement
- Open architecture for future expansions

From one hour to ten minutes

The effects? Noticeable – every day. "The user must be able to decide for themselves when the part goes out. Automation works for us – not the other way around."
What used to take an hour to set up and clamp is now done in ten minutes. No more morning traffic jams at the measuring machine. No more random sorting. Instead: continuous correction, smooth processes and relaxed employees.

Automation with a grip

And the workforce? Fully involved – the main operator was part of the project right from the start. Automation has not replaced jobs – it has changed them. Work is different today: more structured, more relaxed, more efficient. No employees have been made redundant – on the contrary: the company is growing. Because more is now being achieved with the same team. More output, less pressure – and more space for the essentials.

The dream rides on wheels

What began with a sketch follows a clear vision – conceived in three stages. Following the successful development and implementation of the automated cell, the next stage is now imminent: a driverless transport system (AGV) that independently controls the measuring machine – paving the way for a fully automated process.
What still sounds like a dream of the future today is already taking shape at Pavese. This automates the last manual step and closes the process.

A modular standard was the goal

The biggest challenge? The balance between vision and standardization. The aim of the project was not a one-off solution, but a configurable system with EROWA quality that can also be used modularly in other companies.

The gripper automatically adjusts to the size of the workpiece

Partnership-based, provocative, productive

For Pavese, it was crucial to work with a partner that sees eye to eye. EROWA was not just an implementer, but a co-designer. Not just a developer, but a challenger. Daniele Pavese says: "I knew what I wanted – but I needed partners who could make it happen. And that's exactly what I found at EROWA."

Summary

This story is not a product report, but an innovation adventure. With a maker who thinks big – and a development team that not only listens, but executes as well.
What was the result? A cell that delivers maximum productivity. And proof that you often just have to get started – with a simple sketch and a bold first step.

EROWA JMS 4.0 ProductionLine – Intuitive operation on the touch monitor with real-time overview of current drawer loads and automatic space conflict check (Pictures: EROWA AG)

Flexible, modular cleaning solution for large flywheel housings in the commercial vehicle industry

Modular system for large components in the commercial vehicle industry

Greater flexibility in component cleaning

In the production of large and heavy components for the commercial vehicle industry, flexible and modular cleaning concepts are required that reliably meet stringent cleanliness standards while ensuring a high level of process reliability. Manufacturers need systems that are specifically designed for large-volume components, capable of handling multiple part variants, and scalable to accommodate future requirements. Against this background, one of the leading commercial vehicle manufacturers in the Netherlands has selected a highly flexible, custom-engineered cleaning system from BvL Oberflächentechnik GmbH, based in Emsbüren, Germany, for cleaning flywheel housings used in the powertrain.

Scalable and Future-Proof

The Geyser system used in this application from BvL Oberflächentechnik GmbH has been specifically designed for cleaning various large-volume components supplied from machining processes. Different variants of flywheel housings are thoroughly and reliably cleaned fully automatically in short cycle times. Additional component types can be integrated into the cleaning process in the future with minimal effort. This makes the system fully compliant with key manufacturer requirements for scalability and future-proof production.

Modern and reliable robotic handling

A central element of the solution is the integrated robotic cell. It ensures safe and precise handling of the heavy components and their optimal alignment during the cleaning process.

Reliable cleaning, drying, and cooling of components for immediate downstream leak testing

Thanks to a variable gripper, different geometries can be reliably picked up and precisely positioned. This enables effective cleaning of demanding areas such as bores, undercuts, and blind holes. At the same time, robotic handling ensures short cycle times, high process stability, and reduced carryover of media and contaminants, which has a positive effect on bath service life.

Reliable cleaning, drying, and cooling in one system

The customer-specific system consists of a Geyser, Nevada, and Arctic module. In the Geyser chamber, cleaning takes place in an immersion unit using intensive water agitation (the "whirlpool effect"). The component is then moved and rotated in a controlled manner around the nozzle frame in the rinsing area to reliably reach all relevant surfaces. High-performance filtration technology ensures continuous removal of contaminants from the cleaning medium.

After wet cleaning, the flywheel housings are transported via a roller conveyor to an external vacuum dryer, which ensures complete drying. In the subsequent cooling tunnel, the components are cooled to ambient temperature (± 3 °C). This allows the flywheel housings to be transferred directly to the downstream leak testing process without any additional waiting time.

This project clearly demonstrates how modular and flexible cleaning concepts can meet the high requirements of the commercial vehicle industry. Designed for large components, multiple part variants, and future expansion, the system provides the foundation for sustainable and scalable production – an essential advantage for internationally operating manufacturers.

More information: https://www.bvl-cleaning.com/en/industries/automotive-engineering

Modern and reliable robotic handling of flywheel housings during the cleaning process (Pictures: BvL Oberflächentechnik GmbH)

The new coupling station still leaves room for further growth

WITTMANN equips elasto with central material supply system

Saving material and boosting overall efficiency

With a central material supply system from WITTMANN, elasto has reorganized material handling in injection molding production. The investment is part of a comprehensive modernization package aimed at achieving long-term competitive unit costs at the German site.

The granulate is transported inside a closed system. Feedmax Clean material loaders are also used. In this way, dust generation is reliably prevented

elasto ranks among the largest suppliers of promotional items in Europe. From giveaways right up to high-quality household, lifestyle and sports articles, the product portfolio of its shop includes an immense range of different options. Ever since its foundation in 1980, the company with its headquarters located in the German town of Sulzbach-Rosenberg, has seen continuous growth, and this trend continues. A key factor here: close connection between

economic and ecologic strategy. “For promotional items made of plastics, major brand owners increasingly turning to European production”, emphasizes Marcus Sperber, who manages the family-owned company in the second generation.
“Made in Germany” as a quality seal is an integral part of the sustainability strategy. This strengthens the local economy, but also involves some new challenges. After all, people are not always willing to pay more for “Made in Germany” products. So, efficiency and productivity on the shop floor must be improved continuously to keep unit costs competitive.

12.5 million Euros for new, resource-saving processes

More than 600 from the total range of 1400 articles are manufactured in Germany. Primarily plastics products, for this is what the parent company in Sulzbach-Rosenberg has specialized in. The machinery, presenting itself in a shiny new environment, consists of 18 injection molding machines with clamping forces ranging from 50 to 300 tons as well as a stretch blow molding and a blow molding machine.
Most recently, elasto has invested 12.5 million Euros in a new, resource-saving production and logistics center. A completely new hall was built for the logistics department, and the production was moved into the original hall after it had been vacated and thoroughly refurbished. This hall now offers significantly more space and thus caters to the growing demand for advertising articles made in Germany.
“Over the last few years, we had already added some new, larger injection molding machines, which stretched the original hall to the limits of its capacity”, reports the Production Manager Markus Rösel. “A constant challenge was the low, gable-shaped ceiling of the hall. All machines had to be positioned in such a way that the robots could operate below the gable top.” This restricted flexibility, since the installation of an overhead crane was not possible either. Material supply was stored decentralized in the old hall. The granulate containers stood directly beside the injection molding machines, and the granulate was filled into the hoppers by hand. “Two staff members were fully occupied with refilling granulate”, reports Rösel. Simultaneously, valuable human resources were lacking elsewhere, as the shortage of skilled workers has been noticeable for some time now. With the expansion of production, it was therefore necessary to increase automation.

Round waiter’s trays are well-known products from elasto

Unlimited choice of colors for batch sizes from 5000 units upwards

The heart of the new production is now a large central material supply system from WITTMANN. “With this central material supply system, we have also provided the structural basis for further growth”, Sperber points out. Several large Drymax material dryers are standing on the platform, placed below them are 750-kg containers for the most frequently used materials and colors. Polypropylene makes up the lion’s share. Via a closed pipeline system, the granulate is transported to the coupling station and from there to the individual processing machines. Currently, not all of the coupling points are yet in use – here,

The M8 control system of the central material supply system met with a very positive response from staff members

The dryer platform provides a view across the material storage area. The space directly under the platform is reserved for containers filled with the most frequently used materials

too, the equipment has been planned for further growth. Characteristic for elasto is its vast range of different colors. “Batch sizes from 5000 units upwards are available in any color”, says Sperber.

The coordination of material flows with the machines takes place via bar code labels and hand scanners. The M8 control system of the central material supply system automatically checks whether the particular combination fits and only then releases the material transfer. A risk of confusion, such as existed previously, is thus excluded. “The M8 control system was accepted very well by the whole team”, says Rösel. “Following training at WITTMANN, they could all work with it without any problems, although the RFID-controlled granulate supply was a complete novelty for everyone.”

The CMS includes Drymax material dryers

Removal and new start-up accomplished in only two weeks

The WITTMANN subsidiary in Nuremberg with a large training center and application technology center is less than an hour’s drive away. This is an advantage also for servicing. “Whenever we cannot help online, we will come very quickly in person”, emphasizes Wolfgang Prütting, Regional Sales Manager at the WITTMANN Group. “In selecting our suppliers, we have a strong preference for regional partners”, underscores Marcus Sperber. But the decisive incentive for choosing WITTMANN as their supplier of the central material supply system came from visiting a reference customer. “We visited a major manufacturer of electronic components to see how they work with WITTMANN's system. We spoke with staff members on site and saw that their response was very positive”, Rösel reports. Another confirmation that they had made the right choice came to elasto during the installation of the equipment. The schedule was extremely tight. In just two weeks,

the injection molding shop was relocated and the new central material supply system was put into operation. Then production, running at full capacity, started up again.

Regrind processing with thorough dedusting

"The central material supply system has substantially improved our processes", is the conclusion drawn by Markus Rösel. Color changes are now carried out much faster. Residual material is simply sucked back and no longer lands inside a handheld vacuum cleaner. There are no more scattered granulate grains falling on the floor either. "The extremely clean materials handling increases occupational safety, process reliability and material efficiency", says Rösel.

Dust generation has been completely eliminated, which is due to the closed pipeline system as well as the Feedmax Clean material loaders with their integrated dedusting function. "The Feedmax Clean reaches extremely high extraction rates of up to 80 per cent of all particles below 1 mm in diameter", explains Prütting. WITTMANN originally developed the Feedmax Clean to meet the increasing requirements of the circular economy and with the aim of being able to use recycled materials safely also for high-quality applications, thanks to thorough dust extraction.

"For products not certified for direct contact with food, we use regrind more and more often", says Rösel. In part, this is regrind produced in-house from sprue and scrap parts. As an example, they point to a "Profi 320" tray, made of recycled polystyrene. The round waiter's tray with a high rim and a slip-resistant inner surface, on which beer advertising is often shown, is one of elasto's top sellers. It is produced by two-component injection molding with in-mold labeling (IML).

Down-stream finishing of injection molding products is one of elasto's main specialties. In addition to IML, the available options include screen print, pad print and digital print. Moreover, items such as drinking bottles and cups are engraved with a name, logo, or other motif.

20 per cent more effective

elasto is the first company on the promotional item market to be ISCC Plus certified and thus furnishing evidence of its generating resource-saving materials and manufacturing ecologically valuable products. In addition to recycled materials, polypropylene produced from agricultural and forestry waste has contributed to the successful certification.

Working together for higher competitiveness: Marcus Sperber and Markus Rösel from elasto, and Wolfgang Prütting from WITTMANN BATTENFELD Germany (from right to left) (Pictures: WITTMANN)

A particularly large contribution to the reduction of greenhouse gases comes from the company's own photovoltaic system. 1560 solar modules are installed on the new logistics center alone. "On a sunny day, we can operate entirely with energy produced in-house", Sperber emphasizes.

On 5500 square meters, the new logistics hall offers space for 5000 pallet racks and a storage area for 7000 small parts. The latter contains stores of small injection-molded products which are most frequently in demand, and which elasto also sells via online market places. Products ordered are sent fully automatically by mouse click directly to the person responsible in the shipping department. The latter carries out the final finishing step – for example, engraving – and then packages the products for dispatch. "We can only handle such small individual orders efficiently, because we have optimized and automated our processes also in the logistics department", Sperber points out. The overall flexibility of production at the corporate headquarters has increased substantially – and this, too, pays off in terms of high competitiveness.

What is the proportion of the efficiency gain contributed by the new central material supply system? – This is not quite so easy to calculate, since the total number of optimization measures is very large. "But we have certainly become about 20 per cent more efficient in granulate feeding", estimates Rösel.

"The central material supply system definitely helps us to produce competitively", Marcus Sperber confirms. "We now have the necessary efficiency to make products in Germany, which others buy from Asia. "

Complete turnkey solutions

Custom solutions for modern manufacturing requirements

Product innovations at MAPAL are always aimed at supporting and developing customers' productivity. Services so far have ranged from tool design and tool management to production line support. Now the tool manufacturer is going a step further and offering complete turnkey solutions for process design through to the achievement of process capability. AI is also just around the corner.

The process design lays the foundation for the costs incurred for a component. Key framework conditions are cycle time and process reliability. While MAPAL has had the necessary tool expertise for a long time, elements were not yet in place for full-service packages: MAPAL was unable to go into depth in areas such as clamping fixtures, programming and process acceptance – until now.

By acquiring the Italian company X-Pro, that gap has been filled in the past year. MAPAL is now in a position to profoundly assist customers with component industrialisation at an early stage using feasibility studies and optimum planning of machining steps and thus achieve the required cycle times and quality specifications without fail.

By acquiring the Italian company X-Pro, MAPAL is now in a position to assist customers with component industrialisation at an early stage and achieve the required cycle times and quality specifications without fail

"The aim is an efficient and stable manufacturing process", says Stephan Köstler, Global Head of Machines and Services at MAPAL. He adds: "As early as the conceptualisation phase, clamping fixtures are designed to meet requirements for quality and process reliability – tailored to the stresses and strains involved in the machining process. A simulated and optimised NC program ensures that all machining steps can be achieved collision-free before the first component has even been produced. The installation and commissioning of the process under real conditions on the production line with proof of process capability is the final step."

Projects have already been successfully implemented using the new capabilities, where MAPAL took full responsibility and was able to fully fulfil customer expectations within eight to twelve weeks.

Tool management for optimising the machining process and tool cycle

This holistic approach also shapes tool management – a service concept that goes far beyond the mere supply of tools. At its heart is the continuous optimisation of machining processes and the entire tool cycle, from procurement, storage and pre-setting all the way through to reconditioning. In the machining processes themselves, the use of the latest tool technology ensures gains in productivity. MAPAL focuses on digital processes, standardised workflows and close collaboration with production here. The full integration of the cloud-based platform c-Com into the MAPAL Group in 2025 underlines this approach: data, tools and processes are brought together in one system – transparent, secure and available worldwide. Customers benefit from permanently high tool availability, optimised inven-

tories and inhouse logistics that are vastly more efficient. At the same time, the central database enables a sound analysis of consumption, costs and performance – in real time and across production facilities.

MAPAL sees tool management not as an additional service, but as an integral aspect of modern manufacturing. With over 100 ongoing projects worldwide, a main centre of competence in Aalen and decades of machining experience, MAPAL is a strong partner for companies looking to boost their productivity beyond the start of production.

The continuous optimisation of the machining process and the entire tool cycle, from procurement, storage and pre-setting all the way through to reconditioning, are at the heart of the holistic approach that forms the foundation of MAPAL's tool management services (Pictures: ©MAPAL)

Moving into an automated future with PRODaaS@SCALE

Productivity as a Service (PRODaaS) enables even greater digital integration into customers' processes, which includes connecting to live data from the machine tool. An initial research project was successfully completed last year, and now there is an even further-reaching sequel. "With PRODaaS, the aim was to allow the experiences with productivity gains made in ongoing series production to flow back in a structured way, in order to get much closer to the ideal point in the initial component design", reflects Stephan Köstler. To achieve this, a digital assistant continuously evaluated data from the machine environment and made specific suggestions for potential optimisations.

The new PRODaaS@SCALE project goes a step further into a more automated future. Köstler: "With PRODaaS@SCALE, the assistant becomes a self-regulating system. It incorporates experience gained in application directly into the process design." In this research project, the use of AI is meant to bridge the gap between theory and practice. Even during the planning stage, significantly better settings for the machining processes are expected with AI systems with individual customer-specific training than would be the case without this feedback curve.

Implementation is guided by the "Manufacturing-X" initiative that was launched and is coordinated by players from German politics, business, politics and research and the initiative's flagship projects. "Many digitalisation projects in the past ten years haven't got past the pilot phase", says Köstler. "The challenge lay in scaling the shared use of data."

For PRODaaS@SCALE, setting up new data infrastructure is the key to shared data use without risking data sovereignty. Partners on the project are the company Zoller, which is making a major contribution with measurement technology and tool diagnostics, Walter Formenbau as the pilot customer as well as the Fraunhofer Institute for Manufacturing Engineering and Automation and the VDMA. New is the approach of envisaging the application and use of this system in the woodworking industry with the woodworking machine manufacturer Weinig as a further project partner. As was the case in the PRODaaS research project, MAPAL is also assuming the role of consortium leader in the scaled version.

With its expanded offering, MAPAL is positioning itself as a leading provider of pioneering manufacturing solutions. Future themes such as artificial intelligence and digital integration boost productivity and efficiency for customers. With turnkey solutions and c-Com integration, production processes are optimised and continuous gains in productivity are achieved. As a result, MAPAL is ideally equipped to meet the challenges of the modern manufacturing industry and offer its customers tailored and innovative solutions.

GROB relies on in-house automation solutions

In modern manufacturing, one thing counts above all else: maximum flexibility with maximum efficiency. This was precisely the challenge facing GROB-WERKE in its own production hall.

The new automation solution makes Mevlüt Isik's (machine operator at GROB-WERKE) everyday work easier and more efficient

The task was demanding – to create a production system that could manufacture a wide variety of parts equally economically and flexibly. "In our production facility, we faced the challenge of producing flexibly – whether prototypes, series, small series, individual parts, or particularly large and heavy parts," says Mevlüt Isik, machine operator in Hall 7, describing the initial situation. The vision was clear: a production facility that could master this balancing act with ease while also reducing production costs in the long term.

In-house technology for in-house production

Instead of relying on external standard solutions, GROB-WERKE decided to take a consistently independent approach – with technology from its own in-house development. The goal was to further automate production and develop a solution that precisely met internal requirements. The combination of pallet and robot automation was deliberately chosen in order to combine high autonomy times with maximum flexibility without restricting processes through rigid standards.

The solution: Tailor-made automation from three core systems

The result is a flexible automation solution that combines several GROB products: The PSS-L450 linear pallet storage system handles pallet handling, the GRC-R150 robot cell takes care of parts handling, and three G150 universal machines have been integrated with special clamping fixtures as part of a master machine concept. Complex clamping fixtures are clamped manually via the PSS-L450, while smaller and larger cubic components are handled automatically by the robot cell. An additional screwdriving and stamping station within the robot cell automates further work steps and ensures even greater efficiency.

Clear workpiece flow and maximum transparency

The workpiece flow follows a clear principle: large parts run through the PSS-L450, while

With the in-house GROB⁴Automation control software, employees in the production hall have everything in view at all times

smaller parts are handled fully automatically by the GRC-R150. With unmanned production times of up to 350 hours per week, as in Hall 7 at GROB, process stability, tool life, and continuous monitoring are particularly crucial. This is exactly where the in-house control software GROB[4]Automation plays to its strengths: it organizes production orders visually, displays processes in chronological order, and thus ensures maximum transparency.

The system is supervised by five employees working in flexible shift patterns – two machine operators and one setter are responsible for monitoring, setup, and quality control. This ensures an optimal balance between human and machine interaction. In addition to its high flexibility, the system scores particularly well with its enormous autonomy time: up to 46 pallets and around 1,000 parts can be stored in the system. This reduces personnel costs, increases machine utilization, and provides valuable unmanned production hours, especially on weekends.

Perfect interaction for in-house production

"This system is an important step toward an automated future," summarizes Ralph Birkle, project team leader at GROB-WERKE. "It shows that we not only develop innovative products for our customers, but also use them successfully in our own production."

With the automation in Hall 7, GROB-WERKE is proving that its products set standards not only in the customer environment, but also in its own factory. The project is a prime example of the combination of engineering expertise and practical manufacturing experience – and a clear signal of where the journey is headed in terms of flexibility, efficiency, and autonomy.

Up to 46 pallets and around 1,000 parts can be stored in the system

Mevlüt Isik (machine operator at GROB-WERKE) and Ralph Birkle (project team leader at GROB-WERKE) in conversation

(Pictures: GROB-WERKE)

Current trends and topics in metalworking

Automation gaining ground

Featuring around 1,600 international exhibitors from 45 countries, EMO Hannover 2025 provided a global showcase for innovation in production technology from September 22 to 26. 50 years after the premiere of the world's leading trade fair for production technology in Paris, the focus was on forward-looking aspects, such as artificial intelligence and digitalization, automation and sustainability. The exhibitors impressively demonstrated how modern production technologies are now more networked, intelligent and resource-saving than ever before. The technologies include everything from smart machines and IoT-based applications through to AI-supported production processes and systems for data-driven analysis. EMO Hannover 2025 offered an 360° overview of the current state of industrial manufacturing and its future.

The developments – especially in the field of automation – were on show in numerous areas at the trade fair. Visitors were given an insight into the current state-of-the-art. The latest systems showed how it is increasingly possible to operate production lines without human intervention. The solutions presented help to minimize error rates, improve product quality and increase production speed. Flexibility is also being optimized in production, which is opening up new customization and scaling opportunities for companies.

Another key topic at the event was sustainability in industrial production. The concepts and technologies on display were not only aimed at improving the ecological credentials of companies, but also demonstrated concrete ways of raising the efficiency levels of machines. There was a particular spotlight on developments aimed at reducing energy consumption.

A further focus was on the use of artificial intelligence in industrial production. Various AI applications were presented at EMO Hannover 2025 which have the potential to change production processes on a permanent basis. These included intelligent chatbots that can be used as digital assistants in machine operation, maintenance and production planning. Such systems enable intuitive human-machine interaction, assist operating personnel and reduce the amount of training required. In addition, various advanced AI models for process optimization were presented. These analyze large volumes of production environment data, identify patterns and deviations, and adapt processes autonomously.

Selected highlights from various topic areas are presented below. They illustrate not only the innovative potential of the exhibitor companies, but also the diversity of the technologies themselves.

Moving towards autonomous production – Automated machine tools and components

DMG Mori (Bielefeld, Germany) placed the technical focus firmly on automation and process integration at EMO 2025. 33 of the more than 40 machines on display were automated. A particular highlight here was the new AMR 1000. This is a driverless transport system for workpieces and tools that significantly increases machine capacity through

continuous autonomous operation.
Combining milling, turning and grinding in a single setup, the DMC 125 FDS Duo Block stood out as a prime example of process integration. Among the world premieres at the event was the 2nd generation DMC 65 Mono Block, optimized for simultaneous high-precision 5-axis machining. A further innovation was the Ultrasonic 60 Precision, which combines 5-axis milling with ultrasonic technology and 4 µm positioning accuracy. The processes were digitally networked using the Celos X control system. With its consistent further development in the direction of automated and digitalized production, DMG Mori is following the general industry trend of offering machine tools, peripherals and software from a single source, with the aim of achieving optimum interaction between all components.
United Machining Solutions (Bern, Switzerland), recently formed by the merger of the United Grinding Group and GF Machining Solutions, presented several world firsts at the new group's first joint trade fair. The latest technologies in various areas from grinding, milling and eroding through to laser processing and automation were unveiled at a special event held on the very first day of the fair.
A particular highlight was the Studer S23 universal cylindrical grinding machine. Its superior precision, flexibility and modern software integration are especially impressive. The Studer S23 is equipped with "C.O.R.E." (Customer-Oriented REvolution) technology, which allows intuitive machine operation via a large and user-friendly touch screen, and with an automatic B-axis with 1° Hirth serration and a machine bed for optimized vibration characteristics. The machine is extremely versatile, with up to three grinding wheels that can be used simultaneously. In the area of wire-cutting EDM machines, the new Agie Charmilles CUT S series, consisting of the CUT S 400, S 600 and S 800 models, was presented. These machines combine outstanding machining accuracy with high productivity and have been specially designed for integration into automated production cells. United Machining Solutions also presented a high-precision 5-axis milling machine for micromachining in the form of its Mikron Mill P 500 U VHP (Very High Precision). In addition to thermal stability, it features highly dynamic drive and spindle technology for superior surface qualities and sophisticated component designs. The machine has a thermally insulated housing that protects against external temperature fluctuations and ensures optimized thermal stability and consistent precision levels during operation. In the field of automation, United Machining Solutions presented its 3R Transformer T3-600 system, a specially developed solution for workpieces weighing up to 600 kg. The flexible handling system can be integrated into different machine environments. It raises efficiency levels through its reduced manpower requirement and by offering continuous running.
EMO is 50 this year – and Grob (Mindelheim, Germany) is about to celebrate its centenary, which the company marked by showcasing pioneering solutions in the fields of machining and automation. Prominent among these were the new G400 4-axis universal machining center for pre-machining and simple machining, the G550T 5-axis universal mill-turn center and the powerful G920F5 machining center for mega and giga aluminum castings. In automation, it presented the PSS-R900 rotary pallet storage system which has space for 27 pallets and can be loaded by Automated Guided Vehicles (AGVs). Grob thus demonstrated the importance of the current automation trend.
Grob's GMP300 is also setting standards in the additive manufacturing of aluminum products in the form of liquid metal printing. In future, the intention is for the system to additively manufacture other materials. The Grob portfolio is complemented by smart digitalization solutions such as Grob Manufacturing Execution (MES) and Manufacturing Operations Management (MOM) systems as well as large-scale battery cell production systems.
One of the products being premiered by machine tool manufacturer Okuma (Oguchi, Japan) was the MS-320H horizontal machining center, which facilitates autonomous productivity in particularly small spaces thanks to its vertical table arrangement and continuous chip conveyor. The Multus U3000 5-axis turning/milling center (120 tools, second turret) was used to give a live demonstration of friction stir welding. The process's main advantage over conventional welding is its ability to create a firmly bonded welded joint in a normal machine

tool without the need for dedicated welding technology. This widens the range of what is possible in a single clamping operation beyond simple machining. Okuma's new machines meet sustainability requirements by reducing energy consumption through optimized idle management. Alongside machine tools, Mazak (Oguchi, Japan) presented a number of significant technical solutions for process integration and

automation. The highlight here was the European premiere of the Integrex j-200 Neo multi-tasking machine. One of the manufacturer's main innovations in the area of automation is the coupling of production machines with industrial robots which can be controlled directly via the CNC machine tool, eliminating the need for the operator to have dedicated robot programming knowledge. Turning to software, Mazak presented its Mazatrol DX digital service, which uses AI and 3D visualization for cycle time optimization and helps in the creation of both quotations and NC programs. The company also showcased pallet pool systems and robot cells for unmanned operation. Mazak, too, is following the trend of offering complete integrated production chains. For example, all process steps – from the laser cutting of solid material through to automated handling and final machining – are offered from a single source in order to achieve complete digital traceability of the workpieces.

The machine tool manufacturer Röders (Soltau, Germany) presented further developments in its RPT Series of 5-axis high-speed milling centers. The main focus here was on increasing precision levels. The improvements achieve positional accuracy of under 1 µm and the centers can create surface finishes in steel in the single-digit nanometer range. A prominent technical highlight here was the RPT800DSH in a two-spindle configuration. The combination of a ball-bearing main spindle (36,000 rpm, HSK E50) for roughing and pre-machining, and a high-precision, air-bearing spindle (80,000 rpm, HSK E25) for finishing enables complete machining in a single set-up for maximum surface quality. In order to achieve maximum accuracy even with fluctuating ambient temperatures, Röders has developed a temperature control system that includes active thermal stabilization of all relevant machine components, including the torque motors in the rotary axes and the linear guides. According to Röders, this ensures zero-point stability of ±1 µm even with ambient temperature fluctuations of ±3 degrees Celsius. This reduces the need for extensive analysis of ambient influences, which previously had to be carried out predominantly by experienced personnel.

At EMO Hannover 2025, Schaeffler (Herzogenaurach, Germany) placed its technical focus on automation solutions in machine tool peripherals and on precision components for greater efficiency. One such technical innovation was the four-row KLLT linear guideways in an X arrangement. They are specially designed for handling systems and, in contrast to O-arrangements, can adapt better to substructures with small form errors without generating constraining forces. Schaeffler presented its new series of YRTA rotary axis bearings. These double-direction thrust roller rotary axis bearings offer high tilting rigidity for automation tasks thanks to adapted manufacturing processes and a new needle roller cage. The new products were supplemented by precision angular contact ball bearings for screw drive bearings. These use low-wear ceramic balls for the first time, effectively doubling the grease operating life and considerably reducing the amount of resources used in operation.

In the field of process monitoring, the BFD ultrasonic position sensor from Balluff (Neuhausen auf den Fildern, Germany) can be used to monitor clamping processes. It helps to avoid machine downtimes, increases process reliability and enables precise condition monitoring even under difficult ambient conditions. The BFD sensor uses an internal reference system to determine the clamping position instead of measuring the hydraulic pressure. The company's portfolio is complemented by high-performance network solutions in the product lines that are de-

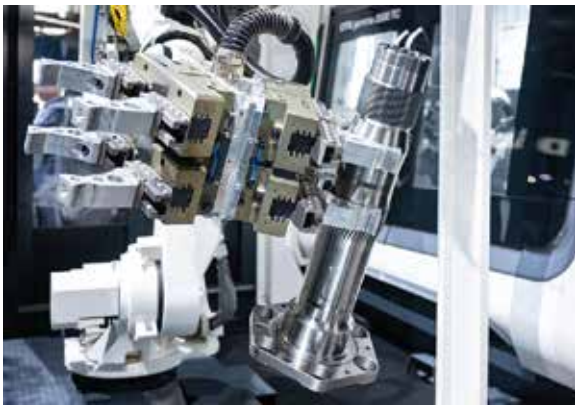
signed to be cost-efficient, robust, hygienic or safety-oriented, depending on requirements. This modularity allows them to be integrated easily into existing and new systems. Balluff also presented advanced condition monitoring systems that can be used to analyze machine conditions in real time. This allows maintenance to be planned in advance, downtimes to be reduced and system availability to be greatly increased.

Beckhoff (Verl, Germany) presented its MX system – a compact, modular automation solution system that combines all the functions of a conventional control cabinet in a directly pluggable, IP67-protected housing. The control system, drive technology and power distribution are mounted directly on the machine, with no control cabinet. This saves a significant amount of space, cabling and material costs, but also reduces the installation time from 24 hours to one hour for a reference control cabinet – and there is no need for a qualified electrician to be present. The passive cooling system also means there is no requirement for energy to cool the system. In addition, a dedicated app that connects to the individual modules simplifies service and maintenance.

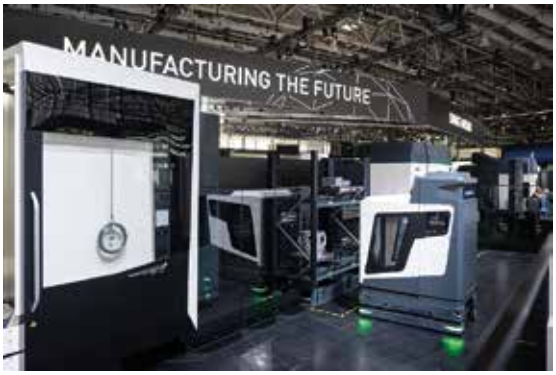
In the field of automation development solutions, a variety of robot systems capable of carrying out a wide range of tasks were exhibited at the EMO. The focus on the stand of Fanuc (Oshino, Japan) was on the new 500i-A CNC series controller, which features an impressive increase in computing power, improved 5-axis simultaneous machining, and the ability to achieve optimized surface quality. The system also offers simplified integration into digital systems such as the ROS2 Robot Operating System based on the IEC 62443 cyber security standards and the EU Cyber Resilience Act. The αi-D Series SERVO enables higher speeds and precision with 10 to 15 percent lower power loss. The system also requires up to 30 percent less space.

Kuka (Augsburg, Germany), another exhibitor in the field of robotics, presented its new KR Titan ultra heavy-duty robot, which can move up to 1.5 metric tons and is designed for applications such as pallet handling and battery assembly. The portfolio is complemented by the KMP 1500P mobile platform, an autonomous transport system that facilitates material flows for heavy components. The iiQKA.OS2 operating system was introduced for virtual commissioning. In addition, the iiQKA.mx Automation software interface has been expanded in cooperation with Siemens to include the Standard Robot Command Interface (SRCI) industry standard. This ensures greater flexibility in the integration of robotic products. Heidenhain (Traunreut, Germany), a specialist in control technology, uses another standardized interface to control and program the robots. An interface has been added to the control system that allows the robot and machine tool to be operated in tandem.

In the field of automated tool management, Wassermann Technologie (Eichenzell, Germany) presented the new Tool-L storage system, which can store up to 5,000 cutting tools with HSK-A63 holders in a minimum of space (basic version approx. 12 m²) with movable walls thanks to its modular design. It is suitable both as a central storage core and as an additional magazine for use directly on the machine tools. It can readily be integrated into automated production environments, even with AGVs, thanks to its robot arm, traversing axis and suitable grippers.



At EMO Hannover 2025, the Australian company Anca (Melbourne, Australia) showcased a number of innovations that combine sensor technology, digitalization and autonomous production. A key element here was the Ultra technology, which helps provide greater accuracy, repeatability and productivity during grinding based on high-precision axis control, intelligent servo algorithms, high-performance mechanical components with nano-resolution in the linear axes, and AI. Particularly noteworthy are the new MicroX Ultra machine models, designed for micro tools with tool diameters of D > 0.03 mm, including in-process laser measurement and spindle temperature compensation. The MX7 Ultra for the automated grinding of indexable inserts with complex contours benefits from the same technologies. Anca is setting software and automation standards with its AIMS Connect platform. It combines job management, digital work instructions and operator guidance – even in existing machines from different manu-



facturers. It thus creates transparency and traceability and results in fewer manual interventions. All in all, Anca demonstrated how modern sensor technology, smart control and autonomous processes come together to form an integrated ecosystem – a decisive step towards Industry 5.0, which offers not only more efficiency but also greater flexibility. With regard to sustainability, the increased use of linear motors and the frequency control of lubricoolant pumps combined with proprietary software to reduce cycle times and optimize feed rates ensures lower energy consumption during machining processes. Anca's EPX-SF stream finishing machine facilitates precise cutting edge preparation and corresponding surface finishing of cutting tools. Technically, the EPX-SF features an impressive and innovative 11-axis architecture, which is distributed across three independently operating spindles. These enable uniform, fully-controlled machining of the tool shape, including the cutting edges and overall surface structure. The machine makes use of AI-based analysis functions to detect deviations at an early stage and automatically compensate for them. The EPX-SF underlines Anca's leading role in the development of intelligent and automated manufacturing solutions. It combines superior surface quality with industrial efficiency and thus creates a decisive building block for future-proof, autonomous tool production environments.

A further technological highlight came from Index (Esslingen, Germany), which is setting new standards in turning with its High Dynamic Turning 2.0. The system is easy to integrate and can be implemented on existing Index lathes. Following the conventional application in conjunction with milling spindles, as presented by Ceratizit in the form of FreeTurn in 2019, the process is now being expanded to include the use of gear tool holders. This enables simultaneous use of the system on turning/milling centers. At the heart of the process is the variable setting angle of the turning tool, which is dynamically adjusted by the machine control system during machining. This means that complex contours can be machined continuously and flexibly without changing tools. Furthermore, chip formation can be adjusted to increase process reliability. Index is also developing a tool holder for several tools based on the FreeTurn system. This combines multiple cutting functions in a single tool holder by rotating the milling spindle accordingly. For multi-spindle machines in particular, this yields reductions in the number of tools and slide occupancy.

Clamping technology in sustainable production

The exhibitors in the clamping technology sector demonstrated the present-day challenges that can arise when clamping workpieces and tools. They presented various radically new solutions, but also intelligent further developments of existing solutions for various clamping situations.

The innovations presented by the Roemheld Group (Laubach, Germany) focused on the digitalization and automation of clamping systems for Industry 4.0. The Stark Spheric zero-point clamping system was a world first. It combines zero point clamping with pendulum compensation and length correction to enable stress-free clamping of free-form surfaces with a stable zero point. Another important technical innovation was the introduction of media feed-through for electrical signals in zero-point clamping systems. For the first time, this permits digital communication from the machine table via the pallet to the vise, and includes sensors for monitoring the clamping status. In the field of electromechanics, a particularly compact swing clamp for confined installation spaces was presented. Driven by a 24V DC motor, it allows precise position and clamping force control.

Schunk (Lauffen/Neckar, Germany) presented an internal clamping system for workpieces that uses hydraulic expansion technology to hold rotationally symmetrical components with an internal diameter of 450 mm. Also being showcased was the new Rota THW3 2+2 power chuck, which enables flexible and precise clamping of a wide range of workpiece shapes thanks to its compen-

sating function. The sealed design, permanent lubrication and quick jaw change system mean that it can offer high process reliability with minimal maintenance. Schunk has also added the Kontec KSC-5X to its portfolio in the field of 5-axis clamping technology. The compact clamp is designed for complex workpieces and offers an impressively high level of flexibility, including a quick-change system and an integrated zero-point interface for modular applications. Another pioneering highlight was the electrically controlled zero-point clamping module NSE3-PH 138 IOL with integrated sensors. It allows seamless, real-time monitoring of various clamping states without the need for additional sensors on the workpiece. The innovations were supplemented by clamping devices that can be controlled wirelessly via IO-Link, and zero-point clamping systems with an integrated battery for electrical clamping. These represent significant steps towards smart and autonomous production.

The tool chuck manufacturer Rego-fix (Tenniken, Switzerland) presented new developments in the area of process reliability and monitoring. The company's main product is the powRgrip system. This was developed by Rego-fix itself and is based on the principle of pressing collets into chucks. A further technical highlight was the AI-supported PGU 9900neo clamping unit. This unit automates the clamping cycle in just 8 to 10 seconds and integrates real-time monitoring. Sensors measure the clamping force. All process data is sent to a cloud for traceability. The press-fit principle has now also been mechanically extended for tool diameters from 20 mm to 40 mm, making the high vibration damping and precision available for larger tools.

Measuring and testing technology is indispensable in automated operation

Just how indispensable measuring and testing technology is in quality assurance was highlighted at EMO Hannover 2025. It represents an important component for ensuring stable and efficient production processes in automated manufacturing processes.

Renishaw (Wotton-under-Edge, United Kingdom) presented its new Equator-X 500 dual-method gauge together with the intuitive Modus IM Equator software. The Equator-X 500 has been specially developed for the production environment and combines absolute and comparative gauging in a single device. Delivering high speeds of up to 250 mm/s in absolute mode and 500 mm/s in compare mode, it enables fast and precise quality control within the production process itself. The dynamically stiff hexapod structure with linear motor drives and separate frame for displacement measurement ensures reliable and accurate measurement results, even in demanding circumstances. The measurement uncertainty of the system is 2.1 µm over 300 mm at 18 to 22 degrees Celsius. The Modus IM Equator software offers a user-friendly interface that considerably simplifies programming and operating the gauging system. In this way, Renishaw supports the continuous validation and optimization of production processes by feeding the measured variables back into the processing step. In addition, the software can independently generate an inspection program by loading CAD models.

The measuring device manufacturer Zoller (Pleidelsheim, Germany) showcased the integration of artificial intelligence into tool measurement. The primary technical innovation was the zKI (Zoller Artificial Intelligence) software solution. This system can be integrated directly into setting and measuring devices. It uses AI-based image processing to detect, analyze and evaluate wear patterns on tool cutting edges. The AI issues recommendations for action based on this. Zoller also presented the micBox. This is an automated solution for rotating and exchanging indexable inserts. Supplemented by an AI-supported camera module, the system can react autonomously to the condition of the individual cutting edge, enabling it to operate without human supervision.

Johs. Boss (Albstadt, Germany) presented fully automated thread inspection options using the MultiCheck 4.0 and MultiCheck 4.0-SPIN testing systems. These combine three inspection functions in a single measuring system: gauging, thread depth and thread conformity measurement. Thread depths of up to 50 mm can be measured. Thanks to its compact design and high test reliability, the system is suitable for use on the machines

themselves, on processing machines as well as for centralized use in quality assurance.

Focus on networking, digitalization and artificial intelligence

Alongside the clear trend towards automation, many exhibitors demonstrated how intelligent systems can make modern manufacturing more efficient, flexible and sustainable. The boundaries between digital

and physical production are becoming increasingly blurred, opening up new opportunities for greater competitiveness and innovation.

The AI + Digitalization Area in Hall 6 was a central meeting point for trade visitors keen to find out about the practical uses of artificial intelligence and digitalization in manufacturing. In the joint exhibition area, companies and research institutions presented specific applications that can be used to make production processes more intelligent, efficient and transparent.

The special AI Hub stand at EMO Hannover 2025 sent a clear signal about the increasing importance of artificial intelligence in industrial value creation. All the solutions presented were geared towards specific use cases and practical production-related issues. A central element of the hub was the AI-supported chatbot Emil which was commissioned by the VDW and developed by aiXbrain (Aachen, Germany) in close cooperation with WZL (RWTH Aachen University, Germany). In technical terms, Emil is based on a Large Language Model (LLM) which was specifically trained with the digital data from the EMO Hannover exhibitor directory. Visitors were able to interact directly with the chatbot in German or English via a terminal to find AI solutions in the field of metalworking and then view a list of suitable exhibitors, including their locations.

The current state of standardized machine communication via OPC UA was demonstrated by the global umati (universal machine technology interface) initiative based on real application examples. It showed how machines and software can be networked to securely record production data and integrate it into digital processes. This applies, for example, to energy consumption analyses which are made possible by the standardized communication of energy consumption. Another technical innovation that was presented was umati Connect, an open source software solution that enables direct communication between umati and the US standard MTConnect for the first time, thus demonstrating the compatibility of both standards in practice. The innovations were complemented by demonstrations of digital product tracking which link umati OPC UA Job Management directly with the Asset Administration Shell (AAS).

Heller (Nürtingen, Germany) presented various high-performance machine tools, but also showcased a range of digital and AI-supported services that optimize operations. The main focus was on the intelligent chatbot ASK.me. It provides context-sensitive answers to queries relating to maintenance, fault diagnosis and status. Production and status data is recorded and evaluated with the help of artificial intelligence and then presented in a comprehensible way in the form of texts, diagrams and tables. This enables targeted process optimization and predictive maintenance, and also reduces unplanned downtimes.

A particular highlight on the Siemens stand (Munich, Germany) was the Machine Tool Robot (MTR) which was developed in collaboration with Fraunhofer IFAM and autonox Robotics (Willstädt, Germany). The MTR combines a new type of drive technology with model-based control strategies and an optimized mechanical structure, enabling it

to achieve outstanding path accuracy even at high feed rates and during complex movements. The MTR thus attempts to close the gap between conventional industrial robots and machine tools.

Siemens also presented the first developments of an AI-supported chatbot that is to be integrated into control systems. It will enable intuitive and supported operation of the CNC control system. Users can communicate directly with the control system in order to create programs, adjust process variables based on stored tool data, or carry out fault diagnostics for the control system and machine tool. The chatbot can also assist with machine maintenance. This will considerably simplify operation and increase efficiency in production.

Tool development and tool production are also benefitting from technological progress and artificial intelligence. Cutting tools used for machining metals have to meet very high requirements in terms of surface quality, process reliability and tool life. Meeting these requires precise micro-cutting with a high degree of repeat accuracy. Profin Progressive Finish (Zurich, Switzerland) uses flakkoting which allows it to produce individual micro-blades quickly and efficiently at all tool cutting edge positions. Edge preparation is used both in tool grinding machines and as a separate process in Profin's controlled six-axis machines. The new Micro AI calculation program allows the edge preparation processes in grinding machines as well as in external applications to be calculated using AI. The best and most appropriate brush tools for specific processes can also be supplied from a wide range. The new software calculates all the process parameters required for edge preparation. These can be calculated for applications in grinding machines or for separate (out-of-grinding) processes. They include not only applications for simple drilling tools, but also the preparation of complex tool shapes such as radii, steps, chamfers, flutes and threads.

Additive manufacturing helps with workpiece clamping and special components

Additive manufacturing is increasingly supplementing conventional production processes, particularly for complex workpiece clamping and the manufacture of customized special components. At EMO Hannover 2025, numerous exhibitors showed how 3D printing processes are bestowing new design freedoms, thus increasing flexibility in production and aiding process optimization. The technology demonstrates its full potential in the case of complex clamping devices and function-integrated components.

DN Solutions (Changwon, South Korea) only moved into additive manufacturing at the beginning of the year, but the company decided to use the trade fair to present its first products in this area. The DLX series is the manufacturer's first generation of metal 3D printers based on Laser Powder Bed Fusion (LPBF) technology. Their appearance at EMO 2025 represented the European premiere of these machines. The main innovation in the 3D metal printing solutions is that now a complete platform for additive manufacturing is being offered alongside the machines themselves. This platform is based on a proprietary software suite that supports complete end-to-end workflows. The functions include the identification of components suitable for AM, the calculation of manufacturing costs and the preparation of component data for printing. It also minimizes support structures in order to improve material utilization and reduce the amount of post-processing required. In addition, the software enables the simulation and compensation of

deformations and accelerates the adaptation of process parameters, even for new materials. At EMO 2025, the Exentis Group (Stetten, Switzerland) showed how additive manufacturing can be conducted at series scale with its 3D screen printing platform. Of particular note is the portfolio of materials that the Exentis platforms can process. The technology is designed for a wide range of materials including metals, technical ceramics and polymers. In addition, additive manufacturing 3D screen printing expands the production possibilities for microfilters. Precision-printed filters have various advantages over conventional filters made of metal mesh and play a decisive role in various applications. They filter liquids such as chemicals, oil and water or protect systems from contamination. Reliable performance is therefore essential. Exentis can produce precision parts from 316 L stainless steel for use in diesel engines, for example. These special exhaust gas purification filters remove impurities and particles from the exhaust gas purification fluid used to reduce nitrogen oxides (NOx) in diesel exhaust. Conventional microfilters are often made from stainless steel mesh, which can fray at the edges over time and therefore lose its effectiveness. The additive production process is fully automated. A squeegee applies a material paste through a screen, building up parts layer by layer, allowing wall thicknesses of t = 75 µm and surface finishes of Ra = 2 µm.

Cutting tools for efficient manufacturing processes

Cutting tools remain a central component of efficient and reliable production. At EMO 2025, numerous exhibitors presented both established solutions and further developments aimed at enhancing productivity and precision. With a clear focus on efficiency, process reliability and precision, Mapal (Aalen, Germany) showcased numerous technical innovations in the field of machining. One prominent example was the new generation of the OptiMill-Uni-HPC solid carbide milling cutter. The tool has undergone further development for use in automated production environments. It features optimized, highly ductile cutting material combined with wear-resistant coatings – and there is a version with an integrated chip breaker. The milling cutter is particularly suitable for machining steel, stainless steel and castings, even in automated or robot-guided applications.

In the field of reaming tools, Mapal presented innovative solutions for its HPR400 system. A new development combines an ISO leading stage with the HPR400 in practical use and thus enables the efficient finishing of large bores with diameters of up to 6 mm in a single step. Mapal also presented an adapted tool solution including PCD inserts for the precise machining of stator housings in electric motors. The range has been supplemented by new chip breaker geometry for fine boring, which optimizes chip formation, chip removal and heat generation. Mapal offered tool innovations and also complete process solutions. These included tool management and technical support during implementation.

The centerpieces of the Paul Horn (Tübingen, Germany) presentation at EMO were the newly developed S234 system for grooving and parting off, especially for grooving depths up to a diameter of 64 mm, and the 66T grooving system, which enables a maximum grooving depth of 9.5 mm. The grooving system is available with different chip breaking geometries which are optimized for machining stainless or difficult-to-machine materials, for example. The DA milling system has also been expanded. Compared to the previous model, the DA65 system offers larger indexable inserts with six cutting edges which enable greater cutting depths.

Iscar (Tefen, Israel) presented a series of

new tool systems from the Logiquick range which are designed above all for superior stability, versatility and productivity. A special feature is the Quickturn system, a six-edged tool for fast multidirectional facing and profiling. The associated clamping system ensures optimum heat dissipation and improved chip control with its robust clamping mechanism and targeted jet cooling which channels the coolant directly into the active zone. Also presented was the Quickpenta all-round system with five cutting edges, which is designed for various applications such as parting and grooving, threading and (reverse) turning. The secure Safe-Lock clamp fixes the cutting insert for superior stability, thus raising process reliability.

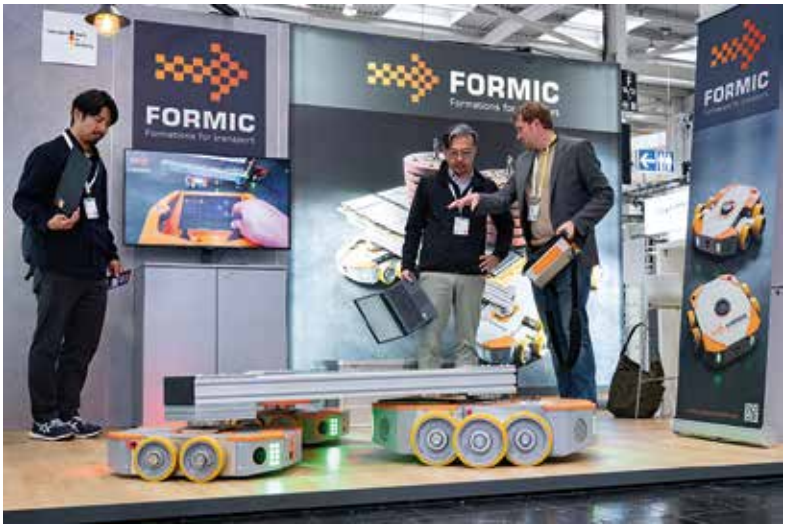
Under the name FairTools, research is being conducted into new tools for production which do not use cobalt and tungsten. This is giving rise to knowledge and technology transfer between an industry advisory board and the project group consisting of various research institutes. At the Institute for Manufacturing Technology and Production Systems (FBK, RPTU Kaiserslautern), milling cutter blanks are additively manufactured by means of high-speed laser metal deposition (HS DED-LB) with a functional carbide layer. Here, part of the tool volume can be replaced by more sustainable materials and material states which are identified by the Materials Testing Working Group (AWP, RPTU Kaiserslautern) and which make suitable substitutes for cobalt and tungsten. Newly developed forms of heat treatment are also specifically intended to improve the properties of the materials, particularly in surface layers which are subjected to high stress levels. The Institute for Surface and Coating Technology (IFOS, Kaiserslautern) is supporting this project with its expertise in surface analysis. After simulating the temperatures and mechanical loads in the manufacturing process and the construction, the application behavior of the milling cutters is examined in service life tests and classified in relation to reference tools. Life cycle analyses based on ecological, social and economic criteria are used to compare the recycling, reduction and substitution methods with those in the established value chain. This ensures the targeted improvements are actually achieved, reduces the environmental impact with the help of sustainable materials and energy sources, and reinforces the social responsibility of tool manufacturers and users of hard metals.

Sustainability – for tools and machine tool manufacturers and in the supply chain

Sustainability and supply dependencies are no longer fringe issues. They have become strategic factors in production technology. At EMO 2025, tool manufacturers' and suppliers' increasing focus on resource-saving materials, durable products, climate-neutral production and adapted transportation was clearly in evidence. The emphasis is on energy consumption not only during operation, but also the entire life cycle of components.

At the beginning of the year, the VDW presented a definition for uniform determination of the carbon footprint of machine tools with its "Product category rules for the evaluation of the carbon footprint of machine tools and machines for additive manufacturing" standard sheet. Coordinated by VDW and VDMA, this was drafted by Chiron, DMG Mori, Grob-Werke, Heller, Schuler Pressen and United Grinding with scientific support from Prof. Dr.-Ing. Felix Hackelöer, TH Cologne. It describes the systematic analysis of all life cycle phases of a machine tool – including materials, production, transportati-

on, commissioning, use and end-of-life – and serves as the basis for calculating a carbon footprint which is practicable, reproducible and transferable. In 2028 this will be turned into an international ISO standard. According to the Greenhouse Gas Protocol (GHG), companies' emissions can be divided into different "scopes". Scope 1 includes all direct emissions from companies' own sources, such as company vehicles or heating and production facilities. Scope 2 describes the indirect emissions caused by the consumption of purchased energy such as electricity or heat. Finally, Scope 3 covers all other indirect emissions in the value chain that are generated through business trips, the use of products or their disposal, and by suppliers.



Ceratizit (Mamer, Luxembourg) presented its sustainability goals and its progress towards achieving them at EMO 2025. With its connACT strategy, the company is pioneering an approach that covers the entire value chain, from raw material extraction and production to the use and recycling of tools. The aims are to anchor sustainable solutions in machining practice, and at the same time to support customers in achieving their climate targets. A major topic on the trade fair stand was the recycling and reprocessing of carbide. Ceratizit offers a comprehensive recycling service for this. Here, tungsten, cobalt and other components can be reclaimed, ultimately requiring less energy input than primary extraction. Over 99 percent of the tungsten carbide used in the S-Cut series already comes from recycled material. Ceratizit is thus underlining how optimized material recycling can help conserve primary resources and reduce carbon emissions. In addition, it provides carbon footprints for various products in order to render the emissions balance transparent throughout the product life cycle. In direct comparison to primary extraction, the recycling of carbide has a significantly lower energy requirement and environmental impact. A further priority for Ceratizit is process optimization in tool development, for example through adapted coatings or optimized design. The aim here is to extend the service life of the tools and thus use resources more efficiently. Another of the company's goals is to achieve climate-neutral production in Scope 1 and Scope 2 by the end of 2025. Scope 3 emissions are also to be reduced through targeted measures. At EMO 2025, Ceratizit demonstrated that sustainability is not merely a goal that it hopes to achieve at some point in the future, but one that is already firmly anchored in its products, processes and services. By combining recycling, resource efficiency and digital traceability, Ceratizit is demonstrating how modern machining can go hand-in-hand with ecological responsibility.

Igus (Cologne, Germany) offers the readychain eco-rack, a transport and assembly rack for pre-assembled energy chains. It is made of birch multiplex boards and, unlike conventional metal frames, is easier to dismantle without tools. In comparison, the new transport rack takes up 88 percent less transport volume, thus reducing the carbon foot-

print and transportation costs. The transport frame can be mounted on a Euro pallet and easily positioned on the machine for installation of the fully wired energy chain.
Chiron (Tuttlingen, Germany) has set itself the goal of achieving climate-neutral production by the end of the year. The company's strategy is therefore to focus closely on the electricity used at all its locations. This is responsible for around half of the Scope 1 and Scope 2 emissions. It is planning various energy efficiency projects, as well as the expansion of PV systems. Chiron significantly increased its proportion of green electricity in 2024. The company aims to reduce Scope 3 emissions by 25 percent by 2028 compared to 2018.

Maintaining and raising competitiveness levels – startups and training

In addition to high-tech and industrial innovations, EMO Hannover 2025 also promoted young talent and offered a platform to fresh input from the start-up scene. In the Startup Area, new businesses presented

fresh ideas for production technology – including everything from digital services to AI-supported solutions. At the same time, there was also a strong focus on training and development. Initiatives, special shows and interactive formats brought together young talents, companies and educational institutions with the goal of attracting the next generation of skilled workers.

The start-up Vorpco (Augsburg, Germany) presented Revogate and Revocam, two innovations that are setting new standards in manufacturing. With its ultra-flat 22 mm design, the Spin Window Revogate provides a clear view of the machining process, even in confined machine rooms or in spaces with sliding doors. The simple, robust and magnet-free design reduces the cost to just a fifth of that of conventional solutions. This is a clear advantage for both OEMs and users. The new Revocam camera adds intelligence to the machine room. Equipped with innovative Pulse Shield Lens Protection, the lens remains permanently free of dirt in the form of flying chips, and even under heavy use of cooling lubricants. The technology has no moving parts or open sealing points, and makes no use of compressed air. This eliminates the weak points typically found in conventional systems. The result gives operators a reliable, low-maintenance and permanently clear overview for process monitoring. In conjunction with AI-supported pattern recognition, Revocam opens up new possibilities for early detection of anomalies such as chip nests or unauthorized personnel access, thus avoiding production downtimes. These two Vorpco innovations bridge the gap between proven vision technology and modern intelligent solutions – for the production of the future.

The start-up Visiontag (Garbsen, Germany) has developed a software solution that uses images for accurate identification of components in series production. This does away with the need for markings such as QR codes or engraved numbers. Instead, an individual fingerprint is calculated from the surface structure, making it possible to distinguish among thousands of similar-looking components. The software renders components traceable, regardless of their material and size. If a complaint is received, for example, the component can be clearly assigned to the production steps it has undergone. The software can also be used to protect against plagiarism, as the surface structures of the component are unique and cannot be copied.

The startup AdaptX (Berlin, Germany) has developed a retrofit cooling solution for machine tools that works entirely without conventional cooling lubricants or oil. The company offers a closed internal cooling system which makes use of a sustainable cooling fluid that flows around the circuit and does not need to be changed. The tool itself is cooled via a special heat sink that efficiently channels the heat away from the cutting zone. This can significantly increase tool life and improve process stability, even with materials that are difficult to machine. Compared to cooling based on cutting fluid, LN_2 or CO_2 cooling, there are negligible handling and operating costs. At the same time it enables clean and sustainable production. The system can be retrofitted to existing machines

and requires no adjustments to the machine control system.

Alongside the Startup Area, the Special Exhibition on Education was a further firm fixture which was once again featured at EMO Hannover in 2025. It was aimed at pupils, students, trainees seeking information about career opportunities, and at companies looking to recruit young talent. Training companies, institutions and educational establishments presented their services in Hall 7, including specific offerings relating to technical occupations and courses of study in production technology. Visitors were able to find out about training options, dual study programs and entry opportunities for the industry. Many companies brought along trainees and young employees who gave first-hand accounts of their day-to-day work. This offered young job seekers an opportunity to talk directly to potential employers. The central aims of the special training and education exhibition were to arouse an interest in technology and to map out career prospects. It featured various practical activity stations for visitors. The focus was on personal exchanges and opportunities to experience technology at first hand. The special training and education exhibition gave companies a valuable platform for presenting themselves as attractive training organizations and for making first contact with the next generation of skilled workers. At the same time, they were able to point out which skills are in demand in the increasingly digitalized and automated world of production. The special training and education exhibition thus makes an invaluable contribution to promoting young talent in engineering and industrial manufacturing. It supports the dialog between industry, educational institutions and young talents and helps to counteract the shortage of skilled workers in the sector.

Conclusion

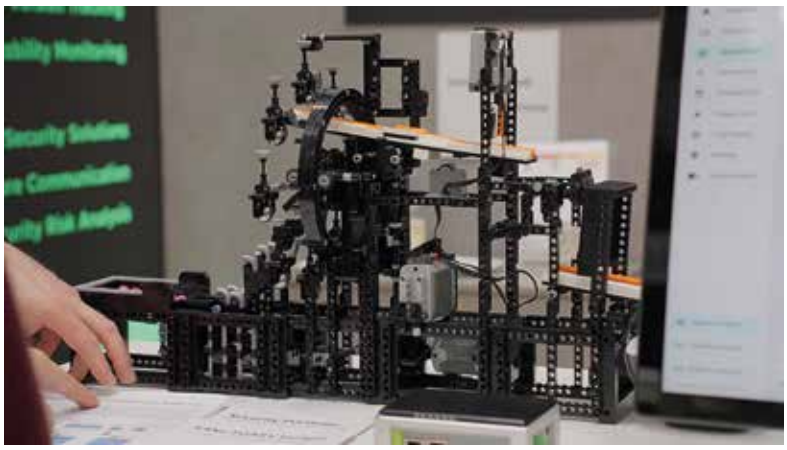
EMO Hannover 2025 clearly demonstrated how automation will be crucial for the future of manufacturing. It showcased innovative solutions which can be used to create autonomous, efficient, flexible and future-proof manufacturing processes. Exhibitors are increasingly focusing on networked, self-optimizing systems as a response to the rising demands for cost and resource efficiency and the continuing shortage of skilled workers. Automation and digitalization go hand in hand and form the basis of production concepts that will permanently change the entire manufacturing process. Solutions based on various aspects of artificial intelligence (AI) are important here. For example, intelligent chatbots which act as digital assistance systems in increasingly complex production environments can provide support with maintenance, fault diagnosis and even machine programming. Their integration into existing systems allows assistance to be offered rapidly, helps to minimize downtimes and increases efficiency. The technologies presented not only showed how existing systems can be enhanced and optimized, but also how companies are taking their production ever closer to the vision of a “dark factory” and complete autonomy.

Authors

Heiko Blech, M.Sc, Institute of Production Engineering and Machine Tools (IFW), Leibniz Universität Hannover, Tel. 49 511 762-19848, e-Mail blech@ifw.uni-hannover.de

Jan Lucas Brause, M.Sc., Institute of Machining Technology, Technische Universität Dortmund, Tel. +49 231 755-90179, e-mail lucas.brause@tu-dortmund.de

(Pictures: VDW)



ADVERTISING COMPANIES

Advertisement order - The mold & die journal

From issue 2/2026, the technical magazine "The mold & die journal" will be published exclusively online at www.mold-magazine.com.

For Issue **2/2026** of the magazine **"The mold & die journal"** we hereby order an advertisement of the size specified below:

- ☐ 1/4 page 4-colors € 200.--
- ☐ 1/3 page 4-colors € 250.--
- ☐ half page 4-colors € 300.--
- ☐ full page 4-colors € 600.--

Publication date: April 24, 2026
Ad order closing date: April 10, 2026

Stamp/Signature Date

IMPRINT

Editorial:
Erik Möller
Anke Fuchs

Publishing house and advertising:
Fachverlag Möller
Neustraße 163
D-42553 Velbert
Germany

Telephone:
Operator: +49 / 20 53 / 981 25-0
Editing: +49 / 20 53 / 981 25-19
Ads department: +49 / 20 53 / 981 25-14

fachverlag@aol.com
info@fachverlag-moeller.de
www.fachverlag-moeller.de

Published bimonthly:
Four times a year
www.silberdruck.de

Purchase prices:
Annual subscription (six issues) Euro 20.-- plus postage (foreign countries)

Registry court:
Municipal Court: Wuppertal, Germany
Trade Register No.: HRA 21087

Owner:
Erik Möller, Velbert

Bank details:
Deutsche Bank AG:
BIC-Code: DEUTDEDBWUP
IBAN-Nr.: DE57 3307 0024 0445 2884 00

Commerzbank:
BIC-Code: COBADEFFXXX
IBAN-Nr.: DE50 3344 0035 0196 6597 00

Postbank Essen:
BIC-Code: PBNKDEFFXXX
IBAN-No.: DE73 1001 0010 0821 6021 39

ISSN 2751-2150

Member of German Audit Bureau of Circulations

Fachverlag Möller

Technical Magazines

DER STAHLFORMENBAUER
Leading magazine for tool, mold and die makers and the EDM sector

Der Schnitt-& Stanzwerkzeugbau
Technical magazine for tool makers and the sheet metal forming industry

BLASFORMEN & EXTRUSIONSWERKZEUGE
Special trade magazine for the blow molding and extruding sector

The mold & die journal
English-language magazine for tool, mold and die makers and the EDM sector

DREHTEIL + DREHMASCHINE
Trade publication covering all aspects of turning technology

SCHLEIFEN + POLIEREN
Special magazine for the grinding and polishing sector

FRÄSEN + BOHREN
Technical magazine for the milling and drillling sector

For further information on the individual magazines please visit our website
www.fachverlag-moeller.de

Subscription order:

☐ **DER STAHLFORMENBAUER**
- 6 issues per year
- Annual subscription price: 30 Euros

☐ **DREHTEIL + DREHMASCHINE**
- 6 issues per year
- Annual subscription price: 30 Euros

☐ **Der Schnitt- & Stanzwerkzeugbau**
- 6 issues per year
- Annual subscription price: 30 Euros

☐ **SCHLEIFEN + POLIEREN**
- 6 issues per year
- Annual subscription price: 30 Euros

☐ **Blasformen- & Extrusionswerkzeuge**
- 4 issues per year
- Annual subscription price: 40 Euros

☐ **FRÄSEN + BOHREN**
- 6 issues per year
- Annual subscription price: 30 Euros

☐ **The mold & die journal**
- 4 issues per year
- Annual subscription price: 20 Euros

All prices including VAT, to foreign countries plus postage

Fachverlag Möller
Neustraße 163, 42553 Velbert, Germany, Phone: +49 2053 981250
E-Mail: Fachverlag@aol.com

Name/Company .....

Street/P.O.Box .....

City .....

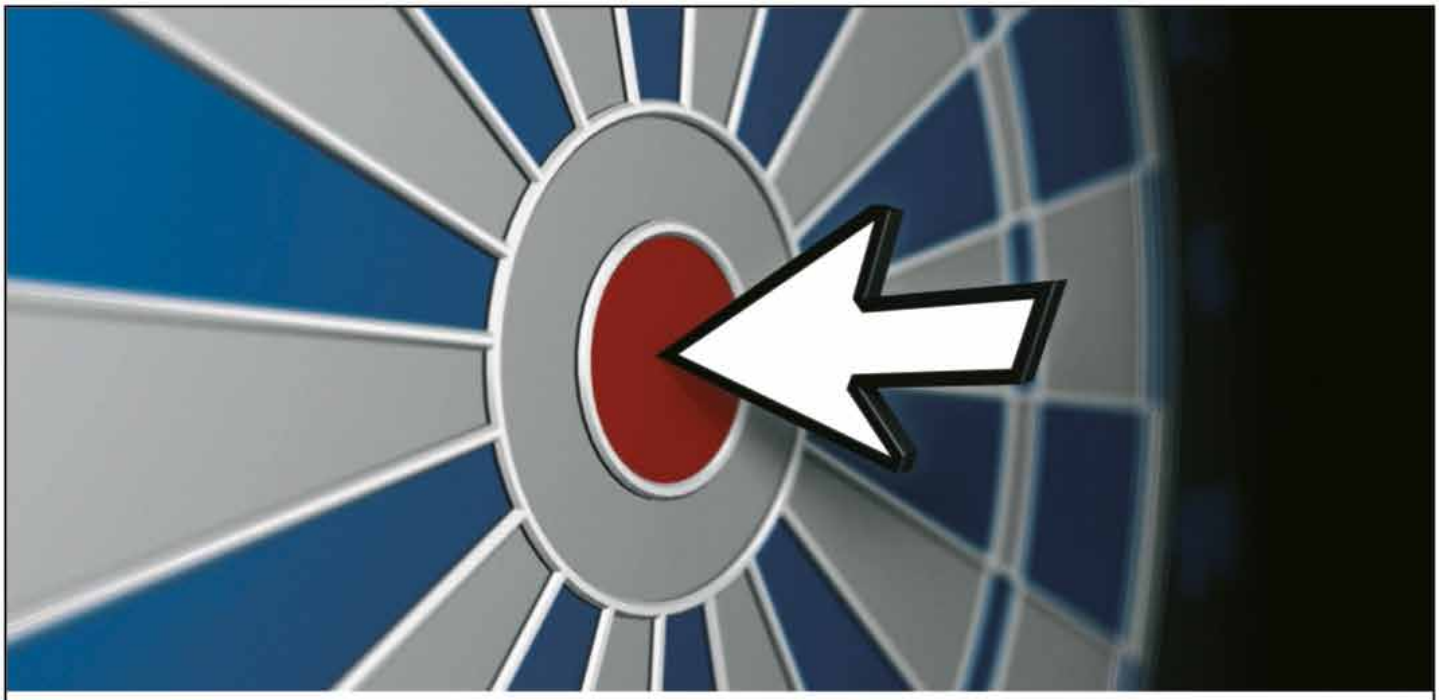
Date ..... Stamp/Signature .....

Trust guarantee:

The publisher guarantees that you are entitled to revoke this order within one week in writing. Dispatch to the publishing house within the specified period will do.

I confirm to have read this guarantee by affixing my signature.

Date ..... Signature .....



Volltreffer!

Der führende Marktplatz der Kunststoff-Industrie

- Rohstoffe kaufen und verkaufen
- Maschinen kaufen und verkaufen
- Neue Lieferanten finden
- Fach- und Führungskräfte gewinnen
- Alle relevanten Neuigkeiten aus der Branche erfahren
- Wichtiges Fachwissen finden
- Wertvolle Geschäftskontakte schließen

www.plasticker.de

aktuell · schnell · kompetent

Nutzen auch Sie jetzt
den führenden Marktplatz
für die Kunststoff-Industrie!

plasticker
the home of plastics