

The mold & die **journal**

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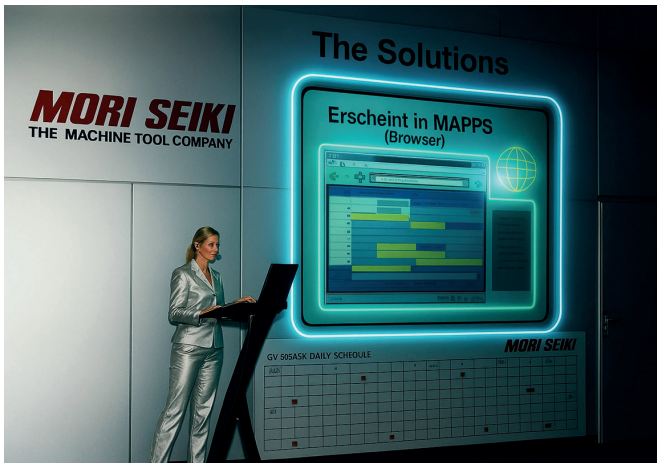
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50 years of EMO: people, machines, milestones



Futuristically staged:
At EMO 2001, Mori Seiki presented the CNC control system MAPPS with browser-based visualization and a modern user interface (Picture: Fecht Press Agency/ ChatGPT)

In June 1975, almost all of Paris is dreaming of love – à l'électronique. As the new, electronically controlled RER highspeed train begins its journey, the Centre Pompidou with colorcoded pipes and electronic building technology is being built in the middle of the city. At the same time, the international machine tool industry celebrates the premiere

of the “Exposition Mondiale de la Machine-Outil” – EMO for short – at the Parc des Expositions de la Porte de Versailles. The common denominator of the three events is that they herald the global dawn of a new era in which electronics are gradually taking over. A look back by technology journalist and contemporary witness Nikolaus Fecht. Farewell, EWA – that's the word in Paris in 1975 and two years later in Hanover. EMO is the successor to the “European Machine Tool Exhibition,” which has been held alternately in Belgium, Italy, France and Germany since 1951. The continental industry show will become an international event, to which the European machine tool association Cecimo invites visitors alternately to Milan, Paris and Hanover.

(The complete text can be found on pages 40-43)

German EMO premiere: In 1977 – two years after Paris – the machine tool industry showcases itself for the first time on a global scale in Hanover (Picture: Deutsche Messe)



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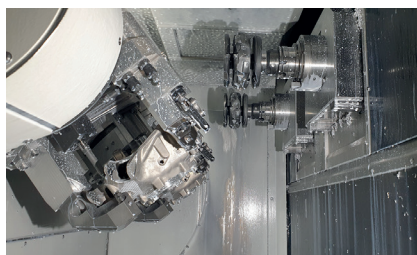
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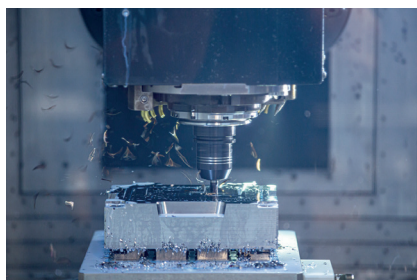
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MAPAL has handled tool management at automotive supplier Schabmüller for some time. The Aalen-based tool manufacturer has now also taken over CAD/CAM programming for components, including simulations. With growing requirements for aluminium machining, the manufacturer values this full-service solution.



26 The next generation of particle foam tools

GROB-WERKE GmbH & Co. KG, in cooperation with Siegfried Hofmann GmbH, is revolutionizing the production of particle foam tools: Thanks to the innovative GROB Metal Printing Process (GMP), foam tools made of aluminum are produced in just a few days.



32 Combining expertise in tool, model and mould making

When three specialists come together and push the boundaries of their respective fields, they can achieve great results. A solution for tool and mould making was the culmination of one such project developed for an online seminar – and the result is testament to the group's expertise and successful partnership. The team comprised workholding equipment specialist SCHUNK, programming professionals from OPEN MIND and tool experts from Horn.

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New partner country of Formnext 2025: Spain impresses as a growth market for AM and a bridge to South America

As this year's partner country, Spain will be bringing an array of innovative exhibitors to the world's leading exhibition in AM technology and the next generation of production while adding key elements to Formnext's lineup of supporting events. In addition to its highly dynamic and rapidly growing AM industry, its geographic location on the Iberian Peninsula enables it to serve as a bridge between Europe and South America. The strength of the Iberian AM sector is readily apparent at Formnext, where Spain has been one of the nations with the most exhibitors for a number of years—including around 30 in 2024. "We're thrilled to be

formnext

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hosting such an incredibly exciting partner country and all its innovative AM firms," states Sascha F. Wenzler, Vice President for Formnext at event organizer Mesago Messe Frankfurt GmbH. "Spain is a perfect example of how AM helps ensure growth and new developments and gives a boost to the entire manufacturing industry, even in challenging times." Spain's AM sector currently employs more than 1,200 people and turns in double-digit growth every year.

According to Wohlers Report 2024, 1.5% of the 3D printers installed all around the world can be found here. "Although the market size is still small, the forecast for the incoming years is promising," reports Naiara Zubizarreta, director of the Spanish 3D Printing association ADDIMAT. At the same time, the Spanish AM industry is highly diverse and features numerous internationally renowned system manufacturers (such as HP Printing and Computing, Meltio, Triditive, Reinforce3D, and Supernova), as well as many material producers, software developers, specialized service providers, and research institutes.

Schaeffler and CERATIZIT sign sustainability target agreements



CERATIZIT today announced the recent signing of a second sustainability target agreement with Schaeffler. The jointly developed sustainability agreements involve prioritizing environmentally friendly materials and promoting ethical and eco-friendly practices. They are the result of close collaboration and deepen the long-standing cooperation between the two companies. CERATIZIT's Hard Material Solutions Division signed a sustainability target agreement with the leading Motion Technology Company Schaeffler. In it CERATIZIT and Schaeffler have agreed on targets for wear protection products made of carbide. A material

that due to its durability and reusability, reduces resource consumption over the whole product live span. With the ecological footprint and a further reduction in resource consumption in mind, the CERATIZIT portfolio also includes a range of premium carbide grades made from reclaimed carbide powder, which are characterized by a particularly low CO₂ footprint. "We are delighted to be the first company in the Designed Tools forming & moulding category to sign a sustainability target agreement with Schaeffler," said Adrien Zoda, Director of Global Sales Hard Material Solutions at CERATIZIT.



Used at Schaeffler: blanks and semi-finished products for cold forming from CERATIZIT (Pictures: CERATIZIT)

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HASCO innovations at K2025

K2025 will be held under the motto "The Power of Plastics: Green – Smart – Responsible". As a reliable and responsible partner for mouldmaking and the plastics-processing industry, we will focus this year on practice-related new and further developments, digitisation in mouldmaking, process reliability and energy efficiency – all with the aim of integrating sustainable and future-oriented solutions.

The latest new products will be presented live in Hall/Stand 1/C06.

Mould Base innovations

The cooling range has been increased. The extended cooling system Ø5 allows precise cooling of slide bars and small moulds – ideal for complex applications with limited build volume. The portfolio is supplemented by further chemical working substances with NSF H1 certification, which meet the highest safety standards in food and medical technology.

With a new slide retainer, HASCO offers a reliable solution for avoiding damage and malfunctions with slide inserts. The new InsertKey also enables unambiguous coding of inserts – for a better overview and process reliability in mouldmaking.

Hot Runner innovations

HASCO hot runner will show some new developments in the field of additive manufacturing in hot runner technology, and how these can contribute to making mouldmaking fit for the future. In addition to additively manufactured hot runners and filters with the highest possible throughput and the lowest shear, the focus is on methods for simple mould diagnosis in order to recognise wiring problems quickly and efficiently from the very beginning. Apart from other highlights, visitors will be able to witness the fast and intuitive ordering of spare parts – thanks to paperless mould documentation. This can always be called up directly at the mould.



(Picture: HASCO)

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Change of general partner to SE & Co. KG: MAPAL sets the course for the future



MAPAL Fabrik für Präzisionswerkzeuge Dr. Kress KG will operate under the name MAPAL Dr. Kress SE & Co. KG starting from June 1, 2025 (Picture: MAPAL)

MAPAL Fabrik für Präzisionswerkzeuge Dr. Kress KG, the headquarters of the internationally active supplier of precision tools and machining solutions based in Aalen, is changing its legal structure. On 1 June 2025, the previous limited partnership (KG) will be converted into an SE & Co. KG and will then operate under the name MAPAL Dr. Kress SE & Co. KG. With the new legal form, MAPAL is creating the basis for a modern and

sustainable corporate structure. The change of name is an important step in the strategic development of the company group and takes account of the increasing complexity of the market environment, the growing international customer base and the need for more efficient decision-making processes.

“We made a conscious decision in favour of SE & Co. KG as the new legal form,” emphasises Dr Jochen

Kress, who will continue to lead the company as President. “The new structure simplifies the control and management of the company and strengthens entrepreneurial responsibility within the management team. It also contributes to MAPAL’s competitiveness in the medium and long term and thus to its future security. I would like to emphasise that this organisational development does not change the ownership structure of MAPAL: We are and will remain a family business.”

No impact on business relationships and labour relations

For customers, suppliers and partners, day-to-day business will remain unaffected by the reorganisation. The change of name will also have no impact on employees. Dr Jochen Kress: “Our success is based on the trusting and long-term cooperation with our employees, customers, suppliers and partners. In the new structure, these relationships will remain the foundation of our actions as well. We look forward to shaping the next steps together.”

René Güntner new CFO of the MAPAL Group

René Güntner is the new Chief Financial Officer (CFO) of the MAPAL Group. In his role, he assumes responsibility for the areas of financial accounting, controlling, purchasing and facility management. “With his many years of management experience and in-depth expertise in international companies, René Güntner will contribute valuable impetus to the strategic development of the MAPAL Group. We are very much looking forward to working together,” emphasises Dr Jochen Kress, President of the MAPAL Group. In his last role as Executive Vice President Finance, Güntner (45) was re-



sponsible for group accounting, controlling, IT, the business management of international subsidiaries as well as contract and risk management. “I see myself as financial officer as well as sparring partner for all areas of the company,” he says. “Open dialogue and cross-divisional collaboration are key success factors.”

René Güntner succeeds Matthias Cöster, who has left the company by mutual agreement.

René Güntner, Chief Financial Officer of the international MAPAL Group (Picture: ©MAPAL)

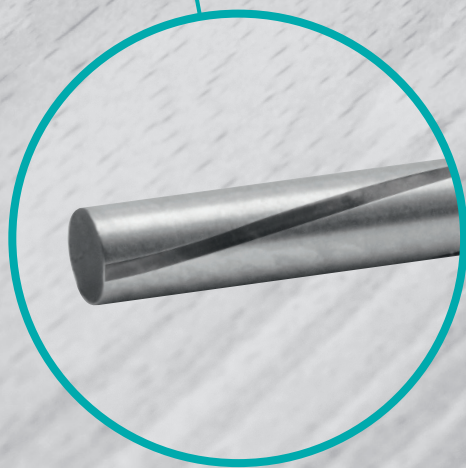
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Magnetfabrik Bonn has been putting its trust in products from HASCO for many decades

New hole filter H5055/... offers a variety of advantages in magnet production

Magnetfabrik Bonn, one of the leading magnet producers in Germany, always opt for safety first when it comes to quality. For more than two decades, they have been using HASCO filters. They have now tested the new model H5055/... in practice, with a positive result and the expectation of extra added value for the customer. The complete production in Bonn is now being successively switched to this latest innovation from HASCO.



Presentation of the new HASCO hole filter H5055/..., Frank Burilov and Marcus Mohr from Magnetfabrik Bonn talking to Stefan Reich and Jörg Karthaus from HASCO

Driving onto the site of the magnet factory in the middle of Bonn, visitors can admire a historical brick facade that reflects the German industry culture. The family company, with around 120 employees, has been an important supplier to German high-tech companies since 1932. On entering the production area, at the heart of the building complex, it immediately becomes clear why the 78 million magnets that are produced there every year are described as high-tech, even though, at first glance, they come across as rather unimposing. They are used wherever measurements are made or controls are carried out. In a modern car, for example, at least 600 of these products are installed for this purpose. Through “field shaping” – the very precise design of electromagnetic fields – every product is customised. The know-how of the magnet factory is also completed by the very sensitive aspect of material selection and the design of demanding geometries.

“The product responsibility for the design lies with our customers. In Bonn, there is no product development taking place in the traditional sense. Our know-how lies exclusively in the customer-specific development and design of the articles, that is something we do particularly well,” says sales manager, Frank Burilov. “We are service partners and service providers for our customers.”

“Quality is therefore of paramount importance to us,” says Marcus Mohr, head of the toolmaking division at Magnetfabrik Bonn. The products are produced almost exclusively by the fully automatic injection moulding process. More than 500 moulds with a general size of 600 x 600 mm are used. The base material is polyamide, as the binding mass, which is processed either as virgin material or as recyclate/millbase. Hard ferrites and rare earths are used as fillers, with the addition of defined additives that are selected for their desired magnetic and mechanical requirements.

Flow properties of the magnet materials in the mould must be adequately simulated and, last of all, must not influence the necessary quality of the finished product. They have used the H109/... filters, where possible, for many years, installing them on the nozzle side.

These hole filters assume the important task of removing all foreign substances from the material compound. “That can theoretically be anything that is relevant in an injection moulding process: From a broken screw, a splinter from the mill from the grinding process of the recyclate or from the material of the outer packaging of the compound.”



Innovative
hole filter H5055/... offers
the solution for demanding
filter applications

Innovative hole filter H5055/... with new features

With its follow-up model H5055/..., HASCO offers a hole filter made from stainless steel, which differs from its predecessor through its innovative design. More than 1,000 angled holes provide an optimum melt flow and reduce shear and flow velocity. In a market comparison, H5055/... guarantees the lowest pressure loss with the same filter performance. The filter can be used in the machine nozzle and in the sprue bushing. Apart from that, Stefan Reich / Key Account Engineer and Jörg Karthaus / Technical Salesman at HASCO, emphasise that the service life through the use of a corrosion-resistant material is much longer and cleaning is very much easier for the user.

Injection pressures fell by 20 percent

That is something that Marcus Mohr can confirm, because the new model has already been tested in-house over several months. The results, after the initial scepticism had disappeared, showed a positive effect in several aspects of the process and the part quality. "When Stefan Reich introduced us to the product at the beginning, I simply couldn't believe it," says the Technical Manager recalling, very precisely, the start of the practical tests. The service life of a filter is, for him, oriented to the tonnages of material that are processed with the injection moulding machine. When the filter was dismantled after the comparable number of operating hours, he was pleasantly surprised that it was still in very good condition. "We could hardly believe our eyes, because really the filter should no longer exist or have been completely worn out." Stefan Reich, praised at this point, his customer for the openness in also trying out new things. "In Germany, it is certainly something that can no longer be taken for granted," says the Key Account Executive, speaking from his many years of experience.

Yet, Marcus Mohr can supply even more facts which, he says himself, he had not expected. "The injection pressures alone fell by 20 percent. This naturally has a positive effect on our component quality." Jörg Karthaus: "The effect is backed by the completely new geometry

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The maintenance-friendly filter was designed specifically for use in machine nozzles and sprue bushings

A satisfactory customer, Head of the tooling division, Marcus Mohr, from the Magnetfabrik Bonn talking to the HASCO team

of our hole filter.” Compared with the predecessor, it has a significantly larger number of holes in the surface and thus enables much higher filter throughput. Through the differentiated arrangement, the shear is recognisably lower

and the injection pressures get more easily into the mould fitted with a hot runner system.

Marcus Mohr also makes a positive appraisal of the direction of installation of the filter: “First of all, we had a look to see from which direction the filter is installed. On dismantling, the contamination settles in the outer area, as a result of which we can subsequently clean the filter much better.”

Moulding tools that are built exclusively in-house are re-equipped every day. To do this, use is made among other things of HASCO's quick-action couplings. We have hardly any mono-cultures in production, says Marcus Mohr. A partnership relationship has existed with HASCO for decades. Marcus Mohr can well remember that the Tempflex system had been jointly developed for their own cooling purposes.

Filter insert H5055/... a must for every customer

“I would recommend every injection moulder use these hole filters,” said Marcus Mohr, immediately providing an explanation: For one of his customers, he had in the past

taken the trouble to note down all the possibilities of contamination. “The customer had not been aware of the extent to which the contamination could get into the melt and finally find its way into the product.” To prevent this in the conventional way is very complicated and, at the same time, almost impossible. For this reason, the use of the hole filter H5055/... for the magnet factory has now become a must and is recommended for general use by all injection moulders – even with virgin material. “We always work with a healthy human understanding,” says Frank Burilov. “Everything that improves the quality of our products is utilised. It is nevertheless clear that wherever people work, errors occur.” “From the customer's point of view, one of the downsides, in the past, was the resultant pressure loss,” says Stefan Reich, recalling a number of customer discussions. “At this point, I can put everyone's mind at rest and encourage them to take the tip from Marcus Mohr – simply test the product, run empty injection pressures and to learn appreciate the advantages.”

Positive outcome: More stable processes and higher quality

Marcus Mohr and Frank Burilov both draw a positive conclusion: The changeover to the new hole filter H5055/... is now being carried out in stages. This can take up to three years with the large product variety of Magnetfabrik Bonn. “HASCO is helping us, through the innovation and further development of the standard mould units and hot runner components, in making our processes more stable and increasing the quality of our products. In this way, they enable us to serve our customers better and, in this respect, make a good impression,” says Frank Burilov, with a clear acknowledgement of the cooperation with HASCO.

HASCO Hasenclever GmbH + Co KG

As a leading manufacturer of standardised, modular quality standard mould units and individually designed hot runner systems, HASCO offers innovative and economical solutions for designers, mouldmakers and injection moulders from a single source. More than 700 employees at 35 sites worldwide enable moulds to be built in the simplest possible way.

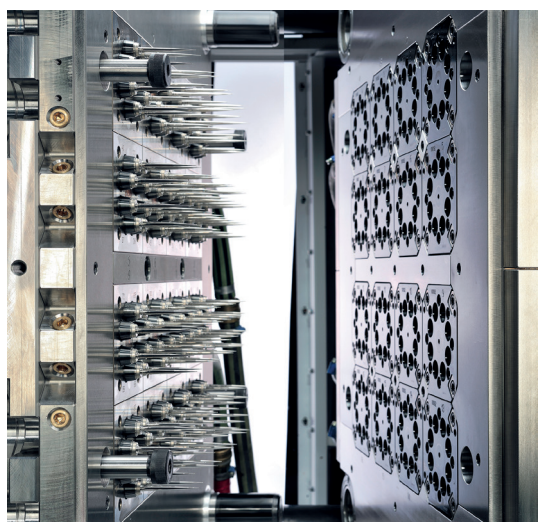
(Pictures: HASCO)



Life-saving precision – mold making for medical technology

Quality begins with the mold

“The mold determines quality – and thus the economic success of our customers,” explains a company spokesperson. In practice, this means: The more precise the mold, the more stable the process and the lower the reject rate. This is especially crucial in medical technology, where validation and reproducibility are essential.



Tanner relies on high-precision mold technology with virtually invisible parting lines and gate marks – a quality feature that provides tangible benefits. The molds meet the highest grade standards, ensuring smooth, high-quality mass production with consistent results.

Where technology meets experience

For over 60 years, Tanner has designed and manufactured high-performance injection molds for demanding applications. All design work is done entirely in 3D, supported by modern CAE tools for simulation and optimization. An in-house testing facility with clamping forces of up to 3,500 kN enables commissioning under real-world conditions – shortening development times and increasing process reliability.

“Our customers benefit from short cycle times, outstanding molded part quality, and maximum flexibility,” the company explains. This is made possible by smart design, compact construction, and premium materials – combined with modern machinery and a high vertical range of manufacture.

Global reach – local craftsmanship

Around 75 percent of Tanner’s molds are destined for the international market. Customers

from Europe, North America, and Asia value the combination of Swiss precision and durability, as well as the additional services offered. The molds are designed for maximum uptime and quick insert changes – a key advantage for manufacturers with diverse product portfolios.

Additional services beyond the life cycle

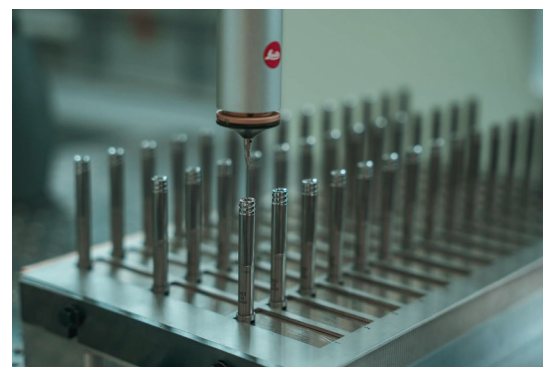
In addition to mold manufacturing, Tanner offers a comprehensive range of additional services: including feasibility analyses, technical optimizations, and emergency supply. Even after delivery, the company remains a reliable partner – providing original replacement parts and ongoing development of existing molds.

“Our customers should be able to focus on production – we take care of the molds,” the company explains. This partnership-oriented approach is a key element of their success model.

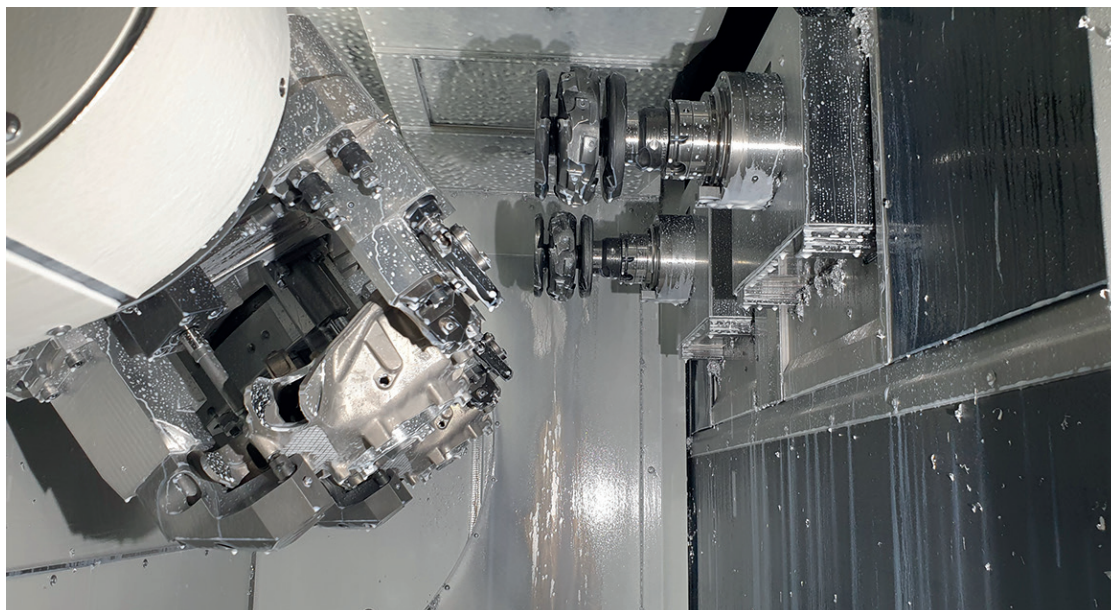
Looking to the future

The demands on mold making are continually growing – not only in terms of precision, but also with regard to sustainability, digitalization, and automation. Tanner meets these challenges by investing in technology, training, and process optimization. These investments ensure that the company will remain a reliable partner for the medical technology sector – and beyond – well into the future.

(Pictures:
TANNER
FORMENBAU AG)



Schabmüller manufactures hub carriers in pairs on a double spindle machine from SW. The image shows the use of disc milling cutters with indexable inserts from MAPAL



Service from programming through to component

Schabmüller taps into MAPAL's expertise in aluminium

MAPAL has handled tool management at automotive supplier Schabmüller for some time. The Aalen-based tool manufacturer has now also taken over CAD/CAM programming for components, including simulations. With growing requirements for aluminium machining, the manufacturer values this full-service solution.

Presenting a rear axle housing (from left): Stephan Streck (MAPAL technical consultant), Eugen Bien (MAPAL application engineer) and Helmut Häckl (Managing Director, Schabmüller)

Schabmüller Automobiltechnik GmbH (SMI) in Großmehring near Ingolstadt has been an automotive supplier since 1988 and has increasingly specialised in the efficient manufacture of large series. The parts are installed in vehicles made by Mercedes, Porsche, Audi, BMW and Jaguar, among others. SMI operates predominantly as a Tier 2 supplier. Major clients are Aludyne and Strojmetal, which directly supply the automotive indus-

try as an aluminium foundry and forge. Until a few years ago, Schabmüller produced cylinder head covers for the VW 3.0-litre V-group engine in quantities of up to 320,000 a year. The components, for which Schabmüller also handles installation, are still produced, but the volume has already decreased. However, other major orders have arrived, making the company less dependent on the combustion engine.

"The production of suspension parts has begun since then. This gives us the opportunity to diversify ourselves in this direction", says managing director Helmut Häckl. "Our business has developed and pursued precisely this goal." However, the new components pose challenges for Schabmüller, too. When becoming involved in the production of suspension parts, Schabmüller had whole new experiences. Particularly for electric vehicle components, projects are sometimes postponed, originally planned quantities are not reached, or additional changes are required at short notice before series production begins.



Häckl knows why: "Up until the end, the OEMs gather experience in load tests for vehicles that are becoming increasingly heavier due to the weight of the batteries. This means that certain components are designed in a more stable way to cover all borderline situations." Stephan Streck, technical consultant at MAPAL, explains using the example of a hub carrier. As issues with stiffness arose during driving. Almost at the last minute, another surface had to be machined and a stiffening rib was added.

Schabmüller has to plan the facilities and prices for the components before their exact design is known, which always presents the manufacturer with challenges. "Cycle time is the decisive factor for getting an order", says Häckl.

MAPAL involved from the outset

To get a better grip on these short-term changes and continue optimising overall production, Schabmüller decided to bring MAPAL on board already at the CAD/CAM programming phase. "We have a very cooperative partnership with MAPAL and appreciate their rapid response times", explains Häckl. "So we felt good about expanding our cooperation to CNC programming and simulation." MAPAL is already involved in tool design for new projects and in charge of tool management. These

services are tailored to the client's needs. These include tool scheduling, pre-adjustment, dispensing and reconditioning, technical support for series production, tool and cycle time optimisations, and tool life optimisations.

Schabmüller stopped programming itself back in 2018. "For CAD/CAM, we need specialists who know this subject matter inside out", says Häckl. "If we only tackle two to four new projects a year, a staff member can't be fit here." Schabmüller has used the machine manufacturer's services for programming from time to time since then. However, there was no option for 3D simulations, which meant the manufacturer knew that not all options for optimising cycle times were being used.

Now that MAPAL is involved from the beginning, this has changed. NC programming, simulation and tool management are now perfectly intertwined. For instance, simulation data is included in tool planning, which helps detect potential collisions at an early stage. It is possible to respond immediately to component changes by the OEMs before the start of production. Modifications are made in the 3D simulations before the tools are finished. Streck explains the importance of simulation: "If you don't catch adverse changes in good time, costs can run into the five figures."



Production at Schabmüller mainly takes place on multi-spindle machines. Hub carriers are machined by SW on a double spindle

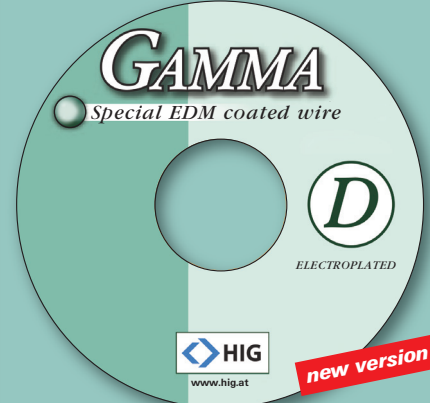
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Simulation also plays a key role in optimising machining. For instance, it shows approach angles that can be used to improve material removal. Data from the computer can also be used to reduce tool wrapping. “This type of detail is much easier to detect in simulations than looking through the window into the machine”, says Streck.

Forged parts, not cast aluminium

The suspension parts involve a shift in starting material from die cast aluminium to forged aluminium. Forged parts have much higher load indicators than cast parts. The higher stability is required in particular for electromobility. However, this also increases machining requirements to achieve the desired cycle time. Material removal and thus the volume to be machined are much higher here, which requires adapted milling strategies.

The material properties have also changed, as Stephan Streck explains: “Compared to aluminium cast parts, the forged material has a much lower silicon content. This means that the chip doesn’t break well, long chips are produced in machining, and we need to deal

In the warehouse system, MAPAL provides all tools needed for a component via the tool management. For hub carriers, 45 to 55 different tools are required

with smeared blades. All of MAPAL’s aluminium machining expertise is required to find solutions here.” Schabmüller currently uses forged aluminium to produce some of the hub carriers, steering knuckles and control arms made in Großmehring.

High-volume milling cutter NeoMill-Alu-QBig used before its market launch

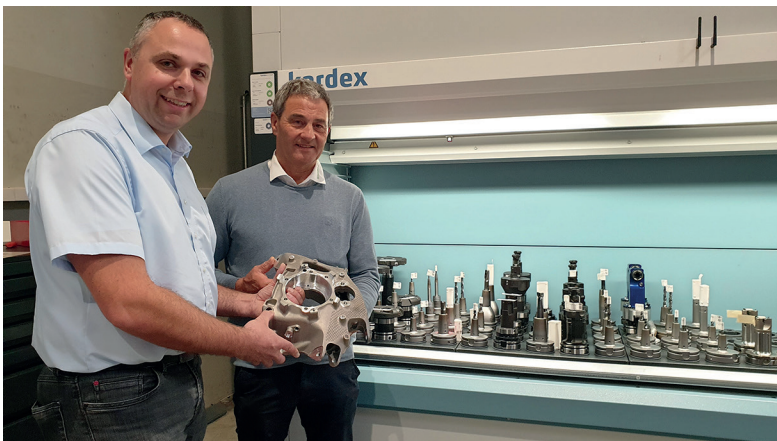
Another aspect of improving processes is MAPAL bringing new tools on board as soon as they are available and promise benefits. As application engineer Eugen Bien notes, the new indexable insert milling cutter NeoMill-Alu-QBig was used at Schabmüller before it even officially came on the market.

This new indexable insert milling cutter from MAPAL stands out for its top performance in high-volume aluminium milling. It is designed for use at speeds up to 35,000 min⁻¹ to achieve the maximum possible material removal rate. For a tight fit despite high centrifugal forces, screws with increased tensile strength are used to hold the indexable inserts firmly in the prismatic seat. MAPAL has fitted the tool body with a fine balancing system to protect the machine spindle and achieve high surface finishes where possible. In addition, focus was placed during development on low cutting forces and highly precise indexable inserts.

From the three coatings available, MAPAL technicians chose a diamond coating for the machining of mould casting at Schabmüller. During operation, the machine operator rotates the indexable inserts with their two cutting edges directly on the machine. MAPAL retips the milling cutter in the setting room. One benefit of the ductile solid carbide inserts of the NeoMill-Alu-QBig in comparison to the milling cutters with brazed PCD blades used before: They break out less quickly when there are sand residues from the casting mould on the raw part.

However, there is another aspect that is decisive for the user, as Häckl affirms: “In production, we achieved shorter cycle times with the NeoMill-Alu-QBig, as we were able to attain greater values for cutting speed and

Helmut Häckl,
CEO of
Schabmüller
(right) and
Stephan Streck,
MAPAL technical
consultant, with
a hub carrier. The
tools used for
its manufacture
are in the back-
ground
(Pictures:
©MAPAL)



feed. For this, we were readily willing to accept shorter tool lives.”

Switching to the NeoMill-Alu-QBig required a different milling strategy and higher central chip density. The values measured by MAPAL are testament to the success achieved as a result. The adjustments implemented with higher cutting parameters, the switch from circular milling to helix milling, and the improved machining conditions resulted in a cycle time saving for this machining operation of 54%. The new tool made it possible to increase the feed per tooth from an average of 14 mm to 32 mm.

In the comprehensive tool set for machining a hub carrier, the NeoMill-Alu-QBig is one of the few standard tools, but it plays a crucial role for the cycle time, as Eugen Bien puts it: “Use of the NeoMill-Alu-QBig constitutes around 30% of the total machining time.” The focus is on the roughing of the component, but the tool also produces surfaces in finished part quality.

The hub carriers set high requirements for the machining strategy. For Porsche and AMG,

Schabmüller produces around 97,000 of these each per year from cast or forged parts, for which cycle time of six minutes for two components is required on the double spindle. The tool sets for this consist of 45 to 55 tools. For the most part, these are client-specific custom tools. Most of them, such as drills, step drills and fine boring tools, are only used for one or two machining operations. The role of the simulation is to keep non-productive time for all the different tools to a minimum and ideally to start each machining operation once only.

Room to grow in future

Schabmüller currently has around 150 employees and is growing constantly. Work was completed on a third hall recently. Originally designed for the production of large quantities of cylinder head covers for VW, part of the double hall is currently used for other purposes. Schabmüller machines a large amount of the starting material to produce top plates for electric vehicle batteries. Rear axle housings are being produced for another automotive manufacturer in a second project.

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Freek Heizelemente – From the hot runner to the ISS



Versatile heating solutions thanks to a broad product portfolio for 75 years

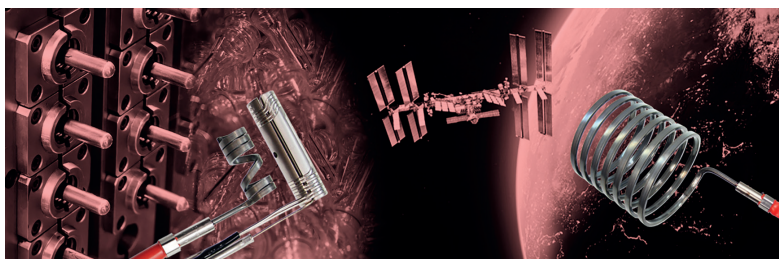
The company Friedr. Freek GmbH has been a reliable supplier of high-quality heating elements for the plastics industry for decades. Today, the company operates as an innovative development partner and problem solver for industrial heating solutions across a wide range of industries worldwide. This year, Freek celebrates its 75th anniversary and continues to focus on quality and production “Made in Germany.”

Electric Heating Technology with Tradition

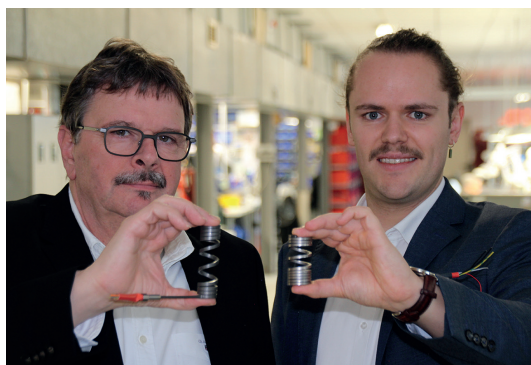
Founded in 1950 as a manufacturer of electrical resistors, Freek quickly became a reliable supplier for well-known household appliance manufacturers. Whether heating registers for tumble dryers or auxiliary heating elements for cross-flow fans – Freek impressed with quality and reliability. With increasing globalization in the 1990s and growing competition from Eastern Europe and Asia, the company strategically realigned itself, focusing on the production of heating elements for the plastics industry and mechanical engineering. Since then, the daily business of Friedr. Freek GmbH has been shaped by the highest quality standards, innovative miniaturization, and the development of customized heating solutions.

Firmly Established in the Plastics Industry

Today, Freek heating elements are installed



Optimism at the site in Menden, Sauerland: Michael Ablas and Jan Kaiser (from left)



tens of thousands of times each year in hot runner systems from renowned manufacturers worldwide. The already high demands of the hot runner industry have continued to rise in recent years, as authorised signatory Michael Ablas explains: “Quality is now taken for granted. Our strength lies in our development expertise and flexibility. Where needed, we deliver at short notice and starting from a batch size of just one.” The hot runner industry remains one of the most important target markets for Freek heating elements, while other markets are steadily gaining importance.

Efficient Heating of Plates

In the packaging industry, demand is growing for quaternary cartridge heaters, ideal for heating sealing bars, large moulds and heating plates up to 750°C working temperature. The special feature compared to conventional cartridge heaters: The square cross-section and low bending stiffness allow optimal heat transfer, a flexible design, and manual bending into milled grooves. Deep-hole drilling can therefore be completely dispensed with. These advantages are also increasingly being used in 3D printing to heat printer beds efficiently.

Development Expertise Reaches into Space

Freek was able to demonstrate the experience gained from 75 years of developing and producing heating elements in a special project in 2024: A Freek HotCoil was successfully used on the International Space Station (ISS) to produce high-purity glass fibres. “This project was uncharted territory for us too, with many challenges. The focus was on the quality and reliability of our products – and we delivered. We are proud of that,” explains Stefan Kaiser.



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In 2025, however, the focus will once again be on terrestrial applications. "Whether it's sealing bars in the packaging sector, tool heating for injection moulding, print beds for 3D printing or high-precision heaters for measurement technology – we are familiar with most applications and can therefore offer fast and reliable solutions," Kaiser adds.

Cooperation as a Core Identity

The drive to open up new markets goes hand in hand with a constantly growing product portfolio. Close and long-standing co-operation with European heating manufacturers in production, research and development, as well as diversification of the company's own production, make it possible to offer a wide range of heating elements and technology-open consulting in all sectors. The principle of cooperation is a key pillar of Freek's success and will continue to be pursued in the coming years through new partnerships and international distributors.



The old and the new management:
Stefan, Wolfgang and Jan Kaiser (from left)

Transition in the Management

A significant milestone awaits Freek in 2025: Since 2000, brothers Stefan and Wolfgang Kaiser have jointly led the company. In June 2025, Wolfgang Kaiser, who has been with Freek since 1990, will hand over his responsibilities to his son Jan Kaiser, who will form the new management duo together with Stefan Kaiser. "Freek has a strong foundation, is successful in many industries, and continues to expand despite challenging times. I am pleased to hand over the company to the next generation," says Wolfgang Kaiser. Jan Kaiser, who has been with the company since 2023 and was previously Product Manager at igus GmbH, is optimistic about the future: "As a company with a strong tradition, Freek stands for quality worldwide. I look forward to continuing its success story with fresh ideas and a commitment to production made in Germany."

The challenge of succession planning, which many medium-sized companies in Germany are currently facing, has thus been mastered and the future of Freek as a family business is secured. The anniversary celebrations will take place in the company of employees and the closest long-term partners. In autumn, there will be an opportunity to experience Freek's product diversity up close at the K-Show in Düsseldorf and to toast the 75th anniversary with the Freek team.

Explore Freek's products at the K-Show in Düsseldorf, October 8th-15th in Hall 1, Booth C64.



Optimum heat distribution thanks to the use of square cartridge heaters (Pictures: Friedr. Freek GmbH)

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E-Mail: mail@freek.de
Internet: www.freek.de

Standard meets custom

Modular hot runner solutions

An innovative approach for hot runner systems combines standardisation and custom-made individuality: the modular design concept of the Meusburger hot runner products enables flexible mould design without having to renege on the benefits offered by standardised components. Mould makers and injection moulders can benefit from this intelligent combination and realise efficient and cost-effective solutions for their specific requirements.

Variety for individual hot runner solutions

The vast range of carefully matched Meusburger products includes optimum components for individual hot runner solutions. Customers benefit from a wide selection, with which they can easily fulfil every industry-specific requirement. Whether simple or complex applications, Meusburger ensures that the right components are available for each challenge.

Meusburger product highlights: smartFILL nozzle series

Meusburger is focusing particularly on its innovative smartFILL nozzle series, which offers multiple innovations that help users meet the demanding requirements of their injection moulded parts. For shot weights from

0.2 to 2,500 g per nozzle, everything can be processed, whether easy-to-treat polyolefins or demanding high-temperature plastics. Meusburger offers its smartFILL nozzle series in two types: the screw-in type, which guarantees a leak-proof screw connection of the nozzles in the manifold and dispenses with the need for height adjustment, and the slide seal type, where the nozzle length does not depend on the nozzle spacing and bending moments on the nozzle are avoided.

Hot runner systems, ready to install and connect

To enable especially easy integration, Meusburger offers hot runner systems that are equipped with smartFILL nozzles and ready to install and connect. These systems are

The vast range of carefully matched Meusburger products includes optimum components for individual hot runner solutions (Picture: Meusburger)



completely assembled and tested for functionality before delivery. The user just has to insert the hot runner manifold into the fixed half of the mould and screw it to the cavity plate. Thanks to the secure screw connection between the hot runner nozzle and the manifold, there is no need for the tedious height adjustment to the clamp plate.

Customised hot halves

The Meusburger range also includes customised hot halves that can be supplied either with open hot runner nozzles or as a valve gate system. The cavity plate is the only other thing missing. The hot halves feature smartFILL hot runner nozzles, optimum system adjustment for leakage-free operation, and pin operation either individually per nozzle or with a lifting plate. Maximum convenience in project planning, assembly, and production is guaranteed by the hot halves, since they are ready to connect according to customer specifications and come with suitable electrical plugs and media connections.

Operating units for valve gate systems

Matching its smartFILL nozzle range, Meusburger offers operating units in different designs and sizes. The hydraulically or pneumatically operated units enable high-precision adjustment of the pin position without changing the pin stroke. The pin can be easily disconnected and can stay in the hot runner system when removing the operating unit, which constitutes a major advantage, as it leads to a significant reduction in adjustment and installation times.

Quick availability thanks to standardisation

Thanks to the systematic standardisation of hot runner components, Meusburger customers benefit from consistently high quality and continuous availability. This saves precious time and money. The optimised order processing ensures that all standardised items, spare parts included, can generally be dispatched the next day, and the user-friendly Meusburger portal is available to customers around the clock and enables simple ordering, delivery status checks and access to all relevant information and documents.

Further information of the Meusburger hot runner solutions can be found here:

www.meusburger.com/heisskanaltechnik

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K 2025: The World's No. 1 Trade Fair for Plastics and Rubber

The Power of Plastics! Green – Smart – Responsible

From 8 to 15 October 2025, K in Düsseldorf will once again be the central stage for the international plastics and rubber industry. Around 3,200 exhibitors from 66 countries will present innovative solutions, forward-looking products and impressive machines in live operation. With its motto “The Power of Plastics! Green – Smart – Responsible,” it sets clear priorities. This reflects the industry's current values and targets, and underlines that plastics form an indispensable component of numerous sectors of industry that make a major contribution to innovation and progress. At the same time, the motto of the forthcoming K stands for the industry's commitment to act sustainably, smartly and responsibly in producing and handling the material that is plastic.



The World's No. 1 Trade Fair
for Plastics and Rubber
8-15 OCTOBER 2025
Düsseldorf, Germany
k-online.com

Especially in today's challenging times K in Düsseldorf underscores its role as the world's No. 1 trade fair. It is the place where the complete value chain is presented at the highest level. Nowhere else are innovations on show in such high concentration, nowhere else can so many product launches be seen as at K in Düsseldorf. On the one hand, it is the global showcase of an active, innovative and responsible sector, on the other hand, it is also the platform where the future is shaped – be it by trail-blazing technologies, in-depth discussions of global challenges or as a point of departure for joint ventures across borders.

Facts, figures and international flair

K impresses not only with its sheer dimensions but also with the variety of nations represented. It has been completely booked up since May 2024. Over 177,000 sqm net exhibition space in the 18 exhibition halls and on the outdoor premises provide room for the entire

spectrum of the plastics and rubber industry:

- Machinery and equipment: Halls 1, 3-4, 8b as well as 9-17
- Raw materials and auxiliaries: Halls 5, 6, 7, 7a, 8a, 8b
- Semi-finished products, technical parts and products of reinforced plastics: Halls 5, 6, 7, 7a, 8a, 8b

The international appeal of K is unparalleled: the last event in 2022 was attended by 3,020 exhibitors from 59 nations and 177.486 visitors from 167 countries. Particularly well represented were the exhibitors from Europe, Asia and the USA and a total of 71% of trade visitors hailed from abroad.

In 2025, exhibitors from Europe in particular will once again be strongly represented, especially from Germany, Italy, Turkey, Austria, the Netherlands, Switzerland and Spain. At the same time, K clearly shows the changes in the global market: the number and exhibition space of companies from Asia have remained at a consistently high level for years. The presence of companies from China, India and Taiwan will be particularly impressive. In addition, the USA will once again be represented by a larger group of exhibitors.

The high number of innovations as well as the presence of all market leaders are regularly rated with top scores by K visitors (98% visitor's satisfaction). This relates not only to plastics and rubber product manufacturers but also to industrial end users that regularly visit K. These include experts from the fields of automotive, packaging, electrical engineering, electronics, communications, construction, medical device technology or aviation and aerospace. They all appreciate the trade fair as a source of

inspiration for their industries and products as well as a platform to discover pioneering innovations that help them successfully hold their own alongside international competitors.

The guiding topics of K 2025: shaping the future

K 2025 has set itself the task of tackling the key challenges of our time and presenting concrete solutions. This is also reflected in the three guiding topics:

Shaping the circular economy

The industry is increasingly working on a sustainable circular economy that promotes the reuse, recycling and the reduction of plastic waste.

Embracing digitalisation

The plastics and rubber industry players are aware of the transformative power of digitalisation and deploy more and more digital technologies to increase the efficiency of their machinery and products and to drive innovations

Caring about people

The sector is aware of its social responsibility with regard to environmental protection. The focus is here on the responsible handling of resources. At the same time, it promotes young talent and creates future perspectives for young professionals in the plastics and rubber sector.

K2025 invites its exhibitors, experts, multipliers and interested parties from all over the world to follow its motto and jointly shape the future of the plastics and rubber industry.

Highlights and new formats at K 2025

The Specials at K 2025 will pick up on the trade fair's guiding topics. They comprise proven successful formats while focusing on innovations at the same time:

Special: "Plastics shape the Future": the official Special Show of K is a project by the German plastics industry headed by PlasticsEurope Deutschland e. V. and Messe Düsseldorf. It illustrates the fascinating developments already happening now and how the visions for tomorrow are already on the way to being implemented today; but it also highlights the important role international politics play in this. "Plastics Shape the Future" comprises seven themed days – featuring discussions on innovative techno-



logies and materials, keynotes, a political panel, Career Day and Start-up Pitch.

VDMA Forum: In 2025 VDMA (German Machinery and Equipment Manufacturers Association) will again present a comprehensive Forum on the outdoor premises, this time entitled "The Power of Plastics". Located outdoors between Halls 10 and 16, the VDMA and 6 of its member companies will demonstrate just how relevant technology is for implementing circularity in the plastic industry. In addition, the Association in the VDMA Pavilion offers not only selected finished products and live presentations but also ample room for discussion and interaction with workshops, panel discussions and events for young talents.

Rubberstreet: In 2025 Rubberstreet will again serve as the showcase for the innovative power and operational excellence of the elastomer sector. Already since 1983 it has been the "first port of call" and orientation point for all those interested in learning more about elastomers (rubber & TPE) at K. The patron of Rubberstreet is wdk (German Rubber Industry Association).

Start-up Zone: The Start-up Zone successfully debuted at the last edition of K. It will also be continued in 2025 and extended to provide a platform for as many newcomers as possible who are specifically dedicated to the development of innovative products and solutions in the fields of plastics and rubber.

Science Campus: At the Science Campus universities, colleges and institutes will present their latest plastics research findings. A new concept of the Science Campus permits

exhibitors – in addition to exhibiting with their own stands – to also take part in the Science Campus Center as an extra option.

Young Talents Lounge: The plastics industry faces massive recruitment problems. Often, however, the simple reason for this is school leavers' lack of knowledge about the variety of skilled occupations and career opportunities in the plastics industry. With a view to also securing sufficient young talent in future the GKV (German Plastics Converters Association) will invite young people and job starters to the Young Talents Lounge for the first time at K 2025. Here, the plastics training will be accessible virtually and in-person and first-hand student experiences will be shared with the trade fair audience.

Women in plastics: This networking event specifically designed for women will debut at K 2025. Successful women in the international plastics sector will report in a panel discussion and best-practice talks on their careers and experiences and will be available for questions from the audience. The aim is to promote exchange with one another, strengthen professional networks and enhance the visibility of female leaders in the sector.

K Services

Part of K in Düsseldorf's success formula is its focus on service. Thanks to its extensive digital services you can conveniently plan your perfect trade fair visit in the run-up to the event.

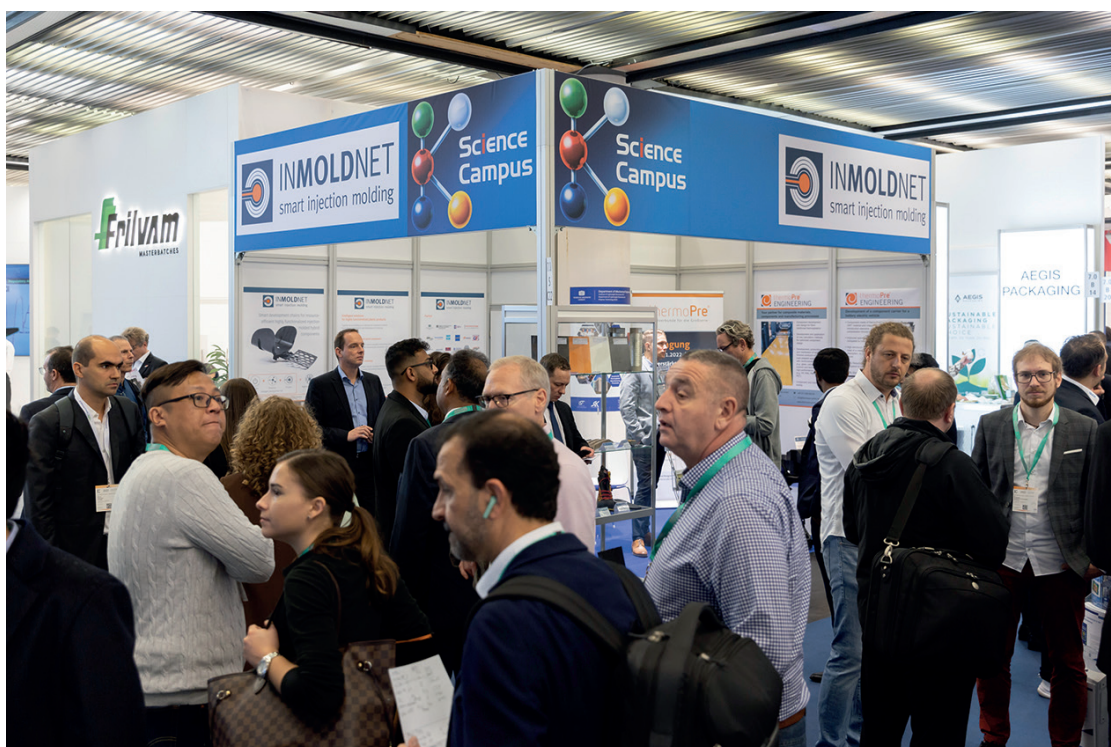
The Ticketshop for K 2025 is open at www.k-online.com. The eTicket can be scanned as a print-out or straight from your smartphone display at the exhibition centre turnstiles, avoiding long queues to get into the halls.

The **K-App** (for iOS and Android) will allow you to conveniently and permanently access news from the entire sector and helpful tips related to the trade fair both in the run-to and during your visit to K. The App will also provide access to the exhibitor database, which can already be found at k-online right now.

The **matchmaking-tool Fair Match** enables trade visitors and all exhibitors to search for matching contacts at K-online from August. All you need to do is enter your interests and search parameters. By quickly matching these interests, recommendations and personalised proposals are generated immediately. This allows exhibitors and visitors to already make contact or conveniently schedule appointments during the runtime before the trade fair.

K Community

K in Düsseldorf underscores and consolidates its pole position as its industry's central communication and information platform by extending the face-to-face event to include additional digital offerings throughout the year.



(Bilder: Messe Düsseldorf / tillmann)

K 2025: focusing on the transformation of the plastics industry

Special show **Plastics Shape the Future** to offer international discourse, innovations and impulses for a sustainable and competitive plastics industry on seven theme days.

At K 2025 from 8 to 15 October in Düsseldorf the official Special, **Plastics shape the Future**, will discuss and reveal how the plastics industry shapes the transition to more sustainability, digitalisation and social responsibility. Organised jointly by **Plastics Europe Deutschland** and **Messe Düsseldorf** the special show will provide insights into the current state and perspectives of transformation: featuring different focal topics every day, discussions with high-ranking representatives from political and scientific spheres and NGOs, innovative start-ups and industry experts – accompanied by interactive expert talks, round tables, guided tours of the trade fair and networking opportunities at the **Startup Pitch**, **Science and Poetry Slam** and the “**Women in Plastics**” event.

Overview of the seven theme days

1) Kick-off Wednesday –

The Power of Plastics (8 October)

Wednesday is all about competitiveness and sustainability and will be kicked off by the opening with representatives from political spheres, business and international associations. Two sessions chaired by Virginia Janssens (Managing Director of **Plastics Europe**) and Dr. Christine Bunte (**Plastics Europe Deutschland**) will highlight how innovations and investment drive the industry.

2) Circular Thursday (9 October)

On Thursday everything will revolve around circularity: moderated by Prof. Manfred Renner (**Fraunhofer UMSICHT/CCPE**) experts will shed light on circular-ready product design, regulatory challenges and circular business models in packaging, textiles, electronics, construction and automotive. The day will be rounded off by a panel discussion on chemical and mechanical recycling.

3) Climate Friday (10 October)

Friday will focus on climate protection and CO₂ reduction: topics span from avoiding pellet losses (OCS) to additive use to lifecycle analyses and the monetisation of sustainable products. A political panel will discuss the competitiveness of the European plastics industry as a driver for a sustainable economy.

4) Smart Saturday (11 October)

On Saturday digitalisation and artificial intelligence will be centrestage: **PolyMaterials**, **INEOS**, **Covestro**, **Netzsch**, the **nova Institute**, **rCycle** and representatives from science, to name but a few, will flag up how AI optimises processes from material development to improved collection and sorting for recycling to the drawing up of sustainability reports.

5) Career Sunday (12 October)

Career Sunday will focus on people. Be it in recruiting through new channels via gaming or diversity, at two book presentations or the **Science and Poetry Slam**; not forgetting the networking event “**Women in Plastics**”

6) Innovation Monday (13 October)

Monday is reserved for start-ups and science: in two pitch sessions emerging companies will introduce themselves with solutions for recycling, digitalisation, material development and organic plastics. In addition, the **WAK Prize** will be presented by Prof. Moritzer (**University of Paderborn**). The concluding scientific panel will discuss the innovative power of plastics as an enabler for various key industries in Europe.

7) Visionary Tuesday (14 October)

The last but one day of K 2025 looks ahead of time – **Plastics 2050**: circular design, bio-based raw materials, CCU and the avoidance of micro plastics will be crucial topics. The keynote by Prof. Michael Braungart (**Cradle to Cradle**) as well as panels with leading representatives from industry and science show that the future of the industry is transforming – with high ambitions and concrete steps.

The programme will be predominantly in English. For more information on the special show and the complete programme go to: www.k-online.com/plastics_shape_the_future

(Picture: Messe Düsseldorf GmbH)



The GMP300
from GROB



Powered by GROB Metal Printing

The next generation of particle foam tools

Movable
tool side



Non-movable
tool side



GROB-WERKE GmbH & Co. KG, in cooperation with Siegfried Hofmann GmbH, is revolutionizing the production of particle foam tools: Thanks to the innovative GROB Metal Printing Process (GMP), foam tools made of aluminum are produced in just a few days.

Maximum efficiency through GROB technology

With the GROB Metal Printing process, GROB-WERKE is setting new standards in the additive manufacturing of mold solutions for particle foam. Aluminum tools produced using GMP technology are not only lighter and more corrosion-resistant than their steel counterparts, but also enable optimum vaporization, venting and homogeneous filling. This is made possible by the GMP300, a 3D printer that GROB has developed specifically for the fast and cost-effective production of aluminum components. The system processes wire into partially permeable components that are ready for use with minimal further post-processing. It only takes a few days from design to the first foaming process – a decisive advantage for the development of



prototypes and series parts with high time and cost pressure.

The foaming tools develop their full potential in combination with the BE-AD.MACHINE from Hofmann. Up to 50% porosity in the mold insert ensures optimum vaporization, so that even large components can be produced without any problems. The high number of steam nozzles ensures shorter cycle times thanks to faster heating and cooling processes.

Particularly practical: different mold inserts can easily be used with just one mold frame. This not only saves costs, but also speeds up the production process considerably.

GROB Metal Printing – the next level of additive manufacturing

The GMP process is characterized by high system flexibility, low production costs and a high level of safety. Easy integration into

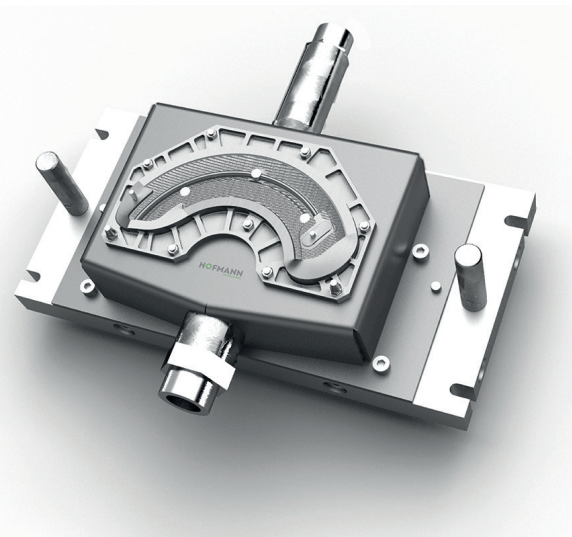
existing production lines means that companies can switch to this innovative technology with little effort.

The second generation of the GMP300 impresses with features such as a further improved sealing concept, real-time monitoring of droplet formation and an optimized shielding gas concept for even higher component quality. A second wire feed system enables faster material changes and additional sensors ensure precise monitoring of the printing process.

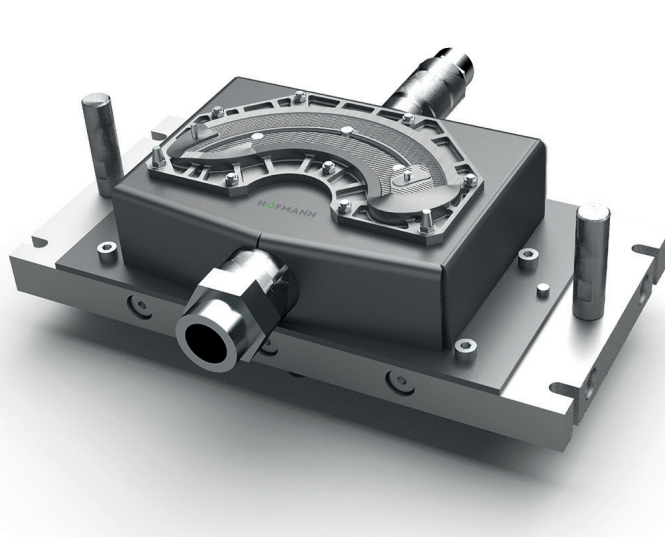
Product demonstrator “Frisbee” (left)

Surface details (right)

(Pictures:
GROB-WERKE GmbH & Co.KG /
Siegfried Hofmann GmbH)



3D representation of the fixed side



3D representation of the fixed side

Shaping the future together

VDWF invites industry to ISTMA Europe Meeting in Berlin

Experts from the automotive industry report on trends and developments

Transformation, networking, looking ahead – from 3 to 5 November, Berlin will be the meeting place for European tool and mold making, as representatives from industry, research and associations come together at the meeting of the European branch of the International Special Tooling and Machining Association, ISTMA.



Stephan Berz took over the presidency of the European arm of the World Toolmakers Association at the beginning of the year

Back in 2022, VDWF members tried out the Bundestag tour as part of the VDWF's "voll wild" tour

The aim is to provide fresh momentum, promote discussion, and develop new perspectives for the industry. Not only national trade associations are invited, companies from across the sector are explicitly welcome too – whether they're members of an association or not. The Association of German Tool and Mold Makers (VDWF), which is itself an active ISTMA member, will be organizing and hosting the event in the German capital.

Focus on transformation

The focus of the meeting is on the topic of transformation. "Requirements in tool and mold making are changing rapidly," says Stephan Berz, President of ISTMA Europe and brand ambassador for the VDWF. "Now, more than ever, it is essential that we network at the European level, develop joint strategies, and send a clear message that a tool is not a commodity; it's a high-tech means of production – one of a kind. If we come together



ISTMA World Conference 2023 in Cape Town

as an industry, see change as an opportunity, and communicate our value with confidence, we will not only be able to overcome difficult phases – we will emerge from them stronger than before."

The venue for the three-day event is the Fraunhofer Institute for Production Systems and Design Technology IPK in Berlin – a leading research institute for manufacturing and digitalization technologies. The Fraunhofer Institute combines scientific work with hands-on industrial application, and is an example of the interplay between research, innovation and practice.

The event will start on Monday with a site presentation by the individual European tool-making associations, followed by a guided tour of the Fraunhofer IPK. On Tuesday, the focus will be on specialist talks and dialogue formats that deal with specific transformation processes within the industry – including contributions from experts in the automotive industry. As part of the subsequent networking program, the participants will take a boat tour on the river Spree, including a





The ISTMA Europe Meeting 2023 was held in Milan
(Pictures: VDWF)

visit to the Reichstag building, before the day ends in an informal atmosphere with a group dinner. The theme for Wednesday is “Berlin Backstage”, offering insights behind the scenes of Germany’s capital – a special end to the ISTMA Europe Meeting 2025 and an opportunity to further deepen personal connections.

Momentum for the future of European tool and mold making

The ISTMA Europe Meeting 2025 is a platform for the entire European “toolmaker ecosystem” – beyond the boundaries between associations. It’s about know-how, perspectives and, most of all, personal dialogue. “I’ll be delighted to see every single participant,” says Stephan Berz. After all, as the ISTMA Europe President goes on to explain, talks on an equal footing between decision-makers, technicians and strategists who share responsibility are what drives the industry forward. Registration for the event is now open on the VDWF website: www.vdwf.de/aktuelles/detail/istma-europe-meeting-2025-berlin.html. Entry to the official ISTMA meeting is free of charge. Admission to the additional networking program, which starts on Tuesday afternoon during the event, will be available for a fee of 295 euros.

Additional information

ISTMA

The International Special Tooling and Machining Association (ISTMA) is the global association for toolmakers. Founded in 1973, the association represents national and regional associations as well as companies from these sectors. It serves as a global platform for the exchange of knowledge, technologies and best practices from the tool and mold-making industry. The main roles of ISTMA are to promote international cooperation, to represent the industry at a political and economic level, and to support its members by providing market analyses, innovation transfer, and training initiatives. In addition to this, ISTMA regularly organizes conferences, trade fairs and working groups on relevant industry topics. The operational work is supported by specialized committees and working groups. ISTMA is divided into three regions – Europe, America and Asia – each with its own regional organizations. The umbrella organization is headed by an international board of directors, which is made up of representatives of the member associations.



PICOMAX® 550/550 PRO

The compact solution for versatile 5-axis machining – economical, progressive, convincing.

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Hall 12 - Booth C40



Your Precision Advantage.

Smart automation for all manufacturing technologies

The new EROWA Robot Compact 150 is the logical addition to the EROWA automation portfolio and impresses with its wide range of functions. It is the perfect automation solution for flexible loading of up to two production machines of all processing technologies - from milling to eroding. Thanks to its innovative design, the loader offers an impressive magazine density with a small footprint. Thanks to its compact monobloc design, the robot can be integrated into the existing infrastructure and ready for operation within a short space of time.

Easy to operate

The pull-out magazine levels (optional) ensure convenient loading and unloading of the workpiece carriers directly into the magazine. Thanks to the EROWA EWIS™ chip identification system in combination with the presence sensor, the operator always has a quick overview of the loading of all magazine locations, which significantly increases process reliability and efficiency.

Ergonomic loading station for heavy workpieces

The optional loading station can be integrated to save space. It makes it possible to set up large and heavy palletized workpieces at an

ergonomic height while the robot is working. An indexing system enables convenient set-up (4x90° rotation) and locks the pallet automatically when it engages. It also ensures that the pallets do not end up twisted in the magazine.

Extendable magazine capacity and versatility

The magazine capacity of the Robot Compact 150 is flexible and can be expanded considerably. Options such as a third rack magazine or an additional rotary magazine offer solutions for every production environment. The device is capable of handling workpieces of different sizes and heights - from small EROWA ITS electrode holders to large MTS 400 pallets and part heights of up to 400 mm.

Technical details and flexibility

With a footprint of just 4.7 square meters and a transfer weight of up to 150 kg, the Robot Compact 150 offers an extra-long reach of the X-axis. Two independent X-axis drives enable fast magazine handling and a high magazine density with a long reach towards the processing machine. The space-saving gripper trays and the innovative Gripper+ technology (sensor system) ensure maximum flexibility and process reliability.

Overall control with JMS 4.0

The EROWA JMS 4.0 process control system enables comprehensive control and reporting of the entire production process. It offers intuitive user guidance and ensures transparency and efficiency in production.

EMO 2025: Visit EROWA in Hall 12 / Booth D20.

The EROWA Robot Compact 150 sets new standards in automation technology and is the ideal solution for companies that want to make their production more efficient and flexible (Picture: EROWA AG)



Deep hole drilling and milling in a single machine

UNISIG provides machines for the mold industry that combine deep hole drilling and milling in a single machine to reduce setup, improve speed and add flexibility in production of mold tools. UNISIG machines are engineered and manufactured in Menomonee Falls, Wisconsin.

All USC-M machines are available with 5-axis positioning and are equipped with absolute scale feedback for high accuracy. The Heidenhain CNC is closely connected to complex machining and deep hole drilling, with Kinematics integration and process controls developed by UNISIG.

The USC-2M model is a universal spindle machine with flat floor installation. Exceptionally quick changeover between gundrilling and milling processes, and options for 40 – 60 position tool changers, are features that highlight the versatility of this machine. It is rated for parts up to 20 tons and 2000 mm (79 in)

overall length, with an option for glass scales for improved accuracy.

There is currently a USC-2M machine under power that can be viewed in-person at our Menomonee Falls, WI showroom; about 30 minutes from the MKE airport.

In addition to new machines, UNISIG provides long-term service and support for our USC-M series machines. Available services include scheduled preventative maintenance programs, machine alignment and calibration, machine repair, and upgrades. UNISIG has spare parts inventory and factory technical support always available to its customers.

(Picture: UNISIG)



Magnetic workholding technology allows the workpiece to be clamped without risk of distortion



Combining expertise in tool, model and mould making

When three specialists come together and push the boundaries of their respective fields, they can achieve great results. A solution for tool and mould making was the culmination of one such project developed for an online seminar – and the result is testament to the group's expertise and successful partnership. The team comprised workholding equipment specialist SCHUNK, programming professionals from OPEN MIND and tool experts from Horn. New approaches were combined with tried-and-tested technologies: from zero-deformation magnetic workpiece clamping with mobile pole extensions through new HPC milling tools for fast processing and high machining volumes to efficient and cost-effective programming. The seminar was of interest not only for users in tool, model and mould making, but also to those in other areas of machining.

The component itself is not magnetised after clamping



“When Uwe Weil from SCHUNK called me and told me about the idea behind this project, I was immediately interested. I agreed to take part shortly afterwards”, recalls Horn product manager Andreas Jenter, whose speciality at Horn is milling with solid carbide tools. “Clemens Bangert from CAD/CAM manufacturer OPEN MIND also immediately agreed to take part in the project. The hyperMILL® expert developed and programmed the 3D model of the complex mould”, explains Uwe Weil, who is responsible for product and technology training at SCHUNK. Weil continues: “After four days of close collaboration, we had a

machining process in place. Some aspects might look different in practice, but we wanted to use different approaches to show how such a complex component could be machined in a cost-effective way”.

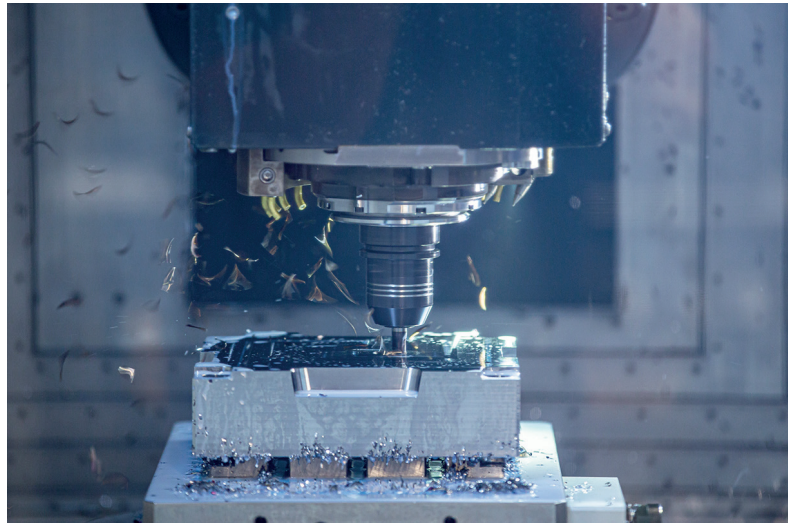
Magnetic workpiece clamp

Although magnets are perhaps most commonly associated with surface grinding machines, magnetic clamping technology is also used in milling. “People still have misconceptions about magnetic workholding in milling applications, but we wanted to use this example to show that magnetic technology is actually very well suited to production”, says Weil. The magnetic plate is attached to the SCHUNK zero-point clamping system on the machine table using an aluminium base plate and appropriately arranged zero-point clamping bolts. The magnetic clamp holding the workpiece is completely free from deformation. This is achieved by using a fixed pole extension to set the height of the workpiece in combination with pole extensions. They compensate for any unevenness in the surface of the component, which ensures that the part is not distorted by the clamps. Once the external dimensions have been face-milled, the workpiece is clamped in the fixed pole extensions. “The depth of penetration of the magnetic field in the component is around 10 mm (0.394”) at the highest level of magnetism. One of the misconceptions about magnetic clamping technology is that the workpieces themselves become magnetised once clamped. But this isn’t the case. The low penetration depth of the magnetic field means that chips don’t stick to the surface even when milling a deep mould”, explains Weil.

Jenter uses the Horn DAH84 high-feed milling system to face mill the periphery. “The insert has eight usable cutting edges, resulting in a low cost per edge and a high level of cost effectiveness. Despite the negative mounting position, the positive cutting geometry ensures a smooth and soft cut combined with good chip removal”, says Jenter. The large radius on the main cutting edge of the indexable insert results in a soft cut, ensures even distribution of the cutting forces and, in turn, extends the tool life. The tangential type 409 milling system was used to finish the surfaces.

Programming expertise

For roughing, Clemens Bangert made use of a function from the hyperMILL® MAXX Machining performance package. “To ensure

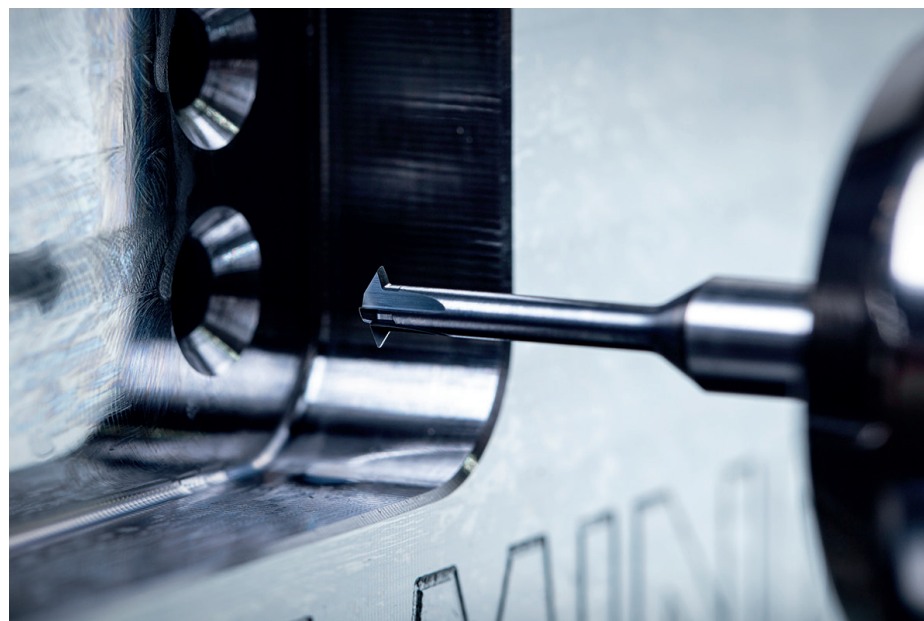


the machining process was dynamic and efficient, I used 3D-optimised roughing. Machining takes place in trochoidal tool paths and the milling cutter ramps into the part helically. It’s particularly important that we can program separate speeds for entry, the dwell after entry and cutting. This ensures that the process remains stable throughout”, explains Bangert. The programmed dwell provides the spindle with sufficient time to reach the correct speed so that the pre-milling of the mould in trochoidal movements can commence. As far as possible, helical movements are used for roughing the mould. “This ensures that the tool always cuts gently at a constant speed with no retraction, and that it never makes full cut contact”, says Bangert.

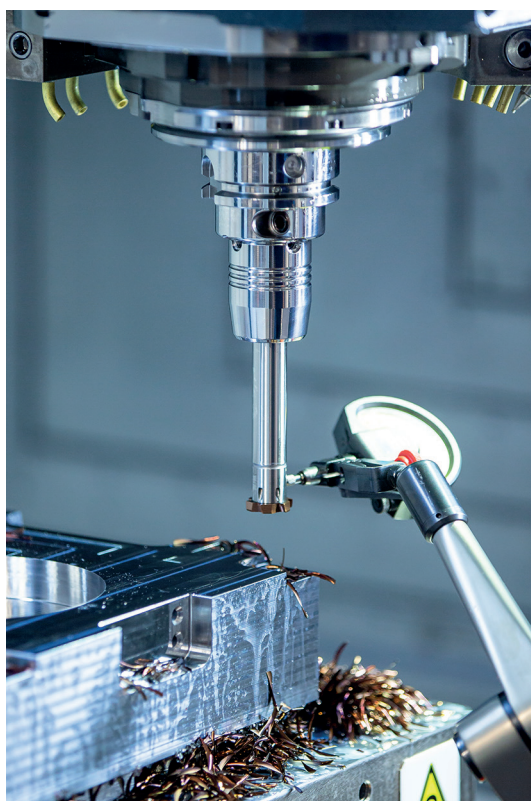
Jenter uses a Horn VHM end mill from the DS system for roughing the cavity. “We developed HPC milling cutters specifically for the purpose of milling high-strength steels with high material removal rates”, explains Jenter. The

Roughing the internal cavity using a HORN HPC milling cutter

High-precision thread machining with the HORN DC milling system

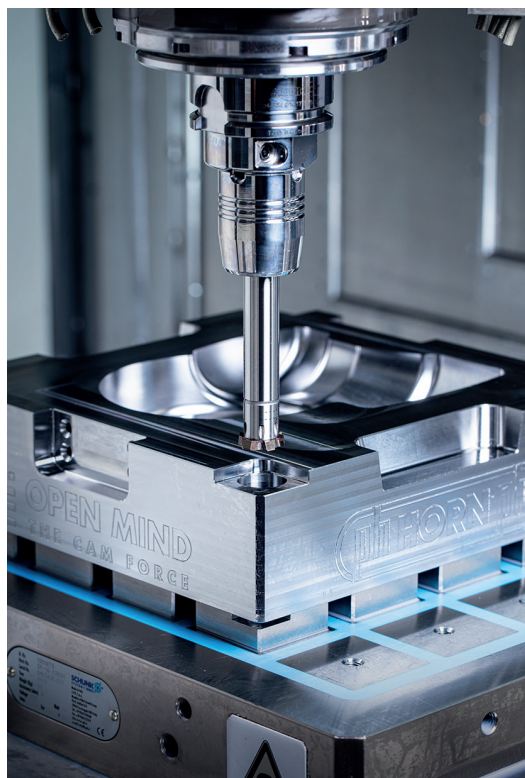


The Tendo Zero clamping system offers precise adjustment of concentricity



system particularly excels in dynamic roughing applications as well as in standard roughing cycles. The first roughing process uses an HPC milling cutter with a diameter of 12 mm (0.472") and four cutting edges. "Given the contour, we deliberately refrained from using a larger diameter to reduce rest machining", says Jenter. The cutter enters the workpiece in a helical movement at an angle of 5 degrees. The cutting depth is $a_p = 20$ mm (0.787"). The

The Horn DR reaming system is a high-performance solution



other cutting data are $v_c = 140$ m/min (5,511.81"/min) and $f_z = 0.08$ (0.003"), while radial depth of cut $a_e = 3$ mm (0.118"). The different helix angles create an irregular tooth pitch, making operation exceptionally smooth. The tools' optimised face geometry reduces the cutting pressure when circular or linear ramping. Improved chip spaces ensure optimal process reliability during chip formation and removal.

A high-feed milling

cutter with a diameter of 12 mm (0.472") is used to rough mill the free-form surfaces. The milling cutters have a double radius geometry, which favours the flow of forces in the axial direction of the spindle and reduces the radial force. "Thanks to this geometry, we can maintain high feed rates even with long tool overhangs, without causing any vibration in the tool", explains Jenter.

TENDO E compact hydraulic expansion chuck

The tools are clamped in SCHUNK hydraulic expansion chucks for roughing. Weil uses the TENDO E compact series for roughing; the short design is ideal for this process. "I am often asked how much torque I need to apply to tighten the chuck. With SCHUNK, this is an easy question to answer: All you have to do is turn the clamping screw as far as it will go and this gives you the optimum concentricity and best possible torque transfer to the tool", says Weil.

To accommodate the guide bolts of the tool, four holes need to be reamed in the corners of the workpiece. Schunk uses the TENDO Zero hydraulic expansion chuck to clamp the reaming tools. The four opposing Torx screws on the collar of the clamping chuck can be used to adjust the concentricity to a high level of precision. The user can check the reaming tool using a presetter and then make the final adjustments directly on the machine using a dial gauge. This approach allows the concentricity to be set with micron precision. "With a reaming tool length of over 100 mm (3.937"), we can achieve run-out below $2 \mu\text{m}$ (0.00008"). This is a great result", says Weil.

High-performance DR reaming system

The DR reaming system from HORN is used to ream the four holes. With an internal coolant supply, the cutting speed was $v_c = 110$ m/min (4,330.71"/min) with a feed rate of 0.84 mm/rev (0.033"/rev). The retraction feed rate was programmed at 4 m/min (157,48"/min). "With a long projection and a through bore, it is important that the tool doesn't protrude from the hole by more than 2 mm (0.079"). Otherwise, there is a risk of the tool oscillating", explains Jenter. The HORN reaming system features a modular design and can be combined with countless interfaces. The repeatability of insert position after changeover is just $4 \mu\text{m}$ (0.0002"). With standard inserts, the system is capable of reaming materials up to a hardness of 58 HRC.

“The four external threads were machined with three lateral infeeds to ensure an exact fit. I used the hyperMILL® ‘Thread milling’ function for machining. This function automatically calculates the value for the lateral feed based on the tool and thread, which means that it can support both single-edged or multi-edged tools”, says the hyperMILL® expert. The Horn DC thread milling cutter machined the threads with a cutting speed of $v_c = 80 \text{ m/min}$ (3,149.61"/min) and a feed per tooth of $f_z = 0.02 \text{ mm/min}$ (0.0008"/min). The tool was clamped in a SINO-R expansion chuck. The clamping system is based on PU elements rather than being hydraulic. This provides excellent vibration damping, which ensures that the entire system remains stable during thread milling.

High surface quality during finishing

“When finishing a mould with different ball nose end mills, there are three key factors that enable you to achieve the required surface quality: the precision of the tool, powerful CAM software for precise machining, and the accuracy of the workholding equipment. We produce the milling cutter radii with a maximum form deviation of $\pm 0.005 \text{ mm}$ (0.0002")”, explains Jenter. The importance of this precision becomes clear when different milling cutters are used for finish machining a mould. Bangert has programmed the mould to be machined with a 6 mm (0.236") and a 4 mm (0.157") ball nose end mill: “Before programming the free-form surfaces, we always check the requirements for the component first. These include the required surface quality, the form tolerances and the transitions during finishing”. The machine kinematics – the interplay between the workholding equipment, tools and machine control system – also play a key role.

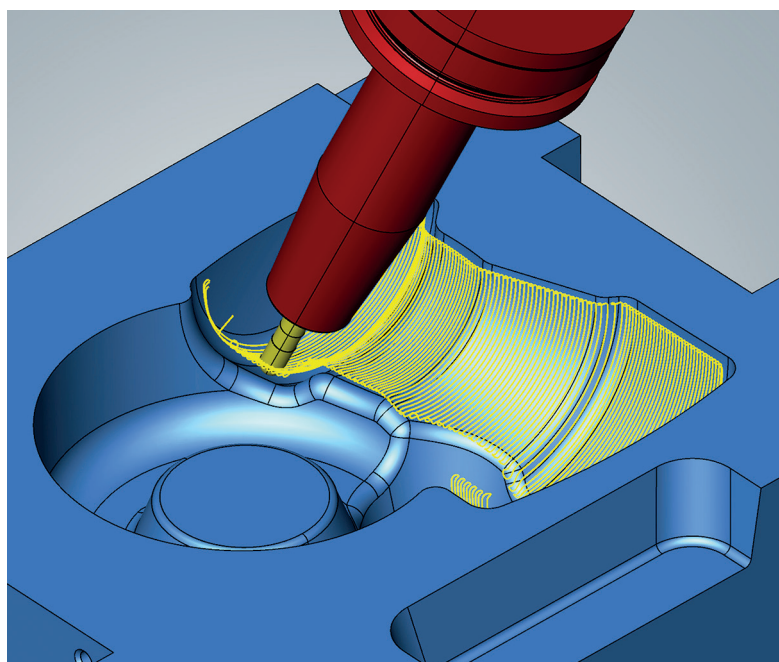
The standard version of the hyperMILL® CAM software includes countless strategies for high-precision machining. The “High-precision surface mode” option, for example, boosts the quality of the surface finish. This function was used when machining the mould. Bangert explains: “We calculate the tool paths based on the actual CAD component surfaces rather than a mathematical model. This means that we can achieve tolerances to within microns.



I also used the “Soft overlap” function to blend the transitions between different surfaces, even when these transitions had been machined with another tool or infeed. This is an efficient way to achieve a seamless surface finish”. Clemens Bangert also deployed the “5-axis radial machining” function: “This strategy allows us to achieve the best possible surface quality. With a radial projection method, tool paths – for bottle moulds, for example – can be calculated much faster. It also allows the user to respond flexibly to the actual component in front of them”.



The high-precision ball nose end mills from the HORN DS system guarantee high surface quality



hyperMILL® 5-axis radial machining:
high surface quality for workpieces such as
bottle moulds (Pictures: Horn/Sauermann)

Maximum efficiency for small companies: Formtechnik Värnamo relies on GROB

Formtechnik Värnamo is a Swedish company that specializes in the manufacture of high-pressure die casting tools and the associated components. In addition to in-house production, the company also offers contract manufacturing for large components. The requirements for precision and efficiency in production are high, which is why Formtechnik Värnamo turned to GROB a few years ago in search of a powerful and versatile machine.



GROB's G550 is the perfect choice for Formtechnik Värnamo (Pictures: GROB)

The first contact between Formtechnik Värnamo and GROB came about in 2022. The focus in Formtechnik Värnamo's production was on optimizing the machining processes. The parts were to be completed in a single operation wherever possible in order to reduce set-up times and machining steps. In addition, chip management was to be improved to enable efficient and unmanned production. After a

thorough analysis, Formtechnik Värnamo opted for GROB's G550 universal machining center after just three months, as it offered exactly the combination of high precision, flexibility and reliability that Formtechnik Värnamo was looking for. Six months after the successful commissioning, a second GROB machine, the G750, was purchased to meet the increased demand and to be able to produce larger tools. "With the machines, we have found a solution to produce our parts in a single operation. The training and service are excellent and we can leave the machines running unattended without any problems," says Dennis Martinsson, one of the owners of Formtechnik Värnamo, describing the decision.

Significant increase in efficiency thanks to GROB technology

By purchasing the GROB machines, Formtechnik Värnamo was able to optimize its production processes and achieve significant improvements. The machining time was reduced from 50 to 60 hours to two to three hours. "We have doubled our capacity and drastically reduced the machining time. It used to take us around 40 hours to drill holes, but now the same process only takes 20 minutes," emphasizes Elvir Sijaric, also owner of Formtechnik Värnamo. Thanks to this enormous time saving, the company has been able to significantly increase its production capacity and thus not only increase its capacity utilization, but also improve its competitiveness.



(from left to right): David Catoni (Owner Formtechnik Värnamo), Magnus Friedland (Johan Nordström), Dennis Martinsson (Owner Formtechnik Värnamo), Elvir Sijaric (Owner Formtechnik Värnamo), Steven Nieberle (Head of Sales Universal Machines International GROB-WERKE)

The machines: Maximum precision and reliability

The G550 and G750 offer a wide range of applications and are ideal for both series and small series production. They are characterized by high dynamics and stability as well as short chip-to-chip times. Another decisive advantage lies in the design of the machines: The horizontal spindle allows the chips to fall directly downwards, meaning that the machines can be operated without constant supervision. With the G750, Formtechnik Värnamo can now also produce larger tools and thus react flexibly to new customer requirements.

First-class customer service as a success factor

In addition to the high quality of the machines, Formtechnik Värnamo also appreciates GROB's first-class customer service. In particular, the fast response time when servicing is required is a major plus point. "We were able to resume production within just five days after a spindle crash. The training courses were also very good and helped us to make optimum use of the machines," recalls Dennis Martinsson. GROB not only supplied excellent machines, but also comprehensive and reliable customer service.

Another success factor in the implementation of the project was the close cooperation with GROB's sales agent. Johan Nordström provided Formtechnik Värnamo with significant support throughout the entire process. Thanks to the close cooperation between GROB and Johan Nordström, the integration of the machines at Formtechnik Värnamo was optimized so that the potential of the new technology could be fully exploited right from the start. "It's so nice to see how these small companies are growing with the new machines and technology. And it's really nice to see the performance of the machine. The customers are very, very well looked after – with our support, both from our company and from GROB," emphasizes Magnus Friedland from Johan Nordström.

GROB – the right partner for small and medium-sized companies

Although no further machine purchases are currently planned, Formtechnik Värnamo is certain that if another machine is needed, it will be another GROB. "We would recommend

GROB at any time. The machines are reliable, efficient and suitable for companies of all sizes. The close cooperation with GROB and our local partner Nordström has helped us to raise our production to a new level," emphasizes Elvir Sijaric.

The investment in the GROB G550 and G750 has paid off in full for Formtechnik Värnamo. The company has been able to significantly increase its efficiency and production capacity, while at the same time optimizing production quality. The success story shows that GROB is not only the right choice for large OEMs, but also offers small and medium-sized companies decisive advantages and the right products for them.

Formtechnik Värnamo is now able to manufacture even larger tools with the G750 from GROB

Capacity doubled, processing time halved: What used to take 40 hours now takes only 20 minutes thanks to the two GROB machines



Servoelectric cold runner molds for LSR injection molding are learning to think for themselves

The patent-pending SMARTshot I cold runner measurement and control concept incorporating servoelectrically actuated nozzle needles, currently under development by LSR mold specialist Elmet, is an intelligent variant of the SMARTshot E system. Once deployed in a practical setting, entirely automatic startup will be possible as will controlled family molds with cavities of differing volumes that do not require additional sensor systems. This will enable cascaded injection processes with time-delayed opening and closing movements as well as injection processes with partially open needles for simultaneously filling cavities with different volumetric flow rates per nozzle. Elmet presented an update of this new concept at LSR 2025 (16 to 19 June 2025 in Irvine, California).

Servoelectrically actuated nozzle needles are the ace up the sleeve of Elmet's SMARTshot E cold runner molds. AI is set to optimize needle control in the future (Picture: © Elmet, iStock-Black-Jack3D)

At its launch at Fakuma 2021, SMARTshot E was one of the first all-electric, servomotor-driven cold runner system for processing liquid silicone rubbers (LSR). The SMARTshot-I development concept is based on the same technology. However, additional rheology-based features will be able to further improve controllability of the injection molding process by using AI with self-learning functionality. It will be possible to set up or retrofit this upgrade on any existing SMARTshot E mold. In combination with compatible injection molding machines that have a suitable interface, it will then be available to any user. SMARTshot I will be the ideal add-on to the type E in future. Elmet's range of valve gate cold runner systems also includes the pneumatic SMARTshot P and the hybrid SMARTshot PE with pneumatic needle movement and electric stroke adjustment.

Getting there faster and more reliably with self-learning

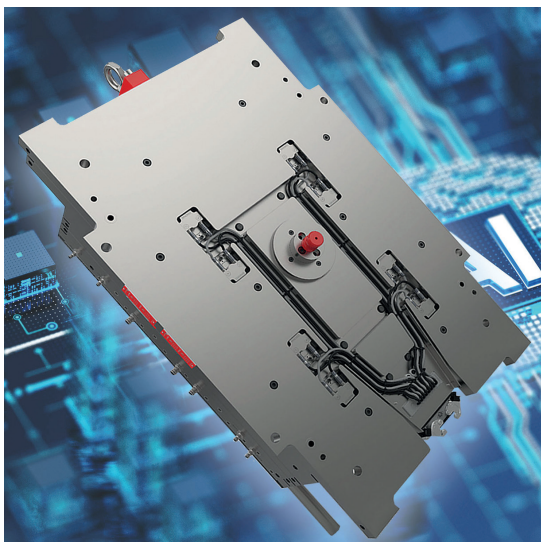
The pioneering "I" technology is based on online rheometry for continuously optimizing the process and determining the actual material viscosity in the shear rate range of relevance to injection

molding. This technology uses a mathematical relationship between the volumetric flow rate of the injection molding machine, the geometric constraints of the cold runner, and the shear force at the needle to identify and quantify batch-to-batch fluctuations. This turns the cold runner into rheological measuring instrument.

In learning mode, the system automatically detects the volume of material required to fill a cavity, so facilitating setup and optimization, especially with family molds with a number of cavities of differing sizes. Ready for integrating artificial intelligence (AI), the system is set in future to be able to support self-controlled injection molding machines if SMARTshot I control is integrated into the machine at a later date.

Micrometer-range precision

In type E and I systems, servoelectric drives perform the tasks carried out by the pneumatic pistons that were until recently used as standard. This is achieved using a highly responsive, brushless 24 V, 50 W DC motor that generates minimal waste heat and can withstand three times the rated load for short periods. As one of the smallest and most compact drives currently on the market, it allows particularly narrow nest spacings from 44 mm. The effective stroke is 4 mm, and the system achieves an accuracy of 0.09° per revolution, so reducing the error range to $\pm 0.05\%$ or ± 0.002 mm. Compared to pneumatic systems, this enables significantly faster and more precisely controllable needle



movement and positioning and minimizes shot-to-shot deviations. In addition, active needle control assists with uniform cavity filling, even if the cold runner is not perfectly balanced, and with cascading the injection phase by delaying needle opening or extending injection. One of the general advantages of the servoelectric drive is real-time control of needle position, including permanent position monitoring. The anti-twist feature of the needles means that the geometries of the needle tips can be adapted to the contour of the cavity, so minimizing marks at the injection point. Needle opening can be adjusted to an accuracy of 0.002 mm. Needle opening and closing times are of the order of hundredths of a second, and the needle movements at different injection points can be perfectly balanced.

Nearly ready for showtime

At its current stage of development, the control software used for SMARTshot I enables precise measurement of cold runner signals and individual and dynamic adaptation of needle stroke to each cavity's specific requirements. In tests with a 16-cavity mold,

the cold runner could be fully automatically balanced within 20 shots to such an extent the components produced only exhibited minimal weight fluctuations of 1.5%. In addition, a reduction in process startup times of around 90% compared to manual adjustment by an operator would seem to be realistic. The forthcoming increase in CPU capacity will enable further improvements in this respect.

As development manager Thorsten Häuser explains, "Our aim with SMARTshot I is to significantly automate setup of the LSR injection molding process and make it more user-friendly. We are also taking the first step toward introducing artificial intelligence, firstly into the mold and later into LSR processing as a whole. This will be a considerable benefit to users by saving personnel time and financial expenditure, not only on setup and startup of new production runs but also in terms of ongoing error prevention. In future, AI will also assist with further automating and boosting the efficiency of LSR injection molding processes and will ensure we're always pushing the envelope despite any potential stumbling blocks."

About Elmet

Molds. Dosing technology. Part production. For over a quarter of a century, Austria's ELMET Elastomere Produktions- und Dienstleistungs-GmbH has been developing high-end, customized systems and services for processing liquid silicone rubbers (LSR) for its customers around the globe. In addition to developing and producing dosing systems and single and multi-component molds, ELMET is a global player in the manufacture of high-quality silicone and multi-component moldings.

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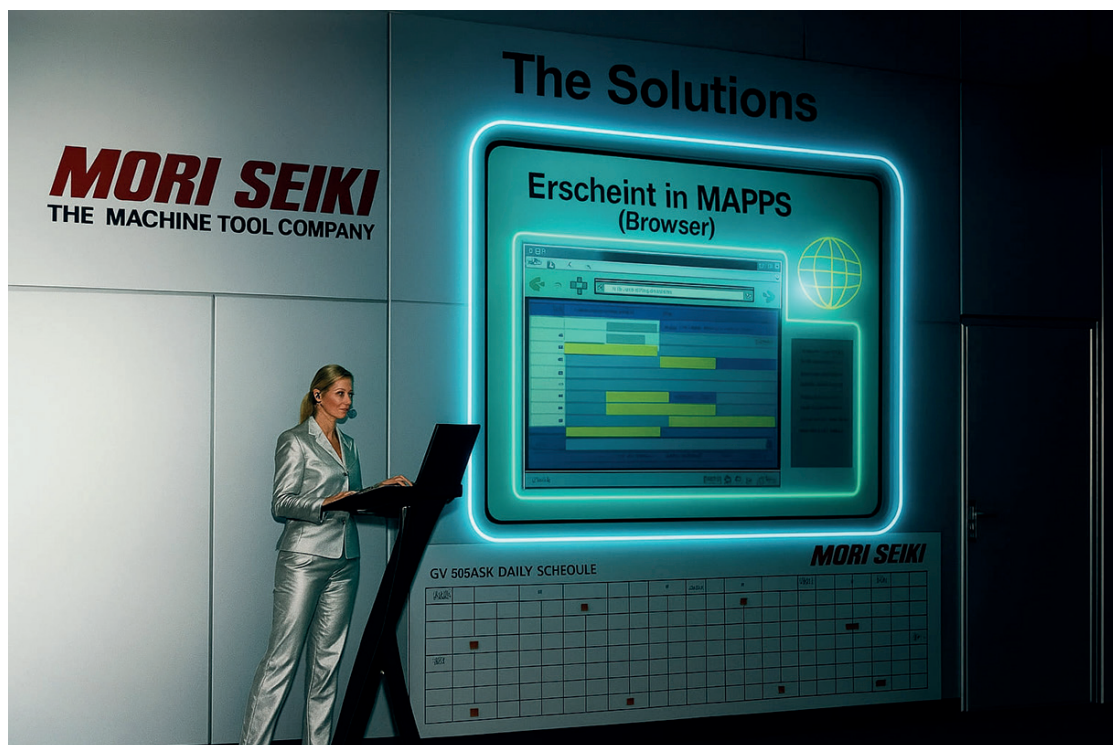
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Futuristically staged: At EMO 2001, Mori Seiki presented the CNC control system MAPPS with browserbased visualization and a modern user interface
 (Picture: Fecht Press Agency/ ChatGPT)



The success story of the world's leading trade fair – from “Bonjour électronique” to “Hello AI”

50 years of EMO: people, machines, milestones

In June 1975, almost all of Paris is dreaming of love – à l'électronique. As the new, electronically controlled RER highspeed train begins its journey, the Centre Pompidou with colorcoded pipes and electronic building technology is being built in the middle of the city. At the same time, the international machine tool industry celebrates the premiere of the “Exposition Mondiale de la Machine-Outil” – EMO for short – at the Parc des Expositions de la Porte de Versailles. The common denominator of the three events is that they herald the global dawn of a new era in which electronics are gradually taking over. A look back by technology journalist and contemporary witness Nikolaus Fecht.



Farewell, EWA – that's the word in Paris in 1975 and two years later in Hanover. EMO is the successor to the “European Machine Tool Exhibition”, which has been held alternately in Belgium, Italy, France and Germany since 1951. The continental industry show will become an international event, to which the European machine tool association Cecimo

Dry machining with HSC: High-speed machining entirely without cooling lubricant – what started out as an experiment at the beginning of the 21st century has become a symbol of resourcesaving manufacturing
 (Picture: Fecht Press Agency)

invites visitors alternately to Milan, Paris and Hanover.

Numerical control: cam disk and camshaft passé

For the first time, the European machine tool industry will be showcasing itself at a trade fair with international appeal throughout. One impulse from the USA in particular caused a stir in the mid-1970s: numerical control (NC). Cam disks, camshafts and mechanical copying devices have been replaced by programmable control systems that allow motion sequences to be flexibly defined via software for the first time. But this is just the beginning, oracles a German trade journal at the time: "The first machine tool world congress concludes with a discussion on the future development of machine tool control in conjunction with the use of computers." But it's not that far yet, punched tape still dominates the scene – the classic storage medium for numerically controlled machines.

I learned about the next step towards CNC – "Computerized Numerical Control" – as a working student in the mid-1970s in Thyssen's large training workshop in Kassel. However, the handling of this technology needs to be learned first: "Hands off, this is not for begin-

German EMO premiere: In 1977 – two years after Paris – the machine tool industry showcases itself for the first time on a global scale in Hanover (Pictures: Deutsche Messe)

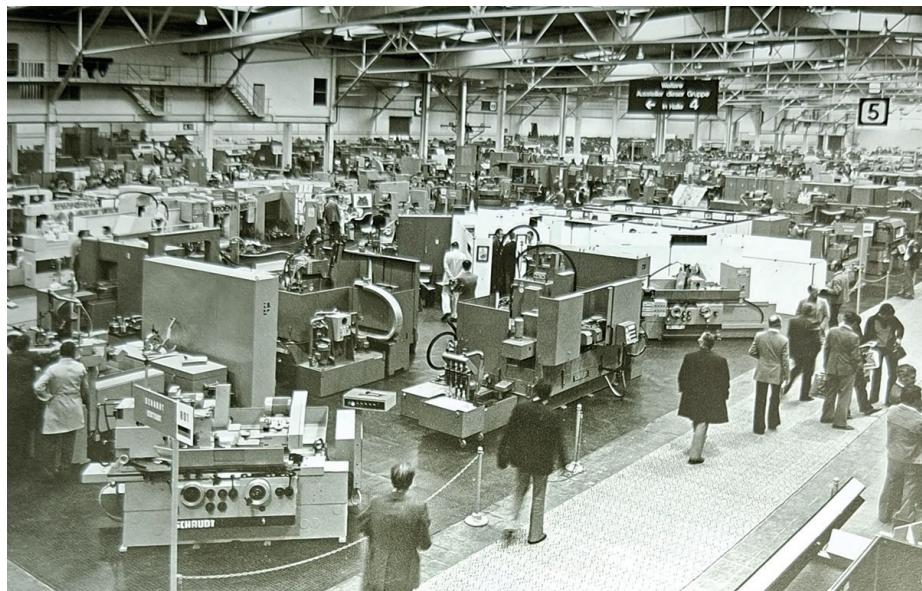


ners!" a master craftsman tells the budding electrical engineer as he curiously inspects his first CNC machine: A CNC machine tool over three meters high – equipped with an early Siemens control system. The student looks at a magnetic tape input system that glows amber.

Advance from Japan: Every fourth lathe has a CNC system

No wonder I'm fascinated by the newcomer – after all, CNC is still a technical exception in the mid-1970s. According to the National Bureau of Economic Research, Cambridge (USA), less than five percent of machines in the United States are CNC-controlled, and only around two percent in the Federal Republic of Germany. Only Japan is much further ahead: In 1975, one in four lathes exported already had a CNC system – and the trend is rising sharply. The production experts look with enthusiasm at computer solutions from the Far East or the USA, but for a long time they are skeptical: I am one of them. During my first visit to EMO in Milan in 1987, as a trade editor I get to

Gateway to innovation: Since EXPO 2000, trade visitors have been entering the Hanover Exhibition Center at Entrance North 1 through the striking wooden roof. The wide-span glued wood construction is symbolic of what will be presented at EMO: technical precision, innovative design and sustainable approaches to production technology (Picture: Fecht Press Agency)





Industry 4.0 under its own control: Maschinenfabrik Heller has been implementing the EMO 2017 motto “Connecting systems for intelligent production” with its own networked production lines for years (Picture: Heller)

know hightech from the Far East: Mitsubishi presents a CNC system that supposedly works five times faster than conventional 16-bit systems and even optimizes machining automatically thanks to artificial intelligence. For me as an engineer journalist, a new era is beginning, which I refer to in the trade press as “CIMsalabim” – a tongue-in-cheek allusion to “Computer Integrated Manufacturing” (CIM), where robots, machine tools, assembly lines, measuring stations and computers merge to form a computerintegrated factory.

The digital trend will soon be followed by green issues – initially ridiculed, then promoted and finally demanded. Highspeed machining (HSC) played a key role. The process enables extremely fast machining with high surface quality – and with very little or no cooling lubricants. At EMO Hanover 2001, Getrag Ford Transmission GmbH demonstrates how HSC and minimum quantity lubrication can be combined to conserve resources. During an onsite report for the EMO press service, I learn: “One glass of Kölsch beer is enough to process 90 gearbox housings” – previously it was 220 liters of emulsion. The VDW also recognizes the potential early on. HSC became a promoted key technology, flanked by eco projects and the Blue Competence initiative. At EMO 2011 at the latest, it becomes clear that energy efficiency is no longer a sideshow.

Industry 4.0: from label to evolution

A few years later, a new guiding principle provides further impetus: Industry 4.0 stands for the idea of networking production systems using powerful computers, sensors and inter-

faces in such a way that they can be controlled and analyzed in real time – ideally even by cell phone. “A smartphone for production”, a developer says in a tongue-in-cheek manner at EMO Hanover in 2017.

However, the first step is to link systems intelligently with one another. Under the guiding theme of “Connecting systems for intelligent production”, EMO is sending out a clear signal for digital networking in production technology. In 2019, umati (universal machine technology interface) – the global initiative for open communication interfaces for the mechanical engineering industry and its customers based on OPC UA information models, initiated by the VDW – celebrates its premiere in Hanover. Since then, umati has continued to develop: Today, under the umbrella of VDW and VDMA, the international community guarantees standardized information models for numerous applications, offers a platform for exchanging experiences, creates visibility on the market and enables the practical demonstration of added value. Open interfaces now exist not only for machine tools, but also for components, software solutions and many other manufacturing technologies – a decisive contribution to the smooth cooperation of a wide variety of systems in networked manufacturing.

The year 2020 becomes a test: Within a short space of time, virtual communication becomes established – a replacement for coronavirus-related contact restrictions. Companies are switching to remote maintenance, digital customer formats and flexible logistics. Further adjustments follow in 2022 with the loss of Russian gas supplies – from energy efficiency

to the realignment of global supply chains. Industry 4.0 is becoming a living practice. Virtual services such as remote maintenance, remote diagnostics and online training are replacing onsite deployment in many places. Digital tools support customer contact, while cloud-based platforms enable training and support regardless of time and place.

Efficient communication despite coronavirus contact restrictions

Contactless communication works efficiently, I observe while researching for a text: “Digitalization shows its strength above all in combination with online communication. We are talking about troubleshooting, teleservice and remote diagnostics, the flexibility of which many companies have come to appreciate in times of crisis.” The pandemic is therefore becoming a catalyst for digitalization – in service and in interaction. This experience still shapes our service structures today. Some people wonder whether physical trade fairs are still necessary at all – after all, virtual communication works surprisingly well these days.

Virtual communication is here to stay – but the next technological leap is already in the pipeline. Shortly after the digitalization push caused by the pandemic, an old acquaintance is back in the spotlight: artificial intelligence. While Asia and America are already investing, Professor Jörg Krüger from the Fraunhofer Institute for Production Systems and Design Technology IPK, Berlin, warns: “Without AI, soon a knockout (KO)” – and advises linking the domain knowledge of workers with neural networks. Data is the “digital gold dust” of production, from which new business models can emerge. This claim will become tangible at EMO 2023: Trumpf presents an AI assistance system for the automatic sorting of sheet metal parts, J.G. Weissner shows predictive maintenance based on learning algorithms. Mapal, Ceratizit and the Fraunhofer IPT also demonstrate how AI optimizes manufacturing processes, reduces testing times and makes machines more intelligent. AI is on its way from buzzword to standard – visible at more and more stands at EMO.

And yet EMO 2023 in particular showed that networking does not replace personal exchange, but enriches it. Under the claim “Innovate Manufacturing.”, the VDW attracted over 90,000 experts from all over the world to Hanover – around half of them from abroad. The trade fair impressively demonstrated that digitalization promotes dialog. In Hanover, I

have come full circle, having stood at my first CNC machine 50 years ago as a curious student worker – and now reviewing half a century of EMO experience as a technology reporter. My exciting question: What happens next? My research shows that EMO 2025 will once again focus on digitalization, automation and sustainability – complemented by new AI applications. Together with Siemens, DMG MORI is showcasing an end-to-end digital twin. Sandvik Coromant launches smart tool holders with realtime monitoring. Supfina presents a new machine concept for surface finishing, and VibroCut introduces ultrasonic support for machining. At the same time, MAPAL reminds us that classic tool solutions still have their place. VDW Chairman Franz-Xaver Bernhard puts it in a nutshell: “The future of production is created where innovation meets experience – and that is precisely the strength of EMO.”

Author: Nikolaus Fecht, Gelsenkirchen

Pandemic as a teacher: Corona taught trade fair organizer VDW new ways of communicating during the Corona years – here at the first online press conference (Picture: VDW)



Automation: The best solutions are simple to use, and evolve to suit the task

EMO Hannover 2025 demonstrates ways to achieve greater efficiency in production



The search for suitable automation solutions is currently at the top of the list for many companies. How can we get faster and become more flexible? What solutions are available to help us (better) fulfill our quality assurance and documentation obligations? Are there technical solutions to compensate for the loss of long-serving employees and their experience? – At EMO Hannover 2025, organizer VDW (German Machine Tool Builders' Association) expects a broad range of automation solutions, from simple handling systems to autonomous factories with self-driving systems.

“Against the background of higher costs and a shortage of skilled workers, automation is vitally important for the industry,” emphasizes VDW Executive Director Dr. Markus Heering. To benefit from the desired competitive advantages, the user and solution must be a perfect match. Not every company has the same automation requirements, and solutions must be consistent to be truly effective. According to Heering, an important basic requirement is that the systems are easy to operate, scalable and flexible enough to adapt to individual requirements. In addition, it must be possible to integrate the solutions

for both large series runs and the economical production of individual items.

Automation relieves the burden on employees

Simple automation solutions include pallet changers and handling systems. A growing trend is the integration of ancillary processes such as cleaning, labeling or measuring, explains VDW. Many machine manufacturers are upgrading their machines with automation solutions, and supporting operators with intuitive user interfaces and assistance systems. EMO is likely to focus on systems that use AI

EMO exhibitors show their automation solutions at the EMO



(artificial intelligence) to provide employees with optimal support, whether by answering questions, providing instructions, or offering solutions to problems. This is expected to be particularly useful in future to support new or less experienced employees.

Another major topic for automation at EMO will be the use of robots. According to the IFR (International Federation of Robotics), around 4.3 million industrial robots are currently in use worldwide. Last year alone, their number rose by 10 percent. The IFR also expects double-digit growth rates in the coming years. In terms of robot density (number of robots per 10,000 employees), South Korea (1,012) and Singapore (730) were the frontrunners in 2024, ahead of Germany (415) in third place. For Dr. Dietmar Ley, Chairman of the VDMA Robotics + Automation Association, one thing is certain: "Robotics and automation are key technologies for the future growth of national economies, as they increase productivity, drive innovation, and open up new opportunities."

Cobots as straightforward productivity drivers

Many small and medium-sized companies, and those with rather small production runs, are asking themselves whether it actually makes sense for them to use industrial robots. In this scenario, cobots (collaborative robots) could be an interesting option. Thanks to their ease of use and rapid deployment, they are suitable for companies of all sizes. They also offer the benefit of being a straightforward introduction to automation, and can be connected using the plug-and-play principle. This makes them particularly well-suited to pick-and-place tasks or loading and unloading of machines. Cobots can also take on internal transportation tasks. They work well in harmony with AMR (autonomous mobile robots) and can help to increase efficiency in production not only by loading machines but also handling materials. At EMO, numerous exhibitors will be offering automation solutions with robots, including Kuka, Robojob, Wick, Apex, Fanuc and many more.

Human-machine interaction benefits from AI

Artificial intelligence is also increasingly



being integrated into cobots. The robot not only learns to recognize and grasp various objects, such as unsorted components, it can also respond to commands and complete quality assurance tasks. Experts believe cobots have very promising future prospects to offer, especially as they are flexible and mobile, and are constantly opening up new fields of application. The machine tool industry is becoming increasingly aware of how well industrial robots and cobots can complement each other. In this scenario, the cobot handles flexible automation and assistance, while the industrial robot ensures high levels of efficiency in large series, according to the experts.

Collaborations between humans and machines are likely to play a major role in the future of automation. The key to its success is that people do not need any programming skills to work with robots. In what is quite a charming interaction, operators can communicate with their "colleague" simply through language, facial expressions and gestures, to give instructions or have questions answered.

You can find out what EMO exhibitors have to offer in terms of technological solutions for automation in the run-up to the trade fair on the Made for Automation landing page at <https://emo-hannover.com/automation>. Here, exhibiting companies will be gradually adding information until the end of EMO in September on what systems and methods you can use to increase the efficiency of your production.

(Pictures: VDW)

Author:
Cornelia Gewiehs

The future of automobiles begins in production

Author:
Cornelia Gewiehs



How can process data from automobile production be recorded and used to increase energy and resource efficiency in production? What influence does the component quality of gearing elements such as drive shafts and axle drives have on noise generation in electric cars? Which grinding tools can be used to machine new materials and steels that are difficult to machine?

For 50 years now, the search for the most efficient machines, tools and systems has attracted trade visitors and experts from vehicle manufacturing and supplier companies to EMO Hannover, the world's leading trade fair for production technology. The transformation of the automotive industry – the second largest customer for machine tools – is changing the focus of the EMO. Topics such as automation, digitalization and artificial intelligence mark the development. New drive concepts are raising questions as to whether the focus should be on the production of mechanical components for electric cars or compressor and motor shafts for fuel cells. Industry solutions for the circular economy or battery recycling are moving into focus because the regulatory framework is changing drastically. And the challenge above all else is to be as efficient and flexible as possible in order to be able to respond quickly to customer requests.

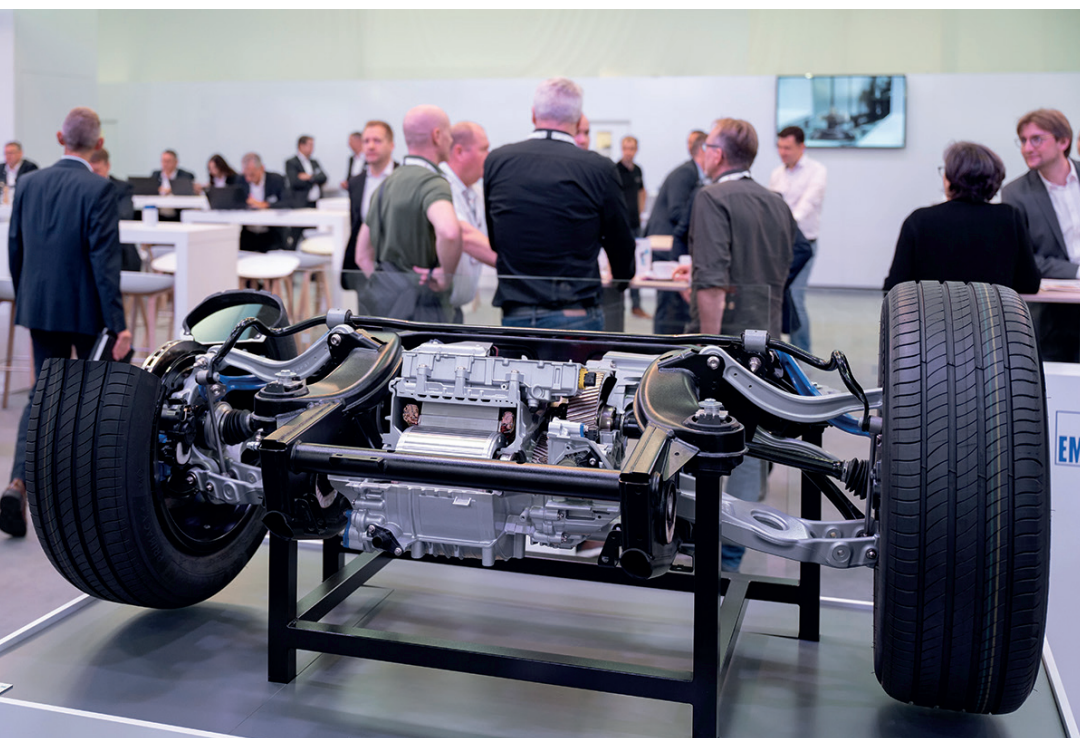
Efficient automobile factories for greater competitiveness

"Modern machine tools and innovative production systems are essential for building efficient, flexible and resilient factories," stresses Dr. Markus Heering, Managing Director of EMO organizer VDW (Verein Deutscher Werkzeugmaschinenfabriken – German Machine Tool Builders' Association). The trade fair concept is currently being presented on an international stage at the EMO World Tour. Under the motto "Innovate Manufacturing", EMO stands for innovation, internationality, inspiration and the future of metalworking. At the same time, Heering underlines the trade fair's expertise in industry solutions: "The machine tool industry is always in close contact with vehicle manufacturing companies," he says.

In fierce international competition, especially with Chinese car manufacturers, the focus is on design, features, quality and costs. In

order to assert themselves here, the modernization of factories is a pressing concern for both OEMs and medium-sized supplier companies. The modern factory features end-to-end process automation, precisely coordinated interfaces and integrated digitalization solutions. Machine tool manufacturers have come up with a solution and are equipping machines with extensive sensor and monitoring systems ex works. They provide the basis for data collection and analysis. The aim is to make it easier for customers to get started with datadriven production technologies in which processes can be visualized and optimized.

Digitalization is not an end in itself, emphasized Dr. Milan Nedeljković,



Member of the Board of Management responsible for production at BMW AG, in a recent interview. Rather, it is an important enabler. The trend is towards integrated machine systems that can be used to manufacture comparatively small quantities in the powertrain area of electric cars just as economically, efficiently and reliably as mass products.

The wide range of equipment variants and design features with which vehicle manufacturers want to incentivize buyers also require flexible production solutions.

Automation in a modular system

EMO Hannover 2025 picks up on such trends, for example with a wide range of automation solutions that can be implemented successfully and also in conjunction with existing machines. Automation extends from simple solutions such as pallet changers and handling systems through to the use of robots and autonomous factories with self-driving systems. Secondary processes such as cleaning, labeling and measuring can be integrated. At the Cobot Area joint stand, for example, the focus will be on collaborative robots and their potential applications.

In order to support and relieve machine operators, assistance systems will be presented in which artificial intelligence can also be used. AI solutions can also be used for predictive maintenance and adaptive process management. The AI + Digitalization Area joint stand offers visitors from the automotive industry the opportunity to find out more about best practice examples.

Sustainability along the supply chain

The automotive industry is intensively discussing how energy and material consumption can be reduced in production. This was also demonstrated recently at the VDA (German Association of the Automotive Industry) Mobility Innovation Summit in Berlin. According to the EMO organizer VDW, investments in new machines already pay off, with energy savings of 25 percent. However, other levers can also be identified to make production



Many EMO exhibitors offer a tailor-made program for the automotive and automotive supplier industry (Pictures: EMO2023/VDW)

processes more efficient and reduce carbon emissions. The Sustainability Area at EMO 2025 is a meeting place to discover modern solutions for sustainable production. Material efficiency plays a major role. With new simulation methods in component development and innovative production processes, for example, components can be designed to be even more resilient and durable.

The recyclability of vehicles must be ensured by taking recycling into account when developing new vehicle components. According to the VDA, around 85 percent of a vehicle is currently recyclable. Around a third of a new vehicle is made of secondary material. In order to further increase these quotas, a functioning circular economy must be set up in which all stakeholders work closely together and share their data. This involves production and material supply chains for several thousand components and parts that are installed in every vehicle. With regard to electromobility in particular, it is important to reuse batteries and recover lithium, nickel and cobalt for new batteries. These examples demonstrate the importance of close cooperation between development, production and vehicle construction. EMO Hannover 2025 is the best platform for cross-technology and cross-company discussions.

You can find out what EMO exhibitors have to offer their customers from the automotive and supplier industry in particular on the landing page in the runup to the trade fair <https://visitors.emo-hannover.de/en/landingpage/automotive/index>. Here, EMO exhibitors will report successively on what visitors from the automotive sector can expect at their stand until the end of the EMO from September 22 to 26, 2025.



150 years of innovation: RUD celebrates its anniversary

In 2025, RUD Ketten Rieger & Dietz GmbH u. Co. KG is looking back on 150 years of company history. What began in 1875 as a small forge for chains and wire components in the Unterkochen district of the Swabian city of Aalen has developed over one and a half centuries to become an internationally leading provider of chain and drive systems as well as fixtures and fittings. With its capacity for innovation, its quality awareness and a strong set of values, RUD has helped to shape industrial change for generations – and is a reliable partner for forward-looking solutions in a wide variety of sectors to this day.



With its headquarters still in the Unterkochen district of Aalen, the family-run company now has a presence in more than 120 countries and stands for top quality, innovation and sustainable management. To this day, the product range is centred around the round steel chain – made in a wide range of versions and refined to create hoist, conveyor, lifting and anti-skid chains. Lifting points, drives and conveyor elements, as well as complete

system solutions and innovative solutions for mechanical engineering, logistics, defence technology and many other sectors, complete the portfolio. RUD products are used around the world in a variety of areas of application – from industry and mining to agriculture: wherever the highest requirements are placed on safety, precision and reliability.

A key factor in our success is our consistent investment in research and development. RUD holds various patents and has already received a number of awards for its innovation performance. At the same time, the company remains true to its roots: as a fifth-generation family-run business, RUD attaches great value to long-term partnerships, social responsibility and the encouragement of its employees. Particular attention is paid to social commitment: through the Otto Rieger Foundation and the Trude Eipperle Rieger Foundation, which were established to mark the company's 100th anniversary, RUD has supported social, cultural and education-related projects in the region for many years.

The company

RUD Ketten Rieger & Dietz GmbH u. Co. KG, founded in 1875 by Carl Rieger and Friedrich Dietz in the Swabian city of Aalen, achieves an annual turnover of over 250 million euros with more than 1700 employees in more than 120 countries. At locations in Germany, Australia, Brazil, China, India, Romania and the USA, among others, the family business manufactures lifting and lashing technology, anti-skid chains, hoist chains and conveyor systems. With the Erlau brand, the Aalen-based company also manufactures tyre protection chains and interior and exterior fixtures and fittings.



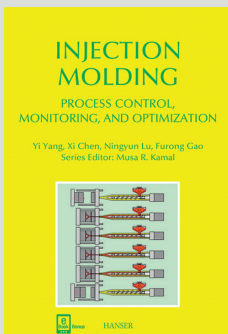
This commitment is also reflected in the long-standing partnership with 1. FC Heidenheim. As a sponsor, RUD supports the Bundesliga football team not only financially, but also in a non-material way – with shared values such as team spirit, reliability and an attachment to the region.

With a clear focus on digitalisation, sustainability and an international direction for the company, RUD is looking towards the future

with optimism. Even after 150 years, the company is the partner of choice for intelligent chain systems and innovative solutions. “150 years of RUD – that is 150 years full of passion, inventiveness and cohesion. We would like to thank everyone who has accompanied us on this journey and are looking forward to everything that is yet to come,” says Dr Jörg S. Rieger, a member of the management team.

Friedensinsel,
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(Pictures: RUD)

TECHNICAL BOOK



Yi Yang, Xi Chen, Ningyun Lu,
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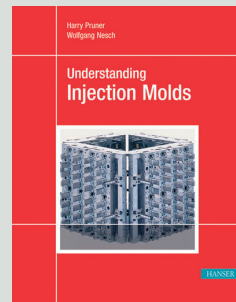
Improvement of injection molding processes remains a topic of great interest in both industry and research institutions. This book introduces the analysis of the molding process from a systems technology point of view.

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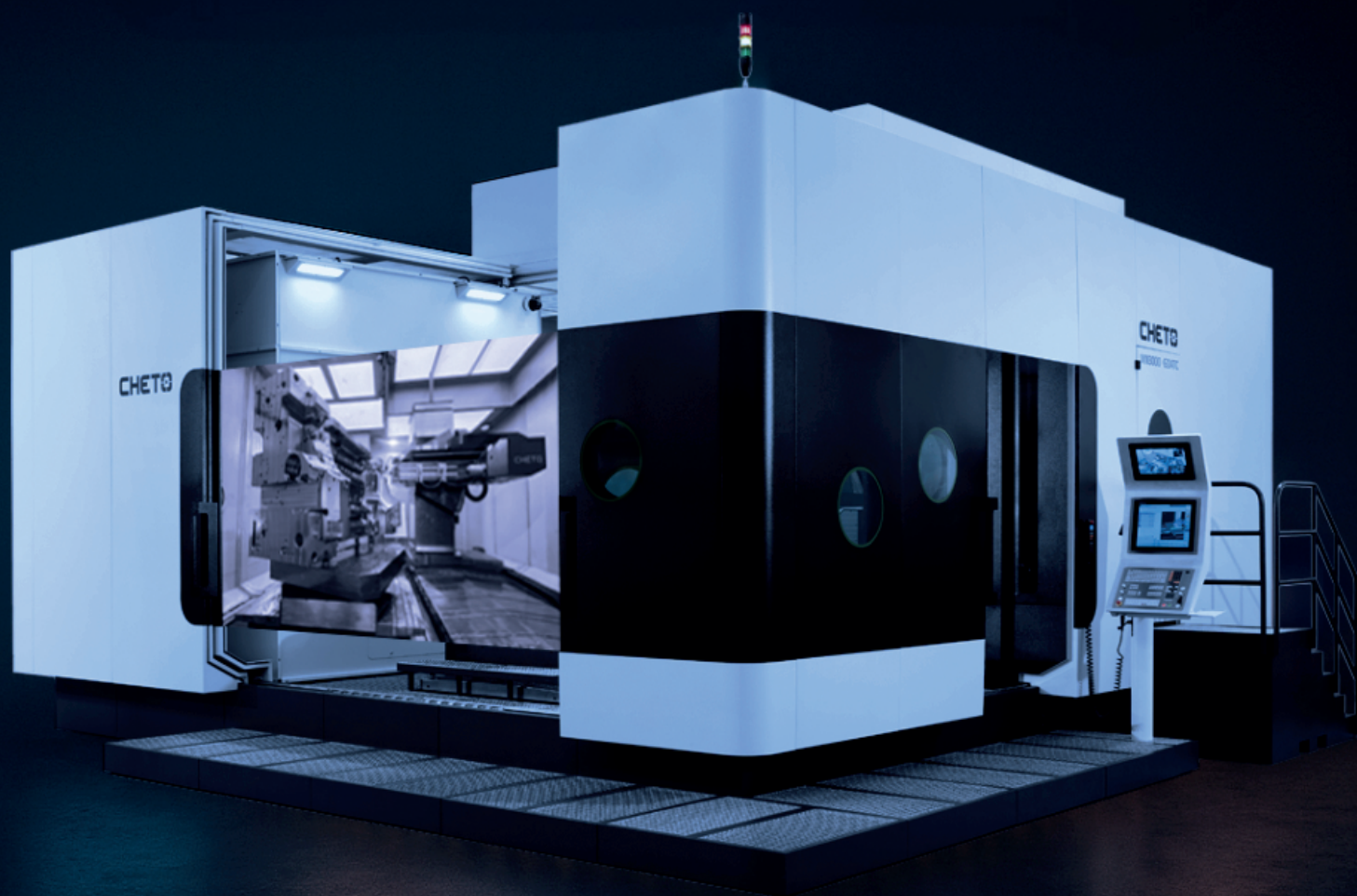
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