

# today

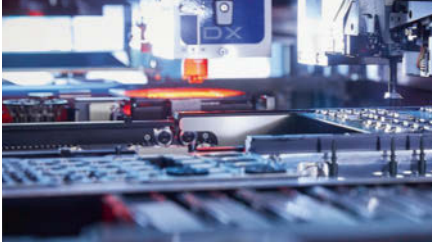
The ARBURG Magazine

Issue 78

2022







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today, The ARBURG Magazine, Issue 78/2022

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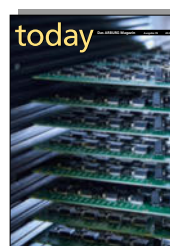
**Responsible:** Dr Christoph Schumacher

**Editorial advisory board:** Benjamin Franz, Christian Homp, Martin Hoyer, Rainer Kassner, Lukas Pawelczyk, Jürgen Peters, Birgit Roscher, Bernd Schmid, Bertram Stern, Wolfgang Umbrecht, Dr Thomas Walther, Manuel Wöhrle, Andreas Ziefle

**Editorial team:** Uwe Becker (text), Andreas Bieber (photos), Dr Bettina Keck (text), Lisa Litterst (layout), Markus Mertmann (photos), Susanne Palm (text), Oliver Schäfer (text), Peter Zipfel (layout)

**Editorial address:** ARBURG GmbH + Co KG, Postfach 1109, 72286 Lossburg, Germany

**Contact:** +49 (0) 7446 33-3149, today\_kundenmagazin@arburg.com, www.arburg.com



An impressive example of ARBURG's in-house controller production: the PCBs were assembled, optically inspected, and magazined in a fully automated process on the SMD line. They are then ready for subsequent work processes.

**ARBURG**



## Dear Readers,

The first issue of the year is always a nice opportunity to look back on the past year and offer a preview of the current one. The first of these is not a problem and can be answered quickly: we were very satisfied with 2021. Even though issues like coronavirus and supply bottlenecks did not make life easy for all of us and will remain with us for some time. In 2021, we managed these challenges well and are confident that we will be able to do the same again this year. Our central production facility in Lossburg plays an important role in this, and we take a closer look at its philosophy in the cover story of this issue of "today".

On the other hand, it's not exactly easy to offer a reliable preview of this year's program. Too often in recent months, we have been looking forward to events such as in-person trade fairs which have then had to be cancelled or postponed due to coronavirus.

So we're keeping our fingers crossed that all trade fairs and events can take place as planned in 2022 – and of course this applies especially to the world's leading trade fair, K 2022, in Düsseldorf in October!

But one thing is clear: regardless of events, we will continue to develop our product portfolio and realise innovative applications and systems together with customers and partners. As always, we present some special examples in our magazine. Find out first-hand how our customers are gearing up for the future: with our digitalisation tools, with an efficient turnkey system, with the fibre direct compounding process, and with the freeformer. You can look forward to exciting features, product reports, and interviews.

We hope you enjoy reading this issue of "today".

Renate Keinath  
Managing Partner



# Those who can, do!

## In-house production: A very modern philosophy.

**A**RBURG has always relied heavily on in-house production to enable it to act more independently. This strategic component is deeply rooted in the company's DNA, so to speak. Current examples of this include the complete drive train for its electrical machines and the latest GESTICA controller generation.

In times of supply chain uncertainty, this strategy has even greater appeal. This is why Guido Frohnhaus, Managing Director Technology & Engineering at ARBURG, says: "A high level of in-house production is a totally modern system!"

Thanks to the incorporation of servo motor manufacturer AMKmotion into the ARBURG family, the production of the entire drive train, including the inverter, motor, and planetary roller screw drive, has now been an internal matter since 2021. All ALLROUNDER control systems, including the latest GESTICA controller generation,

have always been developed at the company's headquarters in Lossburg. This allows ARBURG to not only take a holistic view of these overall systems, but also to continue their development holistically too. There are very few companies in the injection moulding sector that can do the same – and none of them are in Europe.

### Security of supply

From its customers' point of view, ARBURG can consequently offer a high degree of supply security regarding delivery processes and machine manufacture, and also in terms of spare parts supply and long-term availability. This is a very special kind of sustainability, so to speak. What's more, the company is much more flexible when it comes to adapting machines for each customer. And then there are the very short supply chains. ARBURG buys up to 80 per cent of its primary materials in Germany and, thanks to its in-house pro-

Key elements of in-house production: the planetary roller screw drive for the drives (above) and the SMD assemblies for the control system, which are produced on the new production line (right). This consists of 20 individual modules or systems.

duction, can avoid unpleasant or troublesome competition with suppliers. Good examples of this: control software and hardware as well as inverters.

If the "market observation – development – purchasing" process is in your own hands, a proactive way of working becomes possible. Shortages can be anticipated at an early stage and alternative suppliers sought.

What about development projects? These can be considered and implemented differently with a high proportion of in-house production because changes to the design and configuration of the









products are easier and quicker. Here, more in-house production also brings more flexibility and, with it, innovative strength and development speed.

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### Benefits in terms of efficiency

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The field of electrical machines is where ARBURG is able to take full advantage of these efficiency benefits. Having complete control of the drive train in this type of drive means it is also possible to view and further develop the system from an integrated perspective, for example in terms of coordinating the technology with important parameters such as efficiency, dynamics, and energy requirement.

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### Unique controller

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The GESTICA controller, which was developed in-house, fits in perfectly with this philosophy. As a stand-alone solution, it offers incredible ease of use. Its closed operating system with no need for security updates and separate host computers for operation and process control mean that it also has a high level of IT security. In addition, individual updates can be carried out

by the company as well as at the customer's request: another highly flexible feature. A good example of this are the modular, customisable assistance packages.

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### Sustainable through in-house production

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Finally, when it comes to sustainability, longevity, consistency, and trust are factors of high importance. ARBURG achieves a high level of supply security through in-house production and can respond better and more individually to long-term requirements such as those for many electronic components. The purchase of AMKmotion was therefore a logical step, as it enabled us to further expand the security of supply for our customers.

ARBURG is by no means on the sidelines as a result of its independent solutions. In addition to the universal OPC UA interfaces as an industry standard, the cross-machine communication with other peripheral equipment and the integration of these components into the overall GESTICA process also work well.

In the past two years in particular, the benefits of a high proportion of in-house

Quality assurance in a class of its own: ARBURG can test the electromagnetic compatibility of its products in its own EMC laboratory. The spectrum ranges from components such as the GESTICA control system to entire machines.

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production at a central location have been clearly and consistently demonstrated. The concept of independence in terms of development and production has huge strategic benefits – entirely in the interests of ARBURG customers.

# Wishes do come true!

## Host computer system: More performance, interfaces, and functions



More transparency, less paper: with the mobile ALS functions, all important information is available anytime and anywhere.

In addition to many detailed improvements, such as more information in the mouse-over for the planning chart and new display options in the info terminal, it is important that the personal user data of former employees can be anonymised in a way that is compliant with the GDPR. All of these suggestions have already been implemented by the ALS experts.

**M**ore and more plastics processors are turning to digitalised processes to further increase their production efficiency. This is also reflected in new and further developments for the ARBURG host computer system (ALS), including the conversion to 64-bit, mobile ALS functions for paperless production and a new interface technology.

“Our customers constantly provide us with valuable suggestions which we use to further develop ALS in very specific and needs-based ways,” explains Axel Kinting, ALS expert and Head of the Digital Industrial Solutions department at ARBURG. Team manager Peter Kowalewski adds: “The conversion of the server modules to 64 bits is a huge advantage for our customers, as it increases the limit of the working memory enormously – from just under four gigabytes to 16 exabytes, which corresponds to 2<sup>64</sup> bits. To put it in practical

terms: users can work smoothly with the powerful ALS despite ever-increasing amounts of data.”

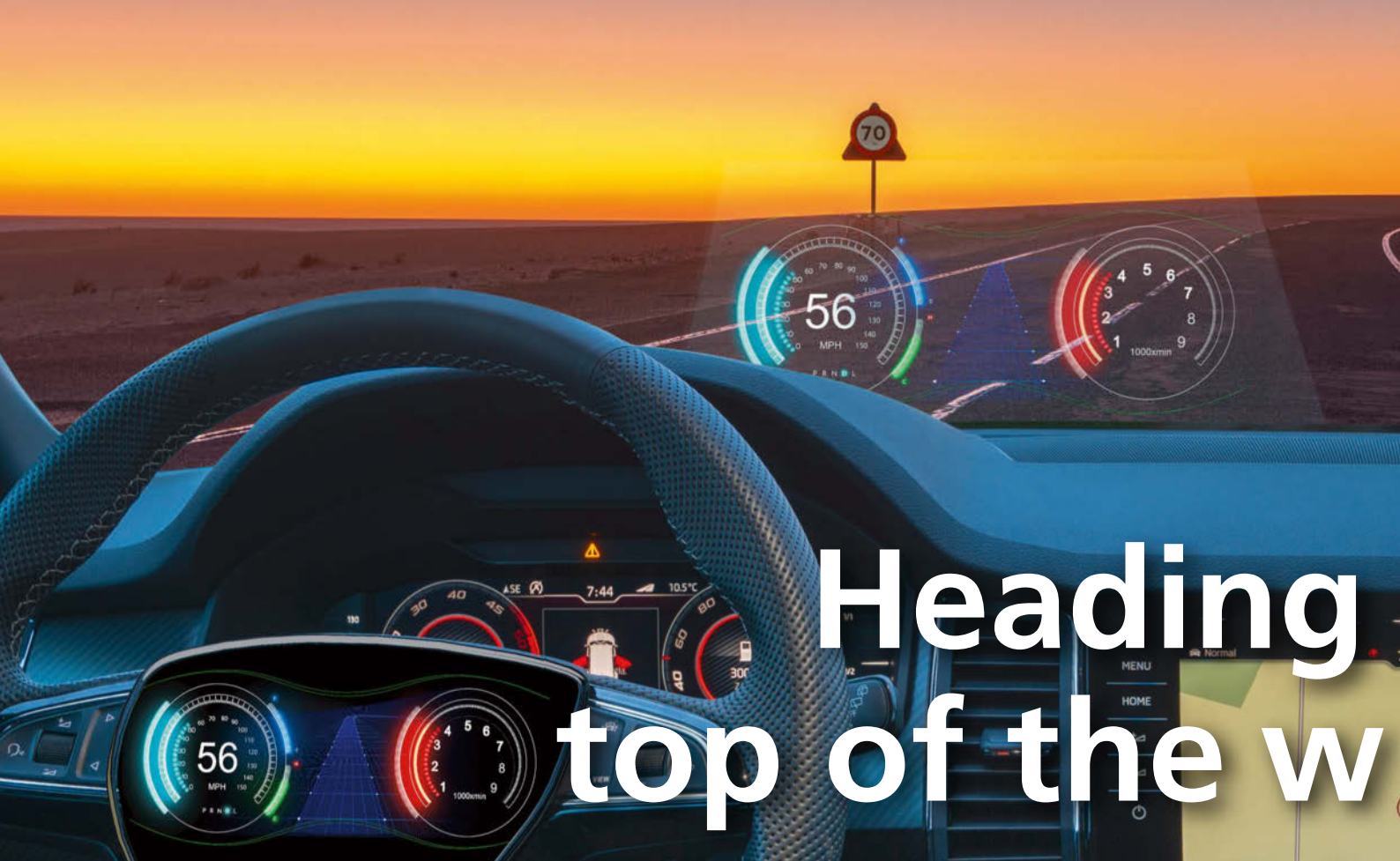
### Paper replaced by tablet

The machine terminal with its mobile ALS functions allows users to enter the world of paperless production. Not only does this significantly reduce paper consumption, it also saves an enormous amount of time and creates transparency, with the individual modules enabling process status and production progress to be viewed and current indicators on OEE (overall equipment effectiveness) and quality to be visualised. Additional resources can be added easily, jobs can be loaded directly onto the machine without typing, maintenance can be carried out paperlessly, and hidden capacities can be revealed. New machine widgets and the OPC UA communication protocol make it easy to integrate non-injection moulding machines as well.

### Connection to arburgXworld

ALS version 7.5 with new features has recently become available. ARBURG is also currently working on new software developments and functionalities, as well as on an extended connection from ALS to the arburgXworld customer portal. A separate support service has now been set up for the important topic of ALS and connectivity. The new REST API interface technology is intended to enable interaction with other systems in the future.

The Track & Trace module, on the other hand, will be used to track parts backwards and forwards in the production process. New functionalities are also being added to the machine terminal.



# Heading top of the w

## Fran Optics: Chinese manufacturer of head-up displays puts its

**F**ran Optics has made a name for itself in the Chinese market as a developer and manufacturer of optical parts. Head-up displays (HUD) for the automotive sector are an expanding business area in which Fran Optics relies exclusively on ALLROUNDERS. The company's vision is to become the world's leading supplier of optical components.

Lenses from the high-tech company in Fuzhou, China, are used in AR and VR glasses, for example, and for smart homes and medical technology.

"We moved into the manufacture of optical components for the automotive industry in 2013," recalls Pan Minzhong, CEO of Fran Optics. "Since then, we have put a lot of manpower and material resources into research and development." After visiting the ARBURG Technology Days 2014 in Lossburg, the CEO was convinced that ARBURG had the right attitude and offered the most innovative injection moulding technology for sophisticated optical products. "ALLROUNDERS enable us

to manufacture our products economically and to a high standard, which gives us a head start in the market," he states.

### ARBURG involved at an early stage

Requirements are particularly high for the production of head-up displays in which aspherical mirrors project driving information directly into the driver's field

of vision via the windscreen. ARBURG was involved in the development of these optical functional components at an early stage and so was able to provide valuable support, particularly with regard to mould design.

The HUD optical parts made of PC and COC are produced on a hydraulic ALLROUNDER with a clamping force of 4,000 kN using injection compression



Photo: Fran Optics





# for the world

Photo: stock.adobe.com

Head-up displays are a thriving business field – and not only in China (left). For this demanding application, high-tech company Fran Optics manufactures optical parts made of PC and COC on ALLROUNDERS under clean room conditions (below).

## trust in ARBURG

moulding. A linear robotic system deposits the finished moulded parts together with the sprue onto a conveyor belt.

### ARBURG as problem solver

To produce the precise surfaces required in a way that is reliable and reproducible, the mould temperature and pressure are exactly matched to the injection compression moulding process. These parameters are recorded via temperature and pressure sensors in the mould and regulated centrally via the machine controller, which also has a fully integrated temperature control unit. "In our first injection compression moulding trials, there were internal stresses and associated cracking in the component which could not be eliminated by simply adjusting the injection moulding parameters," recalls Shao Yuanchao, head of the HUD product line. "ARBURG solved this problem by changing the holding pressure from two to six stages." Process stability and reproducibility were further increased by locking the mould using a disc spring. In addition, the compression does not have

to be readjusted every time the machine is started. The entire production process takes place under clean-room conditions (class 8). Quality is the top priority: every product is manually checked, measured, and visually inspected. The HUDs are then individually bagged and sent for surface coating and finishing. Fran Optics currently produces around 100,000 HUDs per month.

### Big plans for the future

As an innovative company, Fran Optics invests around ten per cent of its turnover in precision tools and the continuous development of new products and processes. Pan Minzhong is optimistic about the future: "We see great potential for the use of head-up displays in cars, far beyond the high-end segment. In addition, we also want to develop products in the future that combine HUD technology and AR (augmented reality) simulation and provide additional virtual information."

## INFOBOX

**Name:** Fujian Fran Optics CO., LTD.

**Founded:** 2004 by Pan Minzhong

**Location:** Fuzhou, China

**Business areas:** Automotive, Healthcare, Smart Home, Security, Lighting, Virtual Reality

**Production area:**

30,000 square metres

**Employees:** 595, of which 160 in R&D

**Products:** Head-up displays, LiDAR optical parts, optical control systems and AR/VR lenses

**Contact:** [www.franoptics.com](http://www.franoptics.com)

# Fit for the future w

## FDC process: Cutting-edge technology saves costs and CO<sub>2</sub>

**T**he innovative fibre direct compounding (FDC) process from ARBURG has established itself on the market, and its area of application is expanding. In this interview, Manuel Wöhrle, Team Manager Industries at ARBURG, explains its potential and the growing interest worldwide.

**today:** How important is the FDC process as a processing method?

**Wöhrle:** Demand is growing. Since the first machine in 2016, we have now equipped ALLROUNDERS with clamping forces from 2,500 to 6,500 kN for the FDC process, in which individually cut fibres are fed directly to the melt. For testing purposes, two moulds are now also available to our customers and partners for

mould trials, as well as for basic tests. Of the five test machines, two are installed at the ARBURG headquarters in Lossburg and one each at the Technical University of Dresden, SKZ Würzburg and the ARBURG Technology Factory (ATF) in Pinghu, China.

**today:** How do you support customers and interested parties in this area?

**Wöhrle:** We are a system partner along the entire value chain, from the initial idea to series production. The earlier we are involved, the better. If the process and hence the corresponding material are determined during the product design stage, savings can be achieved throughout the entire realisation process. This is exactly where we come in with our equipment, for example with material tests for substitution

projects and mould trials of test and series moulds to validate the process.

**today:** What makes the FDC process so future-proof?

**Wöhrle:** The need to produce more economically, more easily and more sustainably! Eliminating the compounding step not only saves costs, but more importantly, CO<sub>2</sub> as well. Since the material can be specifically adjusted to the requirements of the component, technical materials can be substituted even more easily. This expands the area of application from the replacement of long glass fibre material to the substitution of technical materials such as PBT and PA. So for us and our customers, technology often also opens doors to new, innovative projects.

**today:** In concrete terms, what does the substitution of finished compounds mean in practice?

**Wöhrle:** In a "PP LGF" substitution project with a shot weight of 800 grams and a cycle time of 45 seconds, over 1.4 million euros can be saved with a well-utilised machine and a seven-year project duration. Of course, the individual utilisation of the machine and additional costs for quality assurance must be taken into account. The savings are even higher when technical materials are substituted. However, the component design and moulds must be adapted in this case. This represents a huge, economically exploitable potential.



Lightweight yet stable: Manuel Wöhrle, Team Manager Industries at ARBURG, uses an automotive component to demonstrate the potential of the FDC process.



# ith fibres!

The ashing test proves that the fibres are evenly distributed in the component during the FDC process.



**today:** Is recycling not a critical issue when processing fibre-reinforced materials? Can this be done easily?

**Wöhrle:** First of all, fibre-reinforced plastics can also be recycled. These pre-reinforced recyclates can be upgraded with the FDC process in the same way as unreinforced materials. The advantage of individually adjusting fibre content and fibre length develops its full potential here. This makes it easier to meet recycling quotas such as those in the automotive sector.

## Experts fully convinced by the FDC process



**BOSCH**

**Julia Klar, Purchasing Project Management ED Comfort Actuators (M/PPE-CA2), Robert Bosch GmbH:**

“The FDC process allows us to optimally adjust the composition of the material to our respective component requirements. In view of our diverse product portfolio, it offers a very high degree of flexibility. The new process will therefore have a positive impact on Bosch’s profitability and competitiveness in the long term.”



**Dr.-Ing. Thomas Schalk, Manager Polymers (DIWM2), Materials Technology, ZF Group:**

“The advantages of the FDC process are that a material combination can be tailored perfectly to the needs of the component. It also opens up opportunities for more cost-effective production. If the materials are combined well, you get a tailor-made suit for the price of an off-the-peg one.”



**Jochen Krug, CEO Kunststofftechnik KRUG GmbH:**

“Thanks to the flexibly adjustable fibre lengths, we can adjust materials specifically to the component requirements and so achieve a significantly higher load-bearing capacity. This also opens up new possibilities for us in our choice of raw material. If the part design is appropriate for the application, it is entirely possible to downsize from high-priced technical materials to standard thermoplastics. Our three FDC systems have already been running in series production since 2020.”

# Less is more

**Georg Schlegel: Production efficiency 50 per cent higher with**

**W**hen Schlegel entered into discussions with ARBURG about installing a turnkey system for the production of guide sleeves with a stainless steel ring, they were primarily concerned with improving the cost-effectiveness of series production. Other crucial criteria for initiating the project were increasing quantities, component quality, and adapting the previous manual manufacturing process by reducing the number of process steps.

Georg Schlegel GmbH & Co. KG in Germany used to manufacture the components in a very time-consuming way by turning finished parts and then manually gluing them to the VA stainless steel ring. Since large quantities are produced, this had an impact on the



cost-effectiveness of manufacturing the guide sleeves. These are used worldwide in mechanical engineering and shipbuilding, as well as in medical technology, as

bushings and push-buttons. According to Production Manager Dietmar Schmid, Schlegel also approached ARBURG with the new specifications "because we are





## turnkey solution

a 100 per cent ARBURG customer and have had consistently good experience with them”.

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### Automation pays off

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The introduction of the automated production processes for the guide sleeves has increased production efficiency by around 50 per cent.

For Andreas Armbruster, Head of Automation & Turnkey Solutions at ARBURG, the Schlegel system is a striking example: “This solution vividly demonstrates that it is always worth taking a look at possible automation, even for existing applications. Many manual processes can be automated and integrated, so the end result is often a high-quality, economical, and fast process with a turnkey system that is more cost-saving than the manual alternative.”

An electric ALLROUNDER 370 A with MULTILIFT V in transverse design and GESTICA controller including external operating panel operates in the turnkey system. The product is created in an automated overmoulding process.

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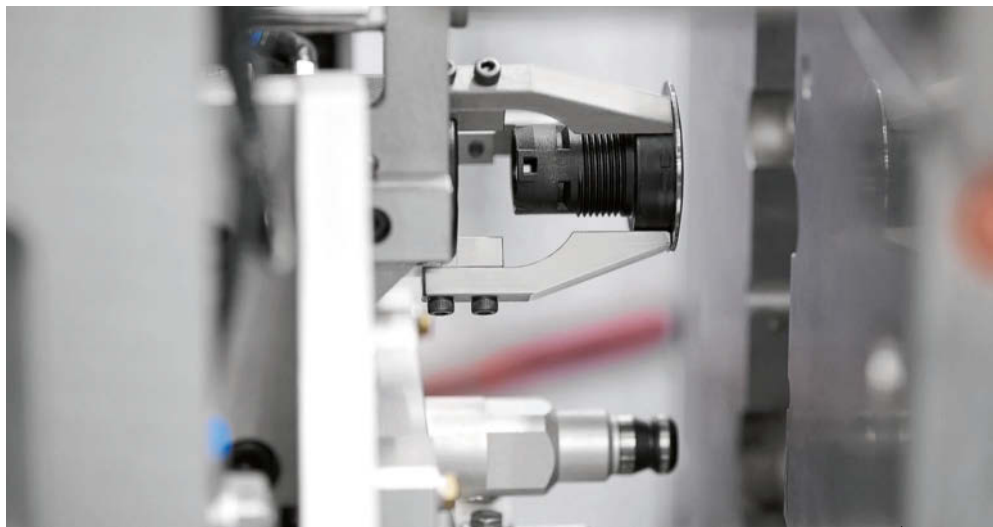
### MULTILIFT instead of manual steps

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First, the stainless steel rings are fed into a tray, from where they are picked up and transferred to a centring station. The MULTILIFT V vertical robotic system then inserts them into the mould where they are overmoulded with reinforced PA6.6. The cycle time is 23 seconds, and the insert is centred by negative pressure. The mould was manufactured in the Schlegel mould shop, and experts from Application Technology Consulting at ARBURG provided support not only

Schlegel Production Manager Dietmar Schmid (left) is proud of the automated production of the guide sleeves (above).

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with its design, but also with tray design and procurement.

### Close cooperation

For Schlegel, the introduction of automated production of the guide sleeves and stainless steel ring was a significant step because the production process had previously involved a high proportion of manual work steps.

Asked about the qualities that Schlegel appreciates in ARBURG, Dietmar Schmid replies: "Proximity, quality, reliability and service are crucial for us. ARBURG not only has the leading technology, but also the expertise to help us with our future issues. What's more, we know each other well. Since 1971 to be exact – making it 50 years exactly in 2021. This creates network connections that we can use to reach our goal quickly. And that's

why ARBURG remains the first choice for us."

The stainless steel rings are supplied in trays (large picture) and transferred to a centring station where the MULTILIFT V's gripper picks them up (left), inserts them into the mould, and removes the overmoulded finished parts (right).

### INFOBOX



**Name:** Georg Schlegel GmbH & Co. KG

**Founded:** 1945

**Location:** Dürmentingen, Germany

**Employees:** 250

**Products:** Actuation keys, emergency-stop switches, built-in sockets, RFID systems, bus systems, housing, and terminal strips

**Machine fleet:** Twelve ALLROUNDERS

**Contact:** [www.schlegel.biz](http://www.schlegel.biz)



# In the mood to celebrate

## Anniversaries: 25 years in Rednitzhembach and Brno

**H**ow can you tell how big a family is? By the number of birthdays it celebrates! This is also true of ARBURG and its many subsidiaries. Many celebrations were postponed due to coronavirus, but last year, the locations in Rednitzhembach, Germany, and Brno, Czech Republic, were lucky enough to celebrate their silver anniversaries in a big way in September 2021.

In keeping with the occasion, high-ranking delegations from ARBURG headquarters were present at both events. Managing Partner Juliane Hehl and Gerhard Böhm, Managing Director Sales and Service used the occasion to thank customers and employees for the many years of successful cooperation. In recognition of the commitment of the local teams, Juliane Hehl presented anniversary plaques to Dr Daniel Orel, Managing Director of



ARBURG spol. s r.o., and to Johannes Herbst, Head of the ARBURG Technology Center (ATC) in Rednitzhembach.

### Rapid development in the Czech Republic

In Brno, Gerhard Böhm reviewed the rapid development of the subsidiary: from its foundation in 1996 and the opening of a branch office in Slovakia in 2000 to the construction of the ATC in 2004 and its

25 years of ARBURG Rednitzhembach (from left):

Johannes Herbst, Head of ATC, Gerhard Böhm, Managing Director Sales and Service, Juliane Hehl, Managing Partner, and Oliver Giesen, Divisional Manager Sales Germany.

### Important location in Germany

“Small but mighty” is how Juliane Hehl described the smallest and newest German location in Rednitzhembach which delivers everything on offer at the headquarters in Lossburg and ATC Radevormwald in terms of pre-sales and after-sales service. Due to the importance of this location south of Nuremberg, it will be significantly expanded in 2022.

### The celebrations continue

“Postponed but not cancelled” is the motto of the subsidiaries in Austria and Turkey which will be celebrating their 10th and 25th anniversaries respectively in 2022. There will also be numerous other anniversary events around the world.



25 years of ARBURG Czech Republic (from left): Guido Frohnhaus, Managing Director Technology & Engineering, Juliane Hehl, Managing Partner, Dr Daniel Orel, Managing Director ARBURG spol. s r.o., Gerhard Böhm, Managing Director Sales and Service, and Steffen Eppler, Divisional Manager Sales Europe.

expansion in 2013. Since 2016, there has also been an assembly hall for customer-specific turnkey systems. Due to the expanded product range, the location now has the status of an ARBURG Technology Factory (see page 24).

# Appetite for more

## Sick: freeformer opens up new possibilities

**S**ensor intelligence and application solutions for safe and efficient sequence control, accident prevention and the avoidance of environmental damage. This is what Sick AG, Waldkirch, Germany, represents as one of the technology and market leaders. Plenty of experience, then, when it comes to process control. The same applies to additive manufacturing (AM) which Sick has been working on for around ten years. Since 2020, the company has also been working with a freeformer.

The first contact with ARBURG in the field of additive manufacturing came about at formnext 2019. This led to the AM specialists at Sick initially producing with a freeformer 200-3X on loan for six months, then from around mid-2021 with their own freeformer 300-3X.

### Wide range of applications for freeformer

Sebastian Matt, Production Engineer at Sick, recognised the potential of the freeformer: "We have integrated the freeformer into our AM production so we can supply prototypes made of original plastics. Materials for special areas of application have also been introduced and ESD – that is, electrostatically dissipative materials – for the construction of operating equipment and fixtures have been tested. We have also already gained expe-

rience with functional integration through hard/soft components. And finally, we can also provide our customers with individual accessories for their Sick products."

### Durable parts made from original material

In the meantime, a wide variety of original materials have already been processed, including PC-ABS, TPU, ABS, and an ESD material, for example. Prototypes up to a maximum of 200 components were mainly produced. Special attention was also paid to the use of Armat11 as a support material.



Photo: Sick

The specialists at Sick consider the freeformer's greatest advantages to be the durability and long-term stability of the components, in addition to high precision and the level of detail. Sebastian Matt continues: "Function integration and the production of parts with inserts are plus points that distinguish ARBURG plastic freeforming from other AM processes."

Besides the manufacture of jigs and fixtures for the construction of operating equipment, the latest production variant at Sick is the integration of inserts into components.

### Great potential for the future

Working with the freeformer makes it possible to delve even deeper into the possibilities of additive manufacturing, says Sebastian Matt: "That's why we see the freeformer as an important component of our AM activities which we want to further intensify in the coming years." In terms of the future with the freeformer,

For Sebastian Matt, Production Engineer, the freeformer offers great potential for further expanding AM activities at Sick.





Impressive component examples: Sick uses the freeformer to produce an adapter plate (top right) from PC-ABS and protective covers (top left), seals (bottom left) and a cover from TPU.

Sick is looking forward to further technical developments in the areas of processing inserts, material portfolio and further integration of the freeformer into the arburgXworld customer portal.

The company cites the good support with questions and problems and ARBURG's openness to new topics as positive factors for further cooperation. Sebastian Matt comments: "In the field of additive manufacturing, we want to get even more involved in small-scale production. Post-processing is a topic that is also becoming more and more relevant. In the future, we want to reduce the time-to-market and make a product available to

customers very quickly. The freeformer is a good option here for the production of series parts and durable prototypes. The APF process has a unique selling point in terms of the need for 3D printed parts from original materials."

## INFOBOX

**Name:** Sick AG

**Founded:** 1946

**Location:** Waldkirch, Germany

**Employees:** More than 10,000 worldwide (2020)

**Sales:** Around 1.7 billion euros (2020)

**Industries:** Factory, logistics and process automation business areas

**Products:** Sensors, systems and services for industrial automation technology

**Machine fleet:** freeformer for prototype and small-scale production

**Contact:** [www.sick.com](http://www.sick.com)



# A passion for

**AURORA Kunststoffe:**

**A**nyone who has saved 54,264 tonnes of CO<sub>2</sub> and 12,826 tonnes of crude oil in 2021 through their own efforts is very well positioned as a long-standing ARBURG partner when it comes to recycling. As a recycling company in the industrial sector, AURORA Kunststoffe and its patented logistics concept help enhance the image of plastics as a valuable resource – thereby fitting perfectly with the intentions of the arburgGREENworld programme.

AURORA Kunststoffe GmbH, Germany ([www.aurora-kunststoffe.de](http://www.aurora-kunststoffe.de)), says its mission is “to process all thermoplastics in a sustainable manner so they can be returned to the economic cycle as plastic grinding media, regranulates, and compounds.”

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## Simple concept

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There are two alternatives for this. Rejects and faulty parts can be processed as regranulated plastic or reground material so the customer can feed them directly back into its production process. The other option is for AURORA to pay an appropriate fee for them and feed them into a sustainable processing process. Thanks to AURORA's Lean Logistics recycling concept, the collection of recyclables for plastics processing companies is as simple as can be, with solutions tailored to the respective production conditions for





# recycling

## From waste to recyclable material – systematically

collecting and transporting recyclables by type.

and are therefore just as easy to process,” explains Thomas Rätzsch.

### High-quality recomponds

Starting with post-industrial recyclate (PIR) that has been sorted by type, AURORA not only collects and grinds, but also mixes in high-quality additives, fillers and/or reinforcing fibres downstream, thereby refining the recycled plastics into high-quality recomponds. Their quality corresponds to that of new goods, which is important according to Managing Director Thomas Rätzsch: “Our customers expect high-quality products that are also sustainable. We can ensure this through the PIR recyclables collected by type, specially developed formulations, and strict quality control throughout the entire manufacturing process.”

PIRs usually differ positively from post-consumer recyclates (PCRs) which can generate certain odours during processing, for example. “Our recomponds, on the other hand, are very similar to the original material due to their high-quality compounding and refinement with additives

Important component of ARBURG’s recyclate package: the special screw geometry for particularly homogeneous material processing.

### Strong partnership

ARBURG has been working with the recycler since it was first founded in 2009. “We dispose of tiny quantities from our injection moulding shop and larger batches from trials, trade fairs, and our Technology Days via AURORA, in each case sorted by type,” explains Christian Homp, Team Manager Applications at ARBURG. Since 2021, the headquarters in Lossburg has also been using AURORA’s small-quantity collection system: faulty parts, sprues and other residual plastics that are only produced in small quantities are collected by type and then combined by AURORA with other small quantities of the same type and processed. “As a result, we’re making an even more extensive contribution to plastics recycling and are also acting in accordance with our objectives under the arburgGREENworld programme. Because every step forward counts here,” says Bertram Stern, Sustainability Manager at ARBURG, in summary. “AURORA has also been very helpful in providing us with various recycling materials so we could thoroughly test their processing,” adds Christian Homp, highlighting another aspect of the two companies’ partnership and referring here to ARBURG’s recyclate package.

### RECYCLATE PACKAGE

With ARBURG’s recyclate package, recyclates of all types, where material quality and form naturally fluctuate more, can be processed safely and to a high standard. The package is available for all ALLROUNDERS and can also be retrofitted. It combines modified plasticising with smart process control. Further information is available in the recyclate package brochure.



Brochure

# Digital power

## Behringer Kunststoff: A double pack of digitalisation

**B**ehringer Kunststoff GmbH & Co. KG in Velbert, Germany, uses two important digitalisation tools at the same time: the arburgXworld customer portal's Premium Connect package and the ARBURG host computer system (ALS). All 25 automated ALLROUNDERS are integrated into this digital environment. A quick overview of current production is possible at any time and from anywhere.

The company, headed by managing directors Jörg Behringer and Benjamin Corsten, is one of the most innovative users of ARBURG's digital offerings. Benjamin Corsten explains why they use arburgXworld and the ALS Dashboard together: "The introduction of both services has taken digitalisation at our company another step

closer to self-sufficient production and paperless communication."

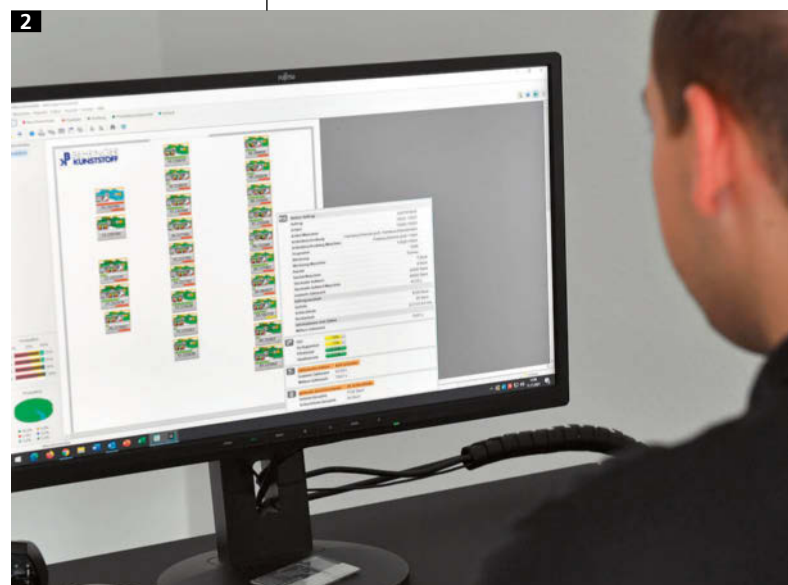
### Keeping an eye on production and quality

The company produces technically demanding parts and assemblies. One speciality is optical articles, partly for the electrical and aerospace industries. Inspections during production as well as incoming and outgoing goods inspections are constantly in progress and require the use of systems such as the ALS for quality control and production tracking.

Jörg Behringer has this to say about digitalisation: "Our ALLROUNDERS are all equipped with OPC UA interfaces for data exchange and are integrated into several production cells. All of our peripheral equipment, such as robotic systems, the

drying system, and the flow-controlled mould temperature control, is also integrated into the arburgXworld customer portal via the Customer Upload feature in the MachineCenter app. We have been using ALS since 2013, in fact with all available modules." The use of the portal's ALS dashboard lent itself to this type of digitalised monitoring. This gives all employees in production, sales and management clear access to relevant

Fully digitalised production: Behringer Managing Director Benjamin Corsten (right) presents the arburgXworld's latest features to his employees (1). With ALS, you can always keep an eye on production and quality (2). The Remote Service feature helps users quickly solve problems directly on the ALLROUNDER (3) while maintaining a high level of production availability (4).







# arburgXworld

production and QA data – from the areas of maintenance and repair, machine set-up and processes, work preparation and planning, and quality assurance, for example.

## Combination: Customer portal and ALS

But Behringer is also way ahead in terms of digital communication with ARBURG through its use of the arburgXworld Premium Connect package. The apps included in the package offer excellent help with troubleshooting and with servicing and procuring spare parts. The Virtual-Control app for programming data sets offline, away from production, can be combined very well with ALS. Machine-Finder helps Behringer check the optimum injection unit using material and parts data. And finally, the memo func-

tion in arburgXworld is also a frequently used function.

## Flawless implementation

“The support provided by ARBURG when arburgXworld was introduced in our company was really, really good,” says Benjamin Corsten. The package was implemented quickly in coordination between the field sales team and ARBURG’s digitalisation team led by Stephan Reich and Benjamin Franz, and all users received very competent advice. Jörg Behringer’s conclusion is also positive: “The apps from arburgXworld are a good addition to ALS for further reducing downtimes and service work.” The company sees this as an important step towards future-oriented production.

## INFOBOX



**Name:** Behringer Kunststoff GmbH & Co. KG

**Founded:** 1972

**Location:** Velbert, Germany

**Employees:** 35

**Industries:** Fluid and filter technology, aviation, medicine, building hardware, door automation, light and luminaires, electrical industry

**Machine fleet:** 25 ALLROUNDERS

**Contact:** [www.behringer-kunststoff.de](http://www.behringer-kunststoff.de)



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4

Photos: Ulrich Bangert/vor-ort-foto.de

# Really attractive!

## Magnetic materials: Great potential for e-mobility and energy

**P**eople have already been processing plastic-bonded magnetic materials on injection moulding machines for three decades. However, the technology is anything but old hat. Current developments are heading in the direction of optimising electric drives for cars and e-bikes, in energy storage technology, and in the 5G mobile communications sector. Various research projects are also looking at innovative magnetic materials and their use.

In future, increasingly complex processes will also become established in magnet injection moulding. A greater weight reduction should be achievable through the use of adapted materials. The aim here is to achieve a higher energy density combined with a lower material density. This is where compounds with optimum properties in terms of corrosion, weight, and ease of shaping come into play.

### Decades of experience

As a pioneer, ARBURG has been active in this field since the 1990s, and has presented innovative applications at many

K trade fairs since that time, including for example the production of magnetic cog wheels and rotors at K 2019. ARBURG's cooperation partner was materials supplier HAWA with whom a joint project is also under way to produce a modified PIM feedstock. The aim is to use the injection moulding process with its high design freedom to produce magnets with a similarly high energy density as sintered variants.

### Hard magnetic versus soft magnetic

Hard magnetic materials are used for the production of permanent magnets, soft magnetic compounds for the amplification of the active magnetic field via rapid magnetisation and demagnetisation.

In sensor technology and electronics, hard magnetic products are used as media flow meters, for example, with design advantages through injection moulding also playing a significant role here. Soft magnets are used in areas such as inductive QI charging technology and e-motors. One example was the ARBURG collaborative project ProLemo in which several partners worked on series production technologies for efficient lightweight motors

in the emerging field of electromobility (see today 64).

### Finished part in a single step

According to Christian Knöpfle from Application Technology Consulting at ARBURG, one of the most important advantages of injection moulding magnetic materials is that injection moulding immediately produces a finished component: "The material is inherently mechanically strong and resistant to media. By combining them with different plastics as substrates, these properties can be accentuated even further." Examples of this, he says, include the use of PPS to increase the chemical resistance of the end products and high-temperature materials such as PEEK which is used for applications up to around 240 degrees Celsius. This opens up new possibilities in electronics where service temperatures of up to 200 degrees Celsius are sometimes required. Tests with LCP compounds are also already underway.

In addition to reducing process steps, this innovative magnetic injection moulding process offers other advantages such as reduced corrosion, the option of combinations with other plastics via multi-compo-





Photo: stock.adobe.com

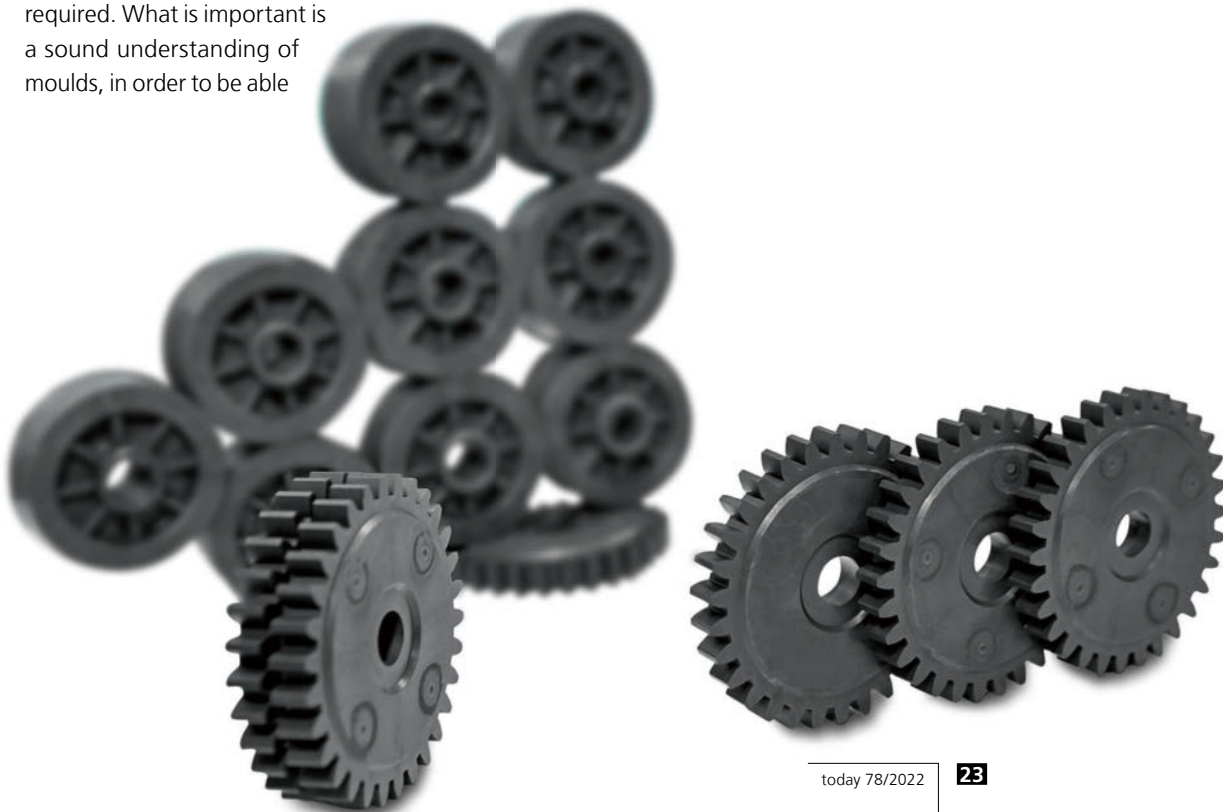
## storage

nent injection moulding, and simple parts handling. Since the magnets are injected and not inserted, the cycle times are shorter. Moreover, the filler reduces the cooling time. There is also no need to factor in the tolerances of inserts for the mould.

The injection moulding process is for the most part 'classic'; due to the highly filled magnetic materials, only injection units with adapted cylinder modules are required. What is important is a sound understanding of moulds, in order to be able

to implement magnetisation in the mould via permanent magnets, for example. Finally, the material behaviour is also important; the highly filled plastic must not become separated.

The magnetic cog wheels and rotors which are used in the field of e-mobility, for example, were produced alternately without conversion on an ALLROUNDER with a family mould.





# Wir sind da

## Global presence: Expansion of turnkey-activities

**P**roximity to customers is one of ARBURG's recipes for success. The global ARBURG locations make an important contribution to this with their excellent pre- and after-sales services. Excellent examples of the way in which this is continuously being developed and expanded are the ARBURG Technology Factories (ATF) and the company's first regional headquarters in China.

Since its first foreign subsidiary was founded in France in 1985, ARBURG's global network has grown continuously. Today, it encompasses organisations in 26 countries at 35 locations.

Their services include showroom, consulting e.g. in the field of application technology, mould sampling, training, sales, spare parts service, and repairs. But there's more.

For decades, ARBURG has been known for its expertise in the turnkey sector. So it goes without saying that the increasing

global demand for automation solutions has also been taken into account.

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### ATFs in China, Czech Republic and USA

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In addition to the 50-strong team of experts at the Lossburg headquarters,



Photo: ARBURG

Assembly of a turnkey plant for the production of pipette tips at the ATF in Pinghu, China.





turnkey specialists are also available in the international subsidiaries. The leading locations here are Brno in the Czech Republic, Pinghu in China and Rocky Hill, Connecticut, in the USA. This is why they are no longer called ARBURG Technology Centers (ATC), but ARBURG Technology Factories (ATF). What does this mean in concrete terms?

In addition to the established portfolio of the subsidiaries, an ATF also has a machine warehouse and capacities to customise ALLROUNDERS and implement turnkey plants with local partners. "Thanks to the ATFs, we can shorten delivery times and further expand the automation business," says Gerhard Böhm, Managing Director Sales and Service, adding that they also provide technical support and advice on the topics of digitalisation and smart manufacturing.

### Regional headquarters for Asia

A further step towards customer proximity is the implementation of ARBURG's first regional headquarters in China. As part of this, Andrea Carta, Director of Overseas

Sales, and a small team of experts moved from the Lossburg headquarters to ATF Pinghu in mid-2021. The aim is to strengthen ARBURG's presence in Asia and to be even closer to the market and to local customers, while simultaneously maintaining close links with the German headquarters at management level.

### Central production in Lossburg

Despite all the changes, one thing remains the same: ARBURG's central production location with short, stable and reliable supply chains and a high proportion of in-house production (see page 4). A strategy that has proven its worth for decades – especially in difficult times.



Photo: ARBURG

Pre-assembly and testing of robotic systems at the ATF in Brno, Czech Republic, where complete turnkey systems are also built.



## TECH TALK

Dipl.-Ing. (BA) Oliver Schäfer, Technical Information



# Just practical!

## Integrated hydraulics for electric machines

**H**ydraulics for electric injection moulding machines? Does that even make sense? The answer is clearly "Yes!" because it allows certain functions in the process sequence to be implemented very efficiently. To be specific, we are talking about the secondary axes, so ejection, nozzle movement, and the core pull functions in the mould.

An essential feature of hydraulics is that several functions can be driven with one power unit and one electric motor. Only the corresponding cylinders are then required in the machine itself. This makes a hydraulic drive much more compact than an electromechanical one and also much more cost-effective, and is especially true for linear movements that are needed for ejection and nozzle movement, for example, and for most movements in the mould.

In the case of these secondary axes, the advantages of electromechanical drives, such as energy-saving operation, fast cycles, and high precision, can also be realised to a large extent with a corresponding hydraulic system.

### Hydraulics ideal for secondary axes

The integrated small accumulator hydraulics of the electric ALLROUNDER ALLDRIVE is driven by an energy-efficient electric motor, for example. The accumulator is only charged when needed, which saves additional energy. What is special about the small accumulator hydraulics is that all movements are possible completely independently of each other and hence simultaneously. For the control of process sequences, this results in a flexibility that is in no way inferior to an electric drive. For example, all secondary axes can be moved

to the mould at the same time, effectively reducing the cycle time. With small accumulator hydraulics, it is also possible to run ejectors and core pulls in the injection and holding pressure phase to partially compensate for shrinkage and avoid sink marks. For better mould protection, ejectors and core pulls can also be actively held under pressure and so securely in position during injection or demoulding. For the realisation of special mould functions such as sprue punching, the ejector and core pulls can also be moved towards each other at the same time. The finished parts can also be held in the fixed mould half via a core pull. This is interesting for moulded parts whose visible side must be in the moving mould half, for example.

Advantages of small accumulator hydraulics in terms of process technology are high forces and their variation in the process. To protect the mould, the nozzle





contact force can be reduced during the holding pressure phase. Another option open to users is to move the ejector to the stop – to jolt against a spring-actuated mould platen to assist in the safe demoulding of moulded parts.

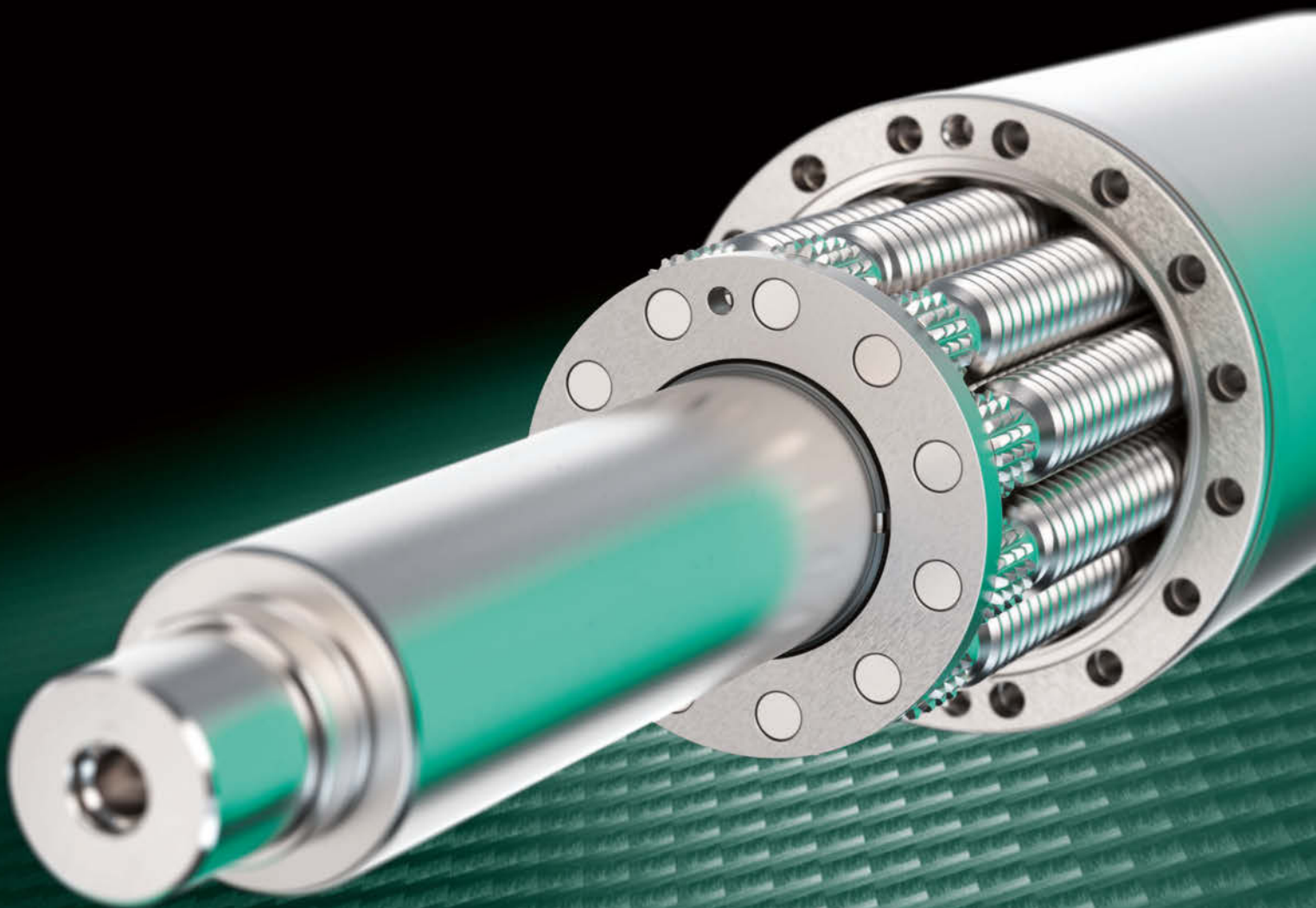
### **Hydraulics enable compatibility**

In terms of compatibility, the hydraulics for secondary axes play an important role. This is particularly true for moulds with linear core pull functions, as here the range of electric drives is significantly limited simply by their size with racks and pinions or spindle drives. With integrated small accumulator hydraulics, existing moulds can continue to be used without the need for an additional, hydraulic auxiliary unit. Moulds can ultimately be changed between machines of different drive types without any problems, especially when special

process engineering features are required. That's just practical!

Electric ALLROUNDER integrated in the machine frame: the small accumulator hydraulics offer many advantages in terms of process technology.

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HIGH PERFORMANCE  
5-YEAR WARRANTY  
**POWER DENSITY**  
SUSTAINABLE PRECISE  
DYNAMIC  
QUIET



**WIR SIND DA.**

Do you know what actually has a lasting impact? The power density of your drive! The planetary roller screw drive of our hybrid and electric ALLROUNDERS is the best you will find on the entire market, and not just in this respect. Make sure you get the best results! In terms of noise emission, cooling, power transmission, load capacity, compactness, and spare parts supply – we deliver, right across the board. And on top of that there's a five-year warranty. Our planetary roller screw drive: one of a kind!  
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