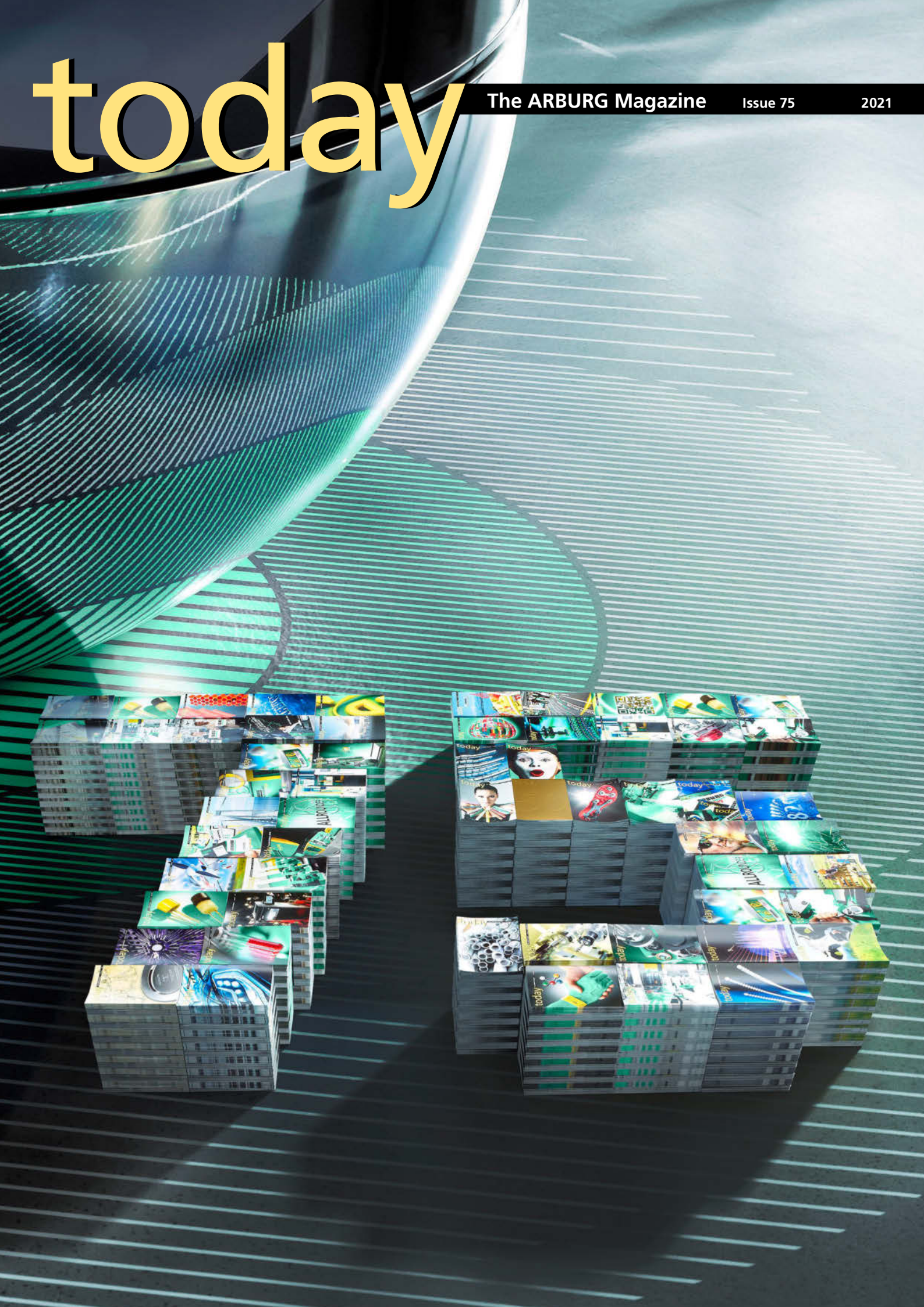
today

The ARBURG Magazine Issue 75 2021



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75 issues of "today", ARBURG's customer magazine: A colourful mix of cover images has appeared since its launch in 1995. To mark this special milestone, "today" is now getting a title role itself.

Dear Readers,

Last year, the coronavirus pandemic presented us with an entirely new set of challenges. Challenges that we will have to continue to face in 2021. However, as we have successfully demonstrated many times in the past, we do not see difficult situations as an obstacle, but rather as an opportunity. Our planning and activities had already put us in a very good position in terms of digitalisation, which we could and can increasingly demonstrate in these coronavirus times. In addition to our digital products and services, we have also launched new digital formats, ranging from the ARBURG Summit: Medical to explainer videos and arburgXvision, our monthly live internet TV show that started on 28 January.

We have also successfully completed, continued or launched many new, challenging projects jointly with customers and also within the company.

I am particularly pleased that my fellow Hehl and Keinath family members and I were able to seize the unique opportunity to take over the AMK Group's important "Drives and Automation" division, thereby establishing a significant milestone in the field of electrical machines and drives! You can find out more in this issue, in which we are celebrating a landmark achievement: the 75th issue of "today". Since 1995, we have been keeping you up to date with our international magazine and offering exciting insights. This time we shine a light on customer projects from the medical technology and the automotive industry, for example, and present innovations from the arburgXworld and arburgGREENworld divisions.

We hope you enjoy reading this special issue!

Renate Keinath
Managing Partner

On course for growth

ARBURG: Global investments – even in difficult times

Stepping on the brakes in difficult times has never been ARBURG's philosophy. On the contrary: It is precisely in times like these that the ARBURG partners believe it is important to invest in development, infrastructure and staff in order to be in the best possible position for a successful future. The construction activities at the Lossburg site and at subsidiaries around the world are visible evidence of this.

"As an independent family business, we made far-sighted investments in previous, economically outstanding years so that we can continue to grow sustainably now," explains Michael Hehl, Managing Partner responsible for Plant Development.

The diggers at ARBURG's headquarters in Lossburg have not stood still for over a decade now. Something is always being built somewhere and the building complex is growing and growing. In March 2020, the new Training Center was officially opened and just one year later, the new assembly hall is already being occupied. The new hall is mainly used for making customised turnkey systems, for which there is now significantly more space available.

More space for subsidiaries

More space has also been created or is being created at our subsidiaries around the world. Following the inauguration of the ARBURG Technology Center in Pinghu on 18 September 2020, ARBURG now has four locations in China. The existing buildings of ARBURG Srl in Peschiera Borromeo, Italy, and the ARBURG Inc. headquarters in Rocky Hill, Connecticut, USA, have been significantly expanded. And in France, too, the signs are pointing to growth. A new, larger subsidiary building in a better location is being built near Paris.

Central production pays off

"These construction activities around the world are proof that we are continuing to invest even in difficult times," says Michael Hehl, "and are thereby positioning ourselves in the best possible way for the future, so that we can continue to provide our customers with top-quality care, as well as high-tech support and expertise." In doing so, ARBURG continues to rely on its philosophy of producing only at one central location, with a high degree of vertical integration (over 60 per cent) and local supply chains. "This also has advantages in terms of our carbon footprint, for example," adds Michael Hehl. "And we also benefited from our central production location during the coronavirus pandemic. Comprehensive hygiene and safety measures were quickly introduced and implemented to protect our employees to the best of our ability while remaining able to deliver for our customers!"

On the home stretch: In October 2020, work in and around the new assembly hall was in full swing.

A warm welcome

AMK*motion*: ARBURG partners acquire AMK division

The ARBURG partners have a reputation for making strategic and sustainable investments. The most recent evidence of this is their acquisition of AMK Arnold Müller GmbH & Co. KG on 1 January 2021. The company's new name will be AMKmotion GmbH + Co KG.

AMK has worked closely with ARBURG as a development partner for electric drive systems since as early as 1994. An important milestone in their joint success story was the market launch of the first electric ALLROUNDER A standard machines in 2001, which have been largely equipped with AMK drive components ever since.

Opportunity seized

The Chinese owner's desire for strategic change presented the Hehl and Keinath families with the opportunity to acquire the "Drives & Automation" division, including employees and locations, along with AMK Arnold Müller GmbH & Co KG. The product portfolio includes motors, centralized and decentralized drive solutions and control systems.

Important acquisition

"We are very confident about this important acquisition," comments Michael Hehl, Managing Partner and Spokesman for the ARBURG Management Board. "In taking this step, we are underlining the importance of electric injection moulding machines, whose share in our portfolio has been growing steadily for years and still has a lot more potential for the future."

Acquiring the important AMK division is intended to give ARBURG access to its expertise and influence on future development work. This will enable pioneering refinements to be made even more quickly and efficiently to the drive systems of the electric ALLROUNDERs. Besides the technology and long-standing partnership, the new company's sound basic philosophy was also a factor for the ARBURG partners in the purchase. AMK and ARBURG traditionally have similar values and exemplify long-term entrepreneurial commitment with a view to stability and a sustainable strategy focused on expertise.

AMKmotion

MEMBER OF THE ARBURG FAMILY

The product portfolio includes motors, centralized and decentralized drive solutions and control systems.

INFOBOX

Name: AMK*motion* GmbH + Co KG
Founded: 1963 by Arnold Müller, 2021 acquisition and name change
Locations: Kirchheim/Teck and Weida in Germany as well as Gabrovo in Bulgaria
Products: Motors, centralized and decentralized drive solutions and control systems
Contact: www.amk-motion.com

Get on board

arburgXworld: New features for customer portal

The arburgXworld (pronounced "arburg's world") customer portal offers one of the most comprehensive ranges of digital products and services in the injection moulding sector. It caters to the entire horizontal and vertical value chain and thereby, in a sense, represents the whole world of the company. Accordingly, the portal is of interest to all hierarchical levels in our customer's companies. New features and apps are continuously being added to make everyday life in plastics processing even easier. Get on board – it's clearly worth it!

To help users keep track of the numerous functions and make full use of the portal's capabilities, there are now exciting tutorials explaining the individual apps in detail.

Extended warranty

New joiners can currently enjoy a very special benefit: Anyone who registers now for arburgXworld and also uses the ARBURG Remote Service (ARS) will receive an extension of the warranty for new machines by three or six months, depending on the country. In addition, customers will receive a voucher with the purchase of a new machine. With this, they can have two older injection moulding machines (built in 2014 or later) retrofitted with the "4.Service" assistance package at a special price, and then use ARS.

The "MachineFinder" and "Configurator" apps are both very popular with buyers. The Configurator enables users to configure and order the ALLROUNDER 270 S compact online – the first injection moulding machine from ARBURG for which this is possible. Since autumn 2020, this is also the case for the THERMOLIFT material dryer and conveyor, with other products to follow.

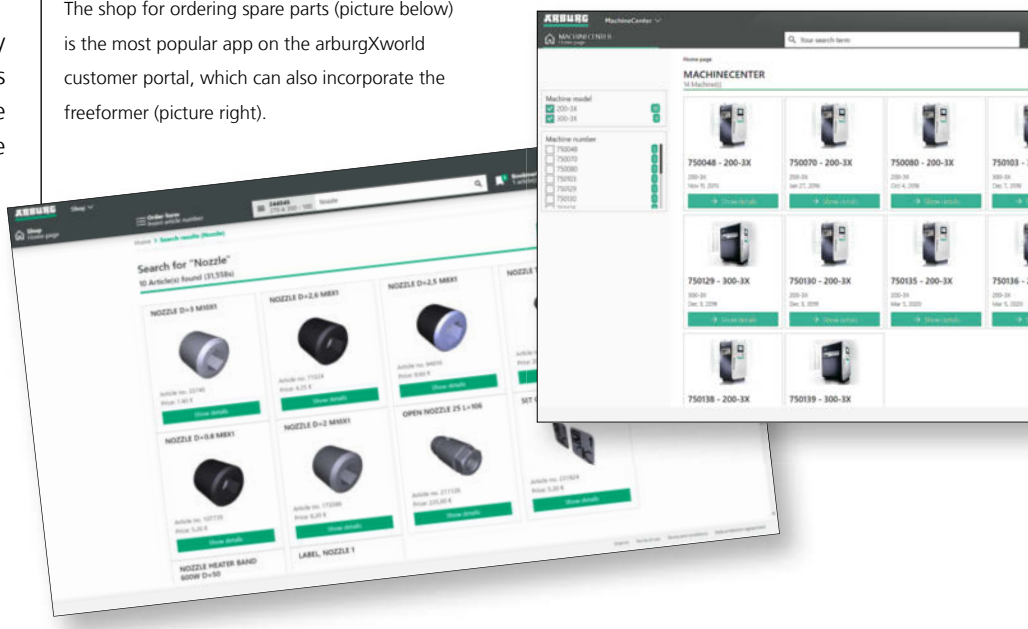
Spare parts available for order via ERP

Ordering spare parts via the "Shop" is no less convenient and comes with a financial incentive, as ARBURG also offers its customers country-specific online sales promotions via this free basic app. To enable spare parts to be ordered in the usual way without any extra effort, the shop can be connected directly to the customer's ERP system via an OCI interface (Open Catalogue Interface). Orders are then automatically transferred to the shop. You can track where parcels are and when they will arrive using the "Calendar" app.

The "VirtualControl" premium app is very helpful, especially for setup technicians. It can also be conveniently used in a home office environment to simulate and edit injection moulding programmes on a PC or tablet and for troubleshooting. The data can then be transferred directly to the machine controller via the ARBURG host computer system (ALS) or via compact flash card.

Another premium app is the "DataDecoder", which can be used to display machine data records in a readable format and save them as scv or xlsx files. A new feature is the option to compare two data sets with each other and to display them visually.

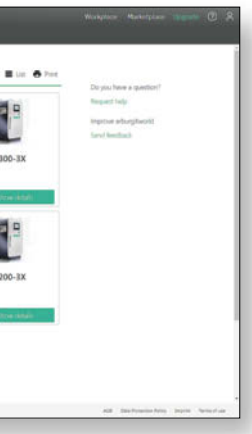
The shop for ordering spare parts (picture below) is the most popular app on the arburgXworld customer portal, which can also incorporate the freeformer (picture right).



Infopoint Digitalisierung
Infopoint Digitalisation
now!

ARBURG experts Benjamin Franz, Manager Digital Solutions (left), and Stephan Reich, Head of IT Application Development, are passionate about advancing the arburgXworld customer portal.

Machine fleets can be connected via the ARBURG host computer system (ALS) or via the "MachineDashboard" app, which is part of the "Premium Connect" package.



freeformer integrated

In future, arburgXworld will no longer be limited to the world of injection moulding: A new development is the option to also integrate the freeformer and hence additive manufacturing into the production landscape via the "ProcessLog" app. Successful and seamless monitoring and documentation of process and job order data play an important role here.

Data transmission is generally state-of-the-art – absolutely secure and only accessible by the customer. The approach can be compared to a "digital room" to which only the customer has a key.

ARBURG sales consultants will be happy to show you first-hand how the customer portal works with a demo version. In addition, ARBURG has set up a physical "Digitalisation info point" at its headquarters in Lossburg, where customers can obtain advice, try out the customer portal in person and see for themselves the added value and the many practical features.

Explainer video

Teamwork makes t

NP Germany: Extraordinary turnkey system for automotive prod

A more impressive sight is scarcely imaginable: NP Germany's turnkey system around a vertical ALLROUNDER 1500 T takes up a quarter of the production hall. During operation, a total of nine robotic systems dance a ballet to produce a pump impeller for the car coolant pump of an international automotive supplier. A level of fully automated production that was not an everyday occurrence for NP Germany and ARBURG, its turnkey supplier.

Benedikt Niglis, Head of Project at NP Germany in Brilon, Germany, says he put several years of his professional engineering life into the project. And the result is really something to be proud of, he adds with conviction. The system is used to produce a pump impeller for a high-output car coolant pump, which can be used to cool vehicle components such as battery packs for hybrid vehicles.

One requirement for the turnkey system was to automate as many work steps as possible up to the finished product while maintaining a high level of autonomy through buffers. Another aspect of the system's great flexibility is its ability to run processing steps manually and to decouple the two aspects of injection moulding and ultrasonic welding so that malfunctions in the welding cell do not lead to an interruption of the injection cycle.

Six seconds faster

NP Germany and ARBURG decided to integrate an ALLROUNDER 1500 T because the machine's vertical mode of operation ensures that the inserts remain precisely positioned in the mould. The cycle time also plays a major role and has been shortened by more than six seconds compared with the horizontal concept. Even with all the different inserts, the electric two-station rotary table saves valuable time as loading takes place at the same time as the spraying cycle.

Versatile SELOGICA is a success

The vertical ALLROUNDER is the first machine of its kind to be integrated into the production process at NP Germany. Initial concerns due to the complex handling processes were quickly dispelled by working with the SELOGICA controller, whose user interface was also integrated into the controller of the KUKA six-axis robots. The gradual ramp-up phase is planned from January to July 2021.

Two versions of the pump impeller made of PPS with 40 percent glass fibre content are produced on the line. Two hot runner moulds with needle-type shut-off nozzles and four cavities each stand ready for each version. One special feature is the ejector side of the three-platen moulds where, in addition to the mechanical slides, there are ejectors that are used to precisely position the rotor packs to be overmoulded after the

Benedikt Niglis, Head of Project (left), and Plant Manager Mario von der Heyde are more than proud of their complex turnkey system (picture left). The transfer points of the six-axis robots, e. g. on the ultrasonic welding system, can also be approached manually during set-up (picture below).

he dream work

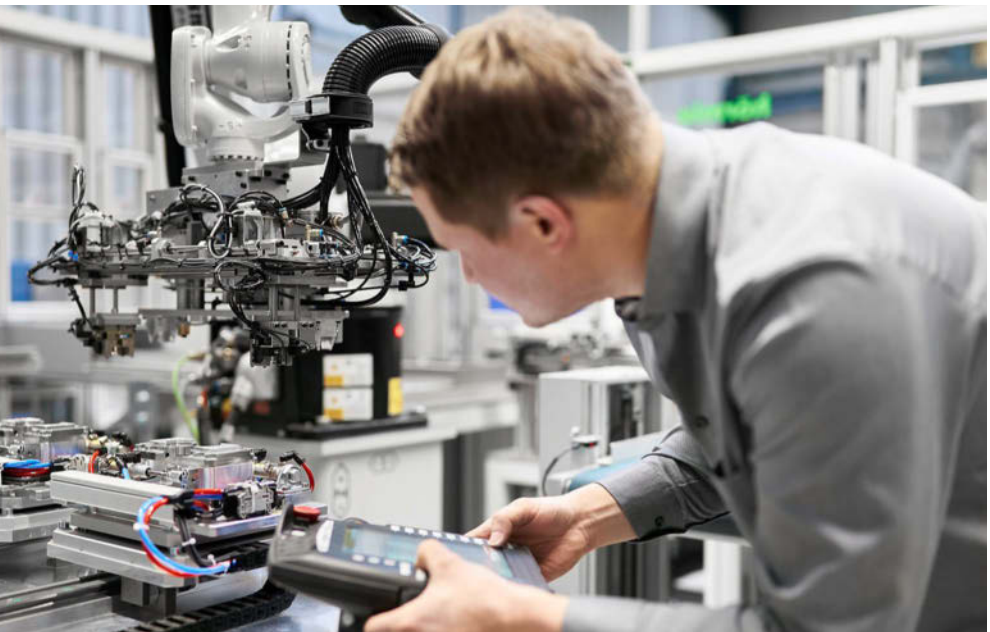
ucts

mould has been closed using a core pull. A KUKA robot removes these from a load carrier on a tray server, positions them correctly and transfers them to a preheating station. A MULTILIFT V 30 robotic system collects the rotor packs from the heating station. Prior to this, bearing bushes were taken up as bulk material. The MULTILIFT first removes the moulded parts from the rotary table and then loads the cavities with the inserts.

Double camera inspection

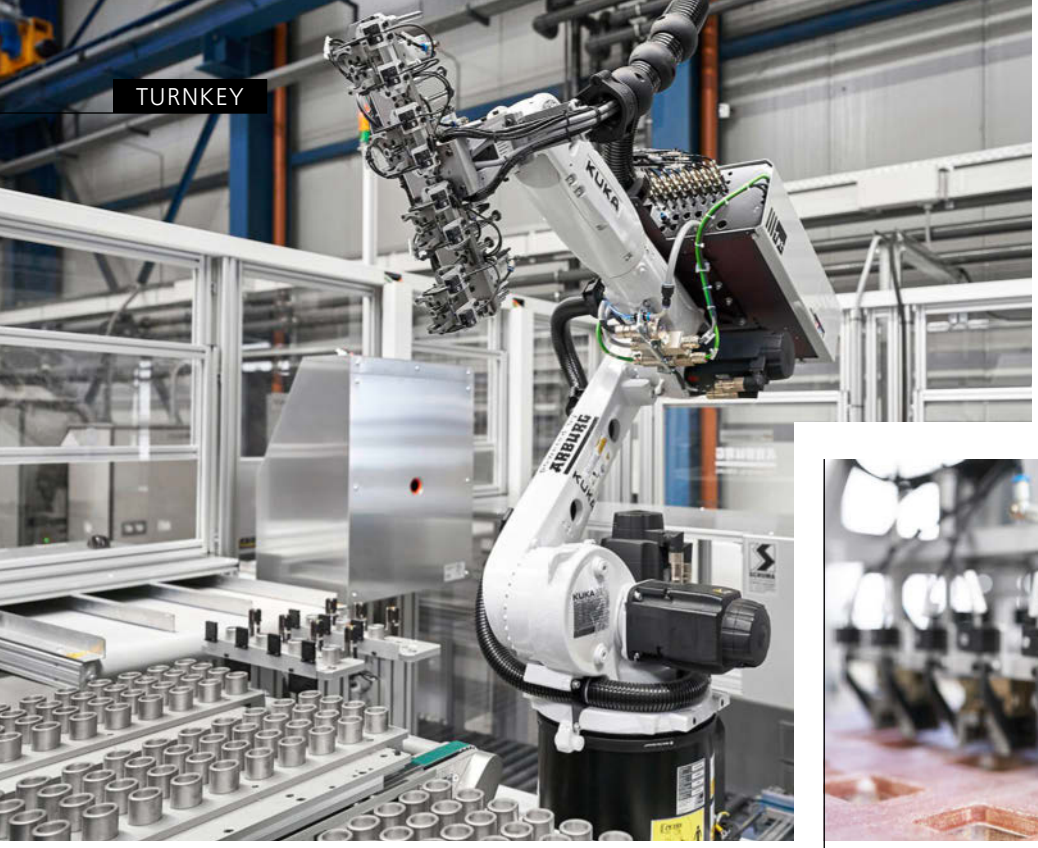
The moulded parts that have been removed are transferred to a camera inspection station, which checks their top sides for moulding defects. The second KUKA robot takes charge of the parts and guides them to another camera station where their undersides are also checked. The moulded parts are then placed on a double sliding table and leave the system in the direction of the welding cell. Once there, they are removed from the double sliding table by the third KUKA robot. The robot then collects lids, which are provided as bulk material via a vibratory bowl.

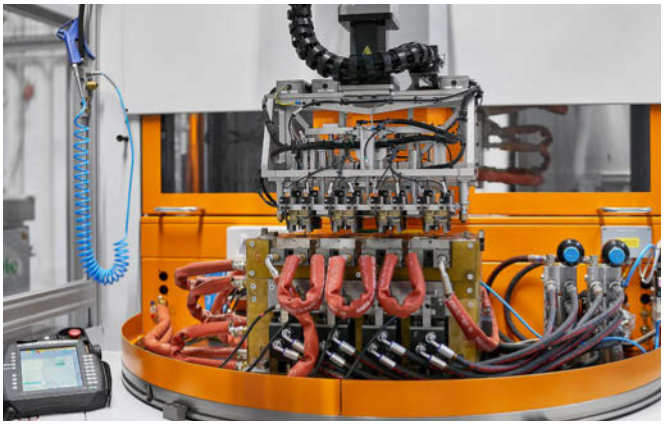
The lids are also turned out in the correct position by the robotic system before collection. Before the moulded parts are transferred to the welding station, the finished parts are removed. The KUKA robot then loads the welding station again and packs the finished parts on a load carrier, which is likewise supplied by a tray server. These then go directly to the customer.



First-class system supplier

Besides the fact that ARBURG was able to provide all the components required for





A six-axis robot (pictured above left) feeds the moulded parts to the camera inspection (rear area) and sorting and deposits the good parts (front area).
Before the overmoulding process, the heating station brings the rotor packs up to mould temperature (picture above right).
There, the MULTILIFT V picks them up, inserts them into the ejector side of the mould and removes the finished parts (picture left).

the turnkey system in cooperation with proven partners, NP Germany also appreciates "ARBURG's cooperative approach, the standardised operation of its systems including all peripheral equipment, plus the company's swift support, short communication channels and solution-oriented work," as Benedikt Niglis explains.

"Even when deadlines are tight, we can rely on ARBURG – whether through remote maintenance or visits from experts at the ARBURG Technology Center in Radevormwald. In recent years, we have completed several automation projects with ARBURG. The fact that we also implemented this highly complex pump impeller system together shows that we hold ARBURG in very high esteem as a system supplier."

INFOBOX

Name: NP Germany GmbH
Founded: 1851, member of the Clayens NP Group since 2012
Location: Brilon, Germany
Employees: 106
Products: Control pistons and impellers made of thermoset and thermoplastic; in-house mould construction
Sectors: Automotive, Electronics, Industrial Equipment, Home & Life, Aviation
Turnover: Has averaged around 15 million euros per year over the past three years
Machine fleet: 33 injection moulding machines, of which 22 are ALLROUNDERs
Contact: www.clayens-np.com/de/implantation/np-germany

Around 3,500,000 characters!

Special milestone: 75th issue of the ARBURG Magazine

In October 1995, hardly anyone involved expected that the first issue of "ARBURG today" would lay the foundation for what is now a 25-year publishing success story. And yet this spring 2021 issue is the 75th edition of the global ARBURG customer magazine.

"Fashions have come and gone, hairstyles have changed, sometimes considerably. Only today and its markedly high aspirations have remained," smiles Dr Christoph Schumacher (pictured, seated), who, as Head of Marketing and Corporate Communications, was responsible for most of the 75 issues.

Impressive figures

And the fact that the magazine is celebrating 25 years and 75 issues virtually at the same time is no real coincidence, given its regular publication three times a year. "Seven languages, 35,000 copies, three times a year! It's almost a trade journal in its own right, and made by us here with huge amounts of journalistic passion," says Schumacher. "Roughly speaking, we have 'produced' around 1,600 pages over the years, created 74 powerful front pages and written articles containing a total of around 3,500,000 characters."

Formidable team

Of course, this cannot be done alone, but only with a committed team, whose members are credited in the legal notice. The editorial team consists of copywriters, graphic designers and photographers from ARBURG Corporate Communications, while the editorial advisory board is made up of employees from various departments. For many years, the editorial advisory board has met three times a year under the leadership of Susanne Palm, PR Group Leader (picture, 7th from left).

"We work hard to achieve a sophisticated mix of topics and listen closely to feedback from our customers all over the world," Schumacher makes clear. International, technically sophisticated customer reports, knowledge transfer, movers and shakers, information from the ARBURG organisation, technical tips and tricks and, last but not least, production-related curiosities – the makers of today are very successful in addressing their global audience. And now, of course, they're setting their sights on the 100th issue…

View from the Sum

ARBURG Summit: Medical 2020 brings experts together digitally

Coronavirus has changed everything. And still is. Creativity, flexibility and high-tech solutions are needed to meet the new challenges. A perfect example of this is the ARBURG Summit: Medical, which took place on 19 November 2020, having previously switched from an in-person event to a hybrid and then to an elaborate digital event in just a few weeks. With great success.

"We broke new ground with this digital format, which was extremely sophisticated, both in terms of content and technology," commented Gerhard Böhm, Managing Director Sales at ARBURG. "Another advantage was that many more professionals were able to attend than was the case with our comparable in-person event on packaging in 2019."

International participation

In total, over 400 participants from more than 40 countries attended the virtual ARBURG Summit: Medical, which offered four hours of concentrated expertise on all aspects of medical technology.

The twelve expert presentations in the "Solutions", "Innovations" and "Visions" categories highlighted concepts for the production of LSR injection moulded parts and microfluidic systems, challenges faced by the healthcare industry, the Medical Device Regulation MDR, digital methods for integrated parts documentation, application examples of innovative high-performance moulds and the additive manufacturing of customised implants. After each presentation session, the speakers answered questions from the participants, who were able ask them live via chat.

Live production of medical devices

In addition to the presentations, there were three "live breakout boxes" on clean rooms, LSR processing and additive manufacturing, where ARBURG experts answered questions from hooked-up participants. They also walked over to the exhibits, accompanied by camera crews, to present the production of LSR masks, needle holders for insulin pens and resorbable implants.

A glimpse into the future

The keynote addressed trends in medical technology over the next few dec-

The ARBURG Summit: Medical 2020 was a first-rate digital event with expert presentations, live breakout boxes, live chats and panel discussions.

mit

Interesting panel discussion (from left): Gerhard Böhm (ARBURG), Niklas Kuczaty (VDMA), Dr Andreas Herold (B. Braun) and Prof. Ute Schäfer (University of Graz) discussed "Medical Technology Challenges and Perspectives for 2050" with moderator Guido Marschall (Plas.TV).

ades. Prof. Dr-Ing. Marc Kraft, Head of the Medical Technology Department at the Technical University of Berlin and Chair of VDI's "Technologies of Life Sciences" association, explained these trends using several examples.

In doing so, he also laid the foundations for the panel discussion with Prof. Ute Schäfer (University of Graz), Dr Andreas Herold (B. Braun), Niklas Kuczaty (VDMA, Medical Technology Working Group) and Gerhard Böhm. The experts discussed "Medical Technology Challenges and Perspectives for 2050" with moderator Guido Marschall (Plas.TV) and agreed that technology-driven companies have a clear advantage. By then, many products would probably no longer be manufactured in a factory, but would be produced locally on a customised basis. The idea would be to integrate the additive manufacturing of patient-specific skull and rib implants into hospital processes, for example. However, quality would remain the top priority. "We see a megatrend in the area of additive manufacturing and also the increasing importance of digitalisation and sustainability," confirmed Gerhard Böhm. "These are all topics that ARBURG is also working on intensively. So we are very well prepared for a future in which plastic remains a vital recyclable material."

"Making of" video

Success at the sharp

ZAHORANSKY: Modular concept for customer-specific production

ZAHORANSKY's Medical Unit creates highly customised production lines for the manufacture of vaccine containers (vials) and syringe bodies with integrated needles. Thanks to the modular design, these can be individually configured according to customer requirements. ALLROUNDERs, which handle the injection moulding part, are always present.

In 2020, ZAHORANSKY Automation & Molds GmbH in Freiburg, Germany, delivered to the US eleven systems for the production of COVID-19 vaccine containers (vials) made from the high-end materials COC and COP. These were a welcome spin-off, so to speak, as they are based on the highly automated downstream equipment for syringe bodies with integrated needles. The link was the material, which is also suitable as a glass substitute for the COVID-19 vials. As soon as the systems, worth approximately 25 million euros, are put into operation in the US, 600,000 vials can be produced per day.

ZAHORANSKY progresses projects of this kind from the development phase to ready-to-use systems within six to eight months, with the entire Medical Unit working on a transnational basis.

Syringes with needles from a single cast

"Our high-output syringe systems now operate with 16-cavity moulds," comments Michael Schmidt, Managing Director at ZAHORANSKY Automation & Molds. "When manufacturing syringe bodies from COC and COP, we add nitrogen as standard to prevent any reaction with oxygen, allowing us to produce them without black spots." It is also important that the syringe bodies have absolutely no cavities or scratches and that the tips of the needles are never touched during the entire production process. "This is another reason why customers demand extensive monitoring procedures from our systems, sometimes even the use of X-ray equipment. Our modular system provides all of this," states Michael Schmidt. The modular components can be combined to form fully automatic production lines according to the customer's individual requirements and incorporating all of ZAHORANSKY's know-how.

ALLROUNDER for all variants

According to Michael Schmidt, the ALLROUNDERs fit very well into this modular concept, as they can likewise be equipped for specific applications and integrated into the overall systems. At the start of the production line, the needles are singulated or, as an alternative, bent. Vertical or horizontal ALLROUNDERs are used, depending on whether curved or straight needles are to be "married" to the syringe bodies.

With the vertical ALLROUNDER T rotary table machine, the correctly positioned needles, whose bending angles have been thoroughly checked, are inserted into the lower mould section where they are fin-

end

lines

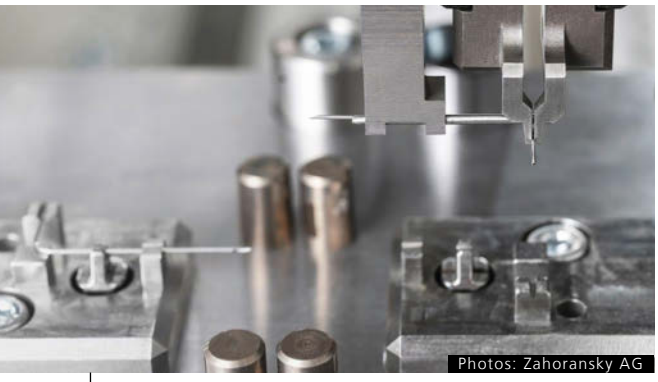
ished. The syringes are used as a finished product in insulin pumps for self-administration.

The variants with straight needles are produced on a horizontal electric ALLROUNDER A with clean room fittings. The connection is made by injecting the gate directly onto the flange of the syringe in a patented mould with hot runner system and valve gate. The removal of the finished articles takes place at the same time as the insertion of the needles. The entire system is operated under ISO class 8 clean room conditions. Extensive testing is integrated in the entire process flow to ensure the high production precision and quality.

No matter which type of needle – straight or curved – is required for the syringes, the modular design enables ZAHORANSKY to configure customised production lines.

Together into the future

ARBURG is and remains ZAHORANSKY's exclusive cooperation partner for the production of syringe bodies. "We have known ARBURG for a long time as a flexible partner with extensive technical knowledge and reliable service," commented Michael Schmidt, citing their automated toothbrush production as an example and raising the prospect of future projects to build on this relationship. ZAHORANSKY also wants to expand its laboratory supplies business, for example.



Photos: Zahoransky AG

The production line with vertical ALLROUNDER (picture left) produces syringes with curved needles that can be precisely inserted into the lower half of the mould (picture above).

INFOBOX

Name: ZAHORANSKY Automation & Molds GmbH
Founded: 1902 in Todtnau
Locations: Ten in Germany and others in Spain, India, Hong Kong, the US, China and Japan
Employees: Around 900 worldwide
Business areas: Full-range supplier of injection moulds, automation solutions, end-of-line packaging machines, tamping and shearing machines
Machine fleet: Five ALLROUNDERs in the technical centre
Contact: www.zahoransky.com

Serious about susta

arburgGREENworld: Comprehensive commitment to the environ

ARBURG has always been very committed to the environment and the careful use of resources. The company's activities in this respect are bundled in the arburgGREENworld programme that was introduced at K 2019. In conversation with today's editorial team, Bertram Stern, Manager Packaging and Circular Economy, offered insights into current projects, collaborations and goals.

today: arburgGREENworld covers all aspects of ARBURG's sustainability management. How do you stay on the ball with this issue?

Stern: By taking an integrated approach! ARBURG takes its lead from the WIN Charter of Baden-Württemberg and the Sustainable Development Goals of the United Nations. We pursue a consistently sustainable strategy with our bundled competencies. Many topics play a role here – from circular economy and energy and resource efficiency to carbon footprint, digitalisation and strategic partnerships.

today: Which projects is ARBURG particularly active in at the moment?

Stern: A whole lot (laughs). For example, we are working on innovative technologies for the circular economy to complete the plastic product cycle. And in September 2020, "HolyGrail2.0" progressed to the next round. Together with over 85 companies along the entire value chain, we are advancing the sorting of plastic packaging by means of digital watermarks. Another project dealing with the labelling and recycling of high-quality recyclates is R-Cycle, initiated by Reifenhäuser.

today: Can injection moulding machines process recycled materials just as well and as reliably as new plastic materials?

Stern: With recyclates, fluctuating material qualities are a major challenge. To cope with this and optimise the injection moulding processes, we are collaborating with partners such as the Institute for Plastics and Closed-Loop Technology (IKK) at Leibniz University in Hanover, which has two ALLROUNDERs in use for tests.

today: What about the sustainability of the ALLROUNDERs themselves?

Stern: This is a very complex issue that we are also working on with the IKK. For example, one of the final papers being researched there deals with the carbon footprint of our injection moulding machines. The aim is to find a method that can be used to evaluate and optimise the production of ALLROUNDERs in terms of sustainability.

today: ARBURG is going one step further with the carbon footprint of the entire company, right?

Stern: Yes exactly. Another approach is to look at all emissions using the corporate carbon footprint (CCF) method. Emissions are sub-divided into three "scopes" for reporting and accounting purposes. Scope 1

inability

ment and conservation of resources

Going green: Bertram Stern, Manager Packaging and Circular Economy, is proud of the "HolyGrail2.0" project, which involves sorting plastic packaging by type using digital watermarks (graphic).

includes all direct emissions, Scope 2 and 3 the indirect emissions, including upstream and downstream value creation stages.

today: That sounds exciting. How is ARBURG approaching a task of this complexity?

Stern: The full scope of consideration ranges from raw material extraction to product disposal ("cradle to grave"). However, we can only exert limited influence during the operating phase at the customer's site and during disposal, for example. This is why we are focusing on the "cradle to gate" element. This covers all the emissions up to the point where the machine arrives at the customer. Our central production location, exceptionally high degree of vertical integration, and high-end building technology bring clear advantages in this respect. Our goal is to identify the largest sources of emissions and to compare different influencing factors in quantitative terms. From this, we will develop a sustainable strategy for climate protection.

Sustainability Report

today: What can ARBURG build on to achieve this?

Stern: We have been developing an internal environmental and energy programme for decades. We are also currently working hard on the topic of "green controlling". In doing so, we are also making external factors measurable so that we can take targeted and transparent action to optimise internal processes in terms of carbon reduction, energy demand and energy mix.

today: Can you sum up all of these activities in one sentence?

Stern: ARBURG is doing everything in its power to sustainably reduce its carbon footprint in plastics processing.

today: Where can people find out more about these fascinating topics?

Stern: In our brand new Sustainability Report 2020, which is published on our website. The Report describes in detail how ARBURG is bringing economic, ecological and social management under a single strategic umbrella.

Life saver

Weiss-Aug: Vertical ALLROUNDERs for sophisticated medical auto

Life-saving medicines must be administered quickly and safely in an emergency. This is exactly what the "MiniJect®" autoinjector from Rx Bandz was designed for. It is produced by the US-based Weiss-Aug Group, which specialises in demanding projects like this. ARBURG is the Group's preferred machine supplier – especially for the sensitive area of medical technology.

Weiss-Aug manufactures hundreds of thousands of components, assemblies and products for surgery, intravenous and disposable items, implants and medication delivery devices every day.

Vertical concept brings efficiency

This involves overmoulding high-precision, stamped metal inserts with plastic, for example, and combining them with other complex assemblies to create products for use in medical technology. The machine fleet is dominated by vertical ALLROUNDERs with rotary and sliding tables, often using three-platen moulds. An advantage of the vertical concept is that the inserts provided in trays can be loaded quickly and the finished parts can be easily removed. In addition, the three-station rotary tables lead to time savings, as they allow simultaneous insertion, overmoulding and removal.

From an idea to the end product

"We have been working closely with ARBURG since the 1990s and, in addition to the machine and control technology, we also appreciate ARBURG's high level of problem-solving expertise, which always helps us to master new challenges," says Elisabeth Weissenrieder-Bennis, Executive Vice President of the Weiss-Aug Group.

Since the company has also built up its own development, design and mould-making capacities, it often works as a one-stop shop for its customers – from the idea to the finished product. One such, extremely complex project is the production of the "MiniJect®" autoinjector by Rx Bandz. The autoinjector can be used to quickly and safely inject life-saving medication in fixed doses, for example epinephrine in the context of cardiopulmonary resuscitation or anti-allergens. The compact, temperature and water-resistant injector can be used for therapeutic, acute or emergency self-medication – i.e. also by patients themselves.

Weiss-Aug and Rx Bandz have entered into a strategic partnership to manufacture the MiniJect® in high volumes once it has been approved by the Federal Drug Administration (FDA) in the United States.

Ultra-fine stamped parts

The design of the "MiniJect®" ensures that the medicinal product is properly stored and protected in the injector. Elisabeth Weissenrieder-Bennis explains what this means for production: "We have to maintain a high level of reproducibility and tight tolerances in the injection moulding process to ensure the exact dosing

Components for the "MiniJect®" autoinjector are produced on the vertical ALLROUNDERs (picture above).

injectors

Photos: Weiss-Aug Co. Inc

Proud of the "MiniJect®" project (from left): Anthony Sanzari, Vice President Surgical Products, and Elisabeth Weissenrieder-Bennis, Executive Vice President, both from Weiss-Aug together with Jessica Walsh, Founder and CEO of Rx Bandz, and Stephen Harhen, Chief Engineering Officer at Rx Bandz.

quantity, for example. In addition, we overmould very delicate stamped parts, which can be as fine as a strand of hair and must not be damaged during insertion."

The precision ALLROUNDER T machines meet these high requirements perfectly, thanks to the hydraulic pressure accumulator, position-regulated screw and numerous monitoring features. Both the sub-assembly housing the container with the primary medicines and other components for the plastic casing, which is also assembled, packaged and then shipped, are injection moulded. For the future, Weiss-Aug is also planning to have the Rx Bandz autoinjector pre-filled with the medication.

INFOBOX

Name: Weiss-Aug Co. Inc.
Founded: 1972
Locations: East Hanover, New Jersey, US and five other locations in North America
Employees: Around 500
Products: Medical devices, sensors and plug connectors, safety-related parts for the automotive and aerospace industries
Machine fleet: 18 ALLROUNDERs
Contact: www.weiss-aug.com

Thinking in new di

freeformer: Adding value through design flexibility

With its layer-by-layer additive construction method, ARBURG Plastic Freeforming (APF) can be used to create completely new components and applications. No need to think within the confines of traditional manufacturing processes: This method enables early, process-matched designing and the creation of added value. In this task, the APF team supports its customers with a wealth of expertise.

"Over the past few years, we and our customers have repeatedly turned completely new component ideas into reality using the freeformer," says Lukas Pawelczyk, Head of Sales freeformer at ARBURG. "For example, we have created real added value through functional integration, lightweight construction and customisation. And that's what matters if you want to be successful in additive manufacturing in the medium to long term."

Important: AM design guidelines

Just as there are design guidelines for injection moulding and machining, certain conditions and requirements must also be observed in additive manufacturing (AM). This is especially true when it comes to additive series production, for example of spare parts, lightweight components for aerospace or implants in medical technology. What's more, AM-compliant designing can achieve potential savings in terms of the construction process and re-working. In most cases, strength, component quality and construction speed are interacting factors. Low layer thicknesses are suitable for producing very fine details and obtaining more attractive surfaces. This in turn increases the build time. To increase the component's strength, you can optimise its orientation, i.e. influence how it is placed in the build chamber.

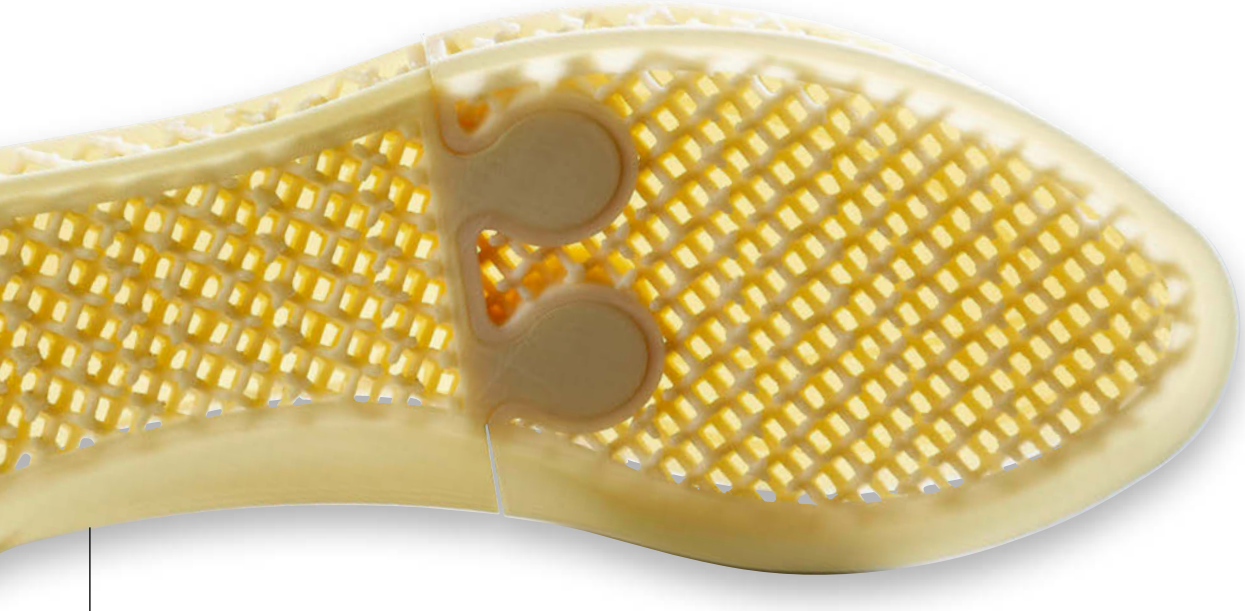
As an "open system", the freeformer processes a variety of original plastics, allowing components to be produced that are not possible with any other process.

Resilient hard/soft combinations

This includes the additive manufacturing of resilient hard/soft combinations and the processing of particularly soft materials, as

Hard/soft combinations: The TPE components enable fingers to move (picture left), for example, or moulded parts to be gripped securely (picture centre). The two versions of the pulley (picture right) prove this: The AM-optimised component (left) is lighter and more resilient.

mensions



Flexible yet firm: The shoe sole (pictured above) was made in two parts with the freeformer and then put together.

illustrated by the following examples:

- The individual parts of a finger made of PC/ABS become movable thanks to joints made of soft TPE.
- A complete gripper assembly made of PC/ABS housing and TPU membrane can be manufactured without assembly. To remove moulded parts, the soft membrane in the injection mould is positively expanded using compressed air.
- The example of a flexible shoe sole made of Hytrel® demonstrates how components that are larger than the freeformer build chamber are created. The design of the sole has been adapted to allow it to be made from two parts and then slotted together.

freeformer parts

Optimised part geometry

The example of the "pulley" shows the potential for optimisation offered by the APF process. The design of the original part geometry was improved in several steps and optimised in terms of force transmission and stress distribution. The idea is to pack the material exactly where it is needed and otherwise dispense with excess material.

The component group that can be moved via joints, with housing and fastening hooks, is produced by a freeformer with the aid of support structures. No assembly is required at all. The support structures must simply be dissolved in a warm water bath. Tensile tests have shown that the lightweight component can now withstand loads of up to 380 kilograms.

Lukas Pawelczyk offers a summary: "Additive manufacturing offers tangible advantages, especially when a component can be optimised or customised in terms of lightweight construction or higher strength. We are currently stepping up our activities in this area. If needed, we offer potential customers the opportunity to improve the design of a benchmark component in order to generate added value through the APF's layer-by-layer construction process."

Fun

Freudenberg: Open sys

If you talk to the specialists at Freudenberg about the freeformer, "open system" and "processing individual materials" are frequent buzzwords. However, the adaptations at Freudenberg are not confined to the use of specific plastics. In collaboration with ARBURG, the focus is also on the hardware.

Freudenberg in Weinheim, Germany, has already been involved in additive manufacturing for more than 15 years, particularly in the areas of prototypes and pre-series samples. The Freudenberg Group and ARBURG have been working together in the injection moulding sector since the early 1970s. In 2019, they also started collaborating on additive manufacturing.

freeformer for soft materials

A crucial factor in the decision to purchase the two freeformers 200-3X and 300-3X for the Group's R&D department was the wide range of materials that could be processed regardless of the machine – including Freudenberg-specific plastics. In addition to TPEs, silicones that have been optimised for processing are particularly exciting – and represented new territory for ARBURG too.

One area of application for the freeformer: components adapted to the patient's anatomy for medical technology applications with approved, biocompatible materials. However, the "sealing and damping" sector also benefits from this foundational research, as silicone and TPE have a wide range of applications in

with the freeformer

tem for increased customisation

this area. Another aspect is the production of parts with support structures and multi-component parts. To optimise the freeformer with regard to the goals mentioned above, Freudenberg independently adapts the screw geometry, for example. This makes it possible to process in-house, modified or filled materials, and also to use completely new compounds.

Future goal: additive series production

According to Dr Clemens Behmenburg, Head of Process Technologies, there are still some hurdles to the group-wide introduction of additive manufacturing: "With the current equipment, we cannot yet enter into series production of high quantities with the appropriate reproducibility. According to our development guidelines, it is necessary and sensible to increase both the accuracy of the produced parts and the speed of the printing process." In this context, the close cooperation and foundational research with ARBURG is very important. The company's objective in this respect is to make decisive progress within the next three years and, in the long term, to facilitate global, decentralised and mould-free small-series production.

The development team sees a positive future for the freeformer at Freudenberg, and plans are underway to purchase more machines. In terms of further development, the ARBURG specialists are providing Freudenberg with proactive and comprehensive support. They are very satisfied with this, said Dr Behmenburg, indicating that a common future could be built on it.

Dr Stefan Kaul (left), Scientific Director, Head of the Molding Technology Platform, and Dr Clemens Behmenburg, Head of Process Technologies, were already enthusiastic about the potential of the freeformer when it was first put into operation in 2019 (picture above).
Jens Fiebiger from the 3D printing team (picture left) proudly presents a nose that was manufactured from silicone as a representative demo part for medical implants.

INFOBOX

Name: Freudenberg SE
Founded: 1849
Location: Weinheim, Germany
Employees: Around 50,000 worldwide
Products: Seals, vibration control components, nonwovens, filters, speciality chemicals, medical technology products and cleaning products
Machine fleet: In the area of additive manufacturing: inkjet and FDM systems, SLA printers and two freeformers
Contact: www.freudenberg.com

For a long life

Upcycling: From disposable cup to robust folding crate

A circular economy only works if all players in the process chain work together – from the material and injection moulding machine manufacturers to the recycler. ARBURG first showed how this could be done at K 2019. In cooperation with Borealis and Erema, cups made of PP mono-material were recycled "live" and later used to make durable folding crates – a vivid example of upcycling. But what should be considered in the process?

Recyclates pose new challenges for injection moulding, as the reprocessed recyclate must be able to be injection moulded to a consistently high quality despite the changing properties of the starting material. Better recyclates are central to the solution. This is because the injection moulding machine can compensate for fluctuating processes, but the product quality ultimately depends heavily on the material quality. Materials manufacturer Borealis and ARBURG jointly tested just how well material that is similar in type can be processed by producing robust folding crates on a hybrid ALLROUNDER 920 H in Lossburg. "Similar in type" means that the plastics of the recyclate have the same basic polymers, but differ from each other with regard to special properties.

Similar-type recyclates

The starting material for the crate was 100 per cent recycled PP, which Erema had produced "live" at K 2019 with its plastic recycling machine. To achieve this, the PP cups injection-moulded by ARBURG at the trade fair were processed together with PP film from dog food packaging – both unpolluted virgin material. This type of admixture is a common practice to reduce the so-called MFI (melt flow index) value of easy-flowing materials. In this specific case, the film reduced the MFI value from 100 to around twelve – ideal for producing thick-walled folding crates from the granulated recyclate. However, one general problem with recycled materials is that, unlike virgin materials, there is no transparent processing data for them. To ensure that the process nevertheless got off to a good start, the ARBURG application engineers initially used new PP material before the recyclate content was then gradually increased to 100 percent.

Initial problems quickly resolved

As expected, there were the usual initial difficulties when processing the recyclate. Due to viscosity differences, the injection and cavity pressures varied at first. The shrinkage characteristics were significantly improved by adjusting the cooling time. In general, process fluctuations can be offset to a certain extent by various setting parameters such as temperature, pressure and feed rate. In this specific case, an ad-

Borealis video

From cup to recyclate to folding crate (picture above), which was produced on an ALLROUNDER 920 H at the ARBURG Customer Center in Lossburg (picture left).

justment of the dosing speed and dynamic pressure was successful, allowing the folding crate order to be produced with high process reliability.

This application proves that if it is possible to collect plastics by type, they can be returned to the value chain very easily and even upcycled to make durable everyday products.

ARBURG and Borealis are also working together on this goal in the HolyGrail2.0 and R-Cycle projects (see interview on page 16).

TECH TALK

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

Stay cool!

Water cooling versus air-cooled drives – what are the differences?

There are two different cooling concepts for electric motors and converters in injection moulding machines. Cooling is either directly with circulating air or via a closed cooling circuit with water. What are the advantages and disadvantages of each approach? And why does ARBURG often use water cooling?

A key feature of air-cooled drives is their simple and therefore cost-effective design. There is no need for an additional water jacket in the housing. In contrast, liquid cooling offers numerous advantages that far outweigh the additional costs for the motors and inverters. One major advantage is rooted in physics: The heat transfer coefficient between water and a solid is 50 to 100 times higher than that of air. This means that water can dissipate a large amount of heat, thereby ensuring that the heat is transported evenly. And unlike air, it can be distributed in a targeted manner for an optimum cooling effect. Even longer load phases, which can occur during holding pressure, for example, are perfectly possible with liquid cooling.

Independent of the environment

Temperature differences between individual engine parts and any possible distortion as a result are kept to a minimum, as the heat is dissipated close to the source via a closed cooling system. This also keeps the effect of lubricants constant within the defined range. With liquid cooling, the ambient conditions in production, which can vary hugely, have hardly any influence on the performance and reliability of the drives. Another aspect is that the temperatures of the cooling medium can be precisely monitored – meaning that any unnoticed overheating can be actively prevented. Liquid-cooled drives are therefore characterised by high operational reliability and a long service life.

The temperatures remain virtually constant not only inside the drives, but also on the outer casing. Heat radiation to the environment is noticeably lower, so there is no additional heat input into the injection moulding plant, especially in warm seasons. This means greater energy and cost efficiency when the system is operated in air-conditioned rooms.

This is proven by the energy measurement on an electric ALLROUNDER 570 A: During a 15-second cycle and a 50-percent utilisation of the injection unit, 1.3 kilowatt hours of heat are dissipated via the cooling water. If this heat input had to be offset by air conditioning, this would result in additional electricity costs of

Photo: Adobe Stock

Water is simply better at cooling – whether it's your body or drives for injection moulding machines.

around 5,900 euros per year for production with 20 machines.

Efficient – in many ways

In addition, the waste heat trapped in the water can be recovered and used to heat buildings at low temperatures, for example, which contributes to sustainable manufacturing. In this example, more than 156,000 kilowatt hours of heat would be available per year, which corresponds to a saving of around 63 tonnes of carbon emissions.

Compared to air-cooled motors, liquid-cooled ones do not require heavy ribbing or additional fans to increase the cooling effect. This makes the motors less susceptible to dust deposits and means that the surfaces need to be cleaned less frequently. This is particularly interesting in injection moulding systems that work with materials containing dust. In addition to ease of maintenance, air turbulence is avoided, which plays an important role in the production of sensitive plastic parts in a clean production environment. The insulating water jacket and the absence of fans ultimately result in reduced noise development as well.

Comparing air-cooled or liquid-cooled drives clearly shows that it is worth taking a close and comprehensive look at the often underestimated topic of "cooling". The technically superior water cooling concept offers many advantages both in terms of return on investment (ROI) and sustainability. This is why motors and inverters in electric, hybrid and energy-optimised hydraulic ALLROUNDERs are generally water-cooled.