

today

The ARBURG magazine

Issue 68

2018

LEADER
ACHIEVER
GUIDE

ROAD TO DIGITALISATION

FUTURE MAKER
PARTNER
GOAL SETTER





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IMPRESSUM

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With and on the “Road to Digitalisation”, ARBURG is presenting itself as a pioneer and partner with regard to the digital transformation at the Fakuma 2018.





Dear readers,

Product design plays an important role for us. In 2016, we placed a central focus on this topic with the premiere of our flagship

ALLROUNDER 1120 H, the new colour scheme of which will be extended to the entire ALLROUNDER range in 2019. We are making a grand impression at the Fakuma in October 2018: here, all the exhibits are already liveried in "mint green/light grey/dark grey".

Special focus at our exhibition stand: the "Road to Digitalisation". Here, we are not only presenting the current progress of our digital products and services, but are also pointing the way towards the digital future that we would like to realise together with our customers. We charted the course for tomorrow a long time ago and have firmly set our sights on the topic of "digitalisation".

We will once again be presenting you with successful approaches and innovative concepts in our articles in

this issue. The range extends from tubes with which blood samples can be traced long-term, to ceramic components used for reducing power consumption and CO₂ emissions in motor vehicles, plant pots from recycled materials and extremely thin-walled coffee capsules.

At the "today", we always place importance on now and again looking beyond technological matters and in particular on presenting special personalities within the plastics industry such as the entrepreneur Karsten Kallinowsky, whose social commitment is exemplary.

A first class mix of topics thus once again awaits you in the present issue.

We hope you enjoy reading our "today".

A handwritten signature in blue ink, appearing to read 'J. Hehl'.

Juliane Hehl
Managing Partner

Pioneering

Fakuma 2018: on the “Road to Digitalisation” with ARBURG

As an international plastics trade fair, the Fakuma in Friedrichshafen, Germany, has for decades been characterised by a practical focus. This industry event on Lake Constance is consequently a perfect forum for ARBURG to offer a glimpse of the future of injection moulding to trade visitors, allowing them to experience the “Road to Digitalisation” both digitally and in the real world.

“Our ‘Road to Digitalisation’ is a bold and practical statement of the approach we want to take with our customers in order to stay on the road to success in the digital future,” explains Michael Hehl, Managing Partner and Spokesperson for the ARBURG Management Team. “On this road, the customers can gather a host of new ideas and find out in detail about our new digital assistance packages, the benefits of augmented reality in service, as well as access to the new customer portal, for example.”

The road to smart production

The six digital assistance packages offer various control features that actively support machine operators – in line with the production requirements at hand – in order to simplify their work: from start-up, set-up and optimisation through to production, monitoring and servicing (see today 67). The packages have been available since March 2018 – both for the GESTICA and for the SELOGICA control systems.



The ALLROUNDERS in the new design, which are equipped as standard with the four assistance packages “4.set-up”, “4.start-stop”, “4.production” and “4.monitoring” are “Ready for Digitalisation”.

The ARBURG host computer system (ALS), which as the central component of Industry 4.0 and responsible for IT networking, also plays an important role on the road to smart production.

ARBURG Remote Service (ARS), for example, which enables fast, efficient and reliable online support, ensures the provision of a smart service. Augmented Reality (AR) offers great potential thanks to a computer-assisted enhancement of reality with additional virtual information and objects.





On the "Road to Digitalisation" with ARBURG: the future of injection moulding is the key topic for ARBURG at the Fakuma 2018. The new colour-scheme of the ALLROUNDERS provides a new look to the exhibition stand.

Initial insights into the customer portal

For even greater customer proximity in the future, ARBURG is also strengthening its range of services and is presenting a newly accessible customer portal at the Fakuma 2018. Central applications (apps)

information from the injection moulding process and camera inspection via OPC-UA interfaces and assigns it to the relevant part via the QR code. All the process data can be displayed on a part-specific website.

The special “Packaging” version of the hybrid ALLROUNDER 820 H in the new

is used to achieve even higher dynamics, reproducibility and injection speeds. The exhibit produces four thin-walled IML containers with a capacity of 500 millilitres in a cycle time of around 3.8 seconds.

Further highlights include injection moulding “on demand” as a practical example of Industry 4.0 and the production



include the “spare-parts catalogue” and the “machine overview”, which clearly displays important information and documents for each machine.

New: ATCM collects important data

ARBURG is also presenting innovations in the area of machines and turnkey solutions at the Fakuma. The ARBURG Turnkey Control Module (ATCM) for complex turnkey systems is on view for the first time. This visualises the entire process, captures the relevant data and transmits the data sets for archiving or big data analysis to an evaluation system, for example. The ATCM is demonstrated on a turnkey system with integrated assembly, quality control and part marking with a unique QR code. The data collector acquires

of micro-components from LSR. Moreover, the potential of ARBURG Plastic Freeforming (APF) is being presented, as are the available training and service offerings. A dedicated recruiting stand rounds off ARBURG’s trade-fair presence.

The ARBURG stand is always a crowd-puller at the Fakuma (photo on right).

The digital assistance packages (photo on left) feature prominently in the “Road to Digitalisation” area.

design and with the GESTICA control system is also celebrating its premiere. This high-performance machine for the packaging industry features a modified size 2100 injection unit. Adapted valve technology

Three cheers!

World premiere: large freeformer extends range

The formnext, to be held from 13 to 16 November 2018 in Frankfurt am Main, Germany, has successfully established itself as the leading international trade fair for additive manufacturing. In keeping with its great significance, ARBURG will celebrate the world premiere of the freeformer 300-3X there. The machine processes three components and enables – for the first time worldwide – the additive manufacturing of complex yet durable hard/soft combinations.

“The freeformer and ARBURG Plastic Freeforming have become very well established on the market because its users greatly value the benefits of our open system,” says Lukas Pawelczyk, who has been the head of freeformer sales since July 2018. “As the next revolutionary step, we have extended our range with the large freeformer 300-3X, which can process three components. ‘3X’ here stands for the movement axes of the part carrier.”

New possibilities

Martin Neff, head of Plastic Freeforming in the Development department describes the new technical processing possibilities available, “Three-component parts as well as complex yet robust hard/soft combinations can be additively manufactured from qualified standard granu-

lates using the APF process thanks to the large freeformer.”

More space in the build chamber

A further feature he mentions is the wider build chamber, which provides more space for larger parts and small batches, as well as the automatic opening and closing of the build chamber door, which enables automation of the additive manufacturing process. Furthermore, the heated build chamber now only has to be opened for part removal as the nozzles and feed hopper are independently accessible.

Wider range of applications

With the two systems – the freeformer 200-3X and the freeformer 300-3X – ARBURG will be able to cover an even wider range of applications in future. Visitors to the formnext

will be able to gain an impression of these based on the exhibits and the various parts produced.

formnext



Thanks to the new freeformer with the larger build chamber and three discharge units, the range of applications of ARBURG Plastic Freeforming is expanded significantly.



Aroma

LAPP Tec: capsules with

Single serve capsules as used for coffee, for example, are booming in the packaging sector. The latest generation of these capsules is characterised by an injected barrier film which conserves the flavour and aroma, while also saving on material. LAPP Tec AG, based in Diessenhofen, Switzerland, produces these complex moulded parts in high volumes on ALLROUNDERS.

In terms of production and recycling, barrier capsules are an alternative to the previous plastic capsules with secondary packaging and, in particular, to aluminium. This improves the overall environmental balance.

The most frequently asked question regarding the new capsules is, "How does the barrier get into the capsule as an intermediate layer?" The answer: through use of an electric two-component ALLROUNDER 720 A and a complex 32-cavity hot-runner mould featuring integrated needle-type shut-off nozzles. The barrier film made from EVOH is injected between the two outer layers made from PP via co-injection and a special common injection sequence of the two injection units.

SELOGICA makes it possible

Roman Germann, Managing Director of LAPP Tec, explains the process, "To inject the barrier film in the capsules, it has to be possible to set different injection pressures and speeds via the machine control system. The SELOGICA control system enables this thanks to which the injection units can be actuated separately. If this wasn't possible,

counts!

integrated barrier film extend best-before date

we wouldn't be able to produce our capsules in a single production step." adds Bertram Stern, Sales Manager Packaging at ARBURG. "We're familiar with barrier solutions using IML or coating technologies from a wide variety of applications. This know-how and our many years of experience in multi-component injection moulding as well as in the packaging sector allow us to create individual customer solutions of this kind."

Preliminary testing at the ARBURG Customer Center

In the run-up to production, "rehearsals" were held in Lossburg on an ALLROUNDER 520 A and a 4-cavity mould. The necessary technical prerequisites for the reproducible production of the food-grade certified SKINCAP®s were tested. These included high performance, combined with speed, efficiency and part quality. According to Roman Germann, the principal issue was, "whether we'd be able to continuously achieve perfect filling of the capsules in the mould despite the very thin barrier film measuring only a few microns."

400,000 capsules per day

In May 2017, high-volume production then started on an electric two-component ALLROUNDER 720 A. Equipped with a 32-cavity mould, this machine produces more than 400,000 capsules a day in a cycle time of under six seconds.

Multi-cavity systems of this kind are of course relatively rare on the market as it is challenging, for ex-



Video

ample, to inject the barrier film at a consistently high level of quality in all the mould cavities. An automation solution featuring an IML unit is used for fast removal and customised decoration of the capsules. An integrated in-line inspection system ensures the reliability of the aroma barrier film.

First-class cooperation

"In addition to the technology itself, the decisive purchasing criteria for us were the high speed and priority with which the project was managed by ARBURG: from the preliminary phase through to implementation," says Roman Germann. "When difficulties arose, which is nothing unusual with a project of this scale, they were solved very quickly and unbureaucratically. For this reason, the quality of the consulting and service offerings are also an important criterion for us, which speaks in favour of a cooperation with the system supplier ARBURG."



The SKINCAP®s preserve the aroma of the coffee and save material (photo on left). Siegbert Lapp, Chairman of the Supervisory Board of the LAPP Group, and Graziano Pedroja, Member of the Board of Directors of LAPP Tec AG, examine the high-quality production process on site (top left photo, left to right).

INFOBOX

Name: LAPP Tec AG

Founded: 1989 by Siegbert and Andreas Lapp

Locations: Diessenhofen, Switzerland

Industries: electrical, solar, electric mobility, manufacturing, food

Products: food packaging, connectors, cable glands, technical products

Employees: over 40

Machine fleet: 18 injection moulding machines, of which twelve are ALLROUNDERS

Contact: www.lapptec.com

Ceramics provide a

FCT Ingenieurkeramik: CIM sliding shoes reduce power consump

The use of sliding shoes made from the high-performance ceramic material silicon nitride (Si_3N_4) have a decisive advantage in controllable water pumps in automotive manufacturing: optimised friction. In motor vehicles, this results in both reduced power consumption and reduced CO_2 emissions. These sliding shoes are produced by FCT Ingenieurkeramik GmbH (FCTI) in Frankenblick, Germany, using a ceramic injection moulding process.

The sliding shoes produced by FCTI from Si_3N_4 replace a DLC (Diamond Like Carbon) coated steel part. The ceramic parts are not only more durable, but also more robust: during a defined test sequence

lasting 6,000 operating hours, they displayed virtually no signs of wear.

Water pumps for VW

The task of the sliding shoes is to convert the rotary motion into a linear piston movement in an axial piston pump. They simultaneously serve for media routing as an active thermal management component. For this reason, resistance against water,

acids, bases, fuels and antifreezes, low weight, high-temperature resistance and high dimensional stability as well as a reliable manufacturing process are required. In this context, a high level of traceability, quality and flexibility must be ensured during high-volume production of the sliding shoes. The controllable water pumps are used in vehicles of the VW Group.

Successful partnership

The partnership between the developer and customer, NIDEC GPM GmbH (NGPM), Auengrund, Germany, and the manufacturer, FCTI, extended, for example, to the production of prototype parts, various bench tests and the construction of a first trial mould featuring near-production contours. This was followed by a further testing programme lasting several months in order to comply with all the standards and requirements. Frank Stegner, Project Manager Automotive at FCTI, remembers: "From feedstock manufac-

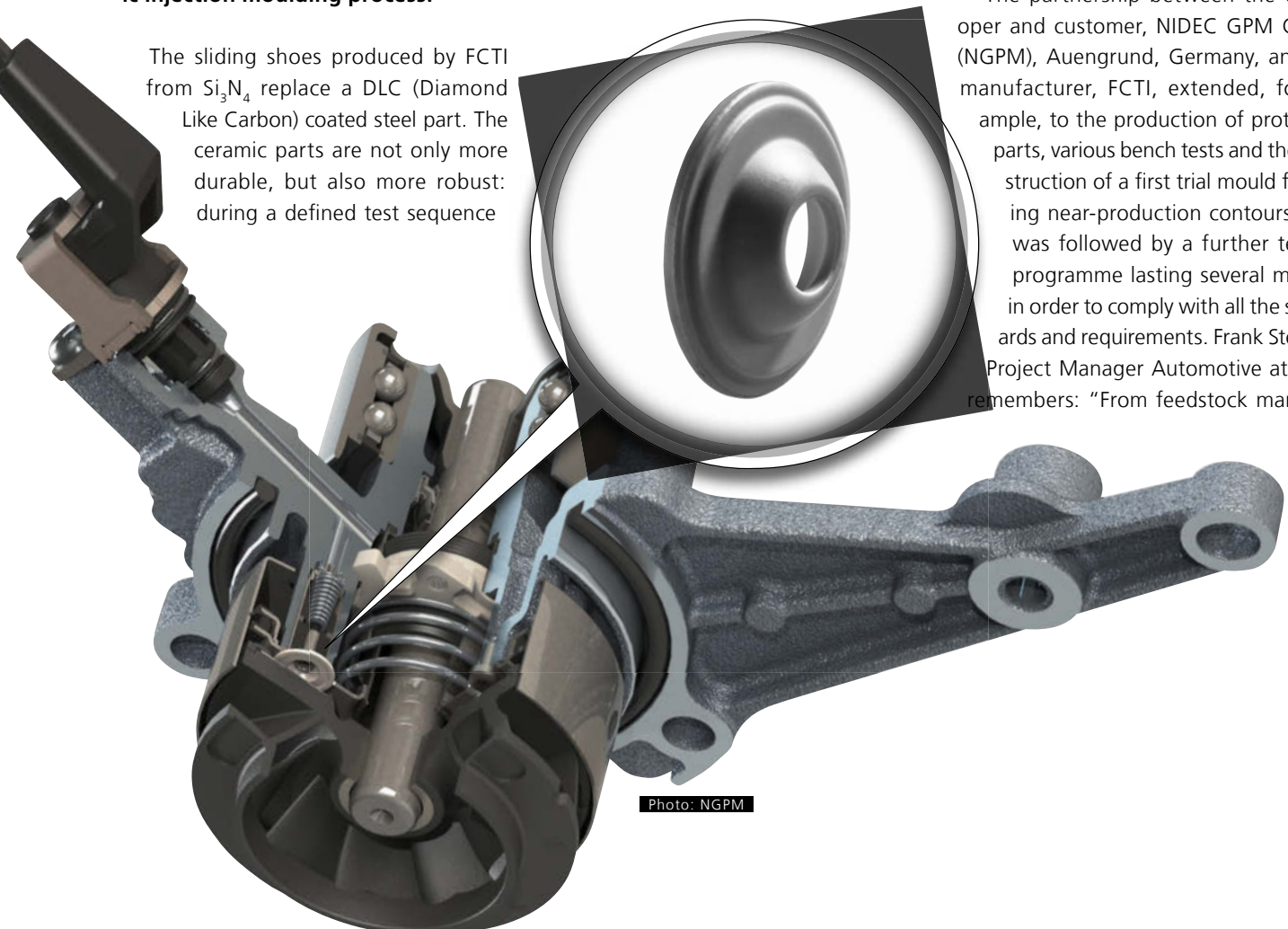


Photo: NGPM

Added value

Production and CO₂ emissions

turing through to injection moulding, the debinding and sintering process through to vibratory grinding and final surface grinding, we were able to document the entire production and machining sequence. ARBURG was not only involved through its injection moulding technology, but also with its in-depth feedstock and process expertise. It wasn't least owing to this knowledge that we were awarded the contract."

Since September 2017, FCTI has been producing the ceramic sliding shoes on two hydraulic ALLROUNDER 270 S machines equipped with 4-cavity moulds. Part removal and set-down in trays is performed by a six-axis robot on both machines. The green compacts shrink by approx. 20 per cent during sintering. This is followed by the machining steps of grinding, lapping and polishing.

Impressive figures

Frank Stegner is highly satisfied with the cooperation between FCTI and ARBURG: "We already received excellent advice in the run-up to the machine purchase – from extensive preliminary tests through to customised compound development. ARBURG's extensive experience in the field of CIM helped us a great deal." As a positive "side-effect" of the change from a steel to a ceramic sliding shoe, he quotes the following figures: "The use of the



Photo: FCT

The sliding shoes made from high-performance ceramics are used in motor-vehicle water pumps (bottom left photo). They are produced on an ALLROUNDER equipped for ceramic injection moulding (photo on left).

ceramic material has led to reduced friction losses. This means that both the power consumption and the CO₂ emissions can be sustainably reduced. The power consumption of each water pump has been reduced by approx two watts. Over two million pumps, this represents an annual saving of some 4,000 kilowatts. Extrapolated to an average annual mileage of 14,000 kilometres per car at an assumed average speed of 50 kilometres per hour and an average driving time of 282 hours, this results in a CO₂ saving of about 983 tonnes."

INFOBOX

Name: FCT Ingenieurkeramik GmbH
Founded: 1996
Location: Frankenblick, Germany
Industries: process technology, aerospace, lightweight construction, automotive, power-plant and machining technology, electronics
Products: parts and components made from high-performance ceramics for metering and feed pumps, lightweight structures, workpiece holders, burner nozzles, deep-drawing dies, transport and forming rollers, gear wheels
Employees: approx. 135
Machine fleet: two ALLROUNDERS
Contact: www.fcti.de

All new!

Design: facelift for ALLROUNDERS and brochures

The adage “ugliness doesn’t sell well” has held true at ARBURG since the development of the very first injection moulding machine. It is a matter of course, therefore, that the flagship ALLROUNDER 1120 H was given an innovative machine design, including a new colour scheme. Now, the next milestone is the conversion of the entire machine portfolio to the new livery.

At the Fakuma 2018 in Friedrichshafen, Germany, visitors are seeing a completely new look at the ARBURG exhibition stand: all of the ALLROUNDERS feature the new ARBURG colour combination of “mint green/light grey/dark grey”, which is being introduced for the entire product portfolio from January 2019.

Juliane Hehl, who is responsible for the Marketing department in her role as Managing Partner, outlines the reasons why: “With the visionary appearance of the ALLROUNDER 1120 H and the GESTICA control

system, we have ushered in a new era in terms of machine design. The challenges in doing so were not only to implement an aesthetic design and a modern language of colours and shapes, but above all to enhance functionality and ergonomics.”

New look all-round

“We then went on to adapt the new machine design to further large machines,” says Juliane Hehl. “As a next decisive step, we are now rolling out the new colour-scheme – not the design – for all the ALLROUNDERS in order to lend our entire range of injection moulding machines a uniform, modern look.”

In keeping with the new-style ALLROUNDERS, the print information system has also received a facelift. Here, in addition to appearance, functionality also plays an important role. Large scale

images in conjunction with compact texts provide a quick overview of all the noteworthy details.

“Whether machines, brochures or exhibition stands – design is always a priority for us because in machine construction, the eye contributes significantly to purchasing decisions,” explains Juliane Hehl. Her father, Eugen and her uncle Karl Hehl – the sons of company founder Arthur Hehl, who made ARBURG into a global leader among injection moulding machine manufacturers – was certain of this, even back in the 1950s.

Design communicates high-tech

According to the previously mentioned adage “Ugliness doesn’t sell well”, before the market launch of the first standard machine, a wooden model was tinkered with until a suitable design had been found that underscored the innovative technology. A further milestone came in 1995 with the colour change from the hammered-finish reseda green to the “mint green/colza yellow” combination. Now, with the new colour scheme, the successful and multiple-award-winning design history of ARBURG is moving forward into the future.





Prize-winning design

The success of the product design has been evidenced through the awards of globally established and prestigious design prizes: the ALLROUNDER 1120 H, for example, obtained the iF Design Award 2018 and the GESTICA control system the Red Dot Award 2018.



Managing Partner Juliane Hehl proudly displaying the “iF Design Award 2018” for the ALLROUNDER 1120 H.



reddot award 2018
winner

No blood spilt

Jako meditec: patented wet-in-wet process for freeze-stored blood samples

Jako meditec specialises in the injection moulding of tubes with closure caps and racks in which blood samples from blood donors are kept deep-frozen for many years. Each sample can be uniquely traced thanks to a DM code. The two-component tubes are produced using a special, patented wet-in-wet injection moulding process.

Jako meditec from Szekszárd, Hungary, produces the tubes for medical and laboratory applications worldwide. One major customer is the French Blood Donor Centre, others include institutions in the US, Australia and Europe. The Asian market is also increasingly becoming a focus. The Blood Donor Centre has four blood sample stores in which two samples are kept for three years at -35 degrees centigrade following each donation. If, for example, an infection with hepatitis or HIV is discovered following a transfusion, the relevant blood sample can be identified and analysed. A prerequisite for this is unique traceability of the sample.

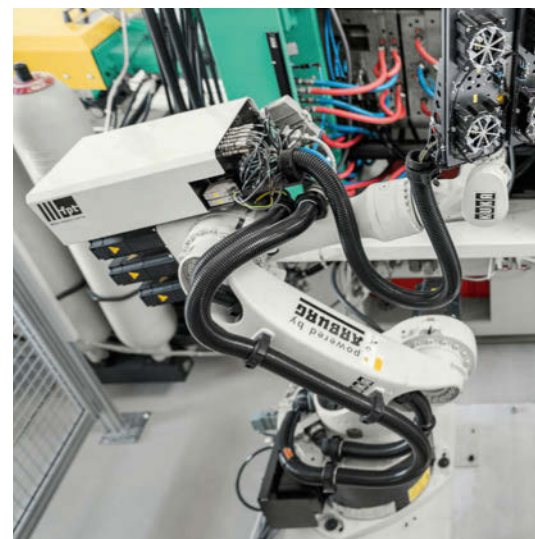
Wet-in-wet process

For this purpose, a DM code is applied to the base of the tube, which can be queried via the database in real time. To ensure clear legibility, Jako relies on two-component injection moulding using the so-called wet-in-wet process. "We produce transparent tubes made from PP

with a black base. In distinction to conventional two-component injection moulding, we dispense with a rotary or sliding-split mould, because their use could subsequently cause cracks during thawing of the blood samples," says Stephan Hauri, Jako Project Manager for plastic injection moulding. "Instead, both components are injected almost simultaneously into the mould. Here, they flow towards each other and fuse together when they meet."

Injection moulding docked to clean room

"Senior boss Adam Koch had the idea for this process. This sophisticated innovation was jointly implemented with ARBURG Hungary and the German mould manufacturer POLAR-FORM," says Jako's Managing Director Joachim Koch, who is more than satisfied with its performance. "The control system operates with a precision down to a hundredth of a second during injection. This enables reproducible production processes and consistently high part quality. Our first 8-cavity mould performed well in excess of two million shots." Today, among other equipment, a hydraulic production cell with a 32-cavity mould docked to a class 8 clean room is used for production of the tubes. The centrepiece of the cell is an ALLROUNDER 570 S with a clamping force of 2,200 kN and two size 170 clamping units. A six-axis robot removes the moulded parts and sets them down



in the cavity pattern following separation of the sprues. The tubes are then conveyed into the clean room via hoses by means of compressed air, where they are interim stored and finally assembled, labelled and inspected according to customer specifications on special machines. "For this purpose, we work with island solutions," explains Stephan Hauri. "One machine places the tubes in racks, checks for leak-tightness, labels the racks with the customer logo and a 2D code as well as applying the DM codes to the bases. At two further islands, printing of the products with a heat embossing foil and a camera inspection take place. The quality and positioning of the codes is checked using a camera system." Further machines perform an automated vacuum



100 sample tubes



Jako produces around one million tubes a month (top photo). Handling of the moulded parts, including set-down according to the cavity pattern, is performed by a six-axis robot. In the clean room, some of the products are subjected to an optical follow-up inspection (photos on left).

check and fitting of the closure caps. The tubes are available with internal or external threads, in seven sizes with capacities from 0.2 to 4 millilitres.

One-hundred percent traceable

In total, five ALLROUNDERS and around 20 moulds with between one and 32 cavities are in operation to produce the appropriate screw caps, TPE plugs and seven different rack types. Depending on the mould, the cycle times are between 16 and 22 seconds. Random samples are removed from production and product specific tests are performed on an hourly basis. To ensure one-hundred percent traceability, Jako carries out a verification scan on each tube. This is double stored in

the company's own databases located in different buildings. From here, all the scan results can be retrieved in real time.

Production takes place five days a week in three shifts. "This year, we're planning to produce around one million tubes per month," explains Joachim Koch. His brother Andreas Koch, also a Managing Director adds, "The ARBURG machines have been in continuous operation very reliably since the start of production in 2014 and have proven extremely well suited to their task."

INFOBOX



Name: Jako meditec GmbH
Founded: 2015 by Joachim and Andreas Koch
Location: Szekszárd
Turnover: around 2 million euros
Production area: 800 square metres
Employees: 35
Industries: medical technology
Products: tubes, closures and racks for blood samples
Machine fleet: five ALLROUNDERS
Contact: www.jakokoch.com

Quality more impor

Aesculap: freeformer for medical products from original material

Those who have been using additive manufacturing for medical technology since 1993 are ahead of the game. This is the case with Hans Keller, Director Research & Development Production at Aesculap AG in Tuttlingen, Germany. He knows what he's talking about: "With our additive products, the set-up time plays only a minor role. Precision and part quality are much more significant. This is where the freeformer can clearly excel."

Aesculap AG is a subsidiary of B.Braun Melsungen AG and, as a "Premium Solution Provider", offers all the aids necessary for patient care from conventional surgery, orthopaedics and laparoscopy through to vascular therapy and the treatment of degenerative spinal conditions. This is where the area of additive manufacturing comes in. This has been used since 1993, initially with the rapid prototyping of mould construction components, then with small production runs in the instruments sector.

High volume production enhanced

Today, additive manufacturing at Aesculap covers a wide range of applications: with the various machines and systems, individual three-dimensional patient templates, training models for surgery and measurement programs for high-volume parts can be created. These are complemented by additively manufactured parts for mould design and configuration as well as the development of individually

adapted geometries, e.g. for patient-specific implants.

With the freeformer, Aesculap has ramped up its high-volume production activities. This is because, particularly in medical technology, the main focus is on options such as the processing of bio-compatible materials or the quality, strength and immediate use of parts.

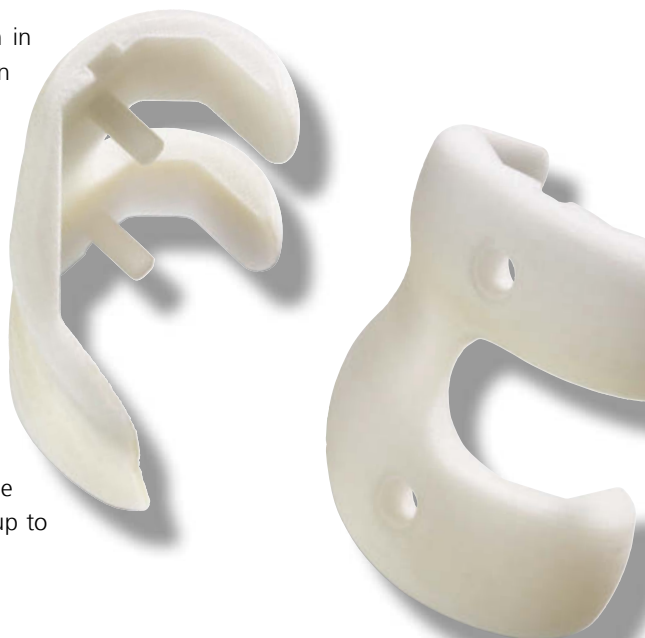
APF offers advantages and saves costs

"Here, the freeformer offers significant advantages: the processing of original materials, e.g. of medically approved, resorbable PLLA, the high quality of the parts produced owing to extremely small layer thicknesses or the option of manufacturing hard/soft combinations," says Hans Keller.

At the end of the day, much in medical technology comes down to costs, for example in the case of specially adapted bone components and implants, which are in ever greater demand for individualised patient treatment. For this purpose, medical products such as sawing templates and trial implants can be custom built from plastic. Here, ARBURG Plastic Freeforming (APF) offers huge cost benefits, as Hans Keller emphasises, "Whereas the special plastic materials cost us up to



200 euros per kilo on average, we can use commercially available plastic granulates at a fraction of the cost with the freeformer."



tant than build time



Hans Keller, Director Research & Development Production at Aesculap, is delighted with the potential of the freeformer (photo on left), e.g. for the manufacture of prototypes such as the rongeur forceps (photo above) as well as for trial implants and drilling templates (photo at bottom).

Further freeformers planned

Hans Keller is optimistic about the coming years and the developments in the use of additively manufactured plastic parts in medical technology. This also means that he is likely to purchase further freeformers for small-volume batch production worldwide.

On the technical aspects, he has the following to say: "At the start of prototype manufacturing with our freeformer in February 2018, we soon noticed where the advantages and development potential of the system lie. Under practical conditions, we have so far gathered experience with PA and ABS as well as with the support material Armat 21. Further materials such as PLLA, which we qualify jointly with ARBURG, expand the application range of the freeformer with regard to our requirements. This re-

lates, for example to processing and build chamber temperatures, as well as the size of the nozzles employed. A fourth CNC axis would also be desirable so that we can also apply plastic materials onto hollow bodies."

INFOBOX

Name: Aesculap AG

Founded: 1867 by Gottfried Jetter

Location: Tuttlingen, Germany

Industries: medical technology

Products: surgical instruments, implants, suture materials, sterile containers, storage, motor and navigation systems, cardiology products

Employees: 12,200 worldwide, 3,630 in Tuttlingen

Machine fleet: 16 systems for sintering and additive manufacturing, of which one freeformer

Contact: www.aesculap.de

On the way towa

IMP: advantages through networked and au

IMP S.p.A. from Saronno, Italy, has long cooperated with ARBURG and for some time been involved in-depth with the topic of Industry 4.0. The many-times certified company produces complex components for the automotive, electronics and equipment industries. This is often associated with high demands and a consistently high quality standard. Not least for this reason, the two injection moulding locations were networked using the ARBURG host computer system ALS. This results in significantly more flexible and transparent production and one-hundred percent traceability.

IMP is a leading Italian company specialising in the design and construction of moulds for the production of high-precision parts made from thermoplastics and thermosets. "We very much appreciate that we always receive fast and highly competent support from the ARBURG experts," summarises Gabriele Malvestiti, Managing Director at IMP, regarding the excellent and trustful cooperation since 1988. "We want to further optimise our manufacturing processes with the aid of Industry 4.0 solutions and are convinced that we will thereby gain an edge in terms of quality with respect to many of our competitors. An important step in my view is the introduction of an MES system." Here again, IMP relied on ARBURG's expertise and has been working with the host computer system ALS since 2014. All 126 injection moulding machines, of which 71 ALLROUNDERS, are networked with ALS. To ensure high part quality, 80 percent of the machines are automated, particularly with INTEGRALPICKERS and linear robotic systems such as the MULTILIFT V.

The automotive parts include gear units, connectors, lead frames, brush holders and coil bodies. Vertical ALLROUNDER T rotary table machines are used primarily for the overmoulding of metal inserts. These include rotor and stator packages and precision stamped parts, particularly starters, electric drives and locks for the automotive industry. Production takes place in three shifts, five days a week.

Flexibility is a major strength

"In 2018, IMP is celebrating its 40th anniversary. Thanks to the many years of experience, we have confirmed our leading position on the international market. Our development and improvement carry on continuously," says Gabriele Malvestiti. In the meantime, he adds, IMP is increasingly involved in the electric motor business and is working together with tier 1 and top players to develop overmoulded rotors and stators on half and fully automated production lines. The company is also specialised in the development and manufacture of moulds, of which around 1,500 are currently in use.

Flexibility is one of the main strengths of supplier IMP, which carries out some 40 to 50 mould changes a week. "Because we control the entire production process, we can offer our customers very competitive total costs of ownership (TCO)," explains the Managing Director. "It is therefore essential that the machines are fast to set up and make ready for production. Normally, the planning requires around ten days lead time, but we're also flexible enough to cater to our customer's "last minute requests."

"The intuitive-to-operate ALS allows us to achieve organised and precise planning as well as good machine capacity utilis-



roads Industry 4.0

Automated injection moulding production



In his several-times certified plant, IMP Managing Director Gabriele Malvestiti (left) relies on ALS and Industry 4.0. He has long been working together with Björn Noren, Managing Director of ARBURG Italy.

tion and creates transparency," adds Roffi Luca, IMP Sales Director, who is also responsible for ALS.

ALS networks two locations

"In the past, we did the planning manually, which was quite laborious. Owing to human error and inefficient manual calculations, this proved to be relatively expensive. With ALS, the planning is significantly faster, more flexible and standardised. We've used it to network our two injection moulding plants and have since achieved more stable production processes." IMP also integrated further systems such as optical inspection systems into the host computer system. "Our objective is to create a report that records and directly compares all the quality-relevant parameters from the injection moulding process together with the results of the quality measurements," says Gabriele Malvestiti describing a further step towards transparent and smart injection moulding produc-

tion. He also sees great potential for ALS with regard to energy management at his ISO 50001 certified plant. "In future, we'd like to determine the actual energy requirements for individual injection moulding machines, production cells and even complete production lines with the aid of ALS. We can network this data with the process data and evaluate it, for example according to order."

INFOBOX

Name: IMP S.p.A. (Industria Manufatti Plastici)

Founded: 1978 by Alberto Proserpio

Locations: Saronno (headquarters) and Lurago Marinone, Italy

Turnover: 31 million euros (2017)

Employees: approx. 200

Industries: automotive, electronics, electrical engineering, mechanical engineering, semiconductors, food and medical technology

Products: gear units, connectors, lead frames, pumps, components for electric tools and closures, overmoulded rotors and stators, two-component parts and housings

Machine fleet: 126 injection moulding machines, of which 71 ALLROUNDERS

Contact: www.imp-spa.com



Thriving production

TN Plastics: efficient production of thin-walled containers

They are needed in thousands of units in Dutch greenhouses: plant pots. At Ter Aar in the Netherlands, TN Plastics produces these thin-walled containers using hybrid HIDRIVE ALLROUNDERS: in high quality and large volumes, around the clock, 363 days a year and above all with the efficient use of all resources.

TN Plastics is a pioneer in the production of organic packaging and containers with the smallest possible wall thicknesses and, accordingly, low material consumption, as well as in the recycling of the in-house produced plant pots through regranulation. In the Netherlands, this system is promoted under the name "Rethink".

HIDRIVE in packaging version

For production of the thin-walled plant pots, the company relies on hybrid ALLROUNDER H machines in the "Packaging" version. "We operate a high-speed thin-wall production with 1 and 2-cavity moulds in cycle times from 3.8 seconds. The material savings through reduction of the wall thickness in high-volume production ensures cost-effective manufacturing. We also conserve resources through the use of our own PP recycle," says



Thomas Nieuwenhoff, owner of TN Plastics, describing the double savings effect.

Ten HIDRIVE machines have progressively been purchased over the past three years. Their process stability and reliability are the advantages that TN plastics values. But their high performance is also important: the high injection speed of the ALLROUNDERS, for example, is utilised to implement the very high L/D ratio needed to achieve the required flow paths.

Each of the high-performance machines operates in three shifts, 8,700 hours a year, completing seven million cycles. "This practice makes it clear that we can't

afford machine downtimes. In this regard, we have always been able to rely on the ARBURG injection moulding technology," says Thomas Nieuwenhoff.

Detailed coordination

The high-end hot runner moulds are so special, that only three mould manufacturers are able to produce them. Here again, the required quality in large-volume production and a long service life are essential.



Photo: Adobe Stock



Photos: TN Plastics

Product quality is meticulously inspected (photo on left): Thomas Nieuwenhoff, owner of TN Plastics (left) and Gerrit Hazeleger, Managing Director of ARBURG BV, are thoroughly satisfied. Production of the thin-walled containers (photo on right) places high demands on the machine, mould and process.

Savings down to the last tenth of a second

In order to save the last tenth of a second in production, the containers are removed by MULTILIFT V robotic systems with a dynamic vertical axis. Application-specific cooling water distribution and heating control circuits ensure that production changes can be performed swiftly. "But we also value the complete integration of the robotic systems in the SELOGICA machine control system in accordance with the principle 'one control system and one sequence programme

for smooth production'", says Thomas Nieuwenhoff.

"TN Plastics and ARBURG BV have enjoyed a long-standing partnership," says Gerrit Hazeleger, Managing Director of the Dutch ARBURG subsidiary in Utrecht. "With the foundation of TN Plastics, the company purchased its first injection moulding machine from us and it's still in use today." Thomas Nieuwenhoff adds, "ARBURG's concept of consulting, machine, robotic system, financing, application technology support and after-sales service from a single source with the added value it offers convinced us from the outset."

INFOBOX



- Name:** TN Plastics BV
- Founded:** 2005 by Thomas Nieuwenhoff
- Location:** Ter Aar, Netherlands
- Industries:** food industry, horticulture and floriculture
- Products:** plant pots, paint tubs and food packaging
- Employees:** approx. 40
- Machine fleet:** 33 injection moulding machines, of which 13 ALLROUNDERS
- Contact:** www.tnplastics.nl

A big heart for sick children

Karsten Kallinowsky: entrepreneur establishes foundation

In May 2016, the little Sophia, whose nickname was Mulle, died of a brain tumour at only three years of age. The following year, on her birthday, her father Karsten Kallinowsky, the owner of Allit AG, set up the Sophia Kallinowsky Foundation. Since 26 February 2017, this has very successfully supported children suffering from cancer and their attending physicians.

Karsten Kallinowsky dedicates the same level of commitment to the foundation (www.ophia.foundation) as he does at the plastics plant for stacking boxes and toolboxes that he manages jointly with his brother Jochen in Bad Kreuznach. Consequently, a six-figure sum in euros was raised in just over a year.

Individual therapy and treatment

From these funds, a so-called Xcelligence technology platform was purchased in May 2018 for the Centre of Paediatrics and Adolescent Medicine at the University Medical Centre in Mainz, Germany, where Sophia had been treated. This can analyse a large number of cell samples from cancer tumours in a short time.

In 2016, some 500,000 people contracted cancer in Germany, of whom around 2,000 were children. New therapies are continuously being developed for adults, which cannot however be applied one-to-one to children.

"If Sophia's death is to have any kind of meaning, then it lies in the idea of a foundation that it inspired in me," explains Karsten

Kallinowsky. "We want to help the young patients and also the doctors. In future, individually tailored cancer therapies and new treatment methods must be made available specifically for children."

The foundation, however, does not only support research, it also ensures joyful moments for the sick children and their families:

"The courageous and incredibly patient children deserve a treat so that they can forget their illness for a short while," says Karsten Kallinowsky. He goes on to explain that last year, for example, a covered wagon tour and an ice cream event were organised at the university hospital.

Own products and events

Furthermore, the foundation owns a vineyard in Winzenheim. Here, three events are held each year. The vineyard is also a good source of income: juice, wine and sparkling wine are produced from the grapes and sold – since recently even in China. Further foundation products include be-brave bracelets, lucky Buddhas, cuddly toys and the "Mulle box" – all in Sophia's favourite colour, green. Further funds are raised via donations and public



Photo: Private

The early death of his daughter Sophia prompted Karsten Kallinowsky to establish a foundation to help other children suffering from cancer.

benefit events, including a crime-solving dinner in Allit's vaulted cellar, for example. One matter dear to Karsten Kallinowsky's heart is still outstanding: a research project specifically for the therapy of children suffering from cancer. "For this purpose, we intend to establish an endowment professorship at the university hospital in Mainz," explains Karsten Kallinowsky with regard to his current objective. "Because every investment in research is also an opportunity for healing!"



Status and outlook of the Asian PIM industry

Dr. Peng Yu
Department of Materials Science and Engineering,
University of Science and Technology of China,
Shenzhen, China

June 5, 2018 at Arburg conference



PIM world visit

Powder injection moulding: 200 experts at global ARBURG conference

Some 200 experts from 23 nations met for the second international PIM conference at ARBURG in June 2018. Eighteen high-profile speakers provided an insight into the future of the powder injection moulding (PIM) of parts from metal or ceramics. The unique industry event was rounded off with live applications, panel discussions and a tour of the plant.

“As a market leader and pioneer with 55 years’ experience in powder injection moulding, we once again created an excellent platform for constructive contributions and intensive expert exchange at the second PIM conference,” summarises Stephan Doehler, European Sales Director, who has headed ARBURG’s PIM team for around 20 years. Hartmut Walcher, a member of the PIM team for almost three decades adds, “The participants agreed that there is barely another event that offers such a comprehensive insight into the global PIM activities and

the latest developments in materials, machines, moulds and process technology.”

High-profile speakers

Furthermore, the conference offered plenty of opportunity for the international experts from the worlds of science and research, industry and business to engage in networking.

In total, eighteen speakers from the US, Europe and Asia provided a variety of insights into the processing of metal and ceramic powders. Parts and material producers also reported on the latest developments.

Live applications in the Customer Center

To demonstrate the potential of PIM at first-hand, ARBURG had prepared some sophisticated PIM applications jointly with partners. At the Customer Center, several ALLROUNDERS produced e. g. turbine wheels from a super alloy, bionically optimised MIM heat sinks for LED luminaires,

At the ARBURG PIM conference, Dr. Peng Yu from the South University of Science and Technology of China provided an overview of the Asian PIM industry.

thin-walled MIM backs for smartphones and micro-sized CIM insulators for model train sets. The specialist programme was rounded off by a factory tour offering insights into production and assembly at ARBURG.



Ready-for-use

Knipping: reliably connecting electrical system and multifunction

Knipping Kunststofftechnik King Plastic GmbH has for years worked with large car manufacturers and their OEMs worldwide. Reliability, reproducibility and durability are written large – for example when it comes to safety-relevant parts. This includes the device holders for body control modules relays and further vehicle electronics components. These are produced fully assembled and equipped with all the electronics components on five identical turnkey systems.

The cooperation between ARBURG and Knipping goes back to the company's year of foundation, 1959. Its specialities include the processing of special materials such as highly technical materials and the high level of automation in production. In addition to part and sprue removal, downstream peripherals such as counters or scales, for example, are integrated.

High demands on device holder

One of Knipping's highly challenging products are device holders that ensure the smooth communication between vehicle electrical system and multifunction steering wheel. Their production using turnkey systems from ARBURG enables the

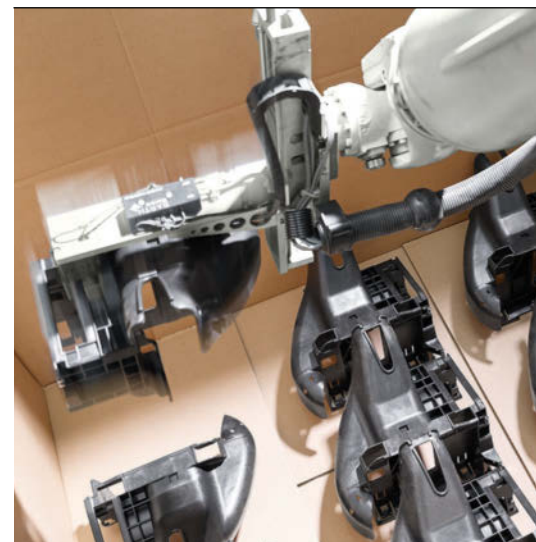
automation of the entire manufacturing process through to the packaging.

Automation through to the finished product

All components – the ALLROUNDER 920 S, the KUKA six-axis robot featuring the SELOGICA user interface, the sorting devices and the roller conveyor – are directly integrated via interfaces and can be centrally managed via the SELOGICA control system.

"For us, it's particularly important that the parts leave the system ready-for-use and without re-work, directly to the dispatch area," says Markus Schaaf, Plant and Production Manager at Knipping in Gummersbach, Germany. He goes on to say that the company is equally satisfied with the price/performance ratio of the system as well as with the project support and the ARBURG service.

"Especially with such complex challenges, we need partners who can quickly familiarise themselves with the issues and understand what we need as customers," explains the Production Manager. He adds that the overall package was precisely adapted to the requirements and could therefore be smoothly integrated into the production environment.



Integrated assembly

The moulded parts are characterised by their compact design. For their production, Knipping uses a single-cavity hot-runner mould with a needle-type shut-off nozzle that integrates complex core pull functions which, due to the complex part geometry, move simultaneously with the mould movements. After the injection moulding process, the parts are removed by the robot and transferred to an assembly station. Positionally correct feed of the assembly parts is realised via linear tracks and a crosswise separator. Presence of the parts is monitored



steering wheel

Snap nuts and relay holders are separated (top left photo) for assembly of the device holders following injection moulding (top right photo). The finished parts are set down, e. g. in cartons by the six axis robot (photo on left).

before they are precision fitted onto the moulded part via centring elements.

At the first insertion station, three snap nuts necessary for screw mounting are pressed in reproducibly with positional accuracy and at relatively high force. Following rotation of the part to a second position, the relay holders (diagnostic holders) are inserted and fastened into place. Their correct position is checked using a photoelectric barrier.

The fully assembled device holders are then set down into cartons or plastic packaging in three layers by a six-axis robot. Thanks to the long cooling time of the plastic parts, all the assembly and monitoring operations can run within the cycle time. An automatic material supply system ensures a high level of system autonomy.

All-round satisfaction

All of the system components down to the moulds were put together by ARBURG and integrated, tested and released at the parent plant in Lossburg. Markus Schaaf is thoroughly satisfied with the entire course of the project and the consulting, "From planning to commissioning, everything was thought through and consistently implemented. Collaboration with the Turnkey department was exemplary. Even small chang-

es were successfully integrated and implemented. This is also the reason why we've already ordered a sixth system."



Satisfied all-round with the result: Knipping Production Manager Markus Schaaf (left) and ARBURG Sales Consultant Reinhold Baar-Bartelt.

INFOBOX



Name: Knipping Kunststofftechnik King Plastic GmbH

Founded: 1959 in Gummersbach as King Plastic GmbH through Arnold Knipping

Locations: four in Germany, one in Hungary and one in Mexico

Industries: automotive

Products: technical components and safety components

Employees: 800

Machine fleet: 35 injection moulding machines, of which 21 ALLROUNDERS

Contact: www.king-plastic.de



TECH TALK

Oliver Schäfer, Technical Information



Cooling on demand

Options for mould temperature control using cooling circuits

Repeatable quality of the moulded parts, fast cycles and shorter set-up times: mould cooling adapted to the production requirements at hand offers significant optimisation potential for injection moulding production. Various equipment options are available for the setting, monitoring and control of cooling circuits. All of the solutions underscore one aspect: injection moulding machines are becoming increasingly smarter.

The standard equipment of the ALLROUNDERS includes an easily accessible, central cooling water manifold with several adjustable connections on the rear of the machine. These can immediately be used for mould temperature control and return cooling of temperature control units. For this purpose, the

number of free cooling circuits can be flexibly extended.

Evaluating the temperature and flow rate

For greater process stability, programmable cooling water circuits are available. The nominal temperature values can be entered into the machine control system and also stored in the relevant data set. In addition to greater operating convenience, it is also possible to continuously monitor and control the actual temperature values in the return – or, alternatively, via an external sensor in the mould.

As an additional expansion stage, cooling circuits with flow rate measurement are available. With these, the flow rates in the return can be included in the individual online process monitoring in addition to the temperatures. Tolerance bands can

be set for each monitored cooling channel. Interference variables such as clogged filters, deposits in cooling channels or kinked lines can be reliably detected and utilised for quality assurance.

If the values are outside the defined limits, for example, the bad parts in those cycles can be sorted out. The influence of interferences on part quality is eliminated. Moreover, it is possible to additionally equip the cooling channels with a volume regulation system.

Thermally stable processes

For greater operating comfort, the connections of the central cooling water manifold can be moved to the mounting platens. This simplifies the set-up process significantly. Especially on moulds with numerous cooling circuits and high-speed applications with high cooling water flow



rates, so called pipe manifolds are recommended. These are also arranged at the fixed and moving mounting platens and feature a separate water connection. The temperature level is thus independent of the machine cooling system.

Cooling no longer a “black box”

In order to ensure thermally stable processes with pipe manifolds and a high degree of reproducibility, flow rate measurement can also be implemented in this case – either in the feed or the return, for single or for all circuits. The nominal temperature and flow rate values can be entered into the machine control system and monitored.

The numerous versions and particularly the option of integration into the machine control system make it clear that mould cooling has no longer been a “black box”

for some time now. The nominal values for cooling temperatures, as well as the quantities of cooling water, can also be stored in the data set. The relevant actual values can be continuously monitored, logged in the form of tables and graphics, as well as automatically controlled. All of this contributes towards a reproducible production process and makes the machines smart. The basis for this is the increasing IT networking – also known as Industry 4.0. Despite the advances in digitalisation, it will remain important in future for perfect water quality. The relevant reference values relating to hardness, pH value, as well as copper and iron concentrations, plus instructions for cleaning are contained in the operating manual.

Programmable cooling water circuits ensure higher process stability. The nominal temperature values can be entered in the control system and saved to the relevant data set.

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