

today

The ARBURG magazine

Issue 62

2016

OSA SOGNARE
你好, 梦想
ATRÉVETE A SOÑAR
HALLO TRÄUME
DARE TO DREAM
OSEZ RÊVER



WIR SIND DA.



4 World premiere:
ALLROUNDER 1120 H – new size,
new control system, new design

7 K 2016: ALLROUNDERS, freeformers,
Industry 4.0 and much more



10 Industry 4.0: Personalised products
through networked production

12 ALLROUNDER CUBE: Predestined
for packaging technology



13 Gerhard Böhm and Eckhard Witte:
Premium service

14 Faller: Hybrid ALLROUNDERS for
thin-walled model parts

16 Smart factory: Industry 4.0 in
ARBURG production



17 Lightweight construction:
K.D. Feddersen specialist conference
at ARBURG

18 Hoefler & Sohn: Automated injection
moulding of 3D touch panels



20 Advanced Molding Technologies:
International benchmark leads to ARBURG

**22 SKZ (Southern German Plastics
Centre):** freeformer for research and
services



24 Manuex: 21 plastic parts for
IKEA kitchen drawers

26 Tech Talk: Euromap 77 interface
improves data exchange on injection
moulding machines

IMPRESSUM

today, the ARBURG magazine, issue 62/2016

Reprints, including excerpts, only with express permission

Responsible: Dr. Christoph Schumacher

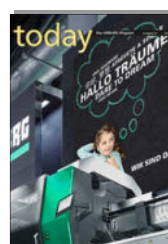
Editorial advisory board: Oliver Giesen, Juliane Hehl, Martin Hoyer,
Jürgen Peters, Bernd Schmid, Jürgen Schray, Wolfgang Umbrecht,
Dr. Thomas Walther, Renate Würth

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

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

Tel.: +49 (0) 7446 33-3149, **Fax:** +49 (0) 7446 33-3413

E-mail: today_kundenmagazin@arburg.com, www.arburg.com



ARBURG makes dreams come true at
the K 2016, in part thanks to the world
premiere of the large ALLROUNDER
1120 H with a new machine design and
the new GESTICA control system.





Dear readers,

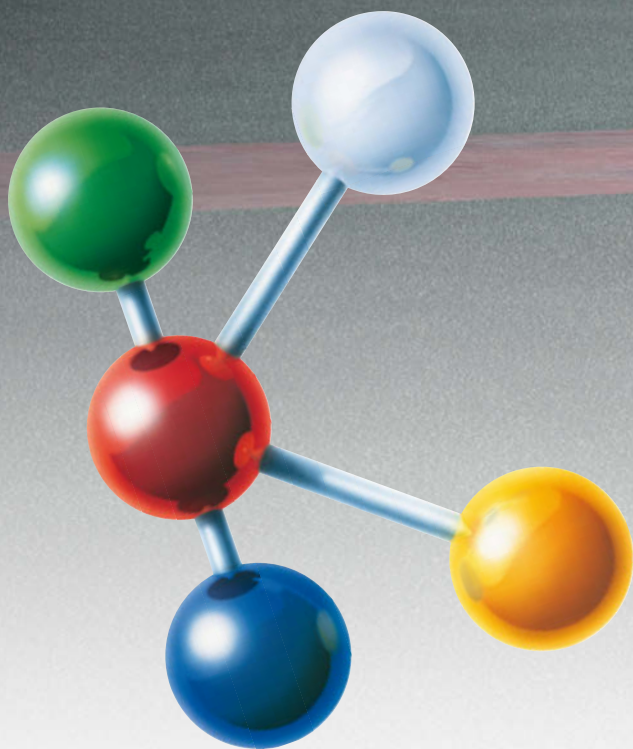
In the last issue of our “today” magazine, we promised you that a visit to our K exhibition stand would be worth your while.

Naturally, we have delivered on our promise, as you have come to expect from us. In Düsseldorf, trade visitors are experiencing a “big” world premiere, both in the figurative and the quite literal sense: our ALLROUNDER 1120 H with a clamping force of 6,500 kN and the new GESTICA control system. With this machine, we are presenting the design of the future. “Dare to dream. Wir sind da.” It was with this slogan that we invited you to the K 2016. Here, you can experience at first hand what “Wir sind da” means. And, no, this is not a printing error. In German, “Wir sind da” means that as a globally operating company from Germany, we are always close at hand, wherever you happen to be located.

Proof that your ideas are turned into reality with us is provided by our further innovative exhibits and applications, be it the new CUBE cube-mould machine, the ProFoam lightweight construction process, the electric entry-level machine GOLDEN ELECTRIC, or the Industry 4.0 production line as an example of how individual customer requirements can be integrated into the value-added chain online and high-volume parts can be individualised to produce single-unit batches. The present issue of “today” provides many interesting details on this and on further K highlights. Our K visitors can thus relive the trade fair highlights and the “stay-at-homes” can find out all the latest information on ARBURG technology.

I hope you enjoy reading our new issue.

Juliane Hehl
Managing Partner

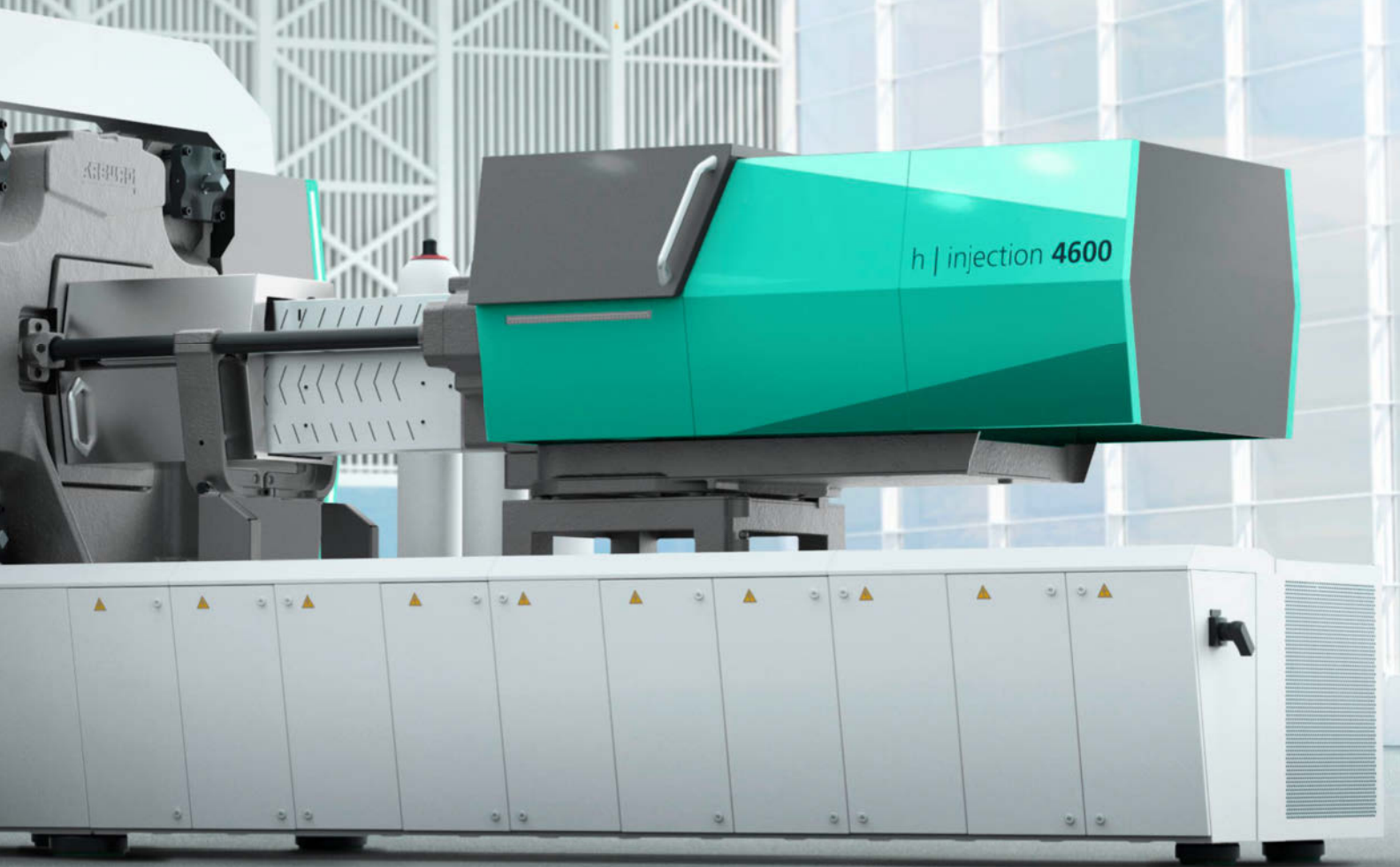


Triple coup

World premiere: ALLRO

ARBURG has pulled off a triple coup at the K 2016 with the ALLROUNDER 1120 H by presenting a new machine size, a new design and the new GESTICA control system.

“The targeted expansion of our product range has led to the development of a new machine size,” explains Heinz Gaub, ARBURG



for the future

UNDER 1120 H – new size, new control system, new design

Managing Director Technology & Engineering.

6,500 kN clamping force

The hybrid ALLROUNDER 1120 H extends the company's product offerings in the clamping force range up to 6,500 kN and combines electric speed and precision with hydraulic power and dynamics. "We are there-

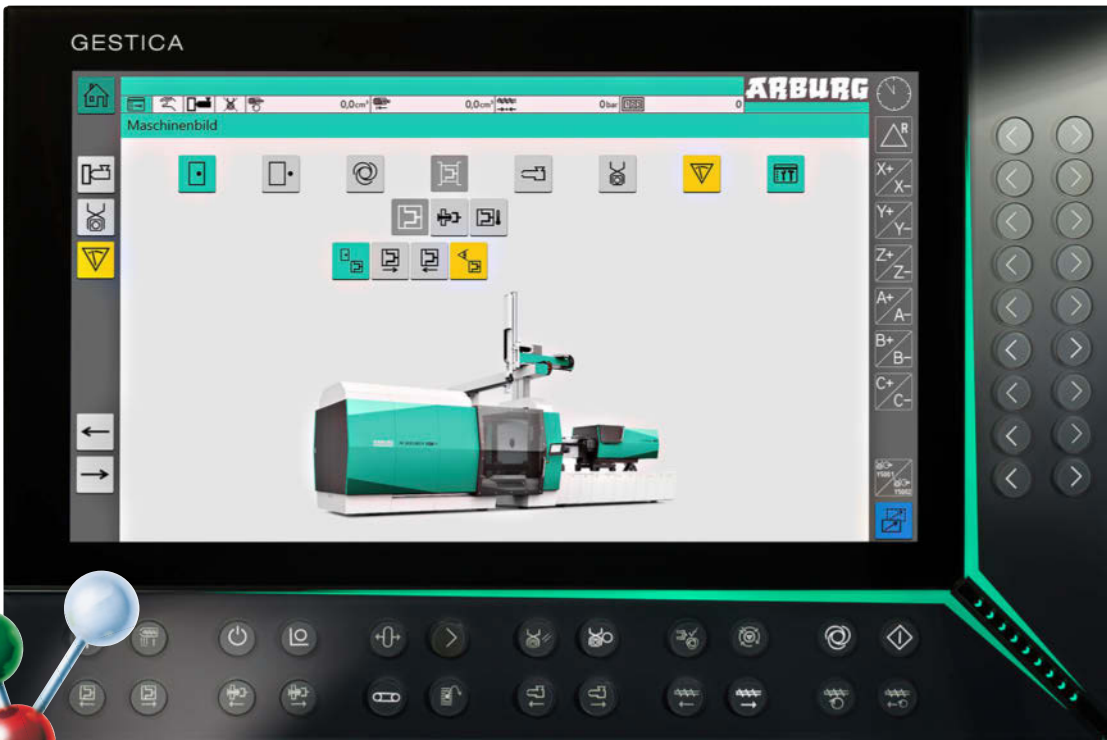
by responding to our customers' need for efficient large machines," adds Gerhard Böhm, ARBURG Managing Director Sales.

The innovative GESTICA control system also opens up a new dimension with a look and feel akin to that of smart mobile devices. GESTICA is based on all the advantages of the well-proven and industry-standard-setting SELOGICA. The data

records are fully compatible and the hierarchical structure and graphical programming system are identical.

Control system of the future

The "ARBURG control system of the future" can be operated even more simply and intuitively, the control panel is ergonomically rotatable and height-adjustable as well as being equipped with



colour-variable LED technology. The new "EASYSlider" operating element makes it possible to control movements simply and precisely during set-up and to indicate these via LEDs. Acceleration and deceleration can be controlled simply "with a swipe of the finger" along a bar at the edge of the high-resolution Full HD screen.

Aesthetics meet functionality

The high-end machine and control system technologies are also reflected in an aesthetic and ergonomic design. Not only have modern colours and shapes been employed, a particular focus has also been placed on functionality and ease of operation through simplified operating sequences and a convenient set-up procedure. Or put simply: on technology that's fun and sets new aesthetic standards.

Designer step stool in a single step

The new high-performance ALLROUNDER 1120 H machine with a

clamping force of 6,500 kN and size 4600 injection unit is demonstrating its potential with the production of a functional, folding step stool at the K 2016. Designed specifically for the leading international trade fair, the stool weighs 1,080 grams and features a design adapted to the machine.

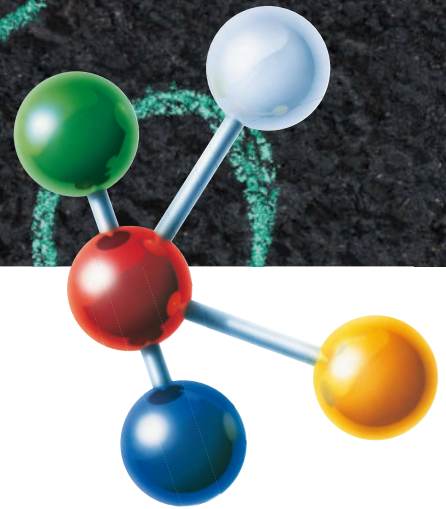
All of the eight individual parts are produced in one shot and in a cycle time of around 60 seconds, four in the top half of a family mould and four in the bottom half. During mould opening, the eight undercuts are demoulded via drag slides. A MULTILIFT V robotic system with a 40 kilogram load-bearing capacity removes the individual parts and sets them down on the rotary transfer table of a connected assembly station where a six-axis robot fits anti-slip stoppers onto the four feet and performs final assembly of the folding step stool.



The large ALLROUNDER 1120 H (photo on page 4) and the GESTICA control system (photo above) impress not only due to their high performance, but also on account of their design. Accordingly, the folding step stool was also created by a designer (photo below).



OSA SOGNARE
 你好, 梦想 ATRÉVETE A SOÑAR
HALLO TRÄUME
DARE TO DREAM
 OSEZ RÊVER



Dreams come true

K 2016: ALLROUNDERS, freeformers, Industry 4.0 and much more

Dare to dream. Wir sind da. – At the K 2016, ARBURG is presenting its visionary technology ideas, the topic of Industry 4.0, as well as new products and innovative applications “live”. A total of 27 exhibits, twelve of which are on display at the ARBURG exhibition stand “13A13”, demonstrate further current practical topics such as production efficiency, lightweight construction and additive manufacturing as well as industry-specific solutions.

The world premiere of the hybrid ALLROUNDER 1120 H with a clamping force of 6,500 kN, a new machine design and the innovative GESTICA machine control system (see page 4) is far from being the only highlight at the K 2016.

Another innovation is the ALLROUNDER CUBE, which has been specially designed to the requirements of cube moulds (see page 12). In addition, ten further machines and turnkey systems demonstrate innovative applications and processes for the efficient production of plastic parts, from high-volume down to single-unit batches.

GOLDEN ELECTRIC entry-level machine series

Launched onto the market in March 2016, demand is high for the injection moulding machines of the GOLDEN ELECTRIC series worldwide. Standardised components enable an attractive price/performance ratio and therefore a cost-effective entry into electric moulded part production. With the new machine series, energy requirements can be reduced by up to 55 percent compared to standard hydraulic machines. These electric ma-

chines are available in the four sizes 370, 470, 520 and 570 with clamping forces from 600 to 2,000 kN. At the K 2016, an ALLROUNDER 470 E GOLDEN ELECTRIC with a clamping force of 1,000 kN and a size 290 injection unit is producing a protective cover. Thirty-two moulded parts are produced in a cycle time of around 12 seconds.

Smart: Industry 4.0 for products and production

At the K 2016, ARBURG is presenting "Industry 4.0 hands-on". Based on the example of a "luggage tag", visitors can move through the individual production stations and experience how plastic parts can be flexibly individualised and produced as single-unit batches through IT-networking of ALLROUNDERS and freeformers (see page 10). Moreover, at the central information point, experts provide information on the modular ARBURG offerings for customised 4.0 solutions.



On-trend: lightweight construction

ProFoam is one of the innovative processes that ARBURG is advancing for the efficient production of lightweight yet strong plastic components. With this physical foaming technique, low-distortion

parts with a homogeneous foam structure can be produced on conventional injection moulding machines. A patented upstream granulate lock adds the blowing agent to the plastic granulate. At the K 2016, a hydraulic ALLROUNDER 630 S is producing an automotive trim panel in a cycle time of around 60 seconds. This example shows how up to 30 percent weight savings can be achieved with this process through process-specific part design. Thanks to dynamic mould temperature control, a high-gloss surface is also achieved.

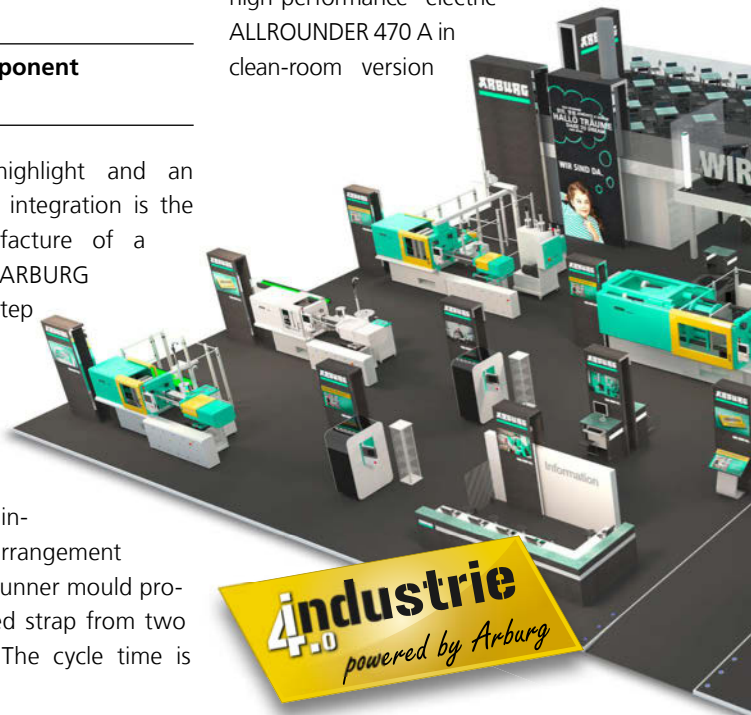
Sophisticated: 2-component LSR processing

One application highlight and an example of functional integration is the "ready-to-use" manufacture of a complete watch in the ARBURG design in a single step on a turnkey system. An electric two-component ALLROUNDER 570 A equipped with size 400 and 70 injection units in an L-arrangement and a 2+2-cavity cold runner mould produces the two-coloured strap from two liquid silicones (LSR). The cycle time is

around 60 seconds. A linear MULTILIFT V robotic system performs the handling and assembly operations for the thermoplastic watch casings and strap buckles, which are provided via interchangeable trays.

Unique spectrum: mass-produced items and single-unit batches

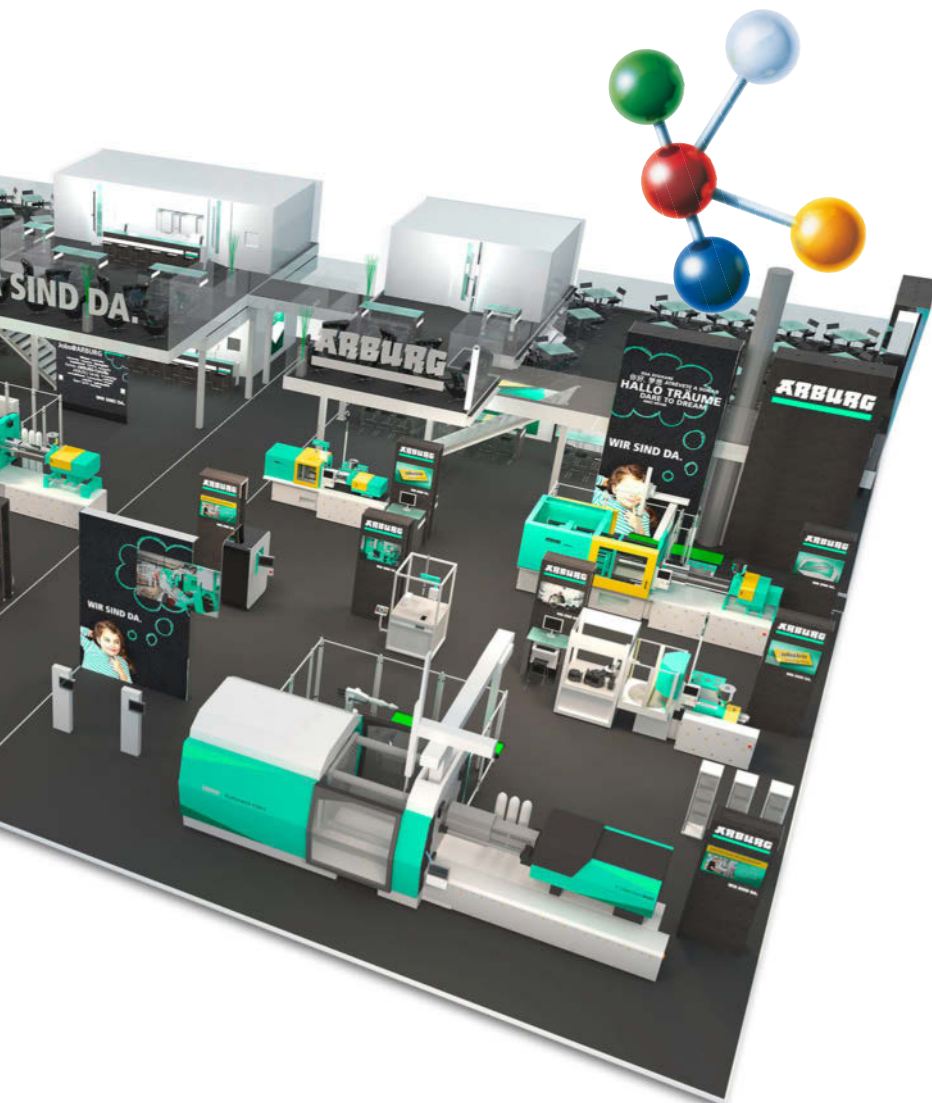
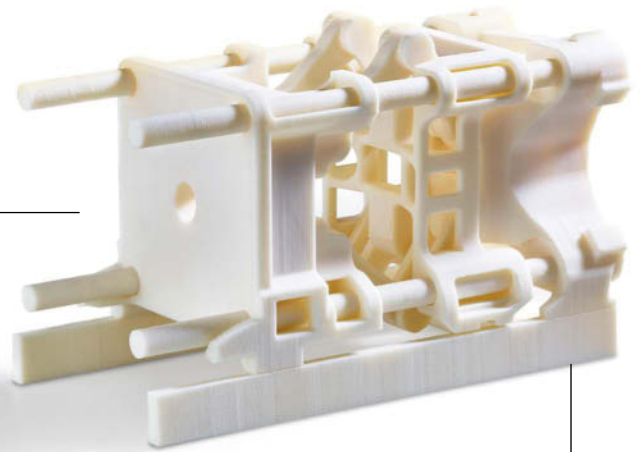
The wide range of products that ARBURG offers its customers is demonstrated by two very different application examples: A high-performance electric ALLROUNDER 470 A in clean-room version



manufactures mass-produced medical technology items. Around 4,500 Petri dish halves are injection moulded per hour on a 2+2-cavity mould, whereby the base and lid are automatically paired and stacked. In stark contrast to this application, a free-former is producing a single component, a complex functioning model of an injection moulding machine toggle, over the entire duration of the trade fair. This two-component application, in which ABS and a support material are processed, demonstrates continuous, process-reliable operation for industrial additive manufacturing. Two further freeformers are being used to produce technical components and for the Industry 4.0 application.

From service to expert assistance

A further topic at the K 2016 is the "smart" ARBURG Service with which machine availability can be increased through the new remote maintenance system, for example (see page 13). For the first time, a dedicated recruiting area is available at the ARBURG exhibition stand for recruiting university graduates, as well as skilled and management personnel for ARBURG.



The application range at the K exhibition stand (photo below) is wide-ranging and extends from protective covers, luggage tags and high-gloss trim panels through to watches and Petri dishes (photos from left to right).



K 2016
microsite



Smart factory

Industry 4.0: Personalised products through

ARBURG is illustrating the topic of Industry 4.0 with a new practical example at the K 2016. Visitors can have their own personal 4.0 product manufactured – an individualised luggage tag. At a number of separate stations, you can discover step-by-step how the important details relating to the 4.0 components can be individually combined and implemented at your company.

As a technology and system partner for IT-networked production in the “smart factory”, ARBURG is also concerned with how new business models can be developed through Industry 4.0 technologies and the integration of customer requirements in the value-added chain. How a flexible automated production process for single-unit batches can work cost-effectively in a spatially distributed production

facility will be demonstrated with a production line combining an ALLROUNDER, a freeformer, automation and the ARBURG host computer system (ALS).

High-volume injection moulding production

At the first station, the high-volume “luggage tag” part is injection moulded on a vertical ALLROUNDER 375 V. Downstream, a six-axis robot inserts an NFC (Near Field Communication) chip into the moulded part.

At the following station, the visitor enters his contact details and selects a graphic motif. The electronic business card (vCard) and the data for the subsequent production sequence are stored on the chip. The product thus becomes an information and data carrier. This makes it possible to apply the name, address and

QR code of the vCard onto the luggage tag via laser in the third production step. All of the part handling tasks are performed by an INTEGRALPICKER V.

From high-volume part to one-off item

In the next step, a freeformer further individualises the luggage tag by additionally applying the selected motif in 3D.

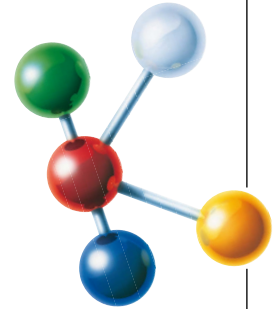
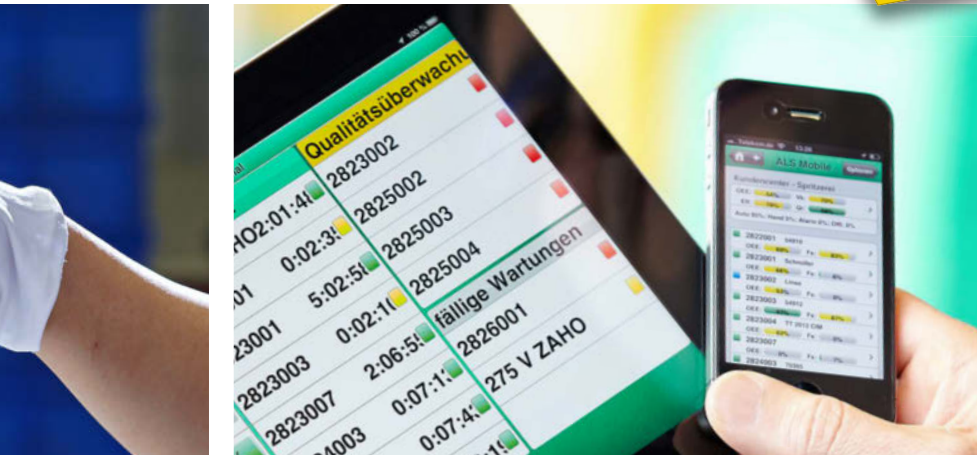
At the last station, the central “Industry 4.0” information point on the exhibition stand, the benefits of Industry 4.0 and the relevant “Industry 4.0” business models are highlighted once again.

Downstream online operations

Examples here include traceability and online ordering, which both take place via the product. Depending on the type of



4industrie
4.0
powered by Arburg



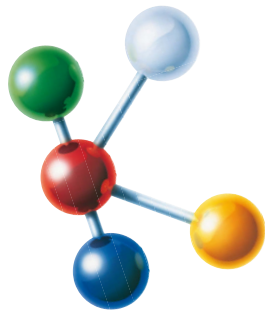
at the K

networked production

mobile device used, the data on the luggage tag can be read out and stored either via the QR code or the NFC chip. The individual URL address of the website relating to the relevant number is also contained here. Moreover, all the production data can be traced back at any time. Thanks to the integrated chip, the visitor can also have more information on Industry 4.0 sent to him or her via e-mail using the luggage tag, which can of course also simply be attached to an item of luggage.

Industrie 4.0 – powered by Arburg. As a technology and system partner, ARBURG supplies all the components for networked production: ALLROUNDERS, freeformers, the SELOGICA control system and the ARBURG host computer system (ALS) (photos above). In the end-to-end IT-networked production line, personalised luggage tags are produced step-by-step at the K 2016 (photos below).





New cube-mould machines

ALLROUNDER CUBE: Predestined for packaging technology

From the K 2016 onwards, the ALLROUNDER CUBE machines will round off the ARBURG range for high-speed applications using cube-mould technology. These special two-component machines are available in two sizes, the CUBE 2900 and the CUBE 4600. At the K 2016, the production of innovative closures for Pril washing-up liquid bottles from Henkel are being presented.

“For the ALLROUNDER CUBE, we’ve optimised the complete clamping unit, for example, including the servo-electric toggle, with regard to the cube-mould-specific requirements,” explains Andreas Reich, Senior Sales Manager Packaging at ARBURG.

Large and fast

Thanks to reduced dry cycle times, the cycle times can be reduced by up to a second and output increased by ten percent with the new cube-mould machines. The distances between tie bars have been increased,

to 820 millimetres on the ALLROUNDER CUBE 2900 and to 1,020 millimetres on the ALLROUNDER CUBE 4600. A further advantage are the significantly larger mould installation dimensions of the clamping unit of maximum 1,900 millimetres on the smaller machine and 2,400 millimetres on the larger one. This means that moulds weighing up to 16 tonnes can be installed.

Energy-efficient

The new cube mould machines feature four servo-electric axes as standard: one for the clamping unit, two for electric dosage and one for rotating the mould. The injection units can optionally be driven hydraulically or electrically. The core-pulls for ejection and further mould functions are always hydraulic. This concept permits an energy requirement reduced by up to 45 percent compared to conventional hydraulic machines.



High-performance ALLROUNDER CUBE 2900: Thirty-two innovative washing-up liquid bottle closures from Henkel are produced in 8.5 seconds.

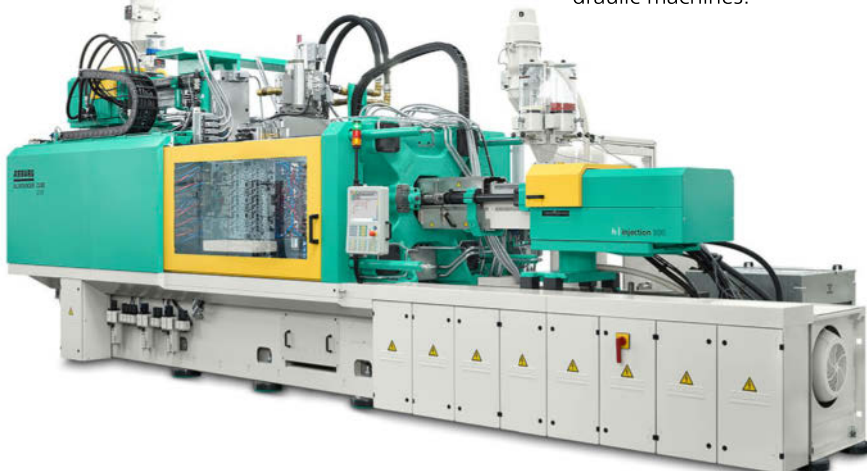


Innovative closures for Henkel

At the K 2016, an ALLROUNDER CUBE 2900 produces 32 innovative two-component closures for Pril washing-up liquid bottles from Henkel in a cycle time of around 8.5 seconds. The cube mould as well as the removal and set-down system are supplied by FOBOHA.



CUBE
Brochure





Even greater customer proximity

Gerhard Böhm and Eckhard Witte: Premium service

The requirements placed on plastics processors are increasing continuously. A premium service is required! In order to meet these requirements, the availability of the machine fleet is an essential factor. In an interview with the "today" editorial team, Gerhard Böhm, Managing Director Sales and Eckhard Witte, Divisional Manager Service, speak about new offerings and provide an outlook on the future.

today: Which innovations is ARBURG introducing at the K 2016 in terms of its service offerings?

Böhm: In Düsseldorf, we are presenting the new ARBURG remote maintenance system with which we will be able to assist our customers even faster and more efficiently in the future.

today: What does remote maintenance actually entail?

Witte: A secure connection to the machine control system is established via the service router with integrated firewall. Following enablement, our experts then have direct access to analyse and optimise

sequences. In this context, it's important that only the customer can issue access authorisation and that the customer data is protected against unauthorised access thanks to a VPN tunnel.

today: When will remote maintenance be available?

Böhm: We will be offering remote maintenance to our customers from 2017 onwards – worldwide.

today: Are there any additional requirements on the customer side?

Witte: Yes, because in addition to the fast rectification of faults, regular maintenance plays an important role in high machine availability. The end customers, for example from the automotive industry, increasingly demand the related documentation as evidence that our customer's machine fleet is operating smoothly.

today: What is planned for the future in this regard?

Böhm: We plan to include simpler maintenance operations in our service package over and above our inspection contracts (see today 57) in order to provide com-

Gerhard Böhm (left), Managing Director Sales and Eckhard Witte, Divisional Manager Service, work tirelessly to expand the service offerings.

prehensive support to our customers also in regard to maintenance. "Industrie 4.0 – powered by Arburg" will then also comprise "Condition Monitoring" for preventive maintenance as well as the provision of the required wear and spare parts in conjunction with optimised maintenance planning. Thanks to these important modules, unscheduled machine downtimes can be reduced and thus the overall equipment efficiency (OEE) enhanced.



Remote
Maintenance
Brochure

Precision – not o

Faller: Hybrid ALLROUND

Big in small things is the slogan of the company Faller. Every child with a passion for model trains has grown up with the miniature products from this Black Forest-based company. However, the brand is also extremely well known among adult hobbyists worldwide. But the challenges involved in producing the thin-walled products in terms of the injection moulding process are known to only a few.

Each year, the company produces 1.2 million model houses alone – exclusively “Made in Germany” – at its Gütenbach plant in the Black Forest. In 2016, the company celebrated its 70-year anniversary. Its major sales markets are Germany, its European neighbours and the US. ALLROUNDERS with clamping forces from 250 to 1,100 kN have been in use at Faller since 2010, mostly in two-shift operation.

6.2 million individual parts per year – high demands with regard to the injection moulding process

A total of 6.2 million parts are produced each year. These include model train set accessories such as buildings, figures, landscapes as well as digitally controlled miniature cars (Car System) and thematic worlds such as “Funfair” and “Camping”. The model sets are available in the scales 1:22.5 (gauge G) and 1:87 (gauge H0) as well as in 1:120 (gauge TT), 1:160 (gauge N) and 1:220 (gauge Z). Every year, 140 new products are added and around 100 older ones discontinued. The individual parts weigh between one and 200 grams.



nly at the H0 scale

ALLROUNDERS produce thin-walled model parts

“We opted for hybrid ALLROUNDERS from the HIDRIVE series because they combine precise electric dosage with hydraulic accumulator technology. This allows them to achieve the required dynamic accelerations, high injection speeds and tolerances of 0.01 millimetres,” explains Martin Zapf, Production Director at Faller. “Many of our parts have relatively large-area and thin-walled visible surfaces, which places high demands on the injection moulding process” adds Martin Buchholz from the injection moulding shop. “Our compact ALLROUNDER 270 H and 370 H machines don’t have a big

footprint and offer many technical options such as core pulls, unscrewing units and temperature control connections in close proximity to the mould.”

Four mould changes on each ALLROUNDER per day

The product diversity is also reflected in the company’s in-house mould construction activities, for which Faller has its own standards and many years of expertise. Around 8,500 different moulds are in use, of which 3,500 are made completely of aluminium. Set-up time optimisation

plays an important role, as Stefan Rude explains: “Each machine has to be set up about four times a day. Here, we plan the order sequence optimised according to material type, colour and mould size. The ALLROUNDERS with SELOGICA control system ensure short set-up times thanks to the integrated material purging programme, automatic mould height adjustment and programmable machine sequences.”

Production of an article begins at the earliest three weeks prior to delivery, which places maximum demands on machine availability. “With ARBURG, we particularly appreciate the expert consulting on injection moulding topics and the reliable aftersales service,” says Martin Buchholz.

The injection moulded products made from PS, PA, ABS, POM and PC are colour-

ed with liquid dyes. More than 1,000 in-house recipes are used for this purpose. Finally, sorting and packaging take place. In order to ensure that no parts are missing, each individual product is weighed during sorting. Packages that deviate from the target weight are sorted out and rechecked.



Fotos: Faller

The anniversary model kit of Bebenhausen Abbey in Swabia (604 x 517 x 374 mm, scale 1:87) comprises more than 1,400 individual parts, including many thin-walled items (photo on left). Martin Zapf, Head of Production at Faller (on left in photo above) and Martin Buchholz from the injection moulding shop rely on hybrid ALLROUNDER H machines with hydraulic accumulator technology

INFOBOX

Name: Gebr. Faller GmbH

Founded: 1946 by Hermann and Edwin Faller

Location: Gütenbach, Germany

Turnover: Around 11 million euros (2015)

Production area:

Around 4,200 square metres

Employees: 95

Industries: Hobby and toy segment

Products: Model building kits and accessories for model train sets and dioramas

Machine fleet: 14 injection moulding machines, of which 6 ALLROUNDERS

Expertise: In-house mould construction with approx. 8,500 different moulds

Contact: www.faller.de



ARBURG leads the way

Smart factory: Industry 4.0 in ALLROUNDER production

The “smart factory” of the future will increasingly control and optimise itself. It can respond extremely flexibly to changes and produce even small-volume batches efficiently. At its Lossburg headquarters, ARBURG is already using Industry 4.0 technologies for the production of its ALLROUNDERS and freeformers. For this purpose, machines, moulds and logistical peripherals are networked.

“Industry 4.0 is not available as an “off the shelf” product, but each company must draw up its own strategy for its production processes. First of all, the current situation has to be determined and competencies analysed,” explains Heinz Gaub, ARBURG’s Managing Director Technology & Engineering. “Here in Lossburg, all the experts are under one roof and can meet personally at short notice thanks to short distances and flat hierarchies. This promotes interdisciplinary cooperation, fast responses and solution-finding, – whether

during the development of new products and processes or during the implementation of Industry 4.0 for in-house production.” The aim is to make processes more flexible and transparent. This results in enhanced process reliability and production efficiency and ultimately in reduced unit costs.

Digital final testing of all ALLROUNDERS and freeformers

The tools that ARBURG employs during production include interactive production planning as well as just-in-sequence supply of the assembly stations with components. From logistics through to data archiving, all operations are IT-supported, SAP-based and partly self-organising. The final testing of new machines is carried out digitally with the aid of the ARBURG Test Framework and around 80 of the company’s own measuring trolleys. Further 4.0 examples during in-house production include highly auto-



Arburg uses around 80 measuring trolleys in Assembly. Digital data acquisition facilitates final testing of the ALLROUNDERS and freeformers.

mated machining centres, which operate unmanned at night and during the weekend, flexible production systems which interlink warehouse, set-up stations and processing machines, as well as a transport control system that manages more than 3,500 transport operations a day.



Think Together

Lightweight construction: K.D. Feddersen specialist conference at ARBURG

Some 100 participants from Southern Germany visited the twelfth specialist "Think Together" conference hosted by plastics distributor K.D. Feddersen at ARBURG in Lossburg. The slogan was: "People. Think. Plastic." and the focus was on lightweight construction, a topic that was illuminated and discussed in detail during a series of expert presentations and live demonstrations.

"ARBURG is delighted to provide a suitable forum for the specialist 'Think Together' conference. With presentations and technology relating to the topic of lightweight construction, we will play our part in the exchange of experiences," said ARBURG Managing Director Sales, Gerhard Böhm in his welcome speech to around 100 participants.

Expert presentations on lightweight construction

The event began with Manuel Wöhrle, Senior Sales Manager Lightweight at ARBURG. In his presentation on current lightweight construction trends he introduced Fibre Direct Compounding (FDC) and the ProFoam physical foaming technique. Practical applications of both of these injection moulding processes were

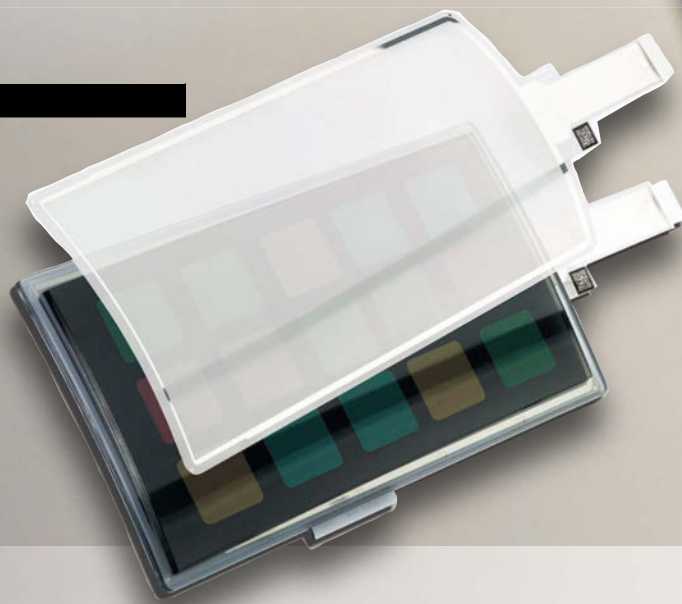
on show at the ARBURG Customer Center in the afternoon. Further contributions were made by Akro-Plastic, Celanese, Lyondellbasell, Proplas and Jell.

"Live" demonstrations of practical applications

In the afternoon, participants attended factory tours in small groups and were able to experience the production of lightweight parts on ALLROUNDER injection moulding machines at first hand. "We had some really lively exchanges," said Manuel Wöhrle, summarising the practical activities and the benefits of the specialist conference, "The lightweight construction day was a great opportunity for material and machine manufacturers to enter into a dialogue and to gain valuable ideas and insights. We have demonstrated that there are a variety of ways in which lightweight construction can be realised efficiently through part-specific design as well as the right choice of material, process and mould."



The specialist "Think Together" conference - a mixture of theory and practice. At the Customer Center, lightweight parts were produced using the ProFoam process, for example (photos above and below). In the presentation section, experts such as Manuel Wöhrle (centre photo) provided information on current topics.



The right touch req

Hoefer & Sohn: Automated injection moulding of 3D touch pan

Touch-sensitive films, which previously only worked on flat surfaces, are now also available in 3D for curved components. This offers completely new product and design possibilities. In order to maintain functionality, expertise and the right touch are required. Based in Fürth, Germany, Hoefer & Sohn, which produces 3D touch panels for washing machines and dryers from BSH Hausgeräte GmbH on turnkey systems, has relied on ARBURG for more than 40 years.

Hoefer & Sohn is a leading manufacturer of precision moulds and technical plastic parts as well as assembled components. In the In-Mould Decoration (IMD) and In-Mould Labelling (IML) segment, this family-run company cooperates with KURZ, a global leader in hot-press and coating technology also based in Fürth. Their latest innovation is a conductive film (PolyTC®) that features metal mesh structures. This enables the cost-effective manufacture of flexible, 3D curved surfaces in conjunction with IMD.

Hoefer & Sohn is a partner for high-volume production and implemented a production cell for this complex task together with ARBURG. A second system followed soon after commissioning.



"With production of the 3D touch panel, we broke new ground," says Dr. Christoph Badock, Managing Director of Hoefer & Sohn.

Challenging: thin, flexible films

"On the one hand, the thin films are mechanically flexible, which poses challenges during handling and processing. On the other, the component is "warped" for design reasons, meaning that there are no reference points. Construction of the moulds and gripper modules was therefore a challenge for us," explains the Managing Director. In order to reliably ensure that the processing technique does not impair functionality of the film and component, the parts undergo 100-percent electrical and optical inspection.

"Based on an initial development by BSH Hausgeräte GmbH and KURZ, we devised a process for manufacturing the high-volume part," explains Martina Badock, Managing Partner at Hoefer & Sohn, describing the implementation phase. Today, the two turnkey systems have a production capacity of around one million touch panels. Around 80 percent of these are destined for the Chinese market, the rest for Europe.

Versatile: seven product variants

Currently, seven product variants are produced on the two turnkey systems, which both comprise a hybrid ALLROUNDER 630 H with a clamping force of 2,500 kN, a clean air module, a



Foto: BSH

wired

els



Fotos: Hoefer & Sohn



Proud of the 3D touch panel project: Managing Partner Martina Badock and Managing Director Dr. Christoph Badock (centre right photo). During the production of 3D touch panels for washing machines and dryers, 3D touch-sensitive films are in-mould laminated (photos above). For this purpose, two ALLROUNDER 630 H machines are docked to a common clean room (photo at centre left).

KUKA six-axis robot, as well as processing, testing and laser stations. The 2-cavity mould and the gripper module are made by Hoefer & Sohn. The two systems are docked to a clean room. All upstream and downstream steps are performed here in order to prevent electrostatic charging and soiling of the films and components.

Two pre-treated films are manually inserted in two pick-up stations on the shuttle table. They are then bonded to the moulded panels in an automated process. Here, a six-axis robot performs all the handling tasks within the production cell. Following removal of the sprue in the laser station and an electric functional check of the components, these are moved to the operating area. There, the quality control of the touch panels

is finalised prior to packaging for transport overseas.

In planning: Industry 4.0

As an expansion stage, printing of the films with QR codes is planned in order to make it possible to call up the production and quality parameters at any time in line with Industry 4.0.

INFOBOX

- Name:** Hoefer & Sohn
- Founded:** 1876 by Johann Hoefer
- Location:** Fürth, Germany
- Turnover:** 15 million euros
- Divisions:** Precision tools, technical plastic parts and assembled components
- Employees:** 120
- Industries:** Automotive, cosmetics, consumer goods
- Products:** Technical plastic parts and assembled components
- Machine fleet:** 33 machines from 350 to 4,000 kN, of which 21 ALLROUNDERS
- Contact:** www.hoefer-und-sohn.de

Best choice:

Advanced Molding Tec

The initial situation at Advanced Molding Technologies: serial production of millions of small bearing carriers for ball bearings. The challenge: an injection moulding machine able to process the engineered plastic Ultem under the required high temperatures and pressures. The means: international benchmarking. The solution: electric ALLROUNDERS.

US company Advanced Molding Technologies is located north of Minneapolis, Minnesota, and has numerous sophisticated products in its portfolio. These include a bearing carrier with a diameter of around ten millimetres, which is used to support ball bearings. The complete component forms part of a hydraulic magnet assembly for the automotive sector.

High temperatures, high material price, complex mould

Because it is used in contact with hot fluids, Advanced produces the bearing carrier from the high-temperature material Ultem. This expensive engineering plastic is characterised by high strength over a wide operating temperature range, low flammability and good dielectric strength, etc. The processing temperatures and process pressures are correspondingly high in order to demould the parts cleanly. Owing to the high material price, a further challenge was to keep the sprue share under 25 percent. The



ALLROUNDERS

Technologies: International benchmarking leads to ARBURG



Foto: Advanced Molding

Ryan Fuhr, Operations Manager at Advanced, is delighted with the electric ALLDRIVE machines (centre photo). These are used to produce 17 million bearing carriers a year made from engineering plastics for use under high operating temperatures (photo on left).

Today, three electric ARBURG machines produce 17 million bearing carriers per year. "So the project was a great success for our customers and therefore for us and for ARBURG," summarises Ryan Fuhr.

reason is that this is the maximum amount of regrunulate that may be processed if no waste is to be produced. With the relatively small parts manufactured, this requires adaptations to the sprue weight as well as a mould with a hot runner manifold and a cold subdistributor. One of the reasons for this is explained by Ryan Fuhr, Operations Manager at Advanced: "By reducing the hot volume flow, we achieve better process control and higher stability."

Problems led to benchmark

During the product start-up phase using the available machines, problems arose, for example with the injection pressures, nozzle contact forces, dwell time of the material in the cylinder and achievement of the necessary cylinder temperatures, according to Ryan Fuhr. "In order to optimise manufacturing and to increase our capacity, I looked for a suitable machine at around twelve international manufacturers based on our benchmarks," explains Ryan Fuhr.

ARBURG technology impresses

This search resulted in initial contacts with ARBURG and the idea of using an electric ALLROUNDER 370 A with a clamping force of 500 kN. One decisive factor was that ARBURG was able to meet the requirement of individual adaptations, for example significantly increased injection pressure and integrated hot runner control.

"We were immediately excited by the high performance of the ALLROUNDER, which offers a bigger process window and higher reproducibility. Right from the start, the results were much better than those achieved with the other machines," explains Ryan Fuhr. "The requirements in terms of higher pressures and temperatures as well as the regrunulate share were not a problem."

Following the purchase of the first ALLROUNDER 370 A, Advanced adapted their entire injection moulding process from the ground up to the new technology and has already run more than 3.5 million cycles with this machine.

INFOBOX



Name: Advanced Molding Technologies, LLC

Founded: 1999 by Brett Nelson, CEO/Owner

Location: Minneapolis, Minnesota, USA

Divisions: Precision moulds and technical parts made from engineering plastics

Employees: 170

Industries: MedTech, BioTec, Automotive and Commercial

Products: Technical plastic parts, sub-assemblies and final device assemblies

Machine fleet: 32 machines in the clamping force range from 20 to 500 US tons, of which seven ALLROUNDERS

Contact: <http://advancedmt.com>



Knowledge transfer

SKZ (Southern German Plastics Centre): freeformer for research and services

Since 2011, the SKZ in Würzburg, Germany, has operated a competence centre for additive manufacturing. Here, various processes and technologies are available for producing one-off parts and small volume batches, including a freeformer. Institute Director Prof. Martin Bastian sees great future potential in the individualisation of plastic parts and the integration of Industry 4.0 technologies.

"We've cooperated with ARBURG in the field of injection moulding for decades and are delighted to be a partner in the further development of the freeformer," says Prof. Martin Bastian, Institute Director at the SKZ. "With our experience in injection moulding and in material development, we are advancing various 3D printing technologies at our competence centre for additive manufacturing, including ARBURG Plastic Freeforming." The focus of the SKZ is on the high-volume

additive manufacturing of plastic parts. "As advisors, we would like to promote the knowledge of our customers and network partners," says Georg Schwalm, Divisional Manager for Injection Moulding and Additive Manufacturing at the SKZ.

3D printing-specific design

"Many plastics processors think in terms of injection moulding and design parts for additive manufacturing in the

same way. However, this can't be transferred one-to-one to additive manufacturing." He added that the latter process offers greater degrees of freedom in terms of complexity and wall thicknesses. Undercuts, bionic structures, joints and interlinking, moving components are comparatively easy to achieve.

Advantage: standard commercial granulates

"ARBURG was the first manufacturer not to make the machine dependent on a particular material," explains Prof. Martin Bastian. "The idea of making it possible to use standard commercial granulates gave rise to considerable excitement on our part. It allows us huge scope for developing and using new materials." The SKZ is working on extending the range of suitable materials and on combining materials using ARBURG Plastic Freeforming (APF) that could not otherwise be combined owing to their mutual incompatibility. Here, the researchers' extensive expertise in Fused Deposition Modelling (FDM) has proven extremely useful. The Würzburg-based Institute's wishlist for the freeformer includes a third discharge unit and a build chamber featuring a temperature control system that enables PA6 and other high-performance plastics such as PEEK to be "printed".

Additive manufacturing offers opportunities

The scientists see particular potential in small-volume batches for automotive manufacturing and model-making, in spare parts provision and medical technology, as well as for consumer goods and sports equipment. A further aspect is its combination with Industry 4.0: "By cleverly adapting high-volume parts, highly individualised products can be produced," says Prof. Martin Bastian. Catchphrases here include "Product on Demand" and



Foto: SKZ

"Design by yourself". Here, the customer orders his or her individual product directly from the manufacturer in a personally selected design and can follow the progress of its production in real time. This gives rise to enormous opportunities and completely new business models for plastic part manufacturers.

The SKZ intends to significantly expand all its areas of activity with the construction of a "Model Factory 2020". Here, teaching, research and practical applications will be closely linked. "At the K 2016, we are already offering plastics technology training specifically relating to additive manufacturing in cooperation with the Chamber of Commerce," says Prof. Martin Bastian. ARBURG Plastic Freeforming is to play an important role in these activities.

Prof. Martin Bastian (on right in photo on left) and Georg Schwalm from the SKZ see great potential in additive manufacturing. The SKZ will closely link teaching, research and practical applications in the Model Factory 2020 (photo above).

INFOBOX



Name: SKZ (Southern German Plastics Centre):

Founded: 1961

Locations: Würzburg, Halle, Peine, Horb and Selb in Germany, as well as foreign branches in Switzerland, Turkey and Dubai

Expertise: Practical research and development, training and further education, testing and certification

Machine fleet: in Würzburg, Horb and Peine, among others, 17 injection moulding machines and six systems for additive manufacturing, of which two ALLROUNDERS and one freeformer

Contact: www.skz.de



One factory –

Manuex: 21 plastic parts for IKEA kitchen drawers

Manuex produces kitchen drawers exclusively. These comprise 21 different plastic parts, e.g. for the self-closing mechanism (photo at top left) and for rollers (photo on right)



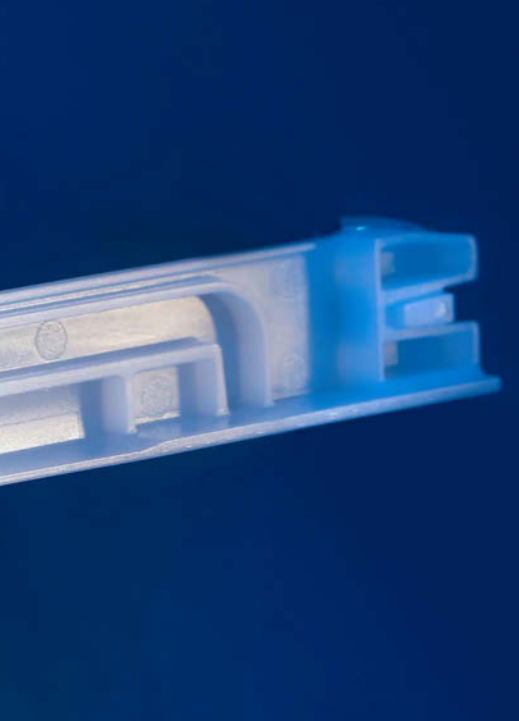
Foto: Manuex

A successful corporate strategy can really be this simple: **Manuex – Manufacturing with Excellence – produces complete kitchen drawers for international sale by IKEA at a central plant. This “greenfield” project, which began in 2010, is based on three pillars: A lean manufacturing concept, high unit volumes and advanced automation. The equipment at the plant includes 14 ALLROUNDERS, which reliably manufacture parts for this product in high volumes.**

The serial manufacture of mass-produced items on standard machines seems simple at first sight. However, high quality standards requiring constant monitoring and optimisation have to be maintained.

Close cooperation with IKEA

The company’s partnership with the large Swedish furniture chain ranges from development and production through to delivery. “In order to ensure the best possible utilisation of the kitchen unit interiors, our products are designed to be faultless and space-optimised,” says Manuex



one product

drawers

Managing Director Giancarlo Formenti. "The ALLROUNDERS convinced us with their high performance, robust four tie-bar clamping unit and servo-controlled injection units for high reproducibility. Another factor was the easy-to-operate SELOGICA control system."

20,000 kitchen drawers daily

The large unit volume of 20,000 drawers per day requires streamlined production and assembly. The metal parts are produced fully automatically on stamping/bending machines from reels. The 21 different plastic parts e.g. for the self-closing mechanism as well as rollers, slide rails, screws and cover caps are produced on 24 injection moulding machines with removal either free-falling or via robotic systems, depending on the product. Moulds with 4 to 64 cavities are used. Eighty million rollers, each weighing 0.3 grams are thus produced annually using a 64-cavity mould. In addition, 10 million self-closing slide rails and housings are also made. All the components are then assembled automatically on several assembly lines.

"We mainly rely on hydraulic ALLROUNDER S machines with clamping forces from 800 to 2,200 kN," explains Giancarlo Formenti. "As we work in three shifts five days a week, a high level of technical reliability is crucial. If we require higher precision, for example, we also make use of electric dosage."

ARBURG: Partners since 2009

The initial contact between Manuex's parent company and ARBURG goes back to 2009. Giancarlo Formenti is satisfied: "Our partnership is very close and fruitful. ARBURG comprehensively offers us reliable technology, competent consulting and comprehensive support. In short: ARBURG is the ideal partner for all our injection moulding needs."

INFOBOX

Name: Manuex srl

Founded: 2011 as part of the FGV Formenti and Giovenzana SpA Group, a leading kitchen furniture manufacturer

Location: Quaregna/Piemont, Italy

Employees: 230

Production area: around 12,000 square metres

Industry: Furniture industry

Products: Fully assembled kitchen drawers made from metal and plastic

Contact: www.manuex.it



TECH TALK

Oliver Schäfer, Technical Information



On the way to “Ind

Euromap 77 interface improves data exchange for injection mou

A decisive factor for the digitalisation of the factory is an open and standardised communication platform. Only in this way can production sequences be achieved that enable comprehensive data exchange between machines, moulds, workpieces and logistic peripherals as well as integration with order information and process data, through to the Internet. Thanks to its manufacturer and language-independent technology, the OPC UA (Unified Architecture) communication protocol creates ideal conditions for the flexibility required in the Industry 4.0 environment.

ARBURG has been using OPC UA for data exchange between its ALLROUNDERS and the ARBURG host computer system (ALS) since 2010. There were a number

of reasons for conversion to this industrial Machine-to-Machine (M2M) communication protocol. It is an accepted and established standard, which offers simple adaptation via an open technology as well as extensive software and hardware support.

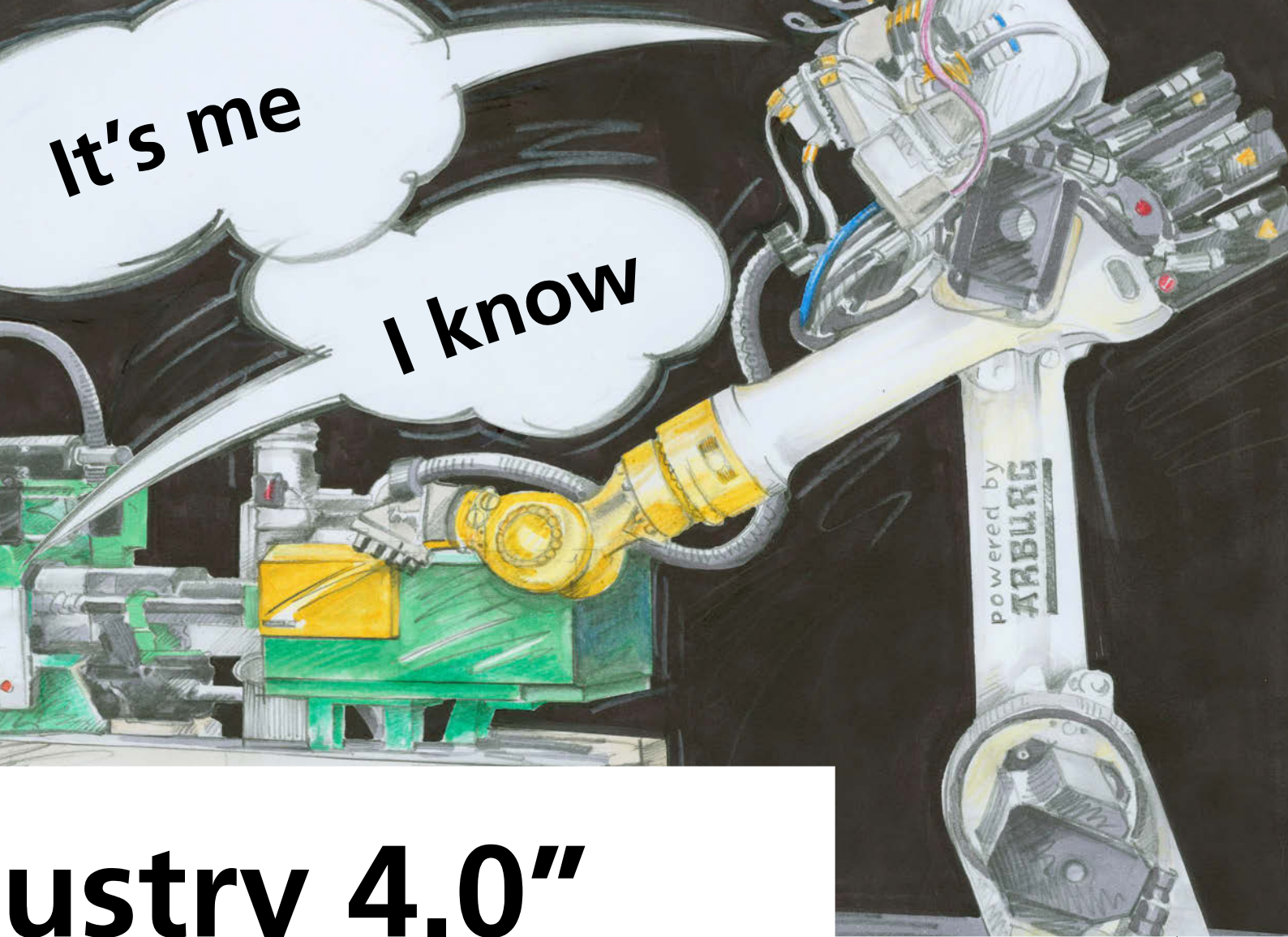
System-independent technology

OPC UA enables seamless data exchange from the sensor in the machine right through to the Internet, regardless of the operating system or programming language. The technology upon which OPC UA is based also provides interesting features that make production management even more efficient. These include, for example, the option of simply monitoring parameters and receiving immediate alerts in the event of changes. Mechanisms for automatic fault detection and remedy, as well as redundant functions, ensure re-

liable communication in this context. All types of information can thus be made available at any time or place, for every application and to every authorised person. Secure end-to-end encryption as also used on the Internet, for example, in addition to the options for implementing an authorisation concept, result in a high level of data security. Moreover, OPC UA is firewall compatible. All that is required is enablement of a connection between the client and server.

Basis for a new interface

On ARBURG's initiative, OPC UA now also serves as the basis for the new Euromap 77 host computer interface, which is being elaborated jointly with further control-system and software developers for leading injection moulding machine manufacturers.



Industry 4.0"

Integrating machines

Standardised language

Compared to Euromap 63, which will be superseded by Euromap 77, this defines not only how, but also what is communicated. Temperature sensors in the cylinder module, for example, share the same parameter designation, regardless of the manufacturer of the injection moulding machine. Sequences such as the transmission of programs to the machine and the corresponding set-up protocols have been standardised. This significantly reduces the effort during implementation of a production management system (MES).

And the development is ongoing: a next interesting step, for example, involves the standardisation of feedback relating to scheduled and due maintenance operations. This allows production-wide maintenance overviews and logs to be created.

In comparison with the Euromap 63

interface, Euromap 77 enables even faster and more efficient data exchange between injection moulding machines and the production management system (MES).

Significant for "Industry 4.0"

Networking with the peripherals integrated in the machine control system can also be standardised and is therefore easier to implement. The new internationally standardised interface is thus paving the way towards "Industry 4.0" in plastics processing.

Decisive for digitalisation and injection moulding production: standardised communication via standardised interfaces.

The new Euromap 77 networks machines via an overarching production management system (MES), the forthcoming Euromap 79 ensures improved data exchange between the machine and robotic system (photo above).

OSA SOGNARE

你好, 梦想

ATRÉVETE A SOÑAR

DARE TO DREAM

HALLO TRÄUME

OSEZ RÊVER



WIR SIND DA.



2016

Düsseldorf/Germany
19.-26.10.2016

www.arburg.co.uk

13A13

ARBURG