

today

The ARBURG magazine

Issue 59

2015



ARBURG Packaging Technology

Fakuma®

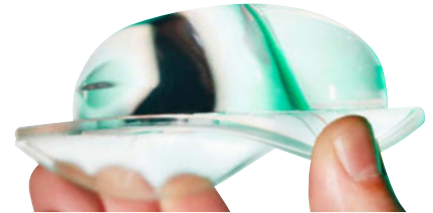




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IMPRESSUM

today, the ARBURG magazine, issue 59/2015

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Located on the shores of Lake Constance, Friedrichshafen enjoys an international reputation thanks to its association with Zeppelins and the Fakuma trade fair. Here, ARBURG will present impressive proof of its expertise in plastics processing, for example with the production and assembly of a fruit basket made using the IML process.





Dear readers,

Pioneering spirit is an important factor for success. The key is not to allow yourself to be put off by difficult tasks, but to tackle them with mo-

tivation. And there have always been plenty of these in our company's history. And, looking back, they have always provided important impetus for successful developments. For example, if it hadn't been for the corrosion problems encountered with the connectors of the optical signalling elements produced by ARBURG in the 1950s, the first ARBURG injection moulding machine would certainly never have been invented. Consequently, we would never have become one of the world's leading injection moulding machine manufacturers.

Networked production – already a hot topic under the heading "Industry 4.0" – was not a complete success from the start: when we presented a fully automated injection moulding production cell controlled via the ARBURG ALS host computer system nearly 30 years

ago, we were far ahead of our time. That didn't discourage us either. Instead we have continuously developed our ALS further ever since. These days, it is the basis for implementing Industry 4.0, as explained in our Tech Talk column.

With the freeformer, we have entered new territory, which now has to be "conquered" in cooperation with our customers. AGRODUR, one of the companies profiled in this issue, is an excellent example of pioneering spirit in this sector. We also report on the innovations presented at the Fakuma, as well as on new product ideas, innovative processes and special production solutions. Let yourself be inspired and demonstrate your pioneering spirit. We can assure you that it will be worthwhile.

I hope you enjoy reading our new issue.

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

Juliane Hehl

Managing Partner & Managing Director



Pointing the

Fakuma 2015: ARBURG



way to the future!

sets trends in production efficiency and Industry 4.0

As well as exhibiting its machine technology, ARBURG will also present itself as a production system provider at the Fakuma trade fair. Practical applications will be used to illustrate current industry trends and the efficient production of plastic parts. One highlight will be the customisation of mass-production parts by combining injection moulding and additive manufacturing, including networking with Industry 4.0 technologies.

"We have been working on the topic of Industry 4.0 for some time now. With automated ALLROUNDERS, the freeformer for additive manufacturing and IT solutions, we are increasingly developing our company into a production system supplier for networked production in the digital factory," explains ARBURG Managing Partner Juliane Hehl. "In Friedrichshafen, we will demonstrate in practice how mass-produced parts can be customised and traced in a part-specific manner using industrial additive manufacturing with the freeformer. Each of the other exhibits on our exhibition stand is also a highlight in itself."

As examples of networked production in line with Industry 4.0, freeformers will be used to enhance injection-moulded, mass-produced office scissors and rocker-type light switches with individualised lettering and symbols. The product itself becomes an information carrier through application of

a code via laser. The ARBURG host computer system (ALS) seamlessly documents all the relevant process and quality parameters and transmits these to a web server. The individual code can be used to call up a web page using mobile devices and to seamlessly trace each individual part. Beyond the Industry 4.0 applications, all the exhibits on the ARBURG exhibition stand are also networked via ALS.

Mobile robot feeds freeformer

The mobile "iiwa" (intelligent industrial work assistant) KUKA six-axis robotic system will be premiered in conjunction with the freeformer. It handles the automatic loading and unloading of the freeformer's build chamber. In addition to its mobility and the associated high degree of flexibility, the main advantage of this automation solution is the possibility of direct,





autonomous cooperation between human and robot. The robot will 'personally' hand out individualised scissors to the visitors at the Fakuma.

Another new addition in the automation sector is the retrofittable INTEGRALPICKER V.

Foaming of glass-fibre reinforced parts

Numerous innovative applications in the injection moulding sector will be on show. These include the lightweight construction sector, for which ARBURG has already developed a number of injection moulding processes jointly with expert partners and universities. An automotive application will be used at the fair to demonstrate the ProFoam physical foaming technique, which is particularly suitable for fibre-reinforced plastics (see page 14).

A highlight in multi-component injection moulding is the processing of two silicones to produce buttons for vehicle interiors: an electric ALLROUNDER 470 A with size 170 and 30 injection units produces the membranes from coloured LSR with a hardness of 50 Shore and the internal disc from transparent LSR with a hardness of 80 Shore. The exhibit operates with a 32+32-cavity mould from Trelleborg and an electric rotary unit. The shot weights are of

only 2.04 and 0.98 grams. A hydraulic, two-component ALLROUNDER 570 S will produce handles for garden saws from 40 percent glass fibre-reinforced PP with a pleasant tactile feel made from TPE. A mobile robotic cell completes the exhibit.

ARBURG will be using a micro production cell to demonstrate the production of delicate micro parts weighing as little as 0.004 grams.

A hybrid ALLROUNDER 820 H has been specially configured in the "Packaging" version for the packaging industry.

Cleverly produced fruit baskets

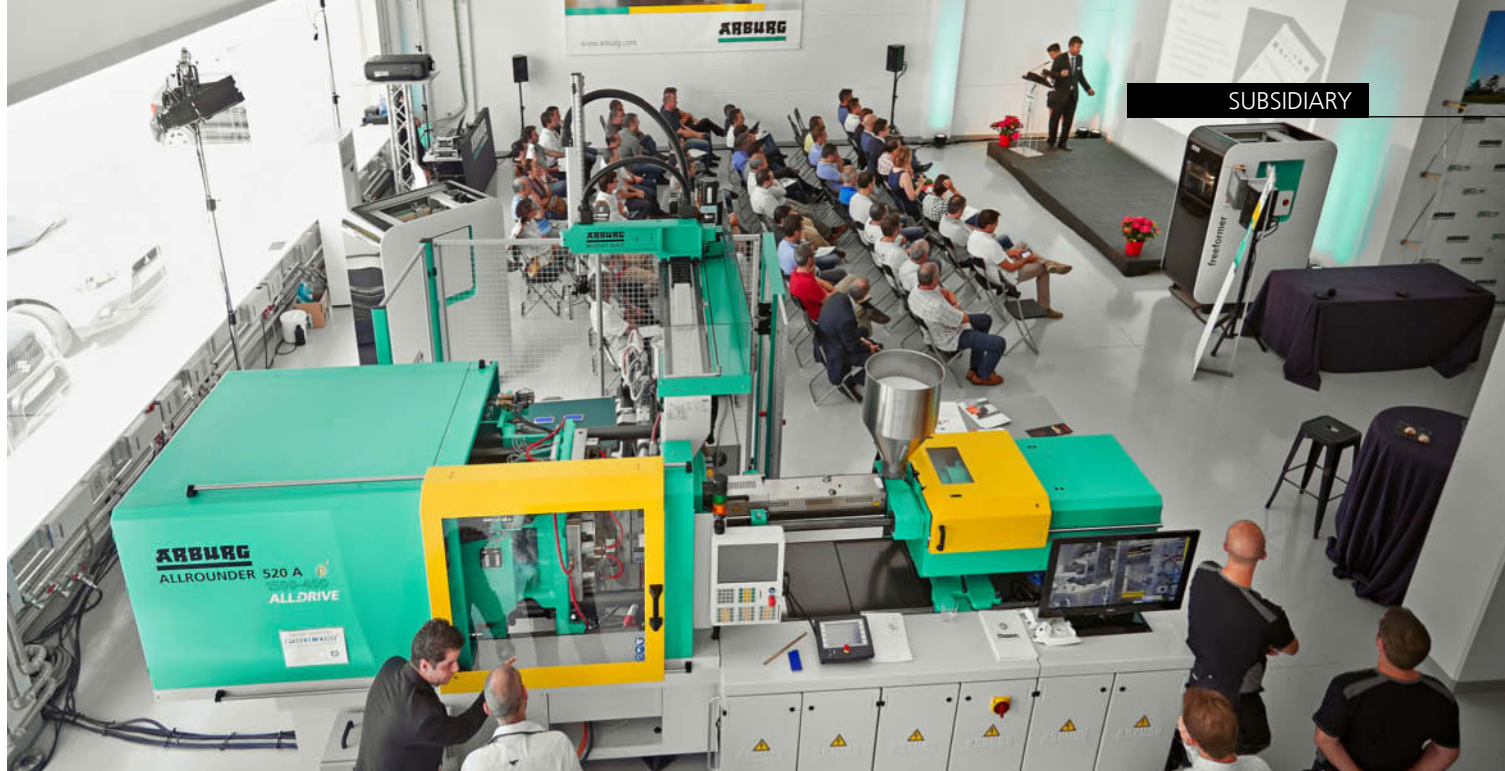
The high-speed machine will produce a small folding baskets for fruit. An automation system from Campetella supplies and inserts IML labels, as well as removing the finished parts. Depending on the requirements, the fruit baskets can be set down on a variety of conveyor belts, folded together or opened out.

The freeformer (photo top left) will be represented by three exhibits at the Fakuma in order to demonstrate its wide range of applications. These include the individualisation of mass-produced moulded parts such as office scissors (photo top right). The production of fruit baskets using the IML technique (photo below) is just one of many complex injection moulding applications.

For the medical technology sector, an electric ALLROUNDER 470 A will be on view, which can be docked to a clean room in order to produce connection elements for use in intravenous drip therapy using an 8-cavity mould from Männer. The highlight of this application is the lateral injection via a needle-type shut-off nozzle and the demoulding of PMMA moulded parts from three sides.



Information on Fakuma exhibits



More space for everyone

Spain: New premises enable expansion in the automation sector

ARBURG Spain opened its new premises in Montcada i Reixac (Barcelona) in July 2015. The move provides the ARBURG Technology Center (ATC) with 800 square metres of space in which to provide comprehensive support for customers in Catalonia, the largest and most important market in Spain.

“We have a lot more space for machines and turnkey systems, spare parts, practical tests and intensive training courses,” says a delighted Martin Cayre, Managing Director of ARBURG S.A.

Showroom for ALLROUNDERS, turnkey systems and freeformers

“The showroom alone covers 320 square metres and offers space for up to five ALLROUNDER injection moulding machines or turnkey systems, as the automation sector is to be further developed. Furthermore, we also have a freeformer that we can use for customer trials.”

The new facilities at the ATC in Barcelona were presented as part of a two-day event that was attended by



Photos: Angel Altés

over 110 guests from Spain and Portugal, as well as ARBURG Managing Partner, Renate Keinath.

Success for over 25 years

In her address, she emphasised: “The new building demonstrates the great importance that we have attached to our Spanish subsidiary over more than 25 years. We owe our success both to our dedicated local team and to our customers. Without them we would not be what

The showroom in Montcada i Reixac offers plenty of space for ALLROUNDERS, turnkey systems and the freeformer (photo above). Inauguration ceremony for the new building (centre photo): ARBURG Managing Partner Renate Keinath with Martin Cayre (right), Managing Director ARBURG S.A., and Stephan Doehler, ARBURG European Sales Director.

we are today: one of the market leaders in Spain and Portugal.” The ATCs in Madrid and Barcelona mean that ARBURG Spain is very well positioned for the future. At present, the entire Spanish team numbers 27 employees, including 14 service technicians who provide optimum support at the local level.

Young, dynamic,

MeHow: Medical technology

Simply producing plastic parts is not sufficient if you want to survive in a high-end market such as medical technology. This is why Chinese company MeHow Innovative Ltd. from Shenzhen places so much value on a holistic approach to the added value chain, automated manufacturing and close cooperation with customers and partners.

The concept behind this young company makes sense, as the figures clearly show: turnover has increased by at least 30 percent on average, year-on-year. According to Marketing Director Feng Yuan, the reasons for the company's success can be found in its expertise in production and its holistic approach to supporting customers, most of whom are from the medical technology sector. The portfolio also includes international brands such as Cochlear, world market leaders in the area of innovative hearing aid implants.

Familiar brands in the customer portfolio

"We don't just manufacture products from thermoplastic and liquid silicon (LSR), but also combine both materials

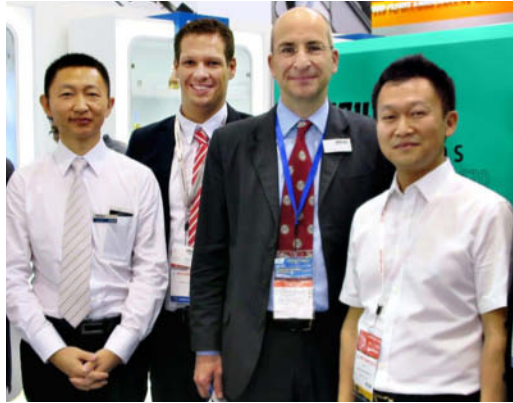


successful

Technology and LSR expert relies on holistic support

in two-component injection moulding," says Feng Yuan. Our own mould making shop completes our offerings." The benefits to the customer include high quality production solutions, reduced market introduction times, reliable risk management and optimal cost control.

MeHow ensures high quality and productivity through automation of its single and two-component injection moulding machines. "The ARBURG robotic systems always impress with their high speed and positioning accuracy," explains Albert Zhou, LSR Director. "Thanks to the SELOGICA control system, we can program even highly complex movements with ease and integrate numerous automation components."



Delighted with the successful cooperation: MeHow's Managing Director Peter Xiong (right) with LSR Director Albert Zhou (left) and Heinz Gaub (2nd from right), ARBURG Managing Director Technology, and Benjamin Franz from ARBURG Shenzhen.

system and other peripherals. A wine bottle closure was produced as a hard/soft combination.

Chinaplas exhibit demonstrates expertise

"This product was not simply a nice give-away. Above all, it demonstrated our overall expertise in injection moulding, mould technology and automated production, including optical quality control, unique part marking via laser and complete packaging," says Feng Yuan. A turnkey system of this type offers all the prerequisites for meeting the high demands of the medical technology sector, e.g. in relation to high precision and reliability during production and the traceability of the individual product.

Convincing technology and service

MeHow has been working very closely with ARBURG since entering the world of LSR processing in 2011. The reasons for this are the high precision, process reliability, performance and dependability of the ALLROUNDER machines, which operate around the clock, seven days a week. On

top of this comes the excellent application technology support, as Albert Zhou explains: "When introducing new products and applications, we first consult with the ARBURG experts, who, thanks to their high level of competence, always find the right solution. They also help us to further optimise our processes further down the line." MeHow used the Chinaplas 2015 to present its range of services. It exhibited a turnkey system for processing thermoplastic and LSR, consisting of a hydraulic two-component ALLROUNDER 470 S, complex rotary mould, six-axis robotic



Photos: MeHow

The LSR and thermoplastic wine bottle closure (photo left) enabled MeHow to demonstrate its expertise in mould construction and injection moulded part production at the Chinaplas 2015 (photo below).

INFOBOX

Name: MeHow Innovative Ltd

Founded: 2010

Location: Shenzhen

Production area: 18,000 m²

Employees: approx. 800

Industries: Medical technology, expansion in the areas of food packaging, baby products and electronics

Markets: Focus on Australia, the US, Europe and Singapore

Machine fleet: 56 injection moulding machines, including 12 ALLROUNDERS with clamping forces from 500 to 5,000 kN

Contact: <http://mehow.gmc.global-market.com>

Perfect service all-

Eckhard Witte: Establishing the same ambitious service standards

How is ARBURG responding to the service challenges of the future? In an interview with 'today', Eckhard Witte, ARBURG Head of Service, discusses important topics such as customer satisfaction, speed and accessibility, as well as all-round support for international service.

today: What are the primary objectives of the Service division?

Witte: The priority for our joint activities is to extend the availability of service and to further increase its quality. This relates both to the accessibility of our specialists by telephone and to the fast availability of service technicians at the local level.

today: What specific steps have been taken?

Witte: In Germany, for example, we have increased our hotline capacity and expanded our operations management team. Our hotline staff now specialise in a variety of different areas. A new deployment planning program optimises the work and travel time of our technicians, ensuring faster, more cost-effective assistance.

Our international subsidiaries are also integrated in the joint planning system, so that the same conditions are available worldwide. This has resulted in the standardisation of service reports, for example. The fault codes entered here allow us to perform standardised evaluations in order to detect accumulations of faults, identify their causes and remedy them by means of targeted measures. The effects extend far beyond Service. They also help Development, Production and



other departments to further improve our products.

today: How do these objectives affect training and personnel planning for service technicians?

Witte: We need to train our technicians, particularly with regard to the increasing technical variety of our product range. In addition, a growing number of large machines require two service technicians, while an increasing volume of individual turnkey systems also need to be serviced in detail. Not to forget the completely new area of the freeformers, of course. Naturally, we can only deal with these additional tasks by increasing our staffing

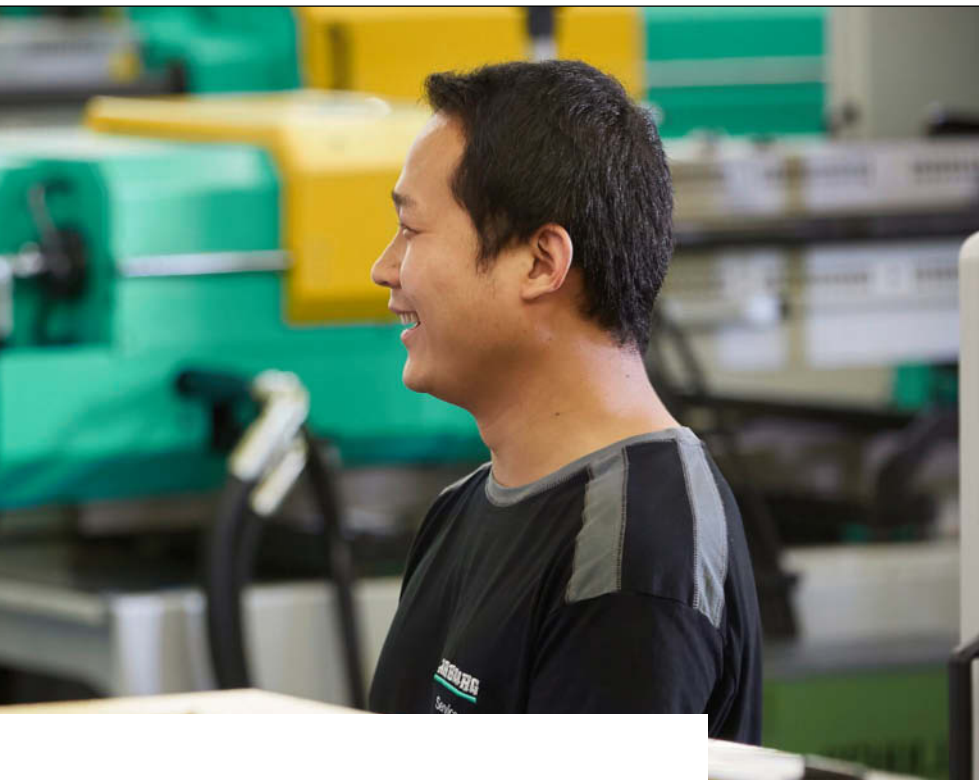
levels. That's how we keep deployment and response times at a perfect level.

today: How do you provide international support to Service from the Lossburg parent company?

Witte: We assist our subsidiaries and dealers with knowledge and information, for example in relation to the required moulds and aids, as well as personnel support through our international technical support. This enables us to structure the service activities worldwide in such a way that they reflect the quality standards of the parent company. This is the purpose of the international service meetings that we've been hosting for

round

worldwide



Eckhard Witte (left), Head of Service, discusses the service challenges associated with individual turnkey systems with Ray Zhao, who is responsible for the automation sector at the Chinese subsidiary in Shenzhen.

mation on special moulds. The feedback from the service technicians is included.

Service availability is an important issue for us. That's why we now offer an extended hotline ensuring prompt availability in Germany and a similar service in all of our subsidiaries. When it comes to technician training, we focus on uniform basic training, which is then extended depending on the requirements of the relevant markets by adding supplementary advanced qualifications.



today: What aids do you use to assist with support?

Witte: For about the last three years, we've been helping out service personnel in a targeted manner with new software, known as the Knowledge Scout. This is a worldwide central knowledge management

several years now, for example. In China, we've had a separate trainer for service technicians since 2014. He works directly at the local level, ensuring that suitable training is provided.

resource for service, application technology and turnkey systems. This interactive advice system can be accessed online. It provides a repository of technical documents and information, solutions for problems and faults, drawings and infor-

Bright, clear and un

Khatod: Transparent LSR lenses for LED street lamps

Italian company Khatod Optoelectronic, Milan, specialises in high-quality optical systems for LED lighting. Shortly after the new "Ultra Clear Silopren LSR 7000" LSR material from Momentive reached the market, the Italian company demonstrated the injection moulding of silicone lenses (SIO3) featuring COB (Chip-on-Board) technology at the Eurostampi 2012 for the first time, worldwide. The innovative application for LED street lamps was implemented by Khatod in conjunction with ARBURG.

"Our strength lies in the fact that we bring together extensive expertise in LED technology at our Milan headquarters with a central production facility that offers everything,

from design and development through to delivery from a single source," explains company boss, Giuseppe Vasta.

75 percent of products are destined for export, mainly to the USA and Asia. Khatod has been producing on ALLROUNDER injection moulding machines since 1995 and has been cooperating more closely with ARBURG since 2010.

Around 20 percent of its income is invested in research

and development. ARBURG Italy took the opportunity to support Khatod with special machine technology in order to produce thick-walled LSR lenses for innovative LED street lamps on an ALLROUNDER machine - a worldwide innovation.

Worldwide innovation undergoes extensive testing

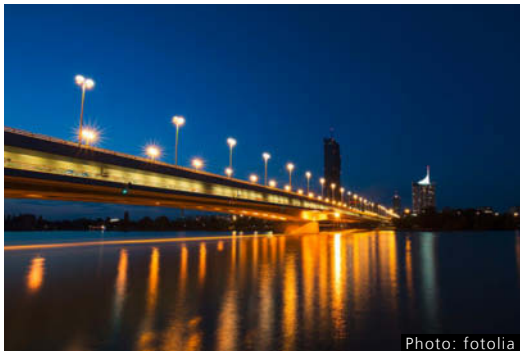
The benefits of the new liquid silicone are evident: "Ultra Clear Silopren" is highly transparent, unbreakable, as well as heat and UV-resistant, making it superior to glass, which would be the conventional choice. Unlike PC or PMMA, SIO3 is not photosensitive and is not damaged by the strong light from the LEDs. The developers and en-



breakable



The flexible LSR lenses supplied by Khatod in over 30 different variants are intended for the LED lighting of large areas (photos left).



The high degree of dedication shown in optimising the product and the production process was most recently rewarded in February 2015, when the silicone lenses won the "Sapphire Award" in the "Enabling Technologies" category from specialist publication "LEDs Magazine".

Engineers at Khatod have extensively tested various sizes and geometries in order to achieve the best possible distribution of light. This is because the LSR lenses are intended for the LED lighting of large areas. A hydraulic ALLROUNDER 470 S with a clamping force of 1,000 kN and LSR equipment was used for the trials.

More than 30 variants

Khatod is the world's only manufacturer of the patented SIO3 lenses, which it offers with a variety of beam angles.

More than 30 variants are produced using the injection compression moulding process with single to 8-cavity moulds from the company's own mould construction shop. The product has now been available on the market for a number of years.

Production around the clock

Around 25 ALLROUNDERS with clamping forces from 250 to 4,000 kN work around the clock in fully automated high-volume production. "We rely on ARBURG for its high level of innovation, dependability and, in particular, excellent service," explains Luca Meneghetti, Head of Technology at Khatod. The high quality products from the Milan-based company are in great demand. The company will consequently be moving into a new building next year in order to increase its production area to 29,700 square metres.

INFOBOX

Company: Khatod

Optoelectronic SRL

Founded: 1985 by Giuseppe Vasta

Location: Design, Development and Production all located centrally in Milan, Italy

Employees: approx. 60

Products: High quality optical systems for LED lighting

Machine fleet: 29 injection moulding machines, of which 26 are ALLROUNDERS

Contact: www.khatod.com

Strong lightweight

ProFoam: Physical foaming of glass-fibre reinforced plastics

The ProFoam foaming technique enables lightweight, resilient and low-distortion parts to be injection moulded with a homogeneous foam structure. ARBURG has collaborated with the Institute for Plastics Processing (IKV) in Aachen, Germany on the research and development of this physical foaming process. An additional benefit: fibre-reinforced plastics can be processed without additional shearing.

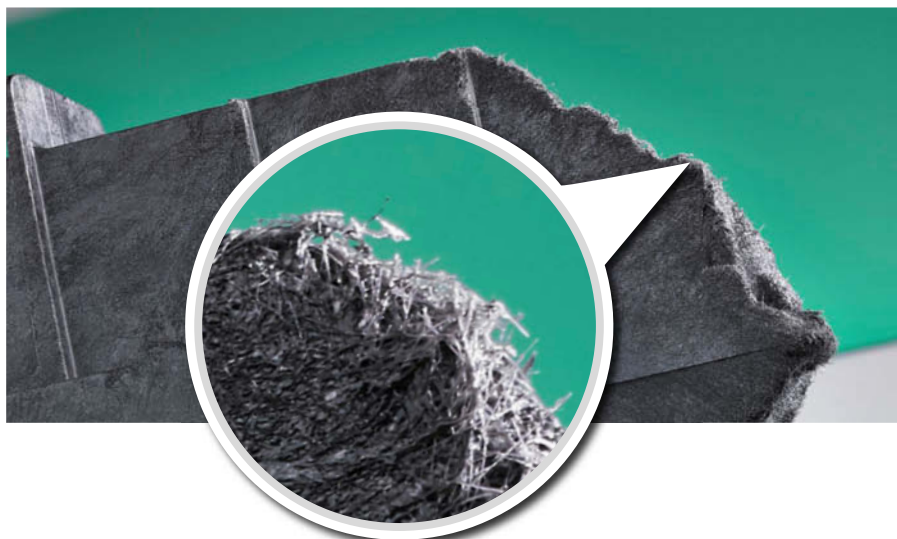
ProFoam is characterised by a simple process sequence. The only setting required is the variable “process gas pressure” parameter. The plastic granulate is first mixed with propellant in a granulate lock between the material reservoir and material feed. An injection unit featuring a normal three-zone screw geometry is used. The granulate lock is equipped with a controller that communicates with the SELOGICA machine control system via an interface. The machine is flexible and can also be used for other applications, enabling the production of compact parts without requiring set-up work.



During the plasticising process, the propellant is dissolved in the melt and only emerges again in the form of micro-cellular “bubbles” when the pressure is reduced during injection. The result is a homogeneous foam structure. In the materials examined to date, the process does not require an additional shearing

and mixing unit on the screw, ensuring gentle melt preparation.

Foamed parts with glass-fibre reinforcement can be produced particularly effectively, achieving better mechanical properties. When these types of materials are used, ProFoam generally produces a longer average glass-fibre length in



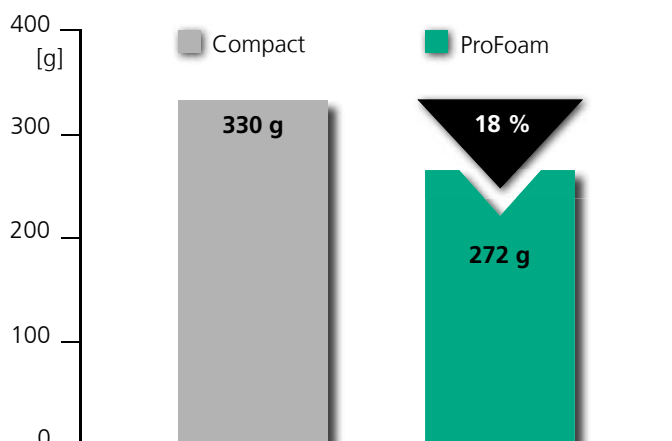
S



In the ProFoam process, the plastic granulate is first mixed with liquid propellant in a granulate lock between the material reservoir and material feed (photo bottom centre). The "air-bag housing" is an example of how fibre-reinforced plastics can be processed without additional shearing (photo above and below left). The weight of the 280 millimetre part is reduced by 18 percent compared to compact injection moulding (chart).

the part than in the case of conventional compact injection moulding. Depending on the material, the surface quality can be improved by means of variotherm process control. At the Fakuma 2015, ARBURG will present an innovative application for the automotive industry, enabling material savings and therefore

a reduction in fleet energy consumption and CO2 emissions.



Lightweight construction at a glance

Physical foaming with ProFoam

- Weight reduction through microcellular structures
- Gentle processing of fibre-reinforced plastics
- Machines are flexible and can also be used for conventional injection moulding

Particle-foam Composite Injection Moulding (PCIM)

- Lightweight, foamed primary product
- Thermoplastics with positive material bonds for additional functions
- Integration of standard parts (e.g. threads) in foamed parts

Fibre Direct Compounding (FDC)

- A side feeder cuts glass-fibre rovings and feeds them directly into the melt
- Individual fibre length, fibre content and material combination
- Inexpensive base materials

Overmoulded thermoplastic composite sheets

- Combination of glass-fibre reinforced FDC moulded parts and thermoplastic composite sheets
- Integration of additional reinforcements or functions
- Composite components replace metals in the automotive sector





Small parts k

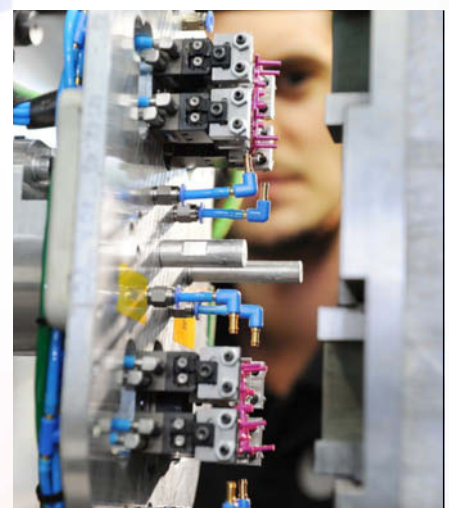
Hörl Kunststofftechnik: Fully automated and

The company slogan, "Precision in plastic" precisely describes the products manufactured by Hörl on a turnkey system from ARBURG since 2014: tiny clips in retainers for connectors in the automotive sector. The entire production set-up, which also includes electric ALLROUNDER A machines, is automated and integrated by means of the ARBURG ALS host computer system.

"Our production facility is highly automated in order to ensure high capacity utilisation. We're achieving annual growth of between 20 and 25 percent," says Thomas Hörl, describing the current situation. The product portfolio includes small housing components for connector elements and insulating parts in high unit volumes that are increasingly being produced on high-cavity moulds. Some 70 percent of Hörl's total production is purchased its majority shareholder, the Rosenberger Group. As a system partner, Hörl provides development, design, mould construction and production from a single source.

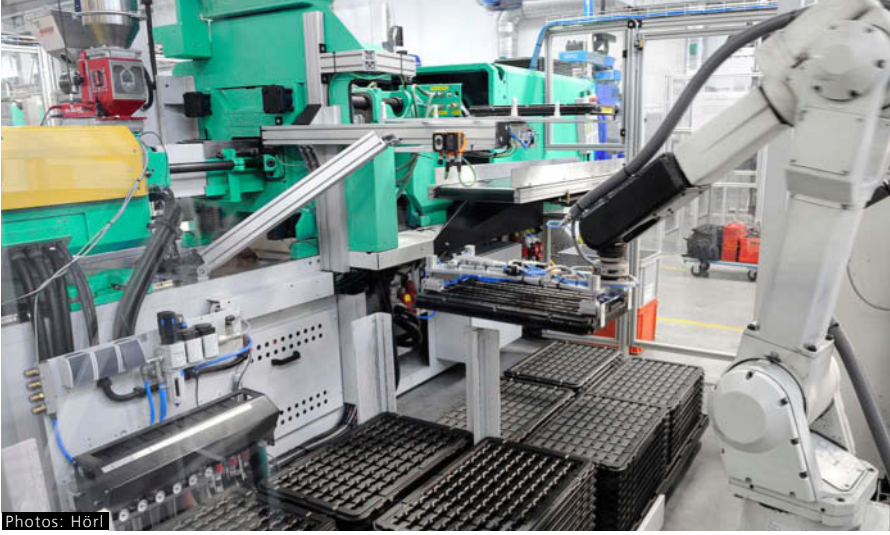
All the machines are equipped with a robotic system

Production quality and transparency in production are enormously impor-



Thanks to the pink clips, the connectors are securely locked in position (photo left). The robotic system removal plate has been specially adjusted by Hörl (photo centre). The clips are produced on a turnkey system (photo above).

tant for the tier 2 producers supplied by Hörl – which has led to the use of electric ALLROUNDERS, MULTILIFT robotic systems, turnkey systems and the ARBURG ALS host computer system. "You won't find a single machine without a robotic system in our air-conditioned plastic injection moulding shop," says Thomas Hörl.



Photos: Hörl

Keep cars moving

networked production

“We only need two operatives to monitor our 65 machines during the night shift. No one else is needed.”

Industry 4.0 already a reality

In the Industry 4.0 sector, the company is developing autonomous closed control loops. Manual work is to be increasingly replaced by programming and monitoring activities. Thomas Hörl summarises the strategy: “There is an increasing trend towards innovative processing techniques, such as assembly injection moulding in multi-component processing or the use of stack moulds and six-axis robotic systems, including in a dual configuration. We already have concrete plans for more turnkey systems.”

Turnkey system for fasteners

The production cell from ARBURG commissioned in 2014 is used to produce special fasteners which ensure that plug connections are held securely in place after being correctly connected. For this purpose, the pre-assembled clips measuring around 7 millimetres in length and weighing 0.1 gram are clipped through the connectors under pressure.

The clips made from ten percent fibre-reinforced PBT are produced using five different 32- to 48-cavity moulds

on an electric ALLROUNDER 470 A. Injection is performed via distributors into eight mould inserts, in each of which six or four cavities are arranged in a circle and held precisely in position by means of a vacuum unit.

A MULTILIFT V with a plate specially adapted by Hörl to the task in hand removes the clips from each mould insert and drops them separately in to six containers by means of a tube system for better traceability. Next, the parts are packaged according to a specific number of units.

The greatest challenge lay in the electrostatic charging of the clips, which was neutralised by means of a three-stage ionisation system using air on the gripper, the tube system and via the transport containers in the cover plate.

Over four million clips each day

When the system was delivered, the cycle time was still around ten seconds, including the robotic cycle. Thanks to continuous process improvements in the commissioning phase, the cycle time was reduced to 7.55 seconds by the time high-volume production started. As a result, Hörl now produces far in excess of four million parts per day for installation in almost every car brand around the world.

INFOBOX



Name: HÖRL Kunststofftechnik GmbH & Co. KG

Founded: 1991 by Thomas Hörl and Alois Hainz

Group: A member of the Rosenberger Group (majority shareholders) since 2010

Products: Small and micro injection moulded parts and contact components made from technical materials

Industries: Automotive, telecommunications and electronics industry

Machine fleet: 65 injection moulding machines, of which 38 are ALLROUNDERS

Contact: www.hoerl.de

A great team

Brink Group: Turnkey solutions for packaging and worldwide

The cooperation between the Netherlands-based Brink Group and ARBURG has been a win-win situation right from the start. Brink is a general contractor and specialist in the area of packaging, thin-walled technology and automation, ARBURG contributes with high-end injection moulding technology. After many successful international projects, Brink invested in a 'Packaging' version of the ALLROUNDER H for its technical centre in 2015. The next objective is the expansion of activities in North America. Here again, ARBURG is on board.

The combination of Brink and ARBURG is the perfect match for implementing turnkey solutions: the Brink Group is not only involved in the construction of complex moulds, but also of robotic systems for the packaging industry – particularly for in-mould labelling (IML) and thin-walled applications. Together with ARBURG, a number of ambitious systems have already been created, e.g. for the fully automated manufacture of yoghurt tubs using the IML process.

One example is the jointly implemented turnkey system for Jalplas in Australia. The task in this case was the production of a two-litre thin-walled container with handle and the corresponding lid (see today 55, page 22).

Increasing demands

The requirements are continuously becoming more complex. For example, there is an increasing demand for large and complex stack moulds for IML products in order to almost double the yield with the same machine size and to integrate



downstream operations such as visual inspections and fully automated packaging. The precise interaction of all components is gaining increasing importance. Cameras not only monitor the dimensions of the moulded items, but also check the positioning of the labels and read QR or bar codes.

Complete turnkey solutions

As a general contractor, Brink takes care of set-up of the entire system, comprising the machine, mould and robotic system, as well as the tests using the customer's material and labels. "During the test run and system acceptance, the technicians determine the fastest cycle and fine-tune everything down to a tenth of a second. Finally, we provide our customers with in-depth training," says Brink Director Johan van Veenschoten. A "Packaging" version of

the hybrid ALLROUNDER 630 H with a clamping force of 2,300 kN and a size 800 injection unit was added to Brink's technical centre in Harskamp, Netherlands, in May 2015.

ALLROUNDERS for mould trials

Johan van Veenschoten fills in some background information: "We use the hybrid ALLROUNDER to test our moulds. With around 200 mould trials per year, the technical centre is a key part of our activities. The ALLROUNDER is of key importance for this purpose as many of our customers also use ARBURG machines." Brink also adds that he has been able to convince his customers of the benefits of ARBURG technology and impressively demonstrate the capabilities of the ALLROUNDER in the packaging sector.

Soft Sheen
For interior walls & ceilings

customer support



ARBURG excels with expertise and internationalism

“In recent years, we’ve seen ARBURG grow very quickly in the fields of thin-walled products and packaging,” says the Director of Brink. “Furthermore, our partner and its subsidiaries offer us a global presence and local experts wherever we need them. We achieve the same through our joint ventures. In future, it is our aim to make even better use of this internationalism and even extend it.” Next, Brink, together with ARBURG, plans to move onto the North American market, which offers enormous potential for growth, particularly in the turnkey sector.

ARBURG and Brink have already jointly implemented numerous turnkey systems for IML products (photo left). Delighted with their investment in an ALLROUNDER 630 H: Brink Director Johan van Veenschoten and Allard Waaienberg, Manager Moulds at Brink, along with Andreas Reich, ARBURG Senior Sales Manager Packaging, at the machine handover in Lossburg (photo right, left to right).

INFOBOX



Name: Brink Group

Founded: 1963 in Harskamp, Netherlands

Locations: Production sites in the Netherlands (Harskamp, Winterswijk and Zelhem), sales joint ventures in South Africa, Egypt and Russia, worldwide presence in more than 70 countries

Turnover: 35 to 40 million euros (excluding joint ventures)

Employees: 240

Industries: Consumer and packaging
Products: Complex injection moulds, automation and turnkey systems, focus on high-speed thin-walled and IML applications

Contact: www.brinkbv.com

A new part every d

AGRODUR: freeformer saves time and money in developing in

As one of the leading manufacturers of technical precision products from thermoplastic and thermosetting polymers, AGRODUR has been using ARBURG injection moulding technology since the 1970s. The company offers the entire range of services, from product design, development and material selection through to batch production. In October 2014, AGRODUR entered the world of industrial additive manufacturing with the freeformer.

Since then, fully functional parts have been produced at the company's site in Radevormwald, Germany, using almost the same standard granulates that are subsequently employed for high-volume production of the moulded parts.

Fully functional parts

"Because the freeformer uses standard granulates, we can, in addition to purely visual samples, also produce parts for installation tests and functional trials, enabling us to dispense with expensive, time-consuming aluminium moulds," says Michael Grosalski, Managing Partner at AGRODUR, explaining the key reason for purchasing the



freeformer. The company enjoys the same level of flexibility in the event of changes to product design or dimensions at short notice.

freeformer produces day and night

"Our customers have realised this and are practically breaking down the doors to work with us," adds Michael Grosalski. The freeformer has been in use around the clock since the beginning of this year. Even

at the Hannover Messe 2015, the company took the opportunity to produce a part for a customer overnight on an ARBURG exhibit.

Business graduate Michael Grosalski is without doubt one of ARBURG's most inventive freeformer customers. He was



ay

jection moulding products

already familiar with the plasticising unit and control system from the ALLROUNDER injection moulding machines.

Expert in the freeformer

“In October 2014, after just two days of familiarisation, I began practising with an ABS that had been qualified by ARBURG,” explains Grosalski. “One month later, I was able to qualify materials myself and achieve very promising results with semi-crystalline and amorphous plastics. We used a microscope and calliper gauge to coordinate all the elements. So far, none of our trials has really gone wrong. If necessary, we can contact a freeformer expert from ARBURG very quickly. Naturally, not every material works perfectly yet, but I am confident that we’ll be able to process even more semi-crystalline plastics in the short-to-medium term.”

At present the system has reached its limits in the processing of fibre-re-

inforced plastics, because longer fibres simply do not fit through the nozzle. However, in most cases, the component strength offered by unreinforced materials is quite sufficient. Overall, the new opportunities far outweigh the limitations for AGRODUR.

The next objective is PEEK

The company’s medium-term goal is the processing of high-temperature plastics such as PEEK and, in the long term, a third nozzle to enable parts to be additively manufactured in two colours or as a hard/soft combination with a support structure. Already produced parts for customers from the automotive and plumbing sectors include ball bearings, a

complex pump casing or an 850 g housing for a water filter using the amorphous polyamide Grilamid TR 90.

On average, AGRODUR estimates that it takes a day to produce a standard part, including preparations and set-up of the freeformer. Around 150 to 250 new products are produced by the company each year. Accordingly, the need for prototypes is great and the potential for in-house additive manufacturing is huge. Hence, AGRODUR is already considering purchasing a second freeformer.

AGRODUR partner Michael Grosalski, who uses the freeformer virtually around the clock, presents an additively manufactured surface mounted safety plug socket from ABS (photo centre). Other examples of parts produced with the freeformers are the components of the four-part water filter housing made from amorphous PA12 (photos right and left).



INFOBOX

Name: AGRODUR Grosalski GmbH & Co. KG

Founded: 1967 by Alfred Grosalski

Locations: Radevormwald (administration),

Bad Berleburg, Hohenmölsen

Turnover: 59 million euros (2014)

Employees: Around 330 (2014)

Industries: Automotive, medical technology, plumbing, electrical installation, electrical engineering and electronics

Machine fleet: 88 ALLROUNDERS, 1 freeformer

Contact: www.agrodur.de



Photo: fotolia

Always an open ear

Worldwide telephone support: Customers appreciate fast expert

Local presence worldwide, telephone hotline and any-time service – these are the goals pursued by the global ARBURG Service: Making sure that we meet these goals is a new challenge every day, whether this involves availability, the handling of queries or the development of a solution.

The fact that ARBURG is well equipped for the task is demonstrated by the worldwide positive customer feedback on the telephone support.

Example: Baxter, Puerto Rico

Alberto Zayas Martínez, Head of Repair and Service at Baxter Healthcare of Puerto Rico, talks about cooperation with ARBURG: "Our ALLROUNDER with multi-component

rotary mould is a key part of our production set-up. When we encountered a problem, which showed up as a error code in the machine control system, and which was linked to the ejector, I immediately called ARBURG Service in the USA, who were able to help me very quickly. I was sent a special solution by e-mail, enabling me to bypass the ejector motor, so that the machine could continue to produce parts. Also when I encountered a mechanical problem, a call to the hotline was enough to solve the issue. They quickly pinpointed a communication problem between the machine and motor to a pin in the connector cable and were able to solve the problem then and there on the phone."

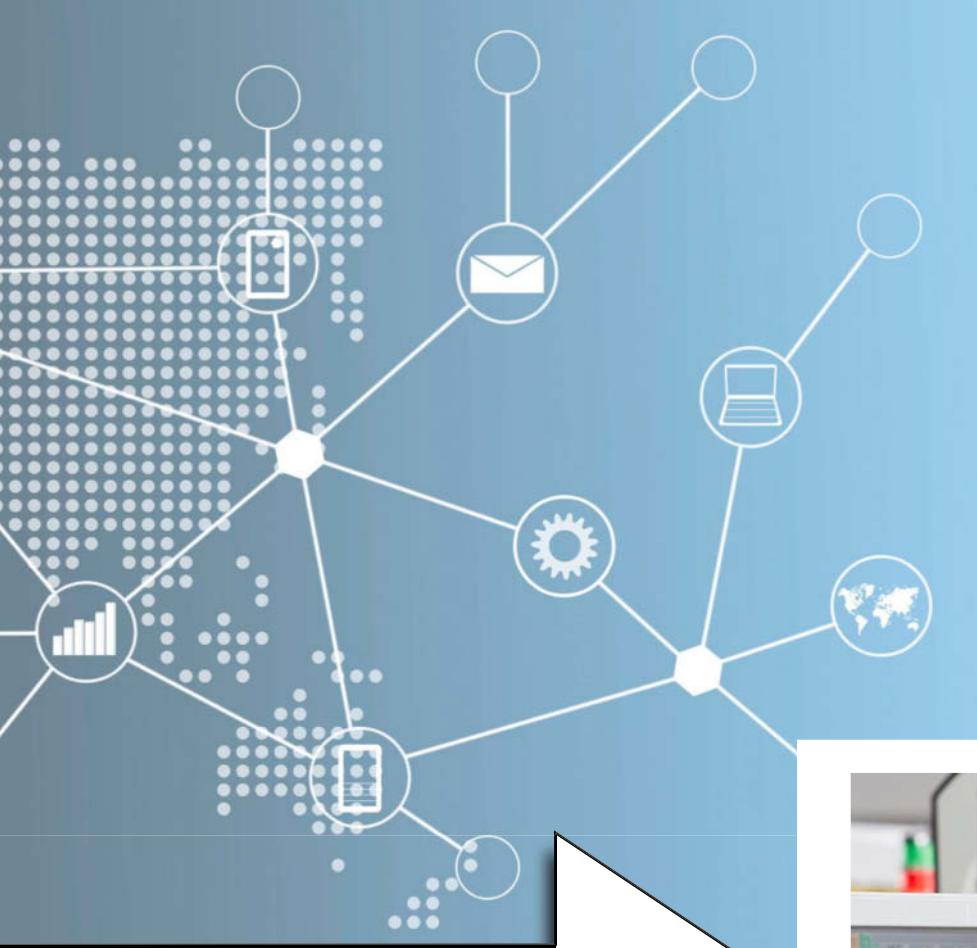
Example: GRW Technologies, USA

Uwe Herold, Production Manager at GRW Technologies Inc. in Grand Rapids,

Michigan, a subsidiary of the Söhner Group, has the following to say about Service: "Delays in just-in-time deliveries for the automotive industry can cause untold reputational damage. That's why the ARBURG telephone hotline is so important to us. The fact that we can have spare parts delivered within 24 hours and that the service technician responsible for us is stationed just one block away really represents a significant saving in time and money. The almost 24/7 availability of the hotline is something we value very much as we know we can always rely on getting help when we need it. All of these factors are of key importance for future cooperation with ARBURG."

Example: Technimark, USA

Patrick Miller is one of the senior application technicians at Technimark Inc.,



The ARBURG telephone hotlines around the globe support customers even outside of normal office hours - an important aspect as ALLROUNDERS are mostly in use around the clock.



assistance

Asheboro, North Carolina, and here he tells us about his own experiences: "We were able to complete an extensive program adaptation for a special two-component application in a very short time. After I called telephone support in the USA, it took just a few minutes for me to be put through to an expert technician, who helped me with the reprogramming. We were immediately able to produce a new product and acquire this customer order. When it came to the installation of a new ALLROUNDER in our production facility in China, Technical Support from ARBURG USA was also very helpful. When we came to commission the complex system, they also provided support over the phone whenever we had any questions or encountered problems. Moreover, our Chinese team also appreciated the perfect machine documentation, which made it much easier to integrate the system in China."

Example: Risheng, China

Hanyi ZHANG from Risheng Precise Molding CO., LTD., is delighted with the high availability of the telephone hotline in Shanghai: "When I call, it's like the experts are right here on site. They know our machine fleet intimately and have already been able to help us a great deal. For example, when our ALLROUNDER 630 S suffered a fault in the drive motor for the hydraulics and automatically stopped, I called the hotline immediately. In response to my call, it was suggested that a service engineer could replace a high pressure pump the next day. As a faster alternative, we tried removing a high pressure pump from an ALLROUNDER 570 C and installing that in the 630 S - all

with the support of the ARBURG engineer at the other end of the line. This was successful and we were able to continue with production on the same day."

Automation brings advance

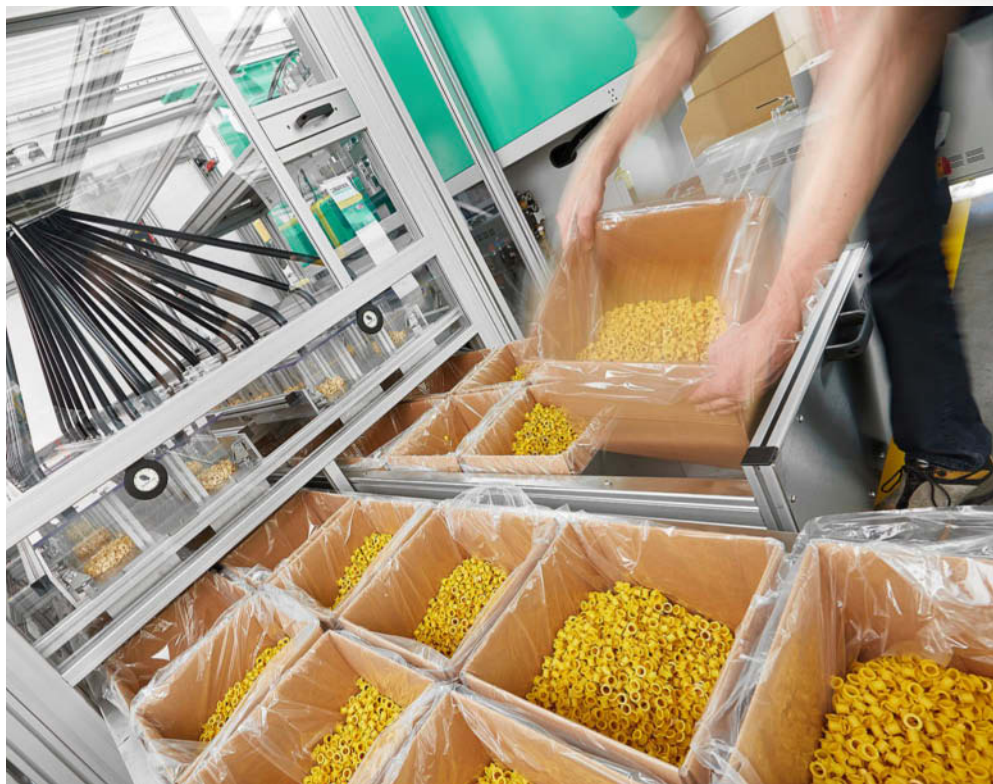
Erwin Quarder: Turnkey project for millions of coil shells

How can customers for plastic parts gain access to cost-efficiently produced products? An simple question that is difficult to answer. At Erwin Quarder Systemtechnik GmbH the answer was: complete solutions. One example here is the turnkey system for producing millions of coil shells, implemented with assistance from ARBURG.

The value added chain that system provider Quarder offers its customers ranges from part and process development, injection mould construction including mould filling analyses and the construction of production systems through to part production and quality control.

25 years of cooperation

Quarder and ARBURG have been cooperating for 25 years with regard to rotary table and vertical machines, as well as larger models and multi-component machines. The automated turnkey system for producing coil shells for Erwin Quarder S.A. de C.V., the company's Mexican production site, was a new venture. The coil shells are moulded and the coils subsequently wound, after which they are incorporated in assemblies for the automotive industry throughout the NAFTA region. According to Bernd Schroeder, Key Account Manager at Quarder Systemtechnik, a total of twelve of these



thin-walled coil shells are used in millions of automotive brake systems.

32 coil shells in 6.5 seconds

The cycle time for the technical moulded parts produced from a glass-fibre-filled PA 6.6 is around 6.5 seconds. The 32-cavity mould with hot runner and needle-type shut-off nozzle, as well as special cooling and ventilation, comes from the Quarder

The thin-walled coil shells (photo above) are moulded on a hybrid ALLROUNDER 520 H (photo below) and are dropped into original boxes according to cavity (photo centre).

mould construction shop. Extremely precise tolerances had to be met for the delicate parts.



Fast, reliable production

A MULTILIFT V robotic system with a reduced load capacity of 6 kilograms and a dynamic vertical axis was integrated to achieve a fast overall cycle. This meant that the mould opening time could be reduced by around 0.5 seconds. Hence, more than 1,000 more parts can be produced each hour.

The parts are set down according to cavity by means of a special tube and container system, so that the relevant batch can be removed from production in the event of problems with one of the mould cavities. The boxes filled with the original parts can be changed without interrupting production. SPC (Statistical Process Control) takes place at fixed intervals through the removal of samples. The coil shells are produced on a hybrid

ALLROUNDER 520 H with a clamping force of 1,500 kN and a size 290 injection unit.

HIDRIVE convinces with optimum cavity filling

"Extensive mould filling analyses were carried out in advance at Quarder to ensure that all 32 parts could be reliably filled during the process," says Frank Fischer, Application Technology at ARBURG. "These analyses have shown that filling must take place at high speed. This means that the air must be able to escape from the cavity quickly. We needed to optimise this, which immediately required us to abandon our original plans for expansion injection moulding. We were able to show that our ALLROUNDER H is capable of filling the cavities to optimum effect using a 'conventional injection moulding process'."



Turnkey system film

INFOBOX



Name: Erwin Quarder Systemtechnik GmbH

Founded: 1971 in Espelkamp

Locations: Worldwide, production facilities in Germany, USA, Czech Republic, China and Mexico

Employees: 820

Products: Complex assemblies with integrated electronics, from development to production

Industries: Automotive, electrical/electronics, medical technology, consumer/packaging

Machine fleet: Around 65 ALLROUNDERS worldwide

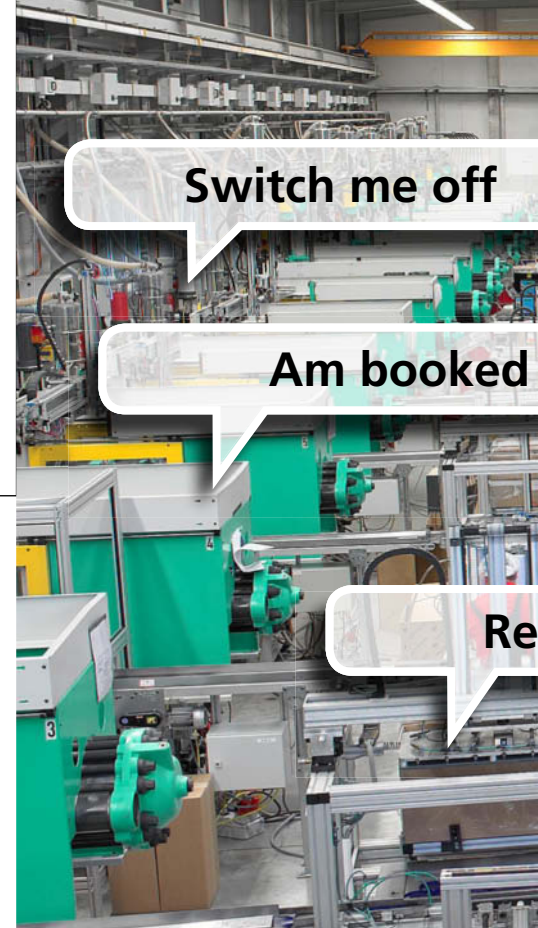
Contact: www.quarder.de





TECH TALK

Oliver Schäfer, Technical Information



The digital factory

Industry 4.0 networks manufacturing with products and offers

The topic of Industry 4.0 is gaining greater attention and already has a massive impact on the entire plastic sector. The use of the latest, highly flexible production technology and its integration with information technology are extremely important. But what does Industry 4.0 mean in concrete terms and what are its benefits?

The term Industry 4.0 stands for the fourth industrial revolution, which will be driven by new information and communication technology, such as Internet clouds, standardised interfaces and mobile devices. The objective is the digital factory (smart factory) in which “intelligent” products (smart products) communicate with machines and employees: When, where and how was an item produced? What is the next processing step? In future, plastic parts will provide the answer

and will thus be able to “independently” find their way through production.

Efficient production of single-unit batches

This opens up completely new horizons for the organization and control of the entire added value chain.

The potential of Industry 4.0 is particularly evident when you consider the changing market requirements in plastic processing: efficient production, increasingly complex products and ever-smaller batch sizes. In a nutshell: How can single-unit batches be produced cost efficiently? The recipe for success in this case is integrated production with flexibly interacting processes that have the capacity to organise and optimise themselves. Additive manufacturing is another important factor in the production of personalised products. It makes individualised customer require-

ments significantly more efficient, so that they can ultimately be implemented cost effectively.

Already strongly in evidence, flexibility looks set to gain greater dynamism. At the same time, production efficiency will increase – both due to greater productivity and to the best possible utilisation of resources.

Products optimise processes

As soon as products have direct access to high data, they can ‘make decisions’ for themselves. This results in shorter response times without loss of information. However, smart products can do more than simply enhance operational processes - they can also enhance service activities. Each part is uniquely identifiable and traceable. This makes, for example, spare parts orders simpler and more reliable.

But how does the theory work in prac-



Need maintenance

out till Friday

Must go to dispatch department

fill my magazine

**Customer order:
100,000 lids by Monday**

enormous potential

...tice? The first thing you should know is: Industry 4.0 is not a finished solution.

Towards Industry 4.0 through modular principle

Industry 4.0 is much rather an individual solution that only comes into being through the interaction of various components and systems. The modules of a digital factory include:

- flexible production technology which e.g. simplifies set-up, integrates process steps with automation or combines conventional processes with industrial additive manufacturing
- Central process management which integrates the complete automation and peripheral equipment of a production cell
- Computer-assisted production organisation which comprehensively networks machines, order information

- and process data with one another
 - Efficient logistics solution, which e.g. clearly labels products or provides information everywhere online via handheld devices and independently organises in-house transport
- ARBURG recognised the changes in market requirements and realised the potential of Industry 4.0 at an early stage, developing and extending the relevant range of products and services to meet the new challenges.

ARBURG assumes a pioneering role

Automated ALLROUNDER injection moulding machines and turnkey systems, the freeformer for industrial additive manufacturing, the central SELOGICA control system and IT solutions such as the ARBURG ALS host computer system are available to customers as the building blocks for networked production.

Industry 4.0 means that "smart" products communicate with the machines and humans in the digital factory.

Furthermore, it all comes from a single source. As an exclusive partner in the "Additive Manufacturing Plaza" special exhibition at the Hannover Messe 2015, ARBURG demonstrated how the digital factory of tomorrow can work, using the example of a rocker-type light switch (see today 58, page 8).



Industry 4.0 information

THE ART OF PRODUCTION EFFICIENCY



High performance is an art! 7.3 million cycles per year on an ALLROUNDER HIDRIVE. That's production efficiency! And that's what really counts in the packaging sector. From yoghurt tubs through to screw caps, we create new perspectives for you!