

# today

The ARBURG magazine

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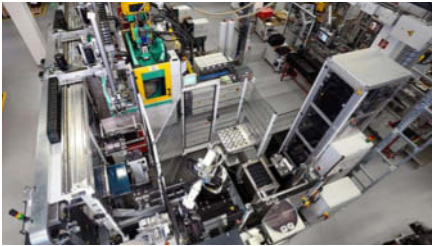
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## IMPRESSUM

today, the ARBURG magazine, issue 57/2015

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Flexible, comfortable and safe: thanks to multi-component technology from ARBURG, uvex i-3 safety glasses are pleasant to wear and can be adapted to any face shape.

**ARBURG**



## Dear Readers,

Strong partnerships play an essential role for a successful future. They allow us to pool areas of expertise, achieve efficient solutions and, in

many cases, break new ground.

Impressive proof of this is provided by the freeformer – our completely new system for industrial additive manufacturing. From the development phase onwards, we were assisted by Festo, a competent partner in practical matters. And during the further development, we also took account of feedback from customers. Their initial experiences are presented in this issue. We are delighted to report that feedback is thoroughly positive. Also very pleasing is the fact that we were able to very quickly acquire expert status in what is still a new sector for us. Accordingly, as an exclusive partner at the Hanover Fair 2015, ARBURG will present the highlight of the Additive Manufacturing Plaza.

We are of course also continuously evolving our prod-

ucts and ourselves in the injection moulding sector. Various examples from the field of micro injection moulding, LSR processing, automation solutions and service show you just how important strong cooperations are.

Platforms for maintaining cooperative ventures and exchanging experiences are equally important. We provide opportunities of this kind with events such as the ARBURG Packaging Days in November 2014 and the ARBURG Technology Days in March 2015, which we also report on in the present edition of the “today”.

I hope you enjoy reading our new issue.

Renate Keinath  
Managing Partner

# Efficiency in all its

## Technology Days 2015: Efficient production with ALLROUNDERS



**F**or 15 years now, the ARBURG Technology Days have been a must for the international plastics industry. Every year, thousands of experts from around the globe make their way to Lossburg to bring themselves up to date and take home valuable inspiration for their own production. In 2015, new impulses will be provided by more than 40 exhibits, specialist presentations, the Efficiency Arena and talks with the ARBURG experts.

The important topic of “production efficiency” will be the main focus of this four-day event from 11 to 14 March 2015. More than 40 exhibits and five specialist presentations

will shed light in detail on the various aspects of cost-effective production.

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### More than 40 ALLROUNDERS and freeformers

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The entire production spectrum of ALLROUNDER injection moulding machines and their potential for the various industries, applications and processes will be presented. Also on show will be a variety of automation solutions and turn-key systems. Innovations on display will for example include the ARBURG system solution for micro components featuring the new micro injection unit (see page 20) and a new foaming process in which the gas is added to the granulate already. This process is also interesting for smaller machines thanks to its simplified technology.

A total of five freeformers will represent the spectrum of additive manufacturing. These machines will manufacture single and two-component parts with and without supporting structures and will also be used to individualise moulded parts.

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### Efficiency Arena covers entire value-added chain

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The combination of the injection moulding and additive manufacturing processes and the practical implementation of “Industry 4.0” is the central focus of the Efficiency Arena. Here, the ARBURG host computer system plays a key role. First, an individualised pair of office scissors is produced. After injection moulding, a unique code is applied by laser, via which the production data can be called up online. Using

# aspects

## and freeformers



International trade experts find out all about the industry trends at the Technology Days (photo, left). These include the combination of injection moulding and additive manufacturing, for example, as demonstrated by individualised office scissors (photos, right).

these office scissors as an example, ARBURG, together with partners, demonstrates the optimisation potential for efficient plastic parts production throughout the entire value-added chain: from product design to mould, machine and peripherals, including their configuration, through to process integration, process control and production planning.

### Fascinating specialist presentations

Complementing the exhibits at the Technology Days, the specialist presentations will enter into greater detail. They will present the potential of additive manufacturing, various measures for reducing unit costs and innovative lightweight construction processes for foamed products.

Furthermore, customers will report on how ARBURG as a project partner can help them achieve efficient production from the product development phase onwards.

## freeformers worldwide

**In the first half of 2015, the freeformer can be seen at the following trade fairs, among others:**

- **NPE**, 23 - 27/3/2015, Orlando, USA
- **Hanover Fair**, 13 - 17/4/2015, Hanover, Germany
- **Elmia Polymer**, 21 - 24/4/2015, Jönköping, Sweden
- **Plast**, 5 - 9/5/2015, Milan, Italy
- **Chinaplas**, 20 - 23/5/2015, Guangzhou, China
- **Plastpol**, 26 - 29/5/2015, Kielce, Poland

# A perfectly clear vi

## uvex safety group: Multi-component technology makes safety

**T**he name **uvex** is synonymous with safety. In accordance with its slogan, “protecting people”, the Group develops, produces and sells products and services for keeping people safe and protected in the areas of sport, leisure and work. The **uvex safety group** is concerned with the area of work and runs an eye protection competence centre at its location in Fürth, Northern Bavaria. One of the product highlights in this sector are the **uvex i-3 safety glasses**, which have won several awards and whose high-quality frame is produced on a three-component ALLROUNDER.

uvex is well known around the globe, above all as a partner for international top-level sports and as a supplier of equipment to many top athletes. The uvex sports group’s portfolio includes helmets and goggles for winter sports, cycling and horse riding. However, more than 70% of uvex’s turnover is earned by the uvex safety group with its comprehensive range of personal protective equipment

### Eye protection competence centre

The basis for expertise and success is an emphasis on the latest technologies, high safety standards, professional quality management and production in Germany. In Fürth, the uvex safety group operates a unique eye protection competence centre where safety goggles and glasses, prescription safety glasses and laser protec-

tion glasses are all produced under one roof. A total of several million high-quality safety glasses leave the factory each year and are primarily used in the automotive, chemical and mining industries. Besides Germany, major sales markets include the United Kingdom, France, Australia and South Africa.

### Safety glasses meeting the most stringent requirements

The characteristics of the safety glasses differ, depending on the requirements and area of application. Suitable coatings on the plastic lenses, which can be different on the outside and inside, make the goggles scratch-resistant, anti-fog, resistant to chemicals, antistatic and/or anti-reflective, offer a nano cleaning effect and protect the wearer from UV and/or IR radiation. uvex enjoys superior expertise in this field: not only are the high-end coating lines developed and produced in-house, but the coatings themselves as well. The mechanical and optical properties of the safety glasses are continuously tested in the company’s own test laboratory and must exceed the requirements of the relevant quality standards by a considerable margin.

The same applies to the frame. Here, key factors are a good and secure fit as well as high wearing comfort. In many models, these are ensured by TPE components in the nose and forehead areas and on the side arms. uvex manufactures frames of this kind exclusively on



multi-component injection moulding machines from ARBURG.

### Top-of-the-range uvex i-3 produced on multi-component ALLROUNDER

The uvex i-3 safety glasses are the top-of-the-range product in their segment. Their frame, including the hinges for the side arms, is produced on a hydraulic three-component ALLROUNDER 570 S with a clamping force of 2,200 kN and injection units in sizes 170 (horizontal), 170 (vertical) and 70 (45 degrees). All three are equipped with pneumatic needle-type shut-off nozzles.

The 2+2 cavity mould with hydraulic rotary unit turns through 180 degrees each cycle. In the upper stations, two main bodies are produced from a hard PC/TPU blend that is injected vertically. After rotation, the horizontal injection unit adds the soft TPE components. The third unit simultaneously injects a PA, producing the hinge by means of assembly injection

# ew

glasses flexible, comfortable and safe

uvex i-3 safety glasses are pleasant to wear and can be adapted to a wide variety of face shapes. The side arms feature five detent positions to allow individual adjustment, providing optimum eye coverage.





Photos: uvex

moulding. Shrinkage of the material enables the hinge to move.

In this sophisticated production task, the advantages of the SELOGICA machine control system can be exploited to the full. It controls all three injection units, four core pulls for rotating the mould and other mould functions, 15 heating control circuits and monitors the temperature control unit.



The frame of the uvex i-3 is produced on a three-component ALLROUNDER (photo, top right). In the 2+2 cavity rotary mould (photo, top left) the two white main bodies are first moulded. Next, the green soft components and red hinge for variable side arm adjustment (photo, centre) are produced simultaneously.

### Modular machine technology for a modular product

“With ARBURG as the expert in the field of multi-component injection moulding, you not only get first-class technology, but also expert advice, whether for the specific machine configuration or for optimising the process,” says Norbert Otzelberger, Production Manager of SBU Eyewear Protection at uvex, describing the teamwork that has been in place since 1982. He adds: “This example shows how, thanks to the modular ALLROUNDER product range, an injection moulding machine can be precisely designed for the process and the product.” Consequently, he goes on to explain, the three-component ALLROUNDER and the product it manufactures share the same advantages.

The range of uvex i-3 safetyglasses is also modular and offers eleven possible colour combinations for the frame and four different coating systems for the lenses. Most of all, however, they impress with their ergonomically ideal fit and individual adaptability. Thanks to the soft TPE component, the safety glasses are not only extremely pleasant to wear, they also fit

virtually anyone, regardless of the shape of their face. Moreover, the so-called variable side arm inclination features five detent positions which enable the side arms to be individually adjusted, ensuring optimum eye coverage.

### Product of the Year

For the above reasons, the uvex i-3 has already scooped up several awards, including “Product of the Year” from the pro-K Plastics Industry Association in 2012. “These safety glasses are a safety product with the appearance of a lifestyle article,” was the verdict from the distinguished pro-K jury comprising experts from industry, design and consumer associations.

### INFOBOX

- Name:** uvex safety group
- Group:** UVEX WINTER HOLDING GmbH & Co. KG, comprising the companies uvex safety group, uvex sports group (uvex sports and Alpina) and Filtral; a total of 42 subsidiaries in 19 countries
- Founded:** In 1926 as a family-run company and currently managed by the third generation
- Turnover:** 260.9 million euros (safety group), 365 million euros (Holding) in the 2013/14 financial year
- Employees:** Approx. 1,300 (safety group), 2,250 (Holding), of whom around two thirds in Germany
- Products:** Safety glasses, ear protection, safety helmets, respirators, professional and protective clothing, safety gloves, safety shoes with steel-toe caps and personal protective clothing and equipment
- Machine fleet:** 26 injection moulding machines, including 13 ALLROUNDERS in Fürth and two ALLROUNDERS in China
- Contact:** [www.uvex-safety.de](http://www.uvex-safety.de)



# Trends live and in colour

## ARBURG Packaging Days: International trade visitors impressed

**T**he first ever “ARBURG Packaging Days” in November 2014 were a resounding success. Some 220 invited guests and eminent speakers took part in the international packaging technology conference at our headquarters in Lossburg. The focus was on innovations, trends and the latest market developments.

“We’re delighted that so many experts from more than 30 countries have come to Lossburg for the ‘ARBURG Packaging Days 2014,’” said Managing Director Sales, Helmut Heinson. Topics such as machine availability, cycle times, service and spare parts supply are extremely important in the packaging industry. All of these aspects of production efficiency were examined in detail during the international conference.

### Trends and innovative solutions

The guests were just as impressed with the specialist presentations on market trends as they were by the innovative live presentations on the cost-efficient production of thin-walled containers, closures and other packaging items. The conference was rounded off by an evening event at the Customer Center, tours

of the plant and the opportunity for a lively exchange of experiences.

### Typical packaging applications on ALLROUNDERS

“We showed well-known customers and speakers in very practical terms how we’ve adapted our modular injection moulding technology to the specific requirements of the packaging industry in recent years,” said Andreas Reich, ARBURG Senior Sales Manager Packaging, summing up the event. Feedback on the “Packaging” version of the hybrid ALLROUNDERS was thoroughly positive, for example – or as speaker Kevin Chew, Technical Manager of Thai company Apex Plastech, put it: “We’ve been using injection moulding machines from ARBURG for the past three years and have already become great fans.”



At the “ARBURG Packaging Days 2015”, some 220 international experts found out all about market trends and technical solutions in the packaging industry (photo, top). The production of thin-walled IML containers was one of the applications presented (photo, bottom).





# Fantas

## ARBURG Plastic Freefor

In early 2014, pilot customers in Germany received the first freeformers for additive manufacturing. Since then, they have gathered extensive practical experience with ARBURG Plastic Freeforming. ARBURG incorporates this feedback in its ongoing development activities.

All pilot customers agree on one thing: with the freeformer, ARBURG has opened the door to a very promising technology that is worth developing further in order to exploit even greater potential from additive manufacturing in the future.

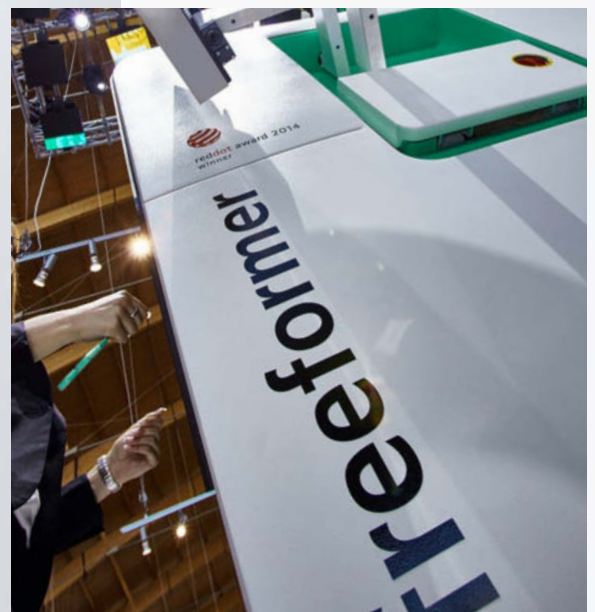
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### Example: Dreusicke

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"On the first day of the K 2013 trade fair, I read in a blog that ARBURG had developed a new system for additive manu-

The freeformer (photo, right) produces functioning bellows made from TPU and vacuum grippers in a hard/soft combination (photos, top right, from left to right). fischerwerke manufactures wall plugs in high volumes using injection moulding and functional samples using an additive process (photo, top, from left to right).





# Freeforming results!

## Freeforming: Plastics processors exploit new possibilities

facturing based on standard granulates. I immediately ordered a machine 'blind,'" explains Thomas Dreusicke, Managing Partner of the Dreusicke Group. The company has already been a customer of ARBURG since the 1960s and operates a total of 72 ALLROUNDER injection moulding machines for the high-volume production of plastic products. The company's "additive manufacturing" activities began in 2010. Dreusicke employs the freeformer for the production of prototypes and small batches, including gripper hands with internal vacuum lines for removal devices, for example.

### Example: Hachtel

Hachtel Werkzeugbau has also been working with ALLROUNDERS for decades. They found out about the freeformer in the trade press and at trade fairs. The decision to purchase was relatively simple, "because the freeformer was developed from the point-of-view of a machine manufacturer and therefore offers process reliability and an easy to use control system. Preliminary trials jointly with ARBURG were also extremely positive," affirms Andreas Kleinfeld, Sales Manager at Hachtel. "We've been working with additive manufacturing for just under two years. With the freeformer, we're now able to create two new jobs." The company's objective is clear: to produce small batches from all possible standard materials purely using rapid prototyping. "In addition to injection moulding and additive manufacturing, our company also has a 3D computed tomography department, which provides us with a suitable qualification system for analysing parts and further enhancing the construction processes," explains Andreas

Kleinfeld before giving the following advice to potential service providers: "Get on board and help develop this extremely innovative machine, which we are sure to hear a great deal more about in the future."

### Example: Hofmann

This was also clear to the Robert Hofmann company. It has worked in the rapid prototyping field since 1991 and has therefore collected extensive experience the selective laser sintering (SLS) and stereolithography (STL) processes for additive manufacturing. The latest newcomer is ARBURG Plastic Freeforming (AKF). "We want to use the freeformer for rapid manufacturing, i.e. for the additive manufacturing of fully functional parts," says Peter Mischke, Head of the Rapid Prototyping department at Hofmann. "Our focus is on industrial applications using a wide variety of plastics. We still have plans where material qualification is concerned - an area in which ARBURG is very active." Its wish list for ARBURG includes faster construction times and further optimisation of software processing. "At the moment, we're getting to grips with the process in detail and building up our expertise in ARBURG Plastic Freeforming," explains Peter Mischke. "We have no doubt that ARBURG's committed Freeformer department will succeed in exploiting the full potential of this technology, even if a bit of homework is still required."

### Example: fischerwerke

fischerwerke, renowned the world over for their wall plugs among other products, previously manufactured prototypes using

their own sample moulds or purchased them from suppliers. With the freeformer, the company has become actively involved in additive manufacturing, with the aim of producing predominantly design and functional samples in the early stages of the product creation process. "For me, the big advantage of ARBURG Plastic Freeforming is being able to produce new design samples in various original materials and the required colour virtually overnight. The 5-axis part carrier that ARBURG is going to offer in future is also interesting, particularly for our long, thin components," says Michael Weisshaar, whose job at fischerwerke involves the development of plastic fastening systems. "Currently, we mostly use ABS. However, we're working on qualifying PA 6 and other materials because we want to use the same standard granulates for additive manufacturing as for high-volume injection moulding." fischerwerke has already been using ALLROUNDERS for injection moulding at its production sites in Tumlingen und Horb for decades.

# Worldwide

ARaymond: Award winner focuses on



ARaymond, winner of the ARBURG Energy Efficiency Award 2015, is a global leader for clip fasteners in the automotive industry. Its product portfolio includes, for example, connectors for headlight cleaning systems.

# responsibility

## international environmental guidelines

**A**Raymond is one of the world's market leaders in clip fasteners for the automotive industry. Based on internal environmental guidelines, the French family-owned company promotes environmental protection at all 37 of its independent companies. In a move designed to reduce energy requirements, for example, the company invests primarily in fully electric injection moulding machines. In recognition of its exceptional global activities, ARaymond has been selected as the recipient of the ARBURG Energy Efficiency Award 2015.

ARaymond has been developing, producing and selling fastening and mounting systems since its establishment in Grenoble, France, in 1865. Today, the plastic, metal and hybrid parts it produces can be found in millions of cars worldwide: in both interior and exterior trims, in the drive system, in the cable routing, in thermal management and in fluid handling.

Plastics processing is one of the key areas of expertise of the company, which has been collaborating with ARBURG since back in 1959. Currently, some 250 ALLROUNDER machines are in operation at the company's production plants in China, Germany, France, India, Italy, Turkey the Czech Republic and the US.

A freeformer for additive manufacturing was added in autumn 2014.

### Global environmental protection

The family-owned company pursues a straightforward strategy both with regard to its product portfolio and in relation to the daily values it practises, which are based on "respect for our fellow human beings and for the environment".

Antoine Raymond, CEO of the ARaymond network and great-great-grandson of the company founder, emphasises: "Energy has always been a precious resource. Hence, environmental protection and energy efficiency have played an extremely important role for the last decade and are promoted on a worldwide basis. Since 2011, we have had our own internal environmental guidelines that apply to all our international, independent companies. All our environmental officers meet every year for an international environmental conference, where they present their local environmental protection campaigns and exchange experiences."

As a result of the global workshops, ARaymond has set itself ambitious targets and is focusing on two principal tasks: reducing energy requirements and cutting raw material consumption.

### Comprehensive package of measures

In order to achieve these targets, the company is investing in a number of projects worldwide, such as systems for utilising rainwater and for automated building lighting. New buildings will increasingly be constructed according to LEED principles ("Leadership in Energy and Environmental Design" is a US system for classifying sustainable buildings) and will be certified accordingly. The Group's new headquarters in Grenoble, which opened for business in 2014, is an outstanding example of this.

In order to increase energy efficiency in injection moulding production, the focus is on reducing heat losses through insulation and the use of energy-efficient hybrid and electric injection moulding machines. Further examples include energy-efficient cooling systems, the utilisation of the waste heat from the compressors and the reduction of compressed air leaks.

One result of this energy efficiency drive is certification of ARaymond Germany's energy management system to DIN EN ISO 50001. This helps to make energy requirements systematically and continuously more transparent, enabling the causes of energy costs to be identified and optimised.

### Motivated by Energy Efficiency Award

The award from ARBURG is a milestone in the company's global activities, as Antoine Raymond emphasises: "For us, the ARBURG Energy Efficiency Award 2015 represents important and encouraging recognition of our consistent implementation of our global energy efficiency targets."

### INFOBOX

- Name:** ARaymond
- Founded:** 1865 in Grenoble, France
- Group:** 37 independent companies worldwide with 22 production locations
- Products:** Fastening and mounting systems
- Industries:** Principally the automotive sector, as well as the truck, industrial, energy, agriculture and life science markets
- Machine fleet:** More than 600 injection moulding machines, including some 250 ALLROUNDERS with clamping forces from 500 to 5,000 kN; one freeformer
- Contact:** [www.araymond.com](http://www.araymond.com)

# A perfect appearance

## Derjin: Global cosmetics industry player values precision and

**A**nyone using pump sprays, mascara or creams for their good looks has no doubt unwittingly come across Derjin. As one of the world's largest manufacturers, the company produces flacons, pots, jars and spray pumps for many of the major beauty companies such as Nuskín, Hanhoo, Mentholatum and Avon. The company's subsidiary Derjin (Shanghai) Plastic Packaging Co., Ltd. specialises in the production of the pump components. For this purpose, high-precision, high-performance injection moulding systems are required. ALLROUNDER machines satisfy these high production standards.

Derjin (Shanghai) Plastic Packaging Co., Ltd. is one of the world's largest manufacturers of precision parts and packaging for the cosmetics and bodycare industry. The company's leading position is the result of a combination of high-quality, innovative products and

competitive prices. Derjin supports its customers as a project partner, from development and product design, mould construction and all facets of production, through to logistics processing, including packaging and on-time delivery.

### Spray pump requires high precision

The company has cooperated with ARBURG since 2011 and has procured 31 ALLROUNDERS from the S and H series during this time. Joe Wang, CEO of Derjin, explains: "With the realignment of our portfolio towards the production

of more complex packaging for cosmetic products such as spray pumps, the requirements in terms of machine technology have grown significantly. A spray pump comprises multiple individual components. In order to assemble these with accuracy during the downstream assembly operations, the manufacturing tolerances are extremely tight at +/- 0.05 millimetres on average. The high precision, repetition accuracy and process stability of the ALLROUNDERS convinced us to opt for ARBURG as a partner for this challenging product segment. The hybrid ALLROUNDER H machines also provide a high level of energy efficiency and speed in the mass production of parts. The option of using extended closing strokes, which enables us to also employ stack moulds, is an important factor for us moving forwards.

It allows us to fully meet future requirements regard-



ce

## productivity of ALLROUNDERS



Photos: Derjin

High-quality cosmetics packaging (photo, left) is produced by Derjin in Shanghai on high-performance machines from ARBURG (photo, top left).

Film  
Derjin

ding the series manufacture of high-quality mass-produced items.”

#### All-round support highly valued

Moreover, the pre- and after-sales service was a further important deciding factor, as the CEO of Derjin emphasises: “In ARBURG, we have an excellent partner with a reliable team at their local subsidiary. When we start a new project or introduce a new product, ARBURG has always helped us out with good advice for the relevant application, both in terms of application and mould technology. The ARBURG team was also helpful for us in establishing contacts with our international mould manufacturers. We greatly appreciate this support.”

Furthermore, ARBURG also leads the field in terms of training. The technicians

are very satisfied with the training courses, as one of them explains: “Thanks to the training courses, we can fully exploit the potential of our ALLROUNDERS in everyday operation. Our employees are well versed in all the functions of the SELOGICA control system, which they’re delighted with. In order to test moulds with special functions such as core pulls, they therefore always use ALLROUNDERS. This is because they know full well that these machines are very much simpler to program and that they allow the quality of production to be monitored most effectively.”

Excellent cooperation: At the anniversary celebration “Ten Years of ARBURG Shanghai” in 2014, Andrea Carta (right), ARBURG Overseas Sales Director, presents an award to C.T. Wang, Chairman of Derjin (Shanghai) Plastic Packaging Co., Ltd.

#### INFOBOX

**Name:** Derjin (Shanghai) Plastic Packaging Co., Ltd.  
**Founded:** 1967 by C.T. Wang  
**Locations:** Shanghai and Taiwan  
**Turnover:** 85 million RMB (10 million euros) in 2014  
**Employees:** 500 in China, 100 in Taiwan  
**Production area:** Currently around 40,000 square metres, 212,000 square metres to be added in Jiangsu Province in 2014/2015  
**Contact:** www.derjin.com



# Expertise in

## Cooperation project: H&B Electronic pools expertise with ARBURG

**C**omprehensive know-how, open communication and physical proximity are the key factors in the successful pooling of expertise between three strong partners: H&B Electronic specialises in the production of complex hybrid components and, in addition to an injection moulding plant, it also has in-house stamping and mould construction shops. For the fully automated injection moulding of connectors for the automotive industry at its central production site in Deckenfronn, Germany, the company relies on turnkey partner ARBURG and on the automation expertise of fpt Robotik.

“ARBURG is open to new ideas, offers reliable products that meet the most demanding requirements and develops innovative, customer-specific concepts,” says Helmut Gräther, Manager of Project and Process Planning at H&B Electronic, naming some of the traits the two family-owned companies share in common. This is why they use solely ALLROUNDER machines in their injection moulding produc-

tion. One advantage is that ARBURG also creates complex turnkey systems. Where six-axis robotic systems are involved, KUKA's system integrator fpt Robotik comes on board as a further partner.

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### Three partners - one challenge

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The hybrid plug-in “Power-Connector” is a practical example of an engineering challenge that the three partners have succeeded in jointly mastering. This complex PBT part, which is used for the electric steering system in a motor-vehicle engine compartment and has to be watertight, is manufactured in a production cell for which ARBURG is the primary contractor and bears overall responsibility.

The system comprises two stamping presses, a vertical two-component rotary table machine and a testing cell with several stations. Handling is performed by a total of three six-axis robotic systems featuring the SELOGICA user interface, plus two linear robotic systems traversing on a cross head.

All communication between the stamping presses, ALLROUNDERS and



robotic systems takes place via the central SELOGICA control system. Thanks to the “Part status” function (see page 26), the machines and robotic systems always know the position of the inserts, pre-moulded parts and finished parts.

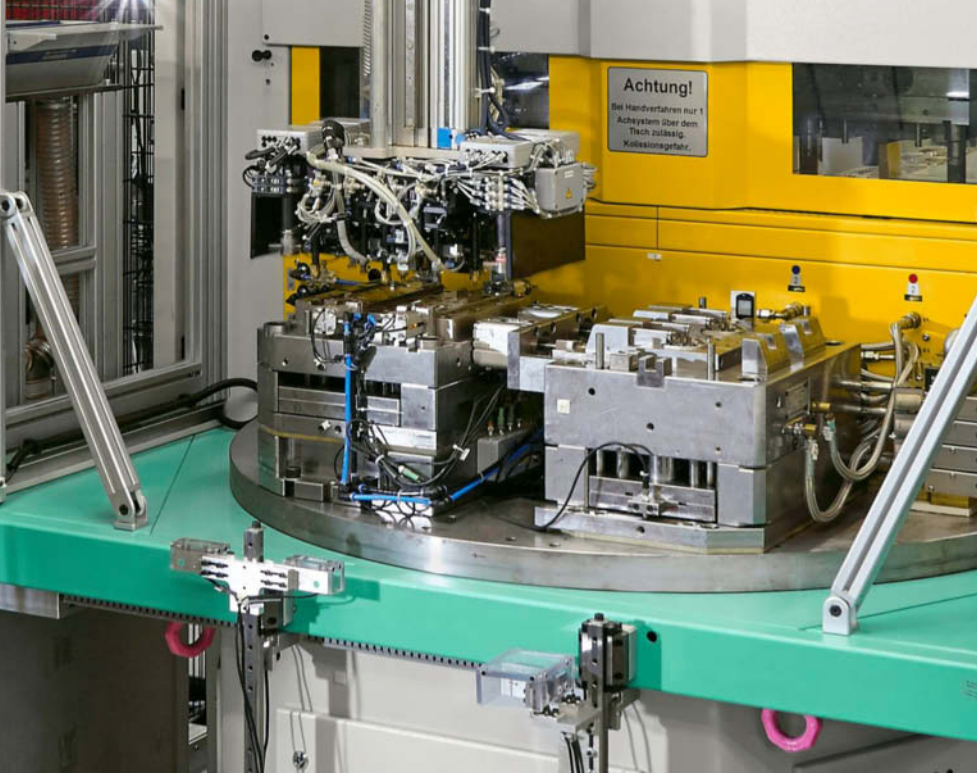
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### SELOGICA ensures high reliability

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“For us, the priority is a reliable overall process – from removal of the stamped parts through to the inspected finished product,” explains Helmut Gräther. “An all-embracing operating principle for the





H&B Electronic manufactures sophisticated automotive parts on a complex turnkey system (photos, left). Project Manager Helmut Gräther (photo, bottom) put the system together with ARBURG and fpt Robotik.

# complex matters

## and fpt Robotik

injection moulding machine and automation solution, as well as a single control logic for the entire interlinked system are major advantages. All sequences have a clear and logical structure and changes can be implemented automatically with ease."

### Sophisticated down to the last detail

As one of the strengths of H&B Electronic, Gräther cites its experience with stamping and injection moulding, a strong development department and in-house mould construction. The company designed and built the two 2-cavity hot runner moulds for the pre-moulded and finished parts itself, for example. Sophisticated temperature control ensures narrow production tolerances. The ALLROUNDER 1500 T is equipped with two vertical injection units on the moving platen and a two-station rotary table.

A well thought-out automation concept ensures an optimum material flow: two small AGILUS six-axis robotic systems place two 7 or 4-way contacts, which have been detached and bent into shape by the stamping presses, onto a transfer

table. The gripper technology for removing the "awkward" contacts and inserting them in the mould in the correct position was developed jointly by H&B Electronic and fpt Robotik. The linear robotic system traverses on a cross head and carries the removed contacts via a cleaning station to the rotary table. The second linear robotic system turns the pre-moulded parts over, removes the finished parts and transfers them to the testing station, which also operates autonomously.

In the testing station, the pin positions are checked while the contact is still in the gripper, before the finished part is set down. A third six-axis robotic system performs all the further handling operations. Downstream steps include electrical continuity and insulation testing, bonding a membrane onto the moulded part and testing it for damage, application of a Data Matrix code (DMC) by laser and verifying its legibility. Good parts are packaged in blister packs of 20 and conveyed out of the system. "As the next expansion stage, we'd like to produce a million parts a year with this system," says Helmut Gräther with regard to the objective.

### INFOBOX

**Company:** H&B Electronic GmbH & Co. KG

**Location:** Deckenpfronn, Germany

**Products:** Complex plug-in connectors, hybrid components

**Portfolio:** In-house development, mould construction and 3D test lab, expertise in injection moulding, stamping and automated assembly

**Employees:** 250, of which ten percent work in Research & Development

**Machine fleet:** 23 ALLROUNDERS, roughly a third of them automated

**Production:** 9,500 square metres

**Industries:** Automotive, medical technology, control technology

**Contact:** [www.h-und-b.de](http://www.h-und-b.de)



# A proven service

## Service contracts: Regular check for ALLROUNDERS

**In the case of cars, regular preventive inspections ensure serviceability and prevent sudden breakdowns. The same applies to injection moulding machines. The solution is a service contract. In Germany alone, where this offering has been available for eleven years, 245 customers with 4,045 ALLROUNDERS have already concluded one – and the trend is rising.**

The need for and interest in service contracts is also on the increase throughout Europe and the world. Here, they are coordinated and dealt with by the ARBURG subsidiaries. The test standards are based on the internationally uniform factory settings.

### Modular offer

The scope of servicing includes the calibration of all machine and control system parameters relevant to quality in line with the standard factory settings and the inspection of all important machine components for wear, function and safety, through regular visits by service

technicians. These take place every 12 to 24 months, depending on the ALLROUNDER and the use to which it is put. This improves process tuning, reduces service costs and machine downtimes, as well as increasing service life. An inspection log book, calibration stamp and inspection labels document the higher availability of the machines.

Customers can choose between several modules, which differ in the scope of the inspection: basic adjustment, calibration, certification. What all variants have in common is that ARBURG proactively contacts the service contract customers, as the machine database at the parent company lists all the due service appointments.

### First-hand experience

The inspection of ALLROUNDER machines is a crucial aspect, especially in connection with the necessary certification in areas such as the automotive or medical technology industries. Various customers report on their experiences with ser-

vice contracts and the advantages these bring.

### Example: Kunststofftechnik Schmid

Stefan Bürkle, Technical Centre Manager at Kunststofftechnik Schmid GmbH & Co. KG, Waldachtal, Germany: "We've been using the service contract since 2011, as we exclusively use ARBURG machines and have purchased 36 ALLROUNDERS in total. Since 2003, all the new machines have been equipped with MULTILIFT robotic systems and these are included in the inspections. We've split our machine fleet for the service contract, i.e. every year 50% of our machines are thoroughly inspected by expert fitters. For tricky products, reliable machine settings are indispensable. It's es-



Stefan Bürkle,  
Kunststofftechnik  
Schmid

essential that the displayed values and actual values are the same and this is assured by regular inspections. For identical machines, we can use exactly the same programs. This prevents rejects, complaints and the resulting high costs. The inspections also give us peace of mind in knowing that our

# history

ALLROUNDERS are always working to the same high standard and the parts produced are therefore always reproducible. Because we are so impressed with the service contracts, new machines are automatically included in the service."

## Example: fischer automotive



Björn Klose  
fischer automotive

Björn Klose, Team Manager of A-TPW Factory and Production Equipment, fischer automotive systems GmbH & Co. KG, Horb, Germany: "We've been using ARBURG service contracts ever

since we started production in Horb back in 2001. All our ALLROUNDERS are included in the inspections. Our experiences are very good, although we would like even more minor services. But we'll continue to make use of the service contract for future machine purchases as well."

## Example: FRANK plastic



Roland Graf  
FRANK plastic

Roland Graf, Production Manager for Medical Technology Injection Moulding, FRANK plastic AG, Waldachtal, Germany: "Here in Medical Technology, we've been using service contracts since 2008 for the entire machine fleet, including our turnkey systems. ARBURG accomplishes the work very competently and punctually. The regular inspection and calibration of systems means that their technical condition is no longer up for debate. In system and customer audits, this preventive servicing always receives a positive rating."

## Example: Intertek

Chantal Haarmann, Commercial Manager, Intertek Benelux, Intertek Life Sciences, Geleen, Netherlands:

"Intertek is one of the world's leading suppliers of industry-specific plastics solutions and has been working with ARBURG injection moulding technology for more than 25 years, including in our laboratory in Geleen. We concluded service contracts for all our ALLROUNDERS and our experiences with the ARBURG Service and what it provides are thoroughly positive. For our laboratory operations, it's essential that the injection moulding machines are always in the best possible condition, because we have to rely on this equipment 24/7. Perfect service and the ser-



Chantal Haarmann  
Intertek

vice contracts give us the necessary peace of mind that comes with knowing that we can produce consistent quality and also deliver on time. It's therefore extremely important that our ALLROUNDERS are always precisely calibrated and the production parameters are perfectly correct. For this reason, we will conclude these service contracts when purchasing new ALLROUNDERS in future as well."

## Example: Ketterer

Martin Ketterer, Managing Director, Ketterer Kunststofftechnik GmbH, Hausach, Germany: "We concluded our service contract for all our ALLROUNDERS and turnkey systems in 2007. Inspections are carried out annually. This way, problems that may have resulted in difficulties in the ongoing manufacturing process in terms of production parameters and part quality have often been

detected at an early stage. We will therefore also include new machines in the service contract in order to maintain their high availability. A particular plus point for us is the phone hotline, as it allows us to carry out rapid failure analysis and order the right spare parts."



Martin Ketterer  
Ketterer  
Kunststofftechnik



ARBURG  
Service Info

# "Big" small machine

## New micro injection unit: Integrated in automated system solution

**S**tringent requirements apply to the precision high-volume production of micro components with shot weights that frequently amount to only a few milligrams. Important factors here include short dwell times of the melt in the injection unit, low shear stresses, the provision of thermally and mechanically homogeneous material, a precisely controllable cylinder temperature, a reproducible plasticising procedure and the option of processing standard rather than micro granulates. All this is offered by the new ARBURG micro injection unit,

which has been integrated in a special micro production cell.

The new micro injection unit in Euromap size 5 has been specially developed by ARBURG to achieve precise regulation of short strokes coupled with high filling dynamics. Like the flexible micro injection module, which is still available, it combines either an 18 or 15-mm screw for melting the material with an 8-mm injection screw. The servo-electrically driven plasticising section, which is installed at 45 degrees to the horizontal injection unit, ensures optimum preparation of the standard granulates.

The molten material is conveyed from the plasticising

section into the injection unit. The injection screw is purely a conveyor screw, which is equipped with a non-return valve and therefore operates according to the screw/piston principle.

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### First-in, first-out principle ensures quality

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This method enables extremely small shot weights to be achieved with great precision and with the necessary short strokes. At the same time, the coordinated interaction between the plasticising section and injection screw ensures excellent, gentle processing of the plastic. The melt is continuously fed forwards from the material inlet to the tip of the injection screw.

This ensures full compliance with the first-in, first-out principle. A homogeneously prepared, newly dosed melt is always available for every shot.

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### Complete system solution for micro components

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The new micro injection unit was presented for the first time at the Fakuma 2014 in conjunction with a special system solution for the reproducible injection moulding of micro components. This comprises a small electric ALLROUNDER 270 A with micro injection unit and a specially designed, new, compact MULTILIFT H 3+1 robotic system. The servo-electric dual-arm robot enters the mould horizontally and simultaneously removes the sprue and the delicate



es



micro components. The main arm removes the moulded parts and gently sets them down separated by cavity, while the auxiliary arm deposits the sprue separately. A laminar-flow box ensures the necessary cleanliness and prevents electrostatic charging. This enables reliable, controlled removal of the micro components.

The ARBURG system solution for micro components comprises an electric ALLROUNDER 270 A with the new micro injection unit and laminar-flow box (photo, left), as well as a special MULTILIFT H robotic system (photo, centre). At the Fakuma 2014, the system produced micro counter wheels.

These weigh only 0.003 grams and are smaller than a pinhead (photo, top).

## Partner Scholz

When developing new products and enhancing existing ones, ARBURG also works with experts from the relevant sectors, who provide important input and test new products under practical conditions.

For micro injection moulding, our partner was Scholz from Kronach ([www.scholz-htik.de](http://www.scholz-htik.de)), which produces technical plastic parts and has been working with ALLROUNDER machines for 40 years. Microtechnology has been one of the company's key areas of expertise since 1999. The smallest moulded part in its product range weighs only 0.9 milligrams and 22 of these parts are the size of a single granule. These dimensions illustrate the demanding requirements placed upon the injection moulding machine and process, which have risen continuously at Scholz over the years. "As we have valued ARBURG as an innovative partner with first-class machine technology for decades, it was clear that we would ask Lossburg about a new, efficient solution," says Karl-Herbert Ebert, Manager of Technology & Development at Scholz, explaining their intention to embark on a new cooperation.

As the first step, ARBURG developed a micro injection module in collaboration with Scholz. This was subjected to extensive tests with their mould and jointly optimised further before being launched onto the market in 2010. As a result of the positive feedback from customers, the next step was the development of the complete micro injection unit and the special micro production cell, which celebrated its premiere in 2014.

ARBURG ensures that the combined expertise is available to customers and is communicated in the relevant national language. To this aim, Jason Ding (centre) received training to become a trainer at the Lossburg parent company in order to then train service technicians locally in China.



# Dependable and cl

## ARBURG China: Ongoing service network expansion brings services

**I**n terms of support and service activities, China represents a significant challenge for a company like ARBURG, due to its geographical size and economic importance alone. Our aim is to provide support for Chinese customers through local contacts. This strategy has borne fruit: today, the vast majority of customers are Chinese companies, who are increasingly turning to ARBURG technology and its special customer support offerings.

The range of services extends from our comprehensive pre- and after-sales service through to individual application technology consulting. Zhao Tong, Managing Director of the Chinese subsidiaries, comments as follows: "Our main focus is on extremely comprehensive and close cooperation with customers intending to manufacture a new product. I would describe our integrated services as full service consulting based on our philosophy of

production efficiency. All this serves to achieve even greater customer retention and consequently a high level of customer satisfaction."

### Regional customer proximity

New premises in Shenzhen and the machine warehouse opened in Shanghai in 2013 are just two examples of how ARBURG manages to provide fast on-site support to its Chinese customers. Of the entire workforce at the Chinese subsidiaries, around half work in service and application technology. In addition to the subsidiaries in Hong Kong, Shenzhen and Shanghai, they are also stationed at various service centres close to the Chinese plastics processing centres. Customers value this coordinated support offering, as the quotes below demonstrate.

### Example: Derjin

C.T. Wang, Chairman, Derjin (Shanghai) Plastic Packaging Co., Ltd., Shanghai (see

page 14): "The extensive consulting provided by ARBURG led to the purchase of hybrid ALLROUNDER H machines, for example. These machines have helped us to work precisely but also energy efficiently using stack moulds, with extended tie bars and thereby to increase our production capacity. For years now, ARBURG has been on hand to provide us with application technology tips and tricks."

### Example: Hongfa

Qihong Tang, Managing Director, Hongfa Corporation Xiamen, Jinyue Appliance Co., Ltd., Xiamen (see today 45, page 12): "Our company is integrated in the comprehensive consulting offerings of the ARBURG customer support programme. ARBURG technology and consulting have helped us to significantly speed up our production cycles, for example. Today, we also employ the ARBURG host computer system ALS for end-to-end production management. In addition, ARBURG trains



# ose by

## to customers' doorstep

our staff, generating added value for our production.”

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### Example: Kostal

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Yang Wang, Production Engineering General Manager Asia Pacific Region, Shanghai Kostal-Huayang Automotive Electric Co., Ltd., Shanghai: “ARBURG’s all-round support has helped us to adapt our moulds specifically to the clamping systems of the ALLROUNDERS, allowing us to achieve a very high level of repetition accuracy. Stable and precise processes ensure a high quality standard for us in China.”

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### Example: Pigeon

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Kazumasa Ito, Production & Technician Executive Manager, Pigeon manufacturing (Shanghai) Co., Ltd., Shanghai: “We appreciate the modular structure of the ALLROUNDERS, especially as it enables us to precisely achieve the characteristic features

of our babies’ dummies for the Chinese market. The support from ARBURG has helped us to achieve stable production processes as well as reliable, top-quality production and to implement system solutions.”

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### Example: Zhenyu Electronics

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Zhiyu Zhang, General Manager, Zhenyu Electronics Co. Ltd., Ningbo: “We opted for ALLROUNDERS due to their high stability, precision and repetition accuracy. The high flexibility of the range in terms of individual machine configurations was also important to us. Our technicians have been trained by ARBURG on the details of the SELOGICA control system and on continuous production optimisation. All this helps us to develop forward-looking, high-tech production capacities.”



Film Service  
China

# The right feel

## Philips Avent: Fully automated production of



**W**ith its new generation of “Natural Bottle” baby bottles and breast milk teats, Philips Avent aims to help mothers breastfeed their babies for longer and also to bottle feed them trouble-free. With this in mind, the Glemsford-based company, which belongs to the Philips Group, has invested in a fully automated production line that incorporates numerous ALLROUNDER machines.

The new generation of baby bottles and teats represents the first change to the existing design for more than 25 years. The teat, in particular, which resembles a mother’s breast, helps mothers to perfectly combine breast and bottle feeding. A unique petal structure inside the silicone teat makes it much more flexible and elastic. Combined with an innovative, integrated air-return system using high-tech valves on the sides, the result is a “natural bottle feel” more likely to be accepted by babies.

On the new production line, which necessitated an investment of some 20 million euros, the bottles are manufactured using the blow

moulding process with subsequent printing in a clean room. At the same time, the teats are injection moulded from liquid silicone (LSR), as are the screw caps and retaining rings that connect the teat to the bottle.

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### 15 ALLROUNDERS integrated

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The complex production line includes the following:

- Ten LSR ALLROUNDER 570 S machines with eight vertical MULTILIFT V robotic systems for the teats,
- Ten master moulds with 17 interchangeable inserts and downstream automation (removal heads),
- Five ALLROUNDER 520 S machines for the screw caps and retaining rings,
- Several blow moulding systems, clean room printing stations, silicone pumps and conveyor stations, continuous curing ovens with four articulated arm robots for component mounting, slitting and testing devices for the lateral teat valves, plus assembly and packaging systems.

Besides ARBURG, Austrian cooperation partners and elastomer specialists Rico ([www.rico.at](http://www.rico.at)), Elmet ([www.elmet.com](http://www.elmet.com)) and ACH Hefner ([www.ach-solution.com](http://www.ach-solution.com)) were also involved in development and implementation. While the moulds originate from three manufacturers, Philips Avent placed its sole trust in ARBURG for the injection moulding machines. This was due to the flexibility of the modular product range, the all-embracing SELOGICA control system for ALLROUNDERS and MULTILIFT robotic systems, as well as the



## baby bottles and LSR teats



Photos: Philips

company's lengthy and extensive expertise in LSR processing.

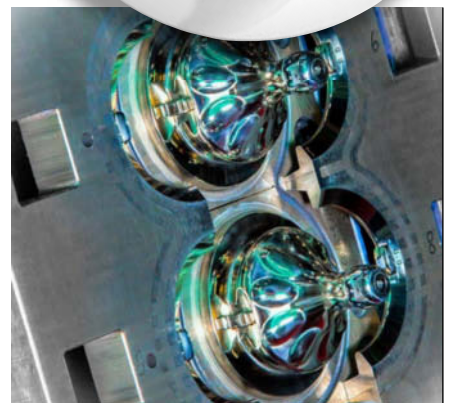
### Sophisticated LSR processing

Accordingly, the LSR ALLROUNDERS are precisely adapted to the application. This includes cylinder modules and position-regulated screws with liquid-medium temperature control, four blow-out valves, integrated vacuum controllers and systems, a total of 18 integrated heating control circuits for mould heating, interfaces for LSR dosage units and pneumatic brush devices, plus host computer interfaces.

The teats are moulded in various 8-cavity sliding carriage moulds featuring cold runner technology. Here, the principal challenge was the narrow tolerances which had to be met for the lateral air valves. The drinking holes in the teats, with a diameter of 0.3 millimetres, are created in the mould as part of the injection moulding process. After the injection process, with a cycle time of 30 seconds, the slides move apart for demoulding and the teats are removed from the moulds by the

special gripper and set down on trays in a specified pattern. A six-axis robotic system then transfers the filled tray to a continuous curing oven, where the teats are cured for two hours. Slits are then made in the silicone parts in a fully automated process, before they are joined to the retaining ring, fitted onto the bottles and packaged.

Thanks to the seamless collaboration between the suppliers, it was possible to put the system into operation within the envisaged time frame with only minor adjustments and it has operated extremely reliably ever since.



Thanks to their special design, the LSR teats (photos, left and top right) of the "Natural Bottle" products feel like the mother's breast to the baby. The requirements placed upon ALLROUNDERS and moulds used to make the teats are correspondingly exacting (photo, top).

### INFOBOX



**Name:** Philips Avent

**Location:** LSR production in Glemsford, United Kingdom

**Products:** "Natural Bottle" range with breast-like teats, milk pumps and bottles

**Material:** Elastosil LR 3040/50 from Wacker as LSR for the teats

**Machine fleet:** 15 ALLROUNDERS with clamping forces from 1,300 to 2,000 kN

**Contact:** <http://www.philips.co.uk/c-m-mo/philips-avent-and-your-baby>



## TECH TALK

Oliver Schäfer, Technical Information



# Ready, steady, go!

## SELOGICA "Part status" function simplifies start-up of complex

**In order to achieve efficient production, complex process sequences often need to be implemented. To ensure that these nevertheless remain as simple and easy to handle as possible, the "Part status" function of the SELOGICA control system offers extremely practical assistance. It enables machine operators to restart the system after an interruption or malfunction not just effortlessly, but also considerably faster. What does this function entail?**

First, here is a brief history of this SELOGICA function: Initially, the "Part status" function was developed for rotary table machines featuring automation. Here, the requirements for a reliable, fully automated process sequence are extremely demanding: working with

inserts, employing several lower mould sections and therefore stations, as well as performing different work steps at one station depending on the position in the sequence, e.g. introducing or overmoulding inserts. Owing to this complexity, it is important to know the current state or "part status" at each station before a work step takes place. A status such as "Insert in mould" or "Finished part removed from mould," for example. The necessary exchange of signals between the rotary table machine and the robotic system is controlled via the interface according to Euromap 67.1.

During implementation of this robotic interface in the SELOGICA control system, the ARBURG software specialists quickly realised that knowledge of the part status is also useful and interesting for other applications. These include all operations

involving inserts, for example (and not just for rotary table machines) as well as multi-component injection moulding. In other words, all applications with complex process sequences. Here, restarting after interruptions or malfunctions offers huge potential for reducing downtimes and actively relieving operating personnel of stress. The robotic interface of the SELOGICA was therefore enhanced in a targeted manner to ensure fast, simple production start-up and included in the "Part status" function.

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### Function saves time and money

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The machine and robotic system know the position of inserts, pre-moulded parts and finished parts at all times – not only in the mould, but also in the gripper. This further expanded, direct exchange



## process sequences

of signals considerably exceeds the range of functions of a standard robotic interface according to Euromap 67. The system components automatically detect their position in the interrupted process sequence and can autonomously resume operations at the correct point. For operators, this means no more clearing by hand and no more moving to the start position. This saves time and money – especially with delicate, complicated and/or expensive inserts. At the same time, there is less risk of the melt thermally decomposing in the cylinder module, which would lead to further time wastage due to necessary cleaning work.

The “Part status” function can be individually integrated in the process sequence via dedicated symbols. Furthermore, the status of the mould and gripper can be displayed on a separate

screen page and adapted in a controlled manner.

### Start-up at the touch of a button

Operators are provided with the flexibility they require in their everyday work – especially in the case of demanding tasks. This is demonstrated by the production of the hybrid plug-in “Power-Connector” from H&B Electronic (see page 16). Delicate contacts are overmoulded with several components on a rotary table machine. For this purpose, several robots operate hand-in-hand. Accordingly, the process sequence is highly complex. In the event of interruptions or malfunctions, it would be extremely difficult for the operator to retain an overview of the status of the individual stations and when, where and what work step is taking place. The

The “Part status” function monitors the states of the machine and robotic system (photo, bottom), thereby enabling a far more efficient start-up of complex systems (photo, top).

“Part status” function then becomes an invaluable help: instead of intervening manually, a restart can be accomplished far more efficiently – virtually at the press of a button.

# THE ART OF PRODUCTION EFFICIENCY



Production efficiency and art have a great deal in common. To create something really extraordinary, every detail has to be mastered. We prove this on a daily basis. Whether it is individually configured technology, comprehensive consulting or first-class service. Make your own picture – of your future perspectives!