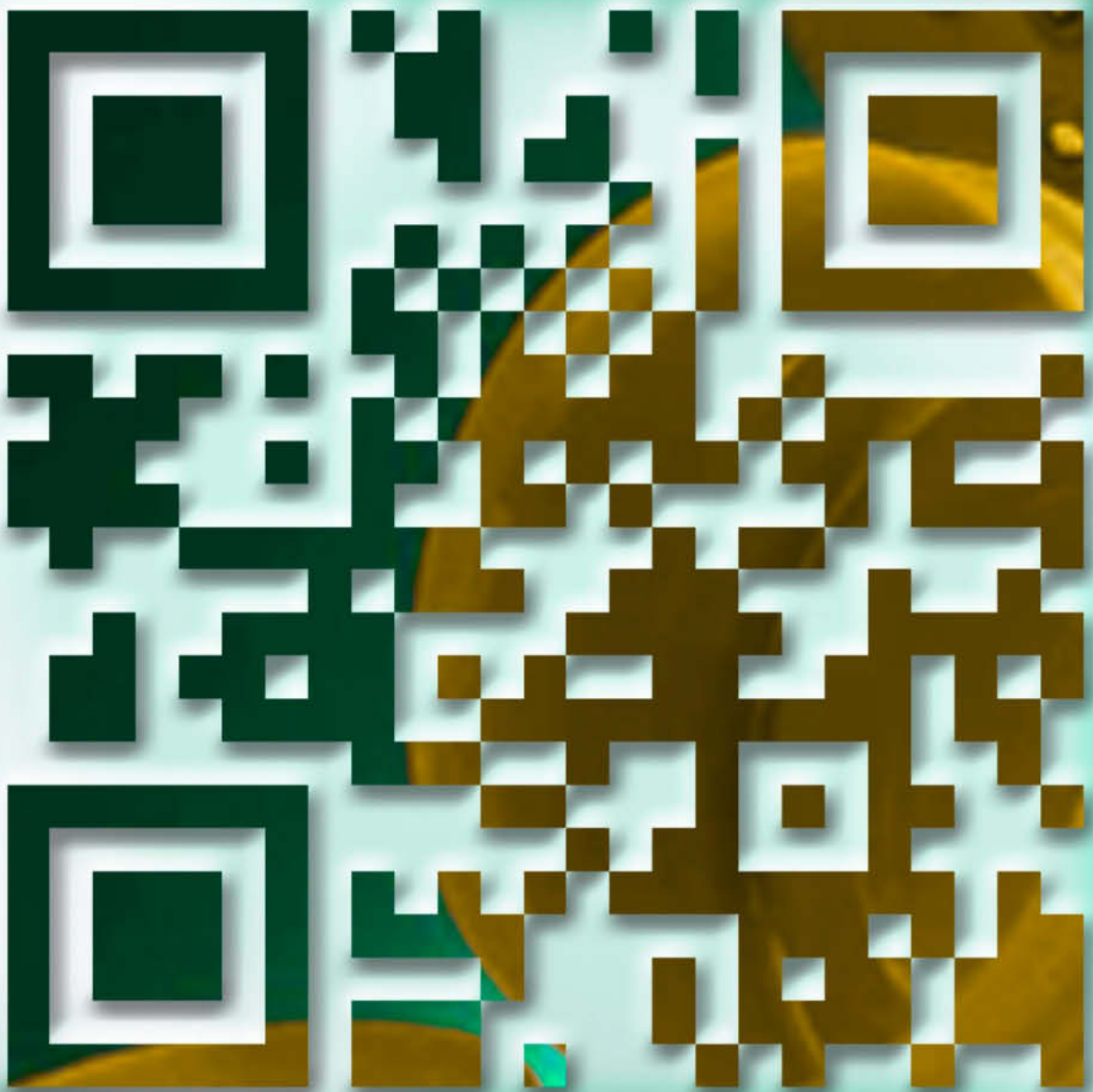


# today

The ARBURG magazine

Issue 47

2011





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## MASTHEAD

today, the ARBURG magazine, issue 47/2011

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ARBURG is synonymous with innovative technology: in the injection moulding sector and also in communication using QR codes. For more information, please go to page 7.

**ARBURG**



## Dear Readers,

The autumn issue of "today" offers a perfect opportunity to look back on the year to date. In brief: we are extremely satisfied with business in 2011. In addition to the excellent business trend, we are also delighted with the success of the new EDRIVE series. As the report on page 8 explains, numerous customers have expressed their satisfaction with the performance of the electric machines. The EDRIVE thus represents the perfect complement to our machine range for standard applications, enabling us to meet your requirements even more comprehensively in terms of production efficiency. You will find more information on this multi-faceted topic on page 22. We make every effort to further improve the efficiency of our production facilities in order to ensure that you, our customers, obtain this new technology and the entire ARBURG machine range within an acceptable delivery time.

For example, we are optimising set-up processes using video analysis with an aim to reducing unproductive times.

Our aim is not only the use of efficient machines, but also improvement of the entire organisation in order to exploit further potential to reduce unit costs and to increase throughput. In addition to this set-up example, this issue also contains many more suggestions for optimising the production of plastic parts.

I hope you enjoy reading the new issue.

Herbert Kraibühler  
Managing Director Technology & Engineering





# Something for everyone

## Fakuma 2011: Anniversary, energy & production efficiency plus

**O**ur presence at this year's Fakuma will focus on the "50 years of ALLROUNDER" anniversary and the new EDRIVE series, which extends our electric machine range. A total of ten exhibits will demonstrate a host of innovative applications, providing impressive proof of the performance of ARBURG products with regard to the efficient production of moulded parts.

"In addition to the K, the Fakuma is always the most important fair of the year for us," explains Michael Hehl, Managing Partner and Spokesperson for the ARBURG Management Team, describing the importance of this international industry event. "That is why, this year, we are not only presenting our latest developments and a representative cross-section of our product range with innovative applications. We will also be celebrating the highlight of this year's '50 years of ALLROUNDER' anniversary in Friedrichshafen, demonstrating the

key advantages that the ALLROUNDER philosophy continues to offer customers today."

During the Fakuma, there will be a special



ARBURG managing partner Michael Hehl said, "We will demonstrate the potential of our ALLROUNDERS with a broad range of machines and applications."

exhibition area on the stand dedicated to "50 years of ALLROUNDER", which focuses on the decisive event – the in-

vention of the Allrounder principle by Karl Hehl in 1961.

Furthermore, the "Economic Miracle" competition will be held in order to find the oldest ALLROUNDER still being used in production (text box on right).

### The EDRIVE electric series provides the perfect addition to the machine range

The emphasis in the machine sector is on the ALLROUNDER EDRIVE series, which further expanded ARBURG's electric machine range this year. A total of three machines from the EDRIVE series will be presented at the Fakuma, these range from the smallest ALLROUNDER 370 E with a clamping force of 600 kN and size 170 injection unit, to the ALLROUNDER 570 E with a clamping force of 2,000 kN and size 800 injection unit. The various EDRIVE exhibits will be used to show that this electric series is designed to cover a broad range of applications in terms of



byone  
more

# 50 YEARS OF ALLROUNDER

## Anniversary competition: "Economic miracle"

performance characteristics and drive configuration. Thus, for example, the ALLROUNDER 570 E is integrated in a complete production cell, which will be used to demonstrate the new MOLD'n SEAL process. This combination of injection moulding and PUR foaming was developed by Sonderhoff, a systems supplier for sealing systems, working together with ARBURG. The sealing material is applied to the plastic parts while they are still warm, directly after the injection moulding process. A six-axis robotic system handles the whole process from start to finish. This fully automatic inline foaming saves a great

deal of money. The success story of the ALLROUNDER is an economic miracle – both for our customers and for ARBURG itself. Some of the original ALLROUNDERS, with pivoting clamping unit and interchangeable injection unit, are still being used in production today. On the occasion of our "50 years of ALLROUNDER" anniversary, ARBURG is holding a very spe-

cial competition in the context of the Fakuma trade fair. The customer with the oldest ALLROUNDER still in production will win an electric ALLROUNDER EDRIVE 370 E, upgrading his machine fleet for the coming decades.

For full information, go to [www.arburg.com](http://www.arburg.com) or pay a visit to ARBURG exhibition stand 3101 in Hall A3. The anniversary competition will culminate at the Fakuma. Closing date for entries is 4:00 p.m. on Saturday 22 October 2011.



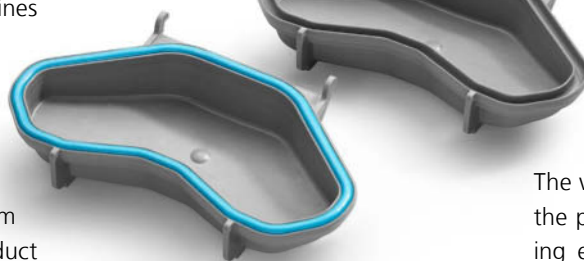




deal of time and expense. Furthermore, energy-efficiency is guaranteed through the use of an electric ALLROUNDER 570 E.

### Energy-efficient machines predominate

The importance of energy efficiency is also reflected in the fact that that seven of the ten exhibits on show on the ARBURG exhibition stand bear the "e2" energy-efficiency label. This includes the three electric EDRIVE machines, an electric two-component ALLROUNDER from the ALLDRIVE series, the two large hybrid ALLROUNDER 720 H and 920 H machines and the hydraulic ALLROUNDER 520 S advance. In addition to a position-regulated screw and the electro-mechanical dosage drive, the equipment package also includes the ARBURG energy saving system (AES), which has featured in the product range since 1993. This is an efficiency-optimised hydraulic drive in which the rotational speed of the frequency controlled pump drive is adapted to the momentary requirements during the injection moulding cycle. This illustrates how ARBURG has for decades been focusing on energy efficiency and offering its customers the appropriate solutions. Another product that significantly increases energy efficiency and, above all, production efficiency is

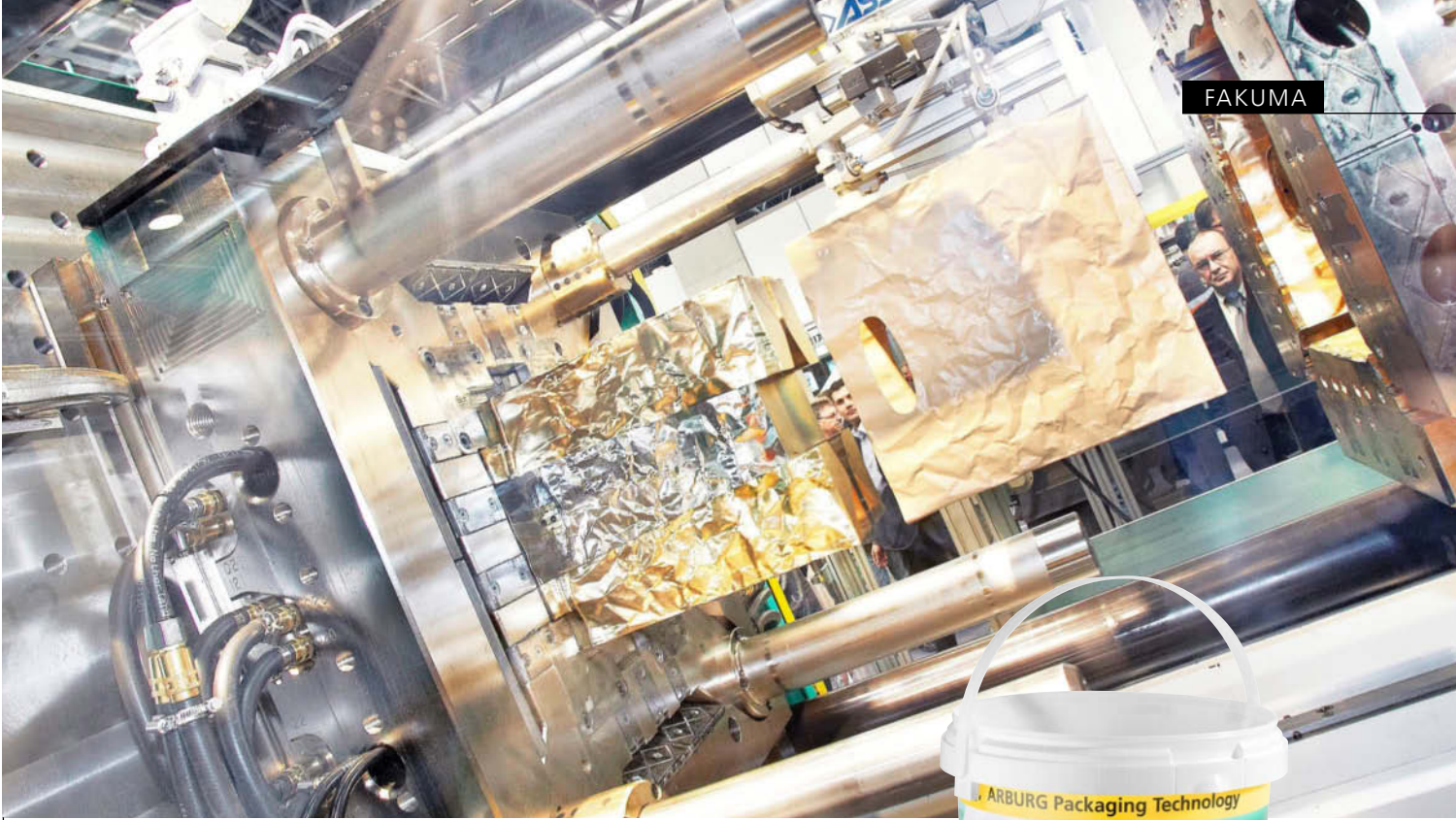


### Wide range of applications

the ARBURG host computer system (ALS), which is 25 years old this year and has undergone continuous further development. The latest example of this is the ALS Mobile feature, which enables current production data to be called up from anywhere in real time using a smartphone. The company maxim, 'ARBURG for efficient injection moulding' is reflected in all aspects of our presence at the Fakuma.

The wide range of applications underlines the potential of ALLROUNDERS in providing efficient injection moulding and the expertise that ARBURG possesses in all areas of the injection moulding sector. This involves multi-component technology, LSR processing and the production of sophisticated hybrid components, automotive products and packaging. These are produced on electric, hybrid and hydraulic ALLROUNDERS, horizontal and vertical machines and with complex production cells. In addition, the SELOGICA "Set-up Assistant" module will be shown





The ARBURG exhibition stand at the Fakuma is always a real crowd puller (top left). Highlights for 2011 include the electric EDRIVE machines, also as part of a production cell for integrated foaming (left), complex mould technology (top right) and an IML application (right).

in the context of reducing set-up times. A new "Remove mould" function has been added here.

### Special "Energy efficiency" show

The special "Energy efficiency" show also demonstrates that it is necessary to take a holistic view of efficient production, a multifaceted topic, which plays a key role in energy efficiency that goes far beyond the machine sector. This show is being held in cooperation with material manufacturer BASF and will demonstrate a variety of measures. As a clear practical example, comparative production with two different plastics will show how energy efficiency can be enhanced by the right choice of material. Further information on production efficiency can be found on page 22.

## QR codes provide information!

For the first time, ARBURG is using QR codes to provide visitors with additional useful information.

QR codes are easy to read. You will need a mobile phone, tablet PC or notebook with a camera and QR code reading software, which is already preinstalled by many manufacturers or can be installed with ease. All the relevant information is available on the Internet, e.g. at [www.wikipedia.org](http://www.wikipedia.org).



All you need to do is to photograph the QR codes and you will be connected to ARBURG.

# New series is a hit

## EDRIVE in practice: Customers are impressed with the electric

**F**or decades the aim of all ARBURG innovations has been to meet the latest customer requirements as effectively and practically as possible.

The new EDRIVE series has evidently succeeded in doing so. Plastics processors who already use various ALLROUNDER E machines all agree: the new electric machines for standard applications are entirely state of the art. They score particularly highly on energy efficiency, repeat accuracy, ease of operation and a good price-performance ratio.

**PKT**  
Präzisions-Kunststoff-Teile GmbH



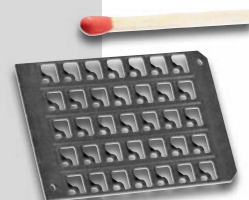
Photos: PKT

**Peter Rapp**

Managing Director  
PKT Präzisions-  
Kunststoff-Teile GmbH  
[www.pkt-gmbh.de](http://www.pkt-gmbh.de)

In the standard performance range, the ALLROUNDER EDRIVE machines of-

fer us a clear alternative to hydraulic machines. With our ALLROUNDER 370 E, we produce parts such as thin-walled housings for plug connectors. We value the machine in particular for its smooth running, reliability and excellent ease of operation.



**APINEX**  
Kunststofftechnologie

**Andreas Hagendorn**

Head of Automation  
APINEX Kunststofftechnologie GmbH  
[www.apinex.de](http://www.apinex.de)

Our multifunctional ALLROUNDER 370 E is characterised by excellent process control capabilities, repeat accuracy and energy efficiency. It is also very easy to use, particularly in conjunction with the MULTILIFT robotic system. We use our system to produce connectors for the electrical and automotive industries, for example. The EDRIVE machine ticks virtually all the boxes in technical terms. The additional costs are justified by the ever-increasing energy prices alone.



Photos: APINEX





# machine



## Erich Gutmann

Team leader, Production  
F. Morat & Co. GmbH  
[www.f-morat.de](http://www.f-morat.de)

We have been using electric machines since 1990. The new EDRIVE series particularly excels in terms of energy efficiency, positional accuracy and reproducibility. We use our ALLROUNDER 520 E to produce technical parts, e.g. bevelled gears, as well as housings for complete assemblies. The price-performance ratio is so good that we have already ordered another machine.



Photos: F MORAT CO



## Helmut Sassnowski

Owner, hesa Kunststofftechnik e.K.  
[www.hesa-plastic.com](http://www.hesa-plastic.com)



Photos: hesa

Compared to our hydraulic machines, the electric machine uses far less energy and features greater repeat accuracy. We used our ALLROUNDER 470 E to produce parts for the automotive industry, for example. My employees are also very impressed. The EDRIVE machine is very quiet and is particularly easy to set up and commission. ARBURG has succeeded in introducing a great innovation.



## Holger Albrecht

Process Planning, Plastics Division  
TRW Automotive GmbH  
[www.trw.com](http://www.trw.com)



Photos: TRW



So far, we are extremely happy with the EDRIVE. We currently use an ALLROUNDER 470 E to manufacture components for seat belts and airbags in three-shift production. The new electric machine is the most economical solution for most applications whose cycle times last between 20 and 25 seconds. This is why we are specifically considering an EDRIVE as our next purchase.



Photo: kmitu / www.fotosearch.de

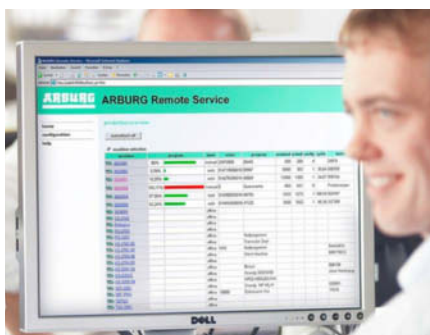
# Look, don't touch!

## ARBURG Remote Service: Customers and hotline staff linked via Internet

**A**RBURG Remote Service (ARS) has been part of the company's service portfolio for a number of years now and has established a place for itself as a diagnostic tool. It determines machine-specific information that can help experts at Lossburg to quickly identify problems and upload data to the machine controllers in order to efficiently rectify them. However, sensitive customer data always remains protected from unauthorised access.

The increasingly complex machine technology with integrated peripherals and automation means that it makes good sense to use the ARS for an increasing number of injection moulding companies. There is no need to entertain security concerns. Setting up ARS access of this kind cannot be used for the purpose of obtaining sensitive business information, such as production data. Without the permission of the customer and the provision of a corresponding IP address for access via the Internet, ARBURG Service cannot access the relevant SELOGICA control screens. Even then it is only possible to display the current status of the relevant machine by calling up the corresponding diagnostic pages.

If a telephone conversation via the



Fast checking: ARS provides ARBURG with machine-related data – provided the customer agrees.

ARBURG telephone hotline does not solve the problem, then it makes sense to pursue the problem via ARS.

### ARS provides effective help with troubleshooting

This often dispenses with a visit from a service technician, which would lead to additional costs. If ARS is installed and enabled, the Service technician can display the relevant diagnostic pages with the most important control parameters directly on his own monitor and check the settings in real time. By browsing through the actual values and screenshots, the ARBURG hotline staff will be able to diagnose the prob-

lem more accurately and perform remote maintenance on the ALLROUNDERS. This not only helps with swift troubleshooting, but also saves on costs.

### Sensitive data remains secure

With ARS, ARBURG offers customers a cost-efficient mix of telephone diagnostics and technician call-outs, enabling minor problems with the ALLROUNDERS to be resolved quickly and securely during running operation. Restrictive access means that sensitive customer data always remains protected. Prospective customers can test the tool extensively using a demo version under [www.demo.arburg.com/ARS](http://www.demo.arburg.com/ARS).





# Networking brings progress

## 2E mechatronic: MID specialist with huge potential for innovation

**C**ooperation brings results. This is the principle followed by 2E mechatronic GmbH & Co. KG with great success. Innovative products are continuously being developed and brought to production readiness in the context of networks and through cooperation with strong partners. Thanks to their R&D activities, the company, which is a member of the Narr Group, has developed into a high-end producer of mechatronic components and systems.

At present, 2E mechatronic has six research projects under way. Managing partner Uwe Remer explains how a company can cope with this volume of work with a total of 70 employees. "It simply isn't possible for us, as a medium-sized company, to do all this ourselves - nor would it make

sense. That's why we've been active in numerous expert networks for over ten years, cooperating with various institutes and universities, as well as well-known companies such as Bosch, Delphi, Festo, Hella, KaVo Dental, Leica Geosystems and Rafi. We've been so successful in developing our own products together with pilot customers that we're planning to expand this area in the future."

2E has already been successfully involved in a number of research projects in the area of microsystems technology since 2001. "The fact that 2E is now one of the world's leading providers of MID modules is the result of our network-based cooperative ventures," explains Uwe Remer. He points to benefits such as the bundling of expertise and easy communication with familiar partners, identifying mutual success as the overriding objective.

### Laser direct structuring offers decisive benefits

The most frequently used MID production process is laser direct structuring (LDS). The basis for this is provided by precision moulded parts made from a laser-activatable substrate. The circuit layout is "inscribed" on the moulded part by means of a laser, whereby an additive compounded into the plastic is activated. The circuits are then built up through metallisation. The LDS process offers crucial benefits, such as miniaturisation through 3D capability and fine circuit structures, fast and flexible layout changes and machining of the LDS material in order to produce samples.

One example of this is the development of MID LED lighting elements in which 2E has brought together two pioneering



Photos: 2E mechatronic

technologies in a single product. Together with KaVo Dental GmbH in Warthausen, the first of these new lighting elements was developed in just six months, reaching mass production in January 2010.

### **MID LED lighting elements are in demand throughout the world**

The numerous advantages of the MID LED lighting element have attracted a great deal of worldwide interest from the medical, automotive, industrial electronics and automation sectors. These advantages include low energy consumption, longer service life, customised colour spectrum design, optimum light focusing thanks to the integral lens, higher luminescence, ease of replacement, good reliability and miniaturisation.

At present, production takes place on existing facilities. The first step involves producing the precision-moulded parts made from the laser-activatable plastic Vectra E840i LDS on a hydraulic ALLROUNDER 220 S, which operates with a 15 mm screw. The bases are then lasered and metallised in order to pro-

duce the circuit structure. Resistors and LEDs are inserted by means of an SMD machine and are subsequently soldered in a lead-free process during the vapour phase. The last production step involves the assembly of the base, lens and housing, followed by a functional check.

"We also intend to automate the production of the MID LED lighting elements as soon as we reach the appropriate unit volumes," explains Uwe Remer.

High-volume production of yaw sensor housings for ESP® systems has been ongoing since 2005. 2E produces the housing for Bosch, which processes it further and then supplies it to numerous motor vehicle manufacturers throughout the



Uwe Remer (top right) relies on expert networks. A successful example is the MID LED lighting element (above and below) for dental technology (photo on page 11).

world. Several million of these precision housings were produced in 2010. As these are safety-related components, a zero-error strategy is pursued. "We're one of the few manufacturers who are able to guarantee the very high precision and reliability required throughout the product life cycle," says Uwe Remer with a smile, referring to the performance of his company and the high level of trust shown by Bosch.

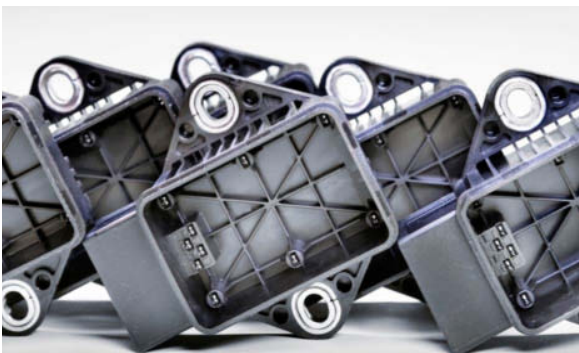
The housings are manufactured fully automatically, with four production cells running in three shifts. The production sequence can be broken down into the following stages: The contacts, which are supplied on conveyor belts, are bent, separated and stamped out,







Large-volume series production of complex yaw sensor housings for ESP® systems (below) is highly automated (above).



### The right solution for every requirement

In addition to the extensive range of vertical machines from ARBURG that meet all of 2E's requirements, he also values the reliability of the machines and the service

offerings. "Because we run a three-shift operation, machine reliability is crucial for us. This is particularly true when we need to run a machine seven days per week for several months, as happened in 2010."

before being inserted into the two-cavity mould together with the metal bushes and encapsulated with PBT. Next, a robot removes the finished housing and places it in an inspection station. The parts that pass inspection are automatically placed in the transport packaging, while the rejected parts are removed. These systems were designed in conjunction with a local special machine manufacturer. "The vertical ALLROUNDER T 1200 with three-station rotary table proved to be the most suitable injection moulding machine for these products," comments Uwe Remer, who chose ARBURG for his company's injection moulding processes right from the start.

offerings. "Because we run a three-shift operation, machine reliability is crucial for us. This is particularly true when we need to run a machine seven days per week for several months, as happened in 2010."

### INFOBOX

**Founded:** 1982 Rolf Hiller GmbH, renamed 2E mechatronic GmbH & Co. KG in 2002

**Production area:** 3,000 m<sup>2</sup>

**Employees:** approx. 70

**Turnover:** 10 million euros (2010)

**Machine fleet:** Nine ALLROUNDERS covering a clamping force range from 150 to 800 kN, including vertical machines with work-piece circulation systems and rotary table machines with three stations

**Certification:** DIN ISO/TS 16949, ISO 9001 and ISO 14001

**Products:** MID products, sensors, housing, connectors

**Industries:** Automotive (main focus), industrial electronics, medical technology, automation, renewable energies

**Contact:** [www.2e-mechatronic.de](http://www.2e-mechatronic.de)



Photo: by Tom



Photo: fotocaiomattos



# Cause to celebrate!

## 50 years of ALLROUNDER: Anniversary events at unusual locations

**W**ith the invention of the ALLROUNDER 50 years ago, Karl Hehl revolutionised injection moulding. In 2011, ARBURG is celebrating the technological and commercial triumph of the ALLROUNDER with special events at around 35 unusual locations throughout the world.

"Working hand-in-hand, my brother Karl and I transformed an innovative idea into a successful international business," says Eugen Hehl (photo right) as he looks back proudly on 50 years of ALLROUNDER. The anniversary got off to a successful start at the 2011 Technology Days, which at-

tracted more than 5,200 customers to Lossburg. The celebrations have been on tour ever since. In total, some three dozen events will be held in Germany and at ARBURG's various international sites by the end of the year.

The ideas for the celebrations are as multifaceted as the ALLROUNDER itself. The colourful spectrum of events ranges from "simple" open house events through golf championships, kart racing, Ferrari test drives and a breath-taking laser show, to opera performances and museum visits, a mediaeval banquet in a castle, a dance spectacular and dinner in the company of tropical fish. Celebrations have taken place, and are continuing across

the world in countries such as Germany, Hungary, Spain, Brazil, Singapore and China. ARBURG's managing directors and partners are doing all they can to thank customers in person for their many years of loyalty to the company and for the trust they have placed in ALLROUNDER injection moulding technology.

Another highlight of the celebration of "50 years of ALLROUNDER" is the anniversary competition to be held at the Fakuma, with an electric ALLROUNDER 370 E as the prize. Read more about this on page 5.









# Plastic in criti

**Sonceboz: Fully automatically encapsulated**

**S**onceboz SA, which develops and manufactures electric drive systems, has developed an injection moulding system for its automotive division in close cooperation with ARBURG. This will be used in a fully-automated process to produce controller housings for the VVT3 Valvetronic valve control for four-cylinder engines from the BMW Group and PSA Peugeot Citroën.

Because it will be used in the engine compartment, the product has to meet stringent requirements: maximum precision and torsional resistance in a very broad temperature range between -40°C and +150°C plus a high level of resistance to vibration and ambient conditions. Dominique Thierion, injection moulding production manager at Sonceboz, explains, "The Valvetronic valve control is an extremely important part of the engine. That's why quality and reliability are particularly important in production. Our aim is therefore to achieve a 0 ppm failure quota."

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## **Two VVT3 types require complex automation**

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Sonceboz currently manufactures two types of housing with different flange positions using the production cell. This fact alone already poses a huge challenge in terms of automation. Coordinated with downstream final assembly, the entire cycle with the single-cavity mould takes no longer than 35 seconds. In order to meet the stringent production require-



# ical area

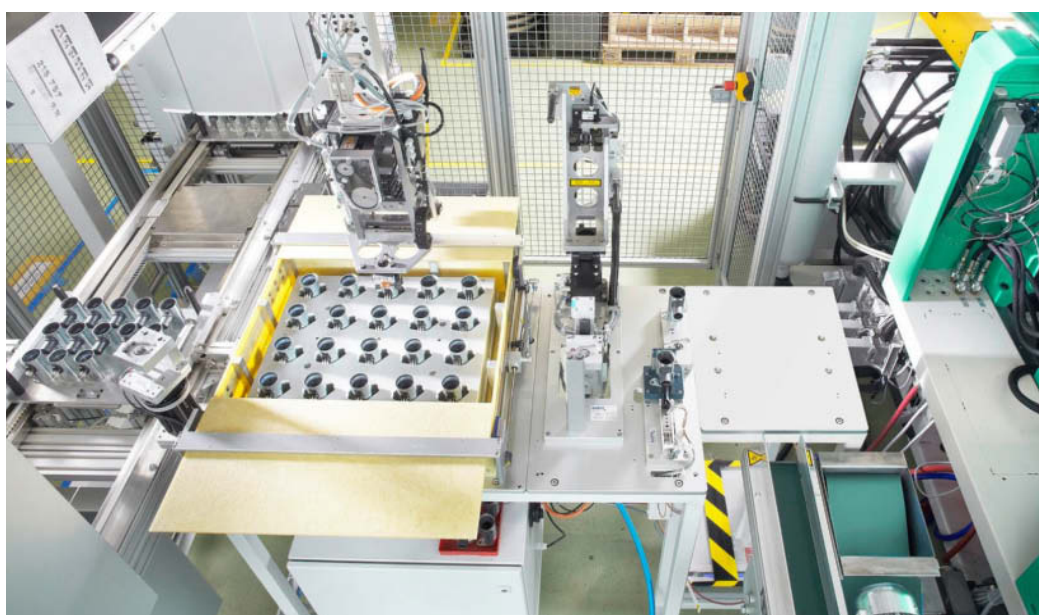
## valve controller housing

ments, a high-tech 30%-reinforced plastic is used, giving the controller housings greater stability and rigidity.

### Hydraulic ALLROUNDER encapsulates controller housing

The injection moulding system was built around a hydraulic ALLROUNDER 470 S with MULTILIFT V robotic system in co-operation with peripherals and gripper system supplier Schuma and Barth and mould manufacturer Straberger. The controller housings to be encapsulated with plastic are placed in the production cell on pallets in groups of 15 units. The linear robotic system with 15 kg load-bearing capacity removes the parts and, using the first-in-first-out principle moves them to a free position in the preheating station. Here, a total of 20 housings can be heated to a temperature of 120 °C. Once the right temperature is reached, the gripper removes the parts and turns them over in a rotary station featuring a servo axis. The contacts provide the reference point for orientation.

Maximum precision is vital for all transfer processes in order to ensure that the controller housing is sealed and fully functional. The housings are therefore aligned for a second time on a turning station with a mandrel, centring them and checking the angle where the two housing types differ from one another at the flanges. For this purpose, a servo axis moves the housing upwards to the common reference point, the highest contact pin. The rotary station turns by 90 degrees and the position of all eleven contact pins in the outer connector



is tested. Next, the gripper of the robotic system removes the housing from the gripper of the turning station, places it in the stationary mould side and removes the already encapsulated part from the moveable side of the mould. After the cooling time, the sleeves are transferred to a measuring station, where a mandrel again enters the connector and checks the current supply by applying an electric voltage. The parts are then sorted onto the pallets by the robotic system and removed from the system.

The entire production cell is also easy to operate because the system is programmed and managed on a central basis via the SELOGICA machine control system. In practice, this means that in addition to the entire machine sequence, the SELOGICA also controls six other servo axes.

Fully automatic: the housing parts for the VVT3 valve control are produced in a SELOGICA-controlled production cell.

### Automotive parts of the future: smaller, lighter and more precise

Philippe Nicolas from the Sonceboz Purchasing department, summarises the future requirements of the automotive sector, which accounts for around 80 percent of the company's total turnover, "The basic challenge will be to make the products even smaller, lighter, more precise and more reproducible. This isn't always easy with the volume of parts we produce because we're operating in a very demanding environment."

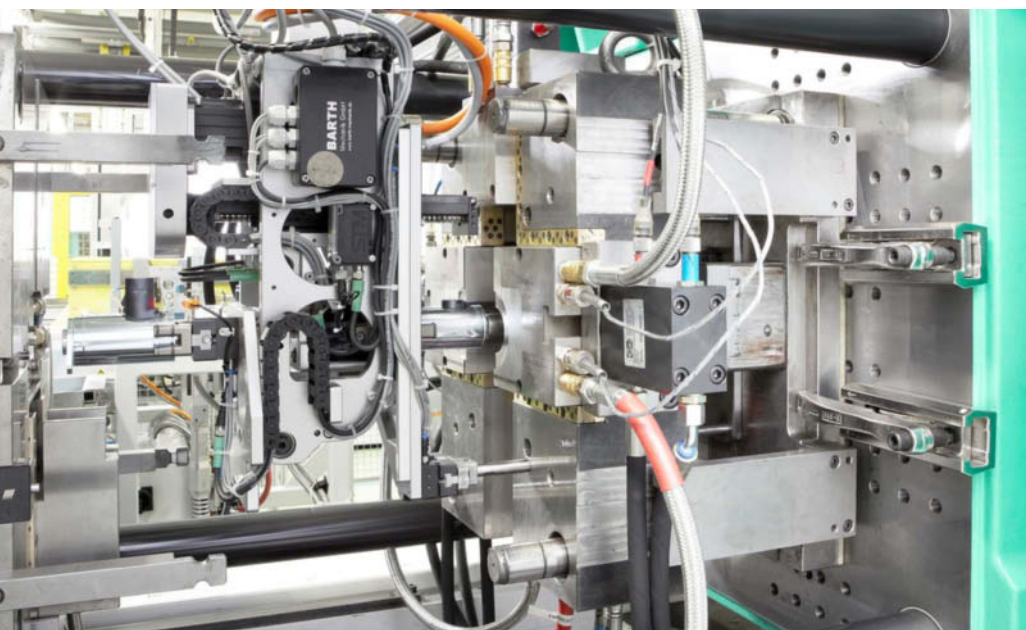
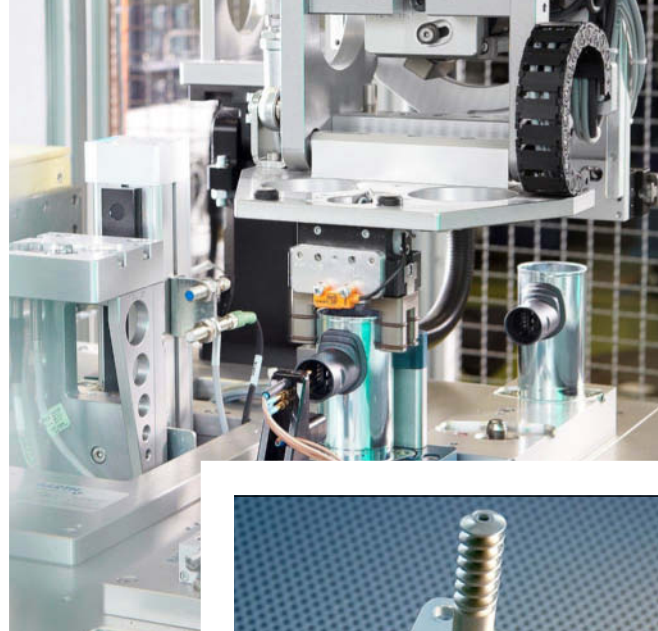
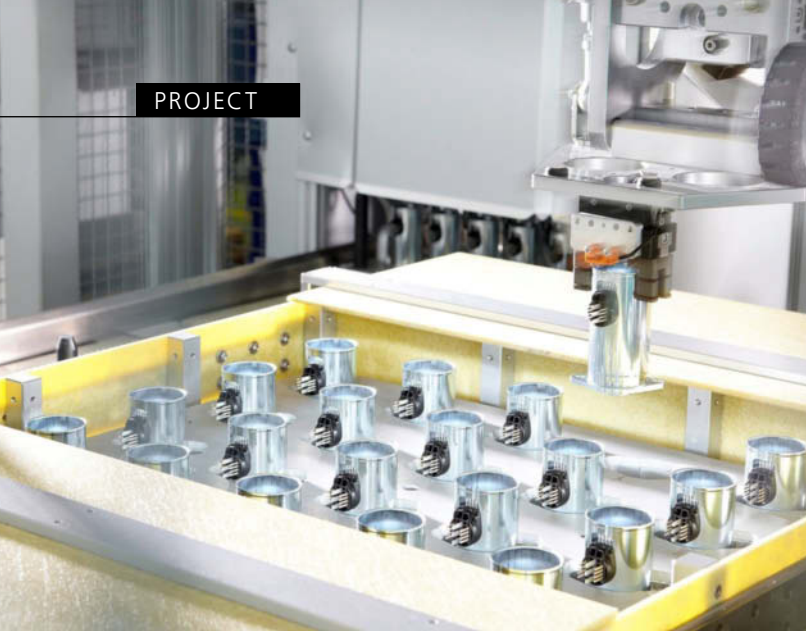


Photo: Sonceboz

From the preheating station (top left), the inserts are transferred from the robotic system to the alignment station (top right) and then into the mould (bottom left). Following the assembly of further components, the housing section for the valve control (bottom right) is ready for installation.

The key players at Sonceboz are extremely positive in their attitude to cooperation with ARBURG in developing such demanding projects. Philippe Nicolas comments, "ARBURG convinced us both with its ALLROUNDERS and with its overall systems. We are very satisfied with the precision, stability and reproducibility of the processes. This is attributable in no small measure to the detailed FMEA analyses carried out prior to system design. The Run@Rate certification, which is extremely important in the automotive sector, was 88 percent, with 85 percent being the required optimum. The high level of mutual understanding and solution-oriented co-operation between the mould maker, the Swiss subsidiary and ARBURG's Project Department, as well as Sonceboz as the client means that we also intend to pursue this successful cooperation into the

future." These comments have already been substantiated through the purchase of three more electric ALLDRIVE machines.

## INFOBOX

**Founded:** 1936 as a family company, Sonceboz SA

**Locations:** Headquarters in Sonceboz (Switzerland), MMT in Besançon (France), Sonceboz Corp. in Ann Arbor (USA)

**Products:** Actuators, motors and complete components for complex environments, such as automotive and medical technology

**Employees:** 860, 110 of whom are employed in Development

**Turnover:** 140 million euros in 2010

**Production/year:** Approx. 35 million motors

**Contact:** [www.sonceboz.com](http://www.sonceboz.com)



# Fast delivery, worldwide

## Advantages of central manufacturing: spare parts distribution as an example

**O**ne of the key elements of ARBURG's corporate philosophy is the manufacture of all its injection moulding technology at the central production location in Lossburg. This is the only way to ensure consistent quality and reliability "Made by ARBURG – Made in Germany". This is evident in spare parts service, for example.

The central production of machines and peripherals is no longer a disadvantage in today's highly networked world. On the contrary, the manufacture of high-tech products at a single location has a number of clear advantages. The logistical advantages go hand-in-hand with compliance with a consistently high quality standard that can be most effectively monitored at a common production site.

### Transport times? Not a problem

Moreover, worldwide transport times are becoming less and less important. Today, even the biggest loads can reach their destinations in any part of the world in a very short time. ARBURG sees this as confirmation of its policy of manufacturing exclusively at its parent factory in Lossburg. Together with the high level of in-house production of around 60 per cent, this yields a comfortable situation for customers.

A clear example is the supply of spare parts. An availability of over 90 per cent

ensures that each spare part required for the current range of machines and peripherals can be shipped immediately.

### Comprehensive order tracking

The ARBURG Spare Parts Service is fast and reliable, particularly thanks to comprehensive, computer-integrated processing and tracking of all orders, from telephone and Internet orders to delivery and, thanks to tracking, even right up to the installation site. Provided the relevant parts are available, orders received at ARBURG's headquarters before 3.00 p.m. are shipped on the same day.

First, the customer places his order by phone or using the ARBURG Internet application. If the purchaser provides an e-mail address, he will receive automatic notification from ARBURG as soon as his consignment is ready to be shipped. This shipping confirmation also includes a tracking number with the required shipping service provider. This number ensures the global traceability of the consignment with the large, internationally active shipping companies via the Internet. Werner Baiker, a member of the export and shipping team, explains, "The service works smoothly on a global basis and offers the necessary transparency and reliability of spare part supply. However, it also helps us



Perfect logistics: spare parts and service technicians arrive at customer's premises at the same time.

to ensure the timely deployment of service technicians. This is because consignment tracking ensures that the necessary personnel is available at the injection moulding company at precisely the moment that the spare part arrives."



# Together we'r

## Formplast: Successful entry into compression

**I**n order to distinguish itself from the bulk of suppliers, Formplast Purkert GmbH in the Czech Republic focuses on the production of sophisticated plastic parts. It also builds the necessary moulds in-house. The company places great emphasis on the transfer of knowledge. And Formplast's success proves it right. With the support of ARBURG's injection moulding experts, it has optimised the compression injection moulding of LED lenses, for example, making part production more reliable and efficient.

Formplast brings together a wide variety of expertise under one roof and produces complex components that require sophisticated processing. "Our strengths lie in the metallisation of plastic parts and in the injection moulding of optical components," explains Formplast's owner and managing director, Zdenek Purkert. The latter include fibre optics and transparent polycarbonate LED lenses, for example, as used for the high beam, low beam and daytime running lights in motor vehicle headlamps.

Most of the components are produced on ALLROUNDERS. According to Zdenek Purkert, the major advantages of ARBURG machines, besides top-class technology and expert service, are open communi-

cation and, above all, the excellent transfer of knowledge, "When we face new applications or projects, we receive excellent support from the injection moulding experts at ARBURG. We are currently using eight special production cells, all of which we designed and manufactured together with ARBURG." The flexible and uncomplicated nature of this co-operation is demonstrated perfectly in the production of LED lenses.

### Problems with thick-walled optical parts resolved

Previously, Formplast produced these thick-walled optical parts using conventional injection moulding. But here, two problems arose repeatedly: sink marks, which diminished part quality, and broken ejectors, caused by the high injection and holding pressure at the material injection point in the delicate base. This resulted in unproductive downtimes and – in the worst case – failure to achieve the required production volumes.

An invitation by the Czech ARBURG sub-



Photos: Formplast



sidary to a seminar in Brno on compression injection moulding therefore came at just the right time. One topic covered during the seminar was protection of the ejector assembly as a significant advantage during the compression injection moulding of LED lenses. Because pressure is evenly distributed onto the large cavity surface at the front and is lowest at the rear where the ejector is located, breakages are prevented. Operating reliability is correspondingly high.

Formplast was quickly convinced that compression injection moulding was the way of the future and would promote the advancement of the company. Using a





Photo: Yurok Aleksandrovich

# e better

## moulding of LED lenses



schematic diagram from the seminar, the pragmatic, experienced mould-making professionals had produced a complete 8-cavity mould for LED lenses within five months. They decided in favour of a compression mould with a spring-loaded cavity frame.

However, when testing the mould, Formplast was disappointed to find that it did not operate correctly. The moulded parts were overfilled. Following a brief telephone diagnosis by ARBURG expert Rolf-Uwe Müller, Formplast installed new springs within a single day and immediately drove some 750 km from Bystřec in the east of the Czech Republic to Lossburg

in the Black Forest with the mould in the luggage compartment. Once they had arrived, the mould was first analysed, then the spring characteristics were determined in a dry run.

### Reliable prevention of sink marks

"As soon as we switched from injection moulding to compression moulding, good parts immediately came out of the machine," enthused the Formplast mould makers. The heights of the mould insert also had to be adjusted, in order to reliably avoid sink marks. So, a mere three weeks later, along came the order for an ALLROUNDER 370 S with a clamping force of 600 kN and size 100 injection unit – with special compression injection moulding equipment, of course. Formplast also ordered a position-regulated screw and an external measuring system for a mould-based compression stroke sensor. This compression injection moulding machine has now been in operation, producing LED lenses around the clock since the beginning of 2011. Since then, Formplast has already brought other moulds for optical parts into operation. This fruitful co-operation is certain to continue long into the future.

Formplast uses its ALLROUNDERS (centre right) to produce parts such as LED lenses for car headlamps (above).

Zdenek Purkert (centre left) is delighted that compression injection moulding can now be used for this process.

### INFOBOX

**Founded:** 1991, as a design office

**Locations:** Two production facilities in the Czech Republic

**Employees:** 300

**Industries:** Automotive, electronics, technical injection moulding

**Corporate divisions:** Optical parts, technical parts, in-house mould making, coating, unit assembly

**Machine fleet:** around 50 injection moulding machines, of which 37 are ALLROUNDERS with clamping forces from 400 to 4,000 kN

**Contact:** [www.formplast.cz](http://www.formplast.cz)

# Spotlight on efficiency

## Reducing unit costs: Influence of energy requirements, cycle time

**E**fficient production means achieving optimum product quality at minimum unit cost.

If this objective is to be achieved, it is not sufficient to concentrate on energy efficiency or machine technology alone. Instead, the entire value chain and all variables should be included and the best possible solution found on an individual basis.

Various areas are of relevance for an integrated approach, from product design to production planning. These each offer varying degrees of potential in terms of reducing unit costs: through increased energy efficiency, reduction in cycle times and optimisation of the organisation

### Product design

The component design itself can have a positive influence on the efficiency of injection moulding production. Optimised geometry enables production steps to be minimised and material to be saved. Thus, for example, thinner walls permit shorter cooling and cycle times. The choice of material also plays a key role, because the energy required to melt different plastics varies significantly, even though they meet similar product requirements.

### Mould technology

An insulated heated mould has the same positive impact on energy consumption as near-contour mould cooling has on the cycle time. Moreover, it is beneficial to precisely adjust temperature regulation in the mould and the quantity of cooling water to the application, as every degree saved has a

significant impact on operating costs.

### Machine technology

The injection moulding machine has an enormous influence on energy consumption and cycle time. Electric machines score highly here with their energy-efficient drives, which also permit fast, independent movements. However, hydraulic machines can also be equipped in the same way.

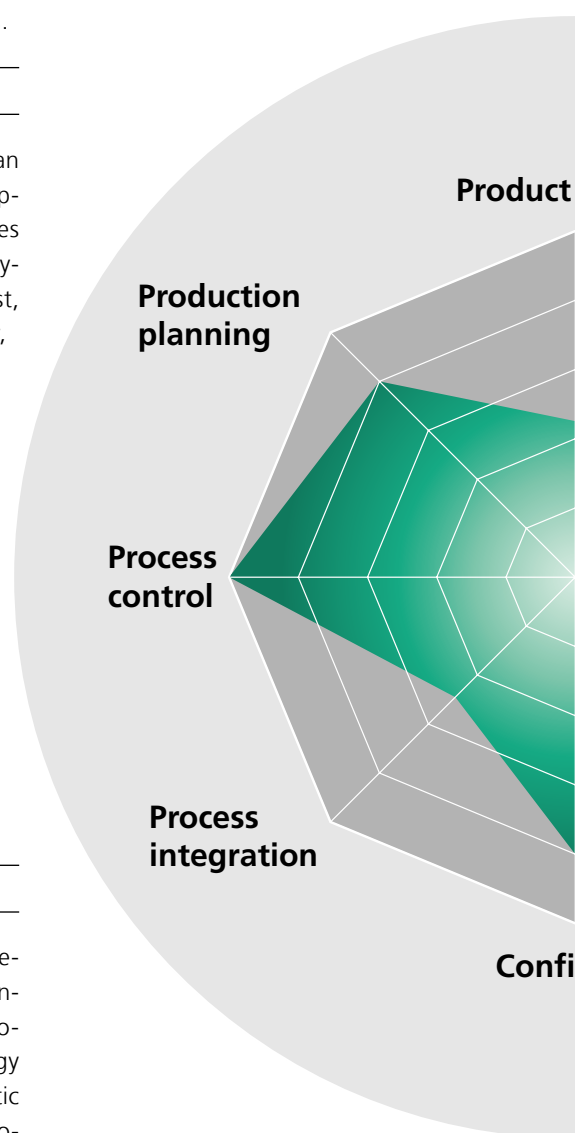
Ultimately, all production parameters must be considered in detail and various drive concepts combined on an individual basis, which is easily achieved thanks to the modular ALLROUNDER range. The ARBURG machine comparison and cost-effectiveness calculator helps in determining the most efficient machine solution, which uses all key parameters to calculate the unit costs and amortisation periods.

### Peripherals

Robotic systems, temperature control devices and material preparation and conveying also impact on efficiency in production. While, for example, high-energy compressed air generation in pneumatic systems has a negative impact, servo-electric drives score points in terms of energy efficiency and cycle time reduction.

### Configuration

In order to optimise a production system in an integrated manner, the machine and peripherals must be tailored precisely to the relevant production process. This is clearly evident in the right choice of

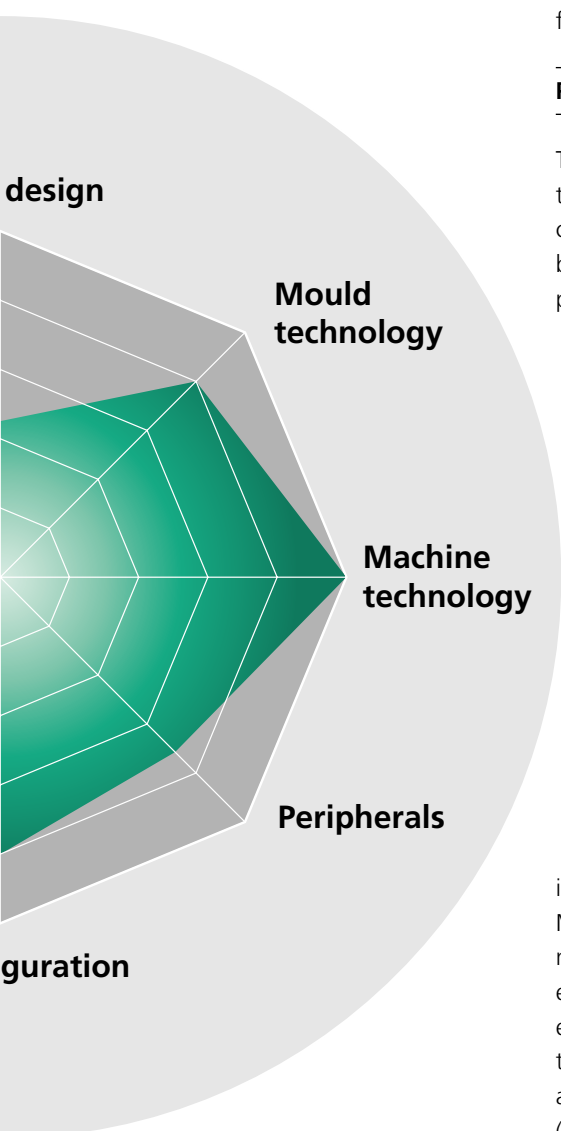


injection unit and screw diameter, for example, because the highest energy consumption occurs during plasticising. The higher the utilisation of the injection unit, the greater its efficiency and the lower the specific energy consumption will be. In turn, high utilisation of the injection unit is promoted by short cycle times.



# ncy

## and organisation



functional parts in a single production step.

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### Process control

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The integration of peripherals enables the synchronisation of movements and comprehensively control quality, thereby significantly increasing efficiency in production. The central SELOGICA control system plays a positive role here.

A standardised, simple approach to the programming of the machine and robotic system, as well as a shared data record reduces set-up and down-times while also cutting costs. The flexible programming of complex processes also makes it possible to optimise the production process and reduce cycle times.

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### Production planning

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The objective of production planning is to minimise downtimes and set-up times because energy is consumed unnecessarily during these unproductive processes. Measures in this area include preventive maintenance, optimisation of work processes and proactive production planning, ensuring that all resources are used to optimum effect. Computer aided tools such as the ARBURG host computer system (ALS) are vital in order to perform these tasks successfully.

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### Summary

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Owing to the many influencing factors, achieving efficient production is a genuinely challenging task. The ultimate goal is always high product quality at the lowest possible unit cost. In addition to the entire technology, people always play a decisive

role. That's why staff must also be made aware of this issue. If this approach is also applied to the wider production environment – such as the infrastructure and facility management at the production site – then it may be possible to identify significant additional scope for savings that will make production even more efficient and cost-effective.

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### Process integration

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Another way of increasing efficiency is to integrate processes through automation and the inclusion of upstream and downstream operations in the injection moulding process in order to produce fully-



Photo: sebastianreuter - Fotolia.com

# From dummies to spark plugs

Hopeful Rubber: quality and production efficiency safeguard the



**C**hinese company **Hopeful Rubber Manufacturing Co. Ltd.** has been involved in the rubber sector for decades and today produces a wide range of products from children's dummies through to spark plug boots. The company began its LSR processing activities in the year 2000. With the aim of continuously improving production efficiency and quality, **ALLROUNDERS** have been used for some five years in this sector and have permitted significant optimisation of the injection moulding processes.

The Hopeful Rubber Group comprises five independent companies, of which Hopeful Rubber Manufacturing is the largest. Manufacture of the products, with

an export share of 50%, takes place at two locations. The plants in Shenzhen and Nanhai are used for standard products and high volume runs, but also for complex automotive parts for well-known brands. Furthermore, the plant in Nanhai employs a strong development team and specialises in high-end products for the childcare-article and medical-technology sectors. The high-tech equipment here includes two clean rooms complying with class 10,000 and 100,000, as well as certified testing laboratories.

## Core precision parts business

"Our core business lies in high-precision rubber parts," says Lydia Lai, Sales and Marketing Manager of Hopeful Rubber. "It's not only quality that's an important

Hopeful Rubber focuses on quality (right) and production efficiency. **ALLROUNDERS** machines (above) significantly increase productivity during the manufacture of LSR products such as the spark plug boot.

success factor in their production, but also production efficiency." Ms Lai adds that in order to achieve this, the responsible management of resources plays an important role and is consequently firmly enshrined in Hopeful Rubber's corporate philosophy. As decisive factors for achieving a high level of quality and efficient production, she mentions well-trained and motivated employees, comprehensive expertise and internal research and development. A further factor is first-class machine technology, as made evident, for example, in the LSR sector.



future



Photos: Hopeful Rubber

"Our successes in the LSR sector are partly attributable to our close co-operation with ARBURG as a pioneer of LSR injection moulding. In addition to the ALLROUNDERS, we were also impressed with the good pre- and after-sales service," says Lydia Lai. "Thanks to their outstanding know-how, the service and application engineers have always been able to help us."

For the manufacture of LSR products, Hopeful Rubber currently operates nine

hydraulic ALLROUNDERS with clamping forces from 500 to 1,300 kN and cold-runner moulds built in-house.

#### Productivity increased by up to 50%

"Since we began working with these ALLROUNDERS, we've increased productivity by 30 to 50% and have also reduced our energy consumption as a result," says

a delighted Lydia Lai regarding the important contribution that the ARBURG machines have made towards enhancing production efficiency.

One example of this is the production of spark plug boots. These were initially produced on vertical machines, which were, however, unable to meet the ex-

pected cycle times and unit volumes. For this reason, the mould was simply converted for the horizontal ARBURG machine, with impressive success: By using the ALLROUNDER 470 S with an 8-cavity cold-runner mould, the cycle time was reduced by 38% and the scrap rate was decreased by around 4%.

In future, the company intends to focus more strongly on the production of medical-technology and other high-end LSR products. "We now have the process

and mould expertise in order to produce LSR parts on a larger scale," says Lydia Lai. "Moreover, we want to further optimise and automate downstream production steps. This is another area in which ARBURG has the competence to provide us with support."

#### INFOBOX

**Founded:** 1976 in Hong Kong

**Employees:** 1,400

**Locations:** Hong Kong (headquarters), Shenzhen and Nanhai (plants)

**Products:** Synthetic Rubber and LSR products, e.g. for the automotive, electronics, household and medical-technology sectors.

**Certification:** ISO 9001, ISO 14001, ISO/TS 16949, ISO 17025, ISO 13485

**Contact:** [www.hopefulgroup.com](http://www.hopefulgroup.com)



## TECH TALK

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



# Variety is the object

## Compression moulding - no limits with ALLROUNDER technology

**C**ompression injection moulding is an interesting process for many applications, e.g. when it comes to increasing contour accuracy of the moulded parts or implementing improved flow path/wall thickness ratios. Both hydraulic and electric ALLROUNDERS can be used. The question of which drive concept is more suitable depends on the mould concept and the product. Individual control options are also required for the detailed implementation of the various compression tasks. This is where the SELOGICA machine control system offers an unlimited range of functions.

In compression moulding, the mould concept determines the compression function required on the machine side. As well as the clear breakdown into main axis and auxiliary axis compression moulding (see Tech Talk today 46), combined compression processes are also possible. In the case of main axis compression in particular, the various clamping unit types offer various advantages in terms of the compression process.

### Hydraulics are ideal for long compression paths

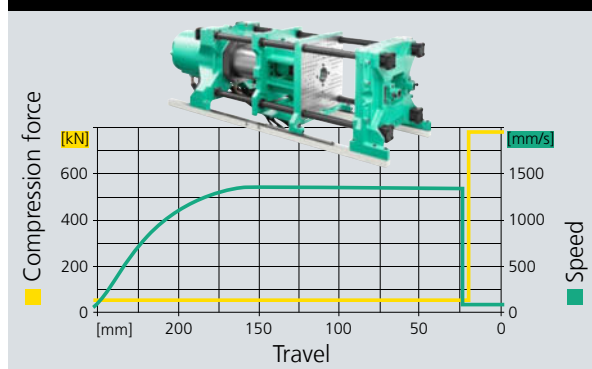
Fully-hydraulic clamping units can provide the maximum compression force – generally the maximum clamping force – in every path position, provided an effective counterforce is available. This allows them to facilitate long compression paths that do not exceed the travel of the clamping unit. Thanks to the stroke measurement system of the clamping unit, the accuracy of the clamping position is usually within 0.1 mm. This compression position accuracy is generally sufficient for applications with longer compression paths exceeding 1 mm. Long compression injection moulding phases can also be implemented with ease. Typical compression injection moulding applications for fully hydraulic clamping units include thick-walled spectacle lens blanks or LED lenses.

The customer report on Formplast on page 20 describes the experiences gathered with the manufacture of LED lenses.

### Electric toggle system ensures a high degree of positioning accuracy

In the case of electric clamping units, in contrast, the clamping force and movement speed always depend on the toggle position, owing to the toggle kinematics. The maximum clamping force is only achieved when the toggle is locked. This means that high compression forces are

### Fully-hydraulic clamping unit





# ive



only possible with short compression paths. It is consequently only possible to achieve compression paths of up to 1 mm in the case of electric toggle systems. Larger drive motors are used to achieve adequate compression forces. Longer holding pressure phases can only be provided by liquid-cooled motors. However, response times and compression speeds are comparatively high because the pressure build-up times required by hydraulic systems do not apply. Furthermore, positioning accuracy can be achieved within a tolerance of well under 0.01 mm. The

position-regulated drive systems mean that repeat accuracy is also much higher than with fully hydraulic concepts. Thus, electric clamping units are particularly suitable when short, yet highly precise compression paths are required, e.g. for optical data media or sensor lenses.

## Compression moulding made easy

Flexible choices are vital in order to be able to set up the ideal injection moulding process for a specific application. The SELOGICA machine control system provides the perfect basis with its sequence programming using graphic symbols. The main and auxiliary axes can be used in a single sequence without problem. Depending on the mould, component, process and available sensors, a variety of initial conditions are available for the compression injection moulding process,

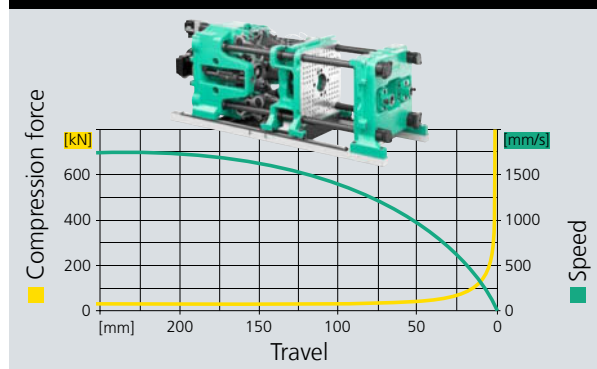
The various clamping systems, each with very different compression force and speed characteristics, contribute to the many options available for implementing compression injection moulding processes with ALLROUNDERS (see graphics below).

according to:

- delay time
- screw position
- injection pressure
- mould cavity pressure
- mould wall temperature
- any external signal

If, in addition, combined force/time and path/time-regulated programming is also possible, as in the case of the SELOGICA, there are no limits to compression moulding. This means that users can program the necessary compression moulding sequence freely and individually without requiring special programs.

### Electric toggle-type clamping unit



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