

# today

The ARBURG magazine

Issue 50

2012





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## MASTHEAD

### today, the ARBURG magazine, issue 50/2012

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50th issue of "today": the title pages reflect the history of the ARBURG customer magazine. High standards were maintained from the outset: the aim was and remains to present interesting solutions and future trends, as well as putting forward ideas for their production facilities to our readers.





## Dear Readers,

This year, the main focus at ARBURG world-wide is on the overarching topic of production efficiency – and in particular a holistic approach in this regard. An important role is played here by the close cooperation between experts from a variety of fields in order to develop and enhance efficient solutions for the future.

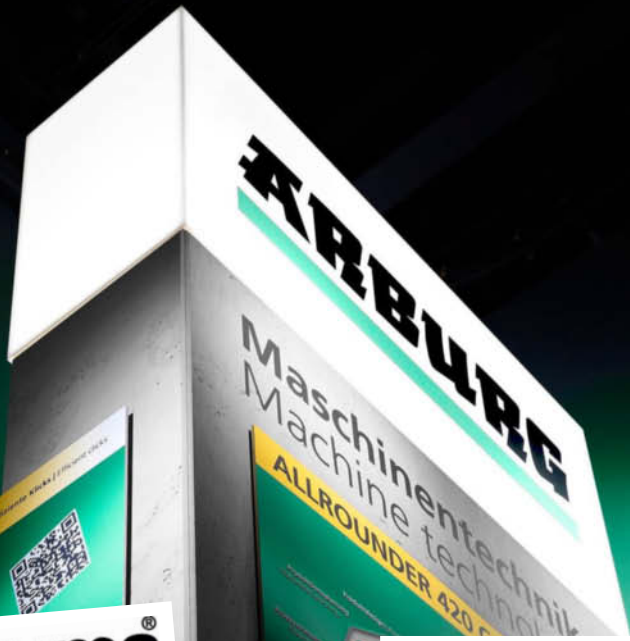
The international Fakuma trade fair in Friedrichshafen represents an excellent forum for premiering innovations. Read about the innovations in the machine and applications sector that we will be presenting there in 2012. These include, for example, the new “long-fibre direct injection moulding” process, which we describe in detail, and “particle-foam composite injection moulding”. These developments demonstrate the potential that can be unlocked jointly with our partners.

As an example from the past, we will report on the compact disc, which celebrates its 30th anniversary and in which ARBURG was involved from the outset. We will also present further successful co-operations to you in reports from several different countries and industrial sectors.

We trust you will be inspired by the reports covering all the various aspects of production efficiency in order to further enhance the cost-effectiveness of your injection moulding production.

I hope you enjoy reading our 50th issue.

Michael Hehl  
Managing Partner



# 100 percent i

## Fakuma 2012: The whole world of production

**A**t the Fakuma 2012, ARBURG will showcase the topic of production efficiency throughout the entire value-added chain. Based on the example of innovative injection moulding solutions, applications and processes, all aspects of cost-efficient injection moulding production will be covered.

“In order to recognise and fully exploit the potential for increasing production efficiency, it is important to consider the entire value-added chain,” emphasises Michael Hehl, Managing Partner and Spokesperson for the ARBURG Management Team. “At the Fakuma, we have therefore highlighted the relevant advantages of all ten exhibits in terms of production efficiency.” World innovations in the application and process sector

also underscore the ARBURG philosophy of offering our customers efficient injection moulding solutions.

### Innovative processes and applications

On the topic of lightweight construction, ARBURG will present two innovative applications. In the case of long-fibre direct injection moulding, longer fibres than previously can be processed to create high-strength moulded parts with thin walls: (more on this topic from page 6). With the completely new particle-foam composite injection moulding (PCIM) process, a foamed component is combined with a second polymer component in a single step to form a finished part, with no downstream assembly steps required.

An example for integrated decoration



in the injection moulding process is the inline printing system. This so-called InkBOT process combines digital printing and robotics to enable fully automatic, individualised printing onto parts in a single step.

### New ALLDRIVE electric machine size

Product-specific selection of machine technology is a decisive factor to ensure cost-effective production. New to the range is the electric ALLROUNDER 630 A with a clamping force of 2,500 kN and size 1300 clamping unit. Thanks to this new size, this ALLDRIVE series machine can be even more closely adapted to the application at hand, ensuring efficient moulded part production. Moreover, the generously dimensioned housing of



Innovations at the Fakuma include, for example, the new electric ALLROUNDER 630 A (left) and wheels for model planes (above) produced using particle-foam composite injection moulding (PCIM).



# Innovation.

## Production efficiency

the clamping unit offers ample space for media supply lines and complex moulds.

### Efficient solutions at attractive terms

On the occasion of the Fakuma, ARBURG will be offering two new solutions with which customers can further enhance the production efficiency of hydraulic machines at particularly attractive terms.

The productivity package for the GOLDEN EDITION machine series reduces energy requirements by up to 20 percent, shortens dry run times by up to around five percent and minimises emissions. It comprises the ARBURG energy-saving system (AES) with variable speed pump drive and a water-cooled drive motor.

The servo-hydraulic drive concept for the ALLROUNDER S machines with clamping forces from 2,500 to 5,000 kN enables energy savings of up to 50 percent compared to standard hydraulic machines. Further benefits of this energy-saving drive alternative include minimal machine cooling and a low noise level.

Altogether more than 20 ALLROUNDERS will be on display at the company's own stand and at those of its partners. ARBURG

will thus offer trade visitors a comprehensive overview of its products and services. The exhibits will include ALLROUNDERS with clamping forces up to 5,000 kN, vertical machines, hydraulic, hybrid and electric drive concepts, as well as turnkey systems featuring linear MULTILIFT robotic systems and six-axis robots. Moreover, set-up time optimisation with the SELOGICA "Set-up Assistant" module and efficient production planning with the ARBURG host computer system (ALS) as well as multi-component technology, the processing of liquid (LSR) and solid (HTC) silicones, powder injection moulding, packaging and optical applications, the overmoulding of inserts, including by the hotmelt process, and much more.

The main focus at the ARBURG exhibition stand (above) will be on production efficiency.

### Innovations

- Additional machine size: electric ALLROUNDER 630 A
- Efficiency enhancing option: productivity package for GOLDEN EDITION series
- Energy-saving drive technology: servo-hydraulic system for large ALLROUNDER S
- Pioneering inline process: long-fibre direct injection moulding for high-strength thin-wall parts
- Flexible inline printing: digital printing of plastic parts during the injection moulding cycle
- Innovative combination: particle-foam composite injection moulding (PCIM) combines foamed component with polymer to create lightweight parts



# Long fibr

## Long-fibre direct injecti

**T**he longer the incorporated fibres, the better the mechanical properties of the manufactured components. However, direct processing of longer glass fibres in reinforced plastics has been impossible to date due to limitations during material preparation and dosage as well as the granulate form. With the new "long-fibre direct injection moulding" process for machines with clamping forces up to 4,000 kN, ARBURG and the Süddeutsches Kunststoff-Zentrum SKZ in Würzburg will jointly present a system which enables the inline feeding and cutting of longer glass fibres at the Fakuma.

Here, the fibres are added directly to the melt via a side feeder on the injection unit.

The substitution of metals with plastics and lightweight construction are the key concepts with regard to the use of fibreglass-reinforced plastics. The requirements in this context mainly stem from the automotive sector. Here, long-fibre reinforced materials are primarily used where high forces act upon the components. With the long-fibre injection moulding solutions to date, comparatively lightweight moulded parts can be produced and thinner wall thicknesses are



# Fibres = high-strength part

## Injection moulding: New possibilities in lightweight construction

achievable, while maintaining the same strength. Housings for passenger airbags, gearshift levers and battery trays, for example, are made from the long-fibre granulates currently available on the market. The initial fibre length here is normally around twelve millimetres.

### ARBURG and SKZ discover the solution

The problem is that the fibres shrink significantly in length due to the forces acting inside the screw. The use of longer glass fibres in reinforced plastics was not only impossible due to limitations during material preparation and dosage, but also because of the granulate form. The solution is "long-fibre direct injection moulding". In this application, the long fibres are fed into the melt in the plasticising cylinder of the injection moulding machine inline. This new process will be demonstrated for the first time at the Fakuma 2012 on an ALLROUNDER 820 S, which produces airbag housings in a 2-cavity mould.

### Special design for screw and side feeder

In order to process the long fibres, the screw used on the injection unit features two stages, in a manner reminiscent of a degassing plasticising unit.



In stage 1, the plastic granulate is melted and in stage 2, the glass fibres are added and the material homogenised.

Feed is performed automatically via a dual-shaft side feeder from Coperion, which is mounted on the plasticising cylinder at the beginning of the second screw stage and principally operates in the same manner as a dual-screw extruder. The glass fibre strands are fed into a rotating cutting device from Wolfangel, which is positioned above the filling area of the side feeder. The cutting device cuts the glass fibre strands into specified lengths. Adjustment is performed by changing the distance between the blades of the cutting device. The cut lengths of fibre are then fed into the plasticising cylinder of the machine via the side feeder. Here, they are worked into the plastic matrix and evenly distributed.

### Longer fibres, lower costs

Feeding longer fibres into the liquid melt at the front

Thanks to the inline feed (small illustration opposite), the fibre length is retained in the airbag housing (illustration below). Pre-ashing using a Bunsen burner (large illustration opposite) provides initial information on quality. Detailed evaluation brings the fibre length distribution under the microscope via a scanner, for which the SKZ has developed a special software (illustration on left).

end of the injection unit and the associated low incidence of fibre damage has a number of advantages. Firstly, mechanical shrinkage of the fibres during dosage is significantly reduced. Their maximum processing length is 100 mm. Furthermore, considerable cost savings can be achieved because the base materials (plastic and fibreglass rovings) are cheaper than finished long glass fibre granulates. Moreover, fibre length, fibre content and material combination can be individually selected.

Further pioneering experiments with other fibres such as carbon or natural fibres are also planned.



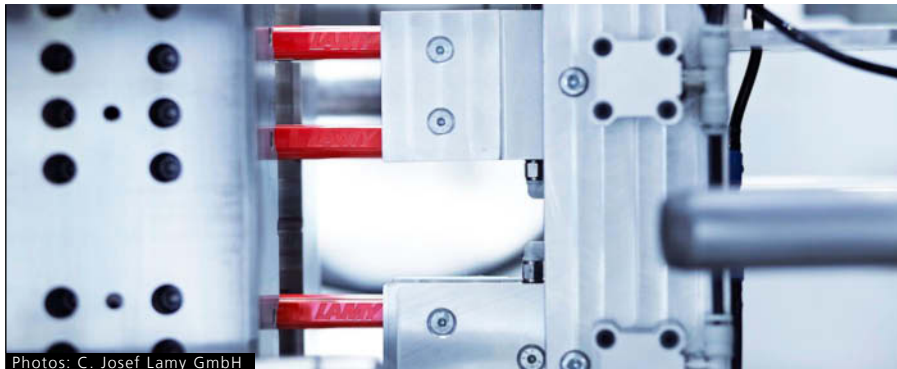


# Design. Made

## Lamy: Multifaceted co-operation with ARBURG from injection m

**T**he fact that a co-operation can be extremely solid and far-reaching, even after being in place for only a relatively short time, is evidenced by the two companies Lamy and ARBURG. The proximity between the writing implement manufacturer from Heidelberg and the machine manufacturer from the Black Forest is based primarily on the views they share in terms of their respective corporate philosophies. Their collaboration has only just begun. But already now, the future prospects are interesting.

Since the company's foundation in 1930, C. Josef Lamy GmbH has remained faithful to its Heidelberg location. From 1966 onwards, the Lamy design, which was influenced by the Bauhaus style, underwent further development. The company, which, like ARBURG, is family run and is currently under the management of Bernhard M. Rösner, sells a comprehensive



Photos: C. Josef Lamy GmbH

For the production of sophisticated writing implements (illustrations at top and below), precision injection moulds (small illustrations above and opposite) are required: Lamy combines expertise in both.

range of writing implements comprising some 200 models.

Today, Lamy is a market leader in Germany and enjoys a strong market position in western Europe. The export markets, above all overseas, are grow-

ing sharply. Very high growth is being achieved in America and Asia, where Japan and China particularly stand out. The export share currently accounts for more than a third of the company's turnover. Today, Lamy produces more than six million high-quality, functional writing implements annually and is represented in 65 countries world-wide.







# in Germany.

## oulding to marketing

Joint activities with ARBURG began in 2010 with injection moulding machines and automation solutions. In 2011, the sectors communication, marketing, trade fairs and co-branding followed for the Lamy Werkzeugbau (tooling) and Lamy Schreibgeräte (writing implements) divisions.

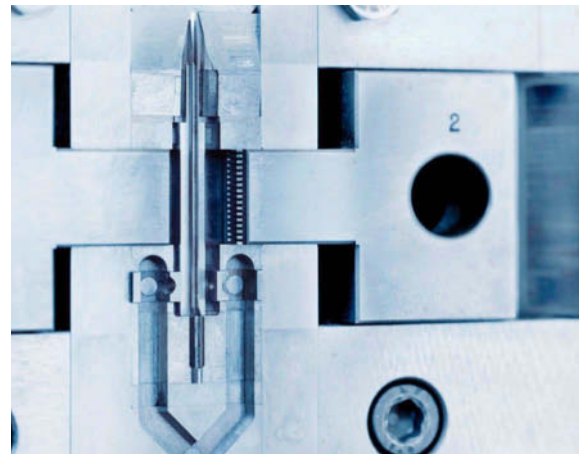
Like ARBURG, Lamy consistently pursues a philosophy of "Made in Germany" for both itself and its suppliers. According to Head of Marketing, Beate Oblau, Lamy products are based on what is possible and not on what is customary. Through innovative technical and original design solutions, they unmistakably stand out from competitor products: a further feature that the company has in common with ARBURG.

### Progression from a system supplier

At its headquarters in Heidelberg, Lamy Werkzeugbau has built production equipment, tools and injection moulds for the

design-oriented production of writing implements for more than 60 years. The Lamy Werkzeugbau division was restructured last year and operates as a profit centre of C. Josef Lamy GmbH. The fully climate-controlled development centre is therefore now also available for external customers.

The manufacture of precision injection moulds for sophisticated and/or design-oriented parts from all sectors up to a mould platen size of 500 x 500 millimetres and a precision of up to 0.005 millimetres in the cavity are the main focus at the facility. Since its realignment to a customer mould construction operation, the Heidelberg-based division offers problem solutions as a systems supplier from design, tooling and mould construction through to the production of plastic parts from a single source. In future, the co-operation with ARBURG will also extend to this area, for example through the presentation of Lamy Werkzeugbau moulds on ARBURG exhibition machines. Moreover,



Lamy and ARBURG are actively pursuing the strategy of placing production and energy efficiency at the forefront.

### Lower energy consumption and high precision with electric machines

Lamy therefore also relies on electric machines during production. Bernd Hirth, Sales Manager at Werkzeugbau, says: "Through the integration of electric machines, we save several thousand euros annually in energy costs alone, not to mention their high precision, which benefits us long-term. Furthermore, we can work in a much more production-efficient manner as a result of the shorter cycle times achieved thanks to a central control system for the machine and robotic system." Plastic components for Lamy writing im-



The experience gained over decades of mould construction is based on the production of sophisticated products such as design-oriented writing implements (illustration left). External customers can also benefit from this competence and the first-class infrastructure (illustration above).

plements are produced on a total of three electric ALLDRIVE series ALLROUNDERS. In addition to an ALLROUNDER 370 A, an ALLROUNDER 470 A featuring a MULTILIFT V linear robotic system and a gripper changer for transport-crate handling, as well as an ALLROUNDER 370 A with a servo-electric INTEGRALPICKER V for sprue removal are used. The automation components were procured in order to ensure autonomous production during multi-shift operation.

**Service as a decision-making criteria**

At Lamy, the machines operate in three shifts, seven days a week. "In the coming years," says Dr. Marius Gartner, Strategic Head of Mould Construction and Department Manager of Production and Logistics, "the existing hydraulic machines are to be replaced by electric ALLROUNDERS, probably also from the EDRIVE series."

In addition to the repeat-accuracy, energy-efficiency and low-noise of the technology, ARBURG's comprehensive, fast service offerings were an impor-

tant decision-making criterion for Lamy. The Head of Plastics Processing at Lamy, Tim Haseldiek, summarises the impressions: "The open atmosphere of partnership during meetings with Applications Technology and Service have led to quick, direct results with no red tape. The machines are user friendly and feature excellent repeat accuracy. The service, for the few replacement parts that have been necessary, has always been exemplary. In short, we are consequently able to rely on a competent service from ARBURG."

**INFOBOX**



**Product:** Lamy brand writing implements since 1952  
**Location:** Heidelberg, Germany  
**Turnover in 2011:** 53.6 million euros  
**Employees:** 320, 18 of which at the Werkzeugbau profit centre  
**Industries:** End-customer business and direct-to-customer trade in writing implements, promotional products, mould construction for the automotive/vehicle engineering, electric/electronics industry, household appliances, furniture industry/fittings, writing implement industry as well as water/installation technology  
**Contact:** [www.lamy.com](http://www.lamy.com), [www.lamy-werkzeugbau.de](http://www.lamy-werkzeugbau.de)



Photo: Robert Kneschke - Fotolia.com

# Do you produce efficiently?

## Production efficiency self-test: Status quo and potential

**H**ow efficiently does my injection moulding facility produce? Many companies ask themselves this central question. Due to the complexity of the issues, a concrete answer is difficult to find. Consequently, the experts at ARBURG have developed a test with which companies can assess themselves, determine their current situation and identify potential improvements.

Increasing production efficiency is an ongoing task and must therefore be pursued over the long-term. Savings potential can be identified throughout the entire value-added chain.

The ARBURG "Production efficiency" self-test allows you to quickly sound out your company's potential for unit cost reductions with only ten questions.

In addition to questions on all stages in the value-added chain, from product design to production planning, the level of knowledge on energy requirements in production and existing activities aimed at identifying savings potential are also topics covered in the self-test. In the area of

machine technology, you are asked, for example, how you select your machine and drive technology. Is identifying alternatives and their economic comparison a matter of course, are enquiries always explicitly made regarding alternative machine and drive technologies, or is the same machine and drive technology always used without alternatives being investigated?

### Fast access to new ideas

In addition to the questionnaire, you will also be provided with tips on how you can enhance the cost-effectiveness of your production. These suggestions do not necessarily require capital investments as they also relate to organisational aspects and processes. So, for example, it is worth checking the difference between "pump operating hours" and "operating hours in automatic mode". If this exceeds ten percent, the pump is frequently operating when nothing is being produced. In order to prevent unnecessary wastage of energy, it should be ensured that the pump is switched off, e.g. during set-

up. This example also makes clear how important it is to raise awareness among personnel in this regard.

### Suggestions for immediate implementation

The evaluation at the end of the test shows you where your company currently stands and what direction further development should take in terms of production efficiency.

You can find the self-test on our website at [www.arburg.com](http://www.arburg.com). Or, simply use the QR code below.



Self-test



# ABBA or Chopin?

## 30 years of the CD: ALLROUNDERS rang-in the digital age

**W**hether the first listeners preferred the pop CD "The Visitors" by ABBA or the classical Chopin waltzes played by the pianist Claudio Arrau, nobody knows. What is certain is that music company Polygram (now EDC) and ARBURG implemented innovative ideas 30 years ago and that the first mass-produced CDs worldwide were commercially produced in Hanover-Langenhagen. Gerhard Eggers, a man of the first hour, remembers the development stage and mass production using ALLROUNDERS.

"Initially, we wanted to mount an injection unit onto a video-disc press at Polygram," remembers the chief engineer at the Entertainment Distribution Company (EDC). "In our Hannover team, there happened to be a colleague from Freudenstadt, which is not far from the ARBURG headquarters in Lossburg.

He knew and recommended the company. That's how we came to buy our first two ALLROUNDER 270 H machines."

The development of the then totally innovative sound carrier that was the compact disc (CD) had been instigated by our parent company Philips, thereby initiating a competition between Japan and Germany. In the run-up to the system development, Sony was also working intensively on the production of CDs. In Hannover, the objective was to bring volume production to maturity in just 500 days, which the chemists, physicists and mechanical engineers also managed to achieve. On 17 August 1982, they



Engineer Gerhard Eggers accompanied the development phase and mass production.

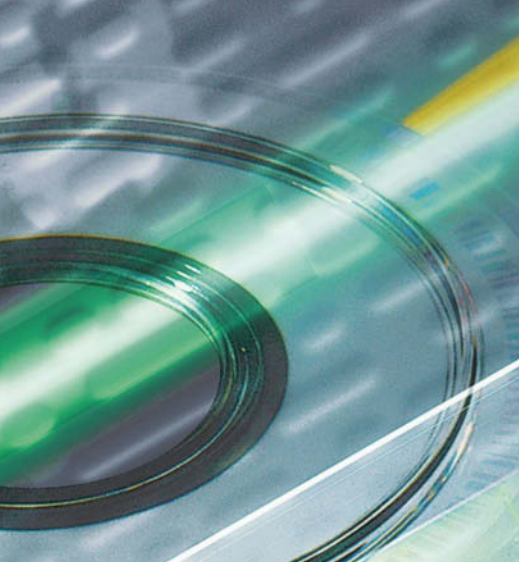
manufactured the first mass-produced CDs for the retail market. For this purpose, the information was pressed into the surface of the injection moulded polycarbonate discs, which were then mirrored and coated with a protective varnish before being printed with a label.

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### Maximum-precision, high-tech parts

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In volume production, around 120 ALLROUNDER 270 H machines especially configured for this task were eventually used. In order to ensure the required quality of the high-tech products while maintaining extremely short cycle times, maxi-



mum precision was necessary during dosage, injection and compression moulding. Half the ALLROUNDERS remained in the factory for many years, the others went to production sites in France, South Korea, China and the US. Later, two-component machines were also used, which produced two CDs in one cycle.

During this co-operation, the interpersonal relationships left a lasting impression. "One highlight was acceptance of the machines, which was combined with buttered pretzels and a language class in Swabian dialect," remembers Hannover-born Eggers, with a smile before adding, on a more serious note, "As customers, we always felt highly valued and received an outstanding service, despite all our demands."

### 3.5 billion discs in 30 years

Today, EDC operates the largest integrated European production and distribu-

tion centre for CDs, DVDs and BluRays. Since 1982, more than 3.5 billion products have left the Hannover-Langenhagen location. During this period, the cycle time for injection moulding has been cut from almost 30 seconds to just under three seconds. The current daily capacity is of 1,000,000 products.

The first CDs then retailed at around 35 German marks, the corresponding player was virtually unaffordable. Nevertheless, a CD boom soon began, so that night and weekend shifts had to be introduced at the factory.

Today, streaming formats and USB sticks are providing competition for the CD. Although it may have already seen its best days, progress is still advancing unchecked. "Even thirty years ago, the technical expertise, well organised production and the size of company impressed us," says Gerhard Eggers. He can there-

fore easily envisage a continuation of the co-operation with new optical products.

Polygram (now EDC) used 120 ALLROUNDER 270 H machines for CD production (below).





# A host of informati

ARBURG customer magazine: "today" reaches its 50th issue with

In October 1995, ARBURG launched its "today" customer magazine. As a successor to the popular "ARBURG heute", which informed customers on the latest developments at the company in the 70s and 80s, the benchmark for the new publication was set high. In the meantime, 50 issues of "today" have appeared – and the response from readers shows that the right course was taken.

The beginnings of "today", however, can only be described as modest. The first edition was still in the A3 newspaper format and was eight pages thick. But even then, it contained the right mix of topics. The readers were provided with information on the highlights of the ARBURG technology range in lengthy, detailed reports, but also with news and background information.

The first "today" was a trade-fair edition for the "K'95" featuring technical

content on K-related topics. A great deal has changed since then. The broadsheet became a magazine with 28 pages in each issue and the topics covered are more diverse. A connection to multimedia applications is established with references to interesting weblinks and through the use of QR codes for further information. High-quality photography and concise summary information at the end of many articles make the magazine an interesting reference resource.



## Consistent further development

It is not often that the same topic appears in both issues 1 and 50 of a magazine, unless the right product is involved. In the case of "today" this is however the case. The first edition contained a detailed report on the ALLROUNDER S machine series, which was presented for the first time at the "K'95".

And in the current anniversary edition, the same universal hydraulic machine series is also featured. During the course of ongoing model refinements, ARBURG will be presenting an energy-saving, servo-hydraulic drive concept for the large ALLROUNDER S machines, which is covered on page 4.

Whether it's the ARBURG machines or the customer magazine: good things endure, as can be seen!



# on

## reports on technology, developments and future trends



A wide variety of moulded parts have been presented, e.g. the three-component goose (illustration above), the Märklin anniversary locomotive (centre) or the butter sheep (below).

### Strategic alignment with continuity

The good ideas have also kept coming over the years. From the very first issue, "today" has appeared three times annually and the magazine's strategic alignment has always been oriented towards what Karl and Eugen Hehl, the Managing Partners of the day, stated in their first editorial in 1995: "...Even then (editor's note: in the days of the "ARBURG heute") your opinion mattered to us. And it still does. It's not only that we have always welcomed your questions and suggestions. We would also like to request your active participation. Please let us know if you have discovered an exemplary solution at your company to which ALLROUNDER technology has contributed. Only in this way can we achieve our objective: to be a global forum that comprehen-

sively informs you on essential data, facts and news..."

### Unconventional topics

Over the years, there have been a number of highlights which the editors like to reminisce on. For example, a number of sometimes exotic products featured in the "today" have attracted a great deal of attention. These range from plastic building bricks or board game tokens, to confectionary packaging in the shape of motorbikes and UFOs, through to dental implants, colour palettes for nail varnish or "anniversary locomotives" with a platinum chassis and injection moulded wheels, insulators and con-rods made from metal or ceramic powder. The injection moulding of an assortment of noodle shapes or sheep and bells made from butter, which were injected at low compressions, are among the more unconventional injection moulding experiments.

Over the years, both our readership and our content have been extremely varied. Both national and international topics are covered, as are user reports and stories on co-operations, but attention is also paid to technical background

information since the introduction of the "Tech Talk" feature.

**More than 32,000 copies of each issue are printed, in six languages.**

This is also the way it should be in a publication that now boasts a circulation of more than 32,000 copies and appears in the languages German, English, French, Spanish, Italian and even Chinese. It is consequently one of the specialist plastics journals with the largest readership world-wide.

The magazine's high standards are explained by Dr. Christoph Schumacher, Head of Marketing and Corporate Communications: "We aim to inform our readers in a journalistic manner and stimulate them to both read and archive the "today" magazine. With our reports, we would like to provide information on the details of other customer's solutions. This has been proven to be of assistance to our readers." So ARBURG also occupies a leadership position in terms of communication.



# No fear of th

## Pfaff: New plastic drill

**A**nyone who has been to the dentist knows that having their teeth drilled is no fun because it can be painful. However, this needn't be the case. Thanks to its material properties, a new plastic drill removes only the caries in a targeted manner. The healthy dentine remains largely unscathed. The drill is produced ready-for-use in a single process. Pfaff, based in Waldkirch, Germany, which specialises in the production of complex technical parts, knows how it's done.

"The secret of the drill's properties lies in its material," explains Andreas Buff, Technical Director of Pfaff, who has realised the product idea of Gebr. Brasseler, a specialist for the sale of dentistry supplies. "The four PEEK cutting edges are sufficiently hard to remove the carious material, yet soft enough to be blunted upon contact with the harder dentine, leaving it intact."

The new plastic drill, which is in fact like a small milling cutter, is used after the dental enamel has been pierced using a conventional hard-metal drill. It automatically removes only as much of the tooth as is absolutely necessary. This can, in some cases save the patient from an unpleasant root canal treatment, e.g. as a result of nerve damage.

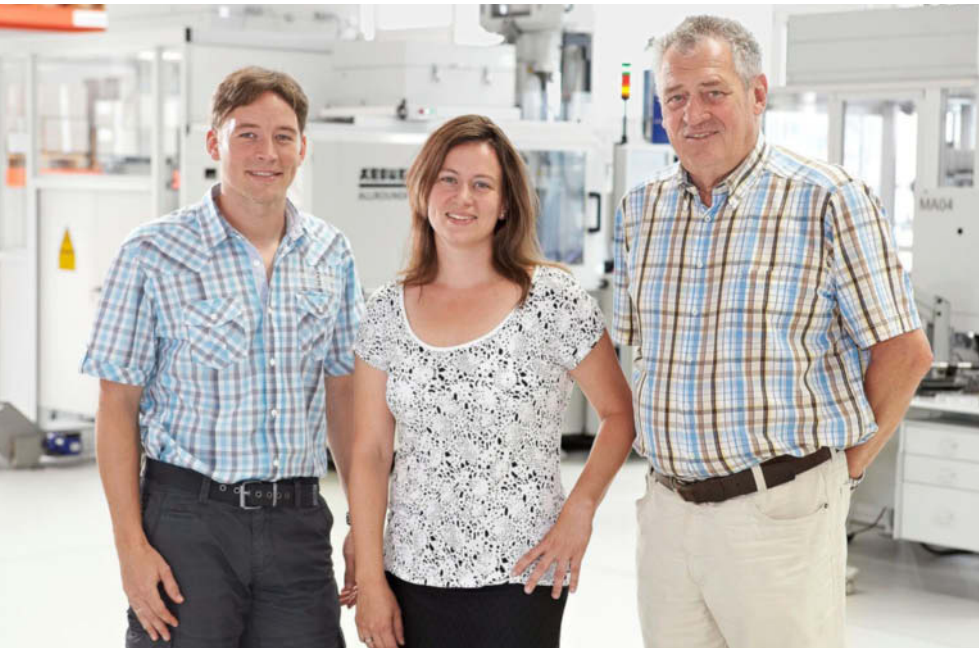
The dental drill (large illustration on left) is produced on an electric ALLROUNDER 370 A. Altogether, six ALLROUNDERs produce mainly technical parts (small illustration on left).





# e drill

## for targeted treatment of caries



### Fully automatic manufacture of ready-to-use end product

"We wanted to produce the tiny drills "ready-to-use" as an inexpensive disposable article in a single step, dispensing with finishing work or sterilisation prior to use," explains company founder and Managing Director Adolf Pfaff. "For this purpose, we needed a high-performance precision injection moulding machine and a robotic system capable of performing complex movements, as well as a clean-room packaging system."

Pfaff designed and implemented the complete production cell jointly with the ARBURG Project Department. "For us as a small company, it is particularly important that we obtain everything from a single source and only have one contact if things don't work as they should," says Adolf Pfaff.

The moulded parts, which weigh

Managing Directors Adolf and Corinna Pfaff, as well as Technical Director Andreas Buff (right to left) have found a competent project partner in ARBURG.

0.8 grams are produced on an electric ALLROUNDER 370 A in a cycle time of approx. 25 to 30 seconds. "Because tolerances have to be met in the hundredth of a millimetre range, the machine must operate extremely precisely and with a high level of repeat accuracy," explains Andreas Buff. All the axes important for part quality, i.e. injection, dosage and mould movements are therefore driven electrically.

Two drills are automatically packaged, simultaneously with the injection moulding cycle. For this task, a module meeting the ISO class 7 clean room requirements

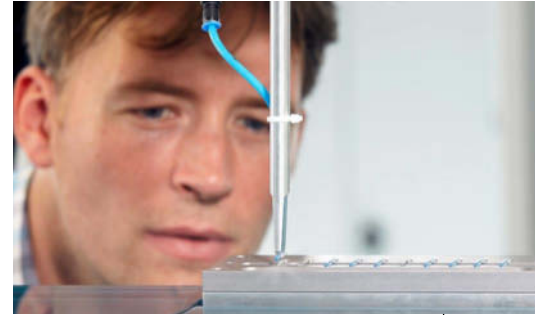
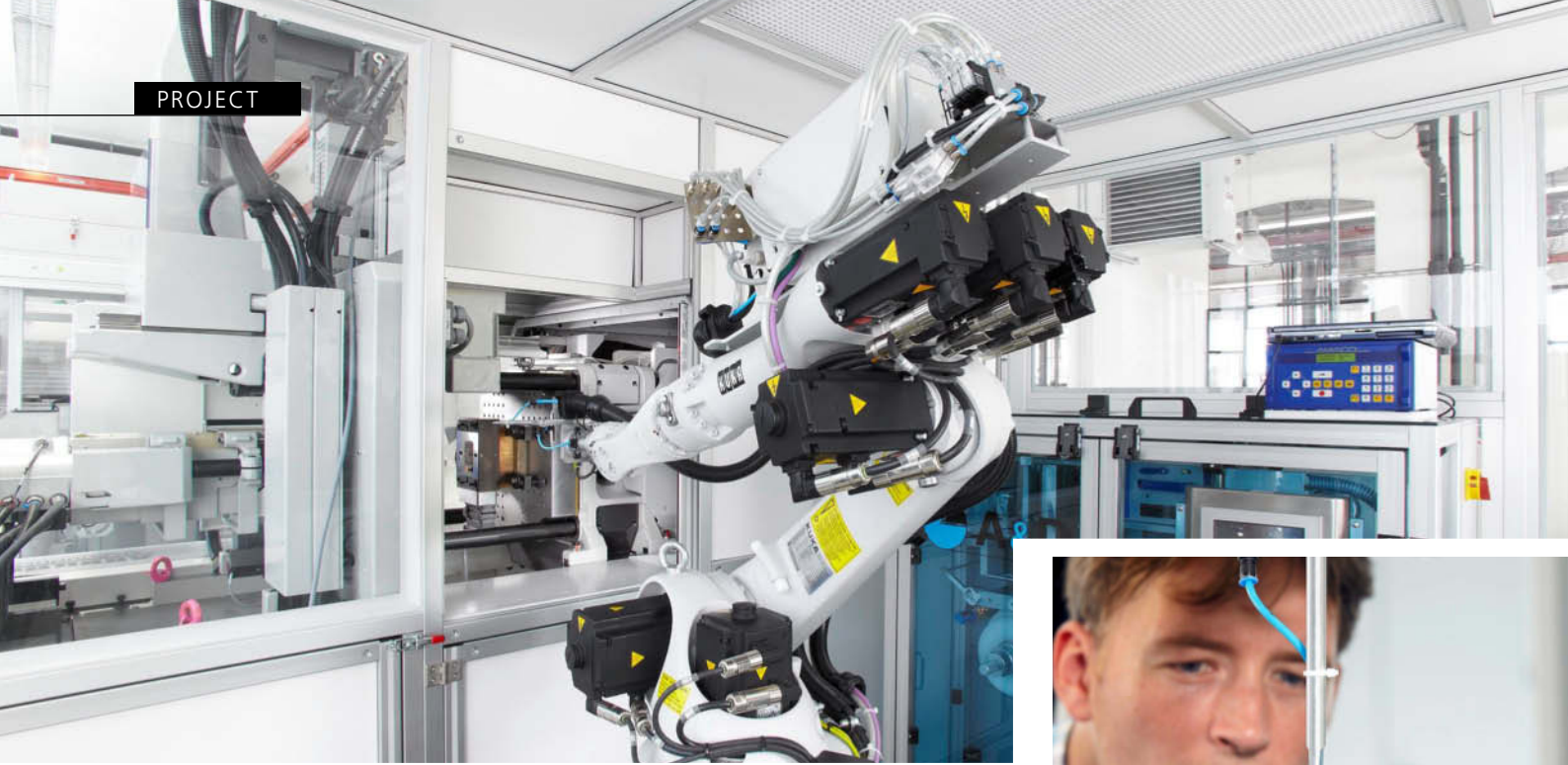
is docked to the machine. This module houses a Kuka six-axis robotic system and a packaging system from A&D.

The compact robotic system moves to a number of positions within the room. It first removes the moulded parts from the two-cavity mould and sets them down onto a cooling station. Positionally correct placement of the parts in the blister packaging then represents a real technical challenge as each drill must lie horizontally in its plastic envelope. This ensures that the dentist is always subsequently presented with the shaft of the drill when he tears open the packaging.

In order to overcome a distance of 100 millimetres in the packaging system, Pfaff has developed its own gripper solution. The vacuum-operated "pistol grip" draws in the drill, which, after passing through a 160 millimetre tube, falls into the packaging in a defined orientation. Units comprising ten parts are then individually perforated, printed, removed via a conveyor belt before being manually packed into the final cartons.

### Six-axis robot programming in no time

Andreas Buff cites the integration of all the peripherals in the SELOGICA control system and the intuitive operation of the six-axis robotic system as significant advantages: "A service technician entered the basic settings and showed me in one evening how to handle and program the robot. This is actually quite simple because it shares the same user interface as the machine control system. The fact that I am now already able to program movement sequences myself is worth its price



in gold for a small company such as ours," adds Adolf Pfaff, "A further advantage is the system's flexibility. If we receive a new order for a medical technology item, for example an insert, we can reprogram the six-axis robot ourselves in no time."

Until production of the drills, which are currently being introduced onto the market, reaches the anticipated unit numbers, the ALLROUNDER, which is equipped with two injection units, will also be used for other tasks under clean room conditions. This includes, for example, the development of a spinal implant and a grant-funded project from the optical sector.

### Specialist for high-tech parts

Innovative products of this kind are one of Pfaff's strengths. "When I founded the company, I didn't want to produce sand pit spades, but high-tech parts," chuckles Adolf Pfaff, who has decades of experience in two-component injection moulding. Back in 1992, the company was already producing complex multi-component parts for the drinking water sector. Later, these were complemented with sensors, lenses and gear wheels with optical functions, as well as products for the electronics and automotive industries and, for ten years, increasingly hand-held instruments, components for probes and other medical items. Since 2011, the

company has been certified according to the EN ISO 13485 : 2003 + AC 2009 medical standard.

### Fast service ensures process reliability

Pfaff currently operates a total of 14 injection moulding machines with clamping forces from 200 to 2,500 kN, of which six are ALLROUNDERS. "We've been relying on ARBURG for around ten years now, because here, it's not only the top quality of the machines and their price which are right, but also the competent field staff and outstanding, fast service." maintains Adolf Pfaff – despite having worked as a designer for another German injection moulding machine manufacturer in the past. Particularly in the medical technology sector, there are contractual obligations to ensure process reliability and adherence to delivery deadlines. "More than 50 percent of all problems can be solved on the phone. ARBURG documents everything seamlessly. I only have to specify the machine number and all the relevant information is available immediately," explains Andreas Buff.

The innovative family-run business plans to expand its production areas and has already identified its forthcoming projects. Whereas, to date, the emphasis has been on producing high-quality two-component parts, a three-component

A six-axis robot removes the dental drill in the clean room and transfers it to the packaging system (large illustration). To ensure the correct packaging position, Andreas Buff developed a special gripper solution (small illustration) and programmed the robotic system himself.

application for the hearing aid sector is currently under consideration.

### INFOBOX

**Founded:** 1992 by Adolf Pfaff  
**Location:** Waldkirch, Germany  
**Production area:** approx. 800 m<sup>2</sup>  
**Employees:** 20  
**Products:** High-quality technical parts for the drinking water industry as well as for the medical technology, optics, electronics and automotive industries  
**Contact:** www.pfaffgmbh.com



Further information



# Shorter downtimes – greater efficiency

## Optimised set-up times: Identifying and exploiting potential

**E**nhancing production efficiency, e.g. by reducing downtimes, is a recurring topic for ARBURG in its own production operations. Because several different small batches a day are produced on some machines, the optimisation of set-up processes has been the subject of 14 workshops over the past year. The results are impressive: through simple measures for the most part, set-up times have been reduced by between 10 and 50 percent. A valuable tool here has proven to be video analysis.

ARBURG has set itself the objective of reducing work-in-progress inventories and achieving optimum machine utilisation, while also producing parts in a short time. The production batches have consequently become smaller and set-up has to be performed more frequently – several times a day on some machines.

ARBURG's first priority was therefore to optimise and redesign its set-up processes. When it comes to placing orders, both internally and externally, the company always measures itself against external providers. Wherever the impression arises that something can be achieved more quickly and inexpensively, or where a work area can be designed more ergonomically, the new video-analysis tool is now used.



**Thorsten Schmid,  
Production Planner**

I see a huge potential that can be exploited here. Time savings of at least ten percent are always possible.

The important thing is to examine all the work sequences in detail following the video analysis and to discuss them in detail.

One of the first workshops was held at the M 70 lathe/milling machine, on which piston rods and guide cylinders for injection moulding machines are machined.

### Set-up times halved

During video analysis it soon became clear that the operator had to turn about his own axis once for each cutter change at a total of 36 magazine places. In a group project, the processes were then improved. The radius of action has now been reduced and an identifying magnetic number has been attached to each cutter, which dispenses with the use of a process sheet. This example shows: thanks to a few cost-effective meas-



**Mike Dieroff  
operator**

When you do the same work every day, it's hard to see what could be done better.

I think it's great that colleagues still come up with suggestions for improvements long after the workshop. The subject has remained in our minds.

A filmed record of movements (illustration above) makes clear what set-up operations can be improved on.

ures, set-up times have now been halved from 60 to 30 minutes. Assembly and Electrical Production are currently also being analysed. Here, significant potential for increased production efficiency is also likely and the associated changes will be consistently implemented in future.

# Forgeries clear

## Polysecure: Special marker identifies genuine



Photos: Polysecure

**Every year, product piracy causes financial losses to the tune of billions. And the trend is upwards. Essentially, it is both the manufacturers, as well as their customers and ultimately the consumer who suffer. Counterfeit-proof product identification is therefore recommendable.**

For many years now, ARBURG has concerned itself with the topic of piracy protection, because machine manufacturers also have to deal with fake parts. The VDMA estimates the losses for the German machine and plant construction sector at 7.9 billion euros annually. At 91 percent, the plastics and rubber processing machine segment is one of the most severely affected.

Against this backdrop, the counterfeit-proof authenticity verification provided by Polysecure GmbH, Freiburg, a developer and manufacturer of special product markers, comes at just the right time. The co-operation began at the K 2010. The two companies are united by the goal of directly marking genuine products with

permanent security elements for the duration of their service life and beyond.

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### **Polysecure offers innovative, practical, counterfeit-proof markers**

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Polysecure develops and produces material markers which are added to the base material of a product, "implanting" certain security elements into each individual product. The markers are made from a crystalline and/or ceramic powder with a particle size in the micro or nano range, which is homogeneously incorporated into the material being marked – comparable to a master batch. Each particle has a complex composition and contains all the marker information. Consequently, the fraction of a material sample is sufficient for failsafe identification.

In terms of the security elements, depending on the marker system, a characteristic fluorescence is used, which represents an individual chemical product code comparable to DNA or a structural fingerprint. This is the result

of random process details and cannot be copied by any means.

The optical fluorescence is generated by means of LEDs or small laser pointers and is visible to the naked eye. The characteristic fluorescence can then be quickly and unambiguously identified using a small optical detector. Finally, the product code is read out by means of an x-ray spectrometer, which is the size of an electric drill.

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### **Injection moulding – not a problem**

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Because the markers are chemically inert, insoluble and temperature-stable up to 2,000°C, practically all materials can be marked. Moreover, ceramic markers are completely non-toxic, bio-compatible and environmentally harmless.

For the purpose of injection moulding, Polysecure adds the marker powder to a dye master batch, for example. Owing to the low proportion of this powder in the material, neither its physical, nor its chemical properties are impaired. In plastics, the concentration used ranges from

# rly detectable

## parts



The security element "fluorescence" can be optically detected. Thanks to the marker, genuine products can be unambiguously identified (illustrations from left to right above).

approximately 50 to 1,000 ppm and is therefore significantly lower than, for example, that for colour pigments. Due to the manufacturing process, the particle sizes and shapes are randomly determined. Consequently, a marker can never be identically reproduced – not even by Polysecure. Furthermore, any "copied" marker mixture can be identified by means of analytical procedures and differentiated from the genuine markers, which counts as legally watertight proof of genuineness.

### OBO Bettermann: a satisfied user

OBO Bettermann GmbH & Co. KG, Menden, Germany, has concerned itself with counterfeit-proof markers for the past two years. This was due to a fire caused by a forged, faulty overvoltage protection switch, which resulted in the company facing claims for damages.

For this reason, OBO has been using the markers as proof of genuineness.

The company's products include components for overvoltage protection made from marked plastics (PA and PBT). For this purpose, OBO procures a "marker master batch" from Polysecure. OBO then injection moulds the parts, adding the marker master batch.

"We manufacture our products," says Matthias Gerstberger, Head of Innovation and Marketing at the electrical and facility management equipment manufacturer, "on hydraulic 370 S, 470 S, 420 C, 470 C and 520 C ALLROUNDERS. Of the around 60 injection moulding machines, about half are from ARBURG."

Polysecure has now presented the effective product identification principle in co-operation with ARBURG at numerous trade fairs, including this year's Hannover trade fair and the Motek. Here, Polysecure demonstrated the marker technology and its detection jointly with the company WMV-Robotics, based in Gomaringen, Germany. In conjunction with the appropriate software, a robot sorted marked from unmarked moulded parts provided by ARBURG at high speed.



The components of this overvoltage protector are made from a marked plastic in order to unambiguously prove its genuineness.

### INFOBOX

**Founded:** Polysecure was founded in 2009 by Managing Partners Dr. Thomas Baque and Jochen Moesslein, together with an investor, as a start-up for the development and production of ceramic and optical marker powders.

**Location:** Freiburg, Germany

**Employees:** seven permanent employees and freelancers

**Surface area:** 700 m<sup>2</sup> of laboratory and production areas, expansion plans to double production

**Customers:** Electrical, sanitary, dental, aviation and musical instruments are most important sectors

**Contact:** [www.polysecure.eu](http://www.polysecure.eu)

# Automation requirements rising world-wide

## Project competence: ARBURG strengthens decentralised structures

**D**emand for automation solutions for efficient and cost-effective injection moulding is growing world-wide. As a rule, ARBURG designs turnkey systems centrally at its German headquarters in Lossburg. However, the company's subsidiaries are also increasingly offering production cells tailored to their specific markets.

"Our project team has extensive expertise in automation technology," explains Oliver Giesen, Department Manager, Projects, "but our colleagues in the world-wide subsidiaries are closer to their customers and know the specific requirements of their markets in detail. That's why ARBURG intends to strengthen its project competence in a decentralised manner.

### ARBURG even closer to its customers

Locally designed and implemented automation solutions offer customers a number of benefits: language barriers fall away and lead times are shortened in the case of enquiries, thanks to the geographical proximity. Pre and after sales activities are also easier when the Service specialist of a partner company or a component being replaced comes from the same country. Moreover, there can be price advantages during the procurement of peripherals.

The share of automated injection moulding solutions is still in the single-digit percentage range. For many sales companies, however, this is sufficient reason to prepare for future demands.



Oliver Giesen (right), Department Manager, Projects, sees advantages in providing automation solutions on a decentralised basis. The Czech subsidiary, for example, supplies its own mobile robotic system (above).



### Cost-effective solutions required

Turnkey solutions are not only needed in high-wage countries and countries in which the use of high-end injection technology is widespread. "In China too, wages are rising, as is demand for cost-effective production cells," says, for example, Toni Tong, Managing Director of ARBURG Shanghai. "In the next two years, we intend, jointly with local suppliers and contractual partners, to enter the market for IML applications and medical syringe barrels, among others."

Highly trained project engineers as central contacts for all automation matters are also employed in many ARBURG subsidiaries.



# Tailored

## Active Spare Parts Management: Now also in Europe

**I**ndividual consulting, a high level of spare part quality and availability with a fair price/performance ratio, as well as customised maintenance and expendable parts packages – this is what, since 2003, ARBURG means when it comes to its Active Spare Parts Management (ASM) in Germany. Following intensive training of the Service personnel from the European subsidiaries, all our customers in Europe can now enjoy this comprehensive service – world-wide rollout will then follow.

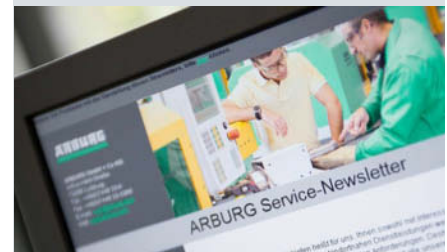
“The main aim of Active Spare Part Management is to explain to customers the benefits of genuine ARBURG spare parts and thereby enable regular contact between our service personnel and the customers. With spare and wearing parts directly from the manufacturer, our injection moulders are always also purchasing consulting, quality and a functional guarantee,” explain Peter Müller and Wolfgang Umbrecht as specialists for repairs and spare parts regarding the ASM service. “We are also able to reduce downtimes and therefore costs through proactive planning and preventive maintenance. This, in turn, has an immediate effect on production efficiency. The equation for preventive maintenance and appropriate part supply to the relevant company is very simple: only when all the ALLROUNDERS are working smoothly can maximum quality be produced at minimum unit cost.”

### Individual consulting essential

Consulting and selection of the components are always carried out on an individual basis as a function of the machines used and the materials being processed. In order to minimise downtimes, the Service specialists can also put together inexpensive maintenance and wearing parts packages for their customers, which are tailored to the relevant machine fleet. High spare part availability is ensured through efficient production and logistics between the ARBURG parent factory and the subsidiaries. Machine maintenance and repairs with all the advantages of Active Spare Parts Managements throughout Europe – this is the direction in which the ARBURG Service offerings will develop throughout Europe and then internationally in the medium term.

Service employees from the European subsidiaries get clued up on Active Spare Parts Management.

## ARBURG Service Newsletter



The Service Newsletter, which has now been published in German for around three years, with interesting information, e.g. on the topics of maintenance, repairs and spare parts, will be available in an English version with immediate effect. Interested parties can subscribe to the German or English version on our website at ([www.arburg.com/de/globale-dienstleistungen/support/technischer-service/service-newsletter-abo](http://www.arburg.com/de/globale-dienstleistungen/support/technischer-service/service-newsletter-abo)). Or, simply use the QR code.



Service  
Newsletter

# High-end tubs from

## Maksima: IML system extends product range, increases automati

**L**ithuanian company Maksima is by his own admission the leading producer of packaging items in the Baltic. For his high-end production, owner Valdas Matulis values fast cycles, high precision and reliability. He is delighted that, "ARBURG, together with Hofstetter, can offer us all of this, as the IML production cell commissioned in 2011 demonstrates."

In 2012, Lithuanian company Maksima, which mainly produces thin-walled containers, is celebrating its 20th anniversary. In keeping with the company's slogan "Path to success", production has been consistently quality-oriented from

the very outset. Valdas Matulis explains a central element of the Maksima philosophy: "The reliable production of high-end parts for our customers." Maksima is consequently certified for the production of packaging articles according to ISO 9001 and has since 2011 been working according to the British Retail Consortium (BRC) standards for packaging products, which primarily cover the areas of quality, hygiene and product safety.

### Co-operation with leading technology providers

In order to meet these high standards, Maksima works together with the leading technology providers in the injection moulding sector. Consequently, most of their moulds are made by Otto Hofstetter AG in Switzerland, with which the company has had an excellent and long-standing working relationship.

The co-operation be-

tween Maksima and ARBURG dates back to 2000, when the first of now eight ALLROUNDER injection moulding machines was purchased. This also includes the high-performance ALLROUNDER 570H hybrid machine, which is integrated in a complete IML production cell. The tub mould used here, as well as the attached robotic system for label handling, part removal and set-down were supplied by Hofstetter.

### Six tubs in only 3.5 seconds

Speed, functional reliability and cost-efficiency – these are key features that form the main focus of this application. The tubs are produced in a six-cavity mould. The special packaging version ALLROUNDER 570 H with a clamping force of 2,000 kN and size 1300 injection unit is characterised by short cycle times of around 3.5 seconds and a high production capacity of about 32 kilograms per hour.

The labels are first picked up by the robotic system using vacuum, electrostatically charged, and then placed directly in the mould. The thin-walled tubs are then injection moulded, removed by the robotic system and set down on a conveyor belt.

Time savings are achieved during production through fast-running peripheral



The IML-system has allowed Maksima to expand its product range (illustration on left).





# Lithuania

## on level and enhances efficiency

sequences and short injection cycles, but also through simultaneous part removal and label insertion. The system is efficient throughout with regard to operating costs, as the IML robotic system features an energy-saving pneumatics concept, which significantly reduces compressed air consumption. Integration in the SELOGICA machine control system makes operation of the entire system reliable and convenient.



Photo: Maksima

### Temperature-stable and water-proof: 120 millilitre container

The high-quality 120 ml containers made from high-grade transparent PP are fitted with a water-proof lid and feature good temperature stability. Most of production involves food packaging and the system makes it easy to produce individual labels for the various customers.

### Efficiency into the future

“With the IML system from ARBURG, we have extended our product range and increased the degree of automation in order to produce competitively,” says Valdas

65 percent of Maksima’s products are thin-walled containers with the corresponding lids (large illustrations above). Valdas Matulis (small illustration above) can well imagine that, “ARBURG will be a central partner for thin-walled IML technology in the future.”

Matulis, who is very clear on the direction his company is to take in the future. “Our aim is to establish ourselves as a reliable manufacturer of technically complex products and thin-walled articles, initially throughout Europe and then worldwide. This requires us to produce cost-effectively and to push forward with automation. This is no doubt what we will do with ARBURG as our partner for machines.”

### INFOBOX



**Founded:** 1992 by Valdas Matulis and Arturas Shalkauskas, who passed away in 1999  
**Location:** Kaunas, Lithuania  
**Employees:** 92  
**Products:** 65 percent thin-walled containers and 35 percent closures and technical items  
**Markets:** approx. 50 percent eastern Europe and Russia, expansion to western countries planned  
**Contact:** www.maksima.lt



## TECH TALK

Oliver Schäfer BA, Technical Information

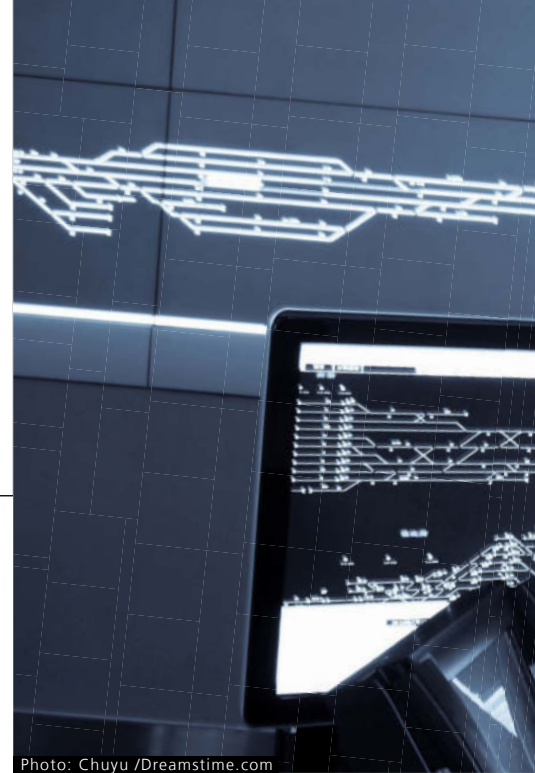


Photo: Chuyu / Dreamstime.com

# Always on target

## Sub-sequences: SELOGICA function simplifies mould handling

**A**nyone who uses complex and often expensive moulds wants to be able to handle these in the simplest and safest way possible. For this purpose, the “Sub-sequences” function of the SELOGICA control system offers a practical solution which gives machine operators the certainty of doing nothing wrong. Especially when it matters: in stressful situations such as restarting after interruptions or malfunctions. But what exactly is behind this function?

Fundamentally, a sub-sequence works like a sort of “automatic” during manual and set-up operation. Based on the machine production sequence, the individual steps to be performed can be freely combined. Regardless of their position and function. This applies, e.g. to intermediate stopping as well as monitoring functions for the machine, mould and peripheral signals. The creation of a sub-sequence is extremely simple to perform by highlighting parts of the production sequence.

### Four sub-sequences individually configurable

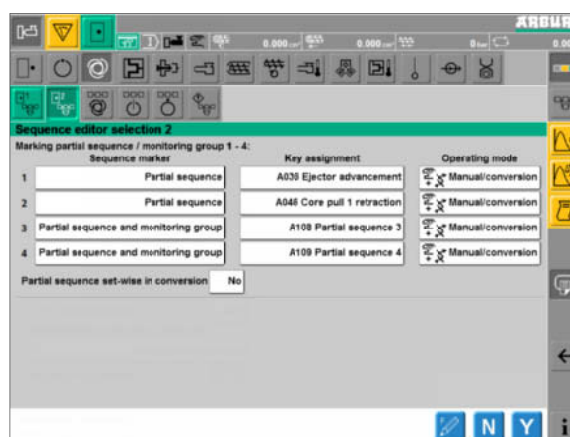
A total of four different “automatic sequences” can be created to form one production sequence. These are stored in the data record. Individual settings options are also available for each of the sequences (see illustration below).

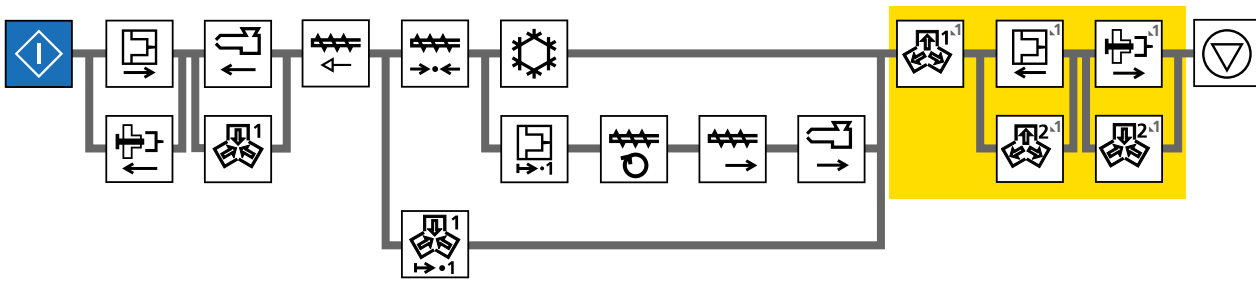
First, it can be defined whether complete machine monitoring is to be active for the sub-sequence or whether it only monitors itself. It may, for example, make sense, in the case of functions such as

wire or strip feeds, to have them run independently of the mould.

A further interesting option is assignment of a sub-sequence to a freely selectable key of the SELOGICA control panel. If, for example, the ejector must never move in isolation, but always together with a slider in the mould, the “advance ejector” and “retract ejector” keys can be assigned the relevant movement combinations. Collisions in the mould through the inadvertent pressing of keys are thus prevented.

Finally, the operating mode for the sub-sequence can also be set. During manual operation, the relevant sequence only runs when the key is pressed. During set-up operation, it is only necessary to press the start button and the complete sequence is run through. For test purposes, it is also alternatively possible to run a sequence step-by-step.





### Efficient working thanks to sub-sequences

In essence, the SELOGICA "Sub-sequences" function is recommendable for all moulds with core pulls. This allows malfunctions to be rectified much more easily, more reliably and also faster. All the functions can be executed with the mould closed, without the individual monitoring systems having to be first deactivated and then reactivated again. All that then needs to be considered and determined with the sub-sequence is how a mould is opened without causing collisions. During everyday production, this can significantly facilitate the machine operator's task.

A further advantage is that production sequences such as "eject finished parts"

can also be performed at the touch of a key during manual operation. This helps, for example during machine start-up and contributes to a smooth production start. Moreover, certain functions are only made possible by means of sub-sequences during manual operation. In addition to the ejector and core pulls, this also includes the air blast function and peripherals. A good example is retraction of a brush device in the mould while the brush is rotating. All in all, sub-sequences represent a useful aid for performing a wide variety of tasks even more efficiently.

Up to four sub-sequences can be individually set (diagram opposite). The required steps for the "automatic sequences" can simply be grouped by highlighting parts of the production sequence (diagram above).



**The broad perspective is what counts!** For your production efficiency – and for our product range. That's why our large ALLROUNDER S machines are also available with servo-hydraulic drives. The right offer for every customer requirement. ARBURG for efficient injection moulding.



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