

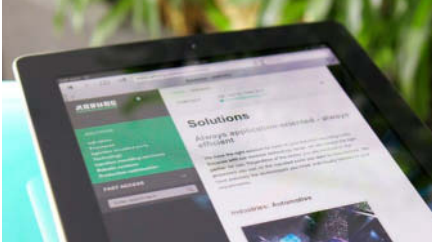
today

The ARBURG magazine

Issue 49

2012





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MASTHEAD

today, the ARBURG magazine, issue 49/2012

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Responsible: Dr. Christoph Schumacher

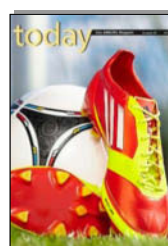
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ARBURG is always on the ball and will also be present at the European Football Championship 2012. This is thanks to framas Kunststofftechnik GmbH, which uses a three-component rotary table machine from ARBURG for the development of functional components used in football boots.

ARBURG



Dear Readers,

This edition of "today" is about perfect strikes, for example at the European Football Championship 2012. Find out how ARBURG is contributing (at least indirectly) to the goals at the Euros in the report from page 14 onwards.

We have also landed another perfect strike as a pioneer in the overarching topic of production efficiency, which we have placed at the centre of all our activities. This was evidenced by the exceptional response to the Technology Days in March 2012, where we showcased the relevant innovations, applications and optimisation potentials. On pages 6 and 12, you can read about enhancing the cost-effectiveness of your moulded part production with innovative inline printing technology or the new twin-screw INJESTER. The fact that new capital investments are not necessarily required for this purpose, but that existing processes can also be im-

proved, is demonstrated on page 13, based on the example of the SELOGICA control system. Our Tech Talk feature provides you with important tips on the essentials of energy measurement.

In our customer and project reports, you will also frequently encounter the topic of production efficiency and no doubt pick up some valuable ideas for your injection moulding production. As always when discussing such important topics for the future, our commitment goes far beyond our primary business activities, for example in the context of the VDMA Blue Competence initiative, the goals of which are detailed on page 20.

I hope you enjoy reading the new issue.

Michael Grandt
Managing Director Finance and Controlling

Showcas

URG

SOLUTIONS

- Industries
- Processes
- Injection moulded parts
- Technology
- Injection moulding machines
- Robotic systems
- Production optimisation

FAST ACCESS

Enter search terms

Solutions

Always application-oriented - always efficient

We have the right solution for each of your injection moulding processes. Because with our modular technology range, we are always the right partner for you. Regardless of the sector you are involved in, the processes you use, or the moulded parts you want to manufacture. We have precisely the technologies you need: individually tailored to your requirements.

Industries: Automotive



The product components for the automotive sector are made with precision and reliability. Our modular technology range offers the right solution for your specific requirements. We have precisely the technologies you need: individually tailored to your requirements.

Industries: Automotive

e to the world

New ARBURG website: customer-oriented, solution-based, country-specific

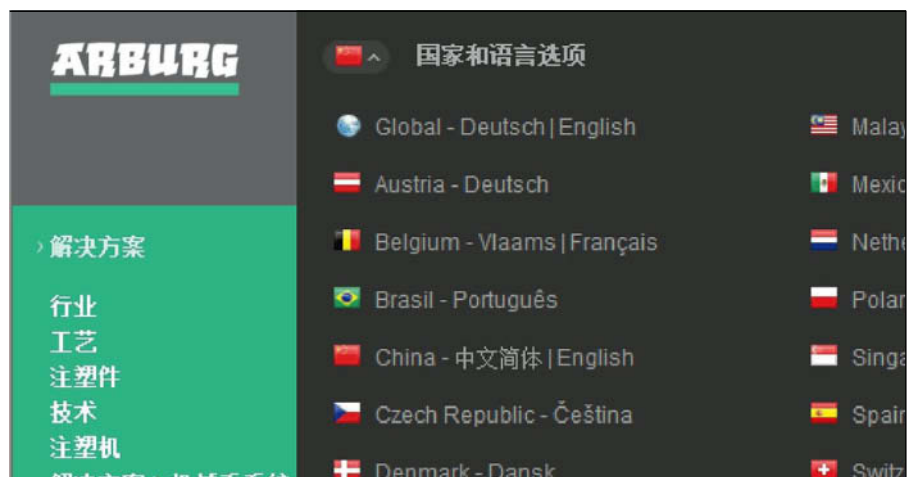
In May 2012, ARBURG introduced a website that is certain to point the way for the capital goods market. How do I produce a particular moulded part? What advantages do the various processes, machines and turnkey concepts offer? At what locations is ARBURG represented, where do training courses take place and who is my contact? At "www.arburg.com", you can quickly find precisely the information you need from an up-to-date source.

International

You can select between numerous countries and a total of 14 languages. In addition to comprehensive information on our range of offerings and the company, you also receive country-specific content in your national language, as well as the relevant contacts for the various topics.

Up-to-date

On the homepage and in the Company area, you will find current news, job offers and the latest edition of ARBURG's "today" customer magazine. Furthermore, we continuously update the Solutions area, for example with new practical examples and products.



Mobility

Enter into the world of ARBURG: impressive video footage illustrates our activities. The underlying technology also meets the latest standards. So-called responsive design ensures optimum display on PCs, notebooks and TVs, as well as on iPads and smartphones.

Media Centre

In addition to numerous brochures and all the 'today' issues, images are available for download from the new Media Centre. Or perhaps you would like to view a

The new ARBURG website is now also suitable for mobile devices (left). On the homepage, the country and language can be freely selected next to the symbols (above).

video about ARBURG, our service offerings and moulded part production? Why not take a look?



Further information



New dimensions

Co-operation with FPT Robotik: digital printing

In order to enhance production efficiency, the process integration of upstream and downstream production steps is gaining importance in the effort to produce parts cost-effectively – even as batch sizes get smaller and product types change with increasing frequency. This explains the need for flexible systems and components that enable new challenges to be met promptly. ARBURG and FPT Robotik presented an example of this to the international trade public for the first time at the Technology Days 2012: inline printing.

The so-called InkBOT process from FPT Robotik (www.fpt.de) combines digital printing and robotics. Thanks to high-precision robotic system kinematics and improvements in the print heads supplied by the inkjet industry, the inline printing system makes it possible to exploit the benefits of digital printing in the high-speed sector in industrial production processes for the first time. Unlike conventional processes such as screen and pad printing, the digital process also allows fast, flexible, borderless and individual printing, even on curved plastic parts. The height difference can be up to six millimetres. The print resolution is 600 dpi, with an accuracy of within two pixels per inch. Once the print data is available, the motif can be changed quickly, enabling customised one-off products to be manufactured in an ongoing process.

This innovative technology not only opens up new areas of application, but can also reduce the time required to introduce a product with a new motif from several months to a few hours (time-to-market). Beyond the plastics sector, the InkBOT process can also be used for glass, aluminium or ceramic parts.

Inline printing increases production efficiency

At the Technology Days, inline printing was a real highlight in process integration. The production cell presented consists of an electric ALLROUNDER 370 E, a six-axis robotic system and the inline printing system. Individual name plates, for example, can be produced from polystyrene in a cycle time of around 20 seconds. The EDRIVE-series injection moulding machine features a clamping force of 600 kN

and a size 170 injection unit. The ALLROUNDER operates with a 2+2 cavity mould to produce two curved moulded parts and the appropriate fasteners per cycle. The entire handling of the moulded part is dealt with by a six-axis robotic system, which features a high level of flexibility and is offered by ARBURG as a special solution. The SELOGICA user interface is implemented on the control system, so that the operator can program the robotic system independently. Moreover, the robotic system is directly linked to the machine control system. Online communication extends far beyond the EUROMAP inter-

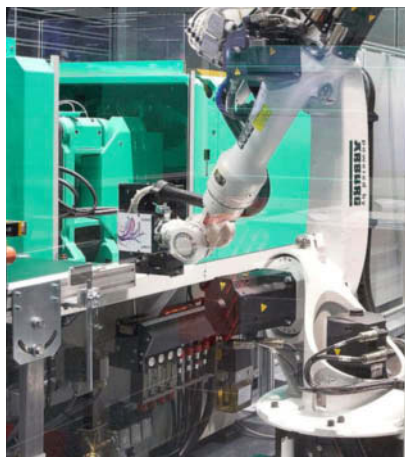
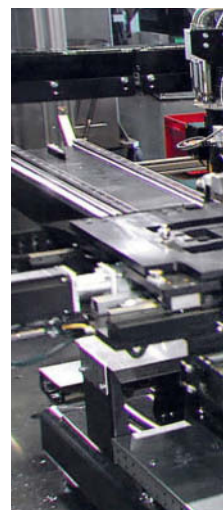


Photo: morlock-fotografie.de



ons

ting for individualised curved plastic parts



The production of individualised name plates (top) demonstrates the potential of inline printing.

The production cell (bottom) comprises an ALLROUNDER 370 E, a six-axis robotic system and the inline printing system (left), the individual stations (centre) each of which can be individually combined in accordance with the production requirements.

for the plastic parts means that injection moulders can increase their added value and respond quickly to new decoration requirements in order to gain a competitive edge.

face and offers functions such as the synchronisation of movements and simplified machine start-up.

From moulded parts to printed name plates

The gripper of the robotic system features a floating bearing, enabling parts to be removed from the mould with precision and transferred for further processing. An intermediate turning station is provided so that the six-axis robotic system can feed the name plates to the printing system in the correct position. The two moulded parts are then positioned one behind the other, so that each can be individually printed. The speed of the printing unit in this application is 50 m/min and maximum speeds of 100 m/min can be achieved.

In order to achieve flawless printing results, the first step is the plasma pre-treatment of the moulded parts before a so-called primer is applied and dried using UV light. Each moulded part is then individually printed in a four-colour digital printing process and dried again with UV light. Two finished name plates with different motifs are produced every 20 seconds in this manner. Further downstream production processes, such as assembly, packaging or quality assurance could also be easily integrated.

This turnkey system thus represents an impressive example of production efficiency as process integration enables customised moulded parts to be produced fully automatically in a single step. The integrated finishing process



Further information

Steppin where

Ernst Rittinghaus Gmb

For Ernst Rittinghaus GmbH, moulded parts meeting requirements far beyond the standard are nothing unusual. Specialities include products made from high-temperature plastics, laboratory consumables in high unit volumes, or complex precision parts such as cogwheels. Not only is the entire value-added chain covered during production, great emphasis is also placed on production efficiency – as is the case with ARBURG. It therefore comes as no great surprise that the two companies have been working together successfully for decades.

“We step in where others give up,” says Bernd Rittinghaus, commenting in general on the business activities of the German, Halver-based family-owned company, which he runs together with his father Dieter. “Our customers get everything from a single source: from professional consulting during the planning stage and high-end production, through to fast and flexible supply of the products.” In addition to injection moulding, the core competencies of the supplier, which produces in three shifts



Photos: Christian Nielinger

g in others give up

H: continuous capital investments enhance quality and efficiency

(two unmanned), include mould construction, which represents “the basis for manufacturing high-precision products,” as Bernd Rittinghaus explains. “All our expertise in mould technology, materials and injection moulding is exploited in mould construction.” The company specialises in highly wear-resistant and consequently low-maintenance moulds for sophisticated applications with complex geometries, a large number of cavities and short cycle times.

Investments enhance quality and sustainability

Rittinghaus invests between five and ten percent of its annual turnover in continuously enhancing quality and sustainability in production. The focus is on reducing energy requirements, optimising cycle times and increasing the level of automation.

One interesting example of forward-looking development was the capital investment in the first electric ALLROUNDER A in 2006. In fact, an order for a hydraulic machine had already been agreed when Dieter Rittinghaus began to ponder over this decision: “Without experience in electric machines, my gut feeling told me that their advantages such as speed, cleanliness and efficiency could be exploited

in order to enhance the cost-effectiveness of our production.” However, he was unwilling to merely decide on a hunch. The mould in question was therefore immediately dispatched to Lossburg for testing on an electric and a hydraulic machine. Here, it clearly became evident that Dieter Rittinghaus had assessed the saving potential correctly.

Electric machine saves around 35 percent of costs

With a cycle time of 6.8 seconds, the electric ALLROUNDER 320 A was 1.5 seconds faster than the hydraulic model. In conjunction with the lower energy consumption, this cycle time reduction resulted in a cost saving of 35 percent. No question, therefore, that the electric injection moulding machine was ordered, which was amortised after about 20 months with this application.

In order to produce consumables for bi-molecular analysis under clean-room conditions, the machine was also equipped with a clean-room module featuring



No challenge is too great for Dieter and Bernd Rittinghaus (above, l to r).

The reliable production and supply of complex products such as high-precision cogwheels (left) is ensured by the ARBURG host computer system (bottom left).

ionisation, etc. Today, all the ultra-clean products are manufactured exclusively on electric ALLDRIVE and EDRIVE series ALLROUNDERS, which account for around a third of the machine fleet.

The ARBURG host computer system, which Rittinghaus has used to monitor and plan its entire production since 1996, along with automation of the machines, which it has progressively implemented



The electric ALLROUNDER 320 A is docked to the clean room (left). The 16-cavity mould (below left) for the production of collecting tubes (below right) is made by Rittinghaus.

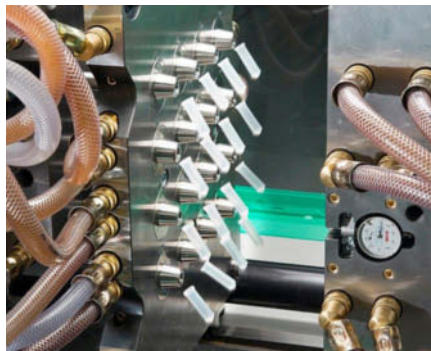
since 1994, also contribute to efficient moulded part production.

One example is the manufacture of so-called "collecting tubes" made from medically approved PP, which are produced in a cycle time of 5.8 seconds on the ALLROUNDER 320 A before being automatically packaged into PE bags in defined unit numbers. The 16-cavity mould built in the company's own mould shop and operates with servo-electrically driven needle shut-off valves controlled via SELOGICA. The same applies to all the packaging peripherals.

For applications featuring moulded part removal, the benefits of the ARBURG robotic systems are much appreciated as these are fully integrated in the machine control system. "What's more, we'll favour joint project planning with ARBURG for complete automation solutions in the future," say the two Managing Directors, who are highly satisfied with their first production cell, built around an electric ALLROUNDER 520 E.

Clean room production extends portfolio

A further example for the consistent further development and close co-operation with ARBURG is the planning and design of a clean-room production facility, which was commissioned in 2011.



"After manufacturing products for decades under ultra-clean conditions, this was a natural extension to our portfolio," says Bernd Rittinghaus. The company thus now boasts a GMP-compliant clean room production facility meeting DIN ISO 14644 Class 7 for the manufacture of contamination-sensitive moulded parts. The fully-electric ALLROUNDERS are docked to the decentralised clean room and, along with the clean-room-optimised mould technology, meet the high requirements for medical technology, a sector which the company intends to focus on more intensively in the future.

INFOBOX

- Founded:** 1956 by Ernst Rittinghaus
- Location:** Halver, Germany
- Production:** approx. 3,000 m²
- Employees:** 11
- Turnover:** approx. 2 million euros (2011), continuously increasing by approx. 5 percent annually
- Machine fleet:** 23 ALLROUNDERS with clamping forces from 150 to 1,500 kN
- Products:** moulded parts weighing from 0.04 to 300 grams for the sanitary, dental, engineering, sensor, heating, electrical, life sciences and medical technology sectors
- Contact:** www.rittinghaus-gmbh.de

Know-how for all

ARBURG customer training courses: high, uniform standard worldwide

When an internationally-operating injection moulding company wishes its operators in Hungary to have the same level of knowledge as those in China, for example, it can achieve this problem-free with our training course system." This is how Uwe Klumpp from Product Training at ARBURG explains the advantages of having identical content in its customer training activities worldwide. The advantages are clear: identical training courses around the globe result in uniform knowledge of the machine operators worldwide and therefore globally standardised production and quality standards.



Today, all the ARBURG subsidiaries participate in this uniform training system. Over a period of two years, it is not only the course content and course schedules, but also the course attendance confirmations, certificates, as well as the administration and equipment for the courses that have been standardised. In terms of the current machine series, the content of the basic courses, machine setting courses, intensive practical courses and service courses are identical. "The course offerings," adds Uwe Klumpp, "are of course tailored to the highest-selling machines and the frequency of the course sessions is based on the staffing levels at the individual subsidiaries. Individual training courses can of course also be arranged. The content is then tailored to our customer's particular needs. Further information is available on the Internet at www.arburg.com."



In-depth training for instructors

The course instructors receive professional training either at the Lossburg headquarters or in the subsidiaries themselves. Training courses in methodology and didactics are also provided. This ensures that the specialists are always up to date in technical terms. Of course, demand for standardised training courses was initially driven by large international customers, who wanted to ensure that their operators had the same level of knowledge at all their locations. Today, the excellent course offerings are also required locally by small and medium-sized companies in order to fully exploit all the possibilities offered by the ALLROUNDER machines. The great advantage for users of this overarching training system, how-

The focus of all ARBURG training courses is on practical matters (above). The certificate indicates the level of know-how available to the participant after completion of the course (below).

ever, is clearly that they can precisely document to their customers that their operators possess a unified level of knowledge and, consequently, extensive expertise for reproducible, reliable, high-quality production upon which they can rely.



The multi-talent

Twin-screw INJESTER: specially for high-viscosity materials

High flexibility and availability are significant features of efficient moulded part production. These requirements are all met by the servo-electrically driven twin-screw INJESTER, which ARBURG first prevented at the Technology Days 2012. Its benefits include the processing of an extremely broad range of high-viscosity and paste-like compounds, such as moist polyester (BMC), solid silicone (HTC) and wax, as well as simple and fast cleaning. This results in shorter set-up and downtimes and therefore much greater cost efficiency.

High-viscosity and paste-like compounds make very high demands on material preparation and feeding. In order to ensure a high level of process reliability and part quality, the material must be supplied continuously, free of bubbles and at a constant pressure. ARBURG has developed the twin-screw INJESTER for this purpose. It operates with two servo-electrically driven screws to feed the material at a regulated, even and gentle rate to the injection unit. It is also possible to refill the material with ease during the process.

Wide range of materials and short downtimes

Thanks to the liquid temperature control, the continuously programmable servo drive and pressure-regulated material feed, the twin-screw INJESTER can be used for a very wide range of materials: highly sensitive materials can be cooled and high-viscosity materials can be heated to improve processability. Thus, for example, in the case of BMC with a high filler content, it is crucial that the fibres should not be broken, while wax makes very stringent demands in terms of a constant processing temperature. During the injection moulding of HTC, the material used is often not standard, but produced on an individual basis according to the product requirements. As well as representing a challenge in processing terms, this also results in frequent material changes.


One great advantage with the twin-screw INJESTER is that it is very quick and easy to clean. The significantly shorter setup and downtimes, in conjunction with the high process reliability, lead to a high level of cost-efficiency in production.

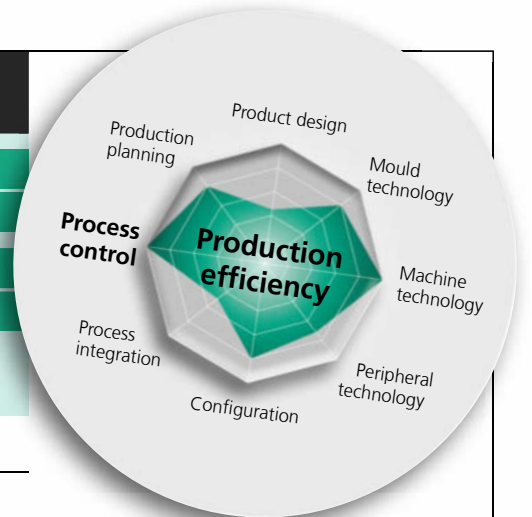


Because both screws (above) can be cleaned quickly and easily (centre), downtimes are reduced significantly.

Optimisation is worthwhile

SELOGICA: shortening cycle times, reducing unit costs

Stacking box 1-cavity 	EUROMAP 67	Integrated MULTILIFT
Cycle time [s]	23,00	20,98
Cycle time reduction [%]		9
Parts produced per year*	769.575	843.672
Increased productivity		74.097
* Basis for calculation: 288 working days per year, 22 operating hours per day, 80 percent availability, 3 percent reject parts.		



In comparison with a robotic system connected via EUROMAP 67, productivity can be increased significantly with the MULTILIFT integrated in the SELOGICA control system.

Even the best injection moulding technology only works as well as its settings permit. This applies to the quality of the moulded parts, as well as to process stability and cycle times. The process control system is thus an important element when it comes to producing efficiently and reducing unit costs. Tangible benefits can be achieved through optimal use of the central SELOGICA control system.

The standard range of SELOGICA functions offers a number of production optimisation features. These include, for example, the simple graphic representation of even complex sequences. The risk of programming errors is virtually excluded thanks to an immediate automatic plausibility check that runs simultaneously to creation of the sequences.

In a second step, peripherals and robotic systems can also be seamlessly integrated into the control system with the appropriate symbols. Robotic systems are treated like an additional machine axis and can be configured for perfect removal operations in accordance with the relevant application.

Optimisation options for robotic systems

Just what can be accomplished in terms of process optimisation is demonstrated by cycle time reductions achieved thanks to simultaneous and stroke-dependent movements. In comparison with serial robotic sequences, for example, synchronisation of ejector and X-axis, starting of Y-axis upon mould opening and movement of the ejector to an intermediate stop are possible. If the X-axis is moved synchronously, i.e. actively to the ejector, it automatically moves at the same speed as the ejector. Consequently, the pneumatic removal stroke of the gripper can be dispensed with. This is rendered more cost-effective and compact overall and the mould stroke can be shortened through the smaller gripper. This function is thus ideal for long and complex parts.

If the Y-axis already starts during opening of the mould, it is always secured, ensuring optimal mould entry.

If, finally, the ejector is moved to an intermediate stop, demoulding can begin as soon as the mould opens, resulting in cycle time savings due to the resulting shorter demoulding stroke.

Stacking box illustrates savings potential

The production of a stacking box clearly illustrates the savings potential (see diagram): if all the options that can be implemented via programming of SELOGICA are utilised, cycle time reductions of over 2 seconds can be achieved on 20.98 seconds. Productivity is consequently increased by 74,097 to 843,672 units. And these improvements only relate to the process control slice of the production optimisation pie. Ultimately, what always counts is the economic success of a company: SELOGICA contributes to this due to the possibilities it offers for central control and optimisation of machine sequences.





Euro g from Pi

framas Kunststofftech

Milan or Madrid – as long as it's Italy! This famous quote from German footballer Andy Möller with its geographically misguided choice of clubs couldn't have been made regarding the development of football boots. The high-performance functional components for the current and future footwear of amateurs and professionals alike all come from Pirmasens in Germany, from framas Kunststofftechnik GmbH. The high-end components are also produced on ALLROUNDER injection moulding machines.

Technical Director at framas Steffen Bossert's response to questions regarding use of the plastic parts in the current boots for the European Football Championship 2012 is laid back: "We don't have any

Goal threat comes from Pirmasens

framas GmbH: functional components for football boots



Some state-of-the-art football boots are made almost completely from plastic. framas produces the relevant high-performance components using ALLROUNDER injection moulding technology.

tion of complete stud systems, which framas designs at its central development site in Pirmasens.

Because framas and ARBURG look



favourites at the Euros because we work for all the major producers of football boots worldwide. When a team wearing Adidas boots plays against one equipped by Nike, we're playing on both sides." In fact the company's customer portfolio includes all the large international sports shoe brands, including, in addition to those already named, established trademarks such as Puma and Reebok.

Specialised in functional parts

Virtually all football boots contain functional parts made by framas. The company, however, also manufactures for the shoe industry. Products include lasts, insoles and heel counters for safety footwear, hiking boots and fashion shoes as well as, for example, hoof boots for horses. Forward-looking know-how goes into the produc-

tion of complete stud systems, which framas designs at its central development site in Pirmasens. Because framas and ARBURG look back at a co-operation of many years' standing, it was a matter of course that a special ALLROUNDER rotary table machine was specially designed and built for the company's development work. "The great advantage of ARBURG in this context is that their applications technology experts are always open to special solutions tailored to our precise requirements. Some 85 percent of the machines that we use for volume production at

our European plant are ALLROUNDERS." The first ARBURG machines are now also being deployed in Asia.

ALLROUNDER T rotary table machine for three-component processing

Although the three-component rotary table machine is based on the conventional ALLROUNDER T machine series, it is equipped with numerous special features adapted to the requirements of the central development department in Pirmasens. The machine, with a clamping force of 2,500 kN and size 400, 400 and 290 injection units, features a servo-electric, three-station rotary table with a diameter of 1,500 mm, which can be moved in both directions. All the injection units are designed for small shot weights and high pressures in order to produce mainly thin-walled moulded parts. The two large units are arranged in parallel and inject into the parting line from the rear of the machine; the smaller one is arranged vertically. The two horizontal injection units have been placed in a raised position and feature extended nozzles in order also to be able to operate with small moulds. All the injection units are equipped with position-regulated screws and needle shut-off valves for sprueless injection without material losses. The temperature control lines are routed centrally through the rotary table in order



to keep the paths short and direct. All the machine sequences and the injection units are managed via the central SELOGICA control system, to which up to six temperature control units can be connected via interface ports. Core-pull control, temperature regulation and mould cavity pressure measurement are also performed via SELOGICA.

Plastic functional parts influence boot properties

“On this machine,” summarises Steffen Bossert, “we run our prototype trials for the functional components that will be introduced onto the market in two to four years. The findings that we make here then also flow into our volume production.”

“If you consider,” adds Bossert, “that some state-of-the-art football boots are made nearly 100 percent from plastic, you’ll realise how important these materials are in terms of the boots’ properties. This is why we not only build our moulds ourselves, but also offer our customers specially formulated material compounds that influence, for example, speed, shooting technique, wearing comfort and injury risks for the players in a targeted manner.” Long gone are the days of simple leather boots with studs: today’s boots are high-tech equipment with which effective training, for example, can be planned. “In some boots,” explains Bossert, “microchips are incorporated into soles, which pinpoint the exact position of the player on the pitch and register the runs

that he makes. This allows match preparation and training sessions to be planned with great precision.” During the Euros, Özil, Gomez, etc. will score their goals for the German national team with high-tech on their feet that has, in a sense, only adopted the form of football boots. “Each of our customers has different priorities, which are influenced by global marketing and consequently by fashion and colour considerations, for example. And we have to cater to these.” This can be a challenging task in view of product cycles lasting around two years.

The customer base of the system supplier framas demonstrates that the company has consistently done its homework to perfection – also with a little help from specially-adapted machine technology from ARBURG. Here, the question “Milan or Madrid?” in terms of high-tech for football boots can definitively be answered with “Pirmasens”. During the European Championship, framas technology will again contribute to the success of many participants, although in his mind, Steffen Bossert has already ticked off the Euros as a work assignment. “I’ll be watching the matches in Poland and the Ukraine purely as a fan, because we’re now already developing the boots for the World Cup in Brazil in two years.”

An ALLROUNDER T three-component, rotary table machine is designed for the volume production of footwear components.

INFOBOX



Founded: 1948

Plants: Headquarters in Pirmasens, as well as plants in South Korea, Indonesia, China, Vietnam and the US

Employees: 2,690

Products: heel counters, soles, insoles, shoe lasts and orthopaedic applications for the footwear industry, as well as high-tech plastic functional components for the sports shoe sector.

Contact: www.framas.com



Valuable aid

SELOGICA "Set-up Assistant" module: proven in practice

ALLROUNDERS can be set up simply, quickly and reliably with the SELOGICA "Set-up Assistant" module. The idea of preparing an injection moulding machine for production without in-depth, specialised knowledge was extremely well received during the product presentation. But what experiences have users made in practice?

First, a brief recap: as a simple human/machine interface, the Set-up Assistant enables menu-guided set-up and "teach-in" of the entire injection moulding machine sequence, including the robotic system. The installation technician is actively supported – from mould changes and initial automatic calculation of parameters through to the finished process.

Because the step-by-step guidance for all the necessary actions reduces parameter entry to an absolute minimum, ALLROUNDERS can be set up very simply and reliably – no in-depth knowledge of the control system is required.

Thanks to the high flexibility of the Set-up Assistant, preparation of the ALLROUNDER for production can be performed much more quickly and subsequent adjustments can be made to the system at any time. The Set-up Assistant thereby also contributes to greater production efficiency.

Initial experiences have shown that ARBURG's efforts aimed at speeding up and simplifying machine setup in order to facilitate the work of installation technicians have been extremely well received in practice.



Eberhard Burkard, Institute for Design and Production in Precision Engineering (IKFF), University of Stuttgart:

"Since the middle of 2011, our ALLROUNDER 170 S with Set-up Assistant has mainly been used for practical training during student instruction, as well as in the context of Bachelor's and Master's theses. Because not all of our students are trained machine operators, it allows us to get them to work independently on the machine very easily and quickly. For training at our Technical Centre, the Set-up Assistant is a useful tool that we would be reluctant to dispense with on a new ALLROUNDER. We also have a second ALLROUNDER operating without the software in order to allow our students to get to know both machine set-up 'worlds'."



Thomas Steinhauser, Technical Director of Adoma GmbH, Kunststoff und Metallverarbeitung, Wangen/Allgäu, Germany:

"We own an ALLROUNDER 470 H with Set-up Assistant which is regularly used by our trainees. The big advantage is that, with this feature, they can convert the machine completely independently. The additional cost has already paid off as a result. For us, it's sufficient, however, to have only one ALLROUNDER equipped with the Set-up Assistant. The experience that the trainees gain when performing setup can be applied to the other machines. The Set-up Assistant basically saves us part of the training."

The Set-up Assistant guides the installation technician directly to the goal: a production-ready ALLROUNDER.

Keeping track of medication

Veaser Plastic Slovakia: autonomous production on two ALLROUNDERs

With medication, both effectiveness and transparency are required. In order to dispense their daily tablets to patients while excluding medication errors, so-called weekly medication boxes are the perfect solution. Veaser Plastic Slovakia, Vadovce, a subsidiary of Veaser Plastic-Werk GmbH & Co. KG, Konstanz, produces medication boxes of this kind on two linked ALLROUNDERs.

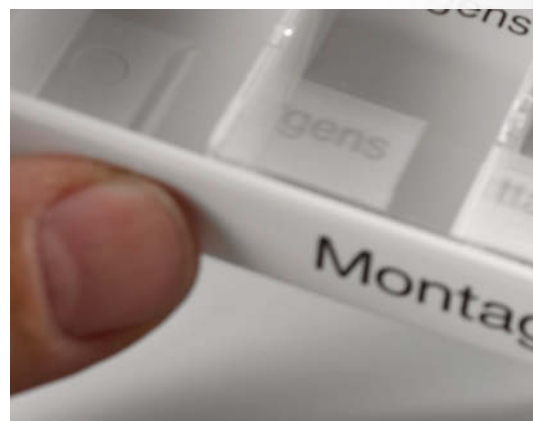
The medication dispensing box, which is sold throughout Europe, consists of seven individual inserts - one for each day of

Two ALLROUNDERs operate in unison

For manufacturing the weekly medication box, two ALLROUNDER 470 S machines with MULTILIFT robotic systems are used. The first ALLROUNDER produces the transparent PMMA covers on a 4-cavity mould. A MULTILIFT SELECT removes the covers via a gripper with vacuum cups and sets them down on a rotary table. Here, they are held, also via vacuum, and rotated into the printing position. The pad printing machine with closed ink system, then prints the times of day onto the covers. Simultaneously, the robotic system removes the covers printed in the previous cycle and places them into a magazine changer. The rotary table and magazine changer are managed via SELOGICA. The control system has access to the pad printing machine via an interface. Through the synchronous movement of the X-axis of the MULTILIFT SELECT with the machine ejector during removal of the covers, an optimised cycle time of only 14 seconds is

achieved.

On the second ALLROUNDER 470 S, which is also equipped with a 4-cavity mould, the individual inserts for the week days are produced in white ABS. The cycle time is again 14 seconds. The components are removed with the sprue via a horizontally-operating MULTILIFT H which sets them down on circulating workpiece carriers.



For automatic assembly of the sliding covers in the insert, which takes place in three steps, the already printed covers are separated and fed via a magazine changer previously loaded by hand. Next, stacks of seven individual assembled inserts are made for each weekly box and positioned beneath a second pad printing machine. Via a servo-electric axis and a pneumatic turning unit on the stacking gripper, the seven inserts then are brought into various positions and printed on both sides. They are then set down onto a table in stacks, from where they are transferred for manual inspection and packaging.

The SELOGICA control system and the assembly automation are connected via peripheral inputs and outputs.

An additional requirement was also met by ARBURG: in order to ensure autonomous production, the injection moulding machines and automation system can be uncoupled. In the event of malfunctions or downtimes of the assembly system, the inserts can be fed manually and production continued.

The linear robotic system attaches the cover to the insert before passing it to a transfer unit for stacking.

the week - which are contained in a housing. A weekday is printed onto each insert and the times of day (medication times) are printed on the transparent cover.

NDERS



Photos: www.digitalimage.at

ARBURG and Veaser navigate uncharted territory

Managing Partner Michael Veaser describes the co-operation with ARBURG as follows: "We've been working with ARBURG since back in the 80s. For our complex parts and assemblies, we have a partner who is prepared to jointly break new ground in order to rapidly bring the technology to production maturity. With the fully-automated production cells in Slovakia, we particularly valued the integrated expertise and performance of ARBURG as a system supplier. In a close collaboration between ARBURG and Veaser, a production system has been created where it's not only a moulded part that's produced, but a completely assembled and ready-to-deliver assembly with multiple printing – in a single, continuous workflow. These reliable, integrated, complete systems allow us to offer our customers a high-quality, top service on an ongoing basis and to work particularly efficiently."

The pad printing machine with closed ink system prints directly in the injection moulding environment.

INFOBOX



Founded: Veaser Plastic-Werk, 1948, Veaser Plastic Slovakia subsidiary, 2004
Plants: Konstanz, Germany, and Vadovce, Slovakia
Employees: 50 in Konstanz, 35 in Vadovce
Machine fleet: six ALLROUNDERS with clamping forces from 700 to 1,000 kN in Vadovce
Production area: approx. 3,000 m²
Products: high-quality 1, 2 and 3-component thermoplastic parts and assemblies in the functional and decorative segments, specialising in multi-component applications, in-house mould-making shop
Industries: automotive, medical technology/pharmaceuticals, white goods
Contact: www.veaser.de

One comm

BLUECOMPETENCE

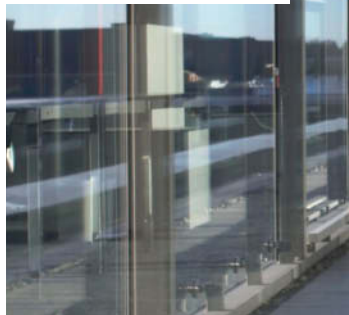
Alliance Member

Partner of the Engineering Industry
Sustainability Initiative

VDMA initiative a perfect

Whether it be the ARBURG Energy Efficiency Award, cost-efficient machine technology, resource-saving production, or the corporate motto "ARBURG for efficient injection moulding" – ARBURG is a leading example of performance and sustainability in the German machine and plant construction industry. This approach is also expressed in the overarching principle of "production efficiency" according to which all the company's worldwide activities have been pursued since 2012. Consequently, the machine construction company is heavily involved in the Blue Competence initiative of the German Engineering Federation (VDMA), which was launched with a great deal of publicity this year. This is quite natural because "production efficiency" and Blue Competence share the same objectives.

Blue Competence is the initiative for innovative ecological product and production design and environmental technologies in all sectors of the German machine and plant construction industry.



It networks the various industrial sectors with regard to the topic of sustainability, exploiting mutual strengths and bundled expertise in order to promote the interests of the machine and plant construction industry on the market, to endure on it in the long term and to jointly benefit from it. Converting technological, business and societal visions into efficient production and consequently products, has always been an important competitive factor. The VDMA not only sees itself and its member companies as duty-bound in this regard, but also and especially as a driving force and motor for groundbreaking technologies, which are often a prerequisite for sustainability ideas.



ARBURG focuses on the topic of production efficiency and becomes involved in the VDMA Blue Competence initiative

What is Blue Competence?

The Blue Competence initiative has been conceived as a campaign by means of which political decision-makers and the wider public are informed of these capabilities in detail and over the long term. Its objective is to become the leading ini-

on goal

fit for the ARBURG topic of production efficiency

tiative for ecological product and production design as well as for innovative environmental technologies and to promote these in a targeted manner on the world market. Here, the VDMA as the umbrella organisation, its individual professional associations and the participating companies are working hand-in-hand, albeit at different levels.

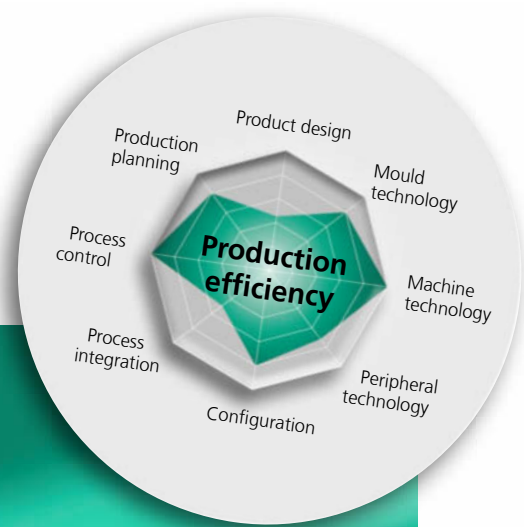
How does Blue Competence work?

The participating companies publish their individual articles and solutions regarding the key questions of our time, accompanied and supported by the communication measures of the overall and professional associations. For this purpose, Blue Competence defines well-founded sustainability criteria and standards which all companies participating in the initiative endorse. The initiative thus ensures greater transparency, simplifies orientation and provides security to all those seeking sustainable solutions and products or companies operating sustainably. Against this backdrop, the VDMA is committed to working on the Blue Competence campaign in which 27 professional associations (status: beginning of May 2012) and numerous companies are already participating. On the www.bluecompetence.net website, the VDMA publishes detailed information on the participating professional associations and companies, as well as standpoints and positions which are significant for the implementation of sustainable business, ecological and societal solutions.



STATEMENT

Dr. Christoph Schumacher
ARBURG Head of Marketing and Corporate Communications



Our topic of “production efficiency” and the VDMA Blue Competence initiative share the same foundations. ARBURG is regarded as a model of sustainability and resource-saving production. The invention of small plastics injection moulding machines in the 50s was already a significant step in the current direction as it represented the birth of the cost-efficient production of small plastic products.

We can demonstrate this ongoing and sustained approach based on numerous examples. Whether it be the use of renewable energies such as wind power, solar electricity, innovative heating and cooling systems or

geothermal energy for our own production facilities, or our customers – cost-effective and high-quality production is synonymous with lower raw material and energy consumption, as well as less waste. For this reason, we are delighted to participate in this initiative, because there is no need to be modest about the truth. And Blue Competence will ensure a positive perception of our company, our professional association and the VDMA through bundling all our respective strengths.



HIDRIVE arri

Combi-Pack: hybrid machines impre

Combi-Pack specialises in innovative packaging for the food industry. The Malaysian company is highly convinced by ARBURG injection moulding technology. This is because in order to produce high-end products in large unit volumes around the clock, manufacturers need high-performance machines and depend on a fast service. Thanks to a clever product idea and through the use of the hybrid HIDRIVE machine series, Combi-Pack has succeeded in sharply increasing its turnover during last five years.

Combi-Pack mainly produces food packaging for the markets in Malaysia, Australia, Singapore, Indonesia and Thailand. A strength of the company lies in innovative applications.

Consequently, enterprises of world renown, such as Nestlé, have already turned to the Malaysian company. The aim was to find an alternative to directly-printed plastic cups, in which warm meals could be prepared through the addition of hot liquids. The result is called Combicup and is a thin-walled, ribbed cup made from PP which, following injection moulding, is provided with a cardboard sleeve in a second production step. This enables comparatively inexpensive offset printing, simple recycling of the materials and good thermal insulation. Around 25 percent of the plastic can be saved due



CEO C. Y. Chow (right) and General Manager Clara Chang successfully lead Combi-Pack.

to the reinforcing effect of the cardboard sleeve. Instead of bonding the sleeve with adhesive, Combi-Pack joins the ends using ultrasonic and fits the sleeve onto the plastic container mechanically.

In operation around the clock

The injection moulding machines produce the high-quality packaging items around the clock, 365 days a year. Apart from the Combicup, many of the products are decorated with in-mould labels (IML).

"Production of the thin-walled cups is highly complex. When I purchased the first four ARBURG hydraulic machines in 2007, the sophisticated technology therefore immediately impressed me," recalls CEO C. Y. Chow regarding the early days. He was especially convinced by the energy-saving and precise operation of the machines, the easy-to-use SELOGICA control system and the low maintenance costs. Production is generally only stopped in order to change moulds and lubricate machine components.

One decisive advantage of ARBURG for Combi-Pack in addition to the high-

ved at just the right time

ss through high performance in the packaging sector



Combi-Pack is very satisfied with the performance of hybrid ALLROUNDERS for its packaging items. The HIDRIVE machines produce around the clock, including some 8 million Combicups a month (far left).

reduce costs – with flawless part quality and at minimum maintenance costs,” says C. Y. Chow regarding the successful use of the ALLROUNDER HIDRIVE machines.

end technology, is the support the company offers. “When we became interested in an ALLROUNDER 820 S with a clamping force of 4,000 kN and an IML system, ARBURG provided us with comprehensive support. From initial mould trials in Germany through to installation of the production cell in Malaysia, the whole project ran smoothly,” says a satisfied C. Y. Chow. This machine is also in operation around the clock.

One year later, a technical innovation from ARBURG came just at the right time for the packaging expert: “The high-performance hybrid machines of the HIDRIVE series are predestined for producing the Combicups”, says David Chan, ARBURG Managing Director ASEAN Region. They combine servo-electric clamping units with hydraulic injection units and performance-adapted hydraulic accumulator technology in a high-quality machine concept. Energy consumption can be reduced by up to 40 percent compared to a standard hydraulic machine. The Malaysian company very soon purchased new ALLROUNDER 520 H

and 570 H machines and, in 2010, were also the first customer worldwide to employ an ALLROUNDER 720 H with an injection speed of 500 mm/s.

17 hybrid machines in operation

Today, at its three production locations, the company operates 5 hydraulic and 17 hybrid ALLROUNDERS, many equipped with servo-electrically driven IML robotic systems. Combi-Pack has virtually become an external ARBURG showroom: whenever someone in the region is interested in hybrid ALLROUNDERS, they can experience the successful use of HIDRIVE machines here at first hand. The Combicups are produced on 6-cavity moulds in cycle times of only 5 to 6,5 seconds. The production volume for Combicups is of some 8 million units a month.

“Because the high-performance hybrid machines enable shorter cycle times and consume less energy than their hydraulic alternatives, we are able to further improve our production efficiency and significantly

INFOBOX



Founded: 2007 by C. Y. Chow

Location: Balakong, Malaysia

Production: approx. 60,000 m² at three locations

Employees: 180

Turnover: approx. 10 million euros (2011)

Machine fleet: 22 ALLROUNDERS with clamping forces from 1,000 to 4,000 kN

Products: Combicups, thin-walled and IML containers for the food industry. Brand products include, e.g. Danone, Heinz, Kraft, Maggi and Nestlé.

Contact: www.combi-pack.com.my



Top-class LSR produ

CVA Silicone: number one LSR processor in France

The history of CVA Silicone has been associated with the name l’Oreal from the outset – however, not in the way one might think. This is because, in the 1960s, l’Oreal was not only known for its cosmetics, but also for its baby products such as bottle teats. Not only does CVA still produce the teats at a volume of billions of units, it has also contributed towards innovative enhancements. Since the introduction of LSR injection moulding at CVA, these items, as well as other, subsequent ones have been produced on ALLROUNDERS.

The partnership with l’Oreal began its dynamic development with an invention made by company founder Joseph Gasset, which was patented by CVA’s main customer: the variable teat, whose flow rate can be regulated via the inclination angle of the bottle. CVA has been producing these teats exclusively for the Dodie brand for decades. When the company then became involved with injection moulding technology in the 1980s, ARBURG was CVA’s preferred machine partner. Through the integration of Research and Development as well as Mould Construction in-house, CVA became a



CVA Partner Nicolas Oternaud (left) is convinced by the high performance of the ALLROUNDER machines, e.g. during the fully-automated production of babies’ bottles (right).

Strategic ARBURG partner

Managing Partner Nicolas Oternaud joined CVA Silicone in 2006 and has progressively broadened the company’s base over the years. The extension of business relations with ARBURG was accordingly positive. An ALLROUNDER 570 S with a clamping force of 2,200 kN and an integrated six-axis robotic system, for example, was purchased. Its equipment enables the production of a baby bottle made from plastic, which is over-moulded inside and out with a highly-transparent, adhesive, liquid silicone.

A broad spectrum of LSR components for medical products in the testing, medication dispensing, transfusion, nutrition, bodycare and contamination protection segments are currently produced by CVA on three electric ALLROUNDER A machines featuring special clean-room

system supplier to its customers, providing consulting, from design through to delivery, as well as for LSR material selection and processing. Today, the activities of the French LSR pioneer are divided into five main sectors: baby products, medical, cosmetics, decorative tableware and industrial.

Today, of the machines at the CVA production facility, 100 percent are from ARBURG: 15 hydraulic and one electric ALLROUNDER with clamping forces from 750 to 2,200 kN and featuring the relevant LSR equipment produce in three shifts, seven days a week.



Photos: CVA Silicone

cts

equipment, which operate automatically in conjunction with MULTILIFT robotic systems for part removal and setdown in a class ISO 7 clean room. On these production units, closure and protective caps, for example, are produced for diagnostic kits for tumour detection. Upon request by a customer, CVA already successfully processes 3 Shore A LSR, which is close to water in consistency. Here, it is not only crucial that the moulds be designed perfectly, the correct processing parameters for the appropriate machine technology also have to be determined. Nicolas Oternaud is impressed with the technology, equipment and high performance of the ALLROUNDER A: "Not only do the electric ARBURG machines operate reliably, they are also energy-efficient, low-emission and quiet. This permits extremely high precision and production efficiency to be achieved, which is of the utmost importance to us, particularly for medical technology. ARBURG injection moulding technology has again and again assisted us in manufacturing all our medical technology products, whether sensitive or highly durable, to the highest quality level in high volumes.



In this way, jointly with ARBURG, we ensure greater comfort and improved health for many patients."

LSR pioneer CVA produces e.g. cosmetic products (top left) with 16 ALLROUNDER injection moulding machines in three-shift operation (above).

INFOBOX

Founded: 1960 by Joseph Gasset

Location: Saint Vidal, France

Employees: 30

Production area: 1,500 m²

Certification: ISO 13485:2004 and ISO 9001:2008

Products: technical items made from liquid silicone (LSR), adapted to customer requirements

Industries: baby care products, medical, cosmetics, decorative tableware and industrial

Machine fleet: 16 ALLROUNDERS in a clamping force range from 750 to 2,200 kN

Contact: www.cva-silicone.com



TECH TALK

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



Correct measurement

Considerations regarding energy measurement in injection moulding

Reducing operating costs and thereby efficiently utilising the available resources is an important prerequisite for the success and cost-effectiveness of injection moulding companies today. Owing to the steadily rising energy costs, the energy requirements of injection moulding machines become a decisive factor. Energy measurements and their evaluation are not yet widely used and conceal certain pitfalls.

The energy requirement of an injection moulding machine is calculated based on the actual power consumption over time. It increases the greater the power consumption and the longer the duration.

Selecting suitable measuring technology

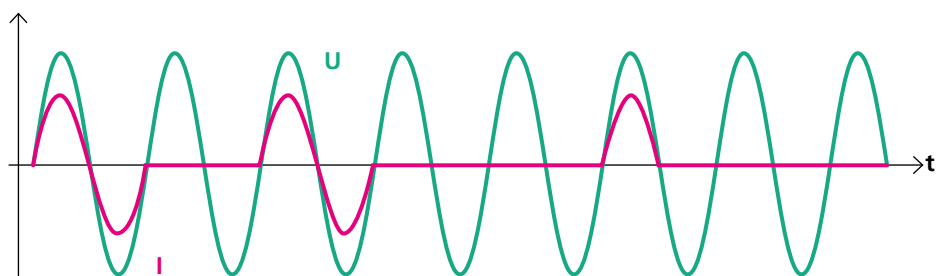
Owing to the shifts in the voltage and current waveforms which are usual in machines and plants, the demands placed upon the measuring equipment are high. The power measurement devices used for

measuring energy in injection moulding machines must therefore also be able to evaluate non-sinusoidal voltages (V) and currents (I). For example, cylinder heating zones generate complete or half sine waves only temporarily (see example 1). Frequency converters, switch mode power supplies, bridge rectifiers etc. can also "break up" the current waveform, render it non-sinusoidal or invert it through energy recovery (see example 2). Power measurement devices that require sinusoidal waveforms for voltages and currents consequently deliver incorrect readings.

This danger applies particularly in the case of inexpensive devices.

Creating the conditions for correct measurement results

Before beginning with energy measurement, it must be ensured that the injection moulding process is in so-called thermal balance. Specifically, this means: the injection moulding machine must have been running in automatic operation for longer than 15 minutes without any parameters being changed or malfunctions occurring. Only then can one-off effects during the heat-up and start-up phases be discounted, such as the temperature rise in the cylinder module or in the hydraulic system. Furthermore, the measurement time must be at least 30 minutes or correspond to



Example 1



nt

ding machines

Selection of suitable instruments for energy measurements and comparisons is decisive.

five times the dwell time of the plastic employed. Process-dependent fluctuations are thus taken into account, without the measurement results being falsified. This leads to a useful mean value – particularly for the purpose of comparisons.

Comparing machines

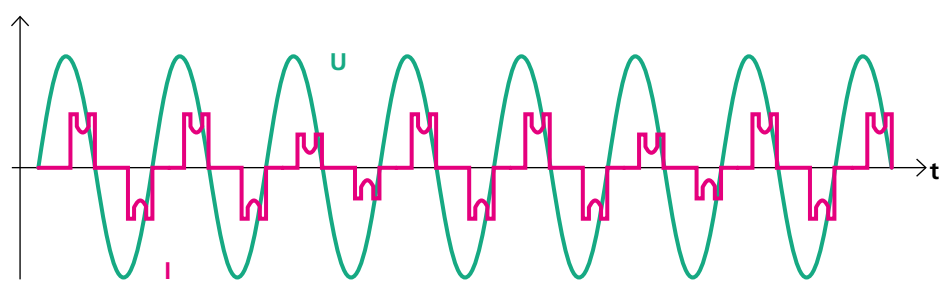
In order to compare the energy requirements of different injection moulding machines it is extremely important to ensure an identical measurement principle as well as an identical measurement scope without any peripherals. Nothing must therefore be connected to the machine sockets. Moreover, identical process con-

ditions (mould, material, ambient conditions) must be ensured. Finally, the same power measurement device should ideally be used. All these points are significant in order to establish an error-free basis for comparison of the measurement results.

If only the energy consumption or the absolute energy requirements of injection moulding machines are being compared, different process settings and sequences are not taken into consideration. It consequently makes more sense to use the specific energy requirement as a comparative value. This is because the shot weight and cycle time, and therefore the performance capability of the machine, are taken into account. In terms of the energy

efficiency of injection moulding machines, only the specific energy requirement permits a realistic economic comparison.

Energy measurement in injection moulding machines is no easy task. As the examples below demonstrate, there a wide variety of possible error sources. For safety reasons, the measurements may also only be made by appropriately authorised personnel. This means that special training is required for the responsible employees.



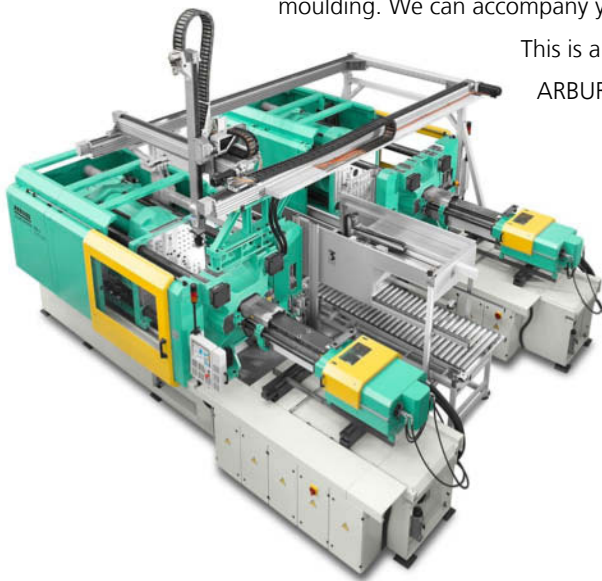
Example 2



Visit our new
www.arburg.com

Distance counts! ARBURG robotic systems currently cover 36 million kilometres annually for our customers. We are the specialists for complex turnkey systems for plastics injection moulding. We can accompany you along the way to turnkey systems.

This is also what we mean by production efficiency.
ARBURG for efficient injection moulding!



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