

today

The ARBURG magazine

Edition 28

Spring 2005



4	ARBURG internal events Generation change at the top
6	K 2004 Thoroughly successful exhibition
8	Customer Report WERMA: A signal for success
10	Co-operation Bayer MaterialScience: Testing times
12	Projects One plus one for greater flexibility
14	Customer Report Ulstrup Plast: Three companies, one strong unit
16	Service Strong together
17	Product ECONomical!
18	History Milestones
19	Tech Talk Adapted nozzle geometries



MASTHEAD

"today", the ARBURG magazine, Issue 28, Spring 2005
 Reproduction – even in part – only by express permission
Responsible: Dr Christoph Schumacher
Editorial Advisory Board: Juliane Hehl, Martin Hoyer, Bernd Schmid, Jürgen Schray, Wolfgang Umbrecht, Renate Würth **Editorial Team:** Uwe Becker (text), Markus Mertmann (photos), Vesna Sertić (photos) Susanne Wurst (text), Peter Zipfel (layout)
Editorial address: ARBURG GmbH + Co KG, PO box 1109, 72286 Lossburg,
Tel.: +49 (0) 7446 33-3149, **Fax:** +49 (0) 7446 33-3413,
e-mail: today_kundenmagazin@arburg.com, www.arburg.com



The tool magazine of a machining centre. On these facilities, components such as plasticising cylinders are manufactured from the raw material in a single working step.



Dear readers,

The time has arrived. Following a long and eventful working life in the service of our company and the idea of making plastic injection moulding utilisable allround, we have retired from our active executive duties as Chairpersons of the Management Board.

After more than 50 years during which we, together with our customers, turned a tiny company into one of the global leaders among injection moulding machine manufacturers, we would like to thank all our companions – customers, co-operation partners and colleagues – for the decades of trust they have placed in us.

We have grown together, never losing sight of customer contacts and market requirements, and with our small machines we have made it possible for many now successful companies to enter into the plastics processing business.

As a manufacturer of technical appliances, we have always had the advantage of being able to approach the tasks and requirements at hand from a perspective slightly different to that of conventional machine constructors.

We thank you for this long and exciting period during which you have placed your trust in us.



With long foresight to this generational succession, we have dutifully, continuously and systematically placed the executive responsibility into the hands of our children, who will pursue our "life's work" under these maxims. Please place the same trust in them as you have allowed us to enjoy.

The new grows out of the old. This step ensures the continuity of our family business in its familiar form – technologically innovative, customer-oriented, quality-conscious and always economically independent.

We wish you all the best for the future and hope you enjoy reading our new edition of "today"!

Karl Hehl
Karl Hehl

Eugen Hehl
Eugen Hehl

Generation change

Tradition and innovation have always been the pillars supporting successful corporate development at ARBURG. These values have also underpinned the corporate management restructuring, which came into force on 1 January 2005. With Juliane Hehl, Renate Keinath and Michael Hehl, the third generation of the owning Hehl family have taken over direction of the company as managing partners in order to lead ARBURG into an innovative and dynamic future in collaboration with the managing directors. The former Chairpersons of the Management Board, Karl and Eugen Hehl, will take on advisory roles within this committee.

Juliane and Michael Hehl, Eugen Hehl's children, have already worked in positions of responsibility in the company. Juliane Hehl will continue to be responsible for the company's Marketing division, which will be integrated into the upper management level with immediate effect. Partner Michael Hehl is now spokesperson for the management team and will be responsible for future plant development.

Renate Keinath, the daughter of Karl Hehl, has taken on responsibility for the Human Resources division in her role as a Managing Partner. She already has a close association with the company due to her involvement in executive committees. Before assuming her new position, Renate Keinath worked in the teaching profession and adult education. An ideal prerequisite for successful personnel development at ARBURG.

Furthermore, the corporate management structure has also been extended. After the ongoing expansion of the international sales network over the past four and a half years, the previous Managing Director of Sales and



Controlling, Michael Grandt will in future be concentrating more on the Accounts and Controlling division. He has therefore handed the management of the Sales division over to Helmut Heinson, who joined the company at the beginning of the year. Heinson has a wealth of

experience in the field of machine and plant construction.

The ARBURG management team now consists of eight people, who have the following responsibilities: Michael Hehl (Spokesperson for the management team and responsible for

at the top



plant development), Juliane Hehl (Marketing), Renate Keinath (Human Resources), Eugen Hehl (advisory role), Karl Hehl (advisory role), Michael Grandt (Accounts and Controlling), Herbert Kraibühler (Technical Department), Helmut Heinson (Sales).

With this forward-thinking move ARBURG has secured the independent, self-determining development of the family business on a long-term basis. Innovation will thus continue to be the tradition at ARBURG.

The ARBURG management team (from left to right): Helmut Heinson, Michael Grandt, Herbert Kraibühler, Juliane Hehl, Michael Hehl, Renate Keinath, Karl Hehl and Eugen Hehl.



Thoroughly successful

ARBURG's presence at the K 2004 was an allround success. "We're more than satisfied. It was an excellent K trade fair with many high-quality contacts –, great business and very good prospects for excellent follow-up trade," was how ARBURG summed it up. The exhibits with the new features and the innovative applications drew a great deal of attention as did the mime artists.

The way to ARBURG in Hall 13, Stand A 13 was easy to find thanks to this special communication concept. All you had to do was follow the mime artists, which were present everywhere. From the International Arrivals terminal A at Düsseldorf Airport and advertising hoardings outside the trade fair centre through to the "real life" mime artists on the stand.

On all eight days of the fair, crowds gathered at the large two-storey exhibition stand, which covered some 1,100 square meters. The great interest shown by the trade visitors was a

clear indication that the right choice had been made with the ten machine exhibits and the interesting applications. In addition to three innovative products, the ALLROUNDER 320 A, ALLROUNDER 270 U and alternative "SELOGICA direct" control system, the complete production cells and various multi-component applications proved to be real crowd-pullers.

A smaller machine has been added to the electric ALLDRIVE series in the form of the new ALLROUNDER 320 A. As a result, the ALLROUNDER A models, the electric axes of which can be combined with electric or hydraulic auxiliary axes, are now available in a clamping force range from 500 kN to 2000 kN.

Following on from the ALLROUNDER 170 U, ARBURG introduced a second fully-hydraulic small injection-moulding machine onto the market, the ALLROUNDER 270 U. The abbreviation "U" stands for the universal application of this machine. The key data for the new 270 U, are a distance of 270 millimetres between tie bars and clamping forces of 250 kN, 350 kN and 400 kN. The centrally arranged clamping



system of the ALLROUNDER U ensures symmetrical force characteristics of the mould clamping unit, guaranteeing maximum precision. The hydraulic system being in close proximity to where it is needed on both the injection and clamping sides, also ensures optimum control of the drive axes, resulting in the highest accuracy.

The third innovation was the new alternative "SELOGICA direct" control system with a 15-inch touchscreen. Fast and effective navigation is possible by touching the appropri-

ate element on the screen, making data entry and control of the machine and peripherals even simpler and more user-friendly. The new "SELOGICA direct" user interface will not replace the previous SELOGICA, but represents an alternative to it. The "SELOGICA direct" was not only demonstrated on the two new ALLROUNDERS at the K, it was also tested extensively on simulators.

Multi-component injection moulding dominated the applications. The well-known ARBURG briefcase was moulded on a two-component version of the large ALLROUNDER 820 S. The fully automatic assembly of the case was an innovation which provided the Project Department an opportunity to demonstrate their work. The production cell on which the sought-after table-tennis bat was made

from ABS and TPE also came from the Project Department. Its centrepiece is an ALLROUNDER 630 S with a three-station rotary mould and a MULITILIFT robotic system which removes the finished bat halves from the third open mould station. The halves are welded ultrasonically during a further stage of the process.

The complete production of a sealing diaphragm made from PA and LSR was demonstrated on a facility with an ALLROUNDER 570 C, which was made available by Rico, ARBURG's long-standing co-operation partner for LSR applications.



exhibition



Ever present: the mime artists at the well-visited ARBURG exhibition stand. The exhibits attracted the attention of the international trade visitors and received close examination.

First ARBURG machine as cult object

It was not only innovations which were presented at the K, but also a real cult object from the fifties: the first ever ARBURG injection moulding machine.



longs to the collection of DITTRICH + Co, the compression moulds are from the collection of C. HÜBNER GmbH. Under the motto "Mould a cult"

visitors to these two companies' exhibition stand were able to mould four limited cult symbols from the fifties, sixties and seventies as a souvenir in plastic.



The original ARBURG machine – painted in the modern, current ARBURG colours be-



A signal for

Blinking, flashing, beeping and even sending text messages, – all this can be done by the products of WERMA Signaltechnik, the market leader in signalling devices. The company has been operating successfully in this market for over 50 years and has always been one step ahead of the competition thanks to its futuristic and customer-oriented innovations. WERMA products are used around the world in all sectors. ARBURG machines are equipped with WERMA signal beacons, the components of which are, in turn, produced on ALLROUNDERS.

WERMA Signaltechnik was established by Werner Marquardt in Rietheim in 1950. Their first product was a new type of hairdryer. The range was quickly extended to include time switches, before the company turned its attention to signalling technology with buzzers and horns, a field in which it remains successful to this day.

According to its corporate philosophy,

WERMA pursues the goal of “ensuring the safety and orientation of people in an automated world regardless of language through the use of clear optical and acoustic signals.” For this purpose, WERMA offers a product range which includes some 2400 products divided into three areas, optical, acoustic and combined signalling technology.

Germany is the company’s principal market, accounting for 65% of sales, although significantly more WERMA products are in use world-wide through the export of customer products. The company

co-operates with 30 trading partners in the export sector, which are regularly invited to attend product training sessions in Rietheim.

One of WERMA’s guidelines is to only de-

velop and market products which are genuine innovations. Thus, the company achieves around a third of its sales with products introduced onto the market within the previous five years. The success of this strategy is evidenced by increases in sales of between 10 and 20 per cent in recent years. In 2004 sales amounted to some 17 million euros.

A further guarantee for success are the 150 employees which make up a strong team. The 15 employees in the development department, for instance, work closely with their colleagues from the other departments. During workshops, new trends are jointly identified and solutions developed in line with market requirements. Absolute priority is always awarded to user benefits and customer satisfaction.

“As leaders in technology, we owe it to our customers to set new trends.” says Managing Director, Günter Kirn. In order to keep ahead of its competitors, WERMA invests about ten per cent of its costs in development and launches many new products on the market every year.

Among the approximately 15 innovations to be unveiled in 2005 is the GSM transmitter element which will be used to upgrade the CombiSIGN signal tower. In the event of a machine malfunction, the GSM transmitter element sends a text message to up to 3 mobile phones.



Photos: WERMA

success



Furthermore, the current machine status can also be checked via mobile phone at all times. It is not only individual signal towers which can be equipped with this module. It can also be flexibly exchanged among various machines.

"Competition is clearly driven by price in our sector today," comments Günther Kirn. "Consequently, we have to produce cost-effectively at the highest quality level."

"Production is the core of our competence" says Production Manager, Erich Martin. "We aim to develop and produce plastic parts in-house which perform as many different functions as possible and to produce them with a high degree of vertical integration."

Correspondingly, some 200 complex moulds work partly using hot runner systems. Many of

the moulds are chrome-nickel coated as fibre glass-reinforced plastics are processed among other materials. WERMA ensures the quality of its moulds, and consequently of its products, by constructing its moulds in-house.

In production terms, WERMA has relied on ARBURG technology from the outset. Its first machine dates back to 1964 when the company began to process thermoplastics as well as thermosets. It currently has nine ALLROUNDERS in operation in its modern production hall, with a clamping force range from 150 to 1300 kN; the monthly injection moulding output is between 200,000 and 300,000 parts, with batch sizes of between 50 and 10,000 units. Immediately next to the injection moulding plant is the assembly area, where the components are assembled, installed, checked and the finished products are packaged.

As all the ALLROUNDERS have been equipped with WERMA signal towers for over ten years, ARBURG is both supplier and customer. Through its production using ALLROUNDERS, WERMA knows which of its own developments may be of interest to injection moulding companies, such as the new GSM transmitter module which ARBURG is adding to its range.

Left page: WERMA signal towers can be flexibly combined with regard to both colour and function.

The GSM radio module is new to the range.

Right page: modern machines in the injection moulding plant and in-house mould construction ensure the quality of WERMA products, which are also utilised during in-house production, for instance the signal towers on the ALLROUNDERS.

INFOBOX

Founded: 1950

Production area: 10,000 m²

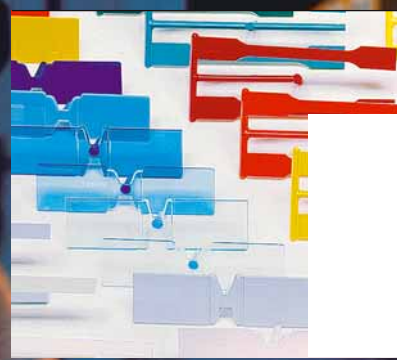
Employees: 150

Sales: 17 million (2004); annual increase between 10 and 20 per cent

Products: Optical, acoustic and combined signalling devices

Machine fleet: nine ALLROUNDERS with clamping forces from 150 to 1300 kN

Contact: WERMA Signaltechnik GmbH + Co. KG, D-78604 Rietheim
www.werma.de



Testing times

When it comes to material tests, the very best equipment is required to make well-founded quality assessments. Consequently, there are approximately 20 ALLROUNDER injection-moulding machines at the Thermoplastics Testing Centre (TTC) at Bayer Material Science AG in Krefeld.

The close co-operation is clearly evidenced in the TTC's latest image video which names ARBURG as a partner. A total of 18 ALLROUNDERS, predominantly C and S-series machines, are in use at the TTC, which covers a total area of 4200 m². They are used exclusively for the production of so-called test samples and plates which are produced in order to perform a wide range of different quality tests. Stated bluntly, the ALLROUNDERS are used mainly to produce parts which are immediately destroyed again.

This also explains what the main function of the TTC is, both internally within Bayer and as a profit centre for all external customers worldwide. In order to effectively assure the quality of plastics and plastic parts, they must be loaded to the limits and beyond. However, in addition to producing samples and confidentially carrying out 175 standard and further individual special tests, the TTC's 'all-inclusive service' also includes the compounding of standard polymers and technical thermoplastics in small batches, as well as consulting in the field of testing technology. Major customers are also able to transmit the composition of their material samples via a network connection and the granulate to be tested is then produced from a

store of components. Virtually all ISO, CAM-PUS, ASTM and UL tests (a range available nowhere else) can be conducted using approximately 100 sample moulds. Using the BMS mould control system, important process data is determined during the injection moulding process and referred to for the purposes of quality evaluation. The range of services provided is completed by the testing of finished or semi-finished parts, the production of optical-quality plastic plates, weathering tests, as well as analysis of the effects of surface treatments on polymers. Their testing-technology consulting activities extend to the assembly, supply and setting up of complete testing centres.

Many of the ARBURG machines used at the TTC feature high levels of automation and autonomy, as are required for 24 hour production and testing. A good example is the four ALLROUNDER 370 C 800-250 production cells with 3-axis NC robots. Following part removal from the moulds, the sprues are cut off in a downstream processing station, and the samples are then fed to a film packaging station which separates them according to test runs. The different mould inserts can be exchanged automatically using a special insert changer. Experts from TTC will be making a presentation of their own as part of the fringe programme at the 2005 ARBURG Technology Days.



Photos: Bayer

Co-operation between the TTC and ARBURG has been stepped up steadily over the years. For example, ARBURG is also supplying ALLROUNDER injection-moulding machines for the new production facility in China.

INFOBOX

Contact: Bayer MaterialScience AG
Thermoplastics Testing Centre
Werk Uerdingen, Gebäude R 33
Rheinuferstraße 7-9, D-47829 Krefeld
www.ttc.bayermaterialscience.com

One plus one for

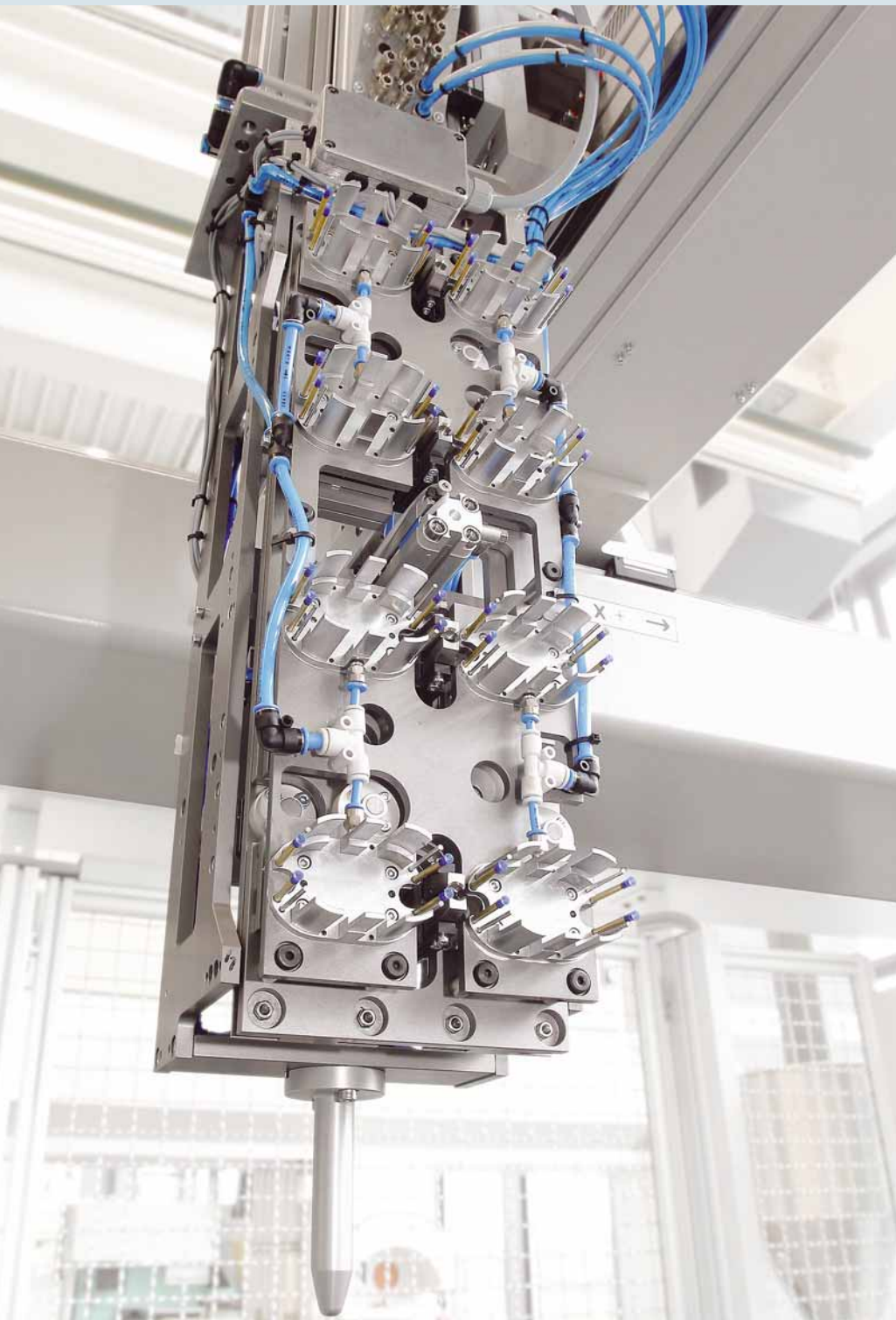
Parts consisting of multiple components cannot only be produced on multi-component machines. The reasons for producing multi-component moulded parts on two machines are as varied as the range of parts produced in this sector. The Project Department at ARBURG can provide assistance with alternative concepts.

The alternatives to classical multi-component injection moulding range from the integration of intermediate processing steps in the production process and the use of special mould technology through to the further use of existing moulds.

The intermediate processing of injection-moulded parts in particular entails very different operations which may best be performed using several injection-moulding machines and robotic systems. For example, the pre-moulded part may have to be cooled, or the moulded part re-worked. The range of operations includes sprue separation, contact separation, deburring or the assembly of components, as well as the re-orientation of parts between the pre-injection and encapsulation station, and visual or dimensional quality checks on pre-moulded parts.

However, different mould temperatures, such as those required for the combined processing of thermoplastics and LSR, may also create the need for part production in two moulds and for automatic transfer via robotic systems. Ultimately, however, part requirements which create the need for complex mould technology (core pulls, mechanical side cores, unscrewing units, pneumatically-operated axes, etc.) and different cavity configurations are also reasons for splitting production between two machines with automated handling processes.

All the concepts which the Project Depart-



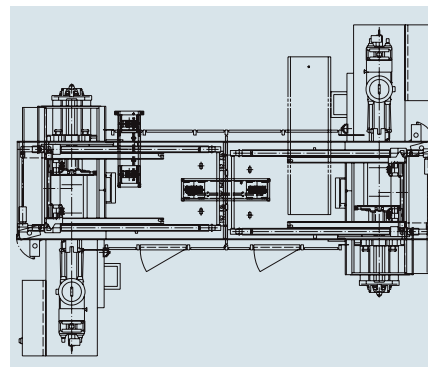
greater flexibility

ment at ARBURG has realised for these types of tasks are primarily based on two principles. Either two ALLROUNDERS are linked together via a MULTILIFT V robotic system, or two machines are used in conjunction with two directly assigned robots. These, in turn, can be linked together in different ways. The simplest configuration: robot 1 places the pre-moulded parts onto an intermediate table, robot 2 picks them up and places them into the second ALLROUNDER for final injection moulding. This type of combined operation is also possible via a central sliding table which both robots work from. In this case the machines stand back-to-back. Another alternative: a conveyor section which transports the pre-moulded parts from machine 1 to machine 2. This permits a flexible machine configuration. Various setup options (back-to-back or in line) can be implemented, whereby the production cell can be expanded at any time.

Furthermore, this creates a buffer between the ALLROUNDERS for separating production steps. The advantage of the solution involving two ALLROUNDERS and two robotic systems is that applications can be implemented more flexibly. This system enables the two machines to be separated functionally at any time in the event, for example, of changes in production requirements.

A typical application for a system configuration with a central robot is the in-mould laminating of film. The process sequence is as follows: first, the films provided are separated, centred and cleaned by the robot before being inserted into the mould on the first machine. The pre-moulded parts are created here. They are removed again by the robot and processed on a cutting station. The robotic system then picks the parts up again and places them

in the second machine where they undergo final injection moulding with another component. Following removal of the finished parts, the robot places these onto a conveyor belt for downstream processing.



Production solutions developed outside the standard machine range and supported through to final use (illustrations at top and bottom) are implemented by the ARBURG project department. Here, flexible production cells are created which can be adapted precisely to companies' individual processing requirements in accordance with the relevant market demands.



Three companies,



Today, many companies in the plastics sector style themselves as system suppliers. However, very few of them actually succeed in living up to this claim due to the lack of the comprehensive expertise necessary for the task. Ulstrup Denmark is a system supplier. As a result of the merger between Ulstrup Plast, Scan Tools and Svanemose, three suppliers have united to form a single competent system supplier offering its customers expert support from the drawing board through to the packaging of the plastic parts.

At the three Ulstrup Plast A/S production sites resulting from the merger, all located in the Greater Copenhagen area, a total of 60 injection-moulding machines are in action, predominantly producing parts for industrial applications, the telecommunications and medical technology sectors. Twenty-five of these 60 machines are recent ARBURG ALLROUNDER models less than eight years old.

The company's main activities are in the fields of high-precision two-component injection-moulded parts and clean-room production. At the Ulstrup premises, facilities are available for the manufacture of clean-room products meeting all the requirements of the medical technology sector. One way in which the company lives up to its philosophy of allround support for its customers is by operating its own mould construction facility which is able to supply high-precision moulds on the dot.

In the future, the company consequently aims to concentrate on the validation of machines and moulds in the field of clean-room and two-component production. The automated production of inserts could also become a core business area.



one strong unit

Ulstrup Plast is exclusively a sub-supplier and manufactures its components primarily for the Danish and European market. The company meets the demands with regard to moulded part quality through certification according to ISO 9000: 2000 and according to ISO 14001. In-house quality control is additionally a must for medical applications. Ulstrup Plast has a team of six employees who use a variety of optical and co-ordinate measuring machines among other equipment in order to ensure production quality on a continuous basis.

The co-operation with ARBURG dates back to the purchase of a machine in the late '60s. The company's owner, Søren Ulstrup's endorsement of the quality and reliability of the ALLROUNDERS is unequivocal, given his firm's many years of experience with engineering from the Black Forest. "We are very satisfied with the flexible and reliable ARBURG ALLROUNDER technology and the excellent price/performance ratio. Coupled with this is the excellent quality of service which we receive from the subsidiary in Denmark. The combination of the two produces a service package which meets our needs and which we are always happy to make use of."

The machine fleet in the three plants at Ulstrup Plast A/S covers a clamping force range from 250 to 2000 kN, with ALLROUNDERS covering the entire range. Production runs 24 hours a day, seven days a week, i.e. around the clock, at all three of the company's sites. About a third of the ALLROUNDERS are equipped with robotic systems to facilitate automatic parts handling. An electric indexing unit from Weber automates production on an ARBURG multi-component machine with a clamping force of 2000 kN. This machine was also supplied via the subsidiary in Denmark. This ALLROUNDER is used to create an adhesive tape dispenser in 2-component technol-

ogy. ARBURG machinery is also used in the company's medical technology production. For example, a moulded part for measuring blood samples is manufactured on a 2-component ALLROUNDER with a clamping force of 1300 kN, with an integrated robotic system.

ARBURG and its ALLROUNDERS have been a great success at Ulstrup Plast A/S throughout the years of co-operation. As Søren Ulstrup says, "The machines are easy to operate and highly precise in day-to-day operation. And the good co-operation with the Danish subsidiary bodes well for a continued collaboration in the future." A lot still remains to be done: the third generation of management from the Ulstrup family aims to keep the company's machines at the latest technical level. In the future it also plans to merge the three current sites into one in order to utilise synergy effects more effectively. This is an ambitious programme, the implementation of which ARBURG continues to be involved in.



Photos: Ulstrup Plast

Ulstrup supplies sectors with high quality demands.

In the medical technology area (illustration above) a wide range of products are produced in clean rooms.

INFOBOX

Founded: 1952 by Emil Ulstrup; production began with buttons and oil cans

Production A merger resulted in three sites, covering a production area of approx. 4000 m², and 65 employees

Specialised areas: Multi-component injection moulding and clean-room production at its own locations

Machine fleet: 60 injection-moulding machines, including 25 ALLROUNDERS, some of which are automated with robotic systems and electric indexing units

Contact: Ulstrup Plast A/S, Industrivej 7, DK-3540 Lyngby, Denmark
www.up.dk



Strong together

Two target groups – one target: Both customers and ARBURG service engineers alike make use of training courses to familiarise themselves with the details of the ARBURG products and to enhance their knowledge of injection moulding. Combining training for customers and internal service engineers under one roof seemed the most logical consequence. And this is exactly what ARBURG did some time ago by assigning both training schemes to the new Product Training department.

At first glance, merging customer training and internal service-engineer training might not appear to have changed much. However, a look behind the scenes quickly reveals the decisive advantages of this approach.

Uwe Klumpp is the central contact person responsible for co-ordination of the entire training department. As there are experts with many years of practical experience working in customer training as well as in service-engineer training, they can now be deployed flexibly and effectively in both departments. Response

to customer's requirements is quick, and specially tailored courses can also, for example, be provided at the customer's premises.

As a result of the expansion of the Product Training department, the team now numbers 17, – and rising. The group of 14 instructors includes plastics engineers and process engineering technicians for plastics and rubber technologies, from mechanical engineers through to electrical engineers and technicians. The entire spectrum of injection-moulding technology is thus covered by appropriate specialists, including the areas of rotary table machines, multi-component injection moulding, powder injection moulding, thermoset processing and the ARBURG host computer system (ALS). In terms of machinery and robotic systems, the team in Lossburg is very well equipped with various ALLROUNDERS and MULTILIFT robotic systems which are available exclusively for training purposes.

In order to ensure that all the ARBURG service engineers around the world are highly trained and possess in-depth expertise in the areas of injection moulding technology and ALLROUNDER technology, they all undergo standardised training in Lossburg. This also

The "Product Training" team around Uwe Klumpp (front right) is made up of experts from a variety of fields, who train the internal service engineers as well as customers on all ARBURG products.

benefits the customers who receive the same comprehensive knowledge relating to the ARBURG products when they attend training courses. The advantages of the joint Product Training department are also evident with regard to new products, as the service technicians receive early training on them. Thanks to standardised training documentation, compiled by the instructors and later to be made available in digital, animated form, the range of customer training courses on offer can be extended very quickly.

UNDER

630 S
2500-1300

ECO

With the ALLROUNDER 630 S ECO, the ARBURG machine range now includes an ECO version with a slightly lower specification than the successful 630 S for the purposes of performing standard injection moulding tasks. It features manual mould height adjustment, as well as the energy-saving twin-circuit pump technology. This means that it meets all the day-to-day requirements of injection moulding practice while offering an extremely attractive price/performance ratio.

At ARBURG, the abbreviation "ECO" traditionally stands for the combination of high cost-efficiency with technical features designed to meet practical requirements.

The 630 S ECO comes with two different specifications, each with a clamping force of 2500 kN which can be equipped with size 800 and 1300 injection units. The screw diameters available are 45, 50 and 55 mm for the size 800 injection unit and 55, 60 and 65 mm for the 1300 unit. This supports injection-moulded part weights of max. 434 g PS and 826 g PS respectively. The calculated injection volume is max. 474 cm³ (for the 800 unit) and 904 cm³ for the 1300 unit.

The performance capacity of the 630 S ECO has been optimally adapted to the processing conditions which apply for many standard parts. Those in the business who can forego high-speed injection and machine movements can choose the ECO machine which offers significant advantages with respect to low energy consumption.

The manual mould height adjustment is also geared towards standard production. The manual adjustment option makes good sense, particularly in factories where mould changes are rare or where similar mould heights prevail.

The acclaimed ALLROUNDER modularity has been adopted from the more high-performance versions of the S series. The ECO machines can also be customised to the

customers' specific injection moulding application requirements.

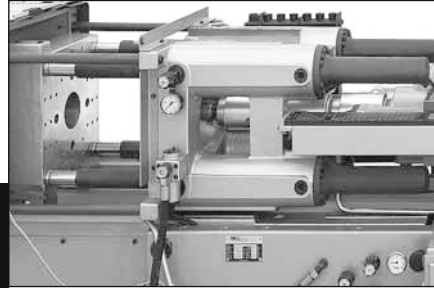
In addition to the smaller footprint of the ALLROUNDERS, high precision is also achieved for all mould movements thanks to the sturdy support of the clamping unit on the machine base. The stable 4 tie-bar clamping system ensures perfectly centred force application. Peripherals are connected via plug connectors for temperature control, electrics and hydraulics (for instance core pulls) in close proximity of the mould. The injection units on the ECO ALLROUNDERS are impressive due to the high plasticizing levels and accessibility to the aggregate. The injection unit can be swung out towards the front of the machine, enabling the plasticizing screw to be changed easily. The plasticizing cylinder and screw can be changed very quickly because of centrally located quick connecting plugs and sockets. A low power connection value and minimal machine cooling water consumption as well as an excellent price/performance ratio make the ALLROUNDER 630 S ECO a

cost-efficient alternative for all moulded part manufacturers who wish to produce large volumes of standard moulded parts.

Thanks to its equipment features, the ALLROUNDER 630 S ECO sets standards in terms of energy consumption in particular.



MILESTONES



So-called “two-platen technology” is increasingly gaining significance in machine design. ARBURG presented this technological concept to the trade public for the first time as far back as 1971 at the “K” in Düsseldorf. However, at the time, the ALLROUNDER 260 machine type was very innovative for ARBURG in another respect as well.

The ALLROUNDER 260 was not only the first machine which ARBURG equipped with two-platen technology. It also premiered the first fully hydraulic clamping unit with four tie bars, and thus, no toggle. The ALLROUNDER which was being built and delivered by the end of the '70s was available in different versions with a PolytronICA II control system on the operator side, a central distributor manifold, two and four tie bars with clamping forces of 400 and 600 kN respectively, as well as with and without a swivelling clamping unit. As the ALLROUNDER 260 ES, the machine was even suitable for injection blow moulding and, combined with the interchangeable injection unit even versions with two injection units - was able

to cover a very wide range of applications.

In order to create the clamping unit with only two platens, the entire hydraulic

system for the clamping movement were moved to the injection side of the machine. The hydraulic clamping system acted directly upon the four tie-bars. The movable platen was securely mounted on the tie bars. In order to

perform the clamping movement, the tie bars moved rather than the platen. When opening the clamping unit, hydraulic fluid was applied only to two diagonally opposite cylinders instead of to all four. Hydraulic fluid was only used in all four cylinders for the closing and holding pressure.

The primary advantage of two-platen technology has remained unchanged over the years; the clamping system generates force much more quickly than the three-platen clamping unit, where the fluid is drawn from a central hydraulic cylinder. The resulting smaller footprint is of particular interest when considering a design for a moulding shop. The overall height of the ALLROUNDER 260 was also lower, which made it easier to integrate the machine into the production environment. A further advantage was that as there was no longer a moving unit behind the moving platen; this leaves more space for the relevant mould peripherals, as well as for the hydraulic ejector, unscrewing units or sensors.

The only problem which arose when using two-platen technology at the time was synchronising the motion of all four tie bars. If the clamping force built up irregularly, it could lead to tilting of the moving platen. This phenomenon is no longer a problem today thanks to the availability of corresponding sensors.

First ARBURG machine featuring two-platen technology: The 260 ALLROUNDER was available with clamping forces of 400 and 600 kN. The hydraulic system for the clamping movement was on the injection side.





TECH TALK

Jürgen Schray, Department Manager, Applications Technology

Adapted nozzle geometries

In the injection moulding process, the outlet geometry of the nozzle represents an important interface between the mould and plasticising. If the thermal transition from the cold gate to the nozzle bore through which the melt passes is not perfect, so-called "cold plugs" occur, blocking the outlet and leading to machine shutdown.

A "cold plug" in the nozzle leads directly to quality problems which are generally apparent from flaws on the surface of the moulded part. If the flow of molten material is completely blocked by a "frozen" nozzle, production is interrupted. Since the problem can only be rectified manually, this leads to lengthy downtime. Consequently, it was imperative

to include the nozzle geometry in the design of the injection mould and to adapt it to the shot weight and sprue diameter. Particular attention had to be paid to the land length of the bore, through which the melt passes to the outlet geometry. The rule of thumb here is that the land length of the bore is 0.5 and $0.8 \times \varnothing$, and should be counter-bored at an angle of 20° . The opposing hourglass-shaped cones created by the nozzle bore and the cross-section of the outlet form a predetermined breaking point, enabling the sprue to be demoulded without causing freezing.

If the injection moulding process requires long nozzle contact times, the surface contact area should be optimised, i.e. minimised. For example, heat transfer to the mould can be reduced by means of a recess in the nozzle

contact surface because the air in the recess acts as an insulator.

Extended nozzles, which are more than 20 mm longer than the standard machine nozzle, should always be equipped with a heater band in order to avoid problems with freezing nozzles and cold plugs from the outset.

Decades of co-operation

In 2004, three trading partners celebrated ARBURG anniversaries: Claus-Peter Dittmer (Ecuador) and Y.R. Anand (India) celebrated 25 years and Juan Carlos Lachica (Mexico) 10 years of partnership.

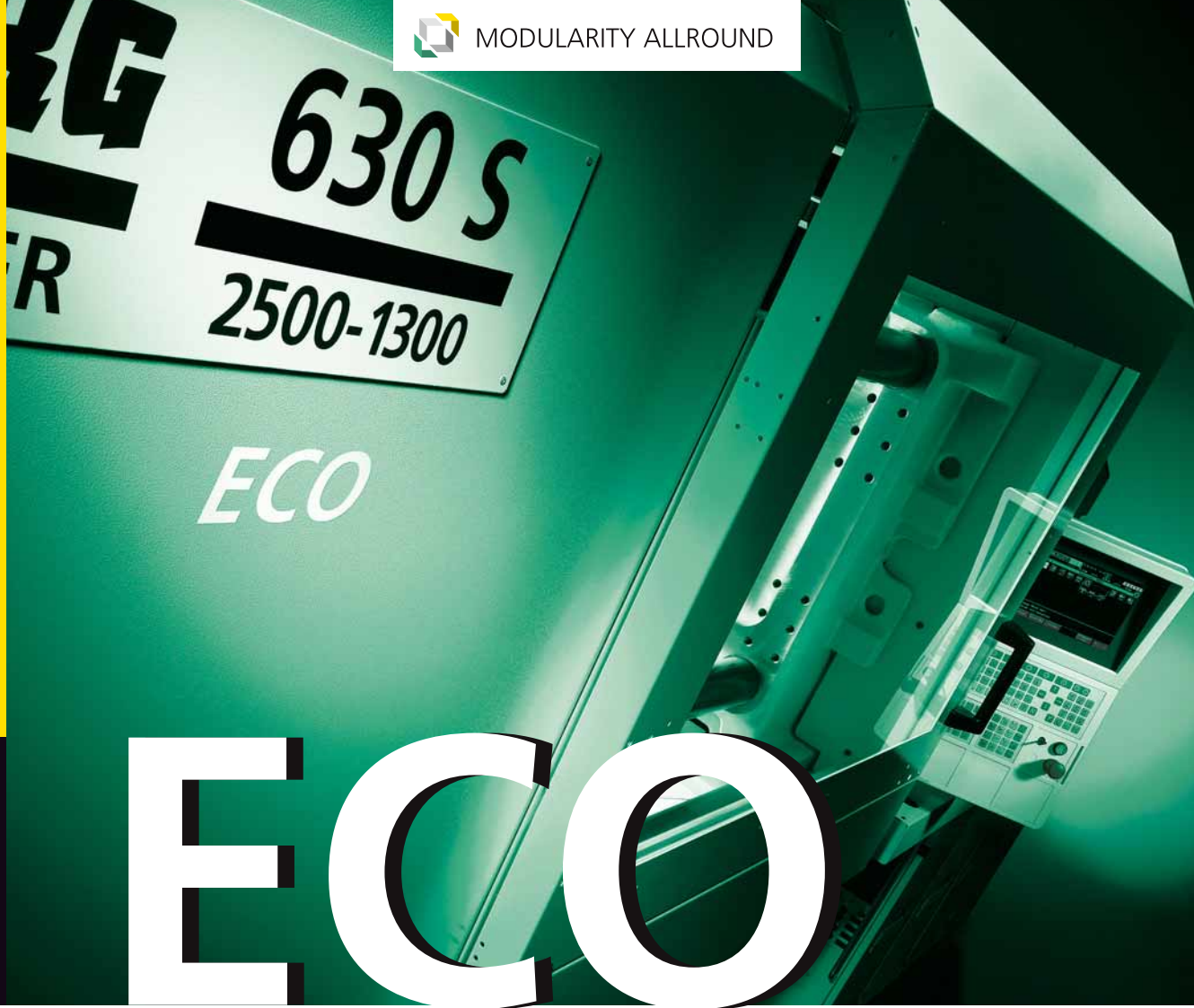


ARBURG is represented in 70 countries around the world. In addition to ARBURG's 21 subsidiaries and representative offices, numerous agents provide support to ARBURG's customers on-site around the world. As many of these successful co-operations have existed for decades, three anniversaries were celebrated in 2004: Claus-Peter Dittmer from Andinotec S.A. in Ecuador and Y.R. Anand from Unimark in India have been working as ARBURG trading partners for 25 years.

In Mexico, the company has been represented by Juan Carlos Lachica from the company Industrias Plásticas L y H, S.A. de C.V.

The three trading partners were in Lossburg for a training course ahead of the K 2004. Eugen Hehl took the opportunity to thank them in person for the successful years of co-operation and to award them anniversary certificates.

Eugen Hehl (on left in illustrations) presented Claus-Peter Dittmer, Y.R. Anand and Juan Carlos Lachica (from left to right) with their anniversary certificates.



ECO

Maximum cost-effectiveness together with optimal technical equipment – to your advantage as our customer. Featuring a clamping force of 2500 kN and injection aggregate sizes of 800 and 1300, the ALLROUNDER 630 S ECO has energy-saving

twin-circuit pump technology. Your advantage: A machine with an attractive price/performance ratio to meet all the requirements of injection moulding practices. The new 630 S ECO makes great technology “affordable”.



ARBURG GmbH + Co KG
Postfach 11 09 · 72286 Lossburg
Tel.: +49 (0) 74 46 33-0
Fax: +49 (0) 74 46 33-33 65
e-mail: contact@arburg.com

ARBURG