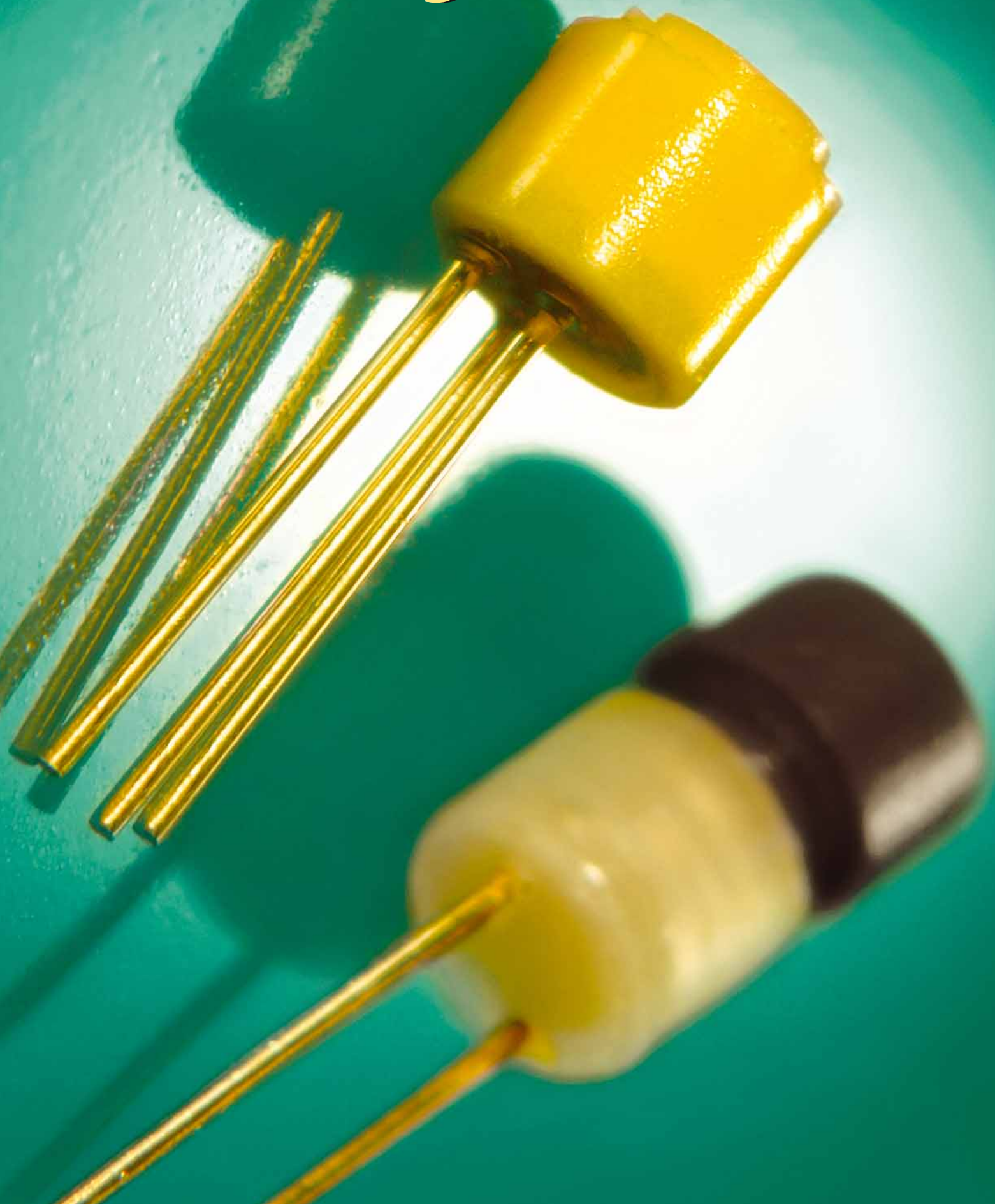


today

The ARBURG magazine

Edition 24

Autumn 2003



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IMPRESSUM

today, the ARBURG magazine, edition 24, autumn 2003

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Weights in the milligram sector, diameter 1.9 mm: push button PB100 and trimmer PJ63 from SonionMicrotronic for installation in hearing aids can be serially produced at a very high quality.

ARBURG



Dear Readers,

As you are all well aware, autumn once again heralds the start of the trade fair season! Whether it be Fakuma or the K trade fair, a major exhibition, which is well

worth the visit, is staged each October. ARBURG recognised that in our sector we can now no longer afford to continue the previously accepted practice of only introducing new products and services in the three-year cycle of the so-called "K years". Therefore at the Fakuma in Friedrichshafen we will be presenting world-wide product innovations and a new range of services. We would also like to present these advances to you in this edition of the "today".

Our customer magazine is well-known for providing our readers with a colourful and diverse picture of plastics injection moulding. Therefore, in this edition, we have once again put every effort into publishing fascinating reports on interesting customers and product solutions. And the fact that we were able to draw on abundant resources from our enormously diverse customer portfolio will be of no great surprise.

However, as we have discovered from a reader survey, there should still be enough attention given to news about our company and technical information. Therefore in this edition you will once again find a whole package of technical topics such as automation, the choice of injection units and optimum temperature control.

In connection with the "Medical technology" motto of this year's Fakuma we have included an interesting report which will shed light on the field of micro-technology. ARBURG has been a leader in this sector for a number of decades.

A wide variety of informative reports from the varied ARBURG world! We wish you a great deal of enjoyment while reading the latest issue of "today".

Yours,

Juliane Hehl



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New Machine

With an area of approximately 940m², and a two storey exhibition stand in Hall A3 ARBURG will be difficult to miss at the Fakuma. A suitable backdrop for numerous world premiers - the new, universal small machine ALLROUNDER 170 U, the new ALLROUNDER 520 ALLDRIVE with modular drive technology and an extended after sales service initiative, ARBURG Service Allround, will be presented at the show.

ARBURG has taken part as an exhibitor ever since the Fakuma first opened its doors in Friedrichshafen in 1981. The company traditionally uses this "International Trade Fair for Plastics Processing", together with the leading world trade fair, the "K", as a forum to present its innovations.

This year, the new ALLROUNDER 170 U with a clamping force of 150 kN will be premiered - this model is also available in a smaller size with a clamping force of 125 kN. The universal small machine was developed for the micro-injection moulding sector which is enjoying a boom in the areas of medical technology, biotechnology and electrical engineering

in particular. The introduction of the 170 U will illustrate that, despite the successful extension of the range to include clamping forces of up to 4,000 kN, the smaller clamping forces have not been neglected by any means.

Another new machine is the ALLROUNDER 520 A, which supplements the ALLDRIVE series with a clamping force of 1,600 kN. The principle of modular drive technology remains the same - the standard electric main axes for mould movements, injection and dosage can be combined with electric or hydraulic auxiliary axes, operating independently, depending on the operating requirements.

However the fact that developing new products involves far more than just the machines is illustrated by the extension of the range of services which traditionally play an important role at ARBURG. The facts behind the new after-sales service initiative, ARBURG Service Allround, will be presented for the first time in Friedrichshafen - from the beginning of the year 2004 ARBURG will be available around the clock and seven days a week for all its customers in Germany.

But there will be a lot more happening at the exhibition than this. The large ALLROUNDER 820 S will be a highlight at the fair, in the true sense of the word. This machine was first presented in Friedrichshafen in 2002 and can be seen this year as a two-component machine.



s, New Service

An attaché case bearing the ARBURG logo will be produced. The moulded parts will be removed by the MULTILIFT HV robotic system, which enters the mould horizontally, picks up the parts and then sets them down vertically. In addition to this hybrid version, which combines a horizontal and vertical robotic system, the horizontally-operating MULTILIFT H will also be demonstrated on two other exhibits.

The tenth anniversary of the SELOGICA control system will also be a special focal point of the trade fair appearance (also see p. 18 Milestones). The special anniversary offer, the ALLROUNDER C "control+" special model with its comprehensive control package and attractive cost/ performance ratio, will be just one of the exhibits connected with this theme. The emphasis will be on presenting special SELOGICA functions on each of the individual machines on display, in real time, capable functions of the SELOGICA control system. Therefore the visitor will be given the opportunity to make a tour of the stand with the "SELOGICA functions".

True to its motto MODULARITY ALLROUND, ARBURG will be presenting a comprehensive range

of its modular products, including the "advance" special model, which, after its great success in connection with the C series, is now also available for S machines.

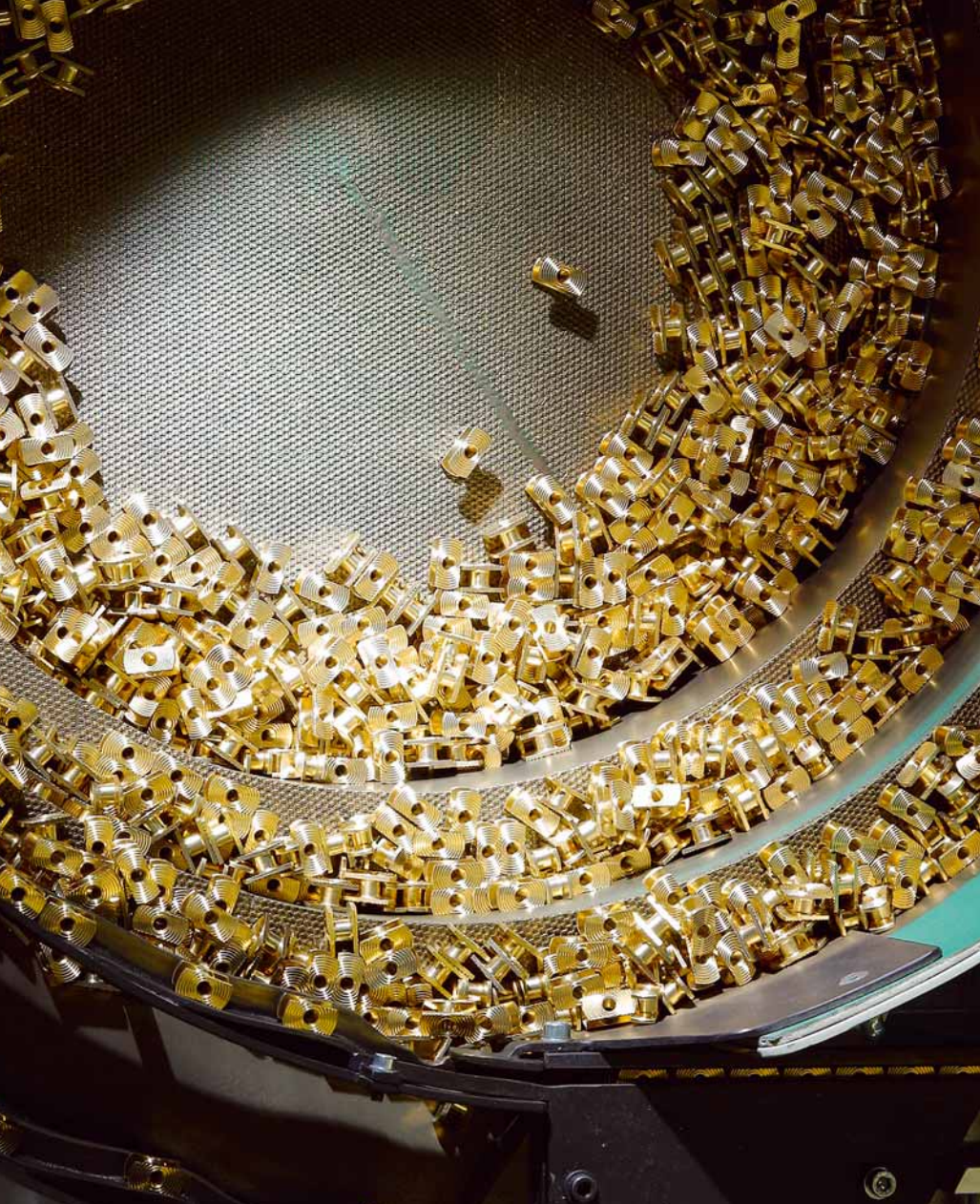
Applications from the fields of medical technology and packaging, precision and multicomponent injection moulding, thermo-set processing and insert encapsulation will also serve to demonstrate the wide range of uses of the ALLROUNDER.

For ARBURG, Fakuma is once again a global forum of innovations. This year it will be the ALLROUNDER 170 U (left) and the ALLROUNDER 520 A (right) which will be premiered.





Small Parts, Big Name



We produce small, detailed, precision parts – in their entirety! What can be summed up by Peter Halverscheid, managing partner of JuHa Kunststoffverarbeitung GmbH & Co. KG in Lüdenscheid, in such a friendly, easy-to-understand way, appears much more complex on closer examination.

The company, founded in 1983 by Peter Halverscheid and his business partner Bertold Junker, manufactures complex, high-quality products from silicone and thermoplastics for purchasers for the automotive industry across the globe. Exemplary product parts for well-known names in the automotive industry like BMW, Daimler Chrysler, Volvo, Renault, VW and Skoda can be seen on display in the showcases.

Water-proof plug connections, with a double locking mechanism for example and recess for headlamp assemblies, water-resistant sealing elements, membranes or the complex mechanism for a sunroof – this is only a small selection from the wide range of products, which covers part weights from 0.1 to approximately 300 grams. Multi-component injection moulding, composite technology with automatic insertion and assembly during the injection cycle are used in addition to conventional injection moulding processes.

The partners Junker and Halverscheid began to work together as early as 1974. This is



mes

when the present partner company, Junker & Halverscheid Formenbau GmbH & Co. KG, was founded in the southern area of the Ruhr Basin, which was well-known for its mould construction companies. "And mould construction still plays a central role for our company, as, in addition to excellent machinery, the quality of the moulds is a decisive factor in the quality of the final product", commented Erich Schmidt, Technical Director at JuHa, as he explained the company's philosophy. Therefore both companies are located "under one roof" in order to ensure that cooperation and lines of communication run smoothly.

From the very beginning of their production of plastic parts, the company from Lüdenscheid put its faith in ARBURG machines as the guarantee for the high degree of precision needed for their products. And they always performed excellently, as Schmidt and Halverscheid explicitly underlined. Today, 37



ARBURG ALLROUNDERS with clamping forces of between 250 kN and 2000 kN can be found in the machine halls which are now outgrown. Therefore an expansion of the production area is planned. The same applies to the field of human resources - there are currently 120

employees who are supported by 15 additional subcontract workers. The number of employees is scheduled to increase rapidly.

The quality of the products is one of the factors which determines the extremely positive business development of the company. Comprehensive service provision is the other. Adherence to delivery schedules and good performance levels are also quality issues which are closely monitored by the automotive industry. "We are subject to a great deal of pressure when it comes to engineering and production quality. If the performance and the quality are the same the service provision is the decisive factor in the supply sector", commented Erich Schmidt. "From the initial product idea to the finished part" is JuHa's maxim as a certified systems supplier.

And JuHa is A1 in this field - 98 percent of the company's customers are multinational concerns with enormous purchasing potential but also with high demands with respect to comprehensive services. "The market decides on the rules", is how Peter Halverscheid describes the business. And therefore they would - if required - go along with the automotive industry in the future, even though JuHa is actually a supporter of central production systems. But the company from Lüdenscheid wants to remain faithful to one part of the company philosophy at all costs - the sophisticated products are to be produced independently, under their own direction. "Which, incidentally, has clear parallels to the extremely agreeable philosophy of our machine supplier ARBURG, which is probably why the partnership between us works so well", asserted Erich Schmidt.

With this philosophy, the companies Junker und Halverscheid Formenbau GmbH & Co.KG and JuHa Kunststoffverarbeitung GmbH &

Erich Schmidt (centre, left) and Peter Halverscheid on a tour of the company with ARBURG partner, Juliane Hehl.



Co.KG were able to increase their turnover by more than 20 percent in the year 2002. And the prospects are positive - an end to this healthy growth is not to be expected with this quality performance and with this customer portfolio.

INFOBOX JuHa

Founded: 1983

Partner companies: JuHa Kunststoffverarbeitung GmbH & Co.KG and Junker und Halverscheid Formenbau GmbH & Co.KG

Employees: 120, plus 15 subcontract workers

Machine fleet: 37 ALLROUNDERS

Specialised areas: High-tech products made of silicone and elastomers for the automotive industry

Location: Auf dem Schüffel 2, 58513 Lüdenscheid, Germany, www.juha.de



At SonionMicrotronic, precision is of prime importance at all production levels.

This also applies to quality assurance.

for Optimum

Many factors contribute to smooth communication. Among the most important is doubtless to make oneself heard properly. The product range of Sonion, a globally operating manufacturer of micro-components supports the implementation of individual communication solutions. From tiny microphones and mobile phone components through to parts for headphones and high-performance hearing aids - Sonion components are contained in all of these. The Sonion Microtronic range covers the entire hearing aid component sector. 25 ALLROUNDERS and many years of cooperation between the two companies have helped to provide SonionMicrotronic with an outstanding market position.

With approximately 1,300 employees SonionMicrotronic is, according to their own figures, the world's largest supplier of components for the hearing-aid industry and mainly produces micro moulded parts for the electro-mechanic and electro-acoustic sectors as well as sub-parts for the telecommunication

production of the sister company, SonionKirk. Today, Sonion has subsidiaries in Denmark, the Netherlands, Poland, the USA and the People's Republic of China. In the manufacture of micro-components in particular, highest precision and quality are required. In this sector the company works with processes such as the micro-winding of aluminium wires, the handling of micro-thin films, the laser welding and drilling of these structures, as well as the bonding of minute parts into complete components.

This also applies to the production of injection moulded micro-components. The collaboration between SonionMicrotronic and ARBURG focuses mainly on moulded parts production using small ALLROUNDERS. The biggest machine producing at SonionMicrotronic is a 270 S 250-60. But the company's machine fleet is continuously kept at a very advanced level; there are a large number of S and C ALLROUNDERS with 35, 55 and 60 series injection units in the production halls. Production must meet very high quality requirements

with regard to performance, service life and strength in order to find application in hearing aids for daily use, which range from so-called "in-the-ear" devices to those worn behind the ear.



The company ensures a high degree of flexibility in production and cost-effectiveness by the use of semi and fully-automated production processes in which the ALLROUNDER injection moulding machines are integrated. Automated processes and production cells also play a significant role in the consistent quality



Good Hearing

Communication!

required with regard to the SonionMicrotronic product range. And thus we come full circle.

SonionMicrotronic sees itself as a systems supplier, providing customer support from the design stage through to delivery of the finished products. Particularly because the work carried out is in the micron range, developments are often at the cutting edge of what is possible today.

The injection moulds required for micro-component production are also constructed and maintained at SonionMicrotronic in order to guarantee the required quality – tolerances down to 0.02 millimetres, processing of material thicknesses of 0.1 millimetres. The independent "Plastics Injection Moulding Center", which works under its own responsibility, is continually investing in its fleet of machines in order to guarantee high quality production. Its quality assurance is ISO certified and is complemented by further internal monitoring mechanisms.

In the production of hearing aid components, a wide variety of materials are used, including high-tech materials. Examples include glass fibre filled polyamide, PPS, PEEK, ABS, LCP and TPU. The high production quality of the ALLROUNDERS as well as their reliability

and practicality have all been proven in the production of ultra-small parts. Of the company's 28 machines, 25 are ALLROUNDERS, with clamping forces ranging from 150 to 350 kN. Owing to the special demands placed upon the moulded parts, all the peripherals for the machines are produced in-house by SonionMicrotronic. Production runs round the clock, seven days a week.

SonionMicrotronic particularly values ARBURG's fast service and the support it provides. When spare parts or a technician are required, machine downtime can be effectively kept to a minimum. The short delivery times for new ALLROUNDERS is a further important reason for the company's cooperation with ARBURG. Not least, however, the high performance and reliability of the ALLROUNDERS and the logical structure of the SELOGICA machine control system are decisive factors why SonionMicrotronic has been working with ARBURG machines for many years. The ARBURG ALLROUNDERS are mainly involved in the production of high-end components for SonionMicrotronic and SonionKirk. For example, with the PJ62/63, an adjustment device to help ear specialists set hearing aids, SonionMicrotronic manufactures the smallest

electro-mechanically operating sub-assembly in the world, with a diameter of only 1.9 millimetres.

INFOBOX SonionMicrotronic

Founded: 1974 in Roskilde, Denmark, subsidiary of Sonion A/S

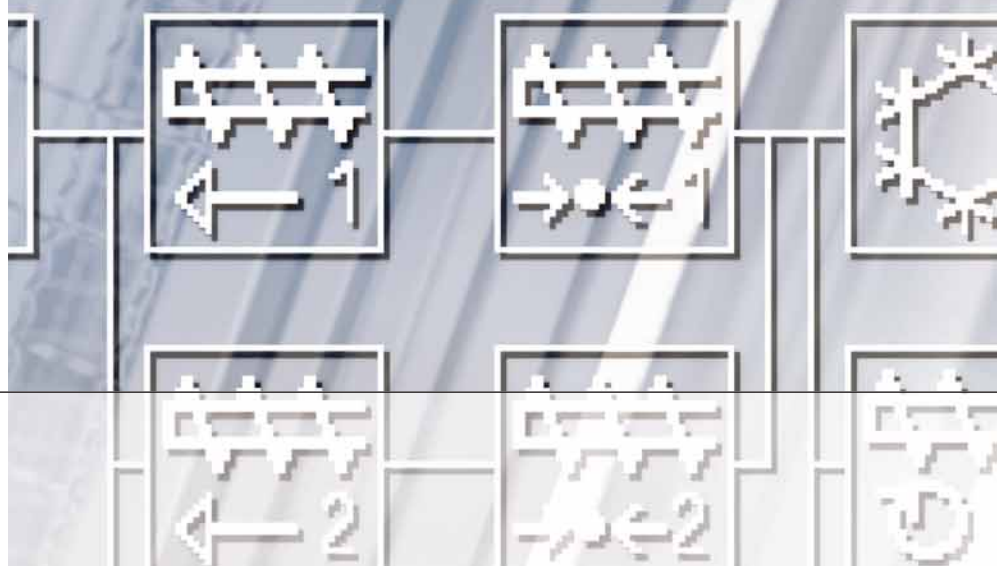
Worldwide: Supplier of microparts and components for the hearing-aid industry

Systems supplier: In-house mould construction, design and production

Specialised areas: The production of high-precision minute parts

Location: Byleddet 12-14, DK-4000 Roskilde, Denmark, www.sonion.com

The SELOGICA control system provides decisive advantages with respect to complete production cells due to the possibility of integrating the robotic system and peripherals.

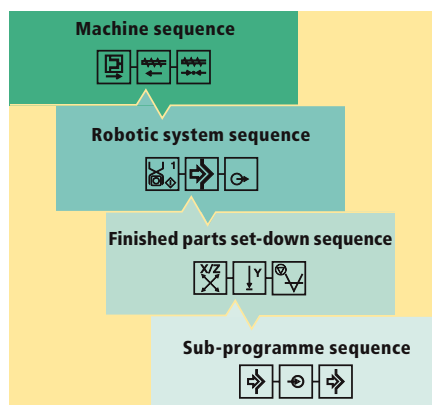


Structured Optimisa

To go from the plastic granulate directly to the packaged finished part is no longer just a dream. Robotic systems and peripherals are undertaking increasingly more complex tasks in the direct vicinity of the injection moulding machine – from assembly and insertion operations, through quality control to the predefined placement of parts in packaging containers. These self-sufficient operating production cells present a challenge, particularly in relation to the control system.

To have the entire process under control, without circuitous routes, is also one of the central points of the SELOGICA control system philosophy. Instead of linking several "islands", which are independent of each other as far as the control system is concerned, the injection moulding machine and robotic systems cycles, as well as the activation of the peripheral devices, are directly integrated into the SELOGICA control system. This ensures that the entire production cycle can be programmed, structured and optimised centrally via a control system - without the need to modify or use other systems or interfaces.

The graphical sequence programming, known from the machine sequences, forms the basis for this. The robotic system sequence is created in a dedicated sequence editor as a flow diagram by means of icons. In addition to this, other sequence editors and sub-programmes are available for special operations. Simultaneous robotic system movements or



stroke initiations which are independent of the positioning axes can also be directly integrated into the sequence. During this process the SELOGICA checks the plausibility of all the operations and calculates possible positions for new functions or links within the sequence.

Complex automation solutions can sometimes demand extremely complex programmes - currently amounting to a maximum of 200 individual steps. This is augmented by frequently changing sequences as, for example, the robotic system has to follow different paths when taking random samples or for pattern set-down than it did for the previous cycle. Therefore repeats or branching off can also be programmed into the SELOGICA control system. For example, if a defective part is identified during an input enquiry, a special sequence for placing defective parts is initiated instead of pattern placement.

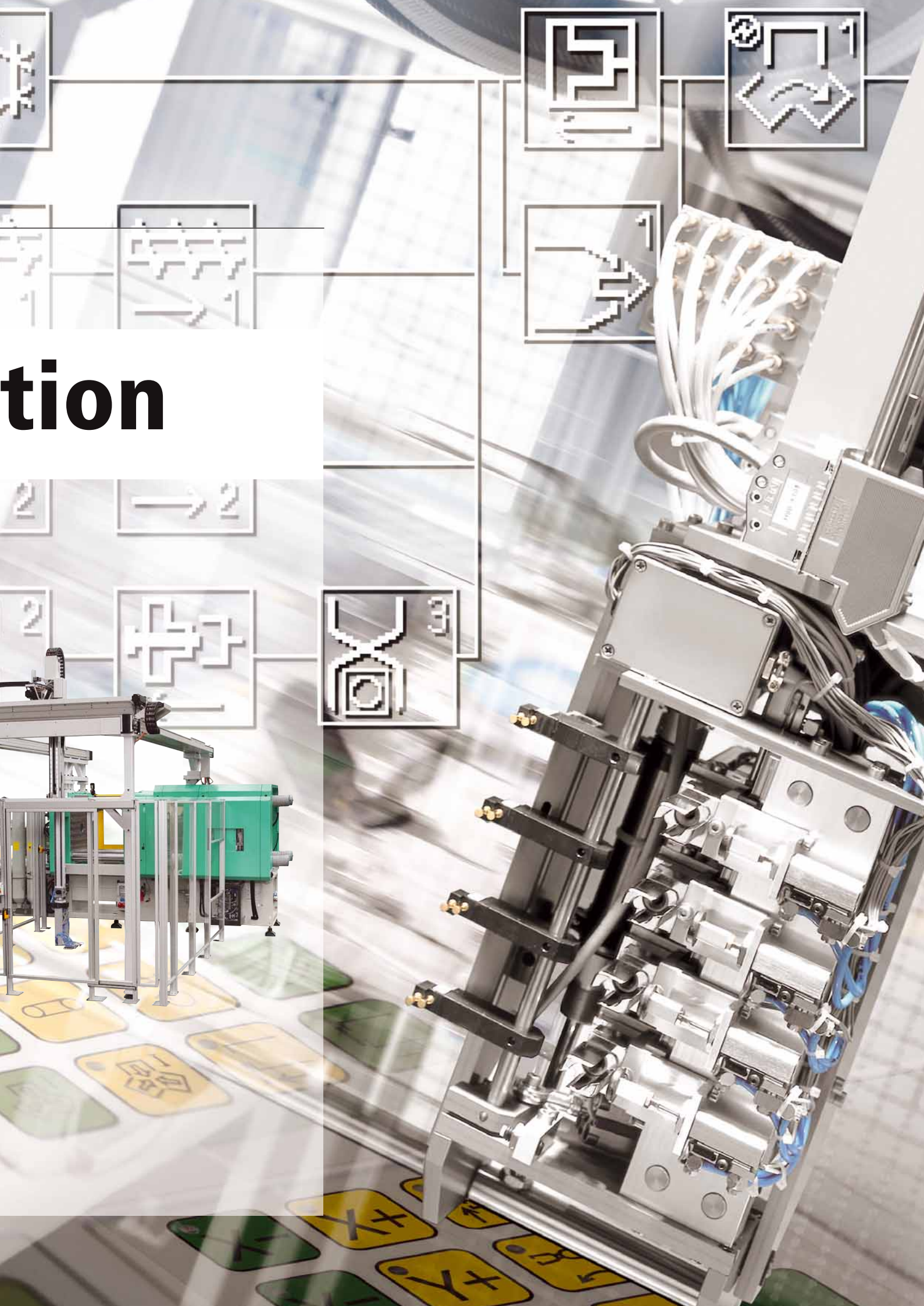
Complex, self-contained sequences, such as pattern set-down of the finished parts or picking up inserts for example, are put together in

a dedicated sequence editor, separate from the main sequence, and are synchronised with the robotic system sequence via a predefined start point. In order to be able to keep a track on so many sequences it is possible to group together several icons, such as gripper functions, within the flow diagram.

The SELOGICA, with its structured programming, provides some decisive advantages - in addition to the time saved when creating new data records, even highly-complex production processes can be displayed in an easy-to-understand way and can therefore be easily tracked at any time. The ability to be structured in functional groups or dedicated sequences ensure that individual operations can be localised and modified quickly. For example, if something has to be changed in the set-down pattern the finished part set-down sequence editor can be called up independently – all other operations which have no connection to the set-down pattern are managed in the other sequence editors.



tion



Top Player in Elastomers

The more specialised the task, the greater the demands. This applies to customers in exactly the same way as it does to processing techniques. Rico, one of the few globally operating mould and layout constructors specialises specifically in the field of elastomer processing, uses this motto as the basis of its own company philosophy. In order to operate successfully on the market, qualified employees, a structured company concept, speed and quality are required. With its ALLROUNDERS, ARBURG helps to make these principles become a reality.

Founded in 1994 in Thalheim near Wels in Austria, the history of Rico reads like a traditional American success story. The company's three founders took the step of forming their own company as they viewed elastomer processing as a market of the future, just as they do today.

Currently, Rico exports nearly 100 percent of its products - mainly to central and northern Europe with the focus being on Germany, Switzerland, Italy, France and Scandinavia. The USA is one of Rico's prospective markets whereby, according to Gerhard Kornfelder, co-founder with responsibility for Sales and Applications Technology at Rico, the following principle also applies to the potential development of this economic region: "We are concentrating solely on our core area of expertise in which we have many years of experience - the production of elastomer moulds and creating turnkey installations for elastomer processing. It is then down to our customers to produce these parts."

Rico's technological lead, as far as the key sectors are concerned, is protected by patents.



Photos: Rico

The silicone moulds are equipped with a special cold-runner and vacuum system which allows for waste-free and burr-free production without the need for secondary operations. The company manufactures moulds for processing LSR, solid silicone and rubber on a 100% in-company basis and provides support for the core aspects of manufacturing with a high proportion of in-house manufacturing under their own control. In order to achieve this there is not only an in-house construction area but also an affiliated hardening shop which pre-treats the tool steels in a special process which Rico guarantees will yield production of one million parts as well as two years of problem-free operation.

As a system partner for the customer, Rico not only constructs the moulds in accordance with customer specifications but also provides support from the development stage to manufacture through to production. Training courses and on-site support for commissioning moulds or installations rounds off the company's range of services. So-called "turnkey" projects are being used for an ever-widening spectrum. In this respect Rico is not only involved with the manufacturing of moulds and the related auto-



mation, but also the selection of the machine and its specifications as well as the associated peripherals. The relationship with their cooperation partner, ARBURG, is also an important factor here. ARBURG either directly refers silicone customers to Rico or Rico approach the company with a specific machine inquiry.

After having successfully completed the quotation stages, the machine specifications, the design of the mould and the automation are worked out by Rico in cooperation with the customer and ARBURG. The resulting article/machine checklist is submitted for confirmation. With regards to the development of parts, Rico achieves quick results, for example with material selection, due to a well-thought out sample mould concept. The mould remains the



same to a large extent - only the mould inserts are changed. Therefore, according to Gerhard Kornfelder, it is both possible and important to include Rico into the parts development/project planning as early as possible.

During the construction phase the customer has repeated opportunities to see how things are progressing and to make their wishes known. Rico then provides the initial sample and the relevant test and data reports by an agreed delivery date. After the customer has given their acceptance, a hand-over date is agreed in Wels which includes a training course on an ALLROUNDER and the mould.

Kornfelder expects to see further growth in the future, particularly in the area of project business, which Rico procure in cooperation with ARBURG. The company is also considering expansion on an international basis. After the joint appearance at this year's NPE in Chicago, at which Rico was on the ARBURG stand for the first time as an elastomer specialist, good contacts in the American market have been established. "But it will be impossible to succeed there without a service partner", commented Kornfelder, explaining his intentions.

From a technological point of view Rico is putting his trust in the bonding of plastics and elastomers in the field of two-component injection moulding. He also believes that there is a demand to be ex-



ploited in this area too, especially in the automotive and medical technology sectors.

Kornfelder is extremely happy with his ALLROUNDERS and the cooperation with ARBURG. "The joint trade fair appearances are of great benefit and the SELOGICA control system was, of course, a real success for the special processing techniques in particular, as it can do without separate control systems and remains easy to operate despite complex processing operations. As the SELOGICA is also ideally suited for two-component production we will also be putting our faith in ARBURG in this sector. Another joint trade fair exhibit is also planned for the K 2004 which will focus on this particular production process."

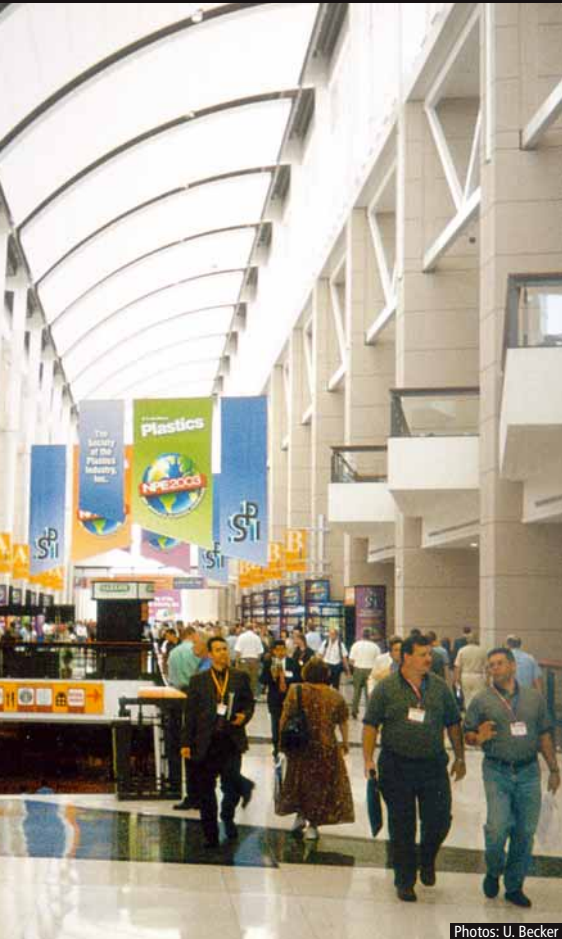


Rico is a system supplier: In Thalheim the customers are given support beginning with the design of the parts through mould construction and production to evaluation.

INFOBOX Rico

- Founded:** 1994 in Thalheim
- Employees:** 60, an increase to 70 is planned
- Range:** Elastomer moulds, production facilities for producers and suppliers
- Customers:** Automotive, medical technology, hygiene, white goods, baby supplies
- Annual production:** 40 to 50 moulds with automation
- Project business:** 50 percent of orders
- Machines:** Four ALLROUNDERS for evaluation, fifth machine (2K) has already been ordered
- Location:** Am Thalbach 8, A-4600 Thalheim/ Wels, Austria, www.rico.at

Successful Appearances



Photos: U. Becker

McCormick Place - The NPE exhibition centre is impressively located against the backdrop of the Chicago skyline, on the banks of Lake Michigan.

In May and June two important trade fairs were on the ARBURG calendar both of which take place on a three-year cycle - the Plast in Milan/ Italy and, seven weeks later, the NPE in Chicago/ USA. The modular ALLROUNDER range was successfully presented at each trade fair on exhibition areas of around 640/ 770m².

The entire sector placed its hopes for an international upturn in the NPE in particular, which is the most important plastics trade fair for the American market and the world's most important after the "K" in Düsseldorf.



Despite the fact that visitors, trade journalists and exhibitors all agreed that these expectations were not fulfilled, ARBURG was able to provide impressive proof of the capability of its ALLROUNDERS in Chicago, as it had already done in Milan – an accomplishment which is sure to pay dividends in the future.

As ARBURG thinks and acts in an extremely future-oriented manner, the great importance of trade fairs is appreciated even in difficult economic times and exhibition appearances are therefore made. Irrespective of whether

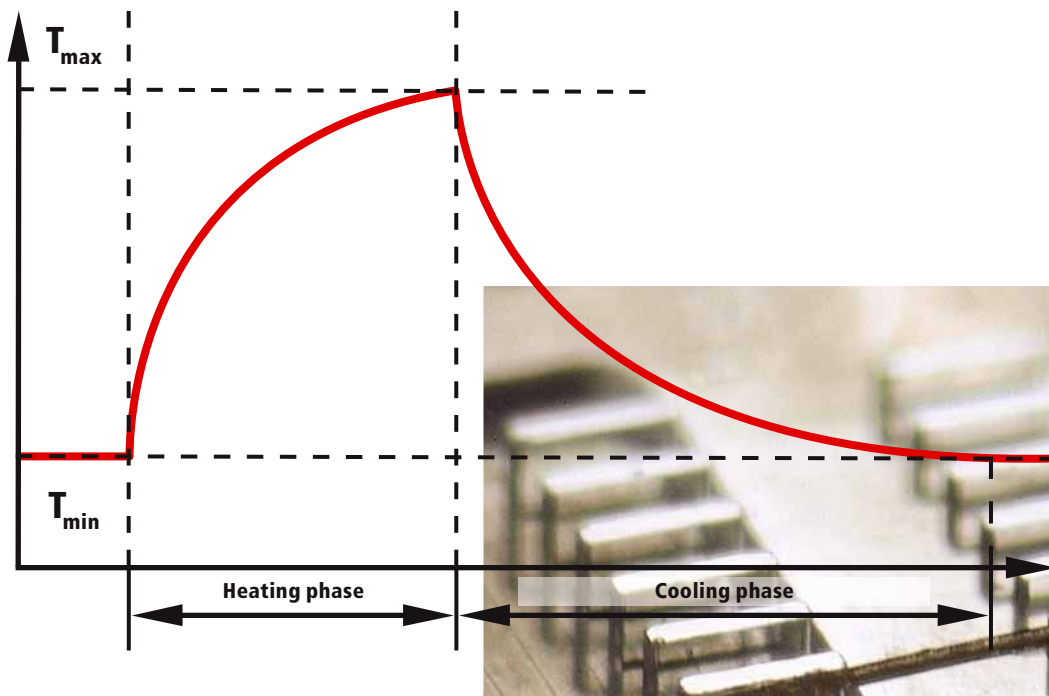
an important plastics trade fair in Europe or America is involved, the ARBURG exhibition stand can be recognised at first glance thanks to its uniform design.

Under the motto MODULARITY ALLROUND the trade visitors at the Plast (nine exhibits) and at the NPE (eleven exhibits) were provided with a comprehensive overview of the ALLROUNDER's modular product range and its versatile application spectrum.

The focus of both trade fair appearances was the large ALLROUNDER 820 S with a clamping force of 4,000 kN, which was seen internationally in Chicago for the first time as a two-component machine, as well as the up-to-date topic "Modular drive technology".

The two ALLROUNDERS 420 C and 470 C were both presented as "advance" special models with electro-mechanical dosage drive, the ARBURG energy-saving system AES and a position-regulated screw.

The ALLDRIVE machine series, in which the standard electric main axes can be combined with electric or hydraulic auxiliary axes, was represented with one machine for each version. Medical products were produced on these machines. While at the NPE exhibit the nozzle movements and core pulls were driven hydraulically, the ALLROUNDER 420 A at the Plast was presented as an all-electric machine.



Optimum Temperature Control

In order to be able to mould small precision parts or microstructures accurately, maintaining special temperature sequences in the mould is a frequent requirement. A process used in this field is variotherm mould temperature control by which the temperature in the cavity at the time of injection is adjusted to that of the flowing melt.

The aim of variotherm mould temperature control is cyclic heating and cooling of the cavities. In order to ensure that the plastic melt fills the mould optimally and that the mould contours are perfectly moulded, the cavity is heated to the melt temperature before the injection process. At the end of the filling phase a rapid reduction in temperature, to a specified nominal value, is achieved allowing the moulded part to be easily demoulded.

Variotherm temperature control can either take place indirectly by means of the heating system integrated into the mould – liquid medium circuits, heating cartridges, induction coils – or by heating the mould directly via induction coils.

In a procedure with two isolated liquid medium circuits, maintained at different temperatures, in each mould half, an external circuit is provided for heating the mould structure and

an inner circuit for heating the cavity directly.

Alternatively, electric resistance heating elements (heating cartridges) or induction coils can be used in the mould. The advantages are quicker heat distribution and reduced cooling times.

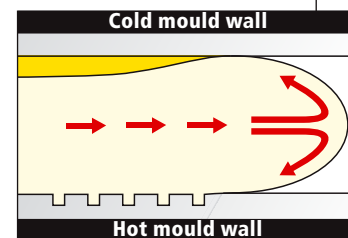
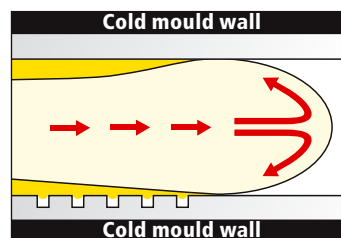
As a large installation area is required for the integration of induction coils, this variant is almost exclusively used for single-cavity moulds.

Furthermore, a mould can be heated directly by means of induction coils by positioning them immediately in front of the cavity when the mould is open by means of a robotic system.

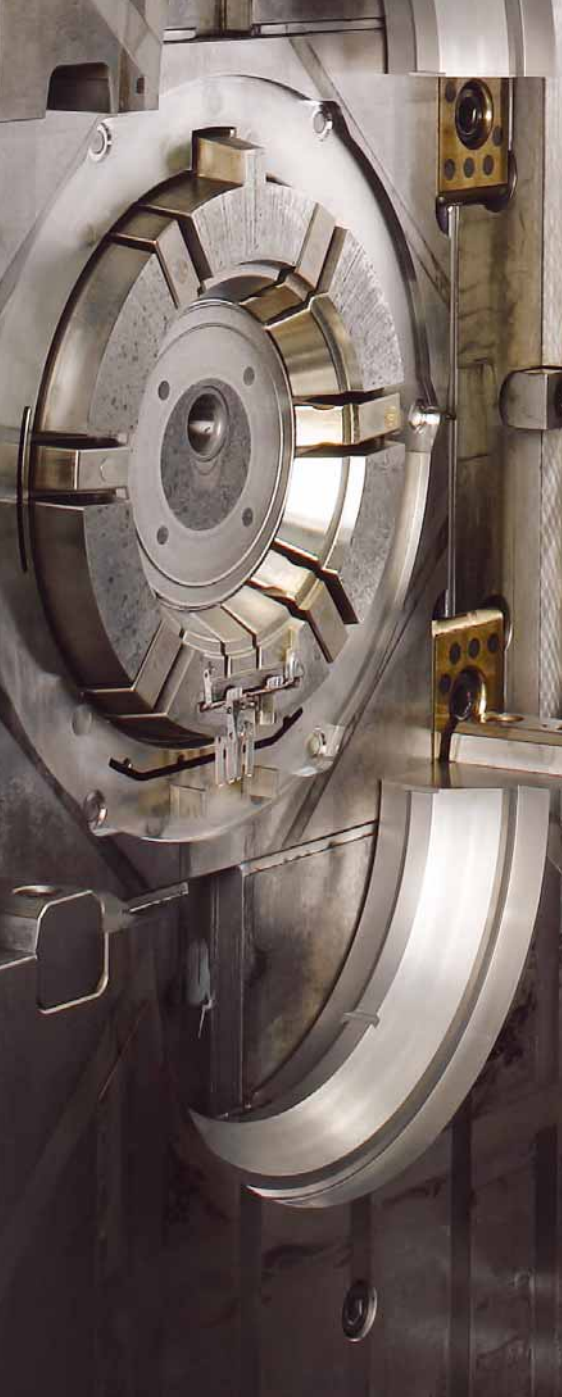
Because the evacuation of the cavities plays a decisive role in the moulding of microstructures with, usually, very high injection speeds, vacuum units are used to remove the air from the mould cavities.

Temperature controlling and monitoring by the variotherm mould temperature control system as well as the vacuum control system are available as options for the SELOGICA control system. All mould temperature con-

trol sequences can be directly integrated into the sequence editor and monitored via the control system.



Comparison of the moulding behaviour of the melt with traditional (left) and variothermal mould temperature control.



Automation in

Belgium but also in another plant in Poland. A joint venture, TMR plastics, was founded for this purpose and is responsible for production and sales in Eastern Europe.

At the beginning of the 1970s, at the time the company was founded by Jan Truyens, production began with the manufacture of parts for lights and security equipment, for Philips among other customers. At that time, twelve employees worked on five injection moulding machines. Today, the company exports its products to all countries in Europe as well as to the Middle and Far East.

Exporting parts to the Middle and Far East? But this is where many plastic parts are exported from for the European and North American markets. What, at an initial glance, seems paradoxical, has its origins in a major rationalisation project and is therefore a consequence of the focus on complex part designs. And this is where Plastruco would also like to be in the future - highly-technical, high-precision parts are to be produced on automated production lines using state-of-the-art processes: thin wall injection moulding, encapsulating inserts, silicone processing.

It is for exactly these processes that the Belgians, as they say themselves, have brought an expert partner on board - ARBURG. From a total of 40 injection moulding machines in the company, 30 are ALLROUNDERS. with clamping forces of between 250 and 5000 kN. Production is carried out five days a week in a three-shift system, round the clock. On these units high-precision parts are produced for the automotive and electronics industry, security systems, IT parts, components for telecommunications, lighting and white goods, using all the common engineering and high perform-



ance plastics. In the last six months alone 13 new machines have been delivered to Belgium and Poland,

The latest unit to be delivered produces loudspeaker holders for cars fully-automatically. In addition to the ALLROUNDER injection moulding machine the production system incorporates a robotics system for removal, a turning station, a bonding station, an assembly station for seals and a conveyor belt. The parts are transported in the turning, bonding and seal assembly areas by means of a rotary table. The overall sequence in individual stages first, metal contacts are taken by the robot from the feed singling station which are then placed in a two-cavity mould and are then encapsulated. The MULTILIFT V enters the open mould and then removes the finished parts by means of a

The Belgian company Plastruco has carved out a clear position for itself since it began operation - those wanting to produce high-precision technical parts will find exactly what they are looking for at the Europark in Houthalen. And the figures prove that the company's customers are of the same opinion. Between 1997 and 2001 Plastruco doubled their turnover.

But it was not only the specialisation of highly technical parts which led to the company's rapid development, but also major rationalisation measures by means of a high degree of automation in the company's factories. Today, Plastruco not only produces its parts in

capital letters



The focus on complex part designs, which are produced by highly-automated production cells, has also brought success for Plastruco in the Asian market.

stroke unit with a suction plate. Next, the immersion axis travels to the insertion position, the gripper centres itself on the mould and the stroke unit pushes the contacts to the pre-centred position. The contact gripper is opened via an additional ejector and the contacts are pushed fully into the mould. The mould's slides then fix the contacts for encapsulation.

The finished parts are set down on the rotary table's turning station, where they are held by the vacuum. The parts are turned over and are transported from the rotary table to the bonding station where a Scara robot applies the adhesive to the two moulded parts. The seal is picked up by and pressed onto a pick and place device from a shaft magazine. The rotary table then turns, the finished parts are removed by the robot and are set down

in stacks on the conveyor belt. An additional two-station rotary table for the seals ensures that further stacks of seals are made ready without interrupting production.

Plastruco views the cooperation with ARBURG, which has stood the test since the end of the 1970s, as being extremely positive – not only due to the ideal functionality of the system described. The question of how the management team rate the machine technology from ARBURG in comparison to other manufacturers is answered with a simple "The best". And what is Plastruco's overall assessment of ARBURG? A simple answer is sufficient in this case as well - "Excellent with respect to both technology and service".

INFOBOX Plastruco Technics

Founded: 1973

The company: Joint Venture TMR Plastics in Poland since 2002

Employees: 75 in Belgium, 15 in Poland

Machine fleet: 40 injection moulding machines, 30 of which are ALLROUNDERS

Specialised areas: Thin wall technology, two-component silicone processing, the encapsulation of inserts

Certification: DIN EN ISO 9001 since 1992, DIN EN ISO/TS 16949 scheduled for the end of 2003

Location: Europark 2073, 3530 Houthalen, Belgium

MILESTONES



It was exactly ten years ago that ARBURG set new standards with respect to the operation of injection moulding machines with a completely new control philosophy. And the development is a long way from being completed.

The task which, ten years ago, led to the introduction of the SELOGICA machine control system was to enable the increasingly complex machine sequences and their interrelations to be controlled easily. The control system developers at ARBURG attacked the problems involved in having to write individual programs for special injection machine sequences in two ways. On the one hand, the operational structure was to be simplified in such a way that the number of icons and parameters in the control system would be reduced, depending on the equipment. On the other hand a logical, easily understandable screen was to pre-structure the numerous parameter icons to make the entire production cycle more simple to understand. Therefore the SELOGICA was structured in a hierarchical way in accordance with the set-up sequence. This sequence-oriented operation with graphical user interface was, at that time, a total innovation for control systems on the market and was therefore patented.

With the new SELOGICA a so-called sequence editor was introduced which was able to manage all the equipment-specific configuration options. If the machine operator had entered the mould-specific ALLROUNDER equipment at the first level, a basic machine sequence would be displayed on the control system's screen

which contained all the movements, divided into different stages. It was then possible for the installation technician to intervene in this sequence to make any necessary injection moulding related changes.

The sequence editor became transparent and simple and quick to understand due to two factors:

- For the first time the machine cycle was displayed graphically in the form of a flow diagram with recognisable pictograms on a coloured screen.

- The entries made by the installation technician and the operator were, again for the first time using this method, subjected to a plausibility check carried out by the control system, in order to prevent operating errors, damage to the mould and rejects.

The parameter icon level could only be accessed after the graphical level. Only those parameter icons were displayed which were selected in the configured production sequence. From 1998 onwards the SELOGICA was used on every machine to control all the ALLROUNDERS - both standard and special machines.

The intensive link-up of peripherals and machines within the framework of setting up modularly structured automation, which was achieved at an early stage, also proved to be an important feature of the SELOGICA over the years. When, with the development of the MULTILIFT robotic system, ARBURG took decisive steps towards production cells, this foresighted approach proved to be a logical move.

Tens years as an ARBURG standard and still ahead of its time - the SELOGICA with graphical sequence editor, plausibility check, quality assurance and the integration of peripherals.





TECH TALK

Dipl. Ing. (FH) Marcus Vogt Technical Information

Targeted Choice of the Ideal Injection Unit

At the first glance it appears to be a simple calculation – the shot capacity and therefore the dosage volume determines the size of the injection unit. However in practice, there are other important factors which definitely have to be taken into consideration when deciding upon the injection unit size.

When making a decision based on shot capacity and dosage volume one must bear in mind that the ideal screw operating range is between 20 and 80 percent of the maximum possible injection volume. If operation is carried out at the lower end of the injection volume, increased process fluctuations can be expected. The reason for this is poorer dosage

behaviour, too long dwell times and the closing characteristics of the non-return valve. On the other hand, too large a load results in an increase in trapped air and, due to lower dwell times, in inhomogeneous material. These can then be seen in the moulded part in the form of non-melted particles or poorer mechanical properties.

In addition to the required shot capacity, the melting capacity of the injection unit is another decisive selection criteria. It is determined by means of the screw pitch volume and the material-specific dwell time. The minimum dwell time required – approximately 30 seconds for solid plastics and approximately 60 seconds for engineering plastics – therefore limits the maximum possible melting capability of the plasticising unit.

With high injection flows and pressures, which, for example, are required for thin-wall items, a selection based on shot capacity and melting capability alone is often inadequate, as the maximum attainable injection pressure is reduced within the injection unit as the screw diameter increases. In cases such as this it is advisable to change up to the next size of unit.

Finally, a check is to be carried out as to whether the plasticising speed available is adequate in order to increase the dosage to the necessary shot capacity within the cooling time. The selection of a larger injection unit could also be required in this case as well.

A Crash Course in Drive Concepts

The new series of technical seminars in Lossburg got off to a great start at the end of June and was attended by ARBURG customers from eight European countries. The participants, divided into groups on a country-specific basis, each had a full day to learn all about modular drive technology.

With 35 customers from the Czech Republic, the largest group attended on the first day. Participants from Switzerland, Belgium, Holland, Great Britain and Italy followed on the next three seminar days.

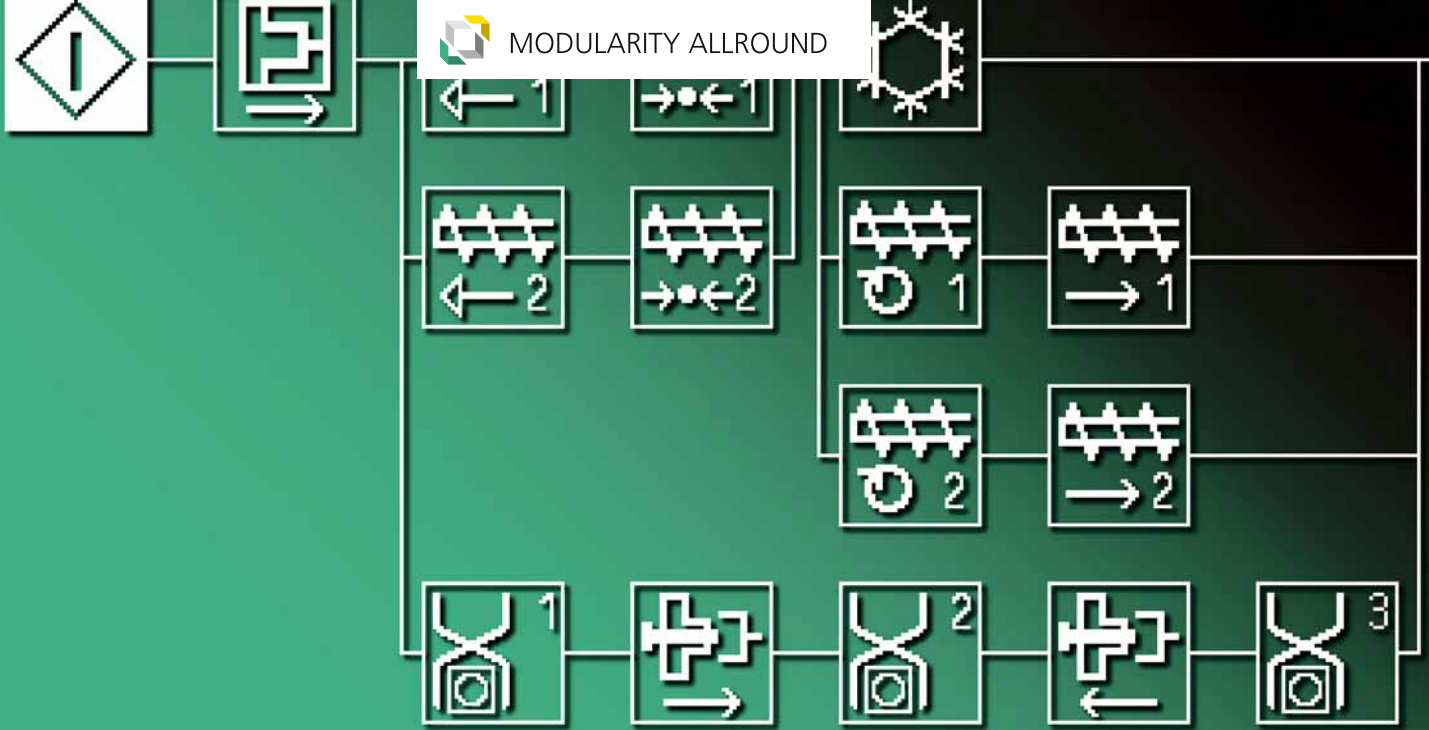
The seminar began with presentations from experts, before the participants met up in the research centre to gain experience with the ALLROUNDER 470 C advance and 420 A at first

hand, to exchange ideas and resolve unsolved issues with the aid of the practical examples.

After Stephan Doehler, European Sales Manager, had given a brief introduction of the company in the morning, Eduard Stücker, International Technical Support, gave a report on the fundamental principles of modular drive technology. A presentation of the differences between electric and hydraulic drive concepts was given by Martin Hoyer, Manager of Technical Application Development. He supported his statements with actual figures concerning energy and water consumption, noise emissions, precision and cycle time as well as with a cost analysis. He summed up as follows: "ARBURG plans to combine different axis drives intelligently – defined by the relevant product requirements."



The participants met up in the research centre to closely examine the different drive concepts and to discuss the topic in detail.



10 Years of SELOGICA



We are celebrating a very special anniversary - ten years of technological advantage provided by our SELOGICA control system. With our graphical sequence editor and logical, selective operating controls, we have been able to

provide you, for many years now, with the most advanced technology available with respect to the user interface and the control system. And it goes without saying that all ARBURG robotic systems are also fully integrated into the SELOGICA. Modular quality from ARBURG - your technological advantage!



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