

ARBURG Singapore

Colourful opening

Micro injection moulding

Big market for small parts



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The start of a new calendar year is the perfect time to bring you right up to date with latest technological developments at ARBURG and at a selection of our customers, with a fresh new edition of our ARBURG today magazine.

As is generally known, ARBURG's technological innovations have always been orientated towards its customer's requirements – and that will remain the case in the future. The addition of machines with large clamping forces and a modular handling system to our product range was ultimately a response to numerous customer requests, wanting to buy machines with diverse clamping forces and peripherals available from one source, namely ARBURG.

However, we have also always regarded outstanding support and the right level of service as one of our company's key attributes: integral parts of our obligation to our customers.

As well as interesting reports on our customers, this copy of today includes information on micro injection moulding among other things, an area in which ARBURG has, for nearly 40 years, traditionally excelled.

Happy reading!

Herbert Kraibühler
Herbert Kraibühler

Michael Hehl
Michael Hehl

Imprint

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Have a "gander" at the multi-component technology at ARBURG: the multi-component geese, beautifully arranged in the picture by our photographer, attracted a lot of attention at the Fakuma show, and not only from smaller visitors.



The biggest ARBURG demonstration room in the world at ARBURG's headquarters in Lossburg offers a complete overview of the product range.

Competence around the world

Want to find out the latest product information from ARBURG's line-up, try out a new mould, or are you having difficulties with your injection moulded part production? Then simply visit one of ARBURG's demonstration rooms and let the experts there advise you – they have a comprehensive knowledge of injection moulding and a wealth of experience gained in the field.

In recent years, there have been numerous additions to the list of ARBURG subsidiaries. They mean that the company today is represented by 17 subsidiaries and three representative offices in all important markets across the world.

One of the main aims of establishing new ARBURG subsidiaries is to be in a position to offer customers the right level of service and to have a well-equipped stock of spare parts close at hand. Another intention is for demonstration rooms, which can be found in nearly all subsidiaries of ARBURG, to serve as a presentation forum for the complete range of ARBURG products. Depending on size and cus-

tomers requirements, the demonstration rooms are equipped with one, or even several, of the very latest generation of ALLROUNDERS. The machines used will concentrate on either C or S models, according to the country involved.

Using examples of applications with a strong practical basis, the customers can develop a good impression of how the machine and control technology, peripheral systems function, and of the various fields in which the ALLROUNDER can be used. At the same time, the demonstration rooms across the world are also intended to serve as a point where customers can carry out tests: to try out a new mould for example, or to receive practical assistance to deal with injection moulding problems arising in practice.

Central port of call: Lossburg

The central port of call for specialist customer tests is the biggest ARBURG demonstration room in the world, situated at the headquarters in Lossburg. As part of the Applications Technology (AWT) department, the room comes under the

capable direction of Jürgen Schray. This demonstration room provides a complete overview of the entire range of ARBURG products. In addition to the standard machine, special procedures such as the processing of thermoset, LSR, elastomers, gas injection moulding and multi-component injection moulding are also on display, as well as the new MULTILIFT H handling system.

Proving performance in customer tests

Customers come from all corners of the world to visit Lossburg: not only from countries within Europe, but also from the USA, South America and places in Asia, such as Japan. With them they bring very

specific questions regarding the performance of the machines and the SELOGICA control system, about the possibilities for integrating peripheral systems or the automation technology.

Instant assistance

14 applications engineers remain on-hand in Lossburg to ensure that no questions remain unanswered and no wishes go unheard. Using their sound knowledge and years of experience gained in all aspects of injection moulding, they carry out tests using customers' moulds or provide assistance over the telephone when production problems arise. Adjustments to the machine configuration or correcting an error map on an ALLROUNDER can be carried out in Lossburg, for example, meaning that applications engineers can usually provide a quick and simple remedy to a problem on the spot.



Concrete examples of applications impress customers.

DITTER[®] Into the multi-co

PLASTIC

The head office of the DITTER PLASTIC group of companies is located in Haslach in the Black Forest. Offering additional surface finishing, the company today ranks among the biggest producers in the field of surface engineering. Technical and technical-optical parts are produced to high levels of precision. DITTER PLASTIC maintains top-class delivery arrangements for its 5,500 to 6,000 different injection moulded parts, including many multi-component parts. This means that its list of customers includes nearly all the major automotive suppliers.

The company's foundation stone was laid in 1947 by Udo Ditter, father of the company's current owner, Rolf Peter Ditter, when he founded Press & Spritzwerk Udo Ditter (forging and pressing). The DITTER group today, whose fate has been presided over by Rolf Peter Ditter since 1975, is made up of DITTER PLASTIC OHG in Kinzigtal, with two factories in both Haslach and Hausach, and DITTER PLASTIC GmbH with a further factory in Meissen/Saxony.

Everything from the design of parts, mould manufacture and in-

1991 at Factory 2 in Haslach, a special 4,000 square metre large, high-shelf warehouse was constructed to house injection moulding moulds numbering around 4,000, of which 60 per cent were produced in-house. The individual factories communicate with each other using radio relays belonging to the company's own communication network.

Rolf Peter Ditter sees definite advantages to its base in Germany: "Here, as well as having structures that have grown with the company, we also have the pool of expertise that is needed." And his commitment to the training of his staff is very apparent. As well as organising training for the entire workforce, the trainees are also given additional, in-house training for the technology that is specific to the company.

Not a classic injection moulder

"We're not a classic injection moulding company", Rolf Peter Ditter



Company owner Rolf Peter Ditter (right) proudly shows Susanne Wurst around production.

engineering, electronic engineering and electronics, and even include medical technology, aerospace, optics and pneumatics. Although their customers are based exclusively within Europe, around 80 per cent of DITTER products find their way into use throughout the world. The automotive branch accounts for the biggest share of DITTER's products, with around 60 per cent going to most major automotive suppliers and even manufacturers. The types of products tends to focus on functional parts such as shafts, sleeves, spring elements, transmission covers and housings, or radial fans. 350,000 of these pieces alone are produced each week.

Surface finishing

The other focus, as far as the automotive sector is concerned, is on decorative parts for vehicle interiors. The product line-up in this category include various displays for radios, air conditioning systems, tempera-

ture gauges and navigation systems, lens systems for rain and light sensors, and numerous different switches and buttons. Daily production of these items runs to 200,000.

Once the production process is complete, these special surface engineering products are polished up with the appropriate lacquer. The lacquer is applied in dust-free rooms using several fully automated lacquering systems that precisely calculate how much lacquer should be used. The lettering that follows is not only applied using traditional procedures such as screen, tampon or hot-press printing, but also using ultra-modern laser printing techniques.

DITTER PLASTIC's machine fleet consists of about a hundred injection moulding machines with clamping forces ranging from 200 to 6,500 kN, including several multi-component machines.



The SELOGICA control system makes for comfortable operation.

jection moulding, through to surface finishing, lettering, and sub-module assembly is covered by the various branches of the DITTER group. When the company started out, it employed around 20 workers. Today, that figure is around 560, 520 of whom are based in Haslach and Hausach. In

says, "The range of products is organised differently because of the surface engineering and sub-module assembly." The industries for which DITTER PLASTIC manufactures between 5,500 and 6,000 products range from automotive, construction and sanitation, via mechanical

The future with lacquer and component technology



Inserting the metal inserts into the mould station on the rotary table machine (r.) and the visual inspection of moulded parts afterwards.

ALLROUNDERS for many years

As long ago as the start of the 1960s, ARBURG delivered its first injection moulding machine to DITTER PLASTIC, used to produce cogs for the watch and clock industry. Today a total of 18 ALLROUNDERS are used by the company, some of which are used to process up to three components.

"It's the classic, well-developed machine construction, the variety of machines available and the options for combining them that are the decisive factors in deciding to purchase ARBURG machines", says Rolf Peter Ditter, hitting the nail on the head. "Thanks to the modular system ARBURG uses, it is possible to put together the right machine from its comprehensive range, to meet the requirements of some very specialised applications." He added that this was a crucial consideration for a company dealing almost

entirely with special machines made to meet their own standards. He went on to say that the high degree of acceptance shown by the specialist staff towards the ALLROUNDERS was also down to the SELOGICA machine control system. This could be adjusted to suit specific applications, but the operating display would always provide a clear overview, as they'd come to expect.

Two-component rotary table machines

To produce high-precision technical parts, DITTER PLASTIC uses the two-component version of the ALLROUNDER T rotary table machine. At Factory 2 in Haslach today, there are four of these ALLROUNDERS 1500T 2000-150/350, which produce transmission covers and brush holders for geared engines used in the automotive industry. Being a hard-soft combination, these parts require injection moulding to take place around metal

inserts in a two-component procedure. The transmission cover itself is made of thermoplastic while the seal is an elastomer. Unmanned production, which the company is largely able to achieve using robot systems, is not possible in this particular special application. The metal inserts, some of which have to be pre-assembled, also have to put into the machines moulding station by hand.

The rotating table is equipped with two mould stations. While the metal part is inserted into the station that is accessible from the outside, at the second station, the plastic components are injection moulded around the metal insert. The two mould stations mean that the cycle time is considerably shorter than vertical machines that aren't equipped with a rotary plate. Further time is saved thanks to a light beam barrier that is used as a guard.

Furthermore, the machine is equipped with an intricate hot runner system and the corresponding control system. According to Rolf Peter Ditter, the core pull functions on the rotary table machines was "exploited to the full". "Which is why we found the SELOGICA control system so brilliant. This system means that simple function options are used to achieve what would normally require an awful lot of complex programming."

He added that he found another major benefit of the ALLROUNDER T is its great precision: something which is of paramount importance when producing very complex parts with up to 640 measuring points.

Best quality assurance

Quality is a subject of particular importance to this company, which is certified to both DIN EN ISO 9001/94 and VDA 6.1 standards. That is why around ten percent of the staff at DITTER PLASTIC work either directly or indirectly in quality assurance. Laboratories, which are superbly equipped for carrying out chemical, physical and colour analysis, are used to carry out incoming goods inspections and other checks that monitor the entire production process. A proportion of the parts are removed by a robotic system immediately after production and handed over for camera inspections or for measurement using a laser.



Injected using a two-component process: TPE transmission cover with white elastomer seal.

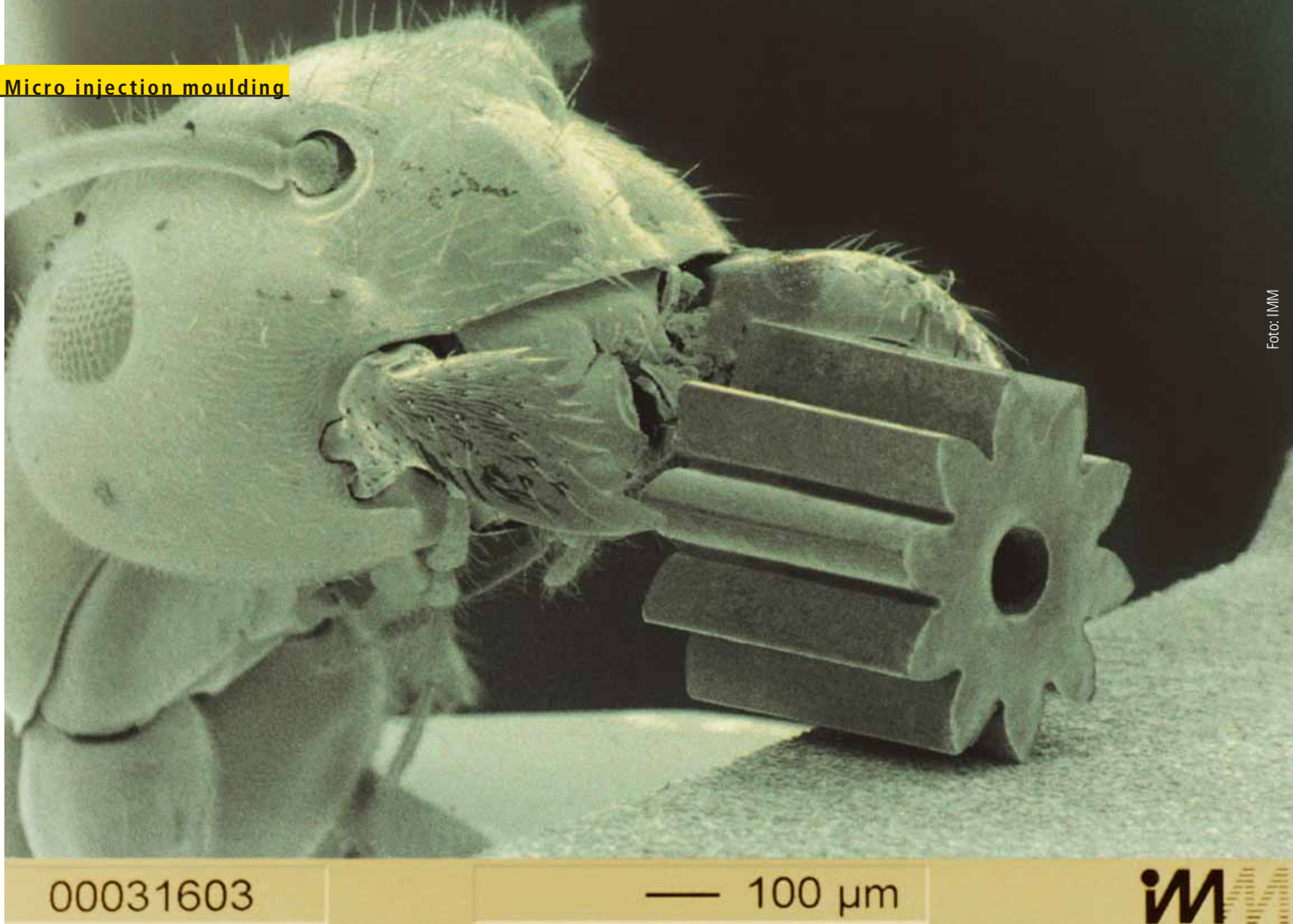


Foto: IMM

Small, smaller, smallest

One of the biggest trends at the moment actually involves rather small parts. How can these parts be produced in series to the highest levels of quality and repeatability?

Micro injection moulding involves the production of small plastic parts using shots weights of less than one gramme. ARBURG is one of the technical forerunners in this particular field. This process should be differentiated from the manufacture of mould inserts and subsequent plastic moulding of microstructures, known as microstructure injection moulding.

Micro injection moulding

In recent times, the significance of this traditional technology has risen dramatically due to the availability of special machine solutions and broadening of range of appli-

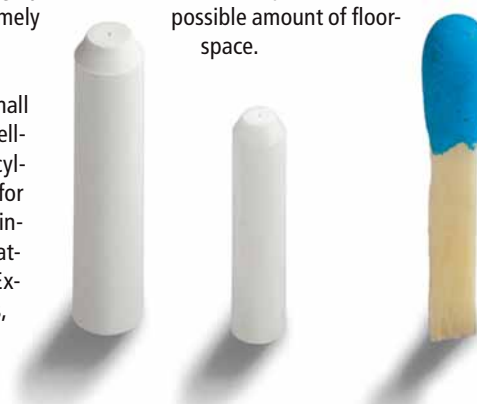
cations – for example, ARBURG has been involved in an association of companies looking into multi-component injection moulding – in microsystem engineering. Inevitably, the tininess and complexity of the parts results in greater demands being placed by plastic processing companies on the machine manufacturers. Optimised inlet zones have to supply the material with short screws of the narrowest possible diameter. The clamping unit has to be robust, easily accessible and precisely controlled; hydraulics and control system must be highly dynamic and work with extremely short reaction times.

Particularly where very small shot weights are used, the dwelling time of the material in the cylinder is an important indicator for optimal production. As far as injection is concerned, short, flat-cut spirals are to be provided. Extremely small injection volumes,

and therefore minimal screw movements, mean that injection control is essential to achieve exact reproduction. The smallest ALLROUNDER 220 S 150-30 has sensor mechanisms that are sufficiently sensitive. Its other features include: a screw diameter of 15 millimetres, an L/D ratio of 18, servo-controlled hydraulic system, fully hydraulic dual piston clamping system, hydraulics close to the user, regulated injection speed and holding pressure profile, regulated back pressure, and regulated screw rotation speed. And all this takes up the smallest possible amount of floor-space.

Example: a ceramic ferrule

Using optimised machines such as the ALLROUNDER C and S, it is possible to produce even highly technical components such as ceramic ferrules. These tiny parts secure the detachable connection between fibre optic cables to make loss-free data transfer possible. The precision of these parts is absolutely critical in determining the data transfer capacity. It is vital to achieve smooth running characteristics to reflect this, and to ensure pinpoint accuracy when boring the hole through the middle. Touch up work that used to be needed can now be kept to a minimum by using injection moulding for the fibre



The production of the smallest injection moulded parts demands the utmost precision.

optic cable connector. In the case of the ferrule, the length of the mould core was 2.5 cm, the bore diameter is 167 µm or 0.167 mm. The degree of tolerance should be no greater than ± 1 µm, the smooth running tolerance no greater than ± 15 µm. With the correct level of mould precision, these requirements can be met and reproduced using injection moulding.

Microstructure injection moulding

Organisations involved in the development of plastic products with microstructures include the Institute for Microscopics in Mainz (IMM), for example. The moulding of plastic microstructures demands that mould inserts are produced using the LIGA process (LIGA being short for lithography, galvanics, moulding). In this, a PMMA carrier is exposed to radiation, the irradiated areas are then removed from the mould and produced into a mould insert using an electroplating process. Typical components include fibre connectors used in micro-optics. Individual components are invariably measured on a scale in millimetres or centimetres whereas the structure elements are in the region of micrometres or smaller still. The micro mould was developed as a cheap alternative, used to replace metal parts in mass production.

The principle advantages of injection moulding over metal processing are the standardised process sequences, and the fact that it is possible to achieve greater levels of automisation and shorter cycle times. The technology required in terms of machines remains much the same as that which is used for micro injection moulding. Small plasticising units, a screw whose position can be controlled or control of the injection process using the pressure inside the mould result in a highly repeatable process and therefore ensure trouble-free production of microstructures.

In terms of the mould, it must be possible to evacuate the cavity and conduct a variothermal process. Variothermal in this case means that initially very high mould temperatures (in the region of the mass temperature of the plastic) are reached during injection, but then the cavities must be cooled down very quickly afterwards for ejection. That means that it must be possible to switch between heating and cooling circuits within the mould.

200th ALLROUNDER goes to Pöppelmann



Celebrating handing over the 200th ALLROUNDER: Karl-Heinz Diekmann, Gerhard Breves, Werner Blome, Guido Schmidt, Eugen Hehl, Alfons Sieverding, Eberhard Lutz and Wolfgang Knop. (from the left). Photo: Pöppelmann

There was cause for a special celebration at Pöppelmann, a producer of injection moulded parts designed to the highest technical specifications. To mark the official delivery of the 200th ALLROUNDER on 14 November 2000, an ARBURG delegation including the chairman of the management team, Eugen Hehl, and Eberhard Lutz, the sales director for Germany, went along to visit the company in Lohne.

the chairman of the advisory committee, Karl-Heinz Diekmann, Eugen Hehl presented Alfons Sieverding, manager of Production and Engineering, with a certificate and a commemorative stone plaque by way of an award and a memento.

Eugen Hehl marked the handover of the 200th machine with a speech, saying, "This special jubilee is almost like the crowning of the long-standing and intensive collaboration between our two companies, which began back in 1974 with the delivery of an ALLROUNDER 221". Attended by the owner of the company, Gertrud Pöppelmann and

Pöppelmann produces injection moulded parts to meet the highest demands for technological precision. Because of this, Eugen Hehl described the company as a "typical" ARBURG customer. He said it was a great pleasure to be able to celebrate the anniversary with a customer like that because Pöppelmann's success is also a testament to ARBURG's technological concept. That is why more than half the injection moulding machines used at Pöppelmann today come from ARBURG.



You're never too young to start reading up on things. That is why our youngest reader is casting a critical eye over the pages of this magazine.

Sorg GmbH: Make waves that

Competitive throughout the world



To be competitive in the world of plastic processing today, a company must – like the material being processed – be flexible to be in a position to react to most varied demands that the market imposes. A good example of a company such as this is Sorg Plastik GmbH, with its headquarters in Lorch-Weitmars between Stuttgart and Aalen.

Founded in 1962 by Karl Sorg, the company started out concentrating only on constructing moulds and press processing thermosets. Their products are used in electronics and domestic appliances. At the end of the Sixties, the technology expanded to include injection moulding of thermoplastics, and in the Eighties they began injection moulding of thermosets.

In 1991, Jürgen W. Strobel took over the running of the company at a time when it had 20 members of staff and 19 "machines that were getting on a bit", as the man himself said. Following the introduction of new technologies, in the field of thermoset processing with automatic deburring for example, the company began attracting customers from the automotive industry. Because of this know-how, orders that had been disappearing to Eastern Europe started to come back to Germany.

Current developments: It's working!

These days, things are looking very good for Sorg on both a national and international level. There are four sites situated around the world: two are in Germany, at Lorch and the Swabian town of Gmünd, one is in the Czech Republic, and the fourth is in Mexico. On a 4,000 square metre site, Lorch boasts 56 members of staff, 37 production machines used for thermoset and

just get bigger!



Tidy solution: ALLROUNDERS at work, producing for the Mexican market. Photo: Sorg-Plastik

two-component processing amongst other things, as well as a modern mould making workshop, assembly and downstream surface treatment sections. A 1,500 square metre extension to the site should pave the way for the construction of a technology centre for multi-component injection moulding. By developing functioning thermoset and thermoplastic links for example, this should ensure bright prospects for the future.

The Swabian company G+S Kunststofftechnik, based in Gmünd, was taken over in 1996. This brought with it a 100-strong workforce and large machines for processing thermoplastics, meaning larger components could be produced as well. The Mexican base covers 6,500 square metres, has 150 staff and 18 machines, a mould manufacturing facility, and downstream finishing stations as well. In the Czech Republic, Formagrau, a G+S subsidiary with 90 members of staff on a 2,500 square metre site, produces thermoplastic parts for the East European market.



Modern: Sorg in Mexico. Photo: Sorg-Plastik

Hi tech: Sorg's customers

All production sites belonging to Sorg Plastik GmbH work almost exclusively for buyers in the hi tech sector. Many of the parts find applications in the automotive industry, electronic engineering, household goods, mechanical engineering, office communication, optics, and energy supply sectors. Parts supplied to the car industry range from PF 31 thermoset ashtrays for cars, switches and connectors, and on to mirror housings, cup holders, transmission components, cylinder head covers and components for airbags.

Quality, know how, training, customer orientation and full service are the cornerstones of the company at all locations. According to Jürgen W. Strobel, the aim is, "To produce quality, not to inspect it." The entire philosophy of the company is geared towards ensuring the customer is satisfied. Their maxim is that everything that is done happens in the interests of the customers. Because: "If Sorg doesn't do it, then someone else will."

Heavy emphasis on teamwork

It is very evident that working in groups is really catching on, just as it is at ARBURG. Teamwork encourages "perfectly ordinary people to achieve quite extraordinary results." It is exactly these

results that Sorg wants to provide for its customers. Logically, since the first ALLROUNDER 221 was bought in 1977, the company has continually come back to, and been able to rely upon, its partnership with ARBURG and its ALLROUNDER technology. Again, this is also reflected in the company philosophy: "To us, partnership means an obligation!" That is not only applied to its customer base, but also to its team of suppliers. This fact manifests itself in the intensive collaboration between Sorg and ARBURG,



Complex: the rear ashtray for the VW Jetta.

which has existed for many years now.

The 630 model: Bound for Germany and Mexico

Up until now, it has not always been easy to find the appropriate machine in ARBURG's range or, to use boxing terminology, in all weight categories. The new ALLROUNDER 630 S now provides the solution to this little problem. It is no surprise, then, that Sorg is one of the first names on the order book for this new ALLROUNDER. Nor is this order for just a single example. For the extension to the plant in Lorch, a 630 S has been ordered – a two-component version this time. As at the Czech site, it is exclusively ARBURG machines that are used.

Eight machines are destined for Mexico. Two of these are ALLROUNDER 630 S models, another is equipped with two injection units and MULTILIFT, making it suitable to use for processing several components.

So the very latest technology is used for the European and North American markets: something the decision-makers at Sorg appreciate just as much as trouble-free cooperation, especially when it comes to support for applications engineering, spare parts supplies and customer service.

The majority of Sorg's modern fleet of injection moulding machines is equipped with the SELOGICA machine control system. This is a factor that not only makes life easier for the workers, by providing a universal control interface, but it is also extremely useful when it comes to the more complex cycle sequences and moulds used for working with multi-components.

Providing the control system as standard makes complicated, special programming unnecessary and means the operator has a complete overview, regardless of the set-up and production situation. The graphical user interface means that all processes are transparent and quick to comprehend. The fact that ARBURG's own peripherals, such as MULTILIFT handling, can be completely integrated in the sequence programming made the decision to choose a complete "major" production solution even easier, as proved to be the case with the 630 two-component machine that is now bound for Mexico. An investment in the future that has proven to be fruitful for both Sorg and ARBURG.

Dances



In very prestigious surroundings: ARBURG Singapore at its new site.

In November 2000, the ARBURG subsidiary in Singapore celebrated the opening of its new premises in the traditional Asian manner. The dance of two fortune lions is said to conjure up a good fortune for the future in the new premises for branch manager Michael Ho and his team.



The actual official opening was conducted by a top-brass delegation from the ARBURG management team. Partner, Michael Hehl, together with managing directors Michael Grandt (Sales and Controlling) and Herbert Kraibühler (Technology and Development), cut the ceremonial red ribbon at the entrance to the new subsidiary office on the morning of

the occasion. Witnessing the event were numerous official guests, customers and employees. On this public occasion, members of the management team were greeted by a large yellow transparency, which was displayed on the front of the new home for ARBURG in the Far East.

Guests from all over Asia

Branch manager, Michael Ho, who also acts as the company's representative in Thailand and Indonesia from his base in Singapore, was able to welcome many of his colleagues from all around Asia to the celebration in the city state on the south coast of Malaysia. After the formal opening, the ARBURG organisation's Asian conference took place in a local hotel in the city with its world-renowned skyline.



Michael Hehl (middle), Herbert Kraibühler (left) and Michael Grandt at the opening.



Asia meets Europe: the dancing lions and the German delegation in the entrance area.

Prestigious surroundings

After the lease for the old premises came to an end, the opportunity to further improve the working environment within the subsidiary arose, and accommodation was found in the Tempco Building in more prestigious surroundings at 16 Ayer Rajah Crescent. With an excellently equipped demonstration room, a training centre, a well-stocked spare parts warehouse and ultra-modern office units, ARBURG Pte. Ltd. has everything to satisfy the desires of every customer.

Dancing lions

Once the members of the management team had cut the ribbon, it was time for the fortune lions to put in an appearance. Accompanied by numerous musicians playing drums and cymbals, two mythical creatures, which must have appeared exotic to European eyes, moved in. As the beat of the lion's dance echoed around a dance that is filled with the promise of happi-



In front of the 630 S: company partner, Michael Hehl, managing directors Michael Grandt and Herbert Kraibühler, Werner Laukemann, Hans Zimmermann and branch manager Michael Ho (from the left).



with lions

Celebrations to mark the opening of the new subsidiary office in Singapore

ness – two members of the dance group moved each of the colourful lions, in what looked like very hot work, through all the various sections of the new Singapore base, which provides support throughout the whole of the Asian region.

Lucky gifts for the lions

The bringers of good fortune were to be rewarded with a real



Michael Ho welcomes the lions into his office.

feast on the lower office floor. Mandarines and salad had been prepared in a dish which one lion symbolically accepted. It lowered its head down to the dish, and while the dancer at the front moved the lion's awe-inspiring mouth, the

dancer at the back peeled the mandarines. These were then ceremonially presented to the partner Michael Hehl, and the peel and salad leaves were spat out from the lion's terrifying mouth.

With the deafening sound of drums beating, the dance continued into the upper office section. There, on subsidiary manager Michael Ho's desk, was another ritual gift offering of mandarines waiting for the lion. It goes without saying that the other rooms in the new subsidiary offices were given the necessary little bit of luck as the lion continued on its rounds.

Technical highlight

And in the demonstration room, ARBURG had prepared a special technological treat for the opening ceremony and the open house event that followed: The opportunity was taken to give the biggest ALLROUNDER 630 S yet produced its première in Asia. As well as this exhibit, which immediately attracted a lot of attention, the visitors had the opportunity to take a closer look at the

ALLROUNDER 320 K
toggle

clamping machine, the smallest ALLROUNDER 220 S 150-30, and an ALLROUNDER equipped with the new modular handling system MULTILIFT H.

Close at hand since 1988

By founding a "Technical Training Center" in 1988, ARBURG consolidated the good economic relations that had already been established in the region as early as the 1960s. We should not forget that ARBURG was the very first German injection moulding machine producer to have its own offices to represent it in South Asia. The success story in Singapore continued unabated. Three years down the line, the independent subsidiary ARBURG Pte. Ltd. was established, serving as one of the important points of access to the Asiatic region. It is from here that Michael Ho and 12 other members of staff provide customers with comprehensive support and service today.

ARBURG Nite

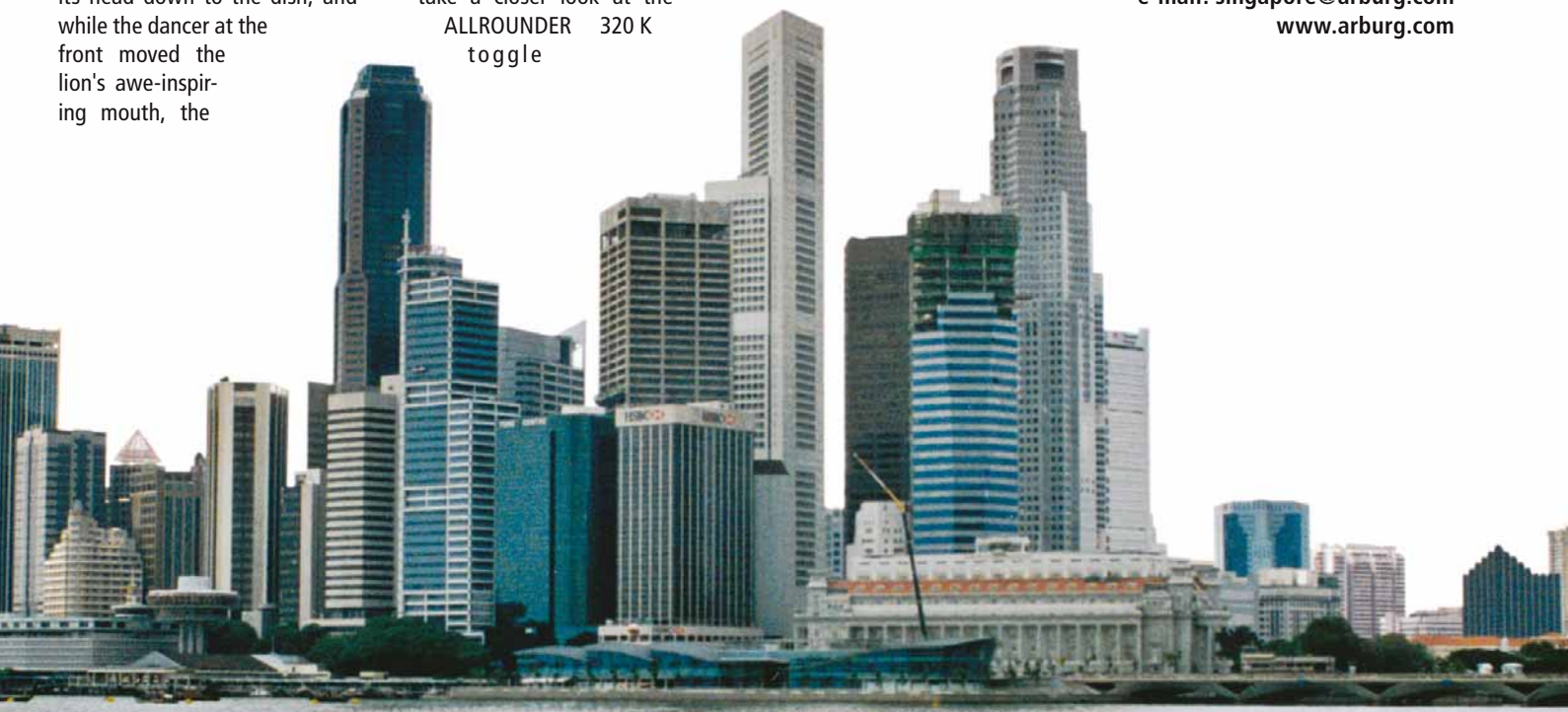
To put the icing on the cake at the end of a hectic day, around 200 official guests, customers and employees had been invited to attend the big ARBURG Nite in the ballroom at the Hotel Grand Copthorne. Director of sales,

Michael Grandt, congratulated Michael Ho and his team on their new premises in the course of a short speech. He then went on to outline how important the Asiatic market is for ARBURG.



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Gold for the ALLROUNDER 630 S



tion. It wasn't the first time, however, that ARBURG has picked up a gold medal: in 1998, the ALLROUNDER 520 C JUBILEE 2000-675 also received the same accolade.

The now traditional competition event at the International Engineering Fair was organised by the advertising and PR agency, Fair Agency GmbH. Responsibility for judging was left to an expert panel led by engineering specialist Dr.-Ing. Oldrich Ambrož, CSc. from the Institute of Technology in Brno.

It was a testament to the quality of the machines entered that, of the 37 exhibits entered in the competition, the jury nominated 28 to be shortlisted for final elimination round. During their judging,

firms from 37 countries displayed their wares at the 42nd International Mechanical Engineering Exhibition held this year in Brno. Accounting for 63 percent of those present, the majority of exhibitors came from the Czech Republic. However, the organisers maintain that international interest in the trade fair in Brno grows from year to year. They were also very satisfied with the response from visitors, with over 100,000 visitors from 63 nations over the five days of the exhibition.

Entered in the "Machines for chemical, rubber and plastic industries," the ALLROUNDER 630 S was up against stiff competition but eventually came through to beat all the others and win the competi-

the jury were looking particularly at the machine demonstrations and how the exhibits were presented on the stands. Other important criteria used included the technical and technological level, the degree of innovation, ecological considerations, the quality of service, supply of replacement parts, and delivery accessibility.

The final results were revealed on the third day of the fair. Altogether nine gold medals were awarded to exhibits from all six categories, one of which was for the ALLROUNDER 630 S. At the official medal presentation, the award for the 630 S was presented to Jaroslav Novak, who is the manager representing the Czech subsidiary of ARBURG.



The exhibition centre at Brno. Photo: BVV

The 630 S took away a gold medal at a competition held in conjunction with the International Mechanical Engineering Exhibition held in Brno in the Czech Republic. Altogether, there were 37 exhibits from the competition, divided into six categories.

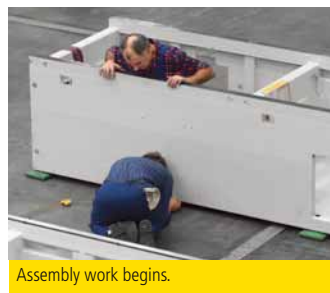
Covering an exhibition area of around 74,000 square metres, 2520

Production of the giants is in full swing

Following the relocation of the production lines for C-series ALLROUNDERS to the new assembly hall in ARBURG II, enough space has been made available in Hall 10 for assembly of, and the production of components for the big ALLROUNDER 630 S. And that extra space is certainly needed because production of the giant is in full swing.

If you need further proof that the introduction of the ALLROUNDER 630 S at Fakuma in 1999, and the presentation of the two-component version of the biggest ever ALLROUNDER at Fakuma 2000, has been a success, look no further than Hall 10.

The giants have been produced here since August 2000, in standard guise and also the first examples of the ALLROUNDER 630 S for



Assembly work begins.

two-component processing. Lined up in rank and file, these big injection moulding machines stand next to each other in the various stages of assembly.

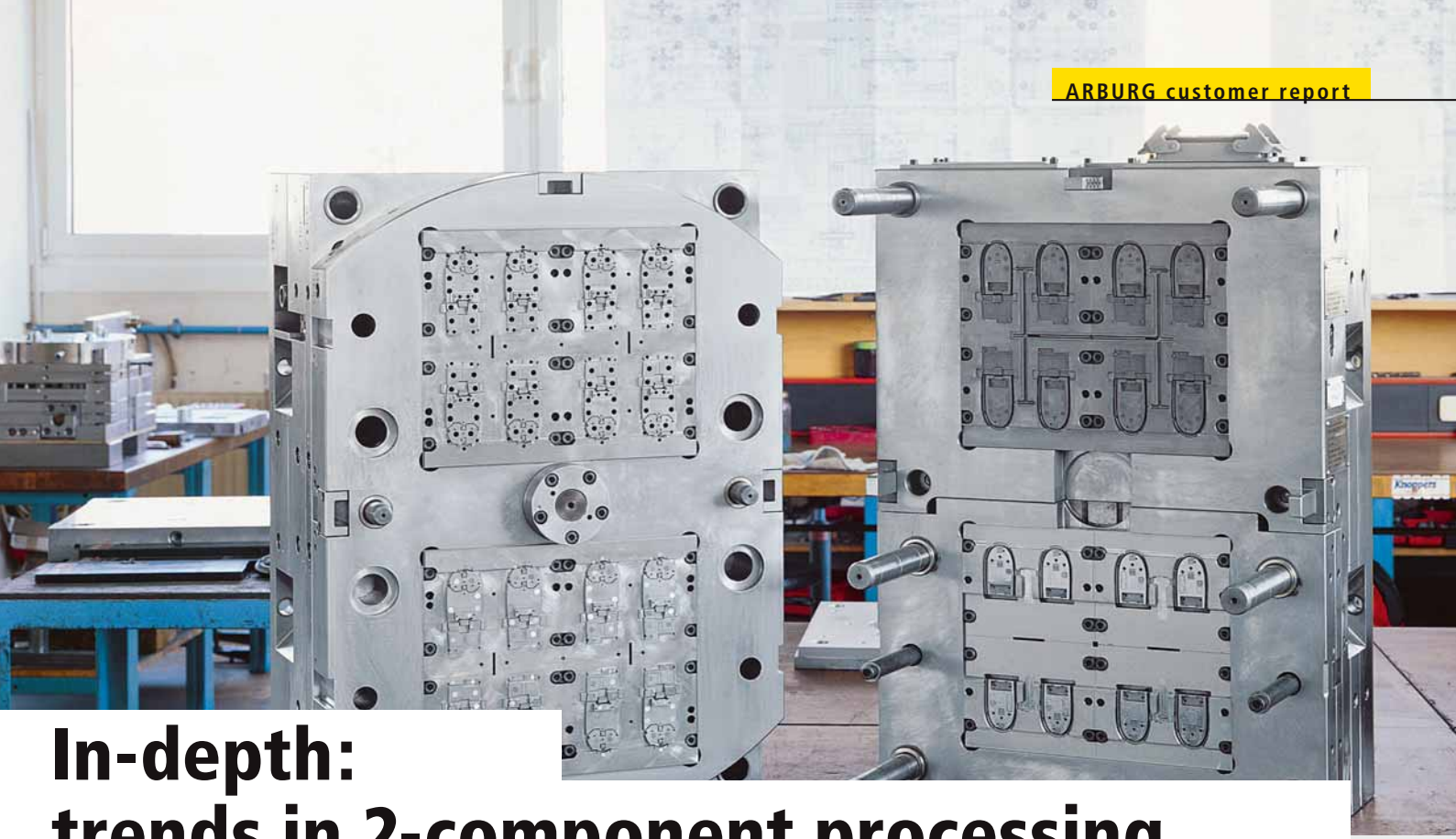


Laid out in rank and file: the ALLROUNDER 630 S

First, the two-part machine base is assembled before oil reservoir, distribution blocks, pumps, motors and hoses are attached. Assembly is completed with the addi-

tion of the clamping unit, injection unit and the machine guard, shaping the big 630 into its final form. All that is needed now is some detail work and then the test run can begin.

The size and weight of the ALLROUNDER 630 S mean that it is no longer as difficult to transport as its smaller counterparts. That is why, in contrast to all the other injection moulding machines, both assembly and the trial run before the machine can be regarded as completed, are carried out in one place.



In-depth: trends in 2-component processing

If you want to know exactly what the trends in multi-component injection moulding are set to be, you have to ask someone who really knows what's what. Wilhelm Weber GmbH & Co., known by injection moulders the world over as Weber Formenbau, is one such trend-setter.

Working closely with ARBURG, the company has been involved in developing and innovating in this field ever since 1962. From their unique position as forerunners – ARBURG invented and patented two-component injection moulding – ARBURG and Weber have helped turn this technology into a global breakthrough.

How does the future of 2-component processing look?

What are the biggest trends in this sector likely to be? Hans Schimek, managing director at Weber in Esslingen, can see a number of major influences. One of these is the manufacture of parts using "hard-soft combinations". Ever since 1990, the proportion of this kind of combination measured against overall 2-component production has risen dramatically. The demand for these

combinations, for example thermo-plastics and TPE, is particularly high in the automotive industry. The reason is not only the way they look, but how tactile the surface is as well. In terms of production, efforts are concentrated on reducing the amount of finishing work on the parts and on making the production process fully-automated.

Three-component processing looks set to pose a further challenge in the future. It is, however, a process that is becoming increasingly important for key/button elements and mobile phones. Used in conjunction with film inserts, it is possible to achieve even more effects with colours. The main priority in this case is to optimise the insertion and shrinking process used for these films.

In Hans Schimek's opinion, there is also still plenty of potential for innovation in terms of mould technology. In the context of the additional time and cost savings, the technical requirements brought about by fully-automated production and assembly suggest further thought needs to be devoted to solving these issues. Added to this is the major issue of design. Put simply, that means: A well-styled user interface in a vehicle interior must have a safe grip and, at the same time, it must be possible to fit as a ready component (i.e. assembly injection), because the fewer components that need to be joined together, the less the well-used switches will rattle or squeak in later life. At the end of the day, that ought to reflect well on the industry too.

Weber is prepared

Weber is well prepared for the challenges that will arise in the future as the company provides a complete range of support for its customers: from development to providing advice on design and construction making the best use of plastics, pilot production, and on to producing documentation for all the necessary quality parameters (production, plans, mould). For nearly two years now, there has also been a new college of technology in Esslingen, where moulds are optimised and test injections are carried out. What machinery is used? You've guessed it: exclusively ARBURG ALLROUNDERS. Because the pioneers of multi-component injection moulding will continue to work closely together in the future.



The Weber college of technology: where the series products of the future are put to the test.



MILESTONES

Anyone setting trends in a particular field must count as one of its pioneers. One field where ARBURG does play the role of trend-setter is multi-component injection moulding.

Ever since the start of the 1960s, the company has been at the forefront of technological advances. To be more specific, this development began in 1961. The demand then was for robust parts made up of two components, to be produced efficiently. Given the right conditions in terms of moulds, the ARBURG engineers were confident that they could not only produce these parts using an insertion process, but that the process could become a cycle by injecting two materials from two independent injection units into one mould.

In 1961, the first prototype was made – a typewriter key with the company logo – automated in the two-colour injection mould. Working with Weber Formenbau, an intricate mould was developed, in which the rotational insert with

its two mould cavities was turned forcibly in a lateral direction to move it into the second position to complete the injection moulding process. This was the first patented development, of which many more were to come.

Globally significant

The dial for a telephone proved to be the next milestone in the course of development. For the first time ever, this injection moulded part was produced fully automatically for the first time in 1962. The first component was injected, the mould insert was turned using a rotating platen, the second component was added and the completed part was discharged by an ejector. The principle has remained basically the same until today and was patented at the time.

The impact on the plastic processing industry soon became apparent, as demonstrated by the global demand and how quickly it spread. In 1964, a test injection on a telephone dial for the Japanese market was conducted,

a year later, a red and transparent lens for a light on the "R4" by Renault came along.

By 1971, there were already four working positions suitable for producing parts using two components on the ALLROUNDER of the time. Two-colour machines were already being equipped with indexing clamping units as standard. In 1976, multi-component technology moved on thanks to the introduction of the interval and sandwich process on the ALLROUNDER 305.

Basic technology remains the same

The technology used to produce 2-component injection moulded parts has remained the same. Improvements, however, have made the production of high-quality parts in larger series possible. Nowadays, three or even four injection units can also be used for automated

part production in a single operation. Specialities such as inserting metal parts have been a major benefit to electronics and automotive industries. Today, the technical possibilities extend to using rotary table machines with two injection units: an option used by ARBURG on the ALLROUNDER T models in its machine range.

However, the basic principles of two-component injection moulding have spawned a number of other techniques that are used in everyday processing. Examples include interval injection moulding and the sandwich procedure. Using the SELOGICA machine control system, it has been possible to make these complex production processes easily programmable.



The new ALLROUNDER 630 S, equipped with two injection units, can also produce mul

ARBURG with MuCell® now European as well



The first European MuCell® system for ARBURG in the demonstration room at Lossburg.

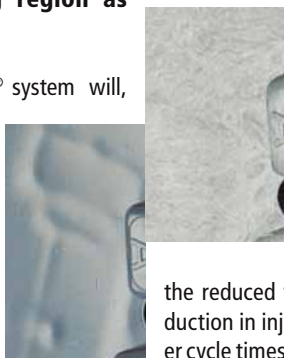
Following a contractual agreement with Trexel Inc., Woburn (USA), it is now possible for ARBURG to sell ALLROUNDERS, which are specially-equipped for micro-structure foaming, within the European trading region as well.

The first MuCell® system will, however, soon be built for ARBURG internal purposes: It will be installed in Lossburg for both testing and demonstration purposes and should be brought into service early in the year.

The importance of the MuCell® process has grown enormously in a very short space of time. The operating principle of MuCell® technology is based on passing something called a "supercritical fluid" into the melt stream of the injection

cylinder. Due to the drop in pressure during the filling phase of the mould, the state of the unit is transformed from liquid into gas. The gas, which is released during melting, expands and this makes for a fine build-up of cells in the finished moulded part. There are very tangible benefits to this: A 60 percent reduction in the viscosity of the material used, occasionally a substantial reduction in process temperature due to the reduced viscosity, up to 50 reduction in injection pressure, shorter cycle times because holding pressure and time are not needed, a reduction in the weight of the parts, up to 80 percent lower clamping forces and more effective prevention of sink marks (see picture).

As well as needing a special injection unit with a modified cylinder, some other machine modifications are needed, such as: special screw and needle shut-off nozzle, gas dosing unit and some modifying of the control software. In the near future, ARBURG will make this technology available to its customers in future for certain screw diameters on machine sizes 250, 350 and 675, used in conjunction with clamping forces of 500, 1,000 and 2,000 kN.



COPYLOG 5.0: Central management of calibration data records

TECH TALK

Dipl.-Ing. (FH) MARCUS VOGT Technical information

It is a familiar problem to everyone working in injection moulding: different moulds, varying materials and a diverse range of machines mean being overwhelmed with calibration data records that could do with being coordinated. This is where the COPYLOG 5.0 program for PCs comes in handy: it allows all ARBURG ALLROUNDER disks to be managed and secured centrally.

Instead of working in production using time-consuming loose diskettes and having to accept the risk of data losses, with COPYLOG, the user can produce a well-structured archive of all data records very easily, using a standard PC with Windows installed. SELOGICA and DIALOGICA data records can be input directly into the program using the standard floppy drive on most PCs; and HYDRONICA D and MULTRONICA data disks require only the optional COPYLOG disk station. This possibility is likely to be of particular interest to users who have a number of different types of machine and who want to convert MULTRONICA data records to DIALOGICA data records using COPYLOG. The data records produced in this way can also be processed by the SELOGICA machine control system.

When archiving, the program not only saves existing information about the type of material and mould used. It also automatically keeps data on the machine, control system, the date of last use or access etc. in the COPYLOG database. Furthermore, from SELOGICA 3.0 onwards, individual screen shots such as log graphics from quality monitoring can

be kept in the archive as well.

In COPYLOG, all data records can be copied, renamed or deleted within the archive, so that new data disks – for example, organised according to article groups or machine location – can be compiled.

Using the machine's access to the freely-editable company data info, other information regarding the use of the program, the mould or other machine accessories can also be added. Working even with large volumes of data is made easier thanks to an up-to-date user guide with various search functions and a comprehensive online help facility covering all the different functions.

The benefits go beyond just program management: the secure storage of all calibration data, evidence of which is often required for certain types of certification, is also possible using COPYLOG.



The New

2500 kN! *

* If you have something bigger in mind then you might consider the economical ALLROUNDER technology to achieve this. 2500 kN clamping force and a maximum component shot weight of 820 gr/PS are just two of the many features of our new injection moulding dimension.



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