

# ARBURG

## today

Issue 1

October 1995

ARBURG PRESENTATION AT THE K'95

## A Modular Future: Allrounder S has its Premiere

Stand number 11A35 at the "K'95", is once again the meeting point for those interested in experiencing the future of injection moulding technology. On this stand with over 1.100 m<sup>2</sup> of floor space, Arburg is displaying interesting new developments and problem solutions for the plastics processing industry. New developments as well as the presentation of varying application processes are to the fore.

### World premiere for the Allrounder S

The new Allrounder S has its premiere. With these machines, Arburg is introducing a concept onto the market, which due to its selective modular concept, allows you to combine various practice-oriented components to suit your individual production solutions.

Three Allrounder S machines with clamping dimensions from 220 to 270 mm as well as clamping forces from 150 and 250 kN, can be viewed on the stand. Numerous expansion modules are available for the controller, drives, hydraulics and injection units in order to adapt the machine to the production requirements.

During development, special attention was paid to space saving external dimensions, low noise levels and high levels of operating comfort.

### Highly Specialized Allrounder Technology

As well as the Allrounder S, Arburg is also displaying a multitude of sophisticated production solutions "live" at the K'95. An example of which is the compact Allrounder 221 M toggle machine with a Multronica controller specially adapted to the machine equipment level.

### Lots of Space: Allrounder 520

The Allrounder 520 offers lots of space for moulds. The clamping dimension of 520 x 520 mm are available for the M, C, and V machines. This allows the use of large or complex moulds without problems.

### Expiernce CD Injection Moulding Live

The CD sub moulding system for the production of Compact discs on

an Allrounder 270 C, is based on standard Arburg machine technology which results in an inexpensive total system. The system can be viewed during the Exhibition under production conditions, at a company in the vicinity.

### AQC Module for Selogica Controller

The Selogica machine controller with integrated process code determination for the Arburg Quality Control System (AQC), is presented as a prototype. AQC allows exact determination of the relationship between quality features their influence factors, as well as their automatic correction.

### Allrounder T with Selogica Controller

An Allrounder 1200T rotary table machine which is used to demonstrate the coating of metal insert parts, can also be viewed on the stand. A new feature is the equipping with the Selogica 32 bit multi-processor controller, which is also used for the first time with the 420 V for two colour injection moulding.

### Special Processes in Perfection

Various processing methods as well as differing peripheral devices complete the Arburg demonstration at the K'95. These include gas internal pressure technology as well as the processing of liquid silicone with a mould sided cold channel system. The handling device spectrum ranges from the simple Picker to the Selogica controlled NC-Handling.

#### WORLD PREMIERE

##### Allrounder S

Selective modular concept offering a multitude of configuration possibilities

#### PERIPHERALS

##### Practical Help

Varied possibilities for increased efficiency with Allrounder production

#### SPECIAL PROCESS

##### CD Injection Moulding System

Allrounder 270 C for the automatic production of CD's

#### FUTURE STUDY

##### Allrounder E

A concept for future-oriented production with many revolutionary details

#### EDITORIAL



### Welcome to Today

Here it is: "Arburg today", the first issue of our new magazine for customers, interested parties and friends of Arburg. Our customer magazine is intended to inform you about current new developments, applications and injection moulding technology. We will also inform you about our company and specialized solutions and system concepts used by our customer companies.

Issue number 1 is a special issue for the "K'95" in Duesseldorf. All new features of our entire delivery program are described within these pages. This should enable you to quickly achieve an overview of the current state of the technology.

"Today" will appear three times a year and is the direct successor of our first customer magazine "Arburg heute". Your opinion has always been important to us in times past and remains so to this day. Not only do we have an open ear for your questions and suggestions, but we also invite your active participation. Have you an exemplary solution in your company where Allrounder technology was of assistance? If so, tell us about it and we will report it.

Help us with the structuring of our new magazine so that we are of interest to you. If we know what our customers want to read, we will be read. You can help us to achieve our aim: a world wide forum that supplies you with valuable data, facts and new developments. For this first issue we would like to wish you lots of fun as you read!

With regards  
Karl and Eugen Hehl

Company Directors



WORLD PREMIERE OF THE NEW ALLROUNDER S

# Module Selection, the New Way for Individual Machine Configuration

Practically oriented with modular selection is the machine concept, which Arburg is demonstrating with its new Allrounder S, for the first time at the K'95 in Dusseldorf. Many expansion stages in the areas of motor capacity, hydraulics, controller and injection unit, with a wide range of combination possibilities, enable an exact adaption of the machine to the production requirements of an injection moulding company.

Arburg's small "new arrival" has clamping dimensions of 220 and 270 mm as well as clamping forces of 150 or 250 kN. And the other general equipment features of the new machine are also quite interesting.

Special attention was paid to the areas of machine floor space, noise emission levels as well as ergonomic design during the development phase, in order to ensure the optimum level of operating comfort.

### Compact Construction

The controller control cabinet as well as the cooling water distributor and electrical interfaces are integrated into the machine base. The conveyor belt or sorter unit can be integrated into the machine without additional space requirement. External peripheral devices can be positioned in the immediate

machine vicinity. All connections necessary are fed through supply channels on the front and rear of the Allrounder.

### Ergonomically Styled Construction

The housing in which the controller flat screen monitor and keyboard are integrated, can be tilted and rotated, enabling an optimum overview and operator access in every situation. The injection unit can be swiveled to the rear which simplifies the exchange of a cylinder module or screw.

### Performance Levels to Suit Application

The Selogica controller is available in many levels of performance. The 32 bit multi-processor system can be trimmed to suit the respective machine equipment with various equipment packages. The Selogica

monitor is available as a monochrome or colour version.

The basic Allrounder S machine is equipped with a water cooled control cabinet for the controller hardware, a servo-valve for movement and pressure hold, and a main pump as well as a manual cooling water distributor. The injection unit is equipped with injection regulation.

Further extension levels include, extended hydraulics for the completion of parallel movements, increased motor capacity as well as differing regulation possibilities for cooling water distribution and injection unit.

### New Double Piston Technology

Performance ability, compact construction and a high level of stability are features of the clamping unit. The double



piston technology used requires little space and displays its advantages with the distribution of force, the movement speed, the regulation as well as an optimum guide performance.

The hydraulic manifold

is located near the user on the support platen, on the movable side of the clamping system, and the hydraulic oil is pumped directly through the cylinder into the piston. The clamping unit is guided by four columns.

### Lots of Free Space in the Clamping Area

Lots of free space is available in the clamping unit area as a result of the safety gate with its large dimensions and the double piston system. Mould related peripherals or unscrewing units have plenty of space available.

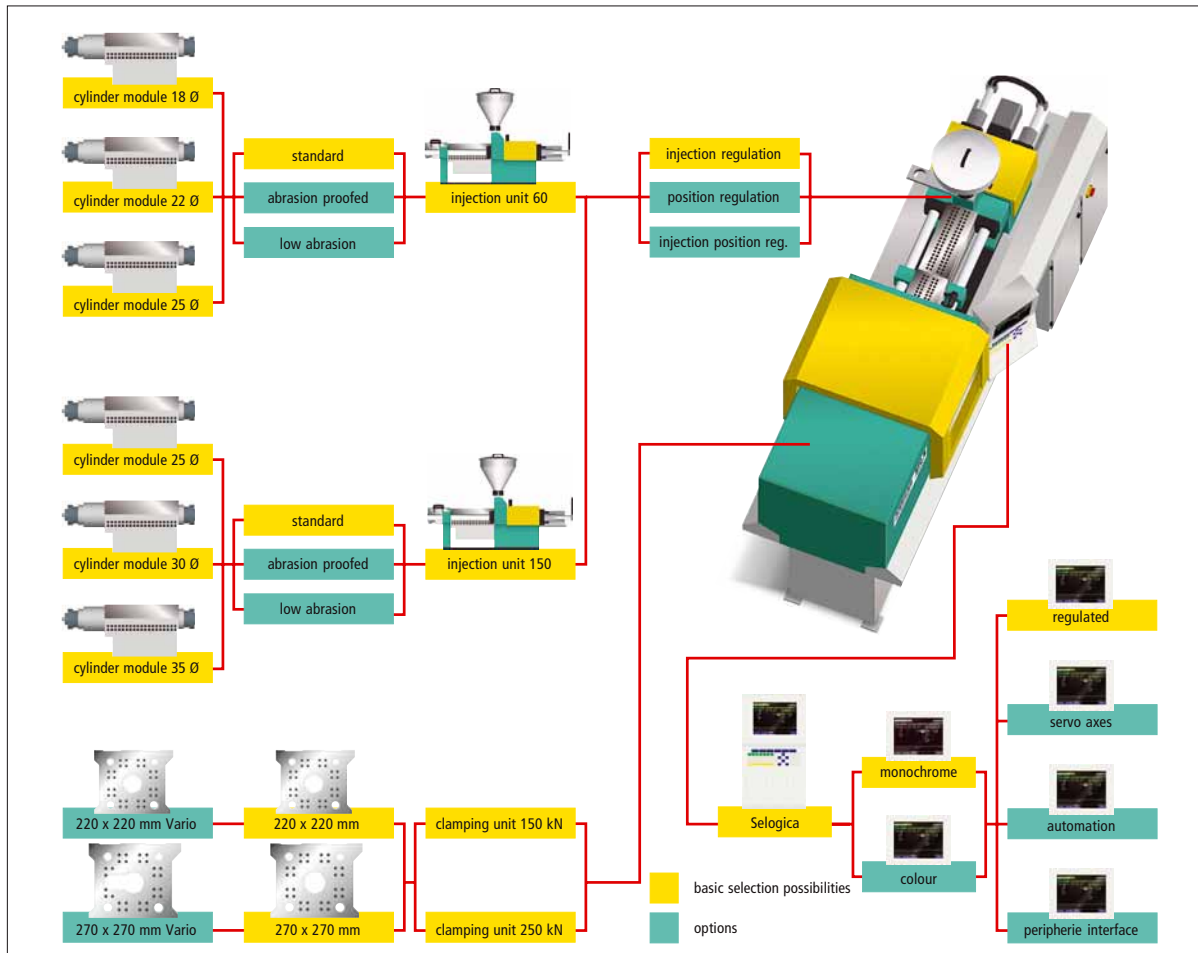
### Injection Unit Modular Form

Arburg's proven modular form for the injection unit has been retained with the S series machines. Central injection and the "Vario System" are also available as alternatives for the new small Allrounder.

The injection unit, cylinder and screw module can be centrally coupled by a connector and a coupling. The screw coupling is free of play.

The injection unit hydraulics operate with either injection regulation, a position regulated screw or injection process regulation. Two injection units can be combined with many hydraulic expansion stages and each with three different cylinder module sizes.

With the comprehensive modular system of the new Allrounder S, and the combination of Allrounder S components from the standard to the High-Tech machine, it is possible to achieve an absolutely application oriented machine. The optimum value for money is achieved with this concept ensuring the realization of economic injection moulding production.



ARBURG'S ALLROUNDER T ROTARY TABLE MACHINE

# Solutions at the Round Table

The handling involved with insert parts can lead to significantly longer cycle times. Part insert and removal undertaken parallel to the injection process is the solution.

You can operate in this manner with the Allrounder T rotary table machine. The Allrounder T enables optimisation of the operating sequence while retaining short cycle times.

Allrounder T rotary table machines can be equipped with a Multitronica or Selogica controller and are available in various sizes and levels of equipment. The machine displayed here at the exhibition is an Allrounder 1200 T 800-210 with a rotary table diameter of 1200 mm and a closing force of 800 kN.

The Selogica controller has control of the entire cycle including all part feed and Handling functions. At the exhibition, we are also demonstrating how easy it is to extend the Allrounder T by adding on various Auto-

mation components allowing integration into manufacturing systems. For example, the parts for coating are supplied and inserted automatically to the machine, the completed parts are removed by Handling devices and deposited on a conveyor belt for further processing.

At the loading station, the insert part is inserted and fixed into the mould half attached to the rotary table. The table rotates to the rear area of the machine underneath the movable mould half.

At the same time a further fixed mould half rotates to the front station. As the next removal or insertion process is occurring at this station, the part which



was inserted initially is coated at the rear station.

If a longer cooling phase is required for thick walled parts, a cooling station can be integrated into the process sequence. A total of three operating stages then occur.

Four station operation is also possible where the table is rotated each time by 90°. A physical isolation of the insert and removal process is also possible here as with the production on a three station machine.



ALLROUNDER T

## Specialized Technology for Specialized Parts

Components which frequently cannot be manufactured with normal injection moulding, can be produced by coating insert parts. The most varied materials can also be bonded using this method. The combinations which most frequently occur are plastics with other plastic materials, as well as with metals, textiles, glass or wood. The reason for the production of such bonded parts are the various characteristics required such as tenacity, conductivity, isolation or weight.



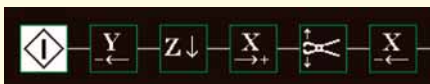
HANDLING CONTROL

## Angußentnahme in Selogica-Steuerung integriert

A decisive step has been undertaken for a simple, safe and universal connection between Handling and an Allrounder, with the complete integration of the Arburg sprue picker in the sequence programming of the Selogica controller.

The entire cycle sequence including all necessary part removal actions can now be centrally programmed on the Selogica controller. This eliminates the need for additional operating systems.

This method reduces the set-up times, increases the operating comfort and allows a greater level of freedom for part removal processes than has existed to date. The central control and storage of the data for movement sequences using one controller, also reduces the dangers of programming errors, which could cause damage to the Handling, mould or machine.



ALLROUNDER 420 V WITH TWO COLOUR TECHNOLOGY

# Selogica Regulated Two Colour Moulding

Two colour or two material moulding is used, when complex highly demanding parts required in large numbers with fast cycling times, are to be produced.

The multi-component technique is demonstrated on the Arburg stand, using an Allrounder 420 V. The Selogica controller is being used for the first time to control the entire sequence. The advantages of the Selogica are fully evident with this processing method. The graphical representation of the injection cycle in the form of a diagram, supplies an optimum overview. The individual possibilities for configuration, the comprehensive plausibility tests as well as the wide range of help

and quality control functions, illustrate the high level of operating comfort.

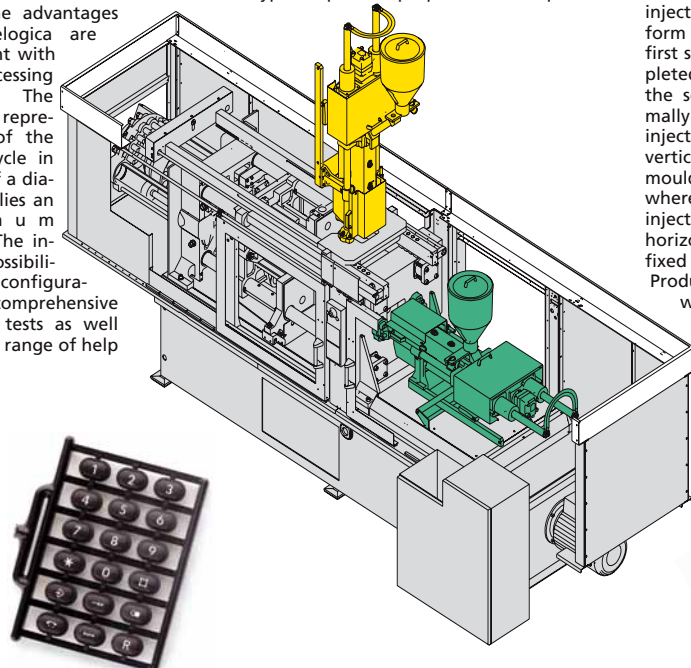
It is possible to process the same material with different colours as well as different types of plas-

tics, i.e. bonding of hard and rigid plastic combinations.

The selection of the materials to be used is especially important with multi-component injection moulding. Special attention must be paid to the chemical and thermal compatibility, the processing conditions as well as the mechanical properties of the plastics.

Two station moulds which can be rotated are mainly used with two colour or two material moulding. These moulds are primarily used because of the elimination of part insert and transport requirements as well as the savings in cost.

On moulds with two stations, the part is produced by the simultaneous injection with two injection units. The preform is injected at the first station and the completed part is injected at the second station. Normally one of the injection units operates vertically through the mould parting line, where as the other injection unit operates horizontally through the fixed clamping platen. Production is possible with two identical injection units as well as with injection units which have different performance capacities.



SPECIAL PROCESS

# Rounded Off to Perfection: The Arburg Injection Moulding System for CD Production



to the active as well as the passive side of the cylinder piston to undertake the screw movements. The fill process which is of extreme importance for the constant quality of the CD's - 100% inspection of the CD's produced is normal - can be achieved with a very high level of exactness using this method.

### Design Optimized for Space Saving

The external temperature control devices have been integrated into the machine base to achieve compact external dimensions. As an option, they can be operated with the Dialogica 16 controller, which makes the adjustment and monitoring of all temperatures on the machine monitor possible.

The handling controller has been installed in the Allrounder control cabinet. The movements of the clamping unit are transmitted to the Handling arm by way of a rack and crank drive. The CD removal is very time saving and practically without extension of the cycle time, due to these parallel movements of mould and handling.

The inputs and outputs for operation of the CD mould are freely programmable, e.g. for control of the mould blow unit and punch functions (CD centre hole). This enables the use of various moulds on the machine as well as the trouble free integration into Downstream systems for the manufacture of Au-

dio CD's and CD-ROM's. The Allrounder C optimised for CD manufacture, can be integrated into a production line as a single or double machine, which has a completed Compact Disc at the end of the line. The digital Audio CD stacker in the vicinity of the machine is also not a problem with the machine technology described. The optional attachment of a clean area or equipping of the Allrounder with special peripherals (e.g. external material drier) is also possible.

The series production of Compact Discs with injection moulding, requires technology which must fulfill the highest demands on precision and speed, to enable competitive manufacturing.



High reproducibility, low space requirement, high yield with fast cycle times and the simplest operation, serve as the basis for Arburg in the delicate area of "CD Manufacturing".

The company develops and delivers CD-submoulding systems, which are based on the Arburg standard machines and equipment. Integration of all necessary peripheral devices and the incorporation into Downstream systems for the manufacture of CD's, is a trouble free possibility with these machines.

ments are controlled with ramps, ensuring the shortest movement times, which simultaneously guarantees the optimum reproducibility.

The plastification has been specially optimised for Polycarbonate; the material used for CD's. The hydraulically position regulated drive system for the screw, caters for a high level of dynamics and dosage precision. Pressure is applied



GUIDED TOUR

## CD-Shuttle

During the K'95, we are offering you the opportunity of experiencing our CD machine live under production conditions.

We will take you to view the system at a company in the vicinity, in our CD Shuttle. Please ask our personnel on the stand for the tour times.



### 270C in a Real Production Environment

During the exhibition, the visitors to the "K'95" can view an Allrounder 270 C which is integrated into a CD production line at a company in the vicinity. The machine operates with 400 kN clamping and is equipped with a regulated clamping system which forms the basis for the highest level of production precision. The clamping force is also regulated and the clamping unit move-



# Comprehensive Product Quality Assurance

**Only computer assisted quality control processes guarantee a continuous high product quality with injection moulding, on a lasting and cost effective basis. The Arburg quality control AQS is designed for the special requirements of the plastics processing industry.**

AQS provides an easy entry level due to its simple operation and its system modularity, ensuring that the successive expansion of a computer controlled quality control system is possible for small and medium sized companies. The expansion stages range from inspection planning on a measurement station for part measurement and attribute testing, up to process data acquisition and SPC monitoring. AQS is also fully network compatible and can be integrated into QC and PPS systems.

AQS inspects the production series according to pre-defined quality standards. Manufacturing parameters can be se-

lected, acquired and processed according to defined inspection plan criteria. The entire production process becomes more clear with this type of quality analysis. Using statistical methods, the system can determine and evaluate variable and attributive quality features as well as injection process parameters.

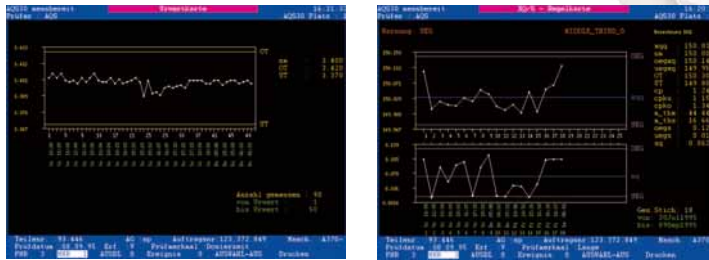
As AQS has a multi-user capability, the measurement data acquisition is decentralized where as the data evaluation is carried out centrally on a PC workstation. The system operates quickly, reliably and can be automated to a high degree. It integrates conventional data input via computer as well as manual, semi-automatic and fully automatic acquisition of data via measurement instruments.

Comprehensive mathematical data evaluation possibilities allow distinctive methods for statisti-

cal process testing. The measurement results displayed are clear and meaningful. AQS makes comprehensive quality testing and associated documentation available for further processors. Manufacturer and further processors can prove part quality at any time by producing the respective print outs.

Subordinate part inspection and additional resulting costs are reduced and the production of reject parts is minimized.

The quality control presents a modern and complete instrument for the inspection and improvement of injection moulding series production, in conjunction with other Arburg QC modules such as AQC or ALS.



## NEW AQC MODULE IN SELOGICA

### 100 % Quality: AQC Inspects parts Shot by Shot

**The Arburg Quality Control AQC, is a modern system for quality monitoring whose possibilities are over and above those offered by normal SPC solutions.**

The "Determination of Quality Features" and "Quality Regulator" software options developed for the Selogica controller, make the AQC to the most modern and advanced quality control system currently available.

Up to now, it was necessary to have an external PC for measurement data acquisition available for every machine, to ensure 100% control as well as complete documentation.

#### Determination of Quality Features

Arburg offers the determination of quality features as an option for the Selogica machine controller. The extension module which is being demonstrated on the exhibition stand on an Allrounder 270 V, uses the standard graphic and quality functions which are already available on the Selogica.

If all the machines linked with the AQC quality monitoring have such an additional module available, the determination of the process models can be under-

taken centrally on one PC. The process models are transferred to the machines as a data set and have the ability to independently control the quality of the moulded part in production.

Before the mould is opened, it has been determined if the part in the mould is within the defined quality tolerances. If this is not the case, the sorter unit is activated and the bad part is sorted out immediately. The part specific quality inspection allows the correction of errors in the manufacturing process immediately within the next cycle.

#### AQC Quality Regulator

The prototype of a quality regulator for the AQC system is also being presented at the "K" for the first time. Not only can AQC determine the process models for quality monitoring using this system, but also the optimum process parameters in the run up to series production. This information is

### Distinctive Advantages with AQC

- Elimination of moulded part measurement in the production sequence,
- One hundred percent quality monitoring of all moulded parts,
- High level of system prognosis precision
- The representation of quality relevant factors as well as the determined quality features with each shot, on the monitor,
- The immediate recognition of the effects of changes in settings or disturbances in the quality features, immediately with the next shot,
- The acquisition also of attributive quality features,
- Faster, machine independent determination of the best operating point of the Allrounder through knowledge of the process factors desired.

supplied to the machine controller and added to the adjustment data set.

Not only does this allow the Allrounder to use the correct data set, but also the optimum process parameters such as mould cavity pressure or mould wall temperature. The regulator corrects the machine adjustment continuously during production so that the process parameters can be maintained,

even with the effect of external interferences.

This method achieves 100% personnel free quality control and regulation in series production, meaning a significant reduction in quality control costs. The quality regulator will be available in future as a software option for the Selogica controllers of the Allrounder S and V machine series.

## NEW: ALLROUNDER C AS U VERSION

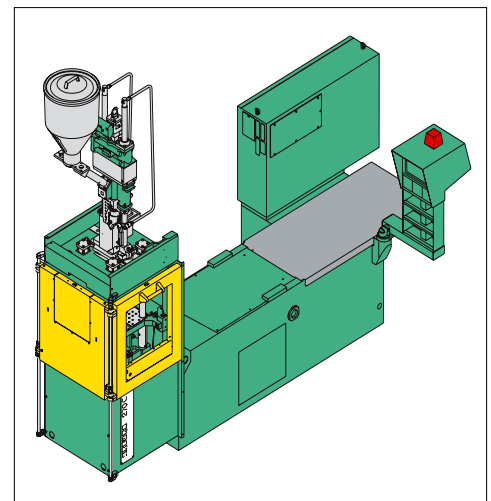
### Allrounder C with Swivelling Clamping Unit

**To ensure flexibility of operation, Arburg developed the universal Allrounder principle, which allows many operating positions on one machine by swivelling the clamping unit and unplugging the injection unit and plugging it into another position.**

For example, conventional moulded parts can be produced with an Allrounder, but insert parts can also be coated by swivelling the clamping unit, which is not possible on normal standard machines.

At the "K'95", Arburg is also presenting the Allrounder 270 C as a universal machine, i.e. with swivelling clamping

unit. This machine allows production in four different operating positions. The conversion of the Allrounder in the operating positions with a vertically opening clamping unit necessary for insert parts, can be carried out quickly and easily with few actions.



# Perspectives for the Future

**Preservation of resources is vital. The necessity is the manufacture of moulded parts with less energy and the development of machines with new technology for universal application which operate with the highest level of precision, but having the ability to be used economically, despite the technical outlay required.**

A new workable machine concept is in question. A concept for an electrical machine.

## Requirement Oriented Concept

The study which Arburg is presenting at the K'95 in Dusseldorf, is based on such a requirement oriented concept. The prototype is called Allrounder E and is a 1000 kN machine with many new details, which have not been applied to injection moulding machines in this form up to now.

The realisation of constant high quality production with a significant reduction in energy consumption led to the creation of this new drive. The Allrounder E saves approx. 40% energy as a fully electric, regulated machine.

## Direct Drive on All Axes

possible without limitation. The degree of effectiveness achieved with a direct electrically driven axis is significantly greater than with a hydraulic drive. The fully regulated motors ensure the highest reproducibility.

The gearing necessary for driving the feed screws is integrated into the respective machine components, in order to save space and prevent dirt and corrosion.

The Arburg "E machine" has a distinctive advantage in the area of power distribution. The required power is continuously available.

## Newly Constructed Free Mould Clamping Unit Area

Clamping surfaces: It is truly fully available on the Allrounder E. The "free mould clamping unit area" opens new horizons. It offers space for moulds and mould related peripherals. Two di-

free of warping and tilting as the clamping force is applied moment free to the closed mould. The fixed and the movable mould platen are free of deformation and installed together on the machine base.

## Fully Modular Injection Unit

The completely modular technology of the Allrounder E injection unit is currently used by Arburg in a similar form. Injection unit, cylinder and screw are separate modules and are connected together with a central quick coupling. The unit sizes are also identical with those of the hydraulic Allrounder. Cylinder change between both machine categories is possible without any problems.

## Into the Future with the Selogica Controller

The prototype is operated with the Selogica machine controller with its graphical user shell, which is currently used with other machines. The entire production cycle is represented by a sequence diagram

philosophy. Comprehensive quality control functions are also integrated.

## Space Optimized Construction

The future of injection moulding technology has been achieved on the Allrounder E with the minimum use of space. The compact external dimensions are proof of this. The machine is also tailored to the latest ergonomic standards with its smooth outer surface, good access to the machine assembly groups, the grouping of all connections in supply line channels, as well as the optimum operating comfort offered by the tilting and swivelling control panel with flat screen monitor.

The machine performance, layout and conception illustrate that the machine has been developed for a wide spectrum of application. A customer oriented, practical idea which above all: Will remain affordable.

## DIN ISO 9001 CERTIFICATION

# Allround Quality

## Successful certification according to ISO 9001 at the Arburg main plant

Two years of intensive project work have paid off: The ISO 9001 certification audit was successfully completed in June this year. The inspection commission of the DQS were able to award a positive evaluation, after this particularly short period of time for a company of this size (approx. 1300 employees).

The certification process proved to be complex, mainly due to the fact that, a production share of 60% is comparatively large. Arburg was inspected for its adherence to the criteria in accordance with ISO 9001. This standard encompasses the areas of development, production, assembly and customer service.

The implementation of the ISO guidelines was undertaken by a seven head project group at the Lossburg plant. The employees were informed about the objectives to be fulfilled for the purpose of certification by means of posters, training and a specialized company information.

Since the guidelines are not static, a continuous process of improvement and development is underway in all areas and departments, to improve internal processes, where the suggestions of each employee are taken into consideration and welcomed.



## ALS HOST PROCESSOR SYSTEM

# Overview of Quality

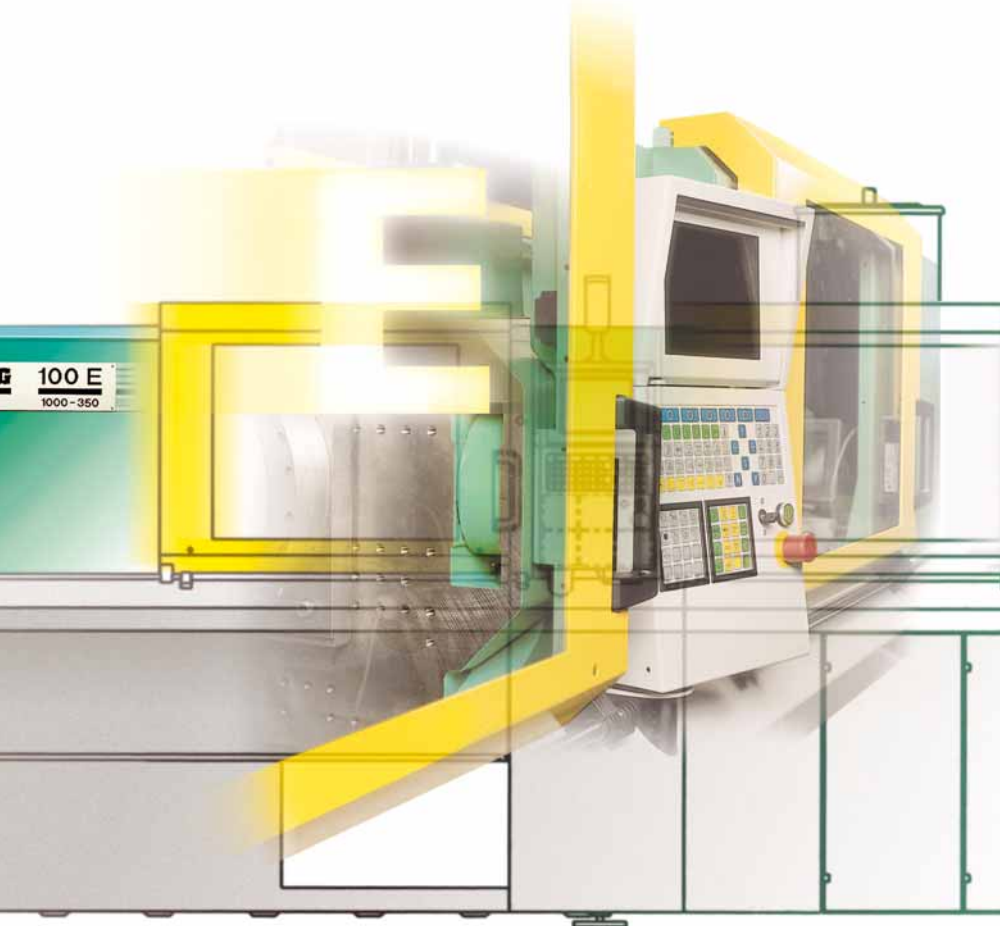
The Arburg host processor system ALS, caters for more clarity in the area of injection moulding production. It is applied to centrally acquire, control, prepare and transfer data to a superior PPS system. This data consists of machine data, operating data, adjustment data and order data which has been acquired from numerous Allrounders.

ALS can be expanded modularly and can operate together with the Arburg quality control systems, AQS and AQC.

A further module being presented at the "K'95", offers the possibility of gaining a quick overview via the ALS terminal, of the constancy of the injection moulding process indicating the quality standard of the respective manufacturing stage. The new software accesses actual values which the host processor automatically records for each integrated machine. The test frequency and range can be selected. The quality parameters selected in this manner can be stored for each order and can be used as often as required for set-

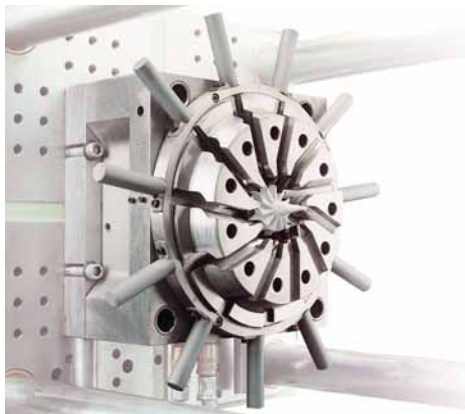
ting the quality data acquisition.

Display of the parameters is possible in tabular or graphic form. Tables and graphs can be printed. Up to 10 quality parameters can be acquired simultaneously for each Allrounder. The 100 most current values for each machine are stored by the host processor system which calculates Minima, Maxima, and average value, as well as the standard deviation from the average and nominal value. All quality parameters can be displayed simultaneously for a machine. The graphical representation of the actual values is automatically updated as soon as new parameters are received from the Allrounder.



ARBURG POWDER INJECTION MOULDING

## Ceramic and Metal Moulding



**Powder injection moulding only uses the plastic as a binder for powder materials consisting of metal or ceramics. The plastic only serves to aid part formation in conjunction with the injection moulding machine and is removed by debinding after the production of the so called "green body".**

Injection of powder materials is used more and more frequently for the manufacture of complex parts. Areas of application include the automobile industry, the tooling industry, the textile industry and the area of high performance-

ance ceramics. The process is especially suitable for the manufacture of high part counts with fully automatic series production.

The processing of powder materials is basically possible on all Arburg Allrounders with the respective special equipment. Even complex moulded parts can be manufactured with practically no waste, without the need for expensive machining and with short conversion times. Automation of the process fully uses the considerable time and cost advantages.



ARBURG GIT PROCESS

## Gas Sinks Costs

**The gas internal pressure technology is used primarily with the production of injected parts with thick walls, partial stiffening or hollow shell construction as well as parts where hollow cores are required.**

This technology is being demonstrated on an Allrounder 370 V. The principle is simple: The material is displaced by the injection of Nitrogen into the molten plastic core. A hollow area forms in the injected part, the material distribution in the cavity is optimised.

The external GIT device receives a signal and injects a compressed gas into the mould cavity. This can be achieved via an injector element integrated into the mould or via a special shut off nozzle on the cylinder.

The holding pressure is applied using the pressure profile set on the GIT device.

The gas internal pressure technology can lead to considerable savings in terms of material as 20 - 30 % of the plastic is replaced by a gas. Reduction of the part wall thickness on the injected part ensures faster cooling and shorter cycle times.

Distortion and shrinking in the cavity are minimised due to the more constant pressure relationships in the cavity. GIT parts stand out particularly due to their relationship of injected part weight to part tenacity. They possess a considerably better surface quality in comparison to parts formed by foamed moulding.

SPECIAL PROCESS

## Special Usages

At the "K", the demonstration of Allrounders which have been technically optimised to process special materials, illustrates the potential available. Machines for the manufacture of injected parts from liquid silicon and thermoset plastics as well as gas pressure technology are being demonstrated. A further area demonstrated is powder injection moulding, which is documented by exhibits and application information on the Arburg stand, illustrating the amount of potential in this area.

MULTI-COMPONENT INJECTION MOULDING

## Coloured Variations

**The "Two Colour" and "Two Material" (Bonded) as well as "Three Component Moulding" and "Interval Injection" are all categorized under the heading "Multi Component Injection Moulding".**

With interval injection, the colours flow into one another to produce a marble effect, where as the intention with two or three colour moulding is to combine the various colours or materials without mixing them.

Injection moulding is not the only method to produce multiple component plastic parts, as they can be produced by printing, steam moulding, hot stamping, painting or decorating with foils. Most of these alternatives to injection moulding, do not offer

enough resistance to the conditions which they are to be subjected on a day to day basis.

However, multi-component injection moulding, makes the series production of long lasting moulded parts consisting of multiple colours or materials to an easier, faster, high quality and cost saving exercise. Today, two or three components can be fully automatically processed on an injection moulding machine. Thus, individual customer requirements are not a problem.

ARBURG LSR INJECTION MOULDING

## New Cold Channel Head

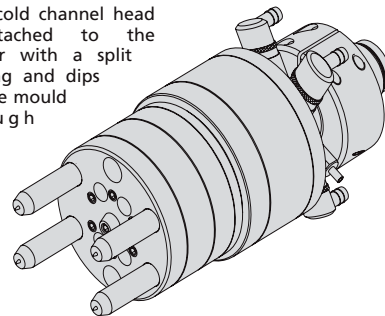
**The processing of Liquid Silicone Rubber (LSR) is demonstrated on an Allrounder 370 C with 800 kN clamping force. As well as the special cylinder required for the processing of LSR, the machine is also equipped with other important options such as a non return valve, a mould blow device and a V24 interface.**

The LSR cold channel head is a new development. Such cold channel systems are being used more and more frequently for process automation as well as material saving. The Arburg development is not mould related as is normal, rather it is machine related allowing it to be used with different moulds.

The cold channel head is attached to the cylinder with a split coupling and dips into the mould through

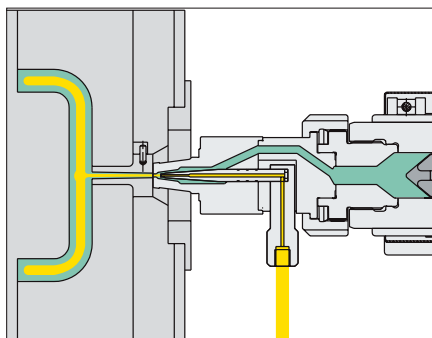
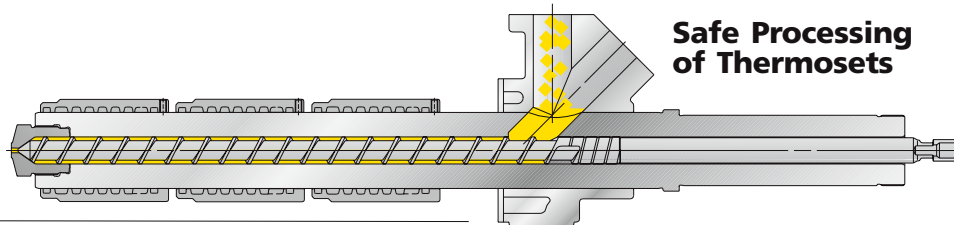
the fixed platen. The individual nozzles are equipped with a hydraulic needle type shut off nozzle system. Because of this, the injection points remain absolutely clean and have a perfect surface quality. Up to six shut off nozzles can be used because of the modular art of construction. The complete mould can be separated from the cold channel head, to isolate the different temperature zones (hot and cold) from one another.

As well as having technological advantages, the Arburg system also reduces the costs associated with mould construction as the cold channel can be used on different moulds.

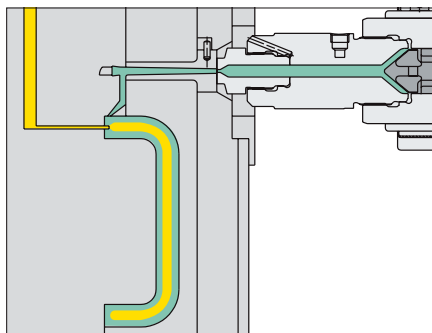


ARBURG THERMOSET PROCESSING

## Safe Processing of Thermosets



GIT-process with shut off nozzle on cylinder



GIT process with injector element in mould

**During the exhibition, thermoset parts are being manufactured on an Allrounder 420 M. When these materials are being processed, it is important to take the differing temperature and viscosity behaviours into account, which are comparable with Elastomers.**

For this reason, cylinder units with liquid temperature control are used, as their heating zones are independent of one another. Special process screws convey the material to the nozzle opening.

Optional heating circuits which can be fitted to the machine controller, enable the tempera-

ture control of even complex moulds directly from the machine controller. A maximum of 12 such heating circuits can be installed with the Allrounder M.

Special cleaning brushes which are used to free the mould halves from impurities, which commonly occur with the processing of thermosets, are also operating on the machine at the exhibition. The brushes dip into the opened mould after each shot and clean the parting surfaces and mould cavity. Control of this device is undertaken by a machine side handling interface.

ARBURG PERIPHERIE

## Practical Assistant

Not only is Arburg presenting the newest machine technology at the "K'95", but also a comprehensive range of peripherals to simplify the daily tasks.

An advantage of these peripheral devices is in their modularity. By successively equipping the Allrounder with this technology, the machines become cheaper to automate. The Allrounder practically grows with the requirements of the company.

If you are interested in Arburg peripherals, information concerning the unscrewing unit, the quick coupling system, the Rapidomat mould changer and the Thermolift is available on the stand at the exhibition.



ARBURG UNSCREWING UNIT

## Secure Rotation

With the Arburg unscrewing unit, internal and external threads can be demoulded in a fast and precise manner directly after the injection process.

Time consuming and costly machining of the injected parts becomes completely unnecessary.

Because of their compact external dimensions, unscrewing units can be connected directly to or integrated in the mould, even with injection in the parting line.

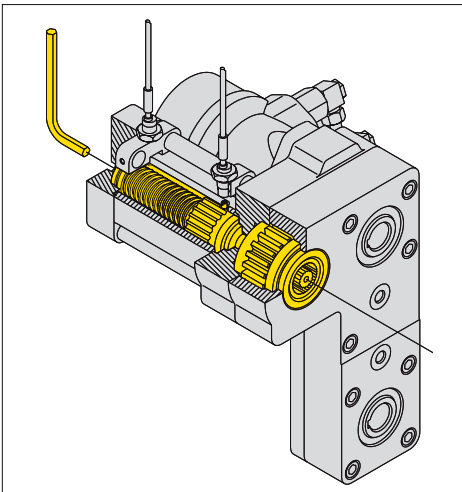
Up to 50 threads can be demoulded with the high performance unscrewing unit H. The start and end points for the unscrewing movement are determined by two cams. Time controlled unscrewing is programmed on the machine controller.

The unscrewing unit F with gearing, has been specially developed for attachment to the fixed

or movable platen of the clamping unit or for installation in moulds. Its method of construction allows for optimum adaption to the respective mould layout.

Unscrewing with fixed end limits is possible in addition to time and stroke controlled unscrewing. Highly precise operation is possible with this method.

Unscrewing unit F without gearing can either be attached to the fixed mould platen or directly to the mould. This unscrewing unit is very compact because of the elimination of the gearing, it can be attached directly to the mould, even with parting line operation.



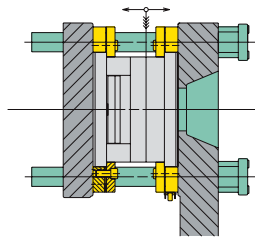
ARBURG QUICK COUPLING SYSTEMS

## Quick Mechanical or Hydraulic Clamping

With the Arburg quick clamping system, conversion times with mould removal, change and clamping can be drastically reduced. The units are simple to use and enable an exact installation of the mould.

### Mechanical Clamping

The mechanical quick coupling clamping system can be installed ver-



vertically and horizontally on the machine clamping platens.

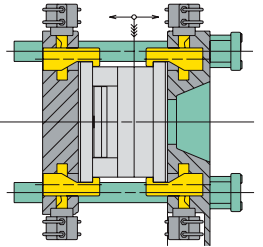
The movable platen is moved to the mould height for mould installation. The mould which is on guide rails with rollers, is inserted up to the intermediate stop position. The ejector is coupled here, the mould is brought to its final position and the eight clamping jaws are tightened. During mould removal, integrated springs

lift the clamping jaws away from the edges of the mould. The mould can be removed from the machine without hindrance as soon as the ejector has been decoupled.

### Hydraulic Clamping

With a hydraulic clamping system, the mould is inserted horizontally into the clamping unit and each half is retained by four clamping elements integrated into the clamping platens. Coupling of the ejector occurs in the same manner as with the mechanical clamping system.

The hydraulic clamping



system is used especially in conjunction with the Rapidomat. The mould change can be fully automated in this manner, resulting in an effective reduction in conversion times.

ARBURG THERMOLIFT 100-2

## Optimum Material

The Arburg Thermolift 100-2 can be adapted exactly to the respective injection moulding requirements because of its modular construction.

The drying and supply unit for plastic granulate can be expanded by component options such as a dehumidifying unit, recirculation air filter, 100 litre granulate container extension and an interface to the machine controller.

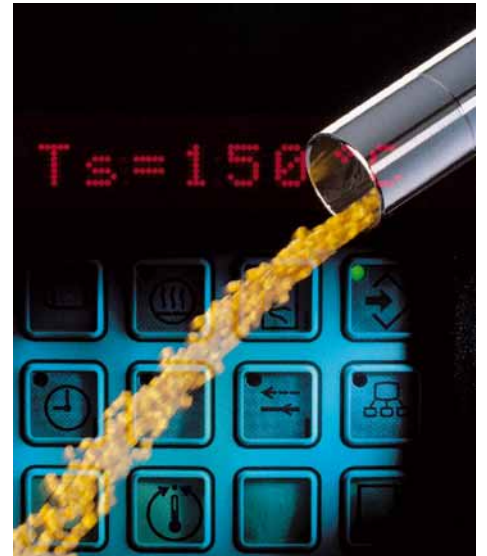
The optional dehumidifier can be used for optimum pre-drying of hygroscopic plastic granulate. A silica gel rotor dries the intaken air by absorption. The saturated silica gel rotor is dried in the regenera-

tion zone in the same rotation and prepared again to absorb moisture.

A filter can be used for the preparation of material containing dust.

The material storage capacity of the Thermolift can be increased from 100 to 200 litres of granulate with the extension for the material container. This is an advantage particularly when supplying two machines.

The optional machine interface allows the operation of the Thermolift directly from the Selogica controller. Switch on times, operating temperature and temperature sink can be programmed and monitored.



ARBURG MOULD CHANGER

## A Quick Transfer

Use of the Arburg Rapidomat mould changer system with frequent mould change leads to a significant shortening of conversion times and cost reduction.

The Rapidomat operates according to the off-setting table principle, where one mould is in production and a second mould is prepared for production on the changer station.

The manual connection of mould temperature control units or hot runner channel systems, can occur on the prepa-

ration station, in the same manner as the connection of electrical connections. The supply to the mould is not interrupted during mould change.

The entire process can also run fully automatically. The Rapidomat can also be extended with program controlled adaption of all supply lines. The adaptor system connects automatically as soon as the mould is brought to the preparation position. All necessary connections between the machine and mould are made and the mould can be preheated to the predefined values.

