



SILICONE INJECTION MOULDING

Highly flexible with LSR and HTV

ARBURG

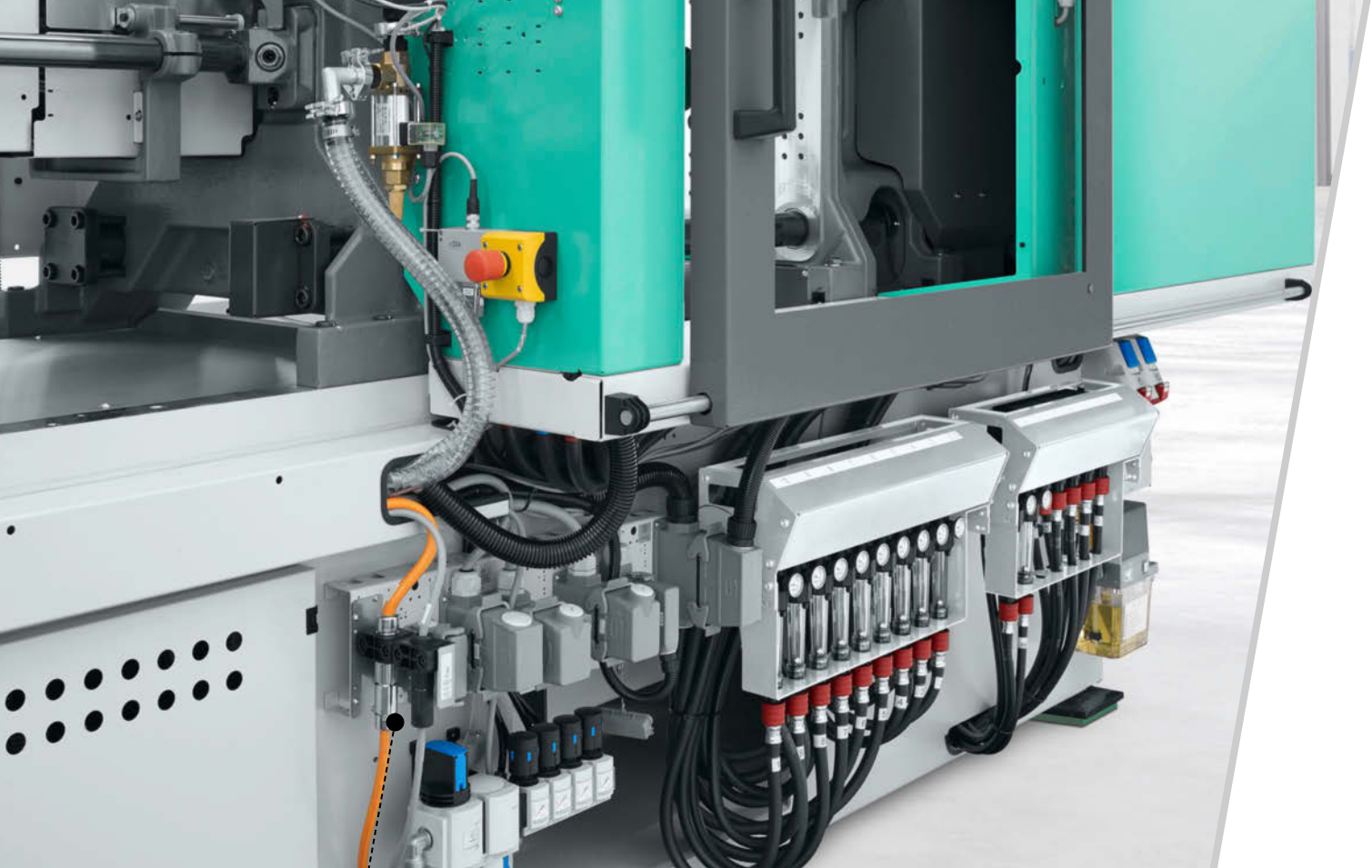
HIGHLY ELASTIC

**The basis for processing
silicone: system solutions
from ARBURG.**

The areas of application of silicone are just as flexible as the material itself.

Individually adapted solutions from specialists are required here. And these are precisely what we provide. Competent and reliable for all industries, also in combination with other materials. More than 40 years of experience with several thousand silicone applications realised speak for themselves. As does our ALLROUNDER injection moulding technology, which can be flexibly adapted to your part requirements. 100%!

WIR SIND DA.



Perfect combination:
ALLROUNDERS individually
adapted to the task at hand.

AT A GLANCE

// We were there from the outset when silicone injection moulding was developed! Our in-depth expertise and our modular technology enable us to set the benchmark in the industry. Our interdisciplinary team of specialists can always offer you the best possible system solution – whether for LSR liquid silicone (Liquid Silicone Rubber) or HTV solid silicone rubber (High Temperature Vulcanisation). Dosing and temperature control adapted to the material, precise moulding and reliable removal are all a matter of course. This applies throughout the entire serial production. //

Highlights

- All machine models can be used for silicone processing
- Central monitoring and digitalised processes
- Automated turnkey systems
- LSR micro injection module
- Customer training course for in-depth know-how

Full utilisation of options

Based on ARBURG's comprehensive offerings for processing liquid silicone (LSR) and solid silicone (HTV), the machine technology can always be adapted precisely to the injection moulding task at hand:

- wide selection of machine series, sizes and injection units
- Numerous equipment and configuration options, as with multi-component technology, for example

Keeping processes under control

Our machine control system easily integrates process-specific peripherals equipment. Thanks to process programming with real-time plausibility check, even complex processes can be set up with ease. Numerous functions for process optimisation, monitoring and documentation ensure top quality moulded part production. These include, for example, adaptive mould heating circuits or the evacuation of cavities.

Reliance on expertise

Benefit from our many years of experience: from individual machine specifications and detailed process technology consulting through to assistance with moulded part design and mould configuration. Alternative concepts are also no problem for us. Comprehensive testing facilities at our worldwide Technology Centers round off the offerings. Significantly greater cost-effectiveness for you – that is our primary objective.



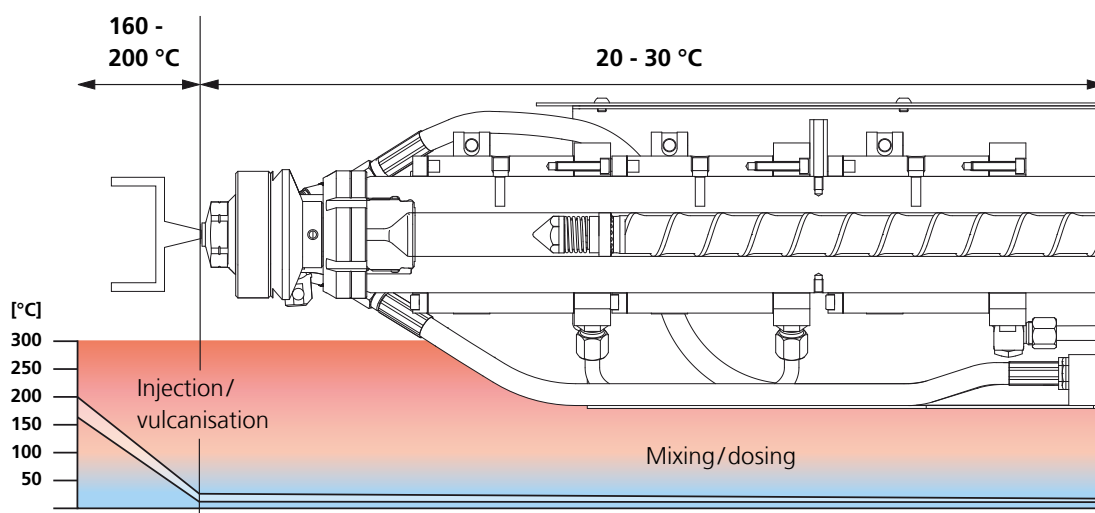
SILICONE PACKAGE

- | | |
|--|--|
| <input checked="" type="checkbox"/> Liquid temperature controlled cylinder modules for LSR or HTV with special plasticising screws | <input checked="" type="checkbox"/> Adaptive mould heating circuits |
| <input checked="" type="checkbox"/> Customised nozzle technology | <input type="checkbox"/> Special peripheral equipment and dosing systems |
| <input checked="" type="checkbox"/> Interfaces for dosing systems and flow monitoring | <input type="checkbox"/> Brushing and demoulding units |
| <input type="checkbox"/> Vacuum and air blow units as well as flow monitors | <input type="checkbox"/> INJESTER tamping device for HTV |

Standard Option

PROCESSING: SOPHISTICATED

// Liquid silicones (LSR) and solid silicones (HTV) are high-quality materials which only develop their unique properties following a special process. Precise temperature control is decisive. While high temperatures are required for vulcanisation, the cylinder module must be kept cool. Otherwise, the reactive material mixture would undergo premature cross-linking. Consequently, thermal separation of the different areas must be ensured – for example by retracting the cool nozzle from the hot mould. //







Raindance AIR - Hansgrohe AG

Integrated functionality through hard/soft combination: blast former with silicone nubs are easy to clean, for example.

Unique properties

When thermoplastic and classic elastomers are pushed to their limits, LSR and HTV are used. The material characteristics are the prerequisite for efficient processes and high-performance products:

- Complex filigree part geometries can be implemented
- Small components are also possible
- Easily automated production
- Short vulcanisation and cycle times can be realised
- "Ready-to-use" products
- Clean processing without residues

LSR: "liquid" becomes highly elastic

Liquid silicones are addition cross-linking silicone rubbers made from two components (catalyst and cross-linking agent). For better delivery capability and storage characteristics, they are supplied in separate containers. A special LSR dosage system homogeneously mixes the two "liquid" components as well as the added dyes and additives. The now reactive material mixture vulcanises very rapidly at high temperatures – completely without decomposition products

HTV: "solid" becomes highly elastic

Solid silicones are self cross-linking silicone rubbers made from a single component supplied in the form of bales, blocks or strips. A special INJESTER tamping device is required for processing "solid" masses. At high temperatures solid silicone rubber vulcanises at a similar rate to LSR.



Over
200 °C
HOT MOULD

LSR and HTV vulcanise at high temperatures and therefore feature unique properties

MATERIAL CHARACTERISTICS (LSR AND HTV)

Cross-linking under high temperatures

High resilience

Odour and taste neutral

Chemical, UV, ageing and temperature resistant (up to 200°C)

Flexible when cold (to -50°C)

Pleasant tactile qualities

Insulating properties

Sterilisability



REPRODUCIBLE LSR INJECTION MOULDING

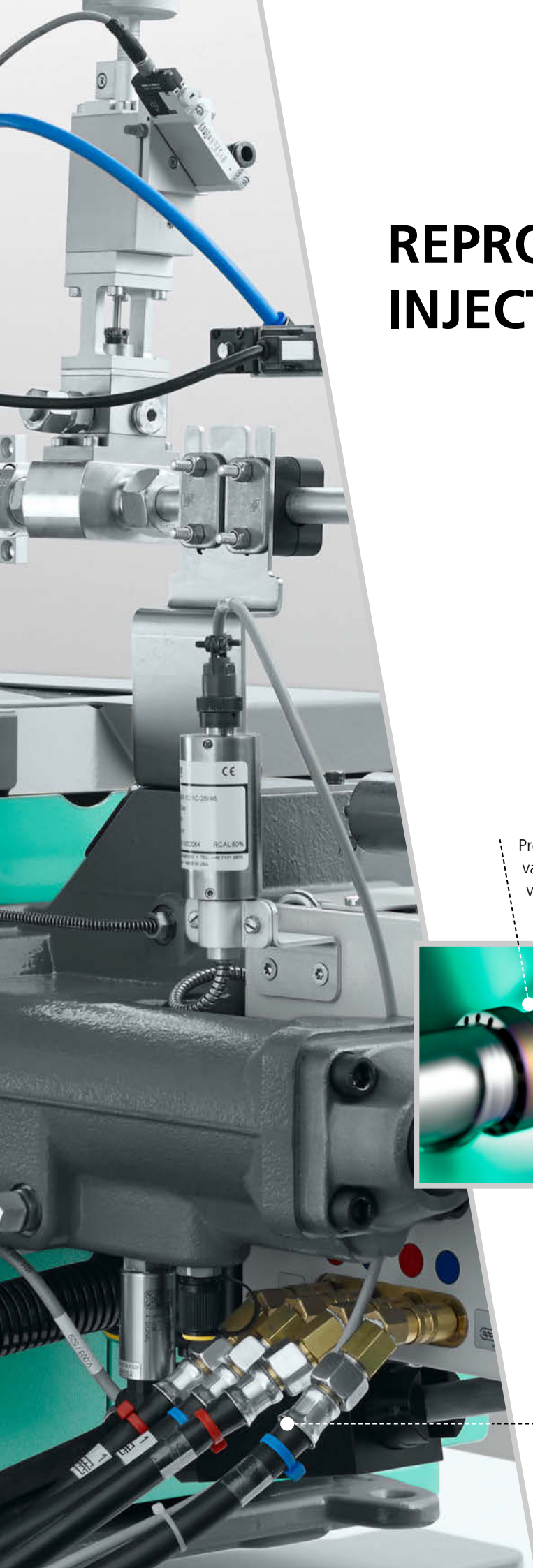
// Many conditions need to be taken into account to achieve a stable, reproducible process. This applies in particular to liquid silicone (LSR), where two components have to be mixed homogeneously and injected "cold" into a "hot" mould. We save you work with our comprehensive process expertise and our precise ALLROUNDER injection moulding technology. This is because a stable process is prerequisite for reproducible high quality. //

Precise: disk-type non-return valve, which closes automatically via spring force.



Matched to the mould: large selection of different nozzles.

Process-reliable: cylinder module with liquid temperature control helps prevent premature cross-linking.



Adapted plasticising

Owing to the low viscosity of LSR, the cylinder module is of particular importance. The cylinder module and nozzle feature liquid temperature control in multiple zones to ensure constant thermal conditions. The zero-compression screw with reduced flight depth and L/D-ratio reduces the amount of material and additionally mixes all the components. Our aXw Control ScrewPilot and the special check valve with ring ensure precise dosing, injecting and holding pressure.

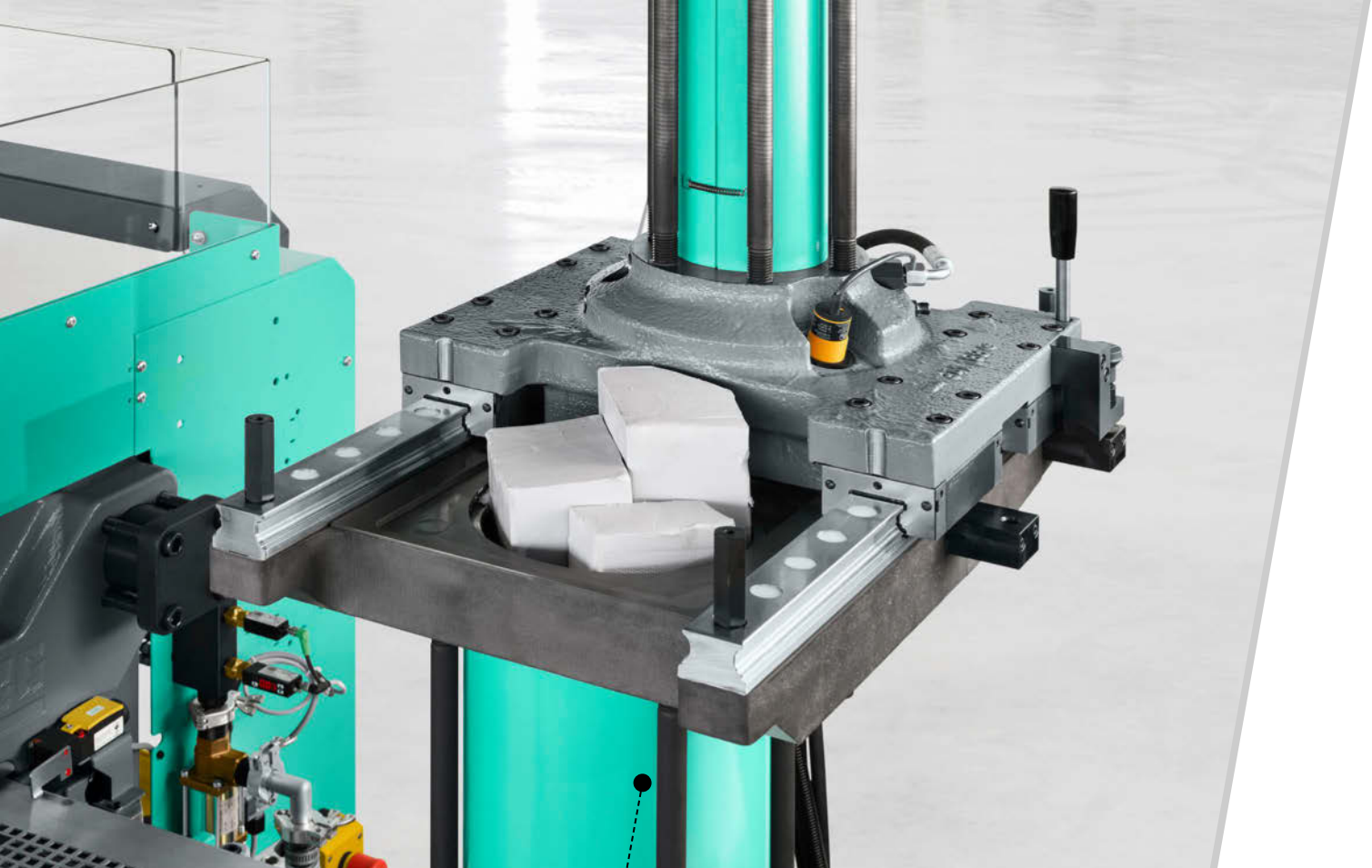
Effective use of materials

The necessary cleanliness during LSR processing is ensured through additional sealing of the cylinder modules. In addition to an open nozzle, a number of needle-type shut-off nozzles featuring a standardised hydraulic drive are available. A single cold runner nozzle also allows for direct injection and consequently sprueless part production.

INJECTION UNITS FOR LSR

EUROMAP size	Screw [mm]	Injection volume [cm ³]	Injection pressure [bar]
5	8	2.5	2000
30	12	6.8	2200
	15	10.6	2200
70	18	23	2500
	22	34	2000
	25	44	1550
100	15	18	2500
	20	31	2500
	30	71	1390
170	25	59	2500
	30	85	2000
	35	115	1470
290	25	73	2500
	30	106	2500
	35	104	2000
400	40	188	1530
	35	154	2500
	40	201	2000
800	45	254	1580
	45	318	2470
	55	474	1650





Material-specific: feed via INJESTER tamping device.

RELIABLE HTV FEED

// Trouble-free processing of solid silicones (HTV)? No problem for our INJESTER tamping device! This is easy and quick to clean, which is particularly advantageous for HTV, as this material is frequently fabricated on a product-specific basis. This also results in frequent material changes. For you, a high degree of process reliability in conjunction with short set-up and standstill times means: greater cost-efficiency throughout. //

Special material feed

The INJESTERs have been designed for the automatic feed of paste-like materials and are fully integrated into the machine control system. All standard containers, as well as bales, blocks and strips, can be processed reliably. Optimum pre-compression is assured, resulting in minimal air and gas inclusions. No voids are formed in the components and the surfaces remain flawless.

Perfect processing

During HTV processing as well, precise temperature control prevents premature cross-linking. For this reason, the nozzle and cylinder module feature liquid temperature control. The adapted feed opening of the cylinder module is prepared for mounting an INJESTER. The zero-compression screw with a special non-return valve is adapted for the processing of HTV.





MACHINE TECHNOLOGY: UPON REQUEST

Everything from a single source! You can rely on our injection moulding technology when processing silicone: the ALLROUNDER precisely adapted to your LSR or HTV application, including dosing, vacuum and demoulding technology if you wish, as well as the complete automation solution. You will be provided with the best solution on offer for reproducibly high product quality.

e | inject



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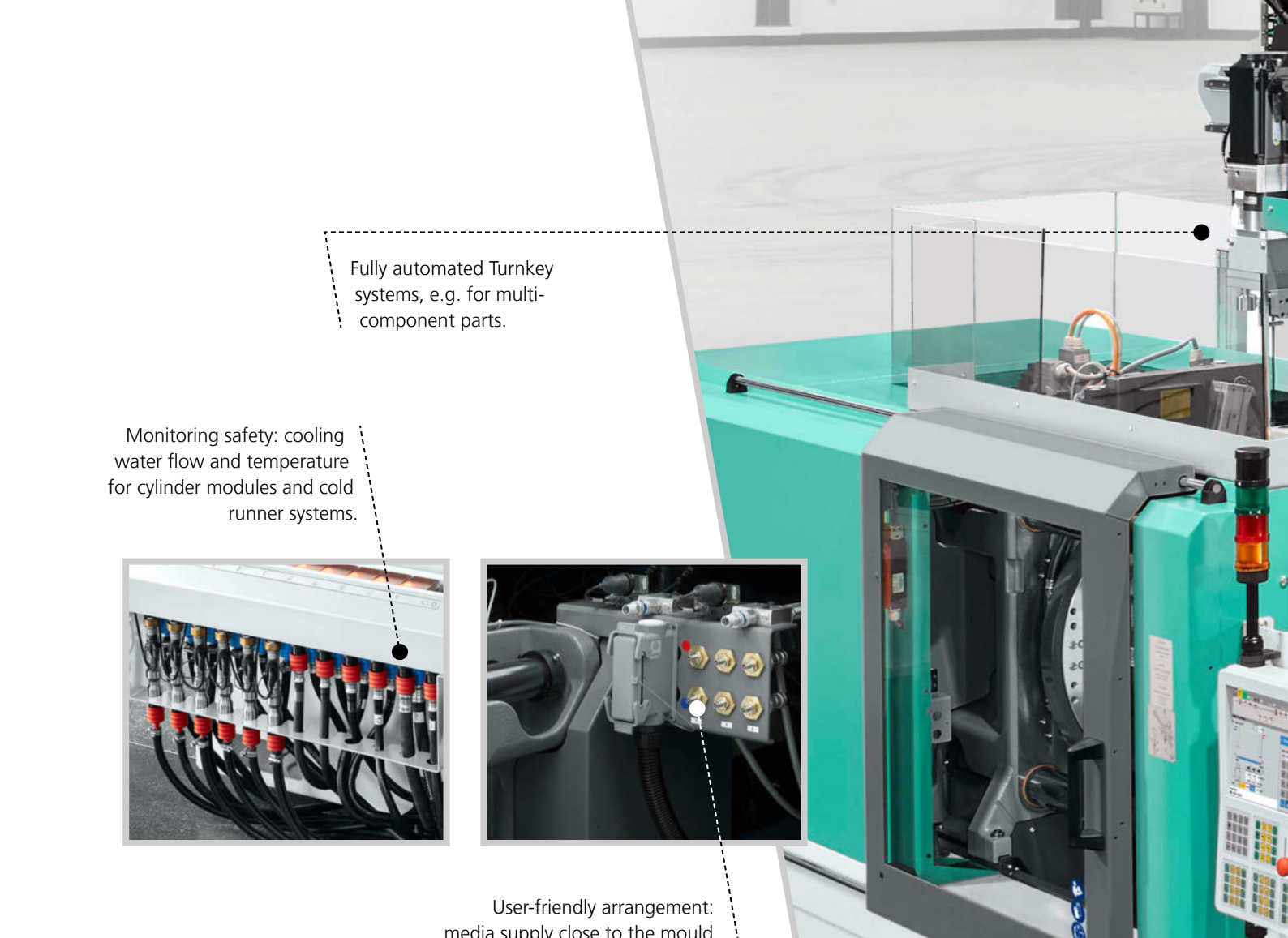
Microkolumn
OSW

max. speed 30 min.
OSW

Filter
170

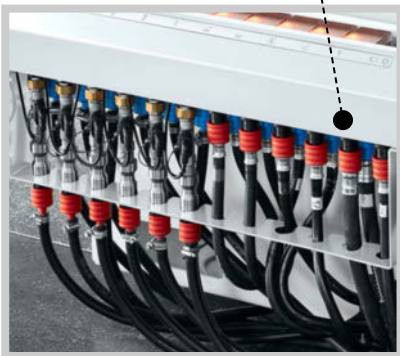
ion 170

ADWEG
Technische Spezifikationen
Modell: ADWEG 170
Seriennummer: 170-170-170
Material: Edelstahl
Gewicht: 10 kg
Abmessungen: 100 x 100 x 100 mm
Lieferumfang: 1 x ADWEG 170
Hersteller: ADWEG
CE



Fully automated Turnkey systems, e.g. for multi-component parts.

Monitoring safety: cooling water flow and temperature for cylinder modules and cold runner systems.



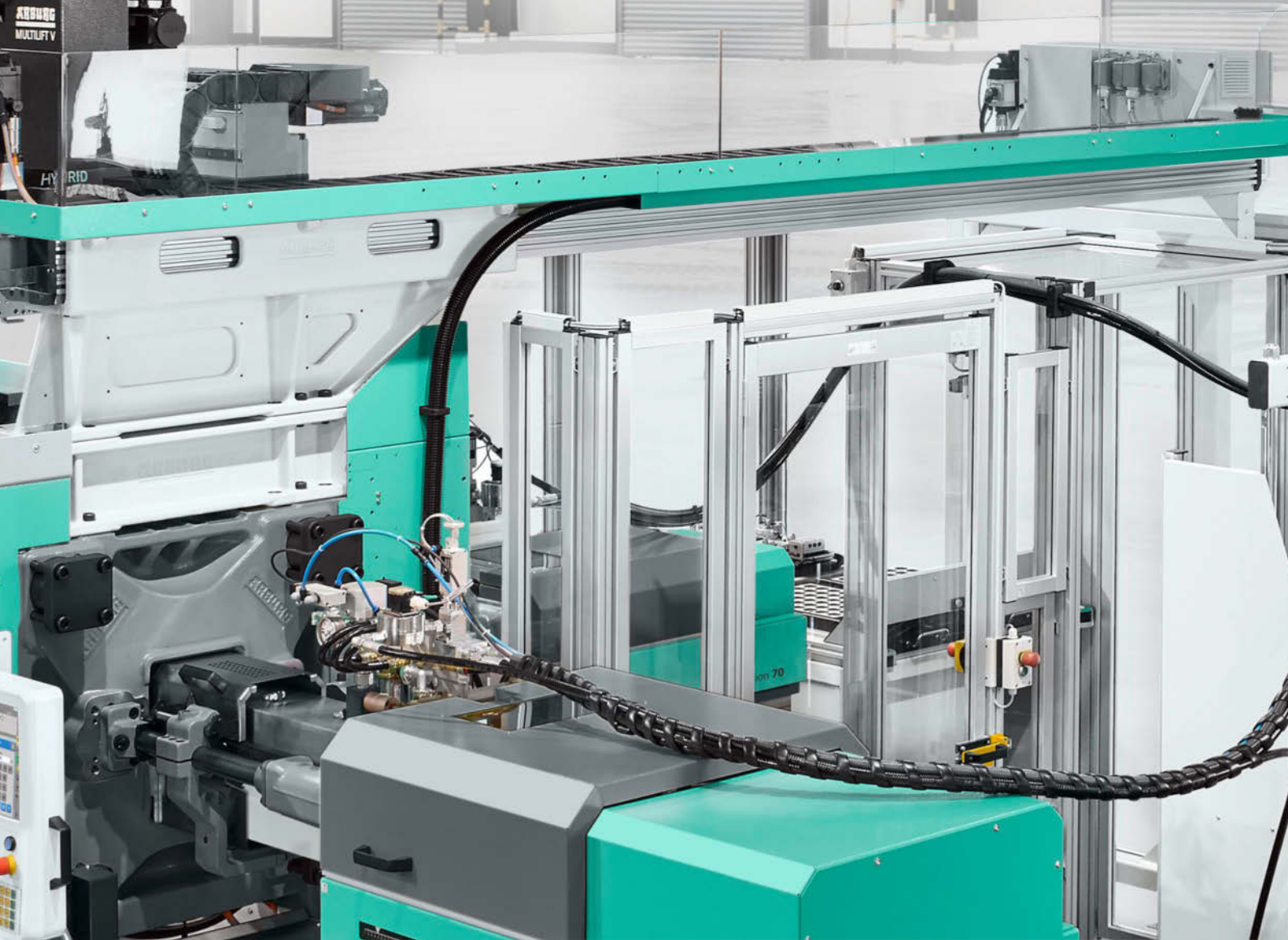
User-friendly arrangement: media supply close to the mould.

Individual selection

With the relevant equipment packages and options, silicone processing is possible on all ALLROUNDERS. This applies to hydraulic, electric and vertical models, whether with large or small clamping forces and injection units, whether for multi-component processing or the encapsulation of inserts. Our product range leaves nothing to be desired – customised, down to the last detail.

Precise basis

Protective mould insert and highly precise moulding without burr or flash formation. With our ALLROUNDERS, we achieve this, for example, through proven three-platen technology with four tie-bar guidance for even force application. Our unique drive systems with planetary roller screw drive boast extreme precision at high speeds. Furthermore, with our standard torque monitoring, you will always produce safely and with low wear – in other words: efficiently!



Complete process control

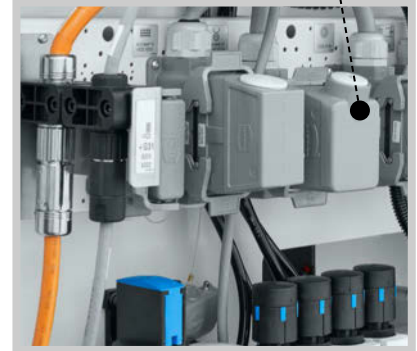
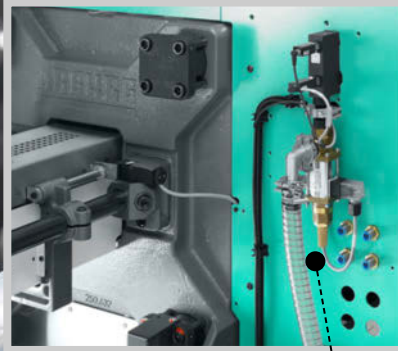
You need complete process control, especially with silicone processing. This is where the equipment features of our ALLROUNDER come into their own. These include mould protection and adaptive mould temperature control. And the easily adjustable sensor system enables production safety. The modular assembly and the quick changing of the cylinder module, for example, save time in your daily routine.

System solutions for LSR and HTV

Individually tailored and always efficient concepts can be realised with us. In some cases, an ALLROUNDER with process-specific equipment may be sufficient, in others, a complex turnkey system with quality assurance or packaging stations may be the perfect solution. We are your technology and systems partner – to ensure the best injection moulding technology for your company.


i / Further information:
products and services brochure

Centralised: interfaces for process-specific accessories.



Custom adapted: mould venting with modular vacuum technology.

Clean respiratory masks: high-end technology for burr and rework-free high-volume parts.

 Further information:
robotic systems brochure



WE VIEW THE MACHINE, ACCESSORIES AND PERIPHERAL EQUIPMENT AS A SINGLE UNIT.

Dosing units

Pneumatic, hydraulic or even better servo-electric dosing devices? For your complete solution, we work closely with leading industry manufacturers. The communication protocol, OPC UA, is also an option in our silicone package: for flexible process control between ALLROUNDER and your production environment. This also makes it easy to provide process information to higher-level systems.

Vacuum and air blow units

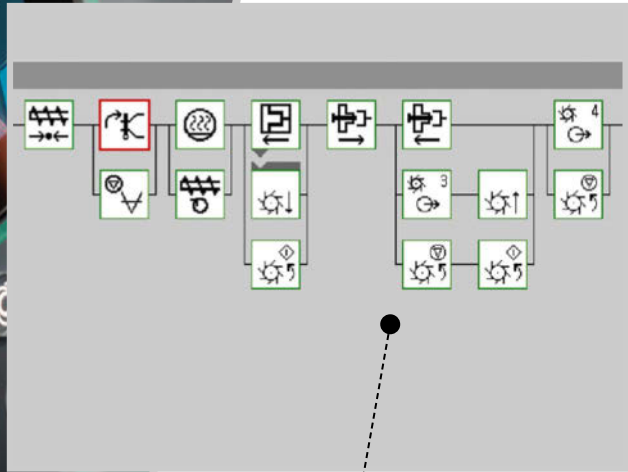
We offer you a wide range of equipment both for evacuation and air blow of the moulds: from interfaces and electrical connections through vacuum valves and air blow units with pressure reducers through to vacuum pumps. All of the solutions can be programmed via our machine control system. We can also optionally implement connections on the fixed or moving clamping platen.

Robotic systems

Complete solution with an ALLROUNDER: our versatile robotic technology can be precisely adapted to your particular handling task. Ideal conditions, also for silicone injection moulding, for example in combination with multi-component applications for hard/soft combinations.

Brushing and demoulding units

Demoulding the elastic silicone parts in a process-reliable yet gentle manner is a complex requirement. In addition to automated removal, special brushing and demoulding devices are also often required – particularly in the case of small parts and multi-cavity moulds. The relevant interfaces for centralised actuation and monitoring are available to you for this purpose.



Targeted process optimisation:
fully integrated freely program-
mable peripheral equipment.

CONTROL SYSTEM: SMART

// Maintaining control over machine, mould, robotic and peripheral technology requires a suitably powerful central control system. This calls for smart technology that offers extensive data integration options, monitors and adaptively controls your processes, and actively supports you in every operating situation. All the features of our machine controller are designed for a fast, secure and convenient set-up and operating process. This enables you to get the best out of all your applications. //

Highlights

- SELOGICA and GESTICA – fully compatible
- Graphic sequence programming
- Real-time plausibility check
- Assistance packages and connectivity modules – ready for digitalisation
- Central control system for complete production cells

i Further information:
GESTICA

Reliable evacuation

Complete mould filling without air inclusions or burning at the surface. The evacuation of the mould before injection is important for smooth silicone processing. Evacuation can be implemented very flexibly via dedicated symbols. Furthermore, you can use the evacuation course via an envelope curve in the machine controller for precise process control. Your benefits: trackable documentation and transparent quality assurance.

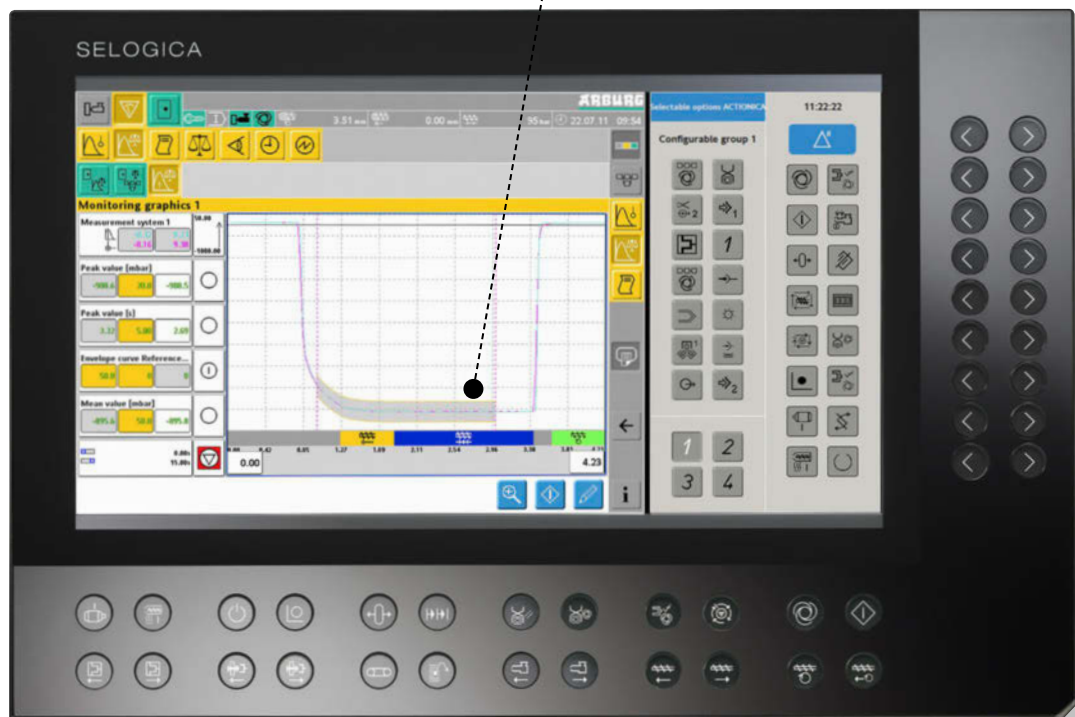
Integrated peripherals

Mould, robot or peripheral equipment functions: all processes can be adjusted and centrally monitored, depending on or in synchrony with machine movements.

Adaptive heating circuits

A high degree of temperature stability in the mould is essential for reproducible part production. Our adaptive mould heating circuits automatically adapt the control parameters accordingly. Several heating zones can be controlled simultaneously via a sensor.

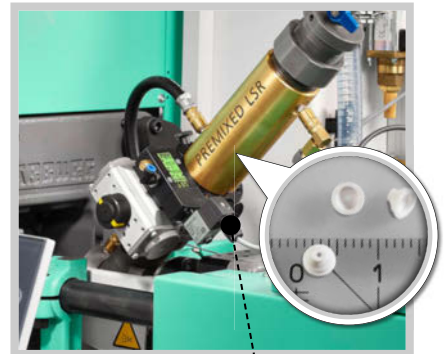
Reliable production monitoring:
process and quality control
dependent on evacuation.



APPLICATIONS: IN PRACTICE

// Owing to its numerous positive properties such as temperature and chemical resistance, the use of silicones regularly results in new solutions and product ideas. As a technology and system partner, we offer you the best basis for the processing of silicone as well as for combination with other processes – with well-founded expertise and customised, cost-effective technology. //

32 Quickly demould sealing rings:
servo-electric demoulding device
reduces cycle times.



Caps weighing 0.009 g: special
LSR micro injection module with
8 mm injection screw.

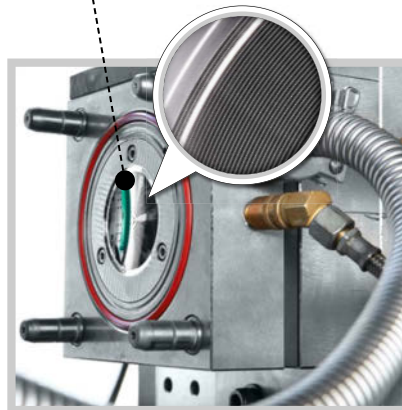
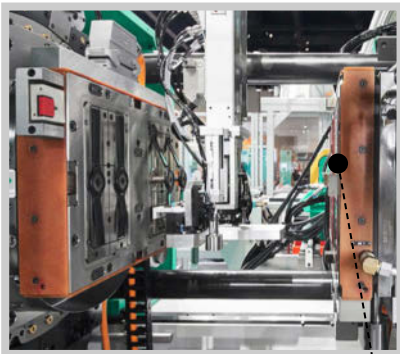
Further information:
Application expertise brochure
Turnkey projects brochure



Combined: button from two silicone materials with different Shore hardnesses



High-precision Fresnel lens: reliable moulding of structures with point radii of 7.2 μm .



Safe hard/soft combination: robotic system demoulds reliably.

Medical drug implant: turnkey project produces fully automatically in clean room.



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ARBURG GmbH + Co KG
Arthur-Hehl-Strasse
72290 Lossburg
Tel.: +49 7446 33-0
www.arburg.com
contact@arburg.com

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