

**October
2024**

Hotline

Customer information from **EWIKON Heißkanalsysteme GmbH**



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EWIKON



Hot / cold runner system as a complete solution

Hot and cold combined – LSR meets thermoplastic

Different processing parameters and mould temperatures – two-component injection moulding with a material combination of thermoplastic and silicone makes special design demands on the mould construction and gating system. Mould maker POLAR-FORM and hot runner manufacturer EWIKON worked closely together on a demanding mould concept for the sprueless production of a spatula.

Wherever high elasticity on the one hand and stability on the other have to be combined in one component, thermoplastics are increasingly being used in combination with LSR materials. These offer almost identical rubber-mechanical behaviour over a wide temperature range and are also highly resistant to ageing. Reason enough for POLAR-FORM and EWIKON to demonstrate their expertise in this area in a joint project and build a sophisticated demonstration mould for use at trade fairs. As a specialist for high-precision LSR injection moulds and turntable technology, POLAR-FORM was responsible for the design and construction of the two-component index plate mould. EWIKON was relied on for the moulding technology. The COOLSHOT cold runner system is a highly developed technology that is one of the few manufacturers on the market to offer combined hot and cold runner systems as a perfectly integrated complete solution.



- 1 Hot runner system
- 2 Insulation through insulating gap and insulating plates
- 3 Cold runner system

High demands on manufacturing precision

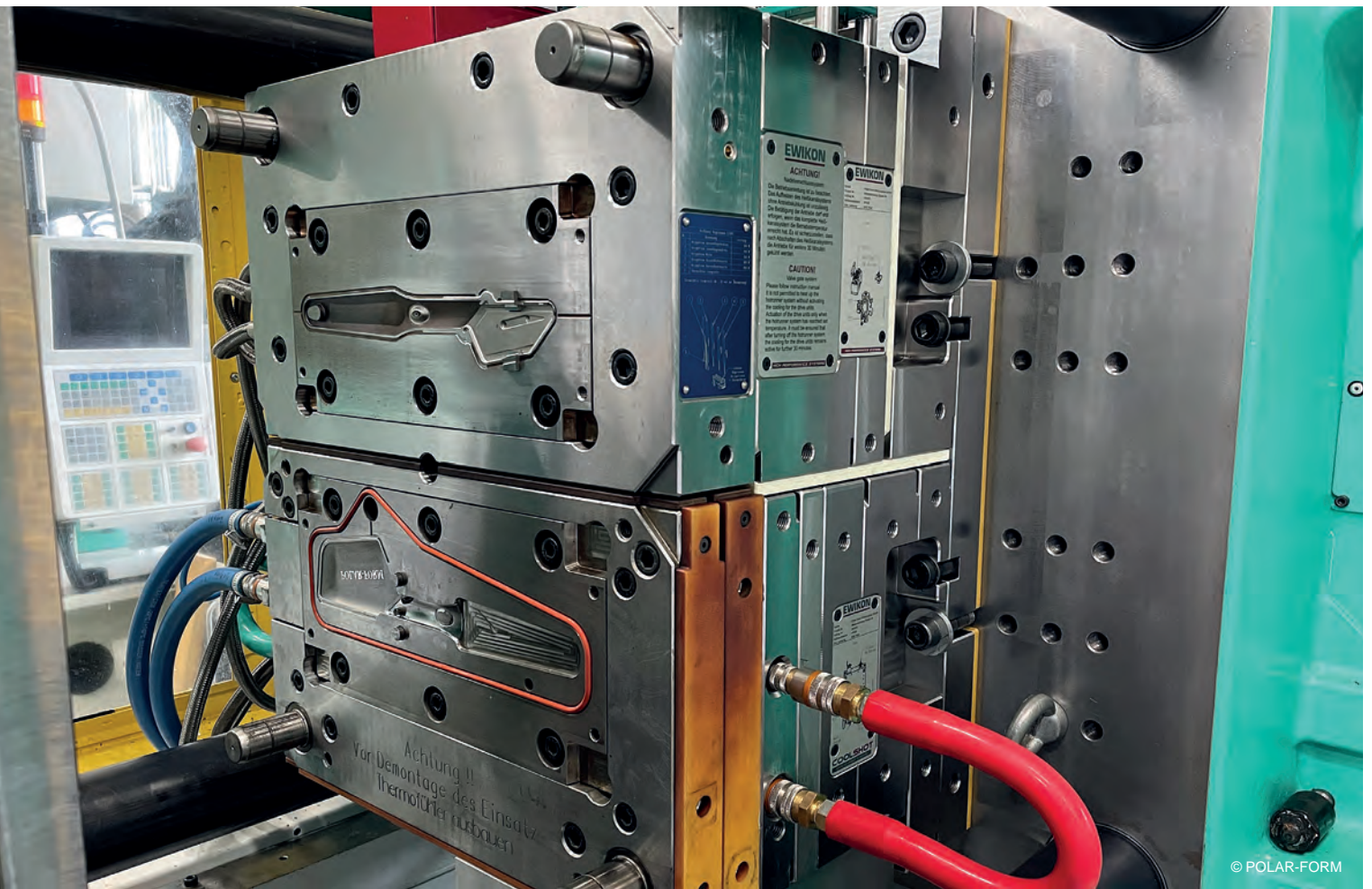
Two-component injection moulding with a material combination of thermoplastic and silicone places special demands on the mould construction due to the different material characteristics and processing parameters. Due to the very different processing temperatures of the two components, precise thermal separation and temperature control of the respective mould areas is required. Furthermore, LSR applications generally place the highest demands on production precision, as the very low-viscosity material requires the cavities to be perfectly sealed in order to prevent flash formation. POLAR-FORM therefore integrated a high-performance evacuation system for the LSR cavities and designed the mould to be particularly rigid to ensure precise gap dimensions and high plate parallelism. Particularly in the transition areas between the thermoplastic component and the LSR-



■ The hot / cold runner system was supplied by EWIKON as a complete solution.

component, precise surface spotting was required to prevent over-moulding by the LSR component. Due to the high operating temperatures, high-temperature resistant and hardenable steels were also used for the mould structure. As the LSR component is cross-linked at high temperatures directly in the cavity, POLAR-FORM also had to take material expansion in this area into

account when designing the mould. The spatula consists of a stable PBT handle with a thumb recess, which is completed with two LSR elements. These have very different shot weights. In the front area, the handle is over-moulded with the wiping lip with a shot weight of 20.3 g, while the thumb recess is also lined with a LSR layer for a secure grip. The shot weight here is



only 0.4 g. To ensure the dimensional stability of the handle during overmoulding in the hot LSR cavity, it was decided to reinforce the material with 30 % glass fibre.

Thermal separation as a decisive factor

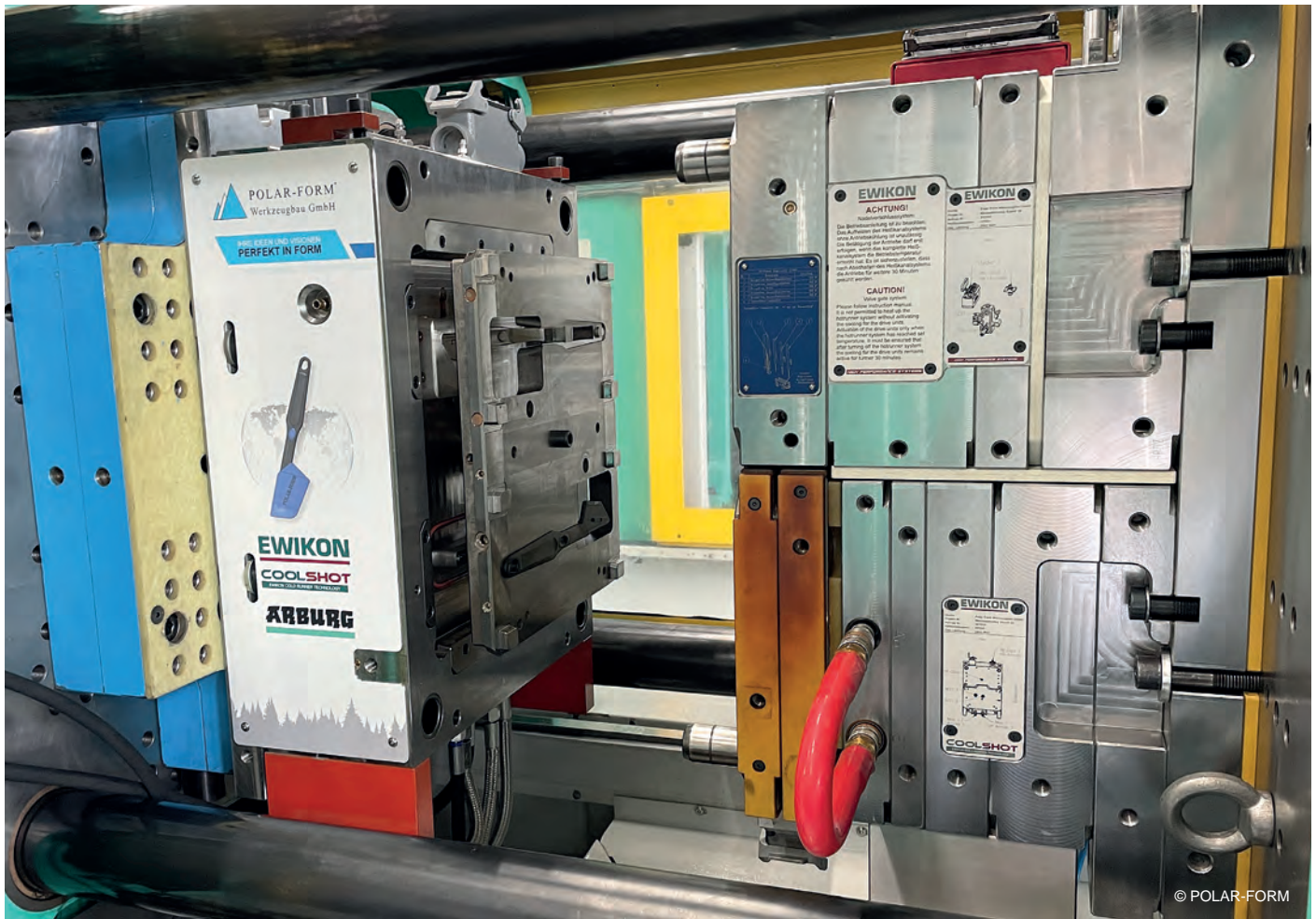
In the first operation, the PBT handle is injection-moulded in the upper half of the mould. In this section, the mould is tempered to 90 °C. After the rotating index plate has transferred the pre-moulded part into the second cavity, the wiper lip and the grip surface in the thumb recess are injection-moulded from LSR. Both areas must be precisely thermally separated from each other to ensure process reliability. While the pre-injection cavity is fluidically tempered to 90 °C, a homogeneous temperature of 180 °C is required in the final injection cavities to ensure complete and rapid cross-linking of the LSR component. POLAR-FORM has integrated electric heaters for this purpose, which are controlled by a separate control unit.

■ View of the nozzle side of the mould. The sealing lip for evacuating the LSR cavities is clearly visible.

Hot and cold runner technology combined

For the upright side of the mould, EWIKON supplied the complete mould half with fully integrated and wired hot and cold runner systems, both in valve gate design. The valve pins in both areas are driven by electric linear servomotors, which are moved by a common motion CONTROL control system. In addition to the high-precision positioning of the valve pins, the system allows the process parameters such as opening time, opening stroke and opening speed to be set individually for each drive. While a cylindrical valve pin is used in the hot runner area, the valve pins in the COOLSHOT system are conical to ensure a perfect seal in the cavity area.

Both systems were mounted on a common clamping plate. The hot runner for gating the PBT handle is located in the upper area. A vertical injection unit, which docks onto the top of the mould, feeds the melt. Injection takes place in the thumb recess of the handle. The COOLSHOT cold runner system is located in the lower area of the mould half and is fed horizontally. The LSR components are injected via two water-cooled cold runner nozzles. In order to enable simultaneous filling of both cavities with the different shot volumes, the valve pins open at different distances and with a time delay. With the help of motion CONTROL control technology, it was possible to achieve perfect fine tuning during the running process.



■ View of the ejector side with index plate.

For a clean thermal separation of both areas, the plate structures of the hot runner and cold runner sections are separated from each other by an insulating gap and insulating plates. The COOLSHOT system also has an additional insulating panel on the front side to insulate the cold runner from the hot cavity side. Furthermore, the special geometry and material selection of the cold runner nozzles ensure an optimum thermal transition in the gate area. This enables rapid cross-linking of the LSR component in the cavity and at the same time prevents partial cross-linking in the cold runner due to heat transfer into the nozzle.

The sampling and final adjustment of the mould took place at POLAR-FORM's own technical centre. Thanks to the appropriate equipment, even

complex multi-component moulds can be fine-tuned here until they are ready for series production. At this year's Arburg Technology Days, the mould was demonstrated for the first time in practical use with automated part removal and impressed with its trouble-free production. In cooperation with Arburg, the mould will be presented at various trade fairs in the future.

Contact



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The next level of side gating performance

pro **EDGE VG**

With *pro* **EDGE VG**, EWIKON is further expanding its technological leadership in the field of direct side gating with a valve gate version. The system enables precision side gating with the highest quality and without compromising on ease of maintenance. It opens up new possibilities in mould making and is the first choice for all applications with the highest demands on process reliability and injection point quality.

Up to 8-drop
per nozzle

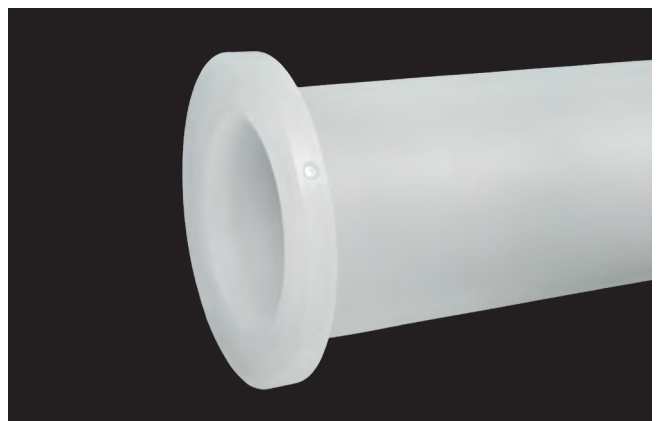
Up to 32-drop
per mould

New standards in maintenance, quality and technology



Unique ease of maintenance

- All wear parts (valve pin, valve pin guide, valve pin seal) can be replaced as one assembly on the open mould.



Extended gating options

- Gating possible on even the smallest side surfaces.
- Problem-free processing of soft materials (TPE).



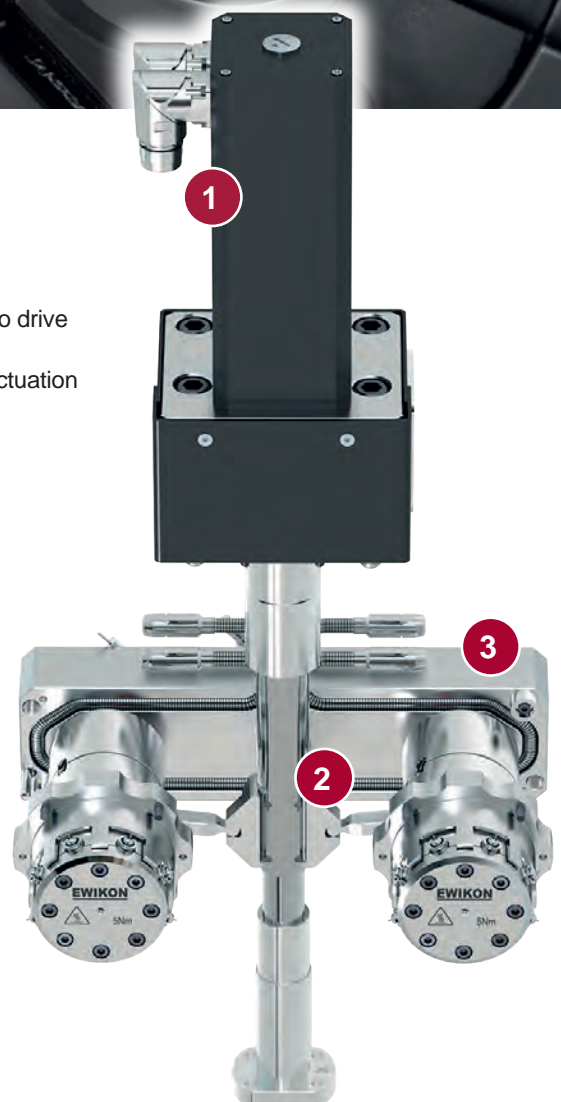
Process reliable with smart drive technology

- Valve pin drive integrated into the nozzle, no additional plate structure for rear drive components. Compact moulds.
- Latest generation linear servo drive.
- Synchronous valve pin actuation.
- The valve pin stroke and opening speed are steplessly variable and can be perfectly adapted to the process requirements.
- Robust operating mechanism with precise guide elements.

motion **CONTROL SD**

High-precision control technology **INSIDE**

- 1 Linear servo drive
- 2 Valve pin actuation
- 3 Manifold



The new standard – Efficient, process-reliable, perfectly customisable

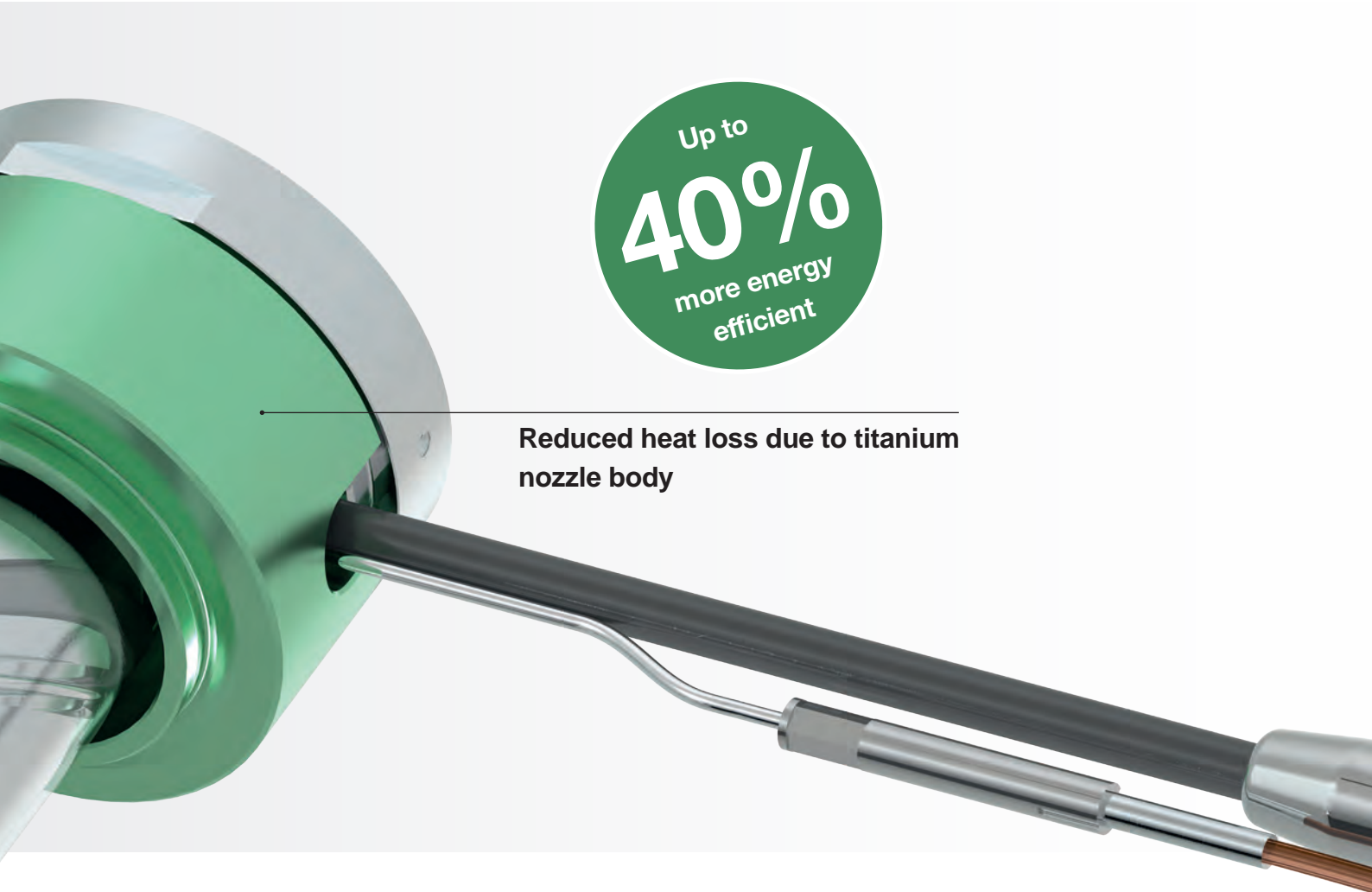
Perfect process control

- Increased thermal performance with direct heating of the latest generation.

Modular design for optimised system layout

- Flexibly configurable with various pressure tube and tip versions and different material combinations for precise customisation to your application profile and plastic material.





Reduced heat loss due to titanium nozzle body

Titanium technology as the key to increased efficiency

pro SHOT

The newly developed EWIKON *pro SHOT* hot runner nozzle sets standards in energy efficiency and process reliability and bundles more than 30 years of EWIKON experience in the development of externally heated nozzles.

The core of the *pro SHOT* nozzle is a nozzle body made of titanium. This material significantly reduces the heat dissipation into the mould and increases energy efficiency by up to 40 %. In combination with a powerful heating system of the latest generation, the thermal performance is also significantly increased. This makes *pro SHOT* the perfect solution for all standard materials as well as for the reliable processing of

difficult-to-process engineering plastics. A proven selection of tip versions and pressure tube specifications is available for the *pro SHOT* nozzle, allowing optimum customisation to specific application requirements. This makes the nozzle extremely flexible and versatile. Initially, the nozzle is available with a flow channel diameter of 6 mm for open gating, other versions will follow shortly.

Optimise existing systems

- Existing tools with HPS III-S nozzles can easily be retrofitted with *pro SHOT* nozzles.

Complete. Fast. Process reliable.

pro MATRIX

Standardised multi-cavity solutions

With *pro MATRIX* we offer new complete solutions for high-cavity mould concepts. This series of hot halves is available at particularly favourable conditions thanks to consistent standardisation and is available in 16-, 24-, 32- and 64-cavity versions. *pro MATRIX* relies on proven technical components for maximum process reliability and du-

rability. Additional technology options are available for demanding applications. These include valve gating with individual drives or as a synchronous plate system, nozzle front installation option for easier maintenance and additional manifold options for faster colour changes and sensitive materials.

Up to
64-drop
possible

Flexibly customisable at attractive conditions



Increased process reliability

- Valve gating with individual drives or as a synchronous plate system.



Simplified maintenance

- Nozzle front installation option.



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Technical information subject to alteration. EWIKON 10/2024