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Hotline

Customer information from **EWIKON Heißkanalsysteme GmbH**

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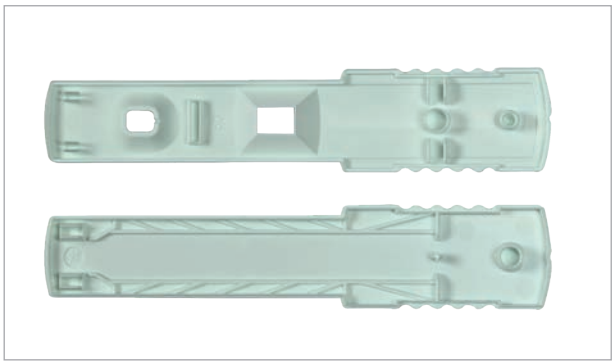
EWIKON



The part: Two-part housing for rapid cardiological tests with filigree internal structures.

One hot half – two moulds

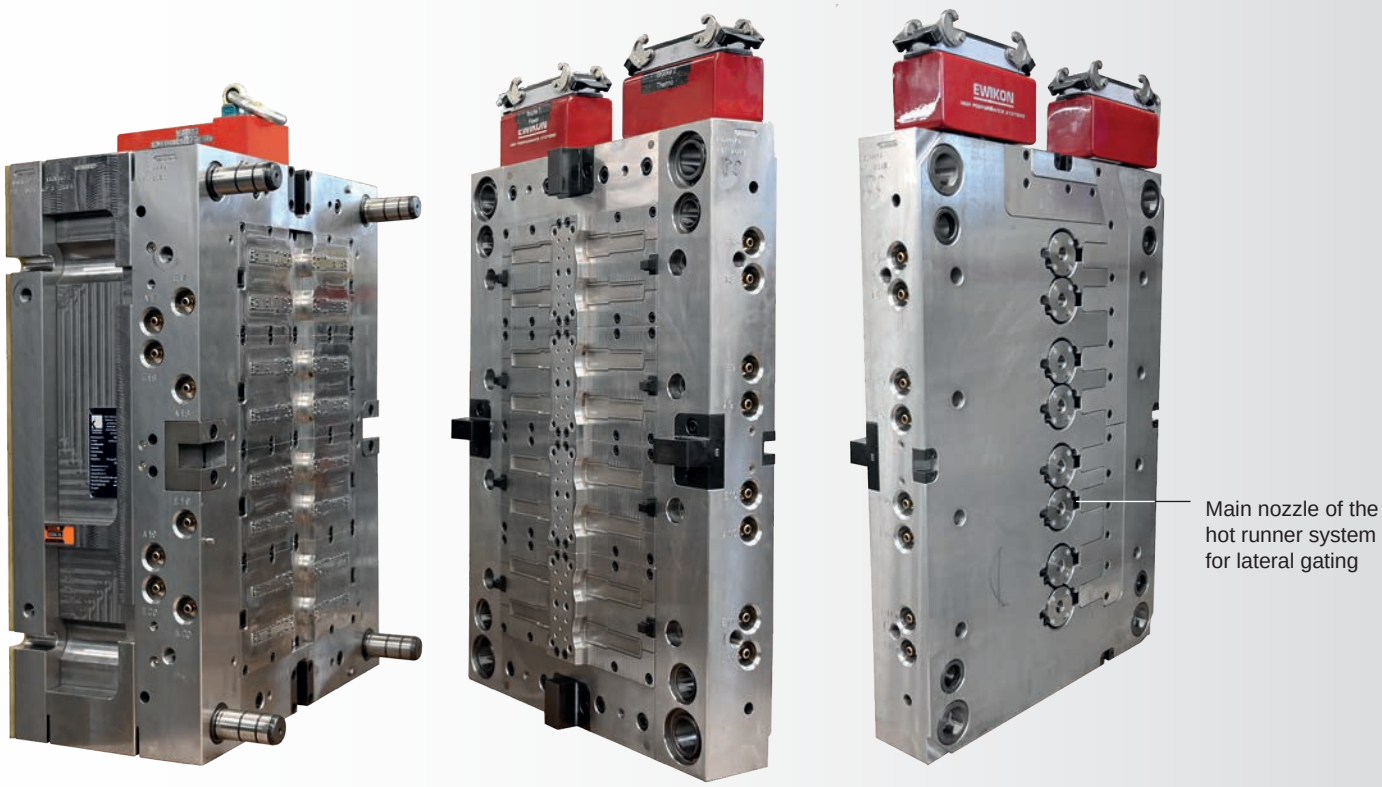
Fully automated production of housings for rapid cardiological tests

For the production of the housing of a rapid cardio test for a major customer in the medical technology sector, Sanner GmbH from Bensheim, Germany relies on two 16-cavity full hot runner moulds in combination with fully automated further processing. When selecting the hot runner, a side gating solution from EWIKON beat out conventional valve gate concepts. It offers fundamental advantages and enables an extremely efficient mould exchange concept.

Cost-effective and compact mould solutions were required to be able to produce the two parts of the housing made of polystyrene type 495NGreen with a processing temperature of 240 °C as efficiently as possible in alternation on one production line. At the same time, a flawless gating point was required to meet the high demands on medical technology articles and to exclude the risk of injury to the user. "Most competitor products of this type are manufactured with valve gate technology," explains Kai Maurer, process engineer for customer products at Sanner, "but this means considerable additional investment in the hot runner and mould construction." In order to keep the costs low and the size as compact as possible for the two 16-cavity moulds, Sanner decided to use lateral gating. Here, the components are arranged in the mould in two vertical rows of 8, and the gating takes place on the front side

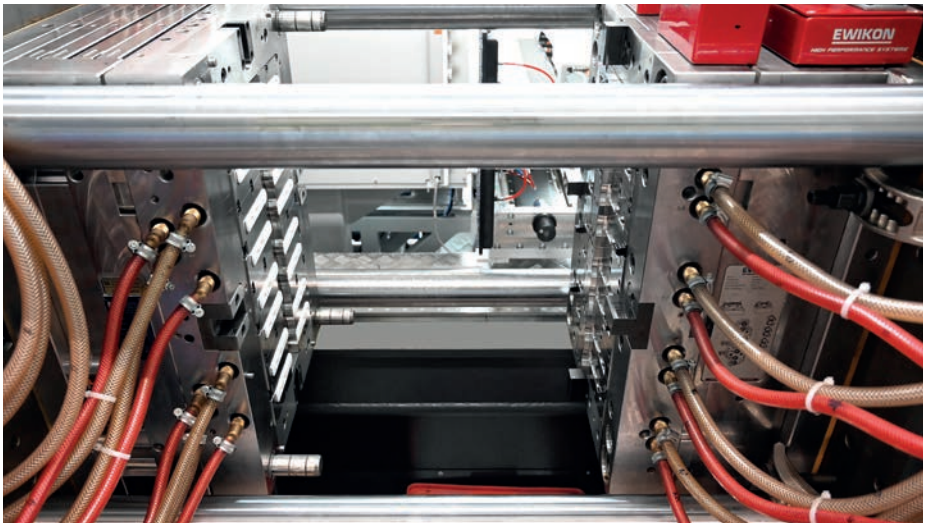
Ejector side mould half

Hot runner side contour plate



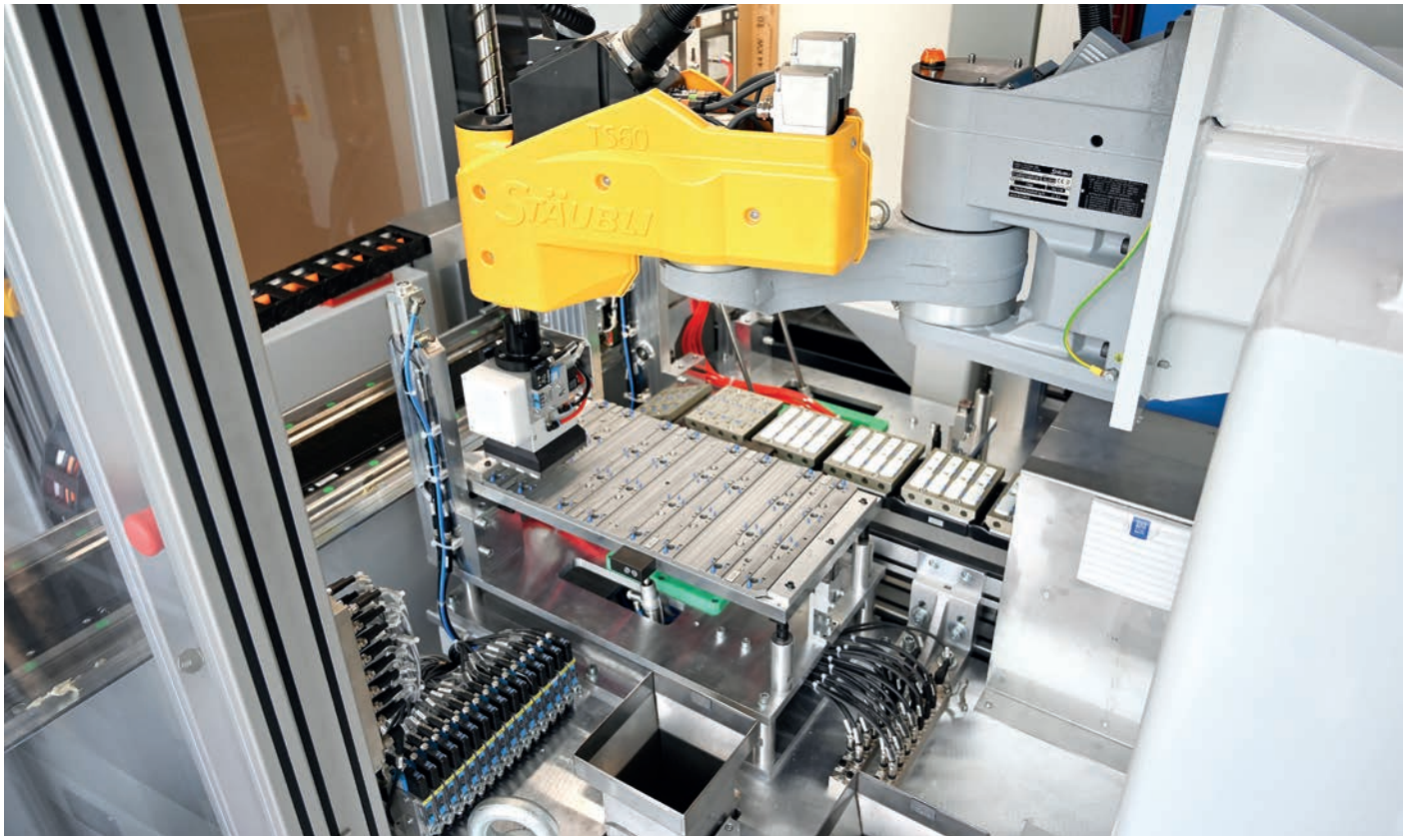
The mould for production of the lower part of the housing. On the hot runner side, only the contour plate is changed. The hot half remains on the machine. The rear view of the contour plate shows the installed main nozzles.

of the housing part. Two parts at a time are moulded with one side gating nozzle. A slim version with two oppositely positioned heat-conducting tips is used for this purpose. The nozzles are installed in a row and are supplied with melt by a fully balanced manifold system. Despite the short shear length available, this solution enabled a perfect gating point quality without visible or noticeable gate marks. A valve gate solution would have required 16 nozzles, a much more complex and larger manifold and, depending on the drive technology installed, a larger mould design.



The mould for production of the upper part of the housing on the machine.

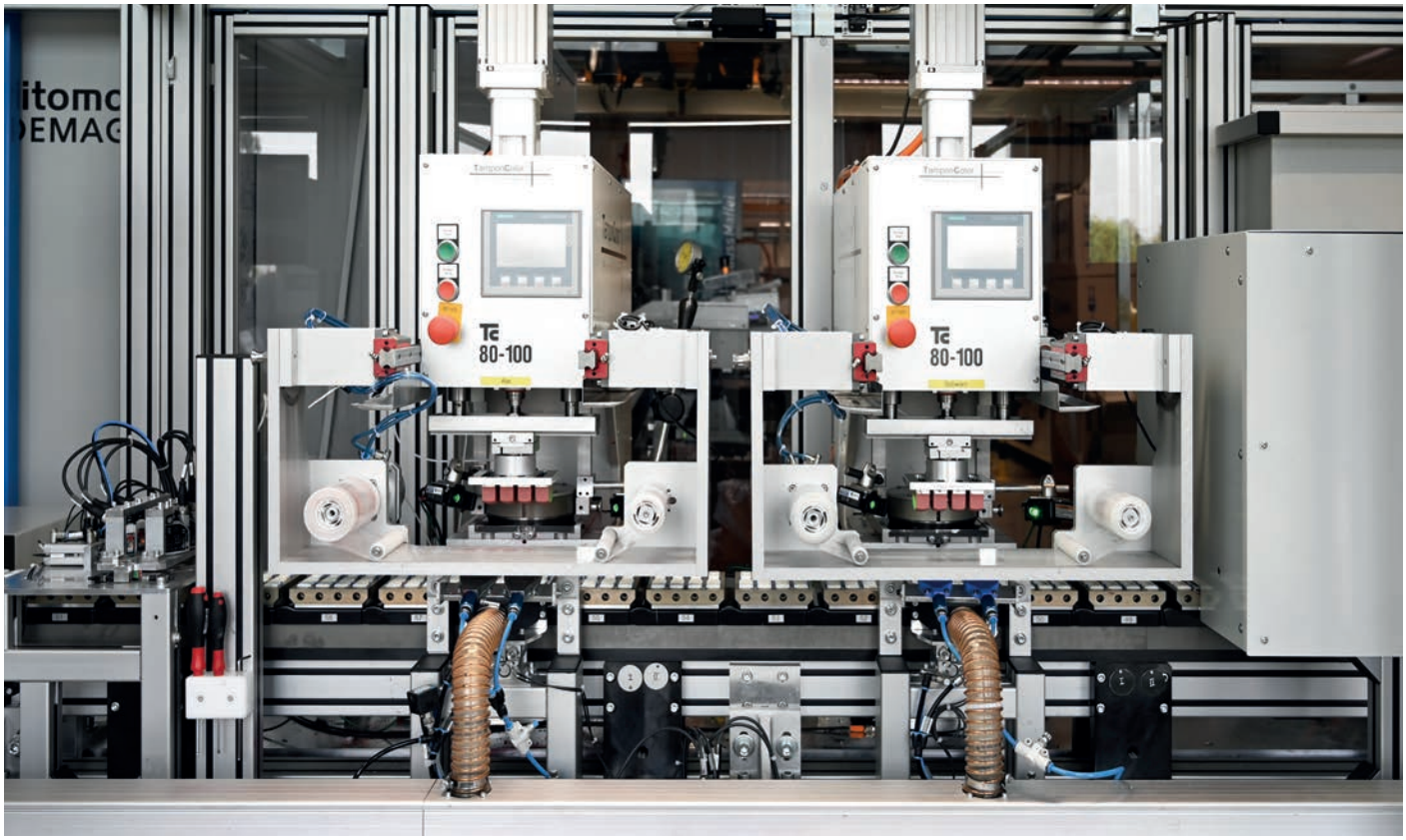
Furthermore, with the EWIKON solution it was also possible to meet the demand for the fastest possible changeover of production from the upper to the lower part of the housing. Since both components have almost identical shot weights, a concept was developed in which the hot half always remains on the machine and only the hot runner side contour plate and the ejector side of the mould are changed. This means that one hot half forms the basis for both moulds - a considerable cost saving. This is made possible by a two-part design of the side gating nozzles. The main nozzles were supplied in double quantity and are installed in



A handling system positions the parts on a conveyor belt for printing. Here, the clocking is a decisive factor for process stability (above). Immediately after removal from the machine, the parts pass through a 100 % video inspection (left).

the respective contour plate including wiring and wiring boxes also supplied by EWIKON. They are fed by transfer nozzles installed in the hot half manifold frame plate. When the contour plate is fitted, the transfer nozzle seals into the main nozzle on the face side. This guarantees a reliable seal at operating temperature. The hot half is tempered with water at an inlet temperature of 15 °C. The contour plate is heated to 45 °C to ensure optimum flowability of the material over the entire length of the thin-walled article with filigree contours in the inner area. After changing the contour plate, it is connected to the hot half via plugs and thus electrically supplied. The tip exchange concept used in all EWIKON side gating nozzles also allows nozzle tips to be exchanged during ongoing production with minimal downtimes. "This means that, if necessary, we could carry out a tip exchange quickly and easily with the mould open," says Kai Maurer, "but our exchange concept means that we can usually carry out any necessary maintenance work on the nozzles and the contour plate while the other housing part is being produced."

A high process reliability of the injection moulding cell is an important prerequisite for the subsequent quality control and further processing of the parts because this process is extremely sensitive. The finished parts are removed from the mould with a handling system and first pass through a 100 % camera inspection of the inside. This checks whether the contour and all the locking pins and locking lugs are completely moulded out. In the case of the upper part of the housing, the sample feed window and the viewing window are also



The two-colour printing of the components is carried out using a pad printing system.

measured with pixel accuracy. Two transfer stations are then used, one of which is loaded with the current and finished controlled shot, while in the second the parts are simultaneously removed from another handling station and positioned on a synchronised conveyor belt. The precise clocking of the conveyor belt is crucial for the subsequent printing process. After the parts are additionally fixed on the belt by applying suction, the printing is carried out in two colours using a pad printing system. Even the smallest deviations can lead to the printing ink on the pad flashing off for too long, resulting in printing errors. This, together with the surface, is checked during the subsequent 100 % camera inspection of the top side of the part. In order not to influence the process cycle, detected rejects continue to run, but are not removed with the good parts. They are blown out by compressed air on the underside of the conveyor belt.

By using side gating technology, Sanner was able to effectively reduce mould and hot runner costs without having to compromise on article quality. Production takes place on a Sumitomo Demag EL-EXIS injection moulding machine with a clamping force of 150 tonnes and a cycle time of 13 seconds. The system has been in operation since the beginning of 2019. After fine-tuning the quality control and printing stations, series production started in May 2019. Almost 30 million parts have been produced so far.

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Smart peripheral solutions

EWIKON CONTROL series

Digitalisation in plastic injection moulding is advancing with great strides. Peripheral components should also be able to be integrated into networked production cells with minimal effort. Therefore, all EWIKON control devices can be easily integrated into digital processes via OPC UA. After the ***pro CONTROL*** hot runner control technology and the ***smart CONTROL*** assistance system for process monitoring, now the ***motion CONTROL SD*** control technology for electric valve gate systems completes the EWIKON CONTROL series.

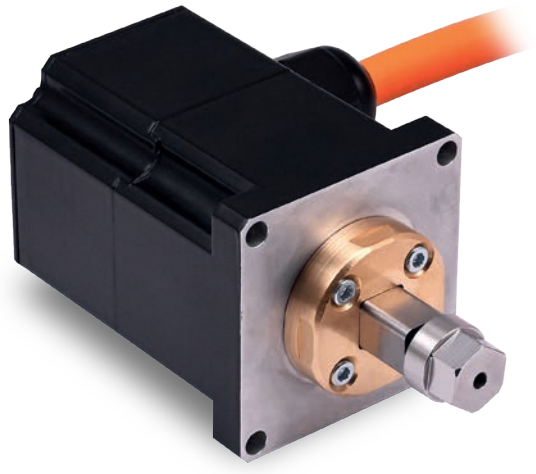
pro CONTROL

Hot runner control technology

NEW! Linear servo motors for electric valve gate systems with motion CONTROL SD control technology

Faster, more precise, more efficient

A new generation of compact linear servo motors is now replacing stepper motor technology in electric valve gate systems. The compact linear servo motors used feature a permanent, high-precision position control as well as integrated temperature monitoring. Compared to stepper motor concepts, a higher valve pin speed can be achieved and thus the cycle time can be shortened. The power consumption of the motor is regulated depending on the required force at a constant speed. Therefore, the servo drive is also particularly energy-efficient. Since high closing forces can be generated without any problems, even rapidly freezing materials like polycarbonate can be processed reliably.



smart CONTROL

Assistance system for complete process monitoring of injection moulding production cells

OPC UA

motion CONTROL SD

The ***motion CONTROL SD*** touch-screen controller was developed for the comfortable and easy operation of the linear servo motors and can operate up to 16 individual drives. It contains a powerful servo control system with extensive functions and is available in two versions for controlling systems with single drives or synchronous plate systems. Adaptation to different injection moulding machine control systems is achieved using simple digital signals (+24 V DC). If required, the process data can be transmitted to higher-level assistance and monitoring systems via OPC UA. This allows easy integration of the system into the networked injection moulding production.

Digitalisation

EWIKON supports Industry 4.0 project of SKZ

Start-up of the system at the SKZ in Würzburg. From left: Georg Schwalme (SKZ), Jakob Schüder (SKZ), Dr Stefan Eimeke (EWIKON).

With a smart CONTROL assistance system for complete process monitoring, EWIKON supports the Industry 4.0 project "Diginject" of the SKZ Plastics Center in Würzburg for setting up a digital injection moulding cell. This networks the injection moulding machine, peripheral components such as resin drying and temperature control, mould sensors for pressure and temperature measurement as well as other measuring and control systems. All process data is centrally recorded, logged and clearly displayed by smart CONTROL via the OPC UA interface. This enables a transparent manufacturing process with continuous monitoring and evaluation.

With its functionalities, the smart CONTROL system represents a novelty in the field of assistance systems. Via the OPC UA communication protocol, smart CONTROL can not only communicate with all components of digitalised production cells, but for the first time also integrates the hot runner system itself as well as the hot runner periphery into the networked production.

To ensure the greatest possible flexibility, smart CONTROL was supplied as a so-called "Machine package" for attachment to the injection moulding machine. This has the advantage that the system can be used

for different moulds. In addition, the innovative "Virtual Rheology" function was integrated. After importing the material and geometry data for the corresponding mould, this enables a live simulation of the shear rates and the residence time in the hot runner system based on the current process data. This allows targeted optimisation of the injection moulding process, for example when processing shear-sensitive or residence time-critical materials.

The system was officially put into operation at an on-site meeting with EWIKON Managing Director Dr. Stefan Eimeke, Georg Schwalme, Head of Injection Moulding and Additive Manufacturing at SKZ, and project engineer Jakob Schüder. In a further step, the injection moulding cell is to be integrated into the SKZ model factory currently under construction, where industrial tasks and new processes for series production can be optimally tested in an industry-oriented environment.

The Plastics Center SKZ offers many services for the plastics industries and has been a reliable partner for 60 years to customers in Germany and abroad. More information: **skz.de**

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