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Hotline

Customer information from EWIKON Heißkanalsysteme GmbH



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Automated biopolymer processing

Full hot runner moulds with digital process monitoring for biodegradable disposable cutlery

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Technical Support

Comfortable and online with
DIGITAL SERVICE SUPPORT

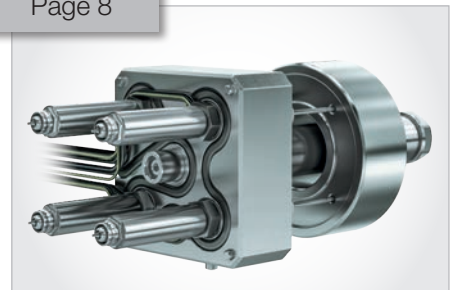
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Assistance system for the
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Complete process
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L2X-Mikro programme extension

Valve gate solution
for micro injection moulding

EWIKON

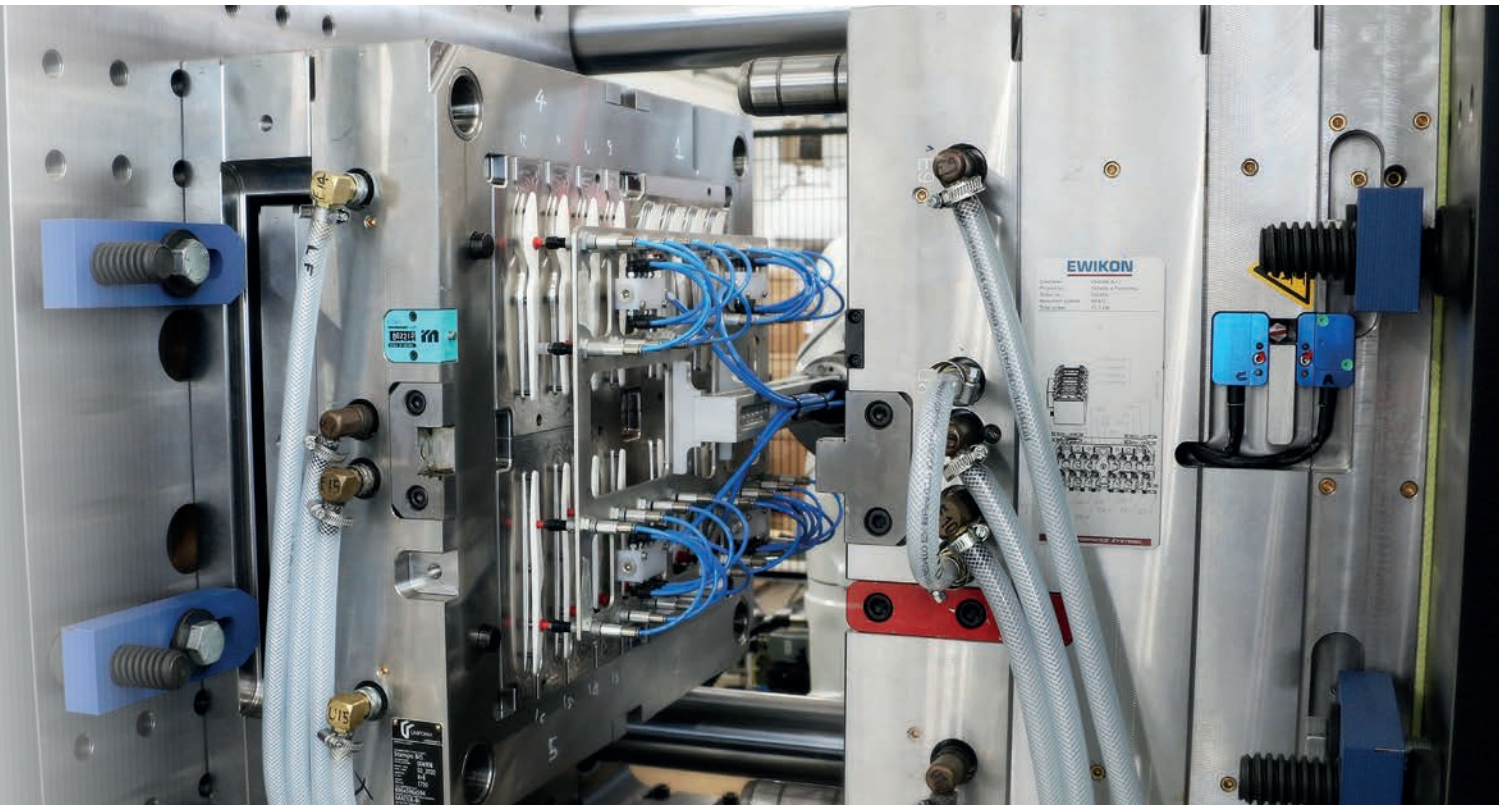


Reliable biopolymer processing

Complete digital hot runner solution for automated biopolymer processing

Ecozema® is one of the leading brands for biodegradable and compostable catering products, such as tableware, cutlery or containers made of paper, compostable plastics and wood. For a cutlery series made of a new biopolymer, three full hot runner moulds with digital process monitoring were developed in close cooperation with mould maker UNIFORM and hot runner specialist EWIKON.

The project included a 16-drop valve gate family mould for the production of a complete cutlery set with knife and fork, another 16-drop valve gate system for a single fork and a 24-drop system for the production of an ice cream spoon. For all three tools, Ecozema planned full automation right through to the packaged product. Also included in the planning was comprehensive digital process monitoring. "Cost-efficient mass production while maintaining high hygienic standards are essential factors for being competitive in our industry," explains Antonio Munarini, Managing Director at Ecozema, "so it is important to have a high level of automation with minimal human involvement and optimal process control."



- The 16-cavity family mould for the production of knives and forks on the machine. Removal and packaging of the parts are fully automated (above)
- High process transparency: With smart CONTROL process monitoring, all relevant operating parameters can be monitored in real time (right)



Demanding material processed safely and automatised

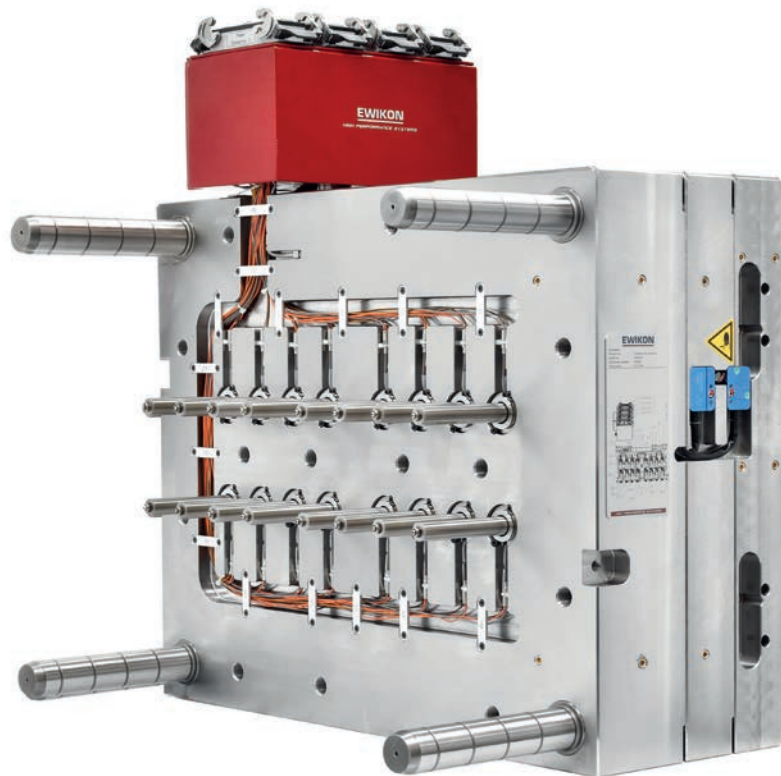
With a multitude of already realised applications with biopolymers and an extensive database of material tests in the company's own technical centre, EWIKON has the necessary extensive knowledge for the safe processing of this demanding material family. During extensive tests, which UNIFORM and EWIKON carried out together with the customer at the company's headquarters in Frankenberg, various valve gate concepts were tested for their suitability for processing the compostable Mater-Bi® biopolymer used from the manufacturer Novamont. Due to the performance of the solutions presented, EWIKON was able to beat out international competitors. In the case of the 24-drop ice cream spoon mould – originally designed for open gating – the decision was made to give preference to side gating after simultaneous tests

with the HPS III-MH multi-nozzle concept. "The direct side gating solution proposed by EWIKON convinced us", says Antonio Munarini, "it is much more compact than a standard system and is also more cost-efficient with shorter cycle times and lower production costs".

The two valve gate systems are equipped with HPS III-S hot runner nozzles with powerful direct heating and a flow channel diameter of 6 mm. Valve pin actuation is synchronised by using synchronous plates with pneumatic drive, which are directly networked with the injection moulding machine via position sensors, thus enabling a precisely coordinated injection process. To increase ease of maintenance, gate exchange inserts made of wear-resistant material have also been integrated. These contain the prefabricated gate contour and can be quickly changed individually for each cavity in the event of wear, without having to replace the entire mould insert.

The 24-cavity system for direct side gating features 6 in-line HPS III-MH nozzles in linear design, each with 2 melt outlets on the long side. These are positioned centrally between two vertical rows of cavities.

The first delivered and at the same time the most sophisticated system was the family mould for the simultaneous production of fork and knife, which not only have different shot weights but also significantly different geometries. In addition to the automated removal of the articles by means of a handling system, the complete packaging is integrated into the process. After the fork and knife



■ Complete digital package: 16-cavity family mould as complete hot half with smart CONTROL process monitoring unit and pro CONTROL hot runner control technology

have been placed on a conveyor belt, they are picked up in pairs under camera control, automatically placed on a paper napkin and finally packed and sealed. When developing the hot runner solution, the highest process reliability and uniform filling behaviour therefore had top priority in order to minimise rejects and thus avoid malfunctions or downtime in the subsequent automation steps. The balancing of the hot runner system with two horizontal rows of four cavities for knife and fork in each mould half was therefore of particular importance. Two possible solutions were considered: a naturally balanced system with one synchronous plate each for the simultaneous actuation of all valve pins of one article type, in which the filling differences are compensated by a time-delayed opening, or a rheological balancing via stepped flow channel diameters, in which all valve pins are actuated by only one plate. After carrying out extensive filling simula-

tions and calculations at EWIKON, in which the material manufacturer was also involved, the decision was made in favour of the rheological version, which is more cost-effective in terms of mould technology.

Digital process monitoring provides transparency

To guarantee consistently high performance, EWIKON supplied the system with a complete digital package consisting of a matching 24-zone pro CONTROL hot runner controller with external touch-screen operating unit and the innovative EWIKON smart CONTROL process monitoring and diagnostic unit. This unit is installed directly on the hot half and integrated into the Ecozema company network. It enables seamless recording and logging of all operating parameters of the hot runner system in real time. In addition, it also monitors the temperatures of the

mould plates, which have been equipped with thermal sensors for this purpose. "For us, this is a very useful additional investment," says Riccardo Passuello, Sales Manager at Uniform, "especially for applications with such a high degree of automation, a high level of process transparency is important. With smart CONTROL, Ecozema has an overview of the system performance at all times and, at the same time, a valuable tool for quality control in the process. In case of deviations, it is possible to react at an early stage - for example, by initiating maintenance measures - before a drop in part quality or an unplanned shutdown of the system occurs".

The second 16-drop valve gate mould and the 24-drop side gating mould were completed shortly after the family mould. Since automation with a handling system for fully automatic article

removal and packaging is also used here, both moulds are also monitored by digital smart CONTROL units.

The family mould was put into operation for the first time at the end of January 2020. The good results in article filling confirmed the decision for the rheologically balanced variant. After the project had experienced some delays due to the COVID-19 pandemic and the lockdown measures in Italy, the mould has been producing trouble-free in series for a few months, just like the two other moulds, which produce alternately on one machine.

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Technical support online

DIGITAL SERVICE SUPPORT



With DIGITAL SERVICE SUPPORT, EWIKON offers fast and efficient online support for the installation of hot runner components, for maintenance and repair work or for setting the optimum process parameters. Our experienced application engineers look over your shoulder virtually and guide you live and in real time to the solution. Smaller technical problems and questions in particular can often be solved in this

way with a minimum of time. Any spare parts that may be required can be ordered immediately and shipped to you promptly. For more detailed questions, several participants can be connected. In many cases, this service eliminates the need for an on-site visit by an application engineer and the time-consuming appointments that go with it.

It's that easy:

All you need is a mobile device (smartphone, tablet or notebook) with a camera and internet access. DIGITAL SERVICE SUPPORT works browser-based via Microsoft Teams. No software installation is required. Simply contact your local EWIKON subsidiary or agent by phone or our application engineering department (awt@ewikon.com) and we will send you a link to your e-mail address. You can log in via your web browser. Once the audio-visual connection is established, simply activate your camera and our service technicians will see what you see, can examine problems and accompany you step by step on the way to a solution.



smart **CONTROL**

Assistance system for the injection moulding production

Complete process monitoring

- Transparent, efficient and safe processes
- Simplified process optimisation by data analysis and live simulation
- Quality monitoring and management
- Networking with injection moulding machine, mould, peripheral devices, hot runner system including control technology as well as higher-level software systems (MES, ERP) via **OPC UA**



smart CONTROL Mould package

Fixed allocation to a mould for monitoring the injection moulding process over its entire life cycle. Supplied as an integral part of a hot half or Drop-In system.

Available versions:



smart CONTROL Machine package

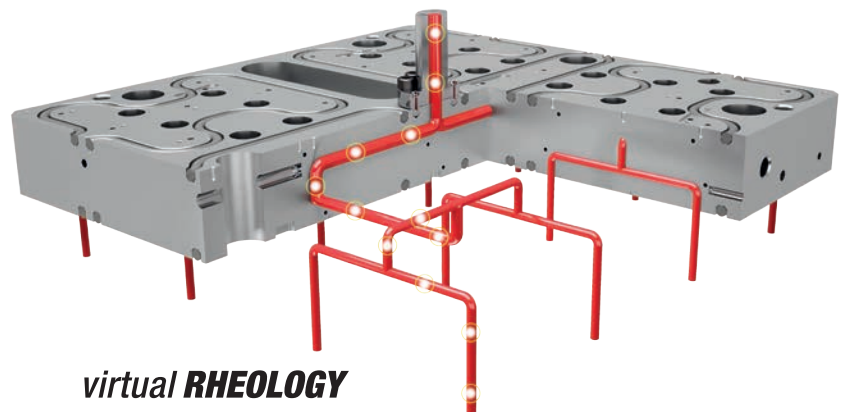
For the flexible use of smart CONTROL in injection moulding production cells. Supplied as a compact unit for mounting directly on the injection moulding machine. Monitoring of several moulds used on the machine is possible.

The second generation of the smart CONTROL assistance system for the injection moulding production is now available. It can now be fully integrated into the networked injection moulding production via OPC UA and records, monitors, analyses and logs the data of the entire injection moulding production cell, including the hot runner system and the related control technology.

An absolute novelty is the optionally integratable "Virtual Rheology" function for live simulation of the melt flow in the hot runner system. It enables real-time calculation of shear rates and residence time based on the material and geometry data stored in the system for the respective application as well as the hot runner temperatures and injection parameters of the injection moulding machine recorded for the current shot. This offers the possibility of targeted process optimization, especially when processing shear-sensitive or residence

time-critical materials, thus guaranteeing optimum part quality. The system can be easily integrated into company networks via the Ethernet interface. The browser-based user interface provides

user-friendly visualization of the data and enables worldwide availability and secure access via mobile devices without additional software installation.



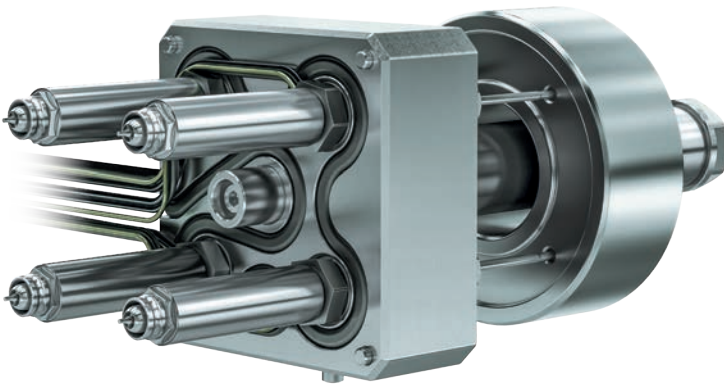
virtual RHEOLOGY

■ Optional: The unique "Virtual Rheology" function for the hot runner system enables a live simulation of the melt flow with real-time calculation of shear rates and residence time

L2X-Mikro

Compact valve gate solution for small injection moulding machines

The EWIKON L2X-Mikro high-performance hot runner system for small injection moulding machines and micro injection moulding applications is now also available as a compact 4-drop version with valve gate technology. The system uses synchronous plate technology for simultaneous actuation of all valve pins. Depending on the material used, shot weights per nozzle from 0.01 g can be realised.



When developing the system, the focus was on high thermal performance in order to be able to reliably process not only standard materials but also engineering plastics with narrow process windows. For this purpose, the hot runner nozzles are equipped with powerful direct heating. For this purpose, the hot runner nozzles feature a powerful direct heating. The very slim nozzle used with an outer diameter of only 10 mm and a flow channel diameter of 3 mm has a leakproof screw connection with the manifold. Despite the extremely compact design, it was possible to use a coil heater, which is integrated into precise cutouts in the melt-bearing pressure tube. This design

ensures an absolutely homogeneous temperature profile over the entire length of the nozzle up to the gating area. The special screw technology with connecting nut allows free rotation of the nozzle until the screw connection is finally fixed and thus precise positioning of the connecting cables. This minimizes the required installation space. The fully balanced manifolds have an edge length of just 59 x 59 mm. Thus, the overall flow path length and the melt volume to be exchanged in the system is reduced. This offers particular advantages when processing materials with critical residence times in applications with low shot weights.

For use on small injection moulding machines, the system is only available as complete hot half in 4-drop version. The nozzle grid is 30 x 30 mm.

In order to realize higher-cavity systems with standard moulds, several of the 4-drop valve gate modules can also be used in combination with a common synchronous plate and a bridge manifold. A 16-drop system can thus be realized with a very compact mould size of 256 x 346 mm. Since the bridge manifold can be kept very simple, the general advantage of short flow path lengths remains even with such a configuration.

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