

Welcome to the ENGEL booth at Fakuma 2017

Industry Competence in Action

Schwertberg, Austria – July 2017

At the Fakuma 2017 from October 17 - October 21 in Friedrichshafen, Germany, ENGEL will be opening up new horizons for the injection moulding industry. The highly integrated manufacturing solutions at the ENGEL exhibition booth in Hall A5 achieve an even higher degree of quality, efficiency and profitability – respectively tailored to the specific requirements of the various application industries. Also there: the all-electric e-mac injection moulding machine in a new clamping force class, the first clearmelt exterior component, the new compact pipe distributor for the cleanroom, and an even higher degree of precision for LSR processing.

Automotive: Extremely scratch-proof in a single step

At the Fakuma, ENGEL and its clearmelt technology will be opening the door to a new application area. The focus so far has been on decorative elements and electronic functional components for the interior of the vehicle; at this time, automobile manufacturers are also becoming interested in using the technology to produce exterior components. At its exhibition booth, ENGEL will present a first applications in this regard.

High gloss exterior panels will be produced on an ENGEL duo 2460/500 injection moulding machine. In addition to the extremely high quality appearance of the components and the outstanding efficiency of the highly integrated process, extremely scratch-proof surfaces are another advantage that clearmelt technology provides for the exterior area. Testing in a car wash has shown the initial sample parts to be very robust.

In the clearmelt process, at first a thermoplastic base carrier is produced in the injection moulding machine, then coated with polyurethane in a second cavity. The process can be easily combined with IML, allowing for the use of decorative and capacitive foils as well as wood veneers. In a single step, clearmelt technology thus provides pre-finished vehicle com-

ponents that do not need to be varnished or post-processed in any way. The polyurethane coating provides the high-gloss, scratch-proof surface.

ENGEL developed the clearmelt technology in collaboration with partner companies. The exclusive partner for polyurethane processing is Hennecke in St. Augustin, Germany.

Teletronics: Economic precision for even larger moulds

ENGEL will be going all-electric at the Fakuma in the teletronics exhibition area. Sophisticated connector housings for vehicle doors will be produced on an ENGEL e-mac 940/280. Until now, the e-mac series has been available with clamping forces of up to 1800 kN. In time for the Fakuma, ENGEL has expanded the line with a 2800 kN version.

e-mac machines are distinguished by their speed and precision, extremely energy efficient operation and a high degree of flexibility. They have proven themselves to be extremely reliable in continuous operation, and guarantee stable production around the clock. They are also less expensive to purchase than all-electric high-performance machines. This spectrum of characteristics predestines the series for the production of technical parts and electronic components. In both application areas, the trend is moving towards larger moulds with higher cavitation. With the expansion of the series, ENGEL has taken this trend into account.

With the production of 40-pole connector housings made of glass-fibre reinforced PBT, during the exhibition ENGEL will demonstrate how highest demands on precision can be combined with economic efficiency. In this market segment, due to the very filigree structure inside the connector housing, the competitiveness of the producer is defined by the precision of the injection moulding process. In several sequential process steps, the connector housings are equipped with stabiliser inserts, gaskets and contacts, then laser inscribed. Precisely injected areas or warping will impede the automated assembly and may lead to a halt in production. Since injection errors often are not detected until the end of the process chain, rejects also become more costly. To prevent this, the e-mac machine makes sure that very thin-walled areas are filled, even across long flow paths.

With the intelligent assistance systems from ENGEL's inject 4.0 programme, the already very reliable e-mac machines are also perfectly equipped for process fluctuations through external influences. Three iQ products are installed on the exhibition machine: iQ weight control, which maintains constant melt volume and adjusts fluctuations in the environmental condi-

tions and the raw material, iQ clamp control, which continuously adjusts clamping force based on the mould breathing, and the new iQ flow control for the needs-based regulation of the temperature control units. iQ weight control was the first of the iQ systems, and was introduced to the market five years ago. It has already become very well-established in the production of connectors, because in this segment with its especially filigree component structures, process fluctuations are one of the main causes of rejects. iQ weight control is a reliable aid in preventing production-related rejects.

Medical: Maximum integration with a minimal footprint

Highly integrated, compact production cells minimise the system footprint and increase area productivity. These aspects really pay off in the cleanroom. For this reason, ENGEL redeveloped the stainless steel pipe distributor for the cavity specific handling of small injection moulding parts, which it introduced two years ago, so that the handling system now fits completely into the expanded safety gate of the injection moulding machine. This new, extremely compact solution will be presented for the first time at the Fakuma.

During the five days of the fair, an ENGEL e-victory170/80 injection moulding machine will be producing needle holders for 1-ml safety syringes in a 16-cavity mould by Fostag Formenbau (Stein am Rhein, Switzerland). An ENGEL viper 12 linear robot will remove the filigree polystyrene parts from the mould and transfer them to the distribution system. In order to ensure batch traceability down to the level of individual cavities, the injection moulded parts will be packed in cavity-specific bags. For this purpose, 16 bags are hung in a cart located directly beneath the pipe distributor. Individual shots can be extracted for quality control purposes.

For unmanned cleanroom operation – during the night-shift, for example – two carts can be alternated in sequence, with a buffering system enabling the fully automated switch. The entire periphery for this is integrated into the CC300 control unit of the injection moulding machine. Thanks to shared data storage, the CC300 can precisely coordinate the movements of the machine and the robot with each other, thus optimising overall efficiency. In addition to this, there are also especially short robot paths due to the tie-bar-less clamping unit of the e-victory machine. In this application, both of these factors contribute to the short cycle times of six seconds.

So that the machine can also be flexibly used for other products, ENGEL designed the pipe distributor and the bag-packing cart as a fixed unit. This can be easily moved back and forth, ensuring full accessibility of the mould area.

With a shot weight of only 0.08 g and varying wall thicknesses, the filigree needle holders require extremely precise process control. Since fluctuations in the melt volume would immediately lead to rejects, ENGEL uses the iQ weight control software.

At the Fakuma, the highly integrated production solution is presented in its cleanroom version. In contrast to many other systems in the market, all components in contact with the product in ENGEL's pipe distributor are made of stainless steel, which helps to maintain low particle load. As a system provider, ENGEL is continually expanding its portfolio of GMP-compliant peripherals. In addition to the pipe distributors, conveyor belts and robot gripper housings from ENGEL's own development and production are offered.

Technical Moulding: Hydraulic precision for sophisticated LSR

The processing of liquid silicone (LSR) in injection moulding fully utilises the efficiency potential of the tie-bar-less ENGEL victory machines. The process consistency resulting from the design plays an important part in this. The patented force divider enables the moving mould mounting platen to follow the mould exactly while clamping force is building up, and ensures that the clamping force is evenly distributed across the platen face. Both the outer and inner cavities are therefore kept closed with exactly the same force, ensuring consistent compression of the mould and a consistently high product quality. This almost burr-free, zero-waste, rework-free, and fully automatic processing is the key element in the economic manufacturing of high-tech products from liquid silicone. At the Fakuma, with the production of venting valves for beverage bottles on an ENGEL victory 860/160 injection moulding machine, ENGEL will demonstrate how this can look in practice. With a diameter of approx. 50 mm, the venting valves have a geometrically complex structure with varying wall thicknesses. The iQ weight control software, which ENGEL is now offering also for injection moulding machines with hydraulic injection units, ensures that cavities are filled reliably even when there are fluctuations in the raw material.

It will be the first time that ENGEL presents a victory machine with a next generation injection unit at a trade fair. Last autumn, based on its long years of experience in the various application areas of its injection moulding machines, ENGEL reorganised the sizes of the hydraulic

injection units and further optimised the performance specifications such as injection pressure, injection speed, and plasticising capacity.

ENGEL is presenting the processing of LSR together with its partner Elmet Elastomere Produktions- und Dienstleistungs GmbH (Oftring, Austria). In this application, Elmet is providing the model OP 5000P LSR dosage system, a 16-cavity mould with a cold runner and demoulding unit. Parts are handled by a viper 40 robot from ENGEL's linear robot programme. The conveyor belt is integrated into the safety gate of the injection moulding machine, keeping the entire system at a compact size.

Focused 100 percent on the requirements of the industry

From the individual injection moulding machine to the highly integrated production cell, ENGEL delivers tailored solutions for the injection moulding industry. Developing customer-specific solutions takes more than technological know-how. This is why at ENGEL, business units are completely focused on a single industry. ENGEL employees are therefore on the same level with customers when discussing projects, able to understand and implement individual requests in detail. Many industry specific developments, such as the GMP-capable periphery devices being presented at Fakuma, are based on the bundled experience of the ENGEL business units.

ENGEL at Fakuma 2017: Hall A5, stand 5204



New horizons for the automotive industry: At Fakuma, for the first time ENGEL will be producing exterior components on a duo 500 injection moulding machine unit using the clearmelt process.



Celebrating its premier at the Fakuma 2017: The new e-mac 280.



With the production of 40-pole connector housings on an all-electric injection moulding machine, during the exhibition ENGEL will demonstrate how efficiency can be combined with the highest demands on precision. The new e-mac 280 injection moulding machine will be used for this application.

ENGEL
be the first

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Compact integration: The pipe distributor fits in the machine's safety guard.



At Fakuma, the highly integrated manufacturing solution for the production of needle holders will be presented in a cleanroom version. The 16-cavity mould is running on an e-victory 170/80, with a viper 12 linear robot handling parts.



The filigree needle holders are designed with a predetermined breaking point that makes it impossible to use disposable syringes multiple times.



On an ENGEL victory 860/160, ENGEL will produce venting valves for beverage bottles during the Fakuma. With a diameter of approx. 50 mm, the venting valves have a geometrically complex structure with varying wall thicknesses.

Pictures: ENGEL

ENGEL AUSTRIA GmbH

ENGEL is one of the leading corporations in plastics machine manufacturing. Today, the ENGEL group of companies offers all technological modules for plastics processing from a single source: injection moulding machines for thermoplastics and elastomers, as well as automation. Also, individual components are competitive and successful in the market in and of themselves. With nine production plants in Europe, North America and Asia (China and Korea), and subsidiaries and representatives for more than 85 countries, ENGEL offers its customers the excellent global support they need to compete and succeed with new technologies and leading-edge production systems.

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