

ENGEL at Fakuma 2018

Flexibly produce the smallest lot sizes

Schwertberg, Austria – July 2018

From vehicles to electronic devices, more and more products are being offered in increasingly diverse design variations. For production, this translates to smaller lot sizes. At the Fakuma 2018, from October 16 to 20 in Friedrichshafen, Germany, using two innovative applications ENGEL AUSTRIA will demonstrate how small lot sizes can be realised with the efficiency and economy of large series.

Production of variations with fully automated switch-over

Three premieres at the same time

At the Fakuma 2018, ENGEL is celebrating three premieres at the same time with a highly integrated production cell on which two-part callipers are manufactured using ABS. A fully automated solution for the very rapid switch of mould inserts will be presented for the first time, the new size 120 of the all-electric and tie-bar-less e-motion TL series with a clamping force of 1200 kN will be introduced to the public, and thirdly, the expanded functionality of the e-flomo electronic temperature-control water manifold will be presented.

Lot sizes of less than 1,000 present a special challenge in injection moulding. In order to economically realise a large number of variations, moulds with interchangeable inserts are often used. At the Fakuma, ENGEL, together with Braunform (Bahlingen, Germany) and other system partners, is going one step further. The system solution presented there allows for a fully automated switch of the mould inserts within just one minute. To this end, the ENGEL e-motion 170/120 TL injection moulding machine is equipped with a mould that includes the fast-switch mechanism patented by Braunform.

To clearly demonstrate the potential of the new solution, the two geometrically different components of the calliper will be produced in rapid succession one after the other. After only three shots, the injection moulding machine alerts the integrated ENGEL easix articulated robot that the lot has been fulfilled and unlocks the mould inserts. The robot first removes the last produced component, then changes grippers and switches the mould inserts. From usable part to usable part, this process only takes one minute. Communication between the injection moulding machine and the periphery is conducted via authentig, the MES of ENGEL subsidiary TIG. The software provides the parts data sets to both the machine and the robot.

4.0 assistance ensures the highest measure of usable parts

One of the challenges of this application is that both components have widely varying shot weights. In order to already produce a usable part with the first shot following the setup, the injection moulding machine continuously optimises itself with the help of three intelligent assistance systems from ENGEL's inject 4.0 programme. While iQ weight control readjusts the melt volume for each individual shot, iQ clamp control calculates the optimal clamping force and sets it automatically. iQ flow control – the third assistance system on the team – automatically compensates temperature differences in the cooling water manifold circuit based on the measurements determined by e-flomo, and adjusts the pump speed in the e-temp temperature control units to the current process conditions.

The electronic temperature-control water manifold e-flomo makes another contribution to the short setup times. The automated, sequential blow-out of the manifold circuits in the mould ensures that water and possibly dirt left in the temperature-control channels is completely removed before the removal of the mould or mould insert. Upon installation, this new function guarantees an optimal ventilation of the temperature-control channels. As compared to the conventional manual blow-out, the automated process saves time and also allows for an extension of the mould's maintenance intervals. Since all channels are not evenly ventilated by pressurised air in the manual procedure, residual water may remain in the channels and lead to corrosion. This risk is eliminated by automation.

All units compactly integrated

One real eye-catcher at the Fakuma is the extremely compact layout of the production cell with the easix robot at its centre. The robot is responsible for the complete handling of the mould inserts and components, the marking of injection-moulded parts and their assembly, and the removal of the callipers from the production cell. To this end, the injection moulding machine, the station for grippers and mould inserts, the laser printer, the assembly device and the conveyor unit are arranged around the robot in a star shape.

Two factors in particular contribute to the extremely space saving arrangement of the individual components. One is the freely definable prohibited areas of the easix robot and the other is the tie-bar-less clamping unit of the e-motion TL injection moulding machine. The barrier free access to the mould area allows the robot to move very close to the clamping unit with no motion restrictions.

With the completely automated production cell, the system partners ENGEL and Braunform are addressing customers who produce articles similar to each other in small lot sizes or with a high degree of variation. Typical products are consumer goods such as writing tools, technical components in the automotive and electronic areas, but also a range of medical technology products.

Tie-bar-less and all-electric – now with up to 1200 kN clamping force

With a clamping force of 1200 kN, the new e-motion 120 TL is the largest machine in its series. This upward expansion represents ENGEL's focus on the trend towards an increased use of multi-cavity moulds. Without any tie-bars in the way, the mould mounting platens can be utilised fully, so that large and bulky moulds can be fitted on comparatively small injection moulding machines. This is also an advantage in the manufacturing of geometrically complex components that require core-pulls and sliders within the mould. Rather than the mould dimensions, now the actually required clamping force determines the size of the machine. This saves costs in new investment as well as current operations.

To ensure a long useful life of the mould and a consistently high product quality, the all-electric and tie-bar-less high performance machines by ENGEL are equipped with a highly sensitive platen parallelism adjustment. Machines from this series are often used in the pro-

duction of extremely small precision parts in the electronics and medical technology industries.

One process for infinite design options

Design, structure, function in just one process step

With the evolution of its foilmelt technology, at the Fakuma ENGEL presents a roll-to-roll IMD application with a flexibility that has not existed until now. The joint development of the system partners ENGEL, Leonhard Kurz (Fürth, Germany), Schöfer (Schwertberg, Austria) und Isosport Verbundbauteile (Eisenstadt, Austria) allows for thermoforming, back-injecting, and punching out in rapid sequence the most diverse surface structures from roll to roll within the mould.

The broad spectrum of possible material combinations is remarkable. Foils functionalised using capacitive electronics, multi-layered foil systems with topcoat as well as structured, back-lightable, or open-pore systems such as wood can be processed from the roll. In addition to the typical materials such as ABS, PC or PC/ABS, PP can be used for back-injecting. To change the décor, structure and functionality, only the roll has to be switched, not the mould.

With the production of differently decorated, three-dimensionally complex sample components on a duo 1060/350 injection moulding machine with integrated viper 20 linear robot, at its exhibition booth ENGEL demonstrates the high flexibility of the series-ready technology. Among others, target groups are the manufacturers of visible parts for car interiors as well as the teletronics and white goods industries.

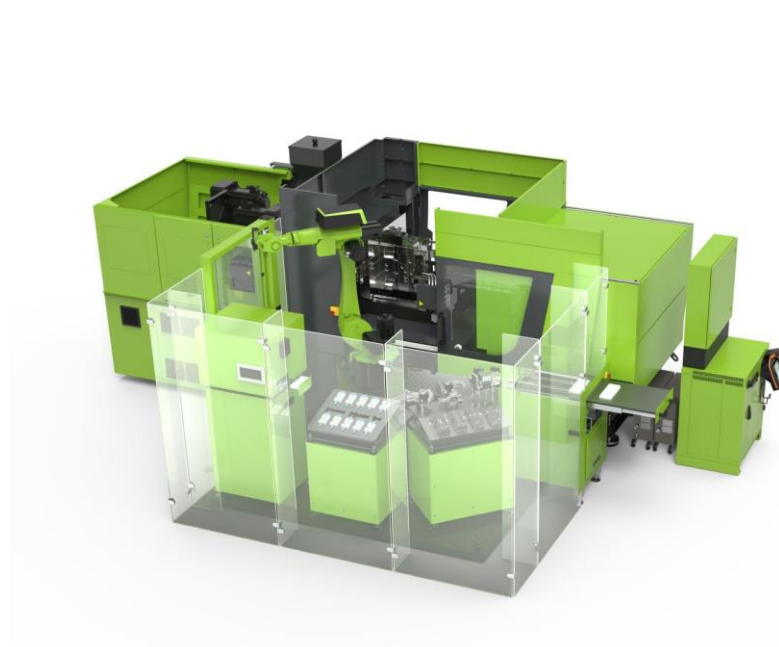
As of January, 2019, the production cell will be available for technology demonstrations, material tests and customer-specific developments in the new ENGEL technology centre at its headquarters in Schwertberg.

Modular and highly flexible safety guard

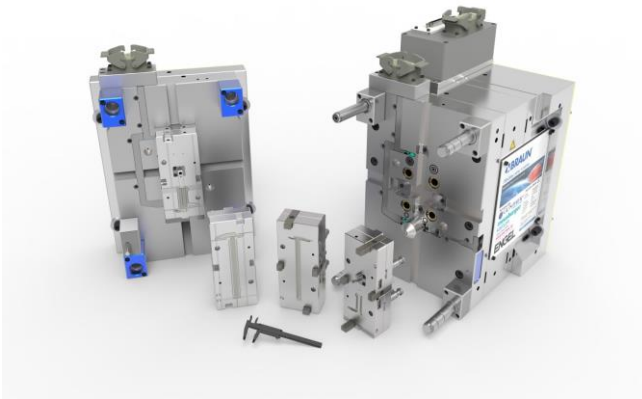
Another innovation presented by the foilmelt production cell at the Fakuma is the new safety guard developed by ENGEL according to EN ISO 14120, which will be available for all auto-

mated injection moulding machines and integrated system solutions as of October. Here again, the focus in development was on high flexibility in combination with a high degree of economic efficiency. The modular concept allows for an especially simple configuration and an equally easy assembly. The comprehensive selection of safety panels and functional elements such as openings, revolving doors and sliding doors allow for the cost-effective realisation even of individual layouts.

ENGEL at Fakuma 2018: Hall A5, Booth 5204



For the fully automated production of variations, the system integrates the injection moulding machine with an articulated robot, a station for grippers and mould inserts, a laser printer, an assembly device and a conveyor unit for the removal of the ready-to-use assembled callipers. (Image: ENGEL)



Built by Braunform, the mould with patented fast-switch mechanism allows for product changes within one minute. (Image: Braunform)



With a clamping force of 1200 kN, the new e-motion 120 TL is the largest machine in its series. With this upward expansion, ENGEL takes into account the increased use of multi-cavity moulds. (Image: ENGEL)



During the Fakuma, a duo 1060/350 injection moulding machine will be used for the production of highly decorated sample components. (Image: ENGEL)

ENGEL AUSTRIA GmbH

ENGEL is one of the leading companies in plastics machine manufacturing. Today, the ENGEL group of companies offers all technology modules for plastics processing from a single source: injection moulding machines for thermoplastics and elastomers, as well as automation, with individual components that are also competitive and successful in the market. 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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