ENGEL at K 2025:

Efficiency, precision and AI – solutions for the future of plastics processing

Schwertberg - Austria, July 2025

At K 2025, ENGEL will demonstrate how technological innovation, digital intelligence and sustainability can be effectively combined. The trade fair presentation focuses on industry-specific injection moulding solutions that enable companies to manufacture more efficiently, precisely and flexibly. ENGEL will showcase its technologies and solutions in practical operation – from the use of artificial intelligence in the running injection moulding process to highly integrated production cells for the automotive, medical, technical moulding and packaging sectors. Visitors are invited to gain a comprehensive overview of future-proof applications at ENGEL's stand in Düsseldorf – and to witness the world premiere of a new electric tie-bar-less injection moulding machine.

Automotive: Efficient mastery of function, lightweight design and new materials

Where design meets function: rear-end-light modules with clearmelt and foilmelt without hardcoating

Image 1: Functionalised rear-end-lights are produced on the ENGEL duo 700 – with high precision and using clearmelt and foilmelt in a single integrated process with a compact footprint.

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ENGEL is demonstrating the highly integrated series production of innovative rear-end-lights on a high-performance duo 700 two-platen injection moulding machine with 7000 kN clamping force. The visible parts, measuring 600 x 240 mm, are manufactured using a combination of decorative foilmelt and functional clearmelt technologies in a vertical rotary table mould. In addition to design freedom, downstream processes are integrated into the injection moulding cell, and a separate hardcoating process is no longer required thanks to clearmelt. While the colour design from a decorative foil is applied to the component on one mould side by back-injection of thermoplastics (foilmelt), the opposite side is overflooded with polyurethane (clearmelt) to form a highly transparent and robust protective layer. A space-saving integrated automation system with a viper 40 linear robot enables short cycle times within a compact and efficient cell. The transfer foil is supplied by *LEONHARD KURZ*. At the partner's stand, the component is further processed using an integrated LED function foil.

With this application, ENGEL demonstrates how visible parts in the automotive sector can be both functionalised and decorated – economically, with high precision, and in a compact production process.

Overmoulding with liquid silicone: precision seals for fuel cells

Image 2: Precision LSR seals for fuel cells are produced on the vertical ENGEL insert 150 – fully automated overmoulding with maximum accuracy in a minimal footprint.

A production cell with a vertical insert 150 injection moulding machine, offering 1500 kN clamping force, demonstrates the fully automated manufacturing of liquid silicone rubber (LSR) seals on sensitive gas diffusion layers (GDL) for fuel cells. The LSR seal is applied with absolute platen parallelism directly in the machine, inspected in the mould and the component is immediately removed. The automation system, featuring ENGEL easix articulated robot and a rotary table mould supplied by ACH, ensures short cycle times and high process reliability. To save space, the control cabinet is integrated directly into the machine frame. ENGEL is showcasing a highly cost-efficient solution for fully automated overmoulding with thin LSR layers in a compact footprint.

Lightweight, strong, sustainable: bicycle handlebars with fluidmelt and organomelt

Image 3: A high-strength bicycle handlebar is produced on the tie-bar-less ENGEL victory 180 – lightweight, automated manufacturing and continuous fibre reinforcement with fluidmelt and organomelt.

A novel bicycle handlebar is manufactured as a hollow component on a tie-bar-less ENGEL victory 180 injection moulding machine with 1800 kN clamping force. The fluidmelt process is used to create the hollow structure, while unidirectional continuous carbon fibre tapes are simultaneously integrated using the organomelt process. This innovative combination of technologies enables maximum part performance with minimal weight and a short cycle time of just one minute. The process is fully automated with an easix articulated robot. With these technologies, ENGEL once again sets new benchmarks in production efficiency and sustainability – opening up new markets for plastic components in applications traditionally dominated by metal.

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Cost-efficient and ready for series production: Physically foamed B-pillar trim using MuCell

A B-pillar trim component is produced in just 50 seconds using the ENGEL foammelt technology on a t-win 6500 two-platen injection moulding machine from the WINTEC brand, part of the ENGEL Group. The foamed part, weighing 290 g, is made of mineral-filled PP from Sabic. ENGEL's foammelt technology reduces weight and cuts material and production costs while achieving excellent surface replication. Automation is handled by a highly integrated viper 20 robot. WINTEC here demonstrates a cost-effective solution for producing visible interior automotive components.

High-precision manufacturing for medical products: Cell culture plates with accelerated validation

In the Medical area, ENGEL showcases a highly efficient injection moulding cell built around an all-electric e-motion 260 combi M injection moulding machine equipped with two injection units and a central rotary platen. Using a stack mould from Hack, 24-well cell culture plates and matching polycarbonate lids are produced simultaneously in a single shot – with a cycle time of just 11 seconds. The additional injection unit is arranged at an angle to shorten the hot runner path, enable central injection without weld lines and improve material protection. This manufacturing solution, featuring a side-entry robot from Ilsemann, delivers the entire process including assembly and packaging in a compact, ergonomic setup.

A key highlight is the validation solution jointly developed by ENGEL and toolmaker Hack. This system enables structured and digital documentation of all validation phases – from Design Qualification (DQ) to Performance Qualification (PQ). Machine- and tool-integrated sensor technology, combined with products from the ENGEL iQ family and standardised documentation modules, significantly reduce the effort required. As a result, the time- and personnel-intensive validation process is substantially shortened.

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Technical Moulding: Saving resources and using installation space efficiently

World premiere – New generation of electric tie-bar-less machines / Automated overmoulding of fittings

Image 4: Unveiled at K 2025: the next evolution of electric tie-bar-less injection moulding machines.

One of the highlights at the ENGEL stand is the world premiere of the latest generation of its electric tie-bar-less victory injection moulding machines. This new model is fast, clean, and energy-efficient, and also features a completely new technical design – delivering additional advantages for users.

On the new victory electric, fittings are produced with a cycle time of just 23 seconds. The mould includes large-volume core pulls, which are optimally supported by the free access provided by the tie-bar-less design. Thanks to ENGEL tie-bar-less technology, even large moulds can be used on comparatively small machines, saving space, energy and investment.

After injection moulding, the fittings are automatically equipped with seals. The production cell is equipped with two easix articulated robots to handle this step.

Blocks made from recycled material with high structural stability

Image 5: Lightweight and robust components made from 100 % post-consumer recyclate are produced on the all-electric ENGEL e-mac 220 – with up to 50 % less scrap thanks to ENGEL iQ weight control.

On an all-electric e-mac 220 injection moulding machine with 2,200 kN clamping force, ENGEL is producing thick-walled, foamed construction blocks for the building industry. The material comes from yellow bag household waste, reprocessed by EREMA. Mould and foaming agent formulation are supplied by Moxietec. For optimum foam homogeneity, an optimised mixing screw is used during plasticising. The result: components with up to 30 % weight reduction and 10 % higher strength. This technology is particularly well suited for logistics pallets and as a substitute for concrete in construction applications.

As 100 % post-consumer recyclate with corresponding material fluctuations is processed, the new iQ weight control plus plays a key role. After defining just two parameters, the digital assistance system automatically adjusts the switchover point and pressure curve during every injection cycle. This reduces scrap by up to 50 %.

An integrated automation solution with servo sprue picker and an integrated conveyor belt inside the machine makes the cell particularly energy-efficient and compact.

Packaging: Scalable sustainability in series production

Thin-walled cups with 30 % rPET produced using a stack mould

Image 6: On the all-electric ENGEL e-motion 420, thin-walled cups with 30 % rPET are manufactured in series production using a stack mould – compliant with the Packaging and Packaging Waste Directive 2030.

ENGEL is demonstrating a series-ready solution for processing rPET in thin-walled packaging on an all-electric e-motion 420 injection moulding machine with 4,200 kN clamping force. What was previously only feasible using hydraulic injection, ENGEL now achieves electrically. A 6+6-cavity stack mould from Plastisud is used to produce yoghurt cups made from 70 % virgin material and 30 % bottle-grade rPET. The rPET is supplied by NGR and upgraded for food contact via Liquid-State Polycondensation.

This production setup delivers excellent repeatability at high performance. The combination of injection compression moulding, iQ motion control, and iQ weight control plus enables the manufacture of thin-walled, precise cups with minimal material usage. The application already complies with the requirements of the Packaging and Packaging Waste Directive for 2030. Moreover, it illustrates the potential to replace thermoforming as the preferred manufacturing process, enabling producers to save on upstream steps (film production) and material (trimming waste). ENGEL thus presents a practical example of how sustainability and precision can be combined in an economically viable production environment.

inject AI: Digital intelligence for real-world production benefits

Smart assistance systems with practical impact

With inject AI, ENGEL is taking its inject 4.0 programme to the next level. At K 2025, ENGEL will showcase the next step toward self-optimising machines by integrating artificial intelligence into many new and existing ENGEL products.

The iQ process observer monitors up to 1,000 parameters per shot, detects process deviations in real time, and provides AI-supported automatic correction suggestions – a key contribution to process optimisation and scrap reduction. The systems continuously learn from the data of all connected machines, creating added value for every new project – a genuine boost for quality and efficiency.

e-connect portal with AI: Digital support for every shift

In the event of machine or process faults, a new AI-supported feature in the e-connect portal provides machine-specific assistance – quickly, precisely, around the clock, and in all languages. Thanks to intelligent search functionality in the ENGEL machine manuals, downtime can be significantly reduced. The system will be available as a pilot series in time for K 2025.

Humans and AI – a team effort

ENGEL does not see AI as a replacement, but as a complement to human expertise. Adaptive assistance systems ease the burden on personnel, stabilise processes and increase equipment availability – an especially valuable benefit in times of skilled labour shortages. In this way, the self-regulating machine is gradually becoming a reality.

ENGEL – Your Partner for the Future

At K 2025, ENGEL is demonstrating how machines, automation, and digital systems can be combined into fully integrated manufacturing solutions. Each exhibit on the stand represents a production cell precisely tailored to meet specific customer requirements – and a well-considered, economically viable response to those needs. The exhibits are complemented by expert corners on topics such as plastification, technologies, temperature control, and training, where ENGEL presents customer-focused solutions.

Whether lightweight construction, the use of recyclates, validation, or process stability: ENGEL thinks in terms of solutions. The trade fair appearance encourages open, hands-on and forward-looking dialogue. Because while plastics processing may not be getting any easier, with ENGEL it remains manageable, flexible, and efficient.

K 2025: Hall 15, Stand B42 & C58

Images: ENGEL

ENGEL AUSTRIA GmbH

ENGEL is one of the world's leading manufacturers of plastics processing machinery. Today, as a single-source provider, the ENGEL Group offers a full range of technology modules for plastics processing as a single source supplier: injection moulding machines for thermoplastics and elastomers together with automation, but also individual components which are competitive and successful in the market. With ten production plants in Europe, North America and Asia (China and Korea) as well as subsidiaries and representatives in more than 85 countries, ENGEL offers its customers worldwide the optimum support which they need to compete and succeed with new technologies and leading-edge production systems.

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