Rethinking Lightweight Construction:

At K 2025, ENGEL presents a series-ready solution for highly efficient lightweight design with reduced material usage

Schwertberg - Austria, July 2025

At K 2025, ENGEL will demonstrate the capabilities of its innovative injection moulding technologies for lightweight construction with a simple and cost-effective production solution. In the manufacture of cockpit bicycle handlebars for CANYON Bicycles, aluminium is replaced by plastic and production time is reduced to a fraction. This is made possible by combining local reinforcement with continuous fibre-reinforced tapes and fluidmelt technology for the production of hollow bodies – all within a closed process.

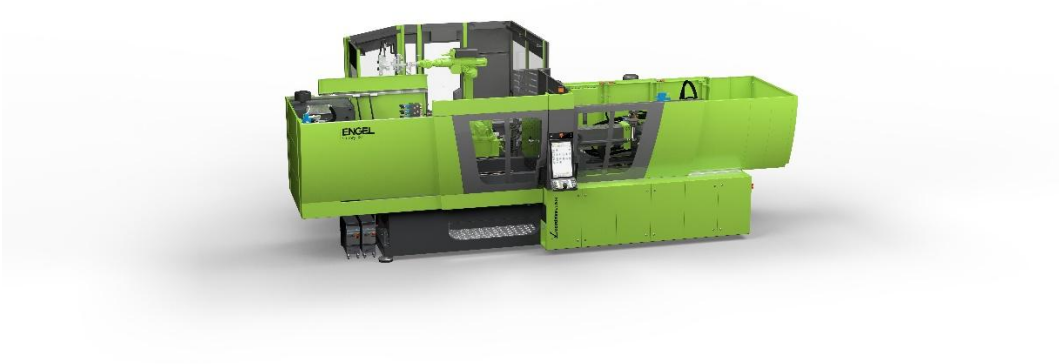

Image 1: ***Highly integrated production cell for structural lightweight construction:*** *At K 2025, ENGEL presents a compact solution for the efficient production of fibre-reinforced hollow bodies – with reduced material usage, short cycle times and maximum design flexibility.*

The fully automated production cell is based on a tie-bar-less ENGEL victory 180 injection moulding machine with a clamping force of 1800 kN. It combines the overmoulding of locally inserted continuous fibre tapes with the formation of a hollow structure in a single, continuous process step. While the equivalent aluminium process involves multiple time-consuming steps, this solution achieves a cycle time of just 60 seconds. This leads to a significant increase in production capacity and considerable cost savings. The resulting handlebar demonstrates that, with the right

engineering, plastic solutions can replace aluminium – offering shorter cycle times, better functional integration, and greater design freedom. These are decisive advantages for demanding applications in the sports and leisure sectors as well as in the automotive industry.

Image 2: ***Strong, lightweight and functional – the newly developed bicycle handlebar for CANYON Bicycles:*** *Produced on the ENGEL system, the handlebar completely replaces an aluminium solution – with a very short cycle time, around 15% less weight, and improved vibration damping.*

The components themselves are made from a polyamide 6 with 50% glass fibre reinforcement supplied by DOMO Chemicals to ensure the required stiffness and strength. By integrating four unidirectional carbon fibre tapes (UD tapes), which are placed in the mould prior to injection moulding, the part withstands high mechanical loads despite its low wall thickness and hollow structure. During the process, fluidmelt is used to inject gas and push the plastic core of the component back into the plasticising unit, creating a hollow space within the part. The displaced material is reused in the production of the next component. The complete integration of both processes into a continuous injection moulding cycle ensures short cycle times and high reproducibility. This combination of local UD tapes and the fluidmelt process enables complex hollow-body geometries with high design freedom and functional integration, while at the same time reducing material usage and energy consumption.

The handlebar has already passed all required approvals, complies with all relevant ISO standards as well as CANYON's internal specifications, and will enter series production in 2026. ENGEL's manufacturing concept represents a significant advancement over traditional aluminium handlebars by making local production in Europe economically viable while significantly reducing environmental impact thanks to a highly improved carbon footprint. For CANYON, this overall concept means a technical enhancement of the product combined with improved sustainability and a substantial increase in production efficiency.

Automation of the production cell is handled by an ENGEL easix articulated robot. It is responsible for the precise insertion of threaded inserts and continuous fibre tapes, as well as for removing the finished parts. All movement sequences and process steps are coordinated via the central CC300 control unit of the injection moulding machine, simplifying operation and increasing process reliability.

The ENGEL victory 180 wide-platen machine demonstrated in operation at the trade fair is an injection moulding machine specifically designed for large and complex components or moulds. Thanks to its tie-bar-less design with a generously sized, unobstructed mould area, the victory series enables the use of large and complex moulds on compact machine sizes. This offers a distinct advantage when working with high-volume, demanding moulds and complex automation systems.

Both the technology combination and the production solution can be modularly adapted to other component geometries and industry requirements. This makes the system suitable not only for sports and leisure products, but also for structural vehicle components or technical parts with hollow geometries. ENGEL thus demonstrates how well-conceived combinations of established processes can open up new possibilities for energy-efficient, resource-saving, and economically attractive lightweight construction solutions.

Visit us at K 2025 in Düsseldorf, 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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