All-electric PET thin-wall injection moulding with rPET at production scale: **At K 2025, ENGEL showcases a high-performance production cell with in-mould labelling and 30% rPET content in bottle quality**

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At K 2025, ENGEL demonstrates how precision, performance and circular economy go hand in hand with a fully integrated production cell for thin-wall yoghurt cups made of PET. These cups are produced on behalf of a global brand owner with a strong focus on sustainability. Containing 30% food-grade rPET from bottle recycling, they already meet the 2030 targets of the Packaging and Packaging Waste Regulation (PPWR) and are fully recyclable. At the heart of the production cell is an all-electric ENGEL e-motion 420 injection moulding machine with 4200 kN clamping force, equipped with a stack mould from Plastisud. ENGEL achieves high-performance thin-wall injection moulding of PET using injection-compression moulding technology – all-electric, energy-efficient, material-saving and ready for full-scale production.

Product requirements

Producing thin-wall cups places high demands on injection moulding technology, especially when processing challenging materials such as PET and rPET. At the show, ENGEL presents a food-contact application that uses a material blend of 70% virgin PET from Novapet and 30% rPET regranulate supplied by NGR, based in Feldkirchen, Austria. NGR, a specialist in advanced plastics recycling technologies, has processed and pelletised the rPET flakes using liquid-state polycondensation to make them suitable for food contact. Polytainers, headquartered in Toronto, Canada, is a specialist in high-quality rigid packaging solutions and, with extensive experience and expertise in design and moulding, is responsible for manufacturing these cups for a global brand owner.

These cups are a prime example of how regulatory requirements can be implemented at an early stage through a forward-looking packaging concept. At K 2025, ENGEL uses this application to demonstrate the entire circular economy cycle – from the cup production within the ENGEL manufacturing cell to the preparation of the input material and the subsequent recycling process carried out by NGR.

ENGEL be the first

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Image 1: ***Recyclable, lightweight and future-proof:*** *These thin-wall PET yoghurt cups with 30% bottle-grade rPET already meet the 2030 requirements of the PPWR and demonstrate how sustainability and product quality go hand in hand in injection moulding.*

All-electric high-performance injection moulding

The all-electric e-motion 420 produces twelve cups per cycle, each weighing ten grams, in just five seconds. With this application, ENGEL demonstrates that rPET can also be processed electrically in high-performance scenarios – enabling an efficient, precise and sustainable manufacturing method.

The newly developed 2465 high-performance injection unit increases injection speed to 500 mm/s – almost 67% faster than standard solutions. At the same time, ENGEL has significantly enhanced the system's dynamics. This boost in performance not only makes electric processing of the application technically feasible in the first place, but also shortens cycle times considerably. A dosing drive with a screw circumferential speed of 1 m/s and a PET-optimised screw ensure gentle material processing and a homogeneous melt, even under high-performance conditions. Improved accessibility for maintenance and servicing further increases overall equipment effectiveness (OEE).

The new iQ weight control plus digital assistance system analyses the injection process in real time – even at these high speeds – and automatically adjusts the switchover point and holding pressure for every shot. Depending on the selected setting, the system operates either speed- or pressure-controlled, based on just two input values.

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Together with Plastisud, ENGEL showcases an industrial-scale application. The basis for this is an innovative 6+6 stack mould developed by the French mouldmaker Plastisud, which is renowned in the packaging sector for its expertise in thin-wall moulds and the processing of bottle-grade rPET. The stack mould injects synchronously via an extended hot runner system into the central mould plate.

ENGEL's injection-compression moulding technology plays a key role in ensuring stable and efficient production of the PET cups. During the process, the melt is injected into a slightly open mould that closes while injection is still taking place. This approach significantly reduces the required injection pressure and speed, minimising shear stress on the material and protecting the PET. This process not only makes the application technically feasible on an all-electric system, but also achieves particularly high part quality with uniform, thin-wall structures – an ideal solution for processing PET.

Image 2: ***Scalable solution for series production:*** *At K 2025, the all-electric ENGEL e-motion 420 demonstrates how demanding thin-wall applications with rPET can be realised at production scale – energy-efficient, precise and cost-effective.*

Both the high-performance all-electric drive and the iQ motion control digital assistance system help to shorten cycle times on the ENGEL e-motion. iQ motion control optimises the clamping-side movements and reduces dry cycle time by up to 12%. This digital assistance system makes a significant contribution to overall cost efficiency.

Automation

The IML automation system from PAGÉS (France) places the labels precisely into the cavities, removes the finished cups, inspects them inline, separates rejects and packs the good parts directly into cartons. The NextCycle IML labels made of PET by MCC Verstraete can be easily separated from the cups during recycling by an air stream, allowing for the production of pure, dye-free rPET. A corresponding recycling example is showcased at the NGR stand.

Conclusion

With this solution, ENGEL demonstrates that even demanding bottle-grade rPET applications in thin-wall injection moulding can be realised in an all-electric, energy-efficient and material-saving way. The showcased production cell is close to series production and fully scaled for industrial use – including a stack mould, in-mould labelling and complete automation.

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, 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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