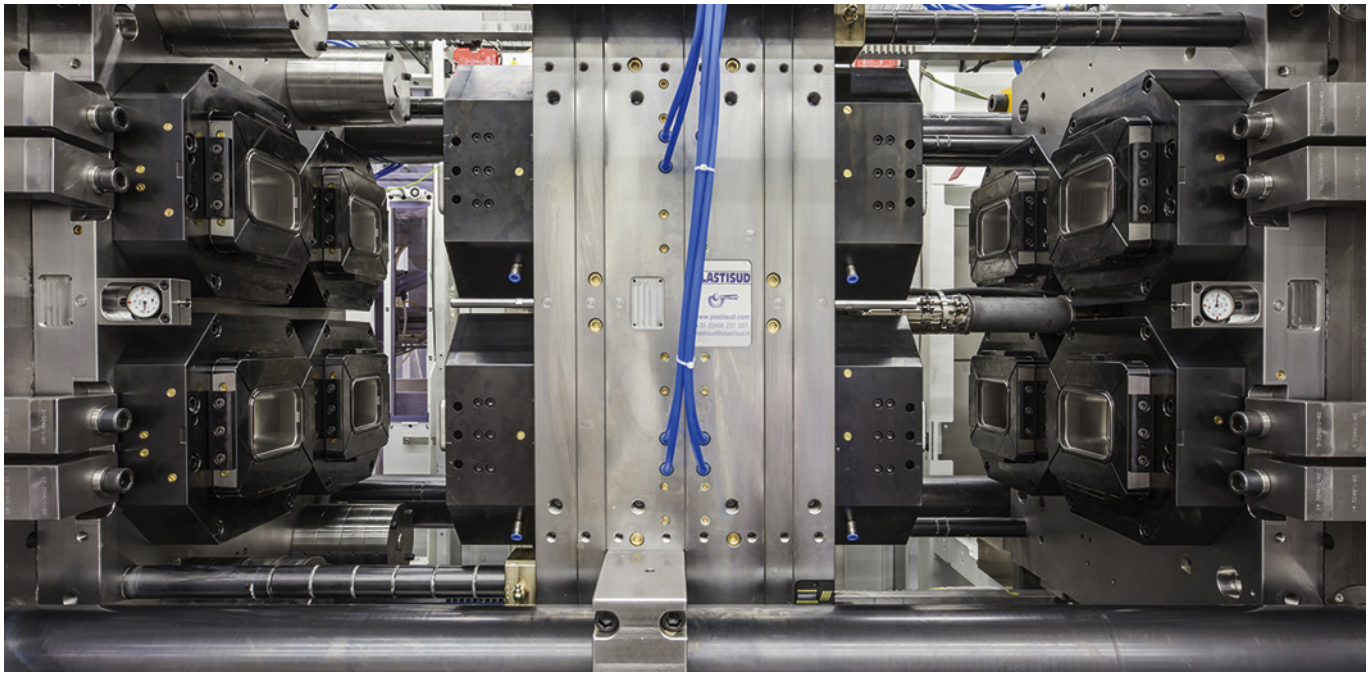


Thinner, lighter, faster... and a great deal cheaper

Packaging specialists are responding to demands for lighter packs with a range of thin wall innovations. **Peter Mapleston** reports

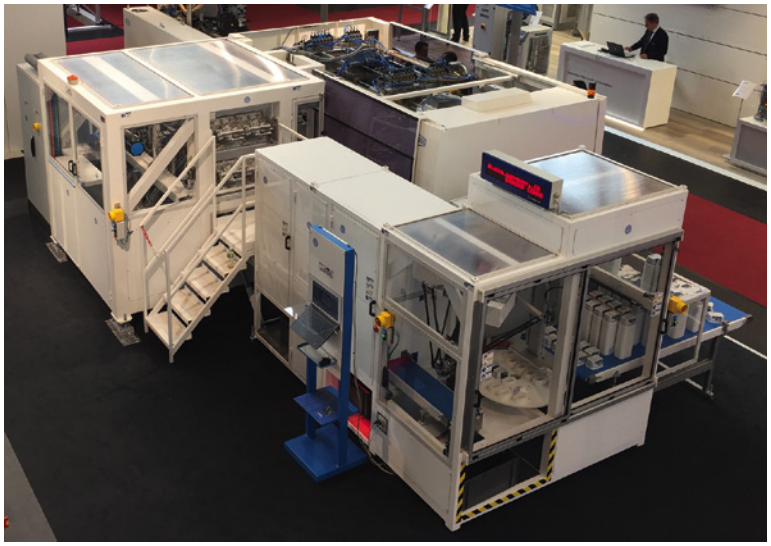
The drive to improve performance and cut cost in thin-walled packaging production continues apace. Packaging producers, injection moulding equipment suppliers and mould makers are all responding with numerous innovations, many of which were on display at the Fakuma show in Germany last October. Perhaps the most innovative of these is what is claimed to be the first commercial application of injection-compression moulding with a multi-cavity stack mould.

Packaging company **Coveris** developed the production technology in a joint project with consumer goods manufacturer Unilever and French mould maker **Plastisud**. Injection moulding equipment producer **Netstal** – a KraussMaffei Group brand - also played an important role. The development of the new technology started in 2011, with the first industrial injection compression IML system successfully launched at the beginning of this year. The production system comprises a 4+4 stack mould with integrated in-mould label (IML) decoration for production of probably the lightest 500g Eurotubs yet, primarily for packaging spreads.

The production injection moulding system ran successfully on a trial basis for several months in the Coveris Centre of Excellence for IM-IML in Ravensburg, Germany, before going into commercial production in December. The Ravensburg plant also processes materials from Coveris divisions in other countries, for instance the 40µm in-mould labels used in the EU Food & Consumer Business Unit in Angoulème, France (which are claimed to be the thinnest labels currently in the market).

The new injection-compression technology achieves up to 20% weight savings as a result of a wall thickness reduction while keeping the high mechanical properties of the product. As the compression technology is integrated into the mould, it can be used on hydraulic and toggle machines, as well as full-electric types, according to Coveris. For the moment, Coveris is using a Netstal Elion unit – which features a hybrid five-point toggle clamping system. Netstal point out that it has a lead in implementation of the technology, if only because it has developed the control software required to make the mould run on its equipment.

Main image: Plastisud's injection-compression stack mould design is claimed to be a world first, cutting part weight by as much as 20%



The Plastisud inection-compression technology ran on a Netstal 280-tonne Elion machine on the KraussMaffei group stand at Fakuma last year. This view shows the Machines Pages IML system

Yves Caunègre, group development manager at Coveris Global Rigid, says he is confident that the injection-compression IML technology "will become a great success story for all parties involved." He also says that Coveris has already started joint developments of further lightweight packaging solutions for the consumer goods industry.

Caunègre explains that the company (previously known as Veriplast before it was bundled together with flexible packaging companies by owner Sun Capital Partners in 2014 to form the sixth largest global plastic packaging company in the world) has been working on new ways to down-gauge injection moulded polypropylene packaging for many years. It has for example been using **Trexel**'s Mucell microcellular foaming technology since 2008 for production of tubs for Unilever (see *Injection World* January/February 2015).

The Mucell technology has enabled part weights to be reduced by around 5%, but Caunègre says that when the company considered the next step it realised it had reached the limit of what was possible with that technology. "So we spoke with Plastisud about other potential solutions, and we concluded that injection-compression would be ideal," he says.

In 2013, the two companies made a single-cavity pilot mould and Coveris contacted Unilever to gauge its interest. The response was positive. Plastisud then modified an existing mould for the process. Tests with this mould showed that injection-compression could shave something like 2g off a 14g tub, a weight saving of 15%. Trials with the tubs at Unilever proved they would perform well on the company's packaging lines and the next step was to upscale the technology to a 4+4 stack mould, which was completed around mid-2015.

By late November, Caunègre said that, after some debugging, the mould had been operational for six months and had produced "a significant number" of tubs, which have been going through market acceptance trials with Unilever. Full production began in December, based on a Netstal 320-tonne Elion 3200 unit. Caunègre says Coveris has also been speaking with "all the big players" in the thin-wall packaging arena to attract further business for the system.

Another, slightly smaller, production system is being used by Netstal and Plastisud for demonstration purposes. That system got its first public outing at Fakuma 2015 last October on the Netstal stand, where it was running on a 280-tonne Elion 2800 with an IML system designed and built by Machines Pagès (and running labels produced by **Verstraete**). The containers weighed 10.7g. At the time of writing this article this demonstration system was on a road trip around the US and Europe. It will also be on show at K 2016 this October.

No limitations

Caunègre says injection-compression introduces no extra limitations on part geometry compared to standard injection moulding. The injection-compression process is capable of producing parts with wall thicknesses down to 0.4 mm, depending on flow length, and Coveris is currently using a 70-MFI grade of polypropylene, the same as it uses for injection moulding. However, he says the company has tested material with an MFI of 45 with good results and this could provide extra cost advantages, since high-MFI grades are considered specialities.

A further cost advantage, already being realised, comes through the ability to run the injection-compression mould on a smaller machine than is needed for injection moulding. Caunègre says a "regular" 4+4 stack mould for 500g tubs would need a 500-tonne moulding machine. The ability to run the injection-compression mould on a 320-tonne model brings savings in terms of initial investment and running costs.

Plastisud says that the technology allows clamping force to be reduced by as much as 40% (Netstal is a little more cautious, putting the figure at closer to 30%). "This huge reduction, results in lower stress of the injected material and thus improved final container or lid quality," claims Plastisud.

Coveris is now also developing injection-compression for lids. Again with Plastisud, it has already produced a pilot tool that is capable of producing lids that match the weight of thermoforming – the preferred route for brand owners at present – but without the limitations on shape that come with that process. Line