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CAPS AND CLOSURES

We interview Kevin Heap, Packaging Expert at Sumitomo (SHI) Demag

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Caps & Closures

Packaging Gazette talk to **Kevin Heap** Packaging Expert, Sumitomo (SHI) Demag about current trends and challenges

What does the process of injection moulding for the creation of caps and closures entail?

Melted and mixed under pressure by a rotating screw until there is a homogeneous melt which is injected under pressure into mould.

In a nutshell - for the production of caps and closures - thermoplastic and thermosetting polymer granules are fed into a heated barrel where they are melted and mixed under pressure by a rotating screw until there is a homogeneous melt which is injected under pressure into a mould cavity where the shape is configured to the cavity and is replicated exactly. The mould is then cooled and opened ejecting the finished cap/closure. For caps and closures, multi-cavity moulds are used to allow the production of thousands of caps per minute.

How does injection moulding compare to other moulding techniques? What are the advantages of using injection moulding for the production of caps and closures?

Compression moulding has enjoyed a perceived 'top of the podium' position with respect

to productivity for a long time, particularly for certain types of beverage caps and closures. Compression moulding is a forming process in which extruded plastic melt is cropped and loaded into a single cavity the cap is formed into shape and ejected.

In recent years, injection moulding solutions have surpassed the capabilities of compressions moulding, particularly for single piece water enclosures. With advances in mould design, materials and high performance injection moulding machinery, such as the Sumitomo (SHI) Demag El-Exis SP 450 tonne fast cycling machine, the new schoettli 96 cavity mould enables high productivity of 150,000 parts/hour - a staggering 2.2 second cycle time for 96 caps which results in low unit costs, high efficiency and outstanding economic viability.

The injection moulding process is very flexible with the closure design, it allows the cap manufacturer to produce complex speciality closures which you cannot be produced with compression moulding. Manufacturers are often contracted to produce millions of caps and closures, so to be

cost effective, invest in high performance plant equipment is advisable. Packaging formats are constantly changing to be more in keeping with modern lifestyles such as sports caps, gabletop cartons, aseptic cartons and stand up pouches, it makes good economic sense to build a complete moulding system for each individual closure. Where a manufacturer is completing small batch runs with a large product portfolio, moulds can be designed for rapid changeover. Once a cap is moulded, zero post production operations are required due to moving core operated by the mould and injection moulding machine. From a sustainability point of view, bio plastics are also being developed to meet manufacturer's green credential requirements, plus a further advantage is that any scrap material from any type of plastic can be reground and reused, which means very little waste.

What trends do you foresee unfolding in the caps and closures sector?

According to a new study* by The Freedonia Group world demand for caps and closures is projected to rise by over 5% per year to \$46 billion in 2016, so the outlook for performance



Kevin Heap, Central Area Sales Manager at Sumitomo (SHI) Demag



injection moulding equipment suppliers looks optimistic. Over the last two years, Sumitomo (SHI) Demag UK, manufacturer and system integrator of injection moulding equipment, has seen substantial growth in the beverage market as manufacturers update packaging formats to make more consumer friendly caps and closures in-keeping with modern day lifestyles. These include sport style caps, which are generally more expensive than standard types but are favoured by consumers for their convenience and ease of use. This segment is expected to see the fastest gains among major plastic closure types. While the popularity of single-serving bottles will stimulate unit gains, using light-weight materials with less costly enclosures will be essential for survival.

Another growth area for Sumitomo (SHI) Demag is the pharmaceutical market. Suppliers of caps and closures need to get a grip on regulations and standards which include child-resistance, elderly-friendly and tamper evident packaging.

With material still being the largest cost element of a closure, thin walling and weight reduction has been the theme for the last few years and will continue. Production and process efficiency are keywords, with a greater demand from manufacturers for an integrated system approach. Polypropylene will remain the leading caps and closure resin with expectations that the material may be replaced with HDPE which has economic and sustainability advantages.

What challenges do you face?

The 'more for less' philosophy is highly evident in our industry. Sumitomo

(SHI) Demag are constantly striving to produce lightweight caps and closures which help to lower costs, increase sustainability and surpass speed/performance expectations. Demands to create smaller, lighter parts have made thin-wall moulding one of the most sought after capabilities for an injection moulder. From a machinery manufacturer point of view, thinner wall sections bring changes in processing requirements: higher

pressures and speeds, faster cooling times, and modifications to part-ejection and gating arrangements.

Our proven technology, in hybrid and full electric platforms, enables us to offer the right turnkey system matched to the customer's exact requirements – specifically we are able to calculate the total part price of a cap/closure taking into consideration the capital investment, for either a hybrid and full electric system, so that

the customer can understand their ROI options - ROI is a major influencer in the purchasing decision.

Sumitomo (SHI) Demag has found increasing pressures from manufacturers wanting not only shorter cycle times, higher productivity and lower costs per part, but more energy efficient machinery. The El-Exis SP is a hybrid system which uses a carefully crafted blend of drive technologies including a servo driven hydraulic clamp unit to achieve precise movements, a hydraulic accumulator delivering high injection rates, and an electric screw drive for parallel plasticising, all of which shave tenths of a second off the cycle time enabling manufacturers to profit from increased margins and lower energy bills. With energy prices continually rising, we can only foresee that to stay ahead, energy efficient machinery will remain at the top of the product design drawing board. ■

