

Ypsomed relies on ENGEL as system partner for platform strategy

Faster growth thanks to clear-cut standards

More efficiency and safety, greater flexibility and faster industrialisation – these were the main arguments which prompted Ypsomed to standardise its production processes in the course of further global expansion. Integrated system solutions by ENGEL play a key role in the medical technology company's new platform strategy.

The number of people suffering from diabetes grows globally by nine percent each year. For Ypsomed, a leading developer and manufacturer of injection and infusion systems for self-medication, this means increasing sales. The company, which is headquartered in Burgdorf, Switzerland, is consistently pursuing its worldwide course of expansion. Most recently, a completely new plant with 13,500 square metres of production space for injection moulding and assembly was built in Schwerin in Northern Germany. At its locations worldwide, Ypsomed produces pens, auto-injectors and pump systems for administering liquid drugs, such as insulin, for large, brand-name pharmaceutical companies.

New products and manufacturing processes are developed at the company's headquarters. This is also where the company's own mould making and technology centre are located, where new processes are trialled before they enter series production at the plants worldwide.

The biggest advantage is fast industrialisation

For a long time, the global injection moulding machinery consisted of machines of different types and brands. "This was no longer compatible with our expansion strategy", reports Frank Mengis, Chief Operating Officer (COO) of Ypsomed. This explains why, five years ago, a decision was taken to standardise. "The aim of the new platform strategy is to further improve efficiency, safety and quality while simplifying our processes."

Standardisation is becoming a trend in the medical technology industry, and not only for the big players", as Christoph Lhota, Vice President, Medical Business Unit with injection moulding machine manufacturer and system solution provider ENGEL, observes. "Ypsomed is a role model here. At a very early stage, we defined all the specifications in detail together, worked intensively on the performance specifications and then implemented them consistently".

To date, more than 100 all-electric ENGEL e-motion injection moulding machines have been supplied to Ypsomed locations worldwide on this basis. The clamping forces vary – 800, 1600 and 2800 kN – but otherwise the machines are identical. Future needs were considered when selecting the options. Not all machines make use of the entire feature set right from the outset. Instead, the aim was to avoid retrofitting and the requalification associated with this later on. In this way, the platform strategy saves a great deal of time and money during operations. "Every change that does not have to go through change management boosts efficiency," says Lhota.

"We can now order injection moulding machines virtually off the peg at all locations worldwide," says Mengis. "But the biggest advantage is fast industrialisation. The qualification plans are identical for all new machines. This means we can integrate new machines and new processes into series production far faster."

The all-electric e-motion high-performance machines help Ypsomed ensure high-precision, zero-defect production. An important prerequisite for competitive unit costs and trouble-free downstream processing of the injection moulded parts. A pen, for example, consists of between eleven and 15 parts – depending on the model – and they are assembled fully automatically.

Automation on a minimal footprint

The injection moulding machines started everything off. In the meantime, Ypsomed has also started to standardise the automation of injection moulding processes.

"We have had very good experience with ENGEL for the machines. We are a well-coordinated team," emphasises Mengis. "That's why we chose ENGEL as our partner for automation of injection moulding processes, too."

The e-motion injection moulding machines are now being equipped with ENGEL viper linear robots. And the new compact cell by ENGEL also plays a key role. When developing the compact cell, which was presented for the first time at K 2019, ENGEL also focused on standardisation. Thanks to its standardised design, the new automation cell makes it particularly easy to integrate a wide variety of automation components and other downstream process units. It encapsulates all the components while remaining significantly narrower than standard safety guarding.

"In terms of footprint, the compact cell is unbeatable", emphasises Marlon Trachsel, Process Manager Production Technology at Ypsomed in Switzerland. "We took a look at the new solution at the K and immediately saw the advantages it offers us."

Uniform control logic for even safer work

Like the machines, all the compact cells use an identical design to achieve maximum flexibility. To avoid having to change the auxiliaries during every mould set-up, the compact cells integrate all components needed for both free-falling parts and for soft depositing using viper robots. Free-falling parts such as needle holders, which are produced in the millions, are transferred directly into boxes by a belt conveyor and a three-way gate. The compact cell provides trays of two different sizes for the housing parts which are removed from the cavities by the viper robot. The boxes and trays are changed automatically.

Irrespective of the high degree of integration, the compact cell ensures that machine operators can quickly access the mould area at any time. When the compact cell is opened, the box and tray changers move to the side.

The process units for bulk material and soft depositing are arranged one above the other. This helps the compact cell to keep the automation extremely compact. "Where we have five production cells today, there will be six systems after the changeover to the standardised automation cells," reports Trachsel. Especially in the cleanroom, this significantly increases cost efficiency.

Another advantage of standardisation with ENGEL systems solutions is uniform control logic across the entire production cell. Robots and other automation units by ENGEL are fully integrated into the injection moulding machine's CC300 control unit. This allows the entire process to be set up and monitored using the machine display. Production staff do not need to

familiarise themselves with a different control philosophy for the automation. Given the trend towards ever greater complexity in production processes, this feature is becoming increasingly important. Simple operation reduces the risk of errors and makes it all the easier to produce consistently high quality.

Digitalisation drives trend towards servo-electric moulds

The compact cell was already demonstrated at the K show with a medical application. Housing parts for medical devices were manufactured on an e-motion injection moulding machine. The technological innovation in this application lies in splitting the injection moulding process into two components with the aim of achieving shorter cycle times. Since the wall thickness of the cylindrical devices cannot be reduced for stability reasons, the two-component process is the only available option for achieving shorter cooling and cycle times. In an 8-cavity mould using Vario Spinstack technology by mould makers Hack Formenbau, and featuring a vertical index shaft with four positions, the basic body is first moulded from polypropylene. The second position is used for cooling while another layer of polypropylene is injected at the third position. "Two thin layers cool down faster in total than one thick layer," explains Christoph Lhota. The parts are removed from the closed mould at the fourth position parallel to the injection moulding process, making an additional contribution to achieving a very short cycle time.

The two-component precision mould has a fully servo-electric drive in this application and uses a software programme newly developed by ENGEL. This ensures that the servo-electric movements – for example, the core-pulls – can be controlled in the same way as those of hydraulic systems. This means that the user themselves can program the servo-electric movements without the need for additional qualifications.

The software sees ENGEL paving the way for increased use of servo-electric moulds. Medical technology is the pioneering field for this trend. Reasons for the use of servo-electric moulds are the particularly high precision of the movements, the complete absence of oil and, increasingly, the digitalisation strategy. "Servo-electric motors offer more possibilities for sensitive monitoring of quality-critical process parameters to enable faults, downtimes and pending maintenance work to be detected at an early stage", as Gunnar Hack, Managing Partner of Hack Formenbau, makes clear. At the K show, the Moldlife Sense System by

Hack Formenbau demonstrated the huge potential that lies in digitalisation mould technology. Just like intelligent assistance systems, such as iQ weight control or iQ flow control by ENGEL, provide assistance for injection moulding machines, it will also be possible in future to counteract critical conditions in the mould before rejects are produced or damage due to wear occurs.

Leveraging the opportunities offered by big data and artificial intelligence to greater effect

Smart assistance and artificial intelligence are increasingly making inroads into injection moulding production. While the system worlds of the injection moulding machine and the mould have been separate thus far, convergence of these data worlds will be possible in the future.

This is also a major topic at Ypsomed. Standardisation has already been anchored in the company's digitalisation strategy. In order to leverage the opportunities offered by big data and artificial intelligence to greater effect, Ypsomed is working on increasingly linking the IT systems of the individual departments in the company. "The volume of data generated is increasing, but use of the data is not as yet", as Uwe Herbert, Ypsomed's IT Manager, made clear at the ENGEL med.con medical technology conference in February. "If we leverage this potential in a better way, we can further improve product quality while at the same time boosting the efficiency of the production processes."



Ypsomed is expanding. Most recently, a new production plant was built in Schwerin and equipped with all-electric ENGEL e-motion injection moulding machines. (Picture: Ypsomed)



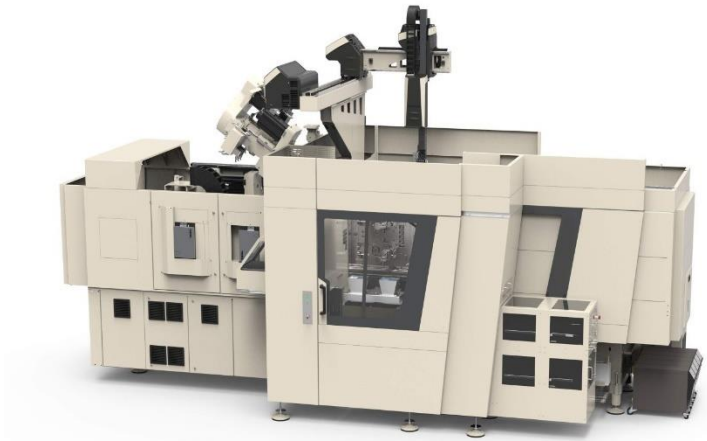
With its high degree of automation, the production of injection pens places high demands on the precision of the injection moulding process. (Picture: Ypsomed)



"Thanks to standardisation we can integrate new machines and new processes into series production far faster." – Frank Mengis, COO Ypsomed. (Picture: Ypsomed)



"Where we have five production cells today, there will be six systems after the changeover to the compact cells." – Marlon Trachsel, Process Manager Production Technology at Ypsomed. (Picture: Ypsomed)



Launched at K 2019: ENGEL compact cell. Houses all the automation components and is still significantly narrower than standard safety guarding. (Image: ENGEL)



Servo-electric moulds are in greater demand, especially in medical technology. Digitalisation of the production processes is one driver of this trend. (Image: ENGEL)