

Digitalization Is the Key

How the Stiff Requirements for Sustainable Injection Molding Can Be Mastered

Those in charge at Engel are convinced: Digitalization is not just a technical issue, it is also a mental hurdle, and sustainability is a lot more than hype. At the live e-symposium 2021 from June 22nd to 24th, 2021, the supplier of injection molding systems bridged the gap between the two megatrends of our time. And showed how the one can help jump-start the other.



What is needed is the courage to be open for digital solutions: Dr. Stefan Engleder

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Digitalization helps us to leverage the full potential of the injection molding machine, and to make production more efficient by doing so”, as Engel Group CEO, Dr. Stefan Engleder, said in his opening keynote at their three-day in-house show that was flanked by a specialist conference.

A current study undertaken by business consultant Accenture in behalf of bitkom – the Bundesverband Informationswirtschaft, Telekommunikation und neue Medien, e. V. – prognosticates that the use of digitalization could cut current CO₂ emissions from German operations by as much as 58%. Quite a high share of that, 23%, is contributed by production plant. “If we genuinely make use of digitalization, the CO₂ reduction targets set by politicians will suddenly no longer seem impossible,” said Engleder.

It is in the industry’s own interest to put this topic on its agenda, said the CEO, since the consequences could, for example, affect company refinancing. Engleder continued, “There is a wide spectrum of proven digital solutions available to us. Now it is up to injection molding producers to put these decarbonization enablers to use.” Engel envisions the entire product life cycle: from concept to design and production all the way to recycling – the symposium made that clear, too.

Linking Simulation with Production

The example of a three-part vehicle door module visualized the process by which part design can pave the way to resource-saving manufacturing and subsequent recycling. Using sim link software, Engel connects simulation with produc-

tion. The settings determined in the simulation are transferred to the injection molding machine control. This significantly accelerates the patterning of the mold as well as further optimization of the processing parameters. Conversely, processing parameters and measurement results can be easily transferred from machine to simulation. “The mold filling study already gives us the correct setting parameters for the machine without having to intervene manually,” as Dr. Gerhard Dimmler, Vice President of Research & Development at Engel, said in his talk.

Machine connectivity as well as constant data flow and exchange along the entire value chain are prerequisites for reducing CO₂ emissions in an energy efficient injection molding plant that produces few rejects, on the one hand, and, on the other hand, as Dimmler pointed out, for establishing pure, high-quality recycling. Meanwhile, 30% of all newly shipped Engel machine are online, and several hundred “edge devices” on the market. Engel has made good here on its promise to develop a kind of FritzBox for injection molding machines. As it turns out, other machine manufacturers have also adopted the edge device as a benchmark.

However, Dimmler also found words of self-criticism. Addressing the connected customers directly, he said: “Seen in retrospect, we incorrectly assumed that we should not get involved in your processing issues. You have set us straight on that.” In fact, the “iQ process observer”, a live data-based assistance system introduced at the K2019, has met with considerable interest. On the other hand, we have been disillusioned regarding the platform econ-



30 percent of all recently shipped Engel machines are already online: Dr. Gerhard Dimmler © Engel; screenshot: Hanser

omy we had initially prioritized. This will remain so until “we can merge horizontal and vertical platforms for you as a customer.”

The Goal: Re- and Upcycling instead of Downcycling

A vertical platform means a digitally imaged system or production cell within a single link of the value chain. Such a “digital twin” describes the system and its behavior based on data, thus laying the foundation for optimization. One example of an application is the “Engel e-connect.24” digital service solution which, when docked to the e-connect customer portal, includes remote maintenance and online support – issues that have come more into focus for manufacturing companies, due not in

the least to the Covid 19 pandemic. Many companies are now giving thought to how they can secure their productivity and ability to deliver in the event of future crises.

According to Gerhard Dimmler, vertical platforms have become established, but horizontal ones are just getting started. By shifting to horizontal platforms, as Engel and other companies in the plastics industry are vigorously pursuing, the entire value chain comes into focus. Applications and companies network themselves along this chain in order to exchange information and data. This benefits the circular economy as well. “It is our goal to replace the dominant downsizing of materials with re- or even upcycling,” says Stefan Engleder. This can work only if data is shared throughout the lifetime of the product and, thus, all along the value chain.

A digital watermark is such an example. Applied invisibly to packaging, it could enable more effective sorting of plastics wastes, in short: pure, high-quality recycling. The material, the manufacturer of the packaging, and the processing method then are identified by the watermark. These data are open to all participants and users of the horizontal platform. In this way, the recycling process as well as downstream recyclate processing can be controlled and attuned to each other in the sense of maximal resource efficiency.

In the virtual exhibition for experts, the several thousand participants in the symposium could discover solutions aimed at simplifying and intensifying recyclate use: in addition to Engel’s iQ Assistance Systems for maintaining process stability, procedural approaches,

such as a new co-injection process that enables high recyclate content (over 30%) to be completely enclosed in new material, or a new, twin-step process with which plastics wastes can be processed by injection molding immediately after being ground into flakes. In the first instance, the switchover from recyclate to new material takes place near the cavity, directly at the injection point, with the aid of a needle valve system. In the second instance, a melt filter and a degassing unit are installed between the plasticizing screw and the injection screw (or ram unit).

An Appeal to Rethink

In closing, Engleder appealed to the branch to be open for digital solutions. “To do so, we need to change our mindsets. Find the courage to apply our inject 4.0 solutions and give connectivity a chance!” Only if by working together can we make the plastics industry sustainable. ■

Dr. Clemens Doriat, editor

Symposium at Home

Those who could not participate live in Engel’s e-symposium 2021 can still register and visit the machine showroom, undertake a virtual plant tour with an Engel contact person, and view all the keynotes and business talks (discussion groups on the topics packaging, medical, automotive, and technical molding). The entire program is available all year long and around the clock to customers, partners, and anyone interested.

» www.engelglobal.com/e-symposium

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To make high recyclate content visible, a transparent skin made from new material is combined with a black core

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