ADVANCING EUROPE'S MACHINERY INDUSTRY

Press release
Plastics and Rubber Machinery

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"The twin-screw extruder enables high recyclate qualities"

Interview on the road to K 2025 with Peter von Hoffmann, General Manager Business Unit Compounding Machines, and Frank Lechner, General Manager Process Technology and R&D at Coperion

How can resource conservation be improved through greater efficiency in compounding?
Peter von Hoffmann: Efficiency is the central goal at Coperion. All our technologies for compounding and recycling plastics are designed with this goal in mind. One example is our ZSK twin-screw extruder, which we currently offer in the ZSK Mc18 generation. It achieves extremely high throughputs, with relatively low energy consumption and a high degree of automation. Numerous additional units such as side feeding, degassing, and condition monitoring increase its performance, enabling our valuable resources to be used in a highly targeted manner, and maximum output to be achieved with high efficiency.

How do you achieve this increase in efficiency?
Von Hoffmann: Let's stick with the example of the ZSK extruder: in order to achieve this high power density, all process parameters of the extruder must be correctly determined. The mechanical variables that transfer the high torque to the twin screw need to be specified. In addition, there are process engineering factors that ensure consistently high product quality during compounding. This is the basis: an interplay of "old technology", process engineering and automation. This is where our wealth of experience in the construction of twin-screw extruders really works in our favour.

What role does digitalisation play?
Von Hoffmann: Once the foundation is in place, digitalisation comes into play. With our C-BEYOND digital platform, operators can view the operating data of their plant at any time. This data is available in the form of informative analyses in real time. Important information on key performance indicators (KPIs) for a production line, such as availability, production volume and product quality, is clearly visible at a glance. With C-BEYOND, the production process can be documented in detail, and the scheduling of maintenance work optimised. C-BEYOND also identifies the energy consumption and CO2 emissions per kilogram of compound produced. With the Overall Equipment Effectiveness Tool, or OEE Tool for short, customers can view the efficiency of their plant and react quickly to any deviations.

How are digital products of that nature regarded by customers?
Von Hoffmann: We initially introduced C-BEYOND to a number of trial customers. Now, increasing numbers of customers want to retrofit their systems with it, in order to benefit from its numerous features. We offer digital life cycle management for example, which provides customers with a proactive maintenance plan that shows when maintenance measures are due for a unit, such as changing the gear oil. We use a condition monitoring system to record the actual load on an extruder. The customer is notified as soon as irregularities occur during an extruder operation and can plan service measures with sufficient lead time. The power consumption of the plant and each unit is also displayed digitally via C-BEYOND. Therefore, anomalies can be identified immediately and countermeasures taken. C-BEYOND can also be viewed on a smartphone via an app. This means that even the company boss can view all the live data from the machines from anywhere.

Is there a trend among your customers towards purchasing complete systems?
Von Hoffmann: Yes, there is a trend in that direction. At Coperion, we offer everything from individual equipment, such as a feeding unit, a rotary valve, or an extruder, to complete systems. It very much depends on the specific application of the system, and where it is to be installed. We have customers who buy individual units from us. If the systems are intended for other countries, they often want to play it safe and will place an order with us for a complete system. They then benefit from the added value of having a partner who can supply them with everything they need. We have the specialist knowledge for the individual machines, as well as the expertise for complete systems.

What role does the twin-screw extruder play in recycling?
Lechner: It is key to producing high-quality recycled materials. In the early days of recycling, single-screw extruders were widely used. However, these have limited capabilities and reach those limits when quality requirements increase. This is where the twin-screw extruder is unbeatable, as it melts the waste plastic very energy-efficiently, and produces a very homogeneous, well-degassed melt that is extremely gentle on the product. The result is a very

high-quality compound. A second argument in favour of the twin screw is the throughput. A single screw is expedient for lower throughputs, but with material flows becoming larger, and applications more diverse, the twin screw is unbeatable.

Has the trend towards recycling slowed down?
Lechner: Germany produces around 5.7 million tonnes of plastic waste every year, of which around 35 percent is recycled. There is definitely room for improvement here. However, the demand for recycled materials is currently higher than the availability of raw materials. This is slowing down recycling somewhat. In addition, less plastic is being produced in this country overall because companies have relocated part of their production abroad due to high energy prices. The fact that the oil price is currently quite low is not helpful either. This makes recycled goods significantly more expensive than new goods. Nevertheless, we see a strong drive towards recycling, not only in Germany, but all over the world; that is why we believe that the trend towards recycling is continuing unabatedly.

Many plastics are considered non-recyclable. Will that change?
Lechner: It's true that we can't recycle everything yet, but there is a lot of research and development taking place. In the future, it will be possible to recycle plastics that are currently considered non-recyclable in an economically viable way. A lot of things are already possible today that weren't possible a few years ago. We are now very good at recycling technical plastics, but also a range of mixed plastics. For example, multi-layer film can already be recycled mechanically in such a way that the result can be reused as a layer in a multi-layer film. With our new ZSK FilCo filtration compounder, we can produce recycled plastic with significantly higher product quality than was previously possible using the common two-stage recycling process. This makes many recompounds attractive for a much wider range of applications.

Many companies in Germany are struggling with the problem of a shortage of skilled workers. Is this also your experience at Coperion?
Von Hoffmann: The shortage of skilled workers is a major problem for all of us. Due to demographic developments, it is not likely to ease significantly in the foreseeable future. This is one of the reasons why our industry develops machines that are highly automated and therefore require fewer operators. Nevertheless, we will always need qualified personnel. We are working very hard to ensure that we recruit them, and are proud that we are currently training 76 apprentices and dual students at our German sites. We want to attract people to our company at an early stage and retain them.

Video statement by Peter von Hoffmann and Frank Lechner:
https://www.youtube.com/watch?v=dEyf9uzQY2k

Photos Peter von Hoffmann + Frank Lechner, image source: Coperion GmbH

Do you have any questions? Ina Hoch, VDMA Plastics and Rubber Machinery, will be happy to answer them: Phone +49 69 6603 1844, ina.hoch@vdma.eu

Industry interviews on the road to K

Plastics have become an integral part of our world, and are indispensable when tackling the challenges of the future. The plastics industry develops solutions that enable a growing global population to live in safety and prosperity. This important role as an enabler is expressed in the motto of K 2025: The Power of Plastics! Green – Smart – Responsible. Green, because plastics help combat climate change and conserve resources. Smart, because digitalisation helps increase efficiency. Responsible because people are at the centre of everything we do.

To get in the mood for the industry gathering in October 2025, the VDMA is giving representatives of the plastics machinery industry and all other stakeholders in the sector a chance to have their say through a series of interviews.

VDMA Plastics and Rubber Machinery

More than 200 companies are members of the trade association, covering over 90 percent of the industry's production in Germany. Ten percent of our member companies come from Austria, Switzerland and France. The German member companies account for a turnover of 7 billion euros in core machine manufacturing, and 10 billion euros including peripheral technology. One in four plastic machines manufactured worldwide comes from Germany in terms of value; the export rate is 70 percent. The chairman of the trade association is Ulrich Reifenhäuser, Managing Partner of Reifenhäuser GmbH & Co KG.

The VDMA represents 3,600 German and European companies in the mechanical and plant engineering sector. The industry stands for innovation, export orientation and medium-sized businesses. The companies employ a total of around 3 million people in the EU-27, more than 1.2 million of them in Germany alone. This makes mechanical and plant engineering the largest employer among the capital goods industries, both in the EU-27 and in Germany. It accounts for an estimated turnover of around 870 billion euros in the European Union. Around 80 percent of the machinery sold in the EU originates from a manufacturing plant in the internal market.