

Better Performance and Optimized Workflows for TPE Production

Key factors in upgrading the Maag underwater strand pelletizing system at HEXPOL TPE's site in Germany were the possibility of incorporating higher amounts of recycled content and making workflows much simpler. The resulting improvements will boost the corporate sustainability strategy and improve potential in production. "It's a must-have," comments process engineering manager Dominik Fehn.

HEXPOL TPE GmbH, based in Lichtenfels, Germany, specializes in the production of thermoplastic polymers (TPEs): rubber, thermoplastics, and elastomers. Certified to ISO 9001, ISO 14001 and ISO 50001, the company's product portfolio includes thermoplastic elastomers as well as soft PVCs, TPE compounds with TPS, TPO, TPV and TPU, additives, and masterbatches.

Looking to the future, HEXPOL TPE GmbH managing director Jochen Schneider says: "More recycled material and bio-based compounds will play an increasingly important role for us." He and his colleagues are also keen to see a general improvement in performance in the plastics industry. So managing director Schneider, process engineering manager Dominik Fehn and operations manager Markus Schirmacher set out to find solutions to optimize the productivity of their existing lines. They focused on the challenge of producing high-performance, high-quality compounds meeting the specific needs of customers in demanding sectors.

An innovative pelletizing system to meet all requirements

HEXPOL TPE's search for high-performance solutions to meet its requirements didn't take long. It has had close links with Maag for a number of years. The vendor of pelletizing systems for polymer and compound production is a long-established supplier to the polymer manufacturer. Maag pelletizers have been running successfully on several lines at the plant in Lichtenfels for some time. So the cooperation between the two part-



ners is built on deep-rooted trust and experience. HEXPOL TPE uses Maag dry-cut strand pelletizing systems for numerous pellets in its compounding operations, as well as its traditional-design underwater pelletizers.

And the long-standing customer is always interested in new developments that will improve performance, make production more flexible, and so equip it to meet the growing demands of the market. So when Maag launched PEARLO, HEXPOL TPE and its engineering expert were keen to find out more. The underwater pelletizing system is designed to process a wide range of polymers and thermoplastics, promising profitable production with throughputs of up to 42,000 kilograms per hour.

Underwater pelletizing with PEARLO

The key element of the PEARLO system is the cutting chamber. The knife configuration is based on a turbine; the water inflow and outflow are tangential. This means the product is advancing as it rotates. This cutting chamber geometry developed by Maag enables

HEXPOL TPE GmbH based in Lichtenfels, Germany, specializes in the production of thermoplastic polymers (TPEs) (All pictures, source: HEXPOL TPE GmbH)

extruded plastics to be cooled and cut so that much higher outputs are possible with the same water quantities and the same input and output dimensions. The smart knife configuration also means that more knives operate simultaneously. The cut rate is also higher, so increasing throughput. The specific output limit has been greatly increased as a result.

"We had initial discussions about the new system at the K-Show back in 2016 when PEARLO was first launched, after which trials were run at Maag's technical center in Xanten," recalls process engineering manager Dominik Fehn. His colleagues were also quickly convinced of the machine's capabilities, as operations manager Markus Schirmacher confirms: "We saw the benefits of the system right away, so we decided to buy a PEARLO in 2017."

The system's performance in practice proved them correct: "We've



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been able to significantly increase the output of many of our products – actually even more than I would have expected," Fehn reports. The outputs of various polymers illustrate the better-than-expected results: "It's always highly product-dependent, of course, but we were nevertheless able to achieve significantly better performance with many compounds," Schirmacher adds.

The PEARLO pelletizer improved HEXPOL TPE's pelletizing productivity right from the start, to such an extent that other components, such as the extruder and screw configuration, also had to be adapted. To improve the efficiency of the overall system, HEXPOL TPE decided to purchase a new extruder with higher motor power. Extending by two additional cylinder zones also provides greater flexibility for compounds requiring a longer process length.

Machine configuration delivers clear benefits for products and for staff

The wide-ranging advantages for HEXPOL TPE's products were only one aspect in favor of the Maag PEARLO pelletizing system. The HEXPOL TPE management is always keen to provide the best possible support to its workforce. Process engineering manager Dominik Fehn knows the everyday challenges in production well: "All the setup and cleaning phases, and each product cycle, are always hard work for our production colleagues," he acknowledges.

Cleaning is often necessary, for example, before producing compounds

that come into contact with food. The entire system has to be dismantled for the purpose. The process includes dismantling each component, removing the screw elements, and cleaning and sandblasting inside blast cabinets. "This thorough cleaning is very time-consuming," Fehn explains. "The whole process takes about 15 hours."

Given those challenges, he was persuaded not only by the PEARLO underwater pelletizer's process benefits but also by the option to mount the machine suspended from above. In this top-mounted configuration, the floor under all the components remains freely accessible because the machine is suspended from an overhead rail system. Quick-adaptor systems involve just one bolt, whereas twelve previously had to be detached and refitted. "That saves a lot of time: What used to take an hour now only takes five minutes," Fehn reports. Also, much less force is required when a machine weighing 400 kilograms can be pulled along suspended from the ceiling rather than being moved on rollers.

Maag offers two-axis machines that can be moved in two directions. This means production staff can clean and set up faster, and components do not have to be readjusted. "That's a major and crucial reduction in workload," Fehn states. In addition, the faster changeover times reduce energy consumption.

Impressive results lead to new growth projects

HEXPOL TPE has been able to surpass its limits and improve output with the newly installed Maag PEARLO underwater pelletizer. In fact, the company's production management team has been so impressed with the system that it has purchased another one. The



HEXPOL TPE process engineering manager Dominik Fehn is convinced by the Maag solution

Maag pelletizing systems will enable HEXPOL TPE to improve its performance and boost its coverage of market demand, while at the same time tapping into new markets with growth potential. "Our production portfolio is broad-based in order to realize as many development ideas as possible," Dominik Fehn explains. He is convinced: "The new Maag PEARLO will give us the additional push we need."

Seizing future opportunities

HEXPOL TPE sees both the challenges and the opportunities in the future of polymer processing. Managing Director Jochen Schneider and his colleagues have a vision of creating a Smart Factory in the future – aiming, for example, to reduce media interfaces by transferring process parameters directly and seamlessly from the ERP to the MES. Dominik Fehn is also looking at introducing Machine Learning, a component element of AI (Artificial Intelligence): "The extrusion line will be able to detect when there are product-specific deviations based on years of process analysis in polymer processing. The resulting algorithm will then automatically correct the necessary process parameters. The increasing digitalization and automation will further reduce employees' workload, and boost our production potential."

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