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Economy and ecology combined

KB Kunststofftechnik boosts its efficiency with production cells from WITTMANN

More efficiency and sustainability – this is the target KB Kunststofftechnik has set itself for investing in new injection molding technology. Its most recent project – three automated production cells from WITTMANN to produce highly complex technical components – is a prime example.

“Efficiency and reproducibility were the decisive criteria in making our choice”, reports Iris Langenberg, CSR Manager at KB Kunststofftechnik in Gummersbach, Germany, during our visit. We are standing in front of three brand-new production cells from WITTMANN with precisely these attributes to strengthen the contract manufacturer’s competitiveness.

At the heart of each of the three units are servo-hydraulic SmartPower injection molding machines, two with 38 tons and one with 60 tons clamping force. Moreover, two of the machines are equipped with the new WX90 sprue removal system fitted with rotary servo axis. The third cell operates with a Primus 16 pick-and-place robot – here in telescopic design, as the production hall offers only limited space for upward movements.

High-precision machine movements for premium-quality parts

KB Kunststofftechnik supplies a wide range of different components to numerous industries. The customer base for its products includes door and window manufacturers, as well as laboratory and dental technology, mechanical engineering and automotive industries.

Iris Langenberg is holding a particularly complex component in her hands. To be precise, a complete assembly consisting of 68 individual components. With few exceptions – such as circuit boards and switching elements – these are all thermoplastic parts, which are injection-molded in Gummersbach and subsequently assembled

manually, together with the electronic components supplied by the customer. As a central part of winch drives in crane systems, this assembly is an important safety feature. These devices known as geared limit switches control the positioning of the crane hook. Depending on the type and size of the crane, the crane hook must be able to carry loads of up to 120 tons reliably. Therefore, every geared limit switch is examined on a test stand for correct functioning and then provided with a code via which the test documentation and all subsequent servicing activities can be traced.

Accordingly, the demands on injection molding processes for the individual components of the assembly are particularly stringent. “Drive systems only function if the cogwheels are kept strictly within tolerance limits”, says Langenberg. Multi-stage planetary gears, small axes and mounting elements for circuit boards and switches are molded mostly from two materials – ASA and POM.

Inside the SmartPower machines, the main elements providing high process stability and reproducibility for even extremely delicate part geometries are high-precision injection units and a combination of fast-response servo-hydraulic motors with high-performance constant displacement pumps. Consequently, there is no more production scrap.

The machines’ “Drive-on-Demand-2.0” technology also minimizes their energy requirements. During cooling and handling phases, the motor is shut off and consumes no energy. “Depending on the application, Drive-on-Demand 2.0 reduces energy consumption by up to 35 per cent compared to machines with modern variable displacement pump systems”, explains Daniel Müller, Regional Sales Manager at WITTMANN BATTENFELD in Germany.

A further contribution to the high level of energy efficiency is made by the kinetic energy recovery system, abbreviated KERS, patented by WITTMANN. It transforms the deceleration energy of the moving mold platen into electric energy and transfers it to other consumers – for example the barrel heater.

Plastic version tougher than hybrid part

The KB Kunststofftechnik team members are particularly proud of their geared limit switches, since before the crane manufacturer placed the order in Gummersbach, this assembly was a hybrid object made of plastic and metal. “Jointly with our customer, we developed the thermoplastic variant further in order to exploit the advantages of the plastic material more fully”, reports Langenberg. “This proved a major

success, since the parts' unit costs were reduced and the drive systems now reach a longer service life. "

For some other customers, too, KB Kunststofftechnik functions not only as a contract injection-molding business, but also as a co-designer of the products. "These are often companies thoroughly familiar with metalworking, knowing that we have a particularly thorough in-depth plastics processing expertise combined with extensive experience. Our strength is to recommend the most suitable materials for a given application and to design the part to suit these materials", Langenberg continues. On its own premises, KB Kunststofftechnik carries out simulations, strength analyses and FMEA, designs and produces the molds, makes prototypes and subjects these to endurance tests.

Servo-driven sprue removal for more flexibility

One special feature of the new WITTMANN production cells only becomes obvious when taking a closer look. The two WX90 sprue removal systems bear the serial numbers 0001 und 0002. WITTMANN first presented this novelty at the Fakuma trade fair in October 2023. For KB Kunststofftechnik, this innovation was precisely what they had been waiting for. "We deliberately chose the servo-controlled sprue removal device, because it features very smooth, precise movements and yet responds faster than a pneumatic sprue picker," says Daniel Kaufmann, responsible for initial sampling and maintenance work at KB Kunststofftechnik. "With its fluid movements, this parts removal device is also suitable for simple parts handling tasks."

A great additional advantage is its control system. Similar to linear robots from WITTMANN, WX90 sprue removal systems also come with an R9 control system. Consequently, the data from the sprue removal process are fully integrated into the production cell. This means that the injection molding machine and the robot have an ultra-fast data exchange system at their disposal to co-ordinate their movements with optimal efficiency. What is more, with the import of the mold data set, not only the parameters for the machine are set automatically, but also the process sequence of the sprue removal device. This accelerates the set-up process.

Minimizing changeover times

"We produce just in time and have many tool changes", Kaufmann explains, which is why set-up efficiency plays an important part. Eight changeovers per day are normal practice, sometimes there are even significantly more. Added to this are frequent bar-

rel changes. Thanks to the new B8X generation of control systems, the SmartPower injection molding machines still reach very high uptimes. “The injection unit is coded via a sum plug, so that the machine’s control system knows immediately which screw model it is working with”, explains Daniel Müller. “This enables us to plug and produce. The maximum time needed for a barrel change is 20 minutes.” With the introduction of the B8X control system, WITTMANN has included the sum plug in the standard equipment package of the SmartPower series.

“The WITTMANN machines offer many practical features especially for machine setters and re-toolers to make processes simpler and more efficient”, Daniel Kaufmann emphasizes. “People at WITTMANN always have an open ear for us users, and we notice that they really listen to our feedback”.

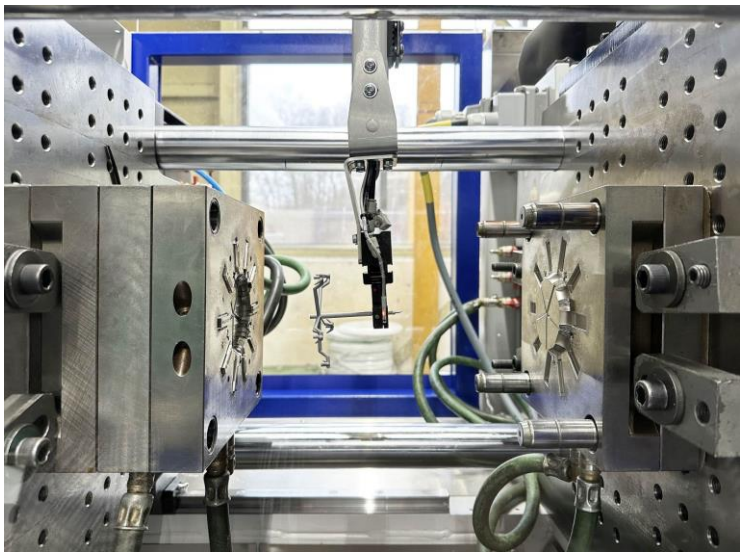
“We always seek ways to analyze and evaluate processes”, Iris Langenberg adds. Transparency is the key to continuously optimizing the processes in the interest of higher and higher overall efficiency. Here, the main focus lies on energy demand and material consumption, which both make up a large proportion of the unit costs. “Whenever we accept an order, we must always know where the real cost levers can be found”, says Langenberg. “After all, we want to continue our competitive production in Germany in future as well.”

Saving resources, however, not only has a noticeable effect on unit costs. Just as important is the fact that production efficiency also supports the sustainability targets which KB Kunststofftechnik has set itself. The newly installed photovoltaic system on the factory roof supplies about 13 per cent of its total energy consumption. “This is already a step in the direction of CO_2 neutrality”, says Langenberg.

In all actions taken, the company manager makes a special point of combining economy with ecology. “We have already pursued ecology for a long time, because we have always pursued economy”, Langenberg emphasizes. “With our investments as well as technical and organizational measures we have, for example, reduced our reject rate. Every kilogram of raw material not processed saves energy and machine service life. We can use the time saved in this way to produce something else and thus generate additional turnover, and simultaneously reduce our product-specific CO_2 footprint. “

The Production Manager Christian Cassierer appreciates the many practical features of the WITTMANN machines, which simplify processes and make them more efficient.

The new WX90 sprue removal systems with rotary servo axes are equipped with an R9 control system and thus completely integrated in the production cell.



Thanks to its servo drives, the WX90 offers highly precise, fluid movements.

The new SmartPower injection molding machines increase the energy efficiency of the injection molding production.

As integrated complete solutions, the production cells have only a small footprint.

Photos: WITTMANN