

USER REPORT

November 2023

Energy consumption cut by more than 30 per cent

All-electric EcoPower Xpress produces sophisticated thin-walled packaging at Heinrich Axmann

A new packaging concept in thin-wall technology has brought about the energy revolution in injection molding for Heinrich Axmann GmbH & Co. KG in Cologne, Germany. For this project, the company invested for the first time in an all-electric injection molding machine. Compared to hybrid machine models, the cut in energy consumption is more than 30 per cent. The injection molding partner WITTMANN delivered the EcoPower Xpress machine as a fully integrated, all-inclusive solution equipped with a Sonic high-speed robot.

Almost everyone has experienced this: when opening the package, the ready-made meal looks delicious. The meat and side dishes are attractively arranged. But now comes the tricky part: transferring the food onto a plate. Many consumers use a spoon, others even turn the bowl upside down to get the contents out, which definitely spoils their looks and thus all too often the appetite as well. Heiner Axmann, CEO of Heinrich Axmann GmbH & Co. KG, has come up with a brilliant idea to solve this dilemma. He developed a plastic bowl which can be opened with the help of a tear-open mechanism along the bottom of the package. The edge of the package then folds back upwards, the meal slides out smoothly onto the plate and looks just as appetizing as it did when freshly prepared and filled into the packaging bowl. "Our customer had institutions such as hospitals, retirement homes or child day care centers in view, which operate without kitchens of their own", Heiner Axmann reports during our visit to the corporate headquarters in the southern Cologne suburb of Rodenkirchen. "Everyone should be able to enjoy their meals. What is more, the new concept offers highest possible standards of hygiene. The nurse dishing out the meals never comes into contact with the food herself."

Creative from experience

Established in 1932 and family-owned ever since, Heinrich Axmann specializes in developing and manufacturing packaging solutions made of plastic. Bowls and small

pots for both liquid and solid food items, such as gourmet salads or coffee creamers, constitute a major part of its production volume. Again and again, new creative solutions emerge from its extensive wealth of experience. So, the impulse for developing the new ready-to-eat food bowl goes back to the lid for a delicatessen package already designed in 1979. The original drawing board design is still kept in a cabinet at Heiner Axmann's office today.

With this latest new development, the company has landed a real coup. "Our customer is still at the start-up stage, but already has the prospect of a major order from the USA. The first bowls in the new packaging design will be used at a New York hospital." In this case, the customer is a major catering company, for which a large quantity of bowls has already been produced to FDA standard in Cologne.

Delivery of the mold for series production is on the way. The injection molding cell for this purpose is already there. Especially for this new product, Heiner Axmann has invested in an EcoPower Xpress 300 all-electric injection molding machine with 300 tons clamping force and a Sonic high-speed robot. The injection molding partner WITTMANN has supplied the production cell as a fully integrated, complete solution.

Highest injection performance for strongly varying wall thicknesses

With this package for instant food, Axmann also opens up a new chapter in injection molding technology. The EcoPower Xpress is the first all-electric injection molding machine in its machine pool. "For a long time, it has not been possible to manufacture thin-walled packaging articles by high-speed injection molding on an all-electric injection molding machine", Heiner Axmann explains. "The EcoPower Xpress, however, is fully up to the challenge." The demands on the injection performance are particularly stringent.

For tearing open the package, the bowl comes with two flaps on one of its long sides – two, because the designers thought of left-handers as well when developing the part. Starting from these flaps, two fine, extremely thin-walled lines, about 5 millimeters apart, run along the bottom of the package. Predetermined breaking points form a kind of tear strip.

The wall thickness at these breaking points is no more than 0.05 millimeters. This is only a tenth of the wall thickness at the bottom and at the edge. Nevertheless, the bowl, consisting of a PP copolymer, must remain stable and airtight while being filled with hot food. 120 °C is the required tolerance. Injection takes place centrally at the bottom of the package. "Our greatest challenge is that during injection the melt needs to pass twice through these extremely thin areas in order to fill the cavity completely to the very edges", Andreas Brüggemann, the company's Production Manager, explains. "For this purpose, we need a particularly high injection speed with extremely short filling times. "

“The EcoPower Xpress is predestined for this type of application”, says Andreas Hollweg, Sales Manager for WITTMANN injection molding technology in Germany. “The injection units of this machine series are laid out for the highly dynamic injection speeds required in this case.” A further advantage with a very positive effect especially in the production of food packaging is the encapsulated toggle lever provided as standard, which ensures an extremely clean production process.

Good parts around the clock

Currently, the new high-speed production cell is fully utilized with a mold for producing crystal clear bowls. With their facet design, these plastic bowls are indistinguishable from glass bowls at first sight. They can be found on the refrigerated shelves of supermarkets filled with barbecue salads of the Merl brand. Heinrich Axmann has been producing these packages for many years for FMR Frische Manufaktur Rheinland GmbH & Co. KG.

“These salad bowls make very similar demands on thin-wall injection molding to those of the newly developed ready-to-eat food bowls”, Brüggemann points out to us. “On this product we are testing how far we can go with the new EcoPower Xpress.” The crystal clear bowls also come with only 0.5 mm wall thickness and a sophisticated design. They are produced in a two-cavity mold with 5.7 seconds cycle time. The filling time for the total shot weight of 44 grams is less than 0.1 second.

At the time of our visit to Rodenkirchen, the fourth week of continuous operation has just begun. “The machine runs around the clock with maximum performance and consistently high parts quality”, Brüggemann reports. “Ultimately, the machine’s reproducibility is the decisive argument in favor of its use for injection molding food packaging products.”

Reliable robot movements

The target set for the new tear-open bowls is a cycle time below 5 seconds. The total shot weight will be 70 grams, and here, too, the maximum filling time is expected to be 0.1 second. The main factors determining the cycle time are cooling time and parts removal. This is why the EcoPower Xpress has been equipped with the Sonic robot. WITTMANN presented this high-speed robot model specially developed for high-speed applications in the packaging industry for the first time at the K 2019. “Its strength is its great reliability in extremely fast movements”, Jörg Schröer, Regional Sales Manager of WITTMANN, explains. “This is precisely what shortens the removal time.”

WITTMANN robots have enjoyed the highest level of trust at Axmann for decades. The company's machinery includes more than 30 injection molding machines of different brands. All of these are equipped with linear robots from WITTMANN.

With the new complete production cell for making the thin-walled bowls, the company has purchased for the first time a fully integrated solution from a single source. "For us, this had the great benefit of getting the entire equipment delivered in full compliance with the CE standard", Heiner Axmann reports. "This has saved us a lot of time and money." A further advantage is the easier operation of the production cell, where the machine and the robot can be operated jointly from the central monitor of the machine's control system.

DC technology in view

"Thin, thinner, thinnest", is Andreas Brüggemann's answer to the question about current manufacturing trends. The requirements for thin-walled products are becoming more and more stringent, in particular for reasons of material efficiency.

The sustainability targets were also the factor that tipped the balance in favor of acquiring an injection molding machine with an all-electric drive. "Energy efficiency is now the most important criterion whenever we invest in new machines and technologies", says Heiner Axmann. "Especially for machines making packaging products, for which we require extremely fast movements and high injection speeds, energy efficiency is a decisive factor in reaching the required lowest possible costs per unit. The modern machines display the consumption figures, so that we can easily compare them. Compared to a hybrid machine, the EcoPower Xpress consumes over 30 per cent less electricity when used with the same mold."

As a member of BVFE, the German Federal Association for the Promotion of Energy Efficiency, it is a matter of honor for Heiner Axmann to work meticulously on keeping energy consumption as low as possible in all corporate departments. Many actions to that effect have already been taken. "Over the last few years, we have reduced our total energy consumption by 1.5 million kWh", says Axmann. Most recently, the company's photovoltaic system to generate its own electricity has been extended. Axmann is already discussing with WITTMANN how the DC technology with a battery storage system presented at the Fakuma 2023 could be used at their own company.

"WITTMANN is a family-owned company, like us, and that makes the difference", says Heiner Axmann. "We very much like working with family-owned companies, since they take a different approach. They are more dedicated in counseling as well as in service. They seek genuine partnerships rather than mere profit maximization. They want us to be satisfied customers."



Fig. 1: The newly developed packaging makes it very easy to present ready-to-eat meals on a plate in an appetizing way.



Fig. 2: With the new EcoPower Xpress, Heinrich Axmann is entering the all-electric injection molding age.



Fig. 3: The Sonic high-speed robot has been specially developed for high-speed applications in the packaging industry.

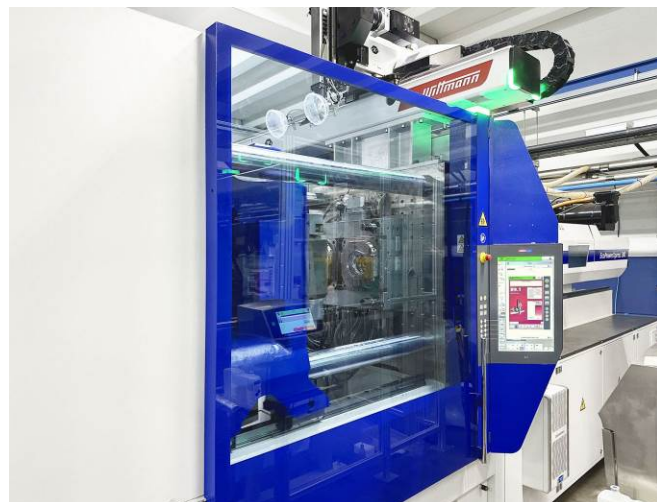


Fig. 4a+b: The control system integration of both the injection molding machine and the robot facilitates operation of the production cell.

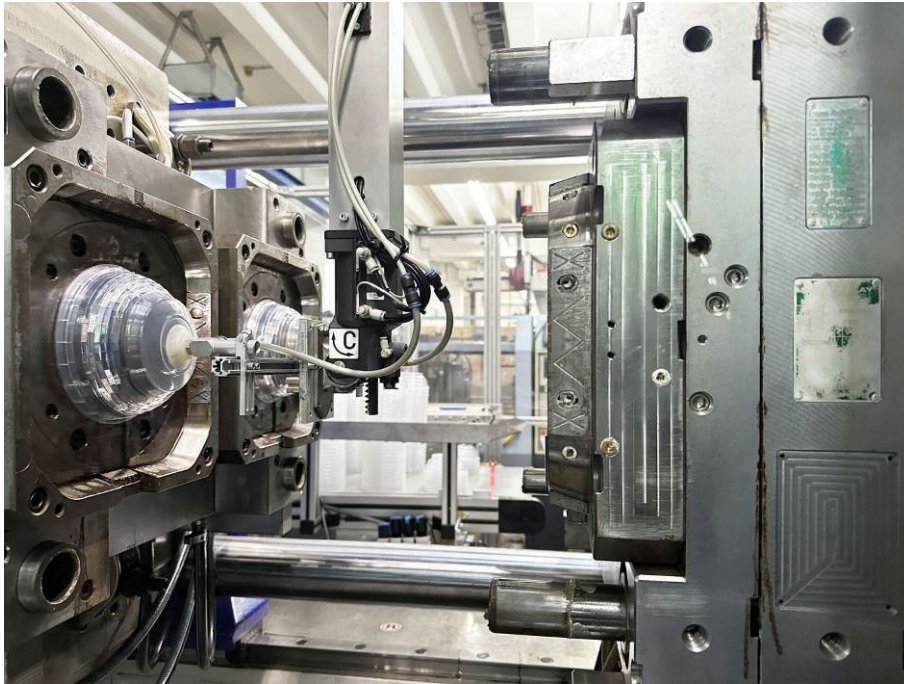


Fig. 5: The high level of stability shortens the parts removal time even with extremely fast robot movements.



Fig. 6a: Jointly exploiting efficiency potentials: Andreas Brüggemann (Production Manager at Heinrich Axmann), Jörg Schröder (Regional Sales Manager at WITTMANN), Heiner Axmann (CEO of Heinrich Axmann) und Andreas Hollweg (Sales Manager Injection Molding Technology of WITTMANN in Germany) on the production floor in Cologne (from the left)

<<Alternative Picture:>



Fig. 6b: Jointly exploiting efficiency potentials: Andreas Brüggemann (Production Manager at Heinrich Axmann), Jörg Schröder (Regional Sales Manager at WITTMANN), Heiner Axmann (CEO of Heinrich Axmann) und Andreas Hollweg (Sales Manager Injection Molding Technology of WITTMANN in Germany) on the production floor in Cologne (from the left)

Photos: WITTMANN

The WITTMANN Group

The WITTMANN Group is a globally leading manufacturer of injection molding machines, robots and auxiliary equipment for processing a great variety of plasticizable materials – both plastic and non-plastic. The group of companies has its headquarters in Vienna, Austria and consists of two main divisions: WITTMANN BATTENFELD and WITTMANN. Following the principles of environmental protection, conservation of resources and circular economy, the WITTMANN Group engages in state-of-the-art process technology for maximum energy efficiency in injection molding, and in processing standard materials and materials with a high content of recyclates and renewable raw materials. The products of the WITTMANN Group are de-

signed for horizontal and vertical integration into a Smart Factory and can be inter-linked to form an intelligent production cell.

The companies of the group jointly operate ten production plants in six countries, and the additional sales companies at their 37 different locations are present in all major industrial markets around the world.

WITTMANN BATTENFELD pursues the continued strengthening of its market position as a manufacturer of injection molding machines and supplier of comprehensive modern machine technology in modular design. The product range of WITTMANN includes robots and automation systems, material handling systems, dryers, gravimetric and volumetric blenders, granulators, temperature controllers and chillers. The combination of the individual areas under the umbrella of the WITTMANN Group enables perfect integration – to the advantage of injection molding processors with an increasing demand for seamless interlocking of processing machines, automation and auxiliaries.

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