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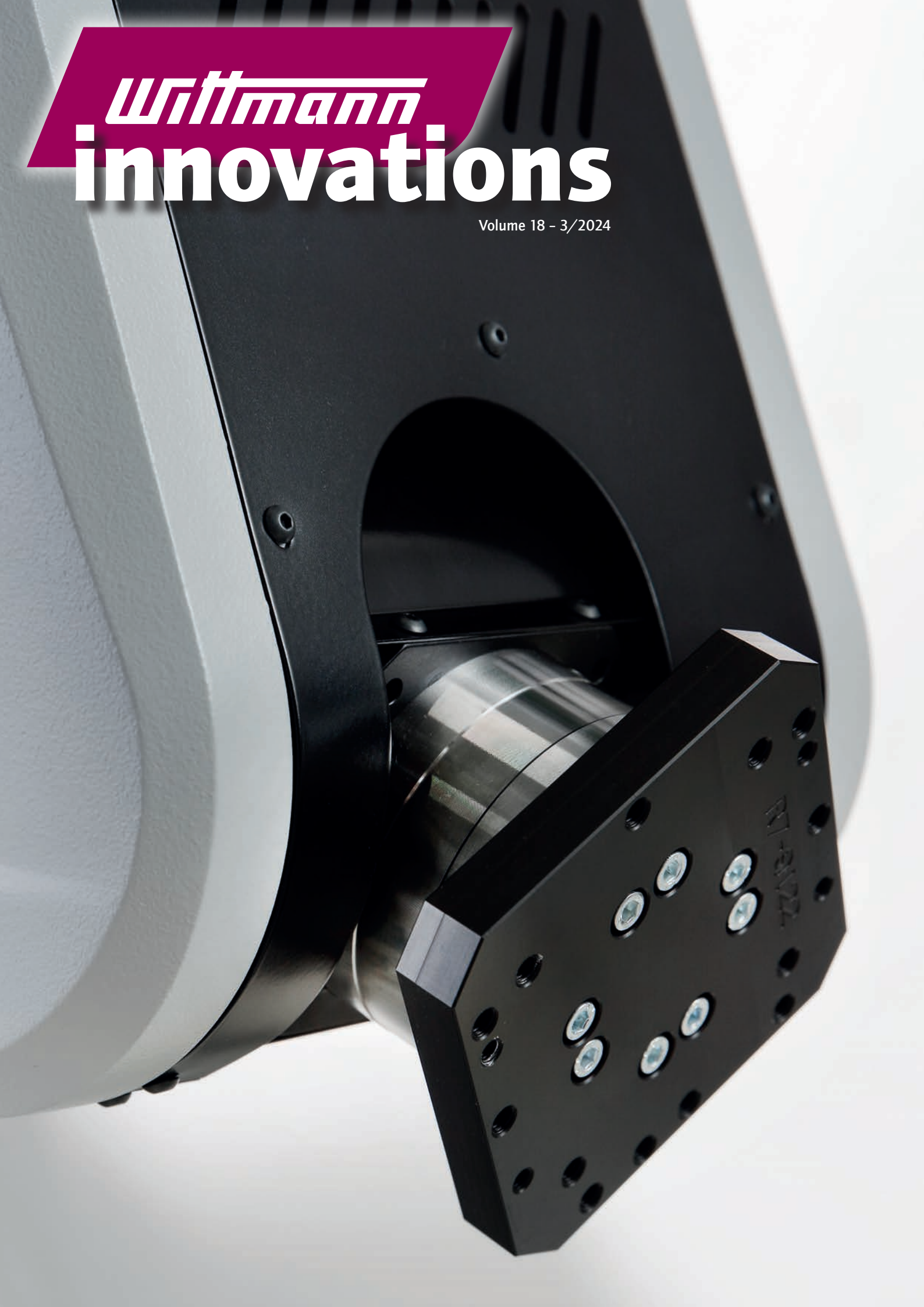

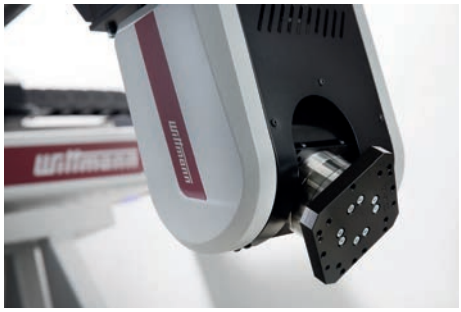

The cover photo shows a detailed shot of a robot with A+C servo axis for applications of 400 to 1,300 t of clamping force.

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Editorial

"Energy efficiency is the fastest, cleanest and least costly way to promote the energy revolution." This statement made by Dr. Fatih Birol, Executive Director of the International Energy Agency, meets with our whole-hearted approval. The urgent need to make our economy and lifestyle more energy-efficient and more sustainable in every respect has been clearly understood by the industry and is becoming increasingly important for everyone.

In the plastics industry, the reduction of energy consumption is an essential driver of innovative developments – and the innovations are proving effective. Many companies are telling success stories about how they have cut their energy consumption and CO_2 emissions.

So, it is not surprising that the terms "efficiency" and "energy efficiency" are found in almost every contribution to this issue of innovations. In the WITTMANN Group, resource efficiency has always been a major development focus. We have the solutions to drive the energy revolution in the injection molding industry.

The basic prerequisite for every move to optimize consumption is transparency. How much energy is consumed by each injection molding machine? How much do the auxiliaries consume? And what about the automation equipment? iMAGOxt delivers precise answers to all of these questions. This energy visualization tool makes it possible to keep an eye on energy consumption rates in real time and take appropriate action to optimize consumption (page 7). After all, lower energy consumption brings about not only a smaller ecological footprint, but also reduces operating costs. This means economy and ecology are working hand in hand (page 8).

Another step towards sustainable production is described in the article about in-line recycling on page 12. When sprue and production scrap are reground right next to the machine and blended in with the virgin material, this improves not only the material, but also the energy balance, with the immediate result of more competitive unit costs. In the project of a well-known producer of electronic components described in this article, the beside-the-press granulators had already amortized themselves in just six months.

Even smaller individual solutions can have a great effect. Here, digitalization offers a particularly large potential. In mid-June, at our Competence Days in the Marx Hall in Vienna, the participants were able to experience how this great potential can be fully exploited. With 1,000 guests, our event was completely booked out. Digitalization, sustainability, efficiency – these were the topics dominating the presentations, live exhibits and in particular the numerous discussions in smaller groups during breaks and throughout the evening event.

Detailed reports about the WITTMANN Competence Days 2024 can be found on LinkedIn, YouTube, in our podcast "We live injection molding" (page 19), and in the trade press. For today I wish you great enjoyment in reading this issue of our innovations magazine.

Very cordially yours, Michael Wittmann

Content

"Efficiency for inefficient markets"

Small batches, a wide range of different materials and colors and frequent mold changes hamper the objective of low unit costs. ZECA accepted this challenge and succeeded in strengthening its competitiveness. The key to its success is in-house injection molding production using complete injection molding solutions from a single source supplied by WITTMANN.

Cable and hose reel systems are among ZECA's most widely known product lines.

Formed in a single cast – this metaphor comes to mind when entering the production plant of ZECA, just half an hour's drive north of Turin. Eight injection molding machines from WITTMANN of different types and sizes are standing in a line, at the end of which a large central unit for drying and handling plastic granulate has been installed. All machines are consistently fitted with auxiliary appliances and robots which have also come from WITTMANN. A glance at the central monitor of the hall reveals that digitalization has become an integral part of the scene as well. The production cells are all networked via WITTMANN 4.0 and integrated into TEMI+, the MES system developed by WITTMANN Digital for WITTMANN Group. "Our customers are impressed when they come to visit our production plant", says Paolo Chiarabaglio with pride. He manages the almost century-old company in the fourth generation together with his brother Marco.

The ZECA colors yellow, gray and black are the dominating shades on the injection-molded parts running off the conveyor belts on the day of our visit. The company specializes in workshop equipment for both professional and do-it-yourself users, as well as charging stations for electric vehicles. Cable and hose reel systems are among their most widely known product lines. In Italy, their brand name has long been established as a synonym for the entire product group. "Whenever people need a reel, they go into a shop and ask for a ZECA,", says Chiarabaglio.

Quality and cost-efficiency fully under control

For a long time, the injection-molded parts were bought from external suppliers. Then, in 2022, the managers decided to establish their own injection molding production. ZECA acquired an existing factory building which had become vacant. In fact, they made a point of exploiting all possible efficiency potentials in the layout of the new injection molding hall.

Competition is tough. In Asia, similar products are manufactured, "at half the price, but also with lower quality standards", says Chiarabaglio, and emphasizes that: "ZECA's good reputation is based on the excellent quality of our products. But we must still produce them at competitive prices."

To have full control over cost efficiency and quality was the essential reason for the management's decision to start up their own injection molding production. "In the past, we had to reject many supply parts due to quality problems", Chiarabaglio reports. "In some cases, materials other than those specified by us were used, and the price calculation was not very transparent."

With its own production, ZECA is also more flexible, above all against the backdrop of an enormous variance in colors. While the company's own products require only three colors to be processed, many other different colors and types of material are added to this by the contract manufacturing sector. When products are being made in a wide range of different colors, this leads to small batch sizes, with the effect of comparatively high unit costs for external production. Accordingly, ZECA often ordered larger batches to keep in stock, which caused additional warehouse costs in-house. Paolo Chiarabaglio calls this dilemma "inefficient markets".

Finally, there was yet another, very personal reason that led to the decision to relocate production to the company's own facility, as Chiarabaglio tells us: "When I was a child, my father often took me along when visiting customers. When presenting our company, he always said that we are assembling products. This irritated me already at an early age. After all, these were our very own products and our product designs. So, I also wanted to be able to say that we are the makers of these products."

Everything from a single source to reduce expenses

Next to one of the new WITTMANN machines we meet Giacomo Meaglia. He is the head of the new Plastic Division – and a "stroke of luck" for ZECA, as Paolo Chiarabaglio puts it. "With Giacomo, we acquired extensive injection molding know-how for our company." The young plastics processing engineer had been trained at his father's injection molding business. From the very beginning, he had learned to think not only in terms of technical parameters, but also in terms of business administration key figures. So, he is predestined for leading the development of ZECA's new production plant in a position of responsibility.

Jointly with the experts from WITTMANN, he planned the layout for the new injection molding hall as well as efficient working procedures. "The most effective support we could give to ZECA was to deliver turn-key production cells from a single source", emphasizes Gianmarco Braga, Managing Director of WITTMANN BATTENFELD Italia. "Coordination between several different suppliers is very time-consuming. Our customers are spared this type of expenditure".

Setup time shortened by 40 per cent

The key to competitive unit costs is high efficiency of production processes. Here, setup phases have a particularly large potential at ZECA, due to the small batches. To enable extremely fast mold changing, all in-

Top image: With eight automated and integrated injection molding machines from WITTMANN, ZECA has achieved great flexibility.

The central unit for drying and handling of the granulates supplies the injection molding machines with a wide range of materials.

jection molding machines are equipped with magnetic clamping plates. For this purpose, WITTMANN has fitted the machines with the necessary interfaces. "With the magnetic clamping plates, we cut setup time by up to 40 per cent", reports Andrea Landriscina, COO of ZECA. Thanks to the digital mold data sheet, the machines already recognize the molds at their second setup and automatically set the optimal parameters. This "plug & produce" process not only saves a lot of time, but also increases process reliability. The risk of errors, which can never be excluded with manual settings, is dispensed with. Since all components of the production cells are fully integrated via Wittmann 4.0, the auxiliaries and automation equipment can also be controlled very easily via the machine's central control system.

A further contribution to optimizing setup times is made by the TEMI+ MES, according to Landriscina, since it enables better planning of the mold changes. "The worst case would be to have four mold changes become due simultaneously. By using TEMI+, we can avoid this, because we can view and control the utilization of all machines at a single glance. In this way, we optimize the productive times of our injection molding machines."

A decisive factor in selecting the eight injection molding machines was the existing range of different molds. The choice of machine models included four SmartPower and two MacroPower machines, all with servo-hydraulic drives, as two all-electric EcoPower machines. In terms of energy consumption, the servo-hydraulic machines from WITTMANN are already proving extremely thrifty. "I always thought that plastics processing was an energy-intensive process", says Meaglia. "I am amazed to see how little energy the new machines consume. Our total consumption is significantly below the amount of power made available to our facility." >>

Jointly exploiting all potentials of efficiency: Andrea Landriscina, Giacomo Meaglia and Paolo Chiarabaglio from ZECA and Gianmarco Braga, Francesco Resteghini, Edoardo Tettamanti and Luca Del Gaudio from the WITTMANN Group (from right to left).

Durable products for maximum sustainability

Polypropylene takes the lion's share of plastic materials to be processed. The materials processed in smaller quantities include PETG, which offers high transparency but is more demanding in processing due to its low viscosity and sensitivity to shearing. Nevertheless, mold changes do not require simultaneous exchanges of plasticizing units. "With the standard screws of the WITTMANN machines, we achieve absolutely homogeneous plastic melts across the entire range of different materials. Perfect color consistency is vital for us", says Landriscina. For masterbatch dosing, Gravimax blenders from WITTMANN are used. More and more often, pre-defined percentages of recycled materials must also be blended in. Sometimes sprue is reground directly on the processing machine and then immediately re-processed.

Sustainability takes many different forms at ZECA. "Our products can be repaired", emphasizes Paolo Chiarabaglio, describing a trend reversal regrettably not yet present everywhere. "For us, this is a very important point", says the CEO. "After all, we are making plastic products, which many people believe to be not sustainable. We have set out to prove the contrary, and that also includes a long service life for the products." Workshop owners can return broken ZECA products to our plant for repair, or they order the necessary spare parts to repair the items themselves. "This is only possible, too, with an injection molding facility of our own", says Chiarabaglio. "Here we have access to all molds at any time and can thus produce the spare parts required for older models at short notice."

Having one's own machinery stimulates creativity. Ultimately, product development also benefits from this. Take, for example, in-mold labeling (IML). "Previously, we never gave this a thought, because it was simply unprofitable for small batches supplied by external contractors", says Chiarabaglio. "For the cable and hose reel systems, we are now thinking about applying our logos inseparably on the reel by IML, instead of gluing the labels on the housings after injection molding. This will make us even more efficient by saving us an entire work step."

When Paolo Chiarabaglio visits customers today, he can talk proudly about his own production facility and bring his full range of technological advantages into play when negotiating about new projects. ZECA's own injection molding facility has increased flexibility, improved the reliability of quality standards and thus achieved competitiveness. "We have now reached the level of efficiency required to serve our inefficient markets," Chiarabaglio sums up.

Sprue and reject parts are reground directly next to the machine.

Keeping an eye on energy consumption in real time

Energy efficiency in production may in the long run be the decisive factor for corporate competitiveness. The important point is to create transparency about the individual energy consumers.

Production conditions are becoming increasingly complex. In many regions, the energy and material costs are continuing to rise, the laws and regulations for more sustainability are becoming more stringent, and competition is getting tougher, because new players, for example from China or Turkey, are pushing into Europe. In this scenario, innovative technologies and digitalization are emerging as key factors to enhance corporate competitiveness and ensure sustainable profitability.

iMAGOxt ensures transparency. All energy consumption rates are measured precisely and clearly visualized.

One of the essential strategic levers to achieve long-term competitiveness is precise monitoring and minimizing of energy consumption. Every program to increase energy efficiency starts with identifying all critical factors leading to excessive or even unnecessary energy consumption.

Intelligent processes contribute to economical use of resources in order to increase overall efficiency. But how can this be achieved without incurring high investment costs? The answer is to introduce digital solutions, which often yield great benefits with a comparatively small investment. One example is iMAGOxt from Wittmann digital. It enables real-time monitoring of all corporate sources of energy consumption and delivers valuable information for process optimization and successful sustainability initiatives..

Creating transparency about individual consumers

Precisely this transparency is often lacking in practice. Only few companies possess detailed knowledge about their equipment's electricity, water and gas consumption, about sources of waste or CO_2 emissions. Here, iMAGOxt comes in as the ideal solution for reducing the consumption of resources and thus cutting the costs involved. It is an easy-to-operate, intuitive software integrated in TEMI+, the WITTMANN Group's MES software. In addition to individual energy consumptions, iMAGOxt also monitors other measured variables with extremely high precision, such as the consumption of electricity or natural gas.

iMAGOxt ensures in particular:

- complete control of energy consumption,
- detailed consumption analysis,
- optimization of energy use,
- identification of problems or inefficient processes,
- waste prevention and production cost cuts.

With the help of special conversion factors, iMAGOxt calculates the CO_2 emissions resulting from the measured consumption rates, and provides the data required for evaluating appropriate actions to increase sustainability. Especially in energy-intensive companies, the software thus facilitates granting of certifications and provides an important decision-making tool for future investments.

Digital transformation is a decisive lever

In this way, the introduction of innovative digital technologies in a corporate entity not only enhances competitiveness, but also contributes to a more sustainable and responsible use of resources in industrial production. Digital transformation is thus becoming a strategic lever to master current and future challenges in industrial production plants.

The display of the total consumption in traffic light colors helps with production planning. While the red light is on, no additional machine should be started, in order to avoid costly energy peaks.

Energy consumption monitoring with iMAGOxt facilitates evaluation and planning of sustainability initiatives as well as decision-making for future investments.

Economy and ecology combined

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.

The Production Manager Christian Cassierer appreciates the many practical features of the WITTMANN machines.

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.

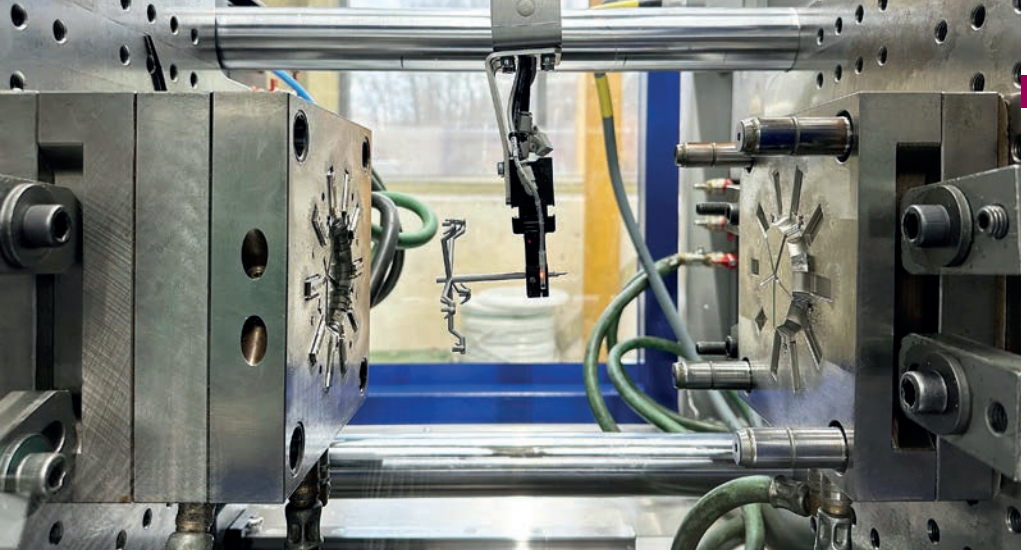
Iris Langenberg is holding a particularly complex component in her hands. To be precise, a complete assembly consisting of 68 individual components. With few exceptions – such as circuit boards and switching elements – these are all thermoplastic parts, which are injection-molded in Gummersbach and subsequently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

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

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 KB Kunststofftechnik team members are particularly proud of their geared limit



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

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

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. 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 barrel 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."

"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. "

„WITTMANN machines are the most economical“

Short setup times contribute substantially to the high competitiveness of Krona in Brazil. In view of the company's product range, not a matter of course. This group of companies ranks among Latin America's leading manufacturers of pipes, pipe sections and fittings. With particularly large and bulky molds, however, the MacroPower injection molding machines from WITTMANN fully prove their worth. For 23 years now, WITTMANN BATTENFELD do Brasil has not only been a supplier, but also an important development partner for Krona.

Founded in 1994, Krona stands for a continuous success story. Today, the Krona Pipes and Fittings Group comprises Krona Joinville, Krona Northeast, Krona Central East, Krona Ultra-Therm, Krona Acessórias, Viqua as well as the Linear Group of companies and remains on course for further growth. "We are growing faster than our competitors", says Valdicir Kortmann, Sales and Marketing Manager and member of the company's Management Board, proudly during our visit in Joinville, Southern Brazil – the location of the corporate headquarters and production plant for both injection molding and extrusion.

In the sanitary equipment sector, the Krona Group is one of the top 3 brands in Latin America, currently producing 2,500 different products. These include pipe segments and molded parts for cold water, hot water and sewage systems, as well as fittings and drainage systems. Additional business segments are irrigation technology and electrical installations. "The electrical sector is growing particularly fast", says Kortmann, and Krona has prepared for it accordingly. Last October, José Armecides Gonçalves, Production Director of the company and also a member of the Board, ordered three additional MacroPower injection molding machines for the production of covers and housings of fuse boxes.

"We are always on the lookout for new technologies to become more efficient", says Gonçalves. "If we are targeting higher competitivity, we must boost our efficiency." Here, the MacroPower machines make a substantial contribution. At the production facility in Joinville alone, Krona is operating 75 injection molding machines from WITTMANN.

Large machines from WITTMANN dominate the scene at Krona's plant in Joinville. 75 WITTMANN machines are operating at this location alone.

Fast setup in spite of many core pulls

Price pressure is high, and the product portfolio is extremely demanding. Fitting production requires elaborate molds with many core pulls. Accordingly, the molds take up a lot of space.

This is where the MacroPower machines prove their strengths. Even large, mechanically complex molds can be clamped efficiently without being taken apart. "The MacroPower machines offer a particularly large distance between tie-bars", emphasizes Cássio Luís Saltori, Managing Director of WITTMANN BATTENFELD do Brasil, to explain one of their advantages. "The very large dimensions of the mold clamping platens were the decisive reason for Krona to invest in WITTMANN machines from the very beginning".

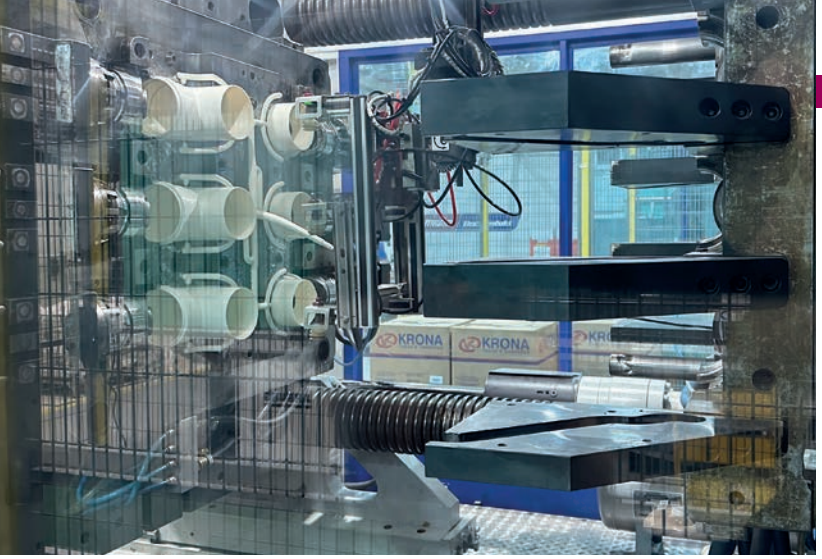
"35 minutes is our target for mold changes", explains Israel Almeida Furtado, Technical Manager at the Joinville facility. "This is what we need on average for cost-efficient production." Without the special features of the MacroPower, the bulky molds could not be set up within such a short time.

Perfect setup for PVC

Almost all products leaving Krona Group are made of PVC. In total, all units process 10000 tons of PVC per month, of which just under 2000 tons go into injection molding.

PVC melts have a high viscosity and are sensitive to shear stress and heat. The consequence is a very small processing window, since the plasticizing time must also be long enough to achieve good surface quality. Although the products are invisible when installed, their surface quality still plays a major part. Pipe segments and fittings are also sold in do-it-yourself markets, and consumers buy according to optical impression.

To ensure a consistently high quality standard for the parts, all WITTMANN injection molding machines at Krona are equipped with plasticizing units optimized for PVC processing. "The WITTMANN PVC package was originally a customized special development for Krona", says Saltori. The geometry and surface attributes of the screws have been adapted to the specific requirements of the material, and the drive torques are higher than normal. In addition, WITTMANN has developed a new special screw tip.



Top image left: The production of pipe segments requires ample space. The molds are bulky, due to the core pulls. Here, the MacroPower injection molding machine from WITTMANN fully plays out its strengths.

Top image right: In the fittings sector, metal inserts are frequently over molded.

The automation cell for separating and feeding the metal threads was specially designed and produced by WITTMANN BATTENFELD do Brasil as a customized solution for Krona.

The Management Board of the Krona Group originally consisted of four people: José Armecides Conçales, Mário Roberto Borba, Vilson Perin and Valdicir Kortmann (from left to right). Mário Roberto Borba died of Covid in spring 2020.

Automation made to measure

When it comes to automation, Krona also benefits from the many years of close cooperation with its injection molding machine manufacturing partner. WITTMANN BATTENFELD do Brasil's great automation expertise shows its most valuable features in the production of fittings. Israel Almeida Furtado takes one of the newly molded blue fitting components with metal threading inside from a mesh box: "For a long time, these parts needed a lot of manual work", he explains. A production worker inserted the metal threading and removed the finished parts following insert molding. Then the WITTMANN team in Brazil developed a new, efficiency-optimized production process based on a horizontal SmartPower injection molding machine for the 16-cavity mold. The production cell now includes a WX143 linear robot from WITTMANN, plus one Scara robot and one automation unit for isolating and feeding the metal threads. By this new process, the unit costs were significantly reduced.

For Krona, quality and service are the basis for the Group's continuous growth. Several acquisitions of additional companies have also taken place. The latest example is Viqua, also located in Joinville. Originally a competitor, Viqua now complements Krona's product portfolio with sanitary products in the premium segment. Viqua has already been working with injection molding technology from the WITTMANN Group for many years, too.

Jointly at the Interplast 2024

Together with Viqua, WITTMANN will present an exciting application in August at the Interplast 2024 in Joinville, the plastics trade fair in Brazil. Water faucets will be produced using Airmould gas injection technology on a SmartPower injection molding machine.

During the Airmould process, nitrogen is injected into the cavity filled with melt. The pressurized gas forms a bubble in the central area of the melt, which counteracts the shrinkage on the surface by internal pressure, thus eliminating shrink marks. A cavity is created inside the molded part, which reduces the amount of plastic material needed. In this way, light-weight components can be produced with Airmould within short cycle times, and with high-quality surfaces. In the specific application of water faucets, the gas forms the hollow structure through which the water will flow. Accordingly, no core pulls are required in the mold.

Sustainability is a central topic for the Krona Group. "We have defined key figures by which we can measure the sustainability of our activities", reports Vilson Perin, President of the Management Board of the Krona Group. "Over the next five years, we will use them to significantly reduce our raw material, energy and water consumption and thus improve our CO_2 footprint."

"With WITTMANN, we are well positioned for reaching our sustainability goals", says Perin. "The WITTMANN machines consume less energy than the other machines on our production floor."

Amortized within six months

More sustainability, creation of a circular economy, fluctuating raw material and energy prices – these current challenges are bringing in-house recycling of sprue and production scrap into focus. It pays off to check into which products regrind can be blended. A well-known manufacturer of electronic components has been able to cut unit costs in injection molding production thanks to in-house recycling. The new S-Max 2 granulators from WITTMANN paid back their purchase price within just six months.

The processing company manufactures sophisticated electronic components on 15 injection molding machines with clamping forces ranging from 15 to 120 tons. These include many different plugs and connectors for technical and industrial applications.

"We are using many of our products here ourselves", explains the injection molding department manager. "For example, in the injection molding machines and robots. This is certainly a decision-making factor in choosing our suppliers."

The most recently acquired machines on the company's production floor – two servo-hydraulic SmartPower models – have come from WITTMANN. The energy efficiency of WITTMANN injection molding technology was a further consideration in favor of choosing this equipment.

The new recycling center on the injection molding production floor: four S-Max 2 granulators from WITTMANN have been acquired for in-house recycling.

Blending in up to 25 per cent regrind

The cooperation with WITTMANN has already existed for many years, since in materials handling the processor also relies on solutions from Austria. WITTMANN supports every project with extensive know-how, counseling and solutions tailored precisely to fit the customer's needs.

Nevertheless, the market is analyzed thoroughly for each new project, and products from several different suppliers are always evaluated. This was done two years ago, when the company decided to recycle sprue and production scrap in-house and return them to the injection molding process.

For a long time, it was considered impossible for customers to accept a proportion of recycled material in their parts. But the current demand for a circular economy has prompted the industry to rethink this point. "We have carried out numerous tests with recycled materials and thoroughly analyzed the quality of the injection molded parts", explains the injection molding department manager. "Many plugs have filigree structures with thin-walled areas. We had to make sure that we can fill the cavities completely and maintain the required product attributes with recycled material, too."

The tests proved successful. The percentage of regrind which can be blended in with the virgin material was defined for each individual product. Up to 25 per cent is possible for parts produced at the company's facility.

Easy grinding of parts with high fiberglass content

Sprue and production scrap such as start-up parts and rejects are now collected in boxes at the machines and brought to the new recycling center by the machine operators. The center located in the middle of the injection molding hall consist of four new WITTMANN S-Max 2 granulators. A separate lattice box is placed in front of the granulators for each different variety and color of main material. Strict single-variety collection of scrap to be processed is an important prerequisite for producing high-quality parts from regrind.

The main materials include various types of polyamides as well as PBT, ABS and polypropylene, all flame retardant modified and mixed with fiberglass. Materials with very high fiberglass contents of up to 60 per cent are being processed.

As soon as a lattice box is full, one of the granulators is started. The recycling center is operated and supervised by the injection molding staff. So, the overall responsibility lies in one hand.

Targeting homogeneous granulate

"We investigated several different granulators at the fair and carried out grinding tests with our own material at the respective

suppliers", explains the injection molding department manager. At WITTMANN's technical lab in Nuremberg, the sprue from our plugs was ground on an S-Max 2 granulator. The result proved convincing. This granulator delivered a highly homogeneous granulate with grain diameters ranging from 3.5 to 4 mm, and the proportion of dust development was below that of other granulators we had tested."

"The S-Max 2 series is designed for processing engineering plastics and parts which are hard to grind", says Wolfgang Prütting, WITTMANN BATTENFELD Germany Regional Sales Manager. The grinding tools have a long service life even with high fiberglass content.

Compact design and integrated sound insulation are further advantages showing their positive effect most distinctly when the granulators are not run in a separate room, but directly in the production hall instead.

Direct onward forwarding of granulate

S-Max 2 come equipped with a filling level sensor as standard. As soon as the collecting container is full, the grinder stops. To enable continuous operation, WITTMANN has designed a special solution for this particular customer. Instead of switching off the grinder, the signal from the filling level sensor is used to switch on an integrated vacuum conveyor unit. In this way, the material is transported directly from the granulator's collecting container into a material bin.

The bin is then passed on to the central materials handling system with a lot of dryers, material loaders and a coupling station located on the floor above the storage room. Forklifts are used to lift the bins filled with granulate to the upper level and there connected with Gravimax blenders – which have also come from WITTMANN. The gravimetric blending system enables gram-accurate metering of the granulate to be blended in with the virgin material.

Virgin material consumption significantly reduced

Since start-up of the in-house recycling project, the consumption of virgin material has gone down continuously, with an immediate effect on unit costs to improve the manufacturer's competitiveness. Most recently, several patents have expired, resulting in intensified competitive pressure.

"Using recycled materials is our only way to achieve competitive unit costs", says the processor. "The new S-Max 2 screenless granulator series from WITTMANN have already amortized themselves within only six months."

15 injection molding machines are installed at the plant. The newest machines are two SmartPower models from WITTMANN.

The granulate is fed into the materials handling system with gram-accurate precision by Gravimax gravimetric blenders from WITTMANN.

The material bin filled with granulate is lifted to the upper floor towards the central materials handling system, using a fork lift with sophisticated safety devices.

From the region for the region

In customized automation solutions, not only the requirements for each application must be met, but also those for the specific local conditions. To enable optimal fulfilment of its customers' individual wishes, WITTMANN has therefore decentralized its automation technology division. Special departments for customized automation have been established in many subsidiaries, for example at WITTMANN BATTENFELD CZ spol. s. r. o. in Písek, Southern Bohemia.

The Czech facility with a total floor space of 1600 square meters provides ample space for developing special customized solutions.

Since 2012, we have been engaged in developing customized automation solutions here in Pisek, and have a permanent, highly experienced team at our disposal for this purpose", says Michal Slaba, Managing Director of the WITTMANN Group's Czech subsidiary, with pride. "We develop automation solutions for renowned companies such as Robert Bosch, Gerresheimer Horšovský Týn, Witte Nejdek, Witte Access Technology and Erwin Quarder CZ – for facilities in the Czech Republic and Slovakia, and sometimes even beyond."

The automation team in Písek consists of design engineers, electrical designers, installation and service engineers, and back office staff. On the corporate premises, 550 square meters have been set apart exclusively for the customized automation department. Modern 3D programs are used for the documentation of design, development and production. With 3D printers, components are adapted flexibly and efficiently to specific tasks.

Machine tools and tooling stand ready for complete preparation of aluminum frames and aluminum structures. This enables the Czech team to cover a very wide range of specific requirements with a high vertical range of manufacturing. For technologies not available in-house, WITTMANN BATTENFELD CZ has built up a network of reliable suppliers, who are all just as strongly innovation-driven as the WITTMANN Group itself. The team in Písek also cooperates closely with its colleagues at the WITTMANN headquarters in Austria.

For fully automatic quality assurance, the automation engineers of WITTMANN BATTENFELD CZ integrated a total of five cameras into the fully automatic workplace for this application.

Integrated solutions from a single source

On this basis, WITTMANN BATTENFELD CZ offers a great variety of products and services for the automation of injection molding processes – all with installation and commissioning, warranty and post warranty service packages. These include among other things:

- grippers – both simple and highly complex – for tasks such as removal and insertion of clips or contact elements,

as well as handling of preforms or semi-finished products in multi-component injection molding,
- appliances for the preparation of insert parts, such as vibration conveyors, Stepp feeders, rotary and sliding tables,
- quality check stations with cameras,
- laser marking systems for component labeling,
- conveyor lines to facilitate depositing and stacking of parts in KLT boxes and handling of these,
- various transfer and cooling stations with exchange matrices,
- fully automatic workplaces and other single-purpose devices.

Significant reduction of unit costs

Fully automated workplaces frequently pay off, especially with large product series requiring different types of controls with maximum repeat accuracy. One representative example is the production of components with different types of metal inserts such as threading, contact elements and housings. Such an automatic workplace may, for example, consist of a vibration conveyor with sorter to prepare the inserts, a robot equipped with a gripper specially designed for handling and placement of the inserts, finished parts and sprue, plus a conveying system to handle KLT boxes or other types of containers. In addition to this, the Czech team integrates a great variety of control stations into the overall concept, such as camera-based systems which check the finished parts for presence of inserts or injection molding faults. Units to apply and evaluate laser labeling are also integrated.

Automation, in particular automated quality assurance with automatic separation of faulty parts, leads to extremely stable production processes and eliminates the risk of human faults. In this way, the production costs and consequently the unit costs can be significantly reduced.

To achieve the maximum possible overall efficiency in the conception and design of fully automatic workplaces and other customized automation solutions, the WITTMANN experts analyze the requirements of the application and the special conditions prevailing on the customer's premises down to the last detail. Here it is of advantage to have sample parts – both good parts and faulty parts – already available. "The more data and information we already have at an early stage of the project, the more efficient and targeted our development work can be. Even the smallest details can sometimes have great effects on the final solution", says Slaba.

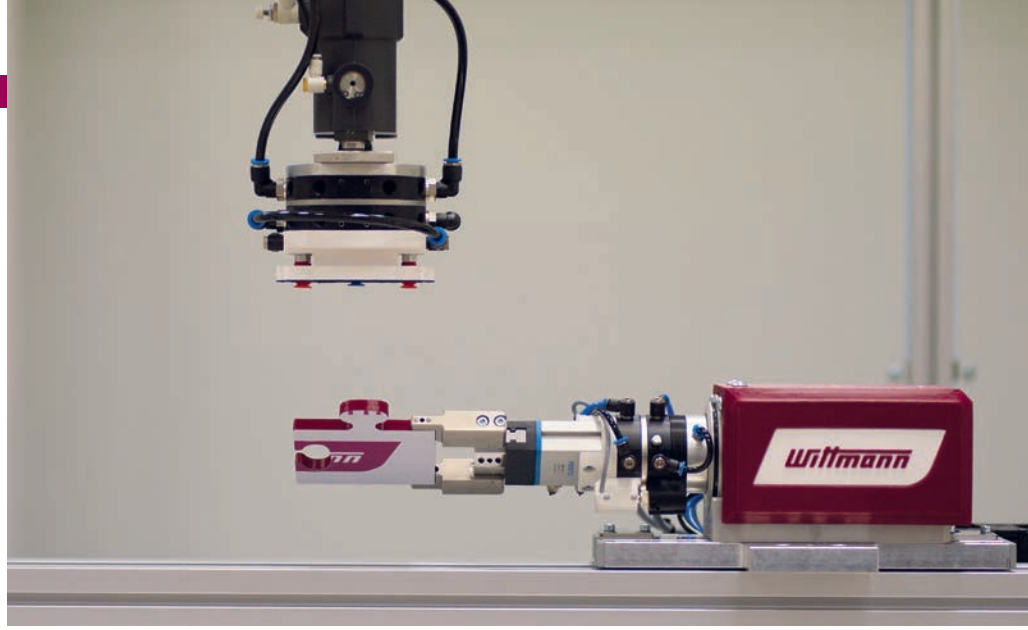


Image above: This gripper has come from an in-house 3D printer as a unique customized solution. With its horizontal rotary servo axis, the gripper serves to move parts between several individual stations.

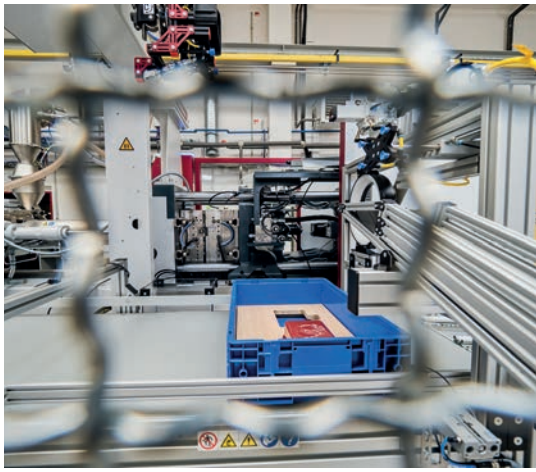


Image right: The fully automatic snack box production was presented for the first time at the 20th anniversary of WITTMANN BATTENFELD CZ last year (see text box).

Directly on course to local automation expertise in the Czech Republic:
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20 years of partnership with customers

In 2023, WITTMANN BATTENFELD CZ celebrated the 20th anniversary of the subsidiary with 150 invited guests. Since its foundation in 2003, the facility has seen continuous growth. The corporate headquarters have a total of about 1600 square meters today, which includes two production halls as well as a large training center and showroom. It is a modern, ecological building, which offers the more than 40 staff members a very pleasant working environment. Some associates can already look back on many years of employment at WITTMANN BATTENFELD CZ The customers benefit from this high level of continuity.

From the left: Dr. Werner Wittmann, Michal Slaba and Michael Wittmann.

Fit for the future challenges

Originally, high efficiency and a large mold space were the decisive reasons for investing in injection molding machines from BATTENFELD, today WITTMANN. Now, ANNA VILADECANS S.L. based in Manlleu, an hour's drive north of Barcelona, also benefits from the automation potential. In close cooperation with its Austrian injection molding partner, the Spanish company prepares itself to meet the future demands of its customers.

Cones, rollers, distaffs and many other components for textile processing machines make up a large proportion of the company's own product portfolio.

Established in 1982 as a technology supplier for the textile industry, the company purchased the required injection-molded parts from external suppliers for more than ten years. Then, with rising order intake, it was decided to move the injection molding production to the company's own facility. The initiative came from Josep Maria Viladecans, then an employee in the company. Today, he is the company's owner leading it on into the future, jointly with his brother Carles and his sister Anna, after whom the company has been named.

Cones, rollers, distaffs and many other components for textile processing machines still make up a large proportion of the company's own product portfolio. In addition, the contract injection molding sector has grown rapidly over the years. The customer base consists of industrial sectors such as automotive, household appliances and packaging.

A wide range of materials is being processed on currently twelve injection molding machines with clamping forces between 60 and 240 tons. In addition to PP, PS, ABS, PA and PC, these also include PVC and rubber.

With its own in-depth tooling expertise, ANNA VILADECANS is able to offer its customers extensive service packages from a single source. "Upon request, we will act as a general contractor performing the complete range of tasks, including product development, selection of materials, as well as 3D validation and mold design, right up to parts production", says Josep Maria Viladecans. Molds are designed, serviced and adapted where necessary in-house. In mold construction, the company cooperates with well-qualified mold makers. A specialty of ANNA VILADECANS is reverse engineering. "Some customers bring us parts or ideas for parts, and we provide suggestions for improvement, primarily concerning parts quality and optimization of production costs", says Viladecans.

Economical throughout the entire machine life cycle

Everything from a single source – this is precisely what the company owner also appreciates about the WITTMANN Group. The injection molding machines in the plant are equipped with material conveyance and dosing systems, as well as linear robots from WITTMANN. "This makes it very easy for our machine operators to integrate all systems", says Viladecans. "With WITTMANN, we are working on a high technological level. The machines function very accurately and are energy efficient. In this way, we are able to manufacture high-quality products with a minimal input of resources."

In 2004, the first injection molding machine from BATTENFELD was installed – just a few years before BATTENFELD became part of the WITTMANN Group. Previously, injection molding machines from Asian production were in use. "We soon discovered that molds running on a 180-ton machine due to their bulky volume could be mounted on a BATTENFELD machine with only 100 tons clamping force. Ever since, no more Asian machines have come into our plant", Josep Maria Viladecans explains. Using a smaller machine saves costs not only for the investment, but throughout the entire life cycle. The smaller machine requires less energy and production media – and takes up less floor space.

Energy consumption tests passed with excellent results

A declared goal of ANNA VILADECANS is constant increase in efficiency, which leads to continuous improvement in sustainability. One main focus lies on energy efficiency. Here, the WITTMANN machines stand out by their low consumption rates. In addition, there is the patented kinetic energy recovery system (KERS), which converts kinetic

energy from braking processes, for example during mold closing, into electric energy. This amount of electric power is then made available to other energy consumers inside the machine, such as barrel heating. Both the servo-hydraulic SmartPower and the all-electric EcoPower machines on the production floor of ANNA VILADECANS operate with KERS.

Currently, two EcoPower machines are in use – with clamping forces of 110 and 180 tons. "Following an analysis and energy study we can say that we have made a further leap forward with the EcoPower, not only in terms of precision, but also in energy consumption. With our applications, the all-electric machines will already have amortized themselves in seven years", Viladecans emphasizes. At first, the two EcoPower machines were only lent to ANNA VILADECANS by WITTMANN for testing. However, they passed all tests with excellent results and have now become a permanent part of the company's equipment.

The automation ensures ergonomic workflows and reliable processes.

Automation enhances the employer's attractiveness

Continuous investments not only promote the attainment of sustainability goals, but also strengthen the employer's brand. "Our modern machinery makes us attractive to expert personnel in the industry", emphasizes Viladecans, who has made a further decision in this context: to automate the plant. "Where robots are used, there is no more need for monotonous, repetitive jobs to be done by hand. Our staff members can dedicate themselves to more valuable and more ergonomic work", says Viladecans. A positive side effect is that the automation ensures very consistent, stable processes, and thus also improves the reliability of quality standards.

The WITTMANN team in Spain closely accompanied the automation project right from the start, provided support for the programming work and trained the staff members of the injection molding department.

"We are enthusiastic about the flexibility of the WITTMANN robots", Viladecans comments, "especially because we can now restart production very quickly after a mold change." Here, too, the company benefits from the strategy of delivering everything from a single source. Via Wittmann 4.0, all components of the production cell are fully integrated. During setup of a mold already known to the machine, the pre-defined process parameters are set automatically in all participating system components with the help of the digital mold data sheet.

"We can teach the robots very easily for new tasks, such as placing inserts or IML labels, or programming additional rotary movements in the process sequence", says Viladecans. "Our production cells are now fit for the future. This will open doors to us for new orders and customer projects."

ANNA VILADECANS is a family-owned company. Josep Maria Viladecans (2nd from right) manages the business jointly with his sister Anna (center) and brother Carles (2nd from left). The WITTMANN team in Spain, in this picture with Carlos Duard (left) and Yoel Vaca (right), currently provide support primarily with the automation of the machinery.

The modern machinery currently includes twelve injection molding machines, of which eight are from WITTMANN.

WITTMANN is growing in Spain

This spring, WITTMANN Technology Spain opened a new, additional facility in Ibi near Alicante. Under the name of WITTMANN Levante, the team in Spain now also offers its customers in the south-east of the country a showroom for technology presentations, practical tests and training. With a 30 per cent share in the Spanish thermoplastics market, South-East Spain is a strategically important region. With this investment, WITTMANN has shortened the ways to its customers.

For more than 30 years, WITTMANN has been present on the Iberian Peninsula with a subsidiary of its own. The headquarters are located in La Pobla de Claramunt near Barcelona. Other facilities are located in Leiria/Portugal, Etxebarri/Northern Spain and now also in Ibi.

On course towards climate neutrality

As a family-owned company, National Sweden thinks ahead. When a new hall was recently built for the National Plast Division on the corporate site in Halmstad, sustainability was the overriding principle for the entire project from the very beginning. The decisive argument for choosing MacroPower injection molding machines from WITTMANN was the high energy efficiency of this machine concept.

The machine most recently delivered from Austria – a MacroPower 700/5100.

National in Halmstad pursues sustainability.

National's customers come from the automotive, furniture, industrial products and medical technology sectors. In the Plast Division, mainly complex technical components are being produced. A great variety of materials are being processed by injection molding, such as PP, PA, ABS, POM and TPE.

Servo-hydraulics and electric dosing save energy

National began at a very early stage to optimize its production processes with the aim of an extremely low CO_2 footprint. A key factor in its sustainability strategy is the consistent focus on the energy consumption of the production equipment. All machines and devices are equipped with monitoring systems to measure the consumption of each individual consumer, thus achieving a high level of transparency. The data are thoroughly analyzed, and the analyses provide the basis for decisions about steps towards a further reduction of the energy consumption. Such actions invariably focus on the corporate site as a whole. For example, a new cooling system uses the waste heat from production to prevent freezing of the service water which flows through an underground circuit below the car park for cooling. A positive side effect is a car park permanently free of ice and snow.

An outstanding example of sustainable investment is the acquisition of new MacroPower injection molding machines from WITTMANN. The decisive arguments in favor of this choice were the energy-efficient servo-hydraulic drive technology and the electric dosing system. While for a long time electric dosing drives were only included in projects requiring extremely short cycle times, we know today that electric dosing saves considerable amounts of energy. On the basis of Swedish energy costs, the electric dosing unit already pays itself off within two and a half years. Based on the assumption of a 20-year service life for the machine, this is a highly cost-effective move.

Easy machine operation for more productive time

Floor space productivity is another important efficiency factor for National, and the MacroPower machines score here, too. Thanks to their two-platen design, they save floor space which can be used for purposes such as pallet storage or automation systems.

All machines in the plant are equipped with linear robots, the most recently acquired MacroPower machines have come with WITTMANN robots from the WX series. The machines and robots were delivered as integrated complete solutions. This means that the robot's control system is integrated in the control system of the injection molding machine. The resulting uniform operating logic has simplified setup and operation of the production cell. The setup times could thus be reduced to increase the productive time of the injection molding machines.

Johan Sverkersson, CEO of National Plast, (left) and Carsten Olsen from BATTENFELD Sverige join forces to exploit efficiency potentials.

Established in 1941, National Sweden is a family-owned company with a long tradition, just like WITTMANN. Team spirit and a long-term perspective are guiding principles – for company staff as well as for customers and suppliers. The long-term relationship with Battenfeld Sverige AB, the exclusive representatives of WITTMANN in Sweden and Norway – also located in Halmstad – is a cornerstone of success for the National Group.

Injection molding now for listeners, too

Podcast about innovations, insights and outlooks for the world of plastics

We live injection molding" is the name of the WITTMANN Group's new podcast. The first episode went online in March. Now we already have a fan community. We thank all listeners for their likes, sharing and comments! For us, this is a great motivation to produce many more episodes.

"We live injection molding" discusses current trends with various partners, presents new developments and gives tips for daily injection molding practice.

With its new podcast, WITTMANN is one of the pioneers among the machine and plant manufacturers in the plastics world. "Audio formats are popular, because they are so flexible", says Susanne Zinckgraf, Head of Strategic Marketing of the WITTMANN Group and hostess of the new podcast series. "Whether on the way to work, at sports or during a flight, the podcast is readily available at any time and place. With this podcast, we offer the injection molding industry a new, entertaining dimension for gathering information."

„**We live injection molding"** is available in German on **www.wittmann-group.com** and wherever there are good podcasts. Just listen in and share it with others!

audible · amazon · Spotify · podcast.de · DEEZER

...and also via the Samsung Free App

wittmann-group.com/de_at/podcasts

Susanne Zinckgraf, hosting Markus Brunnthaler from MIRAPLAST (center) and Michael Wittmann (right) at the podcast studio in Vienna

Audio tips

Episode 3: From in-house recycling to PCR processing
Recycling is much talked about, but how far have we really got on the way to a circular economy? And what prerequisites must be created for closing more material cycles besides PET? Markus Brunnthaler, Owner and CEO of MIRAPLAST Kunststoffverarbeitungs GmbH, and Michael Wittmann, CEO of the WITTMANN Group, discuss the topic of recycling from two perspectives – the injection molder's and the technology suppliers'.

Episode 2: With a slender footprint
Floor space productivity has long been an important efficiency key figure influencing the unit costs. But what solutions are available to save space in the layout and operation of production cells? And why are we usually speaking about floor space, although space actually has three dimensions? Markus Wolfram and Martin Stammhammer from WITTMANN Technology give practical advice on how injection molding production cells can be designed more compactly by innovative solutions and creative planning.

Episode 1: Injection molding now for listeners, too
With a cordial welcome from Vienna, Michael Wittmann and Susanne Zinckgraf speak from the new podcast studio to announce the premiere of "We live injection molding". What can the injection molding industry expect in the next few months? Which answers are available to the industry to meet the current challenges? What can digitalization contribute, and why is sustainability impossible without cost efficiency? The topics in the first episode of "We live injection molding" are opportunities, challenges and the WITTMANN Competence Days 2024.

If you have any questions, suggestions or topic requests, we will be glad to receive your mail: **podcast@wittmann-group.com**

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