

## USER REPORT

August 2024

### **“WITTMANN machines are the most economical”**

**At Krona Group in Brazil, WITTMANN injection molding technology provides maximum efficiency**

**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. During the Fakuma in Germany last October, Krona ordered three additional MacroPower injection molding machines from WITTMANN for the production of covers and housings of fuse boxes.

The Fakuma is a regular fixed date for the Krona managers. “We are always on the lookout for new technologies to become more efficient”, says José Armevides Gonçalves, Production Director of the company and also a member of the Board. “If we are targeting higher competitiveness, we must boost our efficiency.” Here, the large MacroPower machines make a substantial contribution. At the production facility in Joinville alone, Krona is operating 75 injection molding machines from WITTMANN,

or WITTMANN BATTENFELD, as WITTMANN's machine division was called until recently. MacroPower machines are taking the lion's share of this equipment.

### **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 and other mechanical features for injection molding production. The core pulls often protrude laterally far out of the steel block. Accordingly, the molds take up a lot of space. Of course, the core pulls can be removed for clamping the mold, but that takes additional time, which reduces the machine's availability.

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."

Another aspect is that the clamping system permits a large distance between the ends of the tie-bars and the moving platen, thanks to the short length of the tie-bars and a large platen stroke. This enables mold insertion and mold clamping laterally from the rear end of the machine, using a crane.

"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.

An additional gain in efficiency is achieved by the fact that extremely large molds fit on comparatively small machines. In this way, the machine size can be chosen on the basis of the clamping force required for the injection molding process rather than based on mold dimensions. "The door-opener for WITTMANN at Krona was a machine request for a special fitting mold", Marcos Cardenal from WITTMANN BATTENFELD do Brasil remembers. "We finally delivered a machine two clamping force sizes smaller than the one originally requested. This size was perfectly adequate for the mold and led to an increase in overall efficiency." After all, smaller machines not only reduce the investment costs. They also come with lower energy consumption and a smaller footprint.

## **Perfect setup for PVC**

Almost all products leaving Krona Group are made of PVC. In total, all units process 10.000 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. "The outward appearance of parts must reflect their quality", says Gonçalves. Professional tradespeople, on the other hand, judge the products' quality by their durability. Piping components must keep intact and function for a long time. Once installed, they cannot so easily be dismantled and replaced.

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. It reduces the shear load and by its flow-optimized geometry makes complete material discharge possible.

The PVC package is now an integral part of the options catalog for all WITTMANN injection molding machines. Nevertheless, the machines for Krona have not come off the peg. "PVC is not the same everywhere", Furtado points out. "The plasticizing units have also been adapted to the types of PVC available here in Brazil."

## **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. For example, one item that catches the eye during our company tour is a two-armed linear robot, a further solution specially tailored to fit Krona's needs.

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 – a customized solution, also designed and manufactured by the local WITTMANN team. By this new process, the unit costs were significantly reduced, and here elimination of the manual work was not the only contributing factor. “The fully automatic process is considerably more stable, and the cycle time is shorter”, explains Cardenal. This means higher quality consistency, greater productivity and greater energy efficiency.”

“It is a big advantage for us that WITTMANN supplies us with injection molding machines and automation equipment from a single source”, emphasizes Gonçalves. “The production cells are easy to operate, thanks to their uniform interfaces and central control system via the machine’s display, and when servicing is required, we have only one contact partner for the entire production cell.”

### **Jointly at the Interplast 2024**

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.

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.

### **In a good position to achieve sustainability goals**

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<sub>2</sub> footprint. With WITTMANN, we are well positioned for reaching

our sustainability goals. The WITTMANN machines consume less energy than the other machines on our production floor.”

The actions to strengthen sustainability are part of a much more comprehensive corporate social responsibility strategy. Last year, Krona established the Instituto Krona, a type of foundation by which the Group controls its social commitment and makes it transparent. A separate team has been established to analyze and evaluate requests, and to decide which projects will be sponsored and where help will be provided. The funds are spent for sports sponsoring at the individual production locations and for disaster aid, such as relief for flood victims.

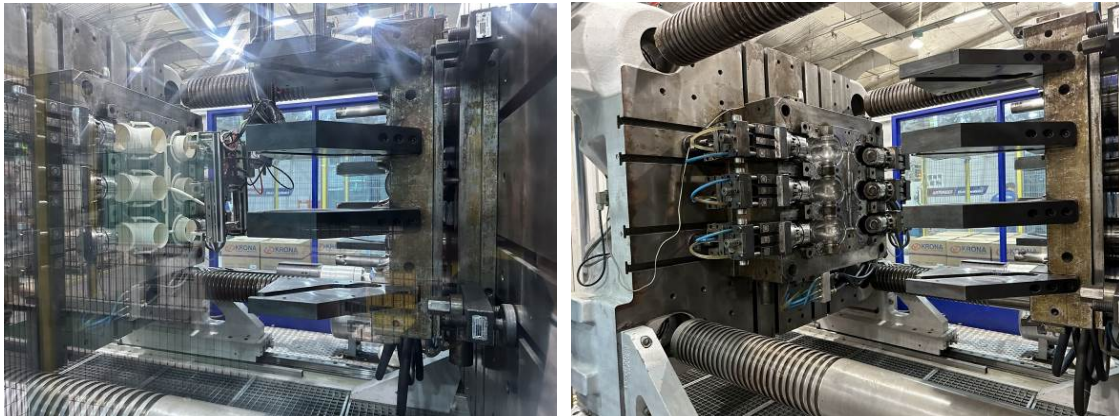


**Fig. 1a+b:** Large machines from WITTMANN dominate the scene at Krona’s plant in Joinville. 75 WITTMANN machines are operating at this location alone. 2500 different articles are currently being produced.

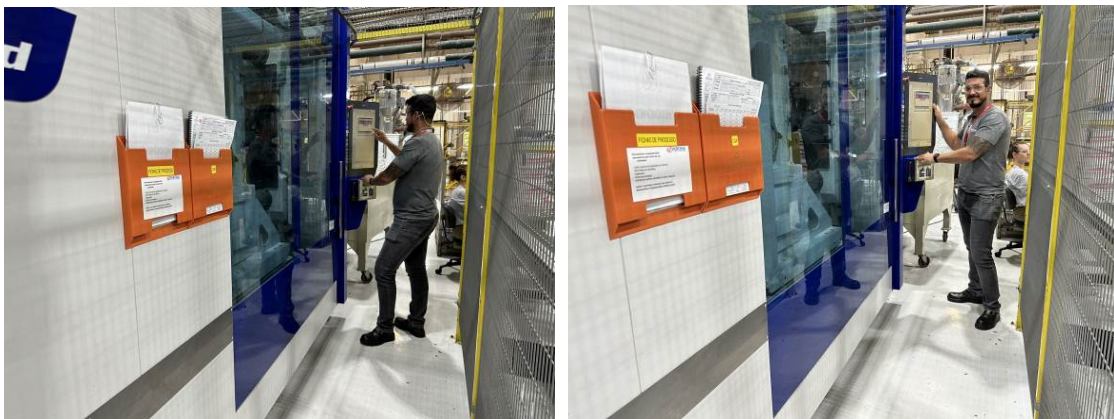


**Fig.2:** Krona is one of the top 3 sanitary equipment suppliers in Latin America. Its products include, for example, pipe segments, connection pieces and fittings for cold and hot water and sewage installations.





**Fig. 3a+b:** 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.



**Fig. 4a+b:** Easy to operate: the injection molding process including automation can easily be controlled centrally via the machine's display panel.



**Fig.5:** Still up and running: one of the first injection molding machines delivered to Krona by WITTMANN BATTENFELD in 2001.



**Fig. 6a+b:** Customized solutions: for Krona, WITTMANN BATTENFELD do Brasil developed application-specific automation equipment, such as a two-armed linear robot.



**Fig. 7a+b:** In the fittings sector, metal inserts are frequently over molded.



**Fig. 8:** For the production of fitting components with metal threading, the WITTMANN team developed a new, fully automatic production process based on a SmartPower injection molding machine.



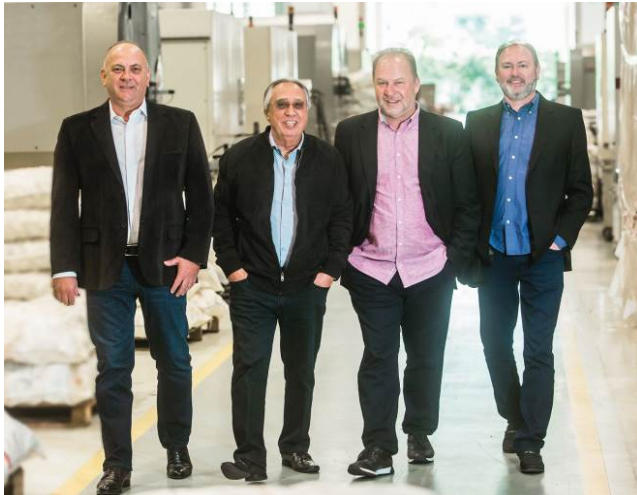


**Fig. 9:** The automation cell for separating and feeding the metal threads was specially designed and produced by WITTMANN BATTENFELD do Brasil as a customized solution for Krona.



**Fig. 10:** Constantly on the lookout for new efficiency potentials: Eliseu Luís de Oliveria, Marcos Cardenal and Cássio Luís Saltori from WITTMANN BATTENFELD do Brasil and Valdicir Kortmann, Vilson Perin, José Armeçides Conçales and Israel Almeida Furtado from Krona (from left to right).





**Fig. 11:** The Management Board of the Krona Group originally consisted of four people: José Arme- cides Conales, Mrio Roberto Borba, Vilson Perin and Valdicir Kortmann (from left to right). Mrio Roberto Borba died of Covid in spring 2020. (Photo: Krona)

Photos: WITTMANN

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## 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 recy- cles 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 35 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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