

Wittmann

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innovations

Techniques – Markets – Trends

Volume 13 – 3/2019

**A
lasting
legacy**

Battenfeld

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Bernhard Grabner – tel.: +43-1 250 39-204, fax: +43-1 250 39-439 – e-mail: bernhard.grabner@wittmann-group.com

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**Michael
Wittmann**

Dear Reader,

280 characters which change the world. – US President Donald Trump's early-morning tweets do not even need to take up the maximum length of text to exert a more pronounced influence on industry than the much-described fourth industrial revolution which has already set in. While on the one hand, trade barriers are being threatened and imposed, the standardization committee of the Engineering Association, on the other hand, successfully dismantles the communication barriers between appliances. So the uneven match can be described as deglobalization in trade versus globalization in technological advancement. And the clear winner here is ... the policy of imposing trade restrictions. The global spurt of growth which should have started long ago as a result of the fourth industrial revolution will probably be somewhat delayed. For how long can be read in the stars – or rather on Twitter. To be continued ... for sure!

In line with my preceding comments, we are describing in this issue of *innovations* among other things a successful example of cross-product and cross-brand communication for the benefit of users. The MES solution TEMI+ has been installed at MAFLEX in Italy and enables clear visualization of production cells as well as communication between injection molding machines of different brands. WITTMANN 4.0 auxiliary appliances are also connected to the MES server via the production cell control systems built into our injection molding machines, and are thus also available for the calculation of a production cell's total efficiency. So far a unique function. MAFLEX was able to realize a substantial increase in efficiency, fully in line with the concept proposed by the "fathers" of *Industry 4.0*.

That we were able to enjoy a period of healthy growth in recent years is easy to see by the numerous extensions and new buildings realized within our group. Our new building in Italy was completed at the end of last year, and we were able to present our new premises and showrooms of WITTMANN BATTENFELD Italia to our customers at the beginning of May. And this would not be Italy, if the official opening ceremony had not also been accompanied by an attractive program of music and exquisite food. A report about this event can be found in this issue of *innovations*, as well as a presentation of our team in Turkey and a colorful selection of reports about interesting applications – for example from Italy, Germany and South Korea.

I wish you great pleasure in reading this issue of our *innovations* magazine.

Sincerely, Michael Wittmann

WITTMANN 4.0

Quality leap through TEMI+



**Andrea Selva
and
Nicoletta
Boniardi**
*interviewing the
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Marco Ravazzani
Klarenbeek.
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Injection Molding

MicroPower at YONWOO



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The record holder



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Interview: Quality leap for a small Italian company

The Italian company MAFLEX in Carbonate, Lombardy, can be regarded as a prime example of a small or medium-sized business under modern management. MAFLEX has invested in state-of-the-art machinery and an integration solution for its production equipment specially tailored for its needs.

Andrea Selva – Nicoletta Boniardi

MAFLEX was established in the 1980s and started off as an assembly and automation specialist before engaging in plastics injection molding.

In the course of the last ten years, its injection molding business has gained more and more significance. Today, the company has 25 employees and runs two production sites, each with 1,500 m² floor space. Work proceeds in three shifts, if necessary seven days a week.

MAFLEX is one of those smaller Italian companies making active use of the opportunities opened up by the Italian national *Plan Industria 4.0*. This has led to a number of changes in order to improve the company's competitiveness.

"Our self-image as an enterprise – or our philosophy, so to speak – has prompted us more and more to develop into a full-service supplier. First and foremost to leading industries such as the electronics, automotive, cosmetics and household appliances industries as well as companies from the irrigation sector which, taken together, make the largest contribution to our sales figures. To a lesser extent, this also applies to the pharmaceutical and toy industries, besides various other niche segments," says Marco Ravazzani Klarenbeek, General Manager of MAFLEX in Carbonate. "In order to be successful here, we have thoroughly investigated the processing methods for various plastic materials including the most technically demanding varieties. We have a range of ultra-modern injection molding machinery at our disposal with a small clean room for micro injection molding, and vertical machines for multi-compo-



TEMI+ allocates one page to each machine to visualize the production progress and planning data, which are automatically linked to the process data.

nent injection molding. In addition, we have assembly lines for pad printing and ultrasound welding, and a workshop for mold servicing as well."

You just mentioned your range of modern machinery. How is it laid out?

Marco Ravazzani Klarenbeek: We work with 20 injection molding machines, more than half of which have been

acquired during the last five years. Our increasingly close cooperation with WITTMANN BATTENFELD has become very important to us and gives us security. We appreciate the machines from WITTMANN BATTENFELD because of their special technical features and low energy consumption.

All in all, this is one of the key factors to ensure our competitiveness. WITTMANN BATTENFELD actively supports our strategy of always acquiring new, powerful injection molding machines in order to continue on our course of constant growth. For our most recent machine purchases, we chose all-electric and hydraulic models from the *SmartPower* and *EcoPower* series. With the help of the new UNILOG B8 machine control system, we are able to control the entire production cell in each case – including monitoring of the status of the injection molding machine and that of some auxiliary appliances in to the production

through before, during and after production – all the way from work scheduling and production to storage of the finished products. If the possibilities available today are fully utilized, small companies, too, can present themselves as suppliers to large companies acting in a structured way. Companies which today require more and more stringent control of the supply chain and of the product.

Having seized this opportunity means that we are now able to present ourselves on the market as one of the first industrial supply companies actually applying the principles of *Industry 4.0*. After we had laid the foundation with the acquisition of the new machines, we still had to take some further steps in order to reach the stage of integrated production.

How did you approach the implementation of this project?

M. R. K.: The most recently purchased injection molding machines from WITTMANN BATTENFELD were already



At MAFLEX, 20 injection molding machines are installed. More than half of these have been acquired in the course of the last five years, which is due to the company's increasingly close cooperation with WITTMANN BATTENFELD.

cell. The great benefit here is the possibility for comprehensive integration of all appliances and processes.

Integration of different systems ... how do you see your approach to Industry 4.0?

M. R. K.: Before the *Plan Industria 4.0* and the opportunities it offers were in existence, we had no digital process for controlling the various stages the products must pass

laid out for integration across systems. The challenge for us was to enable the already existing older machines to communicate with each other via a central computer system.

At that time, the relevant possibilities were already available, even though no applications could be found anywhere that would perfectly fit our situation. We carefully examined all options available to us as a relatively small >>

business and precisely defined the goal we ultimately wanted to reach. Of course we were also able to take advantage of certain tax benefits, but we would certainly not have had the resources available to establish a complete *smart factory*, for which it would have been necessary to purchase highly complex, and extremely costly systems.

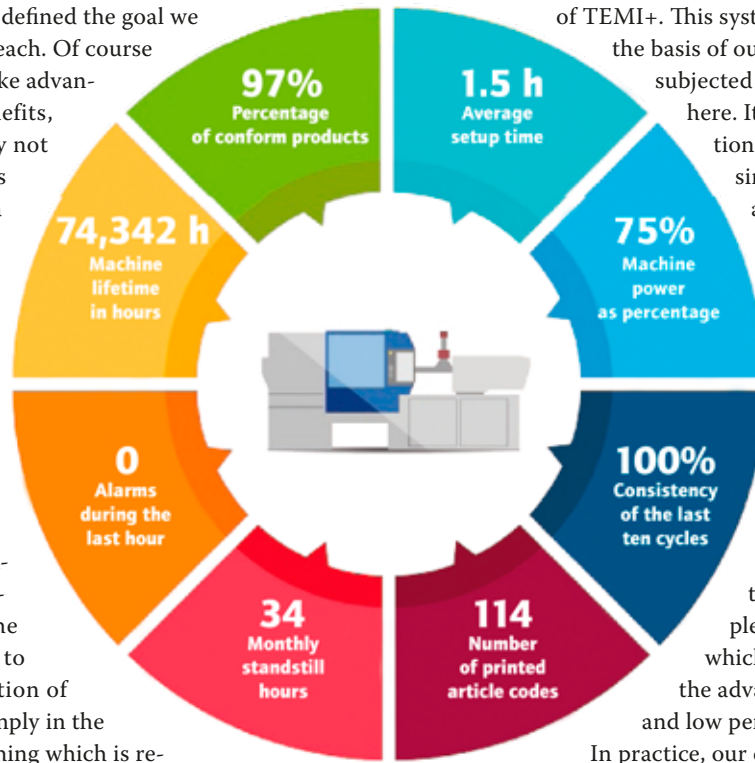
After we had basically clarified which steps should be taken, we also came to the conclusion that it was possible for us to catch the exactly right moment to engage in the digitization of processes. This was simply in the air, so to speak, something which is re-confirmed again and again when we talk to customers, suppliers and competitors. They all have a great entrepreneurial spirit, and they all wanted to have a comeback after the crisis – a crisis which caused an even more rigorous selection in the market, where more and more specialization and service were called for.

The Italian entrepreneurs were actually caught up with a type of enthusiasm, more or less inspired by the “German” approach, understanding digitization as the motor driving the economy and innovation. We decided that this must be the moment for us to try it ourselves – using whatever means we had at our disposal.

How can this be successful without a company of this size being burdened with excessive costs?

M. R. K.: The solutions offered by major players frequently consist of MES systems (MES = Manufacturing Execution System), which have highly complex technical architectures which small companies find very difficult to use. Such companies simply do not have the human resources at their disposal which could be exclusively dedicated to this type of system. From my point of view, small and medium-sized companies need a software characterized above all by being very easy to learn and to apply. Moreover, such a system must not put those at a disadvantage who have machines of different brands and varying ages. It must be possible to include all appliances into the corporate network. So we decided to cooperate with the young company ICE-flex.

Following a thorough examination of our needs, ICE-flex developed the MES system originally named Temi Plast 4.0, which is on the market today under the name



of TEMI+. This system was designed on the basis of our experience, and also subjected to extensive testing here. It is also ideal for application in other companies of similar size and structure and thus addresses a target group consisting of numerous small and medium-sized companies of our industry.

Which requirements had to be met when the system was implemented?

M. R. K.: Primarily the need to have a simple, well-organized system which is not invasive, with the advantages of low costs and low personnel requirements.

In practice, our customers demand a more and more detailed traceability of the products, and TEMI+ enables us to meet this demand.

We are at last able to apply a comprehensive operating concept. This has made us more flexible and enabled us to meet a wide range of different needs – even when a given project has already been started. We can monitor all production processes, control them also on weekends or during the night and receive all information including the reports about machine downtimes in real time via remote query.

This tool allows us to offer ourselves as a supplier to market leaders, since we can ensure the traceability and documentation of all necessary indicators. It is now possible for us to monitor the mold change times, derive the necessary remedial

actions from the alarm graphs, even during ongoing production, and to have the consistency data of the cycle and buffer times at our disposal – all basic parameters for the production process.

But just as important is the cut in paper consumption and continuous reduction in paper filing. It is our ambition to make the use of paper virtually disappear altogether, as we can upload all drawings and working parameters into the screen control systems of the injection molding machines.

The operator can confirm the quality inspection directly on the monitor – currently still a manual process, but one we are planning to digitize completely, which will enable us to keep the production history always up to date as well as very well organized. In short: we have the complete traceability of all our processes at our disposal, not just that of our raw materials and the corresponding batches. ♦

TEMI+ collects both process and quality data directly in each machine, which ensures trouble-free reconciliation of these data.



Marco Ravazzani Klarenbeek:
"Thanks to TEMI+ we are able to ensure complete traceability and offer ourselves as suppliers to market leaders."

Andrea Selva and Nicoletta Boniardi contribute to the Italian PLASTIX magazine.

WITTMANN 4.0 with TEMI+: Tracing of Q-parameters – the right way

Commercial MES solutions (Manufacturing Execution System) have established themselves successfully in the plastics industry as information and control centers for the production monitoring and planning of injection molding machines. One of the reasons for this success is the availability of the standardized interfaces as Euromap 63 and upcoming OPC-UA based protocols, which ensure a simple connection between machine and MES. Practically all MES solutions, however, stop at the machine level as the lowest communication layer and thus cover only a small fraction of the process-determining devices in a production hall. One consequence of this restriction is that it has so far not been possible to achieve complete and consistent quality recording and assurance. Especially in times of Industry 4.0, in which the call for the IIoT (Industrial Internet of Things) is growing louder and in view of the increasing demand for quality assurance, product liability and traceability of produced

parts, this situation is no longer accepted, particularly by the automotive industry, demanding a more comprehensive solution.

Together with its MES partner company ICE-flex, WITTMANN is now presenting for the first time in the industry the MES package TEMI+, which can uniquely cover both injection molding machines and auxiliaries around the machine. Therefore, a full and complete data acquisition and evaluation of the quality parameters of all devices involved in the production of a part is possible for a MES standard product. So far, this would have been feasible only with the help of extensive and expensive programming efforts without taking advantage of the new communication standards available on new equipment.

The most obvious feature of this novel functionality is the extension of the main view of the TEMI+ dashboard to include the auxiliaries, which are part of a WITTMANN 4.0 work cell. It is practical that the peripherals

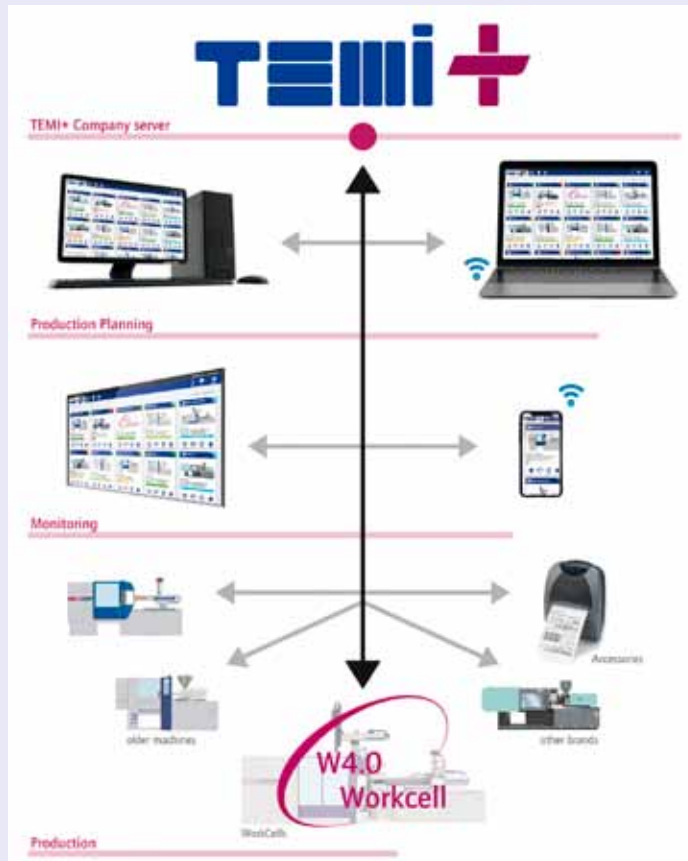
automatically log in and out of the WITTMANN 4.0 work cell in the sense of "Plug & Produce". Thus, the MES solution TEMI+ is always informed about the composition of a work cell and can adjust the display on the screen accordingly and without user interaction.

Another benefit of WITTMANN's "Plug & Produce" for TEMI+ is the ability to easily and completely identify which devices belong to a work cell. The WITTMANN 4.0 router placed in front of the work cell as a gateway, automatically groups all the devices in the work cell and represents the work cell with a single IP address to the outside. Thus, the devices within a WITTMANN 4.0 work cell including the injection molding machine are accessible for the MES program via this one access point as a fundamental condition for data consistency. After the mold change and thus the possible changing of the composition of a work cell, a correct data acquisition will

again be possible from the now pooled together devices in the work cell automatically and without programming efforts. Previous MES systems could not guarantee data consistency.

The access of TEMI+ to the individual devices is implemented via standard protocols. For example, the E63 or E77 protocols are used for communication with the injection molding machines and the protocols E82 or OPC UA for connected auxiliaries.

The perfect interaction of the MES solution TEMI+ with WITTMANN 4.0 offers users completely new possibilities for seamless quality assurance with correct data records. The MES solution TEMI+ is suitable and designed for the connection of injection molding machines of all manufacturers. However, a secure and complete data collection independent of user settings and thus possible operator errors will only be possible with the connection to a WITTMANN 4.0 work cell.



MicroPower replaces conventional injection molding at YONWOO

YONWOO, the largest manufacturer of packaging for the cosmetics industry in Korea, is replacing conventional injection molding machines with machines of the MicroPower series from WITTMANN BATTENFELD, which are specially designed for micro injection molding.

Gabriele Hopf

YONWOO, based in Incheon, Korea, was established in 1983. Today, the family-owned company with a current workforce of 1,500 employees ranks among the world's leading manufacturers of cosmetics packaging with a high technological standard. YONWOO owes its success largely to continuous further development of its products and strict quality control.

The company's product range includes all types of cosmetics containers, such as cream jars and tubes, make-up containers, oil pumps, sprays, foaming devices and much more. One of its main product lines is a range of dosing pumps which YONWOO developed in 1990. YONWOO was the first manufacturer of dosing pumps in Korea.

These pumps were previously imported from Japan for the cosmetics industry in Korea. Most of these pumps work with the *Airless* technology developed by the Korean company YONWOO.

This technology enables a highly accurate, consistent release of the required dosing volume with each pumping process. The portfolio of these pumps includes pumps with dosing volumes of 0.08, 0.15, 0.2, 0.3, 0.5 and 1 ml.

YONWOO sells about 50% of its products in Korea, the remainder is exported. Its main export markets are Europe and the USA. The company's customer base includes groups such as L'Oréal, P&G and Estée Lauder.

Typical products from YONWOO.
(Photo: YONWOO)



MicroPower machines with UNILOG B8 control system at YONWOO in Incheon, Korea.



Martin Philipp-Pichler, MicroPower Product Manager, WITTMANN BATTENFELD, Chong Geun Kim, Managing Director WITTMANN BATTENFELD Korea, Roland Pechtl, Project Manager Asia, WITTMANN BATTENFELD, Kim Hong Suk, YONWOO Deputy Project Leader Incheon, Korea (from the left).

YONWOO orders twelve MicroPower machines

To make the small individual components of the pumps, such as sealing caps, check valves, piston cylinders and housings, YONWOO had decided to replace conventional injection molding machines with *MicroPower* machines from WITTMANN BATTENFELD. The company ordered a total of twelve *MicroPower* machines from WITTMANN BATTENFELD, of which six are already up and running since 2017.

These are used to make parts for pumps with dosing volumes of 0.15 and 0.2 ml. The project to replace conventional injection molding machines with machines from the *MicroPower* series started in December 2016 with WITTMANN BATTENFELD presenting a first mold layout in cooperation with the Ernst Wittner company. This layout was then further optimized by YONWOO in



close collaboration with WITTMANN BATTENFELD. Next, a first mold was constructed and tested successfully in May 2017 at WITTMANN BATTENFELD in Kottlingbrunn, in the presence of YONWOO staff members. This was the starting signal for the first six machines. They were delivered in December 2017.



A challenging application

The six *MicroPower* machines replaced two conventional injection molding machines on which parts had previously been produced with a 64-cavity mold within a cycle time of 14 seconds. Thanks to their compact design, the six *MicroPower* machines take up no more space than the two machines they had replaced.

What is more, in contrast to conventional machines, the *MicroPower* machines with their small dimensions could be transported easily to the seventh floor, where they now stand right next to the assembly area for the pumps. In this way, it became possible to optimize transport distances and to save valuable space in the hall on the ground floor.

The molds now in use have 12 cavities. Particularly positive for YONWOO is the weight constancy of only 2 mg from one part to the next. This could not be achieved reliably with the 64-cavity mold. In this way, it not only became possible to considerably reduce the production and maintenance costs for the molds, but handling and quality inspection of the parts has also

View of a sealing cap.

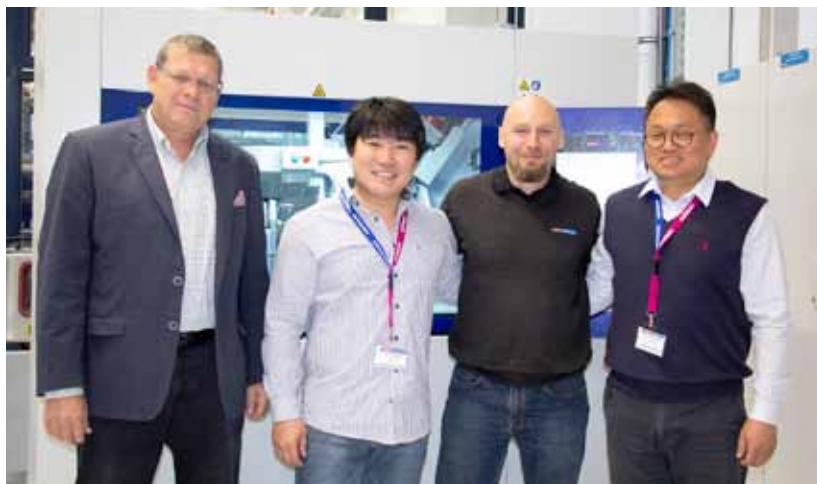


become much easier. The cycle time is now only 8 seconds, and the scrap rate has been reduced to a minimum. Thanks to the cost savings realized together with significantly higher productivity, the investment in the *MicroPower* machines has paid off within less than a year.

Perfect satisfaction

Following this positive development, YONWOO decided to order more machines. The next six *MicroPower* machines were delivered between November 2018 and the first quarter of 2019. The machines are

Quality inspection of sealing caps.



equipped with a rotary disk. As a special highlight, it should be mentioned that the injection volume, which is 4 cm³ for the *MicroPower* as standard, could be increased to 6 cm³ for the first time in one of the machines.

Seong Ho Kim, Team Leader M&I Technical Center at YONWOO, showed himself impressed by the short response times and uncomplicated, good cooperation with WITTMANN BATTENFELD. – In the meantime, YONWOO has ordered the 13th *MicroPower*. ♦

Machine acceptance at WITTMANN BATTENFELD in Kottlingbrunn. Roland Pechtl, Seong Ho Kim, Team Leader M&I Technical Center at YONWOO, Martin Hirschenauer, WITTMANN BATTENFELD Application Technology MicroPower, Chong Geun Kim (from the left).

WITTMANN BATTENFELD machine producing large parts at aquatherm

Since the end of 2018, the pipeline specialist aquatherm has been producing its large molded parts with diameters ranging from 90 to 250 mm fully automatically with a machine from WITTMANN BATTENFELD's MacroPower series. With 10,000 kN clamping force and a 9 kg maximum shot weight, the MacroPower 1000/16800 is the second largest injection molding machine installed at aquatherm.

Gabriele Hopf



*MacroPower
1000/16800 at
aquatherm.
Photos: aquatherm*

The aquatherm company, founded by Gerhard Rosenberg in 1973 and based in Attendorn, North Rhine-Westphalia, is the globally leading manufacturer of plastic pipeline systems made of polypropylene for plant engineering and building services. The owner-managed company employs more than 600 associates at a total of seven facilities in Germany, Italy, the UK, the USA and Canada. Production takes place exclusively at the two German plants in Attendorn and Radeberg. 90% of the products are exported worldwide.

aquatherm produces some 41 million molded parts annually with pipe diameters ranging from 16 to 630 mm. The product range includes more than 17,000 different articles, which are used in single-family houses and



*From left to right:
aquatherm Man-
aging Directors
Christof, Maik and
Dirk Rosenberg.*



apartment buildings, hotels, public buildings, industrial plants, healthcare and social services institutions, sports and leisure facilities and ships. Examples are pipelines for drinking water and sanitary installations, heating systems, distributor pipelines, under floor, wall and ceiling heaters and water recycling. The pipeline systems manufactured by aquatherm serve to transport water, compressed air, liquid foodstuffs and aggressive media such as acids, alkalis and varnishes, which often require extremely high resistance to chemicals. Apart from the high quality of its products, aquatherm is also concerned about environmentally friendly and energy-efficient production of its fittings and pipelines.

MacroPower 1000/16800 with its customized automation system.

aquatherm uses the MacroPower

At its two facilities in Germany, aquatherm constantly works on optimizing its processes and increasing its capacities. In 2018, a new hall with 4,750 m² floor space for injection molding was opened, which was built according to latest standards of energy efficiency and protection of the environment. The company's range of machinery was also extended by adding a large machine from WITTMANN BATTENFELD.

This machine is a *MacroPower 1000/16800* with 10,000 kN clamping force and a maximum shot weight of 9 kg, equipped with a W843 pro robot from WITTMANN and a customized automation system. This machine produces large molded parts with diameters ranging from 90 to 250 mm. The machine comes with the modern UNILOG B8 control system based on Windows™ 10 IoT, which stands out by its easy operation. The electrically actuated safety gate on the operator side provides additional comfort. A 2,000 mm opening stroke allows the insertion of large molds.

Parts removal and depositing with WITTMANN W843 pro robot.

Moreover, the machine delivered to aquatherm fully meets the high standards set by the company's management in terms of energy efficiency, cleanliness and low noise level.

The machine is equipped with a modern servo-hydraulic drive which offers high dynamism and runs very smoothly. Furthermore, the energy loss in the WITTMANN robot from the modern pro series has been significantly reduced by enlarging the energy storage unit integrated in the servo modules. Due to the robot series' optimized energy chain, the sound emissions were also considerably reduced.

Bushings on the conveyor belt.

Fitting with brass threading.

An overall positive experience

Both the management team and the machine operators are fully satisfied with the new *MacroPower* after it has now been used in production for several months. Maik Rosenberg, one of aquatherm's three Managing Directors, comments: "In addition to its modest energy consumption and low noise level, the machine recommends itself by its high operating comfort. Its compact design – and consequently small footprint – is another great benefit of the *MacroPower*." ♦

Gabriele Hopf is the Marketing Manager of WITTMANN BATTENFELD in Kottlingbrunn, Lower Austria.



"Smart power" for Liquid Injection Molding (LIM)

At the Fakuma 2018, the latest version of liquid silicone injection molding technology from WITTMANN BATTENFELD had its premiere at the Momentive Performance Materials show booth, and what is more, in combination with a highly compact production cell based on a servo-hydraulic machine from the SmartPower series. The most important innovations are a revised screw technology and the integration of the LSR dosing pump into the machine's control system via OPC-UA communication. [*LSR = Liquid Silicone Rubber]*

Reinhard Bauer

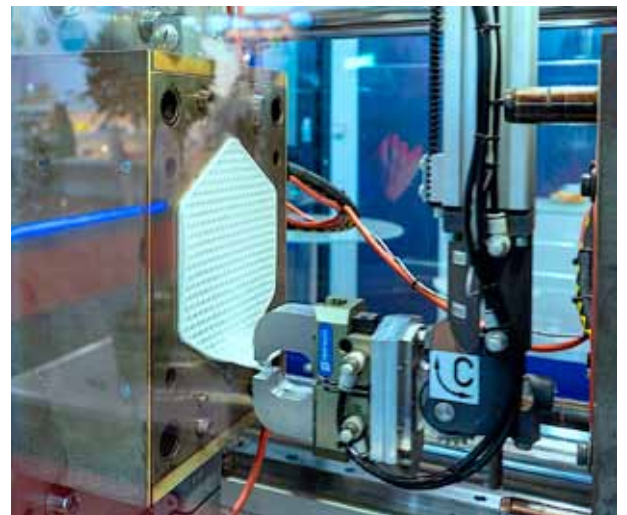


At the Fakuma 2018, WITTMANN BATTENFELD presented its latest-generation machine technology for liquid silicone injection molding. The picture shows a pot holder, produced at the show booth of the Momentive Performance Materials company.

Foto: R. Bauer

Picture left: SmartPower 90/350 working cell with integrated 2-component dosing/mixing device, temperature controllers and parts removal/depositing equipment.

Picture right: WITTMANN handling equipment for highly elastic parts.



Liquid silicone injection molding has been an integral part of the WITTMANN BATTENFELD range of machinery and technology for many years. The machines are operating successfully at numerous well-known processors. “The market requirements are the driving force behind the continuous further development of LIM process technology”, emphasizes Wolfgang Roth, Application Technology Manager at WITTMANN BATTENFELD. And he continues: “The latest version presented at the Fakuma 2018 includes not only updates in the mechanical design, but also the integration of communication interfaces between the machine and the auxiliary components according to the *Industry 4.0* standard. A practical example is the now existing facility to connect every liquid silicone dosing and conveying system commonly available on the market with the machine’s control system via an OPC-UA interface.”

The work cell with a *SmartPower 90* on display at the booth of Momentive Performance Materials at the Fakuma 2018 produced a 255 cm² pot holder with a honeycomb structure on both sides, made from Silopren. During the simulation phase, the parts geometry was laid out for even, clamping-force-optimized cavity filling by SIGMA Engineering with the help of their virtual molding software. The mold maker Emde MouldTec designed the actual production tool on the basis of this simulation. Feeding of the 2-component liquid silicone material was effected via a MaxiMix 2G dosing pump from ACH Solution.

Virtual design of LSR applications

The potholder is a complex part with a shot weight of 83 g, a 135 mm flow path length and a maximum wall thickness of 1 mm over most of its area. Even filling of the cavity without a premature start of curing is therefore a decisive quality factor for this part. This is why the number and optimal positioning of the cold runner nozzles were calculated first by a virtual DoE (Design of Experiments) system. By checking the filling and geometry scenarios with the SIGMASOFT® virtual molding software, it was possible to ascertain the right injection concept under static temperature conditions. In addition to the geometries, the calculation of this concept was also based on the steel grades used for the cavities and the cold runner, as well as taking into account the positioning and output of the heating cartridges.

Efficiency gains through several improvements

In the latest version, the plasticizing unit, the core of the LIM process technology inside the injection molding machine, has been revised in a considerable number of details. For example, the design of the shaft seal at the end of the shaft in front of the screw coupling has been optimized to reduce the risk of liquid silicone leaking out towards the screw drive. Another innovation is the meticulous layout of the check valve, combining a larger flow cross-section with a faster and more precise closing mechanism. This has led to a significant improvement in shot weight precision

compared to the predecessor version. The multi-zone liquid temperature control system of the barrel and the pneumatic needle shut-off nozzle were left unchanged.

Compact mold/machine nozzle assembly

An additional special feature of the trade fair demonstration was the extremely compact assembly combining the machine’s nozzle with the cold-runner injection system and the mold.

For instance, the cold runner from Emde MouldTec was fastened directly onto the machine’s nozzle and then guided through the machine’s platen. This type of design not only offers compact mold dimensions, but also minimizes the contact between the inevitably “cold” gating system and the “hot” mold.



Close-up view of the LIM screw shaft with dual sealing system.

The latest version of the check valve with an enlarged flow cross-section as well as a faster and more precise closing mechanism.

Footprint minimization through integration

The comprehensive injection molding equipment range of the WITTMANN Group, including materials handling, temperature control, robot technology as well as injection molding machines, provides the basis of expertise for concentrating system components to create space-saving production cells. The system demonstrated at the Fakuma was one such example, where the dosing unit, the colorant feed system as well as the finished parts removal and depositing equipment were packed together in a minimum of space.

Competence for handling highly flexible parts

The WITTMANN robots and automation business division covers the entire bandwidth of handling technology for molded plastic parts. An important issue in this area is the expert handling of flexible parts which cannot be ejected, but must be either expressed from the cavity with compressed air, or pulled off by the robot using a gripping device. Adaptation of the correct demolding method to a particular molded part can be included in the LIM equipment package as an optional extra.

Micro to medium-sized dimensions

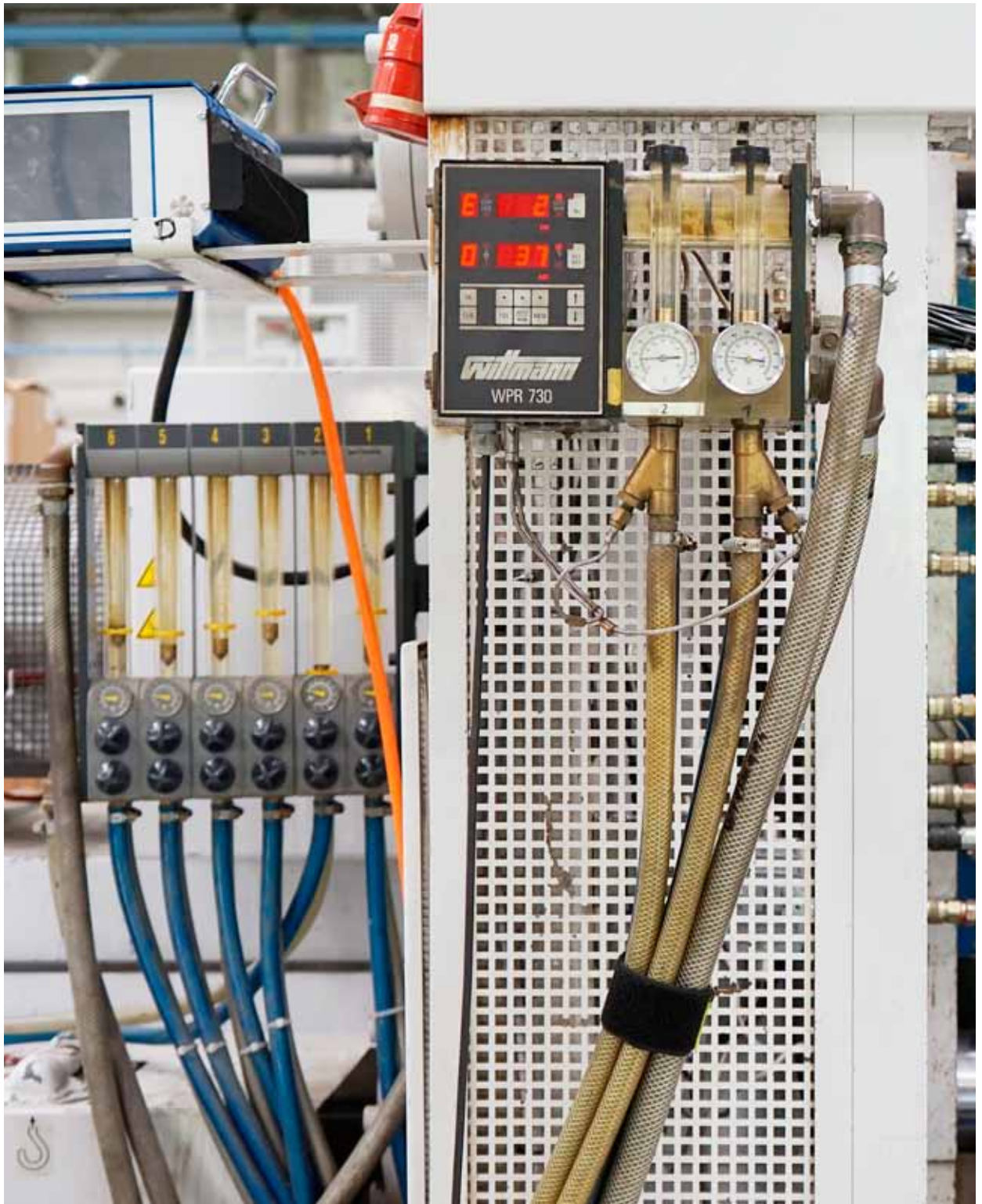
The machinery and equipment packages for liquid silicone injection molding are available within a great bandwidth, ranging from micro parts with shot volumes from 1.2 to 4 cm³ up to medium-sized molded parts. With this LSR injection unit specially designed for minimal part weights, parts weighing less than 1 mg can be produced with high precision. ♦

Reinhard Bauer is a freelance journalist and communications consultant specializing in plastics technology.

WITTMANN flow controller running for a quarter century!

Walter Lichtenberger, the Temperature Control Technology Division Manager at WITTMANN in Vienna, has discovered a long-used piece of control technology at SANIT in Eisenberg near Leipzig/Germany: a WPR 730 installed many years ago and still running today.

Bernhard Grabner



Installation of the WPR 730 on a 650-ton injection molding machine at SANIT in Eisenberg/Germany.

Sanitärtechnik Eisenberg GmbH (SANIT), located in Eisenberg/Thuringia and a part of the Aliaxis Group since the 1990s, operates production plants not only in Eisenberg but also in Rödentel and Wittenberg. SANIT is a recognized specialist in the area of sanitary technology. The company supplies its products to numerous industrial customers, including leading sanitary specialists, and is well known and appreciated beyond the borders of Europe today as a partner to the international sanitary industry.

In large numbers of units, SANIT makes drain units, tube diffusers and WC accessories – from cisterns and WC seats to complete on-wall installation systems and

ding machine models from WITTMANN BATTENFELD, as well as WITTMANN robots, granulators and flow controllers.

SANIT uses WITTMANN flow technology

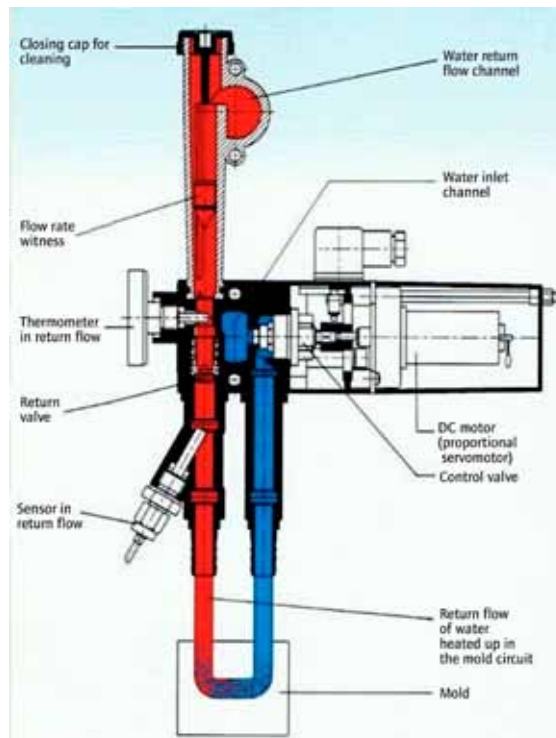
For more than 40 years, WITTMANN has been known as the number one in the development and production of water distribution systems. Already in the 1990s, the company developed its models WPR 730 and WMTR 720, which were able to control the flow quantities in the individual tool channels and to re-adjust them in the event of pressure loss via a proportional control valve in the water pipe system. The flow measurement technology was based on the principle of a measuring transformer with coiling placed on the outer pipe.

The float, a ferrite core overmolded with plastic, served to measure and monitor the flow quantities. The proportional valve of the WPR 730 was created by placing a DC motor with planetary transmission gearing on the existing control valve.

This solution was an original design created by WITTMANN, since at that time no low-cost solutions such as stepper motors were yet available. On the whole, the WPR 730 was a revolutionary new development, but in the 1990s, the time was not yet really ripe for such advanced monitoring systems. During a customer call at SANIT, a WPR 730 which was still in operation caught the eyes of Walter



The WPR 730 proportional flow controller from WITTMANN.



Picture left: Walter Lichtenberger (left), WITTMANN Division Manager for Temperature Control Technology, and Tilo Walther, Injection Molding Plant Manager at SANIT, discussing business. Picture right: Schematic diagram of the appliance's functionality.

system solutions for level-access showers. The Rödentel facility is equipped with two fully automatic production lines, including assembly and quality inspection.

A total of 124 injection molding machines are currently in operation at SANIT, 71 of which are installed at the Eisenberg plant. The business relations between SANIT and the WITTMANN Group have been well established for many years. SANIT is using various injection mol-

Lichtenberger, Division Manager for Temperature Control at WITTMANN. (Many years ago, Walter Lichtenberger had played an important part himself in developing this flow controller model.)

Tilo Walther, Manager of the SANIT injection molding plant, confirmed that this appliance had now been functioning trouble-free for 24 years – a WITTMANN flow controller solution well ahead of its time. >>



View into the mold space of the application at the moment of parts removal.

WPR 730 application at SANIT

At SANIT, this WITTMANN WPR 730 proportional flow controller is used on an injection molding machine with 650 tons clamping force in conjunction with frequency-controlled pumps. In an application running exclusively on this machine, SANIT manufactures two types of 6-liter polystyrene cistern housings and their lids.

The completely assembled polystyrene cistern.



The WPR 730 installed here is fed with a water-glycol mixture as cooling medium, using a central cooling system with an output- and motor speed-controlled pump. Depending on the level of capacity utilization, the cooling aggregate's control system responds by automatically increasing or reducing the pump's motor speed, thus adjusting the pressure of the medium inside the WPR 730. To keep the actual value within the set tolerance margin, the proportional valves of the WPR must be brought into the correct position. This process is carried out automatically and re-adjusted as required. This application is characterized in particular by not having the mold temperature adjusted in the conventional way, that is, no pre-heating with a temperature con-

troller generally operating with high energy consumption takes place. The mold is heated sufficiently by the injected plastic melt and the appropriate hot runner system built in on the fixed side. In this way, the production can be initiated with a "cold" start.

However, care must be taken that the heat energy radiation from the hot runners does not overheat the mold – so cooling is necessary. Via proportional valves, cold water is pumped through the cooling holes in a precisely controlled way. A sensor in the return line of the mold channel measures the return flow temperature and transmits the temperature readings to the electronic system for further processing. The application running at SANIT works with an inlet water temperature of 15°C and a return temperature of 29°C – values corresponding to a cavity wall temperature of 40°C.

If pressure fluctuations occur in the cooling circuit or if a mold channel is partly blocked through soiling, the proportionally controlled valves of the WPR 730 open or close in response and adjust themselves automatically to maintain the set temperature level.

A tolerance margin can be defined for that level. If the temperature exceeds or falls below this margin, an alarm signal will be issued. The WPR 730 was already equipped with an interface to communicate with the injection molding machine, which made its use extremely comfortable over the years.

SANIT's Injection Molding Plant Manager Tilo Walther and Walter Lichtenberger, Division Manager of Temperature Control Technology at the WITTMANN Group, both agree on one point: flow technology which, once installed, has now been running without any incidents for almost 25 years, is not only an excellent testimonial for WITTMANN's R&D work, but is also breaking records. ♦

Picture left: Production plant of SANIT in Eisenberg, Germany. Picture left: View of the company's showroom.



Bernhard Grabner is Head of Graphic Artwork and Chief Editor at WITTMANN's head office in Vienna.

The Turkish WITTMANN BATTENFELD branch

For years now, WITTMANN has been the undisputed Turkish market leader for linear robots. And year by year, WITTMANN BATTENFELD Turkey steadily holds a bigger market share for all of the company's other product divisions: injection molding machines, water flow regulators and temperature controllers, drying and conveying equipment.

The Turkish branch of the WITTMANN Group was established in 2006 in Kadıköy-Istanbul. In April 2009, Muzaffer Engin became the General Manager. Constantly growing, the company moved to a bigger building in 2011 in Maltepe-Istanbul, making full use of 660 m² of floor space, including a 200 m² showroom and 150 m² of storage space. In 2018, another 150 m² was added.

The company's location is very convenient for Turkish customers, allowing quick and effective service. Currently, WITTMANN BATTENFELD Turkey employs 16 people, among them seven technicians and three sales people. There are plans to further increase the company's manpower over the course of this year.

WITTMANN BATTENFELD Turkey provides customized solutions for the most complex automation systems, including top-entry in-mold labeling (IML) robots and special EOAT (end-of-arm tooling) for many applications.

Some application examples include glass insertions, bushing insertions for washing machine drums, and varied insert applications for the automotive industry. Top-entry IML robots are also even exported to Egypt, Lebanon, and some African countries.

Along with its growing market share, WITTMANN BATTENFELD Turkey has extended the number of its spare parts in stock, thus shortening response times and providing solutions to customers in next to no time. In any given moment the company stocks at least one injection molding machine and one robot, as well as mobile dryers, single material loaders, temperature controllers, and water flow regulators.

Highlights of the Turkish market

The automotive industry is the strongest stimulus for the Turkish injection molding sector. In 2018, Turkey produced a total of 1,550,000 vehicles.



View of the Plast Eurasia 2018 show booth of WITTMANN BATTENFELD Plastik Makineleri Ltd. Sti., the Turkish subsidiary of the WITTMANN Group.



The Turkish WITTMANN BATTENFELD team at the Plast Eurasia 2018 show booth.

The most important facts about the Turkish automotive industry are as follows.

- Number 14 in the worldwide automotive production.
- Leading sector for 11 years, 18% of the country's exports.
- Leading industry in R&D: 107 respective centers.
- Employs 200,000 people, globally competitive.
- One vehicle produced every 13 seconds.
- Holds an export share of 77%, exporting to nearly every country in the world.
- Exports a new vehicle every 18 seconds.

The packaging and electrical appliances industries are also strong in Turkey. Especially the Turkish white

goods industry which is an international player. Turkey is in fact the biggest manufacturer of white goods in Europe, and number two in the world. The sector exports 75% of its production to more than 150 countries.

WITTMANN BATTENFELD Turkey participated in the Plast Eurasia Istanbul in December 2018, the Plast Eurasia being the largest plastics industry fair in Turkey and around Turkey. More than 1,000 companies from 44 countries and 50,000 professional visitors attended the show.

As one of the biggest players in the market, WITTMANN BATTENFELD Turkey presented the company's entire product range, welcoming guests and customers to a show booth of 279 m² floor space.

Despite the currency fluctuations involving the Turkish Lira, the Plast Eurasia 2018 experience turned out to be a very successful event. ♦

New premises for the Italian WITTMANN Group subsidiary

More than 250 guests – including customers, plastics company representatives and trade media– attended the opening of the newly built WITTMANN BATTENFELD subsidiary in Ceriano Laghetto, Italy. The opening took place on May 9 and 10 and the event's tagline was "enjoy innovation". There was much to enjoy in the proceedings.

The new premises of WITTMANN BATTENFELD Italia S.r.l. in Ceriano Laghetto, located in the Lombardy Region in Northern Italy.

Boundless joy about the new premises: the enthusiastic Italian WITTMANN BATTENFELD team.

The inauguration saw the presence of Dr. Werner Wittmann and the WITTMANN and WITTMANN BATTENFELD CEOs Michael Wittmann and Rainer Weingraber.

The Ceriano Laghetto showroom was equipped with advanced WITTMANN BATTENFELD solutions: a ServoPower 120/525 injection molding machine set up as a WITTMANN 4.0 work cell, an EcoPower 110/350 with Expert-StepForce system (allowing for a stepwise buildup of the clamping force), a vertical VPower 160R with rotary table, and a COMBIMOULD SP 240/750 H + 210 S. The complete range of WITTMANN auxiliary equipment was also presented. The interconnection of all the molding machines with the TEMI+ system made for a complete exposition of all the current WITTMANN Group technologies.

Gratitude for customer loyalty

May 9, the first day of the event, was reserved for some selected long-standing customers that have shown

their constant loyalty for many years – firstly being business partners with BATTENFELD, and, as of 2008, with the WITTMANN Group. A brief but comprehensive presentation of WITTMANN technologies and their advantages was followed by the opening ceremony.

Dr. Werner Wittmann and the Italian Managing Director Luciano Arreghini both cut through the ribbon to officially inaugurate the new premises.

The customers were invited to visit the new showroom, where they were given explanations of the applications on display and the performance of the different machines and the auxiliaries.

They also had the opportunity to see the new, modern offices and training rooms, the new technical office dedicated to both the "service hotline" and the web service, and also the new automated vertical warehouse.



The event continued with cocktails, served in the magnificent gardens of Villa Erba at Lake Como, where a concert of classical music was held, entitled “Musical journey between Italy and Austria”, thus marking the long and fruitful collaboration between the Vienna group headquarters and the

Italian branch. A gala dinner within the splendid setting of Villa Erba concluded the evening. In the course of the evening, Luciano Arreghini presented a framed commemorative plaque to Pietro Spinelli, Manager of the Spival company in Larciano, Tuscany – in recognition of his exceptional loyalty and

support. Actually, the Spival company purchased its first BATTENFELD injection molding machine in 1959, and the latest one in 2019, when Spival bought a twin-injection model with 160 tons of clamping force. Luciano Arreghini expressed his joy and pride, in view of these 60 years of constant loyalty.



Picture left: Dr. Werner Wittmann (left) and Luciano Arreghini, cutting through the ribbon at the opening ceremony. Picture right: Part of the festivity was a concert of classical music in the Villa Erba in Cernobbio at Lake Como.



The open house event

May 10 was organized as an open house event – open to all actual and potential customers. Here the focus was on presenting the technologies and machinery through live demonstrations in the showroom.

Luciano Arreghini said that “the move to our new building is an important step forward, dictated by organizational necessity, and, above all by our desire to offer ever-greater efficiency and services which are innovative and professional. This is a significant moment in our history. One we want to share with our long-standing clients, who have been a key factor in our growth and who have backed us with their ongoing and valuable loyalty.”

The new premises cover an area of 1,900 m², including 750 m² of office space on two floors, and another 750 m² for the showroom, the warehouse, and the repair shop for temperature controllers, dryers and sprue pickers. There is a training room, a meeting room for some 30 people, and a reception room. The offices feature glazed walls, combining the need for confidentiality with natural light, making the working environment more pleasant. Employees’ comfort was a priority regarding the furniture that is arranged in island units – independent, and still connected. ♦

Showroom installation view.



Discussions and exchange of experiences were omnipresent.

WITTMANN
KUNSTSTOFFGERÄTE GMBH
Lichtblaustrasse 10
1220 Vienna, AUSTRIA
tel.: +43 1 250 39-0
info.at@wittmann-group.com
www.wittmann-group.com

WITTMANN
BATTENFELD INC.
1 Technology Park Drive
Torrington, CT 06790, USA
tel.: +1 860 496 9603
info.us@wittmann-group.com
www.wittmann-group.com

WITTMANN ROBOT
(KUNSHAN) CO. LTD.
No. 1 Wittmann Rd.
DianShanHu Town
Kunshan City, Jiangsu Province
215245 CHINA
tel.: +86 512 5748 3388
info@wittmann-group.cn
www.wittmann-group.com

WITTMANN
BATTENFELD GMBH
Wiener Neustädter Strasse 81
2542 Kottlingbrunn, AUSTRIA
tel.: +43 2252 404-0
info@wittmann-group.com
www.wittmann-group.com

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Battenfeld