



*Wittmann*

# innovations

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The cover shows the linear guide of a WITTMANN BATTENFELD injection molding machine.

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# Editorial

Dear Reader,

Energy efficiency: this is the order of the day ... and of many more days to come. The electricity prices virtually exploding especially during the last few months

are prompting injection molders to take yet another close look at the energy efficiency of their machinery.

Today, far more than in recent years, an energy-efficient injection molding machine now yields considerable financial benefits in production. The differences in energy consumption between machines of different brands and generations are sometimes enormous.

As a result, complete payback of an injection molding machine's purchase price has become possible within relatively few years through the energy savings realized. One example is the installation of our EcoPower 450 injection molding machine at the Austrian company Teko-plastic. You will find the relevant report on page 6.



Determining the actual consumption and comparing the energy consumption of different brands with each other is definitely a rather complex task with a considerable risk of getting incorrect

results. Of course, there is the EUROMAP Recommendation No. 60 for standardized energy consumption measurement, which is also available for our machines, but it covers only the nominal minimum energy consumption of each model, and its relevance for specific applications is very limited in practice. Actually, the only effective method of determination is by measuring different machines with comparable equipment and operating with the same mold. This is the only way to make a specific and accurate comparison. A suitable tool for this purpose is our IMAGOxt measurement system, which we use on our customers' premises for energy measurements and comparisons. Further information can be found on our website under Technologies/Wittmann 4.0.

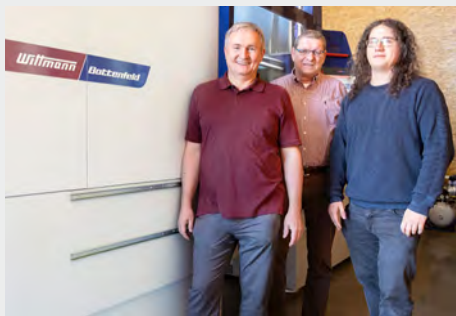
The shortage of skilled labor is another item near the top of the list of this year's major challenges. Especially because of this problem, attention must be paid to keeping the interaction between humans and machines as simple as possible in every new development of operating units, so that even someone operating the equipment only occasionally can handle its control system without difficulty.

A very successful example here is our QuickNew operating assistant for our R9 robot control system. R9 QuickNew enables the creation of complete robot sequences without programming, just by answering a questionnaire with subsequent teaching of the axes' positioning. The R9 control system then creates the logic fully automatically. As a final step, the correctness of the robot sequence can be checked via the digital R9 twin. Please read more about this topic on page 14.

I wish you all great pleasure in reading this issue of *innovations*, full of latest news and reports about our activities.

Very cordially yours, Michael Wittmann

# Content



Page 4: ANA-U: a series of molded parts named "Green Quality".



Page 6: Teko-plastic improves the energy balance using the EcoPower.



Page 8: Correct granulator-feeding of sprues.



Page 10: Entire system at FBT in Spain.



Page 14: The new QuickNew Wizard.



Page 16: Smart Factory in Rapperswil, Switzerland.

# The "Green Quality" series from ANA-U: molded parts from natural materials

Under the "Green Quality" brand, the company ANA-U based in Gleisdorf, Austria produces molded parts from natural ingredients consisting to 100% of renewable materials. The parts are manufactured on an all-electric injection molding line from WITTMANN BATTENFELD.

**Gabriele Hopf**

**A**NA-U, established in 2007 by Ewald Ulrich, specializes in the development, production and global sale of cards, card printers and electronic components, as well as the development and design of lighting solutions for stationary retailers, shopfitters, museums and galleries. In addition to its facility in Gleisdorf, the company has another production plant in Austria and one in Shenzhen, China. In Japan, the company's products are sold via a local agency.

Innovation is a principle at ANA-U. The founder and CEO of ANA-U GmbH, Ewald Ulrich, holds 15 patents in the areas of chip cards, thermal printing and security alone, and is regarded as the inventor of thermorewrite technology (TRW) for chip cards.

A special coating applied to the cards makes it possible to erase card contents and subsequently reprint the cards. By using this type of technology, ANA-U makes a substantial contribution to waste prevention.

## **Natural materials product line**

For just under 3 years, ANA-U has been producing molded parts from natural substances under the "Green Quality" brand. These consist to 100% of plant-based renewable materials and are compostable just like wood. Typical products are event cards, voucher cards, wood-to-wood connecting parts and plastic-free housings. In this way, ANA-U has delivered, for example, 40,000 access passes for students of Karl-Franzens-

University in Graz for the summer semester of 2022. For next year, the production of cards with imbedded electronics is planned as well.

The materials ANA-U is using for its "Green Quality" products grow again within one year. At present, the company keeps 100 tons of material in stock for its customers. The material mix is composed in-house according to each customer's specific requirements. To provide a further benefit for the environment, Ewald Ulrich offers his customers to take back and recycle the Green Quality parts. The recycled material is then mixed with virgin material.

## **The ANA-U production facility**

The Green Quality molded parts are manufactured on an all-electric machine of the EcoPower series from WITTMANN BATTENFELD with 1,600 kN clamping force. The EcoPower 160/750 is equipped with a fully integrated WITTMANN W918 robot, which removes the parts and deposits them on a conveyor belt. A WITTMANN Tempro basic C90 temperature controller and a Gravimax 14 gravimetric blender are also integrated in the machine's Unilog B8 control system. The line is completed by a Coolmax C40 cooling device, an Aton plus segmented wheel dryer, a Feedmax plus material loader and a Dosi-max MC balance dosing unit. In addition, the machine is fitted out with the HiQ Melt software package for monitoring the material quality, a feature of prime importance

in processing plastic-free and recycled materials to enable fast response to viscosity fluctuations. A G-Max 12 granulator from WITTMANN is used to recycle sprue, faulty parts and returned parts.

## **Résumé**

Ewald Ulrich and his son Sebastian, who is mainly responsible for the Green Quality product line, are very satisfied with the equipment from WITTMANN BATTENFELD. The most appreciated feature apart from the machine's energy efficiency and low noise level is its high control accuracy. Ewald Ulrich comments: "Molded parts made of renewable raw materials require production machinery with high precision and extended options for parameter setting. This is provided in every respect by the EcoPower 160 from WITTMANN BATTENFELD.

In addition to the high quality of the machine, the perfect training programs and excellent customer support were decisive factors in reaching all our ambitious project goals."

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





Ewald Ulrich, CEO of ANA-U, Roland Pechtl, Regional Sales Manager of WITTMANN BATTENFELD, Sebastian Ulrich, ANA-U Project Manager Green Quality Projects.



Metering, material loading and drying technology from WITTMANN, installed at ANA-U.



Picture left: Event cards made of biodegradable material. Picture right: Bio access passes for the students of Karl-Franzens-University Graz, printed with ink.

# Teko-plastic improves energy balance with the EcoPower

Teko-plastic, a family-owned company based in Preding near Weiz, Austria, has adopted sustainability and energy efficiency as its guiding principles. In addition to using recycled materials in production and investing in renewable energy, the company installed a machine of the EcoPower series from the WITTMANN Group this February and has carried out energy measurements with this machine.

**Gabriele Hopf**

The company Teko-plastic Kunststoffwerk E. Schröck GmbH, now managed by Theo Koblischek in the third generation, was founded by Erich Schröck und Theo Koblischek in 1961.

Today's 18,000 m<sup>2</sup> production facility in Preding near Weiz, Styria, was built in 1971. Since the beginning of the 1980s, Teko-plastic has specialized in the production of household goods made of plastic. With its takeover of BEKAFORM Kunststoffproduktion GmbH, Teko-plastic successfully entered the German market.

More than 80% of the company's sales are realized with its own products, such as bowls, household and kitchen aids, baskets, tubs, boxes, buckets, canisters, fresh food boxes and much more. Just under 20% are contributed by job order production for Austrian industrial customers. Apart from its main markets Austria and Germany, Teko-plastic also supplies its products to customers in Switzerland, the Netherlands, Belgium, Slovenia, the Czech Republic, Sweden and France.

## Recycling and energy policy

To make its products, the company with a workforce of 48 employees uses 12 BATTENFELD injection molding machines ranging from 1,000 to 8,000 kN in clamping force. The raw materials used are polypropylene and polyethylene, with 25% of the materials processed consisting of regrind. The latter is mostly purchased in Austria and Germany, but sprue and faulty parts are also recycled in-house and mixed in with the virgin materials.

However, Theo Koblischek's ecological commitment goes far beyond just using recycled materials in production. Invest-

ments are also being made into improving the company's energy balance, with moves such as energy recovery from waste heat utilization and use of solar energy.

Currently, 6,000 m<sup>2</sup> of roof area are being covered with solar cells designed for a total annual output of 850,000 kWh. Teko-plastic expects to use 550,000 kWh of this for its own energy requirements, the rest will be fed into the public electricity network.

## EcoPower performs impressively

With energy costs making up an increasing share of the total production costs, it was natural for Theo Koblischek to take a closer look at the injection molding machines, too. "The energy costs have more or less doubled over the last year", says Theo Koblischek, "so the issue of energy efficiency is now highly relevant for us."

In February this year, a machine from the all-electric EcoPower series with 4,500 kN clamping force was installed at Teko-plastic. The machines of the EcoPower series stand out by their extremely high level of energy efficiency, due on the one hand to the use of ultra-modern servo motors and on the other hand to the machine's KERS (Kinetic Energy Recovery System) technology.

Theo Koblischek wanted to evaluate as precisely as possible the ultimate benefit gained from using state-of-the-art WITTMANN BATTENFELD technology, so he carried out the relevant energy consumption measurements on the new EcoPower 450 equipped with an 85 mm screw. He subsequently compared the measurement results with those achieved with a BATTENFELD TM 4500 injection molding machine installed in 2001 and fitted with a 100 mm screw. On both machines, a bucket with a volume

of 10 liters was produced. The difference between the two machines' energy consumption rates turned out to be enormous. Over an eight-hour measurement period, an energy consumption of 68 kWh with a cycle time of 16 seconds was measured on the TM, while the consumption shown for the new EcoPower was a mere 24 kWh with a cycle time of about 13 seconds. Theo Koblischek comments: "Our measurements have shown that by comparison with the TM, an output of 115% has been made possible with an energy input of only 35%. If both machines were equipped with screws of the same diameter, the difference in energy requirements for both machines in favor of the EcoPower would be even greater. Moreover, the EcoPower's water consumption is also considerably lower."

## Future energy planning

Theo Koblischek has now measured the electricity consumption of all machines previously used on the company's production floor and compared the readings to the consumption data of comparable new machines from WITTMANN BATTENFELD. The option of replacing all machines with up to 4,500 kN clamping force with all-electric machines opens up an enormous savings potential of more than 60% for these machine sizes. But for larger machines, too, energy savings of around 40% can still be achieved. Theo Koblischek concludes: "If the electricity price remains at the current level, an exchange of our total range of machinery could be fully amortized within 10 years. Due to the particularly high savings potential for the smaller high-speed machines, we will replace these with new ones first."

Concerning the installation of the EcoPower 450 delivered in February 2022, Theo Koblischek further remarks, that in addition to the machine itself, he also has come to greatly appreciate the customer support provided by the service team of WITTMANN BATTENFELD.





EcoPower 450/3300 with WITTMANN Feedmax basic material loader and W832 pro robot just removing a finished bucket from the machine. This bucket with a volume of 10 liters is produced on both machines for the purpose of comparison.



Examples from Teko-plastic's product range: decorated bucket, cement tub, round bowl, laundry basket. (Photos: Teko-plastic)

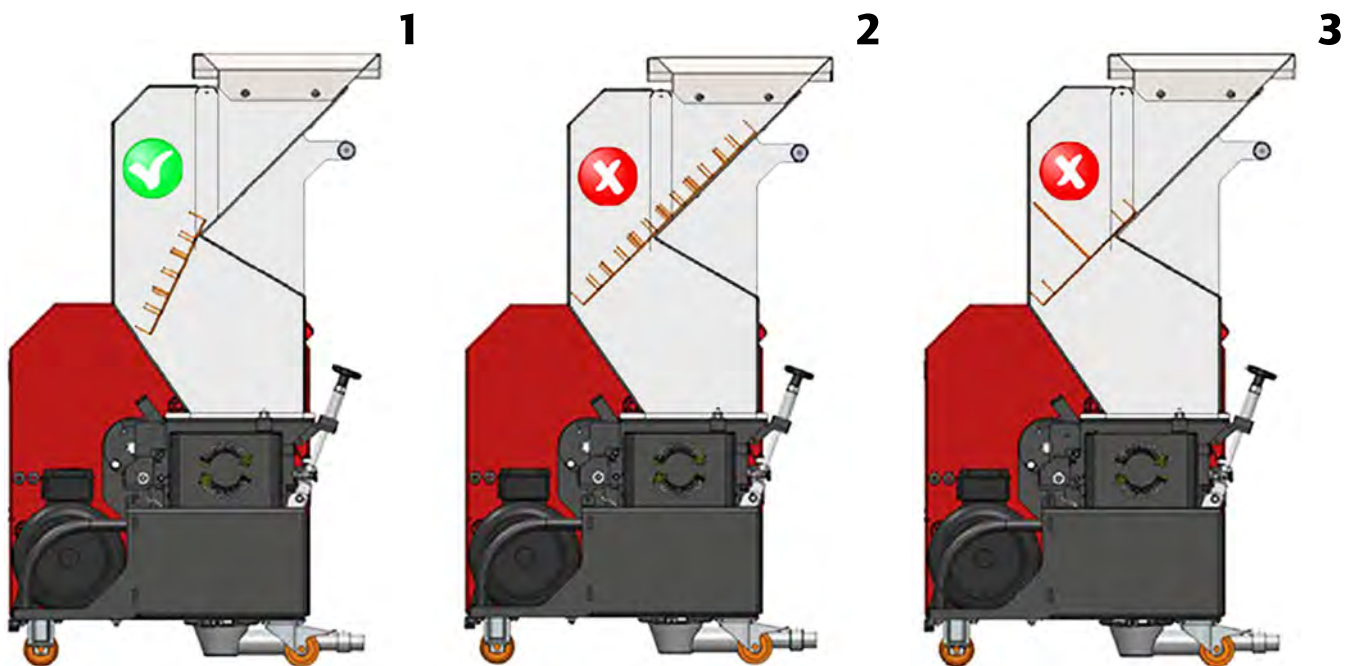


Partial view of Teko-plastic's production floor. For the comparison of energy consumption with the EcoPower, a BATTENFELD TM 4500 was used (in the picture front right). (Photo: Teko-plastic)

# How to feed a beside-the-press granulator with sprues

Answers to some frequently asked questions and troubleshooting advice.

Denis Metral



Free fall of sprues into the feeding hopper. – 1: Sprue turned by itself. – 2: Sprue is too long. – 3: Depth does not fit.

## How should I efficiently size a plastics granulator?

- Firstly the size of the sprue needs to be properly verified – so that it can pass through the baffle in the hopper in order to reach the cutting rotor. (A baffle is mounted into the feeding hopper to avoid flyback of regrind.)
- The width of the cutting chamber must be larger than the sprue.
- The length of the sprue cannot be longer than the clearance of the hopper.
- When the length of the sprue increases, a larger opening at the top of the hopper is required.
- Light-weight or bulky runners may not pass easily through the curtains of the granulator-fed hopper. It may be necessary then to make changes to the thickness or length of the curtain.
- The sprue must always be properly oriented for a free fall into the hopper.

## Which type of feed opening is best?

Large top-opening hoppers are designed for feeding sprues using a robotic solution.

## Is it necessary to anticipate the temporarily higher volume of scrap that occurs at process start-up?

Absolutely, because the undersizing of components can create costly bottlenecks that demand considerably more time and attention from operators than is otherwise necessary.

## The weight of the sprue and the bulk density of the material have to be taken into account for trouble-free operations!

A heavy sprue can be ground quickly because it can easily fall into the cutting chamber. A lightweight sprue can rotate on top of cutting tools; the grinding can be initiated by the push of the next sprue –

resulting in the reduction of the processing capacity. The throughput of the granulator should be larger than the amount of expected scrap. In order to calculate the required throughput, there must be less scrap than the figures shown on the spread sheet.

## Which infeed should be used?

Doing a metered feeding by robot and/or conveyor belt makes it easier to calculate the throughput – compared to just dumping the content of a box by hand with the risk of provoking jamming. In case of feeding simply via dropping the content of a box, an oversizing of the granulator throughput is of course necessary.

## How should I calculate the right granulator size according to sprue dimensions?

The method consists in selecting the cutting chamber at least 20% larger than the





Sieving machine fit for the laboratory.

dimensions of the sprues would suggest. Given this "free space" around the inserted parts allows a free fall of the sprues towards the cutting tools.

### What throughput can typically be expected?

To each granulator, an estimated throughput rate is assigned, but the actual throughput can vary due to many factors, such as: material type, additives, size of inserted parts, material density, wall thickness of parts, size of regrind, material temperature, feeding and evacuation method.

### Monitoring the quality of the regrind is necessary!

WITTMANN BATTENFELD France is equipped with a sieving machine fit for the laboratory to be able to properly inform customers about the characteristics and quality of their regrind. Customers can get this essential in-

formation when sending sprues for a grinding test. The quantitative approach to the test is to perform a multi-stage sieve test using a representative sample of 1 litre. The regrind is then passed through a series of sieves with progressively smaller holes.

- Particles that do not pass the largest screen at the top (holes > 8 mm) are considered "longs" and may cause material handling problems because of their large size.
- Particles that are captured by the 6 mm and 3 mm screens are considered good regrind.
- Particles that pass through the 3 mm screen are considered fines.

The outcome of the test represents the percentage rates of dust and fines – and of good quality regrind.

### A high-level sensor prevents regrinding the regrind!

If the regrind is not evacuated properly from the bin, it eventually will flow back into the cutting chamber. Being exposed to repeated cuts, the material becomes more and more dusty. A high level-sensor with audible or visual alarm will inform the operator of overfilling. Thus, the cutting chamber can be kept free from flow-backs of regrind.

### The quality of regrind can vary when grinding defective parts!

The grinding of sprues can be executed very uniformly – regarding size and time. However, when grinding defective parts, their thickness and dumping the parts en masse into the feeding hopper will modify the outcome of the grinding process, invariably producing more dust.

### Prevent the feeding of metal parts into the cutting chamber!

The screenless technology cannot deal with the grinding of metal parts. If a metal part is introduced into the cutting chamber, it can break teeth off the toothed rollers. A broken tooth within the cutting chamber itself is dangerous. By virtue of the "domino effect", several teeth will be broken off and will destroy the toothed roller. WITTMANN beside-the-press granulators offer the option of a magnet along one side of the feeding hopper.

### How to grind hot/warm materials!

The grinding action invariably produces heat build-up of the material. It is always better to reduce the temperature of hot/warm materials before starting the process. A partially-melted material can clog the screen,

and it can also smear up the toothed roller of a screenless granulator. When it comes to grinding hot/warm materials, the chilling time outside the granulator has to be extended, or cold air can be blown towards the parts, or else a water-cooling circuit can be installed in the cutting chamber area. Where bladed granulators are concerned, an open rotor design with space between the rotating knives and the center of the shaft provides the user with unrestricted airflow through the cutting chamber, thus cooling down the material during the grinding action. Every WITTMANN granulator can be equipped with a water-cooling circuit.

### Additional recommendations

- Parts that are more than 12 mm thick should not be grinded using a beside-the-press granulator, but a central granulator.
- A metered feeding is always much better than just dumping the content of a complete box.
- Assurances will be needed that the rotor of the granulator turns in the correct direction.
- Preventive periodic maintenance of any granulator is highly recommended. Proper blade sharpness and blade gapping are essential for the production of quality regrind.
- Every WITTMANN Group subsidiary or agent anywhere in the world helps finding the most efficient methods of loading and running beside-the-press and central granulators.

Denis Metral is International Product Manager for granulators at WITTMANN BATTENFELD France SAS in La Buisse, France.

# FBT Plastics: excellent quality and development, relying on WITTMANN

The Spanish company FBT Plastics was established in the year 1962 as a family-owned workshop, manufacturing plastic parts for the local industry. Since then, the company's growth has been exponential, and WITTMANN has always been present.

## WITTMANN BATTENFELD Spain

In the early nineties, the company began its expansion by moving to new premises (1,800 m<sup>2</sup>) located in Sant Vicenç de Torelló. FBT Plastics' know-how, dedication and experience enabled the company to offer its best service with added value thanks to the quality of its products and components. From 2006, with the incorporation of the Tesem company, its development continued. In 2012 thanks to ongoing expansion – and coincident with the company's 50<sup>th</sup> anniversary – FBT moved to new 3,000 m<sup>2</sup>, facilities in Torelló.

This allowed the company to make a leap in technology and machinery capacity in order to meet new challenges – with WITTMANN as a valued partner in the optimization of the company's manufacturing processes.

## The WITTMANN Group as a partner

FBT Plastics' most important asset is its highly experienced team, who seek out the best technical and development options. The team carries out the complete development of each project, from the initial viability study up to the integration of the production processes, thus guaranteeing total transparency and traceability for all processes.

And this is why FBT Plastics has invested in multiple cutting-edge WITTMANN W818 robots at its plant which has a manufacturing capacity of one hundred and fifty million parts per year.

These robots provide the highest reliability, shorter cycle times, very low maintenance times, specific automation solutions and ensure maximum performance in every

injection molding cycle. This has made it possible to optimize the manufacturing processes and maintain strict quality control of the parts in all its projects.

After years of perfect collaboration, WITTMANN and FBT Plastics have now created a perfect partnership for building state-of-the-art technology together. With its renowned reputation for quality, FBT Plastics has always invested over the years in the best machinery and equipment for the rigorous manufacture of its products.

## Ready for the clean room

In its injection molding plant, the company has a machinery fleet of 28 machines of up to 300 tons locking force; including a number of EcoPower 110 electric injection molding machines, recently installed in its new clean room. WITTMANN machines meet all the requirements according to EN ISO 14644 for production in a controlled clean room environment and also in terms of cleanliness, documentation and contamination prevention, and the provision of individual project guidance and support. WITTMANN's EcoPower 110 design minimizes emissions and its clamping units have lubrication-free tie-bars and encapsulated drive systems.

An easy-to-clean molding space with smooth surfaces provides favorable conditions for producing contamination-free components. Furthermore, it is possible to increase these standards with specially adapted options such as nickel-plated platens, mobile laminar flow units and also ensuring additional safety through periodic certification.







Unilog B8 control on EcoPower 110 injection molding machine. The Unilog B8 control system works with the Windows™ 10 IoT operating system, which provides extensive process control capabilities.

### WITTMANN material handling equipment

To achieve its quality, productivity and sustainability goals, FBT Plastics has the most advanced equipment to guarantee perfect results and traceability from the beginning to the end of production. A key example is the WITTMANN central material conveying system for 28 injection molding machines, consisting of 28 material loaders controlled by 3 high-performance rotary pumps with automatic 2-stage filtering systems, 8 dryers, and a gravimetric blender built for maxi-

mum functionality and for demanding applications. The modular design of this vacuum system also allows specific adjustments to meet specific customer requirements.

This system is equipped with a coupling station and is prepared for the use of as many materials as the customer wishes to use. The coupling station supplies all the processing machines, and is fit for future extensions. The whole system is controlled by the M7.3 central control system of the latest generation with integral traceability and monitoring. This system individually controls

vacuum loaders, pumps, automatic central filters, controlled vacuum inlets, bleed valves, etc. Any function can be assigned to the digital inputs and outputs of the BUS modules and thus provides the system with almost unlimited configuration possibilities for each particular application.

The end result is an installation capable of conveying, dehumidifying, weighing and mixing materials with a high degree of flexibility and modularity that can be tailored to the customer's requirements – at any time. *(continued on page 12)*

**A lasting partnership**

FBT Plastics has undoubtedly established itself as one of Spain's leading and most respected injection molders - for the custom development of each project and also for its constant search for innovation and technological efficiency. In short, FBT continues on the path of modernization, consolidating

the quality of service and strengthening its brand. WITTMANN is proud to be counted among the company's leading and proven collaborators.

Written by the Marketing Team of WITTMANN BATTENFELD SPAIN S.L. in La Pobla de Claramunt near Barcelona.



EcoPower 110 injection molding machines in FBT Plastics' clean room. One advantage of the EcoPower is its user-friendly design. When developing this machine series, the focus was put on small size and compact integration.

WITTMANN dryers and loaders as part of FBT's centralized material handling system. The wide and innovative range of WITTMANN peripheral equipment allows the implementation of sophisticated complete systems.





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# New QuickNew Wizard for R9 robots provides enhanced functionality and expanded capabilities

New program provides more customization possibilities and much easier programming for injection molders.

**Jason Long**

The WITTMANN Group has introduced its newest robot programming tool, the R9 QuickNew Wizard. QuickNew is designed to provide injection molders with an easier and more detailed tool for programming the functionality of their WITTMANN R9 robots.

R9 QuickNew allows for the creating of a robot sequence without programming, only via answering a questionnaire with subsequent teaching of the axes' positions. The creation of the program logic is taken over completely by the R9 control.

Customer research and feedback led to the improvements that are being introduced in the R9 QuickNew Wizard, resulting in a more flexible and functional program. The QuickNew Wizard is a guided programming tool consisting of two components:

- The first component is a questionnaire where the user selects the processes required to successfully remove any combination of parts/runners from the injection molding machine (IMM) and place them in the appropriate location and mechanism (conveyor, tote, drawer, grinder) downstream from the IMM.
- A QuickEditor is the second component. Based on the selections from the questionnaire, a series of parameters are generated for fast and simple editing of all positions, timers and speeds needed to complete the process resulting in an efficient structured text program, reference program and EOAT change program.

The answers provided by the user automatically create a text program that is used to program the R9 robot. WITTMANN has added many new functions and features to create programs that create easy programming and allow operators to complete and teach the robot program in a minimal amount of time.

While the R9 QuickNew Wizard questionnaire has expanded the number of options, it reduces the work required to edit the text program to add functionality. The R9 QuickNew features descriptive animations to make the process easier for the user, and allows a completed text program to be generated without the need of programming in text.

To allow an easy programming based on the skill and experience level of the respective operator, customers will receive the R9 robot with 4 predefined password protected users:

- **Admin User**  
Has total access to the control including creating additional users.
- **Basic User**  
Will have access to a QuickNew program generator with a streamlined guided interview to create simple pick & place structured programs.

- **Advanced User**  
This user will have access to a QuickNew program generator with an expanded guided interview to allow for additional functionality in the creation of a structured program.
- **Complex User**  
Will have access to the complete guided interview process and all the options a more complex work cell may require.

The Admin User will also have the ability to customize the guided interview even further to meet the specific requirements of the user to produce structured programs that exactly match the needs of the production work cell.

For example, if a work cell only utilizes runnerless molds then the questionnaire can remove the steps pertaining to runner removal; or if a work cell never requires a degating process, these options can be removed and the questionnaire is reduced even further.



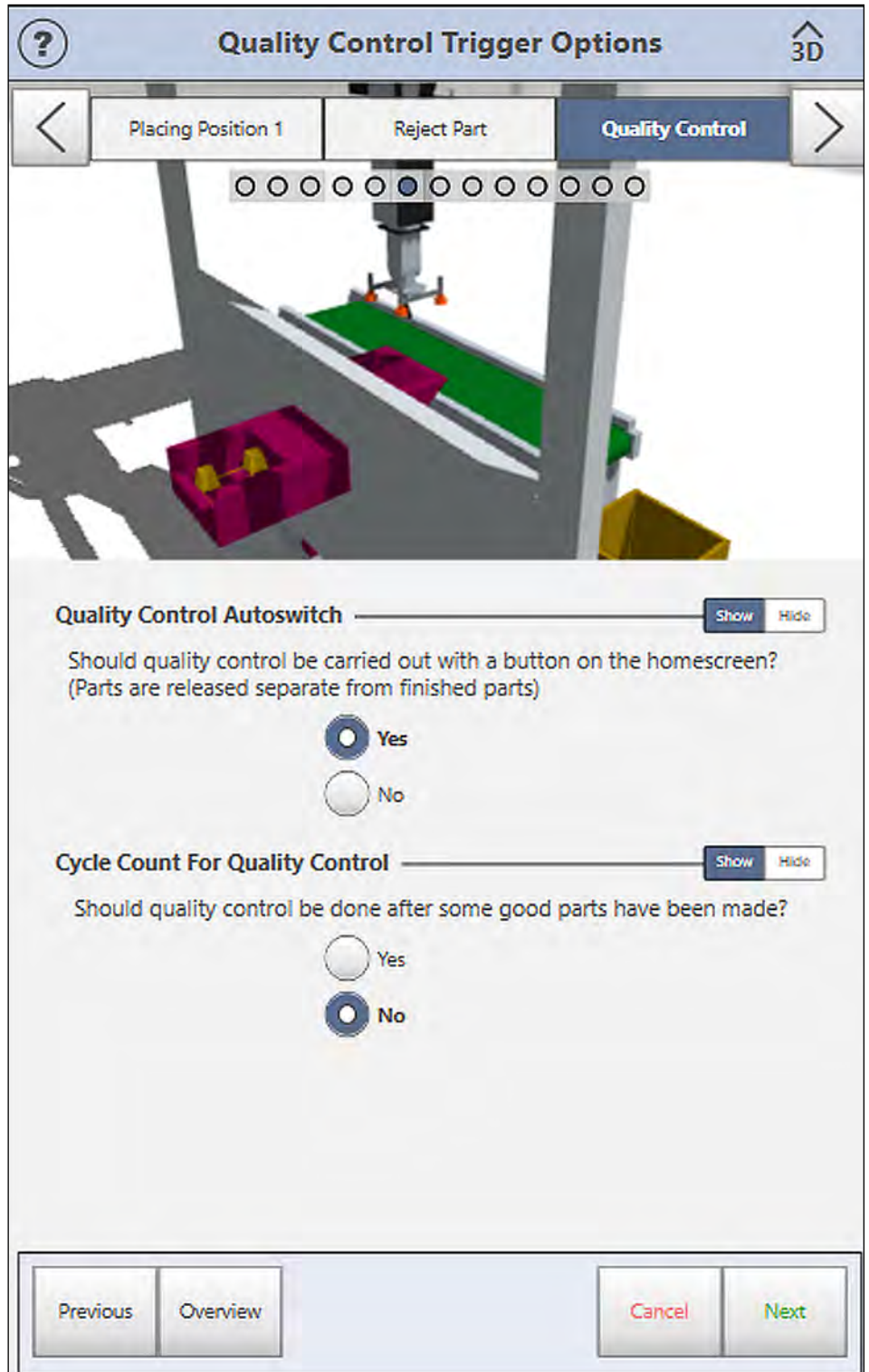
WITTMANN  
R9 robot  
control.



### The enhanced R9 QuickNew program generator

The guided R9 QuickNew Wizard programming tool allows for the entire configured axis, vacuums, grippers and outputs of the robot to be utilized in the program generator. The expanded features of the questionnaire now include:

- Part handling with vacuum, gripper or both.
- Runner handling with vacuum, gripper or both.
- Selectable part and runner monitoring.
- Selectable activation of runner handling before or after ejection.
- Selectable runner release location.
- Selectable placing methods of standard placing with up to 16 drop locations or bulk filling of multiple containers.
- Selectable palletizing at each location.
- RejectSequence is selectable for placing at separate location or to a reversible conveyor.
- QC PartDrop selectable based on auto-switch, part count or both.
- Selectable mold entry utilizing patented time saving SmartRemoval or a traditional take out method waiting for completion of mold open.
- SafeWait selection if needed to wait outside of mold area due to mold obstructions.
- CoreSequence is selectable.
- Selectable use of SoftPush function to remove longer parts.
- EOAT expansion selection with monitoring.
- EOAT compliance cylinder selection with monitoring.
- Mold exit options selectable independent of mold entry type to allow for patented SmartRemoval or traditional including a safe wait location option to allow robot to exit mold area prior to mold closing.
- Selectable degating option to choose which axis moves into the nipper first.



QuickNew screenshot showing the control panel for the selection of quality control trigger options.

# "SmartFactory@OST" – fully digitized manufacturing with WITTMANN BATTENFELD technology

The OST – Eastern Switzerland University of Applied Sciences in Rapperswil – has built an ultra-modern Smart Factory infrastructure for teaching students with technology according to the state of the art. One highlight of the Smart Factory project is a production cell manufacturing customized Floorball balls in an automatic process. The core of this production cell is a SmartPower 60/210 injection molding machine equipped with a W818 robot from WITTMANN.

**Thomas Robers – Curdin Wick**

The Smart Factory is based on the concept of an intelligent production plant, where all steps of a manufacturing process are integrated into a fully digitized system by way of data processing. This method of linking up machines with corporate software offers substantial benefits. An intelligent factory is created, whose basic function is learning from data. The production cell enables fully automatic, customized production of Floorball balls, with an assurance of complete traceability over the entire process.

The process parameters of all production steps as well as the quality criteria are saved in a cloud and can be assigned unmistakably to each ball. This type of quality assurance is indispensable under the aspect of product liability requirements for items such as medical supplies. The comprehensive database also supports learning for very specific applications, as well as developing detailed manufacturing instructions especially for high-wage locations.

## **Injection molding – quality check – welding process**

In the production cell of the Eastern Switzerland University of Applied Sciences, the ball halves are injection-molded in nine different colors on a SmartPower 60/210, then removed by a WITTMANN W818 robot and

subsequently deposited in a labeling laser station. There, the half shells are laser-marked with a serial number (DataMatrix code), so that they can be clearly identified and the collected data correctly assigned to each of them. Via the injection molding machine's EUROMAP 63 interface, the data of the injection molding process can be recorded and saved in the cloud.

For quality inspection, the parts are then precisely and completely measured three-dimensionally by a laser scanner. From the resulting point cloud, the quality attributes are derived and assigned to the production data recorded in the cloud. Next, the measured ball halves are deposited in interim storage, sorted by colors. Automatic handling is carried out by a collaborative robot. In the second part of the production cell, the ball halves are individually welded together according to the customer's choice (see pictures on p. 18).

Whenever a customer places an order, the collaborative robot picks up the ball halves in the desired color(s) from the interim store and passes them on to the welding machine, where the halves are fully automatically welded together to form a finished ball. When ordering a ball, customers receive a collection voucher in the form of a QR code, which entitles them to collect the finished ball from the outlet.

## **An exemplary system**

This production cell and the Smart Factory concept behind it provide practical training for students – thanks to an ultra-modern infrastructure with state-of-the-art injection molding machinery and robots plus a genuine industrial software with a cloud environment!

The equipment is also used for research. The questions raised in this context concern the integration of all components as well as process optimization and intelligent use of the experimental data.

Moreover, the opportunities of digitization can thus be illustrated and explained to interested companies, and it is also possible to provide adequate support to companies in the implementation of their digitization projects.

The WITTMANN Group considers itself greatly honored by being called on to support such forward-looking projects by loans of machines and robots.

Thomas Robers is the Managing Director of BATTENFELD Schweiz AG in Effretikon. Curdin Wick is the Department Head of Injection Molding and Lecturer of Mechanical Engineering at the Institute for Materials Technology and Plastics Processing (IWK) of the Eastern Switzerland University of Applied Sciences (OST) in Rapperswil.





The Smart Factory production cell at the Eastern Switzerland University of Applied Sciences (OST) in Rapperswil manufactures customized Floorball balls in a range of different colors. (Photos: IWK Department of the OST)



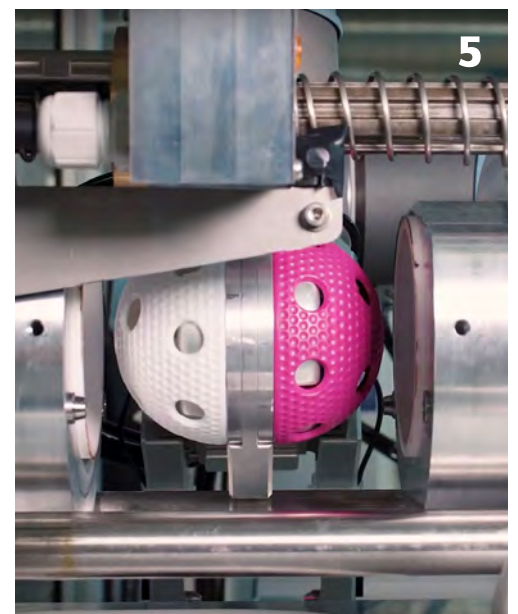
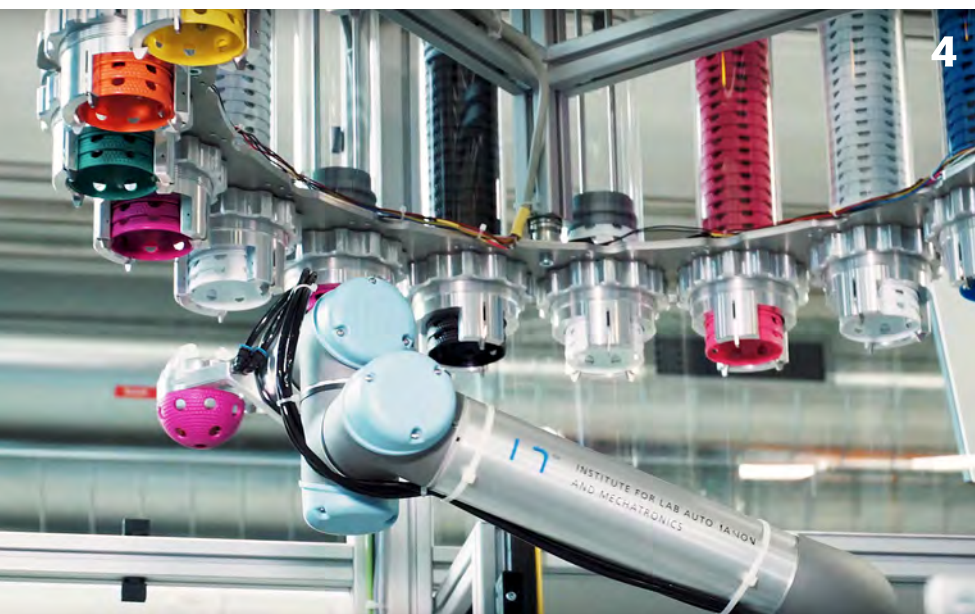
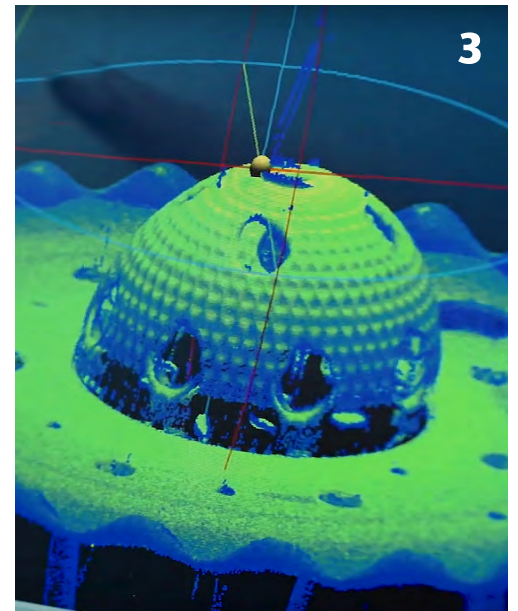
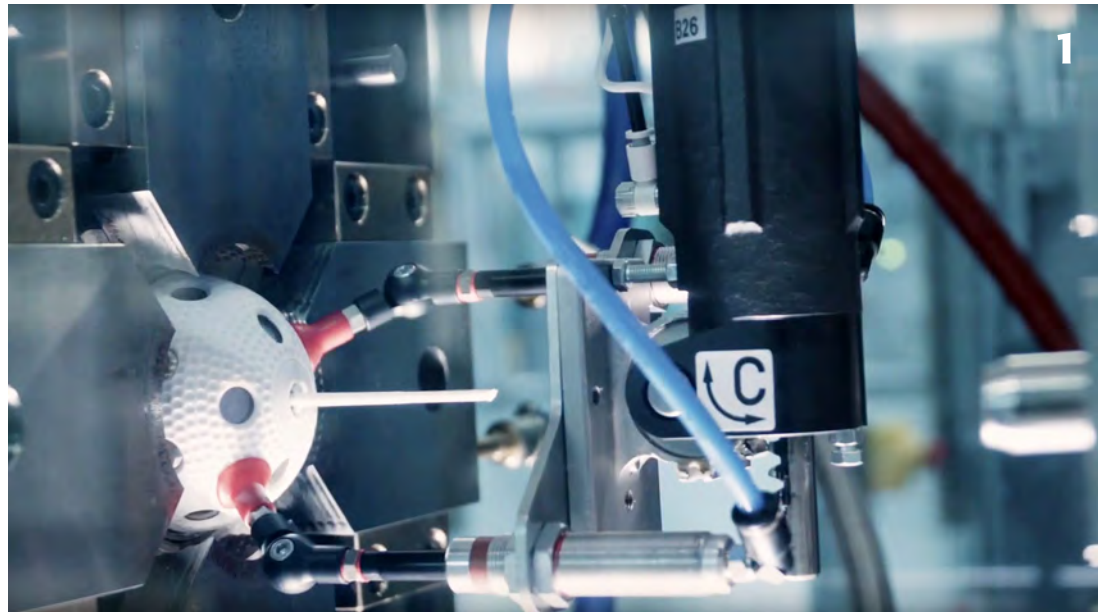
Visibly enjoying the Smart Factory at the Eastern Switzerland University of Applied Sciences: Thomas Robers, BATTENFELD Schweiz AG, Werner Bürli, WITMANN Kunststofftechnik AG, Curdin Wick, Department Head and Lecturer, and Prof. Frank Ehrig, Director of the Institute.

The pictures on the next page show the process of manufacturing a Floorball ball on the equipment described here.



Production process of a Floor-ball ball with color selectable ball halves in the Smart Factory of the Institute for Materials Technology and Plastics Processing at the Eastern Switzerland University of Applied Sciences in Rapperswil.

- 1: Removal of the ball's first half shell.
- 2 +3: Laser scan measurement of the molded part.
- 4 + 5: Picking and welding of the two selectable ball halves.





*Wittmann*

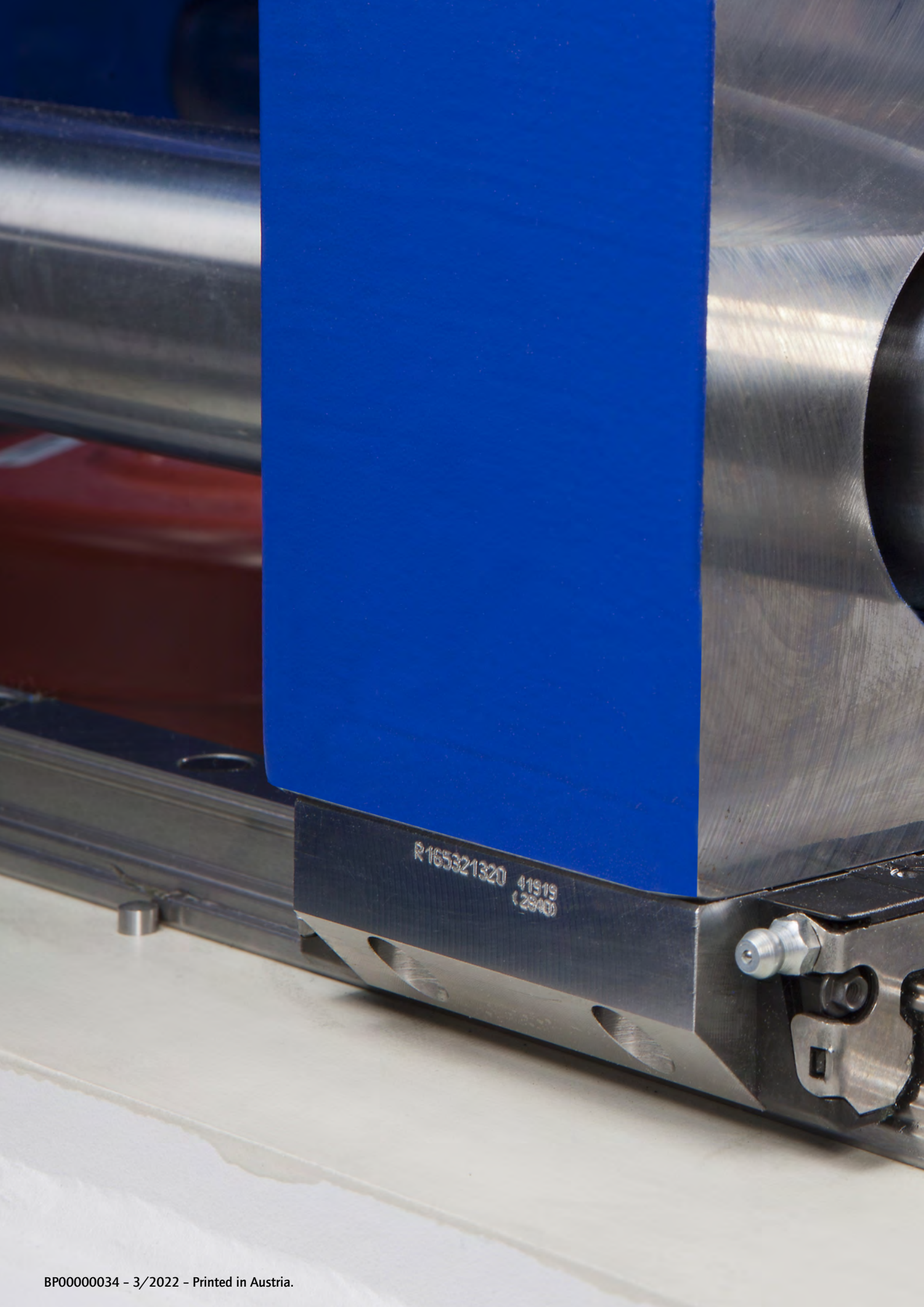


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