

# K-PROFI

international edition



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to plastics processors**

- › Trendsetting know-how
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At Geberit, the European market leader for sanitary products, heavy granulators ensure minimal waste and low energy consumption. Felix Hug explains the various advantages:

**Saving 50 %  
energy during  
shredding**

How **Polibak** gives mono-stretch films a barrier. How **Pöppelmann** integrates welding systems into production cells. How injection moulder **Novapax** centralises material supply. How **Umati** is driving digitalisation as the world language of production. And what trends **K 2022** revealed.

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# „K 2022“ sets the tone for the circular economy

Dear reader

On page 6 you can read how Polibak retrofits a BOPP line with an in-line coating unit for the production of mono stretch films. On page 8 we have researched how Pöppelmann Kunststoff-Technik integrates a wide variety of plastic welding systems into highly automated production cells for automotive assemblies and industrial products. Read from page 14 why the sanitary products manufacturer Geberit relies on granulators with intelligent control and saves up to 50 % energy in the production of regrind. The injection moulder Novapax Kunststofftechnik Steiner has created space in production with a centralised material supply and considerably reduced energy consumption: page 18. The fine, informal “Swiss Plastics” trade fair is the first event of 2023 in Lucerne in mid-January. What awaits visitors from Switzerland, eastern France or northern Italy in a short preview on page 25.

In October, the world’s leading trade fair “K 2022” took place in Düsseldorf – in a surprisingly positive mood (page 26). And this despite the fact that there were 9 % fewer exhibitors and 21 % fewer visitors than three years ago. You can read more figures and data about the fair on page 28. “The great commitment to the circular economy” is the title of our follow-up report, because the fair proved the will of producers, machine builders, processors and OEMs to transform the plastics industry into a circular economy. You can read the first assessment “Even after K 2022 there is still a lot to do” on page 30, followed by some highlights on product innovations. At K, the VDMA presented the benefits of a uniform machine language to plastics processors. We learned from representatives of the association and the



injection moulding machine industry how the “Umati” initiative intends to promote the OPC UA standard and digitalisation (page 34).

On behalf of the team from K-PROFI, K-PROFI international and KI Group, I thank you for your loyalty and wish you a healthy start to what we hope will be a successful 2023.

**Markus Lüling, Editor-in-chief**

lueling@k-profi.de, Tel. +49 (0)9123/9609-10

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# Trade Fair Calender

Trade fairs related to plastics processing in 2023 and 2024

All information without guarantee. Short-term cancellations or postponements are possible at any time.

|                                         |                            |                     |                                                                                          |
|-----------------------------------------|----------------------------|---------------------|------------------------------------------------------------------------------------------|
| <b>Swiss Plastics Expo</b>              | Lucerne, Switzerland       | 17.01. - 19.01.2023 | <a href="http://www.swissplastics-expo.ch">www.swissplastics-expo.ch</a>                 |
| <b>Plast India 2023</b>                 | New-Delhi, India           | 01.02. - 05.02.2023 | <a href="http://www.plastindia.org">www.plastindia.org</a>                               |
| <b>Plastics, Printing and Packaging</b> | Dhaka, Bangladesh          | 22.02. - 25.02.2023 | <a href="http://www.chanchao.com.tw/IPF/">www.chanchao.com.tw/IPF/</a>                   |
| <b>Asiamold</b>                         | Guangzhou, China           | 01.03. - 03.03.2023 | <a href="http://www.messefrankfurt.com">www.messefrankfurt.com</a>                       |
| <b>KPA</b>                              | Ulm, Germany               | 08.03. - 09.03.2023 | <a href="http://www.kpa-messe.de">www.kpa-messe.de</a>                                   |
| <b>ICE/CCE/InPrint</b>                  | Munich, Germany            | 14.03. - 16.03.2023 | <a href="http://www.ice-x.com">www.ice-x.com</a>                                         |
| <b>Koplas</b>                           | Goyang-si, South Korea     | 14.03. - 18.03.2023 | <a href="http://www.koplas.com">www.koplas.com</a>                                       |
| <b>Plastico Brasil</b>                  | Sao Paulo, Brasil          | 14.03. - 18.03.2023 | <a href="http://www.plasticobrasil.com.br">www.plasticobrasil.com.br</a>                 |
| <b>European Coating Show</b>            | Nuremberg, Germany         | 28.03. - 30.03.2023 | <a href="http://www.european-coatings-show.com">www.european-coatings-show.com</a>       |
| <b>Hannover Messe</b>                   | Hanover, Germany           | 17.04. - 21.04.2023 | <a href="http://www.hannovermesse.com">www.hannovermesse.com</a>                         |
| <b>Interpack</b>                        | Dusseldorf, Germany        | 04.05. - 10.05.2023 | <a href="http://www.interpack.com">www.interpack.com</a>                                 |
| <b>Kuteno</b>                           | Rheda-Wiedenbrück, Germany | 09.05. - 11.05.2023 | <a href="http://www.kuteno.de">www.kuteno.de</a>                                         |
| <b>Rapid.Tech</b>                       | Erfurt, Germany            | 09.05. - 11.05.2023 | <a href="http://www.rapidtech-3d.de">www.rapidtech-3d.de</a>                             |
| <b>Control</b>                          | Stuttgart, Germany         | 09.05. - 12.05.2023 | <a href="http://www.control-messe.de">www.control-messe.de</a>                           |
| <b>Plasttechnik Nordic</b>              | Malmö, Sweden              | 10.05. - 11.05.2023 | <a href="http://www.plasttekniknordic.com">www.plasttekniknordic.com</a>                 |
| <b>MedTec live</b>                      | Nuremberg, Germany         | 23.05. - 25.05.2023 | <a href="http://www.medteclive.com">www.medteclive.com</a>                               |
| <b>Plastpol</b>                         | Kielce, Poland             | 23.05. - 26.05.2023 | <a href="http://www.targikielce.pl/en/plastpol">www.targikielce.pl/en/plastpol</a>       |
| <b>Omanplast</b>                        | Muscat, Oman               | 29.05. - 31.05.2023 | <a href="http://www.omanplast.net">www.omanplast.net</a>                                 |
| <b>Equiplast</b>                        | Barcelona, Spain           | 30.05. - 02.06.2023 | <a href="http://www.equiplast.com">www.equiplast.com</a>                                 |
| <b>HanoiPlas</b>                        | Hanoi, Vietnam             | 08.06. - 11.06.2023 | <a href="http://www.chanchao.com.tw/hanoiplas">www.chanchao.com.tw/hanoiplas</a>         |
| <b>Plastec East</b>                     | New York, USA              | 13.06. - 15.06.2023 | <a href="http://www.imengineeringeast.com">www.imengineeringeast.com</a>                 |
| <b>Moulding Expo</b>                    | Stuttgart, Germany         | 13.06. - 16.06.2023 | <a href="http://www.moulding-expo.com">www.moulding-expo.com</a>                         |
| <b>Compounding World Expo</b>           | Essen, Germany             | 14.06. - 15.06.2023 | <a href="http://eu.compoundingworldexpo.com">eu.compoundingworldexpo.com</a>             |
| <b>Plastics Recycling World Expo</b>    | Essen, Germany             | 14.06. - 15.06.2023 | <a href="http://eu.plasticsrecyclingworldexpo.com">eu.plasticsrecyclingworldexpo.com</a> |
| <b>Polymer Testing World Expo</b>       | Essen, Germany             | 14.06. - 15.06.2023 | <a href="http://eu.polymertestingexpo.com">eu.polymertestingexpo.com</a>                 |
| <b>Plast 2023</b>                       | Milan, Italy               | 05.09. - 08.09.2023 | <a href="http://www.plastonline.org">www.plastonline.org</a>                             |
| <b>T-Plas 2023</b>                      | Bangkok, Thailand          | 20.09. - 23.09.2023 | <a href="http://www.tplas.com">www.tplas.com</a>                                         |
| <b>Interplas</b>                        | Birmingham, UK             | 26.09. - 28.09.2023 | <a href="http://www.interplasuk.com">www.interplasuk.com</a>                             |
| <b>Fakuma</b>                           | Friedrichshafen, Germany   | 17.10. - 21.10.2023 | <a href="http://www.fakuma-messe.de">www.fakuma-messe.de</a>                             |
| <b>Plast Imagen</b>                     | Mexico City, Mexico        | 07.11. - 10.11.2023 | <a href="http://www.plastimagen.com.mx/en">www.plastimagen.com.mx/en</a>                 |
| <b>Compamed</b>                         | Dusseldorf, Germany        | 13.11. - 16.11.2023 | <a href="http://www.compamed.de">www.compamed.de</a>                                     |
| <b>Formnext 2022</b>                    | Frankfurt/Main, Germany    | 14.11. - 17.11.2023 | <a href="http://www.formnext.de">www.formnext.de</a>                                     |
| <b>Vietnamplas 2022</b>                 | Ho Chi Minh City, Vietnam  | 18.11. - 21.11.2023 | <a href="http://www.chanchao.com.tw/vietnamplas">www.chanchao.com.tw/vietnamplas</a>     |
| <b>SPS</b>                              | Nuremberg, Germany         | 28.11. - 30.11.2023 | <a href="http://sps.mesago.de">sps.mesago.de</a>                                         |
| <b>IPF Japan 2023</b>                   | Chiba, Japan               | 28.11. - 02.12.2023 | <a href="http://www.ipfjapan.jp">www.ipfjapan.jp</a>                                     |

|                             |                  |                     |                                                            |
|-----------------------------|------------------|---------------------|------------------------------------------------------------|
| <b>Plastfocus Expo 2024</b> | New-Delhi, India | 01.02. - 05.02.2024 | <a href="http://www.plastfocus.org">www.plastfocus.org</a> |
| <b>NPE 2024</b>             | Orlando FL/USA   | 06.05. - 10.05.2024 | <a href="http://www.npe.org">www.npe.org</a>               |

# Fit for mono-stretch films thanks to retrofit

How Turkey's largest producer of metallised films meets its sustainability requirements

**Hardly any packaging is as well suited to keeping sensitive goods fresh for a long time and protecting them from aroma loss as multilayer composite films. Hardly any packaging solution has been criticised as much as multilayer laminates since they cannot be satisfactorily recycled mechanically and thus do not meet sustainability requirements. This dilemma was reason enough for Polibak Plastik Film Sanayi ve Ticaret A.S. from Izmir to retrofit one of its six BOPP lines with an inline coating unit. Says maintenance manager Tamer Dalli: "We are convinced that we can only support the circular economy with simple packaging solutions and that it is time to serve the market with recyclable high-barrier films."**

*Text: Dipl.-Ing. (FH) Karin Regel, Editor K-PROFI*

Polibak is considered the largest metalliser in Europe, the Middle East and Africa with an installed production capacity of 180,000 t/a of BOPP films and a total of eight metallising lines, which in turn create an output of 36,000 t/a of metallised film. The film

manufacturer has grown significantly in recent years, since 2005 has been relying more and more on large-scale plants from Brückner Maschinenbau instead of smaller plants and is expanding not only its sales activities but also its product range towards specialities.

"Sustainability is one of the most important topics that is currently driving the industry," knows Tamer Dalli and sees not only his company as having a responsibility to develop flexible mono-material solutions with a high barrier and thus open up new market segments. The company took a step in this direction about a year ago when it opted for the retrofit solution from Brückner Servtec and had a line with a film width of 10.4 m and an output of about 60,000 t/a retrofitted with an inline coating unit (ILC). Markus Gschwandtner, CEO of Brückner Servtec: "Not only new BOPP lines can be equipped with the innovative ILC technology, but also existing lines, which we take care of comprehensively".

Polibak operates a total of six film stretching lines with a total capacity of 180,000 t/a.



All photos: Brückner Servtec



### Without pre- and post-processing

Inline coating technology is a water-based wet-chemical coating of plastic films with a primer directly during production. The step is carried out between MD and TD orientation of the films, i.e. between longitudinal and transverse stretching of the biaxially stretched end product. The main advantages of the technology are the ease of use and the elimination of any offline steps, which were sometimes very time-consuming.

Previously, for example, a BOPP parent roll was first cut into approximately 1.2 m wide panels before these were transferred to an offline coater. Or a mother roll with an ultra-high barrier made of PA and EVOH had to be laboriously packed and stored before further processing due to the hygroscopy of the barrier layer.

The new inline unit that pours the PU-based coating onto the longitudinally stretched film does not need any pre- or post-processing. The coating layer adheres well to the film and is stretchable so that it is evenly distributed in the subsequent transverse

stretching. The end result is a thin barrier layer of about 0.15 µm on the BOPP film, which is about 18 to 20 µm thick. "This means that the film is considered a sustainable and recyclable mono-material composite, as the barrier layer does not exceed the proportion of five per cent of foreign material in the packaging solution," Markus Gschwandtner emphasises. This proportion would also not be exceeded if the metallisation were applied to the coating layer, creating an ultra-high barrier film that could even better replace conventional multilayer composite films.

With his team, he advises companies like Polibak, which already operate film stretching lines, with customised expansion modules. This is possible not only for BOPP but also for BOPET lines. Several enquiries from other European countries prove that there is great interest in sustainable film solutions. And Tamer Dalli praises his machine supplier for its commitment: "Brückner Servtec has given us optimum support right from the start and continues to be ready with ingenious solutions if we have any questions." ■

[www.polibak.com.tr](http://www.polibak.com.tr)

[www.brueckner-servtec.com](http://www.brueckner-servtec.com)

The inline coating unit is located between longitudinal and transverse stretching and is available as a retrofit kit.



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Injection moulding – hot gas welding – assembly – testing – packaging:  
Here, all process steps are coordinated and interlinked.

# Plastic welding on a piecework basis

How Pöppelmann K-Tech integrates plastic welding systems into highly automated production cells

**Injection moulded parts for the automotive and industrial sectors are undoubtedly among the core competencies of Pöppelmann Kunststoff-Technik GmbH & Co. KG, K-Tech for short, from Lohne. With about 650 employees, K-Tech produces standard products such as plug-in and fastening systems on about 240 injection moulding machines with clamping forces between 250 and 9,000 kN, as well as special parts on a large scale. These are parts with very special requirements. Here, more than just injection moulding know-how is needed – comprehensive knowledge of plastic welding is often required.**

*Text: Dipl.-Ing. Gabriele Rzepka, Editor K-PROFI*

The plastics processor is correspondingly well equipped. The company has 15 welding machines in operation, seven of them hot-gas welding machines from KVT Bielefeld alone, plus laser welding machines from Evosys, as well as ultrasonic and vibration welding machines. One hot gas welding machine is located directly next

to an injection moulding machine and is fully integrated into the automation system. A laser welding machine from Evosys also has its fixed location in the automated injection moulding process. Alexander Neikum, responsible for process development, explains: “When we produce high quantities, we integrate the welding and assembly technology as well as quality assurance into the automation concept. This means we need fewer staff and can realise high cycle times.”

The number of hot-gas welding systems alone reveals that the process is by far the most frequently used. Seven-digit quantities are produced with this technology every year. However, the hot gas tool is very complex, requires long set-up times, the technique requires nitrogen as a process medium and has a relatively high energy demand. Still, according to Lukas kleine Bornhorst, Project Management, it is the process of choice for many components: “We frequently weld polyamides, often have demanding geometries in our components, large height projections, strong angles of



inclination. Not infrequently, very high weld seam strengths and freedom from particles are required. Hot gas welding is often the first choice here.”

### Function comes first

For each new project, the experts check which process would best meet all the requirements. The function of the component always comes first – it must be fulfilled unconditionally. When choosing the ideal welding process, the specialists look at the 3D model of the component – usually a hollow body with various connections – and the customer's specifications. On this basis, the cut is made through the body, and it is checked whether the two shells can be produced by injection moulding. Neikum specifies: “In this phase we also assess which welding processes are available. If it is a small component with a 2D welding contour, good strength and low residual contamination values can often be achieved by means of ultrasonic welding. For larger components, it may be laser or hot gas welding.”

Which process is used also depends on the material. The company mainly processes polypropylene and polyamide, filled and unfilled. Unfilled PA and PP are easy to weld because there are no fibres in the plastic matrix that could protrude from the weld seam. With highly filled PA, on the other hand, it is quite relevant how much the boundary layer plus weld seam is melted in order to achieve a strong joining seam: In ultrasonic and laser welding, the fusion



Hot-gas welding is often the first choice for tight radii and high demands on freedom from particles – as in the case of this coolant line.

layer is around 1 mm, whereas in hot gas welding it is 3 to 4 mm. “With PA-GF50 and higher filling degrees, only hot-gas welding still works when high strengths are required,” Neikum makes clear.

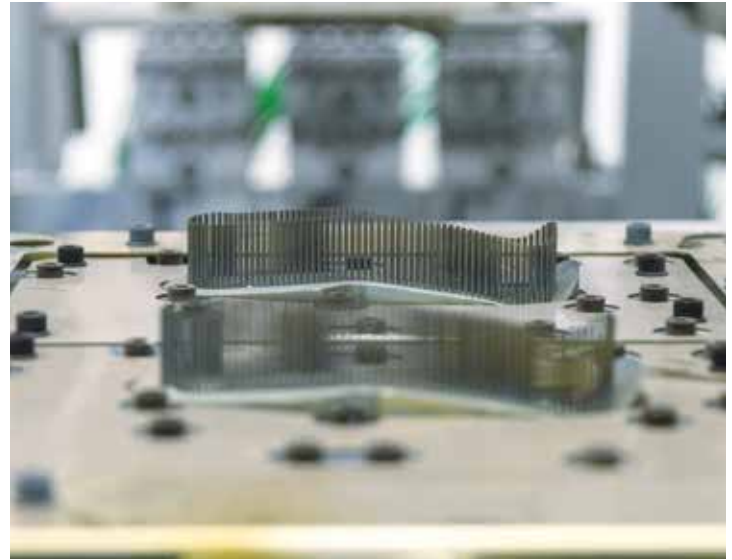
In addition to strength values, the degree of residual contamination and the geometry, the cycle time plays an important role in the choice of process. For example, it can make sense to join a



Alexander Neikum (left) and Lukas kleine Bornhorst discuss the geometry of a coolant line.



The two halves of the coolant line from the injection moulding machine are removed by a linear unit and placed on the transfer belt.



The hot-gas mould follows the contour of the component precisely and can thus handle even complex geometries.

component using hot gas welding despite the higher investment costs, even though laser welding would also be possible, which achieves comparable strengths and freedom from particles. Kleine Bornhorst explains why: "With laser welding, the laser traces the entire contour of the component. If I have a large component, it takes time. With hot gas welding, on the other hand, the web of the weld seam melts everywhere

at the same time. As a result, in some cases I can achieve such a low cycle time that the one-off investment in the hot gas tool pays off."

#### Fully automated

For a coolant line about 200 mm long with an outer diameter of about 20 mm and a wall thickness of 2.5 mm made of a

modified PA-GF30, the experts decided on the process of choice some time ago. The selection of the process was obvious, as the line includes height jumps and slopes. "Hot gas welding is the only option," Neikum confirms. The hot gas welding system, three assembly units and the leak test are all integrated into a fully automated production cell. On a KraussMaffei injection moulding machine with a clamping force of



After hot-gas welding, before assembly: the coolant line lies in the intermediate tray.



Always 2+2 halves are ready on the transfer belt.



2,000 kN, two upper and two lower halves of the pipe are produced with a shot weight of 150 g on a 2+2-cavity mould. A linear unit removes the components from the mould and places them on a transfer belt. A two-armed 3-axis robot from Kuka takes two upper and two lower halves from the transfer belt and moves them to the turntable of the hot gas welding system. There, the second arm takes the two finished welded components, and with the other arm, the robot inserts the lower halves and upper halves into the tool holder. The plate rotates and the hot gas tool retracts. Infrared cameras check the temperature of the welding contour of both halves of the component. The two halves are then held together with a defined contact pressure. Once the pressing and cooling time is over, the plate rotates again, and the process starts from the beginning. "We currently produce a peak of 860,000 of these lines per year over a period of seven to nine years. That makes automation worthwhile," says kleine Bornhorst, explaining the process.

#### Close cooperation

Components for the automotive industry usually run at full capacity for somewhere between seven and nine years. But even after that, the Lohner company has

to keep the tools for a few years to be able to provide spare parts. Speaking of tools and component holders: Here, the company currently works exclusively with the machine suppliers. The hot gas tools and tool holders come from KVT, the tool holders for the laser welding systems from Evosys, sonotrodes from the suppliers of the ultrasonic welding systems, where Pöppelmann relies on several manufacturers. And the welding parameters for each new component are also worked out by the specialists at K-Tech together with the machine manufacturers. Depending on the complexity of

the component, this can take between one and seven days. "We work closely with the machine manufacturers to achieve optimal results," Neikum describes the cooperation.

Only some of the hot gas and laser welding machines are highly automated. But even on the stand-alone machines, the number of pieces is impressive. On the ultrasonic welding system from Herrmann Ultraschall, small membranes made of PTFE are welded onto a casing made of fibre-reinforced PA. Around 100,000 pieces can be produced per year in this way and are part of a ventilator



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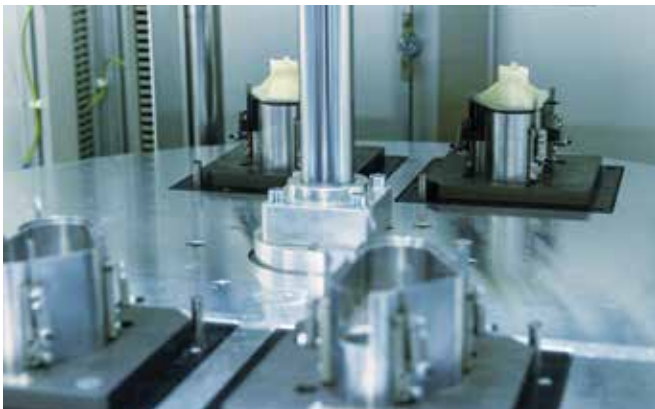


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The fully automated laser welding system produces 600,000 oil suction tubes in variants with four different connections.



By means of the turntable system, the robot can reload the welding system while welding is going on at the same time.



The top shell of the oil suction tube is made of laser-transparent polyamide. Both halves lie flat on top of each other and form a 2D contour.



Alexander Neikum has the automation of the entire production cell under control.



It can also be done manually: K-Tech also uses hot gas welding to produce up to 600,000 units of the individual workstations.



in a car. Two of the neighbouring hot gas welding plants also join coolant lines – for another vehicle model. Here, too, the number of pieces is around 600,000 per year.

Experience shows: Every project requires its own analysis. There is no one process that always fits a particular application. Ultrasonic welding systems often handle palm-sized components with very high strength, good technical cleanliness, and short cycle times. Analyses at K-Tech have shown that laser welding is just as clean as hot gas welding and comparable strengths are possible with radial laser welding. It depends on the size of the component, the complexity of the contour, the material, the particle-free requirements, and the cycle times, which process is the most economical and leads to the desired goal. ■

[www.poeppelmann.com](http://www.poeppelmann.com)

[www.kvt-bielefeld.de](http://www.kvt-bielefeld.de)

[www.evosys-laser.de](http://www.evosys-laser.de)

The ultrasonic welding system welds small PTFE membranes onto a casing made of fibre-reinforced PA. Around 100,000 pieces can be produced per year and are part of a ventilator in a car.



# Minimize rising energy prices

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Calculation example

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Power in Plastics





Felix Hug, process engineer at Geberit in Pfullendorf on Lake Constance, shows an extrusion blow-moulded cistern.

# Save up to 50 % energy in the production of ground material

Why the sanitary products manufacturer Geberit relies on granulators with intelligent controls

**“Simply a dream,” raves process engineer Felix Hug during a tour of the state-of-the-art Geberit Produktions GmbH plant in Pfullendorf. By dream, he means the granulators weighing up to five tonnes, which ensure minimal waste, high reuse rates and low energy consumption at the European market leader for sanitary products. “They are solidly built, robust, durable and at the same time quiet, easy to operate and flexible,” the process engineer concretises, and in conversation with K-PROFI explains Geberit's fully automated production method as well as the functionality of the mills and their advantages for his company in more detail.**

*Text: Dipl.-Ing. (FH) Karin Regel, Editor K-PROFI*

The manufacturing capacities of the Geberit Group, which has its headquarters in Rapperswil-Jona, Switzerland, comprise 26 production plants, four of them overseas. With around 12,000 employees in 50 countries worldwide, the Group generated net sales of EUR 3.56 billion in 2021. The first Geberit site in Germany was founded in Pfullendorf on Lake Constance back in 1955. Today, in addition to the Group's largest sales unit, the largest production plant and Logistik GmbH as the central distribution function for the whole of Europe are also located here. With around 1,900 employees, Geberit is also one of the largest employers in the region. The Pfullendorf plant specialises in concealed and exposed toilet cisterns and produces several thousand of these systems per day. To this end, Geberit operates extrusion blow moulding machines, injection moulding machines and several units at the



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In addition to blow moulding machines for cisterns, injection moulding machines produce accessories for the cistern systems at Geberit's largest production site.



A metal detector operates in front of each mill and a metal separator behind each mill. The result is pure and metal-free regrindate.

German site that process EPS into sound insulation cladding for the cisterns and its accessories. Only completely assembled systems leave the factory and are delivered to wholesalers and DIY stores throughout Europe. "The market is booming," says Felix Hug, who reports that demand for cisterns remained high during the Corona pandemic. The reason was not only the construction of many new buildings, but also the renovation and modernisation of existing bathrooms.

#### Heavyweights are in the basement

All residues from production, such as start-up scrap and sprues, which are not crushed and returned immediately at the production machine, are pre-sorted and sent to the basement, where a total of four large granulators are located. They come from Roetgen and are called, among others, MDSi 650/450 and MDSi 410/260. The mill feeder, who makes sure that each of the four mills is only loaded with the material remnants for which it is intended, recognises immediately if a faulty part from a different polymer has got into a box.

He is also taken with the Hellweg mills and emphasises one of the main advantages, the noise level: "Even when the mill is running, we can talk next to it, as you notice. That's a great relief when you work here all the time."

And there is something else that is important to him: "You can get to the technology." By this he means that the grinding chamber is easily accessible and can be cleaned quickly and conveniently in the event of a product changeover. Because logically, material changes are commonplace when different polymers are processed. "All the waste we produce internally is ground up here and reprocessed," underlines Felix Hug, who is very proud of the low amount of waste at Geberit.

#### Significant energy savings during grinding

Despite careful work, it can happen that a metal part slips into the waste. "A screw is the most common," says Felix Hug. Even if metal is not a big problem for the mill, it must never be allowed back into the



Start-up scrap and sprues that are not crushed and returned directly in production are pre-sorted and sent to large granulators in the basement. The technology of the four mills is easily accessible. They operate so quietly that they protect the people feeding the material from excessive noise.



production process, which is why there is a metal detector in front of each mill that stops the conveyor belt as soon as a metal particle is detected, and a metal separator behind each mill that removes any metal particles.

The highlight of the mills is the intelligent Smart Control system introduced by Hellweg in 2019, with which some of the mills at Geberit are already equipped, including two of the large cutting mills in the grinding centre in the basement. On the MDSi models, power consumption, speed and temperatures are measured, analysed, and documented in real time. "In this way, direct conclusions are drawn about relevant service lives, and excesses are reported at an early stage, long before a malfunction can occur," explains Managing Director Mark Hellweg, who is also very positive about the long-standing and trusting cooperation with his customer Geberit.

All i-model granulators are equipped with a frequency converter, which is responsible for the significantly lower power consumption of these models in contrast to predecessor models. A granulator consumes a particularly large amount of power during start-up, which is why these models start up very gently. In addition, the smooth start-up and low vibrations have a positive effect on wear and tear and the service life of the entire mill mechanics.

Models with frequency converters can easily be operated only at the speed required for the respective size reduction task, which in turn saves energy and ensures a longer service life of the wearing parts. "According to our calculations, more than 50 per cent energy can be saved with our new models, which can reduce energy costs by 40,000



The Geberit site in Pfullendorf on Lake Constance produces concealed and exposed toilet cisterns as systems in numerous designs.

euros per year for a mill that is operated 24/7," promises Mark Hellweg. He is fully aware that with his 20-man team he is rather a small company that cannot convince on price alone. "We have to convince with the technology, and we obviously succeed very well, especially with large companies like Geberit is." 

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# TURN ON



# More transparency, more space, less energy

How Novapax gains flexibility with centralised material supply

**As an injection moulder of technical parts mainly for the automotive industry, Novapax Kunststofftechnik Steiner GmbH & Co. KG in Berlin-Tempelhof relies on a continuous process chain consisting of design, toolmaking, and injection moulding. The team consistently pursues the constant analysis and optimisation of machines, peripherals, and processes. More transparency in energy consumption led to the decision to install a central material supply system. The savings are considerable.**

*Text: Dipl.-Ing. Markus Lüling, Editor-in-Chief K-PROFI*

On the same day as the Federal Republic of Germany was founded in Bonn, Novapax Kunststofftechnik Steiner GmbH & Co. KG was founded. After an exciting history as a mould maker, as a specialist for polishing systems of cavity surfaces, as an injection moulding processor and even as an injection moulding machine builder, the 73-year-old company today offers an integrated process chain





Left side from top left to bottom right:

Stage with the drying systems, octabins, individual bins and material station at ground level central additive traps for filtering volatile components from the drying air.

Material lines lead from the coupling station via a central wall opening into the adjacent hall and there to each individual injection moulding machine.

Currently, 19 drying chambers and an emptying station with a fully automatic cleaning programme are connected to the material supply.

Marvin Weber can call up the quantities of dried material and the amount of energy used for this at the control system.

Right: Heiko Kurzmann has gained experience in the company's own process technology and is now the production manager of Novapax's three-shift injection moulding plant in Berlin.



of design, mould making and injection moulding. With the second and third generations of the founding Steiner family as owners and shareholders, the company produces functional and safety parts, mechanics, actuators and sensors for airbag, seatbelt and lighting systems, door modules and control elements, among others. In terms of process technology, the company's range of services includes multi-component and thin-wall injection moulding as well as production cells with six-axis industrial robots for overmoulding inserts or for fully automatic punching, bending and overmoulding of punch-bend parts.

After Novapax had grown with the production of components for telephone sets and telecommunications infrastructure, it moved within Berlin from Kreuzberg to Tempelhof in 1986, where there are still opportunities for expansion today. With the migration of the telecom industry, the clientele changed. Today, 80 % of Novapax's order volume comes from the automotive segment, namely from Daimler, Autoliv, BHTC, Brose, Hasse & Wrede, Hella, Littelfuse or ODW Elektrik, as well as from other industries such as Doyma, ebm-papst, Grohe and Knipex. Whereas in the past well over 90 % of turnover came from the automotive industry, Novapax is pushing for further diversification: "From 2019 to 2021, we have brought on board some extremely interesting new orders," emphasises Managing

Director Heinrich XVI Prinz Reuß, in the new customer business, competent technical advice and the package service of mould construction, injection moulding production and worldwide delivery capability were convincing. After a record turnover of EUR 31 million in 2018, reduced volumes in 2019 and especially due to the COVID-19 lockdown in 2020, demand has already picked up strongly in 2021, it is currently very high.

Currently, 180 employees, of whom around 110 work in injection moulding and 35 in mould making, produce around 300 million individual items per year. A high-bay warehouse offers 1,500 pallet spaces. The integrated and air-conditioned mould making department with design, milling, eroding, turning, and grinding under one roof supplies the company's own injection moulding production and also a production joint venture in Brasov, Romania, where about 50 employees with 20 injection moulding machines supply automotive customers worldwide.

There are now 74 injection moulding machines running at the Berlin site, mainly from the suppliers Arburg and Engel, some of them as multi-component or vertical machines, for hybrid and thin-wall injection moulding and equipped with demoulding and six-axis industrial robots. Consistent trials among comparable machines of the



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Heinrich XVI Prinz Reuß has many years of management experience in plastics processing and has been managing director of Novapax Kunststofftechnik Steiner GmbH & Co. KG.

a considerable amount of space near the machines and constant handling for the employees. The drying heat remained in the production hall and increased the temperature control effort.

About 190 different types of granulate are in use. Despite a manageable number of customers or customer groups, the increasing variety of orders and thus also of materials made for increasing complexity in the material supply. "We have about 35 machines per hall, some of which run on the same material," explains Heiko Kurzmann, "60% of the processing volume has to be dried." As the person responsible for energy and environmental management, Carola von Holt explains, "Our motivation was not only to save energy, but also to save space between the machines, less waste heat in the halls and a reduction in walking distances for the staff."

Systematic monitoring of the energy consumption of all 28 individual dryers revealed a cumulative power consumption of almost 49 kW on average. As a rough estimate of the energy requirements of a central drying and conveying system, Labotek determined a potential for improvement by more than half. The newly added, neighbouring fifth hall bay also offered the opportunity to reconfigure and optimally set up the central material storage as a racking system and the drying. In 2016, Novapax implemented the installation during ongoing operations. The "Central Material Supply" (CMS) project was essentially realised by an internal project team consisting of Marvin Weber, Head of Operations Technology, Carola von Holt and Heiko Kurzmann, as well as with the support of other specialist departments.

two brands and between comparable hydraulic and electric models of the same brands had reinforced the tendency to further procure all-electric technology, explains the injection moulding production manager, Heiko Kurzmann. The electric machines offer advantages in terms of precision and reproducibility. Order-relevant data from all machines converge in Arburg's MES system ALS, which provides an overview of the utilisation and status of all operating states and order progress at all times.

### Savings potential through central material supply

The sustained high level of investment over many years has been aimed primarily at mould making, higher plant efficiency and injection moulding machines from 250 to 4,000 kN. Last year Novapax acquired four new injection moulding machines, including a 4,000 kN Engel duo to produce airbag covers for customer Autoliv. This year at least two more machines will be added. As part of its expansion, Novapax added a fifth hall bay in 2016/17, which has since been successively filled with new machines.

In its first hall, the so-called Hall A, Novapax had already been operating a central material drying and conveying system for more than ten years. In its second hall, the so-called Hall B, Novapax had long brought the granulates to the injection moulding machines in bags and dried them there with the help of 28 individual dryers. This meant long distances from the warehouse to the machines,

### Comfortable conveying setting

Carola von Holt ensured that subsidies were utilised, especially with regard to energy efficiency programmes. Novapax relied on an investment grant from the Berlin Programme for Sustainable Development (BENE) of the Berlin Senate, which is co-financed with funds

Carola von Holt is responsible for energy and environmental management as well as occupational safety at Novapax.







Viktoria Steiner is a shareholder from the third generation of the owner family and herself runs the associated company raro plastics GmbH, also based in Berlin-Tempelhof.

as Labotek to the receipt of the grant notice, only three months passed in 2016, and less than eight months from project planning to installation. Homework for Novapax included firm commitments from Labotek for the energy savings to be achieved and continuous logging of energy consumption.

#### Installation was successful during operation

The central material supply system is specially designed for Novapax's production facilities and is machine-related: Material lines lead from the central coupling station via a central wall opening into the adjacent hall and with the help of various outlets to each individual injection moulding machine. A total of 2.8 km of piping was installed during ongoing production. The drying hoppers and the processing machines are fed via separate conveying circuits with self-cleaning filters, while the vacuum conveying to the injection moulding machines takes place in a closed circuit with recirculated air.

Currently, 19 drying chambers are connected to the material supply. There is room for five more. In the beginning, Novapax was able to run with one material per dryer, but in the meantime it has to be alternated. Therefore, an emptying station with a fully automatic cleaning programme is included. It empties the dryer via the material station without

from the European Regional Development Fund (ERDF). It supports investment measures for the energy optimisation of production processes with the aim of reducing CO<sub>2</sub> emissions. Installations with very high savings potential are eligible for up to 50 % of BENE funding.

The two-stage and comparatively complex procedure required the submission of a project outline, an advisory meeting, approval in principle, monitoring by a certified energy consultant and processing via the Senate Department's service company BSU. From the submission of the bid by suppliers such

Marvin Weber, who has been with the company for 14 years, is in charge of the entire operating technology.



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Labotek Germany supplied and carried out the installation: Managing Director Thomas Ringheim (right) and customer advisor Günter Faßmann between the drying chambers.

affecting the supply to the machines. Two energy meters are installed in front of the system, which record the consumption of the entire system online. The quantities of material dried, and the energy used are logged. Regular reports from the Labotek control system serve as proof for the funding agency. Marvin Weber: "The ZMV control system is very easy to operate. The database in the background logs the material movements, and the IT link between the individual machines and the drying chambers to transmit the call-off quantities works without any problems."

#### **Material demand drives the drying volume**

Here, the volumes in the drying bins are regulated by the material throughput of the machines. "If a machine is disconnected from the material flow, the system automatically reduces the drying quantity. And vice versa: if another machine with the same material goes into operation, the system increases the drying quantity accordingly," Thomas Ringheim from Labotek explains the principle.

Managing Director Heinrich Prinz Reuß looks at the costs: "The automation of the material supply process is very important. Material supply in production is a necessary process, but not one that creates value. When I think back to the time before automation, many employees were busy with many detailed tasks. From today's perspective, this is no longer commercially justifiable in the complexity that prevails here." Carola von Holt adds an aspect from ergonomics and occupational safety, for which she is also responsible: "The changeover of granulate delivery to octabins has taken the handling of bagged goods out of production and reduced the heavy work in confined spaces for the employees. Because not all suppliers can deliver all types of granules consistently in octabins, we use storage bins under the dryer platform for these instances." At the time, the stage for the dryers was made slightly larger than necessary. Soon, four more drying hoppers will be added.

According to Labotek, Novapax should be able to reduce its power consumption from just under 48.7 kW to well under 20 kW by using gravimetry with load cells under each

The energy monitoring system records the consumption of all plant components and documents it as proof of compliance with the eligibility criteria (left). Central additive traps filter volatile components out of the drying air (right).





hopper. This figure referred to a throughput of 800 t/a of plastic granulate per year. Marvin Weber: “Under optimal conditions – this is also somewhat dependent on employee behaviour – Labotek promised a reduction of 70 % with 13.56 kW power consumption compared to the power consumption of 48.7 kW determined in the factory. That was our target value.” In any case, the new ZMV has undercut the targets, and “the more throughput the plant has, the more efficiently it runs,” comments Marvin Weber. In the following years, the power consumption of the ZMV – with slightly fluctuating utilisation – has decreased by around 70 % – to annual averages of 15.7 kW (2018), 15.0 kW (2019), 12.7 kW (2020) and 13.2 kW (2021). “The frequency converters of the dry air generator and the vacuum conveying system regulate the output depending on the load,” Thomas Ringheim comments on the finding, “nevertheless, a certain proportional difference remains in favour of efficiency at higher throughputs.”

#### Heat from the cooling return should preheat the granulate

Novapax provides recooling of the cooling media for tools and machines via a compression chiller with relief by a classic free cooler. In projects with the Berlin University of Applied Sciences (HTW) and the Technical University of Berlin, various optimisation projects were calculated over the course of time. However, none of the ideas paid off, not even the use of an absorption chiller. The drying air in the new material supply system can be preheated with heat from the cooling return flow of tools and machines. With the hot water supplied, the air would be preheated in an air/water heat exchanger to the level of the lowest drying temperature. Only the



The production cell for overmoulding stamped and bent parts with a vertical machine was realised by Arburg and its partners.

further heating up to the respective material-specific drying temperature would then be electrically performed. Thomas Ringheim of Labotek sees an opportunity here to use the hot water from the cooling of the compressor and brings into play the retrofitting of a heat exchanger at the drying unit, a water pipe and a centrifugal pump at the drying unit.

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### Pure material flows preserve the value of production waste

Novapax is not allowed to grind and reuse sprues and production rejects in any of its products. For this reason, there is also no provision for recycling regrind. "Cleanliness and order – not only with regard to the production environment, but also with regard to the company and production processes," emphasises Heiko Kurzmann. Cleanliness and order also prevail in the in-house recycling centre: an employee specifically responsible for this ensures that all returns from production are collected by type. Each batch of material is collected separately, each punching waste is separated according to the different non-ferrous metals and made available for sale. The management of single-variety material flows in waste pays off for Novapax.

There are plenty of possibilities for expansion. In terms of space, they exist both on the premises at the current location and at the partner company in Romania, which has a comparable portfolio for supplying branches of Tier 1 and Tier 2 customers located there as well. A shareholding in raro plastics GmbH also expands the possibilities: Not far away in the same Berlin district, Viktoria Steiner herself is the managing director of the company, which has ISO Class 8 cleanroom technology, complements the Novapax portfolio and contributes to strengthening the business in non-automotive. Ultimately, Novapax wants to continue to grow and diversify without reducing its automotive business, as Heinrich Prinz Reuß

In injection moulding hall B, Novapax recently retrofitted a central material supply system. For a uniform appearance, machines and installations from all suppliers are painted the same.

The recycling centre collects all plastic and metal waste by type and makes it available for optimal marketing.



emphasises. With continued complex sourcing, even more material types, and even more machines, "ZMV is an essential backbone to keep the company lean moving forward." ■

[www.novapax.de](http://www.novapax.de); [www.labotek.de](http://www.labotek.de); [www.berlin.de/bene](http://www.berlin.de/bene)

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Photo: Swiss Plastics Expo

The latest plastics trends and innovations will be presented at Swiss Plastics Expo from 17 to 19 January 2023 at Messe Luzern.

# Swiss Plastics Expo opens 2023

Small, fine plastics exhibition from 17 to 19 January in Lucerne

**As a meeting place for plastics processors, Swiss Plastics Expo will offer innovative products and holistic solutions from the fields of sustainability, digitalisation and increased efficiency in Lucerne from 17 to 19 January 2023.**

Around 200 exhibitors will present the latest developments in technologies, materials and processing. As a trade fair and symposium at the same time, Swiss Plastics Expo offers inspiration, expertise and networking for plastics processors. By the end of November, the Messe Luzern website lists 180 exhibitors, including represented trade media.

„We are very pleased to be able to create a popular meeting place for specialists from a wide range of application areas with Swiss Plastics Expo. Specialists from the automotive industry, mechanical engineering or medicine come together here,” says exhibition manager Sara Bussmann. In addition to providing information and transferring knowledge, the focus is on personal contact, as she explains: „We offer the space for specialists to exchange ideas, find solutions together and advance the plastics industry.”

The fair is supported by machine manufacturers, tool suppliers, the raw materials trade, colouristics, compounding and well-known Swiss industrial and trade representatives for equipment, tooling and peripheral technology. The last edition of Swiss Plastics Expo attracted 4,100 visitors to Lucerne in 2020 just before the outbreak of the Corona epidemic, 300 fewer than in 2017, and the number of exhibiting companies and institutions had fallen from 292 to 260 in the same period.

## The influence of plastics in the world of coffee

The Swiss Plastics Expo 2023 places a special content focus on the topic of coffee. This is not only because the Swiss drink a lot of coffee, but also because Switzerland is one of the largest coffee

exporters. Exports increased from CHF 202 million in 2006 to CHF 2.5 billion in 2019. In addition to exports, Switzerland generates much more added value in various sectors. And plastics play a central role in this. At the Swiss Plastics Expo, visitors can discover how the coffee sector is developing and what the Swiss plastics industry is contributing, from materials to machines and tools to sustainability. In addition, a „Coffee World“ with its own coffee bar will serve as a meeting place for speakers and guests.

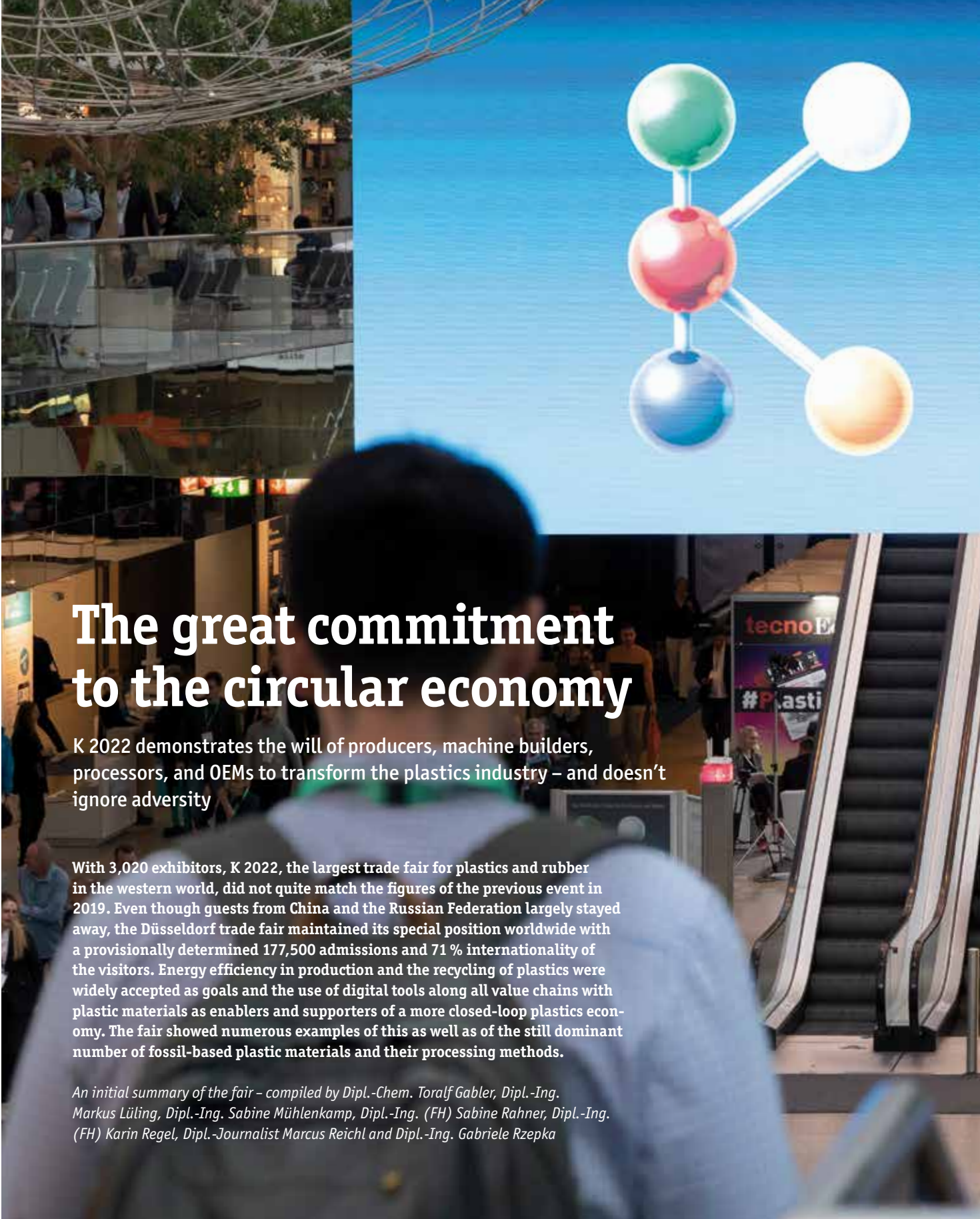
## Exciting presentations at the Innovation Symposium

One of the central tasks of Swiss Plastics Expo is to impart knowledge. In the „Innovation Symposium“, 100 lectures on two stages will convey the latest specialist knowledge in a practice-oriented manner. 36 keynote speakers will give first-hand accounts of science, technology and production. 64 short presentations give an insight into the background of current customer projects. ■

[www.swissplastics-expo.ch](http://www.swissplastics-expo.ch)

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# The great commitment to the circular economy

K 2022 demonstrates the will of producers, machine builders, processors, and OEMs to transform the plastics industry – and doesn't ignore adversity

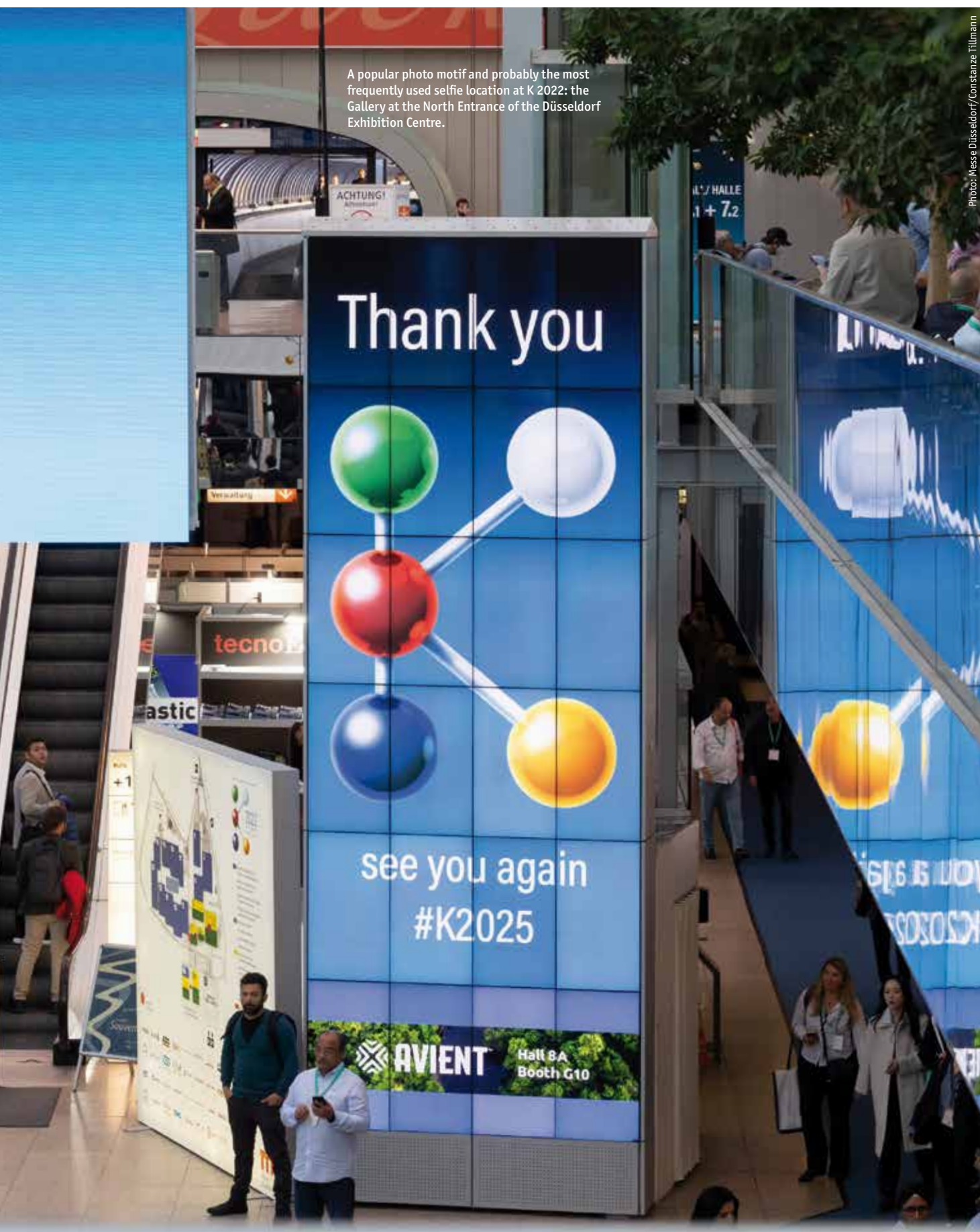
With 3,020 exhibitors, K 2022, the largest trade fair for plastics and rubber in the western world, did not quite match the figures of the previous event in 2019. Even though guests from China and the Russian Federation largely stayed away, the Düsseldorf trade fair maintained its special position worldwide with a provisionally determined 177,500 admissions and 71 % internationality of the visitors. Energy efficiency in production and the recycling of plastics were widely accepted as goals and the use of digital tools along all value chains with plastic materials as enablers and supporters of a more closed-loop plastics economy. The fair showed numerous examples of this as well as of the still dominant number of fossil-based plastic materials and their processing methods.

*An initial summary of the fair – compiled by Dipl.-Chem. Toralf Gabler, Dipl.-Ing. Markus Lüling, Dipl.-Ing. Sabine Mühlkamp, Dipl.-Ing. (FH) Sabine Rahner, Dipl.-Ing. (FH) Karin Regel, Dipl.-Journalist Marcus Reichl and Dipl.-Ing. Gabriele Rzepka*



A popular photo motif and probably the most frequently used selfie location at K 2022: the Gallery at the North Entrance of the Düsseldorf Exhibition Centre.

Photo: Messe Düsseldorf/Constanze Tillmann





## K 2022 in figures and data

### Good atmosphere, but 9 percent fewer exhibitors and 21 percent fewer visitors

Of the 3,020 K exhibitors from 59 countries, 868 (29%) came from Germany. The number of exhibitors at the event from 19 to 26 October 2022 shrank by almost 9 %, while the total area increased by 0.5 %. In addition to the buildings, the outdoor area in Düsseldorf was more intensively used than ever before at a K fair. Here there were not only pavilions of several plastics producers, but with the “Circular Economy Forum” of the VDMA and many other lightweight halls also second and special presentations of 13 machine manufacturers. Ultimately, compared to the previous event, there were 5 % more raw material suppliers and 5 % more service providers among the exhibitors, but 5 % fewer machine and tool manufacturers and even 15 % fewer processors of plastics and rubber.

According to figures from December 2022, Messe Düsseldorf registered around 177,500 admissions from 169 countries, around 21 % or 46,600 fewer than three years ago. At 71 % (2019: 73 %), interest from abroad reached the usual high level. 30 % of international guests alone came from overseas, among them the three most frequent countries of origin were the USA, India, and

Brazil. Due to the strict quarantine regulations imposed there, the number of visitors from East Asia in particular was lower than at K 2019. In addition to Germany, the Netherlands, Italy, Turkey, France, Belgium, Poland, and Spain were strongly represented from Europe.

Around two thirds of the visitors were interested in the exhibits from the mechanical and plant engineering sector. With multiple answers possible, 56 % of the visitors documented an interest in raw and auxiliary materials, with recyclates and bioplastics being particularly popular. As many as 29 % named semi-finished products and technical parts made of plastics and rubber as a main reason for their arrival. As could already be read from the exhibitor announcements before the fair, many machine manufacturers addressed stable customer markets such as medicine and packaging. The exhibits for technical applications and many exhibits with production technology for technical parts left no doubt in Düsseldorf that the mobility transition is being tackled primarily with the help of battery-electric drive technology.

According to analyses by Messe Düsseldorf, around 70 % of all visitors belonged to top and middle management. The organisers were pleased to report that visitors gave top marks for the completeness of the range of products and services on offer and the representation of the entire supply chain. 98 % of all professionals stated that they had “fully achieved” their objectives associated with their visit. According to the exhibition company, machinery and equipment for processing and recycling stood out with 43 % of the investment intentions. Around 40 % of the decision-makers had indicated that they would deal with the topic of decarbonisation.

K President Ulrich Reifenhäuser summed up accordingly on the last day of the fair: “The circular economy was the common thread of the fair.”

The next K is announced for 8 to 15 October 2025 – again running for eight days from Wednesday to Wednesday. If the fair company maintains its usual lead time, exhibitor registration should end on 31 May 2024.

[www.k-online.de](http://www.k-online.de)



Photo: Messe Düsseldorf/Constance Tiltmann





## “Space for creative and critical discussions”

“K sets the right themes with the circular economy, digitalisation and climate protection”, noted Dr Christiane Rohleder, State Secretary at the Federal Ministry for the Environment (2nd from right), at the opening of the special show of the German plastics

industry at K 2022. In her keynote speech, the Green Party politician lamented the consequences of climate change and the loss of biodiversity. “Plastics are indispensable for modern life,” she confessed, announcing a development of a national circular economy strategy, and inviting the plastics industry to participate. She also called for making plastic products “more sustainable and repairable”. Consumers, industry, and society must also accelerate the change in the plastics industry, she said: “We have to act now.” K President Ulrich Reifenhäuser (right) saw the special show as the “optimal place for open, creative and critical discussions.”

The core activity of the special show, which as in 2016 and 2019 has the motto “Plastics shape the future”, was discussions with experts from politics, industry, NGOs, science, and administrations. The special show provided information on economic and ecological challenges and approaches to solutions throughout the duration of K. Numerous ministry officials as well as members of the Bundestag and the state parliaments took part in the exchange with industry representatives. Attending the opening: PlasticsEurope Germany head Dr Ralf Düssel (left) and Messe Managing Director Erhard Wienkamp.

[www.plasticsshapethefuture.com](http://www.plasticsshapethefuture.com)

### K-AKTUELL – official trade fair newspaper of K 2022

The editorial team of K-PROFI and K-AKTUELL.de is once again responsible for K-AKTUELL, the official German-language daily newspaper of the K trade fair. In the eight ePaper editions you will find 370 articles about innovations and what's happening at the fair, as well as commentaries and assessments:

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## COMMENT

## Much remains to be done even after K 2022

The conditions for K 2022 could certainly have been more favourable at many points, but here and there they could have been even more difficult. On the positive side, there were no pandemic-related restrictions that could have limited operations or meetings on site. As expected, the lack of visitors from the Russian Federation due to sanctions and the absence of guests from Asia and especially China due to Corona restrictions had a negative impact. The unfavourable conditions in Europe with recessionary tendencies, inflation, logistics distortions and other uncertainties were also a constant “background noise” at the fair.

Nevertheless, a positive atmosphere spread across the grounds from the very first day. Since hardly any exhibitors had arrived with excessive expectations and everyone was aware of the lack of demand from Russia and China, hardly any hopes could be disappointed. Among the visitors from the accessible markets, many achieved the desired contact density, which was often at the level of the previous events. Even the first two days, which had a high number of visitors, formed a solid basis for a positive trade fair balance, with many expressing satisfaction with their “yield”.

The mechanical engineering sector again accounted for about two-thirds of all exhibitors, albeit 100 fewer than three years ago, without any significant gaps in the technology spectrum becoming apparent. Producers, compounders, and distributors of plastics were present in greater numbers than last time, which confirms the increased breadth of suppliers in this market segment. The presence of plastics processors visibly decreased further – by about 15 %. However – and this is the good news – large manufacturers of semi-finished products and injection moulders with higher turnover presented themselves larger and more professionally than ever before.

For the first time in many years, the ticket for public transport was no longer included in the admission ticket. It had to be purchased at great expense, which caused dissatisfaction among visitors and multipliers. The mobility transition, on the other hand, had arrived in the exhibits of the exhibitors: electric charging, battery and drive technology was present in many presentations.

The plastics producers pushed new bio-based, mass-balanced or recycle-containing material types to the front of the showcases, and

not only for technical applications. After all, recyclates now account for 10% of material use in Europe, as PlasticsEurope reported at the fair, with bio-based types accounting for around 2.5%. This means that one eighth of the plastic input is recycled, the lion's share of 87% continues to be “linear”. Even the most skilful communication cannot hide these facts. All players in the chemical and plastics industry see their transformation plans in line with the goals of the Paris Climate Agreement. Nevertheless, the challenges facing the industry are likely to remain daunting for decades to come. It has been proven that the machinery manufacturers are very serious about their efforts to incorporate recycle into new plastic products.

With its “Circular Economy Center”, the VDMA and many of its member companies have demonstrated that the preparation and processing of plastics containing recyclates is well manageable and deserves much more attention and application worldwide than before.

The good preparation of visitors for their visit to Düsseldorf was also widely praised. Both classic media and digital channels recorded usage intensities before the fair that far exceeded normal fluctuation ranges. No matter how thoroughly information is gathered in the run-up to the big fair, it can only partially replace a personal visit.

K has proven that a well-designed and appreciated trade fair can still benefit its customers – exhibitors and visitors – in 2022. Even in the age of digital communication, the K enabled a broad market overview, an individual deepening of information and a building of trust between potential contractual partners. This position continues to give international trade fairs like K a well-founded justification that neither virtual formats nor in-house trade fairs can call into question. In the weeks following K, this was also impressively demonstrated by “Compamed” for medical technology supplies at the same venue, “Electronica” for electronics production in Munich, “SPS” for electrical drives and controls in Nuremberg and “Formnext” for additive manufacturing in Frankfurt.

Never before in the last three decades have so many exhibitors at a K given positive feedback in the form of press releases as after K 2022. The next few weeks and months will have to prove whether the confidence expressed in these press releases is justified in terms of customer interest, project development and post-fair business.

Markus Lülting





## The R-Cycle community is growing

“Plastic has a problem, we all know that” said Dr Benedikt Brenken, Director R-Cycle, at a press conference in the VDMA Dome. But he immediately provided part of the solution: “We must not lose the important information. Without information, there is no data exchange. Without data exchange, no circular economy.” That’s why, he said, the aim of the R-Cycle initiative, which now brings together 26 cooperation partners, is to record the transfer of information over the entire life cycle of a product in a digital passport and make it available over its lifetime. “Better information, better recyclates, better new products” is the simple explanation of why a digital product passport is needed. After all, the data is already available at individual stations of the value chain, but needs to be transmitted, compiled, and made usable via an open standard. This is exactly what R-Cycle offers and relies on the already established GS1 traceability technology of the cross-industry process development company of the same name, which is also one of the founding members of R-Cycle. In the meantime, R-Cycle already has 26 cooperation partners who presented around 50 implemented projects in Düsseldorf. In these, product passports were created for stretch films, bags, drinking cups or even agricultural films. “For a product passport, we basically need the three elements of identification, product data and the corresponding marking,” Dr. Brenken knows. With this, recyclable packaging could be identified in waste sorting plants, divided into unmixed and recycling-friendly fractions and material cycles could be closed. [www.r-cycle.org](http://www.r-cycle.org)



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## Spot-on and energy-efficient

"Many companies conceal, laminate or emboss plastics. Others weld, rivet or deburr. If our infrared emitters are used in these processes, they bring the energy to exactly the right place," said Dr. Marie-Luise Bopp, press spokesperson at Heraeus Noblelight, describing the heating process at the trade fair. If the energy has a specific effect, it makes the entire process more efficient. Electric infrared emitters can be precisely adjusted, making complex heating processes reliable and automatable. Infrared systems react very quickly and thus ensure that energy is not wasted by preheating, standby or losses to the environment. At its booth, the company showed infrared emitters and systems that transfer heat in a particularly energy-efficient way, for example for riveting, gluing, or deburring.

[www.heraeus-noblelight.com](http://www.heraeus-noblelight.com)



## Plate machine with a new concept

Illig presented a new sheet thermoforming machine with adjustable clamping frame – the UAF. The machine design differs from the classic UA machines. Vice President Erik Hemgesberg went into detail: "The UAF is designed like a roller machine. Our philosophy here is that the heating should not remain in the idle position so that the machine is as energy-efficient as possible." The company implements this concept by having the radiant heaters run longitudinally with the machine. From the automatic sheet loading, the semi-finished products enter the preheating station, where the top and bottom heaters heat the material to about 30 % of the processing temperature. The heating system then moves with the semi-finished product to the forming station. The highlight here is that lamellar cover plates open and close over the semi-finished product in order to achieve the optimum core heat. The heater then returns to the preheating station and the moulding process starts. [www.illig.de](http://www.illig.de)

## Robot cell for deburring

Deburring plays an important role, especially for larger plastic components in vehicles. In close cooperation with Schunk, Frimo has therefore developed a standardised, flexible deburring cell, which the company presented at the K trade fair. With a special spindle, the cell mills off the protrusion on the component. It is equipped with a T-slot table on which the component to be machined or further machining stations can be fixed. Christian Driskes illustrated the example application at the trade fair stand: "The robot guides a compressed air-driven deburring spindle. It is mounted in such a way that the operator can also adjust the transverse force on the milling tool via compressed air. This ensures a certain tolerance compensation during deburring." The work tasks for Universal Robot's Cobot, which is also mounted on the slot table, can be taught by simply guiding it by hand. [www.frimo.com](http://www.frimo.com)





## “We are plastics” with political demands

The “We are Plastics” initiative, led by the German Plastics Processing Industry Association (Gesamtverband Kunststoffverarbeitende Industrie – GKV) and its five supporting associations, as well as PlasticsEurope Germany and the Plastics and Rubber Machinery Association within the VDMA, made its first appearance before an international trade audience at K. The initiative was launched by the German Association of the Plastics Processing Industry (GKV). Mara Hancker (IK, centre), Ingemar Bühler (PlasticsEurope, left) and Thorsten Kühmann (VDMA) reported in the VDMA’s “Circular Economy Forum” that climate protection, the circular economy and digitalisation, the key themes of K 2022, play a decisive role in achieving a circular plastics economy.

IK Managing Director Mara Hancker: “There are often tough discussions between producers and processors, but externally we have a common, strong voice for the plastics industry.” The road to a circular economy is long, but there are already many success stories. At the “Circular Economy Forum” in the open-air exhibition area, numerous machine manufacturers demonstrated on running plants what is already possible today, from sorting and shredding plastic waste to re-granulating it to the finished product made from recycled material. The digitalisation of processes plays a major role here, as VDMA Managing Director Thorsten Kühmann pointed out.

Ingemar Bühler, Chief Managing Officer of PlasticsEurope Germany, emphasised that disruptions in all stages of the value chain in the

plastics industry are needed to transform the industry into a circular economy. In addition to entrepreneurial commitment, the right course must now be set in national and EU policy, the protagonists demanded. At the national level, a significant acceleration of approval procedures for industrial plants, sufficient affordable renewable energy for the German plastics industry as well as planning security and political support are necessary to be able to make investments in the circular economy. [www.deinkunststoff.de](http://www.deinkunststoff.de)



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# A world language creates transparency

How the Umati initiative wants to promote the OPC UA standard and digitalisation

The VDMA used K 2022 to clearly demonstrate the benefits of a uniform machine language to plastics processors. OPC UA is considered the world language of production, allows cross-manufacturer communication with standardised interfaces adapted to plastics processing and forms the basis for successful digitalisation. At the fair, the VDMA was able to win over around 40 machine and equipment manufacturers from Europe, Japan, China, and Canada to network some of their systems running on the exhibition grounds and to make defined data available for visitors to view. How do processors concretely benefit from the OPC UA standard? Which interfaces have already been implemented? What is the goal of the Umati initiative? What about data security? K-PROFI spoke with representatives of the VDMA and the injection moulding machine industry.

Text: Dipl.-Ing. (FH) Sabine Rahner, Editor K-PROFI

First, some basic information: The OPC UA (Open Platform Communications Unified Architecture) standard, as the world language of production, simplifies the integration of machines and devices from different manufacturers into a common system. This interface standard is establishing itself more and more in machine and plant construction, also in the plastics industry. The Umati initiative, short for Universal Machine Technology Interface, has been formed to promote and disseminate these standardised interfaces based on OPC UA. The Umati activities brought together in the VDW (German

Machine Tool Builders' Association) and VDMA (German Engineering Federation) are the basis of a community of the entire mechanical engineering industry and its customers – worldwide. The plastics machinery industry and its customers are part of this.

"Tederic is the only Chinese machinery manufacturer among the 40 participants that sends live data from its injection moulding machines to the Umati demonstrator via the Internet," says Dr Daniel Ammer, Vice President R&D at Plastivation Machinery, official Tederic sales representative in Germany.



All photos: K-PROFI

## LSR dosing system networked via OPC UA for the first time



For the small 7-mm umbrella valves made of LSR, which a fully automated production cell produced at Engel's stand, high precision and process consistency are crucial. The production unit combined an e-victory injection moulding machine, easix articulated arm robot and digital assistance (iQ weight control) from Engel with mould and dosing technology from Nexus. The ServoMix X20 LSR dosing system is networked via OPC UA with the injection moulding machine and the MES authentig from TIG, an Engel Group company. This ensures full process data monitoring and seamless traceability down to the level of individual cavities. "This is the first time we are showing the networking of the injection moulding machine and LSR dosing unit via



So-called Companion Specifications define which data an interface should contain. For example, data transfer between the injection moulding machine and the MES is standardised within the framework of “OPC 40077”, while the OPC 40079 specification, currently still published as a draft, is used for communication with the robot. Other specifications used at K 2022 are OPC 40082-1 (temperature control units), OPC 40082-2 (hot runner) and OPC 40082-3 for liquid silicone metering systems. OPC 40084 has established itself for the extrusion line. The OPC 40086-1 interface for material supply systems was newly introduced as a release candidate.

Many machine manufacturers demonstrated at their booths that data exchange between machines does not only work in theory. Arburg, for example, illustrated the added value of OPC UA for its injection moulding customers with the connection of peripherals such as injection moulds, hot runner controllers, dryers, and automation. As a pilot project, the injection moulding machine manufacturer demonstrated the use of the real-time capable interface for communication with the robot (79) and, as a new feature, communication with the hot runner controller (82-2) (see page 37).

Like Arburg, Engel also supports the OPCUA activities of the VDMA and has been working on the development of these interfaces since 2013. Engel demonstrated the potential at the trade fair via the connection to its own customer portal e-connect.

OPC UA in accordance with the Euromap 82.3 standard live at a trade fair,” explains Armin Mattes, Sales Manager Elast.

The process data of the dosing unit are available in the CC300 control system of the injection moulding machine during ongoing production and can be used for even more precise process monitoring and continuous process optimisation. The dosing parameters are stored in the part data record of the mould. This means they are immediately available at the machine control when the mould is set up again.

[www.engelglobal.com](http://www.engelglobal.com)

In addition, the VDMA enlisted around 40 machine and equipment manufacturers from Europe, Japan, China, and Canada for an OPC-UA demonstration project, in which they networked some of their equipment running on the exhibition grounds via an Umati demonstrator. Visitors were able to read out live data from a total of 85 connected machines and devices via their smartphones. For this purpose, each connected unit was provided with a QR code and the OPC UA logo.

In addition to Netstal, Sumitomo (SHI) Demag, Tederic and Wittmann, the companies interviewed on pages 35 and 36 as examples, Billion, Fanuc, JSW, KraussMaffei, NegriBossi and Toyo from the injection moulding sector and machine manufacturers from other processing methods such as Battenfeld-Cincinnati, Bekum, Coperion, Reifenhäuser etc. also took part.

[www.umati.org/industries\\_plastic-and-rubber-machinery](http://www.umati.org/industries_plastic-and-rubber-machinery)

## Transparency, process stability, documentation



Harald Weber (left) and Thorsten Kühmann (both VDMA) outline the field of action for Umati: “We want to advance OPC UA. Umati has created the tools for this. Part of the initiative is not only marketing, but also building a community. So far, we in the rubber and plastics processing industry are primarily a community of machine builders. But we also want to reach the processors. The goal is that a processor who has installed OPC UA in the breadth of his factory gets transparency from day one and this in an easily accessible form, without the time-consuming compilation of data. This allows better control of the processes and thus process stability. This aspect is important for closed-loop control. On the one hand, the process parameters of the machines and equipment can be coordinated

more precisely, which improves the processing of inhomogeneous recyclates. On the other hand, one can see exactly where in the system how much energy is being consumed and thus optimise the energy cycle. A third important point is reliable, incorruptible documentation vis-à-vis customers and the legislator.

Ultimately, all this is only a first step. To bring additional intelligence into the system, we need a trustworthy, neutral platform so that processors are willing to provide their data. To this end, we are participating in the Manufacturing X funding project launched by the German government. Who owns the data, what happens in the event of data misuse? We need clarity here; this must be defined uniformly. Currently, processors use internal company data from master computer and MES systems for optimisation and already contribute a certain amount of intelligence here. If we create the possibility, for example, to participate in the knowledge of all injection moulding machines worldwide, then a huge potential opens up from which even smaller companies with few machines can profit. In addition to this practical benefit, there is also a general regulatory aspect. The EU Data Act of the EU Commission will in future regulate who may use data generated in the EU and who has access to it. We think it is advantageous if the industry organises itself and creates a platform on which this data is collected. With Umati, we can prepare for this and hold the solution in our own hands.” [www.vdma.org](http://www.vdma.org)

## More trust in digitalisation



Dr Thomas Schilling, Product Manager Digital Solutions Technology at Sumitomo (SHI) Demag, says of the change in acceptance of digital offerings, "OPC UA is an important standard for us. We work in the Umati network, provide machines and services for tests. We also use a proprietary interface based on OPC UA. This provides more information about the process or the status of the machine. We see the fact that we can react much faster to deviations due to this process transparency, thereby reducing the reject rate and downtimes, as the greatest benefit for our customers. This is a plus for sustainability because I can produce much more efficiently. We now deliver more machines with an interface than without. The proportion has multiplied in the last two years. In the pandemic, the fear of the digital and of data transmission has greatly diminished. Now people are looking to the future. Many customers buy machines with interfaces so that they are prepared." [www.sumitomo-shi-demag.com](http://www.sumitomo-shi-demag.com)

## Efficient integration

As an OPC UA Foundation Member, Netstal is also helping to drive the development of the interface standard for plastics machinery. At the beginning of October, the Swiss machine manufacturer announced its Umati partnership. Netstal expects that in the medium term a common view of the advantages of a cross-industry standard will prevail among all market participants. A universal interface based on OPC UA would bring enormous benefits to customers. Customers would be able to efficiently integrate Netstal machines into their own systems. At its stand, Netstal showed the complete peripheral integration of a Manufacturing Execution System (MES) from bfa solutions, temperature control units from HB Therm and Gammaflux hot runner control units. In the picture, Ruedi Speck, Head of Sales Switzerland, shows pipette tips produced on a fully electric Elion 1200 in a 64-cavity mould. This machine as well as all other Netstal exhibits, also shown at partner stands, were integrated into the Umati demonstrator, which could be recognised by the QR code attached to the machine. [www.netstal.com](http://www.netstal.com)



## World standard brings economic advantages

Michael Wittmann, managing director of the Wittmann Group, describes the advantages from the point of view of the machine and device supplier: "We use OPC UA as the communication interface for our various devices not only on the classic machine, the individual peripherals and the robot, i.e. within the work cell, but also externally to an MES or ERP system. Because we have solutions for the entire portfolio with peripherals, machine, robot, automation, we provide valuable input to the VDMA and also Euromap. Personally, I am very happy about a world standard. It gives us an economic advantage. If OPC UA were to really establish itself as the world language for production, we would only have to implement this one interface and no longer have to cover all possible manufacturers with a proprietary system. For communication between machine and robot, we have been using OPC UA for the non-real-time part so far and are currently working on the EM-79 interface for the real-time part, for communication within the work cell and with other injection moulding machines. I expect the introduction at Fakuma 2023." [www.wittmann-group.com](http://www.wittmann-group.com)



## Real-time capable interface in pilot project

Arburg demonstrated a smart cell with the production of transparent blood tubes made of PET. The injection moulding machine, a hybrid Allrounder 630 H, communicated with the mould, hot runner controller, material dryer and automation via the Gestica controller and OPC UA. The new EM 79 interface was used for automation. "We are demonstrating the new real-time capable interface as part of a pilot project," says Henrik Bareiß, Application Technology Consulting.

The Moldlife Sense computer system integrated in the 32-cavity mould of the partner Hack enabled monitoring over the complete life cycle. For communication between mould and machine, Arburg implemented a new solution together with Hack. With the help of sensor technology, it is possible to determine exactly where changes occur on the changes occur on the tool. Two cameras take e.g. pictures or videos of mould separation and part ejection.

In addition, there are four displacement and four knock sensors for the column guides. In this way, process changes can be and damage to the mould can be reliably avoided. The data is passed on directly to the machine control system directly to the machine control system. [www.arburg.com](http://www.arburg.com)



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# Simulate crises regularly – especially now!



*Dr.-Ing. Arno Rogalla is an internationally active interim manager and management consultant in the plastics processing industry: [redaktion@k-profi.de](mailto:redaktion@k-profi.de)*

We all know the sight on Thursday evenings: the fire stations are lit up, the vehicles are parked in front of the fire stations, and the members are practising. They train very regularly, play out a wide variety of scenarios, take exams and repeatedly practise the correct use of the available apparatus and equipment. Major competitions are held regularly. Large-scale operations involving several fire brigades in a group are simulated, and efforts are made to eliminate weak points. The common goal is to extinguish the fire, save people and not endanger themselves or their comrades in action.

Why do we practice over and over again? So that the basic skills are mastered, and routines can be carried out “in their sleep” without further thought. The team should be able to concentrate fully on the special situation in the operation, not have to think about the function of any equipment or even have to read an instruction manual first. Standardised commands and procedures help to avoid misunderstandings and to do the right thing in a targeted manner. The way fire brigades work stands for many others such as the THW (federal civil protection organisation of Germany), emergency paramedics, mountain rescuers and the Armed Forces. In a figurative sense also for athletes who go through standards again and again to become perfect.

Unfortunately, what works here is not common practice in the management of most companies.

If at all, it is larger companies that also address potential crises in the course of risk management and look for the right responses to them. FMEA and risk management in relation to products and production are known and indispensable to everyone. But actively simulating and training managers for crisis situations tends to take place “at the moment of the problem”. Yet, as we have seen in the last two years, it is extremely important to think through processes in the management of entire companies and teams and to practise the best solutions for standard situations. The “officers” e.g. for safety and fire protection in the companies regularly make sure they are up to date. Why not management? I am sure that management is currently better trained in dealing with crises than they were “before Corona”, but there is still room for improvement and a lot is currently happening.

There are so many playing fields that need to be clearly structured and known to everyone: simulation of cyber-attacks, power outage for several days, failure of heating and water, cases of extremely contagious diseases in the company, the absence of several top managers at the same time, but also simple things like a shortage of parts or a short-term liquidity bottleneck. Who are the emergency teams then? What competences and rights do they need? What does the management need to focus on? Who represents whom in the first, second and third line? What may and must be dropped? ■

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### Editors

Dipl.-Ing. Markus Lüling, Editor-in-Chief (responsible)  
Tel. +49 (0)9123 9609-10, [lueling@k-profi.de](mailto:lueling@k-profi.de)

Dipl.-Chem. Toralf Gabler, Specialist Editor  
Tel. +49 (0)9123 9609-11, [gabler@k-profi.de](mailto:gabler@k-profi.de)

Dipl.-Ing. (FH) Sabine Rahner, Specialist Editor  
Tel. +49 (0)711 8877248, [rahner@k-profi.de](mailto:rahner@k-profi.de)

Dipl.-Ing. (FH) Karin Regel, Specialist Editor  
Tel. +49 (0)2433 938941, [regel@k-profi.de](mailto:regel@k-profi.de)

Dipl.-Ing. Janne Reisch, Esq., Copy Editor  
[janne.reisch@gmail.com](mailto:janne.reisch@gmail.com)

Dipl.-Ing. Gabriele Rzepka, Specialist Editor  
Tel. +49 (0)6172 8689940, [rzepka@k-profi.de](mailto:rzepka@k-profi.de)

### Editorial address

Luitpoldstr. 5, 91207 Lauf an der Pegnitz, Germany  
Fax +49 (0)9123 9609-29, [redaktion@k-profi.de](mailto:redaktion@k-profi.de)

### Publisher

Kunststoff-Profi Verlag GmbH & Co. KG  
Saalburgstr. 157, 61350 Bad Homburg, Germany  
Tel. +49 (0)6172 9606-0, Fax +49 (0)6172 9606-99  
[info@k-profi.de](mailto:info@k-profi.de), [www.k-profi.world](http://www.k-profi.world)

Personally liable shareholder:  
Kunststoff-Fachmedien GmbH  
Saalburgstr. 157, 61350 Bad Homburg, Germany

### Management

Andreas Hertsch, Markus Lüling

### Advertising management

Gero Trinkaus, P.O. Box 31 24, 29231 Celle, Germany  
Tel. +49 (0)5141 99 32 026, [trinkaus@k-profi.de](mailto:trinkaus@k-profi.de)

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Annabelle Bräuning  
Tel. +49 (0)6172 9606-23, [vertrieb@k-profi.de](mailto:vertrieb@k-profi.de)

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### Design concept and layout

Dipl.-Kommunikationsdesigner (FH) Oliver Schneider  
Tel. +49 (0)9123 9609-15, [schneider@k-profi.de](mailto:schneider@k-profi.de)

### Production

Therese Stübinger  
Tel. +49 (0)9123 9609-12, [produktion@k-profi.de](mailto:produktion@k-profi.de)

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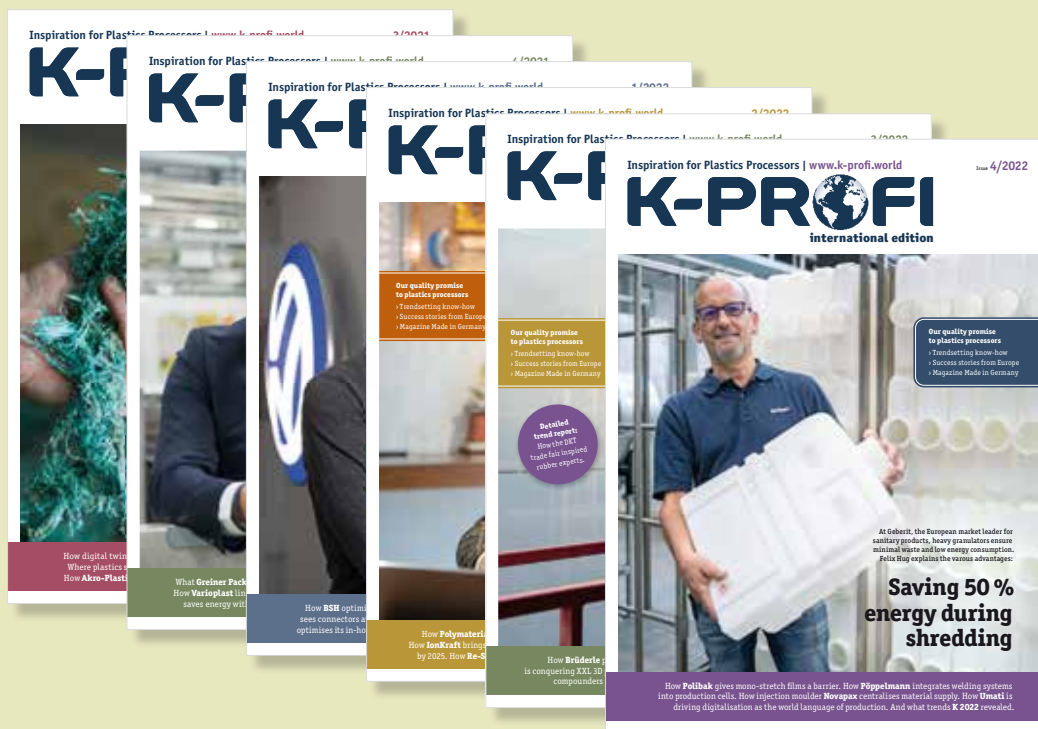
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