

K-PROFI

international edition



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- › Trendsetting know-how
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Priomold meets the need for prototypes, pre-series and small series available at short notice. With its own master moulding system, HSC milling and injection moulding, it goes

In turbo to series parts

How **Südpack** promotes more recycling. How **Hagleitner Hygiene** combats warpage on high-gloss PP parts. How **Fibrecoat** uses glass and basalt fibers to functionalize plastics. How **Formary** simplifies the placing of thermoforming orders. And what **trends are becoming visible in blow molding**.



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From digital tools and turbo to series-identical parts

Dear reader

We visited many interesting plastics processors again this spring and report exclusively for you from the entire breadth of the industry.

Johannes Remmele, shareholder of the Südpack Group, would like to see more political support and a globally uniform approach to recycling, as he documents with Karin Regel (page 6). The start-up Formary wants to simplify the awarding of thermoforming contracts. Gabriele Rzepka found out whether you can benefit from the digital B2B platform (page 9).

Hagleitner Hygiene produces soap, towel and wet wipe dispensers. Gabriele Rzepka looks at how the injection moulder manages warpage and shrinkage in high-gloss PP visible parts (page 12). Ralf Bohle already started a closed-loop system for bicycle hoses in 2015. Sebastian Bogdahn reports to Toralf Gabler on why a recycling system for tyres based on pyrolysis is now being added (page 20). The start-up Fibrecoat coats glass and basalt fibres with aluminium to give reinforced plastics additional properties: page 24.

Many blow moulders are currently having to reorient themselves – from automotive to packaging. Although the automotive industry is not “dead”, as many prophets of doom claim, there are hardly any further developments taking place here at the moment. Karin Regel reports on the current trends in blow moulding at a VDI symposium: page 27. Priomold meets the need for injection moulded



prototypes, pre-series and small series available at short notice. Its own master mould system, HSC milling of aluminium and injection moulding of many materials generate series-identical parts in turbo mode: page 30.

We wish you many useful suggestions and a successful summer!

Markus Lüling, Editor-in-chief

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Trade Fair Calendar

Trade fairs related to plastics processing in 2023 and 2024

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

Molding 2023	Minneapolis MN, USA	29.08. - 30.08.2023	www.moldingconference.com
Plast 2023	Milan, Italy	05.09. - 08.09.2023	www.plastonline.org
Kunststoffenbeurs 2023	s-Hertogenbosch, The Netherl.	20.09. - 21.09.2023	www.kunststoffenbeurs.nl
T-Plas 2023	Bangkok, Thailand	20.09. - 23.09.2023	www.tplas.com
Interplas	Birmingham, UK	26.09. - 28.09.2023	www.interplasuk.com
Powtech	Nuremberg, Germany	26.09. - 28.09.2023	www.powtech.de
Central Asia Plast World	Almaty, Kazakhstan	28.09. - 30.09.2023	www.plastworld.kz
Fakuma 2023	Friedrichshafen, Germany	17.10. - 21.10.2023	www.fakuma-messe.de
Vietnamplas 2023	Ho Chi Minh City, Vietnam	18.10. - 21.10.2023	www.chanchao.com.tw/vietnamplas
Plast Imagen	Mexico City, Mexico	07.11. - 10.11.2023	www.plastimagen.com.mx/en
Compamed	Dusseldorf, Germany	13.11. - 16.11.2023	www.compamed.de
Formnext 2023	Frankfurt/Main, Germany	14.11. - 17.11.2023	www.formnext.de
Plast Eurasia	Istanbul, Turkey	22.11. - 25.11.2023	www.plasteurasia.com
SPS	Nuremberg, Germany	28.11. - 30.11.2023	sps.mesago.de
IPF Japan 2023	Chiba, Japan	28.11. - 02.12.2023	www.ipfjapan.jp

Plastfocus Expo 2024	New-Delhi, India	01.02. - 05.02.2024	www.plastfocus.org
Warsaw Plast Expo	Warsaw, Poland	07.02. - 09.02.2024	www.warsawplastexpo.com
32. Intl. IKV Colloquium	Aachen, Germany	28.02. - 29.02.2024	www.ikv-kolloquium.de
JEC World	Paris, France	05.03. - 07.03.2024	www.jec-world.events
ICE Europe	Munich, Germany	12.03. - 14.03.2024	www.ice-x.com/europe
Plastpackprint Nigeria	Lagos, Nigeria	26.03. - 28.03.2024	www.ppp-nigeria.com
Wire, Tube	Dusseldorf, Germany	15.04. - 19.04.2024	www.wire.de ; www.tube.de
Hannover Messe	Hanover, Germany	22.04. - 26.04.2024	www.hannovermesse.com
Control	Stuttgart, Germany	23.04. - 26.04.2024	www.control-messe.de
NPE 2024	Orlando FL/USA	06.05. - 10.05.2024	www.npe.org
Kuteno	Rheda-Wiedenbrück, Germany	14.05. - 16.05.2024	www.kuteno.de
Rapid.Tech	Erfurt, Germany	14.05. - 16.05.2024	www.rapidtech-3d.de
FIP 2024	Lyon, France	04.06. - 07.06.2024	www.f-i-p.com
Achema	Frankfurt/Main, Germany	10.06. - 14.06.2024	www.achema.de
Plastics Live	Coventry, UK	12.06. - 13.06.2024	www.plasticlive.co.uk
MedTec live	Stuttgart, Germany	18.06. - 20.06.2024	www.medteclive.com
Plastics Recycling Show	Amsterdam, The Netherlands	19.06. - 20.06.2024	www.prseventeuropa.com
Dt. Kautschuk Tagung DKT	Nuremberg, Germany	01.07. - 04.07.2024	www.dkg-rubber.de
Fakuma 2024	Friedrichshafen, Germany	15.10. - 19.10.2024	www.fakuma-messe.de

“Customers want honesty and clarity”

Why film manufacturer Südpack is intensively involved with recycling



“I have never understood plastic bashing,” says Johannes Remmele, owner and partner of the Südpack Group with headquarters in Ochsenhausen. “After all, plastic is not the problem, it’s the solution.” Johannes Remmele is an entrepreneur through and through, having grown up in his father’s business and always remained loyal to it. “I have a great responsibility for my approximately 1,700 employees and their future – in the company and outside.” Although sustainability is currently in vogue as a topic, it is not really being pursued honestly. He would like to see a change in thinking at last, more support from politics, uniform action worldwide and, if necessary, even renunciation. What exactly he means by this, he explains to K-PROFI in an interview on the occasion of the presentation of the Carboliq pilot plant in Ennigerloh.

K-PROFI: Südpack is one of the companies that, as a classic plastics processor, is currently investing very actively in plastics reprocessing and recycling. What drives you?

Johannes Remmele: I very well remember the first oil crisis in 1974 and my father’s concern whether our company would survive this worldwide embargo. We must worry about the same thing today. Unfortunately, not everyone has understood this by a long shot,

whether consumers, entrepreneurs, politicians, or NGO members. We must finally deal honestly with the issue of sustainability and act. We must finally stop giving plastics the malus stamp and pushing other materials. We must finally understand that plastics not only make an important contribution and are indispensable in the medical and electronics industries, but also in everyday life. After all, plastics protect – in our case – natural products so that they don’t spoil and have to be thrown away. And now comes the crux of the matter: we must recover these plastics and, in the best case, recycle them so that we become less dependent on fossil raw materials, especially since we Germans in particular are an industrial nation with no raw material resources of our own.

What do you mean by “pushing other materials”?

The public often perceives packaging made of plastic as inferior to that made of paper or glass, as this is suggested by corresponding marketing measures and unfortunately also misinterpreted studies. Why is there competition between different materials at all, why are plastic types compared with each other? Bashing always prevents a serious and neutral view, but this is exactly what we should be able to do. In many cases, we as the plastics industry can prove that the carbon footprint of our plastic solutions is better than that of paper or glass.

To be honest, it has to be said that glass and paper recycling have been working well for years, while plastics recycling still leaves a lot to be desired in terms of volume.

I see it that way too. That is precisely why we are investing massively in the circular economy. We are pursuing two approaches here: As part of our materials management, we ensure that we significantly reduce the amount of waste for external disposal. We collect all film residues from our film production that can be recycled by material type and process them into high-quality compounds at our competence centre in Schwendi. We sell these to customers in the household appliance and automotive industries, for example. You can see the second approach here in Ennigerloh. We have invested in the ground-breaking Carboliq technology and, together with



Südpack owner Johannes Remmele and Carboliq managing director Christian Happts

our technology partners, we want to establish the chemical recycling process for all materials that have so far been considered non-recyclable.

In addition, we have not only defined a Zero Waste target, but Net Zero for our company. We have set ourselves the goal of reducing 95 per cent of direct and energy-related greenhouse gas emissions and 15 per cent of indirect greenhouse gas emissions along the value chain throughout the Group by 2025. To this end, we are using more and more energy from renewable sources and are continuing to invest in photovoltaic plants.

All these measures are associated with costs. Can you pass these on to your customers?

With our recyclables management and in relation to Carbolig, we are among the pioneers and significant advocates of a functioning circular economy. We build up cycles with customers and thus show ways of solving the waste problem even in our throwaway society. Our customers appreciate this, but admittedly we are still discussing the costs involved. Here, however, I am sure that a change will take place. Of course, it costs something to bring about changes, but especially in terms of resource conservation, these are more than necessary, and we must finally start. I believe in the culture of innovation in Germany and price will no longer play the number one role.

Speaking of prices, the high electricity prices are currently causing problems for many companies. How is Südpack dealing with this?

Südpack has an enormous electricity consumption. That's why we are not only working on reducing it through more efficient processing technologies, we are also already producing our own electricity. As mentioned, we continue to invest in photovoltaic modules to make our sites even more independent of non-renewable energy sources. We need to become less dependent on fossil resources, and we need to do it together. I am following the efforts to produce e-fuels with great interest and believe that we will also be able to produce plastics from water and CO₂ in the future. Our generation will see raw materials from renewable resources become even more widespread, of that I am deeply convinced. It is no longer a dream!

What has to happen for your visions regarding renewable energies and plastics to become reality?

The most important thing is to finally get started and stop badmouthing each other. I am convinced that we as a company will be able to draw circles with our efforts and animate others to also actively protect resources.

And then something must change worldwide. It will be much easier for everyone to make the transition if restrictive laws are

passed that apply not only to Europe but also include the USA and China. My clear appeal goes to the politicians: the desired change, whether it is about recycling quotas, landfill, or energy consumption, is currently still based on bans. That is no support for us entrepreneurs. We need investment support and uniform requirements for all, without exceptions.

The interview was conducted by K-PROFI editor Karin Regel. 

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Photo: Südpack

In the Carbolig plant, contaminated mixed plastics, flexible packaging or complex multilayer composite films are turned into an oil that can replace fossil raw materials in the petrochemical industry.

No competition for mechanical recycling

On the premises of Ecowest, the waste management association in the districts of Warendorf and Gütersloh, Carbolig GmbH operates its plant for oiling of mixed and contaminated plastic waste. Carbolig, which has its headquarters in Remscheid and is the technology platform of Recenso, sells the circular liquid resource (CLR) obtained in this process to the petrochemical industry, which can use the oil as a substitute for fossil raw materials in the production of new, high-quality resources.

So far, the Carbolig plant at the Ennigerloh site is a pilot plant, but it has already been running in fully continuous operation for about a year and is certified according to the sustainability criteria of ISCC-Plus. Carbolig Managing Director Christian Haupts comments: "Oiling processes are not new! We combine this with state-of-the-art technology and have created a unique installation here at the site of a waste disposal company." The process adds an alternative to the possibilities Ecowest has for sorting and reprocessing post-consumer waste. "With our technology, we can and want to be understood only as a supplement to mechanical recycling," says Christian Haupts. Currently, out of around 5 million tonnes of PCR plastics collected in Germany, more than 3 million tonnes are still incinerated, he said. "This has to change urgently."

Although chemical recycling for one tonne of PE/PA "only" has a CO₂ saving of around 20 % compared to virgin production, while mechanical recycling could save around 90 %, it is still something. However, if one considers resource recovery, chemical recycling is in any case preferable to incineration. Especially since the Carbolig process has a 46 % reduction in CO₂ emissions compared to thermal recycling, which makes it even more interesting. "We can 'save' around 70,000 t/y of mixed plastic waste from incineration in our plant, and with very flexible input goods. Our plant is not picky and also tolerates plastics of non-polyolefinic origin as well as paper scraps." This makes the plant suitable for contaminated mixed plastics as well as flexible packaging and complex multi-layer composite films.

The main advantages of the process include operating at a comparatively low temperature of below 400 °C, which rules out coking, and no toxic pyrolysis gases are produced. "The low temperature, the single-stage nature of the process and the input of energy via friction allow the material to be converted with relatively little energy input," emphasises Christian Haupts, venturing a look into the future. "Our vision is to have around 80 locations throughout Germany where our process is used. Always in direct proximity to the consumer and a disposal company, in order to minimise transport costs and complement mechanical recycling to the maximum." A first plant near Cologne is already planned, he said. ■

www.carbolig.com

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Smart matching

How the B2B platform Formary simplifies the procurement of deep-drawn parts

Workpiece carriers for new types of components, housing covers for medical or industrial equipment, containers, plastic inserts – countless companies from very different industries need such deep-drawn parts. Often the quantities are not high, it is not worthwhile to have one's own thermoforming plant, and thermoforming is not the core business either. To place the order, the search for suitable partner companies begins. They must have the right know-how, free capacities and submit an offer. This process can now be handled via the Formary platform.

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

The start-up was launched by siblings Lisa-Marie and Moritz Bittner in 2021. In 2017, they took over the management of their parents' company, which produces thermoformed components and packaging in addition to injection moulding. The siblings look back: "We saw that there are already digital platforms for injection moulding and 3D printing components. In the thermoforming business, this digital offering has been missing, yet the demand is great." The two were able to gauge this, because enquiries for thermoformed parts were also constantly coming in at Roland Bittner GmbH. "With the platform, we simplify and accelerate the procedure from the enquiry to the final component enormously. Within 24 hours, the customer receives an offer for his component. We match the appropriate thermoformer, who currently has free capacities and access to the required materials, with the enquiry," explains Moritz Bittner.

Status quo

For the enquiring customer, the handling of the platform is simple. From a rough selection of thermoforming applications, the user chooses the appropriate one and refines it via a configurator with the desired details such as the geometry of its components and – if available – the CAD data, assembly steps, labelling, duration of use, material requirements and much more. In addition, the platform queries the desired number of pieces. Based on this data, a designer at Formary checks whether the requested product can be deep-drawn. The request is then sent to the thermoforming company, which uses jointly established processes to calculate the offer faster than

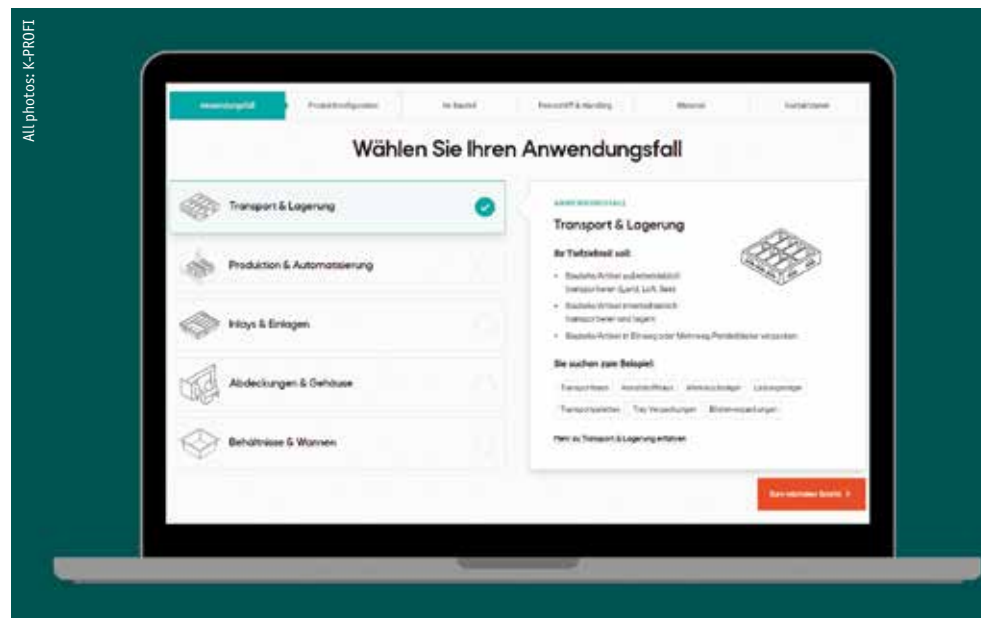
usual on the market and sends it to the customer via Formary. Lisa Bittner explains: "The customer provides all the information via the configurator that the thermoformer

"In addition to the simple enquiry process, the project handling was particularly pleasant when working with Formary. I always knew the current status of the project. Agreements were always kept."

Ralf Gramelspacher, Managing Director,
Zimmerlin Edelstahl-Technik, Bötzingen

needs to calculate his offer. This saves the customer and also the supplier the annoying ping-pong that everyone knows from quotation processes."

Formary currently cooperates with five medium-sized thermoformers and with ten smaller family businesses, some of which have only two to five machines. "We currently have a virtual machine park of around 100 machines – both roll-fed and sheet-fed machines. We have known some of the companies for 30 years and know that they deliver high-quality work," explains Moritz Bittner. Depending on the requirements for the thermoformed part, Formary approaches different partners. If it is to be a visible part with a high-quality surface, a different partner comes into play than for a workpiece carrier or medical blister, for example. All suppliers are based in Germany and have undergone a quality and process audit. In the process, Formary checks the machines used and documents where the core competences of the respective company lie. Moritz Bittner smiles: "We haven't been on the market long and had included the "Become a supplier" tab in the website navigation with little expectation. Accordingly, we were surprised that right from the start many companies were interested in working with us and still are. At the moment, we can hardly keep up with



The first step in the configurator is to select the application for the desired thermoformed part. Subsequently, the user clicks through the further steps and submits all necessary details for a quotation.

"We now employ 25 people and are in the process of recruiting more. We can hardly keep up with the processing of enquiries at the moment," Lisa-Marie Bittner is pleased to say.



the onboarding of new suppliers. At the beginning of March, we hired the first employee, who is only concerned with making sure that all suppliers are well taken care of."

Great interest from all sides

For thermoforming companies, the platform offers a simple way of acquiring customers. Without any marketing and sales effort, the medium-sized partners can better utilise the machines with smaller orders in addition to production for their existing customers. The small companies have access to a whole new group of customers who primarily start their supplier search online, and whom they would only have reached with a lot of effort if it were not for the platform.

In addition to the thermoforming companies, the Bittner siblings have so far been working with one toolmaker, Marquart Formen- und Werkzeugbau in Dornhan. This company supplies both the roller and the plate tools as well as trimming tools such as steel rule dies and milling jigs, which are necessary for the finishing of deep-drawn parts. Lisa-Marie Bittner makes it clear: "Up to now, we have been processing 90 per cent of our orders through this partner. Since new deep-drawers are joining us all the time, we will gradually integrate their toolmaking partners with us as well."

But it is not only the suppliers' interest that is great. Customer enquiries are also not in short supply. Between 15 and 20 enquiries are received on average per week. Moritz Bittner makes it clear: "These are usually companies that don't have their own supplier network because they only need deep-drawn parts occasionally and often only in small batch sizes. We make it easier for them to access the market with the platform."

The near future

Currently, the 24-hour offer promise applies. In the near future, however, the customer should receive a price quote within a few seconds. To achieve this, the start-up relies on a machine learning model. Moritz Bittner explains: "Our model is self-learning. We are currently feeding it with thousands of historical offers and the calculations behind them, because we have found that every supplier takes a different approach. The more approaches our algorithm learns, the better it becomes at predicting prices. We have already been able to achieve 96% accuracy with historical data but will continue to test and develop the algorithm with ongoing requests until it goes live in a beta version. That should be in the second quarter

**"We are extremely busy at the moment
and were able to save a lot of time
and procurement costs."**

Andreas Breitenstein, Managing Director,
Grabo Topspin Powertools, Nabburg

of this year." The model uses monthly material prices published by the Kunststoff Information/Plastics Information Europe (KI/PIE) service when calculating material costs. The advantage for the customer is obvious. Within a very short time, he knows how expensive his product will be for him. But the algorithms can do even more. The more variants the software gets to know, the smarter it becomes, not only in terms of price calculation. In the near future, it will also recommend a suitable material for the application in many cases on the basis of what it has learned and the detailed information provided by the platform user.

"With Formary, we simplify and speed up the procedure from the enquiry to the final component enormously. Within 24 hours, the customer receives a quotation," Moritz Bittner describes his platform.



"The enquiry process was fast, competent and uncomplicated. We received a quotation within a very short time."

Michael Demuth, indEAS Input and Drive Systems, Pliezhausen

For highly complex components, however, the platform sometimes reaches its limits, Moritz Bittner makes clear: "When it comes to an extremely special application, then it becomes manual again. Because we always have real people checking every request. If it becomes clear that the software does not cover the complexity of an enquiry, then our designers and supplier partners come back into play and work out an offer. However, the lion's share of enquiries are about products that our model has a handle on."

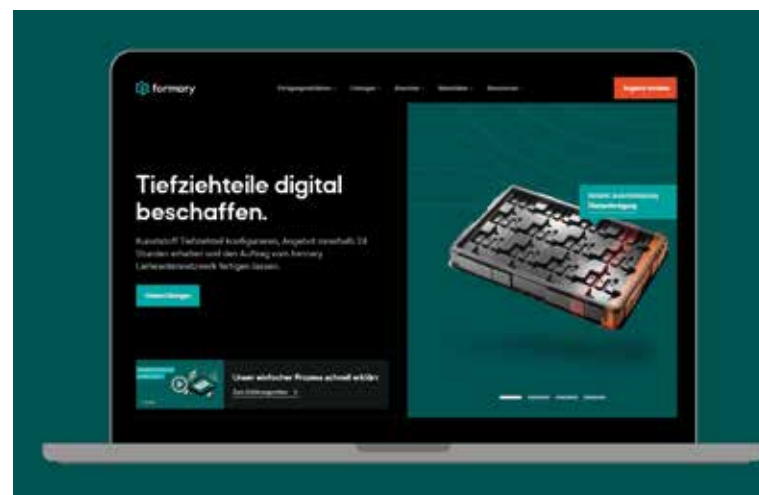
The next targets

The response to the new platform has been great. According to Lisa-Marie Bittner, there is no room for boredom: "We now employ 25 people and are in the process of recruiting more. A colleague has just started who is responsible for the onboarding of new suppliers. Two others have started in sales. At the moment, we can hardly keep up with the processing of enquiries. We want to grow to 30 employees by the end of 2023." Every step in the entire order process is handled via Formary – from the enquiry to design, construction, calculation, quality inspection, payment and also complaints. Lisa-Marie Bittner makes it clear: "We do everything except for manufacturing, we are the contractual partner." This is a great advantage for the customer, who only has to deal with one contact person for all matters. The Bittner siblings also have a clean arrangement when it comes to confidentiality: there are confidentiality

agreements with all suppliers, and Formary signs the customer's confidentiality agreement.

The siblings are far from finished with their visions for the future. The other value-added steps of thermoforming are also to be given their own platform. Moritz Bittner has clear ideas: "Our goal is to also cover the other post-processing steps such as CNC machining, bonding, welding and assembly. We already have some suppliers we can bring on board for this. But that will have to wait a little longer." 

www.formary.de



The handling of the platform is simple. Via the configurator, the user can request his individual component with all details.

One-stop shop for hygienic articles in sophisticated design

How Hagleitner gets a grip on warpage and shrinkage in high-gloss visible parts made of PP and speeds up the sampling process

They can be found in service areas, canteen kitchens, restaurants, hotels, airports, and many other places – the products of Hagleitner Hygiene International GmbH from Zell am See: these include soap dispensers, towel dispensers and, most recently, wet wipe dispensers, all of which are IoT-capable. It's all about hygiene and cleaning products for hospitals, restaurants, and hotels as well as for all kinds of industrial and office buildings. The company serves twelve countries in Europe through direct sales and another 63 countries worldwide through its distribution structures. The special feature of the Austrians is their vertical range of manufacture. All products are manufactured in the company's facilities in Zell am See. Starting with the soaps and detergents to paper towels, toilet paper, wet wipes, routing, and programming of the circuit boards to the injection-moulded components of the dispensers and dosing systems as well as their final assembly.

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

Solely end products and refill packs leave the OEM's halls. The advantages of the B2B business are described by Development Manager Dr Christoph Lind: "Our systems are patented and can only be equipped with our refill packs. We get the systems back from our customers at the end of their

service life. This enables us to implement a real recyclable material cycle and to reuse the plastics." For example, the energy boxes for batteries or accumulators are made of 100 % recycled ABS. This is also the material of choice for towel or toilet paper dispenser housings. When it comes to liquid products, on the other hand, only PP is suitable as a material for the housings. Injection moulding manager Hans-Jürgen Landl makes it clear: "When it comes to the chemistry of liquid products, we don't get very far with ABS. The cleaning agents and soaps would literally eat away at the material over time." But unlike ABS, PP has it all in terms of shrinkage and warpage. This was also evident in the latest new development, the first automatic wet wipe dispenser.

The device hangs in hospitals, doctors' surgeries, old people's homes, gyms – everywhere where surfaces need to be disinfected quickly with a moist wipe. Two foil bags with 100 wipes each can be inserted. The dispenser automatically detects the filling status and also automatically switches from the first to the second foil bag as soon as the first is empty. The device can be configured to block the dispensing of wet wipes after the use-by period. Lind illustrates: "All our devices are activated via a

As bright as a mirror, the tool surface shines towards the viewer.

On the right page:

The wet wipe dispenser has now reached series production. As soon as a user places their hand in front of the sensor in the middle, the dispenser opens and the wipe can be removed.

A look behind the scenes of the dispenser: the reinforcement in the middle of the housing, where the mounting plate for the electronics is also located, is clearly visible. The dispenser is completely filled, as shown by the foil packs above and below.

QR code. During the production of our devices, we create a digital twin of each individual product, which is stored in our cloud. This way, the customer can always see the current status of the device via an app and gets a message when an action is required – for example, refilling soap, replacing the battery and the like. We can see when the device has reached the end of its life and replace it in time."

Simulation paves the way

The wet wipe dispenser consists of 22 different injection-moulded parts. The front cover made of a high-gloss PP was particularly challenging. The designer had specified very flat crowns for the visible surfaces and mirror-like surfaces. Landl explains: "We first 3D print a prototype of almost all component parts of new products. This gives us an idea of whether problems might arise during assembly, and we can already carry out initial functional tests. In parallel, we also evaluate most parts using injection moulding simulation and determine the optimal injection point."

Even during the first simulations with Cad-mould from Simcon, it was clear where the challenges lay, according to simulation and design specialist Martin Hausbacher: "We simulate all new components, regardless of the material we use. The first component





All photos: K-PROFI/Schneider

simulation of the cover showed that we would have a distortion of the cambered surfaces of up to 8 mm on the side walls. That was, of course, unacceptable.”

As a first step, Hagleitner brought its Cadmould Support, imm-solutions GmbH with Martin Mistlberger, to the team. In the group, a procedure was quickly found with which it was very likely that a stockpiling would work. To this end, a geometrically similar component made of ABS for another product was first injected from the PP compound of the wet wipe dispenser and tested to see how shrinkage and warpage behaved here. With these values, the material data set could be calibrated for the simulation. Based on this, Hausbacher went into the Cadmould simulation.

The cover has dimensions of 340 x 340 x 125 mm and is injected from the centre. The flow fronts join at the top and bottom of the 1-cavity mould, so that the flow seams are formed above and below the cover. The latter must not be visible on the final component. The wall thickness of the 655 g component is 3 mm. The sprue is punched out directly during demoulding. Hausbacher used Cadmould to optimise the component in terms of distortion, shrinkage, and weld lines. To ensure that everything fits together perfectly when all the individual components of the dispenser are assembled, the tolerances on the sides may be a maximum of 2.5 mm, while on the top and bottom they must be close to 0 mm. In order to simulate the tooling in such a way that the sink marks disappear as far as possible and the tolerances on the component are maintained, the simulation



Dr Christoph Lind explains: “During the production of our devices, we create a digital twin of each individual product, which is stored in our cloud. This means that the current status of the device can always be viewed via our app.”



Above: Martin Hausbacher confirms: “We simulate almost every component, because this is the only way to get warpage and shrinkage under control, especially with PP housings.”

Below: “We have products where the tool always stays on the machine because of the high volumes. But with the vast majority of machines, there are frequent tool changes,” Hans-Jürgen Landl describes the daily work routine.



A strong team (from left to right): Christoph Lind, Alfred Angerer, Hans-Jürgen Landl, Martin Mistlberger, Martin Hausbacher and Dr Paul Filz.



specialist used the additional module Unwarp from Cadmould. He also used the T-Box and Cool modules for the 3D thermal calculation of the mould. T-Box enables the three-dimensional thermal design of the mould.

For this purpose, the temperature control channels of the Cool module are combined with a complete calculation of the heat transport processes in the injection mould. Lind remembers the moment when the simulation team, production engineering and the mouldmaker sat together and pored over the simulation results: "We always discuss things as a team. I consider it one of our great strengths and the key to success. In the case of the cover, we discussed for ages whether we should really have the tool built with the proposed provisions of the simulation. There was a lot of scepticism as to whether this would really work. But since no one had a better idea, we decided we'd chance it the same way – and it worked out great."

Sim link provides actual data

The Engel sim link tool was used for the first time at Hagleitner during the sampling of the cold runner mould on an Engel e-victory with a clamping force of 5,000 kN. Alfred Angerer, development engineer at Engel, describes how sim link works: "We have stored the individual profile of each machine we have ever delivered in the Engel portal, which also allows the user to bring the simulation one step closer to reality. As soon as Hagleitner injects the first part with the start parameters exported from the simulation using sim link, a good part can be achieved more quickly thanks to the knowledge gained from the simulation. During production, the machine records the complete course of the simulation-relevant parameters or measurement curves such as temperatures, injection and holding pressure profiles, changeover point and the like. Hagleitner can then feed this actual data back into the simulation using sim link and improve the injection moulding process." Dr Paul Filz, Managing Director of Simcon, adds: "Cadmould suggests the initial settings. Sim link provides the machine results from the shop floor, and the software can use them to further optimise the injection moulding parameters."

For the wet wipe dispenser cover, the interaction between sim link and Cadmould worked well right away. The number of shots until the first good part was low. Fewer rejects also means less material consumption, less energy consumption and a faster start to series production. Lind specifies: "We cannot yet precisely quantify the increase in efficiency because we used sim link for the first time with this component. What is certain, however, is that sampling went much faster, and we were able to shorten the time to market." The wet wipe dispenser has now entered series production. In addition to the housing cover made of unreinforced PP, glass bead-filled PP is used for internal components and reinforcements, PA-GF30 for the mounting plate and ABS for the battery box.

Once a product is in series production, however, this does not mean that Cadmould and sim link are no longer needed. Hausbacher gives a concrete example: "It can happen that the mould of a component that has been running on the machine for years suddenly no longer fills properly, or the filling pressure is suddenly extremely high. Then Mr Landl comes to me, and we start troubleshooting with the actual data of the machine and Cadmould. This way we can find the cause much faster and solve the problem."

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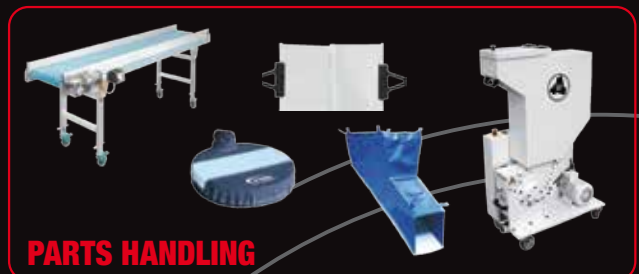
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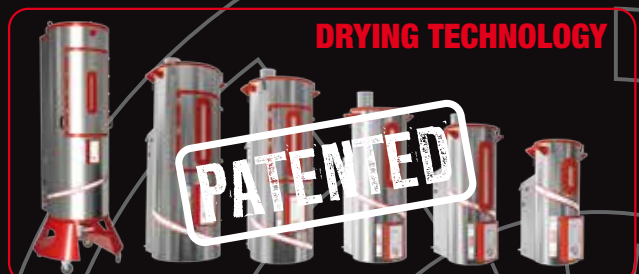
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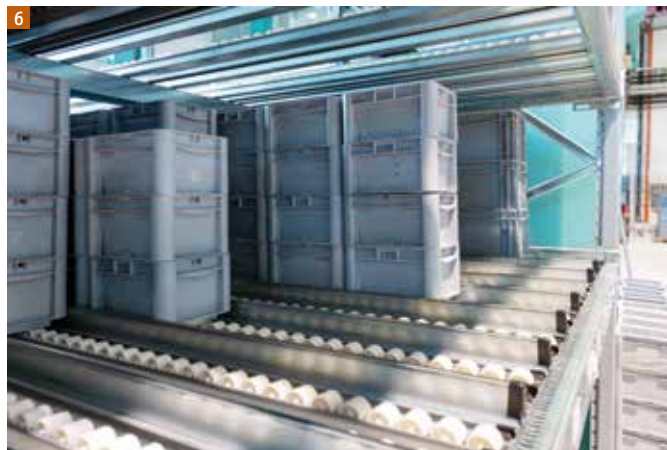
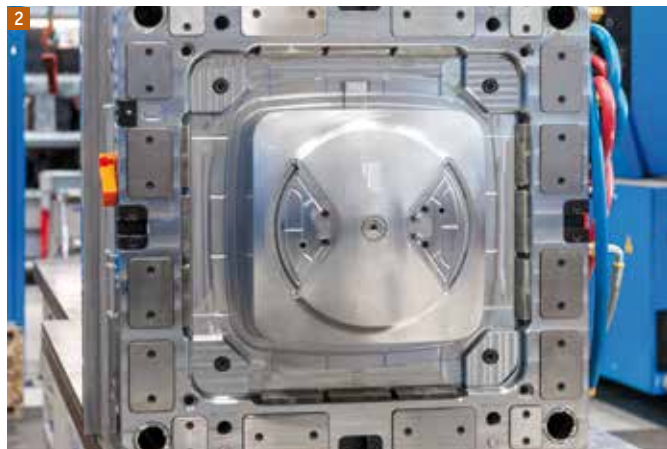
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- 1 The mould for the wet wipe dispenser cover: The visible surface is highly polished to create the glossy finish of the cover.
- 2 View of the ejector side of the cold runner tool.
- 3 The adapters for the liquid soap refill packs are produced in the 8-cavity mould on an Engel machine. An external injection unit injects the TPE seal onto the PP plate.
- 4 The film of the liquid soap bags is welded onto the adapters with sealing ring. They can be inserted into the dispenser with a flick of the wrist.
- 5 The workflow at Hagleitner is highly optimised. From the injection moulding machine, the components of the dispensers arrive in the so-called store directly next to the machine line.
- 6 All the components for one type of enclosure are stored here in one section.

The hygiene specialists also see another plus from the interaction of simulation and actual machine data in future component sampling. Landl describes a possible scenario: "For example, it can always happen that the toolmaker has removed 0.2 mm too much or too little at one point in the tool with the EDM machine. Then all of a sudden I only have 2.8 mm instead of 3 mm wall thickness or I have a filling pressure of 2,400 bar instead of 1,000 bar." In such a case, the process profiles are transferred from the Engel portal to Cadmould via sim link, and the troubleshooting can begin.

In the simulation with the actual data, possible error causes become apparent more quickly, and the problem can be remedied more swiftly. Speed is important to Hausbacher in the simulation: "We simulate so many components here every day that short computing times are indispensable. Cadmould is really fast. I can tell because I have already worked with other programs. And the on-site support from imm solutions is very good."

Efficient workflow

A total of 29 injection moulding machines from Engel with clamping forces between 500 and 5,000 kN are located in the Austrians' halls, five of which are 2K machines. The company uses an external injection unit on three machines to inject TPE seals. This is done, among other things, on the so-called adapter plates of soap refill packs. These refill packs made of foil have a plate made of PP welded on with a sprayed-on TPE seal and can thus be inserted into the dispenser with a flick of the wrist. Landl explains, "The tooling for the adapters always stays on the machine, and we have a backup machine for that, because we make 1.5 million adapters a year."

In addition to the long-running machines, there are frequent tool changes for other components. The company uses around 1,000 active tools, which are located in racks directly next to the corresponding machines. For the housings of the towel dispensers, the production employees take about 60 tools out of the shelves every 14 days and set up the machines. Then 2,000 new towel dispensers are produced and it's on to the next product. "On seven machines, the tools run throughout the year. On the remaining 22 machines, we have

about ten to 15 set-up processes per day across all machines," Landl describes the daily work routine.

A linear robot takes the visible parts from all the machines, puts them on a conveyor belt, from which a worker places them in the so-called store – a shelf storage area that separates production and assembly. Small parts are placed directly into boxes by the removal robots, which also end up in the store. The assembly workers can thus remove all the components of a product at one point. Production runs in two shifts five

days a week. For the long-running products, the company runs an unmanned third shift at night.

Some components go through further steps before assembly, such as hot stamping of logos and lettering or ultrasonic welding. For mass products like the tank for the liquid soap dispensers, automated ultrasonic welding systems are available. Here, a gripper automatically inserts the float from a box into the lower shell of the tank, places the component in the component holder, assembles the float and inserts it, removes

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- 1** In the foreground, the store with a row of Engel machines behind it.
- 2** For the employees on the assembly lines, the distances are short.
- 3** Martin Hausbach (left) discusses the results of the additional tools Unwarp and T-Box from Cadmould from the simulation of the housing cover with Martin Mistlberger (back right) and Dr Paul Filz (right).
- 4** When using a foil bag for the first time, the user opens the lid.
- 5** The company also produces the wet wipes in-house. The dry wipes are cut, folded into stacks of 10, cut and moistened. Then ten stacks go into a foil tube, which is welded into a bag and sealed at the opening. Finally, the lid is glued on.
- 6**

the upper shell, places it on top, then the welding process begins. The welded tank goes through a leak test inside the plant and is then discharged. Landl explains with satisfaction: “We can weld large quantities here. That is important given our throughput.”

If devices – such as the soap dispenser – still consist of motor, drive, pump, and the control boards, these also find their place in the store. The boards are programmed directly on the assembly line. Once everything is installed in place, the devices enter the final testing station, where the digital twin of each individual device is also created and stored in the company cloud.

Family business with high innovation speed

Where today it's all about IoT-enabled products, automated production, and unmanned shifts, 52 years ago it all started more with craftsmanship. Johann Hagleitner, a trained carpenter, began selling air purification devices in 1971. He used the basement rooms of his home for storage and filling. His son Hans Georg fiddled with recipes for soaps and cleaning agents and took over the business activities in 1988. In the meantime, the founder's granddaughters are also on board, and together the family steers the company's fortunes.

The strategy of the one-stop-shop supplier to score points on the market with ever new hygiene products and fast delivery is working thanks to a high degree of in-house production depth. The company expands from year to year. In 2022, 1,300 employees, about 450 of whom work at the headquarters in Zell am See, achieved a turnover of 156 million EUR. The philosophy of keeping everything in one hand,



The PP liquid soap dispenser is available in both white and black.

from soap and detergent production to towel, wet wipe and toilet paper production to electronics and injection moulding, is paying off. Production and development take place solely at the home location.

The approximately 850 sales and service staff look after B2B customers locally. Lind confirms: “In order to grow and to offer customers optimal quality, you need a high speed of innovation. This can only be achieved through in-house production and development. The focus on one location has the great advantage that we can coordinate all processes from the different product areas of chemicals, paper, electronics, and injection moulding. I see this as a major competitive advantage.”

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“We have established a real cycle”.

How Bohle is driving raw material recycling of bicycle tyres and inner tubes.

Ralf Bohle GmbH in Reichshof, better known under its bicycle tyre brand Schwalbe, is not only the market leader in Europe, but also repeatedly makes a name for itself on the topic of sustainability and product responsibility. In 2015, the company launched a recycling system for used bicycle inner tubes through devulcanisation, and last year it added a pyrolysis-based recycling system for tyres. K-PROFI spoke about these activities with Sebastian Bogdahn, responsible for recycling, environmental and sustainability management at Schwalbe.

K-PROFI: Processing used rubber products into rubber powder, which is then used as a filler for other products, is a common process, especially for old car tyres. Why is Schwalbe going its own way with raw material recycling?

Sebastian Bogdahn: Already at the end of the 1980s, Schwalbe made the first efforts to introduce material recycling with rubber powder. At that time, floor mats were made from it, which were used in bicycle workshops, among other places. Old bicycle tyres were collected, prepared and processed at different locations and transported across Europe via several stations.

However, this logistical effort was neither financially nor ecologically viable. In addition, there were technical limits, because the current processing technology was designed for car tyres and not for the comparatively delicate bicycle tyres. Therefore, we discontinued the system around the turn of the 2000s, although it was well received by customers – a great many tyres were taken back. But it was clear in the company that such downcycling with a negative environmental balance could not be the right way.

When did you pick up the ball again?



All photos: Schwalbe

Sebastian Bogdahn is responsible for recycling, environmental and sustainability management at Schwalbe.

We always believed in success and initially developed a devulcanisation process for bicycle inner tubes, which won the Eurobike Green Award when it was presented at the world's leading trade fair Eurobike 2015. The development was carried out in cooperation with the Hamburg-based environmental institute EPEA, which already had a lot of experience with the cradle-to-cradle principle in a wide range of industrial sectors.

We simply started devulcanising Schwalbe inner tubes and investigated how the recovered material could be reused. In the process, we also mixed in products from other manufacturers. As a result, we have seen that these do not pose a problem for a regulated input flow. The advantage here is that due to the high gas tightness, butyl rubber is used in almost all bicycle inner tubes on the market, which in turn makes up the majority of an inner tube.

Do you reuse the devulcanised rubber yourself?

Yes, we have achieved our goal and established a real cycle. All new standard inner tubes, which make up the majority of our inner tubes in terms of volume, contain 20 % regenerated butyl rubber, which comes from old bicycle inner tubes. Parallel to tube recycling, latex and EPDM regenerates are also obtained from other raw materials by devulcanisation and used for new tyre compounds. Devulcanisation takes place next door to compounding at our production partner Hung-A in Indonesia. The devulcanised rubber thus goes directly back into production.

Every year, Schwalbe devulcanises 1.3 to 1.5 million old bicycle inner tubes.

Can the 20 % share still be increased?

Of course, we are working on it, but there are some hurdles to overcome. We deliberately do not use any chemicals for devulcanisation, but rely on a purely thermal and mechanical process. With chemical help, we could separate the sulphur bridges even more selectively and reduce the degradation of the polymer chains, which would lead to a higher-quality regenerate. However, we do not want to add a negative touch to the recycling process by using additional chemicals. We could also achieve an even better regenerate by using single-variety Schwalbe tubes. At the moment, however, we are still dependent on external products because we need a certain volume of material for the continuous process. If the collected quantities continue to increase, we could pre-sort. But we are not that far yet, those are the next development steps. Currently, the 20 % reclaim in new tubes is the technical maximum without negatively affecting the gas tightness of the tubes. And our quality promise is of course the benchmark.

Where do you get the old tubes from?

Our take-back system via the specialised trade is now so well established that we can devulcanise 1.3 to 1.5 million tubes per year. We started in Germany and have so far connected four more countries: the Netherlands, Belgium, Great Britain, and Switzerland. This did not happen overnight, because we had to clarify many legal and logistical issues beforehand. In the meantime, however, we have reached the point where we can expand the system even further.

In the recycling system for tyres that you introduced last year, you are taking a different recycling route with pyrolysis. Why don't you also use devulcanisation, with which you already have experience?

From a purely technical point of view, that would certainly be possible, but the result is questionable. Bicycle tyres consist of several different rubbers. In addition, we collect tyres of all brands and thus have a very colourful mix as input. This would leave us with an undefined rubber mixture as a product – and it is no longer possible to produce a bicycle tyre for the highest demands from this. In use, the tyres have direct contact with the ground and are exposed to high mechanical loads. For us, safety has top priority. Therefore, we see thermal treatment by means of pyrolysis as the best option for recycling.

How did you come across pyrolysis?

I got to know Schwalbe four years ago during my master's studies at the TH Cologne. In cooperation with the company, I used a semi-technical pyrolysis system in the laboratory to conduct research on the topic of bicycle tyre recycling and developed a complete concept in my master's thesis. This went from logistics to mechanical processing to pyrolysis and its results. Schwalbe believed in success and, after I joined the company, we jointly developed the project to large-scale implementation. The most

important cooperation partner was the company Pyrum Innovations from Saarland, which at the time was a start-up that had developed a patented pyrolysis technology for plastics and rubber. It was a perfect fit – without Pyrum we would not be where we are today: Together, we have succeeded in establishing the world's first feedstock recycling for bicycle tyres. At Eurobike 2022 in Frankfurt, we won the Innovators Prize for this.

What products come out of pyrolysis, and can you reuse them?



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The used bicycle tyres are first broken down into rubber granulate, steel and fabric in a multi-stage process. The granulate is fed into the pyrolysis process. This produces pyrolysis coke, pyrolysis oil and process gas, which are used as valuable secondary raw materials. No waste is produced. We ourselves use the pyrolysis coke as regenerated carbon black (rCB) for new bicycle tyres. As the first product from it, we are presenting a tyre at this year's Eurobike in which the industrial carbon black is 100 % replaced by rCB from Pyrum. This is a milestone and the first bicycle tyre in the world to close the loop. At the same time, it is also a starting signal for us. Because we are continuing and researching further possible applications. There is a lot more to come – we are re-thinking some of the product development.

What quantities are we talking about here?

Since we started in August last year, we have already collected half a million tyres and recycled them through pyrolysis. But that is not yet representative, because experience shows that the winter months are not as busy in the bicycle business.

How do you collect the used tyres?

This is done through the specialised trade. In order to cover the running costs that arise from logistics and the recycling process, we charge the dealers a fee for collecting the tyre boxes. We do not make a profit with this. With around 1,600 participants so far, about a quarter of all specialist dealers in Germany have already joined the take-back system. Considering the short time, this is a terrific number. The tubes are taken back without any fees, and the costs incurred for logistics and recycling are borne by us as a company.

Such developments and the subsequent implementation mean a lot of effort for a family business. What motivates you to do it?

Ecological and social responsibility is at the core of Schwalbe. Fifty years ago, Ralf Bohle was already pursuing the sustainable idea as the founder of the company – he had the goal of developing a product that stood for quality and longevity. Of course, this was not called so 50 years ago, but he successfully set himself apart from the competition with it. Today, the company is run by the third generation of the family, and this principle still applies. For example, Schwalbe bicycle tyres, which have been on the market since 1973, are only available as high-quality products in specialist shops.

With the raw material recycling of these products, we are now going a few steps further along this path. For example, the use of regenerated material for the inner tubes has a strong impact on the eco-balance. Even including all transport routes, the energy balance of the recycling process is extremely positive. Compared to the production

of the same amount of new butyl rubber, 80 % energy is saved. We also see it as a source of raw materials that makes us less dependent on virgin material. And the pyrolysis of bicycle tyres causes about 80 % less CO₂ compared to the prevailing recycling of used tyres, which is a mix of thermal recycling, mechanical recycling and co-incineration in the cement plant.

However, our own recycling activities are only one component of our corporate responsibility.

In which other fields are you active?

In so-called green compounds, we want to replace all compound components with renewable or recycled raw materials. For example, compounds for tyre treads and sidewalls are made of natural rubber as well as EPDM and natural rubber regenerate. We have set up a special staff unit to work on the sustainable design of our products. However, we want to move even further and are evaluating all input materials and trying to replace them successively – as far as it is technically possible. We are currently working on various approaches.

However, we do not only focus on the product level, but also on our social responsibility as a family business in our supply chain. For example, we have been a member of Fair Rubber e.V. for several years. With every kilogram of dry natural rubber, 50 cents go to the primary producers as an additional fair-trade premium. They can dispose of this freely. The premiums have already made a lot of difference on the ground and several schools have been renovated, for example.

Mr Bogdahn, thank you very much for the interesting interview.

*The questions were asked by K-PROFI editor
Dipl.-Chem. Toralf Gabler. *

www.schwalbe.de



For the Schwalbe Recycling System, old bicycle tyres are collected from specialist retailers in special boxes.



All new standard Schwalbe bicycle inner tubes contain 20 % regenerated butyl rubber.

Schwalbe – Ralf Bohle GmbH

The family business was founded in 1922 and initially exported bicycle components made in Germany. Since 1973, Schwalbe brand bicycle tires have been produced in cooperation with the South Korean tire manufacturer Hung-A, today in a joint venture between the two companies in Indonesia as well as Vietnam, and sold via distribution partners in over 40 countries. In 2022, Schwalbe had sales of EUR 335 million with tires and inner tubes for bicycles and wheelchairs.

Efficiency boost for hybrid machines

How Arburg helps injection moulders save energy

Arburg is celebrating 100 years of the family-owned company Hehl this year. With the hybrid anniversary machine presented on this occasion, the injection moulding machine manufacturer is “looking to the future”, as Michael Hehl, Managing Partner and spokesman for the management board, emphasises. The presentation of the Allrounder 470 H at this year’s anniversary days at the beginning of March is the starting signal for a new generation of efficient machines. Arburg also supports energy savings with a bundled package of measures that includes retrofitting existing machines as an elementary component.

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

The anniversary machine is not comparable with the machine of the same name from earlier years, emphasises Technology Managing Director Guido Frohnhaus. Arburg combined an electric clamping unit (energy-efficient and cost-effective to operate) with a hydraulic injection unit (robust and cost-effective to purchase) and integrated technical innovations that are “only available from and at Arburg.” In particular, customers who are looking for an energy-saving alternative to hydraulic machines, without wanting to forego their advantages, and who previously shied away from a purely electric machine, are addressed. Arburg speaks of a 50 % better energy balance compared to corresponding hydraulic machines. The new concept will be successively implemented for other models in the hybrid Hidrive series.

So far, the first two of a total of three performance levels – Comfort, Premium and Ultimate – have celebrated their premiere. The Arburg servo-hydraulics have been integrated in both, which are driven by a speed-controlled, water-cooled servo motor in an energy-efficient and low-emission manner and ensure high energy savings, especially for long cooling times. A new feature is the division of the delivery flow of the hydraulic pump. It enables the simultaneous driving



A hydraulic injection unit is robust and reduces the purchase costs of the Allrounder 470 H anniversary machine. Splitting the delivery flow of the hydraulic pump enables simultaneous driving of an additional auxiliary axle.

of an additional auxiliary axle. “In the maximum expansion stage, all axles can be driven at the same time,” explains Werner Faulhaber, Head of Development. In addition, electric metering is offered as an option in the Comfort expansion stage.

The machine builder particularly emphasises the new oil management concept. In the oil tank, warm, used and unfiltered oil is separated from cold, clean oil. The hot, low-viscosity oil flows more easily into the filter and degasses more easily. This, together with the constantly filtered and cooled return flow, improves the oil quality. The waste heat from the machine is used to preheat the oil and does not flow back into the cooling water circuit as residual heat. The cooling water capacity can be reduced by 50 to 70 %. “Thanks to the separation, we also have to filter and pump around 35 percent less oil volume,” explains Guido Frohnhaus. This increases the service life of the components, he adds.

Saving energy according to plan

“The topic of energy will haunt us for a long time to come,” Gerhard Böhm, Managing Director Sales and Service, is convinced. In the new “Action Plan: Energy”, Arburg summarises all possibilities for energy savings. This includes upgrades for existing machines by fully insulating cylinders, retrofitting the Arburg Energy Saving System (AES) and installing energy-efficient motors of class IE3. Consumption measurements to determine energy data for certification and comprehensive advice on process optimisation, energy retrofits, digital solutions (including support in the start-up phase with aXw Control Energy Assist) and subsidies are also part of the package of measures.

In addition, aXw (arburgXworld) users can find out about retrofitting options for their individual machine in terms of energy optimisation directly in the customer portal. The new functions of the portal also include the display of the machine’s carbon footprint (up to delivery to the customer). www.arburg.com



Pneumatics and central lubrication on the operator side as well as inwardly offset storage technology and hydraulic block open up more flexibility for options and peripherals at the rear of the anniversary machine.

Insulator becomes conductor

How Fibrecoat gives glass and basalt fibres new properties

The use of fibres to reinforce thermoplastics is common practice. If electrical and thermal conductivity are also required, natural and glass fibres are unsuitable. Carbon fibres, on the other hand, are expensive. Aachen-based start-up Fibrecoat is filling this gap with aluminium-coated basalt and glass fibres.

*Text: Dipl.-Chem. Toralf Gabler,
Editor K-PROFI*

It all started with the polymer coating of glass fibres. The idea came to Dr. Robert Brüll in 2014 during his doctorate at the Institute of Textile Technology at RWTH Aachen University. To pursue it further, he founded Fibrecoat with his colleagues Richard Haas and Dr Alexander Lüking at the beginning of 2020, supported by an Exist start-up grant for start-ups from science from the Federal Ministry of Economics and Climate Protection.

Immediately after the start, however, the Corona pandemic slowed down the young company. Productions came to a standstill and suppliers dropped out. "Time for something new," the founders thought

and started coating fibres with aluminium. "Aluminium coating makes glass or basalt fibres electrically and thermally conductive," explains Joris Kemperman, marketing manager at Fibrecoat, "and there is a big market for that." The first results were so promising, that the company now focused on further development in this direction. Today, three years years later, the market-ready product

is distributed under the Alucoat brand. 19 full-time employees and 20 students are now working at Fibrecoat.

Flexible coating module

The special feature of the technology is that each filament is already given a coating during production. For this purpose, the start-up

Products reinforced with Alucoat fibres can be used for electromagnetic shielding or effective heat dissipation, among other applications.



All photos: Fibrecoat



The coated fibres are available in rolls ...

has developed a flexible module that can be easily integrated into existing fibre productions. "This allows us to rent existing production capacities from partners, so we can work with low investment costs and produce locally as needed," says the marketing manager. With the patented technology, fast coating is possible. The speed is up to 1,500 m/min. "In the production of solid metal fibres, only 5 m/min is achieved," Kemperman draws a comparison. In the first laboratory tests, the developers coated glass fibres. In their search for an industrial partner, they came across a German manufacturer of basalt fibres. "They were open to new developments, so we were able to test and refine our technology there on a larger scale," reports the marketing manager. This led to contact with a producer in Georgia, to where production was ultimately relocated because of the high gas prices in Germany. In addition, there are large basalt deposits there. Fibrecoat currently produces 6 t of aluminium-coated basalt fibres per month at this location. "And they are all sold, too," Kemperman emphasises.

Production cooperation with Saint-Gobain

"But the greater demand is for glass fibres," the marketing manager knows, "because compounders and processors are used to

them." Basalt, he says, is more of a niche because, as a natural product, it is somewhat more difficult to trade and also a little more expensive than glass. That's why Fibrecoat is now starting to produce aluminium-coated glass fibres in partnership with glass fibre manufacturer Saint-Gobain Vetrotex in Poland. "This is just starting up and is a great success for us," Kemperman is pleased to say. An important property of such fibres is their electrical conductivity. They can therefore be used effectively for electromagnetic shielding, especially against high-frequency radiation. Fibrecoat therefore sees great potential in e-mobility, among other things. "Batteries emit a lot of radiation and are often shielded by solid aluminium or plastic with aluminium foils, which is difficult and costly to process," explains Joris Kemperman. "By using plastic with alucoat fibres, such battery housings are much easier to realise."

Furthermore, in addition to the antistatic effect, the thermal conductivity of the aluminium-coated fibres plays an important role. Thus, corresponding plastic compounds could be used to dissipate heat from electronic components. "The aluminium-coated fibres are much more effective here than if a compound is reinforced with normal glass fibres," emphasises the marketing manager.



Joris Kemperman, Marketing Manager at Fibrecoat.

Price advantage over carbon fibres

According to Joris Kemperman, the advantage over carbon fibres, which are also conductive, is the significantly lower price of Alucoat fibres: "With our three raw materials, aluminium and basalt or glass, we can produce comparatively cheaply." Different fibre units from 50 to 2,400 tex (1 tex = 1 g per 1,000 m) are produced. Customers can



... or already cut.



The founders of Fibrecoat (from left): Dr Alexander Lükling, Richard Haas and Dr Robert Brüll.

purchase them on the roll or cut. "We usually cut to a length of 6 mm as standard, as it is mostly used in compounding and injection moulding," says the marketing manager. But custom lengths are also possible.

There have also been attempts to produce fleece or fabric. "A fleece works well," says Kemperman, "we are still testing which types of fleece work best. Fabrics are not yet fully developed, we are still working on the sizing." The sizing is a very thin coating that is applied to the fibres in the last manufacturing step. It can be used to modify certain properties, such as whether the fibres stick together or not. "Sizings are the secrets of every fibre manufacturer that make the difference," Joris Kemperman knows. "We can also use them to influence the bonding of fibres to a specific polymer matrix." Currently Fibrecoat has chopped fibres that are specifically adapted to PA or PP. "In principle, however, the sizing can be adapted to all polymers."

Polymer coating reinforces reinforcement

Having been successful in the market with the aluminium-coated fibres, Fibrecoat is now also working on the original idea of polymer-coated fibres and aims to have developed them to market readiness in the coming year. "Coating with PP improves the reinforcing effect of basalt and glass fibres," Kemperman knows. "This allows us to compete with carbon fibres. The reinforcement is not quite as strong. Carbon fibres remain premium in this field, but the price difference is significant." This could bring high-performance compounds to the mass market.

While, according to studies at Fibrecoat, aluminium-coated fibres cannot be combined with carbon fibres in a compound, polymer- and aluminium-coated fibres would get along well with each other, so that blends would also be possible here. There are also

ideas of first applying an aluminium coating and then an additional polymer coating. "We still see a lot of possibilities," says the marketing manager, looking ahead. Joris Kemperman is optimistic about the recyclability of the coated fibres: "The materials basalt or glass and aluminium can easily be melted apart again. The question is what the users do with the fibres and how they can be separated from the products again."

Participation in the "JEC" trade fair in April has given further impetus. Last year, the Aachen-based company was represented in the Start-up Village, but this year it came to Paris with its own stand. "As a result, the interest was significantly greater than a year ago," the marketing manager is pleased to say. "And the cooperation with the well-known company Saint-Gobain that has just been announced provides additional confidence." 

www.fibrecoat.de

The blow moulding industry in transition?!

From raw material to machine technology to end product: why the VDI conference in Cologne was so diverse

“Extrusion blow moulding is the ideal method for processing recycled goods,” was the statement of Christian Müller, Managing Director of W. Müller from Troisdorf and head of the VDI Technical Conference on Blow Moulding 2023, which recently took place in Cologne with over 50 participants. “Many blow moulders are currently having to reorient themselves – from the automotive to the packaging industry.” Although the automotive industry is not “dead”, as many prophets of doom claim, “hardly any further developments are taking place here at the moment”, is how Frank Schüller, Managing Director of Mauser Maschinentechnik from Brühl, assesses the situation. On the occasion of the symposium, K-PROFI spoke to the members of the programme committee of the VDI event, which, in addition to Christian Müller and Frank Schüller, also includes Rainer Sattel, senior manager AD/TS Blow Molding at Basell Polyolefine in Frankfurt.

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

The latest developments in the automotive industry away from the combustion engine towards the electric drive mean significant cuts for many manufacturers of extrusion blow moulded technical components. After all, in industrial packaging, plastic fuel tanks and all associated 3D hoses and tubes were considered the cash cows for a long period of time. “In 2019, around 615,000 tonnes of plastic were processed into industrial products in European blow moulding companies,” Rainer Sattel knows. There was no more growth in the plastic fuel container sector, he says. The situation is quite different for consumer packaging and in the IBC sector. “Both areas are growing significantly.” Particularly in the case of IBCs, the curve is pointing upwards. The reason for this is their flexibility for transporting chemicals. “Often enough, a customer does not want as many chemicals as fit into a conventional tanker. A truckload with a total of 26 IBCs is much more versatile. Moreover, the cleaning effort and costs for tank trucks are too high. There are washing facilities for IBCs or – if they are too dirty – the possibility of recycling them,” Frank Schüller explains in more detail.

3-layer technology enables use of recycled goods

Recycling was overall one of the core topics during the conference, which covered all fields of interest with 14 presentations

ranging from raw materials to tool and product design to research with artificial intelligence. “The use of 70 per cent or more of commercially available grey PCR without optical or functional losses has been successfully tested by us with reliable production. The 50 per cent PCR content required by the EU by the end of 2025 is therefore technically no problem at all,” says Christian Müller. Recycled material is simply used in the middle layer of a component in the 3-layer extrusion

blow moulding process and is enclosed by two thin virgin layers. In this way, sustainable monomaterial solutions can be created that can also be recycled again without any problems. “From a purely technical point of view, almost anything is possible, but of course the availability of materials is also a problem for the blowers in order to achieve certain recycling quotas. But this problem can also be solved,” Christian Müller is sure.

Helmut Gersema from LyondellBasell, for example, presented a 3-layer PE motor oil bottle as a solution that is still bright yellow on the shelf thanks to the virgin outer layer, even though it consists mainly of grey recycled material in the thicker middle layer. The Bobby Car Eco from the Simba Dickie Group is made of 100% recycled material. An odour-optimised PCR was used for the product.

“Unfortunately, packaging for the food industry is still not allowed to be produced with recycled goods, so chemical recycling



The members of the programme committee (from left to right) Christian Müller, Rainer Sattel and Frank Schüller in conversation with K-PROFI.



More than 50 participants learned in Cologne about the challenges facing the blow-moulding industry.

is an option here,” says Rainer Sattel, who is convinced that true sustainability can only work in the future by harmonising the three sustainability approaches of mechanical recycling, chemical recycling and the use of renewable raw materials to produce virgin polymers. At virgin level, he sees raw materials recovered from chemical recycling and used directly in the virgin polymer manufacturing process. By 2025, LyondellBasell is building a large-scale “Moretec” plant in Cologne, Germany, which will use the same technology as the pilot plant in Italy and be able to chemically recycle up to 30,000 t/a of plastic residues. It could thus process the plastic residues from household waste of around 1.3 million German consumers and reduce the proportion that is currently incinerated.

Possible solutions for multiple challenges presented

“Unfortunately, chemical recycling is not yet a recognised recycling process and thus does not contribute to quota fulfilment,” reports Thorsten Weber, Head of Application Development Polyolefins at Der Grüne Punkt – Duales System Deutschland, Cologne, which has been operating under its new owner, Circular Resources, for a good six months.

In contrast, the recycling of HDPE from the 2.7 million t light packaging fraction collected in the yellow bag is already working very well. Bottle-to-bottle recycling in particular is convincing with a high added value at justifiable processing costs. “We have succeeded in reliably removing adhering contamination with a hot wash and optimising

odour with the help of an additional degassing stage during extrusion,” says Thorsten Weber, presenting the closed system cycle for bottles and containers. He sees problems with flexible packaging, which cannot be sorted and processed so well and therefore often still ends up in low-quality applications, mainly because of its grey colour or odour. “The stabilisation of polyolefins is also a problem in many short-lived packaging products,” noted Henrik Eriksson, Technical Product Manager Special Additives at Baerlocher in Lingen.

For this reason, the additive manufacturer has developed a special T-blend that can be added directly during HDPE recompounding at a low level of 0.3 %, thus adding value. As such, he named the possibility of being able to introduce a higher proportion of recyclate into blow-moulded products with the same mechanical properties. Various studies have shown that the T-blends improve the hose consistency, avoid necking and reduce slugs – and all this with easy dosing directly into the extrusion process.

Optimised machine and tool design

In addition to presentations from research and development, including Jonas Wermter from IKV Aachen on “Analysis of thermal processes in extrusion blow moulding”, Patrick Michels from Bonn-Rhein-Sieg University of Applied Sciences on “Experimental and simulative investigation of the warpage behaviour of blow-moulded plastic hollow bodies” and Dr Montgomery Jaritz, founder of Ionkraft from Aachen, who presented in his lecture entitled “Recyclable and



Photo: W. Müller

In her presentation “The grey PCR world – challenges and opportunities”, Varinia Lück, W. Müller, showed how coloured bottles can also be realised with PCR.

fluorine-free barrier layers for canisters and bottles” how the barrier behaviour of hollow bodies can be improved in an environmentally friendly way with the help of plasma polymerisation, new, improved tool concepts in particular were not neglected.

Manuel Krebs, for example, reported on the advantages of the combi-electric, partial wall thickness control system from Feuerherm, Troisdorf. The special design is suitable for combining several nozzle diameters in one nozzle holder, which in turn ensures low

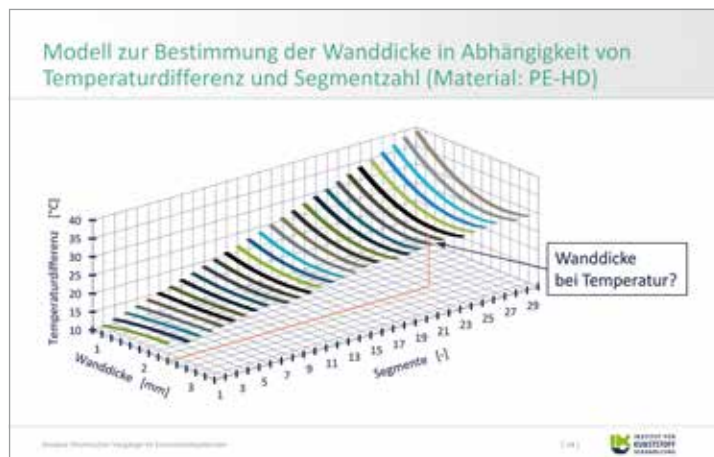


Illustration: IKV Aachen

Jonas Wermter, IKV Aachen, presented a model for wall thickness determination in his lecture “Analysis of thermal processes in extrusion blow moulding”.

investment costs and fast changeover times. Andreas Lichtenauer, Head of Business Development at Fhw-Moulds GmbH, Bottrop, presented a new shell cooling system for blow moulds that works so effectively that cycle times can be reduced and production figures increased. At the same time, the cooling system ensures less shrinkage and warpage, which in turn reduces the number of rejects and ultimately saves resources. www.vdi-wissensforum.de



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Dual leadership: founders Thomas Schönbucher (left) and Moritz Zumdick want to make Priomold the reference in Europe when it comes to bringing products with injection-moulded parts to market quickly.



Instead of large machining centres: compact HSC milling machines produce high surface qualities with their fine cutting tools.

In turbo mode to series-identical parts

How Priomold closes a gap in prototype and small series production with speed

Not yet ten years old and already moved twice. Priomold GmbH, Schömburg, is growing rapidly. The young company serves the need for injection-moulded prototypes available at short notice and for economical pre-series and small series. A master mould system developed in-house and the efficient HSC milling of moulds made of high-strength aircraft aluminium that have been broken down into the smallest individual parts are part of the success concept of the expert for fast toolmaking. Priomold co-founder and CTO Moritz Zumdick provides an insight into an unusual operation that builds the moulds for more than 500 new products a year, samples them and puts them on the injection moulding machine.

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

Priomold (proper spelling: priomold) is in demand when things have to be done quickly or when the customer is unsure whether his component can even be realised in the planned way. "There are always parts for which the simulation result is borderline and even experience does not show any clarity," knows Moritz Zumdick, who founded Priomold in 2015 together with Thomas Schönbucher. "Before the customer invests in a steel mould, we test the concept in a prototype mould. We can reach a conclusion very quickly and change the inserts of our aluminium moulds quickly, even in the course of a day." Often, he says, initial contact arises when engineering needs more time at short notice or when disruptions in the supply chain put customers under pressure, such as containers from overseas not arriving on time and belt stoppages looming. The logistics problems

during the pandemic were rather beneficial for Priomold's business. Aldi Süd also benefited from the fast response time and ordered almost one million hygiene hooks in 2020. "But we also have many customers who generally want to stay here because they can look for solutions together and personally with us on site." Those who come with a mere idea are also supported in engineering by the experts for fast toolmaking and economical small-batch production and are accompanied all the way to product implementation.

It takes a minimum of two working days to deliver 3D-printed parts; for new injection moulding projects it is five. The standard is three weeks, but Priomold can shorten this period for an additional charge. Almost everything needed for tool and part production is located in-house: currently 20 HSC milling machines, a wet machining cell, 17 Arburg injection moulding machines (250 to 3,600 kN clamping force), an EOS laser sintering system and a GOM 3D scanner for quality assurance. As standard, Priomold guarantees a mould service life for 20,000 parts, depending on part geometry and plastic. The maximum shot weight is 1 kg.

Highly efficient one-off production in mould making

The real highlight lies in the special mould concept, for which Priomold has developed its own master mould system on the one hand and a methodology for cutting up the moulding elements on the other. "We break down the mould in the design into many small individual parts that can be easily manufactured. Then we assemble these into the mould. There is a lot of know-how in designing



Ellen Wilhelm (Marketing) points to the standardised mould plate sizes and the high degree of prefabrication of the moulds made of high-strength aluminium.

Puzzle game only in the workshop

For its own master mould system, Priomold provides standardised mould plate sizes and manufactures these itself from high-strength aluminium up to 720 mm x 520 mm. Larger mould plates are supplied by partner companies. The prepared standards can be pulled directly from the shelf to assemble the milled parts into the mould. Putting the kits together in the workshop is manual work and more assembly activity than machining. "With 500 moulds a year, a high degree of prefabrication is essential. Nevertheless, the skills of a toolmaker are still in demand here, especially in the coordination of spotting and venting," explains Moritz Zumdick. Priomold has integrated the temperature control of the moulds into the master mould. "Up to 160 degrees is sufficient for the aluminium moulds. Only for processing high-performance plastics do we drill additional channels into the mould itself." This simplification would not work for moulds made of steel.

Quickly built and set up

The contrast to conventional injection moulding operations becomes clear when it gets to the set-up and production structure. "You don't need a crane for our small moulds made of aluminium. They can be lifted into the machine and fixed with one hand. If the same plastic is used, we manage set-up times of less than a minute. Some of the master mould systems are permanently installed on the machine. On average, we change the moulds 20 times a day, but there are also days with 40 set-ups. With 500 new moulds built a year, we have to do one or two pattern changes every day," says Moritz Zumdick, explaining the situation.

The 17 injection moulding machines are well utilised even without long-run articles. Priomold is already making room for another 20 injection moulding machines. Within the next five years, they are to successively fill a section of the hall previously used as storage space. Currently, the media lines are being laid for the capacity expansion.

this quickly and in such a way that it works later in the fully automated injection moulding process without a change loop if possible. We have mould halves that are made up of far more than 50 individually manufactured CNC parts. Producing these quickly and efficiently is one of our absolute passions," confirms Moritz Zumdick. A wet processing machine ensures a high degree of prefabrication of the blanks. Holes for ejectors, threads and fits for later screwing into the master mould are already made here. The small blanks prefabricated in this way are then contour machined in the air-conditioned tool shop using compact HSC milling machines. "These machines work at very high cutting speeds, always remove only a little material and produce very high surface qualities with their fine cutting tools." HSC milling of many small individual parts on several compact HSC machines is therefore much more efficient and flexible than machining a complete contour on a large machining centre, which only creates a rough surface, says Moritz Zumdick. Through the final machining with different blasting materials, Priomold creates the desired surface, usually a matt-rough structure similar to EDM.

Prefabrication of blanks: Holes for ejectors, threads and fits for later screwing into the master mould are made before the contours are machined.





Photo: Priomold

“This means we are prepared at all times for any new installations that may be required and for customer enquiries at short notice.”

Series-identical, fully automated, quality-checked

Various technologies exist on the market for the creation of prototypes. The spectrum ranges from CNC milling to vacuum casting and various additive methods to injection moulding with rapid tooling tools. Injection moulding prototyping methods are intended to achieve series-identical functions and properties. “That’s why we mill the inserts. On the one hand, this is faster than their additive manufacturing and on the other hand, our moulds are closer to the series production process,” explains Moritz Zum-dick. For the same reason, Priomold usually builds fully automatic moulds that allow a continuous injection moulding cycle without manual intervention for demoulding. Undercuts or other complex geometries are realised in the conventional way by means of slides or spindles. Only for very small quantities does Priomold use loose parts for demoulding. The insertion of threaded bushings, punching grids or pins, on the other hand, is done manually. “There are hardly any restrictions in terms of mould technology. We work with hot runner technology, with inserts, in multi-component injection moulding using transfer processes, and with mechanically, hydraulically or pneumatically driven components,” affirms the CTO. “All injection moulding machines are equipped with linear handling devices or pickers. A fully automatic cycle and process stability are

the most important things.” In addition to small batches, prototypes are also created from the plastic pellets intended for series production. “From simple PP to PEEK with carbon fibre reinforcement, we process all thermoplastic materials. With new formulations, we sometimes don’t even know what material it is.” In its own quality assurance measurement laboratory, Priomold focuses on initial sample test reports. “500 new moulds means 500 new products from a wide variety of industries, each with very individual requirements.” As standard, Priomold offers a random visual inspection in comparison with a master sample and, in addition, simple dimensional checks up to µm-accurate full measurement and creation of a digital twin with a 3D strip light scanner from GOM, a Zeiss division.

Digitalised throughout, including online price calculator

All processes are designed for speed. “We have been using the sou matrixx ERP system since 2017 and invest in optimisations every year to further simplify the processes. Wherever possible, we digitise. We have talented team members who contribute greatly to our continuous development here,” reports Moritz Zum-dick. The internal tool-making department works paperless, the entire process is mapped digitally. In the meantime, Priomold has even launched an online sales portal in addition to the classic sales channel with enquiries and quotations. Instamold.eu is an online price calculator including an order module that allows interested parties to upload their 3D model.

Sophisticated mould storage system.
One pallet can hold up to 50 small moulds.

A software tool developed and programmed by Priomold analyses the STEP data and calculates a price for the mould insert and injection moulded part within seconds. Immediately after the order is received, the express production of the literal instant mould starts. The establishment of this sales channel was the logical consequence of the realisation that the lion’s share of business is generated from online advertising – closely followed by recommendations.

3D printing expands spectrum

The founding of Priomold in 2015 coincided with the phase in which additive processes were conquering industrial production. Due to its great potential, enthusiasts even saw 3D printing as a threat to injection moulding. “We therefore observed the developments in 3D printing for a long time, but rather identified the technology as a useful addition. It allows us to participate in development projects even earlier. 3D printing once again provides access to other parts than injection moulding and our customers have a cost-effective test option for their designs without having to invest in tools,” Moritz Zum-dick is pleased to say. In the early days, Priomold offered stereolithography (SLA) and fused deposition modelling (FDM) through partners. “We realised that our customers hardly asked for these processes. They do not meet the aesthetic and stability requirements. Moreover, low-cost good equipment exists on the market for personal use.” So in



Even faster with 3D printing: EOS installed the first stereolithography system in 2022, with two more to follow this year.



Complete mould kits: Priomold builds 500 new moulds a year, samples them and transfers them to the injection moulding machine.



Manual work: Milled parts are assembled into the mould in the workshop.



Priomold has developed its own master mould system with standardised mould plate sizes for its injection moulds. The temperature control system is housed in the master mould.



Priomold operates 17 injection moulding machines. The media lines are currently being laid for a further 20 injection moulding machines in the rear section of the hall.



Separately temperature-controlled multi-chamber dryers from Gerco with small containers that can be hooked on offer a high degree of flexibility for the frequent changeovers.

September 2022, Priomold invested in an EOS system for selective laser sintering (SLS), “the industry standard for 3D-printed parts”. With the EOS Formiga P110 Velocis SLS (17 l build space), urgent projects can be completed in just two days. Two more systems are to follow this year.

On the pulse of the market

“The market has a great need for short-term parts that work on the first try,” Moritz Zumnick knows. Priomold is therefore “represented in all industries”, even with parts on the international space station ISS. Managing Director Thomas Schönbucher sees great growth potential in the area of e-mobility. “We are experiencing red-hot trends in the front row. Last year, many enquiries focused on charging stations. In the meantime, we are increasingly manufacturing highly integrative components with hundreds of connector contacts,” adds Moritz Zumnick. The two fellow students started out in 2015 with the basic idea of offering very simple parts very quickly. “Within a short time, we realised that our customers come with very complex components that they need quickly. So we turned our focus to pushing the speed further and further,” explains co-founder Moritz Zumnick.

Bold start, rapid growth

Thomas Schönbucher and Moritz Zumnick met while studying aerospace engineering in Stuttgart. Thomas Schönbucher’s master’s thesis on automated five-axis milling at a Swiss manufacturer of injection moulds laid the first seeds for their business idea, which was born in 2014. In January 2015, they founded Priomold. Only two weeks after they had put their homepage online, the first enquiry came from a French customer in the hygiene industry. It was about a 2K component with tight tolerances. “We didn’t trust ourselves to do that yet and made a defensive offer. But the customer ordered. So we built a

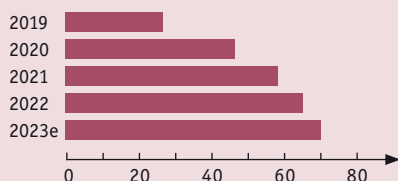
tool and finally got the feedback that they had never received such a good part for the first time before. The company still orders from us regularly today.” In the dual leadership Thomas Schönbucher is the commercial and Moritz Zumnick the technical managing director. The two look back on a steep learning curve: “We learned to design tools, to mill, to assemble and, of course, to injection mould. Until 2017, we did all the activities ourselves before we limited us to coordinating them.” Rapid success required support from skilled workers and eventually more space. The move to Birkenfeld near Pforzheim followed in 2017. “Seven of us moved into a 1,000-square-metre building, which was huge for us, with two injection moulding machines and three milling machines. The space should be enough for five or better ten years.” Just one year later, the two managing directors had to start looking for new premises due to rapid growth. At the beginning of 2019, they moved to their current location in Schömburg with 30 employees and seven injection moulding and seven milling machines.

The former sinker factory offers 5,200 m² of space and still enough possibilities for growth. After all, in just four years in Schömburg, the workforce and machinery have more than doubled. For this year, the two entrepreneurs expect a turnover of 9.5 million euros. Their five-year forecast: “By 2028, this building will be completely filled and on the neighbouring vacant lot we will then have built a warehouse and logistics centre as well as an administration building with a new canteen and possibly a childcare centre. We will then generate around 20 million euros in turnover and deliver even more to other European countries.” The vision of the two is: “We want to become the reference in Europe when it comes to getting products to market quickly with injection moulded parts.” Whether the scaling will be done through subsidiaries or production facilities abroad, however, remains to be seen. ■

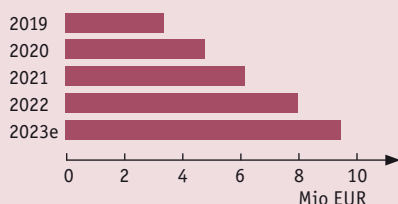
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Employees



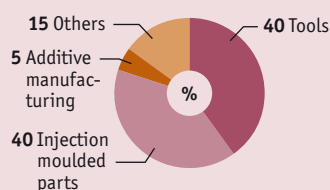
Turnover



Own brand

priogoods “Felix spoons” (spoons for Parkinson’s and tremor patients)

Portfolio



Management

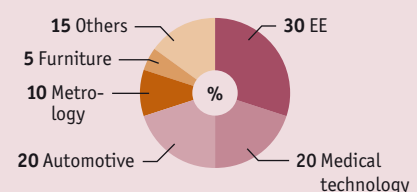


Thomas Schönbucher
Managing Director



Moritz Zumnick
Technical Managing Director

Customer industries



History

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- 2020 “Growth Champion”
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Start of additive manufacturing
“Growth Champion”

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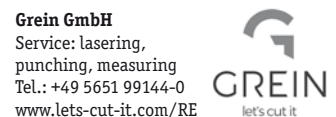
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PMMA

Output of transparent plastic continues to increase / Most capacities located in Asia / Key applications include optoelectronics, civil engineering and automotive / New production processes are more economical

Polymer methyl methacrylate (PMMA) is produced by the radical polymerization of methyl methacrylate (MMA). It is a transparent, rigid, acrylonitrile thermoplastic that is resistant to dilute acids and alkalis, oils and gasoline, but not to aromatic and chlorinated hydrocarbons. PMMA is highly transparent, UV-stable and readily thermoformable. It has good weathering properties and can be joined by welding or bonding.

Global capacities for the MMA feedstock, according to Plastics Information Europe (PIE), amount to about 400 ktpa. More than half of the MMA produced is actually polymerized into PMMA (thermoplastics), the attempt to break down the acrylic market and quantify volumes for specific report and processing methods is very difficult. The MMA not used for PMMA also serves as a copolymer for other plastics, but a large proportion of it goes into non-plastic applications such as paints, surface coatings and adhesives.

"Plexiglas" – a brand name introduced by **Bayer (now Innogy)** – is one of the few known brands among consumers, alongside "Styracem", "Solex" and "Solex". Other brand names for PMMA include "Beyllex", "Acryplex", "Acryplex", "Makrolon", "Bayer", "Cristalux", "Dakron", "Lerdex", "Lerdex" and "Templex". The most popular PMMA products are manufactured by injection molding of the resin, the casting of clear and semi-transparent products, and extrusion. Here, too, it is very difficult to gain a clear picture of the market.

According to the **Statistik** in Mannheim, total global PMMA capacity 2019.

One of the main drivers was rising demand for LED modules. Many more of these goods are manufactured in south-east Asia. It is no wonder that 85% of global capacity is located there, spread across 21 sites. The four European production sites account for just over 17% of total global output, and the sole PMMA facility in North America makes up the remaining 1.6%.

Fluctuations in demand and unpredictable production at a number of plants have managed to maintain the last two decades, above all in Europe and North America. In return, many new sites have been built in Asia, where older plants have also been expanded, although this has resulted in a significant increase in capacity.

Plastics: Global Production Capacities 2019, by product: Share about 1 to 10%

Product	Share
Other	19%
Acrylic Acid	1.7%
Acrylic Acid	1.7%
Acrylic Acid	1.7%
Acrylic Acid	1.7%
Acrylic Acid	1.7%
Acrylic Acid	1.7%
Acrylic Acid	1.7%
Acrylic Acid	1.7%
Acrylic Acid	1.7%

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Mentoring programmes open horizons



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

One, if not the greatest challenge facing companies is appropriate employee development. Above all, passing on knowledge and experience to the younger generation or simply to the successor of a position is essential for the successful continuation of companies. Mentoring is an increasingly popular management tool in this context. Large corporations in particular are setting up larger, targeted programmes in HR departments.

What distinguishes a coach from a mentor? While the coach is usually bought in from outside the company to provide support to personnel in a special discipline or, for example, to new managers in their role, the mentor is usually internal to the company. Ideally, the coach should have completed special training and education blocks in order to be used profitably in his function. This is not necessarily the case for the mentor. By virtue of his office and personality, he is more holistically on the way for a special task.

The term mentor, by the way, comes from Greek mythology, which tells of a friend of Odysseus named Mentor, who educated Telemachos, Odysseus' son. I myself still enjoy the advice and also mediated contacts of a "fatherly friend" for me in the meantime, who has accompanied me in my professional environment for over 25 years. Whenever I need an "opinion", I can reflect on my thoughts with him.

Conversely, I have also been able to pass on much of my experience, e.g. to today's interim managers in our industry. Especially in the orientation and start-up phase, many questions arise that one would like to have answered "just once".

Even companies that do not have a large HR organisation can implement such a programme very easily. Mentors only have to be willing to share their experiential knowledge, at whatever level, with a mentee (as the "students" are called). This is a cultural issue. In the best case, the mentee chooses his mentor in the company himself, because this ensures that both sides really enjoy doing this.

A compulsory obligation along the lines of "You have to finally share your knowledge now!" in this role is not promising. An exchange that is regular at the beginning and later on demand-driven helps the mentee to become confident in his role and to develop the necessary information, contacts and behaviour. It is fantastic if such a "bond" or "tandem" continues even after the mentee has left the original company.

Apart from the business environment, such symbioses exist in all corners, such as the school, the training centre and also in the purely private sphere. There is always a win-win situation for both sides. The experienced person passes on and receives information about current events through the mentee, which he or she might not otherwise have noticed. The mentee consciously reflects on himself and his environment in the role in which he seeks support.

Used well, planned for the long term and permitted (!), the instrument is ideal for the current changes of generations at all levels in the company. ■

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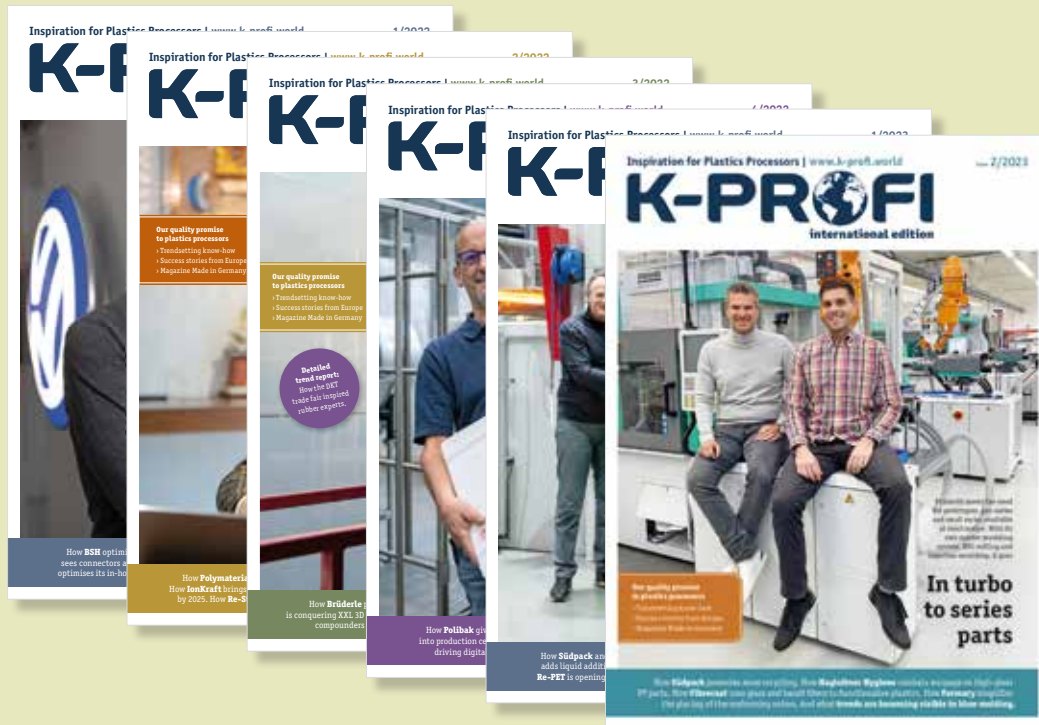
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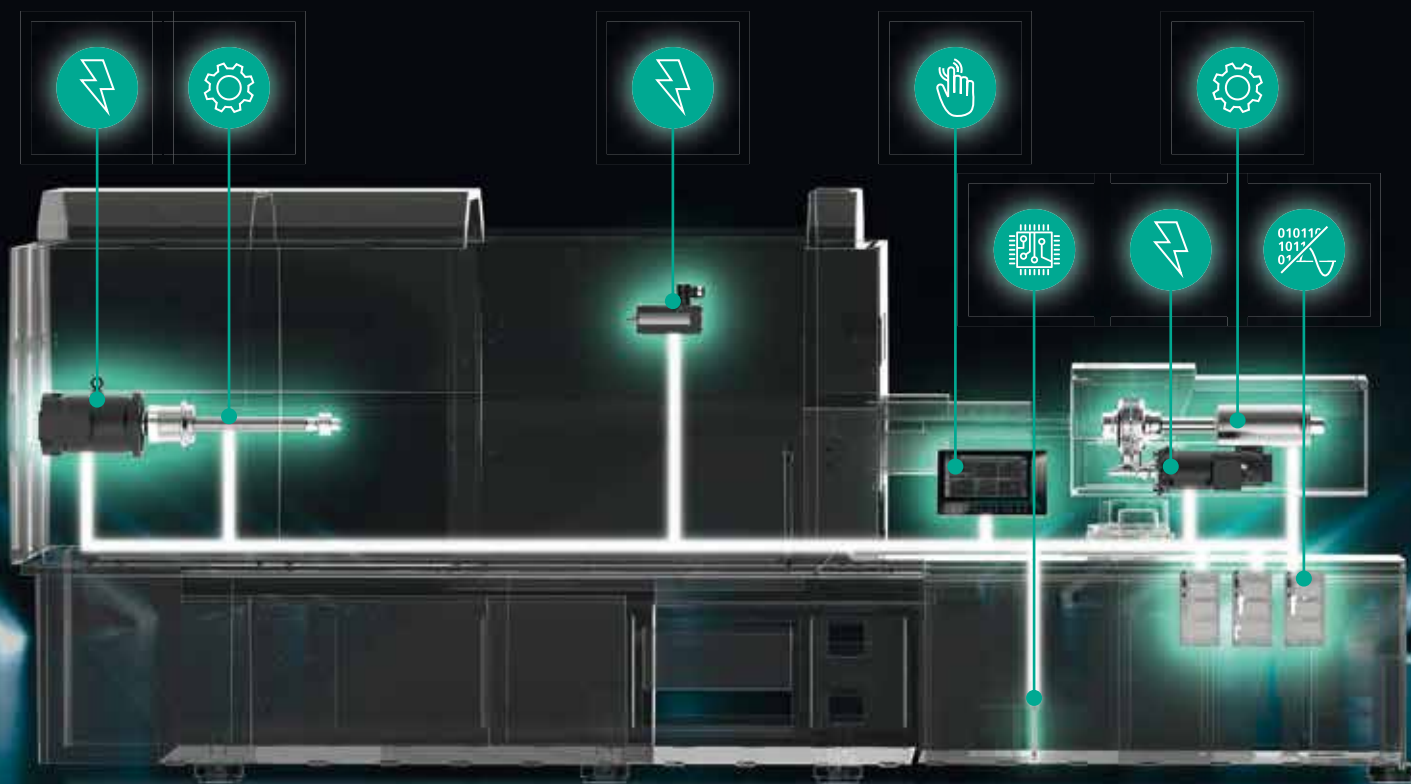
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