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Barac Bieri, CEO and owner of the Swissplast thermoforming group, disappeared for a month and could not be contacted. How did his three deputies cope with the suddenly initiated stress test?

Prepared for an emergency?

What speaks for and against **recyclates in food contact**. How **Agoform** is growing with extrusion and thermoforming. How **Kurz** is expanding its insert technology expertise. How **CeraCon** guarantees 100 % impermeability when foaming. And how **SE** focuses on geometry and functionality in thermoforming.

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A stress test and exciting technologies



Dear reader,

Three German injection moulding companies and mould makers exhibited together at the US medical technology trade fair “MD&M West”. I asked Dr Christoph Badock about the insights gained by Hoefer & Sohn, F. & G. Hachtel and Pfletschinger & Gauch: page 5.

Is food contact really desirable for recyclates? Recycling experts Dr Herbert Snell, Daniel Gneuss and Dr Stephan Gneuss discuss with Karin Regel how assessments against plastics are slowing down ecological decisions: page 6. Prepared for an emergency? Barac Bieri, CEO and owner of the Swissplast thermoforming group, disappeared for a month and could not be contacted. Gabriele Rzepka finds out from page 9 how his deputies Ninyan Bieri, Karin Gröbnitz and Rebecca Bader coped with the sudden stress test.

Complex thermoformed components with high functionality and an injection-moulded look – this is what SE Kunststoffverarbeitung in Langenargen stands for. Thorsten Eymael is convinced by Gabriele Rzepka that he can fulfil almost all of his customers' requirements: Page 12 The Kurz Group from Haigerloch is an expert in insert technology. A high degree of automation supports the production of precise hybrid parts for many industries. Jochen Merz explains to Sabine Rahner how Kurz brings complexity into the component and saves process steps: page 18.

Since 2000, CeraCon in Weikersheim has grown from a start-up to a medium-sized plant manufacturer and foam sealant producer. Dr Frank Kukla explained to Gabriele Rzepka that he now uses his own 1C PUR system for foam gaskets: page 24. Cutlery inserts for kitchen drawers have made Agoform from Löhne big. With its own extruders, specialised thermoforming machines and expertise in coating, the East Westphalian company manufactures high-quality household products. Technical parts in particular are on course for growth. Gabriele Rzepka reports from page 30 onwards.

We hope this booklet provides you with useful ideas for making wise decisions.

Markus Lüling, Editor-in-Chief

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“Powerful medium-sized companies in an alliance”

What three medical suppliers learnt at the MD&M trade fair in California



Photo: Hoefer & Sohn

Roland Pfletschinger (Pfletschinger & Gauch), Dr Christoph Badock (Hoefer & Sohn) and Steffen Hachtel (F. & G. Hachtel, from left) at MD&M.

With Hoefer & Sohn from Fürth, F. & G. Hachtel from Aalen and Pfletschinger & Gauch from Plochingen, two injection moulding companies and a mould maker presented themselves together at the MD&M West medical technology trade fair in Anaheim. K-PROFI asked Dr Christoph Badock, as the representative for himself, Steffen Hachtel and Roland Pfletschinger what motivated them to make the long journey to California/USA at the beginning of February and what insights they gained.

MD&M West – short for Medical Design and Manufacturing West Conference & Exposition – is the largest medical technology trade fair in North America. It brings together medtech experts from all over the world every year in Anaheim, California. The spectrum of products and services ranges from product development and manufacturing technologies to the production of medical devices.

K-PROFI: How did you decide to exhibit together at MD&M?

Dr Christoph Badock: Some time ago, six injection moulding and mould making companies with activities in medical technology came together through Jens Lüdtko from tebis Consulting – these are Stolz & Seng, Gindele, Croner Präzisionsformenbau, F. & G. Hachtel, Pfletschinger & Gauch and our company, Hoefer & Sohn. We have considered new business models and also joint international activities. Roland Pfletschinger received an enquiry about participating in a trade fair. Steffen Hachtel and I were spontaneously enthusiastic about the idea. In the end, the three of us took the plunge across the pond.

Why the USA and not a trade fair in Europe?

North America was the obvious choice because good injection moulding tools are in particular demand in the USA at the moment. Our intention was to recommend ourselves as a replacement for Chinese capacities with a high-quality and consistent production range.

How did you organise the participation?

We took advantage of the offer of the German joint participation and booked a stand there, which was fully equipped. The disadvantage was that we couldn't customise it very much. But we benefited from little effort and – divided by three – a fairly low fee.

What was particularly worthwhile about the joint event?

We were able to hold discussions with several people and present ourselves as a larger, powerful SME with expertise along the medical and medical technology value chains. This has resulted in a very specific project that we hope we can develop together.

What surprised you about your discussions?

How well informed and orientated many of the people I spoke to were about Europe, Germany as a business location, our industry and the political situation. I hadn't expected that. Quite a few people were almost sympathetic about our current economic challenges.

What else did you not expect?

That representatives from several US states and Mexico approached us about a possible new business location. The delegations came with complete offers for property, logistics and other services to promote their locations.

Was the effort worth it for you?

We will have to wait and see whether the promising enquiry can really be developed. But the tour was definitely worthwhile as a learning experience. We now know what the clientele values and what we can perhaps do better.

And what could be done better?

The trade fair had a very heterogeneous range of products and seemed rather unstructured overall, so there was a lot of passing trade. Our conversations actually resulted from chance encounters at the stand or from our own visits to other exhibitors. That's why we need to focus even more clearly on the potential in the USA, do more marketing in the trade fair's target group beforehand and involve an order broker who can identify potential interested parties for us and thus channel a matching of supply and demand.

The interview with Dr Christoph Badock was conducted by Dipl.-Ing. Markus Lüling, Editor-in-Chief K-PROFI. 

www.hoefer-und-sohn.de; www.fg-hachtel.com;
www.pfletschinger-gauch.de

Is food contact really desirable for recyclates?

How populist judgements against plastics are slowing down ecological decisions

“We only have the prosperity we have today because we have plastics,” says Dr Herbert Snell, summing up the opinion of the vast majority of people working in the plastics industry. The long-standing Managing Director of the Veolia subsidiaries Multipet and Multiport, who now works as a freelance consultant for the recycling industry, would like to see new ways of increasing sales of recyclates and putting an end to plastic bashing. The managing directors of Gneuss Kunststofftechnik Daniel and Dr Stephan Gneuss, who presented various machine technologies for recycling plastics at a technology event last November, take a similar view. In an interview with K-PROFI, they explained how critical they are of the current regulations at EU level, what they think of the EFSA and FDA authorisation procedures and what rethinking would be desirable.

Gneuss has developed functioning recycling concepts for both PET fibre waste and used HDPE bottle caps.



Dr Stephan Gneuss explains the benefits of his company's complete omni-recycling systems, which are available for various applications, during the tour of the plant.

K-PROFI: Dr Gneuss, how do you assess the current willingness to invest in recycling systems for food contact applications?

Dr Stephan Gneuss: We have clearly noticed that potential customers are reluctant to invest in systems. This is particularly true in Europe.

Why is that?

Dr Stephan Gneuss: In my opinion, there are two reasons for this. The first is the low price of virgin material, which means that recycling doesn't seem economical, and the second, at least in Europe, is the EFSA's authorisation procedure, which is not practice-oriented.

However, you mentioned in your presentation that the decontamination performance of your recycling concepts enables food contact for recyclates.

Dr Stephan Gneuss: Yes, that is the case, but for the processor this still means that they first have to register a new technology for their specific packaging product with the EFSA and then publish all the production data for this over several years and hopefully receive a positive decision after five to seven years.

Can he not sell his packaging solution in the meantime?

Dr Herbert Snell: Yes, he can already sell the packaging, but it can happen that he doesn't get the OK after the monitoring period. In this case, he has invested and built up distribution channels for nothing. In this way, EFSA is indirectly hindering the introduction of recyclates into the packaging market for direct food contact.

Dr Stephan Gneuss: This is precisely why we are currently finding very few processors who are prepared to produce packaging for the food sector from HDPE bottle caps, for example, even though we offer the right equipment for this and have already proven technically and scientifically that it is possible.

What does the authorisation procedure look like in other countries?

Daniel Gneuss: Even though I can mainly speak for the USA, we can see that recycling is not only a priority in the USA, but also in South America. In most cases, however, there is a lack of the necessary local infrastructure to be able to carry out serious recycling. However, the existing regulations in these markets are often easier for processors to implement, which suggests that Europe could be surpassed by other countries sooner or later.

At the technology event at Gneuss, an Omnimax recycling system for thermoforming sheet was on show live.

What regulations exist outside Europe?

Daniel Gneuss: Many countries have their own country-specific regulations for the use of recyclates for food contact packaging, but most of them are based on the American FDA requirements. As processors in Latin America in particular often import their products directly or indirectly to America, the FDA approval, which is easier to apply for than an EFSA authorisation, is important.

And how does the authorisation work?

Daniel Gneuss: In contrast to EFSA, which certifies the respective producer and their specific product, the FDA decides on the decontamination process more pragmatically. If the selected process fulfils the requirements, the processor can use it to produce and market bottles as well as bowls or cups. One of our customers, for example, has received FDA approval for its PS recyclate preparation process and also fulfils the regulations applicable in South America. He now produces yoghurt pots from PS recyclate on one of our Omni recycling systems.



Photo: K-PROFI

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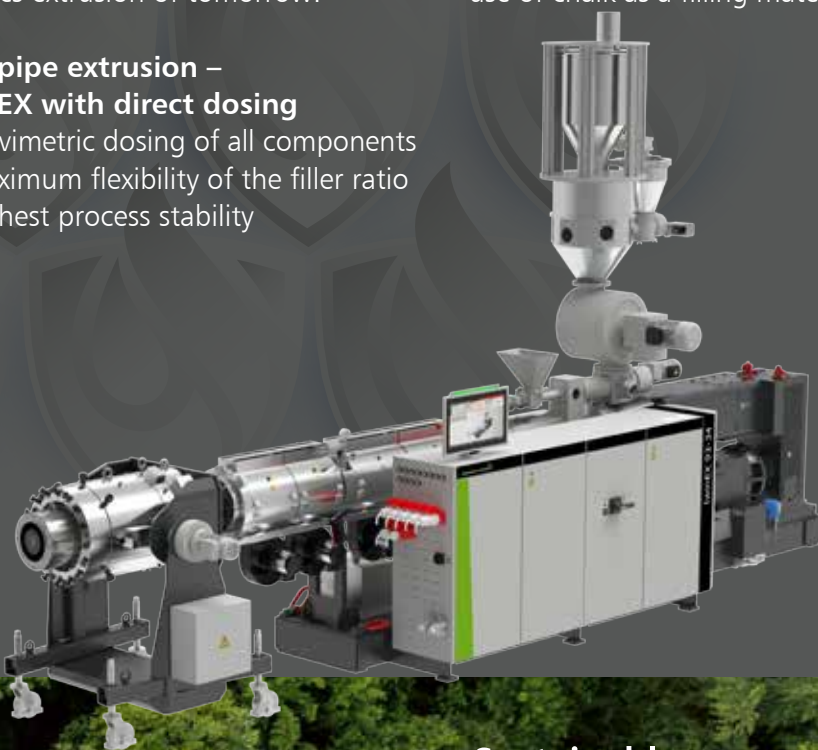
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Let me come back to Europe and the EFSA. Does the requirement that 95% of the recyclates used for food contact must also come from food packaging apply to all polymers?

Dr Herbert Snell: No, so far the 95/5 rule only applies to PET; no specifications have yet been made for polyolefins, for example, which further paralyses the willingness to invest.

Given the difficult legal provisions and EFSA regulations, does it make any sense at all to return recyclates to their original use as food packaging?

Dr Stephan Gneuss: Due to the deposit system and the functioning, already established cycles, PET bottle-to-bottle applications are the only ones that really work economically. However, if you look at the recycling processes from a purely energetic point of view, closed-loop processes are not necessarily the first choice.

Why is that?

Dr Herbert Snell: Bringing recyclates back into contact with food means carrying a higher CO₂ backpack, as more energy has to be introduced into the process, for example to carry out decontamination. However, the CO₂ emissions are still significantly lower than for virgin material. But when used without direct food contact, energy and therefore costs can be saved.

What do you think would be a viable option?



Photo: K-PROFI



Photo: K-PROFI

Daniel Gneuss fears that Europe could be surpassed by other countries due to sometimes lengthy authorisation procedures for recycling concepts with food contact.

Dr Herbert Snell: Instead of establishing closed cycles for food contact, the substitution of virgin material should be promoted in long-term applications, such as in the construction industry or the automotive sector. This is where the most CO₂ can be saved and therefore the best way to protect the environment.

The EU is planning recyclate use quotas for sensitive packaging, i.e. also for direct food contact, can this be achieved with polymers other than PET?

Dr Stephan Gneuss: Technically, this is certainly possible in many cases. We have already shown that. However, if you look at the economic efficiency as well as the energy and ecological effects, other approaches are often more advantageous, as Dr Snell explained. Similar to CO₂ certificates, a credit or certificate system could also be used in the area of plastics recycling. Plastics processors for whom recycling is associated with high costs and energy expenditure could then, for example, buy certificates from processors with high recycling rates. In this way, plastic is recycled as efficiently as possible without jeopardising the ecological CO₂ targets.

Isn't that also greenwashing?

Dr Herbert Snell: No, that's not greenwashing. It should not be advertised that recyclates are used. However, this way the

During the live demonstrations in the Gneuss technical centre, an employee shows how easy it is to replace a filter element during ongoing production.



Photo: Herbert Snell

Dr Herbert Snell would like to see a rethink on the part of politicians and approval bodies to make it easier to achieve ecological goals.

obligated manufacturer can fulfil his legal duty and it benefits the environment. It is undisputed that high CO₂ emissions are our problem and that we must tackle this together in the EU. How we achieve the reduction is ultimately irrelevant. The important thing is that we achieve it. A sustainable industry can only be established if the market for it is there. And the fact that ecological targets quickly fade behind economic ones was once again made clear to us in 2023.

So in your opinion, chemical recycling doesn't make sense either?

Dr Herbert Snell: Precisely. From an energy point of view, it makes no sense. The industry has been talking about chemical recycling since the 1990s and not much has really happened since then. Just think about the steps involved in chemical recycling, such as pyrolysis. Firstly, the polyolefinic components have to be collected and sorted at great expense before being sent to the pyrolysis process. The polymer chains are turned into naphtha in the cracker, which is then polymerised again. This all costs much more energy than throwing the processed polyolefins directly into the extruder and using them in products for long-term applications. In addition, the yield of polymers is very low in the end.

Thank you very much for your frank comments.

The interview was conducted by
Dipl.-Ing. (FH) Karin Regel, Editor K-PROFI. 

www.gneuss.com

Prepared for an emergency?

How a stress test can show whether operational processes can function even in the sudden absence of management

A photograph of CEO Barac Bieri, a man with a goatee and short hair, wearing a dark blue button-down shirt. He is smiling and holding a clear plastic mold filled with small, clear plastic parts. He is standing in a large industrial warehouse with high ceilings and metal shelving units. The shelves are filled with various plastic products, including large circular discs and stacks of boxes. The floor is polished and reflects the overhead lights.

CEO Barac Bieri is reassured:
"The business is running without me,
thanks to my great team of deputies."

Nobody wants this situation to happen, but it cannot be ruled out: the management is no longer available from one second to the next. Be it due to an accident, serious illness or even death. In owner-managed plastics processors in particular, a great deal of knowledge, responsibility and decision-making power often rests on the shoulders of a single person. This makes it all the more important to ensure that internal structures are in place to take effect in the event of their absence. Barac Bieri, CEO and owner of thermoforming company swissplast group, headquartered in Sargans, Switzerland, wanted to find out for his company and initiated a stress test from one day to the next. He disappeared for a month and could no longer be reached by anyone. In an interview with K-PROFI, he explains why he resorted to this measure, and they tell how his deputy team of COO Ninyan Bieri, CFO Karin Gröbnitz and Executive Assistant Rebecca Bader coped with the situation.

K-PROFI: Mr Bieri, how did you come up with the idea of carrying out this stress test and how did you realise it?

Barac Bieri: I travel a lot by car and during one of these journeys I thought about what would happen to the company if I were hit by a lorry tomorrow. What's more, my son Ninyan is due to take over from me at some point, and he also needs to be well prepared. I asked myself whether our structures were good enough to ensure that processes would continue to run smoothly if I were suddenly unable to work.

And what was the consequence of these considerations?

Barac Bieri: I reduced my future appointments and sent an email to my deputy team on 4 December 2023, informing them that I would no longer be available for an indefinite period of time and that they would have to manage the swissplast group on their own.

What happened next internally?

Ninyan Bieri: The first thing I did was to inform our employees, our most important customers and our Board of Directors about the situation, because I believe that transparency is essential in such an exceptional situation. Everyone reacted very understandingly and offered their help and support. Karin Gröbnitz and I have clearly divided responsibilities - she is responsible for everything financial and HR, I am responsible for production, operations and all projects. My father is responsible for purchasing, sales and strategic projects. Rebecca Bader has access to all of my father's email correspondence. The first thing we all did was sit down together and decide who would take on which of my father's incoming emails, enquiries and tasks. We quickly realised that the most urgent task was the supplier payments. Karin took on this job as well as all other financial and contractual matters.

Karin Gröbnitz: There was a whole mountain of tasks to deal with. Barac usually took care of all the payments. The payment runs to the suppliers take place once a week. Ninyan and I have joint account authorisation, but Ninyan still lacked online access to the accounts. As our company philosophy includes absolute punctuality and reliability towards our suppliers, we had to organise online access for Ninyan within a few days in order to

be able to process the payments. Ninyan had to travel to some of the banks, and the time window for this was very tight. But in the end, we were able to solve this too. All payments were made on time. That was one of the points that was not optimally organised in advance, as we learned in the situation.

You talk about a mountain of tasks. What else did you take on that was new to you?

Karin Gröbnitz: I had to take care of a change of electricity supplier, which had to be finalised by the end of the year. That was important because the energy costs as a plastics processor are high. A favourable electricity tariff is essential for us. We also had to extend contracts with our customers and negotiate payment terms with them.

During a month of hard work, the deputy CEO team of Rebecca Bader, Ninyan Bieri and Karin Gröbnitz (from left) showed that they can run the company successfully.

Did you also have to negotiate with customers during this time? If so, who was in charge?

Ninyan Bieri: Until then, my father had always handled the price negotiations and negotiated payment terms with our most important customers. Now Karin and I have been liaising very closely and have also involved our Board of Directors to some extent. It consists of four very competent experts who provided us with advice and support. In the end, I conducted the negotiations with the partners concerned.

You had a lot of new tasks to deal with, which you even had to familiarise yourself with. Did production and the project business not suffer as a result?

Ninyan Bieri: We have always made it our mission to foster a culture of making mistakes and for individual employees to make



Photo: Swissplast

their own decisions, even if they may not always be the right ones. This is the only way employees can learn to act on their own in a responsible manner. Now the time had come for me to call everyone to account. I encouraged the entire swissplast team to make their independent decisions and to support us. I then trained selected employees in the plants to carry out simple product calculations and to relieve me of project management tasks. That worked very well, everyone got on board. I also got Rebecca much more involved.

What does that mean in concrete terms?

Rebecca Bader: I obtained all the information required for a project calculation from the customer and passed this information on to our employees. As soon as the quotation was ready, I presented it to Ninyan again for review and then forwarded it to the customer. I organised Barac's entire mail filing system so that we always had an overview of all processes.

Mr Bieri, did the stress test go to your satisfaction? What are your conclusions?

Barac Bieri: I am very proud of my team that everything went so well. They didn't even try to contact me. I have learnt that I am still doing too many things myself that I shouldn't be doing myself. I will delegate a lot more to Rebecca in future. Basically, I want her to carry on doing exactly what she did during the month I was away. I've also learnt that the shop runs without me. That reassures me a lot. After all, the partners, customers and suppliers I spoke to afterwards were all very positive about the interim management of my deputy team.

What would have happened if the absence had lasted much longer than just one month? The additional workload for the team was very high.

Ninyan Bieri: I would definitely have involved the Board of Directors much more or looked for an interim manager. Karin, Rebecca and I often worked late into the night, and we wouldn't have been able to pull that off in the long term. It's not as if my father just sits around doing nothing all the time, he also has a full working week. We had to absorb all of that.

Karin Gröbnitz: I can only agree with Ninyan. It was a valuable experience that really bonded the three of us. Nothing was left undone, and we showed that we are capable of running the company. But we agree that this burden would be too great in the long term.

Is there anything you would pass on to other companies?

Barac Bieri: I think it's very important that every company director considers what will happen to the company in the event of their sudden departure. I wasn't sure whether we

were really well positioned, although I endeavoured to create all the necessary structures for a sudden absence on my part. It can jeopardise the existence of a company if no one can step in and know what to do if the worst comes to the worst. That's why I can only recommend such a stress test. It uncovers potential for improvement and shows whether a company is up to the challenge.

*The interview was conducted by
Dipl.-Ing. Gabriele Rzepka, Editor K-PROFI.*

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Left page: "We have been in the plastics processing business for four generations and over 100 years," explains Thorsten Eymael proudly – here with a negatively moulded tray.

Thorsten Eymael is satisfied: "We supply well-known OEMs, and we are Tier 1 for quite a few of them."



All photos: K-PROFI/Manuel Hauptmann

High functionality with a sophisticated look

How SE Kunststoffverarbeitung produces thermoformed components with complex geometries and injection moulding-like surfaces

You can quickly sense it in conversation: Thorsten Eymael, Managing Partner of SE Kunststoffverarbeitung GmbH & Co. KG from Langenargen, is proud of his company's long tradition: "We've been in the plastics processing business for over 100 years. With this experience, we can solve almost all of our customers' challenges."

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

The great-grandfather of the current partners Thorsten Eymael and Silke Schuster founded the Herscheid moulding plant in Sauerland in 1921. Back then, the company started out by processing thermosets, primarily for the electrical industry and the emerging radio technology. The company pressed a self-produced material similar to Bakelite into spark plugs, housings and sockets. From the 1940s onwards, the company focused more and more on the up-and-coming thermoplastic injection moulding.

Eymael's parents later made another significant change in strategy: They switched 100% to thermoforming technology in 1979. The company headquarters of SE-Kunststoffverarbeitung, which was then established, was Friedrichshafen on Lake Constance, after the Herscheid moulding plant had already taken over a site there in 1961. Eymael quickly summarised the reasons for choosing this location: "On the one hand, the labour costs

– they were much lower here in the region than in North Rhine-Westphalia at the time. This was a structurally weak area. The company also wanted to be closer to its customers in southern Germany."

A worthwhile change of direction

The change of direction to thermoforming has paid off for the family business. The small thermoset and injection moulding processor has grown into a company with 8,000 m² of production and storage space, around 100 employees and a turnover of just under EUR 20 million in 2023. Its customers come from the automotive, bus, commercial vehicle, construction and agricultural machinery and motorhome sectors. The company often serves niches with a few 100 to a few 1,000 components per year. However, these are always series productions. Eymael emphasises: "We supply well-known OEMs, and we are Tier 1 for most of them."

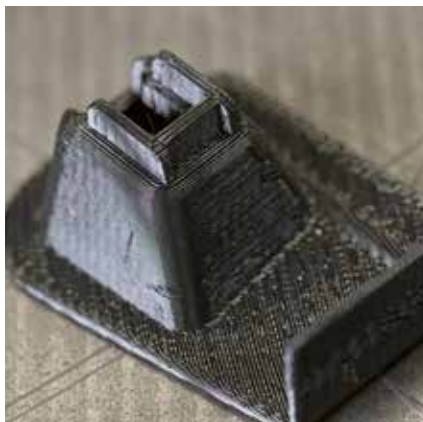
80% of these are visible interior applications such as interior panelling for doors, side panels, headliners, seats, pillars, trims, boot panels and visible and non-visible covers of all kinds. But also exterior applications such as front panelling and trims for bumpers, add-on parts for the body shell – the list goes on and on. The company delivers the components to the end customer ready for installation, often in part-specific load carriers, sometimes just in time.

Thermoforming with subsequent CNC milling is followed by a well-equipped assembly department. In many cases, 3D printers, which are also used in production, produce reinforcements, holders for screw connection points, retainers and brackets. "The combination of thermoforming and components from 3D printing often makes sense, as the quantities are frequently not so high as to make the investment in an injection moulding tool for a stiffener or similar worthwhile," explains Eymael. What cannot be produced in-house, SE buys in from outside.

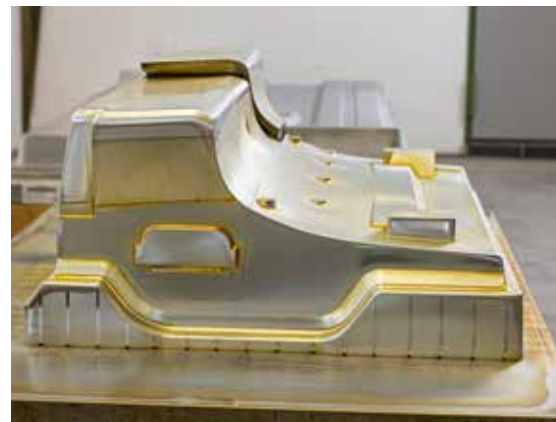
Anyone who thinks that SE usually runs mini-batches through its machines is mistaken. The average quantities per variant are between 1,000 and 8,000 per year. There are also quantities of 15,000 parts per year. "We focus on series products that run for several



The grain, gloss level and colour of the thermoformed component must perfectly match those of the injection-moulded elements. In QA, all delivered materials are checked for this.



SE produces clips, reinforcements and other add-on parts using 3D printing. Here the clip for the rear of a C-pillar.



The mould for the air duct of a car works with sliders on the right and left. They move up for demoulding so that the sides of the component are on one level and it can be demoulded.

years. Small adjustments can always be implemented quickly in thermoforming production, often involving only minor changes to the CNC programmes. Our parts usually run for years," says Eymael, describing the company's philosophy.

A look at production

But what does production actually look like? Five thermoforming machines await the visitor in the halls, four UA from Illig in different sizes, but the latest addition is a Geiss T10. Both the UA 250 4G with a clamping area of 2,500 x 1,500 mm and the T10 with a maximum mould plate size of 2,000 x 2,000 mm have integrated horizontal band saws that are controlled via the thermoforming machine. The moulded components are then transported directly via a conveyor belt to

the saw, which performs the edge trimming. The older machines also have a horizontal band saw attached to them, but this is loaded and controlled manually by a worker. For Eymael, the edge trimming of the still-warm components is essential: "We have a high level of shrinkage with many materials, especially with polyolefins. If we didn't immediately remove the edges that are covered by the stenter frame and have not been heated to a high temperature, the entire component would end up warping."

This is impressively demonstrated by a backrest trim made of black PP for a robust off-road vehicle, which is currently being produced on the Geiss machine with a 4-cavity mould. The grained semi-finished product has dimensions of 1,400 x 1,300 mm and a thickness of 3.5 mm. After the heating process, the mould moves from below into the clamped plate, while a top punch ensures clean boundaries between the four cavities. Immediately after demoulding, the moulded component moves into the horizontal band saw, which separates the four claddings and removes the edge. Before moving on to CNC machining and final assembly, it's time to rest. "24 hours storage time is a must for PP due to the delayed shrinkage," Eymael emphasises.

View of the rear side of the C-pillar panel, in which all the clip holders are already fitted.



The C-pillar panel is negative moulded to perfectly reproduce all edges, radii and contours.

The driver's door panelling for a bus, which runs on the neighbouring machine, the Illig UA 250 4G, is made from a less sensitive material. The 2,500 x 1,200 x 5 mm co-extruded ABS semi-finished product is flame-retardant and consists of 75% post-industrial recycle. The top layer is virgin material, which provides the right gloss level and colour. Here too, SE works with a 4-cavity mould. Although the distortion of ABS is significantly less than that of PP, the band saw is also used here for edge trimming and separating

the components directly after demoulding. However, unlike the PP backrest, no storage is required here before CNC machining.

The Langenargen-based company produces around 3,000 to 4,000 of these door panels per year. Thorsten Eymael gives an insight: "We always use the same moulding tool, but the trim can vary. This means that many variants can be realised. We then control this via CNC machining. When used correctly, thermoforming is ideal for creating variants." In

addition to the thermoforming machines, seven 5-axis CNC machining centres from Maka are therefore in action at SE.

Nothing off the peg

The deep-drawn components often require complex geometries in order to fulfil their function in their later life as panelling, as the back shell of a seat or as an exterior component. They must combine functionality with a sophisticated look. For this reason, the



The underbody panelling for a construction machine is created using this mould.

Storage floor laminated with leather (red) and unlaminated (black), plus the 4-cavity mould for thermoforming.



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Production manager Daniel Miyeso checks the setting parameters on the Geiss T10.

The horizontal band saw controlled by the machine separates the four components and removes the edge directly after demoulding.



thermoforming specialist relies on in-house toolmaking and close cooperation with external partners such as extruders.

Many tools are temperature-controlled, and the company can also realise undercuts if required. One example is the mould for the air duct of a car. The slides on the right and left move up for demoulding so that the sides of the component are on one level and it can be demoulded. The slides are actively controlled by the thermoforming machine's control system. For this reason, SE does not buy machines off the shelf. Thorsten Eymael explains: "We always have special designs so that we can run our mould technology over the machines."

Appearance is the be-all and end-all when it comes to visible parts. The surfaces have to withstand the critical eyes of the OEMs (and end customers): The grain, gloss level and colour of the thermoformed component must perfectly match those of the injection-moulded elements. Eymael puts a lot of heart and soul into this topic: "We mould the lion's share of the products positively. That's why we need semi-finished products with surfaces that perfectly match the customer's requirements. These are often not available ready-made, so we have to put in the development work."

In order to find the ideal grain for the interior panelling of a new camper van, for example, SE-K worked very closely with designers, grain developers and the grain roller and

semi-finished product manufacturer. Together, the team worked hard to develop a new graining roller, which is now in use. Eymael looks back with satisfaction: "We were able to solve the problem for the OEM and create a surface structure that matches the adjacent injection moulded parts. It was hard work – but satisfying when you see the parts in the vehicle later on."

In quality assurance, the employees check all delivered materials to ensure that the gloss level, grain and colour match the reference plate. The inspection is carried out both visually by experienced inspectors and with specific colour measuring devices.

If very high moulding accuracy and exact edge and radius gradients are required, the specialists from Langenargen resort to negative moulding. One example of this is the cover of a C-pillar for a small automotive series made of PC/ABS. All radii and contours on the A-side are clearly moulded. The clip holders on the back are created on the 3D printer and glued into the component.

Reliable and reproducible

Ready-to-install assemblies do not work without assembly: this is often time-consuming and requires a lot of manual labour. An employee joins three different parts together to form a whole for the dashboard panelling of a construction machine. She applies the adhesive with a glue gun and then fixes the three components together using

Daniel Miyeso presents the finished milled and printed backrest panelling.



After CNC processing: Uwe Schupp removes the milled component – part of an air duct – from the clamping device.





The horizontal band saw on the large Illig UA 250 4G is also controlled by the machine. Here, ABS door panelling is being cut from the clamping edge.



Above: Thorsten Eymael shows a lightweight component made from a material that can reduce weight by up to 30%. It is intended for the transportation sector and is currently under development. Eymael does not want to reveal any more at the moment.



ultrasonic welding spots. To ensure the shape and position of the components, SE-K produces a component holder from a modelling block material. The panelling lies in this until it is completely hardened.

A few steps further on, another employee assembles a roof frame panelling consisting of three parts. The three individual parts are also joined using adhesive. The specially designed assembly device ensures that tight tolerances are maintained. Eymael explains: "We have to ensure parallelism and the specified gap dimensions so that the roof frame panelling can be installed cleanly at the OEM."

In addition to manual assembly, a gluing robot also moved into Langenargen some time ago, and another is set to follow. "We want to automate further, including in assembly. This will allow us to manufacture more reproducibly," explains the Managing Director.

Dimensional accuracy, reproducibility, process reliability – these are all requirements that Thorsten Eymael considers a matter of course. For new projects, potential customers approach him with the fear that these requirements cannot be met in the thermoforming process. This is why application consulting is essential for him: "In our business, we value our geographical proximity to the customer. We often have to break a component down into individual elements in order



Below: An employee applies the adhesive with a glue gun along the seam on the components of a dashboard panelling. After bonding, she fixes the adhesive points using ultrasonic welding points.



to be able to manufacture it using the thermoforming process. Close dialogue is important to convince the customer of the benefits of thermoforming. Only then can we explain the procedure and the process in detail. In the end, the good news for the customer is that they don't need an expensive injection moulding tool, but we can manufacture the component – with the much cheaper thermoforming tools." ■

www.se-k.de



Top: The fully assembled dashboard panelling consists of three elements.

Centre: A total of seven Maka CNC machining centres are in use in the SE halls.

Below: The three individual parts of the roof frame panelling are also joined using adhesive. The specially designed assembly device ensures that tight tolerances are maintained.

Bringing more complexity into the component

How the Kurz Group is expanding its insert technology expertise and utilising it across industries

The Kurz Group from Haigerloch has established itself as an expert in complex insert technology with a high number of overmoulded inserts. Managing Director Jochen Merz has accompanied the company's development for almost three decades: "We bring complexity to the component and thus save process steps." A high degree of automation supports the production of high-precision hybrid parts, such as radar sensors for semi-autonomous driving. However, according to Jochen Merz, there is another aspect that is crucial for expertise.

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



Photo: K-PROFI



Photo: Kurz Gruppe

Managing Director Jochen Merz:
"We have changed our shift models so that we can utilise as much of the PV power as possible."

The Kurz Group comprises several legally independent companies whose management and administration are combined under the umbrella company Kurz Holding. These include IKO-Formen, founded by Isidor Kurz from Owingen in 1946, which initially focused on the construction of stamping, bending and forming tools and, since 1954, injection moulding tools. In addition to IKO, the group also includes Kurz Kunststoffe GmbH, founded in 1980, and Kurz Plast Kft in Kiskörös, Hungary, which has been in existence since 1996, both of which concentrate on injection moulding production.

The Kurz Group is owned by Josef and Rudolf Kurz, the two sons of founder Isidor Kurz who are not involved in the operation of the Group.

The headquarters in Haigerloch-Owingen currently employs 55 people, while the company in Hungary employs 120 people. Managing Director Jochen Merz joined the management team in 2016 and has been in sole charge since 2018. He knows the company like no other, having completed his dual studies here and subsequently worked in work preparation, tool design, project planning, quality management and engineering within the Kurz Group.

Brewery valve implemented as a one-way solution

In addition to insert technology, Kurz specialises in injection moulded parts with complex geometries and “tricky plastic parts with high dimensional accuracy”. The Kurz Group generates just over half of its turnover with automotive and commercial vehicle applications, but Jochen Merz emphasises: “Regardless of the industry, we find solutions that others can’t get off the ground so easily.” The Group also manufactures for the food and consumer goods industries as well as mechanical engineering. The Managing Director illustrates the approach using the example of an application from brewery technology: “Breweries are struggling with a low return rate for their stainless-steel kegs, known as KEGs. There are now disposable PET KEGs. To match this, we have converted the conventional stainless-steel valves into a disposable plastic solution. This seemingly banal component has to fulfil high requirements. The valve must close securely at the bottler, but must not close again after opening and use in the pub. The reason for this is that closed and used kegs can swell and burst in the heat. We have integrated this functionality into the valve system, which is created as a three-component part with two springs. We injection mould and assemble it at our plant in Hungary.”



Challenging injection moulding technology: for the intradermal injection device, flattened 0.3 mm needles were overmoulded in the correct position over a length of almost 40 mm without the needles bending.

Overmoulding thin needles

Together with its research and development partner Hahn Schickard and a medical technology start-up, the Kurz Group developed an application to inject active ingredients directly into the upper layer of the skin and not under the skin, i.e. intradermally or intracutaneously and not subcutaneously. Intradermal injections, in which the needle is inserted at a very shallow angle almost parallel to the surface of the skin, are very challenging for the doctor without any aids. The

intradermal injection device, on the other hand, specifies the injection depth directly. “Among other things, we have overmoulded flattened, 0.3 mm narrow needles with a 0.16 mm inner bore in the correct position over a length of almost 40 mm without the needles bending. This is very demanding in terms of injection moulding technology. The development was still undergoing pre-certification by the notified body and was then unfortunately put on ice due to the lack of funds for the high approval hurdles,” regrets Jochen Merz.



The one-way brewery valve system for PET KEGs achieves its functionality through 3K injection moulding and the assembly of two springs.

Complex geometries, tight tolerances

With numerous series applications from a wide range of sizes, the Managing Director underpins the expertise in mapping complex geometries or tight tolerances. For example, there is a miniature nozzle with a screen whose mesh is punched directly in the eight-cavity injection mould and then overmoulded to form the nozzle. Another component is used in lorry brake assistants. Kurz took over production from a competitor. "Here we are overmoulding a stainless-steel sleeve with a complex internal geometry. The poor quality of this component led to high reject rates and poor availability of our customer's production line. The product was not a sure-fire success for us either and cost us sleepless nights. However, the customer is now running its line without any rejects," says Jochen Merz, emphasising his determination to find solutions.

"If you bring complexity into the component through intelligent design, you save on the bottom line," the Managing Director is convinced. "We leverage this added value for our customers." If the

product nevertheless requires multi-stage production, as is the case with some hybrid components, Kurz relies on the greatest possible automation of the process steps. Kurz manufactures a radar sensor for semi-autonomous driving fully automatically in several stages at its Haigerloch site. In a preliminary stage, a flat stamped metal strip is overmoulded from the reel, plastic webs are applied and then wound up again. The reel is fed into a production unit with a vertical rotary table injection moulding machine. The automation concept includes two further rotary tables with integrated stations for cooling, punching, welding, testing, assembly, laser labelling and cleaning as well as a total of eight robots, including two Yaskawa six-axis robots.

Fully automated in step

This is how the process works: the stamped and overmoulded strip is unwound from the reel and fed into a progressive die, where it is bent and separated into individual contact units. A six-axis robot takes these directly from the punching tool and loads them into the four-cavity injection moulding tool of the 1,600 kN rotary table machine. After overmoulding, the robot removes the hybrid components and places them on one of the two rotary tables after passing through a cooling station. Here, the components cycle through various stations, including checking the pin positions and an electrical high- and low-voltage test of the welding pattern via a camera

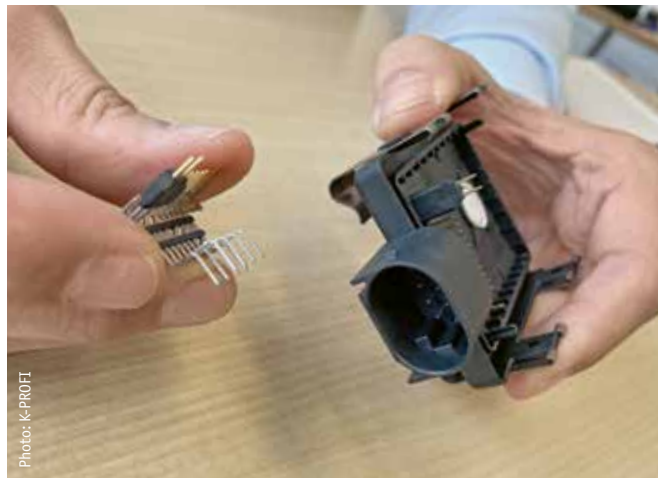


Photo: K-PROFI

Left: Jochen Merz shows the partially overmoulded, bent and punched insert part (left) and the corresponding finished part, a radar sensor housing base for semi-autonomous driving.

Bottom left: The punched metal strip is fed from the roll into the injection mould, where plastic webs are injected.

Bottom right: The stamped and partially overmoulded metal strip is fed into a progressive composite tool, where the contacts are bent and separated into units.

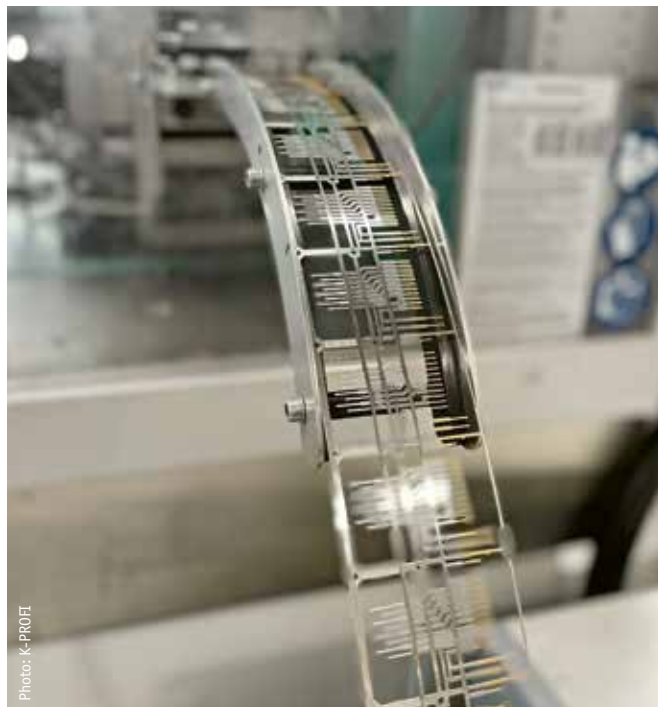


Photo: K-PROFI



Photo: K-PROFI

system. After being transferred to the second rotary table, four springs per component are mounted fully automatically and their positions are also checked by a camera. A laser

Sequence of the individual bending steps of the partially overmoulded metal strip from right to left to the finished insert.

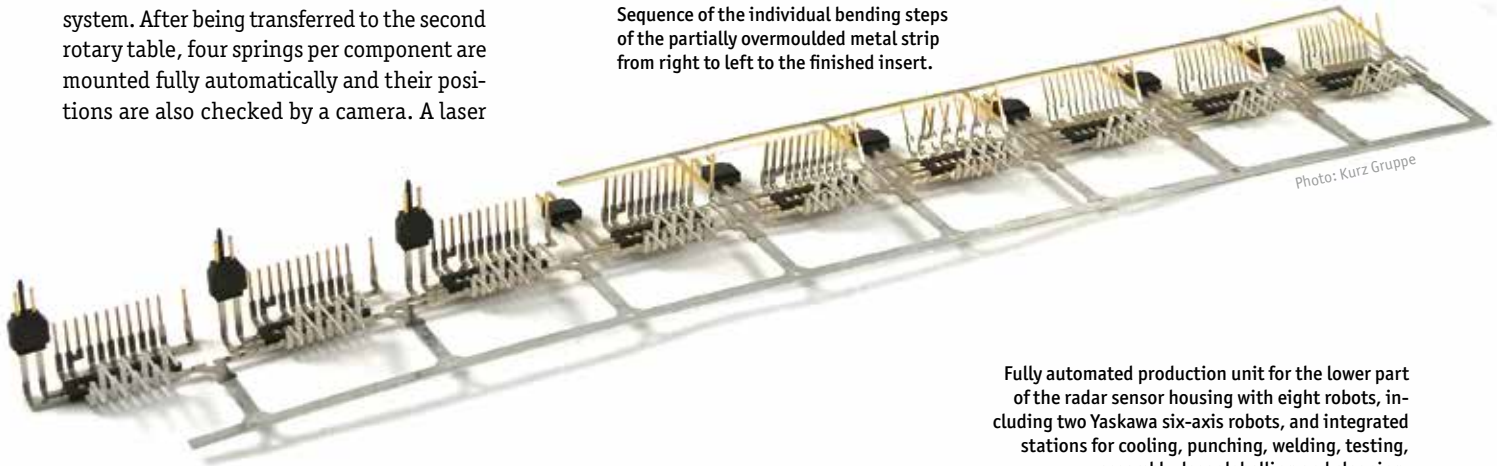


Photo: Kurz Gruppe

Fully automated production unit for the lower part of the radar sensor housing with eight robots, including two Yaskawa six-axis robots, and integrated stations for cooling, punching, welding, testing, assembly, laser labelling and cleaning.

then marks the parts. The labelling is read and the components pass through a cleaning station again before they are placed in blister packs with the correct shape. The radar sensors reach the customer in these small load carriers, from where they are sent to China, Mexico and Hungary for further processing. "Our customers also confirm that this level of automation is exceptional," reports Jochen Merz proudly.

Getting tools ready for series production

Kurz essentially designed the automation system for the radar sensor with its partner EGS from Donaueschingen. Optimisations are again carried out in-house. For example, Kurz introduced the camera systems itself. This approach is in line with the company's general philosophy: "We outsource what is not our expertise." Although the company's history began with the tool manufacturer IKO, the construction of tools for external demand only plays a subordinate role today. Kurz also covers its own needs quite flexibly: "IKO builds individual tools for our injection moulding in Haigerloch and Hungary. However, we buy in considerably more. In some cases, we only purchase mould assemblies from outside and produce the inserts ourselves or we buy a complete mould and take care of the final correction here. This concept allows us to juggle and act very well depending on our capacities and complexity," emphasises Managing Director Jochen Merz.

Being able to say what needs to be done

With this strategy of outsourcing, the importance of actual toolmaking has changed significantly. "Originally, IKO toolmaking here at the site was 60 people strong. Four years ago it was 22, but today we have four employees in toolmaking. The significant



Photo: K-PROFI

reduction is partly due to the pandemic, but mainly to the slow pace of new projects. The decisive factor for us is that we retain the expertise for fine-tuning, and this lies less in toolmaking itself than in the interface to project planning and measurement technology. And this is where we employ six people," explains Jochen Merz. "The key is to derive from the measurement technology what the toolmaking department needs to implement, what corrections need to be made and how these should be carried out. And we prepare this so neatly that almost any external toolmaking specialist can carry out the steps for us. Our expertise is that we can say what needs to be done."

A clear, intelligent and structured approach to fine-tuning the mould is a matter of course for Jochen Merz. For complex components and extremely high tolerance requirements, Kurz uses morphing in the correction phase. As an example, the Managing Director shows

the hybrid component Connector Body, which is used in all-wheel drive vehicles for torque distribution between the front and rear axles (see reference at the end of the report). Here, the tightest tolerance requirements for the positions of the numerous pins as well as the parallelism and flatness of a circumferential sealing surface come together. "These are really brutal requirements." Finding correction approaches without affecting the other positions and surfaces is difficult. "To optimally correct the tools, we not only concentrate on thickening and reducing the steel, but also use the option of mesh modelling while retaining the overall structure. That's the art."

Perfecting overmoulding, expanding the range

Kurz uses the same standards, the same measuring machines and the same ERP system, the Arburg host computer system (ALS)

and even works on the same server for the CAQ system at its two production sites in Haigerloch and Kiskörös/Hungary. “We are stringent here and ensure a good handover of projects with the standardised systems.” This demonstrates the need to catch up in terms of digitalisation in Germany. Experience shows that Hungary is better positioned in terms of network availability and speed. The Kurz Group’s injection moulding machine fleet comprises almost 50 injection moulding machines with clamping forces between 250 and 3,200 kN, including eight rotary table machines and five vertical machines. Kurz operates slightly more than half of the machines in Hungary, where the focus is on expanding semi-automated processes for insert technology. Kurz intends to further automate production at its headquarters in Haigerloch: “Our aim is not to invest in more and more injection moulding machines, but in increasing complexity in order to expand our range. My vision is ten complex automation systems for insert technology with integrated process steps such as welding, testing, laser labelling and the like,” explains Jochen Merz.

For the more complex projects, Kurz relies on Arburg injection moulding systems due to the good service in the home country and in Hungary. In order to remain competitive in standard applications, the supplier Haitian is currently crystallising. Kurz currently operates two all-electric Zhafir machines from the Chinese company. For a new

project – various components for new generations of eBike motors – Kurz will start using a hybrid 3,000 kN injection moulding machine from Haitian in 2024. “In general, our experience shows that the overall energy balance of hybrid machines is better than that of all-electric machines. For our complex components with often highly filled materials, we require relatively high injection performance. The hybrid machine is currently better suited to such applications,” Jochen Merz is convinced.

Using the hybrid component Connector Body mentioned in the text, Kurz verified a new development for media-tight overmoulding. The company is cooperating with Dr.-Ing. Meywald GmbH & Co. KG. Kurz Managing Director Jochen Merz reported on this in the interview “This is an incredibly good connection” in K-PROFI international 4/2023, available directly at

www.k-profi.world/issue/230420.

Kurz strives for the technically and economically optimal solution, even if it means realising hybrid components with up to 70 inserts.

Reducing energy requirements, generating electricity

Kurz takes a close look at the energy balance and sustainability of its production systems. “There are many ways to save energy and not just to replace it with photovoltaics,” emphasises the Managing Director, who is making adjustments in both areas. “We have reduced our electricity requirements by more than half in the last five years. This has mainly been achieved through technology, including investing in hybrid or all-electric injection moulding machines and using ultra-low-energy pumps in water treatment.” Kurz also generates a good third of its own electricity requirements at its headquarters. The company installed a 560 kWp photovoltaic system on a neighbouring 4,500 m² meadow, which was put into operation in 2021. The vehicle fleet can be charged with this electricity during the day. The installation of storage batteries is not yet worthwhile, but: “We have changed our shift models and greatly reduced the night shift so that we can use as much of the PV electricity as possible. We will now also implement these findings in Hungary. A 280 kWp PV system is currently installed on the roof of the hall there. Investing in green technologies is one way of counteracting rising costs and helping to safeguard the site,” Jochen Merz is convinced. ■

www.kurz-gruppe.de

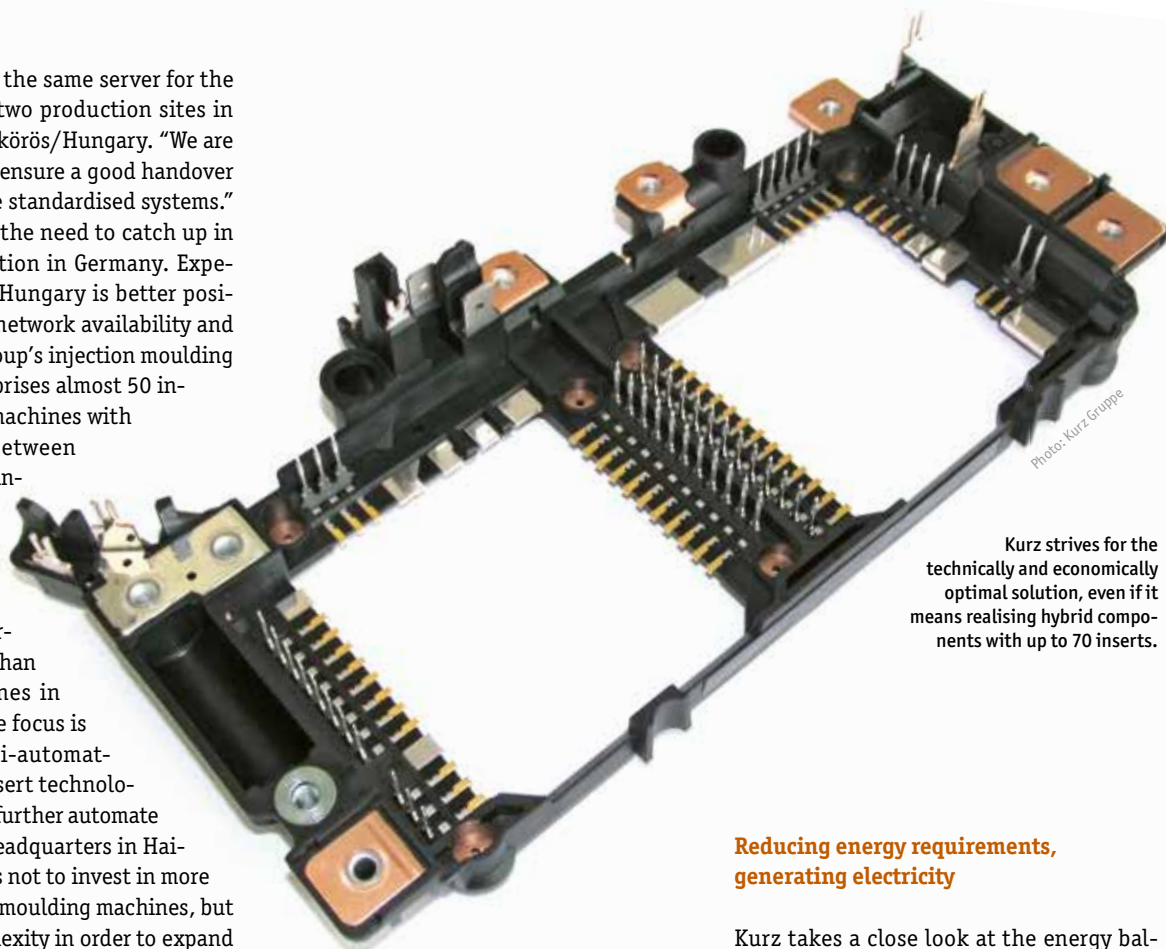


Photo: Kurz Gruppe

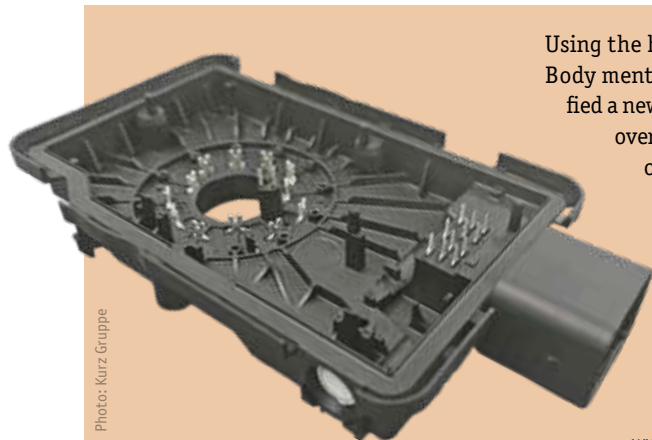


Photo: Kurz Gruppe

Trade Fair Calendar

Trade fairs related to plastics processing in 2024

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

Hannover Messe	Hanover, Germany	22.04. – 26.04.2024	www.hannovermesse.com
Chinaplas	Shanghai, China	23.04. – 26.04.2024	www.chinaplasonline.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
Plastics and Rubber Thailand	Bangkok, Thailand	15.05. – 18.05.2024	www.plasticsrubberthailand.com
Plastpol	Kielce, Poland	21.05. – 24.05.2024	www.targikielce.pl/en/plastpol
FIP 2024	Lyon, France	04.06. – 07.06.2024	www.f-i-p.com
HanoiPlas	Hanoi, Vietnam	05.06. – 08.06.2024	www.chanchao.com.tw/hanoiplas
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/T4M	Stuttgart, Germany	18.06. – 20.06.2024	www.medteclive.com
Plastics Recycling Show	Amsterdam, The Netherlands	19.06. – 20.06.2024	www.prseventeuropa.com
Interplas Thailand	Bangkok, Thailand	19.06. – 22.06.2024	www.interplasthailand.com
Central Asia Plast World	Almaty, Kazakhstan	26.06. – 28.06.2024	www.plastworld.kz
Dt. Kautschuk Tagung DKT	Nuremberg, Germany	01.07. – 04.07.2024	www.dkg-rubber.de
Expo Plast Peru	Lima, Peru	21.08. – 24.08.2024	www.expoplastperu.com
Indoplas	Jakarta, Indonesia	04.09. – 07.09.2024	www.k-globalgate.com
Compounding World Expo	Brussels, Belgium	11.09. – 12.09.2024	eu.compoundingworldexpo.com
Plastics Recycling World Expo	Brussels, Belgium	11.09. – 12.09.2024	eu.plasticsrecyclingworldexpo.com
Polymer Testing World Expo	Brussels, Belgium	11.09. – 12.09.2024	eu.polymertestingexpo.com
Kunststoffenbeurs 2024	s-Hertogenbosch, The Netherl.	18.09. – 19.09.2024	www.kunststoffenbeurs.nl
T-Plas	Bangkok, Thailand	20.09. – 23.09.2024	www.tplas.com
ColombiaPlas	Bogota, Colombia	23.09. – 27.09.2024	www.colombioplast.org
Taipei Plas	Taipei, Taiwan	24.09. – 28.09.2024	www.taipeiplas.com.tw
Oman Plast 2024	Muscat, Oman	15.10. – 17.10.2024	www.silverstaroman.com
Fakuma 2024	Friedrichshafen, Germany	15.10. – 19.10.2024	www.fakuma-messe.de
Vietnamplas 2024	Ho Chi Minh City, Vietnam	16.10. – 19.10.2024	www.chanchao.com.tw/vietnamplas
Compamed	Dusseldorf, Germany	11.11. – 14.11.2024	www.compamed.de
SPS	Nuremberg, Germany	12.11. – 14.11.2024	sps.mesago.de
Formnext 2024	Frankfurt/Main, Germany	19.11. – 21.11.2024	www.formnext.de
Plast Eurasia	Istanbul, Turkey	04.12. – 07.12.2024	www.plasteurasia.com

It all began 24 years ago as a small start-up with five employees. CeraCon GmbH was founded in Weikersheim in 2000. Managing Director Dr Frank Kukla looks back: “We introduced a new technology – 1-component gasket foaming. Until four years ago, we used the licence from the Japanese material manufacturer Sunstar for this. We now have our own 1-component PUR system CeraPUR on the market.”

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

Maik Vogel (left) and Dr Frank Kukla explain the advantages of their sealing technology: “We can process the 1K-PUR system with process stability regardless of the ambient temperature, component temperature and humidity.”



All photos: K-PROFI/Manuel Hauptmann

Right page: Dr Frank Kukla and Maik Vogel are optimistic about the future: “Our order books are full because we supply our systems to companies that are investing in renewable energies and electromobility. A lot of capacity is currently being built up.”

The basis of the new company was mechanical engineering: automated foam sealing systems consisting of plasma pre-treatment, foam application and subsequent curing in a continuous oven. Vertical industrial ovens are another mainstay. However, contract foam sealing was quickly added, because: “In order to gain a foothold in the market with our product range, we had to foam our customers’ sample components. The aim was to convince various industries of our technology. The only way to do this was to apply the foam seal to the components in-house and sample them,” explains Dr Kukla. The start-up thus built the first system for itself and was quickly able to demonstrate what the sealing technology could achieve.

Colourful mix of industries

Today, around 200 employees work at CeraCon, 40 in contract foaming alone. Twelve systems run five days a week in three-shift operation. The company generated turnover of EUR 22 million in 2023, EUR 3.5 million from contract foaming alone. Customers come from the automotive industry, the electrical and electronics industry and medical technology. The aim is always to seal components 100 % against dust, moisture, oil, grease or other substances in order to protect their inner workings. 75 % of the components that the company foams are made of plastic. The other quarter are metal components. Plant Manager Contract Foaming Maik Vogel explains: “We seal the housing for frequency converters, for example, so that no dust, dirt, grease or

moisture gets into the converters. Or we seal the housings of printed circuit boards that are enclosed with a potting compound. No potting compound is allowed to escape from the housing.” The media that the seals have to keep out are very different. This is why the characteristics of the sealing material play an important role.

In-house material development

The company developed the CeraPUR material in-house. It is available in two variants – with a temperature resistance of 80° C and higher hardness or a resistance of up to 105° C and slightly lower Shore hardness. The material’s higher temperature resistance is ideal for connectors or batteries in electric vehicles, while the material with a higher Shore hardness is used for bayonet covers for optical measuring devices, for example. The reason: the high shear forces that act on the seal.

For the 1K-PUR material, the company produces a prepolymer from polyether polyols and aliphatic isocyanates which, after pre-crosslinking, only contains an isocyanate content of less than 0.001 % and therefore does not fall under the REACH regulation during processing. The material also contains a hardener. The 1C PUR material must be processed within 6 months of manufacture. To apply the sealant, the 1K material is physically mixed finely with compressed air at 100 bar.

100 per cent leak-proof

How CeraCon grew from a start-up to a medium-sized plant manufacturer and foam gasket producer in just a few years





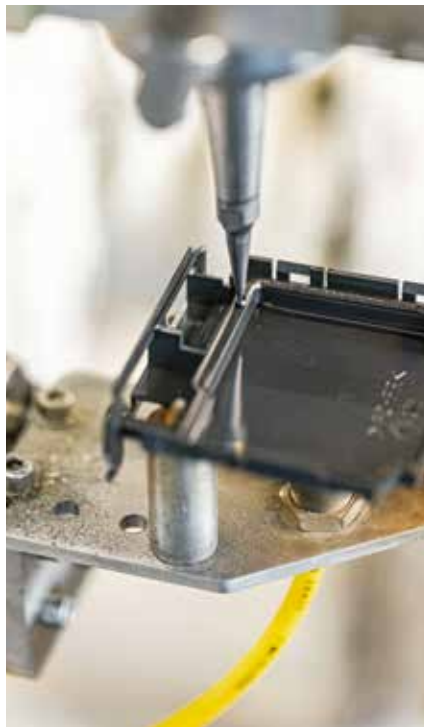
“We introduced a new technology 24 years ago – 1-component foam sealing,”

says Dr Frank Kukla, looking back with satisfaction.

The sealant then emerges from a nozzle, expands to ambient pressure and forms a predominantly closed-cell foam with high impermeability, hydrolysis resistance and very good recovery behaviour. Dr Kukla explains the advantages over a 2-component system: “We can process the 1-component system with process stability regardless of the ambient temperature, component temperature and humidity. These factors have no influence whatsoever on the foam quality. This

is different with a 2-component system. We can also realise much shorter process times. The 1-component system cures within 5 minutes at 80°C. A 2-component system often takes up to 24 hours to fully cure.” The Weikersheim-based company customises the 1-component PUR system to the component function and the corresponding demands on the seal. They set the desired hardness and the degree of recovery of the material via the air supply. In assembly and tightness tests,

To ensure that the foam seal adheres securely to the housing of the mainboard, the component is first plasma treated using Openair-Plasma technology (left). In the next step, the robot moves to the foam dosing unit, where the foam bead is applied (right).



the experts in the company’s own application technology centre check how the gasket material must be designed for a specific application.

In addition to the PUR system, the design of the two contact surfaces and the component geometry also play an important role in ensuring a good seal. Vogel explains: “We believe it is important that we are involved right from the component design stage, and our advice can make the production of the component to be sealed much more cost-effective. This has a particular impact on complex three-dimensional component geometries. In principle, we do not need a groove to apply the sealing bead. If a groove is nevertheless necessary for the component or the sealing requirement, certain conditions must be observed when designing it. For example, it shouldn’t be too deep so that we don’t use too much sealing material unnecessarily.”

Plasma makes the difference

But how does gasket foaming actually work? A tour of the production facility reveals this. The twelve systems for gasket foaming are located on both sides of the hall and are fully automated. During the visit, an automated production system with a rotary indexing table is applying a seal to the housing of a PC frequency converter. The worker places three components in the component holder of the rotary table, which moves them into the system with a 180° rotation. At the same time, finished components leave the system, which the worker removes and then reloads the component holder.

Garland Dodson controls the loading of the conveyor belt that feeds the mainboards into the system.





View into the housing of the mainboard before (left) – and after (right) – the sealant is applied. The seal is firmly bonded to the PC housing material.

With all non-polar thermoplastics such as PE, PP, PC or POM, the PUR seal does not simply adhere to the component. Plasma pre-treatment is essential here – it makes all the difference. The 6-axis robot with the Openair-Plasma nozzle from Plasmatrete follows the contour of the component along the groove to which the foam bead is applied in the next step. The plasma jet works with an energy input of around 800 W. The energy input creates free charge carriers and ions in the gas – with Openair-Plasma, the ambient air is the process medium. The advantage: it is always available. The use of plasma increases the polarity of the plastic component. The plasma – oxygen and nitrogen radicals are used in Openair-Plasma – only changes the top layer of the substrate, where it incorporates statistically distributed functional groups. This turns hydrophobic surfaces into hydrophilic ones, and the non-polar thermoplastic can now be wetted with aqueous media. This is a prerequisite for good adhesion of the foam bead. The energy input by the plasma must be adjusted to the respective material and the width and depth of the sealing groove. This is done by adjusting the distance of the plasma nozzle to the workpiece and the travelling speed of the plasma jet. The closer and the slower the nozzle moves over the component, the higher the energy input.

Once the robot has treated all three housings with the plasma jet, the foam dispenser, which is also mounted on the robot head, is used. It then applies the foam bead to the previously plasma-treated surfaces. The wider and higher the seal is to be, the higher the output rate of the dosing system is set. The time from foam application to the start of cross-linking should not exceed around 60 seconds. As the foam application takes around 10 s per component, it is possible to treat all three components with the plasma first and then apply the seal. As soon as all three components have been coated with the seal, the table rotates, the worker removes the finished components and places

them on the conveyor belt of the horizontal oven. In 5 minutes, the components pass through the oven at a temperature of 80° C, at which point the seal is fully cured and the operator places the components in the designated load carriers.

Garland Dodson, Production Manager Contract Foaming, explains: “When the seals are applied, the usually hard components have an additional soft component, the foamed seal, applied. This is vulnerable. We have to protect the component for the return transport so that it cannot be damaged. Otherwise, there is a risk that the sealing

The PUR seal ensures that this container lid seals the container absolutely tightly.





“We think it’s important that we’re on board right from the component design stage, because our advice can make the production of the component to be sealed much more cost-effective,”

explains Maik Vogel.

function will be impaired. For this reason, we always store the finished components in appropriate product carriers.” Different products run on the systems. The parameters for each process are stored in the robot’s process control system. The workpiece holders can be changed in a single movement so that the next series can be started quickly.

High quantities and exotic products

CeraCon uses a different system concept for foaming mainboard carriers. The PC components, measuring around 100 x 100 mm, are fed to the system as bulk material. A worker removes them from the box and places them on a conveyor belt. The belt moves the component into the system, where a gripper picks it up and initially guides it along the plasma nozzle. In the next step, the gripper

moves to the foam nozzle and guides the component along the foam dosing unit. The gripper places the finished foamed mainboard carrier on another conveyor belt. It travels out of the system through a small tunnel oven and a worker then layers the finished carriers into a box. The sealing experts foam around 120,000 mainboard carriers per year, with each batch containing around 30,000 pieces. “We manage around 1,000 components per shift, which makes 3,000 pieces per day with three shifts. The order is completed after ten days. We have been providing the seal for this product since 2009,” says a delighted Vogel.

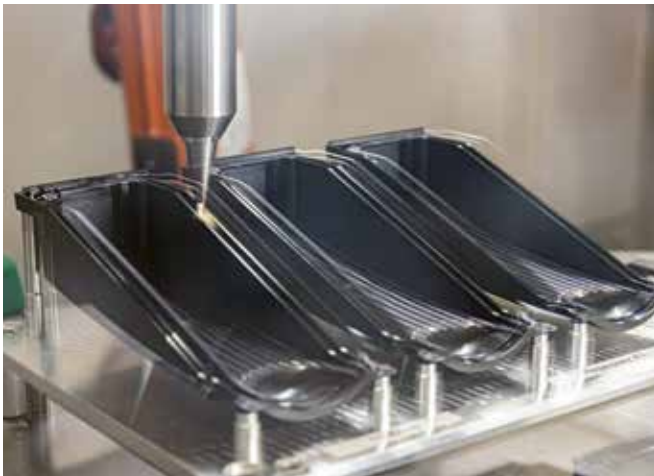
Eight systems are flexible, allowing different components to be provided with the 1K-PUR seals. Four, however, run on a fixed basis for a specific component year in, year

out. Here, at maximum, variants of one and the same part are involved. Vogel explains: “We have a system that has been in use for a customer for 15 years. We use it to produce one component in four variants.” The employees manage around three to four set-up processes per day. As a rule, the batch sizes are several 1,000 units. But there are also the exotic ones, Vogel smiles: “We machine two parts a week for a racing car manufacturer. These are very large carbon fibre components with a complex geometry. Of course, the entire process is manual for these quantities.”

All-round carefree package

The contract foaming service suits many of the Weikersheim-based company’s customers. Those who would like to purchase a system themselves receive an all-round carefree package. Dr Kukla explains: “Before a customer buys a machine, we reproduce the entire process in-house – from prototype to pilot series. If the component in series production is discontinued by the customer at some point, we are also happy to take over the processing of spare parts. We also act as an emergency back-up concept for our customers or absorb production peaks. In the event of machine maintenance or even unexpected breakdowns, we step in. We have everything on site, from the necessary goods carriers from which the robots on the customer’s assembly line remove the components to the complete machine technology. In many cases, our incoming packaging is also the outgoing packaging. We then put the foamed parts back into the product carrier in which they were delivered to us.”

The robot head with the plasma nozzle moves along the contour of the housing of the frequency inverter and modifies the hydrophobic surface of the polycarbonate into a hydrophilic one (left). Pre-treated in this way, the seal applied by the robot adheres excellently (right).





The rotary indexing table is fitted with three housings per run.



The housing of the frequency converter before foam application (left) and afterwards (right). The seal fits snugly around the edge of the housing.



CeraCon is currently not feeling much of the effects of the tense economic situation in plant engineering, and Dr Kukla is confident about the future: "We have more orders than ever at the moment. We are supplying our systems to companies that are involved in renewable energy or electromobility. An incredible amount of capacity is being built up and a lot is being invested." 

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In future, this component will be used in a device for optical measurement technology.



This seal is vital for patients in intensive care units, as it seals an element for the housing of a ventilator.

From the kitchen to the caravan

How Agoform thermoforms products for households and industry individually and often just in time thanks to its own extrusion and specialised machines



"There is considerable growth potential in the technical parts," Nikolai Pahmeyer (left) and Kevin Harwarth explain with conviction.



A pleasant feel is important to many customers in the high-price segment when it comes to drawer inserts for cutlery, emphasise Kevin Harwarth (left) and Nikolai Pahlmeyer.

A product from Agoform GmbH can be found in almost every German household and is encountered by its inhabitants from breakfast to dinner: The cutlery insert in the kitchen drawers – in some cases also the insert in the bathroom cabinet. The company from Löhne has made its name with cutlery inserts. Its customers include almost all German kitchen manufacturers, for whom it produces around 6 million cutlery inserts per year. The lion's share is made of polystyrene (PS), often with a TPE coating for a more pleasant feel. In the high-price segment, ABS with a TPU coating is used. However, the company is also increasingly scoring points with technical parts.

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

Kitchens were already the focus of attention when August Ottensmeyer founded the company in 1928. At that time, curtains were made for the windows of the kitchen buffets that were common in the company's premises in those years. In 1956, the family moved into plastics processing – with thermoformed cutlery inserts made of PS. Even today, inserts for kitchen and bathroom cabinet drawers and matching anti-slip mats made of TPE or PS/TPE still account for around 80 % of sales. In 2023, the family business generated EUR 35 million with its 160 employees.

Since 2015, Agoform has also increasingly focussed on technical parts. Kevin Harwarth, Technical Sales, explains: "We are now strong in the caravan industry and have also been able to gain a foothold with retail discounters. We produce the displays for them to present their baked goods." Agoform had a say in the material development for the display trays, as an impact-resistant, dishwasher-safe and visually appealing material was required.

In-house extrusion ensures individuality

The company knows its way around extrusion and material development. Everything based on PS and TPE is produced on one of the four co-extruders in Löhne. During the visit, the company produces, for example, 3-layer PS semi-finished products with a recyclate core in the centre, with a TPE coating if required. The goals for the use of recyclate are ambitious. Sales Manager Nikolai Pahlmeyer makes it clear: "By the middle of next year, we only want to produce semi-finished products with a 75 % recycled content. Then we will only produce 2-layer semi-finished products. The recyclate layer is at the bottom after the thermoforming process, i.e. not in the visible area. We have already brought most customers from the kitchen and bathroom industry on board."

As post-consumer recyclate (PCR) is also used, the specialists have upgraded their extruders accordingly. The largest extruder is currently being equipped with additional self-rinsing melt filters with a degassing unit in order to reliably process the high proportion of PCR. The long cooling section allows the shrinkage behaviour of the extruded sheets to be easily controlled, while cameras monitor the thickness and surface of the extruded sheets. The edge trim is ground and fed back into the extruder. At the end of the cooling section is the die cutter with a pre-feeding unit that travels at the speed of the conveyor line and cuts the sheets precisely. The finished semi-finished products are handled by a linear robot with vacuum grippers.

View from above of the extruder with mould and cooling section.



These pick up the sheets and automatically stack them on a pallet. Harwarth emphasises: “It’s important to us that the employees don’t have to move the panels manually all day, because that’s really hard on the bones.”

High diversity of variants

A smaller extruder next door is currently producing 2-layer anti-slip mats made of PS-TPE. As the mats are not very elastic, the company produces them – as well as the PS semi-finished products for the thermoforming process – as ready-made sheets with different layer thicknesses. In contrast, the anti-slip mats made of TPE for the high-price segment are manufactured as rolls and cut to size in a subsequent production step.

For the standard colours alone, the company has 15 variants on offer for kitchen manufacturers. In the high-price segment in particular, however, very individual colours and grains are often required. This is no problem thanks to the company’s own extrusion. Pahlmeyer explains: “We sometimes make a special colour for just one tonne of material. This flexibility is important to our customers, and we can fulfil it.”

The lion’s share of kitchen manufacturers is based in the region. The Lohn-based company supplies its drawer inserts to 20 major customers just in time, often even just in sequence. The delivery times for order-related production are four to six weeks. A large buffer warehouse ensures the availability of semi-finished products so that production is fast.

Fully automated production cell

In addition to the business with drawer inserts for kitchens and bathrooms, technical parts are increasingly gaining momentum. ABS, ABS/PMMA, ABS/ASA or ABS/TPE are mostly used for components for the interior and exterior of caravans, trays for the presentation of baked goods or battery labelling for photovoltaic systems. The company purchases these semi-finished products. The eight sheet thermoforming machines from Geiss are used exclusively for technical parts.



1

The run my robot concept

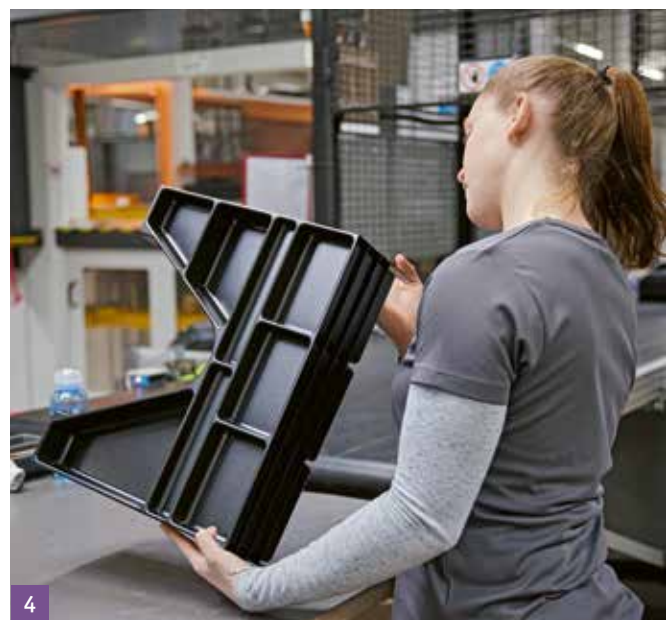
- 1 The moulded component is ejected from the side of the thermoforming system.
- 2 A 5-axis robot picks up the component and places it on the milling template to the right or left of the CNC machining centre.
- 3 The robot removes the machined component, disposes of the edge trim in boxes behind the production line and places the finished part on a conveyor belt.
- 4 Humans only come into play at the end of the line: an employee checks the quality.



3



2



4

A fully automated sheet thermoforming production line has also been available for two years – the run-my-robot system from Geiss. The production cell consists of a T10 thermoforming machine, which is connected to a CNC10 via a robot. Harwarth explains: “We use the production cell when we have batches of 1,000 units or more. Geiss developed the machine with us as a pilot customer. When the process ran completely error-free for the first time, we all cheered. We put a lot of work into it.”

Drawer inserts are currently being manufactured on the production system. The integrated 5-axis robot located behind the system removes the insert after the moulding process using a vacuum gripper adapted to the component, moves to the middle shuttle table from behind and places the component on the component holder waiting there. The CNC opens to the side and the table moves into the CNC, where the insert is milled. While the CNC is processing a component, the robot places the next moulded part on the component holder to the right of the CNC. At the end of the milling process, the milled product moves out of the machine and the waiting component moves into the CNC from the other side. The robot removes the milled drawer insert including trim from the component holder, moves to the rear and disposes of the trim in a waiting container. The robot then stacks the drawer insert on a conveyor belt.

Almost like a jigsaw puzzle

If the batch sizes are smaller, the non-automated thermoforming machines are sufficient. They can process panel dimensions of up to 2,960 x 1,260 mm. These are often very complex components, such as the headliner for a caravan. Production is reminiscent of a jigsaw puzzle due to the large number of individual parts. From an ABS/ASA sheet measuring 1,000 x 2,000 x 4 mm, the T8 moulds the component in a 1-cavity tool, from which 24 individual parts are subsequently milled with a tolerance of 0.5 mm. Numerous holes are also drilled.

The milling process in one of the five 5-axis CNC machining centres from Geiss with table sizes of up to 3,000 x 1,500 mm takes time. Six filigree milling cutters are in use, which the milling robot takes from a drum changer on the rear wall of the milling cabin. After every 5th milling process, a quality assurance employee carries out a 100% check. Harwarth explains why: “We deliver the headliner to our customer’s assembly line, where lights and blinds are installed along with cables, hinges and rollers. The dimensions have to fit exactly, otherwise there will be a problem on the assembly line.”

After the milling process, the 24 individual parts are sent to the assembly line. Under the standardised light of the worktables, an employee checks the thickness, surface and



In order to keep the stretching of the grain in the TPU layer on the front of the dashboard as low as possible, the thermoforming specialist incorporated steps into the design of the temperature-controlled mould.

24 individual parts are milled from this component, which will later become a headliner for a caravan.



An employee pre-assembles some of the 24 individual pieces into window frames directly after the milling process.





The company uses a tempered 1+1 mould made of ABS/PMMA to produce the light supports.

During assembly, an experienced employee glues the individual elements of the headliner together.



cleanliness of the individual parts and removes burrs. She then cleans the individual parts and places the large frame of the headliner in the gluing device, fixes it in place and inserts spacer frames at the edges. Then the complex gluing process begins, in which window frames and other details are created from the 24 individual parts and joined to the headliner frame. According to Harwarth, a gluing robot is not worthwhile for this application: "The quantities are too small for a robot."

Colourful range of technical parts

A dashboard made of ABS/TPU for the front and pure ABS for the rear is also used in the caravan industry. In order to keep the stretching of the grain in the TPU layer of the front as low as possible, the thermoforming specialist incorporated steps into the design of the temperature-controlled mould. Material can collect again at the bases of the steps so that virtually no distortion of the grain can be recognised on the final component. The thermoforming process runs on a T8, which the company has equipped with an additional central blower and cooling mechanisms. "It's a very complex material, and no scratches must be visible on the end product. TPU is sensitive to heat and the heating process in the machine must be carried out carefully. That's why we heat it cautiously from above and go full throttle when underheating. Not everyone can mould a material like this," says Harwarth, describing the daily routine at the machine. Meanwhile, the back of the dashboard is being produced on another T8.

After the CNC machining centre has trimmed and drilled holes in both the front and rear sides, the parts are sent to the assembly department. Once again, extremely tight manufacturing tolerances are required, as the two components have to be glued together airtight. The air ducting for the air conditioning technology runs through the channels created inside the dashboard thanks to the bonding. The air must not escape here. The Löhner team therefore checks every component for leaks before delivery.

A few steps further on, panelling is being created for the batteries of photovoltaic systems. The CNC tirelessly mills countless holes and recesses into the components, which are made of ABS/PMMA. Next door, another CNC machining centre is milling light holders made from a 1,600 x 780 x 4 mm ABS/PMMA sheet using a temperature-controlled 1+1 tool.

High-speed machines for trays and co.

If technical parts are not involved, the so-called high-speed machines are used. Seven of these machines are located in the company's production halls. They process both roll and sheet material. This is where product carriers and drawer inserts are produced at high speed. The latest machine processes sheet material for a drawer cutlery insert. A vacuum gripper removes the PS sheets from the supply stack and places them in a chain conveyor, which guides the semi-finished product through various heating zones. It slowly heats up until it reaches the moulding station, where it is moulded using compressed air and vacuum. After the moulding process, it is fixed on the chain conveyor and travels to the punching machine, where the component is final cut and then stacked.

The Löhner company uses four bending machines to process semi-finished products with decorative foils. Pahlmeyer explains the reasons: "We can't thermoform these materials because the decorative film



Display for the presentation of baked goods for retail discounters.

High-speed machines process both roll and sheet material into product carriers and drawer inserts.

would tear quickly." 20 workstations are available away from extrusion, thermoforming and CNC processing. Here, employees glue, bend, emboss, punch, saw, weld and print.

Eco not just on paper

The shop is running, and the topic of sustainability is not neglected. In addition to the goal of using 75 % recycled material for PS semi-finished products by the next quarter, the plastics specialists are also looking at other sources to minimise the carbon footprint of their products. These include projects with PLA-based materials or materials from the chemical recycling of PS. "Production with these materials works perfectly, but the price is too high, and we can't pass that on to our customers," says Harwarth, describing the status quo.

For this reason, Agoform is focusing on other ways of reducing CO₂: "We have photovoltaic systems on all of our roofs and only use green electricity. We make all regional deliveries, such as drawer inserts for kitchen manufacturers in the area, with our 40-tonne e-truck. It has a range of 300 kilometres, and that works really well," says Pahmeyer, giving an insight into the company's efforts.

Agoform exports around 55 % of its products, about 20 % of them outside the EU. This applies above all to the inserts for kitchen and bathroom furniture. The technical parts generally remain within the DACH region. "This is the division in which we see further growth potential, as it has already developed well over the last nine years," says Harwarth, looking to the future. 

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sales@sikora.net, www.sikora.net

Melt pumps



WITTE PUMPS & TECHNOLOGY GmbH
Lise-Meitner-Allee 20
D-25436 Tornesch
Tel.: +49 4120 706590
info@witte-pumps.de
www.witte-pumps.de

Moisture meters



Brabender GmbH & Co. KG
Kulturstr. 49-51
D-47055 Duisburg
sales@brabender.com
www.brabender.com

Nozzles



herzog systems ag
Feldhofstrasse 65, CH-9230 Flawil
Tel.: +41 71 394 19 69
info@herzogsystemsag.com
www.herzogsystemsag.com

Panel sizing saws incl. software



HOMAG Plattenaufteiltechnik GmbH
Holzmastr. 3
D-75365 Calw-Holzbronn
Tel.: +49 7053 69 0
info-holzbronn@homag.com
www.homag.com

Particle foaming machines



Erlenbach GmbH
Am Rödchen 1, D-56355 Lautert
info@erlenbach.de, www.erlenbach.com

Pipe and hose systems



Michel Tube Engineering GmbH
Tel.: +49 9341 848 55 - 00
www.michel-tube.de

Sources of supply/suppliers directory

The A to Z of the plastics and rubber industry

Plant engineering, assembly and maintenance



KID GmbH Anlagenbau

Assembly/conversion and relocation of granulate conveying systems and peripherals as well as their maintenance; Pipework for complete systems
Hünfelder Str. 73, D-36251 Bad Hersfeld
Tel.: +49 6621 620 630-30
info@KIDGmbH.de, www.KIDGmbH.de

Plastics machining

Grein GmbH

Service: lasering, punching, measuring
Tel.: +49 5651 99144-0
www.lets-cut-it.com/RE



Plastic profiles



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www.polyimide-shop.de



Polyurethane systems



CANNON Deutschland GmbH

Moselstraße 27, D-63452 Hanau
Tel.: +49 6181 50231 00
www.cannon-deutschland.de

Recycling machines



Next Generation

Recyclingmaschinen GmbH

Gewerbepark 22, A-4101 Feldkirchen
Tel.: +43 7233 70107
info@ngr-world.com, www.ngr-world.com

Recycling systems



EREMA - Engineering Recycling Maschinen und Anlagen Ges.m.b.H.

Unterfeldstraße 3
4052 Ansfelden, Austria
Tel.: +43 732 3190 0, erema@erema.at



Herbold Meckesheim GmbH

RECYCLING TECHNOLOGY

D-74909 Meckesheim, Industriestrasse 33
Tel.: +49 6226 932-0,
Fax: +49 6226 932-495
herbold@herbold.com, www.herbold.com

Refrigeration technology



INDUSTRIEKÄLTEANLAGEN TIEFTEMPORATURTECHNIK STEUERUNGSTECHNIK

L&R Kältetechnik GmbH & Co. KG

Hachener Str. 90a
D-59846 Sundern-Hachen
Tel.: +49 2935 9652-0, Fax: DW - 501
www.lr-kaelte.de, info@lr-kaelte.de

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Werkzeugreinigung | Service
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www.technotrans-solutions.de



Weinreich Industriekühlung GmbH

Hohe Steinert 7, D-58509 Lüdenscheid
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info@weinreich.de, www.weinreich.de

Sensor sorting technology



STEINERT GmbH

Widdersdorferstr. 329-331, D-50933 Köln
Tel.: +49 221 4984-0
marketing@steinert.de
www.steinert.de

Size reduction technology



NEUE HERBOLD

Maschinen- und Anlagenbau GmbH

Wiesenstrasse 44
D-74889 Sinsheim-Reihen
Tel.: +49 7261 92480
info@neue-herbold.com
www.neue-herbold.com



TRIA GmbH

Carl-Friedrich-Benz-Str. 1
D-47877 Willich
info@triaplastics.de
www.triaplastics.de



ZERKLEINERN + VERDICHTEN

WEIMA Maschinenbau GmbH

Bustadt 6 - 10, D-74360 Ilfeld
Tel.: +49 7062 95700
info@weima.com, www.weima.com

Standards



Tel.: +49 2351 957-0, www.hasco.com



Meusbürger Georg GmbH & Co KG

Kesselstr. 42, A-6960 Wolfurt
Tel.: +43 5574 6706 0, Fax: +43 5574 6706 11
verkauf@meusbürger.com
www.meusbürger.com

Technical moulding



Spritzgussteile für hohe Beanspruchung
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WEISS Kunststoffverarbeitung GmbH & Co. KG

Rudolf-Diesel-Str. 2-4
D-89257 Illertissen
Tel.: +49 7303 9699-0
kontakt@weiss-kunststoff.de
www.weiss-kunststoff.de

Note

This directory gives you a compact overview of first-class suppliers and their product ranges. The clear structure from A to Z and the clear form make it easier for you to locate and to get in touch quickly. The directory is also available on the Internet at: www.k-aktuell.de/bezugsquellen.

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technotrans

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Tel.: +49 2354 7060-0
www.technotrans-solutions.de

Weinreich

Weinreich Industriekühlung GmbH
Hohe Steinert 7, D-58509 Lüdenscheld
Tel.: +49 2351 9292-92, Fax: +49 2351 9292-50
info@weinreich.de, www.weinreich.de

Temperature sensors

Dr. Mennicken GmbH

Industrie - Elektronik
Tel.: +49 2338 91860
Fax: +49 2338 918640
www.mennicken.de

Thermoplastic elastomers

ALLOD

ALLOD Werkstoff GmbH & Co. KG
Steinacher Str. 3, D-91593 Burgbernheim
Tel.: +49 9843 98089 0
information@allod.com, www.allod.com
ALLRUNA® Werkstoffe

Ultrasonic welding



www.cemas-germany.com

swiss sonic

Die nachhaltige Verbindung
Seemoosholzstrasse 14, CH-9320 Arbon
Tel.: +41 71 680 0805
info@swiss-sonic.ch, www.swiss-sonic.ch

Ultrasonic welding machines

Herrmann

Herrmann Ultraschalltechnik GmbH & Co. KG
D-76307 Karlsbad, Germany
Tel.: +49 7248 79 0
www.herrmannultraschall.com

SONOTRONIC

SONOTRONIC GmbH, Karlsbad
Tel.: +49 7248 9166-0, www.sonotronic.de
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Ultrasonic systems



WEBER ULTRASONICS
Weber Ultrasonics AG
D-76307 Karlsbad, Germany
www.weber-ultrasonics.com

Vacuum pumps and systems

BUSCH VACUUM SOLUTIONS

Busch Vacuum Solutions
Schauslandsstraße 1, D-79689 Maulburg
Tel.: +49 7622 681-0, sales@busch.de
www.buschvacuum.com

EDWARDS

Edwards GmbH
Philipp-Hauck-Straße 2
D-85622 Feldkirchen
0800 0001456 or +49 89 99191856
DEvertrieb@edwardsvacuum.com
www.edwardsvacuum.com

Vibration welding



www.cemas-germany.com

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PIE
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

Polymerized 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-durable and easily flame-retardant. It has good weathering properties and can be joined by welding or bonding.

Global capacities for the MMA feedstock, according to PIE's Polypropylene capacity database (www.piegate.com), come to about 400 ktpa. More than half of the MMA produced is actually polymerized into PMMA thermoplastics, any attempt to break down the supply market and capacity volumes for specific resin and processing methods is very difficult. The MMA not used for PMMA also serves as a feedstock for other plastics, but a large proportion of it goes into non-plastic applications such as paints, surface coatings and adhesives.

"Pentagon" – a brand line introduced by **Bilux** (see below) – is one of the new brand lines among consumers, alongside "Reynolds", "Nebel" and "Safari". Other brand names for PMMA include "Beylure", "Acryplex", "Acryplex", "Mylar", "Bayer", "Cristal", "Dakota", "Lendel", "Lendel" and "Tropics". The most popular PMMA products are characterized by superior 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 **Wirtschaft**, total plastic production in 2010: 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 other PMMA facilities in North America make up the remaining 1.6%.

Fluctuations in demand and unpredictable production at a number of plants have encouraged consolidation in the last two decades, above all in Europe and North America. In certain, many new sites have been built in Asia, where older plants have also been expanded, although this has resulted in a 1.6%.

Plastics: Global Production Capacities
2010, by product group, about 2.5 m tpa

Product Group	Capacity (m tpa)
Other	19%
PE	13.4%
PP	11.7%
PS	10.0%
PA	1.7%
PMMA	1.6%
PC	1.2%
PVC	1.1%
PET	1.0%
PBT	0.9%
PBT	0.8%
PBT	0.7%
PBT	0.6%
PBT	0.5%
PBT	0.4%
PBT	0.3%
PBT	0.2%
PBT	0.1%
PBT	0.0%

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AI and cyber security “made in Germany”

How a business group is becoming
an important IT player

A good eight years ago, I witnessed an attack on the IT systems of a medium-sized injection moulding company that was severe by the standards of the time. An employee in the incoming goods department clicked on a link in an e-mail and activated a Trojan. As the activity was visible on the screen, the quick-witted employee immediately unplugged all the plugs and disconnected his computer from the network. A report was immediately sent to the IT manager. The IT manager promptly shut



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down all systems. The damage was repaired within 24 hours and the company's IT security was subsequently increased. I fear that this was and is a rather typical incident for smaller companies.

Cyber-attacks are no longer so obvious these days. Attackers, often hackers from Russia, spend months analysing companies' IT systems. Prominent examples include Continental AG, major banks such as IBCB, Boeing, etc. Ransomware (malware that restricts or completely blocks access to data and systems) is often infiltrated. The hackers then blackmail the companies for high, often seven-figure sums before releasing the data again. Unfortunately, direct data theft or espionage activities in

the systems are also quite common. The attack on Tesla's Autopilot by three doctoral students from TU Berlin showed how easily this can happen and the far-reaching risks involved. Fortunately, they "only" wanted to demonstrate what is possible.

As a result, companies are setting up ever larger IT teams just for cyber security. The permanent maintenance of the systems and the installation of new security updates devours immense, unfortunately necessary, amounts of money. The associated software and cloud storage generally come from the USA or are based there. Regular price increases and data security in the USA are only grudgingly accepted. Companies based in Germany would prefer to use alternatives from Europe. And indeed, an initiative from Baden-Württemberg is now coming into play that could offer a real alternative to Amazon, Microsoft & Co. in the future.

The state of Baden-Württemberg and the Dieter Schwarz Foundation (the Schwarz Group is known as one of the world's leading retail groups thanks to Lidl and Kaufland, among other things) are each providing EUR 50 million in funding for an AI centre on the outskirts of Heilbronn on an area of around 23 hectares. Among other things, a branch of the Heidelberg-based start-up Aleph Alpha is to be established there, which is competing with the language AI ChatGPT thanks to its Luminous language model. Overall, the Schwarz Group wants to focus on IT services and is already one of the largest German cloud providers. As many as 7,500 IT experts are already combined in Schwarz Digits, which offers IT security and cloud solutions for companies and other organisations. The company's financial strength will certainly make it possible to develop an important player in Germany and Europe and thus significantly reduce its dependence on the USA. **K**

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Inspiration for plastics processors**

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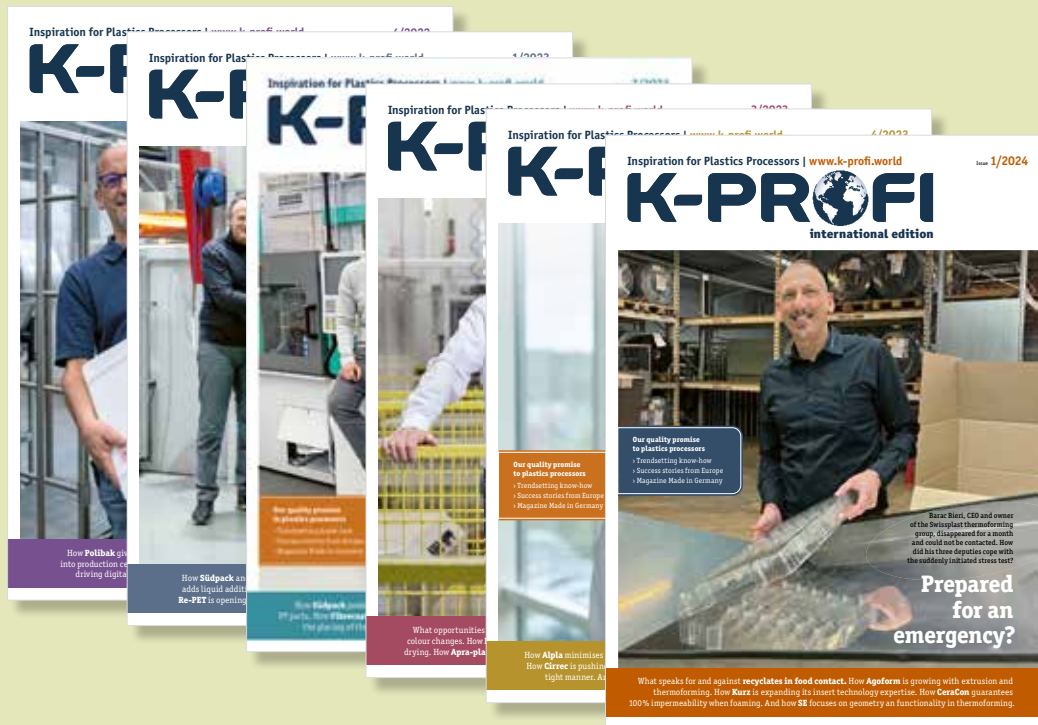
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