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Issue 2/2024

K-PROFI

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As a customised contract manufacturer for the diagnostics, pharmaceutical and medical technology industries, Wirthwein Medical aims to close a gap in the market with prefillable syringes:

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How AI can **close recycling loops.** Which niche products **Sekisui** is investing in in Europe. What the **NPE** had to offer. How **Trelleborg** is expanding LSR molding with AI and AM. How 'green energies' are fuelling **cables and pipes.** And how **Ziehl-Abegg** is pushing simulation to reverse engineering.

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Impulses for eventful and lively times

Dear reader,

The many benefits of artificial intelligence (AI) in plastics processing are occupying the minds of many company managers. AI is now helping to separate food packaging from non-food packaging in sorted post-consumer waste made of PP with 95% certainty and to close the recycling loop with food packaging: page 6. Sealing manufacturer Trelleborg Sealing Solutions has developed iCast, a process based on artificial intelligence and additive manufacturing for rapid product development and small-batch production of LSR parts. We spoke to Jarno Burkhardt about the background, possibilities and future expansions: Page 31.

Sekisui is targeting niche markets with plastic products developed in-house. The Japanese group has expanded its plastics processing operations in the Netherlands. More about railway sleepers made of PU-GF, rain gutters made of PVC and films made of PVB from page 10. The US plastics trade fair 'NPE' in Orlando/Florida ended at the beginning of May in a thoroughly positive mood. It revealed a robust economic upturn in the important North American market, but also a slight improvement in the important DACH region: Page 15. Axial and centrifugal fans are a core competence of Ziehl-Abegg in Künzelsau. The simulation of filling behaviour, holding pressure, warpage and fibre orientation ensures the correct functioning of complex injection moulded parts. Reverse engineering is also involved: page 18.

Wirthwein Medical from Mühltal has grown up with customised contract manufacturing for diagnostics, pharmaceuticals and medical technology. Prefillable syringes are now set to open up a new growth area. How this can be achieved with a standardised product that is subject to strict regulations: Page 24. 'Green energies' are giving the cable and pipe industry a boost. At the 'Wire' trade fair, much of the focus was on high-performance high-voltage underground cables and submarine cables for energy infrastructure as well as low-voltage cables for e-mobility: page 34.

Get off to a good start in the second half of 2024!

Markus Lüling, Editor-in-Chief
lueling@k-profi.de, Tel. +49 (0)9123/9609-10

In this magazine

Cover photo: K-PROFI/Manuel Hauptmannl

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Sebastian Solbach explains the advantages of the "Gain next" system for fractions that have already been sorted by type, such as PP or PET waste, in the technical centre.

Is AI the game changer?

How recycling loops can be closed with food packaging

Toys, margarine tubs, yoghurt pots, trays, or canisters – everything made of PP that can be clearly and easily recognised as such in a sorting system with NIR technology. But which packaging was food packaging, and which was not? A deep learning solution can now answer this question. More than 100 systems are already in use worldwide for various sorting tasks, including for post-consumer waste. Here, they separate food from non-food packaging with an accuracy of around 95%. This makes AI the game changer for closed recycling loops for food packaging, as 95% of the input material for the production of new food packaging must come from food applications according to legal requirements.

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


Photo: K-PROFI

A conveyor belt separates the post-consumer packaging and feeds it to the sorting system.

Tomra Recycling has now provided proof of this at its test centre in Mülheim-Kärlich and demonstrated in three test runs how food and non-food packaging can be separated using the "Gain next" system developed in-house. Test runs one and two demonstrated the separation of a PP or PET fraction into a food and a non-food fraction respectively, while test run three, a so-called PET cleaner application, proved that the purity of a PET bottle fraction can be increased. For example, heavily contaminated and coloured bottles were separated from transparent ones, which in turn forms the basis for the production of new transparent packaging.

"We are still a long way from true circularity in the recycling industry," lamented Dr Volker Rehrmann, EVP and Head of Tomra Recycling, proudly presenting the new solution, which represents a clear improvement in the sorting of post-consumer waste. He is convinced that AI is not just hype but represents the future. "After all, Tomra has been using AI for around 30 years and launched the first deep learning solution on the market in 2019. This has enabled us to make significant progress in sorting technology." In addition to better sorting of material flows, AI primarily offers flexibility, automation, and the possibility of constant data optimisation. The Managing Director describes deep learning solutions as a sub-area of artificial intelligence that imitates the way the human brain processes information. "Our system can do everything that humans can do, only much faster and even with very complex sorting tasks."

How does the system learn and work?

Millions of images of training materials and the resulting huge amounts of data are assigned to specific patterns using artificial neural networks, stored and later compared with the real packaging materials. "The system works with industrial RGB cameras and

recognises, for example, the size, dimensions and shape of a packaging material, as well as labels and prints, and then assigns them to the corresponding fraction by drawing on learned concepts from the database," explained Sebastian Solbach, R&D Team Leader Application Development Deep Learning, during the live demonstrations at the test centre. In addition to good and fast sorting thanks to automation and the ability to "teach" the system more and more data, it is its flexibility that makes the Tomra solution so attractive. The live demonstrations also showed this: All three test runs were carried out on one and the same system. As the machine and system set-up is always the same, only the corresponding database needs to be selected when switching from one material to another.

For Volker Rehrmann, it is clear that the future of post-consumer processing lies in the combination of X-ray, laser or NIR sorting with AI solutions. "This is the only way we can increase the output

Photo: K-PROFI

After recognition and categorisation, the sorting system ejects the food and non-food fractions into separate containers.

Photo: K-PROFI

The end result – here from PET sorting: the deep learning solution recognises and assigns food packaging with 95% accuracy.

Even fractions that have already been sorted by type can be separated into food and non-food packaging.

of recyclable plastics, which is in everyone's interest." Tomra has laid the foundation with the innovative deep learning solution "Gain next". He assumes that AI-based systems will prevail on the market. "We at Tomra alone have tripled the size of our digital team in recent years," he says, emphasising the relevance of the topic. His vision is a self-optimising sorting system that can react autonomously to changing material flows thanks to AI and also deliver usable output for food applications.

www.tomra.com

The intelligence of the system is inconspicuously packaged – "Gain next" at the sorting system.

Trade Fair Calendar

Trade fairs related to plastics processing in 2024 and 2025

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

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*
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	s-Hertogenbosch, The Netherl.	18.09. – 19.09.2024	*www.kunststoffenbeurs.nl*
T-Plas	Bangkok,Thailand	20.09. – 23.09.2024	*www.tplas.com*
ColombiaPlast	Bogota, Colombia	23.09. – 27.09.2024	*www.colombiaplast.org*
Taipei Plas	Taipei, Taiwan	24.09. – 28.09.2024	*www.taipeiplas.com.tw*
PackPrintPlas Philippines	Manila, Philippines	10.10. – 12.10.2024	*www.k-globalgate.de*
Oman Plast	Muscat, Oman	15.10. – 17.10.2024	*www.omanplast.net*
Fakuma	Friedrichshafen, Germany	15.10. – 19.10.2024	*www.fakuma-messe.de*
Vietnamplas	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	Frankfurt/Main, Germany	19.11. – 21.11.2024	*www.formnext.de*
Plastics and Rubber Indonesia	Jakarta, Indonesia	20.11. – 23.11.2024	*www.plasticsandrubberindonesia.com*
PlastEurasia	Istanbul, Turkey	04.12. – 07.12.2024	*www.plasteurasia.com*

ArabPlast	Dubai, UAE	07.01. – 09.01.2025	*www.arabplast.info*
Plast Alger	Algier, Algeria	24.02. – 26.02.2025	*www.plastalger.com*
JEC World	Paris, France	04.03. – 06.03.2025	*www.jec-world.events*
ICE Europe	Munich, Germany	11.03. – 13.03.2025	*www.ice-x.com/europe*
Plastics & Rubber Vietnam	Ho Chi Minh City, Vietnam	18.03. – 20.03.2025	*www.plasticsvietnam.com*
Plastico Brasil	Sao Paulo, Brasil	24.03. – 28.03.2025	*www.plasticobrasil.com.br*
Hannover Messe	Hanover, Germany	31.03. – 04.04.2025	*www.hannovermesse.com*
Chinaplas	Shenzhen, China	15.04. – 18.04.2025	*www.chinaplasonline.com*
Control	Stuttgart, Germany	06.05. – 09.05.2025	*www.control-messe.de*
Moulding Expo	Stuttgart, Germany	06.05. – 09.05.2025	*www.moulding-expo.com*
Plastteknik Nordic	Malmö, Sweden	07.05. – 08.05.2025	*www.plastteknikнordic.com*
Cirplex	Klagenfurt, Austria	13.05. – 15.05.2025	*www.kaerntnermessen.at*
KPA	Bad Salzuflen, Germany	13.05. – 15.05.2025	*www.kpa-messe.de*
Kuteno	Bad Salzuflen, Germany	13.05. – 15.05.2025	*www.kuteno.de*
Compounding World Expo	Mumbai, India	14.05. – 15.05.2025	*www.compoundingexpoindia.com*
Plastics & Rubber Thailand	Bangkok, Thailand	14.05. – 17.05.2025	*www.plasticsrubberhailand.com*
Plastpol	Kielce, Poland	20.05. – 23.05.2025	*www.targikielce.pl/en/plastpol*
Plastec East	New York, USA	10.06. – 12.06.2025	*www.imengineeringeast.com*
Powtech	Nuremberg, Germany	23.09. – 25.09.2025	*www.powtech.de*

Entering international niches with in-house developments

How the Japanese Sekisui Group is expanding its production base in the Netherlands

Railway sleepers made of glass fibre-reinforced polyurethane foam have recently been produced in Roermond in the Netherlands. They are used worldwide as a replacement for concrete, wooden and steel sleepers. "The market is growing enormously," says Managing Director Paul Koopman of Sekisui Eslon B.V. After all, the alternative sleepers have many advantages. They are lightweight and extremely dimensionally stable, can be processed like wood and have a service life of at least 50 years, without the need for reworking or maintenance. The special pultrusion process for their continuous production was invented by the Japanese company Sekisui Chemical, which has main sites in Osaka and Tokyo. The enormous global sales success of 2.3 million sleepers prompted Sekisui to set up its first site in Europe in order to shorten transport routes and simplify logistics. "We have been producing here since 2023, making us the only manufacturer of synthetic sleepers of this type in Europe." A production capacity of 100,000 units per year is planned in the medium term.

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

All photos: Jasper ten Tusscher, Maastricht

Satoshi Masuda, Managing Director of the European headquarters, is very satisfied with the development of Sekisui's production sites outside Japan.

Initiated in 1947 by seven founders, the Sekisui Chemical Group now employs around 27,000 people worldwide and generates sales of over EUR 8.8 billion. What is now a public limited company started its globalisation early on and has been so successful with special products in Europe since 1962 that there are now a total of nine companies in Europe employing more than 1,000 people and manufacturing a wide variety of plastic products, some of which include their own raw materials. The Group is divided into three divisions: Urban Infrastructure, Life Science and Innovative Mobility. Sekisui is also well-known and successful in Japan with its prefabricated house division.

"Due to the large Japanese community, it made sense for us to initially choose Düsseldorf as the location for Sekisui Chemical GmbH," explains Satoshi Masuda, Managing Director of the European headquarters. A sales company, Sekisui Chemical GmbH, is still located in Düsseldorf. The headquarters and production site, which is home to a total of five companies including administrative headquarters, has been located in Roermond in the Netherlands, not far from Düsseldorf, since 2017. "We are now very successful with our production sites outside Japan," says Satoshi Masuda. After all, the Group meanwhile generates around a third of its turnover outside Japan.

100,000 FFU railway sleepers are to leave the new plant in Roermond in the medium term, explains Paul Koopmann.

their resilience and the fact that they are maintenance-free. They are also as easy to work with as wood and have a shock-absorbing effect. "The indestructibility, long service life and shock-absorbing properties of FFU sleepers in particular give them the edge over today's more common and admittedly cheaper concrete sleepers. We are therefore convinced that demand will continue to increase in the coming years," Paul Koopman is certain. You can read more about FFU railway sleepers in K-PROFI international 3/2021 ("Maintenance-free and indestructible – Where and why plastics score over wood") or at *www.k-profi.world/issue/210334*).

The Sekisui-Eslon Managing Director shows how customised rainwater gutters can look in different countries.

The Roermond site, where production has been taking place since 1974, is home to four of the European companies – foam manufacturer Sekisui Alveo, PVC extruder Sekisui Eslon, silicone processor Sekisui Polymatech and composite film manufacturer Sekisui S-Lec – three of which K-PROFI was able to visit during an on-site visit.

Maintenance-free and indestructible

Now that various European state railways have banned the use of tar-oil-soaked wooden railway sleepers and the EU is discussing a ban on them by 2027, the demand for alternative railway sleepers is increasing. FFU sleepers, which have already become the standard product for railway tracks in Japan, are also seeing increasing sales in Europe as a result of these developments. Unique in Europe, Sekisui Eslon in Roermond has been producing continuous fibre-reinforced polyurethane foam profiles up to 10 m long since last autumn. FFU sleepers have a density of 740 kg/m³ and are produced endlessly on a specially developed pultrusion line. "We usually cut the sleepers to the desired length," explains Managing Director Paul Koopman during a tour of the modern hall, "individual lengths of up to 10 metres are possible." The long lengths are required for points, for example.

Typical railway sleepers are 16 cm high and 26 cm wide. If greater heights are required, these can be achieved by gluing two profiles together. The main advantages of plastic profiles are their high temperature resistance, both in cold Finland and in warm Spain,

It could hardly be more customised

From round, square, wide, narrow, grey or green to customised products for private individuals, Sekisui Eslon offers PVC gutters for every country-specific fastening system and every taste. “We have been extruding PVC for 50 years and have built up a huge amount of expertise in this area,” reports Paul Koopman. Ten extrusion lines with extruders from KraussMaffei and battenfeld-cincinnati produce profiles from 3,000 tonnes of PVC per year and ten injection moulding machines, also mainly from KraussMaffei, produce the matching fittings. “In addition to the individuality of our products, our core competence in the PVC sector is colour accuracy, which we were able to achieve thanks to intensive recipe development.” As a result, the colours of the injection-moulded fittings match the extruded profiles exactly. Both the FFU sleepers and the PVC rainwater gutter systems from Sekisui Eslon are good examples of how the plastics processor serves global niche markets with in-house developments and is therefore successful.

“We produce special films with a colour gradient for windscreens,” reports Mike Dieters, Operations Director at Sekisui S-Lec, on the speciality of wedge-shaped inner layers.

The material is decisive

Sekisui S-Lec B.V., which is the largest single company at the Roermond site after the polyolefin foam manufacturer Sekisui Alveo, also operates extrusion lines. On three lines, each equipped with several extruders and wide slot dies, Sekisui S-Lec extrudes films for laminated safety glass, which is used in automotive and building construction. Only polyvinyl butyral (PVB), a plastic from the polyvinyl acetal group, which is characterised by optical clarity, toughness, flexibility and adhesion to glass surfaces, is used for this purpose. The polyvinyl butyral is produced at Sekisui’s own plant in Geleen, around 30 kilometres away. “Part one of our specific expertise lies in the material,” reports Japanese Managing Director Shinnen Kobata. “The special formulations for our customers, primarily from the automotive industry, are developed in the R&D centre in Japan.” The entire PVB production volume is utilised within the Sekisui Group.

"We produce multilayer films with a thickness of less than 1 mm," says Managing Director Shinnen Kobata of Sekisui S-Lec, presenting the typical products for the automotive and building sectors.

"Part two of our expertise lies in film laminates," explains Mike Dieters, Operations Director at Sekisui S-Lec, during the tour, which only allowed a view of the production lines from behind glass for reasons of cleanliness. "We produce up to five-layer film laminates, depending on which application the customer wants to use the film for. Sekisui S-Lec uses wedge-shaped intermediate layers to produce films with a colour gradient, such as those used in windscreens, which contain a blackout or sun protection in the upper area, for example. The three identically structured lines run around the clock, in which the PVB composite passes through several roller mills after the melt emerges from the slot die. Mike Dieters explains: "In the first calender, we define the dimensions of the film, which is usually 3.2 metres wide and less than 1 mm thick. For better ventilation during the laminating process at our customers' premises, the film surface is given a fine structure after embossing. A connected moisture and tempering unit applies a defined level of moisture in the last station before winding." The large film rolls are then customised according to customer requirements, usually wound onto 1 m wide reels and stored.

So that it doesn't get too hot

The automotive industry is also a good customer of the third, modern and youngest company in Roermond, Sekisui Polymatech Europe B.V. "We produce so-called TIM," says Peter Hasch, General Manager Sales and Marketing, presenting the core products. TIMs are thermal interface materials that are used where electrical components need

to be thermally connected. As air is one of the worst conductors of heat, air pockets between components should be avoided in order to prevent heat build-up. TIMs help to close unevenness or gaps and thus prevent air gaps. The main areas of application include batteries for electric cars in which, for example, battery modules are connected using silicone gap fillers. This ensures heat dissipation from the heat sink and increases the service life of the battery cells. TIMs are also used in semiconductors, electrical power modules and other electronic components. "Just like the automotive industry, we work to a very high quality standard, record all data in our SAP/ERP system and guarantee the precise, safe and traceable manufacture of our products."

During the tour of the modern production hall, Site Manager Rene Venner explains the logical production process. "All of our products consist of two components, the silicone and the thermally conductive core products based on aluminium, which are incorporated in varying quantities depending on customer requirements and formulation. After the incoming goods inspection, the raw materials are mixed in

Peter Hasch, General Manager Sales and Marketing at Sekisui Polymatech: "Each TIM consists of two components that are only mixed on site. The customer can choose the colour of the second component."

On a tour of the modern hall, Site Manager Rene Venner explains the production process for manufacturing TIM.

mixing stations according to the selected recipe, subjected to multiple quality checks and finally filled into either cartridges, buckets or drums. Each step can only be carried out once the previous one has been approved and the corresponding barcode has been scanned. This is how we guarantee safety and traceability."

Both Sekisui S-Lec and Sekisui Polymatech produce high-tech products that incorporate specific expertise, enabling them to conquer many a niche and growth market.

www.eslon.nl
www.s-lecfilm.com/en
www.polymatech.co.jp
www.sekisuialveo.com
www.sekisui-europe.com

Signs of hope for and from America

How the leading North American trade fair 'NPE' showed signs of an economic upturn

All photos: KI Group

Under palm trees: The NPE took place in the huge Orange County Convention Centre in Orlando/Florida.

The leading US plastics trade fair 'NPE' ended on 10 May 2024 in Orlando/Florida after five days in a thoroughly positive mood. With almost 2,200 exhibitors on a good 110,000 m² of presentation space, the organising US Plastics Industry Association ('Plastics') at the Orange County Convention Center (OCCC) recorded key figures comparable to the previous event in 2018. The positive mood, especially among exhibitors, was based on hopes for boosts from the important North American plastics market. Positive signs also shone through for developments in Germany. An assessment from a European perspective.

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

After six years without the NPE – in 2021, the trade fair planned to take place every three years was cancelled without much discussion due to Covid – many exhibitors suspected that visitors needed to catch up in terms of technology and market orientation.

Smaller number of visitors, but interested and of good quality

The two buildings of the OCCC were almost fully utilised. The official figures for visitor numbers totalled 51,000 registrations. The visitor density on the comparably large area on the busy trade fair days was as lively as at the previous event, but there were ultimately around 10,000 fewer visitors on the first and last days in direct comparison to 2018.

At 15,000 visitors, or almost 29%, international attendance remained at the same level as six years ago, when one in four visitors (27%) came from outside the USA. Guests from Mexico, Central and South America were very present, while the number of interested parties from China and Europe – according to Plastics COO Glenn Anderson in local media – fell by 17% and 10% respectively compared to 2018. As in the past, most European visitors were either involved in the procurement of equipment for their company's American sites or were employed by US plastics processors or American OEMs.

The vast majority of K-PROFI contacts from both American and international exhibitors were satisfied with the visitor response. This included both the number of leads and their quality in terms of hierarchical position in the companies or involvement in investment decisions. 'Technology scouts' and 'a surprising number of Europeans' were also on the scene, noted Engel CEO Dr Stefan Engleder during the trade fair.

Very diverse and multifaceted exhibition programme

In line with the announcements made by the organisers and exhibitors, the NPE showcased a wide range of raw materials, additives, processing machines, automation, peripheral and operating technology, toolmaking, software and services. The exhibitors were once again dominated by European brands of machinery, equipment and mould making, American manufacturers of peripheral, operating and measuring technology as well as raw material producers from all major producing nations except Russia.

As always, numerous importers from China, Japan, Taiwan and Korea mingled with the German-speaking injection moulding machine brands, all of which were present. The Chinese suppliers, above all the injection moulding machine giant Haitian International with its US representative Absolute Haitian, but also Yizumi, took up even more space than before. Among the Chinese exhibitors, there were also brands on large stand areas, some of them with several exhibits, that had not previously attracted much attention in Europe or North America. Six years ago, this was still an exception, but now it is not uncommon for Chinese branches of European machinery and equipment manufacturers to supply the South and North American markets.

The largest stand at the trade fair was occupied by Hillenbrand with its group companies Coperion, Herbold, Rotex, Schenck Process and Shaffer in the Advanced Process Solutions segment and DME, Milacron and MoldMasters in the Moulding Technology Solutions segment. Even though the parent company took a discreet back seat and the successively acquired brands took centre stage, the presentation was impressive. Barnes Molding Solutions, with its mould, hot runner and control technology subsidiaries Foboha, Gammaflux, Männer, Priamus, Synventive and Thermoplay, opted for a purely electronic presentation without any physical exhibits.

The Davis-Standard Group, with its core brand Davis-Standard for film and sheet extrusion technology, Battenfeld-Cincinnati for pipe extrusion technology, Maillefer for wrapping technologies and Exelliq for co-extrusion line technology, presented its individual brands on separate stands. Piovan also relied on neighbouring but completely separate brand presences with the US peripheral technology manufacturers Conair, Thermal Care and Pelletron, which were acquired in 2021.

Apparently against the backdrop of trade disputes and tariffs on goods from China, simple peripheral and equipment technology from Asian countries was less frequently on display than in 2018. Once again, many US plastics manufacturers and distributors dispensed with a traditional trade fair presence and invited customers and interested parties to presentations and consultations in so-called hospitality suites.

Manufacturers and distributors of machine and peripheral technology offered a large number of exhibits, some even presented their entire portfolio across all size categories. The running exhibits were more often focussed on consumer-related markets and less often on technical value chains than is usual at European trade fairs. This is due to the strongly consumption-orientated customers and the decline in technical value creation, particularly in the USA. All exhibits relating to the production and/or testing of medical devices attracted a great deal of interest. Overall, it can be summarised that there has never been so much technology on display at an NPE in recent decades as this year.

The injection moulding machine as shooting star:
NPE visitors take photos of themselves and the technical innovations.

Along with the abundance of exhibits, there were more running machines and systems to see: The main crowd-pullers were the high-speed exhibits of injection moulding technology, particularly thin-wall applications and cap moulds with cycle times of less than 2 s and production cells with removal robots and stations for the automatic finishing or further processing of plastic parts. Speaking of caps: One of the few recognisable innovations at the trade fair was the concept of an all-PET bottle presented by Husky, in which the screw cap is no longer injection-moulded as PE-HD, but also made of PET. With an audible sound and tangible mechanical feedback when opening, the breaking of the tamper-evident PET cap should be easier for consumers to recognise.

European exhibits continue to lead the field

Most of the exhibits, especially those from European machine manufacturers and peripheral technology manufacturers, were well known or their market launch in the US market followed the European agenda by some distance. However, the gap has narrowed considerably with this NPE: evidently the demands of American plastics processors are increasing and/or exhibitors are expecting greater acceptance for complex and integrated production solutions. In terms of the presentation of process and production technology options, the Düsseldorf K nevertheless remains in a class of its own.

As expected, the NPE offered only a few technical innovations for European eyes, but mainly further developments and scaling of existing products. Overall, more flexible machines and equipment with automatic moulded part handling and integrated post-processing or finishing for more frequent product changes attracted significantly more interest than in the past. The further electrification of machines, peripherals and moulds was also clearly evident.

In view of the rampant shortage of skilled workers and labour in the USA, the efforts of exhibitors to facilitate the operation of machines and equipment with hardware and

software tools or intuitive operation for semi-skilled personnel, which were already familiar from the last NPEs but have been stepped up, were evident.

Discovery of recycling in America

As was heard many times at the NPE, the vast majority of US plastic waste still ends up in landfills, while the core European countries have long since enforced and implemented landfill bans. However, the processing of waste and recycling of plastics is clearly gaining interest in North America. From sorting to shredding technology, cleaning, processing and filtration to compounding technology, a wider range of recycling technology was on display than ever before. The impetus came mainly from European technology suppliers and plant manufacturers.

The urge to deal with recycling and the use of recyclates in new plastic products in the USA came from large, globally active OEMs and, here and there, from end users. Assuming that Americans work all the more consistently and enthusiastically to implement this realisation once it has been made, more intensive recycling in US plastics processing should trigger a considerable boost for the processing industry.

Favourable investment conditions in the USA

Overall, the signs do not appear to be bad for the US plastics processing industry to enjoy years of economic success. In US raw material production, the high investments in fracking-based capacities have been completed and further investments are considered to be open. Nevertheless, Sabic polymer boss Sami Al-Osaimi attributed 'good momentum' to North America, both as a production location of the future and as a sales market. This statement is supported by the so-called reshoring of US processors from Asia, which is being driven by the US government's 'Inflation Reduction Act' economic stimulus programme, as well as the increased interest of European processors in locations on the American continent.

The announcements by Engel to manufacture injection moulding machines in a tenth plant in Mexico and by Arburg to set up a decentralised assembly of injection moulding machines in North America reinforced the impression that American and Mexican plastics processors are expecting the market to continue to develop positively. After a very weak year in 2023 with 'cautious investment behaviour on the part of plastics processors', the market in the USA is showing 'the first rays of hope', reported Arburg Managing Director Guido Frohnhaus in Orlando. Engel CEO Dr Stefan Engleder noted that many injection moulding companies from Germany and Austria are thinking about second locations in North America and are orienting themselves accordingly at the NPE. At injection moulding and peripheral technology full-range supplier Wittmann, the USA has replaced Germany as the market with the highest turnover for the first time in 2023, as CEO Michael Wittmann pointed out. A well-known German automation specialist also reported very good project activity from European customers in the USA.

Orlando not only sent out positive signals for North America. A slight recovery is also evident in the large core markets of Europe. Some machine manufacturers, but above all the vast majority of peripheral technology companies and some European service providers, reported

Despite 51,000 visitors: wide aisles instead of cramped conditions at the NPE

a slight increase in demand in the DACH region over the past few months: 'The low point has been overcome', 'the trough is behind us' – this was heard in many cases. However, there is no doubt that the absolute levels are far from adequate. Michael Wittmann put current business activity at 75 to 80% of normal volumes, and capacity utilisation at the injection moulding machine and automation site in Kottingbrunn at 70%.

Character of a leading continental trade fair

At the end of April, two weeks before the NPE, the largest Asian plastics trade fair 'Chinaplas' took place in Shanghai with 322,000 visitors and 4,420 exhibitors. With 30% more interest compared to the 2023 previous event in Shenzhen, it catapulted to a new record level within a year. It has impressively confirmed its status as the leading continental trade fair.

Even though the number of visitors to the NPE continued to decline in absolute and relative terms compared to 'Chinaplas' and 'K' in Düsseldorf, the trade fair in Orlando was able to maintain its status as the continent's leading trade fair in view of the expanded range of technology on offer and the recognisably broad acceptance among visitors from all parts of America. The organising US association 'Plastics' has scheduled the next NPE for 3 to 7 May 2027 in Orlando again.

www.npe.org
www.plasticsindustry.org

Movement in the air

How Ziehl-Abegg went from being a motor specialist to one of the most important players in air technology

Calculation engineer Lothar Ernemann (left) and Production Manager Injection Moulding Stefan Röger from Ziehl-Abegg with the impeller of the "ZAplus" fan.

All photos: K-PROFI/Manuel Hauptmann

Moving air - that is the trademark of Ziehl-Abegg SE from Künzelsau. Axial and centrifugal fans in many sizes are produced in the company's production halls. They ventilate and convey air in stables, wind turbines, shopping centres, industrial plants, data centres, heat pumps and clean rooms. The demands on these air wonders are high, explains press spokesman Rainer Grill: "Regardless of whether it's about conveying a lot of air or building up pressure, the devices have to run quietly, convey large volumes of air and consume little energy."

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

While impellers, blades and nozzles were predominantly made of sheet steel and aluminium until the turn of the millennium, this has now changed completely. Today, plastic is the material of choice for 80% of fans. What in the past had to be elaborately welded, riveted or screwed together is now produced as a plastic component in the truest sense of the word from a single mould with functional integration. In the housings of the "ZAplus" series fans, for example, the motor mount is integrated into the impeller just like a guide wheel. Ziehl-Abegg supplies the series in sizes between 450 and 1,000 mm. The highly complex injection moulds are correspondingly huge.

Press spokesman Rainer Grill is optimistic, because:

"The energy transition and digitalisation cannot do without efficient air technology."

The centrifugal fans in the "ZAbluefin" series are also quite something. The impeller is designed with five backward-curved blades. The developers modelled the design of the leading edge of the blades on the structure of owl wings, and the surface is reminiscent of the fins of a humpback whale. The transition between the impeller and blade is also taken from nature: This shows the same material reinforcements as the edge between the branch and tree trunk. Lothar Ernemann, calculation engineer for mechanics and injection moulding simulation, explains: "We use bionic design elements because this is a building block for designing the devices to be energy-efficient and quiet."

But that is just one aspect of many. The developers are working on optimising the angle of attack of the impeller blades and the ideal geometry. The fan specialists are constantly optimising the components using flow simulations. The prototypes are then produced on 3D printers and have to prove their suitability on the air and acoustics test benches at the "InVent" technology centre.

Rainer Grill (left) and Lothar Ernemann explain the structure and function of the numerous different fan series.

Things are also getting serious for injection moulding and therefore for Lothar Ernemann: "We have to check how the complex structure can be designed for injection moulding. Ultimately, all the undercuts and filigree elements must be able to be represented in injection moulding."

Component simulation allows important predictions

This is where the Cadmould simulation software from Simcon comes in. Ziehl-Abegg has been using the software to simulate all new component developments in-house since 2020. Lothar Ernemann explains why: "We manufacture voluminous parts with injection weights of up to 20 kilograms. In the case of aerodynamic elements such as wings, the cross-sections are usually aerofoil profiles with variable wall thicknesses. The angle of attack must be exactly right, as must the profile shape of the wings. These are real challenges for an injection moulded part, because we have the huge issue of warpage. In order for the component to function correctly, we have to minimise this at the functional points. The component simulation helps us a lot here."

The air specialists process long glass fibre-reinforced PP, PA6 or PA66 and also short glass fibre-reinforced PA6 for their fans. "We mainly simulate filling behaviour, holding pressure, warpage and fibre orientation," says Lothar Ernemann, describing his day-to-day work. Filling studies with different injection positions and different numbers of injection points show, for example, where the flow fronts meet and how the weld lines are positioned accordingly. This is an important aspect, as these should be located at points that will be subject to less stress in the later life of the fan. FEM calculations provide a picture of the load distribution. Lothar Ernemann explains: "We also use the Cascadic module from Cadmould, as this allows us to simulate cascading gating, which can be used to move the weld lines." In addition, the filling simulation provides information on where vents should be located so that no burn marks are created on the component surfaces.

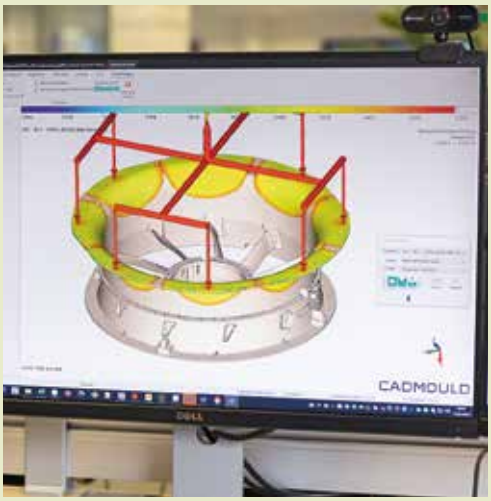
The distortion analysis makes it possible to recognise where deviations from the desired geometries are to be expected as early as the development phase of the component. Appropriate provisions in the mould, but also the variation of injection moulding parameters, provide a remedy. In addition, Lothar Ernemann's team simulates the fibre orientation: "We determine the fibre orientation and transfer it to FEM models in order to take anisotropies into account in stress and deformation calculations." With the finite element calculation, it is possible to carry out strength and deformation calculations for the components while they are still in the development phase. Because only if the virtual component proves itself here will it be used by the customer at some point.

"We produce very complex injection moulded parts. For them to function correctly, we have to minimise distortion at the relevant points. Component simulation helps us a lot here,"

explains Lothar Ernemann.

Lothar Ernemann is very satisfied with the new software: "The simulation results of the filling studies correspond well with reality. Shrinkage is also usually calculated very accurately. Warpage depends on the component geometry and the material. With long glass fibres, there are occasional differences between virtual and real components. But here, too, the trend is correct, i.e. the direction of the warpage and its approximate order of magnitude."

Lothar Ernemann uses Cadmould to simulate the "ZAplus" nozzle. The filling simulation shows that the flange warps in the x-direction and tilts inwards. The expert uses the simulation to vary the position and number of injection points.

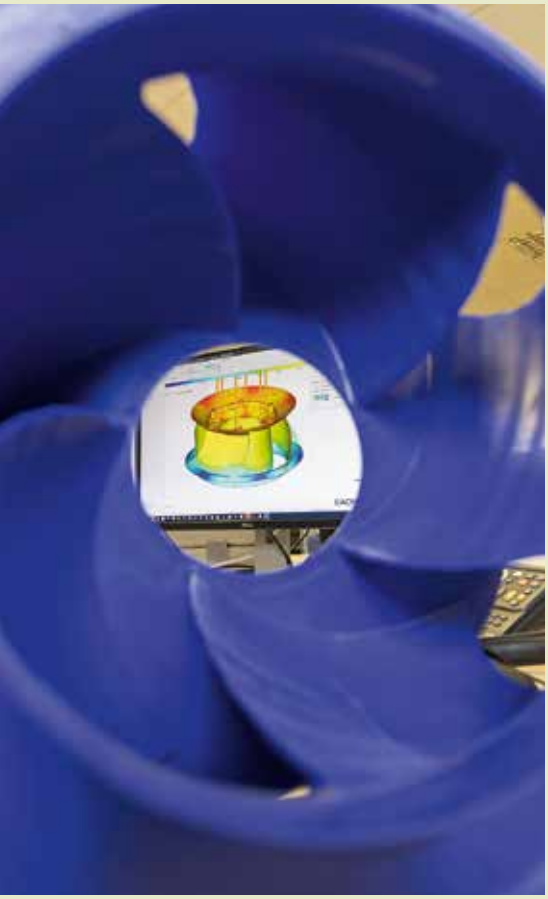


He also takes a very close look at the flow fronts, which are essential for the subsequent concentricity of the nozzle.

Faster to the good part

The work with Cadmould becomes more concrete with the example of the design of the "ZAplus". The spokes act as a guide wheel and at the same time as a motor mount. Fastening elements for protective grilles, terminal boxes and cables are also integrated. The downstream side is designed as a diffuser. Lothar Ernemann explains: "The guide wheel takes the swirl out of the intake air and converts this energy back into static pressure, which is further increased in the diffuser. This increases the efficiency of the device." For this to work, the geometry must be 100% correct. The filling simulation shows that the flange of the nozzle warps in the x-direction and tilts inwards. Lothar Ernemann plays with the injection points, varying their position and number. He also looks very closely at the flow fronts. These are essential for the later concentricity of the appliance, as the gap between the vane and the impeller is narrow. The aim is to achieve a fast, uniform flow front and therefore uniform, fast filling. A few clicks later, the expert shows the optimum result. Eight injection points are required, and their exact position is determined, as are the required pre-supports in the mould.

Another area of application for Cadmould is reverse engineering. Ziehl-Abegg scans the injection-moulded components from the initial sampling and compares them with the printed portotypes. Here, Lothar Ernemann uses the Unwarp module from Cadmould.



Lothar Ernemann enjoys using the Varimos module: "I can play with all the parameters and immediately see which ones have a major influence on the component geometry and which parameters have little influence. If, for example, I can already see in the simulation that little happens when I change the cooling time, production no longer needs to experiment with this later on the machine. If it turns out, as here, that the holding pressure plays a major role, I already know that we don't have to think about shorter cycle times."

Even before the mould is designed, the simulation provides clear indications of what works and what doesn't, where the sticking points are. In the next step, the developers at Ziehl-Abegg exchange information intensively with the mould maker and compare the respective simulation data "The component simulation saves us a lot of time and material when sampling, because we get to a good part much faster as we know which adjustments we need to make," says Lothar Ernemann happily.

Optimising material data

Another area of application for Cadmould is reverse engineering. Every simulation stands and falls with the material data. In order to continually optimise this, Lothar Ernemann scans the injection-moulded components from the initial sampling and looks at their geometry in comparison to the printed, ideal prototype. This quickly reveals where the simulation came very close to the ideal and where there were major deviations. Here the company uses the Unwarp module from Cadmould. Lothar Ernemann compares the distortion data and preloads from Unwarp with the contour of the sample part: "These comparisons serve as the basis for customised user material data. I change the material parameters so that my simulation matches the result of the initial sampling as closely as possible. I can then use this data for later component simulations."

Overall, the components have become increasingly filigree. It's all about lighter blades and less material consumption. This is possible thanks to simulation. Today, the impellers weigh around 30% less than a good 20 years ago. They work more efficiently and are lighter, which saves both material and energy.

Exclusively XXL injection moulded parts

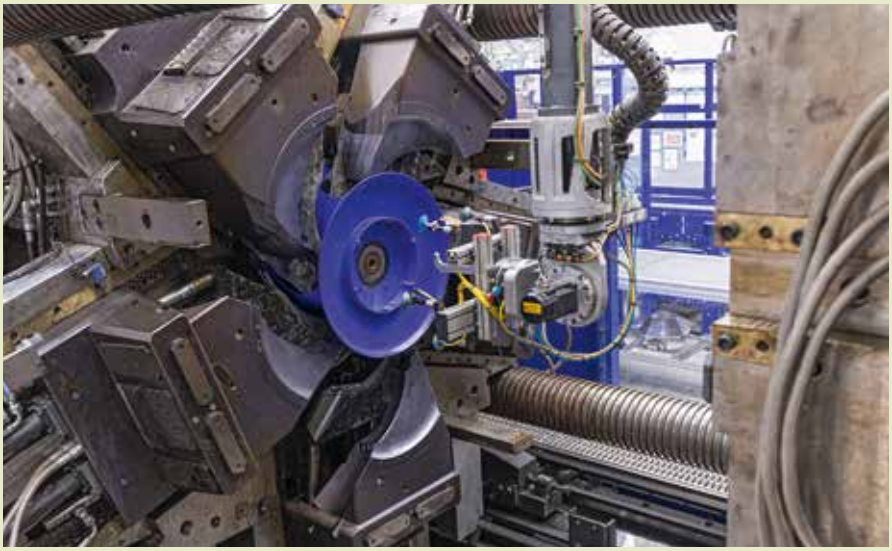
In-house injection moulding is still in its infancy at the air technology specialists - the first 15,000 kN machine from Engel was only installed at the production site in Hohenlohe in 2017. Previously, the company worked with partner companies. Production Manager Injection Moulding Stefan Röger describes the reason for the reorientation: "We realised that we were mainly transporting air through the region. The components are very bulky, but very light in comparison. This is not climate-friendly, which is why we now inject the large parts ourselves." There are only Engel machines in the halls - five in total. The "smallest" has a clamping force of 10,000 kN, followed by two machines with a clamping force of 15,000 kN, and the two largest machines have a clamping force of 24,000 kN and a maximum shot weight of 22 kg.

The company processes up to 80 tonnes of material per week. It is delivered in big bags. The polyamides are dried at 80 °C for two hours before processing. Stefan Röger is not happy with the big bag solution, but there are no alternatives: "Our suppliers have told us that the long glass fibre would be damaged if the material was blown out of the truck into silos. We can't risk that."

The company still produces some of its older models using cold runner moulds, while all newer components are produced using hot runner moulds. Stefan Röger explains the reason for this: "In the past, it was said that valve gate technology could not be used with long glass fibre. It now works, which is why we only use hot runner technology. This is because sprues have to be milled out of components made from long glass fibre materials. A simple punch does not work because it would damage the material. The hot runner mould saves a time-consuming work step."

Sophisticated mould technology

The "ZAplus" axial fan has now arrived in production. During the visit, the brand new 24,000 kN machine was producing impellers with a size of 1,000 mm and a shot weight of 14.6 kg in a cycle time of 180 seconds. After cooling, the mould moves apart, and the four

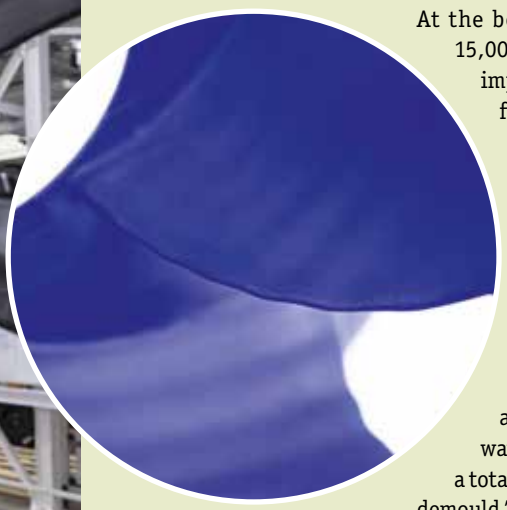


The 15,000 kN machine produces the impeller for centrifugal fans from the "ZAbluefin" series with a diameter of 560 mm. The component is difficult to demould and works with numerous slides.

"ZAbluefin" still warm – straight from the injection moulding machine.

The company uses bionic design elements to make the fans quiet and efficient. Stefan Röger shows fan blades with a design reminiscent of owl wings.

slides open in a star shape to demould the component with its countless undercuts. The ejector pushes the component forwards, where the gripper of the linear handling system picks it up. The gripper then inserts four metal sleeves on the opposite side of the mould. They are overmoulded, positioned in the centre of the impeller and are later used to fix the motor in place. The handling system moves the impeller to the CO_2 laser, which labels it with the batch number, time and component number. In a transfer station, the gripper picks up the impeller from the other side and stacks it in such a way that it lies in the assembly with the correct side facing upwards. The "ZAplus" centrifugal fan is available with different motor outputs. The size of the motor flange in the mould can be varied accordingly.



Bionics also comes into play with the "ZAbluefin": the developers copied the surfaces and edges of the blades from whale fins.

At the beginning of the hall, the 15,000 kN machine produces the impeller for centrifugal fans from the "ZAbluefin" series with a diameter of 560 mm. The shot weight is 7 kg, the cycle time 155 s. A total of 40,000 units are to be produced in this batch. "The component is very complex and difficult to demould. We need mould retainers in the base and cover disc to remove the waviness. We are working with a total of five slides so that we can demould," says Stefan Röger, describing the process.

The injection moulds at Ziehl-Abegg are not only highly complex, but also huge. Quite a few are almost as big as a garage and weigh up to 50 tonnes.

Almost everything made in-house

The assembly lines are located right next to the injection moulding machines. The employees assemble the individual elements into a fan on a total of 18 lines. To assemble the "ZAplus" fans, the impeller is balanced, the motor and cable duct are installed in the impeller and bolted to the blades. Each completed fan is subjected to a final test before delivery. The testing station and the balancing station are integrated into the assembly line.

Ziehl-Abegg has a high level of vertical integration. The origins of the company lie in motor and drive technology. Emil Ziehl founded the company in 1910. With the development of the external rotor motor, he laid the business foundation for the series production of electric motors and fans – for lifts, for example. The company headquarters were located in East Berlin and therefore fell under Russian administration. The family went to the West and was able to rebuild production in Künzelsau in 1949 on the premises of a long-standing customer, the lift company Stahl. In 1957, the first fan with an external rotor motor was launched, still made of aluminium and metal at the time. The model was so successful that the family set up their own aluminium die-casting foundry in the 1970s, which is still in operation today. This was followed by the development of mains-powered EC drives, gearless synchronous drives, increasingly efficient air technology and new production and sales locations.

At Ziehl-Abegg, 5,000 employees at 15 production and 117 sales locations worldwide generated sales of EUR 995 million in 2023.

Moulds the size of a garage are nothing special for Stefan Röger (left) and Lothar Ernemann (right).

2,800 people work in Germany alone. Air technology has become the most important pillar with a 90% share of sales. Around 2.2 million fans leave the company's production halls every year and manage ventilation technology for companies from countless industries around the world.

The Ziehl family has transformed the company into a non-listed SE, holds all the shares itself and sits on the Supervisory Board. The operational business is in the hands of the four-member Executive Board. The air business is running. A single offshore wind turbine alone contains up to 50 fans from Ziehl-Abegg. Rainer Grill is optimistic about the coming years: "The energy transition and digitalisation, with the associated increase in data centres, play into our hands. These industries cannot do without efficient air technology. And we can supply it."

www.ziehl-abegg.com
www.simcon.com

The motor and cable guides are gradually added, followed by the rotors.

The blades are fitted into the impeller on the assembly line.

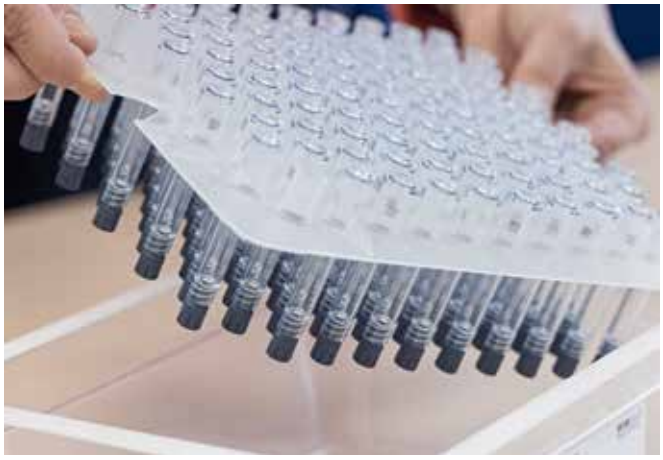
The vertical range of manufacture at Ziehl-Abegg is high: the motors are also produced in-house.

A syringe is a syringe – technically

How Wirthwein Medical contributes to risk minimisation and delivery reliability and wants to grow as a result

Dr Thomas Jakob, Managing Director Wirthwein Medical: 'Both our own products and our customer-specific business are strategically important for us.'

ISO-based tub/nest packaging is standard in the industry and is used for transport and automated further processing at the pharmaceutical company. Wirthwein manufactures the tub and the 100-pack nest in-house.



All photos: K-PROFI/Manuel Hauptmann

Wirthwein Medical GmbH & Co. KG from Mühltal has made its name with customised contract manufacturing for the diagnostics, pharmaceutical and medical technology industries. A year ago, the medical technology systems supplier presented its own product for the first time at Pharmapack in Paris. The prefillable syringes of the WIM Ject brand are intended to close a gap in the market and open up a growth area for the Wirthwein Group. The Chairman of the Supervisory Board Marcus Wirthwein, Managing Director Dr Thomas Jakob and Christoph Merhold, who as Head of Programme Management is responsible for product development as well as the development of production technology and marketing, outline how this can be achieved with a standardised product that is subject to strict regulations.

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

Wirthwein Medical (WIM) develops and produces components for blood, laboratory, PCR and point-of-care diagnostics under controlled cleanroom conditions. Around two billion of these plastic systems leave the three medical sites in Mühltal and Ober-Ramstadt every year. Disposables, i.e. single-use products, glass replacement applications and patient compliance, i.e. the patient's willingness to cooperate in diagnostic procedures, highlight the challenges as a development partner for individual system concepts.

When K-PROFI editor-in-chief Markus Lüling last visited the Mühltal site in 2018, the subsidiary, which was integrated into the Wirthwein Group in 2005, was still trading under its original name Riegler (see K-PROFI 6/2018: 'More compartments in more space – medical device specialist Riegler expands expertise and capacity', available directly at *www.k-profi.de/heft/18066*). A lot has happened since then. In 2020, the company changed its name to Wirthwein Medical to emphasise its affiliation with the Group and position itself more clearly on the market as a globally active company. In the same year, the SARS-CoV-2 virus began to dominate events around the world, not least at Wirthwein Medical.

K-PROFI: How did you experience the pandemic as a medical technology supplier?

Dr Thomas Jakob: We had the foresight to invest in machinery and new premises in advance. This new production area and the switch to 24/7 operation helped us a lot to ramp up the additional quantities for diagnostic end applications such as corona PCR tests quickly and flexibly. We have also built up additional capacities in a very short space of time. Just one example: We built, qualified and validated three 64-cuvette tools here in Germany within ten weeks. This usually takes a year. The same applies to the fully automated system, which we set up in a record time of just a few weeks. It only worked because of our expertise. Our customers were very grateful that we were able to support them as a reliable supplier with high quality.

How have you changed your machinery since then?

Dr Thomas Jakob: Wirthwein Medical works with 100 injection moulding machines, 15 blow moulding machines and 35 assembly machines at its three sites. We are currently waiting for a new 2K injection moulding machine for a new project. In terms of injection moulding machines, we have invested in a micro injection moulding machine in the lower clamping force range. A 4,000 kN machine extends the range upwards. We need this for tub and nest production, i.e. the packaging of our WIM Ject syringe system, our own product.

You have been operating as a system supplier for customised contract manufacturing for decades. You have now launched your own brand, WIM Ject, with prefillable syringes. What prompted you to establish your own product on the market?

Dr Thomas Jakob: There were several reasons. Firstly, we wanted to position ourselves more broadly on the customer side. Previously, we focussed on primary packaging materials for the diagnostics and pharmaceutical sectors. Compared to diagnostics, where we utilise our strength as a development partner for individual system concepts, the pharmaceutical market ticks differently. More or less fully developed products are required. In order to be able to develop further here too, we have to build up our own products.

Marcus Wirthwein, Chairman of the Supervisory Board: 'Within the Wirthwein Group, we invest by far the largest share in medical technology.'

Dr Thomas Jakob, Managing Director Wirthwein Medical: 'The know-how is not in a single step, but in the entire process chain.'

Christoph Merhold: Of course, there are also economic considerations behind this strategic decision. What enables us to assert ourselves here in Germany is expertise. When I started in the medical sector twelve years ago, patient safety and quality were still the top priorities. In the meantime, the economic pressure on companies is becoming ever greater, just like in the automotive industry. In contrast, we can perfectly implement the knowledge we have gained over decades in medicine, the pharmaceutical industry, plastic injection moulding and, above all, toolmaking into our own products.

Marcus Wirthwein: We decided to launch our own products around two years ago as a strategic project within the Wirthwein Group and are driving this forward as a top priority. We have made massive advance investments. In contrast to customised products, where orders are already placed during development, we have to go into marketing ourselves.

What conditions had to be created and how did you prepare for this step?

Christoph Merhold: We carried out a market screening and used this as the basis for a business plan to analyse the potential we saw for ourselves. It became clear that we had to enter the pharmaceutical devices sector, because this is where the highest regulatory requirements and expenses for the production of plastic parts exist and at the same time, we already have all this knowledge. We saw a gap in the market for syringes. The standards do specify to a large extent what this syringe has to look like. But not everyone can implement the expertise in injection moulding and plastics in a fully networked production process from start to finish, fulfil the regulatory aspects and create the right environment. This also sets us apart from the rest of the world. We have an opportunity to make progress here.

There are already manufacturers of prefillable syringes. What's more, the products are predefined by standards. To what extent are you closing a gap?

Dr Thomas Jakob: Our WIM Ject syringes can be used for the administration of emergency medication, for infusions, for pharmaceutical medication and also for cosmetic applications such as Botox or hyaluronic acid. These currently represent a growth market worldwide and there are only a handful of suppliers. However, the market demand is much greater. We therefore see our opportunity to contribute to risk minimisation as an additional supplier on the market or as a secondary supplier and to become a player of the future.

Christoph Merhold: With our supply capability, we are filling the gap in risk mitigation. The pandemic has made us all realise that a component only becomes important when it is no longer available. A syringe, for example, is transformed from a simple-looking plastic part into a high-tech product that is needed in billions of units and must be supplied.

What special features do you bring to the table as a manufacturer of these syringes?

Dr Thomas Jakob: As far as I know, we are one of the few suppliers that manufactures all components of this system from A to Z in-house. This is because we don't just manufacture the prefillable syringe ourselves. We also produce the plunger rod, the finger rest and, above all, the outer packaging. This is the industry-standard ISO-based tub/nest system. We can therefore also make customisations from A to Z for the end customer, such as applying a special logo or label to the plunger or finger rest or using a special colour or design. We know this business.

Christoph Merhold: And we stand out from our competitors because we have the option to UDI the syringe, i.e. apply a unique product identifier. With low-particle labelling, we offer our customers added value. It also gives customers security in the event of a complaint. All quality and process data can be traced via the UDI, not only to the injection moulding machine, automation and peripherals. We also use room and device monitoring so that even humidity, air temperature and pressure conditions are documented. We rely on this data management and the link to the QA and MES system for almost all of our automated lines. This data is important for process optimisation.

Marcus Wirthwein: In recent years, we have pushed ahead with digitalisation. Dealing with the data volumes and turning them into a learning process is the art. We need to speed up our processes and be able to intervene even more proactively in the processes. Artificial intelligence is increasingly supporting us in this. AI will play a major role in the future

Dr Thomas Jakob: One more point: thanks to our high level of vertical integration, with a few exceptions, such as sterilisation or the supply of tip-cap rubber stoppers, we are not dependent on subcontractors for WIM Ject. We are positioned in such a way that we can also react effectively and flexibly to the next pandemic or crisis.

What process steps does WIM Ject go through?

Christoph Merhold: The syringe barrels are injection moulded from a specially additivated COC material in a high-cavity mould. Immediately afterwards, a coating of cross-linked silicone is applied to the inside. The in-house developed siliconisation process achieves the barrier and sliding properties. A tip-cap rubber stopper completes the syringe. The syringes are placed in a standard 100-count nest for transport and automated further processing by the pharmaceutical company. The syringes are protected with a Tyvek inlay before the tub is sealed with another Tyvek film as outer packaging and packed in PP bags after labelling. Due to the risk of contamination, we have designed the production as a fully automated online production and fully networked process with extensive camera controls and measurement. Pre-packed WIM Ject systems leave the ISO 7 clean room. Packed on the pallet, they undergo external gamma sterilisation and are then ready-to-fill. However, we produce the tub/nest packaging offline in a separate ISO 7 cleanroom.

You mentioned your expertise in terms of regulations. Was the knowledge you had in-house sufficient to start producing your own products or did you seek external expertise?

Dr Thomas Jakob: We got in touch with external experts who have years of experience with the standards for prefillable syringes. Based on this, we converted the standards into work instructions, trained our employees and gradually built up the necessary test equipment and our own test laboratory. We now produce the test shots in our own mould making facility. Here, too, we are endeavouring to anchor the value chain as deeply as possible within the company. This involves a lot of expertise.

What do you test in the syringes?

Christoph Merhold: The list is huge. These include the sliding friction and breakaway force. When the doctor wants to push out the syringe, the stopper must not slip through immediately or be too tight. The trick is to use the coating and the process to create a suitable fit and to guarantee this for years

Christoph Merhold, Head of Programme Management: 'To rule out any contamination, we have modified the machine technology and developed our own hygiene concept for the entire process chain.'

Marcus Wirthwein and Dr Thomas Jakob are giving high priority to the entry into pharmaceutical devices as proprietary products at Wirthwein Medical.

despite the effects of sterilisation. Another test examines the tearing forces when opening the outer packaging. On the one hand, the seal must guarantee sterility until the expiry date and the Tyvek film must be sufficiently tight. On the other hand, too many particles must not be produced when tearing open, as they would contaminate the fully automated filling lines.

Dr Thomas Jakob: You won't find this expertise in any textbook; you have to work for it.

Were there any other challenges to overcome?

Dr Thomas Jakob: Of course, we already have a lot of experience from other customer-specific syringe projects. Be it the processing of transparent materials such as COC, the siliconisation technology or the production of the nests, which have to be absolutely flat to rule out abrasion and filling problems. When we presented WIM Ject at the Pharmapack trade fair in Paris in early 2023, our competitors were surprised that we were able to ramp up the project in such a short time, because they know the challenges.

Christoph Merhold: Our learning curve was immense, despite our extensive prior knowledge. In view of the high upfront investment, you don't want to get into too many development loops. The processing of COC is particularly challenging. Compared to standard polyolefins, COC is extremely sensitive in terms of temperature, dwell time, pressure and shear. One mistake can lead to long downtimes and quality deviations. We invest a lot in training people. Employees have to be attentive not just 99 per cent of the time, but really 100 per cent of the time.

Dr Thomas Jakob: Success or failure is decided in the last one per cent. With WIM Ject, too, the biggest challenge was to tease out the last one per cent in terms of quality and the process. The expertise is not in a single step, but in the entire process chain. That's why it's not easy for our customers to 'quickly set up a second supplier'.

Were you able to utilise existing plant technology in any way?

Dr Thomas Jakob: No, from the injection moulding machine to the final packaging, all systems are specially equipped. The injection moulding machine is also tailor-made for this product range. Cleanliness is the top priority here.

Christoph Merhold: Preventing any contamination is the most important aspect. Wherever there is human involvement, particles or germs are emitted. This is a major challenge for this product. We have co-developed the modified machine technology and developed our own hygiene concept for the entire process chain. Furthermore, syringes made from COC must be treated like raw eggs. They attract particles and scratches occur very quickly. It is therefore most important that we produce and package them as quickly as possible. This only works with fully automated inline production designed specifically for the application.

Where does WIM Ject stand today, what is the level of customer acceptance, when do you expect to launch series production and what quantities are you planning?

Dr Thomas Jakob: We are currently in the start-up phase. We have sampled the syringes with some potential customers. These users are now testing WIM Ject with their respective products on their filling systems. We ourselves are in contact with all filling line manufacturers. The fillability has also been tested there; everything works. We want to start series production before the end of this year and are expecting an annual production volume in the three-digit millions. The start depends on the situation at the end customer. What tests do they carry out, how long do they test for? Many customers carry out real-time, long-term tests. This means that the syringes are stored after filling. So-called extractable leachable tests are also carried out. These E&L tests are carried out after a certain storage period and provide information on interactions. Acceptance also depends on the customer's experience: Are they already using prefillable syringes made of plastic or have they previously only used glass?

The Wirthwein Medical team also wants to be able to react effectively and flexibly in the next crisis and is therefore focussing on a high level of vertical integration.

Wirthwein Medical operates twelve ISO class 7 cleanrooms for its fully automated production lines at its three sites in Mühltal and Ober-Ramstadt, with another one already in the planning stage.

Christoph Merhold: You have to realise that pharmaceutical companies are very cautious about making changes to their sensitive products. They usually have years of searching for solutions behind them before they reach the current status quo. They are reluctant to touch what works. This attitude was only breached by the pandemic. It was realised that supply chains can collapse if you rely on a single source. Awareness of risk mitigation has increased significantly. Previously, the validation of a second source was ruled out for cost reasons alone. Today, we know that a second source is important in an emergency. In this respect, the situation during the pandemic was a booster for WIM Ject.

What are the advantages and disadvantages of COC syringes compared to a glass version?

Dr Thomas Jakob: The processing of glass is significantly more energy-intensive. In view of the energy crisis, this aspect has also prompted some users to consider alternatives. And with WIM Ject, they simply have a second option. Basically, both materials have advantages and disadvantages. Glass has very high barrier properties. Plastic, on the other hand, offers greater design freedom and tighter manufacturing tolerances, so that add-on components such as a finger rest fit better. Glass breakage is a risk, especially in high-speed filling lines. Plastic has a clear advantage here.

Back to the keyword investment: Could you please tell us how much you have spent on the project so far?

Marcus Wirthwein: Within the Wirthwein Group, we are investing by far the largest share in medical technology because we want to achieve above-average growth in this area of the company. Wirthwein Medical plays a very important role in our roadmap for the next five years. When we bought the Riegler company in 2005, there were two locations, now there are three. We have tripled our turnover from 17 million euros back then to over 50 million euros. Our goal is to create a powerful unit with a turnover in the three-digit million range. Wirthwein Medical is already a strong horse in the group of companies, is in third or fourth place in the sales ranking and should be in second or even first place in the future.

A soft tip cap closes the syringe. The classic Luer lock thread is theinterface to standard injectionneedle and adapter systems.

Crystal clear: During high-precision injection moulding, the syringe barrels made of transparent, specially additivated cyclo-olefin copolymer (COC) are 100% quality-controlled.

Compared to glass, the production of COC syringes is less energy-intensive, allows tighter manufacturing tolerances and eliminates the risk of glass breakage.

How do you intend to realise this growth and what are your plans for the future?

Marcus Wirthwein: We will position ourselves more globally in the Medical division. In January of this year, we signed a memorandum of understanding with the medical division of the Turkish Koç Holding regarding future collaboration in medical technology. The conglomerate Koç Holding, with around 150,000 employees and a turnover of almost 55 billion US dollars, accounts for around ten per cent of Turkey's total export volume. In the future, we will manufacture components and systems there for the local market, i.e. Turkey and the Middle East, and will initially start with the trade and distribution of WIM Ject. The medium to long-term goal is to establish our own production site for medical technology in Turkey.

Dr Thomas Jakob: 'The development expertise will remain here. We develop and finalise the systems here in Mühltal and then place them in the foreign locations so that we can serve the markets locally for locally. After Turkey, we are targeting the USA.

Marcus Wirthwein: And of course, in addition to the prefillable syringes, we will also be launching other in-house products that are already in development. We are working on corresponding applications with well-known pharmaceutical end customers, whom we are bringing on board at an early stage.

Dr Thomas Jakob: Both our own products and the customer-specific business are strategically important for us. We will also drive the latter forward with new automation projects. Our customers really appreciate that.

www.wirthwein-medical.com

Udo Wirthwein passed away shortly before the company's 75th anniversary

Walter Wirthwein founded the Wirthwein company in Creglingen in 1949 and started by manufacturing octagonal wooden pegs for railway superstructures before moving into plastics processing in 1967 and producing dowels for track fastening. After his death in 1978, his son Udo Wirthwein took over the management of the company, which had around 100 employees at the time. Under his leadership as Managing Director, Chairman of the Executive Board and finally Chairman of the Supervisory Board, the Group grew to over 3,000 people. His sons Frank and Marcus Wirthwein joined the Management Board in 2010. Since January 2022, Marcus Wirthwein has acted as Spokesman of the Management Board with Thomas Kraus (Sales), Dr Ralf Zander (Finance) and Holm Riepenhausen (Technology). Udo Wirthwein was to become 'Honorary Chairman of the Supervisory Board' on the occasion of his 80th birthday but died unexpectedly on 23 April 2024 a few days before his 80th birthday and shortly before the celebrations for the company's 75th anniversary planned for June 2024. On 1 May 2024, Marcus Wirthwein was elected Chairman of the Supervisory Board and Dr Ralf Zander, who remains Head of Finance, was appointed Spokesman of the Executive Board.

Founded in 1998, Wirthwein Aktiengesellschaft is the parent company of all 22 companies worldwide in Germany, Poland, Spain, China, the USA and Turkey and was renamed Wirthwein SE on 1 January 2023. Today, Wirthwein is an innovative group of companies in the field of plastics technology and mould making in the Mobility, Rail Infrastructure, New Energy, Home Appliance and Medical business areas. It is also active in the interior design sector with Bembé Parkett and Winkler Design.

www.wirthwein.de

Pushing the boundaries of LSR processing with AI and 3D printing

Why Trelleborg is bringing injection moulding and additive manufacturing together

With iCast, the sealing manufacturer Trelleborg Sealing Solutions, Stuttgart, has developed a process based on artificial intelligence and additive manufacturing for rapid product development and small-batch production of parts made from liquid silicone rubber. K-PROFI spoke to Jarno Burkhardt, General Manager Trelleborg Sealing Solutions Switzerland, about the background, possibilities and future expansions.

K-PROFI: There are numerous 3D printing processes for rapid prototyping. What is different about iCast?

Jarno Burkhardt: This additive manufacturing concept for parts made of liquid silicone involves a lot of IT expertise that we have developed ourselves at Trelleborg. The technology works with printed mould inserts and can process liquid silicone without manipulation. This means that the customer's original material is used without any additives or interference from the manufacturing process.

So the original production is classic injection moulding?

No, iCast is a very special process. The actual material transfer is closer to 3D printing than bclassic injection moulding. But we don't want to talk about the technical details. After all, eight years of intensive development work went into it.

However, the resulting finished parts are absolutely comparable to those produced by injection moulding in steel or aluminium moulds in terms of tolerance positions, resolution, geometry and surface. And the mould design also corresponds to a later series mould in terms of mould partitions, injection areas, overflows or whatever else is necessary. All of this is incorporated one-to-one into the additive technology. This is then suitable for prototypes, pre-series or even small series of up to several thousand parts.

Where does artificial intelligence come into play?

This is where automated engineering comes into play, which is an important part of iCast alongside the actual production technology. In a traditional feasibility analysis, certain points such as shot weight, geometry, undercuts, demouldability, etc. are always processed. At iCast, we solve all of this with the help of artificial intelligence. Manual processing by a technician is only necessary above a certain level of complexity. This means that we do not lose three to four days of processing time during the initial feasibility assessment and can therefore guarantee a period of 15 working days from the initial enquiry to series delivery.

What conclusions can be drawn from the automated analysis?

It provides initial feedback as to whether the part can be manufactured in this way or whether it may require modifications – in conjunction with specific suggestions regarding the geometry, for example. This enables us to submit a concrete offer to the customer on the second working day.

All photos: Trelleborg

Jarno Burkhardt: "With the iCast process, we are now at the beginning of series production."

Is it that quick?

Yes, the quickest way is when we receive a digital 3D model of the component from the customer. This is loaded into the system and the computer immediately outputs the analysis. We also use one or two simulations to subject the result to a plausibility check, especially with regard to manufacturability in a later series production process. This gives us very valid statements after just a few hours.

iCast covers the entire process from AI-supported engineering to the finished product made from the original LSR material.

In other words, this analysis not only relates to production with iCast, but also takes into account subsequent injection moulding production?

Exactly. This is an important feature that sets us apart from traditional prototype construction. It's not about how you can produce a prototype from a drawing requirement or a 3D model. The manufacturability analysis or, if necessary, slight modifications are designed to enable the part to be produced later in an injection moulding series tool with several cavities. Parts created in a pre-series using the iCast process then correspond one-to-one to the components that may later be produced in an injection moulding process.

You went public with iCast around two years ago. How has the response been from customers?

We worked intensively on bringing the new technology to the market. As a first step, we trialled it with selected and open-minded customers. This allowed us to test whether it also works in specific applications in the way we designed the additive process. This very quickly led to positive results and feedback. We have now reached a phase in which our software has reached the desired maturity, and, above all, we have automated production capacities for the iCast process so that we can promote the technology more aggressively.

Which options are currently in the foreground – prototypes for smaller series?

Basically, both are being used. In addition to prototypes, the second step often involves pre-series production of several hundred to a thousand parts. This allows customers to carry out various test runs for their applications, with this number of parts also on assembly lines and automation systems, for example.

Does the process also pay off for smaller production series?

We have already utilised this too. There are components that are geometrically so complex that they can only be produced using the classic injection moulding process with liquid silicone. The initial costs for such moulds are not insignificant. Sometimes you are forced to take a half step back, use solid silicone and make compromises on the geometry if the requirement for 10,000 parts a year, for example, does not justify an investment in an LSR mould. We address this target group with our iCast process. With the service life of the moulds, repeat accuracies and capacities available to us, we can do this without any problems.

How large can such small series be?

There is no general answer to this question. Depending on the part geometry, a certain number of cavities is possible on an area of 300 x 300 mm, and with moderate investment, several mould inserts can be produced in parallel without any problems. Above a certain number of parts, however, the longer cycle time and the handling effort are factored into the pricing to such an extent that an injection mould can make more sense. As a rule of thumb, it can be said that the iCast process is more cost-effective for up to 10,000 parts. The specific figure varies from part to part, of course.

What part sizes are possible?

The possible shot weight is currently in the range of one to 50 grams. The part weight can then be lower depending on the number of cavities.

Are there any restrictions on the types of LSR that can be used?

No. This is one of the major advantages of our process compared to various 3D printing processes for liquid silicone. The material does not require any additives for the iCast process. And special LSR types can also be processed, just like with injection moulding. Even optical parts made from corresponding liquid silicones are possible, for example light sensors from automotive applications or from machining technology.

In addition to part quality in terms of surfaces and tolerances, this material freedom was one of the starting points of our development. We did not see a future for sophisticated parts made of LSR in pure 3D printing.

3D printing can be used to produce geometries that are not possible with injection moulding. Is iCast also limited in this respect?

It depends, as the technician likes to say. For geometries that are restricted by the flow behaviour, we are closer to injection moulding in terms of limitations. However, with the additive production of mould inserts, we overcome the limits set by traditional metal processing in mould making, including erosion limits.

LSR is often used for medical applications. What about the purity of the iCast process?

Production is fully automated and is also possible in a clean room. We have the necessary capacity at our production site in Stein am Rhein.

Are other materials or 2K parts possible in addition to LSR?

Other materials are generally possible, whereby the flow behaviour is an important parameter. At Trelleborg, we also have a high level of material expertise in polyurethane (PU) because we develop and produce polyurethanes for very specific requirements at our Italian site in Livorno. So we are already working on this. And if the market demands it, we will be happy to take this next step. Materials such as thermoplastic elastomers (TPEs) are not yet on the list of priorities but are conceivable.

I would also like to emphasise that even multi-component parts can be produced in the iCast process, in a two-stage process with inserts. We already have some experience with metal inserts.

What potential do you see for iCast in the future?

In recent years, we have developed a comprehensive and reliable setting in the field of iCast and are now at the beginning of series production. Customers benefit from a high degree of automation and thus correspondingly scalable capacity. With our 40 years of injection moulding experience in Stein am Rhein, we are confident that the technology will come ever closer to the possibilities of injection moulding over the next two or three years. The new process is not only interesting from a commercial point of view, but also offers many technological opportunities. Sometimes fast and low-investment design validations for new developments.

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

www.trelleborg.com

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

Focus on compounding, recycling and extrusion

AMI Plastics World Expos Europe moves to Brussels in September

The associated 'AMI Plastics World Expos' will take place for the fourth time in Europe from 11 to 12 September 2024 – this year in Brussels. The three trade fairs 'Compounding World Expo', 'Plastics Recycling World Expo' and 'Plastics Extrusion World Expo' will bring together managers and experts from the compounding, recycling and extrusion industries for two days of networking, knowledge sharing and innovation.

Attendees will have the opportunity to visit over 170 exhibitors from around the world and gain insights from business leaders and technical experts at the three free conferences. Last year's edition of the three trade fairs in Essen attracted more than 3,000 visitors, mainly buyers and planning experts from compounders, recyclers, extruders, OEMs and brand owners.

Manufacturers of compounding, recycling and extrusion systems as well as suppliers offering a wide range of polymers, additives and related services will be exhibiting at the trade fair. Special exhibition areas will focus in particular on chemical recycling and testing technology for plastics. Among the exhibitors are APK, B+B, Bandera, Buss, Coperion, Erema, Farrel Pomini, FKuR, Gneuss, Hosokawa Alpine, ICMA San Giorgio, KraussMaffei Extrusion, Leistritz, LKAB Minerals, Maag, Mixaco, NGR, Nordson, Orlen Unipetrol, Piovan, Polystar, Rianlon, Sachtleben Minerals, Sikora, Sogapol, Sorema, Starlinger, Theysohn Extrusionstechnik, UniteChem, Van Werven, Vecoplan, Wacker Chemie and Weima.

Renowned representatives from companies such as Flexible Packaging Europe, Nestlé, AMI, Berry, EuRIC, Expra, Aimplas and IMS Polymers will be speaking at the thematically focussed conferences. A networking party on the evening of 11 September will help to establish contacts, exchange ideas and foster cooperation.

You can register free of charge here:
www.ami.ltd/register-PWE-EU

Photo: AMI

AMI is expecting 170 exhibitors and once again more than 3,000 visitors for the first edition of its three trade fairs at the new location in Brussels – as was last the case at Messe Essen.

"Green energies" fuel cables and pipes

How the "wire" trade fair breaks all records and the "Tube" offers a premiere for plastic pipes

As was the case two years ago, it is the various types of "green energy" that are fuelling the cable and tube industry this year. At this year's wire, the focus was once again on high-performance high-voltage underground cables for the North-South corridor, underground or submarine cables for wind turbines, low-voltage cables for e-mobility and, of course, everything that is needed to manufacture them – from the right raw materials to the right machine technology. Everything is preferably green too – i.e. with recycled goods and low energy consumption. The trade fairs took place in a good atmosphere, with many exhibitors and many international visitors. "The halls are buzzing and people are keen to meet up," summarised Senior Manager Petra Hartmann-Bresgen, Messe Düsseldorf, about the biggest wire ever with 1,500 exhibitors from 60 countries.

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

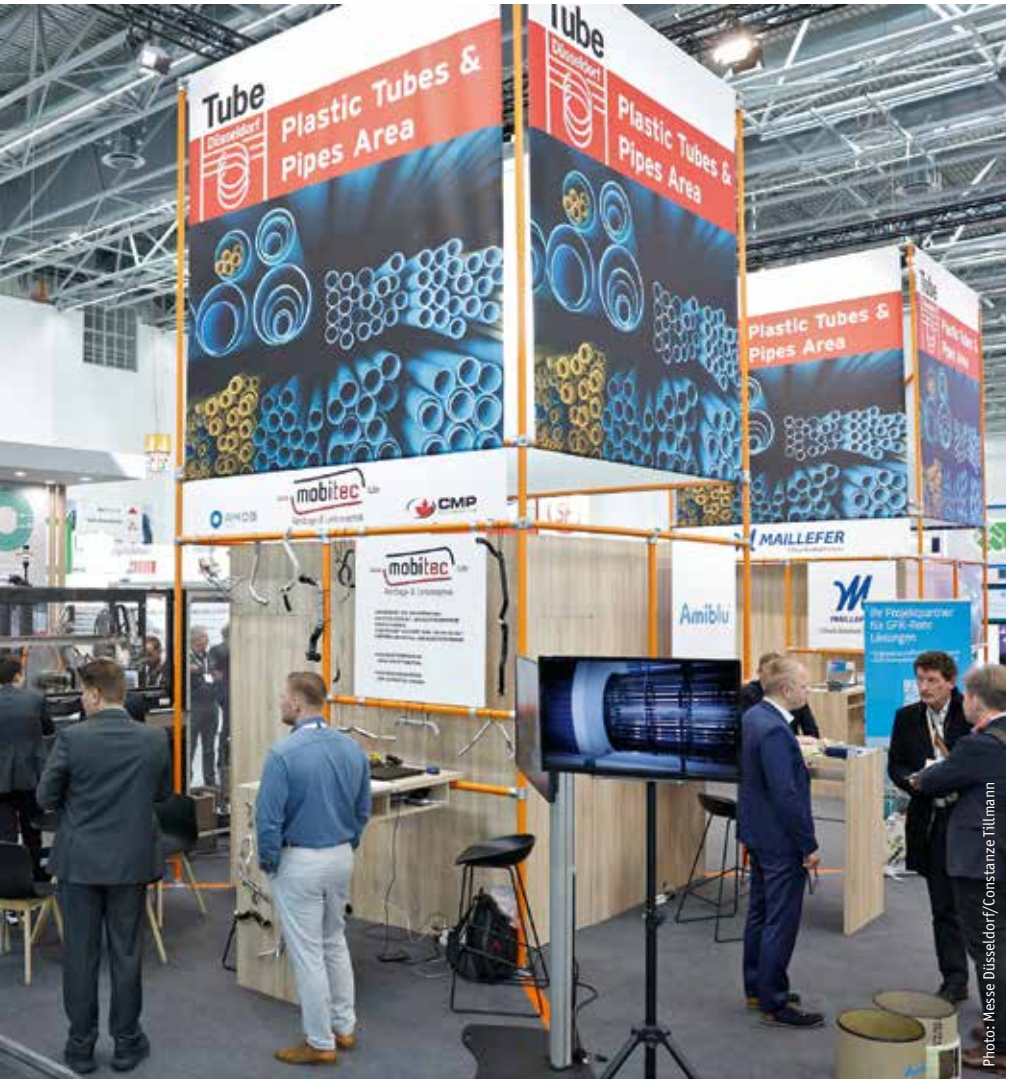


Photo: Messe Düsseldorf/Constanze Tillmann

Unique in Hall 1: For the first time, Messe Düsseldorf has created the "Plastic Tubes & Pipe Area" in the centre of the metal-heavy exhibition halls. Here, visitors found bundled expertise for plastic pipe production.

"It was already clear in advance that it was going to be a good trade fair. Many of our customers had already announced their attendance. Here it has been confirmed. We are very satisfied with the course of the trade fair and the many interested visitors to our exhibition stands," summarised Marketing Manager Haiko Raßweiler from Wafios in Reutlingen, the only company to be represented with three exhibition stands at the Tube and wire trade fairs this year. Wafios' company history began in the wire industry, later adding machines for steel tubes and now also for plastic tubes. "Plastic tubes will replace metal tubes in the e-mobility sector, both as fluid-carrying lines and for battery heat management, as they are significantly lighter," Haiko Raßweiler is certain. This is why Wafios exhibited a new plastic tube bending machine, which is ideal for small series and prototypes, at its stand in Hall 5 in the Tube area of the Düsseldorf trade fair, which was located in Halls 1 to 7a.

Plastic pipes are usually produced by heating conventionally extruded straight pipes and placing them in a metal mould where they cool to the desired geometry. "This process is particularly suitable for large quantities, as it is fast and therefore economical." For small quantities and changing geometries, however, it is expensive and slow, as a new mould always has to be produced. In contrast, the Wafios bending machine can be given a customised tube geometry using the control system, in extreme cases for exactly one tube. "Contact heating requires a heating time of 70 seconds and a cooling time of 25 seconds per bend, depending on the plastic used and the quality requirements. Relaxation of the material is minimal during these times. Shorter heating times would increase the relaxation," said Haiko Raßweiler, presenting


Photo: K-PROFI

Bent prototype at Wafios: Haiko Raßweiler shows the result that the new pipe bending machine produces from a plastic pipe up to 3 metres long, on request as a single piece.

the system, which is suitable for pipes with a diameter of up to 35 mm and a length of 3 metres. The second Wafios stand was located in the wire area, which could be found in Halls 9 to 17, and the third in the specially set up "Plastics Tube and Pipe Area" in Hall 1, this year's novelty at Tube.

Convincing, but with room for improvement

Although there were only eight companies in this "Plastics Tube and Pipe Area", they were quite satisfied with the bundling of expertise on the subject of plastic pipes in a common location in the midst of the rather metal-heavy exhibitor environment. "Due to their many advantages, it makes perfect sense to present plastic pipes, which make more sense for some applications, at this classic trade fair for metal pipes," says Markus Hartmann, Managing Director of the Plastic Pipes Association (KRV). Although IFAT in Munich in May was a leading trade fair for plastic pipes, this does not rule out offering them a forum at Tube as well. He therefore considers the bundling at one location to be very convincing, but in view of the low number of exhibitors, there is room for improvement.

The industry in Germany is currently facing challenging times. Even if business with building refurbishments is still acceptable, business with new buildings tends to be on hold. Both the industrial sector and the private sector are reluctant to invest: "Although there is a need for around 900,000 new residential units in Germany, only around 220,000 will be built this year," says Markus Hartmann, who sees the reasons for this in the rent cap and the reluctance of public authorities. In contrast to building construction, things are looking a little better in civil engineering, although the situation here is also mixed. While pipe laying for drinking water and gas is stagnating, growth is expected for digitalisation – after all, not even 20% of households in Germany are connected to the fibre optic network – as well as for high and extra-high voltage lines.

Peggy Rudies, Sales Manager Home Appliances & Special Applications at Maincor Rohrsysteme from Knetzgau, has a similar view of the situation. This is the company's first time at Tube and finds the joint positioning of the plastic pipe companies in one place a good thing, even if it is still little recognised. "The fact that there are only eight companies in the area is due to the late decision to set it up, which was only made last autumn. This meant that the companies had little lead time," explained Petra Hartmann-Bresgen from the organisers Messe Düsseldorf. Maincor is a traditional pipe manufacturer that employs 400 people and usually offers assemblies made of smooth and corrugated pipes as well as connectors and other attachments. "We are feeling the restraint in the construction industry, less is being built and therefore fewer pipes are needed. Thanks to our broad product portfolio, including for industrial applications where the situation looks much better, we can compensate for weaker areas," explained Peggy Rudies.

Recycled materials are standard

Pöppelmann Kapsto from Lohne offers caps and plugs of all kinds to protect pipes for the automotive industry as well as for valves and hydraulic pipes. "We manufacture both standard products and customised solutions," said Lena Zietlow from the internal sales department. And of course – as is usual at Pöppelmann – a significant proportion of the products are made from PCR-PE, PCR-PP or PCR-TPE. "Sustainability is the number one topic in the industry. Also in the automotive industry. Standards now stipulate the proportion of recycled material in some products," says Lena Zietlow, speaking from practical experience.

Photo: K-PROFI

Tense situation for the plastic pipe association and Managing Director Markus Hartmann: the creation of new residential housing is lagging behind its targets, and the industry is feeling the effects.

Photo: K-PROFI

Successful premiere for Maincor: Peggy Rudies and the plastic pipe manufacturer Maincor are exhibiting at Tube for the first time and are satisfied with the newly created plastic pipe area.

Green materials were also a topic at wire. "We have two groups of raw materials that we use – on the one hand, second-generation bio-based raw materials, i.e. without competing with food production, which we feed into the cracker to process them into conventional polymers, and on the other hand, post-consumer recyclates. We blend around 50% of these into our compounds for the cable industry," explains Bart Verheule, Global Marketing Director Energy at Borealis. "The feedstock is crucial in the production and compounding of recyclates," which is why he believes Borealis has a clear advantage with the four recyclers it has acquired. The raw material manufacturer is experiencing high demand for its high-quality and sustainable compounds from producers of energy cables. "While demand has fallen slightly in the telecommunications and infrastructure sector, high-voltage cables for connecting wind turbines, for example, are increasingly in demand," reports Bart Verheule.

Halogen-free remains an issue

Even if the market for data cables and infrastructure or residential construction is quieter at the moment, cables are essential. And when it comes to protecting people from harmful substances, halogen-free and flame-retardant compounds are used. "For example, we produce HFFR compounds that have to be used in tunnels, lifts, underground railways or on ships," explained Dr Tyll Freese, R&D Manager at Condor Compounds in Braunschweig. In addition to the HFFR (halogen free, flame retardant) compounds, Condor Compounds develops and produces a total of 50,000 tonnes per year of highly filled compounds as well as cross-linkable polyolefin formulations and customised products with 100 employees.

When it comes to the production of cable compounds, quality is key. Thomas Ringheim, CEO of the Danish company Labotek, which offers drying, conveying, mixing and dosing solutions, is well aware of this. "We have been working in the cable industry for around 50 years. Just yesterday, a customer came by who bought a system from us in 1987 that is still running today," he reports with a smile. "When manufacturing cable compounds, any impurities, especially metallic ones, must be avoided as they can lead to short circuits when cables are used. The requirements are similar to those in the pharmaceutical industry." For this reason, stainless steel dry air containers or dosing hoppers are designed with a particularly smooth, fine surface with a roughness of Ra 0.8 to Ra 0.4. For the same reason, Labotek offers the "Compact Clean Room" exhibited in Düsseldorf, which is installed under an octabin feeding station and enables the employee to carry out dosing without direct contact with the material.

Three world premieres at once

Quality is also the focus at Sikora from Bremen, which, as always, was at the wire and presented its customised measuring device solutions for the industry. Three world premieres took centre stage at the trade fair, which also attracted a great deal of attention from visitors. "For the first time, we are presenting the LM Smart length measuring system, which uses the laser Doppler method to measure the length of cables precisely and without contact during production," said press spokeswoman Katja Giersch,

Fitting from Pöppelmann Kapsto: The plastics processor produces plugs and caps of all kinds for the protection of pipes or hydraulic components.


Photo: K-PROFI

Sustainable from Pöppelmann: Lena Zietlow shows a plug for the transport protection of a plastic pipe, which is usually made from recycled materials.

Photo: K-PROFI

introducing the first machine première. Premiere number two was the Laser Pro series, which replaces the Laser Series 6000. The systems use laser technology to measure cables in two planes and achieve a high level of measuring accuracy. Three different measuring head sizes are initially available for cables with diameters of up to 13 mm, 32 mm and 51 mm. The third device premiered by Sikora was the "Centerview Pro", which can measure cable eccentricities as well as diameters. Katja Giersch comments: "Concentricity is very important, especially for data cables and cables for automotive applications. We monitor this very precisely with the two models in the new series." The two measuring systems cover the usual diameters of up to 10 mm and 25 mm respectively.

Flexible machine technology for cable compounds

Several machine manufacturers demonstrated their expertise in the production of cable compounds at wire. For example, the Swiss company Buss presented the Compeo, the latest co-kneader, which is characterised by a high degree of flexibility. "The Compeo can be designed with two, three or four blades, depending on which mixing effect is required," explained Dr Francois Loviat, Head of Sales & Process Engineering. Thanks to the high free volume, the low speeds and the associated gentle processing of compounds, the extruder is suitable for all materials that are sensitive to shear and/or temperature. The processing machine is used in particular for highly filled formulations, for HFFR compounds and for cross-linkable PE formulations. "The Compeo can be used to produce crosslinkable HFFR compounds, which are used for photovoltaic systems or in the engine compartment of cars, for example, due to their high temperature and chemical resistance, in a single step." This is special in that these compounds are traditionally produced in two stages, i.e. first with peroxides for crosslinkability and then with fillers in the second stage.

Entex also recommends its specific machine concept, the planetary roller extruder, especially for complex cable compound formulations. "Thanks to their large surface areas, our machines are excellent but gentle mixing units," emphasises Marketing Manager Thomas Malzahn, whose company is exhibiting at wire for the first time. "We are very satisfied with how the trade fair has gone so far and the response we have received here."

Photo: Borealis

Photo: Borealis

Left: Bart Verheule, Global Marketing Director Energy, believes that Borealis and its four recycling companies have a clear advantage when it comes to meeting the high demand for high-quality and sustainable compounds. Right: Borealis offers post-consumer recyclates, around 50 per cent of which are compounded into compounds for the cable industry.

Oldrich Lohr and David Hacker from the PVC & Cable Compounds sales team at Coperion in Stuttgart are also pleased with the number of visitors to their stand, mainly from Europe. "The provision of electricity and the associated demand for power cables is a major concern for the industry and for us too," they reported. They recommend the twin-screw extruder for processing highly filled formulations and for crosslinkable compounds, as it can be specifically adapted to any processing task thanks to its modularity. And it is precisely this flexibility that enables manufacturers of cable compounds to adapt to changing requirements, both legal and market-related, at any time.

www.tube.de; www.wire.de; www.messe-duesseldorf.de www.borealisgroup.com; www.busscorp.com; www.condorcompounds.de, www.coperion.com; www.entex.de; www.krv.de; www.labotek.com; www.maincor.de; www.poeppelmann.com; www.sikora.net; www.wafios.

Photo: K-PROFI

Clean at the Labotek stand: Labotek offers a "Compact Clean Room" especially for cable production, in which the employee has no direct contact with the fed material thanks to the external intervention, so that no contamination can occur.

Sources of supply/suppliers directory

The A to Z of the plastics and rubber industry

Air filter technology

NESTRO Lufttechnik GmbH
Paulus-Nettelnstroth-Platz
D-07619 Schkölen/Thüringen
Tel.: +49 36694 41-0
Fax: +49 36694 41-260
info@nestro.de
www.nestro.de

Certification

We certify the plastics industry
Tel.: +49 931 4104-310, Fax: -320
cert@skz.de, www.skz.de

Cleaning granules

Völpker Spezialprodukte GmbH
Fabrikstraße 1, D-39393 Völpke
www.voelpker.com

CNC machining and thermoforming technology

Biesse Deutschland GmbH
An der Leibi 10, D-89278 Nersingen
Tel.: +49 7308 96060
info@biesse.de, www.biesse.com

Coupling systems

WENZ Kunststoff GmbH & Co.KG
TALKOB® & MOULDPRO®
Tel.: +49 2351 459040
info@we-ku.de, www.we-ku-shop.de

Cutting mills

Hellweg Maschinenbau GmbH & Co. KG
Vennstrasse 10, D-52159 Roetgen
Tel.: +49 2471 4254
info@hellweg-maschinenbau.de
www.hellweg-maschinen.de

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

Dedusting

NESTRO Lufttechnik GmbH
Paulus-Nettelnstroth-Platz
D-07619 Schkölen/Thüringen
Tel.: +49 36694 41-0
Fax: +49 36694 41-260
info@nestro.de
www.nestro.de

Design, product development and simulation

Konstruktionsbüro Hein GmbH
Marschstr. 25
D-31535 Neustadt
Tel.: +49 5032 63 15 1
info@kb-hein.de
www.kb-hein.de

Dosing and mixing systems

Industriestr. 15, D-63633 Birstein
Tel.: +49 6054 9129-0
info@processcontrol-gmbh.de

Drying and conveying technology

LABOTEK DEUTSCHLAND GmbH
Nöllenhammerweg 10-16
D-42349 Wuppertal
Tel.: +49 202 747585-0
info@labotek-de.com
www.labotek.com/de

WENZ Kunststoff GmbH & Co.KG
Tel.: +49 2351 459040
info@we-ku.de
www.we-ku.de www.we-ku-shop.de

Education and training

Professional training for plastics professionals
Tel.: +49 931 4104-164, Fax: -277
training@skz.de
www.skz.de

Engineering plastics

PRO-plast Kunststoff GmbH
Feldstr. 16 D
D-64331 Weiterstadt /Darmstadt
Tel.: +49 6151 3093-0
Fax: +49 6151 3093-111
info@pro-plast.de, www.pro-plast.com

ROMIRA GmbH
Siemensstraße 1-3, D-25421 Pinneberg
Tel.: +49 4101 706-03
info@romira.de, www.romira.de
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Extraction technology

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Paulus-Nettelnstroth-Platz
D-07619 Schkölen/Thüringen
Tel.: +49 36694 41-0
Fax: +49 36694 41-260
info@nestro.de
www.nestro.de

Extrusion technology

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

Coperion GmbH
Theodorstr. 10, D-70469 Stuttgart
Tel.: +49 711 897 0
info@coperion.com
www.coperion.com

Extrudex Kunststoffmaschinen GmbH
In den Waldäckern 16, D-75417 Mühlacker
Tel.: +49 7041 9625-0
Fax: +49 7041 9625-22
info@extrudex.de, www.extrudex.de

LEISTRITZ EXTRUSIONSTECHNIK GMBH
Markgrafenstr. 36-39, D-90459 Nürnberg
Tel.: +49 911 43 06 240
extruder@leistritz.com
extruders.leistritz.com

Granulate-dedusting technology

Förder- und Entstaubungslösungen
D-88285 Bodnegg
www.pelletroneurope.com

Heating and drying cabinets

Will & Hahnenstein GmbH
Bahnhofsweg 22, D-57562 Herdorf
Tel.: +49 2744 93170
info@will-hahnenstein.de
www.will-hahnenstein.de

Heating elements

ERGE Elektrowärmetechnik Franz Messer GmbH
Hersbrucker Straße 29 - 31
D-91220 Schnaittach
Tel.: +49 9153 921 0, Fax: +49 9153 921 117
verkauf@erge-elektrowaermetechnik.de
www.erge-elektrowaermetechnik.de

Postfach 1863, D-58468 Lüdenscheid
Tel.: +49 2351 666-0, Fax: +49 2351 666-24
E-Mail: info@itlmail.de
www.elektrowaermetechnik.de

WEMA GmbH
Kalver Straße 28, D-58515 Lüdenscheid
Tel.: +49 2351 9395-0, info@wema.de
www.wema.de

Hot runner intermediate plates

A&E Produktionstechnik GmbH
Gostritzer Str. 63, D-01217 Dresden
Tel.: +49 351 8547 8330
www.a-e-produktionstechnik.de

Hot runner technology

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

Infrared welding

www.cemas-germany.com

Injection moulding machines

Sumitomo (SHI) Demag
Plastics Machinery GmbH
D-90571 Schwaig
Tel.: +49 911 50 61 0
info@dpg.com
www.sumitomo-shi-demag.eu

Inspection and sorting technology

PURITY SCANNER
Bruchweide 2, D-28307 Bremen
sales@sikora.net, www.sikora.net

Inspection technology

OCS Optical Control Systems GmbH
www.ocsgmbh.com

Laser welding machines

Evosys Laser GmbH
www.evosys-group.com

Lubricants

ELKALUB Hochleistungs-Schmierstoffe
D-72189 Vöhringen (Württemberg)
Tel.: +49 7454 9652 - 0
info@elkalub.com, www.elkalub.com

Lubricants/Waxes

Völpker Spezialprodukte GmbH
Fabrikstraße 1, D-39393 Völpke
www.voelpker.com

Masterbatches

Oberer Westring 3-7, D-33142 Büren
www.argus-additive.com

FBW GmbH
Forstweg 27, D-52382 Niederzier
Tel.: +49 2428 9563000
Fax: +49 2428 9563005
kontakt@fbwgmbh.de, www.fbwgmbh.de

Gabriel-Chemie GmbH
Industriestraße 1
2352 Gumpoldskirchen, Austria
Tel.: +43 2252 63630
info@gabriel-chemie.com
www.gabriel-chemie.com

Treffert GmbH & Co. KG
In der Weide 17, D-55411 Bingen am Rhein
Tel.: +49 6721 403 0
info@treffert.eu, www.treffert.eu

Material conveying systems

Werner Koch Maschinentechnik GmbH
Industriestraße 3, D-75228 Ispringen
Tel.: +49 7231 8009-0
info@koch-technik.de

WENZ Kunststoff GmbH & Co.KG
Tel.: +49 2351 459040
info@we-ku.de
www.we-ku.de www.we-ku-shop.de

Measuring, testing and control technology

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

Bruchweide 2, D-28307 Bremen
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 relocationof 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

COMPETENCE IN PLASTICS
CH-Bischofszell
www.k-profile.com

Polyetheretherketones

BIEGLO GmbH
D-22765 Hamburg
Tel.: +49 40 401130000
www.bieglo.com
www.peek-shop.de

Polyimides

BIEGLO GmbH
D-22765 Hamburg
Tel.: +49 40 401130000
www.bieglo.com
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

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

Refrigeration technology

INDUSTRIEKÄLTEANLAGEN TIEFTEMPERATURTECHNIK 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

technotrans solutions GmbH
Temperierung | Industriekühlung
Werkzeugreinigung | Service
Scherl 10, D-58540 Meinerzhagen
Tel.: +49 2354 7060-0
www.technotrans-solutions.de

Weinreich Industriekühlung GmbH
Hohe Steinert 7, D-58509 Lüdenscheid
Tel.: +49 2351 9292-92, Fax: +49 2351 9292-50
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 Ilsfeld
Tel.: +49 7062 95700
info@weima.com, www.weima.com

Standards

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

Meusburger Georg GmbH & Co KG
Kesselstr. 42, A-6960 Wolfurt
Tel.: +43 5574 6706 0, Fax: +43 5574 6706 11
verkauf@meusburger.com
www.meusburger.com

Technical moulding

Spritzgussteile für hohe Beanspruchung
Komplexe Baugruppen · Eigener Formenbau

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

Temperature control units

technotrans solutions GmbH
Temperierung | Industriekühlung
Werkzeugreinigung | Service
Scherl 10, D-58540 Meinerzhagen
Tel.: +49 2354 7060-0
www.technotrans-solutions.de

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

Temperature sensors

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

Thermoplastic elastomers

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

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

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

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

Vacuum pumps and systems

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

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

Don’t moan, get to work!

Promoting start-up culture and securing the future

In the current political and economic climate, it is difficult to be optimistic. Wars and looming conflicts around the world, uncertainties in almost all sectors, a bureaucracy that does not exactly encourage entrepreneurship, problems in the supply chain and, and, and ... The driving forces of the German economy in particular, the mechanical engineering and automotive industries, are struggling with themselves or suffering from a drastic decline in orders. Where and how will money be earned in Germany in the future?

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

Even if our country is not the world champion in founding and certainly not in aggressively marketing new companies, a certain start-up culture has become established. Around 2,500 newly founded companies per year in Germany are considered start-ups, i.e. young companies that develop innovative ideas and technologies. They strive for rapid growth and disruption of established industries and are known for their agility, creativity and willingness to take risks.

Our universities are breeding grounds for innovation and research, where students and researchers have easy access to resources and expertise to realise new ideas.

You will read the next issue of K-PROFI international at the end of September 2024.

Mistakes are still made here in a protected space, without the financial risk necessarily turning into a personal fiasco.

Spin-offs from universities promote the transfer of knowledge between universities and industry. Medium-sized companies in particular often use the agility of young entrepreneurs and their know-how to activate new approaches in a bypass, so to speak, which are difficult to activate due to already tedious systematic procedures and testing processes as well as sceptics in the ‘old’ company. Conversely, learning about systematic structures and processes in collaboration is beneficial for start-ups in order to be able to scale cleanly later on.

It is good to see, for example, that after more than 40 years of continuous research in the field of plasma polymerisation at IKV in Aachen, the start-up IonKraft was founded, which offers solutions for barrier coatings for packaging and thus ensures recyclability, among other things (see ‘Someday we’ll coat drums, maybe even IBCs’ in K-PROFI international 2/2022, *www.k-profi.world/issue/220206*). Two start-ups will also have emerged from the IKV by the end of this year, which will join the long tradition of numerous start-ups from the institute. The secret of success is, on the one hand, a culture that allows start-ups and also failure. On the other hand, young people in particular should also have the personal courage not to go straight into the supposedly safe industry after their studies, but to realise their perhaps crazy ideas with a certain amount of risk. They don’t have much to lose, they’re just missing an opportunity if they don't do it.

It is precisely the special atmosphere in start-ups and then also in the further successful development of the new company that makes it fun. Adrenalin and a permanent spirit of optimism are just as guaranteed as a sour-pickle period because something didn’t work out. The world will continue to turn and change dramatically over the next few years. Start-ups are not bystanders, but players.

Imprint

**K-PROFI international –
Inspiration for plastics processors**

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

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

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

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

Dipl.-Ing. Janne Reisch, Esg., Copy Editor
janne.reisch@gmail.com

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

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

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

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

Management
Markus Lüling, Ulrike Mau

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

Distribution and reader service
Lisa van Straelen
Tel. +49 (0)6172 9606-23, vertrieb@k-profi.de

Subscription
K-PROFI international is available to plastics and rubber processors as an ePaper or PDF free of charge upon registration. Registration requires some information about the person and the function in the company. Registration is possible at any time at www.k-profi.world/registration

Layout and production
Ingrid Rieß, Therese Stübinger
Tel. +49 (0)9123 9609-12, produktion@k-profi.de

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