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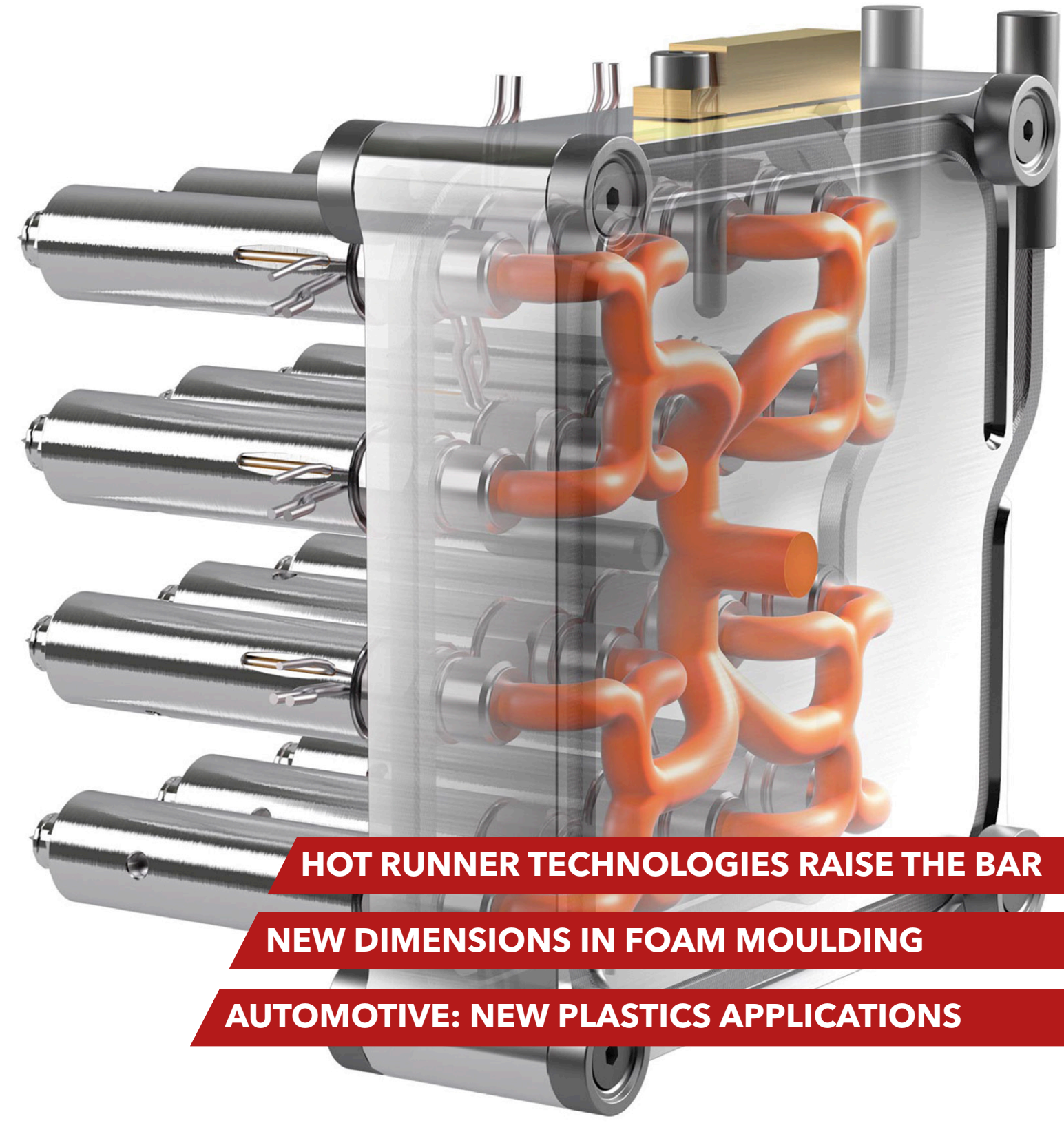

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Krauss Maffei completes relocation

German machine manufacturer KraussMaffei has successfully moved its headquarters from Allach to Parsdorf in the last of its recent relocation projects. Covering 156,000 m², the new site includes three production halls, an administration building, office and social buildings, parking garages, and a 15,000 m² Customer Experience Centre.

Holger Ahlborn, Senior Director Operations in Der Neuen Zentrale in Parsdorf, said: "At the new site, our machines [for machine manufacturing] are on average four years old. At the old site the average age was 21 years. This is one reason why our processes are running much more smoothly now and synchronisation of value creation processes is steadily improving. In mechanical production, we have achieved substantial efficiency improvements. In combination, all this allows us to offer customers very short delivery times."


IMAGE: KRAUSSMAFFEI

Above: KraussMaffei has moved its headquarters from Allach to Parsdorf in Germany

In 2020, plants in Einbeck, Germany, and Jiaxing, China, went into operation and at the end of 2022, Krauss Maffei Extrusion moved to a new plant in Laatzen, near Hanover.

■ The company has appointed Jörg Stech Head of Injection Moulding Machinery EMEA. He joins from hydraulic systems company Argo-Hytos where he was managing director and succeeds Karl-Heinz Bourdon, who has held the post on an interim basis since July.

› **www.kraussmaffei.com**

MGS acquires Winther Mould

MGS has acquired Danish healthcare tooling manufacturer Winther Mould, the investment accelerating MGS' speed-to-market and continuing the company's strategic growth as a provider of high-precision plastic solutions for pharma, diagnostic and medtech applications.

"We celebrate this new growth milestone for MGS, which further strengthens our offer of unparalleled tooling capacity to ensure the seamless launch of large-scale programs. Our expanding global footprint continues to provide healthcare innovators with end-to-end support for new product introductions and ongoing production," said Paul Manley, CEO of MGS.

MGS now operates 12 locations across the US, Mexico, Ireland, Denmark, Sweden and Germany. It recently acquired Danish product development and design firm, Technolution.

› **www.mgsmfg.com**

Martor selects Domo material


IMAGE: MARTOR

Domo's PA6-based Technyl 4earth material is being used to mould Martor's new eco line of safety knives. The materials, made of 100% recycled polyamide with different glass fibre percentages, are said to offer excellent aesthetics and mechanical attributes while providing significant sustainability gains compared to virgin polymer.

› **www.domochemicals.com**

Rosti opens Innovation Lab in US

Injection moulder Rosti has opened a digital innovation lab at its plant at Germantown, US, to facilitate prototyping and product development. Supported by a $1.3m investment, it is modelled on the company's existing units in Europe and Asia.

The company says the facility enables it to bring concepts to reality in just 72 hours.

Rick Riesterer, Director of Sales and Marketing for Rosti North America, said: "We are redefining the landscape with speed and precision like never before."

› **www.rosti.com**

Plastics Europe launches roadmap for Plastics Transition

Plastics Europe has announced plans for how the plastics industry in Europe will move towards circularity, although safeguarding global competitiveness is just as important for the body that represents Europe-based polymer producers.

The Plastics Transition roadmap involves measures to reduce greenhouse gas emissions from the overall plastics system by 28% by 2030 and towards net-zero by 2050. It is predicted to lead to the gradual substitution of fossil-based plastics, so that circular plastics could meet 25% of European demand in 2030 and 65% by 2050 (see Plastics Europe roadmap **here**).

The roadmap is intended "to completely redesign the European plastics sector", said Marco ten Bruggencate, President of Plastics Europe, and Dow EMEA Commercial Vice President Packaging and Specialty Plastics, during a press briefing.

Plastics Europe says it recognises the huge ambition of its roadmap – which will involve €235bn in additional investments and operational costs – but that it is possible to transform Europe's plastics industry and also make it competitive with other plastics-producing regions.

"There is a direct correlation between the industry's competitiveness and its ability to execute the roadmap," said ten Bruggencate.

Virginia Janssens, Managing Director of Plastics Europe, said the roadmap will act as "our North Star", informing all decisions taken in the years to come.

The three pillars of the transition plans, which were presented by Maarten Dubois, Director of Sustainability at Deloitte, are to make plastics circular, to help drive lifecycle emissions to net zero and to foster the sustainable use of plastics.

Based on a projection for 2050 that converters in Europe will use 65m tonnes of plastics, 22m tonnes, or 35%, will come from fossil-based plastics, with the remaining 65% from circular plastics, including: 15m tonnes from mechanical recycling, 12m tonnes from chemical recycling, 11m tonnes from biomass and 3m tonnes from CCU.

Chemical recycling

The importance of chemical recycling to the plans was discussed during the press briefing's Q&A session. Ten Bruggencate stressed the "need to scale up chemical recycling".

Plastics Europe is in discussions with the European Commission about the mass balance approach that is needed for polymer producers to allocate recycled content from chemical (mainly pyrolytic) recycling to new products.

Janssens said Plastics Europe's position is to accept that fuel products cannot be included in mass balance allocation as plastics-to-fuel is not considered as recycling. This results in chemical recycling having lower yields than would be the case using a free allocation approach. She said: "In other regions of the world, free allocation may be applied, so we need to be very careful."

› **https://plasticseurope.org**

Large falls in BASF and Covestro Q3 results

BASF Group's sales in the third quarter of 2023 were down €6.2bn to €15.7bn compared with the same period last year. The hydrocarbons and chemicals company says the decline is mainly due to lower prices, primarily in the Materials, Chemicals and Surface Technologies segments.

During the same period, income from operations (EBIT) before special items declined by €772m to €575m compared to last year.

In the fourth quarter of 2023, BASF expects production in the global chemical industry to stabilise. However, the macroeconomic outlook remains uncertain and rising raw materials prices could have an effect.

Meanwhile, Covestro said the third quarter of 2023 was characterised by a "persistently difficult market environment with continued low demand in all regions".

The group reported that overall sales declined by 22.7% to €3.6bn, compared to €4.6bn the previous year, mainly due to lower selling prices and a reduction in volumes sold. The Group's EBITDA fell by 8.3% to €277m compared to the previous year's €302m.

› **www.basf.com**

› **www.covestro.com**

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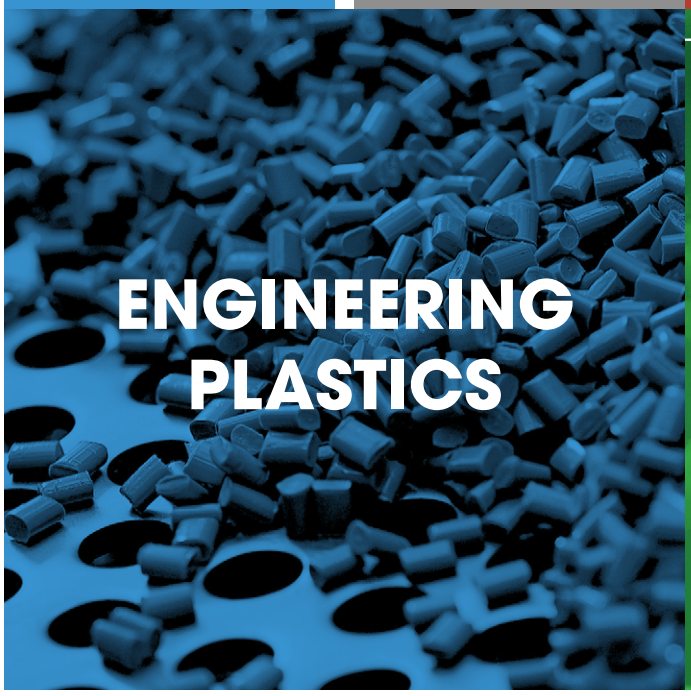

Plastics Engineer

www.tisan.com.tr

IN BRIEF...

The German surface finish specialist **AluConcept** group, which primarily serves the automotive, furniture, and sanitary sectors, has acquired plastic fabrication company **Ditter Plastic** and will operate it under the name AC Ditter.
https://ditter-plastic.de

Vertically integrated medical device contract manufacturer **Biomerics** has completed an expansion of its plant in Brooklyn Park, Minnesota, bringing it to a total of 51,800 m² and consolidating multiple operations and services. The investment will triple extrusion output over the next five years to keep pace with increased customer demand.
https://biomerics.com

Medical device manufacturer Molded Devices, recently acquired by TruArc Partners, is being rebranded as **Aptyx**. The name and corporate identity will integrate a group of brands specialised in moulding, extrusion, coatings, and medical device assembly including GlobalMed, Seitz, Medefab, Bates, and DipTech Systems.
https://aptyx.com

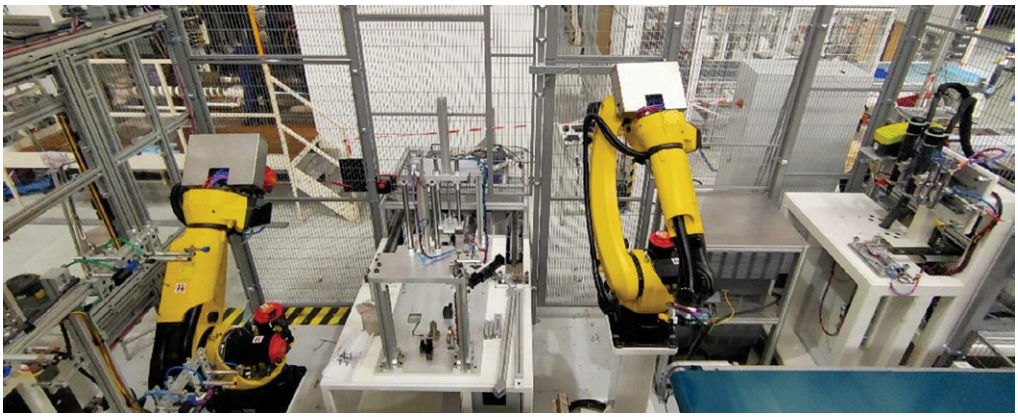

IMAGE: GARBE

Above: Garbe Automatisme manufactures cartesian and multi-axis robots

Sepro acquires majority of Garbe Automatisme

Sepro Group, which maintains facilities in France, Germany, US, and China, has acquired a majority stake in Garbe Automatisme, strengthening its position as a leading supplier of robots and automation solutions.

The transaction was completed at the end of July, and financial terms were not disclosed. Dominique Garbe, who founded Garbe in 1997, will continue to lead the company, which will retain a high degree of autonomy within the Sepro Group. The acquisition of Garbe and its 900 m² operation will increase Sepro's global capacity by 20%.

"Our customers need to accelerate their transformation and automate their production lines to increase productivity, and we are seeing a steady increase in demand for increasingly sophisticated automation applications," said Charles de Forges, CEO of Sepro Group.

› **www.sepro-group.com**
› **www.garbe-automatisme.com**

Valgroup expands operations in Italy

Brazilian packaging producer and recycler Valgroup is expanding its operations in Italy with the acquisition of PET and rPET producer Garda Plast Group, formed through the aggregation between Garda Plast and IFAP led by Progressio.

Luigi Geronimi, founder of Valgroup, says: "With the acquisition of the Garda Plast Group, we further consolidate our position in the Italian market."

The two new plants acquired by Valgroup in Italy are in addition to five other PET preform manufacturing units; one in Uruguay, three in Brazil, and the unit in Villa Lempa, Italy, acquired last year.

› **www.valgroupco.com**

Cosmo Films launches rigid packaging business

Indian speciality film producer Cosmo Films has launched Cosmo Plastech, a new injection moulding and thermoforming business division aimed at manufacturing containers for the food and beverage industry. It will offer a diverse range of packaging solutions for a wide array of FMCG products while providing enhanced supply chain efficiency and recyclability.

Sanjay Chincholikar, Business Head - Technical Films & Rigid Packaging, said: "Our containers ensure durability, reliability, and moisture resistance thereby setting an innovative benchmark in the packaging world. Our strategic move to establish Cosmo Plastech reflects the company's commitment towards excellence in sustainable packaging solutions."

› **https://cosmofilms.com/plastech**

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Mahle and Hella sell stakes in AC venture

Automotive suppliers Mahle and Hella are selling their equal stakes in the Behr-Hella Thermocontrol (BHTC) joint venture to AUO Corporation, the purchase price based on an enterprise value of €600m. The transaction is expected to be completed by mid-2024. AUO, based in Taiwan, specialises in display panel products and solutions.

Above: BHTC's headquarters in Lippstadt, Germany

Headquartered in Lippstadt, Germany, BHTC operates mainly in air conditioning control and is a specialist for system solutions in the field of HMI. In 2022 it generated sales of €619m.

"Since its foundation almost 25 years ago, BHTC has established itself as a strong automotive supplier with an excellent technology portfolio and a high customer reputation. We are therefore pleased to have found a strategic buyer in AUO who can further develop BHTC's business in a competitive and continuously growing environment and seize new market opportunities," said Arnd Franz, Chairman of the Mahle Group Management Board and CEO.

The sale stems from a change of control clause in the JV agreement after Faurecia acquired a majority stake in Hella.

› **www.bhtc.com**

MKS Plastics increases production

MKS Plastics, an industrial pail manufacturer based in Louisiana, US, is investing $14m to double the size of its production facility in Tangipahoa Parish, adding 14 injection moulding machines along with pumps, chillers, air compressors, and air dryers.

"This expansion will help MKS in every aspect of its business model, from our employee capacity to sales," said MKS Plastics COO Robert Latiolais.

The company anticipates the upgrades to the facility to be complete and operational by the end of 2024. This allows the company to better serve customers in petroleum and chemicals.

› **www.mksplastics.com**

Investment firm takes over MKL

Investment group Regio Plus has acquired MKL Kunststofftechnik, a full service injection moulding company based in Mahlberg-Orschweier, south-west Germany, specialising in high-quality plastic parts and assemblies in the automotive interior sector.

"With this investment, we are taking a decisive step further in our goal of establishing a leading network and competence centre and thus [becoming] a partner of world market leaders in the region. We are now also a direct partner of premium automotive OEMs and brands and now have injection moulding machines up to 500 tons in 1K and 2K processes, robotics and assembly technologies as well as 3D printing," said Christian Hauger, partner of Regio Plus.

Other Regio plastics businesses include Regio MLH KST and Babberger Plastic.

› **https://regioplusgmbh.de**

Irish expansion for Freudenberg Medical

Freudenberg Medical, a design and manufacturing partner for medical devices whose operations include injection moulding and extrusion, has completed an expansion at its facility in Galway, Ireland, raising its manufacturing footprint by 50%.

The company operates sites across the US, Europe, Asia and Costa Rica. Its Irish facilities were originally established as joint venture partnerships with the former Cambus Medical and VistaMed operations which have now transitioned into Freudenberg Medical.

Mark Ostwald, CEO of Freudenberg Medical, said: "Ireland is of strategic significance within our global network. The country is renowned worldwide as a leader in the life sciences sector and stands as an epitome of excellence and innovation for medical devices. With the investment in our newly expanded facility and plans to further increase our team, we look forward to building on our 25-year history as we strengthen our presence in Ireland."

› **www.freudenbergmedical.com**

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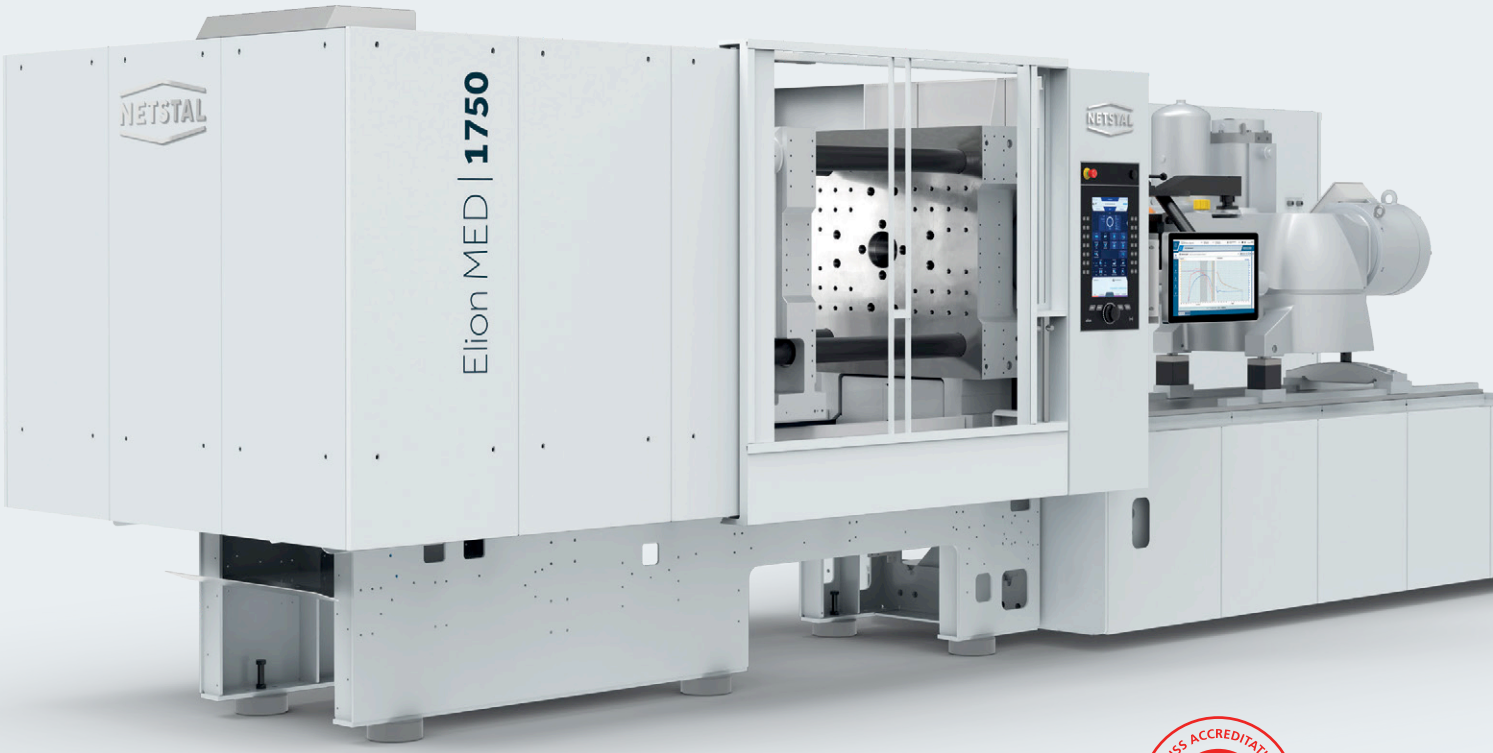

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Daniel Rubenstein
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and many more. See the full list of speakers here

Machinery groups reveal sales decline at Fakuma

The Fakuma 2023 exhibition was held in Friedrichshafen, Germany in October during what has been a tough year for the injection moulding industry. A global economic slowdown has accentuated the sluggish nature of some sectors, notably automotive, and injection moulding machinery suppliers announced poor sales figures at the exhibition due to reduced orders.

IMAGE: D ELDRIDGE

Right: Gerhard Böhm, Managing Director Sales and After Sales at Arburg, speaking at the group's Fakuma 2023 press conference

PE Schall, organiser of the Fakuma exhibition, nonetheless delivered an upbeat verdict at the end of the 28th Fakuma event. "A full house, satisfied exhibitors, 39,343 enthusiastic expert visitors and forward-looking topics – the overall results are quite impressive," said the company. There were 1,636 exhibitors this year, up by 10% from the 1,470 at Fakuma 2021, when the show last ran. The 2023 number was still some way short of the 1,993 exhibitors present at Fakuma 2018 before the Covid pandemic caused a two-year pause in live events in the plastics industry worldwide.

PE Schall emphasised the continuing international profile of Fakuma. This year 44% of the exhibitors came from outside of Germany: 134 companies from Italy, 120 from China, 79 from Switzerland, 70 from Austria, 58 from Turkey and 55 from France.

First time

The company reported Dr Micaela Lorenzi, CEO of Green Chemicals, as saying Fakuma was "a fantastic trade fair". It said: "She and her team exhibited in Friedrichshafen for the first time this year – after two years, the Italian company finally got off the waiting list and into the exhibition hall."

The stands of major injection moulding machinery groups grew busy as the show went on. However, their sales have been hit hard this year following a slowdown in orders starting in the second half of 2022. Arburg reported a €125m decline in consolidated turnover from €875m in 2022 to a forecast €750m in 2023.

The company – one of only a few machinery groups that held press conferences at Fakuma this year – has experienced "a significant decline" in orders in 2023, said Jürgen Boll Managing Director Finance, Controlling and IT. "Unfortunately, no clear, short-term improvement of the situation is in sight yet," said Gerhard Böhm, Managing Director Sales and After Sales.

Böhm said that consumer demand has fallen in 2023 after a post-pandemic rebound in 2021 and 2022. This, along with high energy prices, has deterred injection moulding companies from making investments in markets around the world. Germany is "particularly cautious" and the situation is similar in other countries in Europe, he said, with the exception of Italy, Poland and Turkey. The Asian market is also weak but the decline has been smaller in the US market where a "small recovery" is in sight, he said.

IMAGE: MESSE FAKUMA

Above: The show floor at Fakuma 2023

Despite the difficult market conditions, Arburg has not changed its growth strategy that has led to a 6% increase in staff this year to 3,800 employees. Jürgen Boll indicated that a strategy of maintaining staff levels has served the company well in the past, noting that "in the last crisis [during the Credit Crunch]… we managed at that time and we are hopeful we will manage again".

Family plan

At the press event, Arburg stressed the importance of being a family-owned business, as it has done all year in celebrating the 100th anniversary of the Hehl family's enterprise. Michael Hehl – one of Arburg's managing partners along with Julianne Hehl and Renate Keinath – said Arburg wishes to secure its future family ownership and, for that purpose, it is setting up an advisory board consisting of members of the partner families and external members. Keinath is planning to retire from Arburg and one of the options that the advisory board will look at is the introduction of younger family members at the top level.

IMAGE: ENGEL

Above: Stefan Engleder, CEO of Engel

Right: New infrared heating system for injection moulding machine screw barrels

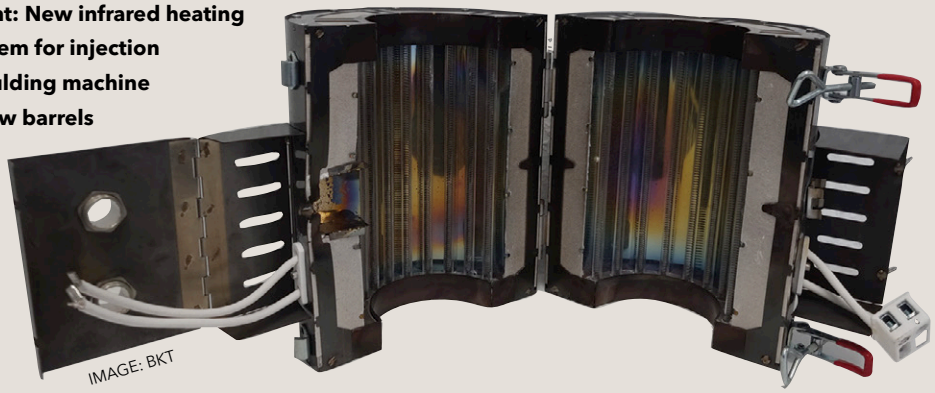

IMAGE: BKT

Low-energy barrel heating

Fakuma 2023 was once again a showcase event for injection moulding technology, not just from the machine manufacturers but also from equipment suppliers.

Bexte Kunststoff-Technik (BKT) introduced a new type of infrared heating system for screw barrels. Andreas Bexte, CEO, told *Injection World* the system reduces energy costs and allows moulders to start production much faster compared with established products, such as ceramic band heaters. The quartz halogen tubes in the alloy metal heater bands emit IR rays with high temperature control precision onto the barrel during the plasticising process.

The surface temperature of the installed heater bands does not exceed 65°C and energy loss to the outside is extremely low. The IR technology works with standard heater band connectors.

Andreas Bexte says BKT is the distributor of the Chinese technology and takes responsibility for meeting all German standards and regulations. The company works with customers to evaluate the technology in tailor-made installation projects. BKT supplies to Germany, Austria, Italy and Poland.

Like Arburg and other injection moulding machinery groups, Engel has seen its sales fall in 2023. It is expecting group turnover to be €1.6bn this year, down from €1.7bn in 2022, due to a reduction in orders of approximately 30%. Stefan Engleder, CEO of Engel, said at the group's Fakuma press conference that it expects volumes to continue decreasing in the coming months.

The downward trend is particularly pronounced in Europe, he said, due to high energy and personnel costs causing investments to be shifted to other countries. Asian manufacturers are increasingly growing their share of western markets, particularly in the automotive sector. Engel is benefiting from investments in the Americas, although strikes by the United Auto Workers in the US have created uncertainty in the automotive sector.

Staff concerns

Engel is reluctant to reduce its staffing levels for similar reasons to Arburg. "If we lose employees, we will never get them back when there is an economic upturn," said Engleder. During the first quarter of 2024 the company will look at taking "certain measures", for example short-time working, he told journalists at the event. Engleder was particularly gloomy about Europe in the medium to long term as the region goes through structural change.

"Even if the energy prices drop again one day, and the Ukraine war comes to an end, we have a substantial problem in Europe that has come to stay: the shortage of skilled workers," he said. Unfortunately, there is a "kind of de-industrialisation" happening in Germany and Austria, he said. The unfavourable situation is leading SMEs to consider establishing footholds outside Europe, in Turkey and North Africa, for example. Some SMEs have closed down businesses that are still viable, said Engleder, who called this a "very negative trend". ›

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Engel says its global network takes this trend into account. Besides production and sales locations, it now also includes several development centres. The company has now established some 100 developers at its Chinese locations.

Sumitomo (SHI) Demag is expecting its revenue to fall by around 20% in 2023. Gerd Liebig, CEO, spoke at its Fakuma press conference about the current challenging economic situation characterised by high inflation, high interest rates, and very high energy prices, particularly in Germany. The European automotive industry's injection moulding demand has significantly decreased as German manufacturers increasingly focus on premium vehicles.

"The demand for injection moulding machines in Europe is affected by the embargo on Russia, making exports from the EU to Russia impossible since September 2023," he said.

Bright spots

However, Liebig sees hope in the packaging sector, which is a major market for the company. "Another defining factor will be the sharply rising demand for pharmaceutical packaging and closure caps, which will significantly boost the high-performance applications segment. Furthermore, the general demand for all-electric machines, which has seen significant growth in the packaging sector, will now also play an increasingly significant role in the consumer and automotive segments."

Although the weak consumer sector in Europe has led to lower demand in many markets, Sumitomo (SHI) Demag expects a consistently high revenue level in the medical technology sector and significantly increased investments in the packaging industry. "Our market share for all-electric machines has more than doubled in the last ten years and is currently close to 30% for Europe," said Liebig.

In a market study conducted by Sumitomo (SHI) Demag into international customers' decision criteria when buying new machines, the importance of machine parameters and the competence, speed, and availability of customer service were prevalent. In recent years, the weighting of decision criteria has seen a significant increase in Total Cost of Ownership and Energy Consumption, according to Liebig.

Sumitomo (SHI) Demag is this year celebrating 15 years since the formation of its German-Japanese partnership. In this time it has developed synergies to enhance efficiency and increase market activities, said the company.

- **www.fakuma-messe.de**
- **www.arburg.com**
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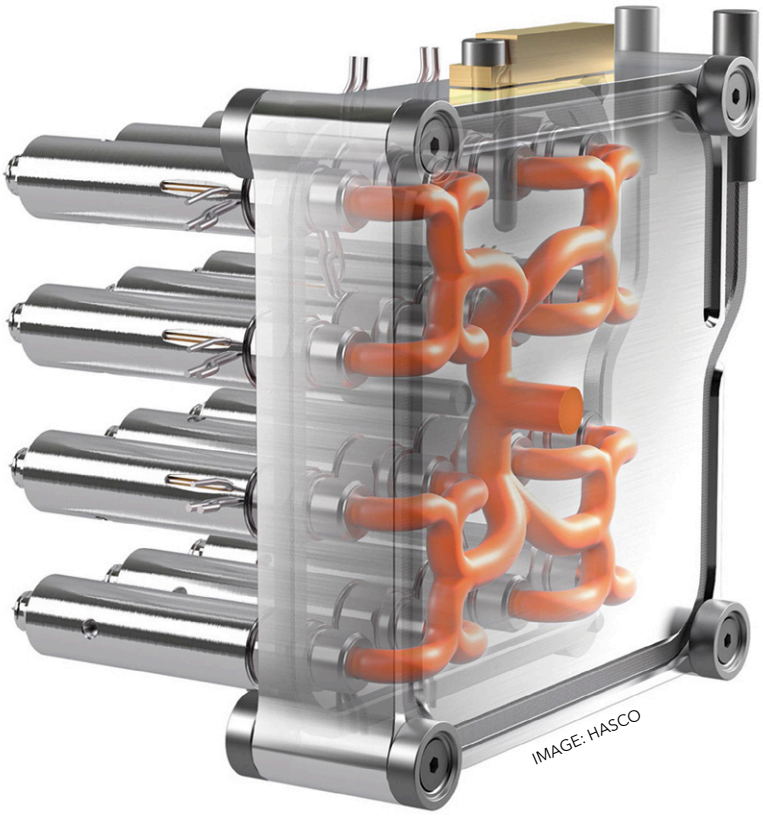
Innovations in hot runners improve part quality, thermal control, the speed of colour changes and more. Mikell Knights reports on developments shown at Fakuma 2023



Hot runner technologies raise the performance bar

The body of technology components relating to hot runners, including nozzle and manifold designs, complete systems and temperature control units, are improving efficiency on a variety of fronts. The latest developments introduce compact and space-saving creations or employ 3D manufacturing in designs for complex moulding tasks or to ease processing troubles, handle a broader range of materials while executing quicker material and colour changeovers, improve temperature control with software and/or heating technology while delivering ease of use, and incorporate connectivity for real-time monitoring and control remotely.

Hasco introduced a new valve gate hot runner design at last month's Fakuma 2023 show in Germany that is built using additive manufacturing to eliminate areas of poor melt flow. Florian Larisch, Executive VP for the Hot Runners division, says its new Shadowfree valve gate technology eliminates "flow shadows" or dead spots which can occur behind a valve pin and can lead to flow disruptions, visible melt flow lines, degradation of plastic and extended colour changes.

Hasco manufactures the screw-in type Shadowfree valve gate using Selective Laser Melting (SLM) additive manufacturing and a finishing treatment procedure it developed, which divides the material flow into streamlined channels that course uniformly around the needle. The streamlined melt flow reunites at a point where the valve pin enters the melt channel. The design enables colour changes in the hot runner that are up to 70% faster than conventional designs. According to Hasco, rigorous testing has shown that the system provides a rapid transition from black to white material in just 25 cycles, whereas conventional valve gate systems may require up to 200 cycles, says Larisch.

Hasco first incorporated the SLM additive manufacturing concept in the production of its Streamrunner line of hot runner manifold systems, introduced in 2019 and designed for multi-cavity systems. The use of SLM allows for the creation of optimised, "free three-dimensional design of the runners," without dead spots and sharp corners. The melt flow channels offer gentle passage of the melt with uniform flow to each drop, even with an uneven number of cavities or with a complex, asymmetric nozzle arrangement, Larisch says.

The Streamrunner manifold is leak-proof and

Main image: Hasco's Streamrunner manifold was one of many hot runner highlights at the Fakuma 2023 exhibition

IMAGE: M KNIGHTS

Right: Florian Larisch, Executive VP for Hasco's Hot Runners division, holding solidified flow from its Streamrunner hot runner manifold system

more compact than can be achieved from a conventionally manufactured hot runner system. As no plugs are needed, it is possible to have an 18 mm pitch and 26 mm manifold height, Larisch says. The low mass of the manifold block reduces energy consumption for an additional cost saving.

Hasco in 2022 introduced Streamrunner Multicolour, a multi-material version of the manifold technology in which the application of additive manufacturing yields a design where different melt channels can be intertwined yet allows for the balanced distribution of different materials or colours over a very small area. Hasco showed a Streamrunner Multicolor manifold created with three separate material channels in a compact design at the Fakuma show.

Flow channel design

Rheologically designed flow channels in the manifold system provide smoother processing of heat-sensitive materials and a reduction in pressure losses, which retains the mechanical properties of the material, Larisch said. Flexible tube heaters with a square cross section are mechanically compressed into a groove to guarantee outstanding heat transfer.

Hasco also developed Streamrunner with needle valve system, which is suitable for multi-drop hot runner applications with narrow nozzle pitch dimensions where a valve gate technology is required. According to Hasco, a needle drive needs space, which generally results in mould sizes designed larger, for use on larger injection moulding machines.

"The distribution of the melt in the manifold is usually associated with restrictions when using a valve gating system," Hasco says.

At Fakuma, Hasco presented a fully balanced, 20-drop Streamrunner system with needle valve technology in which the outside dimensions of the hot runner are just 124 mm by 124 mm. The system is equipped with individually controlled, screw-in nozzles which can also be used for engineering plastics. The stroke motion of the needle takes place via a circular plate package that is driven by pneumatic cylinders, Hasco says.

Below: Hasco's new RFID Mould Tag provides direct access to the latest information and CAD data regarding the hot runner system

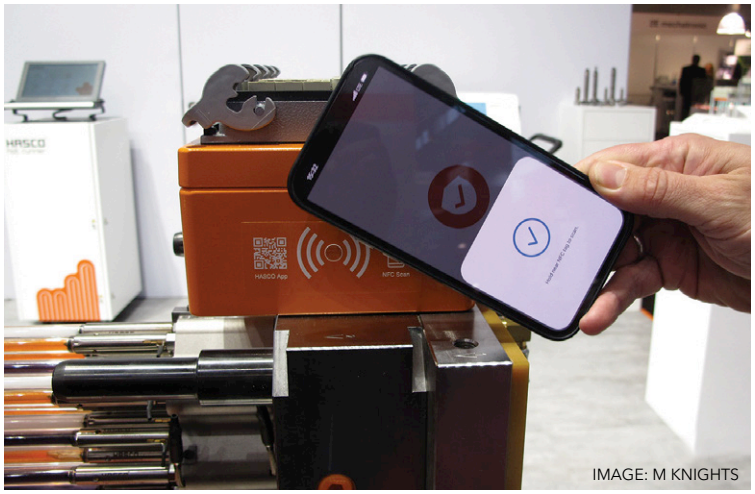


IMAGE: M KNIGHTS

Hasco now offers RFID technology integrated into its hot halves and wired systems as a time-saving aid in gathering relevant product information. Its new RFID Mould Tag provides direct access to the latest information and CAD data regarding the hot runner system, such as individual components in the injection moulding tool and comprehensive details about the components.

Users can view order reference, product categories, product type, material number and maximum mould size, and can download assembly drawings or 3D constructions of the entire system, to ensure correct installation of the mould units. The user can access a safety datasheet and all relevant spare parts available at a glance. Mould Tag is installed as standard on new orders for hot halves and wired systems, Hasco says.

Mould Tag can be used with any smart device with Hasco's new app installed. Users press the NFC Scan button in the app then bring the smart device to the Mould Tag to call up the data. Hasco says Mould Tag offers unambiguous identification with forgery-proof certification of origin compared to bar codes or QR codes which can be copied.

Hasco has updated its Primezone hot runner temperature controller with a new interface and OPC-UA connectivity, says Larisch. The Primezone hot runner controller, introduced two years ago, has a new housing design and an angled 10 inch touch screen display that provides an overview of

all functions and is easy to operate.

The multilingual user interface is simple and intuitive, similar to modern smartphones, allowing settings to be activated quickly without the need for any operating instructions. One highlight of the updated Primezone controller is the integrated mould diagnosis function which checks the wiring of the hot runner components before start-up and immediately recognises potential assembly errors, preventing damage to the mould. In another design feature, the fuses of the control circuit are accessible from the outside so that they can be replaced quickly without opening the controller housing. Hasco offers Primezone in four models, with three desktop versions with 6 to 48 zones of control, and a floor standing mobile version for 64 to 96 zones of control.

PET systems

Mold-Masters has created a new thermal gate hot runner system for processors looking to modernise their single stage PET bottle production. The new Axiom TG hot runner system is designed as an economical direct replacement for many existing but outdated systems and is compatible with all leading

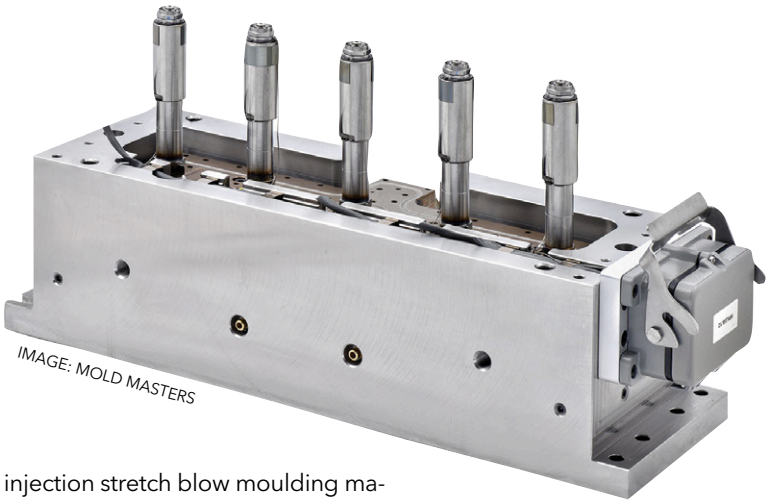


IMAGE: MOLD MASTERS

injection stretch blow moulding machines and moulds. Mold-Masters says the Axiom TG incorporates the latest processing technology to enhance moulded part quality while increasing productivity and lowering the cost per part.

The Axiom TG nozzle incorporates individual nozzle heaters for individual temperature control. The nozzle heaters are field-replaceable for quick and easy maintenance. The nozzle features a threaded nozzle base that provides integrated leak protection.

Axiom TG incorporates a gate-seal design that

Above: Mold-Masters' Axiom TG nozzle incorporates individual nozzle heaters for individual temperature control

IMAGE: M KNIGHTS

Rigth: Philippe Monnet, CEO at SiSE, standing by its MV3 series multi-zone controller

seals on the face of the cavity and is compatible with industry standard cut-outs, Mold-Masters says. The gate seal features an easy-to-replace slip-fit insert liner and threaded gate seal tip. The design of the thermal gate reduces crystallinity in the gate and prevents stringing over a wide processing temperature range.

Mold-Masters combines the new Axiom TG nozzle with its iFlow manifold technology as a replacement system for single stage PET bottle production. Its iFlow manifolds are manufactured from two separate pieces of steel, with the hot runner channels carefully milled from each half of the manifold.

This allows for the incorporation of melt-flow geometries, flow-path options and runner shapes that optimise processing performance, allowing for smooth transitions that minimise hang-up spots and dead spots, permitting rapid colour changes. Optimised runner diameters address pressure loss, material residence time and shear rate, and enhance temperature uniformity, the company says.

Mold-Masters also developed a new gate seal compatible with its Sprint hot runner system that is designed to help improve environmental stress crack resistance (ESCR) during the production of carbonated soft drink (CSD) caps.

Its new Sprint Apex Gate Seal is designed to significantly minimise the presence of injection flow lines, which can increase the ESCR level of CSD caps by up to 40%, as determined and validated through third-party testing at Dow Pack Studios, the company says.

Below: Thermoplay hot runner nozzles on display at Fakuma 2023

ESCR is a key performance indicator that measures durability of a CSD cap when it is placed under pressure or encounters severe operating conditions. The presence of injection flow lines can negatively affect ESCR performance. Additionally, in-field beta testing of the Sprint Apex gate seal on high-cavitation moulding systems determined that stress cracking was eliminated on all dimple and non-dimple CSD-cap designs.

IMAGE: M KNIGHTS

The design of the Sprint Apex gate seal eliminates the use of vespel caps, which are a wear item, for reduced maintenance costs. The gate seal also improves the appearance and quality of CSD caps that have difficulty hiding flow lines, such as transparent decorative caps.

The Sprint Apex gate seal enables light weighting of CSD caps for cost savings without sacrificing product durability. It also enables use of recycled and bio-based resins that do not have the same ESCR durability as conventional resins. Colour change performance is improved by up to 65% when compared to standard gate seals, according to Mold-Masters.

Combined effort

SiSE introduced a new control concept at the Fakuma show that combines its MV3 series multi-zone controller for hot runner systems with its GC product line specially designed for sequential valve gate control and Industry 4.0 traceability.

Philippe Monnet, CEO and Marketing Manager at SiSE, says the new MGC Hybrid 3 unit can handle 12, 24, 32 or 48 hot runner zones and can control either 6 or 12 sequential valve gates. The control screens for the hot runner system and for the valve gate control are combined into a single colour touchscreen unit.

The MV3 series uses a completely redesigned version of Permanent Self Tuning Control software that continuously recalculates control parameters for each zone, immediately considering evolutions in the process. The software, conceived and developed by SISE, also features new softstart modes as well as commands for raising and dropping temperature.

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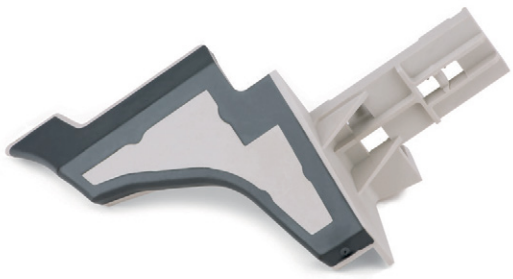

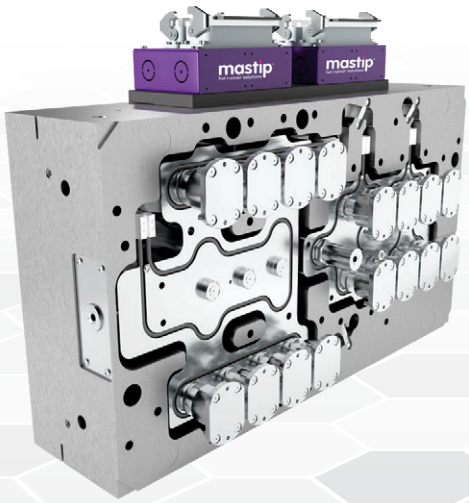

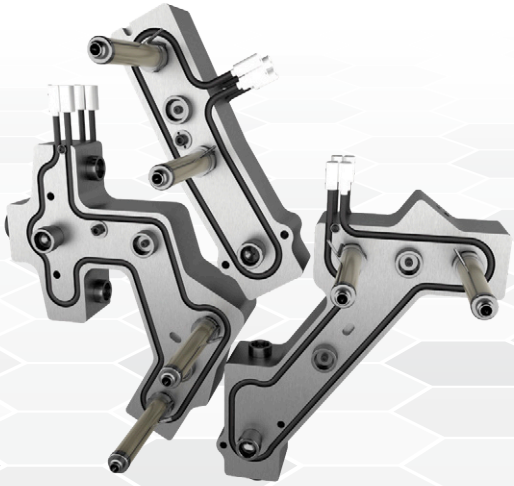

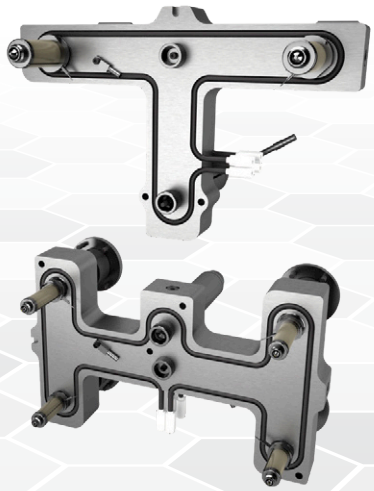

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SiSE offers the MV3 series in six sizes for use in many types of applications where a low to high number of zones need to be controlled. Standard features include two adjustable setpoint values, a display of percentage power and load current per zone (by Amps), and a high and low alarm that is adjustable per zone. Electrical data from the mould can be saved for analysis to improve performance. Advanced functions include real-time mould surveillance for deviations in electrical data, zone slaving, and deferred start time programming. A power-saving function with power limitations delivers energy efficiencies.

Thermal control

SiSE's GC product line for sequential valve gate control incorporates new Statistical Process Control acquisition features to measure process performance and drift, using indicators with mono or multivariate management of machine signals and mould sensors. The new GC line offers traceability of the process, whereby the user can save or send data to various users.

Thermoplay discussed several design updates to its TH series of sliding nozzles for processing general-purpose resins at the Fakuma 2023 show. Bruno Rauchenstein, Area Sales Manager for Switzerland, says heating for the series is improved with a redesigned, easy-to-maintain thermocouple positioned inside the heater, which prevents damage to the thermocouple. In addition, a new mounting head design provides a better thermal condition and heat transfer to the nozzle body. The improved performance of the heater technology brings about energy savings. Heater replacement takes place at the front of the mould, from the cavity plate.

Thermoplay also updated several thermal gate and valve gate designs for improved performance. Its 1PK thermal gate for packaging applications now has a cylinder with an outer diameter that is 10% smaller than prior designs. The tip can be used with the TH18-TH24 nozzles to process a range of materials including neat and glass-reinforced polyolefins, semi-crystalline and amorphous materials and PA or PC blends. The updated design delivers an ample processing window to handle the wide range of materials, as well as excellent wear resistance, short colour changes and the ability to produce a cosmetic gate.

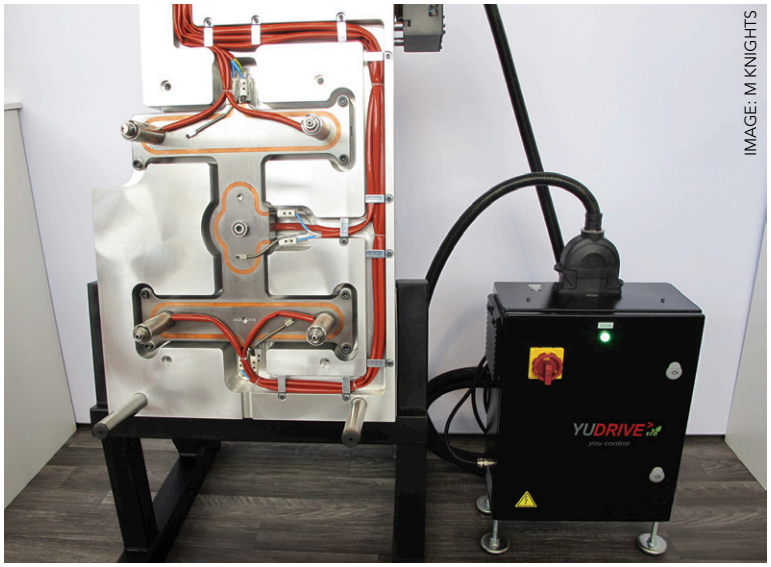

IMAGE: M KNIGHTS

Above: In Yudo's new YUDrive system, each servo electric valve pin is connected to its own operating system and can be configured for dynamic opening and closing movements

Thermoplay also updated its 3PK valve gate which is designed for performance applications. The sealings have been improved and the pistons and cylinders have been made smaller while maintaining excellent gate quality and use in fast cycle applications.

At the K show in 2022, Thermoplay introduced two nozzles to its TFS series of open nozzles for side injection applications. The new nozzles handle larger part volumes. The company also created nozzles for a 45-degree gate to produce conical parts and has developed multi-tip nozzles for small parts that are gated with several gating points, the company says.

Multi-drop

Männer expanded its Packaging and Slimline product range with additional valve gate nozzles, according to Lean-Sophie Haack, Event & Communication Specialist for Moulding Solutions. Männer's Packaging range of nozzles for high-speed moulding is complemented by the new MCP-EP, a high-throughput nozzle for high-speed, thin wall applications. MCN-EP is an unscrew type nozzle with a small diameter and permanently centered valve gate pin. The design of the patent pending nozzle tip facilitates high-precision gating and enables the correction of tip protrusion without reworking, the company says.

Männer also expanded its Männer Multi-drop System (MMS) of small multi-drop configurations with a new side gate design. The MMS line is designed for processing parts with low shot weights using technical resins in applications with tightly spaced mould cavities. The system can be designed for use with 2- to 4-point nozzles available with different axis spacing. Standard, wear-proof and special material nozzle types are offered with the MMS, Männer says.

The company also developed a new hot runner configurator that allows for 2-, 4- and 8-drop hot runner systems designed with the best-selling nozzles from Männer or its sister company Synventive to be created in minutes using 3D data. The hotrunner.shop configurator offers step-by-step instruction that allows customers to generate customised 3D data easily and quickly. The configurator offers an application check, which includes a follow-up with an application engineer when the application is outside of guidelines. The configurator draws on a material database of more than 12,000 resins.

Synventive developed a new compact and cost-effective electric valve gate that complements its eGate system. Its new eGate Sync features plug-and-play installation and a simple user interface. The design of the electric valve gate improves quality by increasing shot-to-shot consistency, along with significant energy savings compared to hydraulic systems, the company says. The configurator will be extended to incorporate top selling nozzles from Thermoplay, it says.

Yudo extended its electric valve pin control technology with a new version that works without a controller required. At last month's Fakuma show, Luca Nante, Key Account Manager for Packaging in Europe, showed the new YUDrive system in which each servo electric valve pin is connected to its own operating system and can be configured for dynamic opening and closing movements.

Yudo configures up to two preset movements of the electric valve pin for the opening and closing strokes, according to user requirements. The pin can open slowly initially followed by fast movement to complete the stroke, or open fast followed by a slow finishing stroke. Closing movement of the pin can also be configured for fast/slow or slow/fast movement, says Nante.

Yudo configures the stroke length or time for each stage of the two-stage opening or closing valve pin movement. Moulders can reduce weld lines or pressure lines on the moulded part by actuating the pin in a two-step sequence, Nante says.

The movement of the servo pin is triggered by a signal from the injection moulding machine. That signal can be based on screw position or time, or a pressure sensor or external timer. YUDrive requires 48 V for activation.

Yudo also offers YUDrive II which operates with the use of a standalone controller. That model offers up to 16 drops of control and comes with a resin purging function built in. The controller can connect with mobile devices or laptops and can

link to an independent wifi network to communicate information on the status of the valve gate control.

Industry 4.0 connectivity

Gunther last year developed what it calls a new high-performance hot runner control technology with optimum control characteristics designed to precisely heat the hot runner to the correct temperature throughout while maintaining the system at the target temperature.

Its new BlueMaster Pro, offered in four versions for 6 to 24 control circuits, provides intuitive operation directly on the unit as well as through a browser which allows for remote access. This enables users to check the status of several devices on a control console, taking action where necessary. The BlueMaster Pro regulator fully supports the Euromap 82.2 standard that defines the interface for data exchange between injection moulding machines and hot runner regulators. It is based on the OPC-UA communication standard for data exchange in industrial automation, which allows for Industry 4.0 connectivity, according to Christoph Munch, Project Manager for Control Technology,

The system includes a 7 inch display that is integrated for the graphical user interface. A setup function helps to configure new moulds. Users can choose from five different screens to select the screen that is best for their application, says Gunther. A diagnostic function detects and corrects any faults in the system instantly. A help function included in the system is context-dependent, meaning that users receive the information they need directly and in plain text.

The unit features a robust metal casing through which load fuses can be accessed from the outside. The load and thermal connections can be designed according to customer preferences.

Gunther also developed the BlueMaster Compact temperature control units for smaller work settings, such as service workshops or laboratories. BluMaster Compact handles three or six control circuits. The system features adaptive control optimisation, meaning it adjusts the control behaviour to the connected load without user intervention. This ensures stable control even when operating tiny loads. Four operating modes are available per zone, including adjust, control, master and monitor.

Gunther says this more economic unit incorporates features of a large control unit but is centered on the application area concerned. "For example, the heating function combines a ramp-up and soft start, and the PID parameters are self-optimising," Munch says. Other features include a newly developed control algorithm for improved precision. Automatic control parameter adaptation ensures excellent control quality with no overshooting. The unit's housing has been kept extremely small, allowing placement on the machine or in the surrounding area to save space. Load and thermal connections are wired to a 24-pin industrial plug, with all fuses accessible from the outside.

Above: Gunther BlueMaster Compact temperature control unit

Gunther also developed an app that can be used to operate a Gunther controller. Munch says the app can be installed on any smart device, with communication taking place via Bluetooth connection. Users can operate the controller from anywhere without requiring space on the operator's side of the moulding machine. A user can operate several controllers at the same time through the app on a single smart device. This can save time in setting operating parameters while reducing the error rate.

The app contains a state-of-the-art menu navigation with graphic temperature displays that are easier for users to interpret. "Users have all key parameters at their fingertips. Furthermore, all measurement data can be uploaded securely to a cloud and used for documentation or more detailed evaluation," says Munch.

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*The use of foaming technologies brings a number of process, cost and design benefits to injection moulding. **Mikell Knights** finds out about new advances*

IMAGE: KRAUSSMAFFEI

Finding new dimensions in foam moulding

Part lightweighting technologies such as the MuCell process, structural foam moulding and particle foam moulding are seeing new developments in equipment technologies designed to increase the flexibility and efficiency of their respective processes. Expanding interest in the application of these technologies is driving the advances.

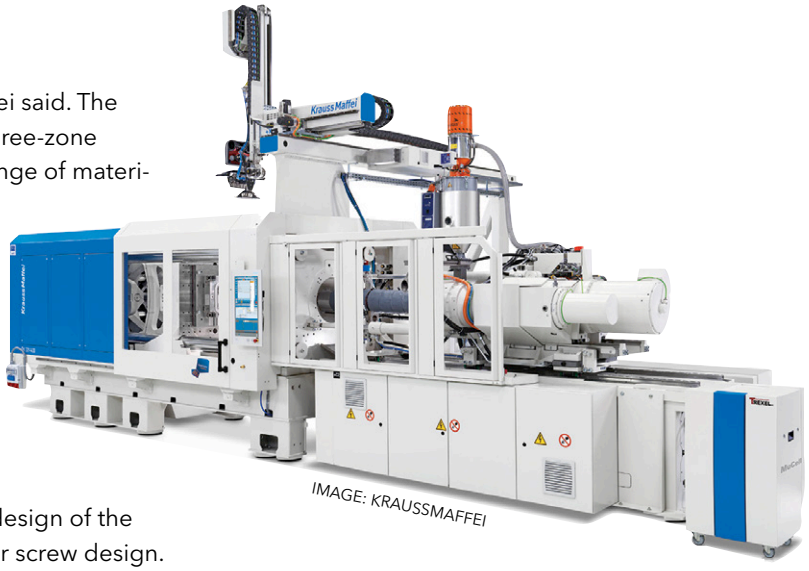
KraussMaffei developed a new universal screw for physical foaming applications with MuCell that delivers 30% higher plasticising performance compared to current screw technologies. The new HPS Physical Foaming screw, developed after intensive development work, is designed to process a diverse range of low and high viscosity materials used in MuCell applications, which often contain different proportions of fibres and fillers, KraussMaffei says. According to the company, "all screw types available on the market were compared in extensive laboratory tests".

The HPS Physical Foaming universal screw was designed around a modular concept that makes it possible to combine the individual elements by means of bolting so that a new screw does not have to be made for each material or product change. KraussMaffei focused its design optimisation on the mixing and gas supply area, the centre backflow barrier, and the three-zone area of the screw.

The three-zone area was made longer – to 17D versus 15D—without a loss of processing quality. The increased length allows the screw to be used for all plastics, including those with and without fibre reinforcement, and increases the plasticising capacity by up to 30%, says KraussMaffei. The mixing and supply area of the screw now has a 4D length.

The design changes increased the plasticising performance of the screw and had a favourable effect on the wear behavior. Until now a higher investment in larger screws was required than what was normally dictated by the component weight, to ensure complete homogenisation of the melt

Main image: Foamed storage table for trucks with partial IML decoration produced by KraussMaffei at Fakuma in October



Above: KraussMaffei says its HPS Physical Foaming screw (fitted on a PX 321-1400 machine using the MuCell process) delivers 30% higher plasticising performance compared to current screw technologies

before injecting the gas, KraussMaffei said. The updated design modularity of the three-zone section allows for processing of a range of materials. The company says a one-thread, three-zone section could be designed for example with a two-thread three-zone section, which would be better for processing a 30% glass-filled PA6, the company says. It designs single-flight and double-flight three zone areas using a modular system.

KraussMaffei also optimised the design of the non-return valve used in the modular screw design. Through analysis by the developers, the most effective design of the middle non-return valve (M-RSP) – which closes at the end of the metering process and separates the mixing and gas supply area from the three-zone section, preventing melt from flowing back – is one with a ball check valve. "This is the only way to keep the critical pressure above 33.9 bar and thus prevent foaming in the plasticising unit," the company says. The design of the M-RSP also ensures a constant shot weight.

Fakuma demonstration

The KraussMaffei team investigated the previously existing and newly developed screw using PP with flow indices of MFI 11 and MFI 44 and containing mineral filling or a glass fiber content of 20% or 30%. It also evaluated the screws by processing ABS and a 30% glass-fibre filled PA6. The plasticising performance changed depending on the compound selected and the parameters set, such as dynamic pressure.

KraussMaffei says its in-depth research yielded additional benefits, making it possible to develop screws specially adapted to a material. This option is appealing to customers who manufacture what KraussMaffei call corresponding products constantly over a long period of time. One example is for quick tests.

At the Fakuma 2023 exhibition, KraussMaffei installed the HPS Physical Foaming MuCell screw on its all-electric PX 321-1400 injection moulding machine in the production of a foamed storage table application for trucks and commercial vehicles with partial in-mould label decoration. The company says the demonstration application represents an area of products (visible intricate parts) that have not yet been the focus of physical foaming technology.

The application represented the first use of its APCplus machine function with a gas-charged melt. APCplus is a process optimisation software option created to keep the production process constant by analyzing and dynamically regulating the injection moulding process when parameters deviate due to external factors. It shifts the change-over point and holding pressure profile from shot to shot based on the measured melt viscosity to deliver weight constant components.

The demonstration application required KraussMaffei to partner with several companies. Wirth Wekzeubau of Helmbrechts, Germany, supplied the mould that is designed to help achieve the maximum possible degree of foaming. Special mould cooling channels are designed into the mould to prevent a post-blow effect, which creates bubbles that can emerge on the surface of the part. The cooling channels ensure uniform cooling at the cavity surface without the use of variothermal techniques. Reichle of Bissingen/Teck,

Below: KraussMaffei's PX 321-1400 machine produced a foamed storage table for trucks at Fakuma

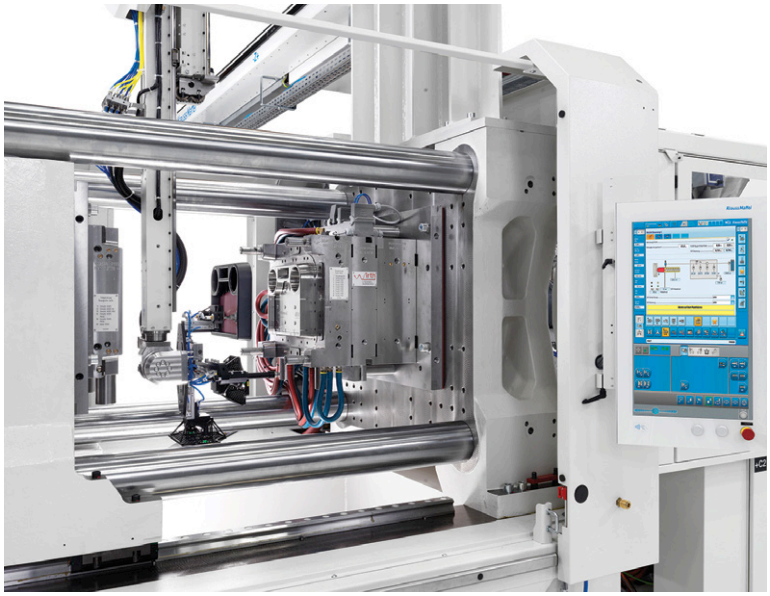


IMAGE: KRAUSSMAFFEI

Germany applied graining that achieves a streak-free foamed surface, KraussMaffei says.

In the demonstration at Fakuma, Isosport of Eisenstadt, Austria, supplied a polymer film for IML that prevents the formation of bubbles caused by the outgassing of nitrogen. KraussMaffei's LRX 150 linear robot picked up the blank IML film for deposit onto a cleaning station from Esta of Senden, Germany. A stack gripper inserted the film into the mould and soon after extracted the demoulded part.

The finished part was transferred to a second robot for a foam structure test. A testing system from Teratonics of Orsay, France, allows users to visualise the compact outer layers and the spatial distribution of the MuCell foam in the interior of the component and to determine if the part is free of bubbles. The part is placed on a conveyor belt and transported out of the automated system following completion of the test.

The MuCell system is fully integrated into KraussMaffei's MC6 control system for seamless communication and operation. In the demonstration, an Orca machine-side temperature control system by Jurke Engineering optimised cycle time by measuring the speed and quantity of the cooling flow in a non-contact fashion by ultrasonic means. All data relating to the production process was collected by KraussMaffei's easyTrace 2.0 system, which was displayed on a screen.

Central gas supply

Structural foam moulding is more popular than ever as it saves raw material, energy and weight, and supports the objective of producing and using plastic parts in a more sustainable way, says **Engel**. The machinery group is improving the cost-effectiveness of structural foam moulding with its new E-foam XL multi central gas supply units.

Where each injection moulding machine previously required its own gas supply for foam moulding, Engel's E-foam XL multi-supplies several injection moulding machines with highly compressed nitrogen for structural foam moulding. Only the plasticising and control technology is still decentralised on the individual machines, Engel says. This new solution significantly reduces the capital outlay for structural foam moulding and makes a major contribution to reducing unit costs.

The new E-foam XL multi system is based on Trexel's MuCell technology. Engel officially launched the E-foam XL multi unit in April of this year and has delivered several orders, Karlheinz Mayr, head of development for smart machines, told *Injection World* at last month's Fakuma show.

In addition to less energy and raw material use, structural foam moulding requires lower clamping forces than compact injection moulding. The dissolved blowing agent improves the flowability of molten plastics. In addition, the foam moulding pressure, which is independent of the location, enables thicker ribs to be moulded. These effects can be used to reduce the wall thickness, which has a positive effect on the required cooling time and in turn on the cycle time.

Door demonstration

At the K2022 show, Engel presented its E-foam XL multi development as part of a new type of system technology for plastics processors who produce parts in parallel on several production cells using the structural foam moulding process.

Together with automotive moulder Faurecia, Engel demonstrated at its booth the huge potential of structural foam moulding technology in the production of automotive door panel sample parts with a sophisticated surface structure, produced on an Engel Duo 1000 injection moulding machine.

The demonstration application used a new MicroJect Advanced process developed by Faurecia's interior systems business unit, Faurecia Interiors, based in Hagenbach, Germany, and Eschmann Textures International (Gummersbach, Germany) that made it possible to produce lightweight visible components with a very high-quality class A surface using only structural foam moulding, according to Engel.

The automotive part maker also presented a

Above: Together with automotive moulder Faurecia, Engel demonstrated at its Fakuma booth the huge potential of structural foam moulding technology in the production of automotive door panel sample parts

IMAGE: M KNIGHTS

Right: Stefan Hofmann, Managing Director of Hofmann, holding a spherical part made from particle foam with a rigid plastic clasp insert moulded onto the part

new ceramic coating technology for the tooling cavity surface in the demonstration application, which supported the advancement of the project. Ceramic coatings in the cavities helped prevent the formation of foam streaks, weld lines, tiger stripes or gloss differences appearing on the surface of the foam moulded part. Additionally, different surface structures can be created directly in the injection mould via the cavity coating, Engel says.

The combination of the new system technology by Engel and MicroJect Advanced process from Faurecia leverages previously undreamed-of efficiency and sustainability potentials in structural foam moulding, claims Engel.

The structural foam moulded sophisticated automotive door panel sample parts made at the show did not need to be painted, and there is no need for additional energy-intensive process technology, such as intermittent mould heating, for parts made for customer-facing applications. Parts with a premium surface were produced out of the mould without additional energy input, Engel says.

New materials developed by Faurecia Interiors for structural foam moulding contributed to the high surface quality. A talc-filled PP with a recycled material content of 30% of the IniCycle type was processed during the K show, for example. IniCycle is suitable for all physical and chemical foam moulding processes.

Wilmington Machinery, the US producer of large part injection moulding machines, added a medium pressure model ideal for moulding large gas assist or foam products requiring superior cosmetics and high-capacity production. Its new Lumina MP1200 unit produces foamed products using direct gas injection into the extruder barrel using nitrogen or CO_2 gases.

Wilmington designed the machine to accept both hot runner and cold runner moulds, including stack moulds. Like its other medium and low-pressure machine models, the new Lumina MP1200 unit is available with integrated robotics, gas assist control, resin blending, gas generation, hot runner control and other accessories. The machine is designed with dual 130 mm reciprocating/compounding injection units and operates with Wilmington's in-line first-in, first-out 50 lb accumulators, the company says. Wilmington says the cost-effective injection moulding machinery is capable of processing 100% recycled materials.

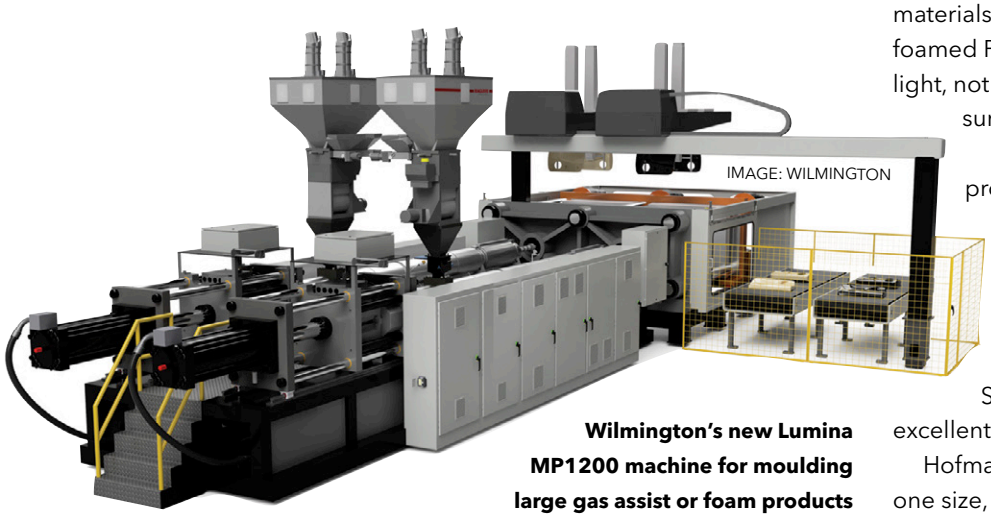


IMAGE: WILMINGTON

Wilmington's new Lumina MP1200 machine for moulding large gas assist or foam products

Particle foam

Hofmann, a manufacturer of particle foam processing machinery, has advanced its Bead.Machine technology to combine conventional injection moulding with particle foam processing to produce high quality parts for the consumer, automotive and safety markets, says Stefan Hofmann, Managing Director. The company brings expertise in toolmaking, mechanical engineering and additive manufacturing to design its compact, energy-saving machine.

Its Bead.Machine unit can process particle foam materials made from EPE-EPP blends, PP, ETPU and foamed PA, for example, to produce parts that are light, not too stiff, yet functional and with a smooth surface, says Hofmann.

Steam is used to heat the mould and process the material, which is cooled by specially designed, water-filled mould cooling channels. Thin-walled stainless steel moulds are generally used to produce the parts, but Hofmann has developed 3D printed inserts, made by SLM, for a more accurate part making with excellent surface quality.

Hofmann currently offers its Bead.Machine in one size, which can accommodate a mould plate of

600 by 400 mm. It can also design complex tooling for use with the machine. The Bead.Machine is designed to produce minimal scrap and operate with water and compressed air consumption optimised. The controller is designed to receive regular software updates and machine updates.

At last month's Fakuma show, Hofmann produced a spherical part made from particle foam with a rigid plastic clasp insert moulded onto the part, to provide a glimpse of the moulding possibilities. Hofmann says it has sold seven of its machines to several companies so far.

Trexel has developed a new generation of its satellite system that receives supercritical fluid from a booster station on a central machine. According to Volker Gründel, Sales Manager, the satellite unit incorporates controller technology and a regulator and can signal for a specific amount of material depending on the shot weight, gas amount or screw diameter, rather than receiving material from the booster in a set amount. The increased control of the gas being received by the unit and sent to the injection machine can bring about 10-15% energy savings and leads to optimised part design and part wall thickness.

Trexel says its technology and the application of foamed parts continues to expand. It is working with Taiwan-based Tienkang to produce MuCell foamed shoe midsoles that use materials other than PU, as that material cannot be recycled, Gründel says. The company is testing the foaming of TPU with MuCell in production of the midsole on Tienkang's Centrex machine.

Trexel is also working in a project under non-disclosure agreements involving the foaming of bioplastics, and with flame retardant, smoke suppressant materials, where, in both applications a density reduction up to 5% with no performance change is being evaluated. The company also has NDAs with several tiered automotive suppliers to produce foam parts for electric vehicle components, where the light weight can improve fuel efficiency, Gründel added.

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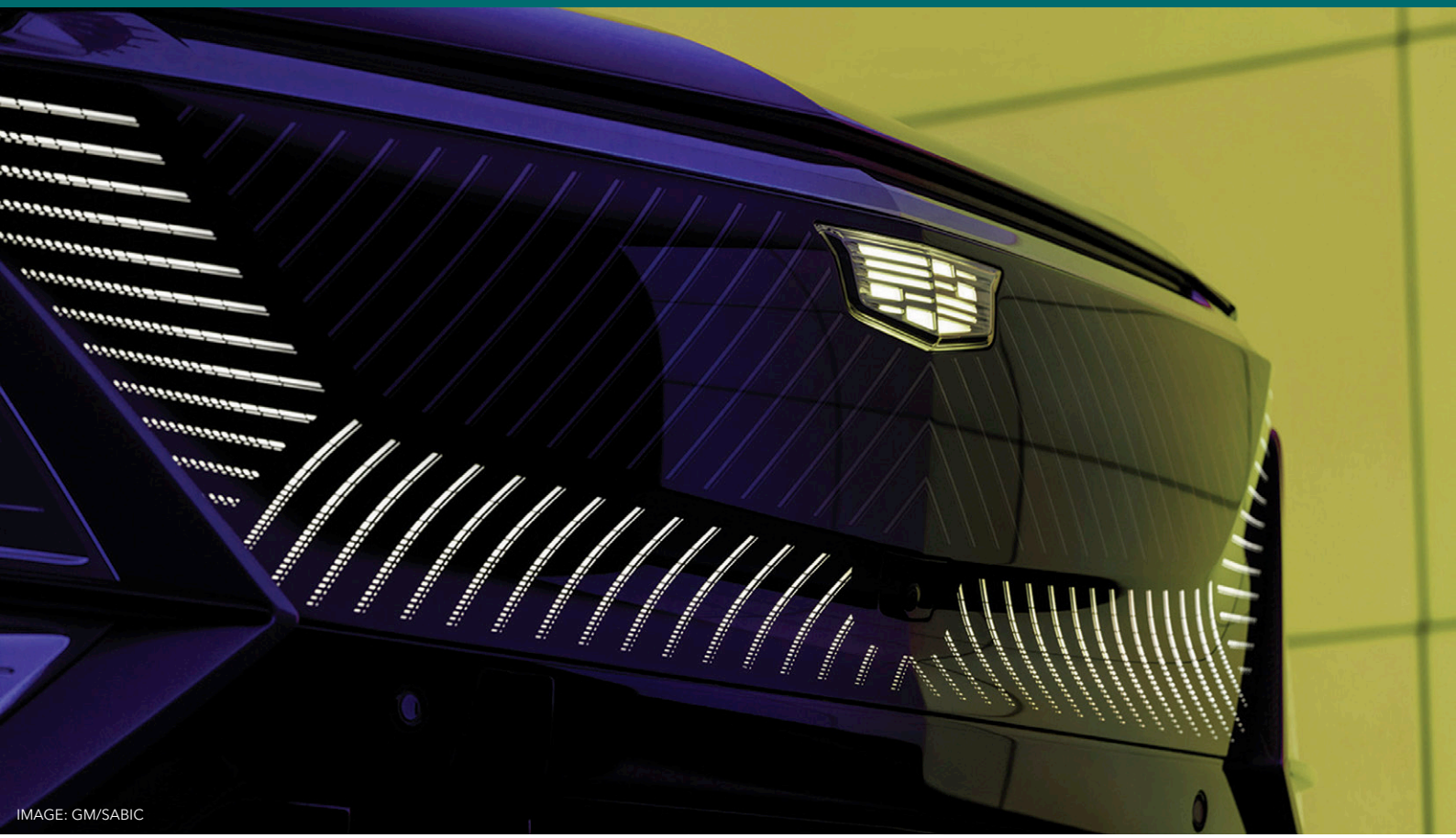

IMAGE: GM/SABIC

Automotive applications abound for plastics

*The opportunities for new plastics applications in EVs are not just around the battery, but also in the front end, lighting and other visible components. By **Chris Saunders***

Despite increasing energy costs and supply shortages, the plastics industry has benefited greatly from the electric vehicle (EV) revolution, where polymers are being used in place of metal parts. Common materials include polypropylene (PP), polyurethane (PU), acrylonitrile-butadiene-styrene (ABS), polycarbonate (PC), and polyethylene (PE). As a result of Covid, sales of EVs slumped in 2020 but the market has gained momentum since. According to analysis by Emergen Research, the global EV polymers market size was valued at over $7bn in 2021 and is expected to grow rapidly in the near future.

Volker Plehn, Global Automotive Director Smart Panels, Lighting & ETP Trim, at **SABIC**, says: "SABIC draws upon its broad set of materials, capabilities and expertise to support manufacturers, designers and system suppliers as they move forward to electrify transportation, enhance the consumers' driving experience, and implement an increasingly circular economy. One of the major areas for innovation in automotive design is the front end. Battery electric vehicles (BEVs) require no engine cooling, opening new opportunities for integrated aesthetic and intelligent features such as electronic and sensor-based digital assist systems. In one SABIC concept, a two-component Lexan PC front panel with a large, curved transparent PU in-mould coating covers an assembly platform, moulded in Stamax long-glass fibre polypropylene. Lighting, sensors, illuminated logo and messaging units are mounted from behind."

He continues: "The front panel puts PC in a new role as a large exterior trim part. The Lexan LS1 resin grade has been optimised to provide maximum flowability, paint adhesion, radar and sensor signal transparency in combination with classical

Main image: The front panel plays a new role as a large exterior trim part in EVs (photo shows Cadillac Lyriq)

IMAGE: SABIC

A SABIC concept for a two-component Lexan PC front panel with transparent PU in-mould coating covering an assembly moulded in Stamax long-glass fibre PP. Lighting, sensors, illuminated logo and messaging units are mounted from behind

PC characteristics such as outstanding impact strength, weatherability and UV stability, as well as high freedom of design for unique shapes and brand or model differentiation. The part is manufactured in an injection compression moulding (ICM) process as this provides wall thickness reductions and can accommodate longer flow paths by taking advantage of the compression stroke which enables lower clamp forces and the use of smaller tonnage machines."

Geert-Jan Doggen, Senior Business Development Manager, Automotive Marketing at SABIC, adds: "The overall decarbonisation of vehicles must also comprise end-of-life recyclability and the reuse of materials within a more circular economy. SABIC has developed long-glass fibre reinforced Stamax PP resins based on up to 30% mechanically recycled content. The technology combines outstanding strength-to-weight with enhanced impact resistance, high stiffness, and low warpage. While these and other long-term performance properties are similar to those of virgin PP-LGF, a cradle-to-gate life-cycle analysis shows major reductions in global warming potential and cumulative energy demand for the recycle-based grades. With specifications and material approvals from many OEMs already in place, vehicles with validated structural applications using these recycle-based grades are expected on the road soon."

Dhanendra Nagwanshi, Global Automotive Leader, EV Batteries & Electricals at SABIC, says: "Besides battery module casings, end caps, busbars, enclosure covers and connectors, successful applications include the world's first commercial all-thermoplastic battery pack cover that meets stringent international fire safety requirements like GB 18384-202. The 1.6 m² component is moulded in a halogen-free flame retardant PP-LGF compound, providing 40% weight reduction against comparable metal designs. In a recent study, a fire retardant PP-LGF compound was evaluated for use as a potential thermal barrier or separator material to mitigate the thermal runaway of battery cells in the event of a thermal event. A 5.5 minute horizontal flame test at 1,100°C showed that the HFFR compound forms an intumescent and self-extinguishing char layer which prevents further flame propagation. The PP-LGF resin also excelled when tested according to the new UL 2596 standard, which combines defined pressure, ablative force, heat and fire conditions."

Full speed ahead

In October, **Celanese** announced the global commercial launch of two new polyamide solutions for manufacturers of EV powertrain components and EV battery applications. The Frianyl PA W-Series of flame-retardant polyamide solutions enables the manufacturing of large, thick-walled, flame-retardant components for EV batteries, the solutions achieving V-0 flame retardance at 1.5 mm, combined with excellent flow characteristics. Compared to standard PA66 grades with 30% glass fibre reinforcement, the equivalent grade of the new W-Series offers a 10-20% improvement in flow in an injection mould, depending on the pressure applied. The solutions also exhibit an excellent Comparative Tracking Index (CTI) even after aging at 125°C for 1,000 hours.

The specialty materials and chemical company also introduced Celanyl PA B3 GF30 E, a new polyamide-based compound for semi- and structural EV powertrain applications. With this grade, the HB flame class is achieved, as well as a CTI of 600 even after 3,000 hours of aging at 150°C. The extremely low halide content in this solution makes it an electrically friendly option for applications like connectors, switches, relays, and sensors where malfunctions often occur because of surface moisture, elevated temperature, or traces

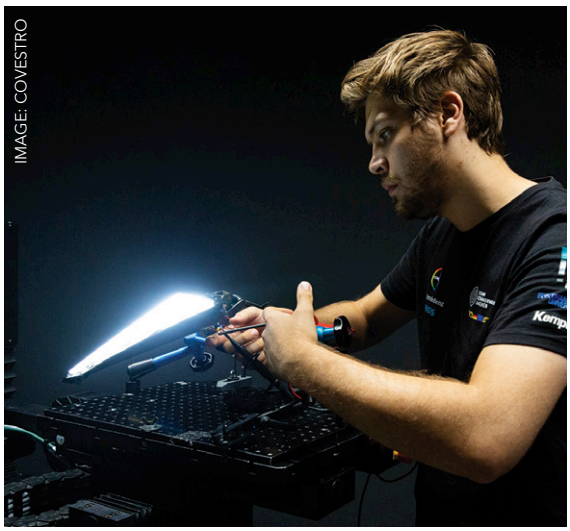

IMAGE: COVESTRO

Right: The Covestro Adelie car uses Covestro materials, including Makrolon TC in the heatsink in the headlamps

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of halide ions leading to electrolytic corrosion.

Covestro says it aims to improve performance while creating customisable, user-friendly interior designs, and hopes to combine this enhanced driving experience with functional improvements in terms of sustainability and safety. Dr Fabian Grote, Head of Global Technical Marketing Mobility, Covestro, says: "Cars not only produce emissions on the road, they also embody 'hidden' emissions from the production processes. To reduce these emissions, the future lies in the use of recycled plastics, bio-circular attributed plastics, and circular design solutions."

Covestro and its partners are currently developing a headlamp that can be recycled more easily within the publicly funded Nalyses project, aimed at optimising the sustainability of complex parts, while Dutch wall charging station manufacturer EVBox chose the company's Makrolon RE as it is said to be the world's first automotive grade PC that is carbon neutral from cradle to gate, manufactured with renewable energy and raw materials from mass-balanced organic waste (see *Injection World* May 2023 issue).

Covestro also provides a number of solutions used in the Covestro Adelie, a future-oriented solar racing car, including Makrolon TC as the heatsink in the headlamps, which reduced the weight of the heatsink by 40%.

Recycled content

The appeal of styrenic materials for a wide range of automotive applications is due to their aesthetic appearance, combined with performance qualities and physical durability, easy processability and low density. The range of styrenic materials provided by **Ineos Styrolution** for the automotive sector includes ABS materials, ABS High Heat materials, ASA/PC, ABS/PA and AMSAN materials. A typical grade for internal applications is Novodur H701, an ABS product specifically designed for heat resistance, low emissions, and high impact, while Luran S 788T SPF30 boasts excellent surface appearance and UV resistance. The recently introduced SPF60 elevates the UV stabilisation of Luran S to a new level and is a material of choice in demanding outdoor applications.

Ineos Styrolution offers most product grades as sustainable drop-in Eco versions. These materials are either mechanically recycled or derived from renewable feedstock based on a mass balance process certified under ISCC Plus, typically containing 30-70% post-consumer recycle (PCR).

Mocom now offers light diffusing compounds containing PCR as well as post-industrial recycle (PIR) produced with raw materials from secondary sources. The compounds represent part of the new Alcom LD ECO (Light Diffusion) and Alcom LG ECO (Light Guiding) portfolios. During production, the material streams used are carefully screened, compounded on specially designed processing equipment, and provided with precisely selected additives. As is customary with compounds based on virgin materials, the photometric properties are individually adjusted and specified for the new Eco grades which contain up to 100% recycle.

Left: Mocom has launched light diffusing compounds containing recycle for automotive parts

Kurt Maschke, Senior Director Global Marketing Automotive at Mocom, says: "New regulations in the automotive sector will increasingly demand recycle-based solutions in the future, even in applications where it would not be expected. To meet these needs at an early stage and support our customers today in applications for tomorrow's indoor and outdoor lighting projects, we are now expanding our sustainable portfolio ahead of time."

Since April, the company has also offered a recycle-based and flame-retardant PC combining the properties of flame retardancy and sustainabil-

Eastman applies molecular level recycling

In collaboration with the US Automotive Partnership (USAMP), **Eastman** claims it has developed technology enabling some automotive materials to be recycled infinitely. Eastman first collaborated on a feasibility study demonstrating successful molecular recycling of leftover materials known as automotive shredder residue (ASR) or 'auto fluff', in 2021. Though a US study, the project is relevant in Europe due to revision of the Directive on End-of Life Vehicles 2000/53/EC, in which the European Commission plans to introduce extended producer responsibility starting in 2025.

Eastman says its molecular recycling technologies can revolutionise recycling because they process hard-to-recycle plastics like those in ASR, breaking it down at the molecular level. One of Eastman's two recycling processes, which it calls carbon renewal technology, can recycle almost any plastic and was used to demonstrate closed loop recycling for ASR.

"Globally, I believe we've reached a tipping point in the automotive industry," says Chris Scarazzo, Global Automotive Segment Market Manager in Eastman specialty plastics. "Manufacturers have pivoted to more sustainable content, and molecular recycling can definitely play a part in that transition."

IMAGE: BASF

Above: BASF Ultramid PA is used in a charging dock developed by cable and connection technologies supplier LAPP

ity. Part of the Altech Eco portfolio, the compound contains a mix of PCR and PIR and passes the UL94 5VA test both with open flame and heated wire.

Kraiburg TPE offers custom-engineered solutions catering to the functional requirements of roof railings, trims, and racks, which deliver durability and flexibility while aligning with sustainability goals. The Thermoplast RC/UV/AP series brings together technology and sustainable practices, showcasing a hardness-dependent PCR content of 15-40% and boasting a range of hardness options from 50 Shore A to 90 Shore A. The series is especially strong in weather and UV resistance, the former confirmed by successful completion of the two-year cycle Florida test, and is further distinguished via good adhesion properties, particularly with PP and PE. The series' ability to work well with multi-component injection moulding makes it easy to assemble parts, enhancing both the strength and appearance of the components. The series also demonstrates good thermal stability, preserving its performance attributes even at elevated operating temperatures of up to 90°C. Ideal applications include roof rack sealing and covers, roof railing underlays, and roof railing bases.

In September it was revealed that **BASF**'s engineering Ultramid PA plastic has been used in the housing material of the Mobile Dock, a portable charging system developed by cable and connection technologies supplier LAPP. Ultramid was deemed the ideal material as it is highly mechanically resilient and UV-resistant. It is also a halogen-free flame retardant and has high chemical resistance. Ultramid grades, which were previously sold as Technyl and acquired as part of the takeover of Solvay's PA66 business, are moulding compounds based on PA6, PA66 and various co-polyamides such as PA66/6. The range also includes PA610 and semi-aromatic polyamides such as PA6T/6, PA6T/66, PA6T/6I and PA9T.

"Mobile charging is an important factor for the acceptance of electric vehicles, as it reduces range anxiety and increases flexibility in everyday life. We are pleased to be able to facilitate the decision to purchase an electric car with our Ultramid material in the LAPP Mobility Dock," says Klaus Uske, Technical Development, BASF.

Automotive transformation

At Fakuma 2023, Italian company **Sirmax Group** presented several new compound formulations with a high percentage of recycled material designed for car interiors. One such product is its Naturally Inspired material range. Through special finishes and embossing, polymers from this range can simulate natural effects such as stone, marble, fabric, or wood, the percentage of post-consumer and bio-based materials within the formulation altered depending on customer specifications. With this line, the company says it is recreating the visual experiences of natural materials and offering alternative design materials for car interiors while reducing the use of fabric upholstery, thereby saving assembly time and costs.

Sirmax has also developed a door panel material that can address problems related to the maintenance of mechanical properties, unwanted odours, and the presence of volatile organic compounds. The PP compound from the Green Isofil family has 5% talc additive and contains 30% PCR, yet has the mechanical and aesthetic characteristics of virgin plastic and has a carbon footprint up to 21% lower than 100% virgin raw material, says the company. The solution is part of a wider range that can be applied to other automotive parts.

"The automotive world is going through an epochal transformation," says Sirmax Group President and CEO Massimo Pavin. "The increasing adoption of the electric car is undeniable proof of this. But there are also issues around post-consumer plastic use and end-of-life waste. Manufacturers are asking questions about redesigning cars that can be sustainable even after they are used, and we are accompanying them on this transformative journey."

Also at Fakuma 2023, **Avient** launched Stat-Tech TPE static dissipative and electrically conductive TPEs, which offer electrical resistivity from 100Ω to 1010Ω, preventing electromagnetic and radio frequency interference in critical electrical components. Stat-Tech TPEs also facilitate single-step fabrication, more design freedom, and two-component overmoulding directly onto polymer substrates. The formulations meet regulatory compliance requirements, including ATEX and ESD, and six standard grades are available ranging in

hardness levels from 40-85 Shore A. Formulations can be customised.

The company also announced the introduction of a line of PTFE-free and non-halogen flame-retardant additives. There is growing pressure to ban PFAS due to environmental concerns prompting manufacturers to search for alternative materials. Avient's new Cesa flame retardant additives are formulated without PTFE and are halogen-free in accordance with the IEC 61249-2-21 standard. Suitable for a variety of PC grades, including those with recycled content, these additives can help achieve GWFI temperatures up to 960°C according to IEC 60695-2-12 testing protocols and are provided in the form of concentrates so producers can combine them with colours and other additives.

Eurotec says it is constantly improving and expanding its solutions for both interior and exterior parts. Emission characteristics are important parameters in interior applications and many OEMs have limited these values with standards. For example, in VW interior applications, a VW 50180 standard is required. For its 30% glass-filled Tecomid PA6 grades, PV 3900 odour characteristic, PV 3015 fogging, PV 3341 emission of organic compounds tests were carried out by an accredited test laboratory in Germany and all results were in line with requirements of VW 50180 standard. PA66 with 30% glass fibre materials are widely used for pedal brackets or housings, while Tecomid Eco NA43 GR30 BK005 HS/M65I (PA66 GF30) exhibits an almost identical mechanical profile to prime materials and has a minimum 65% recycle content.

Surface quality and high impact properties are key for PC/ABS blends where proper sourcing, formulation and process technology are critical when using recycled materials, says Eurotec. Tecotek Eco BC44 UF65 BK013 MB/M65C (PC/ABS, unfilled, impact modified, heat stabilised, black, 65% post-consumer recycled grade) is in-line with all required material properties. Sunroof cable harnesses need high flexibility, toughness, strength, and efficient processing. Here, Tecomid NB60 NL PM (PA6-I) can be designed using a special formulation giving it 1,500 MPa tensile modulus and 85 kJ/m2 izod notched impact resistance. Tecodur PB70 GR30 BK009 CE01 (PBT GF50), which has especially high UV stability, can be used for side mirror applications due to a combination of high mechanical properties and low moisture absorption. Meanwhile, Tecomid NC40 GR30 BK047 CE (PA6.6/6 GF30) exhibits excellent UV performance, good surface quality, and mechanical properties.

IMAGE: AVIENT

Above: Avient says Stat-Tech TPEs are suitable for applications including radars, sensors, and camera systems

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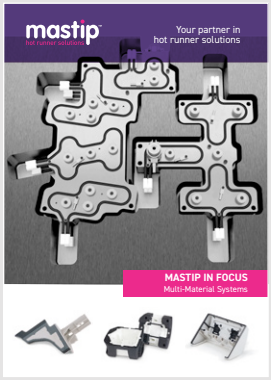
MASTIP: MULTI-MATERIAL MOULDING



This 10-page publication from hot runner technology company Mastip provides guidance on multi-material moulding and includes case studies on a variety of applications and the hot runner system set-up.

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POLYKEMI: CUSTOM COMPOUNDS

This 12-page brochure provides an introduction to Polykemi and its range of custom engineered plastic compounds. It includes details of production locations, subsidiaries, R&D capabilities and quality certifications.

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KORSINI

In this newsletter, IML company Korsini provides updates on company developments, awards, certification and its portfolio of in-mould label products for injection moulding and other processes.

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TISAN: ENGINEERING COMPOUNDS

Tisan Engineering Plastics has more than 40 years of experience developing injection moulding compounds for applications in automotive, home appliances, E&E and other sectors. Find out more about Tisan's wide range of materials in this brochure.

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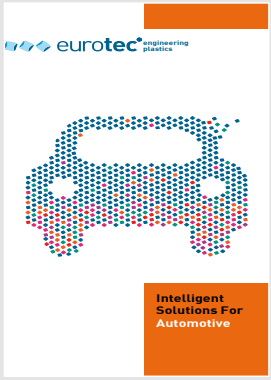
EUROTEC: AUTOMOTIVE COMPOUNDS



This brochure presents the full range of Eurotec's engineering polymer compounds for automotive applications, including interior, exterior and under the hood. Read all about Eurotec's innovative products and tailor made services.

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SUKANO: BIO-MASTERBATCHES

Switzerland's Sukano offers a full range of bioplastic masterbatches and compounds to allow processors to maximise the performance of bio-based resins such as PLA and PHA and to simplify and speed up processing.

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If you would like your brochure to be included on this page, please contact Claire Bishop claire.bishop@amiplastics.com. Tel: +44 (0) 1732 682948

Keep informed: read our latest editions

AMI publishes five process-specific FREE plastics industry magazines. Simply click on the cover below to read each magazine. Or download the issue in the relevant Apple or Android app

Injection World October 2023
Injection World's October 2023 issue includes feature articles on in-mould labelling and decoration, the latest materials for E&E applications, and developments in materials handling, plus a preview of Fakuma 2023 in Germany.

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Injection World September 2023
The September edition of Injection World magazine takes a look at how plastics suppliers are adapting to OEM demands for materials with recycled content. Plus an update on the latest developments in machine control technology and medical moulding.

› CLICK HERE TO VIEW

Compounding World November 2023
The November 2023 issue of Compounding World looks at the latest innovations in black and white pigments. It also explores some innovative developments in bio-based plastics, inline process control technology, and mixing systems.

› CLICK HERE TO VIEW

Plastics Recycling World October 2023
The October edition of Plastics Recycling World takes a look at innovations in extruders for plastics recycling. It also includes a review of the state of chemical recycling investment and explores the latest in recycling additives and odour reduction.

› CLICK HERE TO VIEW

Pipe and Profile October 2023
The October 2023 edition of Pipe and Profile Extrusion magazine looks at the latest in pipe inspection techniques and standards. It also explores developments in materials handling equipment, pipe for the oil and gas industry, and innovations in oriented PVC pipe.

› CLICK HERE TO VIEW

Film and Sheet November 2023
The November issue of Film and Sheet Extrusion has a cover feature reporting on recent construction applications for film and sheet, plus other features on advances in thin-wall packaging, sheet developments and the R-Cycle digital passport scheme.

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Take out your own FREE subscriptions to any of the magazines. Click on the logos below to simply register on-line.

Compounding WORLD
Film and Sheet EXTRUSION
Pipe and Profile EXTRUSION
Injection WORLD
Plastics Recycling WORLD

GLOBAL EXHIBITION GUIDE

2023	**15-16 November**	Compounding World Expo USA, Cleveland, USA	www.compoundingworldexpo.com/na/
	15-16 November	Plastics Extrusion World Expo USA, Cleveland, USA	www.extrusion-expo.com/na/
	15-16 November	Plastics Recycling World Expo USA, Cleveland, USA	www.plasticsrecyclingworldexpo.com/na/
	15-16 November	Polymer Testing World Expo USA, Cleveland, USA	www.polymertestingexpo.com/na/
	22-25 November	PlastEurasia, Istanbul, Turkey	https://plasteurasia.com/en/
	28 Nov-2 Dec	IPF Japan 2023, Chiba, Japan	https://www.ipfjapan.jp/english/
	13-15 December	Arabplast, Dubai, UAE	https://arabplast.info/
2024	**4-6 March**	Plast-Alger, Algiers, Algeria	https://www.plastalger.com/
	23-26 April	Chinaplas 2024, Shanghai, China	www.chinaplasonline.com
	6-10 May	NPE 2024	www.npe.org
	4-7 September	Indoplas, Jakarta, Indonesia	www.indoprintpackplas.com
	11-12 September	Compounding World Expo EU, Brussels, Belgium	https://eu.compoundingworldexpo.com/

AMI CONFERENCES

20-22 November 2023	Fire Resistance in Plastics, Berlin, Germany
28-29 November 2023	Thin Wall Packaging, Cologne, Germany
5-6 December 2023	Polymers in Footwear, Nuremberg, Germany
5-6 December 2023	Polymer Engineering for Energy, London, UK
7 December 2023	Polymers in Hydrogen and CCUS, London, UK
19-20 March 2024	Single-Serve Capsules, Boston, MA, USA
23-24 April 2024	Fire Retardants in Plastics, Philadelphia, PA, USA

For information on all these events and other conferences on film, sheet, pipe and packaging applications, see

www.amiplastics.com