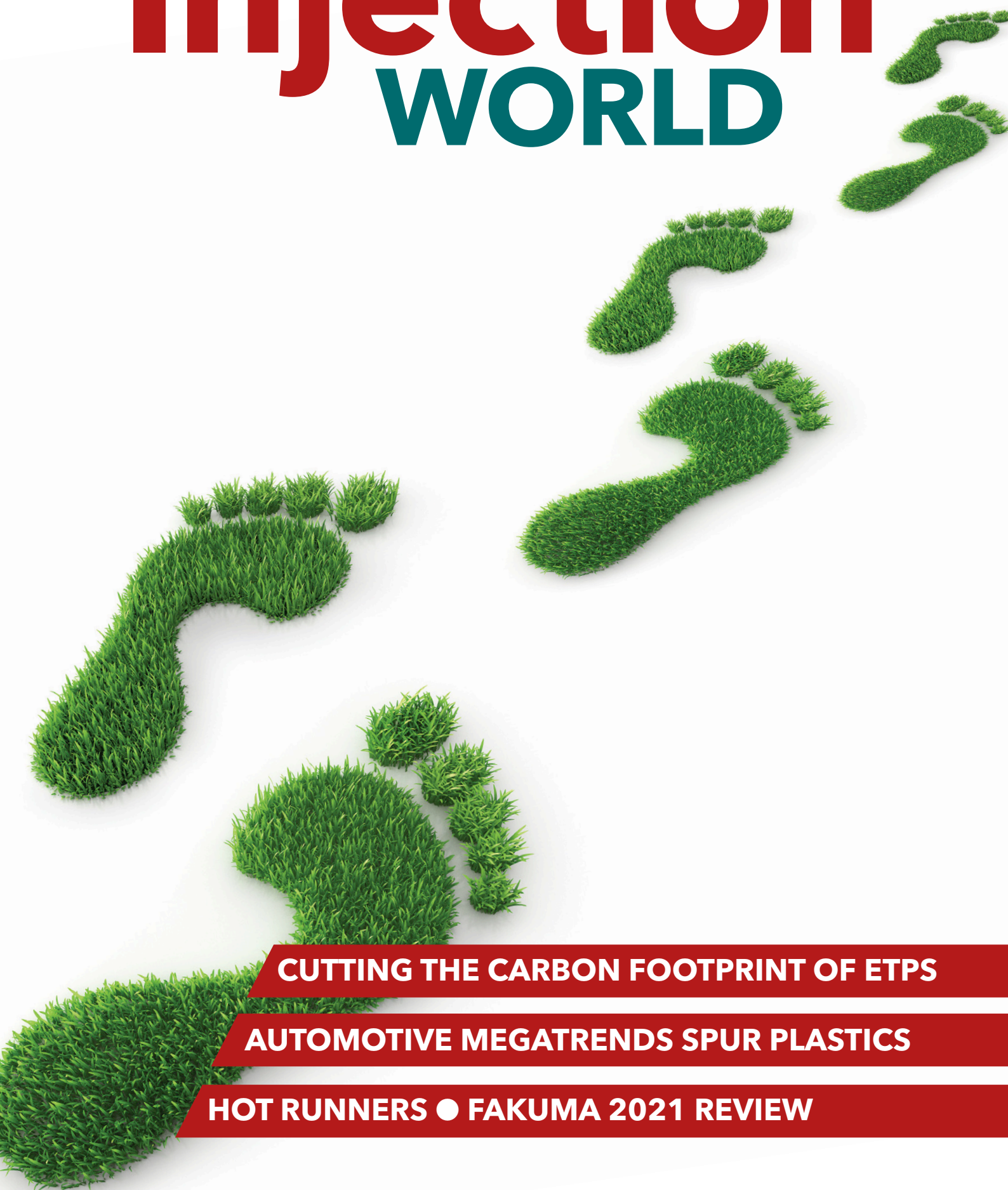


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HOT RUNNERS ● FAKUMA 2021 REVIEW

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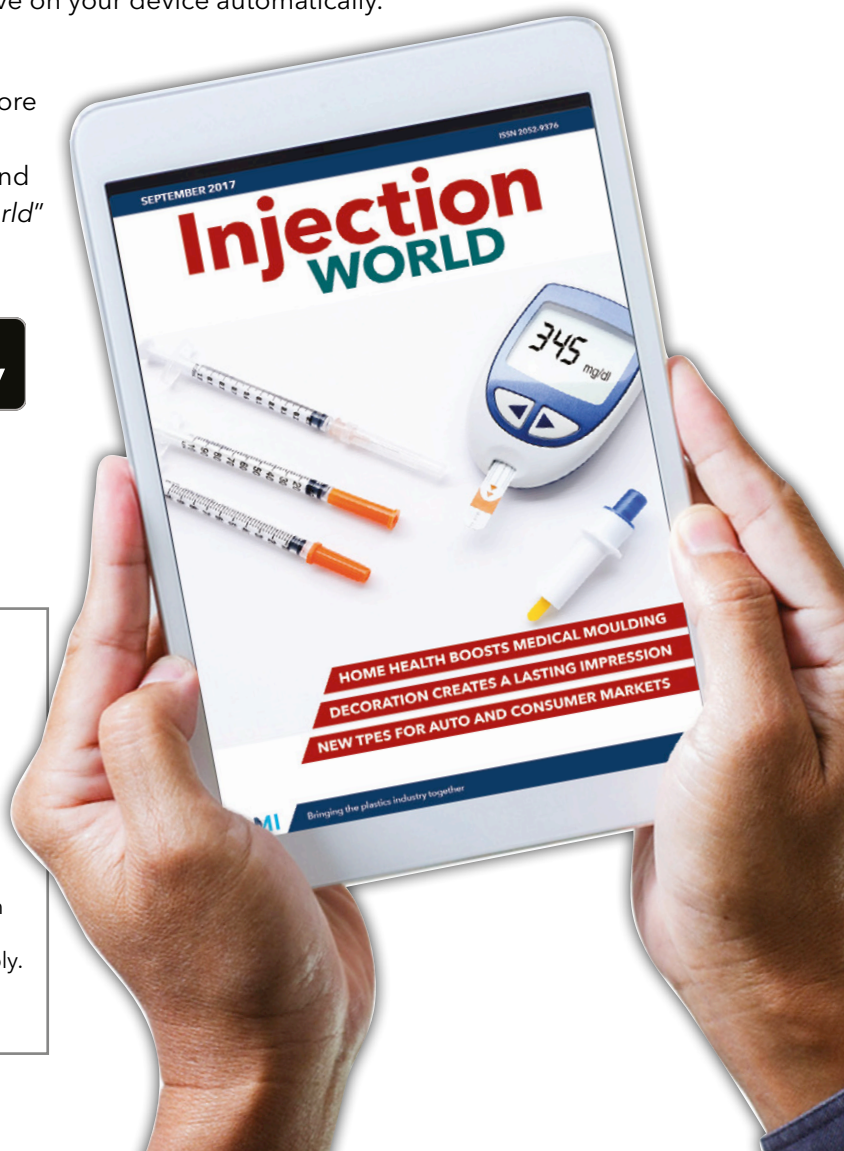


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Injection WORLD

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COVER PHOTO: SHUTTERSTOCK

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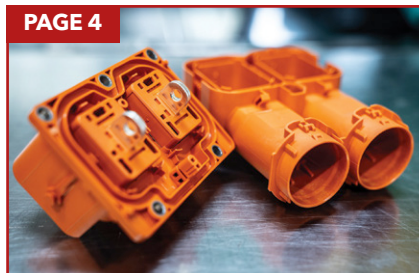
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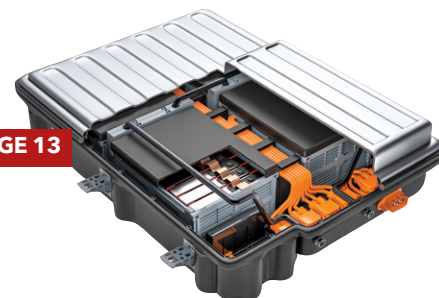
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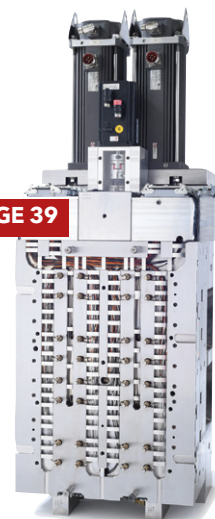
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Phillips-Medisize boosts its global manufacturing capacity

Molex-owned company Phillips-Medisize, which specialises in drug delivery, diagnostic and medical technology devices, is to expand its manufacturing footprint and its capabilities in product design and development.

Once this is all complete, the company will have 280,000 m² of manufacturing and R&D space in 36 facilities worldwide, plus 55,000 m² of Class 7 and 8 cleanrooms to support tool building sites and quality and regulatory systems. About 1,000 more employees will be taken on as a result.

"Our expanded global reach and resources will enable us to solve complex development and manufacturing challenges while meeting escalating customer demands for more localised production, supply chain management and accelerated go-to-market strategies," said Paul Chaffin, president of Molex's Medical &



Phillips-Medisize launched the Aria smart autoinjector earlier this year

Pharmaceutical Solutions business.

To address growing demand in Europe, Phillips-Medisize is building a medical manufacturing facility in Katowice, Poland. It is also expanding production capacity in Suzhou, China, for the global and regional pharmaceutical and medical technology markets.

In the US, expansion at an existing Molex facility at Little Rock, Arkansas, is already under way for high-volume, diagnostic devices. The company had completed a 26,000 m² facility at St Croix Meadows, Wisconsin, last year for the production of high-volume moulded components for medical diagnostics. This includes a 6,000 m² Class 8 cleanroom.

Phillips-Medisize also announced a strategic initiative with Credence MedSystems, including ramping production of the Credence Companion and Dual Chamber Reconstitution Systems at its site in Letterkenny, Ireland, and the new facility in Poland. This follows other recent agreements with GlucoModicum and with Eyeven-sys on its ocular device component for the delivery of novel gene therapies for eye diseases.

➤ www.molex.com

Smart material choice

Swedish compounder Polykemi has developed a simulation tool that allows it to provide cradle-to-grave carbon footprint data to customers for any of its materials.

This follows a scientific study by Polykemi in 2020 focused on analysing the climate impacts of the company's materials. The study demonstrated that the choice of material has a significant part to play in the fight against climate change.

➤ www.polykemi.com

Pöppelmann grows in the US

Pöppelmann Plastic USA, the US subsidiary of the German injection moulder, will invest more than \$19.2m to expand its manufacturing campus in Claremont, North Carolina. This will create 133 new jobs, including machine operators, maintenance technicians, warehouse personnel and administrative staff, according to State

Governor Roy Cooper.

The site itself first opened in 2007 with a focus on plastic pots and cultivation systems for the commercial horticulture industry, but has since diversified. The expansion will add about 9,000 m² to the automotive production line.

➤ www.poeppelmann.com

GHO invests in Sanner Group

Specialised healthcare investor Global Healthcare Opportunities has acquired Germany's Sanner Group, which makes plastic packaging and components for the pharmaceutical, medical technology, diagnostics, healthcare products and nutritional

supplements sectors. The amount involved was not disclosed.

"We have been observing increasing consolidation in the market for some time now. As a medium-sized company, we must react if we want to remain successful in the long term," said

shareholder Jürgen Sanner, from the founding family, which will remain involved.

Following 15% year-on-year growth in 2020, Sanner now makes over 4bn component parts/year and has over 600 employees.

➤ www.ghocapital.com

➤ www.sanner-group.com



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Plastic Omnium cuts costs as revenues slide

Automotive supplier Plastic Omnium has announced its third-quarter results, which saw its revenues fall by 14.4% to €2.097bn. Global automotive production saw a 19.5% decline, however. The company said that it took strong cost reduction measures, reducing the impact of production stoppages linked to semiconductor shortages, and focused its efforts on cash generation.

The group said: "Alongside the impact of the semiconductor shortage in the automotive industry and the strong rebound in global demand following the pandemic, supply disruptions and depletion of inventories have driven up raw material prices and transportation costs worldwide. This inflationary environment, coupled with a lack of visibility on future production, has led the



IMAGE: PLASTIC OMNIUM

Above: Laurent Favre, CEO of Plastic Omnium, says the group's operations are now more flexible

group to reinforce cost reduction measures and actively negotiate with its suppliers to mitigate the rising costs."

For the first nine months of 2021, however, revenue was up 13.4% versus a 9.7% increase in global automotive production, and the company saw growth in all areas. In Europe, this was driven by a successful first

half, a large number of production starts in Q3 and positive momentum in electric vehicles, while in China and the rest of Asia, it was boosted by a strong economic recovery from Covid and being less impacted than some other groups by semiconductor shortages.

Laurent Favre, CEO of Plastic Omnium, said: "Our teams are doing a remarkable job of increasing the flexibility of our production facilities and adapting our operations. As of now, IHS foresees some recovery [in the global automotive market] in H2 2022 and we will be ready for it, supported by a solid backlog." The company also expects to achieve growth in hydrogen storage systems following some "significant breakthroughs in the commercial pipeline".

➤ www.plasticomnium.com

Raumedic to expand in NC USA

German medical technology company Raumedic will expand the clean-room manufacturing facilities at its US headquarters in Mills River, North Carolina by February 2022. This will be used for new product lines. The existing 1,200 m² ISO Class 7 cleanroom facilities in the Asheville area, which were built in 2016, are now full.

"The advanced equipment and processes that will go into the new space will help us to remain ahead of the curve," stated Martin Bayer, CEO. "With automated assembly cells and robotically augmented moulding presses, we are able to produce high-quality medical technology solutions in the mainland US and remain competitive."

➤ www.raumedic.com



Simba Dickie orders 12 KraussMaffei machines

Toy manufacturer Simba Dickie Group has recently ordered 12 new injection moulding machines from KraussMaffei, which supplies 95% of the machinery it uses. These included the hydraulic CX, GX and MX series and all-electric PX series, in the clamping force range from 500-16,000 kN. Seven will go to the BIG plant in Burghaslach, Germany, and five to the Smoby Toys location in France.

Best known for the red Bobby-Car racer and the AquaPlay waterplay system, Simba Dickie has eight production sites. According to KraussMaffei, Michael Raum, head of production at Simba Dickie, values most of all the modular design of the KraussMaffei machines, plus the MC6 control system, and training and application expertise of the machinery supplier.

➤ www.kraussmaffei.com

Left: Bobby-Car production at Simba Dickie's facility in Burghaslach, Germany

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Wirthwein expands in Poland

German injection moulder Wirthwein is building a new hall at its site in Łódź in the heart of Poland. This is its third site in the city. It will cover a space of 71,000 m² and will create some 35 new jobs this year and over 100 by 2027, the company said. The new facility is scheduled to go into series production, with the first machines in operation by the second half of 2022.

"The new location enables Wirthwein to align production even better with the product areas and customers," the firm stated. Currently, this was only possible to a limited extent due to the good plant capacity utilisation." The new hall will make parts for the automotive, home appliance, electrical and healthcare sectors.

Initially, Wirthwein Polska will rent just over 6,000 m² in the modern hall complex, 5,800 m² of which will be used as production and storage space, and the rest will be as staff and office space.

> www.wirthwein.de

DuPont and Lanxess cut loose PA businesses

DuPont and Lanxess have both announced plans to separate their respective engineering plastics units from their core businesses. The two companies are major producers of polyamide 6 and 66 resins, along with other engineering materials.

DuPont announced that it intends to divest a substantial part of its Mobility & Materials division, including its Engineering Polymers and Performance Resins lines of business as well as the company's stake in the DuPont Teijin Films joint venture. The product brands being sold are Zytel PA materials, Delrin POM, Hytrel polyester elastomers, Crastin PBT, Vamac ethylene acrylic elastomers and others.

The businesses being divested by DuPont repre-

sent \$4.2bn in revenue and \$1.0bn of operating EBITDA based on full year 2021 estimates.

The plan was revealed at the same time that DuPont announced the acquisition of Rogers Corporation in the US, which serves the electronics sector and produces engineered materials and components at its global facilities.

Ed Breen, DuPont Chairman and CEO, said: "Building on our recent acquisition of Laird Performance Materials, the acquisition of Rogers further cements our position as the leading electronic solutions provider in the industry."

Lanxess announced it will transfer its High Performance Materials (HPM) business unit to an independent legal corporate

structure. HPM employs around 1,900 people at 14 sites worldwide. Sales are in the low single-digit billion euro range.

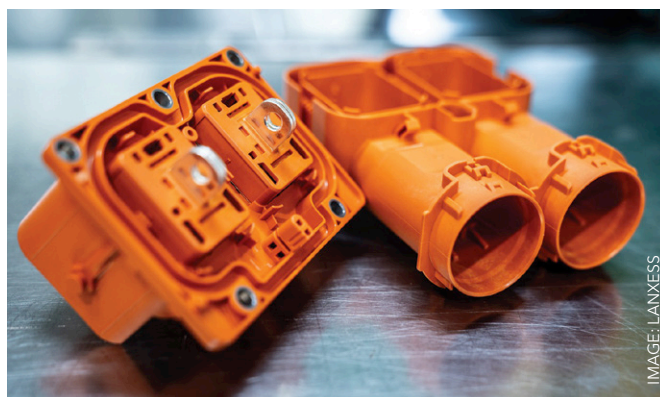
Hubert Fink, member of the Board of Management at Lanxess, said: "The global market for new forms of mobility is developing very dynamically and is strategically rearranging itself - creating many innovative alliances and partnerships. In order to get the most out of the growth opportunities in this market and to be able to act flexibly, we will create a separate legal structure for the [HPM] business unit."

Injection World asked Lanxess if the separation of HPM was part of a plan to sell the business, but a spokesperson reiterated the purpose of the move is to get the most out of market growth opportunities and to become more flexible.

The main HPM brand products are Durethan PA materials, Pocan PBT and Tepex thermoplastic fibre composites. Its largest customers are in the automotive and electrical & electronics sectors.

> www.dupont.com

> <https://lanxess.com>



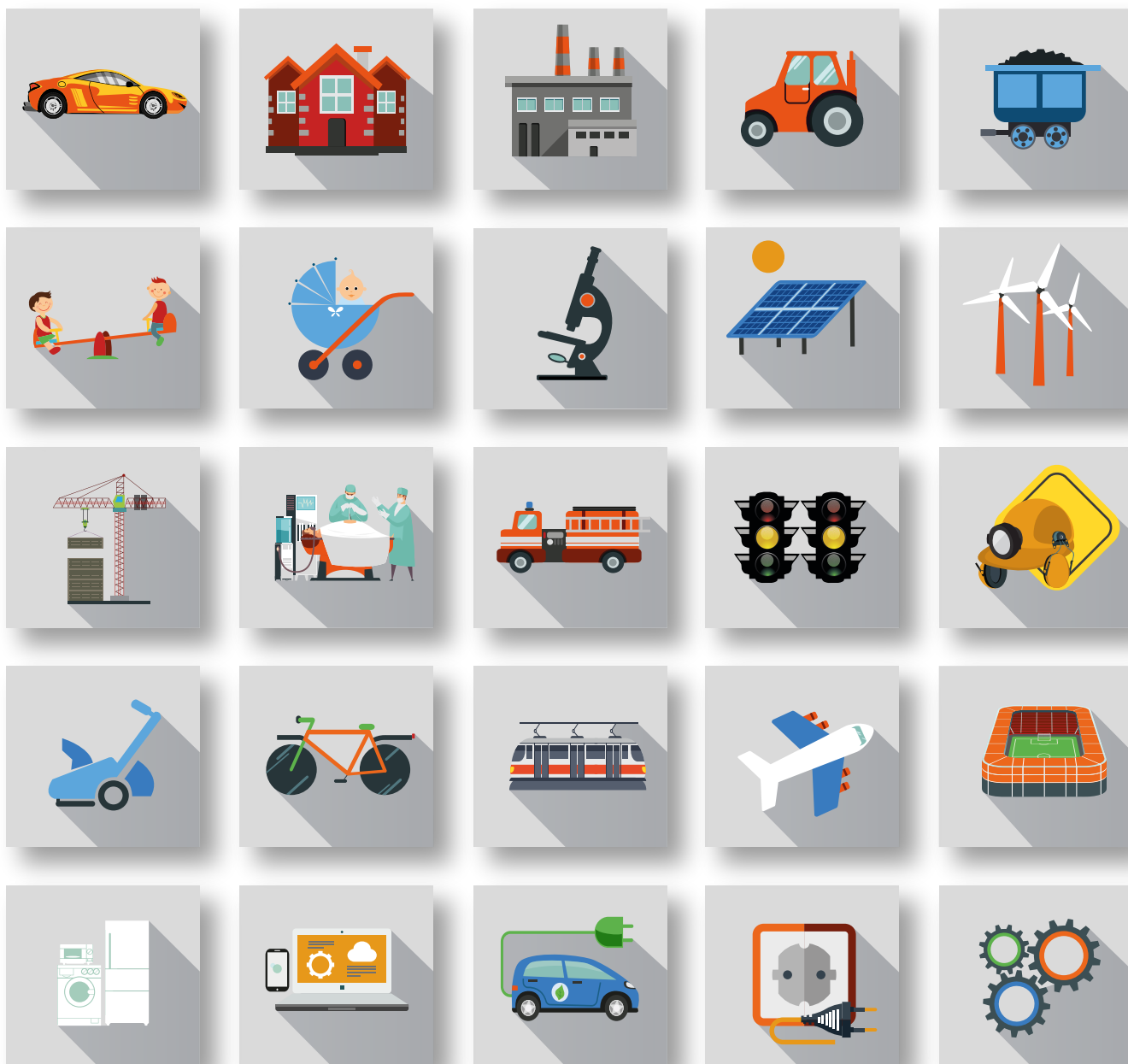
Arburg forms new subsidiary for AM business

Arburg has created a new subsidiary called ArburgAdditive at its HQ in Lossburg, Germany which will house all activities related to additive manufacturing. It said following the launch of its Freeformer technology, plus the

purchase of InnovatiQ, the next step was "to combine the full range of additive manufacturing activities under one roof with the aim of strengthening this business field and paving a path towards a successful future".

InnovatiQ, which produces fused filament fabrication technology, will remain an independent company based in Feldkirchen, but will be affiliated with ArburgAdditive.

> www.arburg.com



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Husqvarna to acquire Orbit Irrigation in USA

Husqvarna Group has agreed to acquire Orbit Irrigation, a major supplier of residential watering systems in North America, from Platinum Equity. The \$480m agreement was made on a cash and debt-free basis and will be financed through existing cash and undrawn credit facilities. This should be completed by the end of 2021, subject to customary regulatory approval.

Salt Lake City-based Orbit employs about 300 people and had net sales of about \$320m over the last 12 months. It will become



Above: Orbit's B-hyve smart watering system

part of Husqvarna's Gardena division, making the division "a clear global market leader within residential watering", according to CEO Henric Andersson.

Hitherto, Husqvarna,

which is a producer of outdoor power products, has had a limited presence in North America, whereas Orbit generates over 95% of its revenues there.

➤ www.husqvarnagroup.com

Alpla picks Missouri again

Austrian-based packaging systems manufacturer and recycling specialist Alpla Group has chosen the Blue River Commerce Centre in Kansas City, Missouri, as the site for its new 23,000 m² manufacturing plant.

The new facility is due to begin construction before the end of 2021 and to be completed in Q4 2022.

The new facility will make injection moulded products such as closures, and will create about 75 jobs. It will be Alpla's fourth site in Missouri and the first dedicated to injection moulding. The company cited the region's central location and strong community relationships as key drivers for the decision.

➤ www.alpla.com

Utz opens Mexican facility

The Utz Group, which claims to be "the global leader for reusable plastic packaging", has opened a new facility in San Miguel de Allende, central Mexico. This follows on from the original launch of a project more limited

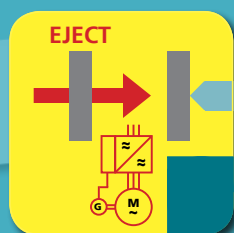
in scope in 2017 that was accelerated in the middle of the pandemic. "We have completed the new building and the transition from the old facility," the firm added.

➤ www.utzgroup.com

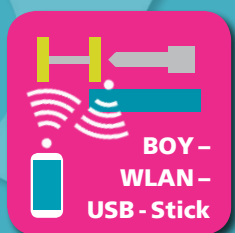
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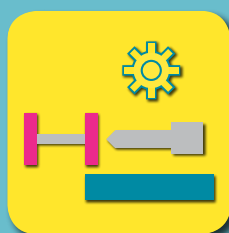
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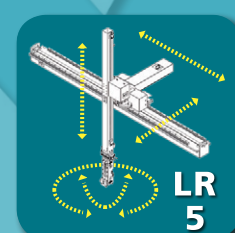
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Cutting the carbs in ETPs

Producers of engineering thermoplastics and compounds have embarked on a journey of reducing the carbon footprint of their operations and products.

Peter Mapleston reports

As attention all around the world becomes increasingly focused on global heating and the determining role played by fossil fuels, suppliers of engineering thermoplastics are upping their game to reduce carbon footprints. ETPs have for a long time played an important role in automobile lightweighting, which leads to fuel savings – and they continue to do so. Another tendency is for polymer makers to look at how they can reduce their own carbon footprints through greater use of renewables, both in the polymers they make and in the energy they consume while producing those polymers.

Take **DSM Engineering Materials** for example. At the end of September, it announced an acceleration in its carbon footprint and greenhouse gas emission reduction journey. It said it was committing to: reduce its total greenhouse gas emissions, including Scope 1 (direct emissions from owned or controlled resources), Scope 2 (indirect emissions from generation of electricity and other utilities), and Scope 3 (other indirect emissions along the value chain) and also reduce the carbon footprint of its products by 50% by 2030 (from a 2016 baseline); use 100% renewable electricity in all production plants by 2025 (it reached 70% in 2020 and its plants in Europe and China are already fully powered by renewable electricity); and achieving Net Zero Scope 1 and 2 greenhouse gas emissions by 2040 on the way to Net Zero across all value chains by 2050.

DSM announced in June that it had halved the carbon footprint of its Akulon polyamide 6 and was also developing greenhouse gas reduction roadmaps for Stanyl PA 46 and Arnitel thermoplastic elastomer. In addition, DSM Engineering Materials has committed to developing and rolling out bio- and/or recycled-based alternatives for its entire portfolio by 2030; specific grades are already available for all major product lines.

Sustainability is also reflected in various **DuPont** developments. At Chinaplas earlier this year, the company introduced its Delrin Renewable Attributed acetal resin (POM), which is made with 100% bio-feedstock sourced from waste. It is the first renewable POM acetal polymer to be certified through the International Sustainability and Carbon Certification (ISCC) system.

The material is a drop-in alternative to other grades of POM. DuPont says it has quickly found interest among brand names in the consumer goods and consumer electronics industries. One commercial customer that the company has named is Regina, a global manufacturer of industrial handling equipment headquartered in Italy, which has begun moulding conveying components from a custom-coloured grade that also was formulated for increased slip performance, to reduce friction on handling lines.

DuPont announced in November it will divest its

Main image: Materials suppliers are upping their game in regard to carbon emissions



IMAGE: SHUTTERSTOCK

Right: Avient's reSound NF materials have natural fibre reinforcement

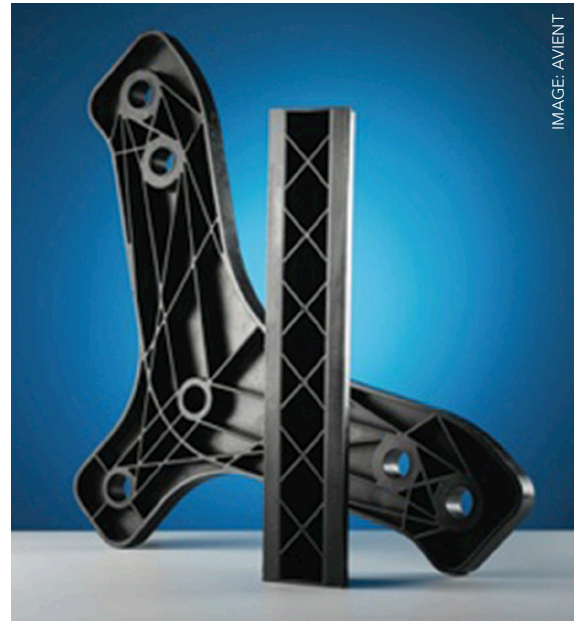
engineering plastics business (see [page 8](#)). **Avient** points to its growing portfolio of sustainable solutions that now include bio-filled polymer grades in its reSound NF family, reSound R recycled content thermoplastic elastomers, which have recyclate contents ranging up to 83% coming from post-consumer and post-industrial sources, reSound OM bio-based TPE, and Nymax PIR post-industrial recycled PA 6 and 66 formulations with up to 100% recycled polymer content.

SABIC in October launched a new portfolio of bio-based Ultem polyetherimide (PEI) resins that offer sustainability benefits while delivering exactly the same high performance and processability as incumbent Ultem materials. The materials are the first certified renewable high-performance, amorphous polymers available anywhere.

Based on a mass balance approach, for every 100 kg of Ultem resin produced, SABIC replaces 25.5 kg of fossil-based feedstocks with bio-based materials derived from waste or residue, such as crude tall oil from the wood industry. The new resins are in performance terms exactly the same as current Ultem materials.

Scott Fisher, Director, Business Management, Ultem Resins and Additives, says: "Because these products perform in the same way and maintain the same regulatory listings – such as UL94 and FDA food contact – as traditional Ultem resins, adjustments to product designs and manufacturing processes are not required."

The increasing requirements for the use of more sustainable raw materials present manufacturers of technically complex components and assemblies with new challenges, says compounding group **LehVoss**. The group says it has taken on this task with its subsidiary WMK Plastics and developed ecological and economical alternatives to virgin materials in the upper third of the material pyramid on the basis of material recycling.

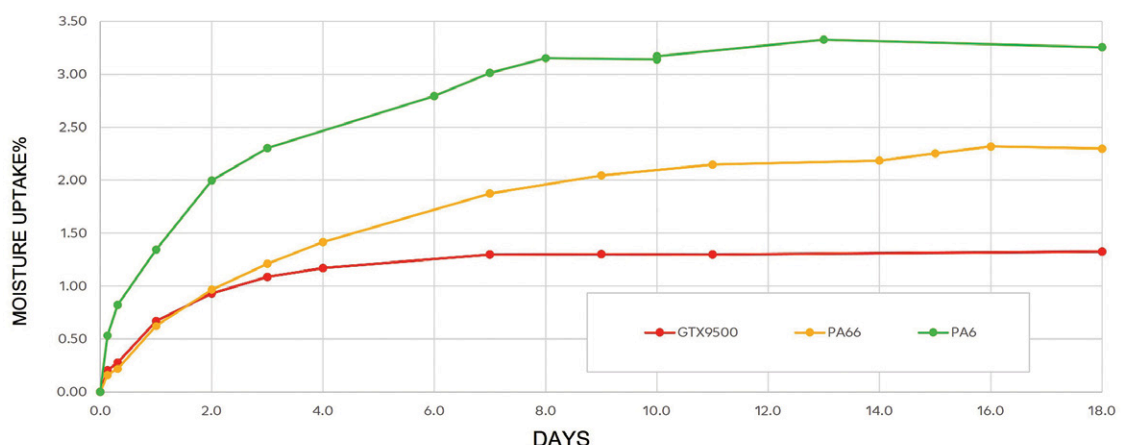


The first portfolio of the high-performance polymer PEEK includes six standard recipes which were presented at Fakuma in October. These Luvotech eco PEEK grades are characterised by significantly reduced greenhouse gas emissions with almost the same technical performance compared to new goods and thus offer an alternative for almost all classic areas of application. In cooperation with the SKZ (South German Plastics Centre), a reduction in greenhouse gases of around 55% was demonstrated using the Luvotech eco PEEK GF20 as an example.

"In addition to the ecological advantages, a significantly reduced raw material price also opens up new fields of application in which the use of PEEK was previously not possible from an economic point of view," says the company. "For a reliable supply of the highest quality, secure raw material sources are just as important as the more than 35 years of know-how in the development and manufacture of recycled materials, the

SABIC's Noryl GTX 9500 is a PPE/PA blend that picks up much less moisture than pure PA6 or 66

Source: SABIC





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Other eco high-performance materials based on high-temperature polyamides are in the final development phase.

Earlier in the year, Avient launched two polyketone-based series, Edgetek PKE and LubriOne PKE, said to deliver comparable performance and lower production-related CO₂ emissions than polyamides PA 66 and PA 6 and acetals with which they compete. Avient says they were developed in response to ongoing polyamide supply constraints.

The PK formulations combine high chemical and hydrolysis resistance. As far as carbon footprint is concerned, PK base resin production emits up to 61% less CO₂ than polyamides and POM.

The Edgetek PKE series includes short glass-reinforced formulations with 10-40% short glass fibre. The LubriOne PKE series are internally lubricated grades that combine chemical resistance performance with improved wear resistance

and low coefficient of friction properties.

On a similar note, SABIC has introduced Noryl GTX 9500, an unfilled alloy of polyphenylene ether (PPE) and a polyamide, said to deliver excellent dimensional stability under hot and humid conditions found in many automotive applications. SABIC says the alloy retains a better balance of mechanical properties when exposed to heat and humidity typical of automotive under-hood environments than unmodified PA 66 and PA 6, as well as comparable high flow and high-temperature performance.

“Its dimensional stability and mechanical property retention under a wider range of temperatures and humidity – together with high flow performance – can open opportunities for thin-wall designs that reduce weight,” says SABIC. Target applications include vehicle junction boxes, connectors and other applications requiring dimensional stability. There is also potential for use

Marbling ETPs in household goods

Two years ago at K 2019, BASF demonstrated an injection moulding technique it was working on for mixing colours into plastics to provide a marbled effect. Now it says that its patent-pending technology makes it possible to produce marbled serial components made of Ultrason polyarylethersulphones using a standard injection moulding process. It sees potential in household appliances, catering bowls and containers as well as various visible components.

“For the first time, surface effects such as colour shades, colour streaks and patterns can be reproduced: injection-moulded parts of one series look alike but are not completely identical,” says the company. The technique has so far proven to be successful with grades of Ultrason E (polyethersulfone) and Ultrason P (polyphenylsulphone), both of which have high mechanical, thermal and chemical resistance as well as approval for food contact.

Obtaining marbled effects with injection moulding is not new, but BASF says now it can be done more easily and with a greater degree of process reliability than before, using



Marbled serial components made of BASF Ultrason using a standard injection moulding process

new types of nozzle inserts and a special dosing technique. Georg Graessel from global Ultrason business development at BASF says: “Until now, these effects were only possible with complex two-component injection moulding and did not guarantee reproducibility. So far, our customers have been able to mould transparent, translucent, and, of course, solid-coloured components from Ultrason.”

In the BASF process, using a machine equipped with a single plasticising unit and an open nozzle, pre-coloured base material and a high-contrast colour masterbatch are

fed synchronously. The patterns in the moulded part are achieved by separating and merging the melt streams, which is done with 3D-printed nozzle inserts. BASF says not only mirror-image patterns can be created but also rotationally symmetrical patterns, something not previously possible. Other factors influencing the pattern design are the nozzle design itself, the mould’s gating system, the location of the gate, and the flow behaviour of the melt during mould filling.

The technique is also suitable for other thermoplastics.



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as the base resin in carbon fibre-reinforced thermoplastic composites used in structural and body components, and for applications in the industrial, aerospace and marine markets.

Noryl GTX 9500 resin offers significantly lower water and moisture uptake than PA 6 and 66, even under high heat conditions, up to 150°C. SABIC testing demonstrated that Noryl GTX 9500 resin absorbed 21% less moisture at equilibrium than PA 66, and 58% less than PA 6. It had a total dimensional change (flow direction and crossflow direction) at equilibrium of 0.29%; the total change for PA 66 was 84% higher, while for PA 6 it was 165% higher. Noryl GTX 9500 resin also demonstrates higher retention of mechanical properties (flexural modulus, tensile modulus and flexural strength) under wet conditions.

Domo database

Polyamides specialist **Domo's** Engineering Materials BU, which supplies the Technyl and Domamid lines, says 12% of its sales now consist of (principally post-industrial) recycled materials, marketed as Technyl 4earth and Econamid. Domo also says it is using its considerable materials know-how to help customers be more efficient in their use of polyamides. It has a material database covering more than 50 grades of PA 6 and PA 66.

The database, which Domo describes as the premier advanced mechanical modelling data resource, is integrated in its MMI Technyl Design predictive platform. This is a multiscale modelling, mechanical calculation, and injection moulding simulation technology built around Digimat (which was developed by e-Xstream engineering). The technology enables accurate analysis of the behaviour of Domo's glass-reinforced polyamide materials.

There are over 42,000 files in the MMI reposi-

tory. These material cards cover not only static load and failure, but also tests on a wide scope of dynamic parameters. These include impact, crash, vibration, modal frequency analysis, NVH, damping, fatigue, thermal dilation and warpage, and effects of moisture and glycols. The files can be used by Domo customers who have access to Digimat MX, and Domo can also perform simulation support in-house on their behalf.

Materials and properties are measured under a wide range of conditions, including different strain rates, temperatures and humidity levels. An in-house methodology for identifying polyamide matrix parameters is employed based on various glass fibre measurements, including orientation and fibre length distribution. Machine learning improves the efficiency of the various models. Domo says it also provides up to 15% greater accuracy than standard reverse engineering.

"OEMs and tier parts suppliers looking for metal replacement solutions can rely on MMI Technyl Design's advanced predictive simulation tool to ensure optimal design integrity before moving to production," says Domo. It cites one case study, in which diecast aluminium could be replaced with Technyl MAX for an automotive motor mount application, resulting in a 40% weight reduction of the final part with tensile strength values similar to the die cast version, and up to 100 times better acoustic damping.

Meanwhile, **Ascend Performance Materials**, the world's largest fully integrated producer of PA 66, earlier this year acquired French compounder Eurostar Engineering Plastics, which has a broad portfolio of flame-retardant engineered plastics. "Eurostar's experience in compounded polyamides fits well within our own portfolio and manufacturing capabilities," says John Saunders, Ascend's Vice President for Europe. "Their Starflam materials are enabling the transitions to clean energy and transportation, and smarter devices."

Last year, Ascend acquired the Italian firms Poliblend and Esseti Plast, as well as a compounder facility in China.

At the Fakuma trade show in Germany in October, DuPont highlighted inroads it has made in developments for automotive electrification, another important route to carbon footprint reduction. Company experts say many of those have been focused on supporting EV battery and thermal management optimisation, e-motor and power electronic efficiencies, safety, lightweighting, and durability, and connectivity and infrastructure.

"Polymer-based solutions that exhibit excellent mechanical properties and can resist heat, chemi-

Below: The DuPont stand at Fakuma 2021, once again an in-person event after the "virtual" Fakuma 2020



IMAGE: DUPONT



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Right: Avient has new toughened PPA-based compounds for IC engine compartments and other demanding applications

icals and fluids are absolutely essential in supporting demanding applications for vehicle electrification," says Giacomo Parisi, Global Marketing Director For Automotive Electrification.

Latest developments geared to EVs include a new hybrid bobbin produced from Zytel HTN that supports thermal management in e-motors; a plastic/metal hybrid cooling plate where a channel plate made from Zytel HTN is chemically bonded to aluminium to create a solution that improves durability and thermal management performance of battery cells; Zytel and Zytel HTN "electrically friendly" (EF), heat-stabilised resins that can handle contact with aggressive fluids and low- to high-voltage loads in various temperature and humidity conditions; and Crastin HR hydrolysis stabilised PBT for sophisticated sensor systems and other electronic components.

Rudy Van Engen, Commercial Director EMEA for Automotive Solutions, says that with the addition of the new EF grades, DuPont is enabling manufacturers of EV batteries to overcome concerns about the durability of thermoplastic parts in a very harsh environment.

The Zytel 500 series is a new family of PA 66-based solutions within the company's HTN (High Temperature Nylon) product range. These new materials were developed to largely retain properties in e-mobility oils, to have a high CTI (Comparative Tracking Index) for electrical parts, and EF characteristics.

DuPont has developed four ranges of Zytel HTN EF solutions, each based on different polymers, and differentiated in terms of mechanical performance and such characteristics as heat aging resistance and chemical resistance. Each also offers enhanced durability to protect parts from failure due to moisture, elevated temperature, or traces of halide ions.



IMAGE: AVIENT/GETTY IMAGES

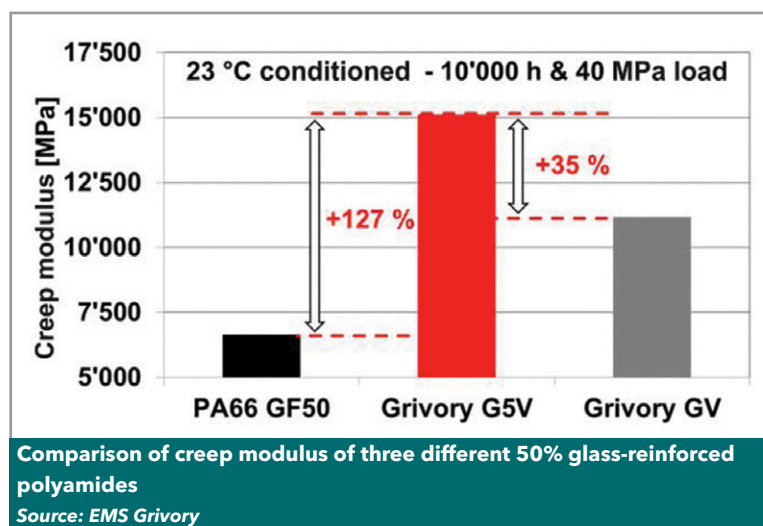
BASF says that with its new heat-stabilised 30% glass fibre reinforced Ultramid B3PG6 BK23238, introduced earlier this year, it is expanding its product portfolio of polyamides for the high-temperature range. The stabilisation system offers heat resistance of up to 190°C and also prevents galvanic corrosion on electrical components due to its halogenide- and metal-free chemistry (halogenide content is under 50ppm). The compound is also said to impress with excellent thermal aging performance, as well as vibration and hot gas welding properties.

According to Andreas Stockheim, Segment Marketing Manager Powertrain and Chassis in BASF's Performance Materials division, the material "can not only be used in conventional environments [meaning for internal combustion engine compartments], but is also suitable for electronic applications, such as in electric vehicles."

In late October, Avient introduced Edgetek Toughened polyphthalamide (PPA) formulations. The heat-stabilised, impact-modified materials are formulated in filled and unfilled grades. They maintain tensile strength and tensile elongation properties when tested for long-term thermal aging up to 120°C. With enhanced chemical resistance, they are targeted at such applications as cooling systems, housings, fuel pumps, and structural components.

EMS Grivory, meanwhile, has relaunched a grade in its portfolio of partially aromatic polyamides, Grivory G5V, which it says shows a significantly improved performance at higher temperatures. It was developed for metal replacement applications, such as automobile instrument panel supports, air vents and seat shells, as well as functional components in non-auto applications. Improved creep resistance allows lower wall thicknesses to be used.

Grivory G5V first came out at K 2016, but Nikolai



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Lamberts in Product Management at the company says that since then, various modifications have been made to the production process and the product, so today it is a lot different. It still contains glass fibres though (35% or 50% at the moment, but there will be other versions coming out later).

The new Grivory G5V is for applications at temperatures of up to 100 °C. Modulus of elasticity in a conditioned state at 80°C is 45 % higher than the company's well-established Grivory GV (PA66+PA6I/X), while creep resistance is 35% higher.

Lanxess is expanding its range of halogen-free, flame-retardant, glass-fibre-reinforced PA 6 compounds to include Durethan BKV30FN01 and Durethan BKV30FN04 DUS064. Both products are designed for use in thick-walled components with specially optimised requirements regarding fire resistance. Potential applications include power tools, household appliances and industrial equipment. "These structural materials also offer outstanding potential in the field of electromobility and its periphery - for components such as thick-walled battery covers or charging plugs and the associated connector holders," says Alexander Radeck, an expert in flame-retardant plastics at Lanxess.

The new products are derived from Durethan BKV30FN04, which is already widely used in flame-retardant components. This compound achieves a UL 94 V-0 rating at 0.4mm. Many components requiring a high degree of flame resistance, however, are much thicker than 0.4mm, so they can be made using compounds containing less flame retardant while still obtaining sufficient fire resistance.

Durethan BKV30FN01 and Durethan BKV30FN04 DUS064 are specially designed for components with wall thicknesses of 0.75 - 1.5mm and more. They have a V-0 classification with 0.75mm and 1.5mm respectively. Radeck says the specially optimised flame-retardant package provides very good processability during injection moulding. "They also ensure high-quality surfaces, even with large, planar component geometries," he says.

Lanxess is planning to expand the Durethan BKV FN range to include exceptionally easy-flow variants for thick-walled components.

Evonik is expanding its portfolio of PA 12 compounds for insulating electrical conductors,

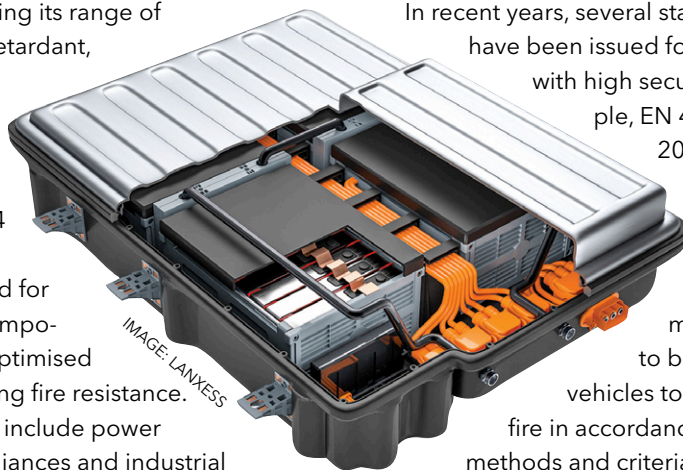
with Vestamid LX9050 OR, which is suitable for extrusion and injection moulding. It contains a halogen-free flame retardant system to achieve a UL94 V-0 rating and is coloured orange (RAL 2003).

The new grade was developed especially for e-mobility and "offers the possibility of making energy management in electric vehicles even more efficient and, above all, significantly safer," says Eckart Ruban, who is responsible for e-mobility in Evonik's High Performance Polymers Business Unit.

In recent years, several standard requirements have been issued for many industries with high security risks. For example, EN 45545-2 was issued in 2013 for railway applications, and became mandatory in Europe in 2016. It sets out the material specifications to be used in railway vehicles to protect them against fire in accordance with the test methods and criteria specified in the standard, depending on the place of use.

Compounder **Eurotec** has recently been developing and certifying many tailor-made products to meet the increasing high safety requirements in the transportation industry. It has developed products with PA 6 and PA 66 fire resistance grades to meet the demanding requirements for application classes R22-R23 in accordance with EN 45545-2. Tecomid products can be safely used in electrical and electronic applications for railway vehicles, such as insulators, switches, relays and connectors.

Eurotec says it continues to develop products to offer proper solutions to the more demanding requirements of technical applications needed for the railway industry.



Left:
Durethan BKV30FN01 and BKV30FN04 DUS064 were developed for components like thick-walled battery covers or charging plugs and the associated connector holders

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IMAGE: ISTOCK/JAMESTEOHART

Automotive megatrends spur the need for plastics

The processor chip shortage has had a severe impact on car production, but nonetheless advances in moulding technology and materials continue to support automotive plastics innovations. By Mark Holmes

The automotive market is on the move again and injection moulding machine manufacturers and developers of compounds and composites are innovating to meet the multitude of challenges presented by the move to e-mobility and electric vehicles, while meeting sustainability targets with higher quantities of recycled materials.

Mobility is changing and automakers are gearing up for the ultimate electric and digitally connected reinvention, according to **Sumitomo (SHI) Demag**. Already, vehicle interiors have commenced the shift towards greater comfort, convenience, driver safety and creating a sensory experience. For exhausted engine vehicles, noise reduction, efficiency and weight reduction remain major trends. Additionally, for hybrid vehicles there is a focus on improving and regulating the thermal management of the temperature to ensure the

system can adapt to the ambient temperature and maintain comfort for passengers. In all-electric vehicles, current trends are focused on improving the protection of the current. Materials like Duroplastics are experiencing a renaissance. Additionally, the vibration and resonance behaviour are totally different in an EV and consequently need a new selection of materials and part design.

As a result of Artificial Intelligence (AI) and infotainment trends, car interiors are changing fast, says Nigel Flowers, UK Managing Director of Sumitomo (SHI) Demag. Bulky dashboards are being replaced by more aesthetically pleasing minimalist surfaces. Customisable controls are boosting comfort. Interior lighting, acoustic systems and sound insulation are being integrated into door panels. Featuring fewer switches, tactile panels create a more sensory experience for

Main image:
Future interior vehicle designs will offer drivers a greater sensory experience with fewer buttons and switches

Right: The newest IntElect series can accommodate larger moulds, providing an energy efficient option for automotive applications previously requiring a larger tonnage

Below: Arburg's new Allrounder More series is equipped with numerous optimised features for production-efficient two-component injection moulding

motorists. In the future, applications like this will reduce the number of components in a vehicle.

"From vehicle entry to fingerprint ignition, sensors to computer vision software, the possibilities are endless," says Flowers. "Health, wellness and wellbeing (HWW) are new features already being spotlighted, with a number of startups developing health tracking sensors to monitor heart rates, rhythms, fatigue and stress levels. Sophisticated biometrics like this could even adjust personal comfort settings or perform an automatic alcohol breath test."

He says: "In-car voice assistance has an equally big role to play. For many consumers, voice is one of the biggest purchasing influencers, suggests a report by Voicebot, allowing drivers to safely access navigation, detours, and potential pit stop information. Over 60% of drivers now factor the availability of voice assistance when purchasing a new vehicle. By no means new technology - Ford pioneered its Bluetooth connectivity way back in 2007 - brand consistency from home to car is emerging as a preference. In April Lamborghini unveiled the first car to rely entirely on Amazon Alexa to control environmental settings. The level of hyper personalisation and sophisticated in-car entertainment that pushes content from one connected device to another is opening up a whole new market for manufacturers and OEMs."

As with any electronics or safety component, moulding precision and stability is paramount. This need to enhance precision and eradicate component defects is prompting more moulders in the automotive supply chain to switch to all-electric injection moulding machines. "If you are repeatedly manufacturing a connector or sensor and you



IMAGE: SUMITOMO (SHI) DEMAG

know it performs between the upper and lower weight limit, an all-electric system will enable you to run much closer to the lower limit, with greater precision and consequently fewer defects and lower scrap rates," adds Flowers.

According to Sumitomo (SHI) Demag, its newest IntElect electric machine series is dynamic, precise and energy saving, and features direct servo drives, enabling improved repeatability and shorter cycle times. Ranging from 220 to 500 tonnes, the big tie bar spacing, increase in mould height and opening stroke mean that the new IntElect models can accommodate larger moulds. The result is a less energy intensive machine for automotive applications that would previously have required a larger tonnage.

"As society moves towards more integrated and sophisticated electronic components in vehicles, injection moulding machines and OEMs have to adapt," Flowers adds. "All of the technological enhancements in the IntElect series are designed to give moulders the tools, machine synchronisation, mould safety and real-time production monitoring required for the next generation of digitalised automotive concepts."

The IntElect's optimised clamp force is a result of an innovative double centre press platen. Designed in-house by Sumitomo (SHI) Demag, it ensures equal surface pressure distribution. Units can be modified with a larger screw geometry and non-return valve (ActiveLock) to achieve higher repeatability and precision.

Arburg reports that the automotive market is trending upwards once again, across the board, with most projects involving electric mobility. Pilot installations are just starting up. However, it will still take a while until these products and models go into widespread volume production, says the company.

In the era of digitalisation, increasingly complex production processes for automotive applications are placing high demands on production cells that are also required to be 'smart'. "To enable the Allrounder injection moulding machines to be

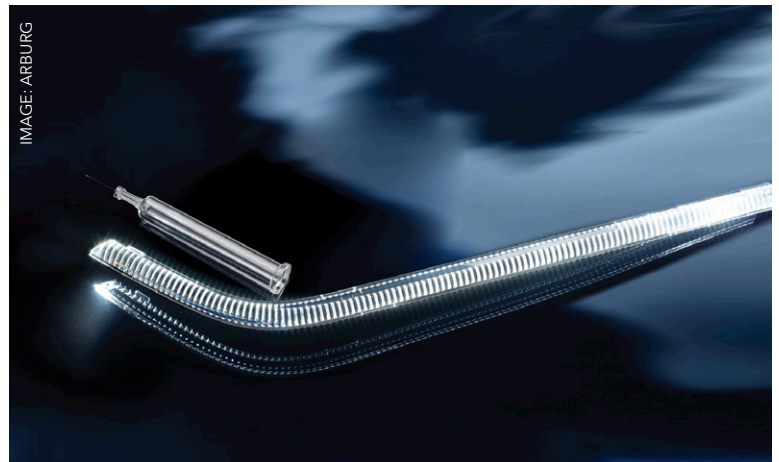


IMAGE: ARBURG

networked in a standardised manner, they are equipped with an IIoT [Industrial Internet of Things] gateway and have basic connectivity," says Manuel Witte, Department Manager Applications and Industries. "By incorporating software such as the Arburg ALS host computer system, production data can be captured in real-time and analysed, greatly improving production efficiency and transparency."

He continues: "Something highly relevant to the automotive industry is the ability to trace individual components or installed sub-assemblies on a 100% basis. One way of achieving this is with the Scada system, Arburg Turnkey Control Module (ATCM). The ATCM visualises the processes of complex turnkey systems and merges all relevant process data and quality data in a component-specific manner. To accomplish this, the injection moulding machine, the automation system and the peripherals – such as laser, scanner, image processing systems and measuring instruments – all supply relevant data to the ATCM."

At Fakuma 2021, Arburg launched the Allrounder More. This new range of machines for the efficient production method of multi-component injection moulding provides more space for larger



tools, greater flexibility for adaptation to specific customer and market requirements, as well as numerous optimised features for greater ease of use and simple maintenance. In addition, energy-efficient and liquid-cooled servo motors make this new series very attractive, says the company.

Allrounder More machines are all equipped as standard with a highly dynamic electric toggle-type clamping unit with energy-efficient liquid-cooled servo motors. At series start, the machines have two electric injection units and a clamping force of

Above: Arburg says the quality of transparent components can be improved greatly with nitrogen flushing in the material infeed zone

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either 1,600 or 2,000 kN, as required. In future, it will be possible to select injection positions using modules. Initially one horizontal and one vertical injection unit (V-position) will be available as standard. Horizontal L-shaped (L-position), parallel vertical or parallel horizontal (P-position), and angular (W-position) injection units will additionally be available as options. This will enable all common two-component applications to be realised.

Arburg adds that there is plenty of free space for moulds, rotary units, media connections and a usable ejector stroke. The tie-bars have been extended by 200 mm as standard and the moving mould mounting platen has also been enlarged by 200 mm. The distance between tie-bars is 570 x 570 mm, and the maximum platen daylight 1,200 mm. The sliding guard has also been widened by 400 mm. Together, all these features facilitate accessibility to the mould area.

Special emphasis has been placed on ease of maintenance and use, adds Arburg. Among such features are plug-in media couplings for electrics, water and hydraulics. The cylinder module can be changed in a few easy steps. The vertical injection unit can be conveniently positioned on a support frame, placed on the ground and transported separately from the machine if required. The material is fed outside the mould area so it cannot be contaminated by granules. Hose guides optimise hose routing and prevent possible chafing marks. With its numerous improvements to details and modular design, the new Allrounder More series meets all the requirements of a modern multi-component machine, says Arburg. It offers added flexibility for precision configuration and greater efficiency in the production of high-quality plastic parts made from different materials and colours.

Another innovation for Allrounder injection moulding machines regarding manufacturing of transparent visual components in cars is a turnkey solution for flushing the material infeed zone on the moulding unit with the inert gas nitrogen. "This prevents material decomposition caused by oxidation during the preparation of a melt that can cause black spots or yellow discolouration and would constitute rejection criteria in terms of product quality," says Witte. "The supply of nitrogen is designed as a compact unit with integrated flow rate measurement. The desired amount of gas can be adjusted easily and accurately using a pressure regulator. Nitrogen flushing is advisable for melts at risk of oxidation, for example, when processing PC and glass substitute materials such as COC and COP."



IMAGE: ENGEL

Engel says the automotive industry has returned to more robust business levels, with investments being made again worldwide. "The focus is now clearly on electric mobility, and that requires innovative injection moulding solutions," says Franz Füreder, Vice-President Engel Automotive. "However, the fact that the production lines in some plants have come to a standstill due to the chip shortage is already having an impact on investments in injection moulding technologies. The next few weeks and months will show the extent to which this will have a lasting impact on growth."

Autonomous driving, connectivity and car-sharing are among the major trends, and sustainability and recycling are further innovation drivers, as shown by the example of electromobility, says Füreder. Sustainable mobility demands that components which are made of fibre reinforced plastic composites are returned to the materials cycle at the end of the vehicle's service life. So far, this has not been practised in many cases. Engel has a viable solution to this challenge in the form of its Organomelt technology because it enables the production of components all based on thermoplastics.

Applications requiring new solutions regularly involve lightweight construction, as well as sensor technologies and functional surfaces. In some cases, completely new applications are developing. "We are also seeing an increasing demand for multi-component solutions, for injection compres-



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IMAGE: KRAIBURG TPE



Above: The RC/UV series of compounds from Kraiburg TPE contains at least a 20% proportion of post-industrial recycled material

sion moulding, foaming and optical technologies, and very strongly for composite processes,” says Füreder. “Electromobility requires injection moulding solutions that combine high processing precision with a robust machine design. The background to this is that in many cases demanding, abrasive materials with a high flame retardant finish and high fibre content are processed. This increases the demands on the plasticising units.”

To meet these new requirements of the automotive industry, Engel says that it offers a wide range of technologies. Examples include Organomelt technology in the field of lightweight composite construction for processing organic sheets and UD tapes, as well as Foilmelt and Clearmelt in the field of surface technology. These two multi-component IMD technologies make it possible to obtain high-quality and at the same time robust surfaces and to functionalise them in a cost-efficient manner.

The automotive industry is still a dynamically growing sales market, with plastic materials currently one of the most discussed topics in the sector, according to **Wittman Battenfeld**. “The characteristics of plastics over other materials is still crucial in the development and construction of new vehicle parts, both interior and exterior,” says Rainer Weingraber, Chief Executive Officer. “These include weight, integration of functionalities, insulation, various surfaces and a broad spectrum of design possibilities. Other factors influencing the market include the development of new technologies and resource-friendly design, as well as production paired with circular economy topics.”

He continues: “There are also various factors driving developments. These include energy efficiency, lightweight design applications and quality control, as well as the integration of various functions in produced parts such as sensor foils or particles for quality control. Of course, a high

degree of automation is generally always required. For all of these topics we offer solutions for customers. These include the proven energy efficiency of our machines that gives us a competitive advantage. In addition, Wittmann 4.0 integration provides seamless and harmonised communication within the entire work cell, as well as MES systems that ensure easy operation and detailed quality control.”

Quality control when processing recycled materials can be difficult. Weingraber adds that there are always viscosity differences within a batch. To be able to compensate for this directly on the injection moulding machine, methods must be developed that can detect this, while also offering software solutions that can automatically compensate for these material fluctuations. Wittmann Battenfeld has developed software packages – HiQ Melt and HiQ Flow – specifically for this topic.

For future-oriented operating concepts, one main area of development is a modular system technology for IMD. At this year’s Fakuma show, the company introduced an interior module of the future. This development includes a complete system concept for decorated and functionalised surfaces, as well as a sensor-controlled, programmable overhead display light console, where operation is via touch through sensors integrated into the component. Operation through touch functions will make dozens of built-in parts superfluous.

Weingraber adds that the company is also investigating new injection moulding operating concepts. “At Fakuma, we gave our customers a taste of it – the Done by the Holo-Voice-Concept,” he says. “Of course, this is no short-term project, but it is a good look into the future of operating concepts.”

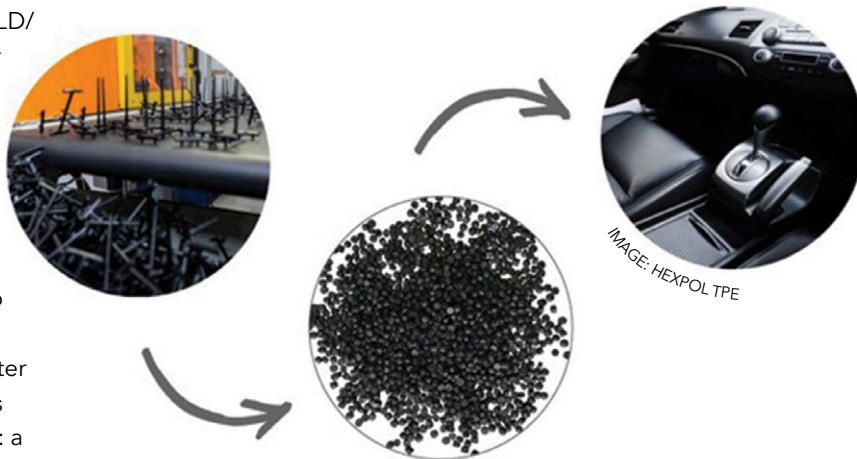
Moulding materials

Kraiburg TPE has developed a new compound series for exterior automotive applications that contains at least 20% and up to 40% post-industrial recycled materials. The company says that the main target of development was the highest possible proportion of recycled materials in the individual hardness ranges. Adhesion to polypropylene enables the implementation of single-component and multi-component parts. The low density of the new compound series allows weight reductions of up to 25% compared to conventional TPEs. The RC/UV series is particularly suited for exterior, under-side and under-the-hood areas of automotives.

Kraiburg TPE Americas has also introduced styrene block copolymer-based TPEs with superior flow properties for automotive interior applications.

The company adds that the Thermolast K FG/LD/AM series is an improved material solution for applications requiring precise dimensions, clean aesthetics, low density, and superior flow properties, dedicated to the needs of US automotive manufacturers. The new series' focus is primarily on addressing the current challenges of existing TPEs used for interior mats, as well as cup holders, door gap seals and trims, glove box mats, for example. Aligning with TPV's density, while offering better flow properties than TPV, the new compounds provide an improved combination of benefits: a wide range of interior part size possibilities, while refining surface quality and reducing processing pressures versus the conventional incumbents TPS and TPV. This series is commercially available in Shore 65A, 75A, and 85A.

Hexpol TPE has expanded its range of TPEs with recycled content - both post-consumer and post-industrial. The new Dryflex Circular TPE grades have been tested for odour and emissions performance in automotive interiors. The company adds that an important aspect of automotive interior parts is their emission behaviour regarding odour



and volatile substances. The exact specifications and requirements vary depending on application and OEM. But generally, the material odour must not be disturbing even at higher temperatures, for example 80°C. A representative Dryflex Circular TPE grade, a 65 Shore A material for inlay mats with a recyclate content of 20%, showed a low amount of VOC (60 µg/g) and FOG (594 µg/g). The TPE was tested at an external accredited laboratory and shown to have almost no odour (grade 2.0 according to VDA 270, B3). The mechanical properties fulfil

Above: Hexpol TPE has expanded its range of Dryflex Circular TPE grades with recycled content - both post-consumer and post-industrial

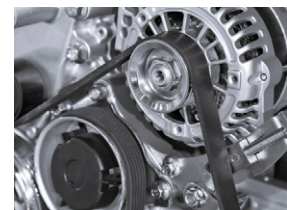
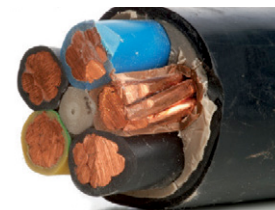


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IMAGE: AVIENT



Above:
Avient's
reSound R TPEs
incorporate
25% recycled
content from
polyvinyl
butyral (PVB)
from broken
automotive
windshields
and laminated
architectural
glass

automotive requirements, and they can be coloured. The material is currently being approved by a German car manufacturer. The new Dryflex Circular TPEs can be used in various automotive interior applications, such as inlay mats, cup holders, sealing lips and HVAC parts.

Lanxess has supplied Chinese car manufacturer Geely with a high modulus and high flow PA 6 base material - Durethan BKV50H2.0 EF - for a front-end carrier to provide a modern lightweight design with optimised costs and good mechanical performance. While the lower cooler mounting is in sheet metal, the complex upper member was developed using the highly filled and heat stabilised Durethan BKV50H2.0 EF, a material well suited for structural components that require high stiffness and strength, says Lanxess. The full plastic design for the upper section caters to a wide range of requirements of this multi component assembly. The concept is a demonstration of a hybrid solution application in automotive lightweight structures with a high modulus thermoplastic material, but also provides a cost-effective solution to achieve multiple saving targets.

Lanxess has also introduced a PA 6 compound made from 92% sustainable raw materials with automotive applications including car front ends, brake pedals and oil pans. The company says that Durethan BLUEBKV60H2.0EF is an easy-flowing compound that uses more sustainable raw materials than in any other quality glass-fibre-reinforced plastic. The new plastic grade is the first product in the new Scopeblue series. The brand label identifies products that either consist of at least 50% circular (recycled or biobased) raw materials, or whose carbon footprint is at least 50% lower than that of conventional products. One of the raw materials used in the compound's production is

cyclohexane from sustainable sources - meaning cyclohexane that is either bio-based, recycled bio-based or produced by means of chemical recycling. The material is also strengthened with 60wt.% glass fibres comprising industrial glass waste instead of mineral raw materials. The alternative raw materials that Lanxess uses in the precursors for PA 6 are chemically identical to their equivalents of fossil origin (drop-in solutions), so Durethan BLUEBKV60H2.0EF exhibits the same characteristics as the virgin material and can be processed just as easily using exactly the same production tools and facilities with no conversion work needed. The developers are looking to increase the content of sustainable raw materials in this compound to 100%.

Avient has introduced a new series of polyamide-based Complèt long fibre reinforced thermoplastic composites with enhanced moisture resistance and smooth surface aesthetics for lightweighting automotive and powersports applications. The company says that the formulations feature PA 6 and 66 with delayed moisture absorption, which prolongs the effectiveness of their structural performance in moisture-rich environments. These new materials also take aim at inconsistent surface appearance issues with long fibre polyamides, which have affected quality perceptions in the past. Long glass fibre reinforced grades of Complèt have surfaces that are smooth and virtually free of visible fibre.

Avient has also made additions to its growing reSound R recycled content TPE range, which are suitable for automotive applications that benefit from vibration damping, such as door mats, door damping and glove boxes. The materials are a result of close collaboration with Shark Solutions, a manufacturer of sustainable PVB products. Both new TPEs contain 25% post-consumer recycled content from PVB reclaimed from broken automotive windshields and laminated architectural glass. Avient's formulation allows the supply of reprocessed, high-quality, non-toxic PVB to be upcycled into more sustainable TPEs with good properties. Developed in 45 to 55 Shore A durometers, the new reSound R grades are injection mouldable TPEs that can be overmoulded to PP and come in a natural grade that can be easily coloured.

EMS-Grivory has developed two new polyamide compounds, Grivory G5V and Grivory HT6, for automotive metal replacement applications. The company says that both products expand the application opportunities for polyamides into higher temperature ranges and enable the cost-efficient production of lightweight components,



Fire Retardants in Plastics

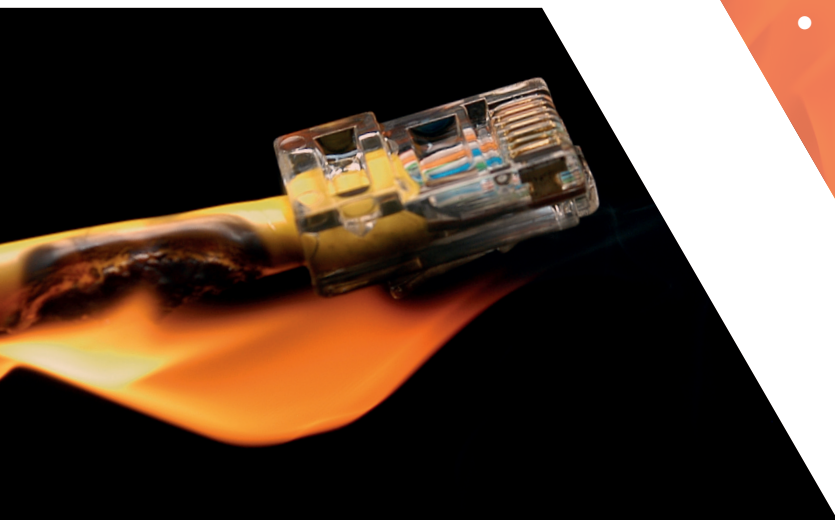
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Right: Grivory G7V grades are designed to make technical components more economical. From pearl white through neon colours to glossy black: Grivory G7V grades offer a high degree of creative freedom

which until recently could only be achieved with metallic materials. The improved creep resistance of both products allows lower wall thicknesses to be used, allowing cost and weight savings to be achieved, even compared to other metal replacement solutions.

The company adds that Grivory G5V has been developed for applications at temperatures of up to 100°C. The stiffness of the material (measured as modulus of elasticity) in a conditioned state at 80°C is 45% higher than that of Grivory GV. This is due, among other things, to reduced moisture absorption, which also ensures improved dimensional stability. The improved stiffness at higher temperatures makes component designs with lower wall strengths possible, which is further facilitated by a 35% improvement in creep resistance compared to Grivory GV. This allows cost and weight savings to be achieved. As is usual for Grivory GV components, the mechanical properties of the product remain practically unchanged, even after conditioning (moisture absorption) and Grivory G5V is also easy to process using injection moulding methods. Grivory G5V has been designed for use in structural components in automobile interiors, such as instrument panel supports, air vents and seat shells, as well as functional components in mechanical engineering, furniture fittings and fastening elements, where the material's stiffness at temperatures of up to 100°C and low tracking index are important.

The company has also introduced Grivory G7V for high gloss metal replacement and a good surface finish. The new high-performance polyamide gives visible components a decorative and stylish finish that is also resistant to scratching and chemicals. In addition, Grivory G7V makes high-gloss surfaces possible for glass fibre-reinforced compounds. Glass fibre-reinforced Grivory G7V combines properties such as increased stiffness and strength, even after moisture absorption, with the chemical resistance of a Grivory GV and the high-quality finish of a low or non-reinforced polyamide. In addition, the new Grivory G7V products exhibit better UV stability than other semi-aromatic polyamides. The material is a new aliphatic high-performance polyamide with well-balanced properties, which enable cost-efficient production of lightweight components without any additional painting.

The surface sheen of glass fibre-reinforced polyamides often misses the mark when it comes to visible parts because the surface is too rough or too uneven, adds EMS-Grivory. Partially crystalline



polyamides contract during cooling, leaving sink marks on the surface and rough areas due to exposed glass fibres. Complex injection moulded parts therefore often have to be painted in a separate production step to cover critical areas. Grivory G7V has a melting point of 215°C and offers all the advantages of a semi-crystalline aliphatic polyamide, such as PA6 or PA66.

Lower shrinkage and a reduced crystallisation rate compared to PA66, make for a shinier, smoother, more uniform, and easier-to-clean surface, says the company. This makes it possible to produce a perfect surface finish using glass-fibre-reinforced material. In addition, the smooth surface also minimises friction noise and wear. The company says G7V also benefits from being a 'genuine Grivory GV' with reduced moisture absorption and comparable stiffness and strength in a dry and conditioned state. The new polymer glass-fibre system Grivory G7V significantly improves the finish of the surface while maintaining a high glass fibre content. Due to its delayed freezing behaviour, it reproduces the mould surface perfectly without extending the length of the cycle. Another advantage of the aliphatic polyamide is its minimal shrinkage. This allows for the precise production of components, while the risk of ending up with a wavy surface (known as 'orange peel') is significantly reduced. Even the basic grade, Grivory G7V-5H (GF 50), low-distortion parts with a high-quality surface and an average roughness depth (Rz) of less than 1µm can be produced. Special X-types reduce distortion even further. Gloss and rigidity combined A high-gloss and uniform surface sheen defines the value and brilliance of a surface. Another required property is increased hardness of the surface to ensure the surface is scratch resistant. Grivory G7V combines these properties in one product. If a surface achieves a gloss value of greater than 70 at an angle of incidence of 60°, it is considered a high gloss surface. All new versions of Grivory G7V easily meet these requirements with a

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IMAGE: SABIC



Above: SABIC has developed new LNP Thermocomp compounds for advanced driver assistance systems (ADAS) radar covers

50% glass fibre content.

Grivory G7V was developed for high-gloss component design and straightforward processing by injection moulding methods. The material is easy to process due to its flowability and wide processing window. A good surface finish is achieved at melt temperatures of 270°C and above in combination with normal mould temperatures between 100-120°C. Due to the low melt and mould temperatures, injection moulders can save energy and reduce costs. Grivory G7V can be used in a wide variety of applications. The material is particularly well-suited for structural components in automotive interiors, such as air vents, indicator and gearstick levers and handles, for example.

RadiciGroup has launched the Renycle range of engineering polymers originating from pre- and post-consumer recyclate with high environmental performance, suitable for automotive and e-mobility applications. The company says that the Renycle PA 6 and PA 66 products include a variable percentage of post-industrial and post-consumer recycled polymers, which are the result of careful selection from incoming raw materials and advanced mechanical characterisation.

BASF and Grupo Antolin have developed automotive roof frames with Ultradur High Speed PBT. The design allows weight reduction while meeting the trend towards panoramic roofs in the automotive industry. The roof is integrated into the ceiling trim (headliner) of the car which is made from light polyurethane Elastoflex E 3943/134. The actual sunroof opening in the headliner is supported by a structural bracket. Traditionally made of heavy steel, Ultradur High Speed offers a metal replacement solution. The design of these parts allows a weight reduction up to 60% compared to other traditional solutions. The material allows the injection of large parts with good performance characteristics, such as dimensional stability, low

warpage at short cycle times, high stiffness, high temperature resistance and good flowability.

Röhm has developed a new automotive moulding compound – Plexiglass Optical HT – for the best optical quality at a high continuous service temperature. The new compound is Röhm's reaction to industry trends such as high-power LEDs in vehicle lighting and the demand for long light guides for striking signature lights. The company says that the moulding compound guarantees the best possible optical quality even at elevated continuous service temperatures of up to 105°C. Röhm has also introduced Plexiglas Resist AG 100 for vehicle front applications. The company adds that it has high impact resistance, is extraordinarily robust and weather-resistant and combines high heat deflection temperatures with good optical qualities. The material is a cost-efficient alternative for many components in automotive manufacturing which would otherwise require post-mould UV protective coating to achieve a comparable UV resistance.

SABIC has developed new LNP Thermocomp compounds for advanced driver assistance systems (ADAS) radar covers that require high-performance materials that can optimise the capabilities of today's higher-frequency (>75 GHz), millimetre-wave (mmWave) radar units. WFC06I and WFC06IXP compounds have been developed for the front and back enclosure covers (respectively) of next-generation radar units. The glass fibre-reinforced PBT grades offer a low dissipation factor (Df) and dielectric constant (Dk) to help support the transmission of higher-frequency radar signals. They also feature super-low warpage that allows designers to potentially create new, thinner covers that improve signal transmission. Furthermore, these new SABIC products can contribute to efficient radar unit assembly by supporting high-speed, high-precision laser welding.

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What's new in hot runners

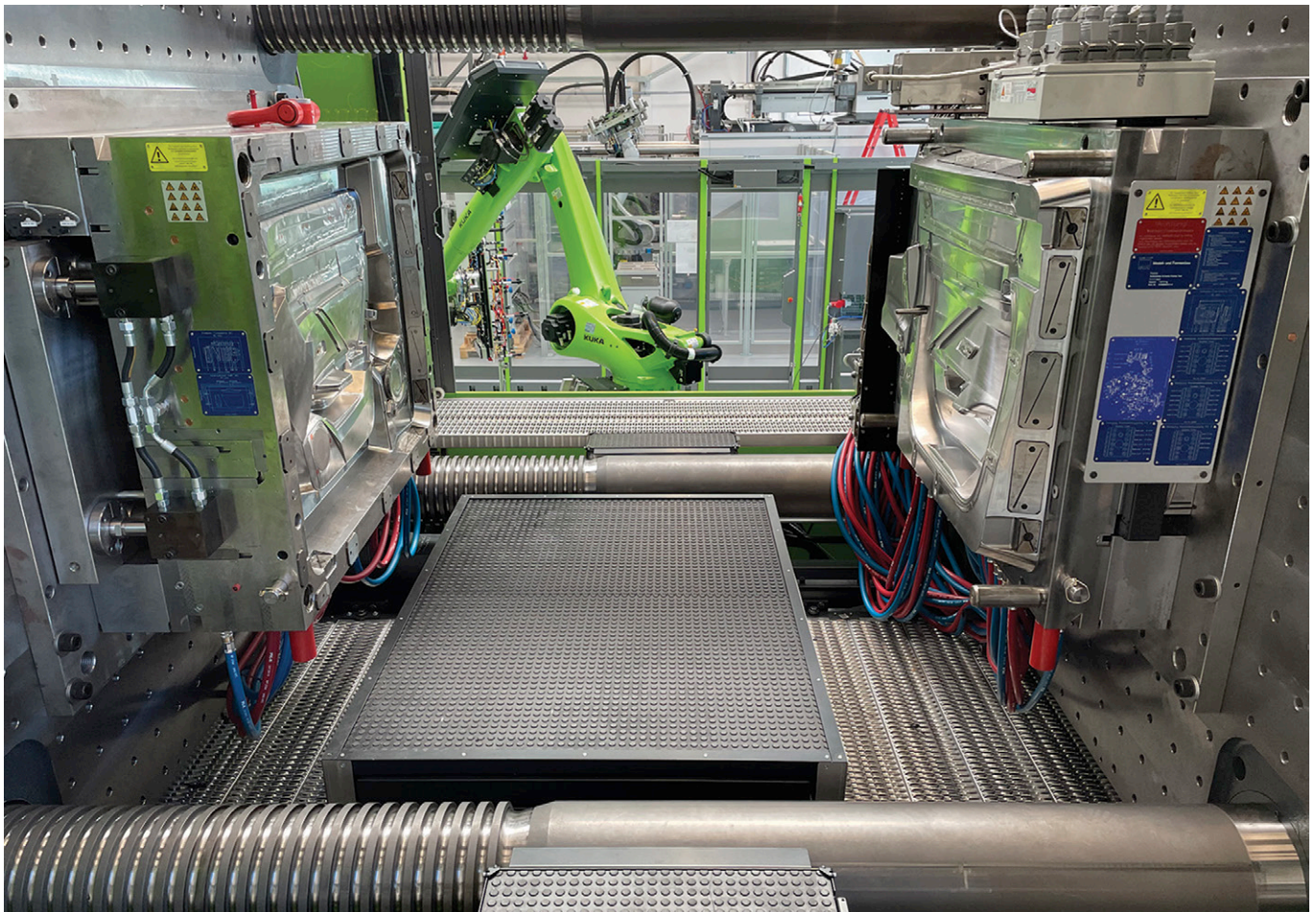


IMAGE: FOBOHA

Fakuma 2021 provided a showcase for new developments from hot runner companies. Injection World reports on some of the highlights from the show

Hot runner technology continues to evolve, enabling injection moulders to increase precision, improve part quality, cut material waste and more. Many of the recent developments by leading technology suppliers in the field were on display at Fakuma 2021, which took place in October in Friedrichshafen, Germany.

Barnes Molding Solutions – which is made up of Synventive, Männer, Foboha, Thermoplay, Gammaflux and Priamus – showed its broad range of mould making and hot runner technology, including integrated solutions for temperature and process controls, on a joint stand at Fakuma. Jessica Poliner, President of Barnes Molding Solutions, said before the exhibition: “This year at Fakuma will be particularly exciting because our connected brands

and portfolio have come together stronger – especially with the leadership and focus on innovation from our new product management organization. We have connected extensively with our customers and considered their feedback to build new solutions to serve as a one-stop-shop for our customers across all segments that we serve. I am excited for what the team has put together this year and for the roadmap of new and next generation products we have in the pipeline.”

Sustainability was a unifying theme for all the Barnes brands during the show. The companies are partners in the HolyGrail 2.0 digital watermarks initiative for identification and sorting of material types during the recycling process for plastics packaging. Mould maker **Foboha** is making a key

Main image:
Barnes Molding Solutions has opened its new **Customer Technology Centre** in **Haslach, Germany**, at the site of its **Foboha business**

IMAGE: MÄNNER



Above: The MoldMIND III smart device was developed for all of the Barnes brands and third-party providers

contribution to this effort to develop and introduce digital watermarks into injection moulds, which will enable sorting systems to process a wide variety of plastics packaging more accurately than before.

"We are very proud to be a key player in the Digital Watermarks Initiative HolyGrail 2.0, which was initiated in the spring of 2020 by AIM - European Brands Association and the Alliance to End Plastic Waste," said Arno Pfaff, Vice President, Business Development and Strategy, Molding Solutions.

"We have been active in this initiative since 2016 under the leadership of the Procter & Gamble Company and facilitated by the Ellen MacArthur Foundation."

Barnes says customers in the automotive sector are also demanding more sustainable solutions. Hot runners company **Synventive** recently launched eGate Sync, a motion controller enabling the electrical movement of the valve gate. The new eGate Sync allows for a much faster plug-and-play installation on a hot runner, it says. Unlike hydraulic or pneumatic systems, eGate Sync improves the process, focusing on sustainability by leveraging electrical technology. This results in higher quality parts with greater efficiency and reliability.

New from **Priamus**, the Barnes company involved in cavity pressure and temperature control, is FillControl. This balances inconsistencies in the moulding process automatically by reducing cavity-to-cavity variations. These auto-corrections are especially relevant when processing bio-based or recycled materials to control and balance viscosity variations. At the same time, this allows for implementations of regrind resins with a broader viscosity range. Barnes says a clear benefit to customers is the ability to minimise personal attendance for process adjustments, even with the complexity of high cavitation.

The group is becoming more active in the area of smart machines. It says: "With an increased demand for production and machine information comes the need for industrial smart devices, which are the first step to capture operational data. With that, customers can make more informed decisions faster. Smart

devices are the gateway to the information you need to take immediate action, improve productivity, and start your journey for a digital transformation."

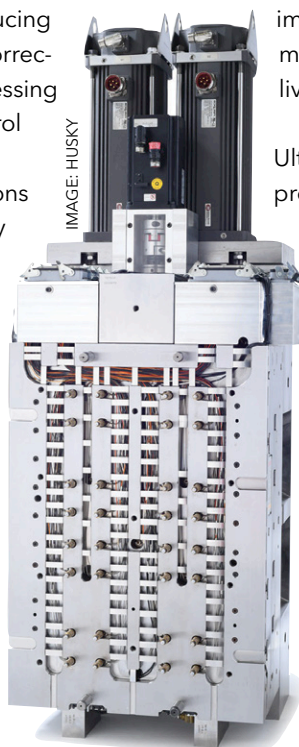
Barnes' digital platform transmits data from the mould to a cloud infrastructure. It allows its users to dramatically reduce catastrophic events, optimise maintenance costs, and increase uptime and output. MoldMind III is the first smart device developed for all of the Barnes brands and third-party solutions. The group says MoldMind III will be a standard offering on all moulds starting from 1 January 2022.

Not long after the end of the Fakuma show, Barnes opened its new Customer Technology Centre in Haslach, Germany, at the site of its Foboha business. All of the group's businesses are represented at the centre which covers a variety of customer end markets including automotive, medical, packaging and electronics. The facility is equipped with an Engel Duo 2700 / 17060 injection moulding machine. Customers will have access to hot runner solutions through Synventive's Dynamic Feed pressure control system and the Synflow pin control technology, moulding multiple parts of varying sizes in one cycle. The machine will also be equipped with a **Gammaflux** temperature controller and Priamus pressure sensors to demonstrate the process improvements offered through advanced controls technology.

Husky Injection Molding Systems introduced its UltraShot Injection System earlier this year, which it says delivers plastic in a way that increases part design flexibility, while reducing risk and improving part quality and speed of mould qualification. The system made its live debut at Fakuma 2021.

The company says that key to the UltraShot Injection Technology is that it produces pressure near the cavity with a precise, servo-controlled injection system. This provides control of cavity filling and balance for critical parts and challenging applications. Pressurising the resin near the cavities reduces the influence of resin compressibility and shear, and thermal variations on balance and part quality. Eliminating these influences achieves balance and good part quality. Unlike conventional hot runners, balance and part quality do not degrade with higher cavitation tooling, says Husky. The discrete injection circuit design is scalable to 128 cavities, providing the

Right: Husky has introduced the UltraShot Injection System



3D printing tool inserts for foam moulding

SKZ, the plastics research and services centre based in Würzburg, Germany, has started the ADDfoam project using additively manufactured tool inserts to enable the injection moulding of high-quality foamed components with superior surfaces.

3D printing of mould inserts for small series production has grown as an alternative to conventional tool making, which is time-consuming and cost-intensive. However, SKZ says the use of additively manufactured tool inserts for injection moulding presents new challenges and requires rethinking process management. For example, the heat transfer properties of the mould largely determine the degree of crystallisation and the shrinkage behaviour, so inserts made of plastic require longer cooling times. Also, the cyclical forces of the clamping unit and the ejector lead to rapid failure of the mould, it says.

By combining additively manufac-



Left: 3D printed tool inserts produced in the SKZ ADDfoam project

tured tool inserts with foam injection moulding, the disadvantages of the respective technologies are compensated for in a cost-efficient manner, says SKZ. The saving of the holding pressure phase during foaming, the lower melt temperature of the gas-laden melt and the reduced mass of the component lead to a significant reduction in cycle times. The lower internal mould pressures in the foam moulding process significantly reduce the cyclical load for additively

manufactured tool inserts, it says.

In the ADDfoam research work, the dimensional accuracy and reproducibility as well as the surface properties are examined depending on various production parameters for both the tool inserts and the injection moulded lightweight components. Another research focus in the project is on the durability of the printed synthetic resin tools and the effect of their use on the mechanics and optics of foamed components.

same process conditions regardless of mould size. Elimination of the scaling effects leads to faster qualification time from pilot to product tooling while reducing risk.

Husky says that typical design rules for injection moulding do not apply with the UltraShot Injection System. The technology delivers high pressure at the gate with greater control than conventional injection moulding systems. This means that parts can be designed the way they need to be and not constrained by the requirements of the injection moulding process. Parts completed with other processes or post-mould assembly can now be produced in a single injection moulding cycle.

Compared to conventional hot runners, Husky says that melt in the UltraShot Injection System experiences fewer high-pressure injection cycles, preserving the original resin properties. This leads to lower moulded-in stress and better mechanical and optical properties in the moulded part.

The UltraShot is powered by the Altanium Mold Controller, which provides an advanced process monitoring and control for injection moulding. Injection is performed with electric servo motors providing accurate and repeatable performance. The controller offers real-time visual graphing of

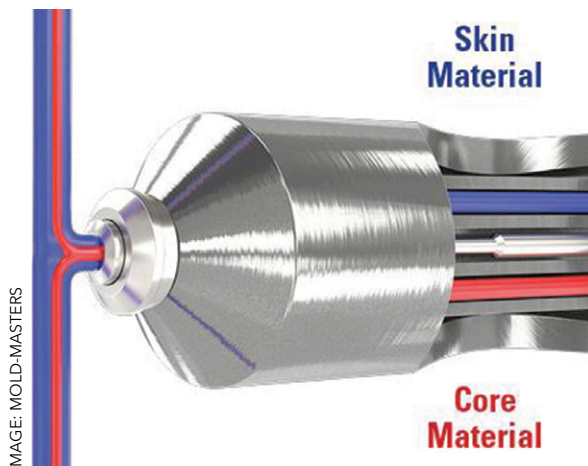
key injection parameters. In addition, each parameter can be set with tolerance bands and alarm outputs to give control of the injection moulding process. The controller integrates hot runner temperature and mould servo control in the same unit, says Husky.

At Fakuma, the latest addition to Husky's hot runner portfolio was also shown. Pronto Direct "offers outstanding flexibility, value and performance and is ideal for automotive, packaging and consumer electronics part moulding" the group says.

Mold-Masters introduced a number of new developments at Fakuma 2021, including its new PET-Series hot runner system for preform production. The system gives the customer the ability to fill thinner PET preforms to reduce material use due to better hot runner balance and less variation in preform weight. It also features a reduction in cycle time due to faster fill time and a wider process window along with a reduction of AA content. PET-Series is compatible with any major brand of pet-preform mould and is available in a wide range of industry standard configurations, plus optional custom configurations.

Mold-Masters announced that its co-injection multi-layer systems are now available for injecting

Right: Mold-Masters' co-injection nozzle combines two resins in three-layer melt stream



light blocking barrier materials as the core layer for PET bottle applications. Light blocking barriers reduce light transmittance by up to 99.9% to extend product shelf life and preserve freshness and flavour of dairy products. It currently offers co-injection PET preform hot halves to inject light blocking barriers as the core layer. By co-injecting the light blocking black layer, there is the opportunity to take thickness out of the container and achieve the same light blocking performance with a thinner wall. This translates into a lower cost package through the potential for overall material cost savings. The co-injection technology can also be used for incorporating recycled material into mouldings. The group says its system can inject up to 50% of core with recycle.

At Fakuma, a live demonstration on the Arburg stand featured Mold-Masters' new Symfill technology. This minimises core shift to improve part quality (straightness) of cylindrical, centre injected components having an aggressive L/D ratio. It achieves this by allowing the melt to enter the nozzle runner channel from multiple sides as opposed to the single-entry point of traditional designs.

It says examples of applications that would benefit from this technology include blood tubes, needle shields, over caps and other similar parts from the medical, cosmetic and stationary industries. On recent blood vial applications that used Symfill, barrel bow was reduced by up to 90% (as little as 0.15mm) by eliminating core shift, it says.

Also on display at Fakuma were TempMaster M3 and ME temperature controller platforms. The M3 incorporates new features including TC-Connect technology that eliminates the need for traditional T/C control cables altogether, reducing cost, weight and clutter from the moulding cell. TC-Connect uses a new eBox design that attaches to the mould. A single, thin and lightweight data communication cable (similar in

size to ethernet) connects from the back of the M3 controller to the eBox. It is compatible with new and retrofit hot runner systems.

The new TempMaster-ME is the simplest and most economical hot runner temperature controller for low cavitation moulds in the Mold-Masters portfolio. The ME controller provides essential features for low cavitation moulds (12 zones maximum) in a compact and lightweight package. Units can be ordered with 6 or 12 zones (15-Amp per zone) and any choice of mould plugs. Its touch screen control has key production and safety features including Soft Start, Wet Heater Bakeout, Continuous Ground Fault Detection, Overload Protection, Automatic Tool Diagnostics, Plastic Leak Detection and Tool Storage.

Fakuma 2021 provided a platform for the first hot runner developments from **Oerlikon HRSflow** since the multi-industry Oerlikon group acquired Italy-based INglass and HRSflow in April this year. The new S series hot runner systems have a low space requirement in the mould and are targeted at production of small-format technical components.

Depending on the application, the new S series can be equipped with screwed-in or non-screwed-in (face-to-face) nozzles. The inner bore size can be selected according to the shot weight. The design allows a compact mould structure with a minimum nozzle pitch of 37 mm. In the valve gate version, the S series is combined with either a compact cylinder 62 mm high or, in the version with adjustable needle position, with a 70 mm high cylinder. Extensive internal laboratory tests have ensured an optimal sealing and thermal profile along the whole nozzle. In addition, a special channel geometry enables fast colour changes.

The company says the new S series is suitable for low shot weights, multi-cavity moulds and thin-walled components. Typical applications include consumer goods, technical and electronic components as well as small automotive parts such as emblems, interior switches, knobs for sound systems or air conditioning components.

Right: The new TempMaster-ME hot runner temperature controller from Mold-Masters



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At Fakuma, Oerlikon HRSflow showcased the new S series in a healthcare application. This hydration reminder device made of PP attaches to bottles or glasses to remind the user by signal to drink regularly. The S series made it possible to meet the requirements for a low part weight with a wall thickness of only 1 mm as well as for quick colour changes, says the company.

HRScool Evo is a further development of the HRScool hydraulic cylinder system for hot runner injection moulding, which does not require active liquid cooling of the actuation unit. Thanks to a further reduction in the heat flow between the hot runner and the mould plate, HRScool Evo version can now be used at higher mould temperatures than its predecessor system HRScool, which was launched in 2019.

Oerlikon HRSflow says it has optimised the heat balance of the cylinder. As a result, the technology, which is mainly used in the production of interior and exterior automotive parts, is now also available for previously temperature-critical applications. Despite the significantly improved heat transfer, HRScool Evo – in both the basic and the damped version – fits into the mould cut-outs of the fully

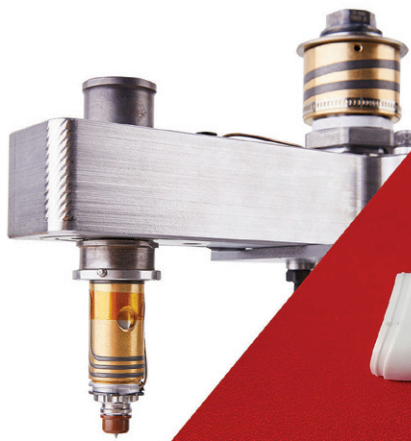


IMAGE: OERLIKON HRSFLOW

Left: Typical applications of Oerlikon HRSflow's new S series hot runner line include small technical parts such as the housing for a smart device called Hydration Reminder (right)

compatible hot runner systems of the P, M, G and A series from Oerlikon HRSflow.

HRScool Evo reduces the heat transfer from the manifold heaters to the oil of the actuator thanks to the geometry optimisation of the contact elements between manifold and cylinder. In contrast, the highly efficient heat dissipation to the cold clamping platen takes place via a cover whose large, flat surface is made of a material with very high thermal conductivity that works as thermal bridge. An

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Europe	10,000
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Meet the Injection World team

- David Kitcher - Editor**
David has over 20 years of experience in the plastics industry, having worked for leading injection moulding companies and as a freelance journalist. He is responsible for the editorial content of Injection World magazine and the Injection World website.
- Chris Smith - Editor-in-Chief**
Chris has been working for injection moulding companies for over 20 years. He is responsible for the editorial content of Injection World magazine and the Injection World website.
- Mark Houghton - Managing Editor**
Mark has been working for injection moulding companies for over 20 years. He is responsible for the editorial content of Injection World magazine and the Injection World website.
- Julie Russell - Production Editor**
Julie has been working for injection moulding companies for over 20 years. She is responsible for the production of Injection World magazine and the Injection World website.

2022 features list

- Way Automotive – 100% electric
- Thermoplastics of the future
- AMT Eye Pen
- March 2022
- Material innovation
- Production
- AMT Eye Pen
- April
- Automotive and robotics
- Recycling
- AMT Eye Pen
- October 2022 (Show Preview)

Exhibition and show coverage

Injection World magazine provides comprehensive coverage of all the major injection moulding exhibitions and conferences around the world. This includes detailed reports on the latest products, technologies and trends in the industry.

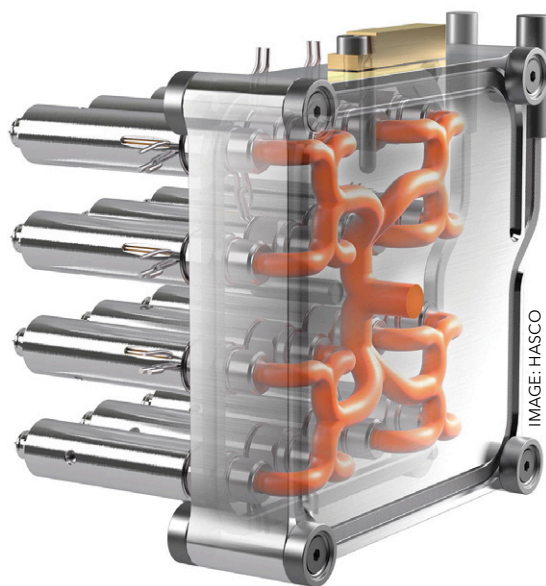
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Right: Hasco's Streamrunner is an additively manufactured hot runner manifold offering maximum freedom of design



integrated height adaptability ensures maximum efficiency even without accurate seat tolerances.

Oerlikon HRSflow says HRScool Evo enables savings in costs and maintenance, because the elimination of liquid cooling reduces the number of components. The connection of cooling circuits is equally eliminated, as is the problem of clogged cooling ducts or the degradation of hydraulic fluids.

Hasco launched its additively manufactured hot runner system at the K 2019 fair. Since then, a number of successfully implemented customer projects have served to confirm the advantages of the system, it says. The company has now adopted the name of Streamrunner for this innovative technology to enable its clear identification and differentiation. This was shown on the Hasco Fakuma stand in the form of a compact, fully balanced 20-fold system.

The Streamrunner is an additively manufactured hot runner manifold offering maximum freedom of design. Using this technology, flow channels can be configured with the optimum rheological layout, avoiding sharp edges and areas with poor flow. The gentle passage of the melt through the

manifold makes for considerably lower shear stress in the material, resulting in better quality mouldings. And the flow-optimised design speeds up colour changes too, since the melt can be divided and deflected over generous radii.

Hasco says the complete absence of diverting elements means the Streamrunner can be produced in a particularly compact design. Very tight spacing down to 18 mm is also possible for high cavity systems, depending on the application in question. The height of the manifold can also be restricted to 26 mm, making it considerably smaller than other manifolds on the market. Used in conjunction with separately controlled nozzles, the advantages of this unique system become even more apparent.

At Fakuma, other Hasco highlights included new Primezone H1281 control units together with a new 4-fold control unit of the Basezone H1250 range. Both control units feature intuitive operation, precise control and maximum production reliability, says the company. It also presented the latest software update for the Primezone range. With the new group and select function, the controller can be parameterised and adjusted to new process conditions very quickly. The possibility of external control has been extended by two functions: in addition to standby operation, the boost and the zone heaters can be activated by an external signal.

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Welcome return of live Fakuma exhibition

Several injection moulding machinery groups announced their successful participation in the Fakuma 2021 exhibition in Friedrichshafen, Germany in October

The Fakuma plastics exhibition, with its strong focus on injection moulding, returned to an in-person event in October, following an online version of the event in 2020 which was necessitated by the Covid pandemic. The trade show's organiser PE Schall and machinery exhibitors expressed their satisfaction with the live event and the high level of business conducted with visitors to Messe Friedrichshafen.

Fakuma 2021 had 1,470 exhibitors from 39 countries which PE Schall said underlines Fakuma's great significance all over the world. Annemarie Schur, Fakuma project manager at the company, said: "Fakuma was even more important this year. On the one hand because on-site trade fairs only became possible again in the fall of 2021, and on the other hand because the issues of environmental protection, circular economy and sustainability

are an enormous task that we all have to tackle."

"I'm delighted that something like this is possible again," said Prof Martin Bastian, Institute Director at SKZ in Würzburg, at the trade fair's opening ceremony. In his technical presentation, he spoke of the work that needs to be done in the plastics industry: "We have to take more responsibility for what happens with plastic. We have to ensure that plastic isn't just accepted, but rather used with enthusiasm as well. And we have to do a lot more to educate people about its benefits."

Engel declared "Fakuma 2021 was a complete success" for the company. The injection moulding industry's first major face-to-face event after the automotive crisis and Covid pandemic "took place at exactly the right time", it said.

"The automotive industry has returned with

Main image:
The stand of
injection
moulding
machine maker
Boy at this
year's Fakuma
show

IMAGE: ENGEL



Above: Engel's Injection 4.0 display on its Fakuma stand

great strength and the investment backlog has cleared," said Christoph Steger, CSO of the Engel Group, at the end of the event in Friedrichshafen. "Even if the corona pandemic is still preventing some from traveling, the Engel booth was well attended. We had very good discussions, completed numerous projects and launched new ones."

Visitors came from all sectors including strong representation from medical technology, packaging and technical injection moulding.

At Engel's press conference at Fakuma, Steger said the group expects to increase its order intake by around 30% year-on-year by the end of its fiscal year in March 2022. "This will allow us to close the 2021/22 fiscal year with sales close to the pre-crisis level," he said. In the previous fiscal year, Engel Group generated a turnover of €1.1bn, while in the 2019/20 fiscal year the figure was €1.3bn.

However, the outlook still has major uncertainties, according to Engel. Risk factors include material bottlenecks, massive increases in raw material prices and the continuing Covid pandemic. The company's biggest challenge at the moment is delivery bottlenecks in raw materials and components. It said: "Due to Covid-19 and the shift in consumption trends as a result of the pandemic, semiconductors in particular have become scarce on the market. This is aggravated by an increase in demand following the end of the lockdowns, which cannot be met by current supplies. Steel and steel products are following a similar trend."

But Steger reassured Engel customers. "Thanks to our very good cooperation with our suppliers and our global network of plants, we can largely avoid delays in delivery, though," he said.

Boy said after the end of Fakuma 2021 that despite a slightly lower number of visitors at this year's event, it was "highly satisfied". Andreas Scheideler, Domestic Sales Manager, said: "We had

discussions of high quality and with good prospects. Many interesting projects could be initiated at Fakuma 2021 which offer great potential for the future."

Thomas Breiden, Marketing Manager at Boy, said: "Our success at Fakuma 2021 makes it clear that visitors want to experience an injection moulding machine live and have intensive technical discussions on site. A virtual trade fair simply can't offer that."

In addition to Boy's four machine-centred demonstrations (see *Injection World* October 2021), the group had two further premieres. One of these was an electro-mechanical ejector (for Boy 50 E to 125 E machines) with a function independent of the main drive of the injection moulding machine and high dynamics as well as exact path positioning with synchronisation of ejector and handling movement.

The second debut was a cooling water distribution feature with electronic flow rate recording (plus the option of a temperature display with process data monitoring). The set flow rate is digitally recorded, displayed on the machine display and monitored.

The company added: "A new operating option via voice input provoked a high demand potential among the visitors. Many asked for information on possibilities and advantages of a voice control of injection moulding machines. This could be demonstrated with a demo control on the Boy trade fair booth."

Arburg's partners and managing directors expressed their support for the Fakuma show during the company's press conference. The company's theme "The best of both worlds" combined major topics of the future: digitalisation as well as sustainability and resource conservation, along with Arburg's aim of increasing customers' production efficiency and making them future-proof in the long term.

Christoph Schumacher, Director Marketing at Arburg, summed up the company's pre-show expectations: "After a long time with no major international in-person trade fair in Europe, we travelled to Friedrichshafen with a great deal of joy and excitement, and were hoping for a Fakuma that was as 'normal' as possible."

He said that, during the exhibition, "our expectations were more than met: the quality of the trade visitors and their interest in our exhibits and innovations was very high. Many decision-makers came to our stand to discuss specific projects."

Arburg says it had the largest trade fair stand and many new products on display at Fakuma

2021. Schumacher said "the very positive feedback from all visitors confirmed that the company's strategy of showcasing itself to the full".

The ArburgGREENworld platform showcased several applications to demonstrate how resources can be conserved and materials recycled in a sensible way. Examples included the processing of transparent, bio-based PA 12, consisting of 39% renewable raw materials based on castor oil. Post-consumer recyclate was used on an Allrounder 1300 T rotary table machine at the stand of Arburg's partner, Lauffer.

For moulders needing to deal with fluctuating quality of recycled material, Arburg has put together a new "recyclate package", which made its debut at Fakuma. The package includes various control functions and special plasticising features to enable recyclates to be processed reliably. The recyclate package is available for all Allrounders and can also be retrofitted to older models.

Wittmann Battenfeld said "numerous regular customers as well as new interested parties" visited its Fakuma stand. "Many highlights aroused great interest," said the company. Among them was the new SmartPlus machine, which it says is characterised by its high level of cost-effectiveness, energy efficiency and repeatability demonstrations (see *Injection World* October 2021).

Also new from Wittmann Battenfeld at Fakuma was IMAGOxt which allows the scalable display and visualisation of energy consumption of connected machines, devices and any consumption clusters in the moulding company. It said: "IMAGOxt includes numerous functions and tools to help show current energy consumption, graphically prepare historical trends and define KPIs and consumption targets. For example, IMAGOxt can be used to visualise real-time energy flows between different departments or consumption clusters. These consumption analyses help companies identify the real energy consumers within the company and thus help them achieve the savings targets set by the EU while maintaining financial sustainability and growth. Likewise, the program directly calculates CO2 consumption and energy savings already achieved. All calculated values can be stored in reports and are thus available for long-term analysis."

Another innovation shown by Wittmann Battenfeld is the Health Factor, which uses key figures to provide a view of the condition of the machine axes as well as the hydraulic pumps. It said this makes it easier to plan necessary machine maintenance, among other things. "With this information, the maintenance or repair can not only be better



IMAGE: ARBURG

planned in terms of time, but it is also carried out in a targeted manner for the respective axis or pump. The user can procure the necessary spare parts in good time and plan any machine downtime required for the repair in such a way that ongoing production is disrupted as little as possible," said the company.

Billion showed a new generation of electric injection moulding machines called Select². These feature a clamp unit design with optimised mechanical specifications to provide capacity for large moulds with heavy weight bearing requirements. The range is configured for fast cycle production, which the company says perfectly matches the performance needs of packaging, cosmetics and medical applications.

Select² machines are available from 175 to 400 tonnes clamping force, in single and twin-shot versions. At Fakuma, a Select² 200 tonnes twin-shot machine was shown moulding a 50 cm multi-functional ruler, foldable in two parts fastened by a magnet. The ruler was produced with recycled bio-based materials from Biofibre made from bio-polyesters and wood fibre or mineral reinforcement.

For this application, the EasyControl function developed by Billion measured material viscosity in real time, eliminating variations from batch to batch, which are more prevalent on recycled polymers than on virgin materials.

The next edition of the exhibition, the 28th Fakuma, will take place on 17-21 October 2023.

Above: Arburg says a cross-section of its diverse range of products and services was displayed to great effect at its expanded Fakuma stand

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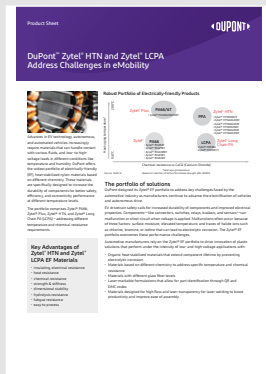
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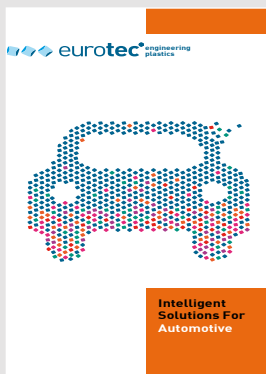
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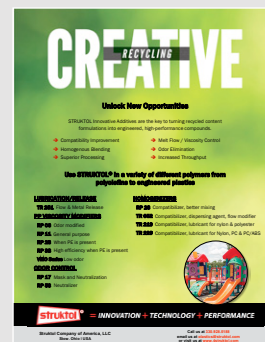
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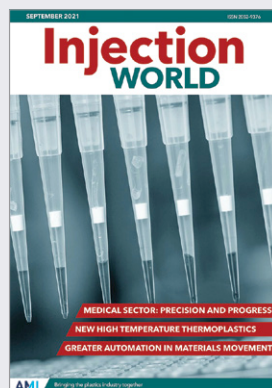
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Injection World October 2021

The cover feature of the October issue of Injection World looks at how in-mould technologies are bringing surfaces to life. The issue also has features on E&E moulding, smart machine functions and highlights of the Fakuma 2021 fair.

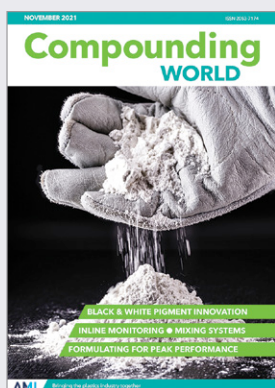
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Injection World September 2021

The September issue of Injection World has a cover feature on medical moulding technology and how it suppliers are helping moulders meet the demands of the medicare sector. Other features cover new high temperature thermoplastics and materials handling.

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Compounding World November 2021

The Compounding World November edition looks at issues around safety and sustainability in black and white pigments, inline measurement systems for compounders, new mixing equipment and the use of additives and reinforcement.

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Plastics Recycling World October 2021

The October issue of Plastics Recycling World has technology features on the growing choice of recycling extruders and recompounders, the challenge of odours in recydate, and R&D in additives. Plus a preview of Plastics Recycling World Expo North America.

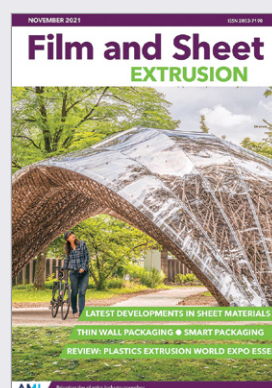
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Pipe and Profile October 2021

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2021	15-18 November	Arabplast, Dubai, UAE	www.arabplast.info
	1-4 December	Plast Eurasia, Istanbul, Turkey	https://plasteurasia.com/en/
2022	25-28 January	Interplastica, Russia, Moscow	www.interplastica.de
	17-21 February	PlastIndia, New Delhi, India POSTPONED	www.plastindia.org
	8-10 March	JEC 2022, Paris France	www.jec-world.events
	8-11 March	Plastimagen, Mexico City	www.plastimagen.com.mx
	15-17 March	Swiss Plastics Expo, Lucerne, Switzerland	www.visit.swissplastics-expo.ch/en/
	16-17 March	Injection Moulding and Design, Detroit, MI, USA	https://injectionmoldingexpo.com/
	5-8 April	FIP, Lyon, France	www.f-i-p.com
	3-6 May	GreenPlast, Milan, Italy	www.greenplast.org
	26-30 September	Colombiaplast, Bogota, Colombia	www.colombiaplast.org
	27-29 September	Fachpack 2022, Nuremburg, Germany	www.fachpack.de
	3-7 October	Plastex, Brno, Czech Republic	www.bvv.cz/en/plastex/
	19-26 October	K2022, Dusseldorf, Germany	www.k-online.com
	1-3 December	Plast Print Pack West Africa, Accra, Ghana	www.ppp-westafrica.com


AMI CONFERENCES

22-23 November 2021	Performance Polyamides Europe, Munich, Germany
23-24 November 2021	Conductive Plastics Europe, Munich, Germany
30 Nov-2 December 2021	Fire Resistance, Dusseldorf, Germany
25-26 January 2022	Ocean Plastics Virtual Summit
8-9 March 2022	Chemical Recycling, Houston, TX USA
29-31 March 2022	Single-Serve Capsules Virtual Summit
7-9 June 2022	Plastics Closure Innovations, Barcelona, Spain

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