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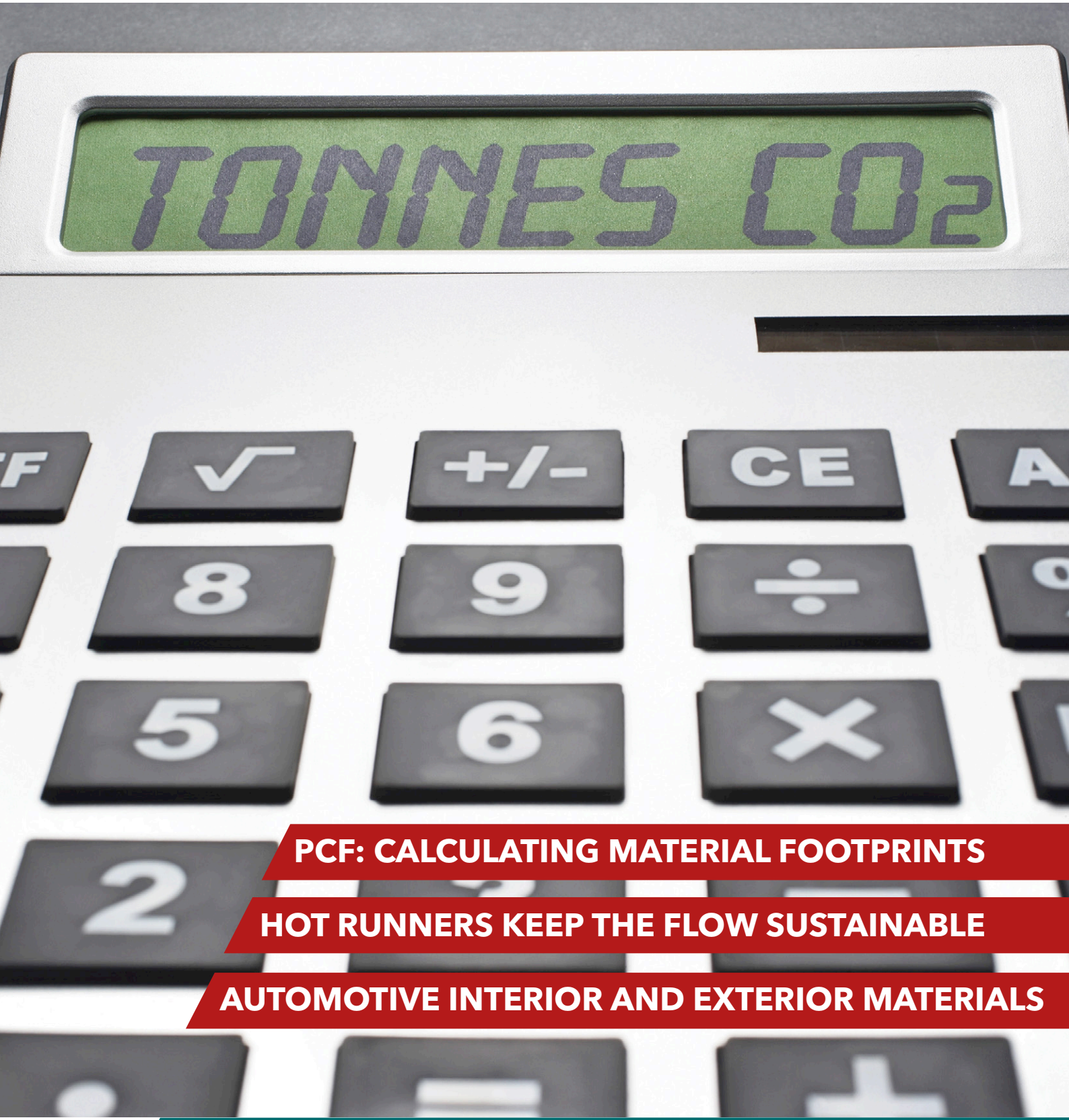

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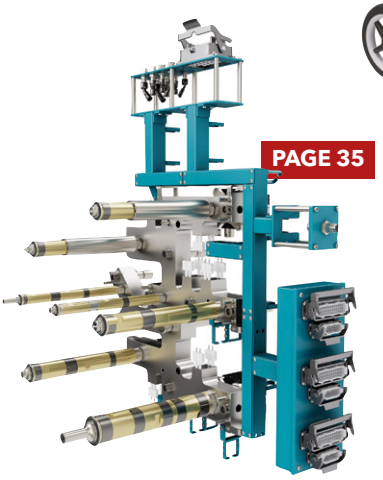
PAGE 13


PAGE 23


PAGE 35


PAGE 41

COMING NEXT ISSUE
› Medical Materials › Granulation › Thermoplastic Composites

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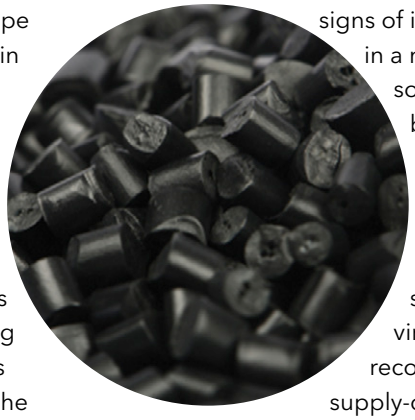
Alliance says converters have been put in 'impossible position'



The Polymers for Europe Alliance has once again spoken out against materials suppliers making surcharges.

In January 2022, the alliance published a statement highlighting the issues that had been affecting plastics manufacturers and converters since the arrival of Covid. These included material shortages, disruption to supply chains, unprecedented price increases, unpredictable fluctuations in demand, and escalating energy costs.

Some of these issues, including the availability and cost of many commodity polymers, were starting to show signs of improvement, it said in a new statement. But something proving to be particularly problematic were energy surcharges, many of which have been structured in such a way as to be virtually impossible to recover further down the supply-chain, it said.

Traditionally, costs of this type have been incorporated in price indices and reflected in agreed pricing formulas with converter customers. The Polymers for Europe Alliance said it was therefore difficult to make a case for additional surcharges covering costs that were thought to have already been incorporated in negotiations, and consequently, many were withdrawn.

The alliance said it was regrettable that this type of increase has re-emerged in some places, especially as until recently some semblance of normality appeared to be returning to the plastics supply chain. "At a time when suppliers' hedging arrangements are infinitely variable and the impact government support to control energy costs is also anything but clear, it is putting converters in an impossible position to ask them to pass these costs down the supply chain. Absorbing them at some of the levels proposed would eradicate industry margins," it said.

› **www.polymercomplyeurope.eu**

Valeo and SRG Global form strategic automotive alliance

Valeo has announced a strategic alliance with SRG Global to develop the next generations of illuminated exterior front panels for the automotive industry.

Valeo is a specialist in visibility systems, which include lighting and wiping systems, while SRG Global is a manufacturer of high value coatings on plastic. It is hoped the combination of the companies' respective expertise will lead to new innovative solutions, enabling highly integrated and stylized exterior lighting.

Valeo President Maurizio Martinelli said: "I look forward to enforcing this strategic partnership that puts Valeo and SRG Global among the biggest players in the automotive exterior front central area that will grow with vehicle electrification. I am confident that the teamwork and the complementarity between Valeo Lighting Systems and SRG Global will improve customer satisfaction and bring additional business opportunities to both parties."

› **www.valeo.com**

BEC Group invests in UK facility

BEC Group has invested in new machinery across its facility in New Milton, Hampshire, UK. An Arburg Allrounder 570 C with a clamping force of 200 tonnes was installed in September to replace an older version, the newer model coming with an Arburg AES energy saving system for lower energy consumption. This was followed by the installation of a Boy 60EVV machine, which has a clamping force of 600 kN, and a new XYZ 2000 Manual Milling Machine which has been brought in to increase capacity for tooling.

› **www.becgroup.com**

Latest SyBridge takeover

Industrial technology company SyBridge has acquired Galway Tool & Mould in Ireland, expanding its presence in the high precision life sciences end-market.

The transaction represents the company's first investment in Europe and its 13th acquisition since its inception.

New York based private equity firm Crestview Partners established SyBridge Technologies in 2019 and committed $200m of equity capital to create a market leading manufacturing group.

› **www.sybridgetech.com**

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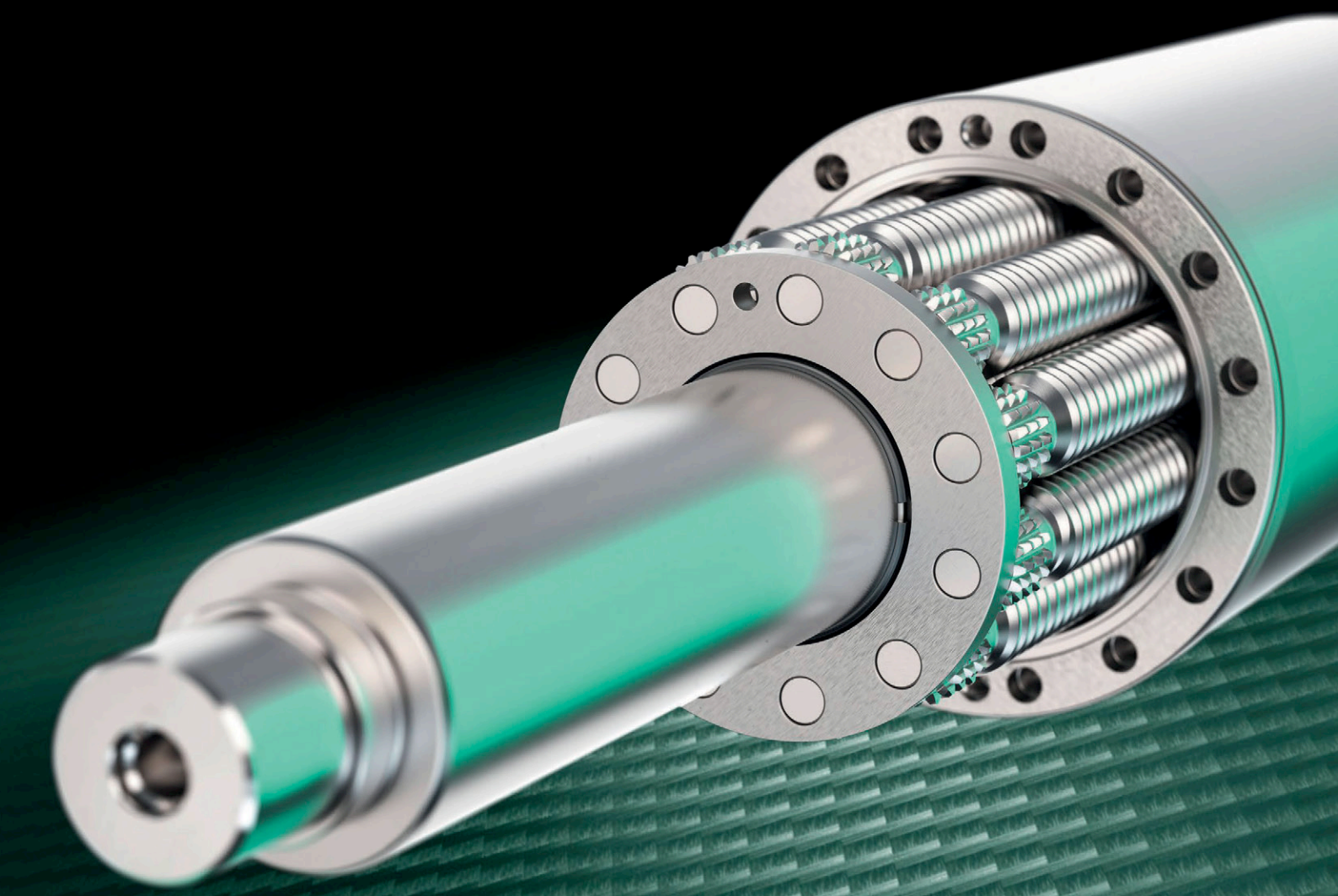

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www.arburg.com

ARBURG

Ruplas is launched to assemble new plastics processing group

UK-based investment firm Opulentia Capital has established the Ruplas Group with the intention of assembling a new £100m plastics processing group and is looking to acquire convertors that have at least 10 years' experience and revenues in the £4-30m range.

Bogdan Georgescu, Director of Ruplas Group, said: "Our goal is to build a £100m revenue group in this space, acquiring and investing in plastics, rubbers, and other related businesses. The model is to be [applied to] long established and well-run companies, which can benefit from being part of a larger group."

Bruce Margetts, current MD of Bericap UK, has been brought onto the Ruplus Group Board of Directors.

The UK plastics and rubbers industry has an annual revenue of £27bn GBP and employs 162,000 people. Opulentia says that despite these figures, it is a fragmented segment comprising of 5,800 companies. Where there is fragmentation such as this, Opulentia says it is a specialist in consolidation with similar experience in the leisure and food industries.

Recycled plastics will form a large part of the group as Opulentia sees this area growing significantly in the near future as the march towards more sustainable consumption continues.

› **www.opulentiacapital.com**

Luran S selected for the Grenadier

IMAGE: INEOS

Ineos Styrolution has announced that its ASA polymer Luran S product has been selected by Ineos Automotive as the material of choice for the front grille of the Grenadier 4x4.

Ineos Automotive was established to meet demand for a rugged and uncompromising off-roader, the Grenadier SUV, which began production in October.

› **www.ineos-styrolution.com**

Fanuc opens Irish facility

Japanese robotics company Fanuc has opened its first dedicated facility in Ireland. The 500 m² training centre and showroom in Maynooth, County Kildare, will provide cutting-edge automation technology, servicing, and training directly to Irish manufacturers.

Fanuc specialises in factory automation for CNC control systems, robots, and production machinery, and has more than 8,000 employees. The Maynooth facility is the company's 24th subsidiary in Europe.

Martin Heydon TD, the government's minister of state at the Department of Agriculture, Food and the Marine, and TD for Kildare South, said: "I would like to thank Fanuc for investing in Kildare. Automation is the future of manufacturing and Fanuc has a large foothold in the industry, so this is a huge vote of confidence for Kildare."

› **www.fanuc.eu**

CamdenBoss commits to UK investment

Electromechanical components and enclosures manufacturer CamdenBoss has made a substantial investment in injection moulding technology, saying the move marks its commitment to UK manufacturing and provides a more resilient supply chain for customers.

The company selected the latest electric Arburg equipment which, along with the company's recent investment in solar power and reduced transport mileage, significantly reduces the carbon footprint of its operations and accelerates its transition to net zero.

This investment follows a 2021 move to the Galaxy Building in Mildenhall, Suffolk, where design, warehousing and manufacturing operations are all co-located to meet their customers' requirements.

MD Katy Davies said: "CamdenBoss has been committed to repatriating its injection moulding to the UK for several years, and this investment takes us to the next level of producing as much as possible as locally as possible to support our growing customer base efficiently, effectively and with greater resilience."

› **www.camdenboss.com**

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Backlash against Greenpeace plastics recycling report

The Plastics Industry Association in the US has responded strongly to a new Greenpeace report condemning recycling as a "dead-end street" and concluding that "most plastic simply cannot be recycled."

The report also claimed that while US households generated an estimated 46m tonnes of plastic waste in 2021, only 2.2m tonnes was recycled and "no type of plastic packaging in the US meets the definition of recyclable used by the Ellen MacArthur Foundation's New Plastic Economy Initiative".

In a statement, Matt Seaholm, President & CEO of the Plastics Industry Association, said: "The activists at Greenpeace cannot call themselves environmentalists while simultaneously discouraging recycling as part of the solution to our world's waste problems. There is no question that we, as a society, can and must recycle more. However, their assertions that recycling cannot keep plastic materials within the circular economy are disingenuous and irresponsible. Recycling is real, and the claims that it can't ever work, made in this document, will likely result in unnecessary waste and public reaction that could actually cause greater environmental harm."

Seaholm went on to say:

"Nowhere in the Greenpeace-created document is there a focus on the value that plastics provide. One example is eliminating food waste to ensure we reduce world hunger, get much needed produce to areas that don't have access to nutritious, fresh food, and reduce food waste emissions. Especially during a time of heightened food uncertainty, global food shortages, and greater demand, plastic must be embraced for its ability to build a reliable, sustainable food supply chain across the world economy.

"The plastics industry agrees that we don't recycle enough plastic. The difference between our industry and Greenpeace is that we understand the necessary action needed to preserve a material that saves lives and improves our overall safety and quality of life through responsible use and recycling instead of creating false narratives."

› **www.greenpeace.org**
› **www.plasticsindustry.org**

Arburg customer reaches 100 mark

Weißer + Grießhaber, a family-owned company based in Mönchweiler, Germany specialising in the manufacture of high-precision, small plastic parts, has been using Arburg injection moulding technology since being founded in 1969.

It reached a milestone in October when a special ceremonial event took place to mark the handover of the company's hundredth Allrounder machine.

IMAGE: ARBURG

Above: Team members at Weißer + Grießhaber

"Arburg covers the entire technology spectrum with its precise and reliable Allrounder injection moulding machines and also offers very high service quality," said Reinhard Fauser, Weißer + Grießhaber MD.

He also cited Arburg's innovative strength and technical advice as well as stability and dependability as additional reasons for the successful partnership.

Weißer + Grießhaber has a workforce of 310 employees and generated turnover of €55m in 2021.

› **www.weisser-griesshaber.de**

Seaway acquires MME in US

Seaway, which was acquired by asset manager ICG acquired in June, has purchased MME based in Minnesota, US, which provides injection moulding, engineering, tooling, and assembly for FDA-regulated medical items.

The combined company will now have over 73,100 m² of manufacturing space at five facilities in Florida, California, and Minnesota, providing multiple points of production and delivery.

› **www.seawayplastics.com**

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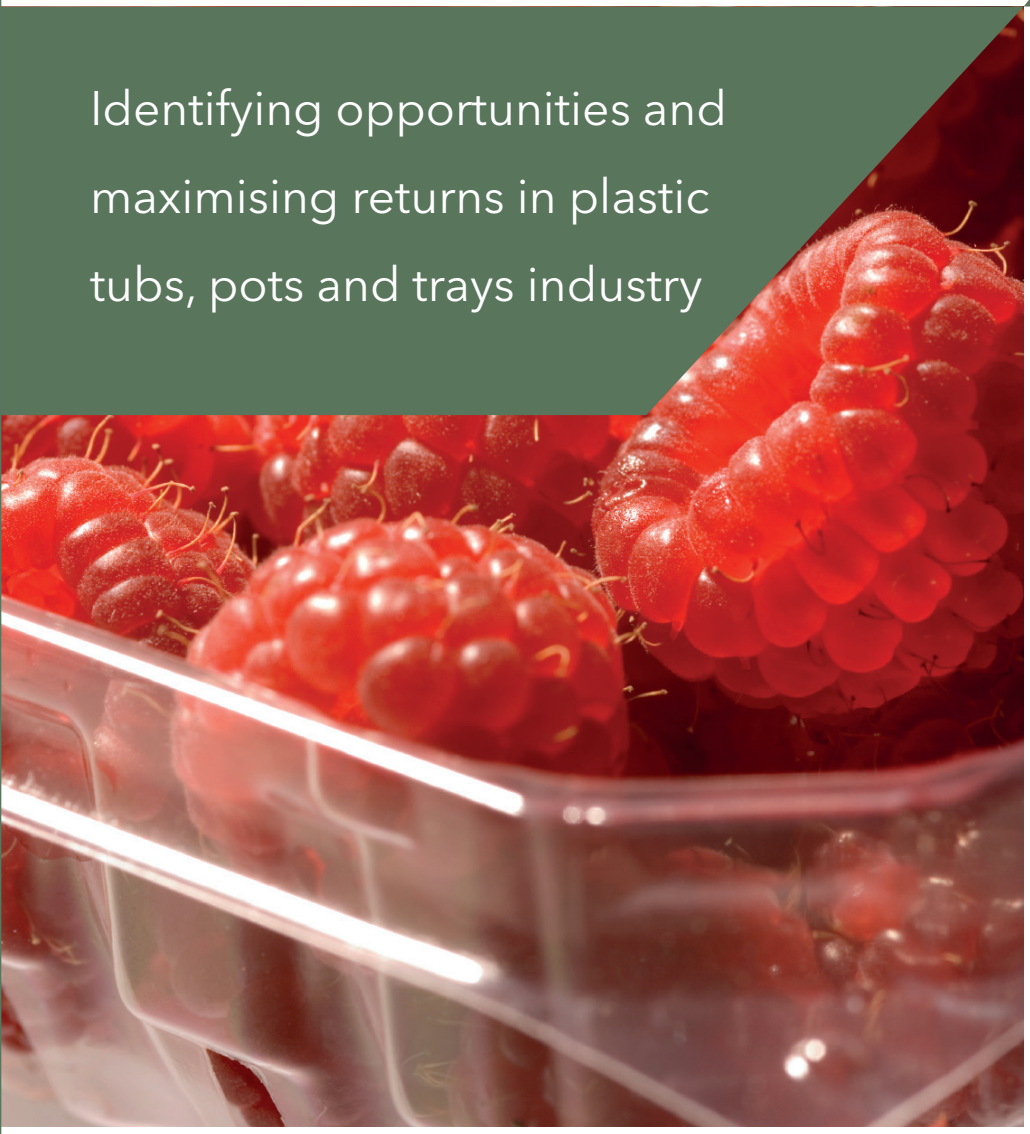

Industry experts include:

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Coopbox Group

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Plastics production in Europe grew in 2021

According to Plastics Europe, production of plastics in the region grew by 6% in 2021 to 57m tonnes with post-consumer recycled materials accounting for 10% of the total figure. This rise was reflected across the board, with global plastics production rising by 4% to a total of 391m tonnes.

Furthermore, in 2021 over 1.5m people in Europe were directly employed in the plastics industry, a slight increase from 2020. There were over 52,000 companies, most of them SMEs,

distributed across the EU with a combined total turnover of approximately €405bn.

The figures were revealed in "Plastics – The Facts 2022", an analysis of the latest data related to plastics production, demand, conversion, and end-of-life management in Europe.

However, there may be challenges ahead. The data shows that China's share of global plastics production continues to grow and reached 32% in 2021, while Europe's share continued to decline to 15%.

Plastics Europe said this loss of competitiveness could be exacerbated further by energy and logistical crises resulting from the war in Ukraine and other global uncertainties.

› **www.plasticseurope.org**

Orbis Expands facility

Orbis is expanding one of its facilities in Urbana, Ohio, US, adding 30% more space for the manufacture of totes, bulk containers, and pallets.

The expansion, expected to be complete by Q2 2023, will increase the company's overall moulding capacity by 10%.

Orbis is part of Menasha Corporation and operates 13 manufacturing plants in the US, Canada, and Mexico, employing over 3,150 people.

› **www.orbiscorporation.com**

AMI | Events

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Sustainable liquid metering

Avient launched several new products including the ColorMatrix FlexOne, a single equipment unit featuring new technology for liquid metering, developed with sustainability in mind to optimise the benefits of liquid colorant and additive technologies.

The unit incorporates efficiency-enhancing features including an integrated pump with a gravimetric liquid metering system along with automated and self-correcting calibration capabilities. These high-accuracy technologies ensure continuous and consistent delivery of liquid colour and additives, reducing overall waste. The box and inner liner are recyclable.

› **www.avient.com**

Arburg bosses maintain confident outlook

A positive attitude at Arburg was evident at the start of K2022 when senior executives presented the company's outlook at a press conference. The group expects consolidated turnover in the region of €750m in 2022, taking it back to the level of 2018, its record financial year. "We are quite happy with the performance," said Jürgen Boll, Managing Director Finance.

He reported a good order backlog and indicated certainty in Arburg's production schedule, due to taking precautions to address material shortages and supply bottlenecks. "We look positively into the future and continue to invest," he said.

Giving the company's market overview, Gerhard Böhm, Managing Director Sales, Service, said the European injection moulding market was being cautious and reducing investments to core projects. The market in North America has shown "staying power", he said, but added, "we are seeing the first signs of braking there as well". Asia is "satisfactory", but demand is expected to decline.

IMAGE: ARBURG

Above: Arburg's management team at K2022 holding tool boxes moulded during the show on a hybrid Allrounder 1120 H from the Hidrive series with a clamping force of 6,500 kN

Arburg expects market developments in 2023 to reflect a trend towards customers buying more advanced technology, said Böhm during the Q&A session. It expects the switch from hydraulic to electric machines to continue, and anticipates growing demand for "complete solutions" and turnkey projects.

› **www.arburg.com**

Plastics industry crowds return to K fair

The doors closed on K2022 on 28 October and it was without doubt a successful event. "K in Düsseldorf has once again fulfilled highest expectations. It continues to be the most international, complete and innovative trade fair of the global plastics and rubber industry," said Erhard Wienkamp, Managing Director at K organiser Messe Düsseldorf.

The verdict from Ulrich Reifenhäuser, Chairman of the Exhibitor Advisory Board at K 2022, was equally positive: "After hardly any trade fairs could take place worldwide, K 2022 was all the more eagerly anticipated as the world's number one trade fair of the plastics and rubber industry and succeeded in providing fresh impetus in all sectors of our industry."

K2022 marked the 70th anniversary of the fair, which in its last pre-pandemic edition in 2019 drew in around 224,000 visitors. The 2022 edition, which took place in a global environment where the shadow of Covid continues to impact on international travel, attracted 22% fewer at 176,000.

IMAGE: MESSE DUSSELDORF

The organisers had not publicly given an indication of their expected attendance but the *Injection World* team understands the result to be at the highest end of private expectations – certainly on some days the centre seemed to be as busy as previous K shows.

› **www.k-online.com**

Engel expects good results in 2022 despite market challenges

Engel expects injection moulders will continue to make investments in technology to achieve sustainability goals, although the market is currently under pressure from energy, supply chain and geopolitical issues. Executives at the Austrian machinery group said at its K2022 press conference that incoming orders had been declining since August and they are expecting this to continue in the coming months. But in the medium and long term, Stefan Engleder, CEO, said: "Plastics processing remains a growth market."

Engel still has a comparatively good order backlog, though, and it expects annual sales to moderately increase in its 2022/23 financial year. Engleder said it aims this year to reach the level of the pre-crisis year 2018/19 when sales amounted to €1.6bn – in 2021/22, group sales were €1.5bn.

The North American market has been strong, benefiting from ongoing reshoring. Engel's packaging division in particular saw significant growth. The region is now showing signs of slowing in the short term, said Engleder. The West European market is developing as expected, he said, noting growth in automotive and packaging. In China, the group is "still on track", although the country's zero-covid policy is stifling economic growth. Southeast Asia and India are benefiting from the policy as they are viewed by investors as alternative production locations to China.

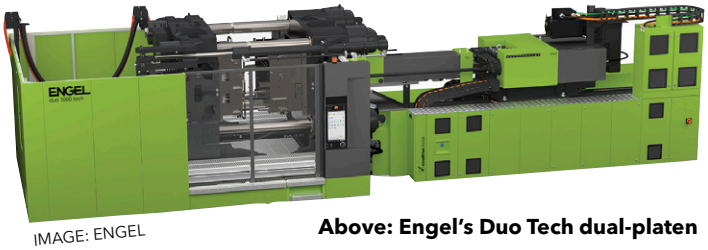

IMAGE: ENGEL

Above: Engel's Duo Tech dual-platen machine series now has 35 sizes with a clamp force range between 3,500 and 55,000 kN

Gerhard Dimmler, Chief Technology Officer, spoke about a new version of the Engel E-connect platform during the press event. Machines from other manufacturers can now be integrated into the shop floor monitoring system. This is the most frequently used function, providing transparency across all machines. E-connect enables process data analysis even for older injection moulding machines and for machines by other manufacturers. The new web version of the iQ Process Observer is used for this on Engel machines with previous control unit generations.

New Duo Tech

Dimmler introduced a revamped Duo Tech dual-platen machine series, which now includes 35 sizes with a clamp force range between 3,500 and 55,000 kN. Compared to the previous Duo series, the clamp force sizes have been redistributed and supplemented by further WP (wide platen) versions. Larger moulds can be mounted thanks to extra space resulting from a newly-developed clamping unit. The injection and plasticising capacities have both been boosted by up to 25%. Cycle times have been reduced, contributing to reduced energy consumption.

Cycle times of Engel machines also benefit from iQ Motion Control, a new smart assistant which automatically optimises the acceleration phases to support faster movements. The machine does not require additional energy for this performance boost. On its stand, Engel showed iQ Motion Control on an E-speed machine producing 125 ml round containers from rPET. Without iQ motion control the time required for the mould movement is 1.27 s and this is reduced to 1.12 s using the system.

› **www.engelglobal.com**

Borealis launches Neoni emissions calculator

Borealis showcased a demo version of a new carbon dioxide emissions calculator known as Neoni. Populated by data on hundreds of grades from the Borealis materials portfolio, with additional commercial products added in successive stages, the tool presents data for a wide range of materials from virgin, fossil feedstock-based solutions, to renewable feedstock-based grades.

Borealis says this is the first digital tool in the polyolefins sector to offer CO2e emissions data down to the grade level, which enables its customers to make informed decisions on which materials can best meet their own circularity goals.

Borealis also used K to launch Borstar Nextension Technology. Described as 'a step change' for performance-based polyolefins, it broadens the range of PP properties thanks to its proprietary Borstar production technology's performance and unique single-site Borstar Nextension catalysts.

› **www.borealisgroup.com**

ABSOLUTE IN MOLD LABELS

Korsini Packaging is the legacy of the printing business which Italian Corsini brothers have started in year 1902 under the name "Fratelli Corsini" and carries the printing family traditions for more than 117 years to this day, combining this with a contemporary business approach.

Korsini, pioneering in many kind of packaking among the years, has decided to concentrate all the experience in a newly started project 'IML' in 1998 and founded in the year 2004 the first dedicated 'In Mould Label' production plant as a Joint Venture between Korozo Group and Korsini Packaging Companies.

When our experience is combined with the latest technologies and with innovative approach, it allows us to reach the best solutions and to succeed in the IML industry. Today, with the highest quality and sustainable business approach, we are able to meet all objectives related to IML in our four factories with a total area of 42,000 m², three in Turkey and one in Italy, with offset, rotogravure and flexo printing techniques.

Korsini has installed and began production with its 4th line (12th in the Group) at its second factory in the Aegean Free Zone. With this new production line, Korsini has tripled its LED printing capabilities and completed the 3rd phase of its 5 years expansion plan within 36 months. Korsini's commitment to serve its valued business partners within constant improved consistency has been and will be company's focus.

Our commitment for the Food Safety has been always our main priority that has driven our company to use Conventional Cobalt Free Vegetable Based Inks since 2011, Low Migration Low Odor UV since 2012 and latest in 2019 Low Migration Low Odon LED UV inks.

As well as the respect for the environment, Korsini recycle all industrial waste since 2006 for the non-food industry to utilize it as second grade material for pallet/crates manufacturing. Korsini is proudly overachieved its sustainability targets and became a carbon-free company since 2021.

The perfect process, from prepress to final point that the label reaches to the customer, and wide range of products we have, make Korsini one of the leading companies offering products and services to more than 60 countries around the world, with the largest IML product variety today.

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Hope to see you next time

www.korsini.com

Sumitomo (SHI) Demag keeps a steady course

Gerd Liebig, CEO of Sumitomo (SHI) Demag, said company turnover will slip by only 4% to €778m in 2022 despite difficulties in markets and the supply chain (particularly the shortage of microchips). The 2022 result compares with a record sales year in 2021 when the machinery company achieved €808m in turnover, he told journalists at a K2022 press conference.

Sumitomo (SHI) Demag expects most injection moulding end-sectors to be relatively stable in 2023. But challenges remain, including higher energy prices in Europe putting pressure on the automotive industry and possibly slowing investments connected with e-mobility. "I don't think this [e-mobility investment] will come until the end of 2023," said Liebig.

The company's focus on boosting market share for its all-electric machines is continuing. It has already dedicated production at its Schwaig facility in Germany to electric machines, and the Ningbo facility in Japan will likewise focus on electric machines. Sumitomo (SHI) Demag calculates it currently has a 35% share of the all-electric machine market and Liebig said it is aiming to increase this to 40% in the next two years.

Amid the market difficulties, Sumitomo (SHI) Demag has not made staff redundancies. "Our strategy is not to fire people and then hire again in two years when the market is better," said Liebig. Staffing is becoming a "big, big challenge" for the plastics industry, he said, as a wave of retirements is expected in the Baby Boomer demographic.

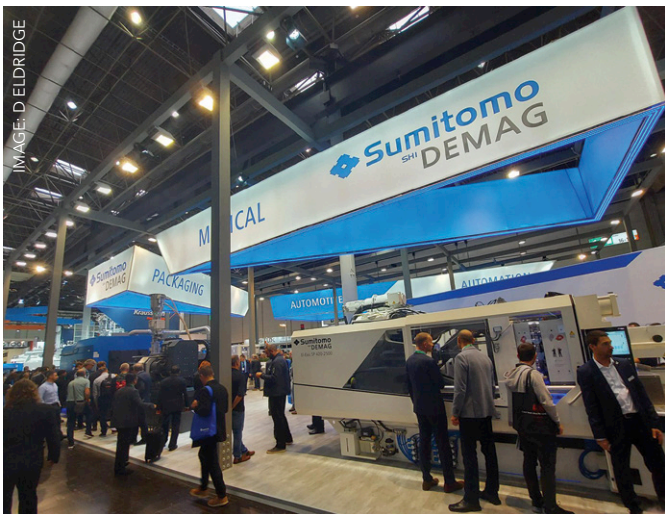

IMAGE: D ELDRIDGE

Above: Sumitomo (SHI) Demag's stand at K2022

New hybrid robot

Automation is one answer to potential skills shortages, making it a target growth area for Sumitomo (SHI) Demag. Liebig highlighted the premiere of the SAM-S robot as an indication of automation being an important focus of the company's product strategy.

SAM-S, which builds upon the SAM-C cartesian robot which it developed in-house, is a 6-axis hybrid robot comprising Scara mechanics and linear robots. With two payload sizes (12 kg and 25 kg) currently planned, the SAM-S series is suitable for applications where a linear robot is considered too inflexible, yet industrial robots too complex for operators. The robot is intended to be used with injection moulding machines with 130 to 1,000 tonnes clamping forces. On its K2022 stand, Sumitomo (SHI) Demag showed a SAM-S12 robot in a demonstration of LSR moulding.

Christoph Wynants, in Sumitomo (SHI) Demag's Product Management team, spoke about the PAC-E high speed electric machine as one of the new products at K2022. The main target of the PAC-E's development was to enable beverage cap and thin-wall packaging moulders to increase productivity, he said. The company already manufactures fast-cycling machines for packaging – the IntElect and IntElect S machines – but the PAC-E sets a new benchmark for energy consumption and cleanliness, the company says.

› **www.sumitomo-shi-demag.eu**

Sepro develops Visual+

At K2022, Sepro revealed the next generation of its Visual platform. Visual+ features total integration of robots, peripheral equipment and injection moulding machine regardless of the brand. It is a flexible platform with modular software that is customizable and easily deployable, one central controller for multiple robots, and peripherals, and a versatile HMI.

One of the demonstration cells at the exhibition gave visitors a chance to control a Sepro S5-15 Speed robot through a complex series of motions using the HMI they felt most comfortable with. Choices included a smartphone and an Xbox controller.

To further illustrate the benefits of Visual+ along with its latest control innovations, Sepro created a production cell around a 100-tonne Milacron machine supported by a Sepro 5X-15 Cartesian robot with servo-driven wrist and a 6X-140.2 articulated-arm robot, all working in conjunction with each other to produce a toy sailboat. The fully automated production process included assembly, inkjet printing, production-data collection, dimensional checks, tray packaging and final delivery of the finished product.

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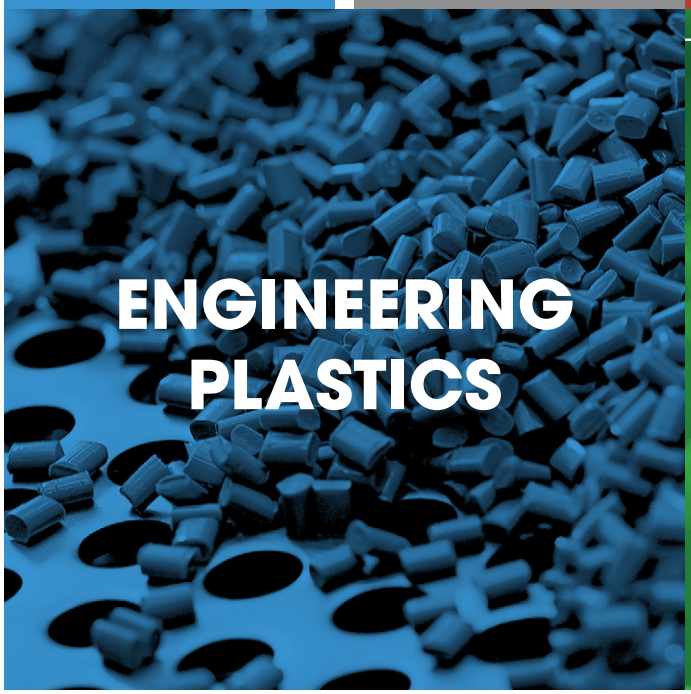

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Wittmann Group plays it smart

With an emphasis firmly on sustainability in keeping with the overall theme at K2022, Wittmann Battenfeld partnered with Wago to demonstrate on its stand how the continuous current generated by solar cells can be used directly for driving injection moulding lines using a machine from its EcoPower series.

IMAGE: WITTMANN

Left: An Ecopower 180/750+ was shown fitted with solar panels in a DC power concept

After the event, Rainer Weingraber, Managing Director of Wittmann Battenfeld, said: "K2022 was a complete success. The response of the public to our exhibits was excellent. Special interest was shown in our trade fair highlight, an EcoPower driven by direct current from solar energy, and in the options for processing alternative materials."

A three-component machine was also on display to highlight the advantages of combining several processes. Visitors were able to watch a reusable coffee-to-go cup being manufactured with a servo-hydraulic SmartPower 400/750H/210S/525L Combimould equipped with a servo-hydraulic rotary unit. The main aggregate, the 750H, designed as a Cellmould unit, had additional equipment such as the compressor, gas flow regulator and gas injector, fully integrated.

The company also demonstrated an EcoPower 110/350, equipped with the new B8X control system and designed as an Insider cell with a parts removal robot, a conveyor belt, and other upstream and downstream auxiliaries.

Using a MacroPower 1100/12800 fitted with an energy-saving, speed-controlled servo motor and a constant displacement pump, a door panel was manufactured using a single-cavity mould. The door panel consisted of an extremely light natural fibre material onto which a map pocket made of Borcycle EE1300SY, a mineral-reinforced PP for car interior applications with 30% PCR content from Borealis, was over-moulded.

Wittmann Battenfeld displayed its expertise in thin-wall injection moulding with the production of a cup using injection compression moulding (ICM) technology whereby the melt was injected into a partially open mould. The technology was demonstrated on an EcoPower Xpress 160/1100+, the machine's high-speed making it ideal for IMC technology.

Silicone processing is one of the company's core competencies, and among its exhibits at K was a microscale LSR application producing a micro loudspeaker membrane made of thermoplastic and LSR manufactured on a MicroPower 15/10H/10H Combimould. This membrane, made of PA6 and a self-adhesive LSR material, was produced inside a single-cavity mould by way of a 2C injection moulding process.

› **www.wittmann-group.com**

Milliken and Purecycle cut carbon footprint

Additives producer Milliken and recycling technology company PureCycle updated on progress with their collaborative work in PP recycling and carbon footprint reduction.

PureCycle is commercialising a patented solvent-based PP purification process, which was developed and licensed by Procter & Gamble. It is claimed to separate colorants, odour and other contaminants from PP waste feedstock to convert it into a virgin-like resin.

Milliken announced a new PP concentrate based on PureCycle's recycled PP that it says offers a carbon footprint (GHG) approximately 35% lower than that of virgin PP. The new concentrate is formulated using Milliken's Millad NX 8000 ECO clarifier; the company said an added benefit is that the certified energy savings realised by using resin produced with this clarifier allows brand owners to display the UL Environmental Claim Validation label on injection moulded parts.

PureCycle has opened its first plant, in Ironton, Ohio, and plans to install two lines at a new plant it is building in Augusta, Georgia. It also has a joint venture with Mitsui in Japan and with SK Geo Centric in South Korea.

Dustin Olson, CEO of PureCycle, said at the show that the company is making progress in work with the US FDA to gain food-contact approval for its rPP products but that feedstock and product testing will take some time. "A good base has been laid with the FDA," he said.

› **www.milliken.com**

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KraussMaffei launches two new 3D printing technologies

KraussMaffei has formed a new additive manufacturing technology business and showed its first two 3D printers on its K2022 stand last month. The PowerPrint line is a large-format extruder-based system for processing thermoplastic granulates. PrecisionPrint uses a different process, stereolithography, and is intended for smaller batch production. The company is starting an intensive test phase with beta customers next year, after which the printers will be available on the market.

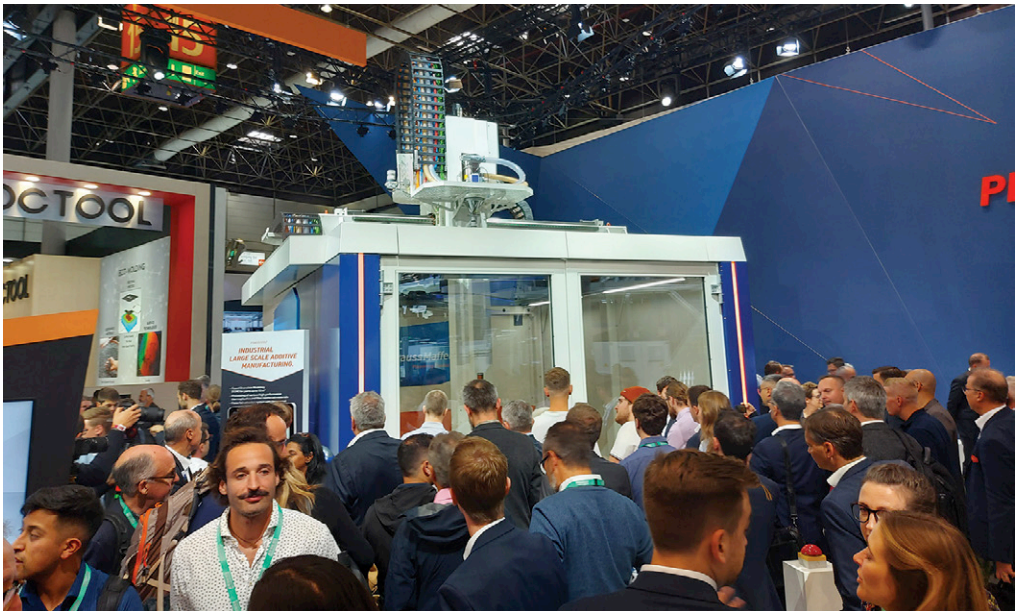

IMAGE: D ELDRIDGE

Above: Visitors gathered round KraussMaffei's PowerPrint additive manufacturing machine at the launch of new 3D printers on the group's K2022 stand

Michael Ruf, CEO, said additive manufacturing machines will become the fourth pillar of the KraussMaffei group (in addition to injection moulding, extrusion and reactive production). "KraussMaffei is opening up additive manufacturing technology for industrial production," he said. "Using our expertise gleaned from series production of plastic parts, we are designing efficient system concepts and appropriate solutions for every component, regardless of the technology. For us, this is about taking our capacity for productivity, quality and efficiency in industrial plastics processing and applying it to additive manufacturing solutions."

The technologies will be sold first in Europe and the US, followed by other regions around the world. Ruf said at KraussMaffei's K2022 press conference that adoption of 3D printing in the injection industry has made slow progress. "It still takes time to convince customers of the benefits of additive manufacturing," he said.

Large and small

PowerPrint offers high discharge rates at fast printing speeds, enabling short throughput times for large components, with a build volume up to 10 m³, said KraussMaffei. A wide variety of fibre-reinforced plastics and compounds can be processed. At a stand unveiling, K2022 visitors clustered around the PowerPrint machine that was producing a complexly structured component. Nearby, application samples from the foundry industry were on display.

PrecisionPrint has been developed for smaller part production (build volume of 250 mm x 250 mm x 450 mm) with the highest quality and resolution, and little material loss. "The aim is to print parts that come out 'right first time'," said Michael Heineder, Head of Additive Manufacturing, at the press event.

The "power" and "precision" prefixes are also being used by KraussMaffei for new injection moulding machine series for standard applications. At K2022, sales in Europe and North America were started for the all-electric PrecisionMolding machine, available worldwide in the clamping force sizes from 500 to 3,200 kN, and the hydraulic PowerMolding two-platen machine, which will be available from 1 January worldwide in the clamping force sizes from 6,500 to 16,000 kN.

One of the key features of the new machines is shorter delivery times, said Xiaojun Cui, Executive VP New Machines Business, at K2022. Both machine series are standardised, designed using a modular concept with a customised selection of options that allows them to be made available quickly.

At K2022, KraussMaffei showed a PowerMolding 1300-11900 with a clamping force of 13,000 kN producing front-end carriers. This was part of a circular economy demonstration, in which insulin pen caps made of PP were recycled and fed to the PowerMolding machine for production of the automotive component.

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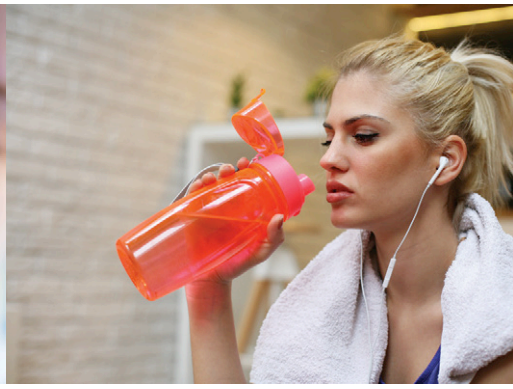

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PCF: suppliers calculate the footprint of plastics

A new abbreviation, PCF, sounds like a new engineering thermoplastic but actually denotes Product Carbon Footprint, as shown in some of the latest developments by ETP suppliers. By Peter Mapleston

IMAGE: SHUTTERSTOCK

Main image: Product Carbon Footprints are increasingly available for individual materials

On the stands of engineering thermoplastics suppliers at K2022 in Düsseldorf in October, discussions took in product price and performance, as always, but also something hardly discussed at all at K2019 just three years earlier: Product Carbon Footprints (PCF). OEMs are increasingly asking their suppliers to put a number on the sustainability of components, and those suppliers are turning to material producers to help them provide the answer.

For some time, it has not been uncommon for material suppliers to tell us they have solar panels on their factory roof, or that some of their electricity comes from the wind. But now, their virtuosity is being quantified for every kilogramme of product they ship. And the numbers are improving all the time.

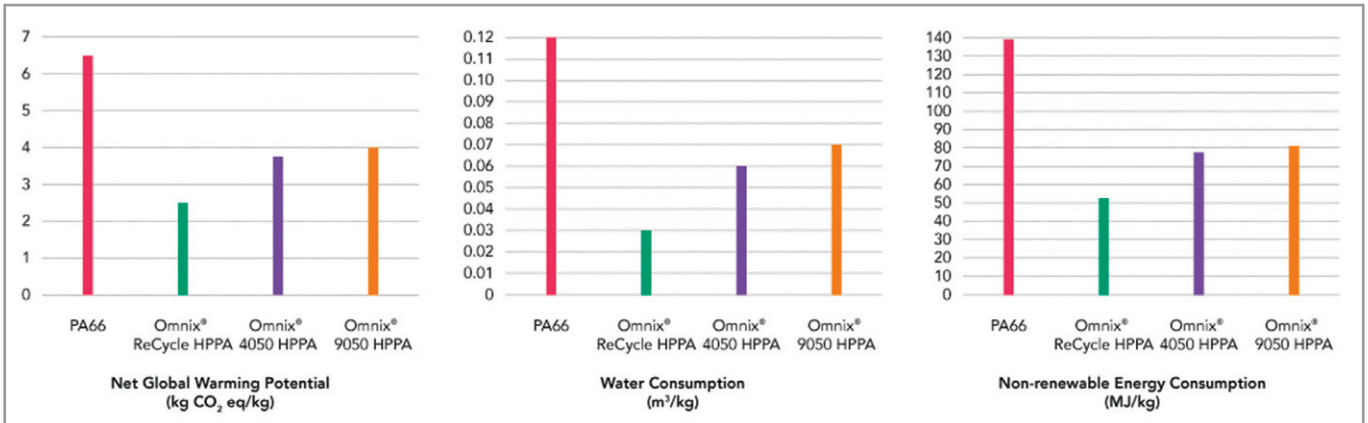
At **Solvay Specialty Polymers**, Georges Houtappel, Global Head of Transportation Business, said: "We commit for all our products to share the carbon footprint, energy usage, and more. We really need to provide a lot of data. OEMs are now rating their suppliers based on their sustainability profile. It's now a KPI [key performance indicator]. We now have the numbers on our product data sheets, including even information on freshwater intake." 100% of the electricity that Solvay sources in the US for PPA, PPS, HPPA and PEEK base polymers production is renewable.

Houtappel also emphasises progress in use of renewable and recycled feedstocks. "Lots of companies now demand recycled content and the question is how to integrate recyclate into high performance materials," he says. "If we start adding recycled materials, we have to do so without reducing performance." Hence Solvay's use of chemical recycling and the mass balance approach.

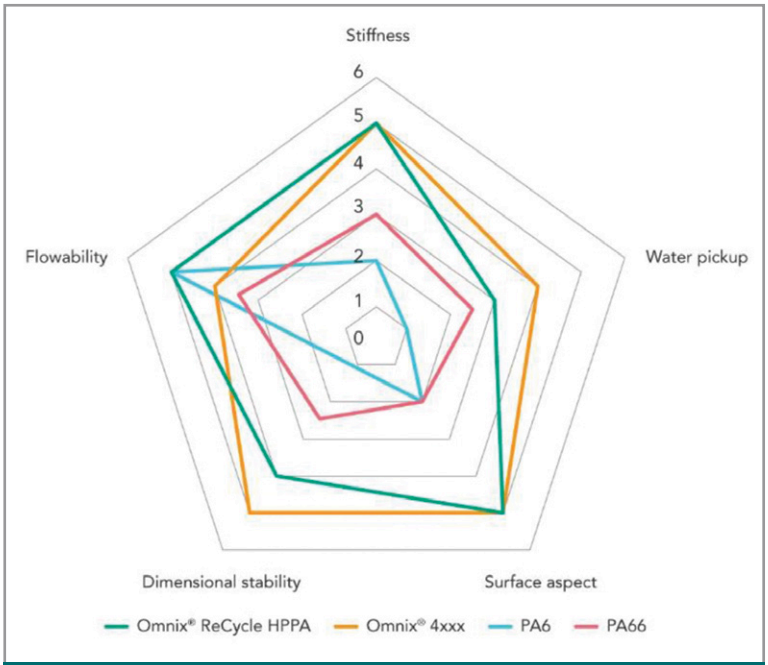
Solvay has several product lines made using chemical recycling, and it intends to increase the number. It is also looking into the use of recycled fillers and reinforcements. "We are now defining with major customers their preferred grades in these families," said Houtappel.

The company recently gained ISCC-Plus certification – a standard for materials produced using a proportion of bio-based or recycled feedstock – for its Augusta, Georgia site. The site is currently manufacturing an ISCC-Plus compliant sulfone monomer, which will subsequently be used for the production of Udel PSU ReCycle MB and Radel PPSU ReCycle MB sulfone polymers.

This certification process will cover a growing portfolio of products spanning different chemistries. Additional certified high-performance materials will become available globally soon,



Comparison from Solvay of key sustainability data for PA66 and different Omnix grades
Source: Solvay



Comparison of various properties of Solvay's Omnix ReCycle with virgin Omnix, PA6, and PA66
Source: Solvay

starting with Ryton PPS ReCycle MB and Amodel PPA ReCycle MB.

At the beginning of this year, Solvay introduced a new Omnix high-performance polyamide (HPPA) compound family based on a minimum of 33% recycled content (PIR/PCR), which Solvay says is "highly secured and has a controlled process by the supplier." A spokesman says material comes from a segregated process of chemical recycling. Principal target market is household appliances. Omni is a family of polyamides that bridge the cost-performance gap between PA66 (or PA6) and polyphthalamide, PPA.

PA66 leader **Ascend Performance Materials** was also talking about PCFs at the K show. Its seven global compounding operations are already carbon neutral, and the company expects to reach an 80% reduction in GHG emissions by 2030 at the latest, compared with emissions in 2020.

Ian van Duijvenboode, global segment director for the company's e-mobility business, said Ascend is looking at various options for improving sustainability. "We can use bio-propylene as a raw material to further reduce carbon footprint. Emissions from plants are also being brought down." Ascend says it will make available LCAs on virgin grades at the beginning of 2023.

Ascend introduced ReDefyne at the show. This is a PA66 made using up to 100% post-industrial and post-consumer recycled material, much of it from old carpets. Van Duijvenboode says the supplier of the feedstock provides a consistent source of material. "This is the challenge with PCR [post-consumer recyclate]. We can also add PIR [post-industrial recyclate] to lower the carbon footprint."

ReDefyne products are third-party certified and Ascend is partnering with ITW Global Fasteners to pilot blockchain traceability through Plastic Finder's Certified Circular Plastic program. "With ReDefyne, ITW is producing fasteners with a considerably lower carbon footprint," says Christelle Staller, Ascend's Sales Director for EMEAI.

Lanxess says it is looking to use certified carbon footprints for identifying ways to reduce the level of greenhouse gases (GHGs) emitted during plastics production. New product ranges such as Durethan Blue, Durethan Eco or Pocan Eco are currently being extended that contain a significant proportion of circular (recycled or bio-based) raw materials or have a carbon footprint that is considerably smaller than conventional products. The sustainable origin of those raw materials is certified according to the ISCC Plus standard .

The certification is coupled with mass balancing, which allows the share of sustainable material in the end product to be determined and subsequently indicated in a transparent manner for

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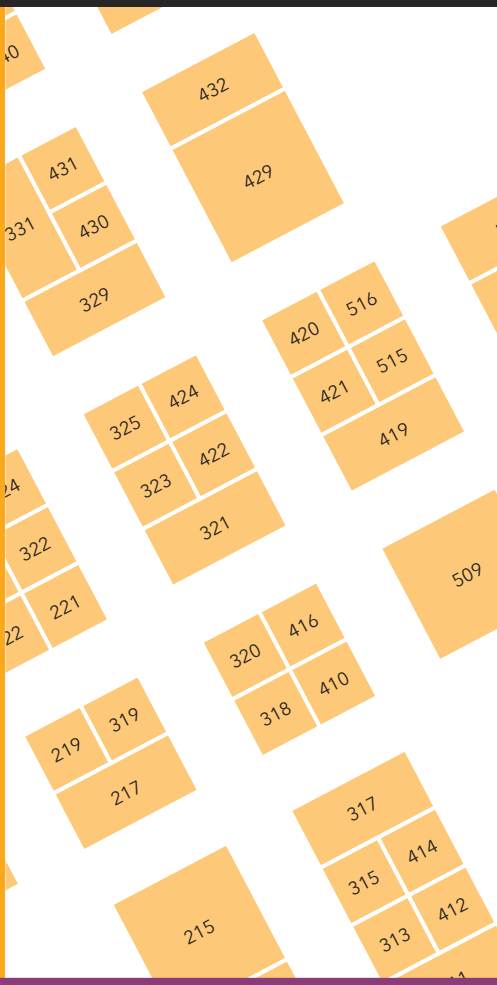

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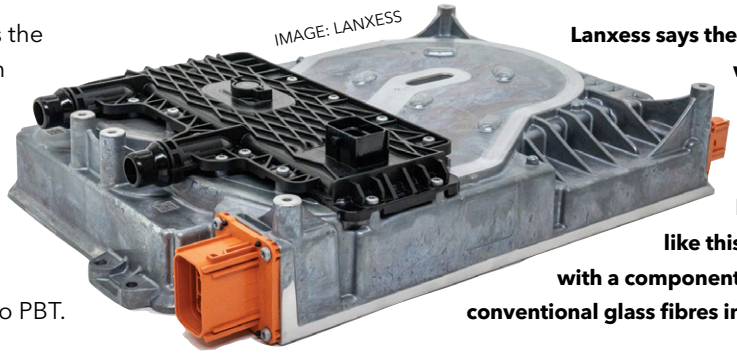
processors. One product example is the 60%-glass-fibre-reinforced Durethan BlueBKV60H2.0EF. In this PA6 compound, 92% of the raw materials have been replaced by sustainable alternatives. Lanxess is now planning to calculate the carbon footprint associated with the compounding of polyamide and also PBT.

IMAGE: LANXESS



Lanxess says the use of a BKV50 type with Eco glass-fibre reinforcement could have reduced the carbon footprint of a battery charger cover like this by 46% compared with a component made from PA66 with conventional glass fibres in the same quantity

Smaller footprint with PA6

Lanxess, which supplies different types of polyamide under the Durethan brand, says its PA6 compounds (Durethan B) are not only cost-effective alternatives to PA66-based compounds but are also much more climate-friendly. "This is according to calculations performed by the company based on its own data and on figures published by a range of institutions," it says.

"With 3.66 tonnes of CO_2 equivalents emitted per tonne of material produced, the carbon footprint of our PA6 base resin is much more than 40% lower than the current published European industry average for PA66," says Guenter Margraf, Head of Sustainability and Product Management in Lanxess High Performance Materials. "The carbon footprint of our PA 6 compounds is therefore also correspondingly smaller."

The carbon footprint of the compounds from Lanxess can be further reduced through use of Eco glass fibres developed by the company, which make use of industrial glass waste in their production. "The carbon footprint of our Eco glass fibres is around two-thirds smaller than that of conventional glass fibres," says Margraf.

IMAGE: BASF

Above: One example of the use of BASF's Ultraform in the consumer electronics segment, which is particularly keen to use more sustainable plastics, is keyboard scissors

Lanxess cites an on-board battery charger installed in an all-electric compact vehicle made by an unidentified German carmaker as an illustration of how the carbon footprint can be reduced. This incorporates Durethan BKV50H3.0, reinforced with 50% short glass fibres. Margraf says: "Compared with a component solution made from [an equivalent] PA66 compound, the carbon footprint can be reduced by 36%. The use of a BKV50 type with Eco glass-fibre reinforcement could potentially have reduced the carbon footprint by as much as 46%."

Polyamide supplier **Radici** also emphasised carbon footprints at the show. In China, the company is now moving and expanding its compounding operations for the third time since it established operations in the country in 2007. This time, it is designing and building the plant itself. The result will be a doubling in capacity in the country. The plant will have top environmental credentials with LEED (Leadership in Energy and Environmental Design) Gold and (Chinese) GBL-2 Star credentials. Features include zero liquid discharge, use of rainwater, and energy from solar panels.

Radici recently introduced Renycle, which makes use of post-industrial and post-consumer mechanically recycled resources. Radici provides full traceability, while LCAs show environmental impact is much lower than virgin material. The company has already introduced several grades.

BASF presented a portfolio of selected engineering plastics (and also polyurethanes) with a significantly reduced PCF at the K2022 trade fair. It includes a range of Ultramid A and B polyamides, Ultradur PBT, and Ultraform POM with PCF reductions of at least 30% compared to similar standard products while maintaining identical chemical and physical properties. All products currently available from the low-PCF portfolio are certified according to the mass balance approach in line with the REDcert standard.

All use certified renewable feedstock. Biomethane or bionaphtha replace the conventional fossil raw materials. "In addition, green electricity is used in the production of low-PCF products at those sites, where it is available," says Gregor Daun,


IMAGE: BASF

Right: Bow door handle for selected Mercedes-Benz models made from BASF's mass-balanced Ultramid PA6 reinforced with 30% glass fibre

Strategy Carbon Management, BASF. "The use of glass fibres and other additives with a reduced CO_2e footprint is in preparation."

Also new is Ultraform BMB, which is ISCC+ Biomass Balance certified, and which BASF says contributes additionally to the use of renewable raw materials in the production chain and allows a PCF reduction of approximately 70%.

BASF, Mercedes-Benz, Pyrum Innovations and Witte Automotive say they have successfully closed a material cycle to produce automotive components from mass-balanced plastics. A bow door handle for selected Mercedes-Benz models made from mass-balanced Ultramid PA6 reinforced with 30% glass fibre will start series production this year. To produce the plastic for the handle, BASF combined alternative raw materials in a mass balance approach: pyrolysis oil generated at Pyrum Innovations from scrap tyres, and biomethane from agricultural waste and food industry residues. The resulting compound features the same properties as a virgin compound.

Mass-balanced products will be used for bow door handles for the Mercedes-Benz S-Class and the EQE this year. The jointly developed solution approach will later be transferred to a crash absorber for the Mercedes-Benz S-Class.

On track with 2030 targets

DSM Engineering Materials says it remains on-track to meet objectives it set itself at K2019 to have a complete portfolio of bio- and/or recycled-based alternatives for its range of polyamides and polyesters by 2030. This year, it launched a 100% bio-based version of Stanyl PA 46, with half the carbon footprint of regular Stanyl. At K2022, it also discussed partnerships with Schneider Electric and with Samsung Electronics on applications using, respectively, recycled ocean plastics and recovered fishing nets in Akulon RePurposed PA 6.

DSM has set itself a target of cutting greenhouse gas emissions in half by 2030 compared to 2016.


IMAGE: DSM/ BUGABOO

Right: Bio-based Akulon PA 6 from DSM is used extensively in this Bugaboo stroller

At the show, the company discussed a partnership with children's stroller maker Bugaboo, Fibrant, and Neste, that has enabled the launch of an entire Bugaboo stroller portfolio made with bio-based materials. The majority of the strollers' plastic parts are made using Akulon 100% bio-based B-MB PA 6, which in turn is made using bio-based feedstock from both Fibrant and Neste. DSM Engineering Materials uses a mass-balancing approach with renewable waste and residue raw material to enable an approximate 75% PA 6 carbon footprint reduction compared to conventional PA 6 and up to 24% of the entire stroller.

K 2022 was the first opportunity for **Domo Chemicals**, another leader in polyamides, to present its entire range of Technyl solutions to a global audience (Domo acquired Solvay's European Performance Polyamides business in 2020, and is now using the Technyl brand across its portfolio).

It showed new solutions addressing needs in lightweighting, metal replacement, thermal management and e-mobility. The Technyl 4Earth portfolio, which includes grades containing 50-100% recycled material, coming from airbags and fibre production, continues to grow. Designed for cooling applications, Technyl 4Earth A1E 218 V30 BK 34NG LP is a sustainable variant of an existing coolant resistant grade, Technyl A 218 V30 BK 34NG, for example. For E&E applications Technyl 4Earth flame-retardant polyamides, in grey and white, are based on recycled feedstock with reduced CO_2 emissions.

Currently, around 10% of Domo's product sales are from circular solutions. The company plans to grow this to 20% by the end of the decade, and to 30% by 2035. It says it is exploring technologies and solutions around depolymerisation, polyamide dissolving, and new feedstock recycling.

Covestro premiered an e-mobility application for Makrolon RE, a polycarbonate

from mass-balanced biowaste and residues. Netherlands-based EVBox is manufacturing the entire housing of its new EVBox Livo wallbox from a compound of the new product series .

The sustainability of Makrolon RE is demonstrated by a partial life cycle analysis tested by TÜV Rheinland. If 3.5 kg of fossil-based Makrolon is replaced with an RE counterpart with an assigned biocircular material content of more than 70%, the carbon footprint of the charging station is reduced by approximately 10 kg of CO_2 equivalents, says Covestro.

IMAGE: COVESTRO

Left: EVBox is manufacturing the housing of its new Livo wallbox from Covestro's Makrolon RE

Makrolon RE compounds are identical to their fossil-based counterparts. The grade used for EVBox Livo offers tailor-made properties for charging stations. Its high flame resistance is reflected in a 5VA rating (Yellow Card) in the UL 94 fire test. It is also UL f1 listed and can therefore be used outdoors under water and UV exposure.

SABIC recently introduced LNP Elcres FST polycarbonate copolymer resins in regular and partially bio-based versions for rail seating, compliant with the EN45545 flammability standard. LNP Elcres FST2432B incorporates 55% renewable feedstocks from crude tall oil and other waste products. SABIC says an Intergovernmental Panel on Climate Change (IPCC) CO_2 equivalent analysis showed this and other bio-based products reduced carbon emissions by 33% versus fossil-based counterparts.

At K2022 SABIC showcased a wide range of automotive applications based on its thermoplastic materials, which it says support carbon emissions reduction, vehicle efficiency and performance enhancements. Solutions were based on its ETPs and also Stamax PP.

The company was highlighting its BlueHero initiative, which it describes as an expanding ecosystem of materials, solutions and expertise that aims to help accelerate the world's shift to electric power and a lower carbon future. The initiative's initial focus is on potential polymer solutions for battery pack components and systems of EVs.

At **DuPont Mobility & Materials**, Delrin Global Business Director Brian Ammons highlighted a grade of the POM homopolymer with a reduced carbon footprint, Delrin RA (Renewable Attributed). This uses feedstock from bio methanol on a mass balance approach. The company is yet another one making use of renewable electricity, and repurposing processing waste. There are currently nine grades, of which seven are general purpose and two are for healthcare applications.

The Delrin business was not included in the acquisition (just completed) of DuPont Mobility & Materials by Celanese and so is, at least for the moment, an independent organisation for the first time in its history. "This is a big deal for us," said Ammons. ›

IMAGE: ASCEND

Above: In a battery-related flammability test by Ascend, an aluminium panel was breached by the flame in little over 4 minutes (left), and in the same test, the plaque in X-Protect remains intact for at least 15 minutes (right)

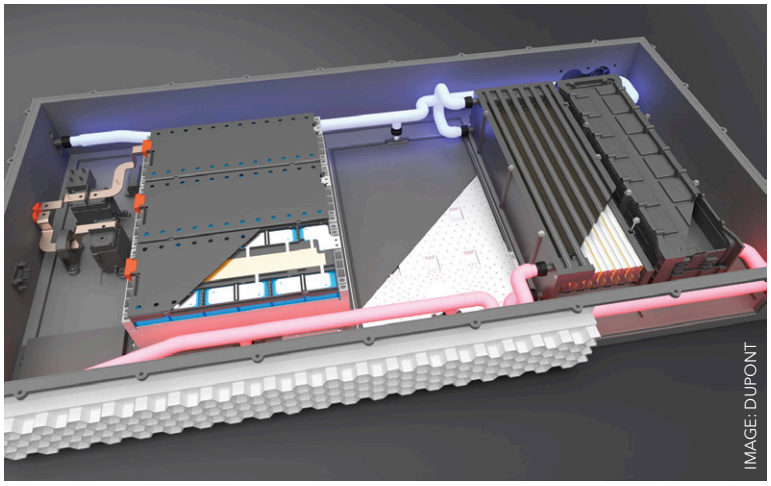


IMAGE: DUPONT

Above: A new hybrid plastic/metal cooling plate developed by DuPont Mobility & Materials and automotive Tier 1 Novares

Battery options

Staying with the subject of sustainability, but looking further downstream, new developments for electric vehicle components were everywhere at K2022.

For example, Ascend's Starflam X-Protect was developed principally to reduce the risk of thermal runaway in EV batteries. Ascend has carried out tests on plaques 3 mm thick to show the effect of a direct flame (the Powerplant Fire Penetration Test uses a 1.4-kW burner producing a 1,100°C flame) on different materials. The first one is a regular flame retardant V-0 polyamide containing glass fibres; the second one is made from X-Protect (also glass reinforced); the third one is made from aluminium.

The first and the third plaques rupture (melt) after little over two minutes and four minutes respectively, while the second plaque in X-Protect resists until the flame is turned off after the regulation time of 15 minutes. A char forms on the first surface, but there is no melting, and the reverse side is largely undamaged.

"We think this is of a lot of interest for EV battery producers, for use inside the battery itself, to provide a flame barrier between one area of the battery and another, as a second line of defence after the electronic battery management system," said van Duijvenboode.

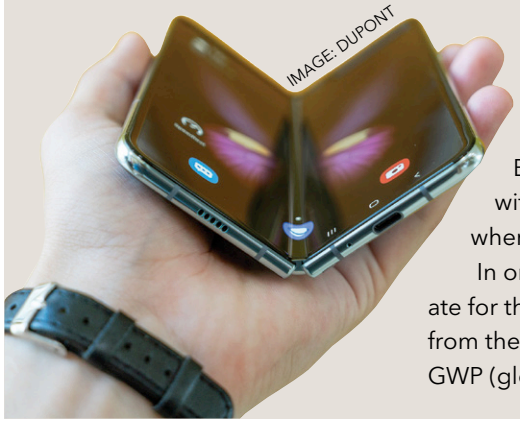
In China, norms call for materials that allow at least 5 minutes for occupants to escape from a vehicle in which a fire started. It is expected that the same requirement will be adopted around the world, and future requirements could be even more stringent.

Less noise in EVs

Another novelty from Ascend is Vydyne AVS (Anti-Vibration Systems). This provides damping for high-frequency noise sources in EVs (the compressor, for example), which in general are much quieter than ICE Vehicles (far less noise from the motor/engine, and also less noise from air passing around the car, since EVs need to have a very low drag coefficient to extend their range). It already features on the Cadillac Lyriq, described by one automotive magazine as "crypt quiet".

A typical component in Vydyne AVS is a bracket attaching the compressor to the body-in-white; this would normally be made in cast aluminium, which is heavier, and transmits more vibration, owing to its rigidity. Tests at Cadillac showed that a version in the new material cuts noise by 80% (7dB), compared to a bracket in regular PA66. The effect is achieved by modification of the backbone of the polymer, rather than through compounding.

Foldable and renewable



Several models of foldable phones feature structural parts moulded from new, renewably sourced Zytel PA610 grades from **DuPont Mobility & Materials**: Zytel FE150065 BK010 and Zytel RS32G10DO BK236. Typical application is the mainboard cover. The supplier says Zytel RS32G10DO BK236 is formulated for low density and balanced stiffness/toughness along with excellent dimensional stability. It can reduce part weight by 30% or more when compared to the incumbent structural materials.

In one foldable smartphone application, a manufacturer replaced polycarbonate for the PCB board cover with Zytel FE150065 BK010. This switch removes 0.5g from the part weight with even higher stiffness than polycarbonate. It also lowers the GWP (global warming potential) for the entire device.

There will be a family of solutions, tailored to different frequencies (around 4,000-5,000 Hz) and different operating temperatures.

DuPont Mobility & Materials has reported a similar development to Ascend, with its newly formulated PA66-based compound, Zytel NVH Gen 2. Its automotive electrification team developed Zytel NVH70G35HSLA2, the first entry in the Zytel NVH Gen 2 product family. This 35% glass-filled product is said to offer high damping, yet keeps its base polymer's robust structural properties for parts that need sustained mechanical strength throughout their lifecycles.

According to Gabe Knee, Automotive Market Manager, the new grade takes a different approach to high-frequency vibration isolation by utilising the material's structural damping ability without sacrificing extended fatigue resistance over time. The material can endure high-stress conditions and provide stable characteristics under varying ambient and loading conditions.

In a recent commercial application in North America involving EV motor mounts, Zytel NVH Gen 2 maintained structural integrity while offering over 20% direct mass savings and considerable material cost savings compared to aluminium. Ascend is also looking for materials to handle higher voltages in EVs, so that they can charge more quickly.

DuPont Mobility & Materials showed a new hybrid plastic/metal cooling plate it is co-developing with automotive Tier 1 Novares that they say will help OEMs extend the range and lifetime of their EV batteries. One key to this new project is the patented plastic/metal bonding technology developed at DuPont's technology centre in Meyrin, Switzerland. According to Laurent Vanholme, Expert Powertrain Components at Novares: "We were able to master the difference in thermal expansion between the metal and plastic parts, and re-engineer the product to be processed with conventional welding."

"When it comes to the flame-retardant plastics that make up many EV components, designers must ensure that the materials they specify retain mechanical properties, process easily, deliver dimensional stability for big and flat parts, enable design flexibility, and withstand a wide temperature range," says the company. It has developed new halogen-free flame-retardant material grades aimed at overcoming limitations in all of these categories. Solutions include compounds based on PAs, PPA, and PBT.

For example, Zytel FR70G30V0NH2 (PA66-based) is said to deliver exceptional mechanical properties, low mould deposit, easy processing and laser transparency for laser welding, while Zytel HTN FR53G50NH and Zytel HTN FR53G30NH2 (PPA-based) provide very good mechanicals for structural parts. Crastin LW-FR864NH2 (PBT-based), with high dimensional stability, is for long, thin parts common in EV

Below: DuPont Mobility & Materials has developed halogen-free flame-retardant PA, PPA and PBT grades

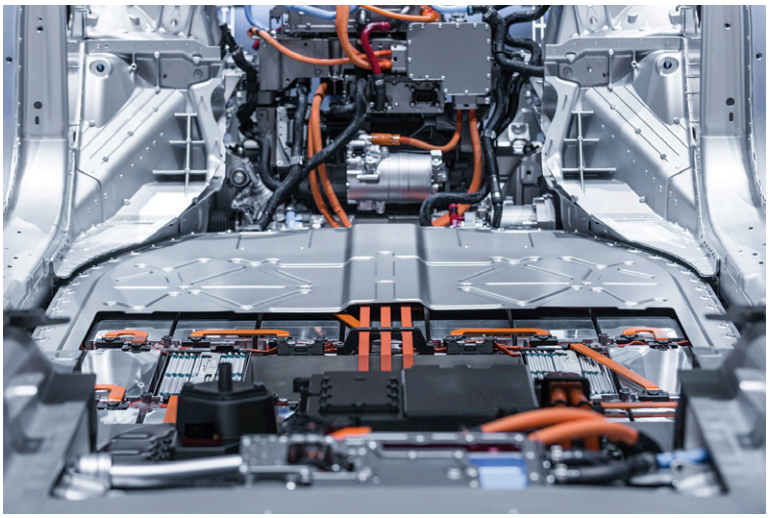


IMAGE: DUPONT

Covestro collaborates with X2F

On its stand at K2022, **Covestro** showed the results of a collaboration with **X2F**, to develop a thermally conductive automotive heat-sink with in-mould electronics using X2F's controlled viscosity moulding technology. Application samples include small modules for automotive forward lighting. X2F says the new product "will be a unique alternative for automotive OEMs and processors who seek a replacement for cast aluminium heat-sinks that is both lighter and more affordable."

A heat-sink moulded in Makrolon PC is approximately half as heavy as the typical aluminium part. It is part of an in-mould assembly that can be used to integrate LED modules directly into the headlamp housing – eliminating the weight and labour associated with the installation of brackets, screws, thermal pastes, and adhesives. X2F says the technology is production-ready; it has already been demonstrated in high-volume series manufacturing for other applications.

"This new program involves using controlled viscosity moulding by X2F to attach the LED module directly onto the thermally conductive heat-sink without fundamentally changing the heat-sink adjuster module design," says Paul Platte, Senior Marketing Manager with Covestro in the USA.

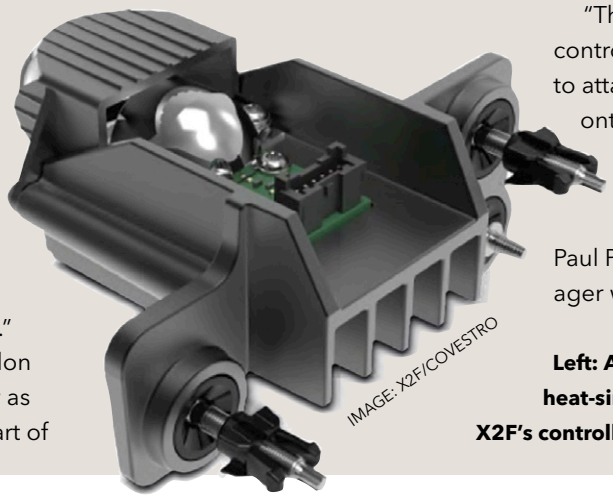


IMAGE: X2F/COVESTRO

Left: A thermally conductive automotive heat-sink with in-mould electronics using X2F's controlled viscosity moulding technology

batteries, with stable electrical properties up to 170°C. All grades are designed to achieve UL94 V-0 at 1.5 mm. "The fact that these materials achieve flammability at 1.5 mm rather than 0.8 mm enables them to retain additional performance properties," the supplier says.

Applications range from high voltage connectors, battery modules, and bus bars to junction boxes, inverter parts, and electric motor parts. Certain grades are available in a high-voltage orange colour that remains stable over a broad temperature range.

On the SABIC stand was the Lucid Air EV from Lucid Motors, said to be the world's longest-range and fastest-charging luxury production EV. It uses thermoplastics from SABIC in more than 25 applications, including a battery module housing, into which the electrical conductor is incorporated during injection moulding with a 20% glass reinforced flame retardant Lexan polycarbonate (see more information about suppliers working with Lucid Motors in the Automotive feature starting on page 41). Use of metal for the same part would add significant weight, limit design freedom and introduce significant processing challenges, says SABIC.

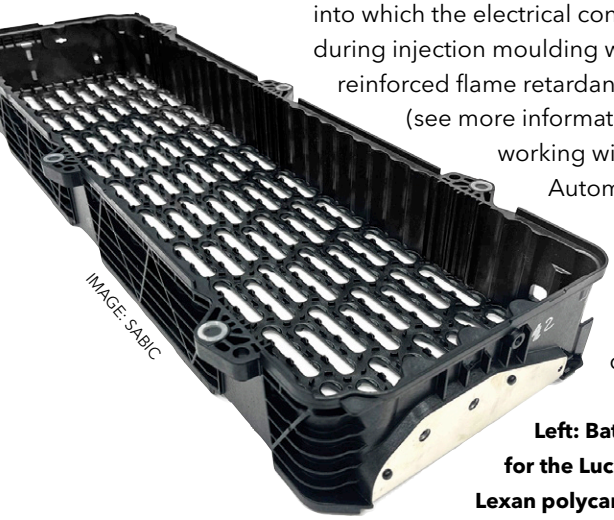


IMAGE: SABIC

Left: Battery module housing for the Lucid Air EV in SABIC Lexan polycarbonate

Lanxess launched the Pocan E range of PBT glass reinforced compounds with very high tracking resistance, said to be ideal for compact electrical and electronic assemblies. Grades are available with "excellent" hydrolysis stability, flame-retardant properties, flowability, and toughness.

The new compounds score the best possible rating of 600 in the CTI A test (IEC 60112). "Previously, glass-fibre-reinforced PBT compounds with such high tracking resistance were not readily available on the market. We have now closed that gap," says Claudia Schmid-Daehling, who shares the responsibility for PBT product development at Lanxess. "The Pocan E product range can also be used with the significantly higher rated voltages that are required for rapid charging of electric vehicles, for example."

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Increased use of bio-based resins and post-consumer recyclates can cause problems in the injection moulding process. New hot runner technologies are meeting these challenges, writes Mark Holmes

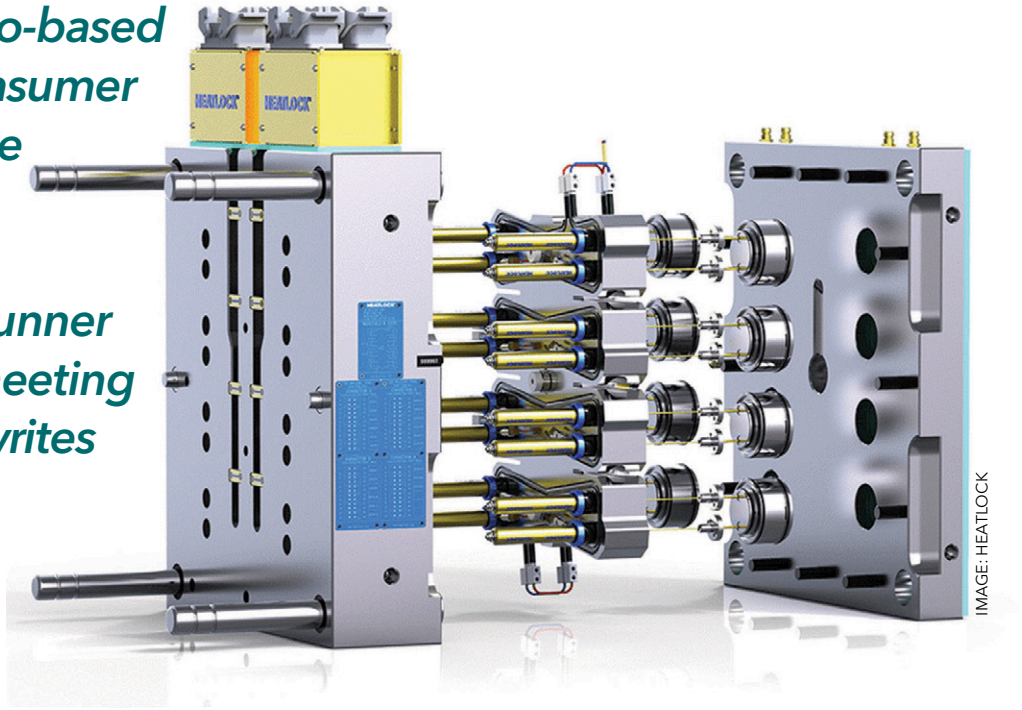


IMAGE: HEATLOCK

Keeping a sustainable flow with hot runners

Hot runner technology is central to a cost-effective and efficient injection moulding process. The expansion of the circular economy in plastics continues to provide challenges as sustainable options, such as bio-based polymers and post-consumer recyclates, require new hot runner solutions. In this feature article, we report on leading mould and hot runner technology suppliers which have been developing solutions for this and other challenges.

Mold-Masters reports that the growing demand for plastics components, including ones from recycled materials, is providing a buoyant market for hot runner systems in injection moulding and new technical developments. "We are always looking at ways to enhance processing through improving part quality, increasing productivity, and minimising downtime," says Sudheer Thrissileri, Technical Director. "There are developments targeting the general injection process as well as for specific applications, such as Symfill technology. In addition, consumer demand and environmental awareness around the globe is accelerating the need for companies to find solutions for sustainable applications. Mold-Masters supports this by being an industry leader in processing bio-resin and post-consumer recycled (PCR) materials."

Mold-Masters says that it also has sustainable application knowledge and success with both bio-resins and PCR materials. Sustainability is not only driven by government regulations, but consumer demand and environmental awareness around the world are pushing more companies towards sustainable applications. Using co-injection multi-layer technology, the company says that it can combine two separate resins into a single three-layer melt flow. This enables the injection of high levels of PCR content as the core layer of up to 50% of total part weight, without sacrificing part quality or cycle time.

In a recent production application, Mold-Masters implemented a co-injection system for producing 5 gallon (20 L) pails. Each of these pails incorporated 50% PCR as the core layer. This sustainable solution has the potential to generate significant savings for the moulder (based on current prices) by reducing the use of virgin material and titanium dioxide (compared to traditional mono-layer pails). These significant savings and favourable return-on-investment mean that sustainability initiatives can also make good financial sense.

According to Mold-Masters, its systems allow

Main image: Heatlock 16-drop valve gate technology

Right: Fork using bio-based polymers processed with hot runners from Mold-Masters

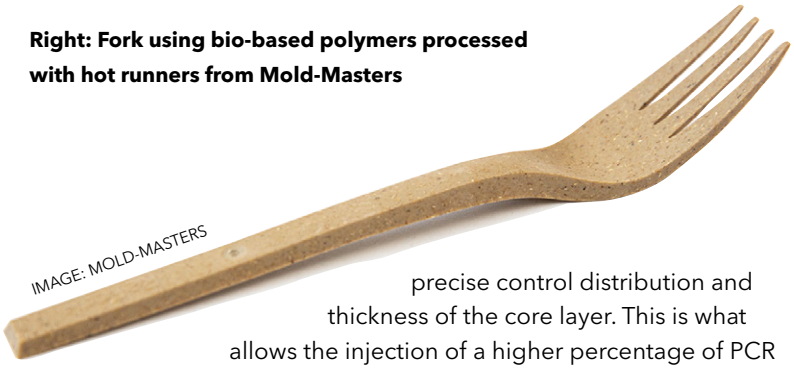


IMAGE: MOLD-MASTERS

precise control distribution and thickness of the core layer. This is what allows the injection of a higher percentage of PCR content compared with competitive systems, it claims. Where Mold-Masters can inject up to 50% PCR core, it says many competing systems are limited to incorporating up to 35%, which could limit sustainability targets and can significantly affect implementation of return-on-investment. Uniform control allows Mold-Masters to achieve more consistent and fuller core fill.

Mold-Masters adds that its 'fold-over' capabilities are a technical advantage that enable the highest core percentage to be achieved and ensures uniform distribution and complete coverage of PCR resins, which prevents contact of PCR with the product. Another significant difference is the ability to position the core where it is required. For example, on packaging applications customers may prefer to keep any PCR core away from the injection point to avoid moulded in stresses, which can cause brittleness and result in drop test failures.

According to Mold-Masters, one of the major advantages of co-injection technology is that there is no penalty to cycle time and existing tooling can be re-used. A variety of materials can be combined although those with similar melt temperatures are ideal for compatibility. Many applications are those that utilise the same material, for example, 50% virgin HDPE with 50% PCR HDPE. However, thermally isolated manifolds also make it possible to combine two thermally different resins.

Indicating its experience with bio-based plastics, Mold-Masters says these materials can be challenging to process compared to the common resins they typically aim to replace, which can make producing good parts difficult and sometimes impossible. Some bio-based grades can be easier to process than others, but it is common for many to have narrow processing windows due to thermal or shear sensitivities. Hot runner design needs to be optimised for bio-resins. Taking into consideration flow pattern, eliminating hang-up spots and other design requirements are critical elements that need to be considered.

When moulding with bio-based plastics, a wide range of visual defects can appear based on the processing characteristics of the material and the hot runner configuration used. These defects include jetting, streaking, splay, flow marks, knit lines, burn marks and stringing. Mold-Masters says that it has spent extensive time testing a wide selection of these materials in its R&D facility and through a partnership with the University of Massachusetts, USA. In addition, the company has worked with leading converters and brand owners to select resins and to define a priority test sequence. This research allows evaluation and understanding of their unique properties and effective processing requirements.

Mold-Masters has also recently launched the new Fusion Series G3 hot runner system. Fusion systems are shipped completely pre-assembled, pre-wired, plumbed and tested for fast, one-step installation. The company says that the Fusion G3 system incorporates several major enhancements that help optimise mould design and simplify and speed up installation. These enhancements include reduced nozzle bore cut-outs, new nozzle heater sleeves (optional), more compact actuators (PN and HY), and system installation at room temperature.

FG3 nozzle bore cut-outs have been significantly reduced to minimise cut-out requirements to save time and money. FG3 nozzles currently offer a shot range of 50g to more than 5,000g per nozzle. Fusion nozzles incorporate field replaceable heater bands and gate seals to ensure moulders have the ability to respond and fix issues quickly to minimise downtime. New heater sleeves protect the nozzle and wiring from damage during installation and do not impact cut-out dimensions. FusionG3 also has the advantage that it is engineered to be installed and uninstalled at room temperature. It can be pulled directly from the shipping box and placed into the mould. This helps to reduce installation time, eliminate extra equipment such as a temperature controller and improve safety conditions during installation, assembly and removal.

Symfill Technology significantly minimises core shift to improve part quality (straightness) of cylindrical, centre injected components having an aggressive L/D ratio. It

Right: Mold-Masters has recently launched the new Fusion Series G3 hot runner system

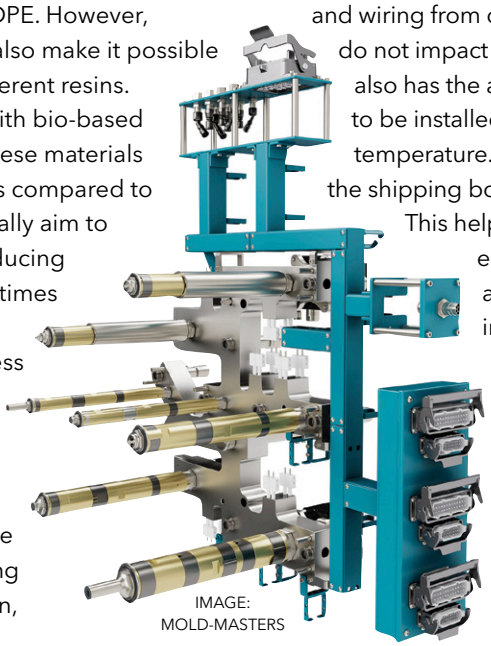


IMAGE: MOLD-MASTERS

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. Minimising barrel bow offers many downstream processing advantages which includes tubes roll concentrically in the labelling machine, an increase in final stage throughput, and minimising machine downtime. In a recent blood vial application using Symfill Technology, barrel bow was reduced by up to 90% (as little as 0.15 mm) by eliminating core shift.

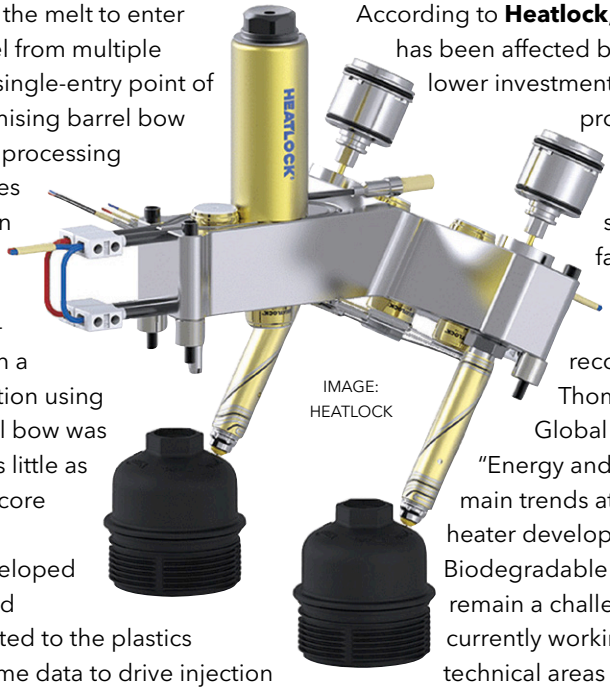


IMAGE: HEATLOCK

Left: Heatlock says its new Straight hot runner nozzle series offer a straight temperature profile un-affected by mould temperature

Mold-Masters has developed SmartMold, a cloud-based software platform dedicated to the plastics industry providing real-time data to drive injection moulding innovation. Process data is collected from sensors embedded within the injection mould which is used for feedback and insights that drive enhanced productivity. The solution is the first step towards predictive and autonomous capabilities within a facility. In addition to collecting process data, SmartMold software offers performance tracking, downtime tracking, scrap tracking, maintenance reminders, alerts, reporting, analytics, mould information and document storage. SmartMold is compatible with any brand of equipment.

Data collected through SmartMold is displayed on intuitive desktop and mobile interfaces. However, users also have the freedom to pull data into existing ERP/MES systems through APIs. Additionally, data can be exported from the SmartMOLD system in various formats, such as Exel, csv, xml and net. Users can scale the system to a facility and budget requirements and only pay for what is used.

According to **Heatlock**, the hot runner market has been affected by the pandemic, with lower investment in new projects and products as a result.

"However, together with the current global situation we now are facing, I am still confident that the plastic injection moulding market will recover over time," says Thomas Kjellberg, Director Global Application Engineering. "Energy and sustainability are the main trends at present, which drives heater development to save energy. Biodegradable and recycled resins remain a challenge that the industry is currently working on. While other technical areas of interest at present include the caps and closures market, high cavitation solutions, and comparative simulations for filling pattern."

Kjellberg says that Heatlock's latest innovation for the hot runner market are its Straight series nozzles. The Straight series heat profile is extremely straight from the start to the end along the nozzle. The heater technology works well with the company's ceramic insulation, allowing full control over heat distribution and part quality.

Other projects that Heatlock has recently been involved with include a valve gate HRS system for POM with a Pawl Disc 32 cavity. The project involved finding solutions to reduce plastics waste, shorten residence time and make use of a smaller injection machine. An open HRS system was also developed for COC, involving a head up display, one cavity, and high demands on the part surface quality. The project identified solutions in the tool to avoid defects. Heatlock also developed a solution for a valve gate HRS system for PET

IMAGE: HRSFLOW

Above: The updated HMI 4.0 for the control unit of FlexFlow hot runner systems can show a mould cards archive, which allows selection of an existing data set or new recipes

packaging with a 2+2 cavity, involving transparent parts. Future developments will include further energy and resin saving measures, as well as improved part quality.

Hasco has developed the Vario Shot Xgate, a new interchangeable needle-valve pre-chamber for its Vario Shot nozzle range. The company says that the wear resistant Vario Shot Xgate simplifies maintenance of the injection moulding tool and significantly reduces costs. The life of the gates is extended considerably and guarantees good moulding quality over millions of injection cycles. The easily changed pre-chamber with a compact, easy-to-produce tight fit offers precise needle guidance with pre-centring and is also highly resistant to abrasive and chemically aggressive materials.

Individually geared to specific applications, the two new variants of the Vario Shot Xgate offer solutions for either amorphous or semi-crystalline plastics. The gate area and contact surfaces can be varied for application-specific temperature control. The needle valve pre-chamber supplements the Vario Shot range, which is noted for its compact dimensions, optimum temperature control, simple servicing and modular design. More than 1,000 nozzle variants enable many demanding applications, from gating on lower distributor manifolds up to high-end needle valve solutions. The wide selection of nozzle lengths with runner and individual nozzles offers an increased level of freedom in mould design, says the company.

Oerlikon HRSflow has revised the software for the control unit of its FlexFlow hot runner systems. The company says that the updated HMI 4.0 now makes operation even more intuitive and convenient. Systems with different nozzle types can be integrated and several parameter sets can be saved per mould. Extended possibilities have been added to control each servo motor individually for nozzle needle positioning and to monitor process stability. In addition, specific user accounts for individual access authorisations can now be set up and managed. Due to the web connection, access to the control unit is possible regardless of location.

According to the company, HMI 4.0 now offers the possibility to control multiple servo motors individually and with specific data. This also enables the handling of systems with mixed nozzle dimensions. For this purpose, the system uses specific mould cards for each tool equipped with the FlexFlow hot runner technology. All the information required by the control system can be uploaded to these cards, including recipes, the number and configuration of servo-electric nozzles. Storing the individual recipes also facilitates changing the working mode of the mould, which is mainly relevant for family tool operations. Even parameters for purging cycles can be integrated. These mould cards can be downloaded on a USB stick to transfer them to another control unit or to save them as a backup.

To facilitate individual programming and to make it even more intuitive, an image of the respective moulded part can be stored on the corresponding card. Individual gating points can be correlated to the respective hot runner nozzle. Double-clicking on them allows for disabling or enabling certain functions and checking the status of the motor. Moreover, the user can manage the operation parameters of each motor to optimise the performance of the related nozzle independently. A cycle list page provides master diagrams for individual moulding recipes. Overlaying the appropriate diagram for a specific task with the

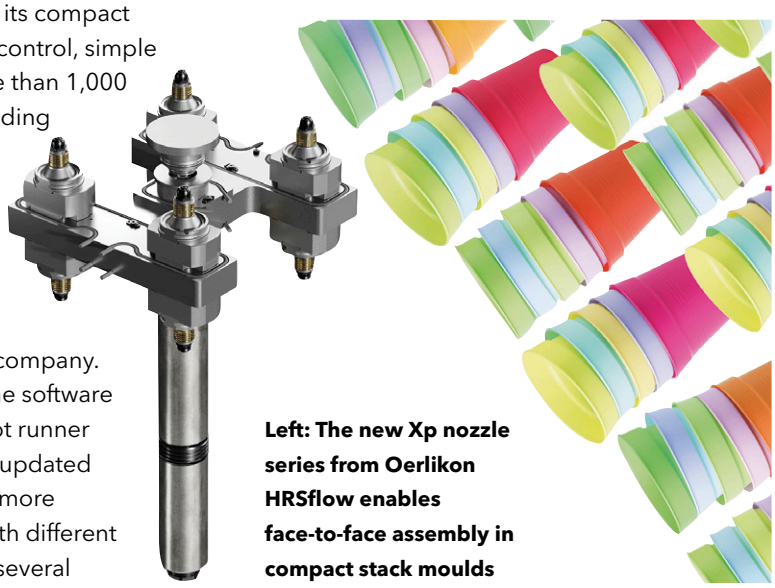


IMAGE: OERLIKON HRSFLOW

Left: The new Xp nozzle series from Oerlikon HRSflow enables face-to-face assembly in compact stack moulds

corresponding actual process data provides the possibility to check the process stability and to take measures where necessary.

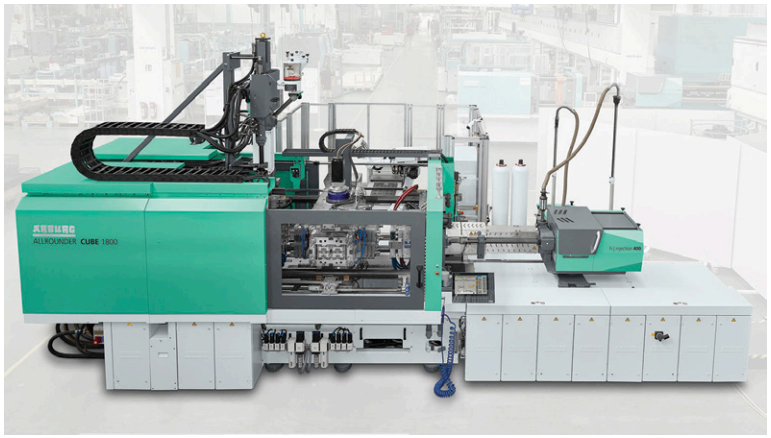
Several users can connect to a control unit at the same time. However, only one participant can take control, while the remaining ones only receive information about the respective status. It is possible, however, to pass over control to another user. Integrated into the customer's network, the HMI 4.0 allows for controlling FlexFlow hot runner systems from any location via PC or tablet, using an internet browser.

Oerlikon HRSflow has also developed a range of hot runners tailored to small shot weights and the new Xp nozzle series for use in thin-wall injection moulding. Both support the trend towards greater sustainability by helping to reduce energy consumption in plastics processing. The company says that it now offers complete systems for the small shot market segment, which require tight nozzle pitch solutions. These include nozzles with small dimensions in all designs, from thermal gate to valve gate, as well as the associated manifolds and actuation mechanisms. For multi-cavity applications, a multi-valve plate (MVP) provides synchronised control of the injection channel across all cavities for high part-to-part weight consistency.

The new low shot weight system line covers market segments such as medical technology, thin-walled packaging, and packaging for beverages and domestic goods. The latest version of the system is also highly reliable for processing biopolymers and PCR compounds. A version with a specially coated nozzle tip is available for processing highly corrosive polymers including flame retardant compounds. For demanding applications, Oerlikon HRSflow uses its in-house additive manufacturing process SLM (Selective Laser Melting) technology to produce cooling circuits for all market segments. Through Oerlikon Balzers, the company also offers surface protection for all moulded part surfaces to increase their corrosion resistance.

The new Xp series of valve gate nozzles from Oerlikon HRSflow is designed to withstand high filling pressures of up to 2,200 bar and enables fast injection and cycle times in a stable process with high part weight consistency. A solution for stack systems in thin-wall injection moulding has also been developed. Assembly is simplified and highly efficient due to a plug-and-play installation. This

IMAGE: ARBURG



Above: At K2022, an Arburg three-component Allrounder Cube 1800 moulded a functional component from PP, TPE and POM using an 8+8+8-cavity cube mould from Foboha

hot runner system, which enables the use of smaller injection moulding machines, fits a maximum plate thickness of 240 mm. This allows perfectly symmetrical systems with up to 8 plus 8 drops to be supplied, with a minimum pitch between cavities of 65 mm and between nozzle and inlet of 120 mm.

Companies in the Molding Solutions business unit of **Barnes Group** have announced various product developments. **Synventive** has developed a new electric valve gate, the compact eGate Sync, which will complement the legacy eGate system. The company says that the cost-effective eGate Sync has plug-and-play installation and a simple user interface. Quality is improved by increasing shot-to-shot consistency.

New hot runner and control technologies for multi-cavity applications are now available from **Männer**, which is expanding its Packaging and Slimline product ranges with additional valve gate nozzles. The Packaging range for high-speed moulds is complemented by the MCN-EP, with a small diameter and permanently centred valve gate pin. The design of the nozzle tip facilitates high-precision gating and enables the correction of tip protrusion without reworking. Like the proven MCN 8 and MCN 6.5, the new MCN 5 valve gate nozzle from the Slimline series is ideal for tight installation conditions in high-cavity moulds. The company says that it not only has the nozzle in mind, but also the optimisation of the manifold. A 3D printed manifold designed using artificial intelligence can show how the design of flow bore helps a non-symmetrical 6-drop hot runner system achieve perfect balancing.

Thermoplay has added two nozzles to its TFS series – the open nozzle series for side injection – for larger part volumes. The company is also targeting special applications. For example, it has created nozzles for a 45-degree gate to produce conical parts as well as multi-tip nozzles for small parts that are gated with several gating points. Thermoplay sees 3D printing as an option for fast delivery times and is introducing a new multi-nozzle with an additively manufactured collar.

Gammaflux offers hot runner temperature control technology and has developed Triangulated Control Technology for up to 192 zones, with the G24 being the most popular temperature controller.

Molding Solutions says that adding digital intelligence to high-precision mechanics is a high priority. When processing PCR and bio-based materials, injection moulders struggle with material fluctuations, which makes process-reliable production difficult. The Fillcontrol process monitoring system from **Priamus** identifies and corrects material fluctuations that contribute to decreased quality through dynamic process control by adjusting the manipulated variables of pressure and temperature signals.

The development of **Foboha**'s 48-cavity mould was the result of focused efforts to produce the best design of a high-cavity hot runner system in terms of balancing and energy efficiency. Each cavity has been equipped with a Priamus sensor to offer complete system monitoring and optimised use of the Priamus process control system.

Finally, Molding Solutions has established the hotrunner.shop, offering 3D data within minutes. With the new hot runner configurator, 3D data of 2-, 4-, or 8-drop hot runner systems with nozzles from Männer and Synventive can be created within minutes. The step-by-step configuration can draw on a material database of more than 12,000 resins. Customers can generate customised 3D data easily and quickly through the application check, which includes a follow-up with an application engineer for applications outside of guidelines. Synventive and Männer configurators are currently available, with Thermoplay to be added shortly.

CLICK ON THE LINKS FOR MORE INFORMATION:

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- **www.thermoplay.it**
- **www.gammaflux.com**
- **www.priamus.com**
- **www.foboha.com**

IMAGE: LUCID

Plastics suppliers have worked with injection moulders to tailor materials to applications that meet the sustainability goals of car manufacturers. By Mikell Knights

Adapting plastics to meet changing needs in auto

Material choices for automotive interiors and exteriors have become more diversified and specified to an application. Yet they continue to keep function, performance, costs, and aesthetics in sight as they open the door to light weighting, carbon reduction, sustainability, and use of renewable materials.

A **Borealis** Fibremod long glass fibre reinforced PP grade was used to produce the largest ever all-thermoplastic tailgate for Volkswagen AG's Transporter Multivan model. The tailgate, which took home the second-place award for chassis unit/structural component at the Society of Plastics Engineers (SPE) Central Europe's 21st Automotive Awards, delivered weight savings of around 200 kg compared to its immediate predecessor as well as a lower CO_2 footprint and lower energy consumption in manufacturing, and it incorporated a renewable polymer and is recyclable. Borealis and Volkswagen worked with Tier One supplier Magna Exteriors to manufacture the completely redesigned tailgate.

Borealis developed Fibremod GB416LF as a lower-density replacement for conventional engineering polymers that was specifically tailored for use in tailgate carrier and visible structural parts. The high-flow 40% glass fibre reinforced material fulfills stringent emission and mechanical performance requirements and offers excellent surface aesthetics that eliminate the need for additional surface finishing steps such as painting. The material offers excellent flowability for smooth processing, and low warpage, as well as excellent fibre impregnation and flexibility in the use of various PP matrices.

The tailgate consists of several components, including an outer frame and inner part made of the Fibremod GB416LF, glued together to meet design

Main image: Sabic thermoplastics are used in more than 25 applications in the Lucid Air e-vehicle

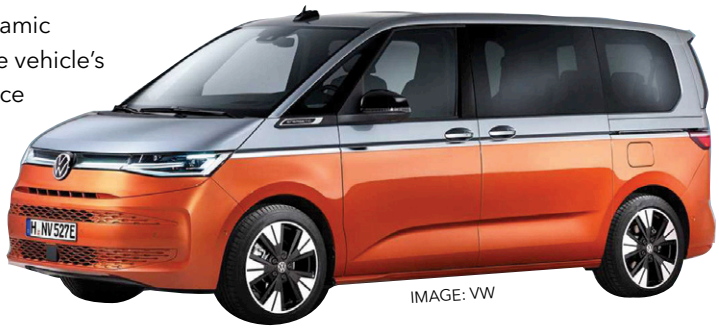
IMAGE: VW

Right: Volkswagen T7 Multivan

requirements and withstand static and dynamic loads. Part of the tailgate also lies within the vehicle's interior and must therefore meet compliance for emissions, fogging and odour.

An automotive interior centre console trim concept made with a Borcycle M EE1300SY compound won the second-place Automotive award for best enabler technology. The material is a 15% mineral filled PP compound containing 30% post-consumer recycled polymer. The part delivered several sustainability goals, including recyclability, CO_2 footprint reduction and the elimination of a surface coating requirement.

At its K show booth in October, Borealis displayed several additional automotive component concepts along with the two SPE award winning parts. These included:

- A trunk cladding concept made using a Borcycle M MG1416SY mineral-filled PP compound containing 10.40% post-consumer recycled polymer.
- A D pillar concept made with a Borcycle M EE1300SY PP compound.
- A door panel concept manufactured using a Borcycle M EE1300SY PP compound.
- A door panel concept for Skoda produced with a PCR-based Daplen EE001AI grade.
- A front bumper study designed using a Borcycle M EG1217SY PP compound comprised of 15% mineral filler and 25% post-consumer polymer.
- A bumper bracket concept designed with a Borcycle M GD3600SY PP compound containing 30.68% post-consumer recycled polymer with glass fibre reinforcement.
- A centre console for Skoda made with a Daplen EE058AI 13% mineral filled thermoplastic olefin (TPO) compound.
- An instrument panel carrier for VW's ID.4 model manufactured with a Fibermod GE 277AI-9502 20% glass fibre reinforced PP compound.
- Shifter housing GM Onix concept made with a Fibermod material.
- Rear view mirror concept for the GM Tracker vehicle made with a Fibermod GE grade.

Below: The Lucid Air from California-based car maker Lucid Motors is recognised as the world's longest-range and fastest charging luxury production EV


IMAGE: LUCID

SABIC displayed a range of exhibits and applications in automotive and the larger transportation sector at its K show booth, based on its thermoplastic materials and solutions that support carbon emissions reduction, vehicle efficiency and performance enhancements. Its Bluehero initiative that aims to help accelerate the world's shift to electric power and a lower carbon future was a central theme, with electrification solutions, such as a structural EV battery and electrical components a highlight. The company also showed several innovations for exterior and interior automotive parts.

A standout display at SABIC's K show booth was the Lucid Air sedan from California-based car maker Lucid Motors. The model is recognised as the world's longest-range and fastest charging luxury production electric vehicle and was named the 2022 MotorTrend Car of the Year.

SABIC thermoplastics are used in more than 25 applications in the vehicle, from structural, EV battery and electrical components to exterior and interior parts. SABIC developed a Smart Panels solution that presents concepts for both front and rear panels and highlights critical considerations for the choice of materials that advance the emergence of grille-less designs for EVs. A sample front and rear panel were displayed and includes what SABIC says is the industry's first and largest high-volume illuminated front panels on a production vehicle. The front panel is manufactured through an injection-compression moulding process with a clear Lexan LS resin for the first shot and a black Cycoloy PC/ABS resin for the second shot. The panel integrates lighting and decorative elements for distinctive functionality and aesthetics. A second sample panel is an integrated rear panel produced from Lexan through an in-mould decoration process.

SABIC also displayed a prototype of a full structural tailgate carrier produced using its

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mechanically recycled Stamax resin available under its Trucircle portfolio of circular solutions. SABIC offers three new grades of the mechanically recycled PP grades containing long glass fibres along with the recycled material. Stamax T2E-40YR240 and T2E-30YR240 are high stiffness grades, while Stamax T5E-40YR27E is a high impact resin. The materials are intended for a range of exterior, structural and interior parts while supporting demand for more sustainable materials that reduce CO_2 footprint and enable circularity.

A Lucid front-end module on display demonstrated the high strength to weight ratio achieved in a single-shot injection moulding process with Stamax resin combined with SABIC organic sheets. The pre-cut organic sheets are inserted into a mould, shaped and combined with several additional inserts, then over-moulded with the Stamax to form a lightweight composite hybrid part with a high level of rigidity. The high level of integration resulted in less assembly work and, in turn, lower costs.

Left: At K2022, Sabic displayed a prototype of a full structural tailgate carrier produced using its mechanically recycled Stamax resin available under its Trucircle portfolio of circular solutions

Other lightweight solutions at the K show booth included foamed parts on display. This includes an inner tailgate panel made with new SABIC PP materials which are suited for foam injection moulding and deliver low weight with exceptional aesthetics. The foam injection moulding materials are suited to vehicle interior applications. SABIC also showed an all-PP sandwich panel made with an ultra-melt strength (UMS) SABIC PP resin. The material offers outstanding foam-ability to support weight reduction, as well as potential cost optimisation and design for recyclability.

Thermoplastics compounder **Mocom** has supplied no less than three different grades of its Alcom PP or PC materials as part of various decorative trim components on the side doors and dashboard in the newest BMW 1 Series. The grades are used in the individual components of the trim strips and contribute to the high-quality ambience of the vehicle's interior. Use of the materials in automotive interior lighting applications reflect Mocom's long-standing co-operation with the BMW group, where its project involvement since 2015 encompasses intensively supported application development and material tests.

"The material optimally meets both BMW's demanding structural and visual requirements," said Matthias Treglia, Business Development Manager for Automotive at Mocom.

The side doors and dashboard of the BMW 1 Series are finished with decorative trim strips, each of which is composed of a light diffuser as the upper part and a reflector as the lower component. An Alcom PC 740/4 WT1140-03 LD grade is used in the diffuser as the back injection moulding material for the decorative film of the trim strips to ensure homogeneous illumination of the component. By combining the decorative foil with the material optically adapted for this purpose, the trim strips can be illuminated in different colours and with different effects, creating a high-quality ambience in the vehicle's interior while fulfilling its function as a structural component, due to its mechanical properties.

The trim strips are also completed at the back with reflectors material from an Alcom PP 620/1 WT 1433-05 LB grade. Its light blocking characteristics guarantee the necessary opacity of the lower component of the door trim strip while at the same time ensuring high light reflection into the light diffuser. In addition, the material in this combination reduces unwanted creaking noises in the side door. The PC/ABS blend of the Alcom PC+AWL 750/15 1 WT1378-04 LB material is used in the dashboard for its light blocking properties and to ensure good bonding with other PC and ABS components.

Covestro presented functional materials solutions for car interiors that further automotive megatrends such as autonomous driving, electrification, and personalisation. The company says its Makrolon Ai PC material offers a special edge-lit composite colour that can range from transparent to translucent, providing various options for ambient and dynamic automotive interior lighting. The PC can be combined with its Maezio composite, a lightweight material made partly from post-industrial recycled materials, for design freedom.

Covestro developed Makroblend OM 845G, its first shrinkage-free, highly dimensionally stable, transparent and heat resistant PC blended 20% with glass fibres that can be back injection moulded and backlit to create textured and 3D shapes.

Avient has extended its sustainability portfolio in Europe with the introduction of new recycled

Right: Avient has launched Maxxam recycled and bio-based materials

and bio-based polyolefin formulations that can replace traditional polyolefin materials in a range of applications including transportation, industrial, electrical and electronic, building and construction and consumer industries.

Maxxam REC is a recycled polyolefin formulated with 25-100% recycled resin from post-industrial recycled and post-consumer recycled sources. The Maxxam REC grades are offered in darker shades. Maxxam BIO polyolefins are formulated with 15-100% bio-based resin and/or natural filler from renewable plant sources. Maxxam BIO formulations are natural and are easy to colour.

The new formulations are fully customisable and can be filled and reinforced or blended with glass, minerals, impact modifiers, colorants and stabiliser systems to meet specific application needs, including flame retardant performance.

Avient also announced the availability in Europe of its Nymax BIO bio-based polyamide formulations. The material was manufactured at the company's Shanghai facility when it was initially launched. The grades are now made in Avient's facility in Germany. Nymax BIO comes with formulations between 16% and 47% natural filler from renewable plant sources, including corn, straw and wheat.

Elix Polymers has launched a complete portfolio of electroplating materials made with renewable or recycled feedstocks. These electroplating ABS and ABS/PC blends are used in the automotive industry and sanitary applications.

Below: Elix Polymers has completed a Life Cycle Assessment of its more sustainable E-Loop materials

Electroplating is a process that is very sensitive to impurities in the plastic substrate, which are often present in mechanically recycled plastics. But using chemical recycling and bio-processes for feedstocks means Elix can produce plastics in which the performance of the substrates is identical to the petroleum-based versions. All the characterisation data for the standard grades applies also to the new ones, including flow simulation and crash material cards.

IMAGE: ELIX

IMAGE: AVIENT

The more sustainable electroplating portfolio includes the following grades: E-Loop P2MC CR50, E-Loop HH4115PG CR25 and E-Loop HF4200PG CR25, including a high flow ABS and two ABS/PC grades with higher thermal resistance and impact resistance than ABS, and two different levels of flowability. The sustainable content of these grades are currently 50% for the ABS and 25% for the ABS/PC, but there is potential to increase those contents in the short-term, says Elix.

The company has undertaken a full Life Cycle Assessment (LCA) validated by the Anthesis group to investigate the environmental performance of its more sustainable E-Loop products and to compare them with fossil-based polymers. The LCA shows that mechanically and chemically recycled products can considerably reduce the environmental impact of the final product, says Elix.

Ineos Styrolution has developed new specialty solutions and sustainable plug-in solutions that replace virgin materials and are said to be of interest to the automotive industry. The material developments reflect the continuing industry transition embracing e-mobility and new fuels like hydrogen, which is prompting brand owners to seek sustainable materials to be introduced in their next generation vehicles.

At the K show, Ineos Styrolution presented results of its first tests with a new Novodur ECO HH-106 MR 30 grade that contains 30% mechanically recycled content. A B-pillar and a rear light housing made from the material were exhibited.

The company's Luran S materials are also now available as a sustainable solution. The Luran S ECO grades have up to 50% bio-attributed content with the process ISCC Plus certified. The material allows automotive application designers to reduce the ecological footprint of their designs.

Other advances include a new SPF 60 modification that introduces the next generation of UV

stabilisation for ASA high gloss materials, suited for automotive exterior applications. The new grade offers best-in-class UV protection for Luran S, resulting in less graying of parts, significantly improved gloss protection after prolonged UV exposure and substantially enhanced colour depth.

An improved Novodur H701 ABS grade targets interior applications like door panels, pillars and covers for crash tests, and brings an increased level of heat and impact resistance that contributes to passenger safety while allowing for greater design freedom.

Novodur Ultra 4255 is designed to address the demands of automotive interior designs including glove box doors or centre and overhead consoles. Key features of the material include low temperature ductility, high impact strength, high heat resistance and low emission. It's high flowability contributes to good processability.

Lanxess' Tepex Dynalite continuous-fibre-reinforced composite materials provide a lightweight solution as mechanically stable underbody paneling components for new vehicle applications in China. Chinese carmaker Li Auto, Beijing, a manufacturer of electric vehicles and said to be the leader in China of new energy vehicles, incorporates the Tepex Dynalite underbody paneling components to its Li 9 and newly launched Li 8 models of six-seater, family plug-in-hybrid SUVs.

The paneling component is around 1.5 m in length, 1 m wide and 3-4 mm thick. It is manufactured with a 1 mm thick insert made from Tepex Dynalite 104-RG600 and an additional extruded Direct Long Fibre Thermoplastic (DLFT) mass. Both materials are heated and plasticized and then placed in a compression tool, where they are moulded together in a single step. The matrix of the Tepex insert consists of PP and is reinforced 47% by volume of continuous glass fibre rovings. The PP DFLT mass contains 40% long glass fibres by weight.

The resulting underbody panel is around 30% lighter than a comparable steel design and more highly resistant to underside road surface impacts. When compared to other material concepts such as pure DLFT, the Tepex reinforcement makes the paneling component stronger and more rigid and energy absorptive.

Lanxess says a development about to be completed is a matrix plastic based on PA 6 for Tepex Dynalite that is produced starting from a "green" cyclohexane, and therefore consists of well over 80% sustainable raw materials. The plastic meets the requirements Lanxess has set for its new Scopeblue range which contains a significant portion of recycled or bio-based raw materials or has a carbon footprint that is considerably smaller than that of conventional products. The semi-finished products with a green matrix are suitable for applications in structural lightweight design that are typical for Tepex Dynalite, such as automotive front-end carriers, seat shells or battery consoles.

IMAGE: LI AUTO

Above: Lanxess' Tepex Dynalite is used for underbody paneling components in Li Auto's Li 8 SUV

Another product line comprises variants of Tepex, with a proportion of recycled material of up to 80%, that yield surfaces with a forged carbon look. The high proportion of recycled material is based on carbon fibres from post-consumer and post-industrial waste used as non-woven material or as chopped fibre mats. A variety of thermoplastics, including recycled PA 6 and 66, PP or PC are suitable as a matrix material. The mechanical properties of the composite semi-finished product are isotropic and approximate the Tepex range of continuous glass fibre reinforced composites. The materials are suited to applications that require high-class decor and high-grade mechanical properties, such as car interiors and exteriors.

PA and PBT producer **Eurotec** says it has many material solutions for various interior applications. One application, a sunroof cable harness, needs high flexibility, toughness, strength and efficient processing. Tecomid NB60 NL PM PA6-I provides a solution, having 1,500 MPa tensile modulus and 85 kJ/m^2 izod notched impact resistance. In gear lever applications, there is a need for long-term mechanical properties and stiffness. Eurotec offers solutions with Tecomid NG and Tecomid HT NT with different loadings of glass fibre to overcome reduction on mechanical properties due to moisture uptake.

In exterior applications, one of the key parameters is high UV stability, says Eurotec, which developed Tecodur PBT grades for this issue. Tecodur PB70 GR50 BK009 CE01 PBT GF50 is used for side mirror applications in many well-known OEMs due to a combination high mechanical

properties and low moisture absorption. It is a preferred material, according to Eurotec, due to a balance of good fatigue resistance with long term UV stability. In these applications, Tecodur PBTeco material which incorporates recycled PET from consumer bottles can also be used as a sustainable material solution.

Kraiburg TPE is expanding its portfolio to include post-industrial recycled TPE compounds for sustainable automotive interior applications. The waste material is derived from other companies' manufacturing processes for plastic products. With a recycling content of up to 38%, Kraiburg TPE's Interior PIR TPE provides good abrasion resistance and excellent flowability combined with low density to keep the part weight at a minimum. Possible applications include anti-slip mats, floor mats, soft components in cup holders as well as fixation elements. The product series is also suitable for applications requiring a hardness range between 60 and 90 Shore A. The material can fulfill strict OEM requirements for emission and odour. Interior PIR TPE can be combined with PP in co-injection moulding applications or used as a single soft component solution.

The company also said it is now able to provide the product carbon footprint (PCF) of compounds for many products, which gives a competitive advantage to customers who require this value to assess the carbon footprint of their components and ultimately of the whole vehicle. The PCF quantifies the CO2 footprint and is calculated according to DIN EN ISO 14067 principles, requirements, and guidelines to measure the carbon footprint based on a cradle-to-gate concept, and DIN EN ISO 14044 principles to determine the environmental management or lifecycle assessment of a product, following greenhouse gas protocols.

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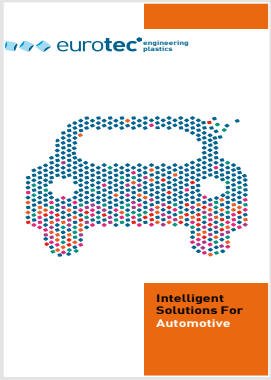

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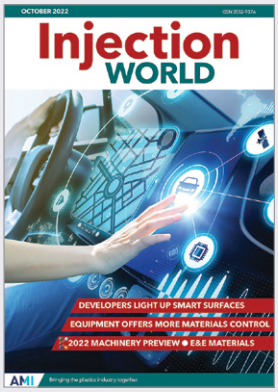

Injection World October 2022
The Injection World October issue contains features covering surface technologies including integrated electronics, new equipment for materials handling and new E&E materials, plus there is a machinery preview of K2022.

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Injection World September 2022
The September issue of Injection World looks at an ownership shake-up going on in the engineering plastics production sector. Other features are on digital production and medical moulding, plus there is a K2022 preview on injection moulding materials.

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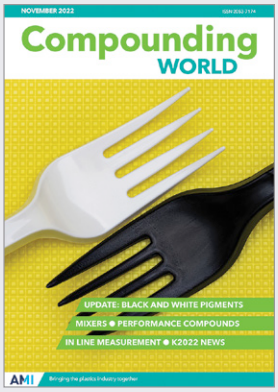

Compounding World November 2022
The Compounding World November issue has a cover feature that looks at black and white pigments and how they must meet demanding regulatory, environmental and performance needs. Plus features on high-performance compounds, inline measurement and mixers.

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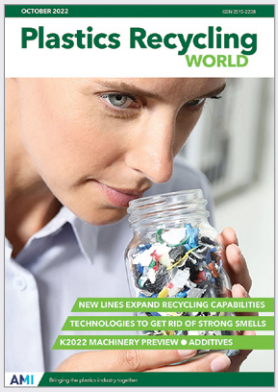

Plastics Recycling World October 2022
The October 2022 edition of Plastics Recycling World looks at the latest technologies for removing odours from recycled plastics. This issue also explores the latest developments in recycling extrusion lines and additives. Plus, we preview the US Plastics Recycling World Expo.

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Pipe and Profile October 2022
The October edition of Pipe and Profile magazine looks at the latest advances in pipe inspection. This issue also explores new developments in material handling equipment and PVC-O pipe technology. Plus, a preview of some of the new material introductions to see at K2022.

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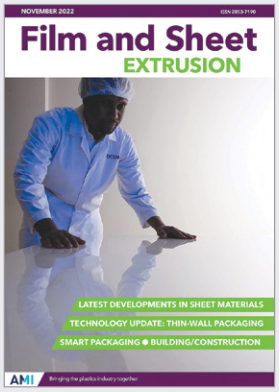

Film and Sheet November 2022
The most recent issue of Film and Sheet Extrusion magazine has a cover story that explores recent developments in the sheet sector. The November edition also has features looking at thin-wall packaging, plastics in construction and smart packaging.

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	1-3 December	Plast Print Pack West Africa, Accra, Ghana	www.ppp-westafrica.com
2023	**17-19 January**	Swiss Plastics Expo, Lucerne, Switzerland	https://swissplastics-cluster.ch/
	1-5 February	PlastIndia, New Delhi, India	www.plastindia.org
	17-20 April	Chinaplas 2023, Shenzhen, China	www.chinaplasonline.com
	30 May – 2 June	Equiplast, Barcelona, Spain	www.equiplast.com
	14-15 June	Compounding World Expo Europe, Essen, Germany	www.compoundingworldexpo.com/eu/
	5-8 September	Plast 2023, Milan, Italy	www.plastonline.org/en
	26-28 September	Interplas, Birmingham, UK	www.interplasuk.com
	20-21 September	Injection Molding & Design Expo, Novi, MI, USA	www.injectionmoldingexpo.com
	17-21 October	Fakuma, Friedrichshafen, Germany	www.fakuma-messe.de
	8-9 November	Compounding World Expo USA, Cleveland, USA	www.compoundingworldexpo.com/na/

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28-30 November 2022	Fire Resistance in Plastics, Cologne, Germany
29 Nov-1 Dec 2022	Polymers in Footwear **VIRTUAL**
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7-8 December 2022	Oil & Gas Non-Metallics, London, UK
7-8 February 2023	Reinforced Thermoplastics, Cologne, Germany
28 Feb-1 March 2023	Compounding and Masterbatch Asia, Bangkok, Thailand
7-8 March 2023	Single-Serve Capsules, Tampa, FL, US
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