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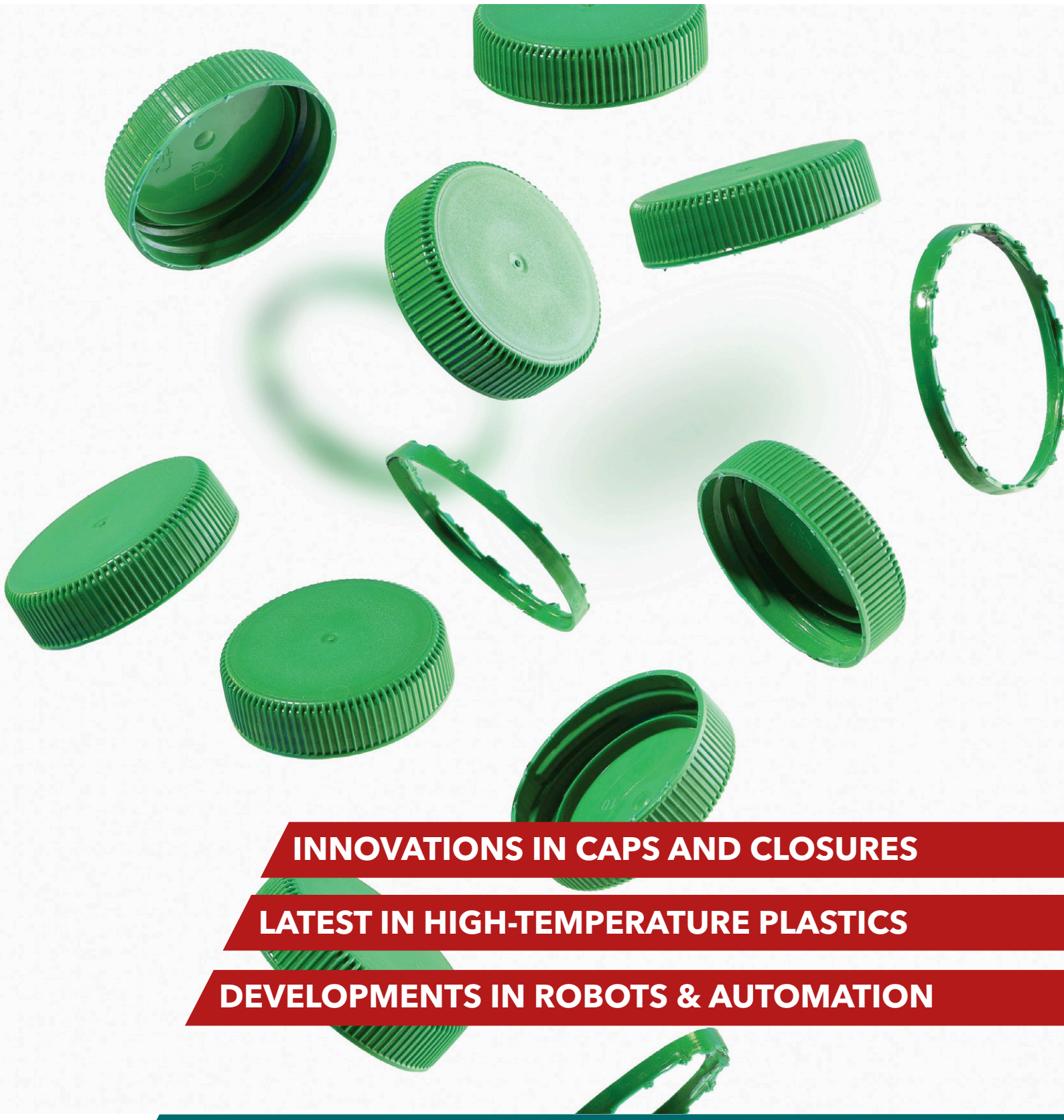
Injection WORLD



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US plastics machinery down again in Q4 2024

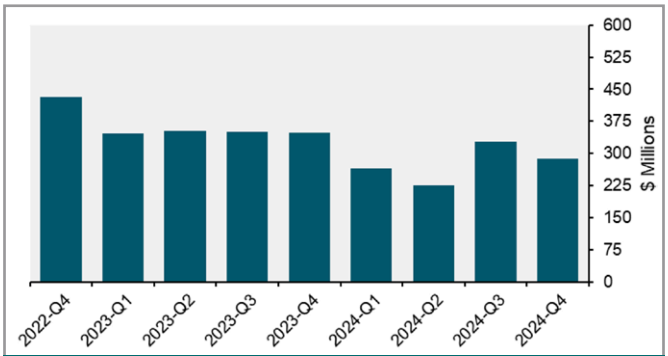
Sales of plastics machinery in North America saw another decline in the fourth quarter of last year.

Estimates for the quarter indicate sales of nearly US$289 million – a 17% fall compared to the same period in 2023. At the same time, the figure is around 12% lower than that from Q3 in 2024, says the Plastics Industry Association's Committee on Equipment Statistics (CES).

For comparison, single-screw extruders saw a decrease of more than 25% compared to the previous quarter – and a 33% fall compared to Q4 2023. Twin-screw extruder sales fell by 48% compared to Q3 – and by nearly 8% in comparison with Q4 2023.

In primary plastics machinery, injection moulding sales fell nearly 6% on the previous quarter, and by more than 16% over the full year.

"Plastics equipment shipments pared back their gains in Q3, underperforming forecasts," said Perc Pineda, chief economist at the association. "Weakness in US manufacturing persisted in Q4, driven by increased economic policy uncertainty amid expectations of a shift in US trade policy after the November elections," he added.



Primary plastics machinery shipments
Source: PLASTICS Committee on Equipment Statistics

Last year closed with US plastics equipment exports falling nearly 6% to US$329m in the fourth quarter.

The latest CES quarterly survey shows no change of confidence in the market, with 83% of respondents expecting conditions to remain steady or improve over the next 12 months. In addition, 43% reported that quoting activity was holding steady, while 31% reported an increase in quoting activity compared with the previous quarter.

Mexico and Canada remained the largest export markets for plastics machinery, with total exports to them reaching US$158m, accounting for 48% of the US total.

"Plastics demand in the US remains stable, though slack in plastics production is leading to weaker-than-expected demand for primary plastics equipment," he said.

He added that more cuts in the Fed funds rate are still projected this year.

"Lower interest rates and greater clarity on US economic policy – particularly on trade – would help reduce uncertainties," said Pineda.

› **www.plasticsindustry.org**

RecyClass updates guidelines

Following 18 testing campaigns commissioned in 2024, RecyClass has strengthened its Recyclability Evaluation protocols and Design for Recycling guidelines to address the impact of various packaging features on recycling streams. Specifically, small-size packaging, rigid rolling behaviour, and the impact of various decorations were assessed with sorting a primary focus.

Updates include revisions within the laminating adhesive section and the inclusion of PVOH as limited compatible with the PE recycling stream for coloured flexible PE. Additionally, for rigid packaging, EVA is now recognised as fully compatible with HDPE recycling, and the recommendation on PO foamed liners has been extended to the PP stream.

Paolo Glerean, Chairman of RecyClass, said it is crucial to implement standards that enhance the recyclability of plastic packaging.

› **https://recyclass.eu**

Increase in German packaging recycling rates

Germany achieved a positive milestone in 2023 by recycling more packaging than the previous year.

This was announced by the German Environment Agency and the Central Agency Packaging Register in January, when it also revealed the German waste management sector collected, sorted and recycled more than 5.5m tonnes of packaging waste in 2023.

Statutory recycling quotas have increased significantly since 2018, with dual systems meeting five out of the eight target rates. Some quotas have been exceeded, while for plastics there are two separate quotas: one for mechanical recycling, and another that includes both recycling and energy recovery.

Figures show the share of plastic packaging undergoing mechanical recycling increased from 42.1% to 68.9% between 2018 and 2023.

› **www.umweltbundesamt.de**

Radici sells its polymer business

Investment group Lone Star has entered into a definitive agreement to acquire the speciality chemicals and high performance polymers business areas of Italian engineering plastics compounder Radici Group.

The transaction is expected to close in the second half of 2025. The Radici family will retain control of the advanced textiles solutions business.

"The agreement with Lone Star Funds marks the beginning of a new chapter in the global expansion of Radici's speciality chemicals and high performance polymers businesses, which boast a strong mutual integration," said Angelo Radici and Maurizio Radici, president and vice president of Radici.

Radici serves customers in Europe, the Americas, and Asia. It is mainly known for its polyamide products but it also produces compounds based on PPS, POM and other engineering plastics.

› **www.radicigroup.com**

German converters report 4% sales fall

GKV, the trade organisation that represents German plastics processors, reported another fall in turnover last year.

It said this was down to "domestic reasons" such as lower consumer spending, rising interest rates and high energy prices.

GKV said that sales fell to just over €69 billion in 2024, a decline of 4% compared to 2023. Nearly 43% of sales (almost €30bn) were from exports – around 2% lower in value than the preceding year. At the same time, domestic sales fell by more than 6%, to account for nearly €40bn.

"Our industry has the potential for growth," said Helen Fuerst, president of GKV. "The proverbial silver lining on the horizon is gradually becoming visible after two challenging years."

German plastics converting, 2024

	Sales 2024 (bn€)	% Change
Domestic	39.7	-6.1
Export	29.7	-1.7
Total	69.4	-4.3

Source: GKV

The number of employees in the industry fell by about 2%, to around 313,000, while processing volumes dipped by 5% to 12 million tonnes. Of this, 2.5m tonnes was recyclate – a 4% increase on 2024. The number of processing plants remained stable at just under 3,000 facilities.

Figures are not broken down into specific processes (such as injection moulding). However, the technical parts sector – which is most relevant to moulders – saw a 9% fall in the amount of material processed (2.7m tonnes). This equated to turnover in the sector of around €20bn – a fall of 3%, said GKV.

For companies in the sector, the prerequisites for an upturn are relief from high energy costs and a consistent reduction in bureaucracy, she said.

› **www.gkv.de**

Sapa expands with acquisition

Sapa, the Italian company that patented the One-Shot method, has acquired Megatech Industries, which is active in the plastic injection moulding business for the mobility industry.

The acquisition creates the opportunity to combine the companies' strengths and scale the One-Shot technology to a broader footprint and reach, said Sapa. One-Shot allows the production of plastic components in a single step.

Sapa's turnover was close to €360 million in 2024 and it employs over 2,000 people across seven countries. The expanded company will have sales of nearly €700m. Sapa says it will further consolidate long-standing relationships with OEMs such as Volkswagen.

https://sapagroup.net

Japan to drive use of recyclate in automotive

A consortium of industry, government and academia has set a target of using over 15% recycled plastic in the production of cars in Japan by 2031 – and over 20% from 2036 – according to a report in The Japan News.

The goal is partly in response to new regulations to be introduced by the European Union in 2031 – that would require at least 20% of the plastic used in the production of cars to be recycled plastic.

The consortium includes the Japan Automobile Manufacturers Association, Japan ELV Recycler's Association the Japan Plastics Industry Federation, the Economy, Trade and Industry Ministry, the Environment Ministry and academic experts.

Although the Japanese car industry uses around 1 million tonnes/year of plastics, very little of this is based on recycled materials, according to the report.

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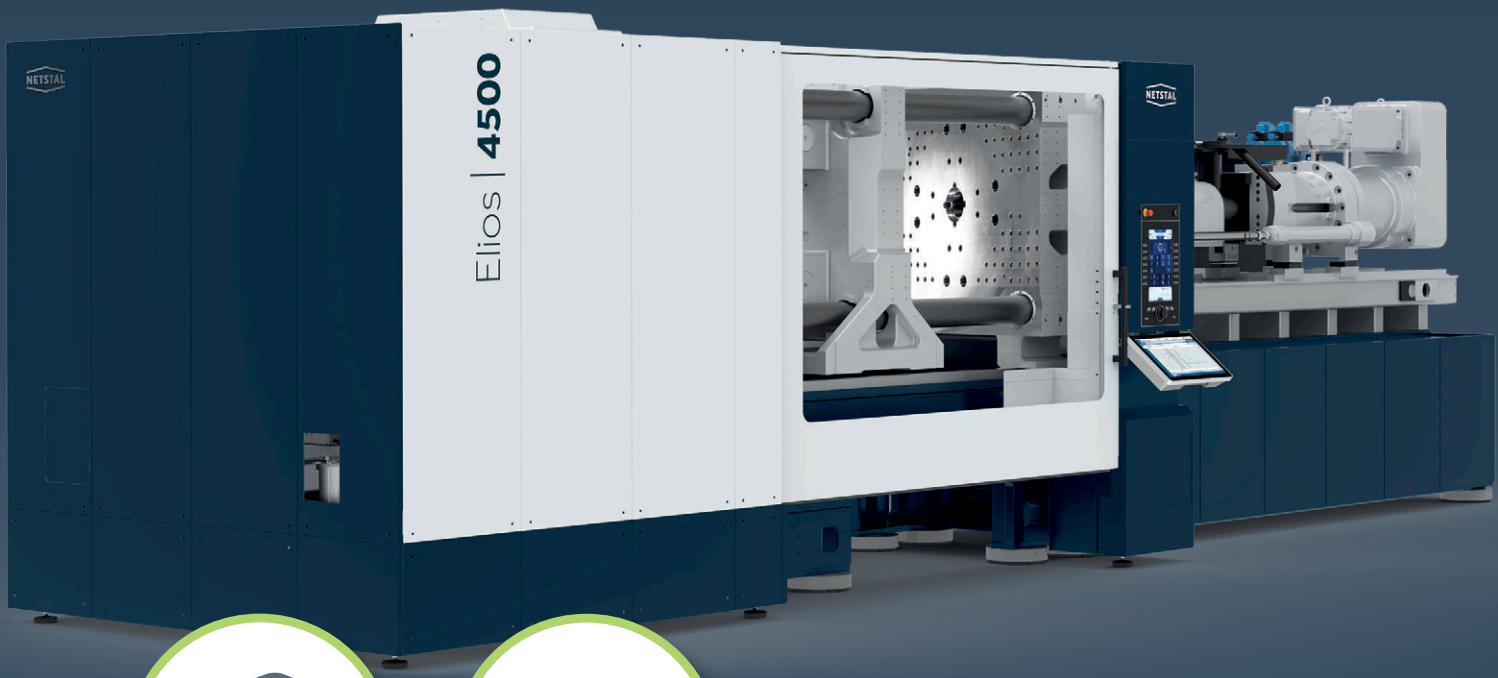

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OPmobility sales and profits both up in 2024

OPmobility – the Tier One supplier that was formerly Plastic Omnium – reported a rise in both sales and profits last year.

Sales rose around 2% to nearly €11.4 billion, while operating margin grew by more than 11% to reach €440 million.

"In 2024, we delivered a solid performance despite a complex environment," said Laurent Favre, CEK of OPmobility. "With revenue of €11.6bn, we stand out in a declining and competitive market."

There were mixed fortunes in terms of business areas. While the Modules segment grew sales by 12%, there were declines of nearly 2% for both the Exterior/Lighting and Powertrain divisions.

The company said that this corresponded with a global decline of just over 1% in global automotive production. The company says it typically out-performed the market in each of its regions: in Europe, where auto production fell around 5%, it reported flat sales; in North America, which declined by around 2.5%, the company grew by nearly 8%; but in Asia, which grew by 0.5%, it declined by around 1%.

OPmobility produces a wide range of automotive components

The company expects automotive production to be stable in 2025, but with strong differences between regions. There are also uncertainties over the consequences of potential regulatory evolutions – especially trade tariffs and CAFE standards.

In addition, the company says it is on track to attain scopes 1 and 2 carbon neutrality from 2025.

› **www.opmobility.com**

MGS bought by Husky

Husky Technologies has acquired secondary injection unit and rotary platen technologies from MGS Healthcare Manufacturing (MGS), a provider of healthcare manufacturing solutions.

It says the move strengthens its position as a provider of integrated multi-material solutions in industries, including medical, packaging and consumer electronics.

It enables the integration of precision secondary injection units and rotary platens with Husky's Altanium mould controller technology.

Integrating these multi-shot technologies raises Husky's ability to provide tailored solutions for the production of multi-material and multi-colour applications, it said.

› **www.husky.co**

Collaboration makes recycled products

Elix Polymers has teamed up with Repsol and Anqore to produce a range of recycled products.

It signed agreements with both companies in 2020 to ensure supplies of more sustainable materials.

Elix's E-Loop CR products are made using sustainable and certified raw materials that incorporate circular and bio-circular feedstocks. The products hold ISCC-plus certification, ensuring traceability and transparency across the supply chain.

Different feedstock combinations are possible, as there are three alternative sources (fossil-based feedstocks, chemically recycled post-consumer waste and bio-circular feedstocks) for the three main monomers (acrylonitrile, butadiene and styrene).

In addition, E-Loop CR can help reduce the CO_2 footprint by promoting sustainable and circular feedstocks, which have lower GHG emissions than conventional materials.

For the toy industry, Elix ABS E-Loop M220 CR100 uses the sustainable version of acrylonitrile from Anqore.

› **www.elix-polymers.com**

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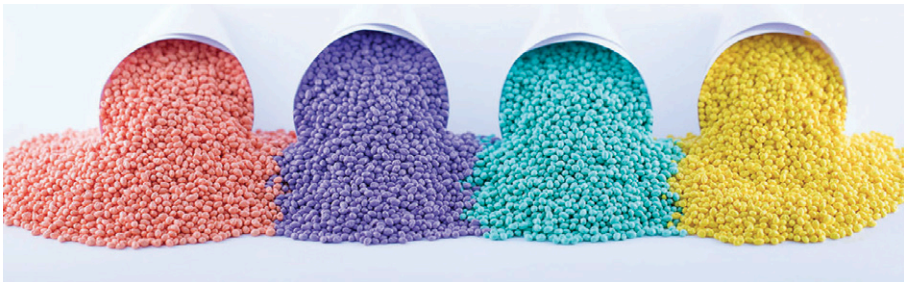

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Origin Materials looks to grow sales of PET cap machines

Origin Materials, which develops machinery to make caps and closures from PET, saw a modest rise in full-year sales.

Revenue for the full year was around US$31.3 million compared with around US$29m in the previous year. However, the company saw an adjusted EBITDA loss of more than US$48m, compared to a loss of US$42m in 2023.

"The year was transformational for us, and Q4 was an inflection point for our caps and closures business," said John Bissell, CEO of Origin Materials.

He said 2024 had several milestones for the young company, which it says it "introduced the world to the first fully recyclable 100% PET cap". In Q4, it finished building its first PET cap manufacturing line and has since begun commercial production.

"In February 2025, we announced three new CapFormers are nearing completion, and expect them to complete factory acceptance testing during Q2," he said. "We also expect to have eight CapFormer lines online by the end of the year."

Forthcoming lines are expected to incorporate Origin design modifications to increase throughput.

Origin expects the first products with Origin caps to appear on shelves in Q2 or Q3 of this year – and says it will have "meaningful revenue generation" by then end of this year.

"We also expect full-year 2026 revenue of US$110m to US$140M, separate from potential licensing revenue," he added.

The company is in the process of securing debt financing to fund its capital equipment build-out and working capital needs.

"We do not anticipate needing to raise equity capital to finance our growth," said Bissell.

He added that the company has also enhanced its IP portfolio.

"Our patent portfolio now comprises over 70 issued patents, and dozens of pending applications," he said. "Our IP lets us make a lighter, better-performing caps than our competitors."

› **www.originmaterials.com**

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Top performance: developments in caps and closures

Sustainability is a critical factor for closures – ranging from the need for more recycled material grades to new European legislation that insists caps are tethered to the bottle

IMAGE: SHUTTERSTOCK

Main image: Tethered caps are a key market driver – especially in Europe

Last year's *Plastic Closure Innovations* event, organised by **AMI**, covered a variety of topics – with delegates learning about market trends – such as tethering – various re-use and recycling schemes and technical developments.

Martyna Fong, director of market intelligence at AMI, told delegates that PE and PP will remain the dominant materials for caps and closures until at least 2030. In Europe, a key driver will be the new Packaging and Packaging Waste Regulation (PPWR), which will introduce binding, uniform packaging rules across the European Union (EU).

"This is a 'Regulation' rather than a 'Directive' – so is directly applicable, with no individual Member State implementation processes and no deviations," she said.

PPWR's aims include reducing the amount of packaging placed on the market, improving packaging waste management and increasing recycled content – especially in plastic packaging.

Cap trends

Maciej Nurkowski and Levent Obut of **Sabic** presented details of several new material grades for caps and closures. They said the company's bimodal HDPE CC255C/CC255SL organoleptic polymer for carbonated soft drink (CSD) caps combines good processability with high ESCR – allowing cap manufacturers to design and produce lightweight closures with short cycle times. "It offers optimised processing for CSD caps," they said.

Its HDPE CC458 grade does the same for still water and beverage caps. The material also allows the design of tethered caps – a key trend in PPWR, allowing design for recycling. The company also offers a number of Trucircle grades, which incorporate mechanically recycled materials. One example is tubs of Magnum ice cream, which use a circular grade of PP for the lid.

"It has identical product specifications to conventional PP," said the presenters.

In another nod towards sustainability, Sabic also develops bio-based materials from feedstocks such as crude tall oil and used cooking oil – and is considering the use of algae in future.

In collaboration with partners, it has developed bio-based packaging for beauty brand Lumene – which includes the jar, lid and labels. Here, crude tall oil feedstock was used to make the PP, which was used for the jar and lid. The label was made from BOPP. The presenters said: "97% of this packaging is made from renewable feedstock."

The new material is a drop-in solution, with no change in packaging characteristics, no investments in line modification or compromise in product safety, they said.

In the neck

As a major brand owner, **Coca-Cola** is a huge user of bottles and caps. It has set itself a number of sustainability goals – including to make 100% of its packaging recyclable by the end of this year – and to use at least 50% recyclate in its packaging by 2030.

In addition, the company is moving towards a new neck finish for all its bottles, on the principles of the GME30/40 design standard for bottles with tethered caps.

"The design criterion for our system was to

Right: Tubs of Magnum ice cream have a lid made from Sabic's circular grade of PP

IMAGE: SABIC

introduce a next generation finish/closure that is lighter, loved by our consumer, and requires the minimal line investment," said Richard Novomesky, managing director of closures and labels at Coca-Cola in Singapore. "The lowest possible weight is not the primary design criterion."

Regarding tethering, the company has converted almost all its lines in Europe – with remaining lines currently being converted.

"Impact on overall productivity is low but the initial cost of tooling and slitting equipment – plus design costs – is considerable," he said.

He added that around 95% of closures in Europe are already returned with the bottle – regardless of whether they are tethered. In addition, he said, tethered closures have only been significantly implemented in Europe.

Water works

Alessandro Pasquale of Mattoni – who is also president of **Natural Mineral Waters Europe** (NMWE) – said that all packaging used in the mineral water industry is recyclable. However, this does not mean it is necessarily recycled. While schemes for bottles are well established, he said the next step is to focus on caps, labels and secondary packaging.

While bottle-to-bottle recycling is common practice, he says cap-to-cap is also achievable in a closed loop system. This is likely to begin with eco-design principles, include a well-managed deposit return scheme (DRS), and lead to a full bottle-to-bottle (including components such as caps and labels).

He cited one DRS, in Slovenia, which reached a 92% packaging return rate in 2023 – after its introduction at the start of 2022. It collected around 22,000 tonnes of material – of which more than 15,000 tonnes was PET. "This system is now ready for cap circularity," he said.

Below: One of Coca-Cola's sustainability goals is to use at least 50% recyclate in its packaging by 2030

IMAGE: SHUTTERSTOCK

Using again

Re-using packaging is a far more established concept than recycling – and is seeing a resurgence. Stuart Chidley, co-founder of UK-based **Reposit**, said his company provides 'packaging as a service' – allowing packaging for products such as cosmetics to be returned and re-used.

"Re-use will become the largest impact area – but is currently the smallest, with isolated failing trials and pilots," he told delegates.

Re-use sits within a larger category of 'reduce' – which includes eliminating packaging and re-using it. Other current ways of dealing with plastic packaging include 'substitute' (with materials such as paper or compostables), 'recycle' (mechanically or chemically), 'dispose' (in landfill, or as fuel) and 'mismanaged' (such as in the form of pollution).

The company already runs schemes with UK retailers such as Tesco, Asda and M&S, with plans to scale up and add new schemes in future. It says that 98% of its packaging returns include the closure. However, he said there was still debate as to whether closures for re-usable containers should be single-use – or designed to be durable, washable and reusable themselves. "Are we all waiting for the demand signal from the consumer, the retailer or the brand owner?" he said.

Cosmetic change

Jacques D'Heur, technical service and product development manager at **Ineos** in Belgium, explained the company's new recycled material for cosmetic lids.

He said there was a 'paradox' for recycled cosmetic caps. While PP is the most commonly used material, recycled versions do not meet the needs of the cosmetics industry. Virgin PP will produce uncoloured caps with consistent quality that are transparent and glossy, with no smell. Recy-

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cled PP is typically white, pearl or grey, with a smell and an opaque or hazy appearance – as well as batch-to-batch fluctuations.

Ineos has managed to overcome these concerns with its Recyl-In rPP2030C – which, he said, is RecyClass certified, collected separately to PCR and compliant with ISO 14021. It is also a mixture of 70% recyclate and 30% virgin material.

There are several materials in the range – both homopolymers and co-polymers – with various melt flow index and mechanical strength values.

In the area of tethered caps, the company says its Eltex materials have high stress crack resistance (ESCR), good organoleptic properties (no smell) and good processability. They are already used in applications for suppliers including Bericap and Tetrapak.

Consumer drive

Henkel is a huge consumer brand, with adhesives, detergents and personal care products among its many offerings. Like many large companies, it has sustainability targets – such as making all packaging recyclable or reusable, cutting the use of fossil-based plastics and banishing plastic waste.

Ingomar Henning, global injection moulding manager at Henkel in Germany, said the company used around 625,000 tonnes of packaging materials in 2023, of which around 45% was plastics. Within its consumer division, it used around 200,000 tonnes/year of plastics – of which nearly one-fifth was injection-moulded PP.

Part of its approach is to redesign packaging – such as making 'shoulderless' tubes in which the cap is smaller than before.

In one specific example, it relaunched its Schauma shampoo and conditioner brand in 2022. For one shampoo packaging, closure weight was reduced by 3%, to 6.4g – while PCR content went from 0% to 25%. For a conditioner, the cap weight was cut by 15% to 5.9g while PCR content was increased from 0% to 25%.

The company compared a range of virgin, partially recycled and recycled materials. Virgin PP required an injection pressure of 400 bar, for instance; an equal mix required 480 bar; and a 98% rPP needed 520 bar. At the same time, capping forces were 105, 142 and 146N, respectively. For an HDPE, a virgin grade needed 750 bar of injection pressure, an equal mix 1300 bar, and a 98% rHDPE 1650.

Another cap innovation – in laundry gel – was to go from a spout and dosing cap (23.8g) to dosing cap (11g) to a flat cap (5.4g). The total saving in virgin plastic is 77%. The company has also carried out impact tests on caps – such as its Perwoll laundry gel. Here, it found that a PP-homopolymer cap passed a critical drop test, while materials such as HDPE, LDPE and PP-RBC were either inferior or more expensive.

IMAGE: SHUTTERSTOCK

Above: Henkel used around 40,000 tonnes/year of injection-moulded PP in 2023

Seasonal eating

Kaho Tanaka, a designer at **Nippon Closures** in Japan, told delegates about the company's closures – whose pouring and powdering function help to increase the product's own value.

Here, the closures are used in seasoning products such as soy sauce and other condiments. As well as needing good sealing performance – to preserve the product – the closure needs to pour smoothly. Another critical factor is oxidation, which accelerates the degradation of the product.

"We have developed innovative pouring caps," she said.

One is a new type of spray cap that moves away from the traditional multi-components – and multi-material – design, to a three-part, mono-material design. It comprises a nozzle – to suck up the sauce – as well as a cup to store the sauce, and a hinge cap. Here, a small amount of sauce is sucked into the cap and dispensed – ensuring minimal oxidation.

It has also developed a three-part powder cap that has a two-sided hinge cap – one side of which includes a 'mesh' that sifts the powder as it is dispensed. It is used for ingredients such as powdered sugar, flour and cocoa.

"Our pouring cap can increase the product's own value," she said.

Closed market

Aptar Closures has a wide portfolio of products, including snap tops, tube tops, pouring spouts, safety caps and many others. It says that 80% of consumers feel that sustainability is important. ›

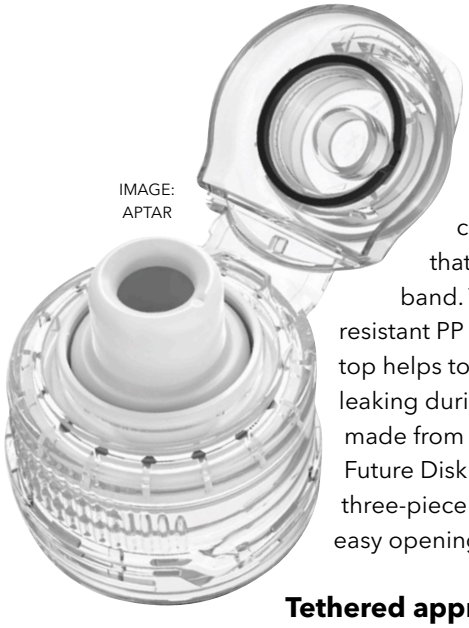

IMAGE: APTAR

Above: Aptar's Rocket sports closure is a non-removable cap made from impact-resistant PP

Derek Hindle, global innovation director at the company, cited a number of innovative examples. One, the Rocket e-commerce sports closure, is a non-removable cap that also has a tamper-evident band. The cap is made from impact-resistant PP random co-polymer. Its E-disc top helps to protect against cracking or leaking during transit. It is PCR capable, and made from mono-material PE. And, its Future Disk top is made from 100% PE. The three-piece design has a slidable section for easy opening and closing.

Tethered approach

Cap Sustainable Solutions, as its name might suggest, develops closures with an eye on sustainability. The company's Miquel Batlle and Sergi Garcia presented a number of its innovations.

Several of these are to do with tethered caps – such as designs that address different opening angles (OAs). This is typically either 160 or 180°. It is already using a 160° OA design, using Husky closure design.

"Closures submitted by Husky have been approved by Coca-Cola," they said.

It is also looking at a 180° OA design. This is a prototype-level design that is ready for commercial ramp-up, they said. Pepsi has approved the design, while closures submitted by Husky are awaiting approval from Coca-Cola.

Despite the growing acceptance of – and, in Europe, requirement for – tethered caps, they said the market is still "not mature", with still a lot to be discovered and "consumers not satisfied".

The company's approach is to listen to the voice of the customer and invest in line with these learnings.

"We need to choose the right technology that can be adapted to different solutions – such as 160/180 OA, tethered or non-tethered," they said. "The more polyvalent the better."

Vladislav Medvedovskiy, head of service at **Retal** in Lithuania, also addressed tethering. The company is a leading producer of bottles, preforms and closures. One key issue it identifies among customers is technical issues on production lines – with products including closures.

"Our customer survey shows that most customers are leaving the switch to tethered closures to the last moment," he said. "Experts in implementation are in great demand."

He said that common technical issues – such as closure jams in chutes – can be overcome by adjusting the height control of the chute.

"Jams can also happen in the chutes due to the protrusion of some tethered closure designs – an issue that is reduced when the protrusion is small," he said.

Health benefits

Mark Grazhul, global sales director at **Vicap Systems** – part of Nature Force Technologies – explained how the company developed a closure to allow a neutraceutical product – containing vitamins and probiotics in a concentrated capsule – to be dispensed into water when the cap is activated. It if were ready-diluted, the active ingredients would likely be degraded by pasteurisation, and exposure to heat, water and sunlight.

"At first glance, it looks pretty much like a conventional sport bottle top," said Grazhul.

However, the cap can discharge 12.5ml of liquid concentrate or 7g of powder to create a flavoured drink, nutritional supplement or any other beverage. The closure incorporates the concentrate capsule, closure with spout and adapter ring.

"Most parts are multi-use – and only the capsule is consumable," he said.

The drink is prepared by filling the bottle with water, putting the capsule in the adapter ring and then screwing the closure onto the bottle – which activates the capsule.

The Vicap Smart Twist&Push fits to bottles with a 28mmneck.

Paper caps

With so much focus on reducing the effect of plastic closures, it makes sense to consider alternative materials – such as paper. Sweden-based Blue Ocean Closures is doing exactly that – producing cellulosic fibre-based closures (both screw caps and lids) that are bio-based, biodegradable and recyclable.

The closures are tough and strong – with high torque – as well as stable, water-resistant and a drop-in on existing lines. They have a have a polymer top-seal liner, said Lars Sandberg, the company's CEO.

Production is based on high-density sintering using simple, robust moulds, he said. Key parts of the process include breaking up structures, vibrating and moving fibres then sintering them together using high force. The parts are made in a 'short holding and cycle time'.

"There is the possibility to adjust and tune mechanical properties," he said.

He claimed that the 'low cost' technique has

IMAGE: BLUE OCEAN CLOSURES

Left: A paper-based cap from Blue Ocean Closures is already on the market

high potential. The material is "on a par" with PE, he said, and allows a production capacity of around 500 units per minute. In addition, there is low CapEx and a simple installation.

"It's also low energy, because there's no melting, cooling or drying," he added.

The company began its first production facility (with three machines) in Säffle in Sweden. He said that the first products are already entering the market in Sweden.

"We are collaborating with Swedish supplements brand Great Earth as a partner to pilot our first product to market," he said.

Other partners include Coca-Cola, L'Oréal and Pernod Ricard.

■ The next edition of *Plastic Closure Innovations* is held in Malaga, Spain on 19-21 May 2025. For more details, contact Annabel Kerr on +44 (0) 117 314 8111 (annabel.kerr@amiplastics.com).

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IMAGE: BASF

Raising performance in high temperature plastics

High temperature plastics allow superior performance due to their thermal characteristics – in industries including medical, automotive and aerospace

Because certain plastics – such as Peek, PSU and some polyamides – can withstand elevated temperatures, they can replace metal in a range of demanding applications, from automotive to oil and gas.

In a recent example, backup rings injection moulded by Drake Plastics – using 30% glass filled KetaSpire Peek XT resin from **Syensqo** – have helped to extend downhole pump life in oil and gas drilling.

The rings retain higher mechanical properties at elevated temperatures to extend the service life of the equipment. The new Peek formulation offers improved melt stability – which preserves the material's overall properties during high temperature processing compared to conventional Peek, says the company.

Oil and gas downhole equipment must work under aggressive conditions that can shorten the life of components. At the same time, operators are looking to extend the time between shutdowns and cut overall maintenance costs. This can be achieved by using higher-performing materials – and was seen in Drake's collaboration with an oil and gas equipment customer.

"Our customer wanted us to supply backup rings that would exceed the thermal resistance of the standard grades of Peek traditionally used in pump components," said Wayne Free, global sales manager at Drake. "After a review of the operating environment, Syensqo recommended KetaSpire Peek XT, a new grade that raises the bar on the upper temperature limits of the polymer."

Performance and processing evaluations led to

Main image: BASF says its Ultrason E 2010 BMB is the world's first biomass-balanced PES

IMAGE: SYENSQO

Above: Syensqo has raised US production capacity of its Udel polysulfones by more than 25%

the specification of 30% glass-reinforced Peek XT 920 as the best way to achieve the thermo-mechanical properties required by the customer.

Peek XT technology uses the same ether-to-ketone ratio as standard Peek, and imparts higher temperature resistance and melt stability during processing. This helps preserve the material's mechanical properties during high temperature moulding, adding to its performance consistency.

KetaSpire Peek XT 920 claims to be the industry's "first true high-temperature polyetherether ketone". It exhibits a boost in durable mechanical properties, including tensile modulus and tensile strength, at temperatures up to 175°C. This was essential for Drake's backup ring, where standard Peek fell short of the required 170°C.

IMAGE: DRAKE PLASTICS

Above: Syensqo's glass-filled KetaSpire Peek XT has helped extend the life of downhole pumps

With a 20°C higher glass transition temperature (Tg) and 45°C higher melt point (Tm) than standard Peek, the material still maintains its lower melt viscosity after shear compared with PEK or PEKEKK – and so offers better flowability for complex parts in injection moulding.

Brian Quance, sales and applications engineer at Drake Plastics, added: "With KetaSpire Peek XT 920, the legacy of true Peek has been extended to a new level of high temperature resistance."

Capacity rise

At the same time, Syensqo has raised US production capacity of Udel polysulfones (PSU) polymers at its Marietta, Ohio facility by more than 25%.

It says this will help it meet growing demand in critical applications such as life sciences and green hydrogen production.

The materials offer high strength and rigidity, flexible sterilisation options and high resistance to cracking – even at elevated temperatures. They are used in areas such as haemodialysis and medical instruments, as well as playing a role in water purification and green hydrogen production systems.

"Since we embarked on this expansion three years ago, the trend towards higher performing materials with strong mechanical, thermal and chemical properties has continued to grow," said Peter Browning, president of speciality polymers at Syensqo.

The production increase at the Marietta site complements a recent expansion at the company's facility in Augusta, Georgia, where components used in these materials are produced.

Critical component

Envalior – in collaboration with Ford – recently won an SPE award for its contribution to making a critical component: a re-engineered exhaust gas recirculation (EGR) cold tube and diffuser.

By replacing stainless steel with Envalior's Xytron PPS material, the part weight was reduced by 28% and has high chemical resistance.

The EGR cold tube and diffuser can now withstand a highly acidic environment with pH levels of 2.2 and temperatures up to 200°C. The new design also eliminates the need for multiple components, including a gasket, O-ring and fasteners, resulting in a simplified part that directly integrates into the air intake assembly.

"This validates our commitment to material innovation and the collaborative expertise of our team," said Russ Bloomfield, application development engineer at Envalior.

Other partners in the project were Sogefi – which serves as the Tier 1 supplier for the EGR assembly – and Viking Plastics, which moulds the Xytron EGR tube supplied to Sogefi.

Envalior's portfolio includes engineering plastics such as PA6, PA66 and PA46, PBT, PPS and PPA.

"With this range, we can meet different and demanding material requirements," said Tim Arping, director of innovation and advanced development at Envalior.

Recycled PPS

Polyplastics plans to launch a grade of mechanically recycled polyphenylene sulphide (PPS) by the end of the year. ›

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Valves at low temperature

Polymers can also be used for extremely low temperature applications. **Victrex**, which supplies both Peek and PAEK, says its Victrex CT polymers have met the stringent specifications outlined by Shell for ball valves in cryogenic services.

New standards for low-temperature valves now include 'Cryo-Peek' as a designated material for cryogenic ball valve applications. Victrex CT polymers have met these specifications, making them a viable alternative to PCTFE in these applications.

The updated MESC SPE 77/302 and SPE 77/200 standards recognise Peek as soft seat/insert material for ball valves used in cryogenic conditions as 'Cryo-Peek'. This approval expands opportunities for valve manufacturers.

Key advantages of Victrex CT polymers include an extended temperature range from -269°C to higher than +260°C, plus improved mechanical and thermal properties compared to fluoropolymers like PCTFE.

"Victrex CT products are the latest example of us developing and commercialising new Peek products that deliver against our customers' needs, enabling them to further innovate," said Jakob Sigurdsson, CEO of Victrex.

The 40% glass fibre-reinforced grade of its Durafide rG-PPS will be available by December 2025, it says.

Polyplastics will be responsible for optimal formulation and objective quality assurance in the project, which intends to achieve 100% circularity of engineering plastics by expanding the applications of mechanically recycled materials.

As part of the company's mechanical recycling business, scraps of glass fibre-reinforced PPS will be collected from customers through an Open PIR Mechanical Recycling Scheme – and used as a raw material to make Durafide rG-PPS. Initially, strict acceptance inspections will be conducted, and metal will be removed. In later processes, recycled materials and some virgin materials will be reformulated to meet the target specifications and compounded under optimal conditions. The materials will undergo the same quality assurance system as that for virgin materials and will then be shipped to customers.

Polyplastics says its recycling scheme will help our customers to reduce and use waste while reducing the carbon footprint of their products. For now, the glass-fibre reinforced PPS collected from customers will be specific grades of its Durafide glass fibre-reinforced PPS.

The company aims to develop a high filler grade as the second iteration of Durafide rG-PPS.

"We intend to establish a system to supply that grade and the 40% glass fibre-reinforced grade to customers in Japan," said the company. "In future, we will build a 'local production for local consumption' recycling chain that is complete within each region or country around the world."

Biomass PESU

BASF says it has developed the world's first biomass-balanced polyethersulfone (PES).

With Ultrason E 2010 BMB, fossil feedstock is replaced with renewable alternatives from waste-based resources and attributed to the product via a certified biomass balance approach, it says.

Ultrason E 2010 BMB is a drop-in solution because it is identical to the standard grade in properties, quality, and certification – such as for food and water contact. As a result, customers do not have to re-qualify their applications or adapt existing manufacturing processes for injection moulding or extrusion.

"With this addition to our Ultrason portfolio we enable our customers' green transformation towards more circular solutions – and this as early as possible on their journey to meet their sustainability targets," said Erik Gubbels of global business development for Ultrason at BASF.

Half of the fossil raw materials required for the manufacturing of Ultrason E 2010 are replaced by

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Right: BASF says its Ultramid T7000 PA/PPA blends outperform PA66 for stiffness and strength

ISCC Plus certified bio-circular feedstocks which results in an attributed amount of 39% to the final Ultrason E 2010 BMB grade, says BASF.

Ultrason is name for BASF's range of polyethersulfone, polysulfone and polyphenylsulfone.

In addition, BASF is offering a portfolio of polyamide (PA) and polyphthalamide (PPA) blends that promises more constant mechanical properties than PA66 alone.

Ultramid T7000 outperforms PA66 for stiffness and strength in dry state – and especially in presence of humidity. The PPA portion leads to a lower water absorption, which gives components higher dimensional stability. Ultramid T7000 can be as easily injection-moulded as PA66, giving parts a glossy, smooth surface finish. This makes PA/PPA blend a suitable metal replacement for structural parts that are exposed to moisture, such as mirrors, air brake parts and valves.

These components can also be optimised using BASF's simulation tool Ultrasim for properties such as improving NVH (noise, vibration, harshness) performance. The result is a robust assembly with consolidation of parts, no corrosion, and improved durability, says BASF.

Ultramid T7000 is globally available with different glass-fibre reinforcements up to 60% for highly loaded structural parts. There are also grades in laser sensitive black and surface-improved black.

"In collaboration with our technical service colleagues, we want to inspire our customers to investigate other weight- and cost-saving opportunities for metal replacement, which is now possible with Ultramid T7000," said Andre Schäfer of global business development PPA at BASF.


IMAGE: BASF

Bio-based PA

Xenia has developed a new carbon-fibre reinforced material, based on bio-based PA10.10, with high strength and temperature resistance.

With up to 50% carbon fibre reinforcement, XECarb 31 ensures increased stiffness, making it ideal for structural applications that need high mechanical strength. In addition, it is suited for environments that require higher operating temperatures without compromising performance, thanks to its high melting point.

The PA10.10 base polymer ensures lower moisture absorption, which improves long-term durability. Its cold impact resistance makes it suitable for applications that are exposed to low temperatures, such as outdoor environments and high-altitude settings.

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The combination of lightweight construction and rigidity makes it optimal for high-performance sports equipment, says Xenia. The material raises product durability without adding unnecessary weight.

In the industrial sector, chemical resistance and mechanical stability are key advantages for parts exposed to harsh working conditions. This includes applications where the material's ability to withstand heat, oil and grease ensures longevity and reliability.

Composite innovation

At the recent JEC World event, **Arkema** launched several innovations including Rilsan PA 11 – a bio-based solution for composites.

Rilsan is used in to produce bio-based composites for transport, aerospace and sports applications. With an optimised melting point, can be easily processed with natural fibres such as flax, hemp, and bamboo without degradation. Both polyamide 11 and natural fibres are derived from renewable resources, making these composites more sustainable and recyclable than traditional materials, says Arkema.

The company also showcased its UDX tapes – which combine carbon fibres and bio-based thermoplastic polymers. In addition, the HAICoPAS aerospace demonstrator showcased the performance of next-generation thermoplastic composites.

HAICoPAS is a technology demonstrator made from HexPly thermoplastic composites, using Arkema's Kepstan PEKK resin and Hexcel's HexTow® AS7 and IM7 carbon fibres. The material meets the needs of the aerospace industry, offering productivity gains and enhanced recyclability due to its thermoplastic nature. As part of this demonstrator, a continuous, dynamic in-situ welding (ISW) process has been co-developed by the Institut de Soudure and Arkema to meet the structural assembly needs of aerospace manufacturers.

Raised temperature

Temperature resistance is a property that often limits the use of plastics in applications such as automotive and electronics. The performance of materials such as PPA, PPS and Peek means they can be used in areas like ignition components and sensors for under hood components in cars, as well as in sockets and coils in electronic systems. Automotive manufacturers also need to achieve more power from smaller engines – meaning they must run at higher temperatures.

Eurotec offers several materials in this area. Its Tecomid HT (PPA) and Tecotron XS (PPS) have continuous use temperatures (CUTs) of up to 180°C and 210°C. A 40% glass fibre-reinforced grade of Tecomid HT is being currently used by a leading automotive OEM for an inverter housing application – where standard PBT and PET cannot provide the required CUT. At the same time, 50% and 30% versions of this were designed for use in gear lever and high-heat lamp socket applications, respectively. A 30% glass fibre-reinforced grade of Tecotron XS has been used in thermal management systems such as a thermostat housing.

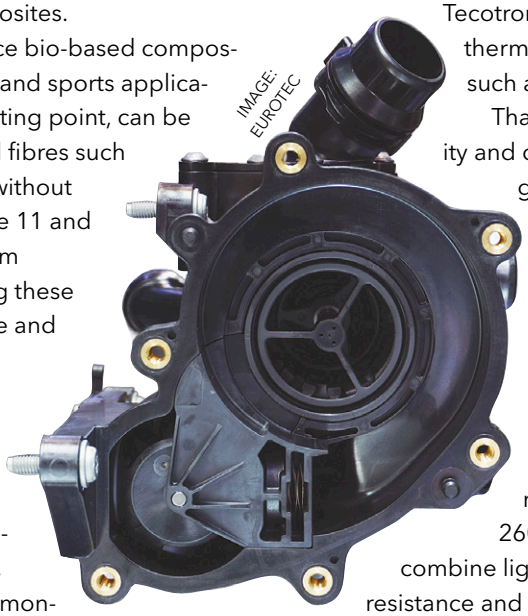
IMAGE: EUROTEC

Left: A 30% glass fibre-reinforced grade of Eurotec's Tecotron XS PPS has been used in a thermostat housing

Thanks to its thermal conductivity and dimensional stability, a 65% grade of Tecotron XS has been used for an insulation coil application. For brush holders in E-motors, a 40% reinforced version has been used.

If a higher temperature is needed – such as in aviation – PEEK is typically the right material to withstand up to 260°C. Tecopeek grades combine light weight, high thermal resistance and mechanical properties.

Tecopeek PK40 CR30 BK111 is designed to overcome corrosion issues and is used in metal replacement applications such as gears, bearing rings and pump components. Tecopeek PK40 CR30 BK111 RT 0D with a tensile strength of 23,500 MPa and 215 MPa is tailored to solve the problems equipment that operate under high temperatures and are exposed to constant wear, such as chain bushings in a textile machine.

"We develop products that offer accurate solutions to our customers," said Buket Turan, technical marketing manager at Eurotec.

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Rise of the robots: plastics automation

IMAGE: WANDELBOTS

The injection moulding sector is boosting its adoption of robotics and automation – as manufacturers look to increase production efficiency and raise productivity

While industries such as electronics and automotive are the main drivers of robotics in industry, the plastics industry – especially injection moulding – is also increasing its adoption of automation. Sophisticated offerings from suppliers, coupled with the inexorable rise of AI, means that more moulders are using robotics to increase efficiency and productivity.

UK-based moulder **Broanmain Plastics** recently installed its first fully automated injection moulding machine cell.

It has taken delivery of a 320-tonne **Haitian** machine with **Hilectro** cartesian robot. The investment, it says, ties in with a wider industry push towards optimising performance.

The Generation 5 Mars machine is a servo-hydraulic machine equipped with an electric screw motor as standard. This has a huge impact on energy efficiency as the use of a traditional hydraulic screw drive is the most energy-hungry phase of the process, it says. In addition, it is very quiet and delivers high precision and reliability.

"Compared to fixed pump hydraulic machines, these servo-hydraulic moulding machines can save processors like Broanmain over 70% in energy consumption," said Veronica Edmunds, head of sales at Haitian UK.

The weight and aesthetics mean that each part must be carefully removed from the tool and placed on a conveyor to prevent structural and cosmetic damage. The robot can perform this demoulding task at a consistent pace and rate. Having a choice of end-of-arm tooling means that the whole cell can be adapted to Broanmain's future production needs, such as lights out manufacturing.

Before-and-after energy tests – running at the same cycle times – will be performed on installation. Because the Generation 5 series includes the additional hardware, automation and HT-X-tend

Main image: Wandelbots says Nova is the first agnostic operating system for industrial robots

Right: Broanmain's new machine has an electric screw motor as standard and includes a cartesian robot

software at no extra cost, Haitian says that a manufacturer like Broanmain could expect a return of investment within the year.

"We intentionally selected this 320-tonne machine to provide extra manufacturing capacity and mould larger components. The automation option was essential for handling 1kg parts," said Thomas Catinat, operations manager at Broanmain.

He cites a recent study from Gartner, saying that lights out manufacturing is expected to accelerate this year – with 60% of manufacturers expected to have at least two completely lights out processes in 2025. With minimal human intervention required on the new production cell – which already operates staggered early and late shifts – Broanmain believes that automation will augment existing efficiencies.

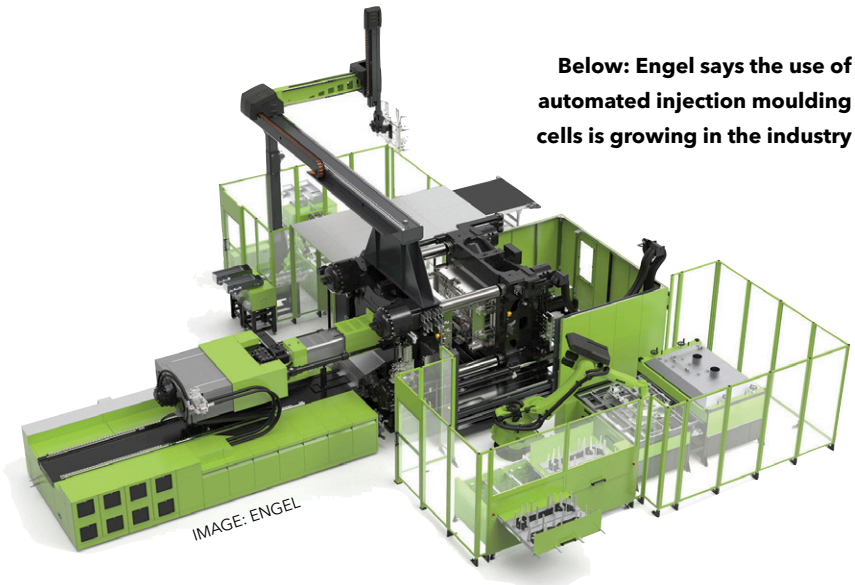
"The focus for us is unlikely to be full lights out production, but more lights out processes," he said. "Having a robot – rather than a full-time operative – to take components from the mould delivers a much faster cycle time, with no interruptions. It is also far safer for the workforce."

Automation showcase

At last year's Fakuma exhibition, **Engel** showcased a number of its automation solutions – including its Viper linear robots and Easix articulated robots and conveyor systems.

Because they integrate seamlessly into Engel control systems, the company says they enable synchronised movements between the robot and injection moulding machine, leading to reduced cycle times and simplified setup processes.

In the company's Automation Expert Corner at the show, a Viper 20 dual robot used iQ motion control to optimise cycle times – helping to reduce part removal times by up to 30%. The new combination hand axes with 48V drive technology are compact, and the integrated vacuum-saving circuit reduces compressed air consumption by up to 90% – which is a critical cost factor in continuous operation. In addition, a new multi-level box transfer allows for quick box changes and is directly integrated into the Engel control system.



Below: Engel says the use of automated injection moulding cells is growing in the industry

In a second exhibit, a Viper 4 gave visitors the opportunity for a hands-on experience. Its simple, intuitive operating philosophy – supported by integrated assistance systems – makes programming easy and requires no prior knowledge. It also stands out for its energy efficiency, says the company. Thanks to a vacuum-saving function, the vacuum generator only operates when the vacuum level drops below a certain level, for significant energy savings.

Engel also showcased a bin-picking cell. Here, the separation of bulk parts with complex geometries can be time-consuming. Here, a stationary camera was positioned above the bins for part recognition, speeding up analysis and supporting the robot's task. While the robot is still positioning one part, the camera can identify the next optimally grippable part.

Engel said the exhibits showed how intelligent systems can raise the efficiency and flexibility of plastics processing.

Prior to this Engel said that – despite a 6% dip in annual sales – it was seeing an increase in demand for customised automation. Customers are increasingly looking to automate as many process steps as possible – such as quality checks – directly via the machine. Depending on customer preferences, the automation integrates with the machine to form a high-performance injection moulding cell.

"Most of the time we are involved in customer projects from the start," said Stefan Engleder, CEO of Engel. "This enables us to respond specifically to

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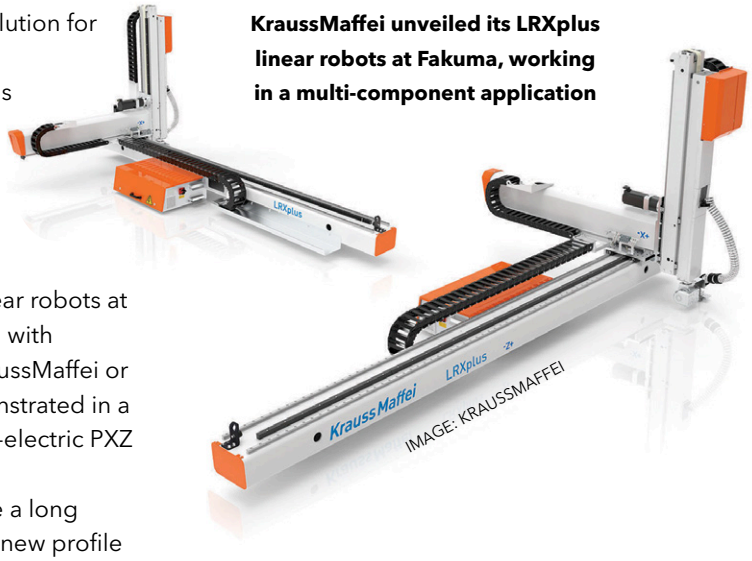
requirements and tailor the optimal solution for our customer."

While the standard segment remains stagnant, customised automation is seeing a significant upswing, he added.



KraussMaffei unveiled its LRXplus linear robots at Fakuma, working in a multi-component application

Linear demo

KraussMaffei unveiled its LRXplus linear robots at last year's Fakuma – which can be used with injection moulding machines from KraussMaffei or other manufacturers. They were demonstrated in a multi-component application on an all-electric PXZ 121 machine.

The new robots are robust and have a long service life. The traversing axes have a new profile geometry and are made of crash-resistant aluminium or steel. This reduces unplanned downtime and enables cost-effective maintenance.

They also offer enhanced functionality and user-friendliness in control technology with the new MC7 control. The new user interface is intuitive and has freely configurable operating buttons. In addition, the teaching function has been improved so that movement sequences can be implemented quickly.

The new LRXplus retains the advantages of the LRX series, including high precision thanks to high-performance rack and pinion drives on the axes and a high residual load capacity of the robots. Powerful servomotors continue to ensure fast acceleration and synchronous movements to reduce cycle times. In addition, the absolute encoder (multiturn) eliminates the need for time-consuming referencing when starting the robot.

This speeds up the start-up of the robot and the start of production.

Below: Wittmann says its W832 pro robot is the link between injection moulding and downstream steps

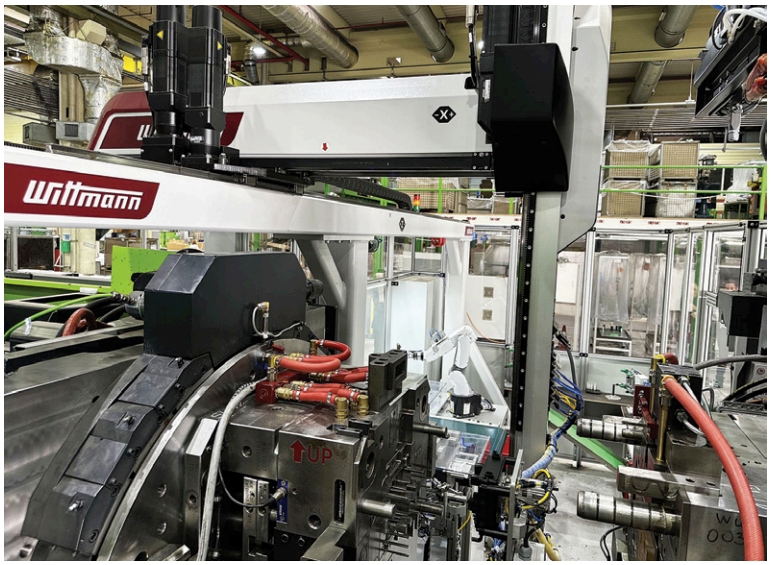


IMAGE: WITTMANN

Integrated cell

Automation specialists **Wittmann** and **Maier** have helped injection moulder **Reinert** to develop an integrated production cell for a multi-component process.

Reinert needed help to produce a fuse box for agricultural utility vehicles, comprising two black boxes clipped together with sealing, numerous sockets and screws, plus red brackets to hold the cover in place after electrical installation.

"Both boxes have come out of the injection moulding machine as complete assemblies including sealing and metal inserts, except for the red brackets," said Christoph Klement, deputy project manager at Reinert. "This is a milestone for our company."

The challenge was not just cost pressure, but the need to combine lowest possible unit costs with high flexibility of the production cell. The fuse boxes are made in 18 variants. The production cell also had to make some other products.

While Maier has previously helped Reinert design production equipment for complex parts, Wittmann supplied a large W832 pro linear robot for the project. It handles the inserts as well as the finished parts and so functions as the link between the injection moulding process and the subsequent processing steps.

Automation begins with a small six-axis robot, which arranges the sockets and screws needed for one fuse box in the specified grid dimensions. The Wittmann W832 takes up the inserts and places them into the lower cavity of the rotary mould. Then, the gripper takes out the moulded part from the previous cycle. In the 1+1 cavity mould, the base body is formed first. The hard component is a glass-reinforced, flame-retardant polyamide. After rotating the mould, the second component – a TPE material – is directly overmoulded, to provide the

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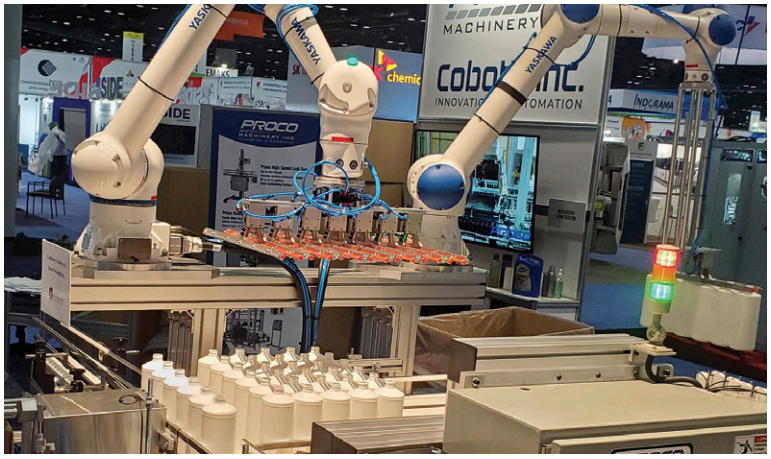
IMAGE: COBOTS



Above: Cobots recently helped a customer to streamline its injection moulding operations

seal for the upper edge of the fuse box.

Parallel to the moulding process, the W832 pro also performs an assembly task and a quality check. From the moulding machine, the robot first takes the part to the assembly station. In the base of the black fuse box model running off the clock-out belt on the day of our visit, there are four small holes – which will later provide ventilation. For now, they are covered with a silicone membrane. For the quality check, Maier has installed a camera system next to the assembly station. The robot must move the part 20cm to the right. Here, the W832 pro robot's rotary servo axes come into play – presenting, in quick succession, three different critical points on the moulded part to the camera.

The production cell is laid out to produce up to 400,000 assemblies per year. Initially, 50,000 fuse boxes for agricultural utility vehicles are being produced. How fast the numbers of units may increase is not known – partly because the cell will be used to make other complex parts.

"The basic concept of the cell keeps all options open for us," said Christoph Klement.

Once the fuse boxes take off, the trays that are now being filled manually can be replaced by vibrating bowls, hoppers and separators. At this point, the equipment will be able to maintain autonomous production for up to eight hours.

Collaborative effort

Cobots, a new company set up to provide collaborative robot automation to packaging companies, recently helped a customer to streamline its injection moulding operations.

The customer needed to palletise small injection-moulded trays that are used for specialised candy. The trays were moulded from clear acrylic and had to be handled carefully to avoid scuffing or damage. They had to be assembled before palletising as they were moulded in two parts. Tray and the lid were moulded in the same mould.

"We were tasked with assembling the two parts together immediately after moulding," said John McCormick, director of Cobots.

Once assembled the assembled, trays were then conveyed to its robotic palletiser system – which placed the trays into layers onto the pallet with tiers sheets between each layer. The full pallet was then fed out of the system for transport to the wrapper system and eventually the warehouse.

Collaborative robots – also called co-bots – are designed to work alongside human workers, helping them with a variety of tasks. They can address labour shortages by assisting workers with repetitive tasks, increasing productivity and reducing injury risks.

Cobots is the sister company of Proco Machinery, which makes automation systems for the blow moulding industry.

Autonomous robots

Muller Technology launched several new automation solutions at last year's NPE show.

It says it has expanded beyond traditional downstream automation, offering new autonomous mobile robots (AMRs) and mobile manipulators (MoMas) which improve productivity, reduce OSHA recordable events, and can run continuously.

"With our latest product line and service offerings, we are empowering plastics manufacturers to unlock new levels of efficiency, productivity, and profitability," said Carsten Eisenkrämer, group CEO at Muller Technology.

Muller's MoMa is an AMR combined with a collaborative robot (cobot) including a vision-based end-of-arm tool. They can operate in microprocessor cleanrooms, offering efficiency, productivity, accuracy and cost reductions. The MoMa automates the transportation of goods and complex operations such as picking items from

IMAGE: MULLER

Right: Muller Technology launched new AMRs and MoMas at last year's NPE show

Use of robots doubles in seven years

The use of robots across the world has doubled in the last seven years, says the **International Federation of Robotics** (IFR).

In its World Robotics 2024 report, IFR says that global average robot density reached a record 162 units per 10,000 employees in 2023 – more than twice the number measured seven years earlier (74 units).

"Robot density acts as a barometer to track the degree of automation adoption in the manufacturing industry around the world," said Takayuki Ito, president of the IFR. "This year's runner-up is China – which ranks third worldwide behind South Korea and Singapore, but right up with Germany and Japan."

The European Union has a robot density of 219 units per 10,000 employees (up 5.2%) – with Germany, Sweden, Denmark and Slovenia in the global top ten. North America´s robot density is 197 units per 10,000 employees, up 4,2%. The US ranks tenth in the world among the most automated countries in the manufacturing industry. Asia has a robot density of 182 units per 10,000 persons manufacturing employees, an increase of 7.6%. The economies of South Korea, Singapore, mainland China and Japan are among the top 10 most automated countries.

South Korea is the number one adopter of industrial robots with 1,012 robots per 10,000 employees. This is an annual 5% increase since 2018. Singapore follows, with 770 robots per 10,000 employees. China took third place in 2023 – taking it above Germany and Japan – with a robot density of 470 robots per 10,000 employees. China has doubled its robot density in four years.

Germany ranks fourth with 429 robots per 10,000 employees – a figure that has shown a 5% CAGR since 2018.

Japan is in fifth place with 419 robots per 10,000 employees. Robot density here has grown by around 7% per year (2018-2023). Robot density in the US reached 295 robots per 10,000 employees in 2023. The US ranks tenth in the world.

shelves, assembling components, or placing delicate objects.

The company has added AMRs to its portfolio of products as a certified system integrator for Omron products. AMRs minimise health and safety risks in warehouses and factories, helping to raise efficiency and reduce cost, says the company.

New operator

Germany-based **Wandelbots** says it has developed "the world's first agnostic operating system specifically developed for industrial robotic automation" – called Nova.

"Just as Android revolutionised smartphones and Windows transformed the PC world, Nova will make industrial robotics accessible to everyone and create new ways for software developers to commercialise," said Christian Piechnick, CEO of Wandelbots.

Nova is designed to make robotics accessible to everyone, he said. By supporting modern development tools such as Python and JavaScript, it empowers developers to create and scale robotic applications with ease, reducing the complexity of automation.

Following a 'plan, build, and operate' approach, Nova claims to simplify the whole automation lifecycle – from planning and simulation to deployment and scaling – with AI technologies at its core.

As a vendor-independent operating system, Nova claims to simplify and optimise industrial robotics by integrating hardware components from various manufacturers and making them accessible to everyone using through a modern interface. Complex programming and inflexible automation landscapes are not needed. Nova's open API concept, user experience, and seamless integration of externally developed apps make it a versatile platform for both robot users and software developers, it says.

Its seamless integration with existing hardware allows businesses to leverage past investments while scaling across multiple robots and brands, without costly retooling. Wandelbots says its close collaboration with Microsoft and OpenAI ensures scalability – and that the latest AI capabilities enhance Nova's feature set.

In the second half of 2024, around 50 customers experienced Nova in a closed beta phase. Now, the company has made its operating system available to more users in an open beta phase – as well as showcasing the system at last year's SPS show.

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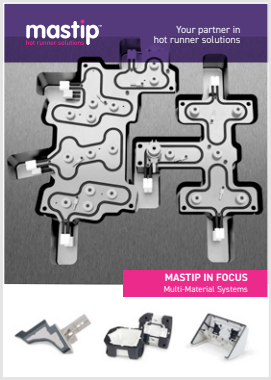

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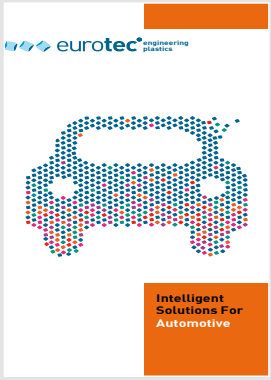

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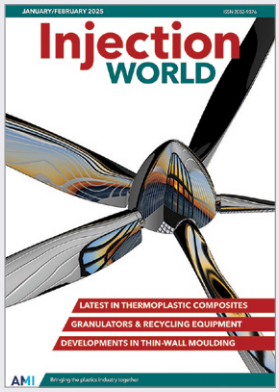

Injection World January/February 2025
The January/February 2025 issue of Injection World provides injection moulding companies with the latest on recycling and granulator technology, recent advances in thin wall moulding and an update on reinforced thermoplastics.

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Injection World November/December 2024
The November-December issue of Injection World magazine has a cover feature on the growing availability of digital aids to production in injection moulding, while other features cover developments in hot runners and materials handling. Plus there is a Fakuma 2024 review.

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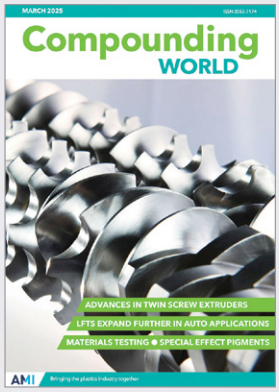

Compounding World March 2025
The March issue of Compounding World magazine has a cover feature on technological developments in twin screw extruders, plus updates on special effect pigments, materials testing and long fibre thermoplastics.

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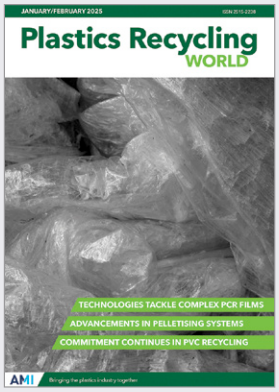

Plastics Recycling World January/February 2025
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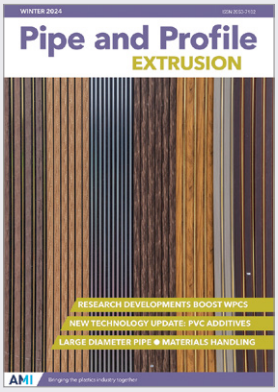

Pipe and Profile Winter 2024
Pipe and Profile Extrusion's Winter 2024 edition has a cover feature showing how R&D is helping wood-plastic composites continue to improve, while other features are on large-diameter pipe, materials handling products and PVC additives.

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Film and Sheet March 2025
The March issue of Film and Sheet Extrusion has a cover story looking at the increasing sophistication of control systems for film and sheet companies, while other features cover the latest developments in thermoforming, barrier film and additives for film.

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17-18 June 2025	Masterbatch, Malaga, Spain
17-18 June 2025	Plastics in Electric Vehicles, Germany
16-17 July 2025	Polymer in Footwear, Portland, OR, USA
19-20 August 2025	Rigid Packaging Forum North America, Cincinnati, USA
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11 November 2025	Performance Polyamides North America, Cleveland, USA
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