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MINERAL FILLERS REDUCE COST AND CARBON

NPE 2024 NEWS REVIEW ● PVC ADDITIVES

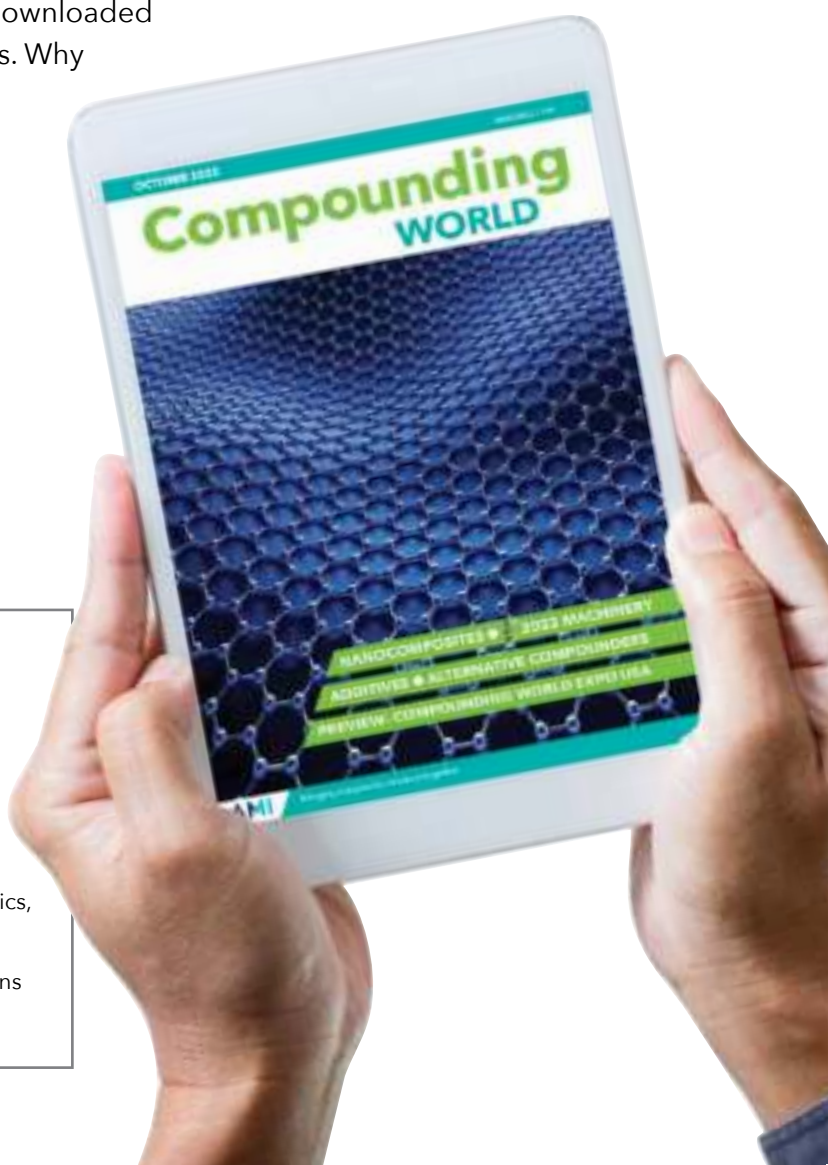
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5 News

News from the global plastics compounding industry

14 NPE 2024 Review

News from the major US exhibition in May

23 Fibres reinforce sustainability trend

Producers of carbon fibre and other reinforcement fibres are turning to recycled and bio-based materials to meet sustainability requirements. Jennifer Markarian reports

COVER PHOTO: JOHNS MANVILLE

33 PVC additives evolve still further

PVC formulation additive suppliers are continuing to develop alternatives to older, less sustainable technologies. Chris Saunders finds out what's new

41 Reducing cost and carbon

Minerals act as polymer substitutes to reduce cost and carbon footprint along with providing functional benefits. Jennifer Markarian reports on new products

49 Melt filtration moves in new directions

Suppliers of melt filtration systems are improving their technologies to ensure efficient removal of contaminants even at finer levels. By Chris Saunders

56 Diary



PAGE 14



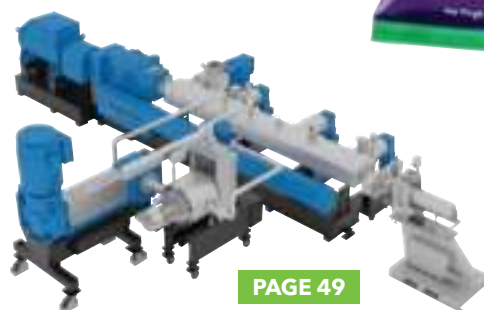
PAGE 23



PAGE 33



PAGE 41



PAGE 49

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Domo inaugurates PA compounds plant in China

Engineering thermoplastics producer Domo Chemicals has responded to surging demand in China for its Technyl polyamide compounds with a \$14m investment in a new 40,000 m² plant in Haiyan, Jiaying, in China's Zhejiang province. The investment represents a large commitment to the Chinese market, with the new plant capable of increasing current Technyl capacity to 35,000 tonnes/yr, potentially rising to 50,000 tonnes/yr.

The performance of a wide range of applications, including electric vehicles electrical/electronics, consumer and industrial goods, is enhanced using polyamides, said the company. As these sectors move towards sustainable solutions, Domo is investing



IMAGE: DOMO

The plant will produce Domo's Technyl polyamide compounds

heavily in renewable energy initiatives and advancing polyamide recycling technologies.

Yves Bonte, CEO of Domo Chemicals, said: "Our steadfast commitment to staying close to customers, both geographically and through innovative products, is at the heart of Domo's success. We have

strong and growing partnerships in crucial sectors like e-mobility and green energy in Chinese markets."

Since 2016, Domo Chemicals has experienced growth in China, marked by a series of capacity expansions at its Jiaying facility and culminating in the groundbreaking of the new plant.

> www.domochemicals.com

LyondellBasell starts review

US-headquartered polyolefins producer LyondellBasell has launched a strategic review and evaluation of the European assets of its Olefins & Polyolefins and Intermediates & Derivatives business units.

Peter Vanacker, Lyondell-

Basell CEO, said: "At the 2023 Capital Markets Day, we stated our intent to concentrate our portfolio around businesses with long-lasting competitive advantage and to reinvest around those advantaged areas generating superior

returns at meaningful scale. These criteria have not changed."

The company says investments in a commercial MoReTec plant and a circularity hub in Germany will continue as planned.

> www.lyondellbasell.com

Dupont reshapes again

DuPont has announced plans to split into three companies, further reshaping the group after its merger with Dow in 2017, followed by separation in 2019 and then the sale of its ETPs business to Celanese in 2022. The three independent, publicly traded companies, comprise Electronics, Water, and New DuPont.

"This is an extraordinary opportunity to deliver long-term, sustainable shareholder value through the creation of three strong, industry-leading companies," said Ed Breen, DuPont Executive Chairman and CEO. "The three-way separation will unlock incremental value for shareholders and customers, and create new opportunities for employees."

Businesses in New Dupont had \$6.6bn sales in 2023 and have a key product focus on medicare/pharma, including Liveo silicones (used for elastomers, tubing, adhesives and overmoulding), Kapton products (polyimide films) and Tyvek nonwovens (packaging).

> www.dupont.com

Graphene nanoplatelets for masterbatch

Black Swan has released its GraphCore 01 family of graphene nanoplatelets products, which are tailored to meet a diverse range of needs within the polymer industry and come in various

forms including powders and polymer-ready masterbatches.

Michael Edwards, Chief Operating Officer said: "After several years of meticulous research and development,

we are able to provide the industry with turnkey solutions with constant and reliable results without interrupting our customers' production process."

> www.blackswangraphene.com

Free registration opens for AMI's expos and conferences in US

Free online registration has now opened for the AMI Plastics World Expos which are being held at the Huntington Convention Center in Cleveland, Ohio on 13-14 November 2024.

Taking place for the fifth time in North America, the event - organised by *Compounding World's* publisher - brings together four focused exhibitions: the **Compounding World Expo**, **Plastics Recycling World Expo**, **Plastics Extrusion World Expo** and **Polymer Testing World Expo**.

By registering in advance, visitors will receive free admission to all four exhibitions, featuring more than 300 suppliers, plus free entry to four conference theatres hosting technical presentations, educational seminars and business debates. Attendees and exhibitors will also have the option to buy tickets (\$60 each) for a networking party at the Punch Bowl Social on the evening of 13 November.



"The event will provide visitors with a great opportunity to meet and compare suppliers from around the world, as well as giving them the chance to learn from business leaders and technical experts in the conference theatres," said Jenny Amaru, Expos Business Manager at AMI. "When we ran these expos in Cleveland last year, they attracted more than 5,100 visitors, including senior buyers and specifiers from leading extruders, recyclers, compounders, OEMs and brand owners".

The four expos will

occupy the two largest halls at the state-of-the-art Huntington Convention Center in downtown Cleveland. They will feature a wide array of leading manufacturers of extrusion, compounding, recycling and testing equipment, plus suppliers of a huge variety of polymers, additives and related services.

The exhibitor line-up already includes companies such as: Advanced Blending Solutions; AdvanSix; Ampacet; Amut; Aurora Plastics; Azo; Baerlocher; Barentz; Bausano; Bay Plastics Machinery; Birla

Carbon; Brabender; Budenheim; Buss; BYK; C-Therm; Cabot; Chroma Color; Coperion; CPM; Dover Chemical; Dynisco; Entek; Erema; Farrel Pomini; Galata; Gneuss; Graham Engineering; Heritage Plastics; IMCD; Instron; Intertek; JSW; KraussMaffei; Leistritz; Maag; Milliken; Mixaco; Netzsch; NFM; NGR; Niche Polymers; Omya; Orion; Perkin Elmer; PMC; Sesotec; Steer; Steinert; Struktol; Syncro; TPEI; Thermo Fisher; US Extruders; Vecoplan; Wacker; Westlake; Windmoeller & Hoelscher; Zeppelin; Zoltek; and hundreds more.

The very limited number of remaining booths are filling up fast. To find out more about exhibiting at any of the expos, [CLICK HERE](#).

The four focused conference theatres will feature 100 expert speakers over the two days, including influential representatives from leading compounders, extruders, recyclers and testing organizations.

To book your free ticket for the expos and conferences, which is valid for both days of the event, visit: <https://ami.ltd/Plastics-World-Expos-NA-Register>

Versalis acquires Italian compounder

Versalis has completed the acquisition of Italian compounder Tecnofilm.

The acquired company is a family-owned enterprise based in the Le Marche region which manufactures functionalised polyolefins and compounds mainly for the footwear and

technical goods industries. Founded in 1972, the company has patented several successful products.

"The acquisition of Tecnofilm further strengthens Versalis' business specialisation strategy," said Adriano Alfani, CEO of Versalis (Eni).

He said Tecnofilm enables Versalis to expand its product portfolio by integrating downstream supply chain activities in elastomer-based compounding, particularly in the industrial and footwear sectors.

> <https://versalis.eni.com>

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Borealis to add recycled PO compounding line in Belgium



IMAGE: BOREALIS

Borealis is set to install a semi-commercial demonstration recycle-based polyolefins (rPO) compounding line in Beringen, Belgium. Construction of the line will take place during 2024, and it is expected to be fully operational in the first half of 2025.

Borealis will use its proprietary Borcycle M technology to mechanically recycle post-consumer waste into high-quality rigid PP and PE materials. It said: "Capable of processing a broad range of recycle flakes from both PP and HDPE waste sources, the new line will offer

exceptional versatility and flexibility."

The group described this as "a semi-commercial demonstration line" and its production capacity has not been disclosed. As a showcase for the Borcycle M technology, the line "will support Borealis' customers to integrate value-added recycled plastics into their product lines without compromising performance", it said.

The move complements the group's recent acquisitions of recycle-based compounder Rialti and mechanical recycler Integra, said Borealis

> www.borealisgroup.com

Ampacet expands ELTech portfolio with PBT carrier

Masterbatch manufacturer Ampacet has expanded its ELTech portfolio to include a range of high performance colour masterbatches based on a PBT carrier resin specifically designed for optical fibre cable PBT jacketing, which is often made of PBT to harness its mechanical properties and

resistance to heat and chemicals.

The company said the move comes in response to a "significant increase in consumer and business demand for high-speed internet [which] has resulted in dramatic growth in the fibre optic cable market".

The company says the

new masterbatches preserve high-performance signal transmission and feature excellent opacity at a low addition rate, high resistance to heat and colour fading, and are available in 16 colours that comply with RAL colour references.

> www.ampacet.com

Ineos Styrolution ASA selected again by automotive customer

Ineos Styrolution says a "leading European automotive brand" has selected its Luran S SPF60 ASA material for the blackening panel of a line of trucks.

Laura Nübling, Product Manager Luran S, EMEA says: "Luran S XA SPF60 was developed for demanding

outdoor applications that require superior UV resistance and high gloss surfaces."

The two companies have previously collaborated on development projects using INEOS Styrolution's Luran S 778T material and the SPF30 additive package. Ineos

Styrolution said it was a natural next step to test the enhanced XA SPF60 package as soon as it became available. Initial tests were positive and subsequently, the new material was approved for the company's automotive applications.

> www.ineos-styrolution.com

IN BRIEF...

Wanhua Chemical has opened a second European R&D centre in Barcelona, Spain, to advance the company's footprint in Europe. The centre will be able to quickly meet the needs of downstream customers, facilitate the development of new products, provide technical support, and keep pace with technological advancements.
<https://en.whchem.com>

Celanese has strengthened its supply network in Asia with the announcement of a specialty compounder in China to manufacture its Santoprene TPV materials. Parts made with Santoprene TPV, have a long and proven service life with consistent performance across various applications, said Celanese.
www.celanese.com



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EcoCortec's compounding operation begins in Croatia

EcoCortec, a subsidiary of Cortec, has started using new compounding lines at its facility in Beli Manastir, Croatia, to produce masterbatch.

Cortec said this is expected to significantly shorten lead times for customers and bring benefits for both EcoCortec and its European licensees

and distributors.

Cortec's green VpCl films and bags are used in various industries and applications, for example to protect metal parts and equipment from rust and corrosive elements such as oxygen, moisture, and chlorides. The company's goal is to use 30% recycled content in

its packaging products by 2030.

"By completing the entire production process inhouse, EcoCortec is now less dependent on outside sources, enhancing its self-sufficiency," said EcoCortec's General Manager, Dijana Zrinski. "By overseeing operations from VpCl masterbatch compounding all the way to extrusion, converting, and printing, we can achieve better quality control. Once we have the raw materials, production can proceed seamlessly from start to finish."

In another development, the Beli Manastir plant has taken its first delivery of waste from its customer Jakob Schober, signalling the start of a new partnership to recover plastic scrap and incorporate it back into quality finished goods.

> www.cortecvci.com



IMAGE: CORTEC

Above: The facility in Beli Manastir will use film waste returned by Cortec's customers

IN BRIEF...

Chemovator, BASF's business incubator and early-stage investor, has invested in **Heartland**, which produces natural fibre plastic additives such as hemp-based materials.

www.chemovator.com

www.heartland.io

Krahn Chemie is expanding its long-standing partnership in Germany and Poland with specialty chemicals and materials provider Vibrantz Technologies. In addition to pigment dispersions, Krahn will now distribute a broader range of products for applications such as coatings, printing inks and plastics.

www.krahn.eu

PVC recycling pilot plants start at Ineos Inovyn site

Ineos Inovyn has launched two new PVC pilot plants at its Jemeppe-sur-Sambre R&D site in Belgium to accelerate new technologies for recycling PVC. The move forms part of a strategic Project Circle initiative, which aims to commission an industrial unit with 40,000 tonnes/yr recycling capacity by 2030.

Geir Tuft, CEO at Ineos Inovyn, said, "PVC is one of the most recycled polymers in Europe, but reaching full circularity remains a complex challenge for our industry."

Across Europe around 30% of PVC waste is cur-



IMAGE: INOVYN

The plants in Belgium are part of Ineos Inovyn's Project Circle

rently mechanically recycled. Project Circle targets the remaining waste by developing new technologies including dissolution,

pyrolysis, and gasification with industry-wide collaboration playing a key role, according to Ineos Inovyn.

> www.inovyn.com



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Tosaf develops PPA carrier system

Tosaf subsidiary Tosaf Color Service has launched PPAX, a new colour masterbatch carrier system based on the high-performance polymer and whose specially selected pigments allow increased processing temperatures. This makes it possible to colour products in many different colours without affecting the material's special properties.

Tosaf said that unlike PA66-based masterbatches, which are often used as an alternative for cost reasons, the high thermal stability, good strength, stiffness, and toughness values, low moisture absorption and high chemical resistance, are also retained in coloured injection mouldings.

The 28 standard stock RAL colours

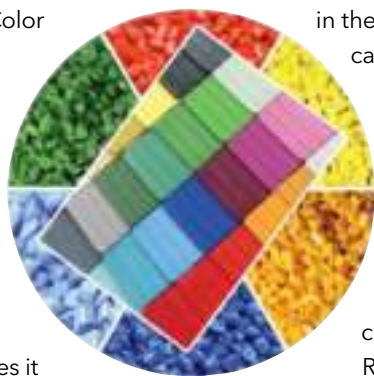


IMAGE: TOSAF

in the PPAX product range can be laser-marked, and processors using PPAX can take advantage of the higher melt temperatures available to shorten cycle times without being limited by the colour masterbatch.

Rudolf Reinhart, Product Manager at Tosaf Color Service, said: "PPAX enables us to meet the requirements of industries in which electrical and electronic components are exposed to high thermal loads. These include the automotive industry with its focus on e-mobility, as well as manufacturers of kitchen appliances and white goods, which require colour-coded plug connectors for a wide range of electrical outlets."

> www.tosaf.com



IMAGE: MOCOM

Mocom opens CFRP hall

Mocom, part of the Otto Krahn Group, has held the grand opening of a new production hall for carbon fibre reinforced plastics (CFRP) in Gardelegen, Germany. The new €10m hall, constructed on a 39,000 m² site, will enable the company to produce more than 3,000 tonnes/yr of CFRP.

"We prioritised future-proofing this new production hall," said Jens Kaatze, Mocom CEO. "For instance, a photovoltaic system on the roof supplies electricity autonomously and we will utilise our process waste heat for heating."

Mocom is initially operating one extruder line.

> www.mocom.eu


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Envalior steps onto the NPE stage

The 2024 show was the NPE debut for Envalior, the new company formed from the combination of Lanxess High Performance Materials and DSM Engineering Materials in 2023. Envalior is among the top three global engineering thermoplastics (ETP) producers, said Grace Showalter, Regional Commercial Director - Americas, during an NPE press event.

The company has a well-established worldwide presence with a network of more than 4,000 employees located across 18 production sites, 14 R&D centres and multiple sales and distribution offices. In the Americas, it operates R&D, sales and production facilities across the USA, Mexico, and Brazil. Considering the strength of Envalior's ETP product slate, including PA6, PA66, PBT, PA410, PA4T PPA, PA46, TPC, PET, PPS and composite materials, the fit of the Lanxess and DSM legacy businesses has been a good one.

Showalter said the two businesses are "quite



complementary in their product portfolios", which has helped in their integration. Customer bases are also complementary. "The integration of people [from the legacy businesses] has been going well," she said. "Everybody speaks the same technical language."

Christophe Cazabeau, Executive Vice President of Envalior's Performance Materials division, said both the Lanxess and DSM Engineering Materials ETPs businesses have gone from being one part of a larger corporate to now being the core, and employees appreciate that.

Envalior is expecting the

integration process to be completed in the latter part of this year. Cazabeau said the group may look for acquisitions in the future, but its current focus is on the integration process.

One of the key sectors for Envalior is the automotive ETP materials market, including EV battery applications. "We are confident we are front runners in the market," said Ryohei Takao, Vice President Specialty Materials at Envalior. He highlighted the importance of Envalior's high temperature Stanyl PA 46 and its PPS materials in EV battery applications.

At Envalior's NPE booth,

it showcased high-voltage battery enclosures made of Tepex Dynalite composite material and Durethan PA6. Keith Kauffmann, Application Development Engineer at Envalior's Americas business, said: "We are seeing an uptick in interest in plastic battery enclosures." One-step processing is one of the advantages of ETP over aluminium, he said, as it eliminates the welding step.

Consumer goods and medical supplies are also important markets for Envalior. At the company's booth, the former sector was represented (among other consumer applications) by Puma sports shoes that use its Arnitel material in the midsole. Arnitel is a thermoplastic copolyester material that is adaptable to various foaming techniques. The booth had an area devoted to its work in medical applications, which displayed items including catheters made with materials from the Arnitel Care range.

> www.envalior.com

NPE attracts new generation of visitors

The return of the NPE show in May after a six-year break was heralded by its organiser, the Plastics Industry Association, which announced that more than 50,000 registrants signed up for the show.

NPE has historically been the major plastics industry event in the Americas, but the association was forced to cancel the triennial show scheduled for 2021 due to restrictions caused by the Covid pandemic. In its post-show

announcement, the Plastics Industry Association said: "NPE 2024's global reach reestablished its reputation as the international gathering place of the plastics industry in the Americas."

It reported representatives from 133 countries registered to attend NPE 2024, a 9.9% increase on the number of countries registered at NPE 2018.

A notable trend was the large proportion - 63% - of attendees who were experiencing their first NPE. The

association said 30% of attendees were under the age of 40.

The association worked hard to appeal to younger attendees, said Tammy Straw, Vice-Chair of the NPE Sales & Marketing Committee. She said a lot of networking events were held during NPE 2024, along with more educational presentations, and she also noted the appeal of new features like the Women in Plastics event.

> www.npe.org

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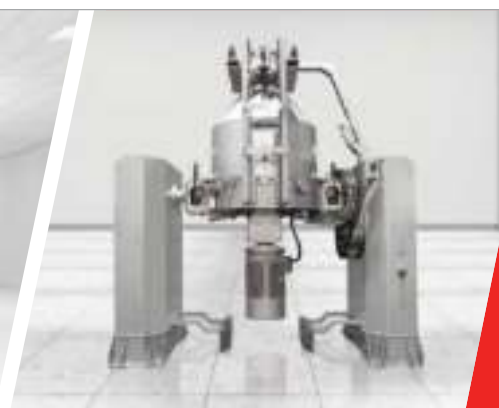
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Suppliers respond to PFAS pressure with new additives

An emerging trend at NPE 2024 was the growing number of additives and masterbatch companies branding their products "PFAS-free". The move comes in response to new regulatory pressure from the European Commission and the US FDA that will result in bans for some per- and polyfluoroalkyl substances (PFAS).

PFAS are present in bonded form in a vast range of applications in industries as diverse as textiles and semiconductors. Brand owners are taking a precautionary approach as regulators work on the details of restrictions, which is leading additives suppliers in the plastics industry to develop PFAS-free products as the regulatory tide turns against fluoropolymers.

One segment of the plastics additives and masterbatch markets where fluoropolymer substitution has started is polymer processing aids (PPAs) – see *Compounding World* April 2024 for more information.

"PFAS is a hot topic at NPE," said Nicole Dechant, Senior Marketing Communications Content Specialist at Avient, at the group's press event

during the show which was the platform for the launch of its Cesa non-PFAS process aid for extrusion. Avient said this offers comparable processing performance to traditional processing aids, reducing melt fracture, eliminating die build-up, and lowering torque for higher throughput. The Cesa PPA helps to improve productivity and process stability for film or sheet extrusion, pipe extrusion, or extrusion blow moulding.

Clariant launched AddWorks PPA, a PFAS-free processing aid for polyolefin film extrusion, which is the company's first PPA additive. "We are announcing the birth of a new product line with AddWorks PPA and we are bringing it to market at an early stage with the aim to grow this product family," said Diederik Goyvaerts, Global Segment Manager – Processors, in Clariant's Performance Additives business.

Clariant said it is launching AddWorks PPA in Spring 2024 in all regions. Other applications being targeted for later grades include pipe extrusion, extrusion blow moulding and fibre/textile production.

The company has not revealed details of the chemical basis for its PFAS-free additive. Goyvaerts said: "We picked up early on the trend and then looked at the capabilities we have in Clariant."

The tensile, mechanical and sealing properties of polyolefin films are unaffected by the new compositions, said Clariant. AddWorks PPA exhibits high thermal stability and low or no migration, plus low let down ratios.

BYK has added to the growing choice of PFAS-free PPA additives with two new grades. The company said BYK-MAX P 4109 and BYK-MAX P 4110 prevent melt fracture, reduce



Left: At NPE, Clariant introduced AddWorks PPA, a PFAS-free processing aid for polyolefin film extrusion

the viscosity of the melt, reduce die build-up and allow faster material changes.

Flame retardants are another area of development activity induced by the PFAS clampdown. Spain-based additives producer Tolsa has developed anti-dripping agents for FR additives that do not use PTFE.

At Tolsa's NPE stand, Marta Sacristán, Functional Additives Product Manager, said the company's Adins range of products are based on needle-like silicates modified in their surface with organic compounds to ease dispersion in polymeric matrices. Key applications for the additives include wire and cable, E&E devices, pipes and transportation.

Tolsa has experienced increased demand for its Adins products as the PFAS-free trend has emerged this year. Sacristán said that most of this demand growth is focused on PC and PC/ABS compounds and also in PP compounds.

Electric vehicle applications offer great potential for the Adins products, said Tolsa. It has validated their use as a PTFE replacement in an EV battery case application in the UK. It said it is also working with global firms to substitute PTFE in automotive parts and electrical devices.

- > www.avient.com
- > www.clariant.com
- > www.byk.com
- > www.tolsa.com

IMAGE: D ELDRIDGE



Above: Marta Sacristán, Tolsa's Functional Additives Product Manager, at the company's NPE 2024 stand

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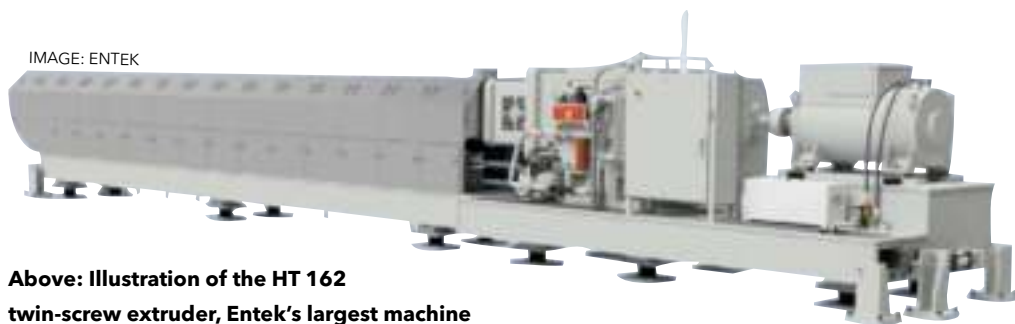
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IMAGE: ENTEK



Above: Illustration of the HT 162 twin-screw extruder, Entek's largest machine

Entek makes innovation the focus of NPE presence

Twin-screw extruder group Entek discussed technology and corporate developments at its NPE 2024 stand. At previous NPE shows, the group has made one of its extrusion lines the centre-piece of the stand, but it took a different approach this year.

Linda Campbell, Vice-President of Sales, said Entek had so many innovations following the six-year gap since NPE 2018 that it decided to focus on all these developments, without a spotlight on one extruder. That said, the group provided updates on its new high output HT 162 twin-screw extruder, which is currently in production and scheduled for shipment in the first quarter of 2025.

The HT 162 twin-screw is the largest machine Entek has ever built. It has maximum power of 4,200 hp and a maximum screw speed of 600 rpm. Rated production capacity goes up to 30,000 lb/h for HDPE, LDPE and PP compounding, as well as for PS, SAN and ABS compounding. Polyamide compounding can run at up to 23,600 lb/h maximum. The HT line was launched in 2020 with the introduction

of the HT 72 machine. The product expansion, in addition to the HT 162, includes the newest machine, the HT 92, which is in development.

Entek displayed a variety of other new twin-screw machinery technologies, including: vent flow sensor technology, mounted on a 103 mm twin-screw extruder barrel; VFT twin-screw machinery compounding technology for increased output and improved product quality; a 37mm QC3 stuffer, with mounting arm and 4 x 43 mm twin-screw extruder barrels (to show reach/flexibility) as well as ease of switching between vacuum stuffer and side feeder; and Entek's twin-screw extruder machinery controls.

In early 2023, Entek launched a new business unit, Entek Wear Parts Division, and opened a facility in Nevada for items such as screws and barrels. Whereas Entek's work has previously focused mainly on replacement wear parts for its own extruders, the new facility is manufacturing and selling replacement parts for all brands of twin-screw extruders.

There has been an increase in demand for barrels and screws, and so on, said Tammy Straw, Entek Wear Parts Division Director, explaining the reason for the group's investment in a new facility. As for the market for non-Entek wear parts, she said: "We are targeting that aggressively."

Since the launch of the new division in February 2023, the company has increased its offerings, added manufacturing shifts, stocked inventory and reduced delivery times.

At NPE, replacement wear parts displays included: screw layout program 2.0, with new features added since its 2018 launch; 162 mm screws; 133 mm screw set on shafts; 27mm screw set on shafts.

After cost and efficiency programmes that followed Entek's acquisition of Adaptive Engineering and Fabrication (AEF) in 2022, the focus is now on exploiting opportunities. Rick Buschini, VP Material Handling Sales, said the company is selling turnkey systems. Material handling displays at NPE included a filter receiver and a vacuum loader.

➤ www.entek.com

Songwon shows new additives

Additives group Songwon launched a phosphite antioxidant and a UV absorber at the NPE show.

Designed for enhanced hydrolytic stability, SONGNOX 9228 is a secondary diphosphite-based antioxidant that Songwon says overcomes the limitations of conventional phosphite or phosphonite antioxidants by enhancing the resistance of polyolefins to oxidative corrosion, especially at high processing temperatures.

Robert Seeley, Senior Sales Manager for Polymer Stabilisers at Songwon in the Americas, said at NPE that the new grade "gives us more options", adding to the group's large portfolio of antioxidants.

SONGNOX 9228 blends well with primary antioxidants and other stabilisers, says the company. As a modified version with a small fraction of tri-isopropanol amine, SONGNOX 9228T brings these performance features to Songwon's solid phosphites.

Also on show at NPE was SONGSORB 1164, one of the latest additions to the group's UVA offering and a complement to its triazine-based UV absorbers for polymers portfolio. It was specially developed to maximise the UV stability of polyolefins intended for use in food-contact packaging applications.

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Driving sustainability in the global compounding industry

How *Apply Carbon's* comprehensive portfolio of mass-produced recycled and natural fibers is enabling the ecological transition in the plastics industry

The plastics industry finds itself at the forefront of significant changes, driven by growing concerns around climate change, an increased ecological awareness among consumers, and an evolving legislation targeting the CO₂ footprint of materials and end-products. To support the paradigm shift towards greener, more eco-responsible practices, the plastics industry is rapidly embracing more sustainable raw material options with a natural or circular economy origin.

An industry leader with decades of experience in sustainable fiber products, Apply Carbon (a daughter of Procotex Corporation) offers a broad portfolio of recycled carbon fibers, recycled aramid fibers, and a range of natural fibers – each offering unique attributes that are key to the development of advanced technical as well as bio-based plastic compounds.

Recycled carbon fibers

Renowned for its exceptional strength-to-weight ratio, carbon fiber is widely used as a reinforcement in compounds serving the automotive, aerospace, sporting goods or renewable energy sectors. Its production and disposal, however, pose significant environmental challenges, and virgin carbon fiber comes with a highly unfavorable CO₂ footprint. Apply Carbon's recycled carbon fibers, on the contrary, are derived from reclaimed post-industrial or end-of-life composite waste. With a CO₂ footprint reduction of 85% vs. virgin fibers, they present a compelling solution for minimizing the environmental footprint of high-performance structural or conductive compounds. A wide variety of milled, cut, granulated or pelletized and easy-to-dose product formats is available, with the appropriate sizing to ensure optimum compatibility with a vast range of polymers – from PP to PEEK.



PFAS-free solutions for sealing, friction & wear

"Recycled aramid fibers can offer a viable alternative to the per- and polyfluoroalkyl substances (PFAS) commonly used in compounds destined for sealing or tribological applications."
Bruno Douchy, Commercial Director, Apply Carbon

Recycled aramid fibers

Its outstanding strength, extreme durability, and unique chemical and heat resistance have made para-aramid fiber the material of choice for reinforced compounds exposed to the most severe conditions.

Applications include brake pads, seals, gaskets and clutch linings, as well as, increasingly, in non-corroding, low-noise plastic gears where aramid fiber imparts high durability, low friction and reduced wear compared to metal solutions.

To mitigate the high cost and constrained supply of virgin aramid fiber, Apply Carbon has developed a full range of dust-free and easy-to-disperse para-aramid products, that come with an attractive price and a 6x lower CO₂ footprint.

Natural fibers

Inherently CO₂-negative, natural fibers are ideal reinforcements for sustainable compounds. Their very low density as well as their unique sound absorption and vibration damping properties make them attractive candidates for applications where NVH performance is critical, as in automotive interiors. Apply Carbon supplies a wide range of natural flax as well as recycled flax, hemp, sisal, jute or coconut fibers. A growing application domain is the market for bio-based, eco-friendly compounds.

Industrial capacity, uniform quality

Sustainable fibers have long remained in the shadow of their virgin counterparts, for which demand had grown steadily over the years. Anticipating a surge in the demand for sustainable fibers, Apply Carbon has conducted a series of investments since 2011, all targeted at creating a robust, future-proof industrial supply of high-quality, cost-effective and sustainable products. Operating today from a hyper-modern and fully automated 16,500 m² factory in France, Apply Carbon serves customers globally with a portfolio of products that is key to a wide range of end-markets. With a nameplate capacity of 4,000 metric tons of fibers, a raw materials stock that exceeds 3,000 metric tons to ensure uniform quality and security of supply, and a highly energy-efficient production process, Apply Carbon is ready to support the global compounding industry as it transitions to more eco-friendly next-generation products and a more circular economy emerges. Sustainable fibers have now reached industrial maturity.



Sustainable solutions for e-mobility

"Offering the ideal combination of lightweight structural performance and antistatic or EMI-shielding properties, recycled carbon fiber compounds are a key enabler for e-mobility applications."
Hervé Cayuella, Managing Director, Apply Carbon

CPM develops standardised GXT twin-screw extruders

The Process Solutions business of CPM is working on a new product line of twin-screw extruders dubbed GXT, short for Global eXtruder Technology. The GXT is a standardised line that can be manufactured at all of CPM's global manufacturing facilities for the benefit of regional customers.

CPM is developing the GXT in response to customer demand. "We have a constant 'can this be done' process with our customers," said Sean Doran, Vice President of Engineered Materials, speaking to *Compounding World* at NPE 2024. In this instance, customers have been asking CPM about reducing overall operational cost in their use of twin-screw extruders.

Doran said that technology trends

have usually focused on performance improvements, such as higher RPM and higher torque. But the company observed what customers were actually doing operationally, he said, and often they were not running their extruders at the higher RPM and torque levels.

Standardisation is the main concept in the GXT development, but Doran stressed CPM is standardising around its proven technology, not as part of cost-cutting in the engineering of the GXT. The GXT extruders are available in standard centreline geometries, 13 Nm/cm³ torque densities and anywhere from 40 to 48 L/D. The company is in the process of making final decisions on sizes and models, but it is able to take orders and start building

machines for customers right now.

The standard Do/Di 1.55 extruder is the basis for the GXT design, as it is widely used in the industry. "We know the 1.55 has been an effective work-horse," said Doran.

The GXT is a standardised solution suitable for nearly all compounding applications, says CPM. It is a plug and play design and offers benefits to customers such as improved delivery times, as well as the reduction in operating costs that customers have requested.

Doran said the company is confident that customers will appreciate the low cost of ownership of the GXT, plus its reliability and flexibility.

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IMAGE: JOHNS MANVILLE



Fibres reinforce sustainability trend

Producers of carbon fibre and other reinforcement fibres are turning to recycled and bio-based materials to meet sustainability requirements. Jennifer Markarian reports

Sustainability continues to be a key topic for suppliers of materials and compounds. Fibre suppliers - and their suppliers - are working to reduce product carbon footprints via manufacturing and supply-chain efficiencies, recycling, and bio-based content in their drive to sustainability. Users of fibre reinforcement in thermoplastic compounds are eager to formulate plastics that will help meet the needs of the growing electric vehicle market as well as allow lightweighting in various applications, in the quest to reduce greenhouse gas emissions.

Johns Manville's ThermoFlow 636 with 4 mm chopped strands is a short glass fibre that is used widely in thermoplastic compounds. The material is manufactured in both Europe and the US.

"[Local manufacturing facilities] allow us to supply key regions with locally produced, high quality materials, supporting our commitment to sustainable practices and efficient supply chain management," says Robert Gasparik, JM's Technical Service Engineer based at the Trnava, Slovakia, fibreglass manufacturing facility. Gasparik adds that JM has been working to lower the emissions profile of this fibre via the manufacturing process, and that these innovative efforts have also improved material performance. In addition, at the Slovakia facility, nearly all fibreglass production waste is recycled back into the glass furnaces.

The flow and reinforcement properties of the fibre are due to JM's "direct dry" in-line manufacturing process as well as the proprietary formulation of the sizing on the fibres that ensures compatibility with the selected polymer, the company says. JM offers chopped strands designed for three major polymers (PA, PP and PBT/PC) as well as specialty polymers, such as PPS, POM, PEEK and ABS/PC. The company says that reinforced PP has recently been selected by several manufacturers, including those in the automotive sector, who see reinforced PP as an alternative to components that may potentially be overengineered.

Ineos Nitriles' new Invireo bio-based acrylonitrile is used to make polyacrylonitrile (PAN), which is used to produce carbon fibres. The bio-based Invireo acrylonitrile is produced using the International Sustainability & Carbon Certification's ISCC Plus mass-balance route. It is chemically the same as conventional acrylonitrile, so it is a drop-in replacement. It allows Ineos Nitriles to offer customers products with a 90% reduction in their carbon footprint versus conventional acrylonitrile-based products, the company says.

"Customers are asking for bio-based product, reduced carbon footprint and drop-in solutions," says an Ineos spokesperson. "At the moment we have a wide spectrum of requests from the market as the market (ie our customers) understand what

Main image:
ThermoFlow
glass fibre
produced by
Johns Manville

their customers actually want. One of the drivers for delivering this product to the market is to try and test what our customers want and help provide some direction.”

Carbon and aramid fibres

“We see [double-digit] growth in projects using carbon and aramid fibres as reinforcement in compounds,” says Dieter Henau, Sales Manager and R&D for Technical Fibers at Apply Carbon, which is a subsidiary of **Procotex**. These projects, in areas such as automotive, sporting goods, and electrical and electronics, are the driver for the company’s investment in a fully automated carbon and aramid fibre recycling plant in Plouay, France, says Henau.

The carbon-fibre recycling facility was commissioned in October 2023 and produces approximately 2,000 tonnes of recycled carbon fibre per year, with a nameplate capacity nearly 4,000 tonnes/yr. An adjacent facility for recycled para-aramid fibres has an annual production capacity exceeding 700 tonnes. Automation ensures cost-efficiency and batch-to-batch reproducibility, the company reports. The new facility has been designed for energy efficiency, using heat pumps and solar power, for example.

“A major driver for the growing demand for recycled fibres, next to their ability to now deliver outstanding performance and repeatable quality at affordable cost, is nowadays the increased focus on sustainability from customers and consumers across end markets,” says Hans Miltner, a senior consultant acting for Apply Carbon. “Reducing the so-called ‘scope 3 emissions’ has become a major objective of our customers. With this demand

comes the need for scale and maturity in the supply chain, which is why Apply Carbon has invested substantially to secure its market leadership position.”

The company currently sources post-industrial carbon fibre for recycling. According to the company, the global-warming potential of its recycled fibre products is 85% lower than that of their virgin counterparts. In the future, the company expects to have more capacity to recycle post-consumer, end-of-life carbon feedstock using pyrolysis.

Henau says that carbon fibres are used for properties such as lightweighting, mechanical reinforcement, tribology, and electrical conductivity. Aramid fibres are added for mechanical reinforcement, wear resistance and lubrication, especially in metal replacement compounds for machine parts or moving or rotating parts requiring high wear resistance, he explains.

The company has recently developed two new grades of carbon fibre with a PP sizing for blending into PP; CF MLD 300 G P1 is a 300-micron carbon fibre granulate and Carbisio P CF OS P1-6mm is a 6 mm carbon fibre grain.

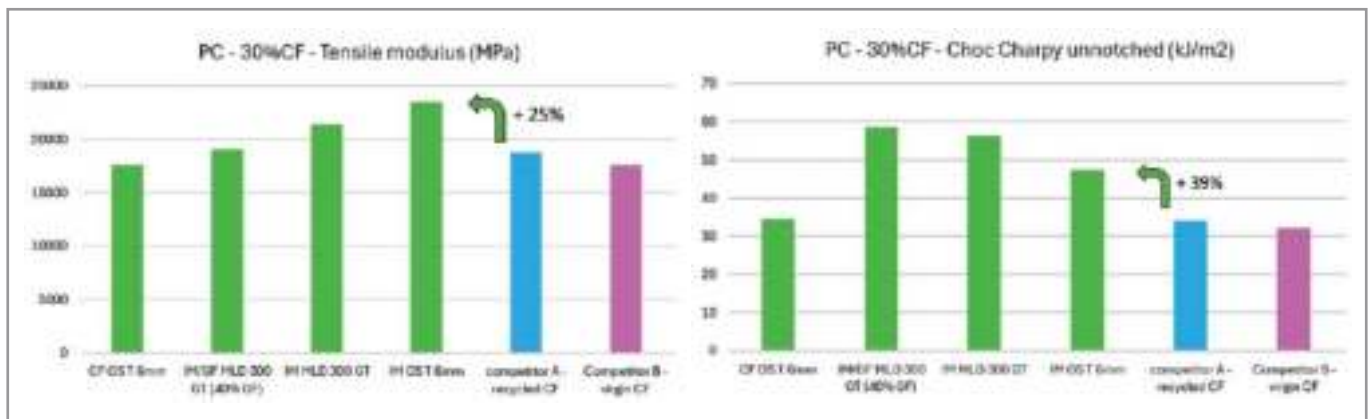
Recent tests of recycled carbon fibre in polycarbonate showed similar or better results than competitive virgin or recycled carbon fibre, Henau reports. The highest tensile modulus was found using the IM 6 mm cut carbon fibre with a sizing formulated specifically for the PC matrix. The best unnotched Charpy result was obtained with a mixture of carbon fibre and 40% glass fibre (see charts below).

Growing application areas may include antistatic packaging for electronics, electromagnetic interference shielding in automotive, metal-replacement in various industrial parts, and 3D-printing, the company suggests. ➤



IMAGE: PROCOTEX

Above: Apply Carbon uses recycled carbon fibre to make new fibre products

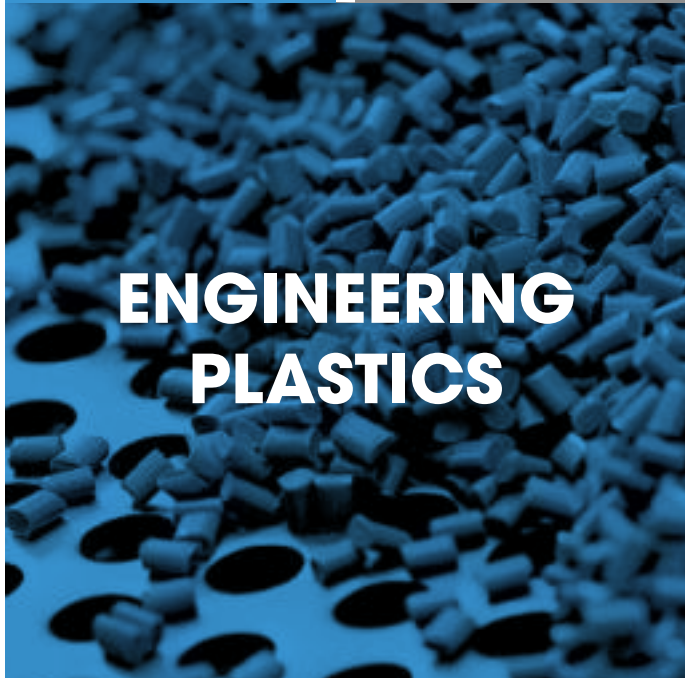


Apply Carbon says that tests of its recycled carbon fibre in polycarbonate showed similar or better results than competitive virgin or recycled carbon fibre. Left chart: The highest tensile modulus was found using the IM 6 mm cut carbon fibre with a sizing formulated specifically for the PC matrix. Right chart: The best unnotched Charpy result was obtained with a mixture of carbon fibre and 40% glass fibre
 Source: Apply Carbon

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Toray's latest is TorayCA M46X carbon fibre, which the company reports is approximately 20% stronger than others in the TorayCA MX series while maintaining a high tensile modulus. Using the new fibre reduces the weight of carbon fibre-reinforced plastic materials and thus lowers environmental impact. Achieving both high tensile strength and high tensile modulus is a technical challenge, which the company says it achieved by "pushing the structural control technology envelope".

"Nano-level controls of the graphite crystallite structure inside fibres resulted in an ultrafine, ultrahigh orientation producing carbon fibre that is more than 20% stronger than conventional materials while maintaining its tensile modulus," the company explains. Both properties are crucial for the sporting and leisure goods market, for example, to maintain performance while using less carbon fibre to lower the weight of moulded parts.

Also new from Toray is TorayCA T1200, a high strength carbon fibre with a tensile strength of 8.0 gigapascals (GPa), which is higher than the 7.0 GPa strength of TorayCA T1100. The company says it uses its proprietary nanoscale structural control

technology to design and achieve an internal structure with high toughness.

Toray announced in late November 2023 that its French subsidiary, Toray Carbon Fibers Europe, obtained ISCC Plus certification for its Lacq and Abidos production plants in South-West France for allocating biomass or recycled materials through the mass balance approach to produce and supply carbon fibre. The company further noted that its carbon fibre plant in Japan and the carbon fibre facility of Toray Composite Materials America in Decatur, Alabama, plan to obtain ISCC Plus certification in 2024.

Compounders have also been directing their attention to fibre reinforcement. **Mocom** recently announced the opening of a new production hall for carbon fibre reinforced plastics at its facility in Gardelegen, Germany, built with a €10m investment in the site from the Otto Krahn Group, Mocom's parent company. The new production facility has capacity for more than 3,000 tonnes/yr of high-quality carbon fibre compounds. The company says that the use of recycled carbon fibres significantly reduces the carbon footprint of these lightweight and durable materials. >

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IMAGE: FESCHD

Above: A smartphone fixture made of Luvotech Eco PA66-GF50-HS-BK, a compound produced by Lehvoss

Jens Kaatze, CEO of Mocom, says: “We prioritised future-proofing this new production hall. For instance, a photovoltaic system on the roof supplies electricity autonomously, and we will utilise our process waste heat for heating. Initially, we are starting with one extruder line and equipment for processing carbon fibres for compounding, which means producing plastics for further processing. The hall is designed to accommodate additional extruder lines.”

Tennessee-based **Insight Polymers & Compounding** sees ongoing growth of fibre-reinforced plastics for lightweighting in transportation, particularly in the automotive and aerospace industries. The company is developing an ultra-high viscosity, glass-fibre reinforced PET compound targeted initially for big area additive manufacturing of transportation applications. “This product is designed to meet printers’ need for thermal stability up to [approximately] 250° C and stability under thermal cycling,” says AJ Pasquale, Co-founder and Director of Operations at Insight Polymers.

Metal replacement

The latest from **Celanese** is Zytel XMP70G50, a PA66 reinforced with 50% short glass fibres. The company says it is ideally suited for replacing metal in electric vehicle chassis and structural components and many of the same components in vehicles with internal combustion engines. The new Zytel compound has a tensile strength of 270 MPa and a 19,000 MPa elastic modulus at 23° C (dry as moulded), with improved durability and fatigue resistance without sacrificing mechanical strength and processability.

“Because electric vehicles are heavier, additional lightweighting is needed,” says Tom Kelly, Senior Vice President of Engineered Materials at Celanese. “This new material allowed our customer to replace the metal crossbeam with a reinforced thermoplastic, which proves the concept of using these

materials in structural applications.”

Reinforced PA66 can also be used in aluminium-PA hybrid parts, using Zytel Bonding Technology, which is coated onto the aluminium before overmoulding the plastic to create structural bonds between the materials. Kelly claims the technology is “a game-changer”. The technology has been used, for example, in a hybrid thermoplastic aluminium cooling plate for an automotive application.

Another growing new automotive application for glass-filled PA66 is the use of specially formulated compounds to tune the level of dampening to meet the noise, vibration, and harshness (NVH) requirements inside the cabins of electric vehicles. Zytel NVH has been used in the Cadillac Lyriq motor mounts and is planned for broader use in upcoming General Motors’ EVs.

The Luvotech eco product line of technical compounds from **Lehmann & Voss** is based on raw materials made with recycled fibre-filled compounds and includes a wide range of technical plastics, including PC/ABS, polyamides (PA), and PEEK, says Thomas Collet, Director of Marketing at the Customized Polymer Materials division of Lehvoss.

“The big challenge in the production of fibre-filled compounds lies in processing them as gently as possible,” explains Collet. “Fibre-reinforced compounds that consist of 100% recycled raw materials have, on average, about 10-20% lower technical/mechanical performance than their equivalents in the area of virgin goods. [This is because] the average fibre length is significantly shorter than that of new material due to the ‘first component life’ and the grinding process as a preliminary stage for [compound] production. In some cases, and depending on the required material performance, it may be necessary to add a proportion of new fibres in the compounding process.” He explains that, for example, a recycled PA6 might need 35% glass fibres to be equivalent to a virgin 30% glass-fibre filled PA6.

An alternative to increasing the glass fibre reinforcement is to use a mixture of recycle and virgin materials. Lehvoss has introduced new compounds for this purpose. Luvotech Eco+ PPS GF40 BK (REC50), for example, consists of 50% virgin material and 50% recycled material. Collet says this product achieves nearly the property levels of a fully virgin material.

Lehvoss has determined carbon footprints for its materials using international standards (DIN EN ISO 14040, 14044 and 14067). Collet says that in addition to the use of recycled material, the compounds are produced solely with green electricity from a certified energy supplier. ➤

Sumika Polymer Compounds Europe, part of Japanese group Sumitomo Chemical, anticipates a growing demand for reinforced PP in the automotive market. The company says that its short-glass fibre reinforced (GF) PP Thermofil HP compounds and its Thermofil Circle recycled PP compounds offer carmakers performance equivalent to engineering plastics (such as PA) and with up to 60% lower carbon footprint (due to lower energy demands in PP production as well as the benefit of recycled raw material for rPP). In addition, PP components are designed for recyclability.

As product designers are creating new components for electric vehicles and seeking to reduce weight, there is a need for more performance data. SPC Europe partnered with **Hexagon's** Manufacturing Intelligence Division last year to produce accurate, multi-scale behavioural models of Thermofil GF-PP and GF-rPP compounds. These models allow designers to perform material analysis using their established digital engineering workflows to evaluate GF-PP compounds in new designs.

"Limited material behaviour data is a barrier to sustainable e-mobility innovations because automotive engineering teams have not been able

to put new materials through the rigorous virtual durability and safety tests required for automotive endorsement," says Guillaume Boisot, head of the Materials Centre of Excellence at Hexagon. He says that the models allow product development teams to simulate a component and subject it to automotive engineering test and validation.

"Combining our efforts with Hexagon allows us to support the race towards carbon neutrality by further lightweighting our customers' automotive components, reducing physical material testing and prototyping," says Bruno Pendélio, Marketing Manager for SPC Europe.

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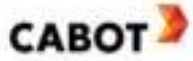
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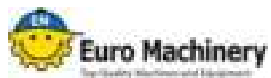
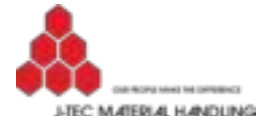
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PVC formulation additive suppliers are continuing to develop alternatives to older, less sustainable technologies. Chris Saunders finds out what's new

PVC additives evolve in tough environment

Due to its durability, chemical resistance, and low cost, polyvinyl chloride (PVC) is one of the most versatile and widely used polymers in the world. To tailor it for specific applications and to overcome its inherent limitations, various additives are incorporated in PVC which play a crucial role in enhancing the material's performance and functionality. For example, PVC is prone to degradation when exposed to heat, light, and reactive chemicals, so stabilisers are often added. A report by Intellect Insights Journal estimated the global PVC Additives market size to be \$3.2bn in 2022, and this figure is expected to increase to \$3.9bn by 2028 with a compound annual growth rate (CAGR) of 3.4% during the review period.

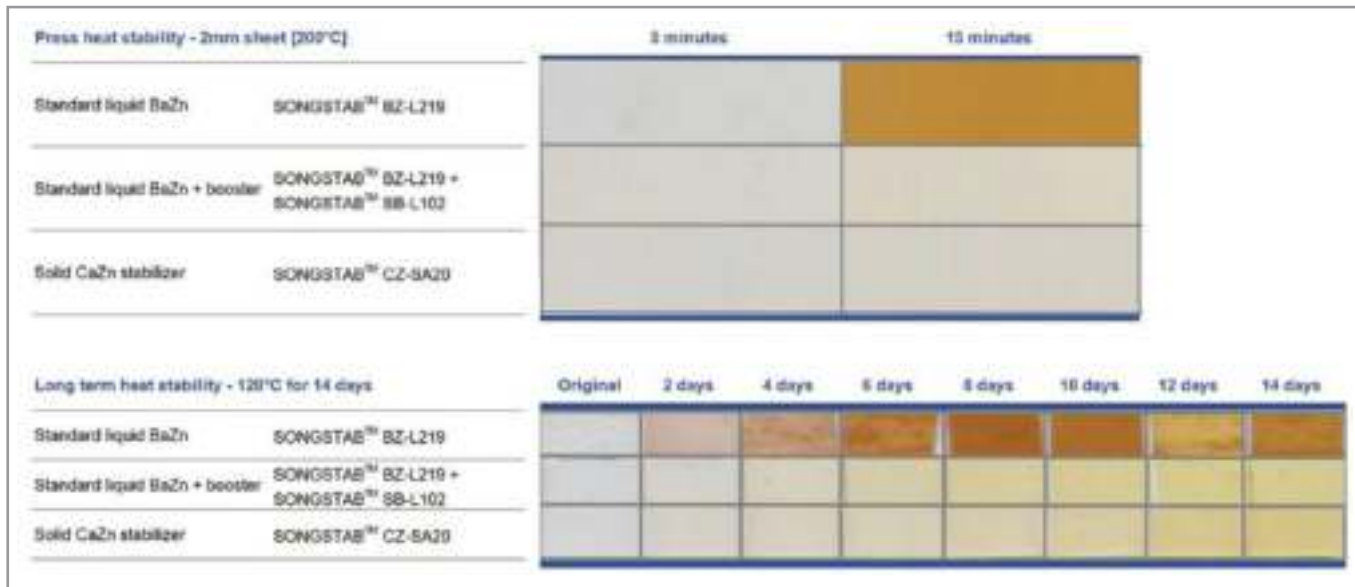
The automotive manufacturing sector is actively trying to reduce volatile organic compounds (VOCs) emissions in car interiors, which arise from sources including PVC artificial leather. South Korean chemical manufacturer **Songwon** says it is actively developing new stabilisers to meet changing regulations and specifications of the international PVC industry and has been promoting SONGSTAB CZ-SA20 against standard liquid barium zinc (BaZn) stabilisers used in the automotive artificial leather industry. The Songwon product is a solid calcium-zinc (CaZn) stabiliser that imparts high heat stability, offers good processability, and

meets low odour requirements. As a solid stabiliser, it does not contain any volatile solvents or liquid materials that contribute to high VOCs, causing unpleasant odours and creating a high value in reflectometric and gravimetric fogging tests.

SONGSTAB CZ-SA20 also helps reduce amine discolouration which is caused by amine catalysts in the polyurethane foam backing migrating into the PVC itself causing it to degrade and discolour. Generally, boosters are added with the conventional liquid barium zinc (BaZn) stabilisers to negate the effect of these migrating amines. PVC will naturally discolour over time, but with the right formulation and a good choice of stabiliser, the service life of products can be significantly extended. The company says SONGSTAB CZ-SA20 has been proven to slow ageing of artificial leather in extreme conditions such as those in regions with high or low temperatures or increased humidity. It also emphasises the importance of processors understanding that PVC stabiliser performance should not only be judged with regards to heat stability, but also in many other areas.

A recent study by Italian chemical company **Reagens**, whose portfolio comprises a variety of stabiliser technologies, challenges the common perception that harsh weather conditions can lead to accelerated colour fading in PVC. The company

**Main image:
Demand is growing in both rigid and flexible PVC applications**



Songwon says its SONGSTAB CZ-SA20 calcium-zinc (CaZn) stabiliser helps reduce discolouration caused by amine migration
 Source: Songwon

says: “We tested two tin-based stabilisers (mostly used in North America) and three calcium organic stabilisers (COS) mostly used in Europe, each with 7 and 9 phr of titanium dioxide concentration. Each extruded sample was exposed five times, each for four years, in a severe climate (EN 12608-1), starting in four different seasons and the same season for two consecutive years. [At the study’s conclusion] we did not have evidence of a starting season that particularly negatively affects ageing, neither comparing colour change (Delta E) at end exposure nor the overall speed of the colour change over the whole exposure time frame. The evaluations evidenced a similar performance of all stabilisers, with COS technology proven to be a valid and, in many instances, outperforming alternative to tin-based stabilisers.”

Tin replacement

Tin-based stabilisers for PVC, predominantly used in rigid, often transparent, calendered film and foamed profiles and sheets, have long been the focus of regulatory bodies due to environmental concerns. Calcium-based stabilisers are seen by many as a viable alternative and are already being utilised in many applications such as plasticised film or rigid compact and foam sheet extrusion. Conventional tin stabilisers offer limited lubrication but provide good transparency, heat stability, and high transparency. All these properties and more need to be provided by the alternatives.

German additive manufacturer **Baerlocher** has developed various calcium-based grades for rigid calendered film, such as Baerostab NT 1883 P or Baerostab NT 1929 P-series, which can cope with

demand for high transparency, good initial colour, and maintaining a stable calendering process due to adjusted low lubricity. For foam profile and foam sheet formulations used in continental Europe, calcium-based stabiliser systems are designed in a conventional way as they are used in rigid PVC profile extrusion. Care must be taken when fine-tuning co-stabiliser systems and lubricants for foam extrusion to achieve proper surfaces and colour. Not all aspects are related strictly to stabilisation, and the company is a big advocate of making necessary formulation adjustments after close communication with converters.

At NPE 2024 in Florida in May, US-based performance additive producer **SI Group** showcased Weston 705, a phosphite stabiliser free of nonylphenol which can be used in a variety of polymer systems including PVC. Weston 705 reduces both plate-out and gel formation by a factor of ten, and has been developed as an alternative to TNPP or for use in applications with nonylphenol restrictions. Adam Watson, Senior Sales Director, Polymer Solutions - North America at SI Group, said: “Our presence at NPE underscores our dedication to driving positive change within the plastics industry, advancing towards a more sustainable and circular future.”

As in other areas of plastic production and manufacturing, sustainability is now considered a high priority in PVC formulation and a lot of PVC materials such as building materials, film, and wire and cable, are being developed in accordance with these concepts. Japanese additive manufacturer **Adeka** has long been involved in the development of environmentally friendly stabilisers to meet

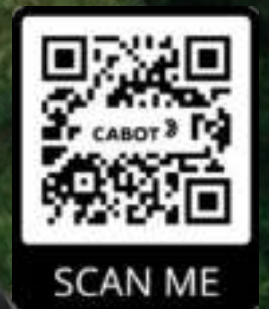


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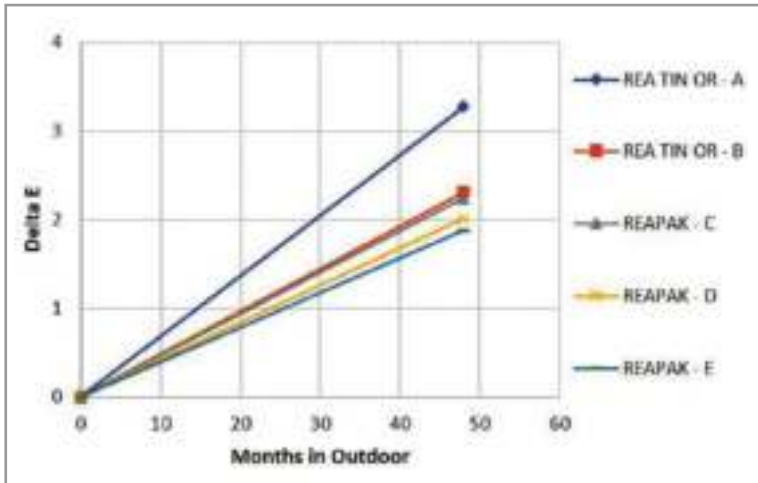


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Reagens tested two tin-based stabilisers and three calcium organic stabilisers for colour change after ageing and found similar performance

Source: Reagens

these increasing requirements and offers Ca-Zn system stabilisers as an alternative to lead-stabilisers, such as ADK STAB RX-300 series for fittings, and ADK STAB RUP series for wire and cable, which are said to provide excellent heat stability, colour stability, and processability, as well as possessing other important mechanical properties.

The company says recently it has also focused on the development of tin-replacement stabilisers, traditionally said to be difficult to replace due to their excellent stability performance, and claims its latest offering can provide similar levels of transparency, colour stability, heat stability, and heat ageing characteristics. Adeka has also succeeded in developing an improved weatherability stabiliser formulation for flexible PVC which can provide

long-term weatherability in outdoor applications. Lubricants are added to improve the flow properties of PVC, prevent sticking, and enhance surface finish. Several types are commonly used in PVC compound formulations, including **Sasol's** Fischer-Tropsch Hard Waxes and oxidized Fischer-Tropsch (FT) waxes. In a presentation at AMI's PVC conference in February 2024, Steve Torchia, Senior Manager Global Market Development and Product Innovation, Sasol, USA, said the company is developing a 'lower carbon' version FT wax manufactured using an improved gas-to-liquid (GTL) technology with a lower carbon footprint than the current GTL technology that was developed in the early 2000s. He went on to say that the ultimate aim is to achieve a net zero carbon footprint by transitioning to alternative feedstocks, and Sasol is seeking development partners to further these ambitions.

Wax lubricants

Sasol creates novel lubricant materials by functionalising wax. These chemistry changes alter the functionality and technical benefits for the PVC convertor, adding to their use in many other polymer compounds such as polyolefins, ABS, EPS, composites, and as dispersant and viscosity modifiers for colour masterbatch. In PVC potable water pipes, for example, Sasolwax B52 is a high efficiency lubricant requiring about half as much lubricant as PE wax or paraffin waxes.

In recent times Sasol has introduced the Sasolwax B39 series of functionalised products, including formulated lubricant packages, which provide improved dispersion of CaCO₃ filler and

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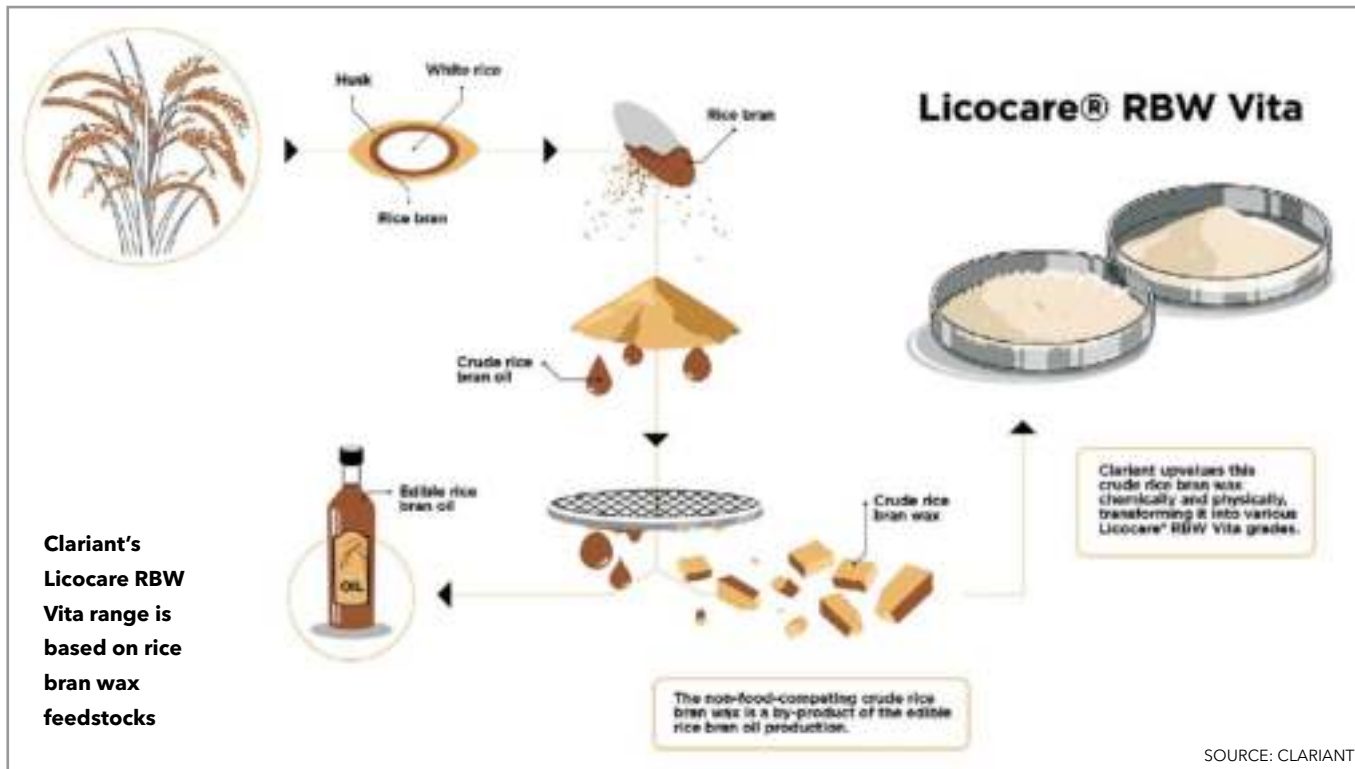
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impact modifiers in highly filled conduit, siding, and window profiles. "Because of [the additive's] high efficiency, the PVC convertor will see a counter-intuitive effect of a stiffer melt viscosity with lower melt pressure. This technical effect bodes well for pushing output rates faster, maintaining the extrudate as it enters the forming sleeves, and helps to lower converting costs," says Torchia.

At NPE 2024, **Clariant** showcased its latest additive solutions including Licocare RBW Vita waxes which are particularly suited to PVC and said to accelerate the transition to renewable-based products. The waxes are based on renewable bio-based rice bran wax feedstocks, a non-food raw material with at least 98% Renewable Carbon Index (RCI), and are well positioned to drive the chemical industry's transition from fossil-based to renewable carbon materials. With superior performance and sustainability features, they are a natural replacement for traditional coal-based montan waxes and offer the same levels of lubrication, dispersion, release, and nucleation as their montan wax equivalents while helping customers achieve their sustainability targets.

Clariant introduced Licolub PED 1316 at NPE, which is an oxidised HDPE wax for PVC building applications. PVC is growing in applications such as PVC siding at a rate of 3-4% per year in the US market, said Carl Crowder, Senior Account Manager at Clariant, and Licolub PED 1316 has been launched as an alternative to products by established US suppliers. Licolub PED 1316 is available

in the Americas and domestically produced to facilitate rapid sampling and supply.

US-based **Valtris Specialty Chemicals** has licensed a key technology in an exclusive arrangement to Transfar Huayang in China, as the first step for establishing sustainable alternatives to cadmium-based PVC stabilisers in the Asia market. The agreement will allow Transfar Huayang to use Valtris technology to manufacture and sell phenol-free over-based barium stabilisers in Asia.

Qu Yaping, President of Transfar Huayang Chemicals, said: "The Valtris phenol-free over-based barium project is a comprehensive strategic cooperation project reached by the two teams' effort on the basis of enhancing understanding and trust. Transfar Huayang fully recognizes Valtris' technical strength and China strategy. Transfar Huayang expects more high-quality projects under negotiation to effectively develop soon, which will achieve mutual benefits and win-win results for both parties."

The deal involves Transfar Huayang becoming a production partner for selected products for Valtris in the Asia market.

Regulatory report

PVC, together with various additives, continues to be tested and monitored amid ongoing health and environmental concerns, which could affect production and distribution in future. In November 2023, the **European Chemicals Agency** (ECHA) conducted an investigation focusing on 63 PVC

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additives, including plasticisers, heat stabilisers, and flame retardants, and collected information on the potential hazards to human health. It also considered possible alternatives while assessing the societal impacts of risk management measures. The key findings of the investigation suggest that regulatory action would be needed to mitigate risks associated with plasticisers (particularly certain ortho-phthalates), minimise risks from heat stabilising organotin such as DOTE, reduce emissions of flame retardants, and implement and improve technologies minimising PVC microparticle emissions which contribute to plastic pollution.

After a thorough analysis by **VinylPlus** and other bodies, in March this year the ECHA report was discussed by the European Parliament's ENVI Committee where the veracity of the report's results were called into question when an ECHA representative said it had made "plausible assumptions" in cases where data was lacking. Furthermore, whenever ECHA identified potential hazards, it was assumed these hazards were confirmed. In consideration of this, VinylPlus underlined that data gaps must be filled, and worst-case assumptions verified to allow for informed decision-making.

VinylPlus said it appreciated the transparent interventions from ECHA and the European Commission and will use this information to refine its current research activities related to the findings of the report. "Since its inception, VinylPlus has enabled the transformation of the PVC value chain, with proactive industry action to substitute additives of concern and create circular business models," said Charlotte Röber, Managing Director of VinylPlus.

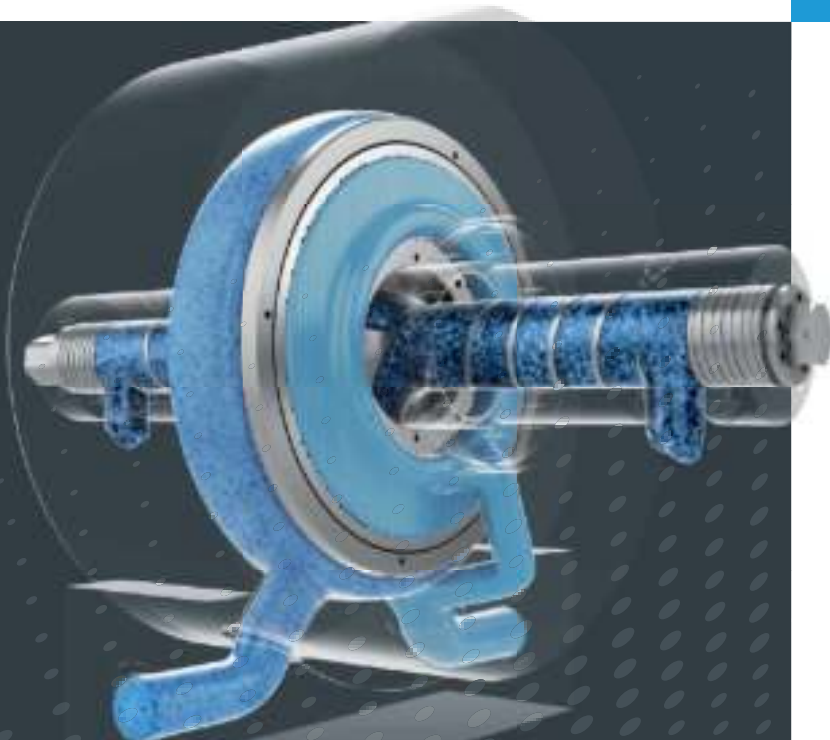
"Ultimately, we all need scientific and regulatory clarity to ensure the PVC value chain can continue to invest in its transition."

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Reducing cost and carbon

Minerals act as polymer substitutes to reduce cost and carbon footprint along with providing functional benefits. Jennifer Markarian reports on new products

There has been much recent work on renewable and plant-based fillers for thermoplastic compounds (as discussed in the *Compounding World* May issue), but mineral fillers also offer benefits for reducing the carbon footprint of the compound and the end-use product. Suppliers are undertaking life cycle assessments (LCAs) as well as seeking to optimise their processes to reduce environmental impact in mining, purifying, milling and transporting, for example.

Calcium carbonate has a long history as a lower-cost filler in thermoplastics, but it is seeing a revival as a part of plastics' sustainability story as a lower-carbon footprint replacement for petrochemical-based polymers.

Heritage Plastics, headquartered in Mississippi, US, has been a proponent of calcium carbonate concentrates for thermoplastics for more than 40 years. "Achieving sustainability will require many different solutions, and the use of calcium carbonate to reduce greenhouse gas emissions is one of them," says Heritage Plastics Director of Technical

Services and Development, Jason Riggs.

The company's first LCA of its product was conducted in 2008, and has recently been updated by a third-party consultancy, YellowYellow, based in Toronto, Canada. The 2023 LCA showed that each kilogram of Heritage Plastics HM10-type concentrate results in a 56% reduction in emissions compared to each kilogram of traditional LLDPE production.

Carbon dioxide (CO₂) emissions were calculated based on the manufacturing of three products in the HM10 minerals concentrate line (HM10 Max, HM10LC, and the HM10S Series), to arrive at an empirical value for the entire cradle-to-gate process. Each of the three products emitted 645 kgCO₂/tonne of product in 2023. LLDPE produces an average of 1,472 kgCO₂/tonne.

"The LCA was rigorous in its analysis of our three flagship products," says Riggs. "It considered emissions from both the constituent, turn-key components, and those resulting from the manufacturing operation at our plant in Sylacauga." ➤

Main image: Okeanos has developed QR code technology which tracks the journey of calcium carbonate used in packaging from "ground to grocery"

IMAGE: OKEANOS



Above: Potato chips packaged in mono-material multi-layer barrier film Made From Stone with scannable QR code technology for consumer transparency in sustainability

The LCA data is being used in a new emissions calculator developed for Heritage Plastics, which Riggs says will give their customers a way to communicate the sustainability associated with the use of calcium carbonate.

INCOA's new InCal surface-treated calcium carbonate mineral modifiers are produced from what the company says is an exceptionally pure limestone source. The company's production process creates a narrow particle-size distribution with a low top-cut and minimal specific surface area.

The modifiers are used to enhance processing and improve mechanical performance in a wide range of polymers, including PVC and polyolefins. The modifiers do not contain iron,

which is a benefit particularly in PVC for preventing yellowing and ensuring stability. Recently INCOA has introduced an InCal version tailored for breathable films and another grade designed for biopolymers.

INCOA says that its modifiers help reduce the carbon footprint of plastic products in several ways, including lowering energy consumption during processing and replacing a portion of petrochemical-based polymer with the mineral. The company plans to expand production capacity this year or next in response to growing demand.

Calcium carbonate

Omya's latest product is a version of its Omya Smartfill functionalised calcium carbonate with a surface modification designed for compatibility

with engineering polymers, including polyamides (PA) and polycarbonates (PC). When used in PA it increases ductility, and in glass-filled PA compounds, the functional filler increases the modulus and does not have a detrimental effect on impact, explains Karsten Schulz, Business Development Director for Polymers at Omya.

Omya found that approximately 5% of glass fibre could be replaced with 10-20% Omya Smartfill to reduce carbon footprint and cost without harming properties. In Europe, the product is produced in Italy using a 100% certified recycled mineral source, which is of interest to users who are seeking materials to increase recycled content. Omya Smartfill can also be used to replace a portion of the titanium dioxide used as a white pigment in PC, to reduce carbon footprint while maintaining colour and properties.

At NPE 2024, ingredient technology company **Okeanos** highlighted its Made From Stone (MFS) materials, which are compounds based on calcium carbonate with a proprietary coating. The company currently has eight compounds designed for different applications, with the goal of making the materials affordable and accessible for converters to immediately reduce carbon emissions of packaging and single-use products using 30-70% calcium carbonate in place of the polymer in the end products.

Part of Okeanos' technology includes supply-chain tracking to provide a product carbon footprint, which can be accessed via a QR code that brands can use on their products to communicate carbon footprint savings to consumers. The company has partnerships with compounders on

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five continents, with the goal of sourcing the raw materials locally and producing in-country, for-country. This approach also allows manufacturers and brands to create end-of-life solutions that match their country's infrastructure and regulatory environment. In the US, for example, Okeanos has designed their products to be compliant with Association of Plastic

Recyclers (APR) guidelines and is working towards APR recognition.

Talc applications

Engineered grades of talc find extensive use as functional fillers to improve the mechanical performance of plastic parts in automotive applications in the quest for light-weighting.

Talc-producer **Imerys**, for example, supplies high-

aspect ratio (HAR) talc, ultrafine talc, and microlamellar talcs for automotive parts. In late 2023, Imerys inaugurated a talc processing plant in Wuhu, China that is intended to supply China's growing automotive industry, particularly in electric vehicles. The plant was built in two years and is expected to reach full production capacity of 35,000 tonnes/yr by 2025.

Imerys has 10 other plants in China, including a calcium carbonate processing plant adjacent to the new facility.

"With booming EV production in China, Imerys' capacity to provide a local source of critical minerals is crucial to local automotive part manufacturers," says Guillaume Delacroix, Imerys Performance Minerals, EMEA & APAC Senior Vice-President. "The new plant will be able to provide Chinese polymer producers with the same state-of-the-art talc products we currently supply to global automotive polymer leaders from our European production sites. It not only strengthens our strategic presence in the region and our relationship with customers, it also brings a host of benefits to local manufacturers, including shorter lead times and cost-competitiveness."

Talc supplier **IMI Fabi** reports demand for highly engineered talcs in automotive applications, such as those with high lamellarity, to provide high rigidity. Ultrafine talc grades are also in demand for high resilience combined with dimensional stability and high rigidity, says Piergiorgio Ercoli Malacari, Product and Application Development at IMI Fabi.

IMI Fabi's latest development in mineral fillers is NatFeel, a high-purity, talc-based functional mineral for compostable biopolymers, such as polylactic acid (PLA), poly(butylene succinate) (PBS), and polybutylene succinate-co-butylene adipate (PBSA). In PLA,



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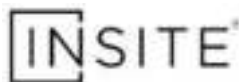


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NatFeel has a nucleating effect that promotes crystallisation and increases the glass transition temperature, says Ercoli Malacari. This effect raises the use temperature above the boiling point of water so that the plastic compound can be used in hot food or hot beverage applications, including thermoformed coffee pods.

The high purity of NatFeel meets demanding food contact requirements and minimises the presence of elements (such as fluorine) that might affect compostability certification, says Ercoli Malacari. In PBS and PBSA, NatFeel serves primarily to increase stiffness, which makes it possible to use the plastics in rigid packaging. The talc product also reduces polymer shrinkage while preserving dimensional stability (ie, limited or no deformation). In addition, if properly dispersed, the filler can increase barrier properties in films.

Fillers in recyclates

Mineral fillers can further reduce the carbon footprint of compounds containing recycled material, says Thorsten Hilgers, Project Manager Thermoplastics at **HPF Minerals**. He notes that the Industrial Minerals Association Europe has pub-

lished performance data for selected high-volume industrial minerals that provides average representative environmental footprint values for industrial minerals in Europe, based on ISO 14040-14044 standards. "We are in the process of developing company specific - or rather product specific - footprints, taking into account our multiple efforts to implement sustainable measures," says Hilgers. "Comparing these data with other materials like metals or polymers it can be stated that the environmental footprint of these natural industrial minerals is rather small."

Functional fillers also add reinforcement. For example, the company's needle-shaped wollastonite Tremin 939 is used as a reinforcing filler in both recyclates and virgin polymers.

The latest from HPF Minerals is the Rescofil odor-absorbing filler for thermoplastic compounds containing post-consumer recyclate. At 5 wt.% in a PCR PP, for example, the filler successfully reduced odor below the "clearly noticeable" threshold level of three in olfactometric testing according to the VDA 270 standard.

HPF has also previously investigated the performance of its high-performance mineral fillers

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IMAGE: FARREL POMINI

Left: Farrel Pomini says that its Farrel Continuous Mixer is well-suited for compounding high levels of fillers

in bio-based PLA compounds. “Test results showed significant improvement in mechanical properties. Our needle-shaped and platelet-shaped additives significantly increase the stiffness. Our blocky additives improve impact strength. In addition, these effects can be further enhanced by a suitable surface coating of our mineral high-performance fillers,” reports Hilgers.

While fillers are often aimed to reduce weight, high-density fillers in thermoplastics can be used to create densities similar to metals while retaining the advantages of thermoplastics, such as design freedom and mouldability. Weight can be important to provide a luxurious feel in caps and closures, or to provide functionality in applications such as sporting goods.

Avient’s Gravi-Tech Density Modified formulations provide customised densities from 1.2-11 g/cm³. In early 2023, the company launched its Gravi-Tech REC recycled formulations, which include recycled content. The company’s latest grade is Gravi-Tech REC GT5200-5089 C I natural, which is based on up to 60% Social Plastic polymer resin material from Plastic Bank, a social enterprise that collects and recycles ocean-bound plastic waste. Avient says the high recycled content supports a Product Carbon Footprint (PCF) reduction of >70% compared to technically comparable virgin material. The new grade is manufactured in Europe and is commercially available.

Farrel Pomini, the Continuous Mixer Business Unit of HF Mixing Group, says that its Farrel Continuous Mixer (FCM) is well-suited for compounding high levels of fillers. “The FCM’s large feed volume can handle filling with more than 70% titanium dioxide (TiO₂) or 80% calcium carbonate in white masterbatches, for example,” says Paul Lloyd, President at Farrel Pomini. Other highly filled compounds and halogen free flame-retardant compounds benefit from the FCM as well.

Lloyd says the FCM requires lower specific

energy than a twin-screw extruder to mix highly filled products. The FCM also uses less electricity, because a twin-screw extruder might need two or three side feeders to add high filler levels, he adds.

While companies have often looked at high filler levels to reduce cost, Lloyd adds that a recent trend is the desire to use off-spec fillers for further cost savings. Companies are also looking at a wider range of fillers, including natural fillers and fibres, which were the topic of an article in *Compounding World’s* May issue.

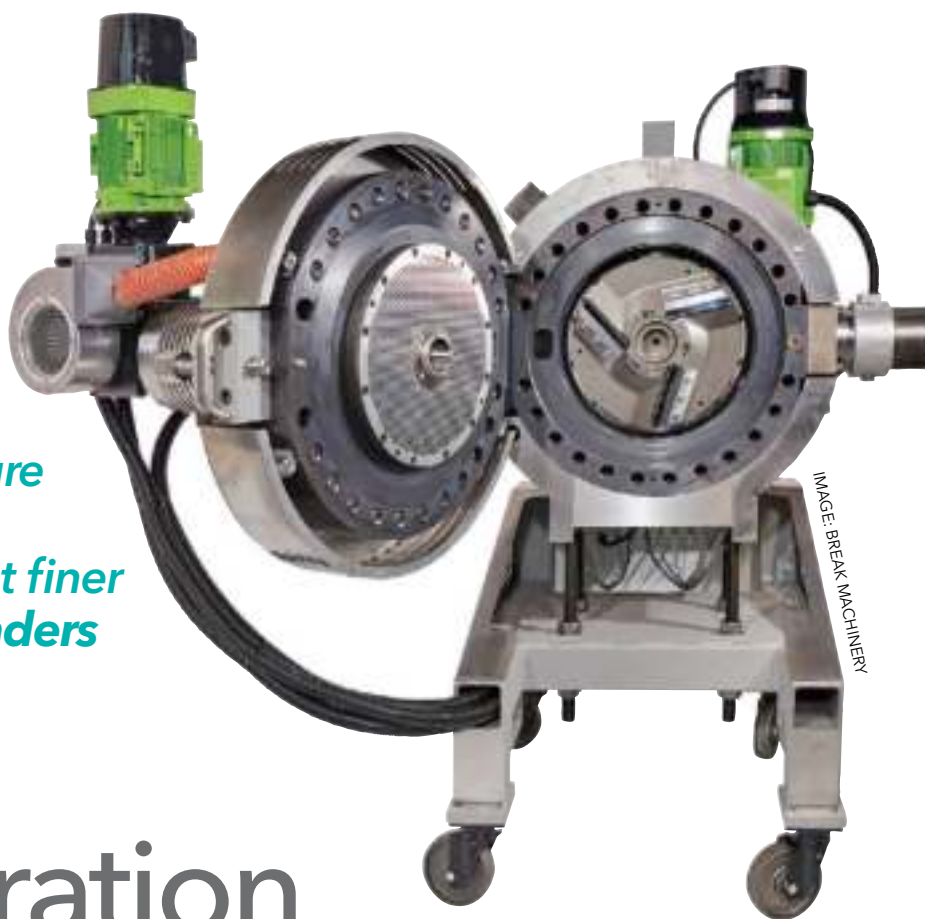
Farrel Pomini has partnered with **FPIInnovations**, a non-profit R&D organisation focused on Canadian forest products; West Fraser Timber company; and Good Natured Products, which produces bio-based rigid plastic sheet and parts, to develop wood-pulp filled bio-based and biodegradable plastic composites using Farrel Pomini’s FCM. Peng Ye, Applications Development Manager for Farrel Pomini, presented some results of the collaboration at NPE 2024. He reports that the wood pulp acts as a functional filler to improve compostability, improve heat deflection temperature, and lower cost and carbon footprint.

The FCM has been found to provide good mixing of the wood pulp into PLA, and the low temperatures in the FCM can prevent colour generation from any residual lignin that remains in the purified wood pulp, says Ye. The FCM also has efficient venting for any residual moisture in the wood pulp. The researchers were able to reduce moisture levels from 3-4% in the incoming pulp to 0.05-0.1% in the finished compound. The FCM offers 15-30% energy savings compared to a twin-screw extruder, which can help reduce product carbon footprint, Ye reports. In one trial, injection-moulded disposable knives were produced from a compound with up to 40% fibre. In another trial, thermoformed products and extruded sheets were produced at industrial scale with a version of the compound containing from 0.5% to up to 10% fibre.

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Suppliers of melt filtration systems are improving their technologies to ensure efficient removal of contaminants even at finer levels. By Chris Saunders



Melt filtration moves in new directions

The growth of plastics recycling for post-consumer packaging and its expansion into areas such as fibre production makes quality a top priority for new melt filtration technology. Rising to the quality challenge, suppliers are developing systems that also provide recyclers with greater automation, increased throughput and improved control.

“Since the early days of plastic recycling, melt filtration has been a crucial part of the process,” said Matthias Schmitz, Head of Engineering Recycling Technology at **BB Engineering** (BBE). “State of the art for decades were screenchangers and laser filters in different executions. With an increasing demand for high quality applications like melt spinning, the requirement for finer filtration is gaining importance. Filter ratings of 20 µm or finer are in operation.”

Building its reputation as a supplier to large spinning and film lines, BBE, based in Remscheid, Germany, has grown its capabilities in rPET fine filtration. It says its non-stop filtration equipment can easily be retrofitted either into existing recycling lines or directly into spinning lines to make them rPET-ready. The company said an interruption-free process is guaranteed by an easy switch-

over between congested and clean filter inserts, while its know-how and ongoing innovation result in the latest generation of candle-type filters, which are specially designed for the demands of recycled polymers.

Over 400 BBE installations are currently running around the world. The continuous filtration is available with 1.8 to 40 m² of filtration area, resulting in very low flux rates, defined as throughput per area. These are necessary to extract the finest particles down to 15 µm as well as gels or accumulations. The produced melt achieves the lowest filter pressure values, which in turn increases the performance and feasibility of subsequent processes.

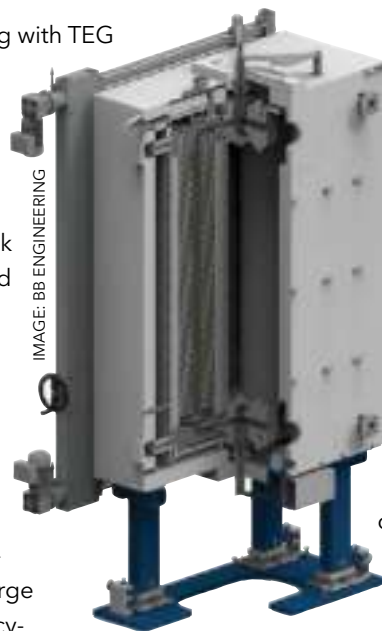
One of the latest innovations used by BBE is known as White Filter Cleaning (WFC), a pre-cleaning system for filter media and filter housings that does not use hazardous or harmful chemicals such as TEG. Instead, superheated steam is used to effectively remove residues on the filter media via hydrolysis. This treatment is not only environmentally friendly, but also improves filtration performance and extends the life of the filter media.

“With WFC, BBE is offering an ecological

Main image:
Break Machinery's Duo self-cleaning double filter system

Right: Non-stop Filter from BB Engineering

alternative to widely spread cleaning with TEG and a solution to reduce the filter cleaning costs by over 50%," said Schmitz. "WFC uses nothing but superheated steam to free the filter cartridges from polymer and contamination via hydrolysis. A quick switch over between production and cleaning reduces manpower to a minimum and guarantees reliable availability of the filtration."



of R-PET with a filtration fineness of 75 microns (200 mesh).

There was also an SFneos and a KSF model on display. These filter series also operate continuously but do not offer backflushing, so are better suited for applications that don't require self-cleaning.

The SFneos series operates automatically and is suitable for a wide range of applications including foam sheet, battery separator film, or PVC, and is characterised by a large active screen surface area and compact design, as well as providing extremely easy and safe operation.

The KSF series is designed specifically for applications with frequent material type, grade, or colour changes, as well as for high pressure applications like blown film. On this model the screen changers are compact and offer excellent value for money while permitting quick and easy functionality.

Finer filtration

Gneuss, the family-owned melt filtration specialist based in Bad Oeynhausen, Germany, has retrofitted its melt filtration systems to a large number of existing LDPE/LLDPE recycling extrusion lines. The company said it can offer complete retrofit packages consisting of a filtration system, melt pump, and integrated control system, to maintain ease of operation with minimal disruption.

Gneuss - which marked its 40th anniversary with a two-day event last November - recently worked with Spanish waste management specialist **Llorens GMR**, which mainly deals with the collection and preparation of industrial waste. As part of its operation, the Barcelona-based company has a relatively new extrusion line for reprocessing post-industrial LDPE and LLDPE waste film.

However, the original equipment was unable to remove enough critical contaminants, so Llorens decided to add an RSFgenius melt filtration system to filter out impurities down to 56-100 µm. The Gneuss system achieves this at a constant melt pressure, ensuring that gels and black specks are removed on a consistent basis, meaning

Llorens can use the material produced on this line for high value cast and blown film applications.

Gneuss describes the RSFgenius as its most sought-after model. It operates with an integrated backflushing system offering self-cleaning for very demanding applications and highest quality requirements. Screens can be re-used up to 400 times and filtration finenesses below 10 µm (1200 mesh) are available.

At the NPE Plastics show in Florida in May, the company displayed an RSFgenius 150 with an active screen area of 450 cm² (70 sq in), for 1000 kg/h (2,200 lbs)

EPS solution

Late last year, US-based advanced materials provider **Epsilyte** entered into a strategic partnership with Italian company **Fimic**, which specialises in the design and manufacture of automatic and self-cleaning screen changers and will now be responsible for supplying equipment to improve the quality and efficiency of Epsilyte's expanded polystyrene (EPS) recycling solutions. Fimic's equipment filters recycled EPS, addressing the challenge of physical contamination and ensuring that the recycled material meets the highest standards of purity and quality.

Epsilyte said its decision to choose Fimic as a partner was driven by several key factors. Specifically, it said that Fimic's equipment demonstrated exceptional versatility in handling varying types and levels of physical contamination commonly encountered in recycling EPS, while minimising the risk of damage to recycling equipment, a crucial consideration in optimising operational efficiency and reducing downtime.

"Epsilyte is committed toward a more sustainable future and demonstrates it in the investments we're making in technologies like Fimic Melt Filtration," said Epsilyte Plant Engineer DJ Harris.

Fimic offers a range of five different automatic melt filters and screw pumps, offering all possible filtration specs and covering the many different

Below: Fimic's new SPA 190 screw pump



existing applications. Its flagship RAS melt filter has reached over 530 units installed world-wide. At Plast 2023 in Milan, Fimic officially presented the latest version, the RAS 800. With a 30% larger filtering surface than the RAS 700, it allows an increase of 40% in production capacity and is the largest model of the RAS series to date.

This latest addition to the range of automatic self-cleaning melt filters allows recyclers to reach a higher hourly production capacity, with the efficiency and simplicity characteristic of Fimic's filtration technology. It is also fitted with a new radial discharge valve, and because the body is heavier than any other melt filter of this series, comes with two support arms to assist the mobile lid.

The second innovation Fimic unveiled last year was the new SPA 190, which it claims is the biggest screw pump on the market. It enables increases to the hourly production, transporting the melted plastic material from the extruder to the filter without using gears, which are sensitive to contamination and can be damaged easily.

Powerfil, the **Erema** business unit dedicated to supplying high-performance filters, offers two filter models, the Erema SW RTF (backflusher) and the Erema laser filter. Both are available in a wide range of sizes, versions and capacity options. The latest development in the company's filter technology is the new DischargePro control system which significantly increases the level of automation. It reacts to fluctuations in contamination in the input material by constantly refining and adjusting the rotational speed of the filter scraper disc and discharge screw as and when required. This ensures consistent thickening during melt filtration, which is an important parameter for a constant and economical process and ensures an optimum thickening ratio for a high proportion of filtered contaminants while minimising the proportion of melt in the filter discharge.

Discharge control

Depending on the application, material, degree, type and contamination, the new control system has the capability to reduce melt loss during filtration significantly. The company said one of the first customers to compare the DischargePro to the previous Erema laser filter control system could save around 50%. With DischargePro, operators benefit from easier operation due to higher automation and are required to carry out less adjustment work. This saves costs, as less time and labour is required.

Robert Obermayr, Head of Business Unit Powerful, said: "Efficient filtration is essential for a stable recycling process. At Erema, we can draw on 30 years of experience in melt filtration. The new DischargePro control system for our laser filter is a major step forward. It significantly increases the level of automation and makes it much easier for recyclers to master challenging filtration tasks. This applies even when highly trained personnel is missing."

ADG Solutions, a recycling equipment distributor and supplier based in Tucker, Georgia, US, has recently expand-

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IMAGE: BREAK MACHINERY



Above: Break Machinery has taken on ADG Solutions as a new distributor for its melt filters in the US

ed its product line to include **Break Machinery**. The Italian company offers a range of automatic and efficient filtration equipment and recently introduced the Duo self-cleaning double filter system. This new design is considered extremely suitable for fine or coarse filtration, and can filter heavy levels of contaminants with the help of a double screen design which achieves maximum productivity while guaranteeing high product quality.

The Duo offers a constant pressure operation to maximise line productivity with minimal waste for even the highest contaminated materials. The new geometry of the scraper disc and the innovative discharge system allows contamination to be removed in a rapid and controlled manner, while the shape of the six-blade rotating scraper disc is said to offer excellent cleaning, even at low rotational speeds, while also preventing filtered contaminants from returning into the melt. The company said the unit is simple to operate and the general design reduces cleaning and replacement times for both the filter and blades.

"We are continually looking to find the best equipment solutions to enhance our portfolio we provide to our customers," said Sandy Guthrie, ADG President. "Taking the best quality machinery and marrying that with our advanced industry knowledge allows us to help our customers transform plastic scrap into high-value raw material."

Boosting efficiency

At last year's Fakuma trade show in Friedrichshafen, Germany, **Britas Recycling Solutions**, part of the NGA group, presented the CMF-BF, its continuous

piston screen changer with backflush function which the company claims is a "clear leader" on the market. Heiko Henss, Britas CEO, said: "The loss of melt is considerably reduced [and] the process is more efficient and quicker. That means our customers save time and money."

The piston screen changer series includes four filter types, both discontinuous and continuous, which between them cover all customer requirements. Depending on the required throughputs and different operating modes, customers can choose between the discontinuous version mainly with one piston, and the continuous version with two pistons.

By virtue of optimal design of the melt channels, filters, and breaker plate geometries, deposits and black spots are mostly avoided and the CMF-BF can clean the filters automatically. In an attachment module, there are two backflush pistons which facilitate an automatic backflush procedure. During a filter change, one of the two pistons is moved into a backflush position and the melt inlet of the corresponding filter is interrupted. A small melt flow of the material, which has already been cleaned, is separated and guided backwards through the filter. This procedure is repeated automatically for the second filter. The CMF-BF is available with fluid heating, steam heating, or as a high-temperature version.

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Compounding World May 2024

The May 2024 issue of Compounding World has articles about innovations in bio-based fibres and fillers, compounds for 3D printing, developments in the wire and cable sector and new compatibiliser additives. Plus a preview of the NPE 2024 exhibition.

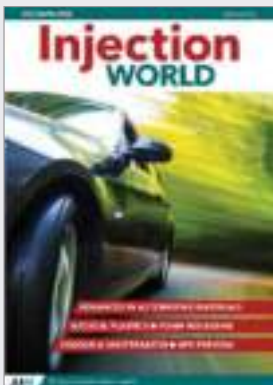
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Compounding World April 2024

The April edition of Compounding World magazine has feature articles about innovations in compounds for medical applications, the benefits of processing aid and lubricant additives, new polyamide additives and options for impact modification.

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Injection World May/June 2024

The May-June 2024 issue of Injection World has features on automotive materials, colour and masterbatch, medical plastics and foam moulding technology. Plus there is a preview of NPE 2024 giving a guide to key exhibitors in injection moulding.

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Plastics Recycling World May/June 2024

The Plastics Recycling World May-June issue has a cover feature on the growing number of developments in post-industrial recycling, plus articles on compatibilisers and new shredding technology demonstrated at the NPE 2024 show.

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Pipe and Profile Extrusion Spring 2024

The Spring 2024 edition of Pipe and Profile Extrusion magazine has features looking at the latest polyolefin pipe materials, melt filtration, and process control developments. Plus, a preview of the US NPE plastics show.

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Film and Sheet Extrusion June 2024

Film & Sheet Extrusion's June 2024 edition has a lead feature that looks at the sustainability efforts in stretch and shrink film, particularly related to recycling. Features also cover film printing, blown film dies and masterbatches.

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GLOBAL EXHIBITION GUIDE

2024	26-28 June	Central Asia Plast World, Almaty, Kazakhstan	https://plastworld.kz/?lang=en
	11-12 September	Compounding World Expo EU, Brussels, Belgium	https://eu.compoundingworldexpo.com/
	23-27 September	Colombiaplast, Bogota, Colombia	www.colombiaplast.com
	24-28 September	TaipeiPLAS 2022, Taipei, Taiwan	https://www.taipeiplas.com.tw/en/index.html
	8-11 October	Plastex, Brno, Czech Republic	www.bvv.cz/en/plastex/
	15-19 October	Fakuma, Friedrichshafen, Germany	www.fakuma-messe.de
	13-14 November	Compounding World Expo US, Cleveland, OH, USA	https://na.compoundingworldexpo.com/
	4-7 December	PlastEurasia, Istanbul, Turkey	https://plasteurasia.com/en
2025	11-14 March	Plastimagen, Mexico City	www.plastimagen.com.mx
	24-28 March	Plástico Brasil, São Paulo, Brazil	www.plasticobrasil.com.br
	6-9 May	Moulding Expo, Stuttgart, Germany	https://www.messe-stuttgart.de/moulding-expo
	7-8 May	PlastTeknik Nordic, Malmö, Sweden	www.plasttekniknordic.com
	27-30 May	GreenPlast, Milan, Italy	www.greenplast.org
	8-15 October	K2025, Dusseldorf, Germany	www.k-online.com


AMI CONFERENCES

11-12 June 2024	Polymers in Cables, Philadelphia, PA, USA
25-26 June 2024	Rigid Packaging, Cincinnati, OH, USA
23-24 July 2024	Polymers in Footwear Portland, OR, USA
17-18 Sept 2024	Bioplastics, Cincinnati, OH, USA
24-26 Sept 2024	PVC Formulation Europe, Düsseldorf, Germany
8-9 October 2024	Polyolefin Additives, Barcelona, Spain
21-23 October 2024	Executive Summit, Savannah, GA, USA
23-24 October 2024	Plastics Recycling Technology Vienna, Austria

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

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