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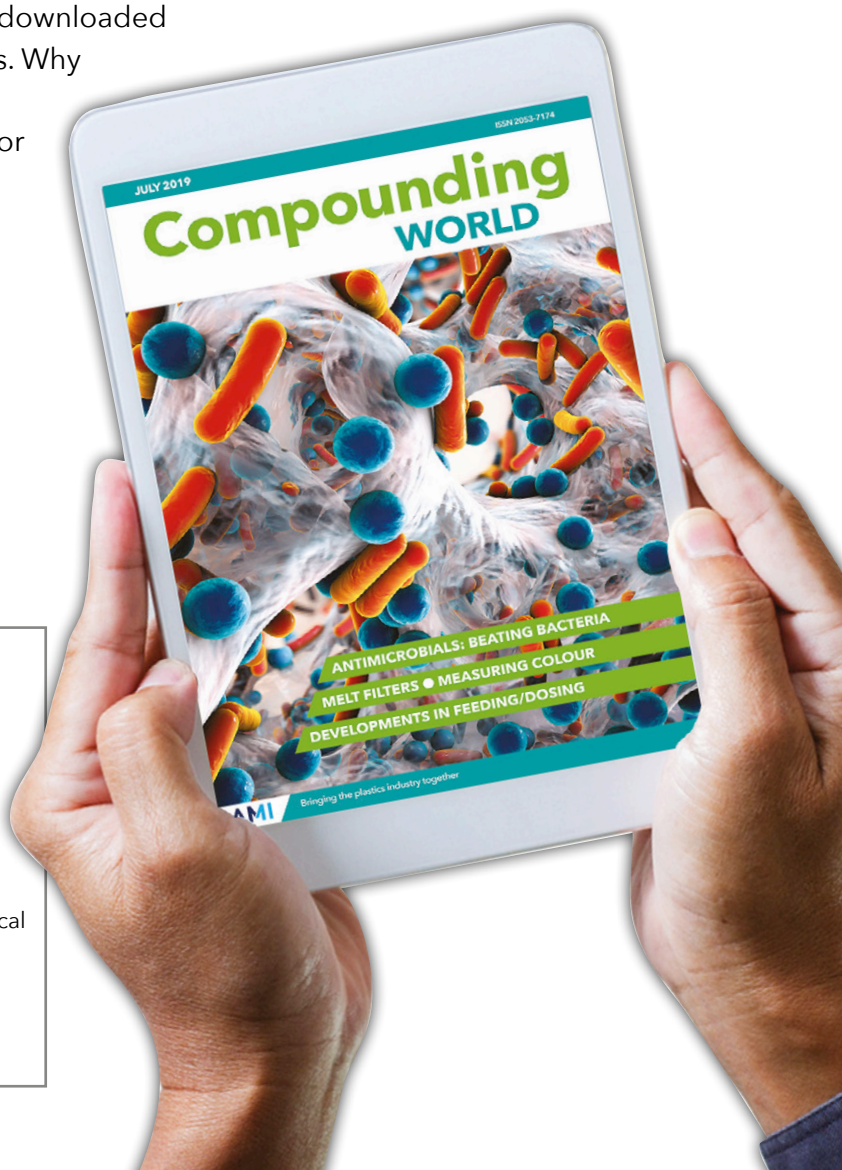

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extruders.leistritz.com

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COMING NEXT ISSUE

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It will be free-to-attend for compounders, masterbatch makers, plastics processors and end-users around the world. They will learn how mineral and synthetic fillers can add functionality and improve the profitability of their polymer materials and products.

The event will cover the latest development in functional fillers and their applications, as well as advances in coupling agents, plus processing tips for increasing filler loadings and dispersion.

Register your free* place today

**All applications for free places will be vetted by AMI to check that they meet our qualification criteria. AMI reserves the right to refuse access to individuals and companies*

Lati and Star Plastics align for US growth

US-based custom compounder Star Plastics has established an alliance with Italian technical compounder Lati allowing it to market the latter's full product line in the North American market.

Star Plastics Director of Sales Chuck Hoop said the relationship "is a great fit with complementary product lines in parallel markets." He said the combination of Lati's PA and specialty compounds with Star's own PC, ABS, and PC alloy flame retardant materials will create new opportunities for both.

Star said the partnership aligns strategically with its current North American and Asian customer base in the electrical, electronics, and appliance markets, as well as other engineering applications.

Lati material grades that will be available through Star Plastics include flame retardant, lubricated, antistatic, conductive, and other high-performance products.

Initially, Star will be supplying product manufactured in Italy and will put in place a US stocking programme to provide fast delivery to local customers. Looking ahead, Hoop said the companies are developing plans to compound Lati products in the US. He also sees Lati representing and potentially producing Star products in Europe.

Lati generates annual sales of around €130m; Star Plastics sales amount to around $70m, according to independent data.

Lati Sales Director Vittorio Gerola said the company has previously operated local distribution agreements in the US but that they were much more limited in scope than its alliance with Star. "We hope to generate significant growth in the US market through this collaboration by leveraging on the local presence of Star in the same market sectors," he said.

› **www.starplastics.com**
› **www.lati.com**

Nexam tackles odours

Nexam Chemical's Performance Masterbatch business unit has developed a series of multifunctional odour scavengers that can neutralise odours and revive the original properties, such as viscosity and stability, of recycled plastics.

The scavengers can be used in a range of polymer materials and application areas, including PE from food packaging or plastic bags where unwanted odours remain through the regular recycling process, as well as PP, PP-PE combinations, PA and other polymers.

› **www.nexamchemical.com**

Sysplast grows with Leistritz

German recycling specialist Sysplast has invested in a new compounding line for its plant at Nuremburg in Germany, where it produces recycled compounds based predominantly on ABS and styrenic blends.

The line, which is assembled around a ZSE 60 Maxx twin-screw compounding extruder from Leistritz Extrusionstechnik, will increase the company's production capacity for ABS regranulate by 4,800 tonnes/year.

› **www.leistritz.com**

Akro-Plastic set for direct sales

KD Feddersen's compounding subsidiary Akro-Plastic is taking on sales and distribution of its full product line, including its Akromid, Akrolen, Akrotek and Precite brands, from the beginning of this year.

Akro-Plastics products have formerly been handled via KD Feddersen's channels. Customers in Germany and China will be serviced directly immediately; conversion of other European customers to direct supply will take place during this year.

"The strategic repositioning of the business areas plastics production and plastics distribution in the market is intended to secure the potential for success and create the best possible conditions for the further development of the group as a whole," said Volker Scheel, Managing Director of KD Feddersen Holding.

IMAGE: AKRO-PLASTIC

Above: Automotive ventilation blades moulded in Akro-Plastic's Akromid PA

Akro-Plastic provides a full range of technical compounds, although it is perhaps best known for its polyamides. KD Feddersen said it will continue to offer PA products and is working to extend its portfolio with offerings from other manufacturers.

› **www.akro-plastic.com**
› **www.kdfeddersen.com**

JV partners reshape in POM

Celanese and Mitsubishi Gas Chemical (MGC) are planning to restructure their POM joint venture company, Korea Engineering Plastics (KEP), by the end of 2021.

KEP, which makes POM for the Asian market, is 50% owned by Celanese, 40% by MGC and 10% by Mitsubishi Corporation. The new plan sees KEP focus on manufacturing while the two main parent companies will independently market the products without restriction.

The JV partners said the change is a necessary response to globalisation of the POM industry and fragmentation of the marketing supply chain since KEP was set up in 1987.

› **www.mgc.co.jp/eng**
› **www.celanese.com**

BASF compounding cuts

BASF has announced plans to permanently end compounding at its location at Leuna in Germany as part of a review of its global Ultramid polyamide business.

The company said the site will be closed by the end of April next year, with activities transferred to its compounding units at Ludwigshafen, Rudolstadt and Schwarzheide (the latter was expanded in 2017).

"Although business performance in recent months has been encouraging, sales and earnings in the Ultramid business have been declining for several years," said a BASF spokesperson. "Our strategy is to continue to expand Performance Materials' business in Europe profitably in the long term."

Negotiations have been initiated with the Leuna works council over the future of the unit, which almost exclusively compounds Ultramid PA grades and employs around 100.

BASF's global annual compounding capacity for engineering plastics – PA and PBT grades – currently amounts to 750,000 tonnes.

› **www.basf.com**

Lease option from Bausano

Italian extrusion systems maker Bausano has introduced an operating lease financing scheme covering its twin screw granule production systems, which are commonly used for production of PVC compound for markets such as medical.

Bausano Marketing Manager Alessandra Grosso said the operating lease model is especially appropriate for granule production lines, which are highly standardised. It is said to offer an affordable option for companies looking to update or expand capacity without resorting to finance agreements or extending lines of credit.

The Bausano scheme involves payment of a fixed periodic fee that covers the entire line aside from cylinder and screws, which are bought outright.

"This is a new kind of service that we decided to offer so we can remain even closer to our customers in this particular time," said Grosso. "Granules perfectly respond to this need as a product with extreme versatility which can be resold to those who deal with it, for example, moulding in the medical sector."

› **www.bausano.com**

Völpker launches into purging compounds

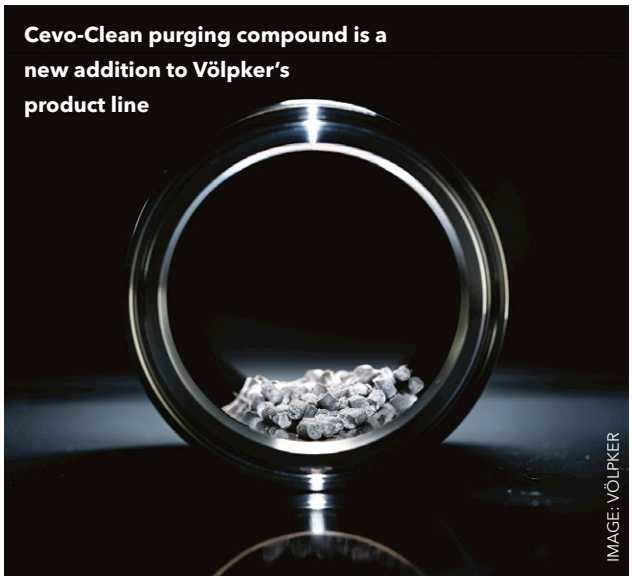
Germany's Völpker Spezialprodukte, best known for its wax-based process aids, has entered the purging compound market with the launch of Cevo-Clean J-1819.

The company said the new purging compound is an internal development and can be used to remove polymer deposits and residues at processing temperatures up to 360°C.

Described as a "one-for-all" grade, it functions through a combination of chemical and physical action and is typically used as a 1:3 blend with the polymer being processed. The purged extrudate can be regranulated and re-used several times.

Völpker Head of Business Development Lutz Matthies expects the new compound to appeal to compounders. "We are convinced of the quality of this product and are sure that it will be very useful for the compounding community. As it is also very price effective and user friendly…fast growth is expected," he said.

› **www.voelpker.com**



Cevo-Clean purging compound is a new addition to Völpker's product line

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IN BRIEF...

German compounder **PETEC Rust und Brune** has taken delivery of a new plantetary roller extruder from **ENTEX Rust & Mische** at its plant at Bochum. The TP-WE 150/5400-M6 is equipped with six modules that can be configured for a variety of applications, including compounds with heavy filler loadings, natural fibre products, preparation of recyclates, and reactive extrusion.
www.petec-cs.de
www.entex.de

Beon3D is a new line of PP compounds from **Lyondell-Basell** formulated for additive manufacturing applications. The grades are said to combine easy processability in extrusion-based 3Dprint manufacturing equipment with high hydrophobicity, good acoustic and optical performance, high dimensional stability and high surface quality.
www.lyondellbasell.com

Zeppelin buys MTI Mixers

IMAGE: ZEPPELIN SYSTEMS

Above: Detmold, Germany-based MTI is now part of Zeppelin Systems

German plant engineering group Zeppelin Systems has acquired mixing machinery maker MTI Mischtechnik, which went into administration in October last year.

Zeppelin said the deal includes MTI's product line, employees and its plant at Detmold. It said the business will continue to manufacture at Detmold but will be integrated with Zeppelin's Kassel-based Mixing Technologies division, which was established in 2009 through the acquisition of Reimelt Henschel and is headed by Dr Stephan Poller.

MTI Managing Director and former owner Christian Honemeyer has not joined Zeppelin.

"With this acquisition, we are further expanding our market position in mixing technology," said Rochus Hofmann, Managing Director of Zeppelin Systems. "MTI has great products and an excellent service concept that will benefit us and our customers."

Hofmann said the MTI product range complements its own. "The overlap of the portfolio is small," he said. MTI has a particularly strong presence in the European and US PVC mixing market; Zeppelin is stronger in the powder coating, compounding and masterbatch sectors.

MTI sales amounted to around €7m in 2018. A spokesperson for Zeppelin said it did not expect the business to reach that level this year but said it estimates the acquired business will expand its Mixing Technologies sector sales by around 25%.

› **www.zeppelin.com**
› **www.mti-mixer.de**

Polyplastic adds two more lines in Russia

IMAGE: R&P POLYPLASTIC

Above: R&P Polyplastic is installing two more lines at its Engels plant in Russia

Russian compounder R&P Polyplastic is investing more than €3.3m to expand capacity at its plant at Engels in Russia. Two new lines based on KraussMaffei ZE 80 42D BluePower twin-screw extruders will be installed this year, with an expected start date set for the autumn.

Polyplastic says the move is a response to growing demand for engineered compounds in Russia. It will use the new lines to manufacture products for the construction industry.

"Faced with a continuously increasing demand, we have to ensure energy-efficient and resource-conserving production while meeting the ever more exacting quality standards requested by our customers," said Director Andrej Menschov.

› **www.polyplastic-compounds.ru**
› **www.kraussmaffei.com**

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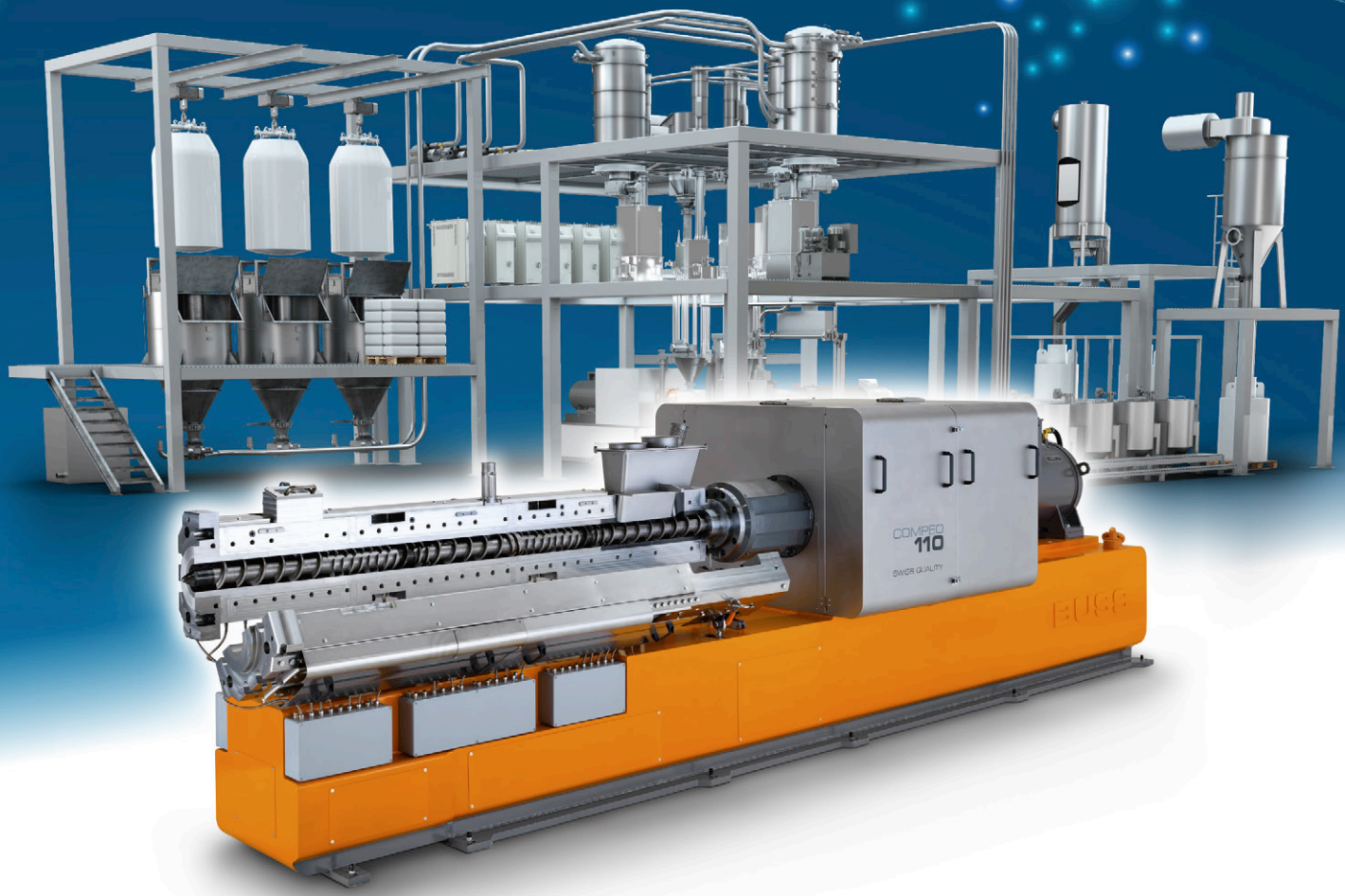

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www.busscorp.com

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Ascend buys Eurostar

Integrated PA66 producer Ascend Performance Materials has added to its global compounding footprint with the acquisition of Eurostar Engineering Plastics, a specialty compounder located at Fosses, some 30km north of Paris in France, with a particular strength in halogen-free flame retardant compounds.

Ascend Vice President Europe, John Saunders, said that Eurostar's experience in compounded PA fits well within its own portfolio and manufacturing capabilities. "Their Starflam [flame retardant] materials are enabling the transitions to clean energy and transportation, and smarter devices," he said.

Ascend said Eurostar brings a full portfolio of UL yellow card certified flame-retardant, water contact and thermally conductive engineered plastics. It believes such

IMAGE: ASCEND PERFORMANCE MATERIALS

Above: Ascend Vice President Europe John Saunders

materials will play an integral role in future application areas such as e-mobility, as well as smart appliances, industrial automation and consumer electronics.

"Combining our portfolio and application development expertise with Eurostar's portfolio immediately provides our customers with a bigger toolchest to produce safer, more reliable parts at higher and more constant voltage loads," said Steve Manning, Ascend's Senior Director for Engineered Plastics.

The acquisition is the latest in a series of moves by Ascend to extend its global footprint and technology scope. Last summer, it acquired the compounding operations of NCM (Changshu) and Tehe Engineering Plastic (Suzhou) in China, giving it a first production foothold in Asia.

Earlier last year, Ascend added a second European compounding location when it bought the Esseti Plast and Poliblend compounding operations from Italy's D'Ottavio Group. That move provided it with 5,000 tonnes/yr of masterbatch and 35,000 tonnes/yr of engineering plastics capacity. It made its first European move in 2016 with the purchase of Netherlands-based BTP, which had capacity of 32,000 tonnes/yr.

› **www.ascendmaterials.com**

SKZ leads conductive research

Germany's SKZ plastic centre is working with Fraunhofer IKT and Centexbel on a two-year project to develop novel thermally and electrically conductive compounds.

The TECMAT (Thermally and Electrically Conductive fibre and plastic Materials) project aims to avoid the usual need for high loadings of functional fillers, which have a knock-on effect on flow and processing properties, in favour of a new approach that uses the basic immiscibility of polymers to modify conductivity.

SKZ said this "coalescence" approach allows areas within the polymer matrix to be deformed to create a conductive network during processing into components or fibres.

› **www.skz.de**

SABIC extends its radar sensor options

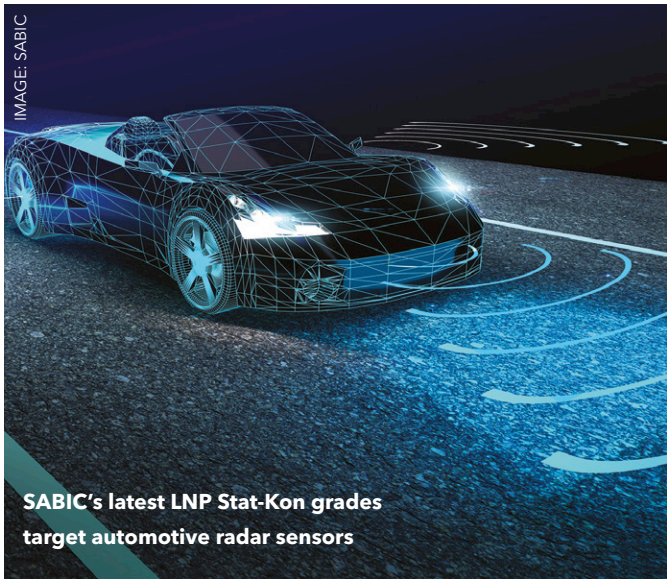


IMAGE: SABIC

SABIC's latest LNP Stat-Kon grades target automotive radar sensors

SABIC has introduced two new PBT-based radar-absorbing LNP Stat-Kon compounds for automotive radar sensor applications, easing integration with PBT-based radomes.

Radar-absorbing materials are used to shield the field of radar transmission and attenuate side waves in advanced driver assistance systems (ADAS), increasing detection range and improving signal resolution.

The new compounds provide absorption of 67% at 77GHz. They are said to complement and extend the company's radar-absorbing offering, which also includes PC and PEI-based compounds.

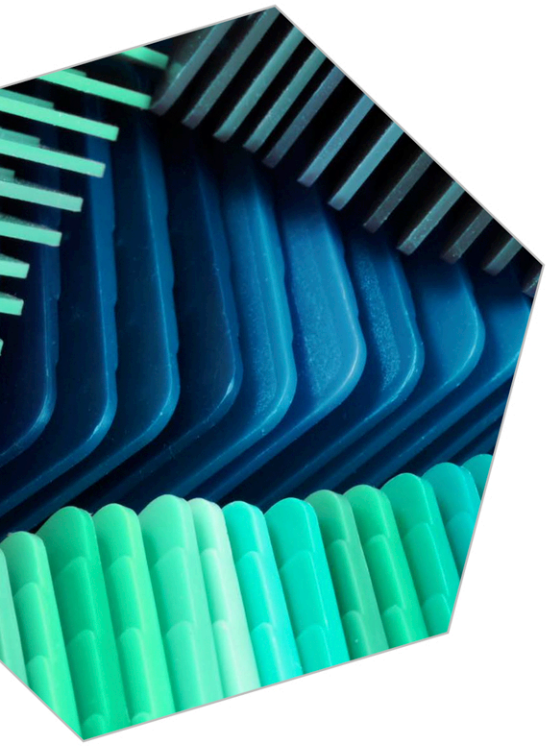
"A broader choice of radar absorbing LNP Stat-Kon compounds can help manufacturers to increase flexibility in sensor positioning and function and to help design sensors that can be optimised for vehicle size and other variables," the company said.

› **www.sabic.com**

www.ami.international/market-reports

MARKET REPORT

The Global Market for PP Compounds 2020



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IN BRIEF...

Ineos Styrolution has broken ground on its 600,000 tonnes/yr ABS plant at Ningbo in China. The site, which was selected for its access to feedstock supply options and connection to customers, is expected to be operational by 2023.
www.ineos-styrolution.com

Farrel Pomini is currently building an 18UM Continuous Mixer with a nominal production rate of 40 tonnes/hr at its plant at Ansonia, CT, US, for installation at a major US producer of PE polymer. The 18UM model is said to be very well suited to mid-range HDPE and LLDPE finishing.
www.farrel-pomini.com

Avient has announced plans to equip an existing facility in Singapore with a new production line to meet growing demand for speciality pre-coloured, medical grade Mevopur polymers in the Asia-Pacific region. The line will complement similar capabilities in North America and Europe when it goes onstream in Q2.
www.avient.com

Swedish firm **Polygiene**, a specialist in soft material odour control technologies, has acquired **Addmaster**, the UK-based supplier of antimicrobial additives for plastic compounds sold under the Biomaster brand for SEK374m (€37m).
www.polygiene.com
www.addmaster.co.uk

Plastics associations say market 'on turn'

Germany's plastics and rubber machinery industry association, VDMA, said in December this year's downward trend in orders has flattened out with evidence of an upturn in September and October 2020 (the latest months for which figures are available).

Like every other part of the economy, the plastics machinery industry was badly affected by the Covid-19 pandemic. However, VDMA said the situation began to improve in mid-2020 and, cumulatively, from January to October 2020, incoming orders were just 3% below the first ten months of 2019. It said September saw a 13% year-on-year growth in incoming orders, with order books for October standing at twice the level of the same period in 2019.

"This means the German plastics and rubber machinery industry is about to turn the corner," said Thorsten Kühmann, VDMA Managing Director. "It gives us confidence to see that companies have adapted to the challenges better and better over the course of the pandemic. Business is up and running again."

IMAGE: VDMA

VDMA Managing Director Thorsten Kühmann

Total sales for 2020 are still expected to end up 10-15% down on 2019, as these lag well behind orders. However, for 2021 and 2022 the association expects to see respective sales growth of 5% and more than 10%, setting the industry on the path to return to pre-crisis levels in 2023.

Meanwhile, PlasticsEurope's latest annual report, 'Plastics: The Facts 2020', has identified similar trends in production and demand for materials. After a "sharp drop" in the first half, it said production started to recover in the second. "We expect the recovery to continue in the last quarter of 2020 and during 2021, while pre-crisis levels of production will probably not be reached before 2022," the association said.

› **www.vdma.org**
› **www.plasticseurope.org**

European plan targets pellets

PlasticsEurope and EuPC (which represent European plastics resin producers and processors respectively) have agreed to jointly develop a certification aimed at controlling pellet loss across the plastic supply chain system by 2022.

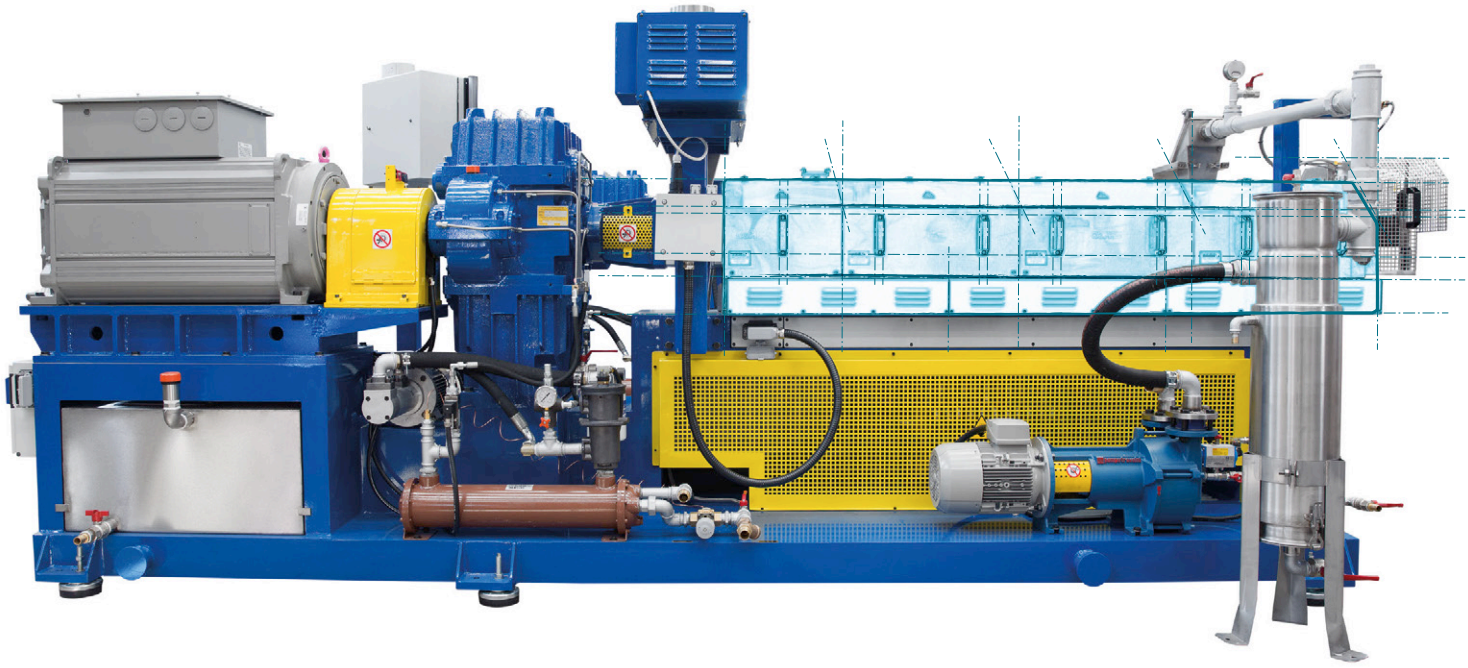
All signatories will be audited regularly by accredited third parties to establish their compliance with the requirements of PlasticsEurope's Operation Clean Sweep (OCS), developed to tackle pellet leakage.

PlasticsEurope made OCS compliance compulsory for its entire membership as of 1 January 2020. Around 1,200 entities have signed up to it to date, including three major European ports that handle plastic pellets: Cartagena and Tarragona in Spain and Felixstowe in the UK.

› **www.opcleansweep.eu**

IMAGE: SHUTTERSTOCK

New European pellet initiative could be in place by next year



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Domo Chemicals sells film to up focus on PA

Germany's Domo Chemicals is to sell its Italy-based Domo Films Solutions (DFS) business to the European subsidiary of India's Jindal Films. The deal is expected to close in Q1, subject to required regulatory approvals.

According to Domo Chemicals CEO Yves Bonte, the move will allow the company to "concentrate in its competence area of polymers and engineered materials."

Domo bolstered its polyamides business in 2019 with the acquisition of Solvay's PA66 production activities in Europe, sold by BASF to gain regulatory approval for its acquisition of Solvay's global polyamide activities.

IMAGE: DOMO CHEMICALS

Above: Domo Chemicals CEO Yves Bonte

That move roughly doubled the size of Domo's polyamide polymers and compounds activities and included the Technyl product line (albeit with a time-limited restriction to Europe.) This month Domo announced it was preparing to rebrand all of its PA products under the Technyl banner and commence global sales from February 2022.

DFS is one of the largest European producers of biaxially oriented and cast PA films for flexible packaging in the food, pharma, medical and other industrial sectors. Jindal said the business will complement its existing capabilities in polyolefin-based films for the pharma, medical and other high end flexible packaging segments.

› **www.domochemicals.com**

Barlog re-merges design unit

German compounder and distributor Barlog Plastics has re-integrated its standalone materials formulation company Bahsys.

"Bahsys GmbH was founded around 12 years ago as an independent company in order to sharply separate the service competence bundled in it from the previous materials business", said Boris Korlatzki, Commercial Director of Barlog Plastics. "However, it turned out that the offers of both companies had to be much more closely intertwined in the interest of our customers than initially thought."

› **www.barlog.de**

Plast/NPE shows hit by Covid

The ongoing Covid pandemic continues to impact the global plastics exhibition calendar, with NPE, the biggest show in the US, now cancelled and Italy's Plast fair postponed.

US-based Plastics Industry Association, organiser of NPE, announced earlier this month that it had decided to cancel the event, which takes place every three years and was due to take place in Orlando in Florida on 17-21 May this year. The US show typically attracts close to 55,000 visitors and more than 2,000 exhibitors.

Meanwhile, in late December last year, Plast show organiser Promaplast announced that the 2021 event in Milan, Italy, was to be rescheduled from 4-7 May to 22-25 June. The show also takes place on a three-year cycle and attracts around 50,000 visitors.

› **www.npe.org**

› **www.plastonline.org**

IMAGE: USEON

This Useon extruder is in production in Russia

Useon delivers in Russia

Chinese extrusion machinery maker Useon commissioned a twin screw compounding system last year for a Russian producer of polyolefin steel pipe coating materials.

The line is built around an Useon SAT series 175mm diameter extruder with a 1,850kW Elin motor, Siemens drive and Zambello gearbox. It provides an output of 5 tonnes/hr.

The complete line includes storage silos, seven-component Brabender loss-in-weight feeding system, melt filter, BKG underwear strand pelletiser, classifier, and packaging equipment.

› **www.useon.com**

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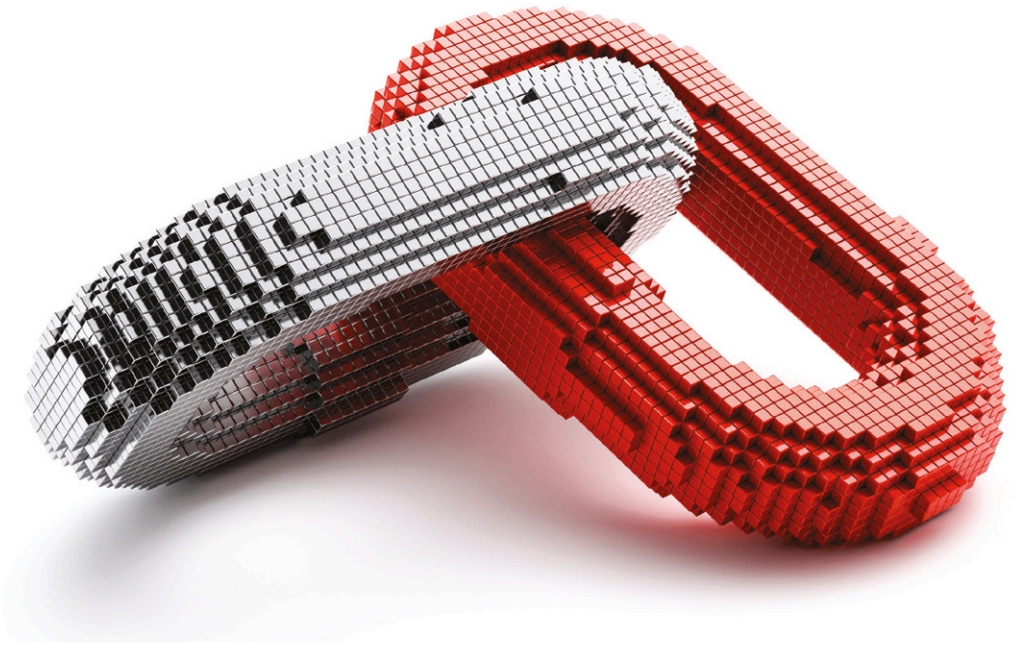

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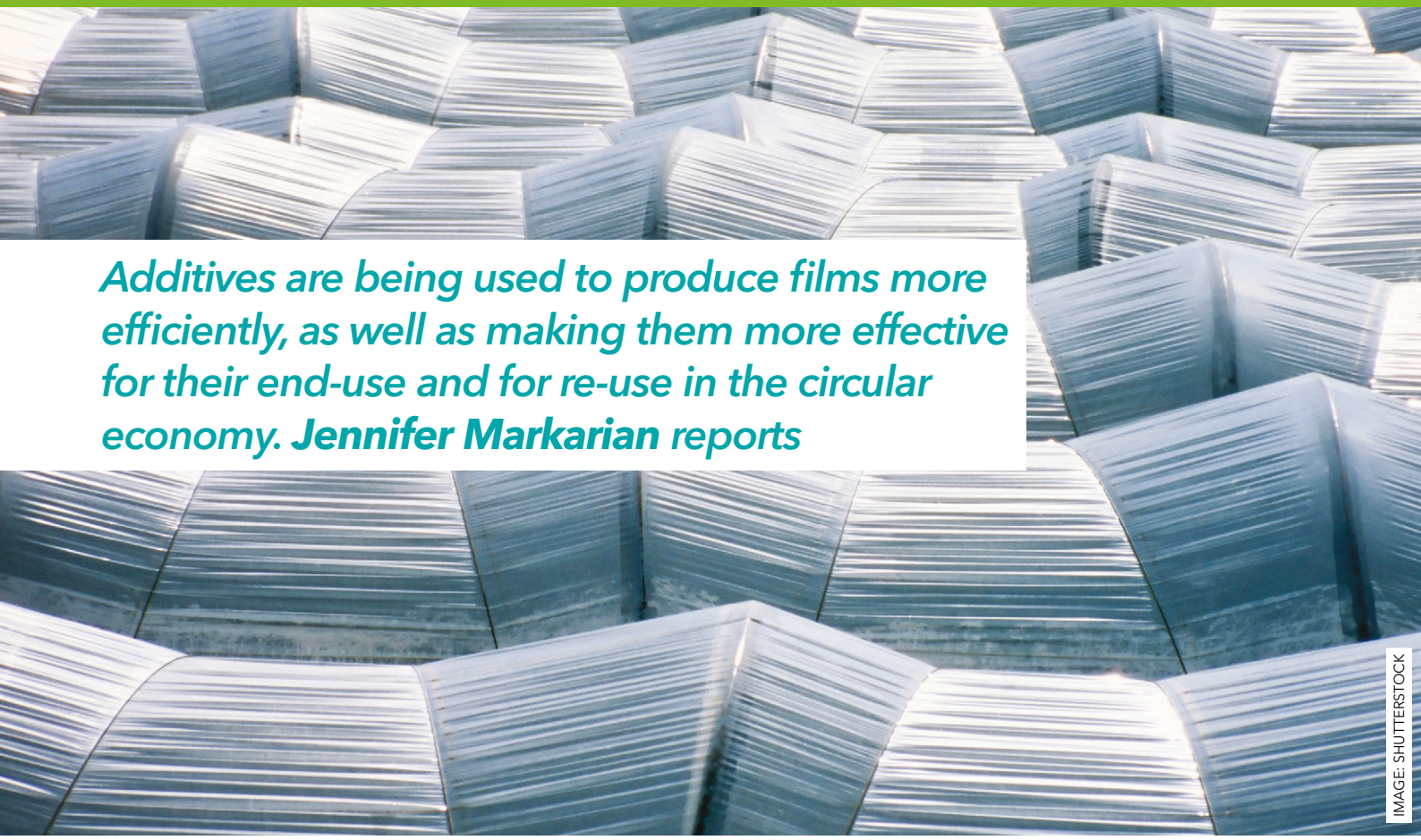

Additives are being used to produce films more efficiently, as well as making them more effective for their end-use and for re-use in the circular economy. Jennifer Markarian reports

IMAGE: SHUTTERSTOCK

Adding performance to films

Polymer films rely on an extensive variety of additives to enable them to be processed faster and made thinner, and that ensure good surface properties and high strength that lasts as long as necessary. In such a competitive and demanding area such as film production, additive suppliers and masterbatch producers have become experts at listening to the voices of their customers to identify where additives can be tweaked to help even more for a particular application. From greenhouse films to high barrier packaging, new and improved additives are playing their part in more efficient production and enhanced performance. And, because films are often components of single-use packaging or other disposable products, they are also being used to improve recycling and to enhance the processability of recycled materials.

Greenhouse films depend heavily on additive technologies, including antifogs and stabilisers, to deliver optimal film performance that creates the right conditions of light for plants while holding up under harsh environments where the film is exposed to weather and chemicals. Additives that protect the films from degradation due to ultraviolet light include UV light absorbers (UVA) and hindered amine light stabilisers (HALS).

Film applications in "plasticulture" continue to grow, according to **BASF**, which cites uses such as netting and substrate bags in addition to greenhouse and tunnel films. In November last year, the company completed construction of a new manufacturing plant for its high molecular weight NOR technology thermal and light stabilisers for agricultural films at its existing site at Pontecchio Marconi in Italy. The new facility will use digital technologies such as remote maintenance and troubleshooting and has been designed for energy efficiency. The Pontecchio site produces HALS and NOR HALS additives, as well as being the location for BASF's global testing hub for agricultural applications and its regional weathering center.

During AMI's Agricultural Film Virtual Summit in October last year, Hanna Schwartz, R&D Manager at **Kafrit Group**, explained that greenhouse films must have high chemical stability to resist degradation when in contact with pesticides and fumigants. In field trials, the company has examined the resistance to sulphur, commonly found in agrochemicals, of several UVA masterbatches and said it has found that its proprietary UV masterbatches showed equivalent or better performance to typical NOR or nickel and HALS-based UV stabilisers. She said it had also seen good results using experimental UV masterbatches for PE films designed to

Main image: "Plasticulture" applications such as greenhouse films are driving demand for performance enhancing polymer additives

withstand chlorine-based insecticides and outdoor weathering (Figure 1).

Schwartz said that some specialised greenhouse films require only partial UV absorption. She cited, for example, growing of plants that require UV for colour development or for greenhouses that use bees for pollination. The company's new masterbatches – UVA 00021 LD and UVA 07920 LD – are designed for such uses (the 07920 LD grade is said to be based on a novel technology).

Meanwhile, a new long-lasting antifog masterbatch from Kafrit Group – AF 00854 LD – is recommended for production of the core and internal layers in three-layer greenhouse film structures. Accelerated testing simulating both hot and cold climates predicts that the antifog effect will prove durable for at least two seasons, which the company says is among the longest currently on the market. The masterbatch also has lower haze for more transparent films.

Oriented to quality

Biaxially oriented polypropylene (BOPP) is widely used in flexible packaging, and ongoing demands for "faster, cheaper, thinner" continue to be the drivers for improvements. "Quality and consistency of quality is one of the most important criteria, because BOPP are very thin films manufactured at very high speed," says François Thibeau, **Ampacet**'s Strategic Business Manager, Films in Europe.

One specialised need in the BOPP area is additives that enhance cavitation, which Thibeau explains as "the process of delaminating polypropylene at the interface with particles under the action of stretching."

Ampacet's PEARL portfolio of cavitation masterbatches for BOPP includes both organic and inorganic options. PEARL 368 is a new organic cavitation masterbatch that yields consistent cavitating efficiency across the full web width of the widest BOPP line, according to Thibeau. "It was designed to enable extended run times between die cleanings and requires lower addition rates than other organic cavitating masterbatches," he says. Organic cavitation masterbatches are said to offer higher gloss and better mechanical properties and enable higher film yields (square metres of film for a defined weight) compared to inorganic alternatives such as calcium carbonate.

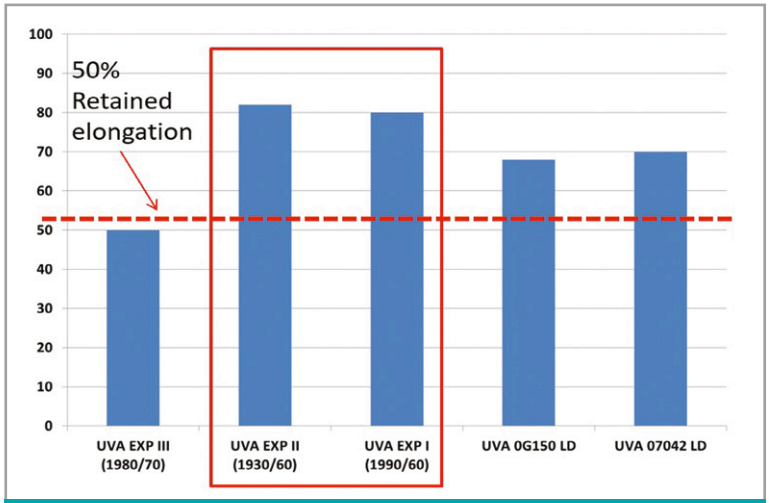

Figure 1: Outdoor weathering performance of 100 micron PE films containing different Kafrit UV stabilisers exposed to monthly hypochlorite or acetamiprid insecticide spraying measured by retained elongation (UVA EXP I and UA EXP II are experimental grades) ***Source: Kafrit***

IMAGE: BASF

Above: BASF has expanded capacity for production of its high molecular weight NOR light stabilisers at its Pontecchio Marconi location in Italy, which is its global testing hub for agricultural applications

Matt compounds for the outer layer of a BOPP film are supplied as compounds rather than masterbatches as they must provide a high level of homogeneity to ensure the matt finish is uniform after stretching. Sealing properties are also critical. Ampacet's latest MATIF matt compound – MATIF CSR 330 – is designed for producing good cold seals for packaging heat-sensitive products. The silicone-free compound provides good release performance, including smooth unwinding and prevention of transfer of adhesive to the wrong side of the film.

Biaxially oriented polyethylene terephthalate (BOPET) films are used as part of multilayer, multimaterial packaging structures because of their good tensile strength and high gas barrier. These multimaterial films are difficult to recycle, however, so some companies are seeking to replace them with mono-material alternatives. Biaxially oriented polyethylene (BOPE) films are making an entrance in all-PE constructions, in some cases replacing BOPET or BOPP as brands and packaging companies look to improve recyclability. ❯

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IMAGE: TOSAF

Above: Stand-up pouch with a paper-like feel and good printability produced in a mono-material PE laminate using Tosaf's latest MATT masterbatch

Mono-structures

Masterbatch suppliers have introduced a range of products to support the manufacture of BOPE mono-material film structures. **Tosaf** has introduced a portfolio of BOPE masterbatches that include slips, antiblocks, antistatics, and antifogs. "We have several products for monomaterial all-PE solutions that give the same optical, mechanical, and chemical resistance as BOPP/PE laminates," says Michal Schreiber, Product Manager for Flexible Packaging Applications at the company.

"We're seeing BOPE and machine-direction oriented (MDO) PE in both blown and cast films being used, and we have masterbatches for each of these specific types," Schreiber says. She adds that some film processors are switching from BOPET structures to structures with two PE film layers, which in some cases use a layer with a matt surface for reverse printing and then laminating.

Tosaf's latest matt additive for polyolefins is a blend of polymers that is used to create a thin skin layer on a film. "A matt surface has a paper-like feel and is associated with luxury products," says Evgeni Zelikman Chief innovation Scientist at Tosaf.

"We can reach a higher level of quality and transparency with this blend of polymers than with mineral-based matt additives," Schreiber adds. She also says that the thermal resistance of Tosaf's MATT allows its use as an external layer without being laminated to BOPET or BOPP. The matt additive also results in a high surface tension that supports printing and adhesion of a clear lacquer layer.

Right: Many film additives are used to modify surface properties such as coefficient of friction and wetting, says Tosaf

Optimised surfaces

Surface properties are important for many aspects of film performance. For reliable processing in packaging machinery, for instance, a consistent coefficient of friction (COF) is highly desirable. Tosaf has developed a permanent, non-migrating slip additive mastertbatch that is intended to provide better control of COF than migrating, plant-based alternatives, according to Zelikman.

"The unique proprietary chemistry is a combi-batch of antiblock and a slip that provides a stable COF specifically for PE films. A synergistic effect is created during masterbatch production," he says. The masterbatch is said to be finding use in heavy-duty bags, where sealing is critical, and also in antifog films. "Obtaining a low COF in an antifog film is a challenge because traditional slips compete with the antifog on the surface. This masterbatch provides good COF without damaging the antifog effect," Zelikman says.

Antistatic additives for films are available in a wide range of migrating and non-migrating chemistries. One of the challenges for conventional migrating antistatic technologies is that they may require a certain relative humidity to function. Tosaf claims that its latest migrating antistatic masterbatch for polyolefins – ST0249PE – works even with low humidity levels, has long-lasting activity, and works at a low loading. It is described as an amine-free product, which the company says makes it non-corrosive and suitable for electrical part packaging.

Films used in building and construction (under roofing, for example, or in protection film between walls and rooms, in carpet backing or house wrap) require flame retardancy and low smoke emission to meet appropriate standards. Tosaf Flame Retardant Business Manager Oren Moshe says in such applications it is important that UV and flame retardant additives do not interact negatively with each other. The company has introduced a dual-action flame retardant masterbatch that is designed to act as both as a UV and halogen-free flame retardant (HFFR) for PE and PP films for outdoor uses, FR8906PE EU.

Also targeted at construction industry applications, **Ampacet**'s Halofree HFFR masterbatches,

IMAGE: SHUTTERSTOCK

including its new Halofree 709 and 229 for PE films, offer halogen-free flame retardant performance in PE films. Initially developed for European applications, the products are now available globally, according to the company.

Multi-layer recycling

Although seeing growing interest in BOPE monomaterial films, which Ampacet is targeting with it BIAX4CE portfolio of masterbatches, the company's North American Strategic Business Manager for Flexibles, Jim Morrison, says there will continue to be a need for high barrier multi-layered films. These films are more difficult to recycle because they contain combinations of non-polar and polar polymers, such as EVOH and PA.

Morrison says Ampacet's ReVive portfolio of compatibilisers combines a synergistic blend of functional additives designed to enable efficient recycling of such films. ReVive is said to allow post-industrial recycled film (edge trim, for example) to be recycled into the PE layer of a multi-layer film or to be used as PCR.

"As CPGs [consumer packaged goods companies] continue to push for greater recycle incorporation in all plastic packaging, the challenge for multi-layered films will be to maintain strength and barrier functionality. The value chain continues to develop more advanced materials, from resins to innovative additives, to meet these objectives," says Morrison.

IMAGE: SHUTTERSTOCK

Above: Halogen-free flame retardant systems are making headway in films for the construction industry

AddWorks PKG 906 Circle stabiliser from **Clariant** is designed to allow higher levels of recycled content to be incorporated into polyolefin films. Reground scrap from BOPP film production or any PE or PP blown or cast film process can be


IMAGE: CLARIANT

Right: Clariant's AddWorks PKG 906 Circle stabiliser allows higher levels of recycled content to be incorporated into polyolefin films

reintroduced without affecting quality or processing, according to the company, which says the stabiliser reduces gel and black speck formation, allows manufacturers to maintain high line speeds, and minimises film breakage. It reports that up to 20% BOPP regrind could be added in one commercial trial, with up to 30% shown to be possible in Clariant's own in-house testing.

Easier processing

Processing aids are also an effective additive tool to improve processing of film formulations containing recycled resins and can help ensure a good film surface and, in some cases, can reduce die build-up, according to David Seiler, Americas Business Manager, Industrial and Fluoropolymers Global Advisor at **Arkema**, which manufactures the Kynar line of polyvinylidine fluoride (PVDF) polymer processing aids (PPAs).

Seiler says PPAs lessen start-up and processing variability, which are potential problems with reprocessed resin due to the variability in recycled material streams. "Before considering processing aids, the manufacturers often added large amounts of virgin LDPE to make the films. Now, with processing aids, they can use no or less virgin resin and can run faster at higher shear rates," he explains.

Films made from recycled resins often run more slowly than virgin resins, but the addition of a PPA can improve this. "If converters are pressure-limited, using a PPA, which reduces melt pressure, improves their output," says Robert Lowrie, Field Sales Engineer at Arkema.

Trials performed in Arkema's processing labs have evaluated Arkema's PPA in three representative samples of recycled LLDPE from a commercial film converter. They found that PPAs helped relieve processing variation and also reduced degradation and discolouring problems. "Melt fracture is really flow instability," says Lowrie. "PPAs can eliminate melt fracture and improve flow stability and surface finish." Lowrie will present results of the company's studies at the upcoming AMI Polyethylene Films **conference** in the US.

PPAs are typically added by the film converter as a pelletised masterbatch containing 1-6% of the additive. Alternatively, they can be dosed using a liquid masterbatch. Seiler says that having some residual PPA content in the recycled resin itself is not a concern when adding PPA to a film formulation. "There is no harm in having 300ppm of PPA in the material versus 1,200ppm," he says. However, he does add that levels above 2,500ppm may result in blooming.

Seiler also says that Arkema eliminated the use of PFAS (perfluorinated alkylated substance) in its production of Kynar PPA fluoropolymers several years ago. PFAS use is being regulated or phased out in many regions of the world due to its persistence in the environment.

CLICK ON THE LINKS FOR MORE INFORMATION:

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Putting plastics to the test

Manufacturers of materials testing equipment continue to focus on making their systems easier to use and more productive. Peter Mapleston reviews some of the latest developments

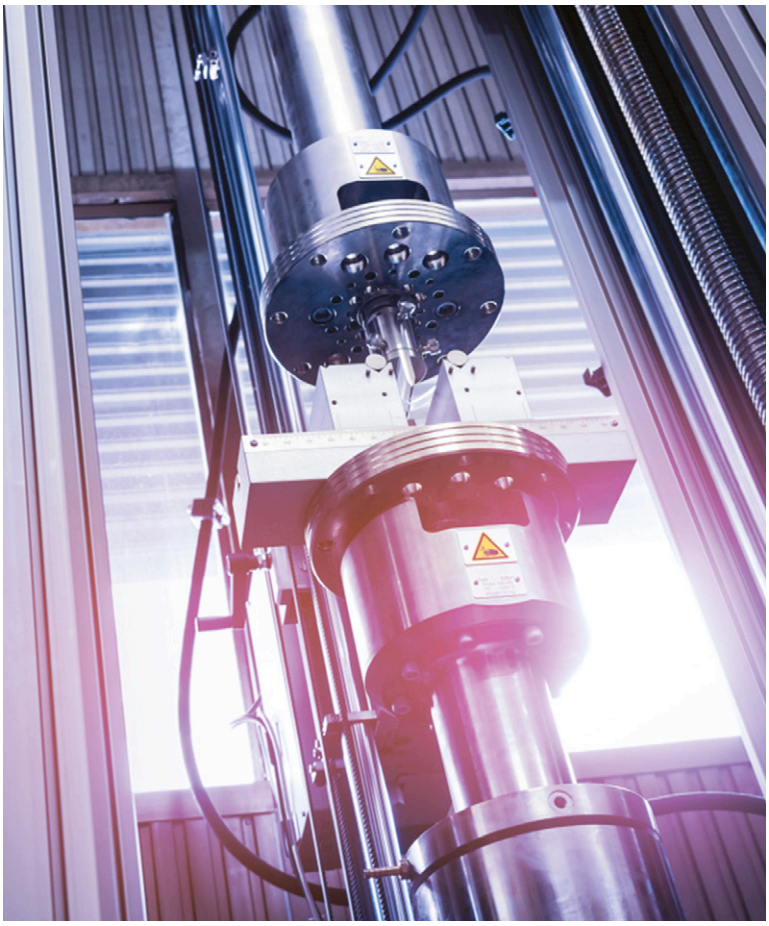

IMAGE: SHUTTERSTOCK

Main image: Testing is a vital element in the development of polymer materials, requiring equipment that is both accurate and simple to use

Property testing is a fundamental part of polymer and compound development. But it often requires considerable repetitive and tedious work on the part of equipment users, whether for tensile testing, thermal analysis, or for assessing rheological properties. Some of the latest examples of testing hardware go a considerable way towards simplifying test procedures, at the same time making the entire testing process more accurate, faster, and potentially less costly.

"Automation has been proven successful in increasing efficiency, consistency, quality, and reducing costs across a vast array of processes. The question that needs to be answered is how much automation improves results obtained from laboratory testing." That's the thinking from testing equipment start-up **LabsCubed**, which last year launched a compact automated tensile tester, the CubeOne.

The CubeOne integrates fully automated hardware and cloud-based software. The user loads up to 12 tensile or tear samples into a tray, places the tray in the machine, then sets up the tests via a touch screen. Once the start button is pressed, the device automatically loads one sample at a time, tests it, removes and deposits the broken test piece, analyses the stress-strain data, and continues to the next sample.

The first version of the CubeOne, which came onto the market last year, is designed for elastomers but a new version for testing plastics should debut before the end of Q1, circumstances permitting, says CEO Khaled Boqaileh. At the time of writing this article, the equipment was said to be in pre-production, with a number of examples in use at a few selected customers. LabsCubed is currently taking pre-orders and carrying out comparison testing on its working machines. Boqaileh expects the company to be in full production by Q4.

Very different in appearance to a standard tensile testing machine, the current elastomer version of the CubeOne measures 1,300mm wide, 520mm high, and 420mm deep, with a touch screen control panel mounted on top and a small drawer for loading samples on the front. The plastics version of the CubeOne is similar but will feature a larger loading tray. It will work with ASTM and ISO standard tensile samples and offer a maximum pulling force of 10kN. Boqaileh says a version of the CubeOne for carrying out flexural tests is in progress and should be ready around the end of the year.

LabsCubed has carried out a study to quantify potential improvements and savings by comparing its CubeOne solution to conventional methods. "LabsCubed enables and expedites the creation of

IMAGE: LABSCUBED

Right: LabsCubed aims to introduce a plastics-focused version of its CubeOne automated tensile testing system, which was originally designed for elastomers, early this year. A version for flexural testing is in development

new and innovative materials," the company says in a White Paper on the study. It explains that manual material testing hinders development by limiting throughput, producing inconsistent data, and increasing costs.

The study was undertaken using a mix of materials (all elastomers) from LabsCubed clients. To ensure study accuracy, the samples were created and tested at the same time, reducing mixing and production errors.

Reproducibility is key

"The results from manual vs CubeOne tests showed that, for both stress and strain, the data produced by the CubeOne is well within the compounders' internally defined acceptable range," says the White Paper. "This is important as data reproducibility is key to ensuring continued testing with no correlation issues.

"Specifically, it was found that the average difference for stress at break is 0.5%. The CubeOne uses an Omega load cell that is calibrated and certified to ASTM standards and therefore results in highly accurate data," the company says.

"For strain at break, compounders' in-house data was produced using clip-on physical extensometers, while the CubeOne uses a contactless vision extensometer. These different methods of measuring strain result in a slightly higher difference at around 2%. The vision extensometer found in the CubeOne is also calibrated and certified to ASTM standards."

To compare data consistency, the standard deviation was calculated across five samples for each compound set. For strain at break, it was found that the consistency of the data was 40% higher using the automated system than with the manual machine. As for stress at break, it was found that the automated system increased consistency by 36%.

LabsCubed says the biggest cost savings achieved when using the CubeOne derive from the technician no longer having to perform repetitive manual tasks. On average it was found that to test a single sample on a manual machine, an operator would require approximately four minutes, while the CubeOne system requires approximately 30 seconds to prepare a sample.

"Total savings per year are estimated at $43,750, which is a significant and direct savings," the White Paper claims. "This translates to a ROI of less than 1.25 years for the average customer."

The company claims the CubeOne can replace any current manual machine without problems for both quality-control or R&D testing. It says the consistency gains that result from automation amount to up to 40%, with users also seeing savings in time and money. ›

Guill invests in rheology laboratory

US-based extrusion tooling company Guill Tool has established an in-house rheology laboratory in its facility at West Warwick in Rhode Island. The lab's equipment list includes a Hybrid Rotational Rheometer, Differential Scanning Calorimeter, and Thermal Conductivity Meter.

Guill says the invesment means it is now equipped to test customer's materials and work with them to create extrusion tooling that will give them a competitive edge. Having the capability in-house also speeds up turnaround on test results, reducing delays during the tool design process and offering better control over the processes and test parameters. The rheology lab will be available for use by extrusion processors as well as material formulators.

› **www.guill.com**

Some of the equipment in use in Guill's new rheology lab at its US plant in Rhode Island

IMAGE: GUILL TOOL

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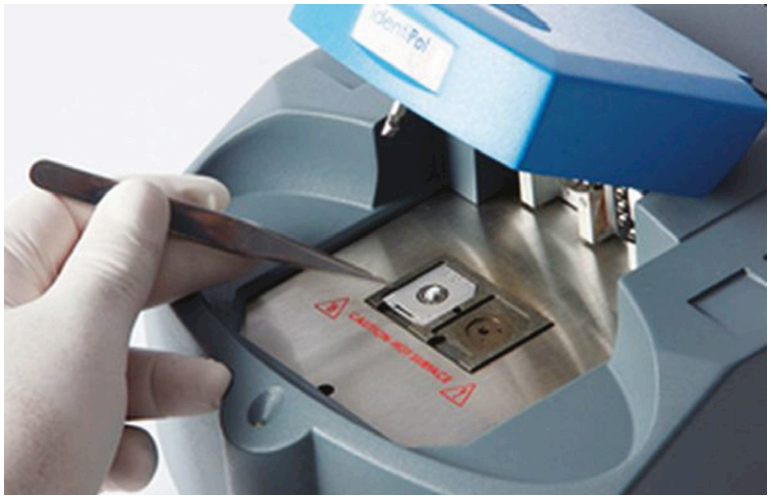
IMAGE: FTT/LACERTA TECHNOLOGY



Above: IdentiPol is claimed to be a cost-effective thermal analysis tool for routine quality testing

Bridging the gap

Improved ease of use also figures in new developments in other areas of materials testing. At **Fire Testing Technology** (FTT), Marketing Manager Teri-Leigh Peach says its IdentiPol thermomechanical analysis quality control bridges the gap between the basic plastic tests found in traditional quality assurance facilities and the complex instruments used in scientific laboratories.

FTT is the worldwide distributor of IdentiPol products, which are manufactured by **Lacerta Technology** (both companies are based in the UK). The techniques used by IdentiPol are said to be comparable to those used in Dynamic Mechanical Analysis (DMA) and Differential Scanning Calorimetry (DSC). "It has been designed as a cost-effective tool for quality assurance, with quick and easy use in mind," Peach says. "A test can be run by an unskilled operator from start to finish in about 15 minutes [including sample preparation]."

There are four basic functions in IdentiPol: identification of the material; confirmation that a new batch of material is the correct specification; comparison of any test result with stored reference data; and estimation of MFI with each test (available for PE and PP only).

Materials identification is derived from measured thermomechanical properties, for example glass transition temperature and melting point. These key properties are automatically determined, without the need for user intervention. "Since these are bulk properties, analysis is unaffected by fillers, fibres and pigments," claims Peach, who adds that the IdentiPol system can distinguish between most commonly used plastics.

Confirmation of batch consistency is achieved by comparing measured properties with reference data from previously tested batches. "Unlike other techniques that provide only chemical information, these thermomechanical measurements provide structural information, which will depend on crucial factors such as molecular weight, chain branching, crystallinity, and these can have a significant effect on both processing parameters and product performance," Peach says.

Chemometric analysis

The analysis uses what FTT describes as chemometric techniques to automatically assess the match of the incoming material, ultimately providing a pass/fail indication. Batch reports can be generated, which list the key thermomechanical properties together with the chemometric score. "This is useful when a problem arises and it provides solid evidence to a material supplier of differences between current and old batches – a must-have feature where recyclate is used in production," Peach claims.

Using the "comparison" feature, any test result can be scored for similarity against all reference data. This is said to be especially useful when comparing an equivalent grade, perhaps for replacement or substitution of an original material or for the incorporation of recycled material, as it can be used to see how the properties of various grades differ. A practical example of where this can be used is in the event there is uncertainty over the contents of a silo or bin of material. The Identipol system can match the grade to others being used in the factory in one simple test, immediately avoiding the wrong material being used.

IMAGE: NETZSCH

Right: The TMA 402 F3 Hyperion Polymer Edition thermomechanical analysis system is designed specifically for low temperature work

German engineering group **Netzsch** has been busy both in product development and in business development. Last year, it acquired Taurus Instruments and merged it with Netzsch Analyzing & Testing to create Netzsch Taurus Instruments, based in Weimar, Germany, expanding its product range for determining thermal conductivity and heat transmission in materials and fire testing. The company has also added rheology to its thermal analysis product line through the acquisition

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Right: PerkinElmer's EGA 4000 offers integrated thermogravimetric analysis and infrared spectroscopy with evolved gas analysis

of the rheometer product line of Malvern Panalytical. This includes the Kinexus rotational rheometers and Rosand capillary rheometers.

Dr Shona Marsh, Application & Product Marketing Manager for Rheology within the company, says the rotational rheometers "possess an ultra-low friction air bearing which is what makes them so incredibly sensitive. In comparison to a simple viscometer, the performance of a rheometer allows far greater characterisation of flow, deformation and even tackiness of a material (for Newtonian and non-Newtonian materials).

Capillary rheometers are designed to operate at much higher shear rates than rotational rheometers, allowing the rheological behaviour under processes such as extrusion or injection moulding to be investigated. They provide information about the material's shear viscosity (resistance to flow) but also the extensional viscosity (resistance to stretch). "This means we can detect how different polymers/grades will perform in processes such as blow moulding," says Marsh.

New to the thermomechanical analysis product line-up is the TMA 402 F3 Hyperion Polymer Edition, which is described as a robust, reliable, and easy-to-operate instrument for quality control, especially of polymers. Philipp Köppe, Head of Marketing at Netzsch, says this new device is tailor-made for low-temperature applications, determining various viscoelastic properties such as stress relaxation and creep.

The TMA 402 F3 Hyperion Polymer Edition comes with a compact furnace capable of covering a temperature range from -70°C to 450°C and uses a mechanical cooling system that works without the need for liquid nitrogen.

Easing the pressure

"Customers in the plastics compounding world are experiencing a number of pressures and pain points when it comes to testing and analysis," according to Venkata Mattegunta, Product Marketing Manager, Materials Characterisation, at **PerkinElmer**. These include the ability to carry out cost-effective raw material identification of a wide variety of samples; streamlined study of chemical composition and interaction of additives; accurate study of biodegra-

Atlas responds to UVC concerns

The Covid-19 pandemic has put hygiene very much in the spotlight. One increasingly popular means of product sterlisation is the use of short wavelength ultraviolet (UVC) radiation, a technology that is now being used in a growing range of applications extending from medical and healthcare to transport and household goods.

However, the growing use of UVC technology is raising some concern among materials formulators that materials are being subjected to a new source of severe photodegradation stress, according to Atlas Material Testing Solutions. "They fear that their materials – textiles, plastics, coatings, etc – potentially could degrade because of exposure from this 'new stress,' which is much harsher than solar UV, and may considerably reduce service lifetime," the company says.

The company claims its Atlas UVCTest is the first system designed specifically to test the durability of materials exposed to UVC radiation, which is centred at 254nm. Based on the company's UVTest fluorescent/UV platform, the radiant energy from the UVCTest's eight 40W fluorescent lamps is concentrated in the UV 254nm wavelength region.

To protect the operator from accidental exposure to this harmful UV radiation, the instrument is equipped with safety devices to automatically turn off the lamps when either test chamber door is opened. Additional, light-blocking gasketing has been implemented to further ensure user safety.

› **www.atlas-mts.com**

The UVCTest, from Atlas MTS, is specifically designed to test materials for compatibility with short wavelength UV sterilisation techniques

IMAGE: ATLAS

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IMAGE: TA INSTRUMENTS

Right: The Discovery X3 DSC from TA Instruments' offers multiple sample capabilities to speed up DSC testing

dability, and the effects of environmental degradation. On top of this comes single-use recycling analysis – especially useful given the boom in take-out dining during the Covid-19 pandemic – and overall management of QA/QC of finished compounds.

Aiming to address these needs, PerkinElmer has introduced the EGA 4000, which it says is the industry's first fully integrated TG-IR (thermogravimetric analysis-infrared spectrometry) system for evolved gas analysis (EGA). The company says the unit's design "eliminates issues posed by current EGA systems to offer a simplified TG-IR analysis, accessible to experienced and novice users alike."

Mattegunta says current TG-IR systems use separate instruments via transfer lines, introducing operational complexity and maintenance issues. The EGA 4000 incorporates a fully functional PerkinElmer TGA analyser into its Spectrum 3 FT-IR spectrometer, "combining all aspects of instrument control and analysis into a simple user interface." Hardware and software are controlled by a single software platform.

The Discovery X3 DSC is the latest addition to the **TA Instruments**' line of Differential Scanning Calorimeters (DSC). The company says the ability to keep pace with demand for high performance materials is limited by the fact that most traditional DSC equipment is limited to analysing a single sample at a time.

It says that the Discovery X3 has been designed to eliminate multiple testing steps, generating three times the amount of experimental data as a standard DSC system. It uses the company's Fusion Cell technology to allow users to compare different formulations side-by-side under the exact same test conditions. Its three sample calorimeters are said to provide unmatched flexibility whether used for replicate testing for statistical analysis or for validation/verification against a control sample.

The Discovery X3 is supported by the introduction of a Batch Processing feature in the company's Trios software, which is designed to handle the additional data generated with the X3 DS. Optional equipment includes a variety of cooling options, sample cutters, pans, and linear autosampler with 54 programmable tray positions.

Melt flow challenge

Melt-blown polypropylene non-woven fabrics can function as filter materials to provide high filtration efficiency against very small particles. They are found in a variety of medical applications, including respirator masks as well as other non-woven, medical protective clothing, and have been in particularly high demand during the Covid-19 pandemic. Quality assurance of the raw material often involves the use of an extrusion test but, as the volume flow index (Melt Volume Rate, MVR) of PP grades for melt-blown non-wovens typically lies between 1,200 and 2,000 $cm^3/10$ min, this is a challenging task.

"A high MVR value such as this requires a sophisticated instrument to accurately and repeatably measure test results," says **ZwickRoell**, which supplies melt flow test equipment. Especially important for compounders, the MVR of a polymer may change significantly after the addition of additives. "A change to the MVR may affect processing and it is therefore important to understand to what degree various additives effect the MVR of a material," says the company.

ZwickRoell's Mflow unit can be fitted with a die plug that ensures the material stays in the barrel during the preheat time. Once the test begins, the die plug is removed from the barrel, the material begins to flow, and a travel transducer automatically records the MVR. "These accessories on the Mflow ensure accurate and repeatable results of high MVR polymers like melt-blown PP," says the supplier.

"A recent redesign of the Mflow to include a new colour touchscreen electronic improves efficiency

Mflow, from ZwickRoell, can measure MVR of high flow PP grades used in non-woven production

IMAGE: ZWICKROELL

and saves space in a crowded lab. These new electronics offer a user interface that follows the logical layout of ZwickRoell's testXpert III software, with relevant parameters, operator inputs, and results grouped for fast and easy access."

Tracking contaminants

Contamination can also be a problem in compounding applications. **Sikora**'s Purity Scanner Advanced online inspection and sorting system combines an X-ray scanner with up to three optical cameras. X-rays make it possible to detect metal inclusions with a size down to 50 µm in the raw material, while black specks and colour deviations are detected by the optical cameras.

Integrated software provides the operator with a statistical evaluation providing detailed information about the size, area, and number of the detected contaminants during production. In addition, impurity data can be saved in an image gallery.

IMAGE: BUEHLER

"Due to continuously increasing quality requirements of plastic processors, the demand for online inspection and sorting systems will further grow," says the company. "New tooling technologies as well as ever decreasing cross sections in [hot runner systems] set higher criteria regarding the raw material to be processed."

The company claims that these higher quality requirements can only be fulfilled using future-oriented technologies such as the Purity Scanner Advanced. "By using the system, repairs and follow-up costs can be avoided and costs for machines and personnel as well as down times and scrap can be significantly reduced," it says.

IMAGE: SIKORA

Left: Sikora's Purity Scanner technology detects a wide variety of contaminants in polymer pellets

Sikora also supplies offline systems to inspect and analyse smaller amounts of pellets randomly, for example after they have been sorted out by the Purity Scanner Advanced.

ITW group company **Buehler** says its new Wilson RH2150 hardness tester is an appropriate solution for a large range of applications in quality control and research environments, including plastics (the RH2150 can be used for ISO 2039 ball indentation testing of hardness of plastic materials).

The company says the equipment is based on its well-proven RB2000 concept but incorporates a number of newly developed functions. Buehler says a new user interface, advanced statistical calculations, result graphing, and easy test programmability all help to optimise testing processes.

Left: Buehler's Wilson RH2150 can test plastic hardness to ISO 2039

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Perfecting your pellets

IMAGE: SHUTTERSTOCK

*Speed, efficiency, and the flexibility to handle a broad range of compound formulations that include high filler loadings and recycled content are prime requirements for a modern pelletiser, writes **Mark Holmes***

The needs of the compounding industry are changing and manufacturers of pelletising systems are responding to that, adapting product offerings to satisfy key user demands such as the need to more effectively handle recycled and difficult-to-pelletise polymers. The latest equipment innovations also target the need for greater flexibility, faster change-overs and higher levels of automation.

Interest in recycled product is identified as a key global trend by **Maag Group**, which brings together the Gala, Reduction Engineering, Sheer and Automatik brands. Society is becoming more environmentally-aware and the company reports that, after a strong three-year period for pelletising systems for virgin polymers, it now sees a growing requirement for recycling equipment. It also identifies an increasing market focus on pelletising solutions for special engineering thermoplastics and high-performance polymers.

Maag says compounders are also looking for increased flexibility and more automation. "Nobody wants to limit their production possibilities tomorrow with the equipment they purchase today, because we do not know what the market will be like in one or two-years' time," says Product Manager Alexander Helm.

"On the other hand, we are also aiming to be more efficient at the same time. This trend highlights the need for fully automated pelletising systems, which are unaffected by upstream process errors, require only a low level of manual maintenance work and therefore reduce downtime to a minimum," he says.

Helm says that the principle of plastics pelletising has not changed greatly over the years and equipment has improved largely through a process of continuous improvement. "Nevertheless, we still need new ideas completely detached from existing principles to solve problem applications, such as pelletising of extremely soft or low viscosity polymers and high temperature polymers without defects," he says. ›

Main image: More challenging formulations and shorter product runs make pelletiser selection an increasingly important consideration

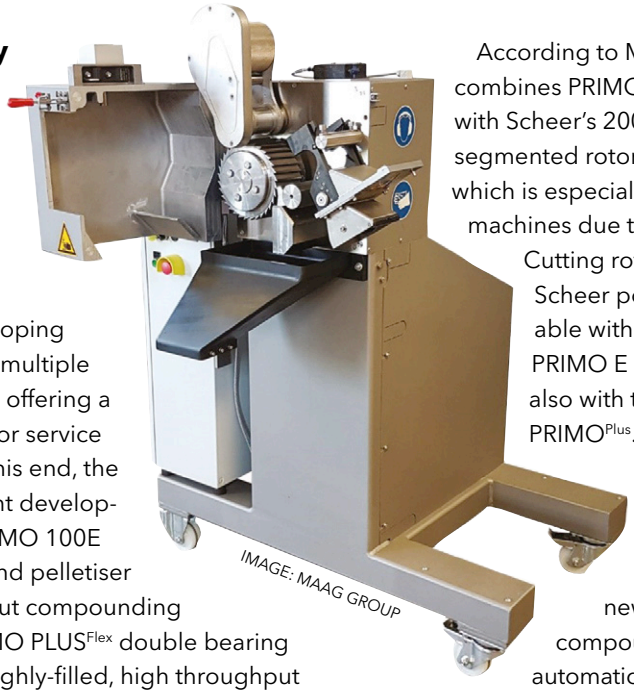

IMAGE: MAAG GROUP

Right: The PRIMO 100E is a single sided dry-cut strand pelletiser for low volume throughputs

Flexible efficiency

Due to rapidly changing market requirements, Helm says that customers need both more flexibility and improved efficiency. He says that means developing machines suitable for multiple applications while still offering a reasonable package for service and lifetime cost. To this end, the company's most recent developments include the PRIMO 100E cantilever-design strand pelletiser for medium throughput compounding applications and PRIMO PLUS^{Flex} double bearing strand pelletiser for highly-filled, high throughput compounding applications.

Maag says the PRIMO 100E completes its single-sided strand pelletiser portfolio and provides the ability to efficiently process even highly-filled products in the lower throughput ranges. The new model is particularly suitable for compounding thermoplastics, for functional or additive masterbatch production, and for production of colour concentrates up to 1,000 kg per hour.

In common with the larger PRIMO 200E, the 100E features a cutting geometry with a flat entry angle and short unguided length between the feed rollers and cutting unit. This allows a straight path to the carbide cutting tools and guarantees high cut quality for hard, brittle and very soft strands. A highly wear-resistant metal feed roller is available on the PRIMO 100E in place of the usual elastomer feed roller, and granule length can be easily changed during operation by means of a second optional dual drive.

According to Maag, the PRIMO PLUS^{Flex} combines PRIMO^{Plus} machine technology with Scheer's 200mm cutting rotors. The segmented rotor geometry is maintained, which is especially beneficial for larger machines due to its modular structure. Cutting rotor segments from the Scheer portfolio are interchangeable with cutting tools of the PRIMO E series machines and now also with the Flex version of the PRIMO^{Plus}.

Pelletising projects

Maag has recently delivered a number of new pelletising systems to compounding customers. Three automatic JSG (Jet Stream Granulation) systems have been delivered to DSM's high performance materials compounding operation at Evansville, Indiana, in the US. The systems provide an overall throughput of 18 tonnes/hr. Two lines comprising standard water bath and JSG pelletisers have been supplied to Germany's Akro Plastic. The company has also supplied 26 standard pelletising lines and two automatic JSG systems with a combined throughput of 25 tonnes/hr to Poly Plastic Masterbatch, which is based at Suzhou in China.

Helm says future strand pelletising developments at Maag will involve machine condition and wear monitoring depending on vibration, improved connectivity and machine intelligence, as well as alternative pelletising solutions.

Underwater pelletiser developments within the Maag Group are also focused on improved product flexibility, easy changeovers and a higher degree of automation and efficiency. "Good looking product within the customer's specification is an absolute expectation, which is what end-users are looking to get from these machines to differentiate themselves from other suppliers," says Michael Eloo, Managing Director at Maag's Gala Kunststoff- und Kautschukmaschinen division.

"From our point of view, pelletising is the heart of the machine - this is the step where the product finally becomes a visible form of the plastic," he says. "At this point, the pellets need to meet all of the required specifications. Overall, there is a need for a holistic approach to downstream equipment following the extruder, compounder, reactor or mixer. This addresses issues of cleanability, accessibility and the ability to exchange tools in operation. However, such flexibility cannot affect the efficiency of the machine."

IMAGE: MAAG GROUP

Maag's PRIMO PLUS^{FLEX} combines Primo machine technology with Scheer's 200mm rotors

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Maag's PEARLO underwater pelletiser has been specifically designed to process spherical pellets efficiently at high capacities. The machine is suitable for use with virgin materials, compounds, masterbatches, engineering plastics, wood and natural fibre-filled polymer composites, and thermoplastics elastomers, as well as for recycling applications, and can reach production rates of up to 36,000 kg/hr. Since its introduction, more than 150 machines have been supplied to the plastics industry.

According to the company, the integration of moveable and flexible components of the PEARLO on a single frame helps ensure increased uptime, efficiency and low waste generation. Plastic melt is transferred to the die plate via the hydraulic start-up valve and from there extruded through the ring-shaped die into the cutting chamber, which is flooded with process water. Cut pellets are carried to the dryer in the process water, where they are separated. The pellets go onto packaging while the process water is filtered, tempered and returned to the cutting chamber.

IMAGE: COPERION

Above: The latest generation of strand pelletisers from Coperion Pelletizing Technology include no-tool cutting gap adjustment

Maag says the PEARLO's narrow face-width die plate designs and the use of wear resistant surface materials, along with a turbine-style flexible cutter hub and standard single-sided long blade, allows one cutter hub to be used for multiple jobs. This results in a cost advantage of up to a factor of eight. Heat losses have also been reduced by 25%.

The PEARLO is available in top-mounted and rail-type configurations with automated and manual blade-advance capabilities and can be easily upgraded at any time. The fully automated EAC version provides precise blade advance during operation and is suitable for continuous, as well as batch, operation.

Automation demand

Pelletising systems for recycling applications are also identified as an area of increased interest by **Coperion Pelletizing Technology**, which reports growing demand across the entire market for increased automation, improved cleaning and shorter shutdown times. "Pelletisers are also now required to handle a wide range of different recipes, such as hard, soft, abrasive and coloured compounds," says Raphael Strehle, Head of Sales at the company. "Improvements for easier cleaning, for example smooth surfaces, have been necessary, as well as rapid maintenance through quick couplings and centric pins, to minimise downtime that results in higher profitability of the complete production system. Other important issues at present include easy handling, improved cutting performance, high efficiency and noise reduction."

To meet these needs, Coperion has improved its SP series dual bearing strand pelletisers. The SP140, SP240 and SP340 models have been equipped with a variety of enhanced features to provide rapid handling and optimised pellet quality. The company says it has also developed a new cutting gap adjustment technology.

The re-engineered strand pelletisers feature a more compact design with an integrated operation panel and redesigned interior space arrangement. The cutting tools have been installed closer to one another, enabling a shorter unguided strand length that is said to ensure optimal cutting results, particularly with soft materials. This new construction results in reduced dead space in the interior which, together fewer free surfaces, is said to improve cleanability. The new quick-change cutting chamber system is also accessible without tools and the cutting unit can be exchanged quickly and easily to minimise machine servicing times and downtime.

The company has also reworked the intake area. The previous conical construction is now replaced with a straight intake to allows strands to be optimally side-fed into the pelletiser. This eliminates deflection while side panels on the intake roller prevent individual strands from breaking free. The operating width has also been increased by 20 mm to support higher throughputs. Noise levels have been reduced as a result of the more compact interior cutting space and smaller sound chamber and location of the motors under base plate.

Recycling interest

While the Covid-19 pandemic has resulted in projects being postponed or frequently rescheduled, the overall market for pelletising systems is stable, reports **Nordson Corporation**, which like other key suppliers sees strong interest from the recycling sector worldwide. "In particular, there is a boom in PET recycling and huge investments in China for SAN/ABS," says Frank Asmuss, Business Development Manager Pelletising at the company.

"In general, the trend of moving from strand pelletising to underwater pelletising (UWP) continues steadily," he says. "In addition, water-ring pelletisers are a good, easy-to-handle alternative to strand pelletisers, especially for commodities like polyolefin and styrenic compounds. The market for recycled materials is also continuously growing,

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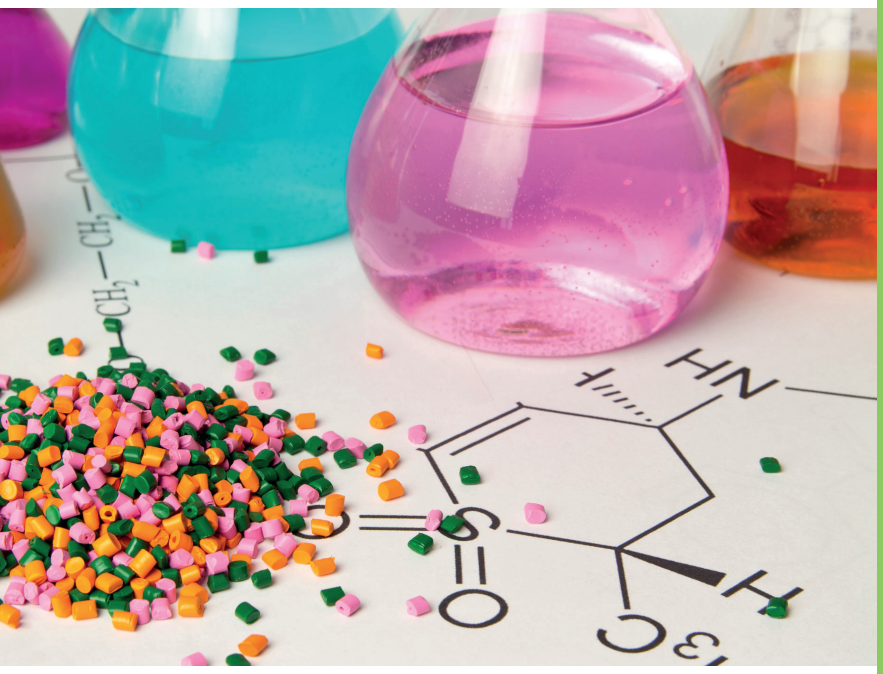

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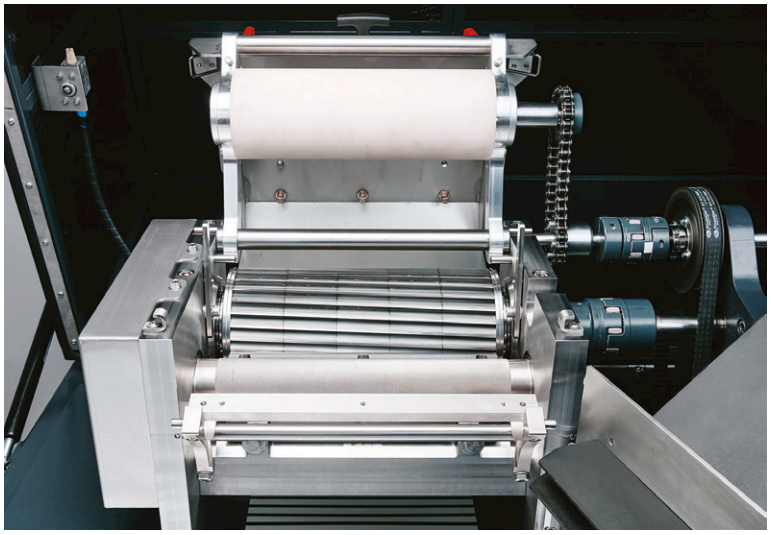


Above: Coperion Pelletizing Technology's SP cutting chamber features an optimised cutting tool arrangement to improve cut quality and cleaning

and there is strong demand for increasing recycling rates. New potential growth areas are the production of micro-pellets for use in 3D printing and a recent increase of biodegradable materials."

Higher levels of contamination in feedstocks from recycled materials brings new challenges in terms of melt filtration. "A fine filtration with minimum material losses is key to meeting these challenges," says Asmuss. "In addition, energy consumption is increasingly being considered by companies investing in pelletising systems. Besides new features for all types of pelletisers which improve process stability, handling, energy efficiency and productivity, the 'core' of each equipment system is still the most important detail to take into consideration; by that I mean the die plate design for pelletisers, and the filter medium for melt filters."

Nordson has developed a range of BKG systems for pelletising, including a complete system for producing virgin-like rPET from PET bottle flake. "Regulatory and market mandates call for a dramatic increase in use of rPET in the major markets - fibres, bottles and films. Our product line for rPET combines the next generation of BlueFlow gear pumps, HiCon V-Type 3G+ screen changers and BKG underwater pelletising systems. Included are the new FlexDisc filters for finer filtration at lower material losses and the CrystallCut system for energy-saving inline crystallisation. Of course, using the latest developments in die plates offers the longest lifetimes for changing raw material qualities," he says.

Strand alternative

Asmuss adds that, while water-ring pelletisers (WRP) are not appropriate for lower-viscosity materials such as PET, they provide advantages over strand pelletisers in processing a wide range of polyolefin and styrenic materials. The company's latest generation WRP – the BKG WRP 1000 –includes a number of improvements adapted from its well established BKG underwater pelletisers.

"The compounding and recycling industries are moving away from strand pelletising because it is labour intensive, has a substantial footprint, generates dust, tends to yield pellet inconsistencies, and provides little scope for automation," says Asmuss. "The BKG WRP 1000 water-ring pelletiser eliminates these problems for a capital investment that is mid-range between that of a strand pelletiser and our more high-performance underwater systems."

Nordson says that, compared to equivalent strand pelletisers, the new WRP design is more compact, generates less dust, is more capable of automation, and yields pellets of more uniform shape and size. Obviously, strand breakage is eliminated.

Key features of the WRP 1000 include a split-design die plate with separate heating flange and easily exchangeable insert, which is said to make for rapid colour changes and easy cleaning. The die plate is heated with electrical heating cartridges and is designed for uniform polymer flow in the die plate holes. The centrifugal drying system is adapted from the established pellet dryer design used for BKG UWPs. The company says it provides low moisture levels in the pellets, noise levels of below 85 dB, and easy maintenance access. doors.

The WRP 1000 provides a maximum throughput of 1,000 kg/hr and can operate at pressures up to 210 bar and temperatures of 320°C. It can be used to process a wide range of olefin and styrenic polymers and copolymers with densities up to 1.5 g/cm^3, including moderately filled formulations. Die plates are tailored to the specific material to be processed and the machine is available in a pre-wired version without control for system-integrators, or as a stand-alone PLC-based system for independent operation or upgrading of existing lines.

Right: Nordson says water ring pelletisers such as its BKG WRP 1000 offer advantages over strand alternatives

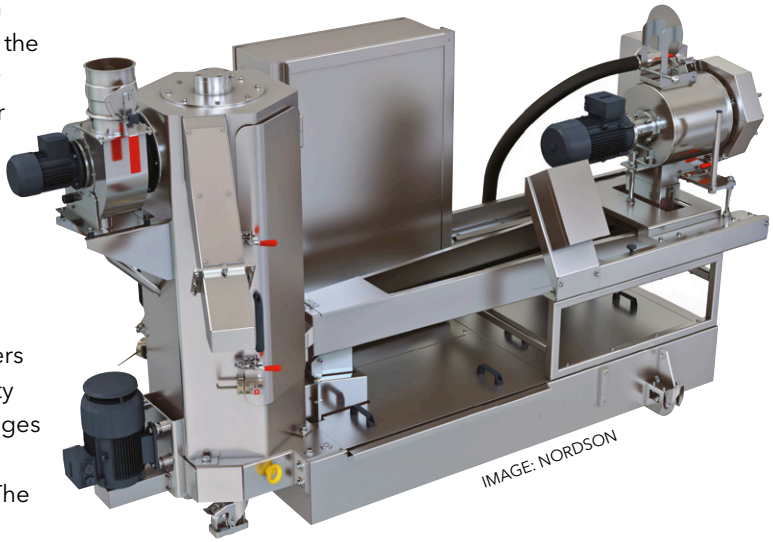
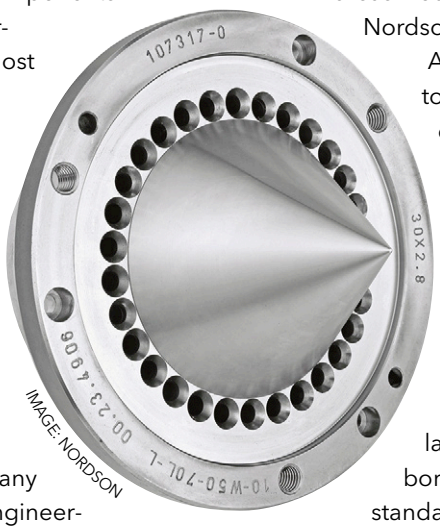


IMAGE: NORDSON

Nordson has recently built a dedicated production line for die plates used in its BKG underwater pelletising equipment at its plant at Münster in Germany. Die plates are wear components which must be periodically refurbished or replaced. While the most common die plates are held in stock and can typically be delivered within a couple of days, delivery times for less common plates can be significantly longer.



Left: Nordson has invested in a dedicated production capability for electrically heated die plates

Cutting lead times

The combination of the new dedicated production with a database of standard design elements has allowed the company to eliminate certain upstream engineering processes that had contributed to longer lead times. As a result, it can now deliver many of its electrically-heated die plates in just three weeks from order placement (including order entry, engineering and production).

"The dedicated production line for die plates enables Nordson to meet the needs of customers much more quickly, helping then to reduce downtime and maintain product quality," says Andreas Trouvain, Sales Director EMEA for Nordson's BKG product line.

At present the capability is limited to two-piece, electrically-heated die plates for BKG A, AH, Compact, and AHD190 families, which it says comprise the largest share of its die plate output. These are available with the most common nozzle bore diameters and with optional features such as different carbide inlays, thermal insulation layers, pressure reduction, nozzle bore configurations, and both standard and short land lengths.

"We continue to expand the range of designs that can be produced in this line, and we are looking for more ways to shorten the processes upstream and downstream of die plate production in order to make lead times even shorter," Trouvain says. Nordson continues to offer fully custom

IMAGE: BAY PLASTICS MACHINERY

Above: BPM's cutting chamber includes a number of quick changeover features

designs where required for specific customer applications.

Covid caution

US-based **Bay Plastics Machinery** (BPM) says the pelletiser market overall has remained stable through the current Covid situation but reports some evidence of caution. "The market seems to be expecting a crash and no-one wants to get caught over-exposed. As a result, we have seen less of a need for new systems compared to the past few years, but a huge increase in the need for spare parts," says James Forgash, Vice-President Sales at the company.

That is not to say that demand for innovation has disappeared. "We have been working with many manufacturing companies to streamline their existing process with the goal of going lights-out, operator free," he says. "This includes automation of repetitive tasks, to where a single operator can be responsible for multiple pelletising lines without being overwhelmed. Customers are looking to improve uptime, reliability, and ease of maintenance in their pelletising lines."

Forgash says plastic dust continues to be an issue in cutting plastics, whether that is generated at the time of cutting or during conveying. A further problem is wear on equipment caused by abrasive formulations. "We are always looking at new coating or hardening processes to improve longevity of machinery," he says. "Improved blade life for heavily-filled materials is moving us into new wear resistant materials, such as PCD (diamond) materials. This is showing a significant improvement in blade life."

BPM also reports a sharp increase in the use of its speciality pelletisers. For pelletising pharmaceutical and food grade materials, the company is designing new machines and modifying existing pelletisers to improve performance. Examples include its new BT25 Pharma pelletiser and the AXM micro pelletiser with pellet EVAC, which can consistently produce pellets as small as 0.1mm by 0.1 mm with a 95% yield of good pellets.

The company says it has also accelerated development of its pellet evacuation system, which was originally designed to transfer cut pellets from cutting chamber to a remote classifier or gaylord. "The system initially reduced the amount of dust generated from the cut by an air filtration system. Working with key developmental customers we have modified the system to help remove any remaining dust with our new de-dusting option, where cross-flow air is introduced into a pellet separating cyclone, capturing any remaining particles. Initial tests show the new option is very effective," says Forgash.

"Dust occurs in the pelletiser cutting chamber during the cut. Pellets can sometimes be double cut, which generates a pellet that is now a fraction of the intended size and out of spec. Evacuating the pellet immediately reduces the chance that it could bounce around the cutting chamber with the potential of being cut twice," he says.

Dust and fines created during conveying are also removed through the secondary de-dusting cyclone, which uses a proprietary ratio of counter-flow air in selected areas to remove a controllable amount of unwanted material sizes from the end-product as it is spread thinly in the de-dust phase.

Energy savings

Austria-based **ECON** has further developed its underwater pelletising technology with the extension of its thermally insulated die plates to colour masterbatch production. The company claims its insulated die plate technology is well suited to difficult-to pelletise compounds, including highly-filled and soft formulations. It is said to minimise die freezing and avoid the risk of overheating of the compound while reduced heat transfer to the process water helps reduce energy consumption.

Other ECON system features include its Water Treatment & Drying System, which facilitates easy and quick access to all components, prevents build-up of sedimentation, and allows fast exchange of rotor and screen. It is claimed to speed material changeovers and enable clean down of all important components in less than 20 minutes.

Addressing automation demands, the ECONia system is fully automated and designed for Industry 4.0 production environments. Manual start-up of the process and manual knife changing is no longer required. The operator can efficiently operate and

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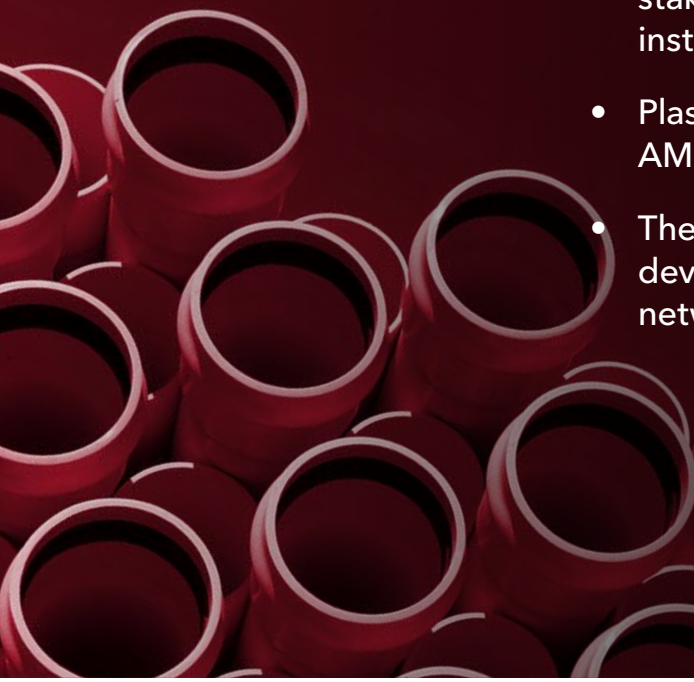

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IMAGE: ECON

Right: ECON's EUP 10 pelletiser is a compact model designed for laboratory applications

control up to ten ECONia lines from one point while an inline monitoring system – ECON Pellet Vision – monitors pellet quality. If the system detects any deviations, the parameters are adjusted automatically to maintain pellet quality and minimise production of off-spec material.

Targeting LFTs

Last year, Germany's **ips Intelligent Pelletizing Solutions**, which produces strand and underwater pelletisers, introduced a system for production of long-fibre reinforced thermoplastics (LFT) pellets. It worked on the development together with the Cetex Institut and the Institut für Textil- und Verarbeitungsmaschinen (Institute for Textile and Processing Machines) at the Technical University of Chemnitz. The initiative was promoted by the Zentrale Innovationsprogramm Mittelstand ZIM (Central Innovation Program for Medium-Sized Businesses ZIM).

The company will offer the LFT HP system on a turnkey basis. It says the technology will produce high-quality LFT pellets using either pultrusion or strand pulling production methods. The system is said to be suitable for use with a wide range of base polymer materials and fibre reinforcements, including glass, carbon and aramid. It can produce LFT pellets with fibre contents of 30-60 wt% in cut lengths from 6-25mm at throughputs of up to 1,000 kg/hr.

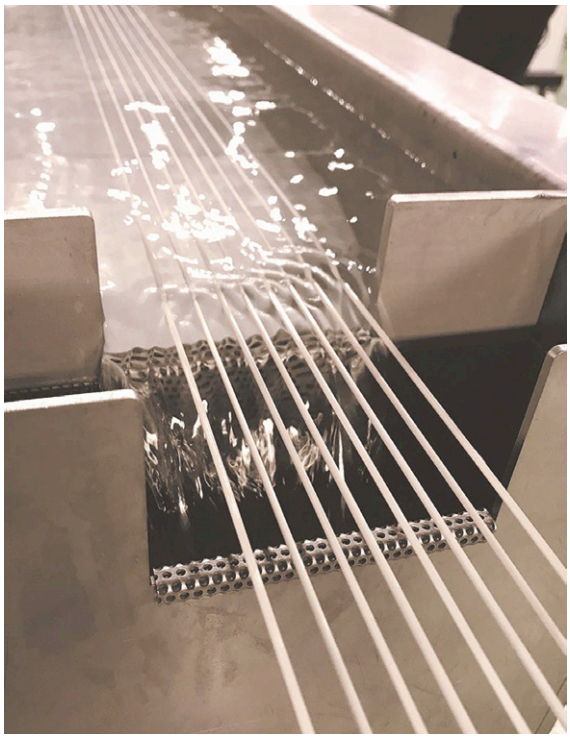

IMAGE: IPS INTELLIGENT PELLETIZING SOLUTIONS

Right: ips Intelligent Pelletizing Solutions extended its expertise into LFT production last year

"Our objective was to develop a more efficient manufacturing technology for long-fibre reinforced polymer pellets," says Managing Director Simon Weis. "Our eight-strand pilot system is operating successfully. It is also available for customer trials. We can use it to check on individual customer requirements quickly and product small quantities for test purposes."

The latest extension to the ips underwater pelletising product line is a compact rotary drum crystallisation unit for PET. The ips-DR/K is available as an optional add-on unit that integrates to the pellet dryer and uses the residual energy in the pellets to achieve levels of crystallisation of up to 30%. No external heating input is required. The device unit can handle throughputs of up to 2,500 kg/hr.

UK-based **Accrapak** has introduced a new stainless steel water removal tray for its pelletiser product line that is suited for demanding hygiene applications such as pharma. Intended for water removal on lines set up for dry cut strand pelletising, the trays can be custom built and are positioned between the cooling bath and strand pelletiser (either before or after the suction dryer depending on the material being processed).

The trays are equipped with grooved PP or stainless steel rollers that strip the water from the strands as they pass through the grooves. The stripped water runs down the slide and back into the cooling bath or into a collection tank, preventing unwanted drips from falling onto the floor. The company says the unit removes most of the water from the strands and, when used in conjunction with a strand dryer, is extremely effective at ensuring strands are dry prior to cutting and that the pellets are dry on discharge. Accrapak has already supplied a 4m long by 450mm wide tray for an ASL150 pelletiser processing 21 extruded strands.

CLICK ON THE LINKS FOR MORE INFORMATION:

- **www.maag.com**
- **www.coperion.com**
- **www.nordson.com**
- **www.bayplasticsmachinery.com**
- **www.econ.eu**
- **www.pelletizing.de**
- **www.accrapak.co.uk**

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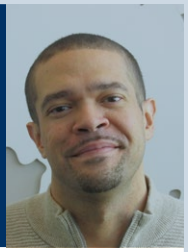

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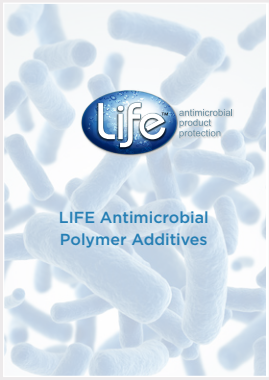
LIFE MATERIAL: ANTIMICROBIALS



Life Material Technologies offers a full range of antimicrobial additives for protection of plastics from bacteria, fungi and algae, including silver inorganics, synthetic organics and natural botanics. Find out more in this four-page brochure.

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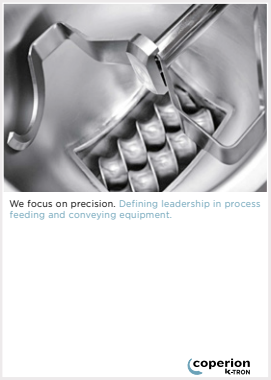
COPERION: FEEDING TECHNOLOGY



Coperion K-Tron provides a full portfolio of feeding and conveying equipment for compounders. This 16-page brochure details the full range, from volumetric and gravimetric feeders to blenders and metering units.

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BUSS: COMPEO KNEADER

The Compeo is the latest generation of kneader extruder from Buss and is designed to provide the utmost flexibility in application. This 12-page brochure details key features and model specifications.

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LEISTRITZ: MASTERBATCH SYSTEMS

Additive and colour masterbatch production places specific demands on compounding equipment. This 16-page brochure from Leistritz explains how its ZSE 35 iMAXX masterbatch twin screw extruder rises to the challenge.

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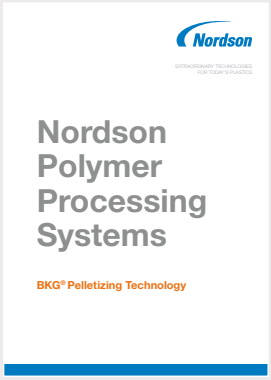
NORDSON: BKG PELLETISERS



The BKG range of pelletisers from Nordson Polymer Processing Technology includes underwater, water-ring and strand systems suitable for almost any thermoplastic pelletising application. Find out more in this six-page brochure.

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STRUKTOL: CREATIVE RECYCLING

Struktol offers a full range of additives to enhance performance of recycled compounds. This brochure details its extensive range of lubricants, PP viscosity modifiers, homogenisers and odour control products.

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Compounding World December 2020
The December issue of Compounding World reports on tighter regulation pushing development of more sustainable flame retardants. Plus features on lab-scale compounders and markers for tracing plastics materials.

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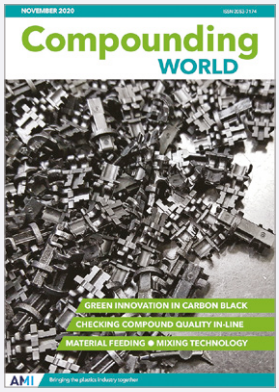

Compounding World November 2020
The November issue of Compounding World looks at how innovations are providing sustainability solutions in carbon black. Other features focus on checking compound quality in-line, developments in material feeding and the latest in mixing technology.

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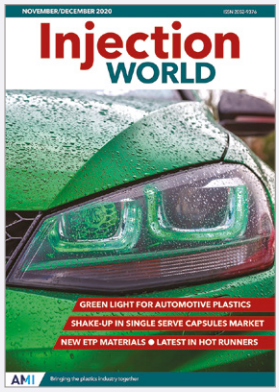

Injection World November/December 2020
Injection World's November-December edition has features on materials for automotive interiors and exteriors, new ETPs, the latest in hot runners, plus an article by AMI Consulting on a shake-up in single-serve capsules.

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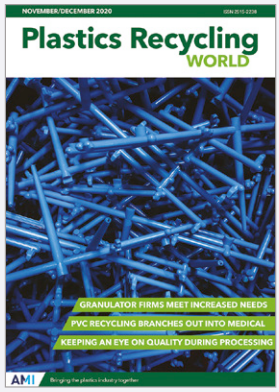

Plastics Recycling World November/December 2020
The final 2020 edition of Plastics Recycling World looks at the latest developments in the world of plastics granulation. This edition also reviews innovations in PVC recycling and examines some applications of automated quality control technology.

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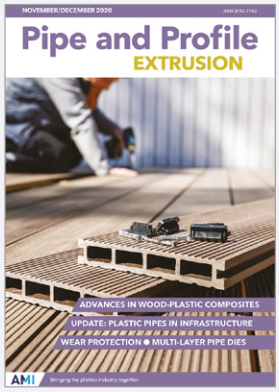

Pipe and Profile November/December 2020
The November-December issue of Pipe and Profile Extrusion has in-depth features which cover infrastructure pipe, innovations in wood-plastic composites, the latest in multi-layer pipe and an update on extruder wear.

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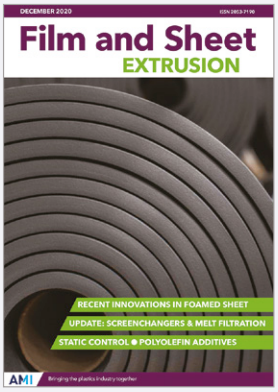

Film and Sheet December 2020
The final 2020 edition of Film and Sheet Extrusion looked at the latest trends in foamed sheet materials. It also reviewed some of the newest developments in polymer melt filtration, static charge control, and additives for polyolefin films.

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Pipe and Profile EXTRUSION
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4-8 February	PlastIndia, New Delhi, India **POSTPONED**	www.plastindia.org
25 Feb-3 March	Interpack, Dusseldorf, Germany **CANCELLED**	www.interpack.com
9-11 March	JEC 2021, Paris France **POSTPONED**	www.jec-world.events
22-26 March	Plastico Brasil, Sao Paulo, Brazil	www.plasticobrasil.com.br
13-16 April	Chinaplas 2021, Shenzhen, China	www.chinaplasonline.com
4-6 May	Kuteno, Rheda-Wiedenbrück, Germany	www.kuteno.de
4-7 May	Plast 2021, Milan, Italy **POSTPONED**	www.plastonline.org/en
17-21 May	NPE 2021 **CANCELLED**	www.npe.org
1-2 June	Compounding World Expo Europe, Essen, Germany **NEW DATE**	www.compoundingworldexpo.com/eu/
1-3 June	JEC 2021, Paris France **NEW DATE**	www.jec-world.events
15-18 June	FIP, Lyon, France **NEW DATE**	www.f-i-p.com
22-25 June	Plast 2021, Milan, Italy **NEW DATE**	www.plastonline.org/en
29 June -1 July	Interplas, Birmingham, UK **POSTPONED**	www.interplasuk.com
10-12 August	Feiplar, Sao Paulo, Brazil **NEW DATE**	www.feiplar.com.br
12-16 October	Fakuma, Friedrichshafen, Germany	www.fakuma-messe.de
14-18 September	Equiplast, Barcelona, Spain **NEW DATE**	www.equiplast.com
28-30 September	Interplas, Birmingham, UK **NEW DATE**	www.interplasuk.com
3-4 November	Compounding World Expo USA, Cleveland, USA **NEW DATE**	www.compoundingworldexpo.com/na/

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23-25 February 2021	Fire Resistance in Plastics **VIRTUAL SUMMIT**
2-4 March 2021	Chemical Recycling USA **VIRTUAL SUMMIT**
16-18 March 2021	Functional Fillers **VIRTUAL SUMMIT**
20-21 April 2021	PVC Formulation, Cleveland, OH, USA
27-29 April 2021	Plastic Pipes in Infrastructure **VIRTUAL SUMMIT**
27-29 April 2021	Thermoplastics Concentrates, Coral Springs, FL USA
10-12 May 2021	Masterbatch Europe, Cologne, Germany
11-13 May 2021	Performance Polypropylene **VIRTUAL SUMMIT**
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POLYMER TESTING WORLD EXPO

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ESSEN, GERMANY

PLASTICS EXTRUSION WORLD EXPO

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3 - 4 November, 2021

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