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RKW adds tube forming line at Echte site for €4m

RKW of Germany has invested around €4m (US$4.6m) at its Echte site, on an advanced tube forming machine.

The new production line will manufacture different versions of its self-venting RKW ProVent plastic sack and FFS films. It is suitable for a wide range of sack formats and allows for custom manufacturing. The investment also covers the expansion of RKW's garbage bag production.

RKW earlier invested in the site, to introduce a flexographic printing press in 2016.

"In response to the growing demands for our products – especially ProVent – we are continually investing in technologies," said Johannes Heintges, site manager at Echte. "With the tube former we are now taking the next step and focusing on high-precision, customised converting."

The combination of tube former and flexographic printing line ensures short delivery times and tailored plastic sacks, says RKW.

ProVent sacks are used for powdery goods such as construction materials, chemical precursors and food additives, providing better moisture protection than conventional paper sacks, says RKW.

RKW celebrated 50 years at its Echte site this year. In 2017, it generated sales of €905m (US$1bn), and employs around 3,000 people worldwide.

RKW is also expanding production of garbage bags at the Echte site.

"We significantly increased production capacities with investments in our printing centre in 2016 and in the new tube former," said Heintges. "Now we are recruiting new staff in all areas to support the steady growth of the site."

› **www.rkw-group.com**

RKW celebrated 50 years at its Echte site this year

MCC sells European sheet arm

Mitsubishi Chemical Corporation (MCC) of Japan is to sell its European acrylic (PMMA) sheet business to Schweiter Technologies.

MCC will sell the business – based in the UK, and operated by Lucite International UK (LIUK) – for £92m (US$102m) – which includes a production site in Darwen, Lancashire in the UK, as well as Perspex Distribution, the local sales company for LIUK's acrylic sheet. Last year, the UK operation had sales of around £126m (US$164m) and employed 330 people.

Schweiter is a leading producer of plastic sheet in Europe, especially in PMMA. It has also bought MMA monomer – the raw material used to make PMMA sheet – from MCC for many years.

› **www.m-chemical.co.jp/en**

New protocol for PE film recycling

Plastics Recyclers Europe (PRE) has developed a procedure to assess the recyclability of polyethylene (PE) film in Europe.

The procedure, called the RecyClass Recyclability Evaluation Protocol for PE films, aims to analyse the impact of different technologies on the recyclability of the PE film and flexible packaging recycling stream.

"Recyclability should not be decided subjectively," said Paolo Glerean, chairman of RecyClass. "The various elements constituting a plastic packaging have to be tested, analysed and measured in a transparent and repeatable manner."

Publishing specific testing protocols will aim to support all the technical solutions and materials that improve recyclability of plastic packaging, he added.

The protocol analyses whether a new packaging innovation will undergo the necessary pre-treatment, extrusion and conversion steps described of the methodology – at a laboratory scale – without negatively affecting the recycling process.

RecyClass was developed with the Association of Plastics Recyclers, and its content and methodology take into account the expertise of the Benchmark Polyethylene (PE) Films and Flexible Packaging Innovation Test Protocol, published by APR.

RecyClass has also created a partnership with Centexbel-VKC, a test lab that will perform the recyclability tests according to the protocol.

› **www.plasticsrecyclers.eu**

› **www.recyclass.eu**

Faerch to buy tray recycler

Thermoformed packaging producer Faerch Plast is acquiring 4PET Group, based in the Netherlands. 4PET manufactures PET sheet for thermoforming and also carries out recycling.

At its recycling plant in Duiven, Netherlands, 4PET recently started a new tray-to-tray PET recycling line, which it claims is unique for creating a PET tray closed loop.

Faerch Plast CEO Lars Gade Hansen said: "The recycling system offered by 4PET Group is an innovative, industrial-scale break-through in our transition towards a sustainable circular economy. It enables us to take responsibility for the post-consumer phase of our trays."

The transaction is expected to close during the third quarter of 2018, subject to customary closing conditions and regulatory approvals.

4PET has 200 employees at four sites. The company had a turnover of more than €50m.

› **www.faerchplast.com**
› **www.4petrecycling.nl**

Machine deliveries in North America rise for fifth quarter in a row

Deliveries of primary plastics machinery in North America increased for the fifth quarter in succession to exceed US$335m in the second quarter of this year – with extrusion machinery sales showing particularly high growth.

According to the Plastics Industry Association's Committee on Equipment Statistics (CES), this was less than 2% up on the first quarter of the year, but nearly 6% higher than the corresponding period in 2017.

"Plastics machinery shipments seemed to have hit a speed bump in the second quarter, but there's no indication that shipments for the remainder of the year are trending down," said Perc Pineda, chief economist at the association. "US economic fundamentals remain strong. As the economy fast approaches – if it hasn't already attained – full capacity, businesses will have to cope with tighter resources, and output increases will not be as robust as in previous periods."

The delivery value of single-screw extruders increased by 23% from the corresponding quarter last year, while that of twin-screw extruders – including both co- and counter-rotating machines – increased by 80%.

In comparison, the value of injection moulding machinery rose by 4.5%.

"We can expect to see continued uneven quarterly data moving forward, but by and large the outlook for plastics machinery remains positive," Pineda added.

In the CES' second quarter survey of members, 11% of respondents reported that their customers were having difficulty obtaining financing for new equipment. This was a 7.4% increase from the first quarter. However, the remaining 89% reported no such financing difficulties. CES says this suggests that financing rates were not cost prohibitive and financing for new plastics equipment remains largely accessible.

› **www.plasticsindustry.org**

Renolit buys Dutch PVC film and sheet business Vulcalux

Global film and sheet producer Renolit is to acquire Draka Polymer Films from its parent company, Vulcalux Nederland.

The transaction is expected to close by the end of the year. The purchase price has not been disclosed.

Draka, located in Enkhuizen in the Netherlands, manufactures PVC film for the office supplies business.

"Because of the progressive digitalisation of office organisation – and the import of office supplies films, especially from Asia – the European office supplies film business is facing major challenges," said Rubens Leite, general manager of Vulcalux Nederland. "Falling demand and increasing competition from outside Europe have put Draka in a difficult entrepreneurial position."

For this reason, Draka's owners have decided to sell the company – and say Renolit is the right partner to expand the business.

Vulcalux says it will now focus on technical film at its two existing plants in France – Alkor Draka Industries and Alkor Draka Medical.

› **www.renolit.com**
› **www.drakapolymerfilms.com**

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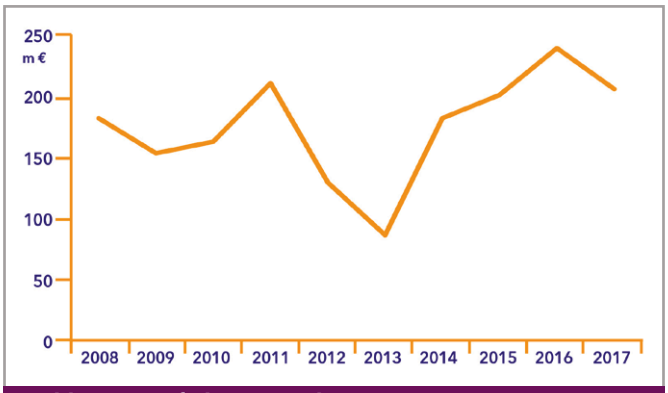
German exports to Iran fall in first half of 2018

German plastics and rubber machinery exports to Iran have dipped in the first half of this year – though the sector remains cautiously optimistic about its prospects for the full year.

In the first half of this year, German plastics and rubber machinery exports to Iran reached €22 million – a decline of 11% compared to the first six months of 2017. As a result, Iran has dropped from position 25 to 28 as an export destination for Germany.

"With annual growth rates of almost 6% for plastics consumption, Iran is still considered a high-potential market for the plastics sector," said Thorsten Kühmann, managing director of VDMA Plastics and Rubber Machinery. "The increasingly difficult political framework conditions – accompanied by still insufficient financing options – are showing their effects. We counteract this with continuity – by nailing our colours to the mast in difficult times."



World exports of plastics machinery to Iran (m€)
Source: VDMA, National Statistics Agencies

Decreasing export figures for 2018 also affected the size of the German Pavilion at the Iranplast trade fair. This year, 17 German enterprises presented their products there – around half the number that did so at the last edition.

German's dip in first-half exports to Iran is a turnaround from last year, when it saw its market share in the country increase. In 2017, German plastics and rubber machinery exports to Iran rose by more than 87% to reach almost €38m. This raised its share of the market from around 8% to more than 18%. At the same time, China saw its share decline from around 63% to 48%. Overall, plastics and rubber exports to Iran declined by more than 13%, to nearly €206m.

› **http://plastics.vdma.org**

VinylPlus to recycle more PVC

VinylPlus, the voluntary commitment scheme run by the European PVC industry, has raised its recycling commitment.

It now says it will recycle at least 900,000 tonnes of PVC per year by 2025 – which it says is a significant contribution to the overall 10 million tonnes objective set by the European Commission.

It has also committed to recycling a minimum of 1m tonnes per year by 2030.

"VinylPlus has improved the sustainability performance of PVC for nearly 20 years," said Brigitte Dero, general manager of VinylPlus."Because our programme brings together the entire value chain, we responded immediately to the Commission's call for voluntary pledges."

› **www.vinylplus.eu**

Neste backs feedstock recycling

PHOTO: NESTE

Finland's Neste has joined UK-based chemical recycling company ReNew ELP and Australian technology developer Licella in a development project to explore the potential of using mixed waste plastic as a raw material for fuels, chemicals and plastics.

As part of the project, the partners will study the feasibility and sustainability of liquefied waste plastic as a refinery raw material and will also work for regulatory acceptance of chemical recycling. Neste said it aims to process over 1m tonnes/year of waste plastic by 2030.

ReNew ELP is separately beginning construction of a chemical recycling plant in Teesside, UK, which will use Licella's Cat-HTRTM catalytic hydrothermal liquefaction platform to produce raw materials for multiple petrochemical products from post-consumer plastics. This will be the first plant to use the technology at commercial scale and is co-financed by energy investment firm Armstrong Energy.

Neste is already working with Ikea to develop a bio-based PP. A commercial-scale facility is expected to open this autumn using waste fats and oils as raw materials.

› **http://neste.com**

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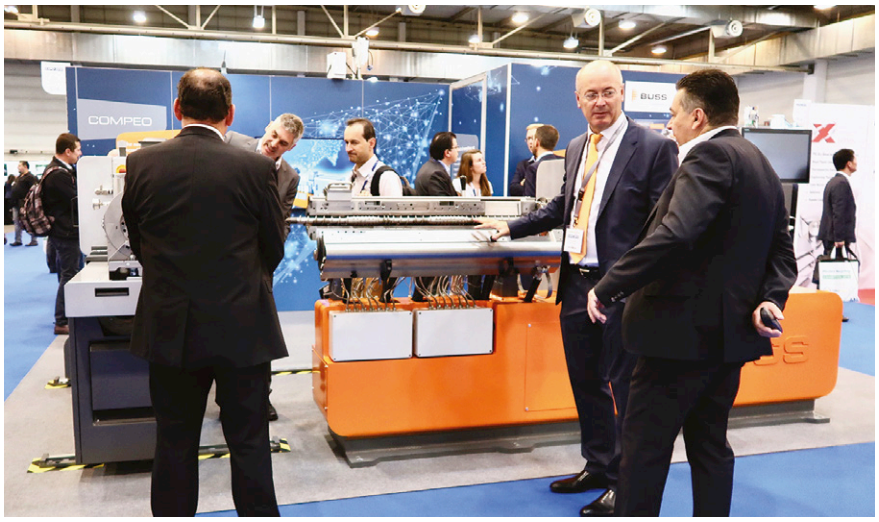

The event builds on the success of earlier shows held in Essen

Booths selling fast for new plastics show

More than 50% of booths have already been sold for a major new free-to-attend plastics industry event that will take place at Huntington Convention Center in Cleveland, Ohio on 8-9 May 2019. Organised by AMI, the event will include three focused tradeshows – the Compounding World Expo, the Plastics Extrusion World Expo and the Plastics Recycling World Expo.

Over 120 companies have already booked their booths at these three tradeshows. The latest leading suppliers to join the event include Azo, Chemours, Clariant, Colines, Exxel Polymers, Konica Minolta, Nordson, Oden Technologies, Reifenhäuser, Starlinger, Universal Dynamics, and Wacker.

They join an impressive array of existing exhibitors including Addex, Advanced Blending Solutions, Bausano, Beier, Brabender, Buss, Cabot, Coperion, CPM Extrusion, Cumberland, Davis-Standard, Dr Collin, Doteco, Dover Chemicals, Entek, Farrel Pomini, Ferro, JSW, Kaneka, Leistritz, Luigi Bandera, Macchi, Milliken, Modern Dispersions, NFM, NGR, Omya, Piovan, PTI, Struktol, Toyota Tsusho, Windmöller & Hölscher, Zeppelin and Zoltek.

"We are delighted by the industry's response to these new tradeshows," said Andy Beevers, events director at AMI. "The two large halls at the Cleveland Convention Center are filling up quickly, and we've seen strong growth in interest in recent w eeks as more market leaders book their booths."

Building on the successful launch of AMI's compounding and recycling shows in Essen, Germany in June of this year, the Cleveland event is set to be the largest plastics industry gathering in the USA next year. It will feature five free-to-attend conference theatres, plus there will be a networking party for attendees and exhibitors at the Rock and Roll Hall of Fame on the evening of 8 May.

Online registration for free tickets will go live on 26 November, and you can register your interest in advance at the website listed below.

For more information on exhibiting at the Compounding World Expo 2019, the Plastics Extrusion World Expo 2019 and the Plastics Recycling World Expo 2019, please visit: **www.ami.international/exhibitions**

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Whether for a few days or a few decades, ensuring plastics maintain their performance throughout their intended lifetime means using effective antioxidant systems. ***Peter Mapleston*** *reviews the latest developments*

Bringing stability to plastics

PHOTO: SHUTTERSTOCK

Plastics have earned a reputation for durability but that is not by chance. Whether for long-life applications such as automotive parts, products intended for just a few years in the field – literally – such as agricultural films, or single-use packaging that is destined – hopefully – for near immediate recycling, plastics need chemical additives to provide sufficient stability to survive processing and intended use. Polyolefins are key beneficiaries of such additives: antioxidants, UV absorbers, and hindered amine light (HALS), and heat stabilisers. Additive suppliers continue to make progress in developing products for this sector that are better performing, more cost-effective, and safer.

Plastics deteriorate over time as a result of the polymer chains reacting with oxygen via autocatalytic reactions. Antioxidants, added at a sufficient concentration, slow down these oxidation reactions. "With an increased focus on recycling polymers it has become important to reconsider what constitutes 'sufficient stabilisation' for even single-use short service-life applications," says Dr Niall Marshall, Technical Manager with Everspring Middle East (part of Taiwanese producer **Everspring Chemical**).

"As the volume of polymer to be recycled increases –the European Commission's Strategy for Plastics in a Circular Economy envisages that all plastic packaging will be recyclable by 2030 – the quality of the recyclate will become more important as it finds uses in more demanding applications. The stabilisation system will be required to protect the polymer during processing, use and reprocessing."

Marshall notes that in applications with short service lives such as packaging, the stabilisation requirements for processing are more demanding than those for the service life. For such cases, Everspring offers customised combinations of well-proven stabilisers such as its Evernox range of hindered phenolic antioxidants and Everfos phosphites, together with what he says are highly effective boosters such as Everstab FS042, a dialkyl hydroxylamine which acts as a catalytic chain-breaking radical scavenger.

Recent work carried out by Everspring as part of a study with a plastics recycler has shown that while the same families of stabilisers, with their proven performance and broad regulatory approvals, are able to meet future requirements of stabilising the polymer sufficiently to allow for successful post-use recycling, there are some additional factors which need to be taken into account.

"Even virgin polymer which appears to have the same levels of stabiliser performance after five extrusions is found to have a significantly different

Main image: Surface crazing is one of the most immediately visible signs of inadequate polymer stabilisation

PHOTO: AMPACET

Right: Ampacet's Agristab 372 UV stabilising masterbatch offers better greenhouse film performance where sulphur fumigation is used

MFI after even a single extrusion following oven ageing," Marshall says. "Adding additional antioxidant during recycling (following the oven ageing) does help retard further increases in MFI during subsequent multiple extrusion, but it does not eliminate the differences observed in the first post-ageing extrusion, nor does it undo any damage already done to the polymer." This is shown in Figures 1a and 1b.

Everspring's work has demonstrated that the presence of sufficient levels of active hydroperoxide decomposers (its Everfos 626 and 9228 for example) in the polymer as it is being melted for recycling is important to maintain the polymer's properties. "This is because hydroperoxides, which form during the service life of the polymer in air, are relatively stable at ambient temperatures but rapidly decompose causing a surge in oxidation reactions while the polymer is being heated for reprocessing but before any additional antioxidant can be blended in to the polymer melt," Marshall says.

Agricultural options

Moving to products with lifetimes measured in years rather than weeks and months, **Ampacet** has introduced Agristab 372, which it describes as a highly effective UV-stabilising masterbatch that outperforms conventional HALS and NOR HALS stabilisers typically used in greenhouse film when pesticides are heavily used.

"Typical greenhouse film containing conventional NOR HALS stabilisers is designed for maximum 3,000 ppm sulphur content and three years, or four seasons, of effectiveness, while the market tends to require greenhouses with longer life-spans and higher pesticide usage, to withstand up to 5,000 ppm sulphur for a duration of more than three years," the company says.

Sulphur evaporators are one of the most commonly-used methods to fumigate greenhouses. But the use of sulphur fumigation leads to a loss of UV stabilising properties of the greenhouse film as photo-oxidation of sulphur deposited on the greenhouse film surface can yield acidic species, deactivating HALS stabilisers. Ampacet says Agristab 372 provides greenhouse film with outstanding resistance to pesticides, allowing usage of up to 5,000 ppm sulphur for a greenhouse that can last for more than three years. It does not affect the colour of the film and offers very high light transmission.

Phosphite alternatives

At the NPE 2018 show in Orlando earlier this year, Baerlocher USA, part of **Baerlocher Group**, introduced a new generation of its Baeropol RST resin stabilisation technology. It says Baeropol DRS 6812 is a key component of its expanding Baeropol RST global technology platform. "The new additive delivers improvements in melt stability, polymer colour and antioxidant solubility and can be used as a replacement for most secondary phosphite antioxidants," the company claims.

"The rapidly growing polyolefin market, including the circular recycling economy, requires new

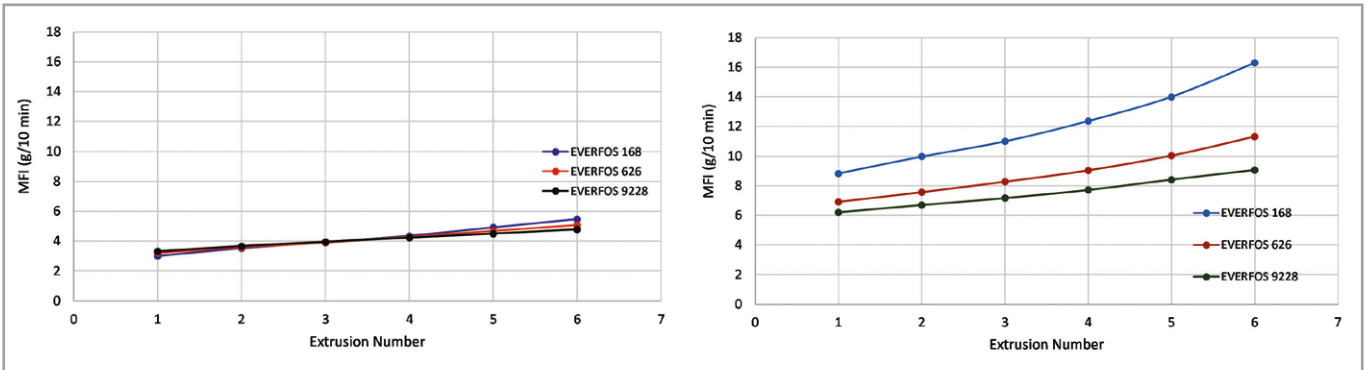

Figure 1a and 1b: Recycling presents greater challenges for polymer stabilisation. A system that works well to protect virgin PP through multiple reprocessing steps (Figure 1a) can be far less effective when the material has a previous service exposure history (simulated in Figure 1b by oven ageing). ***Source: Everspring Chemical***


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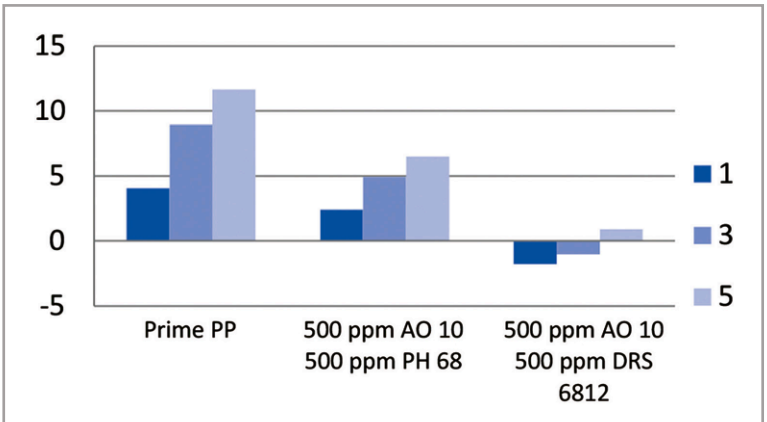

Figure 5: Comparison of the effect of different AO packages on yellowing in polypropylene after one, three, and five extrusion passes
Source: Baerlocher

stabilisation technologies that can solve the challenges facing traditional phosphite additives, such as limited solubility that can lead to processing issues," says Robert L Sherman, technical director for Baerlocher USA's Special Additives division. "Innovative solutions are particularly critical for stabilising recycled polyolefin content, meeting regulatory requirements for safety in food packaging, and delivering improved colour and polymer stability." This effect is shown in Figure 5.

Baerlocher says that even though they have been used for years as secondary antioxidants for polyolefins, particularly for melt phase stabilisation, phosphite additives can present solubility issues. "They can come out of solution and cause plate-out on extrusion equipment and polymer parts," it says. "New Baeropol DRS 6812 additive delivers excellent solubility and optimises hydrolytic stability for consistent performance." The new antioxidant is also claimed to offer "exceptional" compounding flexibility. It can directly replace phosphites as a 1:1 drop-in substitute, or act as a synergist to reduce the loading of phosphites. It is even said to allow the use of lower-cost phosphites while maintaining desired performance.

Baeropol DRS 6812 contains synergistic polymer stabilisation additives that improve melt stability in polyolefin resins and compounds, as well as polymer colour and processing consistency, compared to standard phosphites. Baerlocher adds that it also extends useful polymer life. Baeropol RST chemistry can be suitable for generally recognised as safe (GRAS) applications, making it applicable for indirect food contact.

Thoughts for food

Addivant notched up another success for its Weston 705 antioxidant when it obtained clearance for use of this nonylphenol-free liquid phosphite for food-contact applications in the Mercosur region of South America. Weston 705 already has approvals from US, European, and Chinese regulatory authorities, and Martin Pavlik, Addivant's recently-appointed Global Director of Business Development (he moved to the company in March, after almost 12 years at Dow Chemical) said in late August that approval from the Mercosur Southern Common Market had just been granted. "Weston 705 is currently the only sustainable globally registered liquid AO for polyolefins on the market," he says.

Weston 705 is targeted squarely at polyethylenes, although it is also being used in some TPEs. Pavlik says Addivant is working on obtaining food contact approvals for its use in polypropylene, but this will take around 18 months.

Addivant has also begun developing a new solid AO with improved efficiency, based on what it describes as a novel sustainable chemistry. Market launch is expected to be around 2020. "We think liquids are the most effective for a variety of reasons, but a large part of the industry is still operating with solid antioxidants, so we are committed to developing as quickly as possible a new complete solution system for that sector," says Pavlik. "Our aim is to have a system with a safety profile that complies with current and likely future regulatory requirements and which in any case will be superior to any solid system currently available."

Pavlik notes that most solid AO systems for polyolefins are combinations of a phenolic primary antioxidant and a phosphite secondary antioxidant. "Phosphites are coming under increasing scrutiny," he says. "In three to five years, today`s molecules may undergo a similar phase-out as TNPP recently did. So we are conducting studies on possible alternatives. This is why we developed Weston 705 in the first place. At the end of the day, Addivant wants a portfolio of the safest products possible." ❯


PHOTO: BAERLOCHER

Right: Baerlocher's Baeropol DRS 6812 in "prill" form. Individual particles are about the size of sugar granules

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PHOTO: ADDIVANT

Above: Addivant's Weston 705 liquid AO now has food contact approvals in Europe, China, and across the Americas

Pavlik says that the expected merger of Addivant with **SI Group**, another major manufacturer of performance additives and intermediates, will provide more momentum for this strategy. SK Capital Partners , the private investment firm that has owned Addivant since 2013, said in June that it had agreed to acquire SI Group.

Headquartered in Schenectady, NY, SI Group operates 20 manufacturing facilities on five continents. At the close of the transaction, expected later this year, SK Capital will combine SI Group and Addivant (which itself makes not only antioxidants but various other additives, including antiozonants, inhibitors, polymer modifiers and UV stabilisers).

Barry Siadat, a co-founder and Managing Director of SK Capital, says SI Group has an excellent fit with the technologies and end markets of several SK Capital businesses, of which Addivant is one. "By combining the complementary strengths of SI Group and Addivant, we will be creating a global technology and industry leader in plastic, lubricant, oilfield, and rubber additives," he says.

Addivant continues to expand production capacity for Weston 705, especially as it hopes to tie up partnerships with two major Chinese polyolefin suppliers - Sinopec and Petrochina - in the near future. Production in China under licence by a production partner is set to begin in Q4. "Additional integration within the Weston 705 manufacturing process will be enhanced by making an intermediate in France and the future combination with SI Group is expected to bring further synergies," Pavlik says.

He also draws attention to Genox EP, a solid phenol-free stabiliser that acts as both a primary and secondary antioxidant and which has been in the Addivant portfolio for some time "but which is only now resonating among suppliers of polyolefins. It also has possibilities in engineering thermoplastics."

Genox EPis 90% vegetable-based and is, Pavlik claims, the best solution for preserving colour. He believes it is especially appealing in such applications as fibres used in hygiene products. It is claimed to be five times more effective than more traditional stabilisation systems, but it is also expensive. Addivant is currently investing to improve production efficiencies, he says.

New capacities

Addivant is not the only additives supplier adding capacity. Last October, **Solvay** said it would invest to double the capacity of its Technology Solutions global business unit's high molecular weight HALS production facility in Willow Island, West Virginia, US. The core HALS products currently produced at the site are the foundations for the company's Cynergy and Cyxtra polymer additive product families. The investment is for a second, fully independent HMW HALS manufacturing unit to complement the existing line at Willow Island and is slated to be operational by mid-2019.

This July, **BASF** said it plans to increase global production capacity for its antioxidant Irganox 1010 by 40% through production expansion projects at its sites in Jurong, Singapore, and Kaisten, Switzerland. New production in Kaisten should come online in 2019 and in Singapore in early 2021. The investment includes doubling capacity in Singapore by adding an additional production line that will be integrated into the existing production facilities. An increase of 30% at Kaisten will be achieved through debottlenecking.

BASF is also investing in its McIntosh, Alabama, US, site to improve supply reliability and expand capacity of Irganox 1010 and associated antioxidants. The company has not quantified that expansion.

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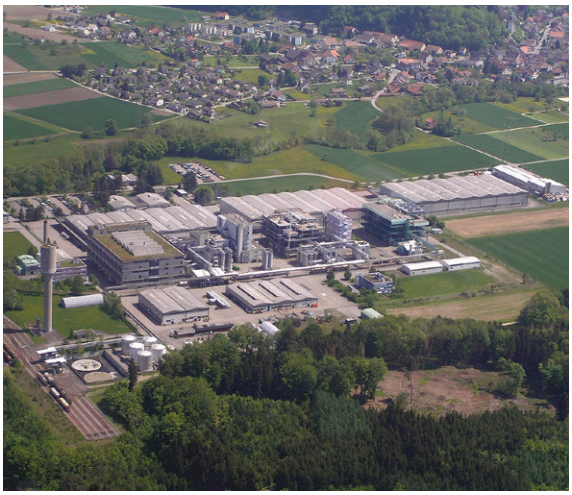

PHOTO: BASF

Right: BASF is adding global capacity for its Irganox 1010 antioxidant at three plants, including a 30% expansion at its Swiss facility at Kaisten

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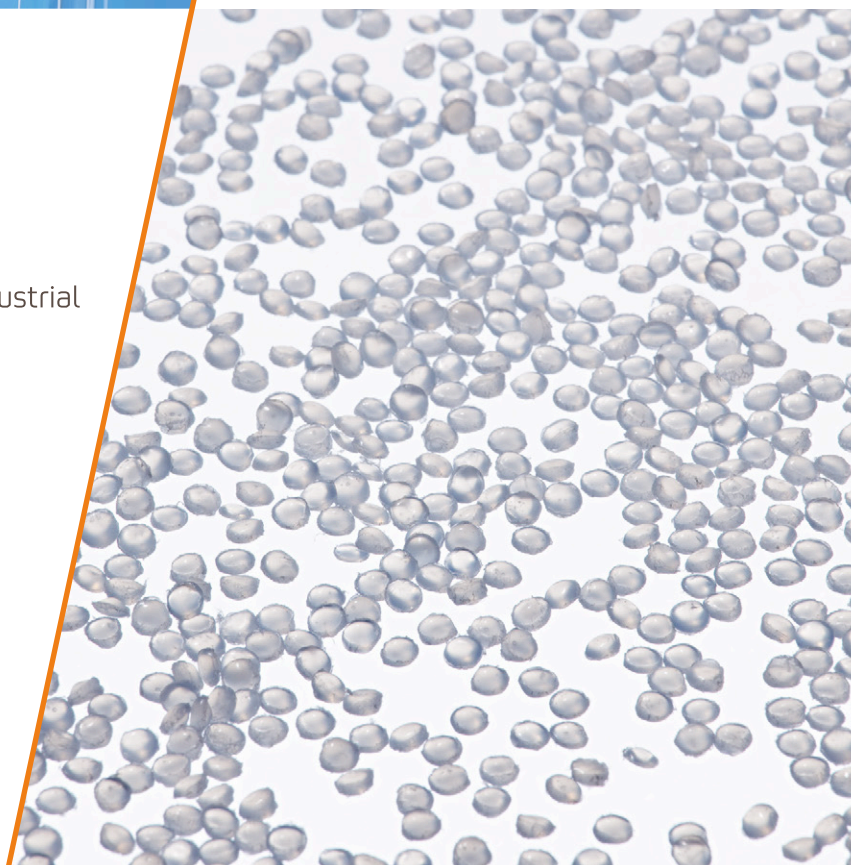

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Extruder suppliers have recently been busy supporting plant expansions – especially in Europe and the Americas. ***Lou Reade*** *reports*

Extruder deliveries on the rise

Extruders lie at the heart of the film and sheet production process, and there has recently been a flurry of activity in machinery sales. Machinery trade associations in both Europe and North America are reporting increased sales – so it is no surprise that so many new extrusion

At its recent Competence Forum event, **Krauss-Maffei Berstorff** demonstrated the production of co-extruded PVC sheets.

"We showed our visitors cost-effective and flexible manufacturing of PVC sheets," said Matthias Sieverding, president of extrusion technology at KraussMaffei.

A variety of co-extruded products can be created using cost-effective materials using the 'total system' concept and utilised in applications in the construction industry, container construction and advertising, he said.

The main extruder KMD 133-32/PL produces a foamed intermediate layer with an output of up to 1100 kg/h, while a KMD 75-26/PL co-extruder produces a solid outer layer with an output of up to 240 kg/h.

The flexible design allows the processor to modify a mono extrusion in just a few easy steps, says the company.

"The KMD 164-32/PL twin-screw extruder has a very high output of up to 1400 kg/h and shows our comprehensive expertise in sheet extrusion," said Sieverding.

Three-section cast line

Amut Dolci Extrusion recently delivered a three-section cast-laminating line – to make PA-PE barrier film – to a customer in Europe. The film will be converted into vacuum pouches/envelopes or trays for sliced foodstuffs.

This type of application requires a multiplayer film with barrier properties against gas, fats and flavourings.

The line configuration has three sections: two have flat dies (cast) – of which one is for barrier resins (PA), and the other for polyolefins (LDPE, LLDPE and ionomers). There is also a central lamination section where the two formed films are coated.

A barrier film with net width of 1,800mm and PA/primer/PE+PE/PE+PE+PE formulation is obtained. The roll diameter is 800mm and the total

Main image: KraussMaffei Berstorff produced co-extruded PVC sheet at its recent Competence Forum

Above: Amut has developed a new line for the production of cast PP film

output is 600-900 kg/h depending on thickness.

Although the formulation of the produced film is quite simple, the line has high performances in terms of efficiency and flexibility, says the company.

The absence of 'curl-problem', the high transparency of the film and the in-line edge trims recovery system to reduce waste at minimum represent further competitive margins, especially for vacuum pouches production, according to the company.

The first section – for the cast PA barrier layer – includes an extruder with a gravimetric dosing system, automatic T-die, chill roll with three heated calenders, rolls unit for film stabilisation, water based primer-coating station with reverse roll system and hot air dryer, plus a Corona treater.

The second section, for cast PE, has three extruders with related gravimetric dosing, a three-layer feedblock, automatic T-die, and chill roll with two cooled calenders.

The central lamination station has two extruders and related control equipment. Each section is equipped with scanners for automatic gauge and film tension control. The line includes an in-line edges trimming, recovery and refeeding system and an automatic contact and gap winder, with integrated edge slitting.

Right: Amut Dolci Extrusion delivered a three-section cast-laminating line to a customer in Europe, to make PA-PE barrier

Fast-change chill roll

At the same time, Amut has developed a new line for the production of cast PP film.

The 2,100mm-wide ACP series has been designed to make smooth, general-purpose film, and film with an embossed surface for stationery applications such as document folders.

In order to produce both types of CPP film surface, the line has two different chill rolls. A fast-change system enables production to be switched between the two very quickly.

The line has a four-layer multi-manifold die which allows very accurate distribution of the layers by using four extruders.

An independent rotary arm type winder is equipped with an in-line cutting system for the production of finished rolls without any reduction of maximum winding diameter, even when running multiple rolls in winding and with absolutely minimum tail, says Amut.

Technical film

Luigi Bandera of Italy is to deliver a three-layer TechnoFlex line to a customer in Poland

TechnoFlex lines are designed to produce high quality technical films, says Bandera. They are equipped with components including the latest ESR-9000 generation of winders, which allows three winding modes – by contact, axial and with gap. This makes it the best solution when the qualitative target is elevated – such as for the converting industry – or when the film presents critical aspects such as stickiness or elasticity, according to Bandera.

The line, which will focus on the production of shrink-film, and lamination and converting film – with a maximum layflat of 2400mm (net trimmed foil) and output up to 550kg/h – will be delivered to an existing Polish customer – a leading flexible packaging producer that has been working in the market for more than 20 years.

Turkish BOPP line

Polibak, a leading plastic film producer in Turkey, is planning to boost output by 40% by installing a new line from **Brückner**.

The company, which has two facilities in Izmir, currently has an annual production capacity of 130,000 tonnes of BOPP film, 25,000 tonnes of metallised BOPP film, and 3,000 tonnes of CPP film.

It will now install a 10.4m wide line that has production speeds up to 525m/min, equivalent to an output of over 7,400kg per hour of five-layer film.

Brückner says that, when installed, it will be the

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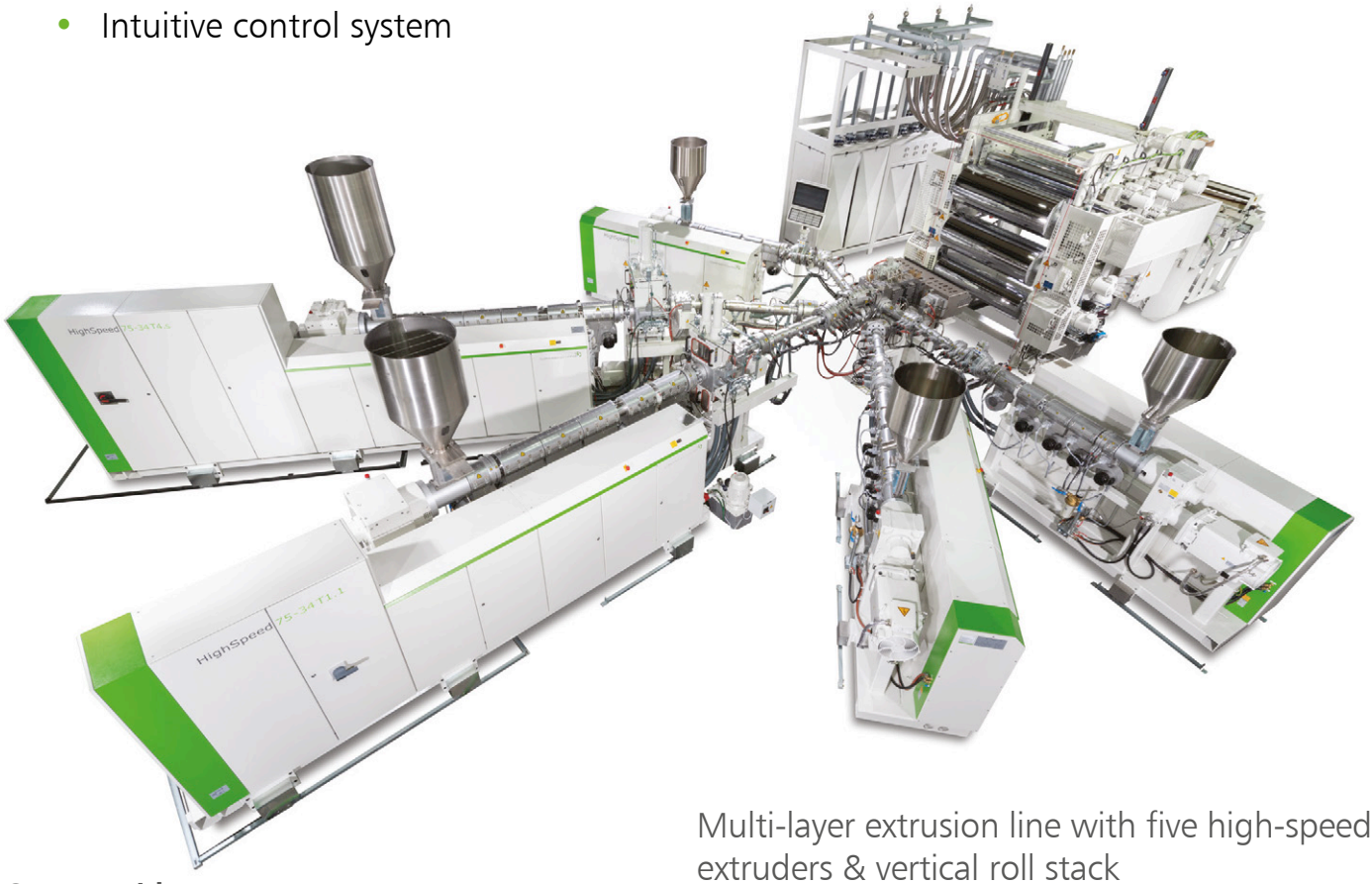

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Right: Luigi Bandera will deliver a three-layer TechnoFlex line to a customer in Poland

largest BOPP film production line in Turkey.

Enver Bakioğlu, a board member of Polibak, said: "The demand for packaging films and different label types such as IMLs is constantly growing – in Turkey as well as abroad. With our new line we will be able to optimally serve our local and export markets."

Polibak's previous joint project with Brückner was an 8.7m BOPP line with an output of 6.5 tonnes/hour – which is still the largest line of its kind in Turkey, said Brückner.

Nine layers in Colombia

Plastilene, a large flexible packaging manufacturer based in Colombia, recently took delivery of a Varex II extrusion line from **Windmöller & Hölscher** of Germany.

"This Varex II is the first W&H nine-layer extrusion line in Latin America measuring 2,600mm in width," said Gabriel Jaramillo, technical director of Plastilene. "This is the ideal film width for the markets we serve."

Plastilene has used W&H lines since 2005, and now has 19 of them – including a Primaflex flexographic printing press and several extrusion and converting systems. The new line has been commissioned at its Novalene subsidiary, situated near Bogotá in Colombia. From there, it supplies markets with films for high-tech barrier structures and technical films.

"We have high expectations of our machines, as we only produce products to international standards," said Jaramillo.

Below: A new line from Brückner will help Turkish film producer Polibak boost output by 40%

The Varex II has been combined with a Miraflex AM8 flexographic printing press and a Corematic non-stop roll handling system for the printing press rewind. The entire installation has been adapted to Novalene's needs and is specialised for the manufacture and printing of films for the food industry.

Plastilene has production facilities in Colombia,

Guatemala, and Ecuador, employs more than 800 people and has revenues of around US$150m.

Sigma stretches

During the recent NPE show, US film extruder Sigma Plastics signed a deal to buy three **Davis-Standard** film lines – one 2.5m cast film hygiene line and two five-layer agricultural blown film stretch lines.

The cast hygiene line – scheduled for installation this year – is the second of its kind purchased by Sigma in the last three years. It will be engineered for A/B/A structures with in-line printing capabilities. The five-layer stretch lines will include Davis-Standard Optiflow LP dies and vertical oscillating haul-off technology.

"Davis-Standard has been exemplary at supporting our business demands and growth," said Alfred Teo, chairman of Sigma Plastics.

Sigma has been a Davis-Standard customer for 40 years and operates more than 350 of its lines at 42 manufacturing facilities in North America – accounting for an annual throughput of more than 2 billion pounds (around 900,000 tonnes) of resin.

The purchase comes hot on the heels of Sigma's order of four co-extrusion blown film lines from **Reifenhäuser** of Germany. For its BJK operation in Louisville, Kentucky, Sigma ordered two high output, five-layer PE dedicated lines – including Ultra Cool IBC and an Ultra Flat inline flattening system. Sigma also ordered two high output lines for its Allied Extruders division – in three-layer and five-layer versions. Both incorporate Ultra Cool and Ultra Flat technologies.

Boosting output

Valfilm North America, based in Findlay, Ohio, last year installed a second AllRollEx 3000 extrusion line from **Colines** of Italy, to produce cast stretch film ❯

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Right: Colombian flexible packaging manufacturer Plastilene has begun running a Varex II extrusion line from Windmöller & Hölscher

The new 6-UP multilayer AllRollEx line is equipped to reduce energy consumption, minimise maintenance operations on the line and improve consistency and traceability of the final product. A new ergonomic extrusion line layout design, plus an efficient technical solution for multiple in-line slitting of short rolls, will help Valfilm boost their production capacity in North America and will be adding value to its products, said Colines.

"We care about securing our customers' shipments," said Dan Maiorino, commercial operations manager of Valfilm. "This new technology, combined with our film design know-how, has allowed us to push the limits of film optimisation, consistency and load stability."

The first multilayer AllRollEx line – bought two years previously – proved to be very flexible, meeting a wide variety of jobs with minimum changeover in the manufacture of multi-layer cast stretch film in all roll formats.

More recently, Colines ran a final test of an AllRollEx cast line before delivery to a customer in Spain. The line makes seven-layer film, using five extruders, and can produce up to 6in-line rolls with a 250mm width.

"The test results were great, because we could run all the different options in a very short time – even switching the production from 3in reels to 2in reels," said Nicola Lombardini, R&D manager at Colines.

"Our customer really appreciated the flexibility and user friendliness of the line – which have always been among the best features of the AllRollEx line."

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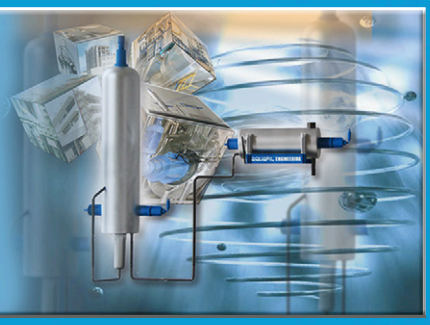

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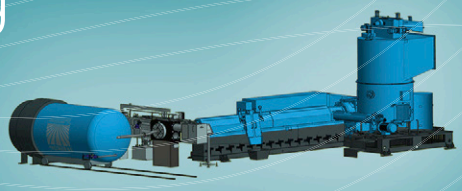

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Right: Pregis has added a Hosokawa Alpine five-layer, coextruded blown film line at a plant in Wisconsin

Blown film at NPE

Macchi of Italy says it was the only company showing a blown film line at the recent NPE show in the USA.

At the exhibition, it showed a five-layer POD line – comprising two 55mm extruders, two 65mm extruders and one 90mm extruder.

The line also incorporated a 400mm die, and produced collation shrink film with an output of 600 kg/h.

During NPE, it produced a five-layer stand-up pouch following cooperation with materials supplier Dow Chemical, which developed the material for the application.

It took Macchi around two weeks to build the line at the show. Such a short installation time was possible because each line had earlier been installed and tested under real production conditions at its workshop.

Macchi said it was able to make the structure with a thickness of 75 microns – rather than the usual 90 microns.

"The five-layer structure allows the converter to choose the resins with the best features," said the company.

"Instead of using extensive blending, it is possible to use the most suitable material – such as high melt strength polymers for intermediate layers. This increases the stiffness of the whole structure, which reduces its thickness."

After the show, the line was delivered to Versa-Pac, a Macchi customer based in Ohio – which has since confirmed that it will buy two more similar lines from Macchi.

Below: Macchi says it was the only company to show a blown film line at NPE

Pregis expands plant

US-based **Pregis** has invested more than $10 million in its Sharp Packaging flexible packaging operation

in Wisconsin – which includes adding a blown film line and enhancing printing capabilities there.

A new **Hosokawa Alpine** five-layer, coextruded blown film line – which produces polyethylene-based film for use in flexible packaging, including poly bags – has been installed in the vertically-integrated facility.

Material is extruded, printed, then converted into pre-opened flexible bags.

The company has also invested in two 8-colour flexographic printing presses that have a broad range of printing capabilities and wider colour range, with higher quality graphics.

"With increased demand for Sharp bagging systems –particularly for e-commerce applications– this investment puts us in an ideal position to supply marketplace needs," said Mike Menz, president of Sharp Packaging Systems. "Our new five-layer blown film line allows us to push the envelope on engineered film solutions which address specific packaging objectives."

Sharp flexible bags and bagging systems are used in a variety of applications including e-commerce, medical/pharmaceutical, retail displays and OEM parts.

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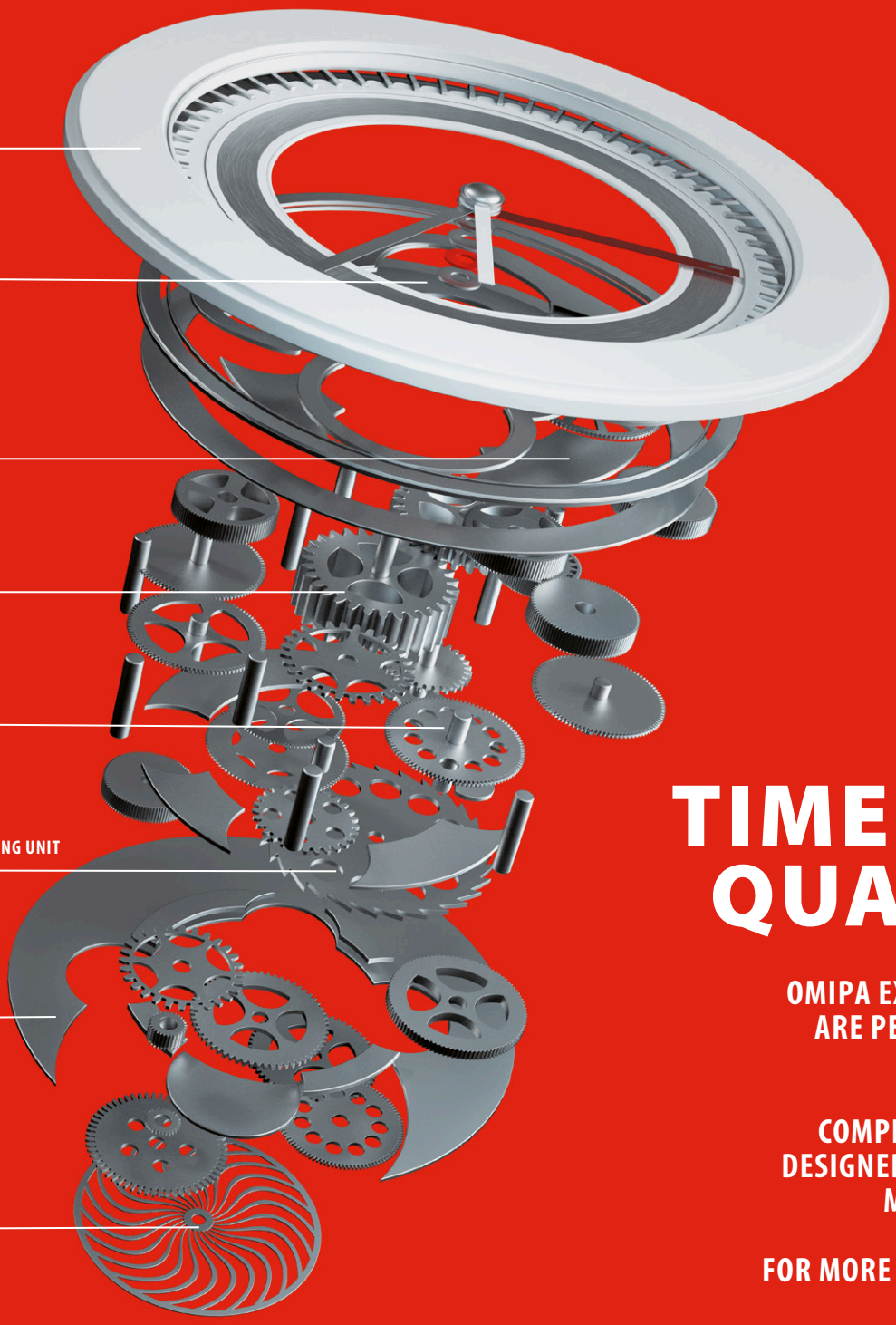

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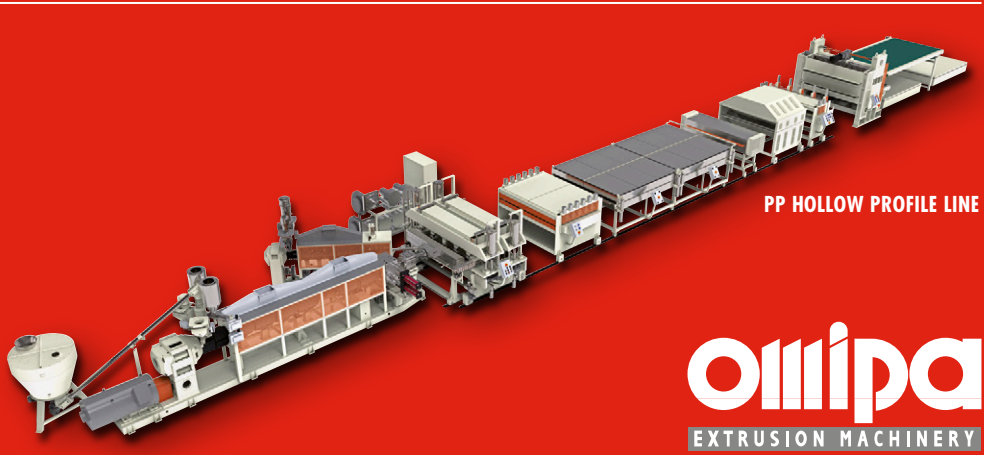

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***Chris Middleton** explains how blockchain aims to make sensitive supply chains smarter and more trustworthy. But the technology is not without its challenges...*

Blockchain: redefining industry supply chains

Blockchain – the encrypted ledger technology that secures cryptocurrency and potentially a whole raft of business transactions – is simultaneously one of the most hyped and criticised technologies in living memory. And it is sometimes hard to sift the truth from the fiction.

Last month, the professional services specialist PwC published global research suggesting that 84% of organisations are experimenting with the technology. 25% of organisations have projects that are either live or at the pilot stage, it said, while 32% have projects in development and a further 20% are researching the market.

However, in May the technology analyst firm Gartner had published a very different set of findings. Its 2018 CIO survey said that only 1% of CIOs report live blockchain programmes within their organisations and just 8% are either planning blockchain initiatives or looking at or experimenting with the technology. According to Gartner, 77% of CIOs said their organisation had no interest in the technology and/or no plans to investigate or develop it.

Two highly reputable organisations and two detailed, global surveys presenting contradictory findings published just three months apart. These extremes of claim and counter-claim have typified discussions about the technology. However, Gartner's latest Hype Cycle report, published at the end of August, acknowledged that blockchain is a fast-maturing technology.

Blockchain explained

Essentially, a blockchain is a distributed ledger. It is a continuously expanding chain of records (blocks) that are linked and secured via strong cryptography to create a networked audit trail of transactions. Because each block, ledger, or record usually contains a cryptographic hash of the preceding one, together with a timestamp and data about the

Main image: Blockchain technology could reshape supply chains in industries such as chemicals and plastics

Right: The development of smart cities is paving the way for real time data collection to create permanent and inviolable records

PHOTO: SHUTTERSTOCK

transaction, the system is designed to be resistant to tampering and modification.

Typically, blockchains work using the processing and mirroring power of distributed/peer-to-peer computing systems, which is both the technology's advantage and, some argue, its inherent problem, because it replaces trust with networked complexity.

Theoretically, tampering with any one record creates a ledger entry that differs to all of the verified copies across the network. This is why blockchain's proponents believe it could become the foundation of a new data commons, challenging the concept of proprietary data and data landlords. The disadvantage is that this type of distributed processing is typically slower and more resource intensive than others. And that means that the cost of every transaction is higher and uses more energy.

Most blockchains are either public/permissionless – meaning anyone can join or add their processing power – or private/permissioned. The latter demands that someone's identity can be verified before they are allowed onto the closed system.

Linked with blockchain are the concepts of digital tokens and cryptocurrencies. Indeed, the technology was developed as a decentralised computing model to support cryptocurrencies and verify transactions. On some distributed, blockchain-supported systems, digital tokens are exchanged for work/processing and may represent an asset of any kind – that could include plastics, chemicals and compounding or mixing services.

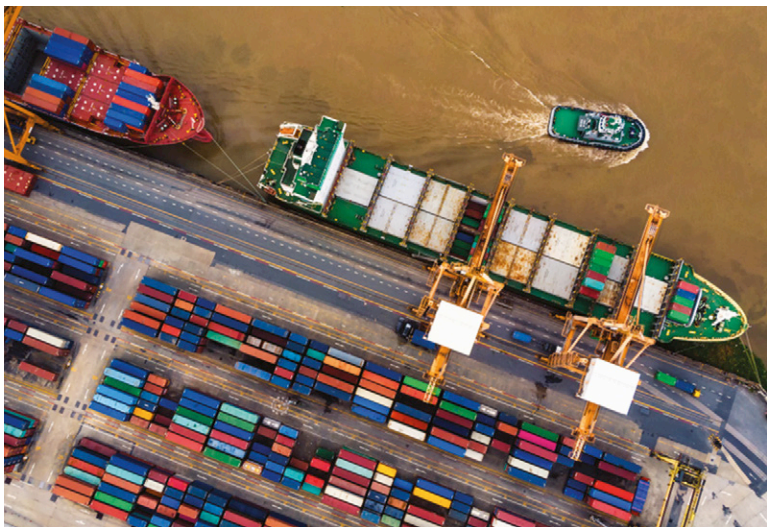
Below: Blockchain technology provides a mean to track, monitor and record condition of goods at every point in the supply chain

The big attraction

The concept of an immutable system of record makes blockchain attractive for many applications that demand verification and authentication, which is why use cases are fast developing in supply chain management, logistics, transport, manufacturing, financial services, publishing, intellectual property, contracting, legal services, and more.

And in an increasingly interconnected world of smart things – from smart, connected cities, transport networks, factories, industrial installations, offices, and homes, to smart trucks, shipping containers, delivery boxes, and even sensor-filled labels on perishable goods – the idea of an inviolable system of record, together with smart contracts and automated payments, is even more attractive.

Blockchain is making its presence felt in all of these areas, because of the Internet of Things (IoT), the same technology, incidentally, driving interest in Industry 4.0 manufacturing management systems. Imagine a supply chain for sensitive, fragile, and/or perishable goods on which they could be authenticated at source and throughout the chain, shipped in ideal conditions, and delivered safely, on time, to the correct recipient. Each stage of that process could be logged and stored on an immutable ledger, with payments made automatically if and when all conditions are satisfied. That's the promise of blockchain in the chemicals sector – and in others that face similar challenges.



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Blockchain realities

So how does blockchain look in practice? In March IoT supply chain specialist Brieftrace developed a blockchain solution to transform the way that pharmaceutical companies track their assets and perishable goods, allowing them to ensure that they are being handled correctly and delivered safely. The firm teamed up with transport and logistics company DSV on a pilot programme that deploys blockchain-connected tracking and sensing devices to monitor shipments. The pilot is based on the Traceum blockchain, which facilitates smart contracts, fiat currency transactions (currencies backed by a government as legal tender, rather than by a commodity such as gold), fixed transaction fees,

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Above: Systems such as IBM's Blockchain World Wire aim to provide trusted "near real time" international payments

partner transparency, trusted data, and archiving.

The new system gives companies the ability to monitor issues such as product temperature, humidity, and light exposure, which can affect many drugs, chemicals, and other sensitive or perishable goods. This information is then stored on the blockchain, along with the vehicles' locations at every point.

Meanwhile, in the meat supply chain, the Arc-net initiative connects each step of pork product journeys using blockchain technology. This extends to encoding the DNA signature of each pig into the blockchain so the system can ensure that the same meat is being processed throughout the supply chain.

Blockchain is also being used in the diamond industry to authenticate the origin of each stone from a specific pit in a specific mine, and to then trace it all the way to the end customer.

There are other indications that blockchain is changing the business landscape, according to the August PwC report. For example, the concept of tokenisation is spreading to raw materials, finished goods, income-producing securities, membership rights, carbon offset trading, and even charitable donations. At the same time, initial coin offerings (ICOs), in which a company sells a predefined number of digital tokens to the public, are funnelling billions of dollars into blockchain platforms. ICOs raised $13.7bn in the first five months of 2018 alone, according to PwC.

There are other potential advantages in the technology. "Using blockchain in concert with enterprise resource planning platforms will enable companies to streamline processes, facilitate data sharing, and improve data integrity," said the PwC report. As a distributed, tamperproof ledger, a well-designed blockchain doesn't just cut out intermediaries, reduce cost, and increase speed and reach, it also offers greater transparency and traceability for many business processes, the firm said.

Securing transactions

However, while such a blockchain validates data and eliminates the need for a central authority to approve and process transactions, cutting out that authority also removes the institutions important to ensuring market stability, combating fraud, and more. And that is a challenge to any long-established, risk-filled sector. Some organisations are working to ensure that centralised trust and blockchain are not mutually exclusive concepts by being in the vanguard of the change. In October 2018, for example, IBM officially launched its Blockchain World Wire (BWW) banking payments network.

Blockchain World Wire uses the Stellar block-

Learn at Blockchain for Chemicals

Blockchain technology is much more than cryptocurrency – it holds the potential to redefine supply chains across industry. Blockchain for Chemicals is a two-day conference that will focus on application of this emerging technology in the chemicals and plastics industries. It will explain how it could be used in the future to demonstrate traceability of materials, save time with paperwork, prevent fraud and lost goods in transit, build trust in the supply chain, and provide the plastics/chemical industries with a new tool for growth.

Taking place at the Sofitel Kurfürstendamm in Berlin, Germany, on 12-13 December 2018, the event will bring together industry leaders to discuss the opportunities for the chemicals industry and to explain how early adopters can save time and money for their businesses through fast and secure access to end-to-end supply chain information.

The conference will be chaired by Chris Middleton, an expert author and journalist covering blockchain technology and application. Other key participants include: Peter Busch, Mobililty Lead Distributed Ledger Technologies at Robert Bosch in Germany; Heinz Lux, Senior Digital Strategist at Evonik Industries in Germany; Rafael Cayuela, Chief Economist at Dow Europe in Switzerland; Nicolas Buhmann, Commercial Manager at Maersk in Denmark; and Dr Stefan Guertzgen, Global Senior Director Industry Marketing and Communication for Chemicals at SAP in Germany.

For information about attending the event, taking an exhibition space, or sponsoring the conference, visit the **conference website** or contact Grace Midgley. Tel: +44 (0) 117 314 8111; **grace.midgley@ami.international**.

BOBST AlOx CONVERSION: METALLIZER & OFF-LINE COATING

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BOBST

PHOTO: SHUTTERSTOCK

Above: Blockchain is being touted as a means to assess and rank logistics suppliers and create new on-demand options

chain to clear and settle international payments between banks in "near real-time", according to IBM, via a mutually agreed digital currency. Using the new system, two financial institutions agree to use a digital asset as the bridge between any two fiat currencies. That digital asset facilitates the trade and supplies settlement instructions.

Using their own payment system, the first bank converts the fiat currency into the digital asset. IBM's World Wire system then simultaneously converts that digital asset into the second fiat currency, completing the transaction, which is then immutably recorded on the Stellar blockchain for clearing.

The financial services industry has been in the vanguard of exploring blockchain and what IBM terms "programmable money" for some years. In July, for example, a number of European banks, including HSBC and Deutsche Bank, adopted their own blockchain platform – we.trade. Earlier in the year Japan's biggest bank, Mitsubishi UFJ, announced its own blockchain payment platform in partnership with US cloud provider, Akamai.

Linking to business

This summer, Swiss B2B blockchain company Equidato Technologies announced the launch of its SophiaTX blockchain – main net. It is a decentralised computing system that extends traditional enterprise applications, such as enterprise resource planning (ERP), supply chain management (SCM), and customer relationship management (CRM), into the blockchain environment.

The aim of main.net is to use the distributed ledger and decentralised processing structure of the Graphene blockchain to underpin enterprises' operational and management processes "to ensure maximum transparency, traceability, and trust",

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Right: GDPR is one of the challenges blockchain technology providers and users will have to address

according to the company.

Meanwhile, DB Schenker, the transport and logistics division of the German railway company Deutsche Bahn, has co-developed a decentralised application for supplier evaluation using the VeChainThor blockchain. Its system aims to rank and track service providers by such factors as the quality of their packaging, transportation times, and overall service.

Blockchain could also underpin an entire integrated transport system in the future without the need for large, costly, centralised control mechanisms, according to a UK research paper from the Transport Systems Catapult (TSC) and the University of Sheffield.

Counting carbon

Another novel venture, which is being billed as the "world's first retail platform that connects consumers to their own carbon footprints" was launched as a pilot programme in the UK by non-profit organisation the Poseidon Foundation earlier this year. The Poseidon retail platform uses blockchain technology to integrate carbon markets into transactions at the point of sale. Poseidon is partnering with ice cream giant Ben & Jerry's to demonstrate the system at one of its stores in London. The back end of the system runs on the Stellar blockchain network.

Environmental fintech company Veridium Labs is also working in the area of carbon offset trading. The company is partnering with IBM to transform carbon credits into fungible (exchangeable or interchangeable) digital assets that can be redeemed or traded on Stellar. In this relationship, Stellar acts as the underlying ledger, IBM as the token manager or broker, and Veridium provides the environmental expertise and industry structure. The resulting 'digital environmental assets' are designed to help companies and investors purchase carbon credits to mitigate their own environmental impacts, and/or hedge against future liabilities.

Also in the summer, the Mobility Open Blockchain Initiative (MOBI) announced its foundation

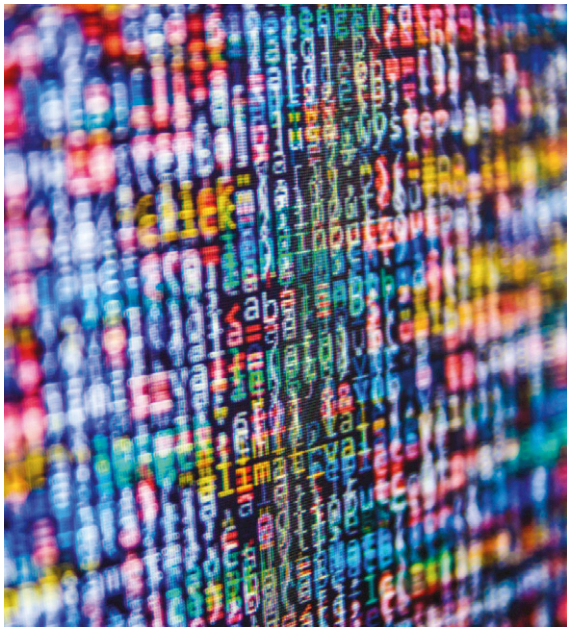

PHOTO: SHUTTERSTOCK

across the transport industry. The aim is to create "a minimum viable network" for the technology that includes car makers such as Ford, GM, Renault, and BMW, public transportation and toll road providers, technology firms such as IBM, blockchain innovators such as Fetch and the IOTA Foundation, academic institutions, startups, and regulatory bodies across the globe.

Blockchain challenges do remain in terms of complexity, cost, energy usage, and, some argue, GDPR compliance. GDPR stipulates that data should be permanently erased from storage systems, should that be requested by a data subject. In theory, blockchain makes that impossible, although various initiatives claim to work around the problem, as **this report** explains.

Taken together, however, it seems clear that the potential that these and other blockchain initiatives are demonstrating to transform supply chains for fragile or sensitive goods in terms of authentication, transport, contracting, finance and payments will see this emerging technology adopted across the chemicals sector in the future. And these initiatives are being backed by some trusted names. Welcome to blockchain!

About the author

Chris Middleton is a leading business and technology journalist and author specialising in information technology, artificial intelligence, machine learning, automation, enterprise policy and technology ethics. He is editor of InternetofBusiness.com, contributing editor to diginomica and Computing, and a former editor of Computing and Computer Business Review. He has also written for The Guardian, BBC, Computer Weekly and The Times. Middleton will be chairing AMI's Blockchain in Chemicals conference, which takes place in Berlin in Germany on 12-13 December 2018.

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Design for Sustainability 2018

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11 - 12 December 2018
Radisson Blu Portman Hotel, London, UK

Image courtesy of: **HP Inc**

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Multi-layer film offers opportunities in food packaging – including one new concept that puts the barrier properties in the outer layer. Lou Reade reports

Multiple layers add barrier and properties

Delegates at the *Multilayer Flexible Packaging* conference held in Chicago, USA earlier this year heard about the importance of new materials to the development of new packaging structures.

Li Zhang, packaging solutions manager at **915 Labs**, explained how new multi-layer packaging formats were needed to satisfy the company's MATS technology – which sterilises food using a combination of heat and microwaves.

MATS – or Microwave Assisted Thermal Sterilisation – is a "companion technology to pasteurisation", said Zhang, and is used widely in the food industry. Sealed packages are subject to pre-heating (to 65-85°C) by immersing them in warm water, in order to achieve homogenous heat distribution. In the next phase, the package is microwaved, which allows cold spots to reach sterilisation temperatures at the same rate. During this stage, the package reaches 65-130°C and up to 50psi in pressure. In the 'hold' phase, the packaging is kept at this elevated temperature for several minutes.

"This methodology eliminates edge burns and overheating," said Zhang.

In the final phase, the package is cooled by circulating water, to return the food to ambient temperature and atmospheric pressure.

Zhang said that MATS works more effectively than retort treatment, especially in terms of retaining the food's properties (such as flavour) and appearance, and can provide a shelf life of one year.

Gentle treatment

However, despite the gentle way that it treats the food, packaging for the process must be robust enough to reach high temperatures and pressures. It requires more temperature-resistant materials than retort packaging. Any flexible barrier structure must also be able to withstand the stress of the high pressure, for example.

915 Labs has developed a software package to help packaging producers develop the most effective MATS packaging, according to a rigorous set of criteria, he said.

"Results show the expected heating pattern, cold spots and temperature history," said Zhang.

The tests can be performed on rigid packaging (such as trays) and on the flexible packaging that surrounds it – such as a multi-layer package

Main image: PolyOne's OnCap helps to reduce fogging in transparent packaging

Right: 915 Labs says new multi-layer packaging formats will be needed for its MATS technology, which uses heat and microwaves to sterilise food

consisting of coated PET, bi-oriented nylon (or BOPA) and a PP sealant.

Retort concept

In retort packaging, **Ube** says it has developed a new concept that puts barrier materials in the outer layer.

Sergi Salva Saez, technical development manager at Ube America, told delegates that it has developed the concept using structures based on a new grade of its polyamide material.

Retort is a sterilisation process that puts food through an autoclave at high temperature (around 121°C) and pressure for around 30 minutes. It is used for everything from ready meals to pet food. Retort packaging needs to be able to resist high temperatures, retain its appearance (such as transparency), maintain sealing performance and deliver an appropriate barrier for the food inside.

In an Ube study to test the new concept, the company created two five-layer asymmetrical structures – with a total film thickness of 100 microns, of which polyamide took up 30% and EVOH 10% – comprising either a medium barrier layer (with one outer PA layer, a tie layer, and three PP layers), or a high barrier with two PA layers

(outer and middle), plus layers of EVOH and PP, with a tie layer too.

In the tests, pouches were prepared and sensors were fixed inside them. In one case, tomato sauce was placed within a package, along with a temperature and pressure sensor.

The asymmetrical structures proved to have superior oxygen and moisture barriers than similar symmetric structures, he said. One structure used Ube's hydrolysis resistant 5033FD8 grade as the outer layer, and the same (or similar) grade for the middle layer (for the high barrier version).

Tie-layer importance

Although tie-layers are typically relegated to being of second importance in a multi-layer film – especially when expensive barrier materials form part of the structure – they play a vital part in ensuring that all the layers can be combined.

Norman Aubee, technical service specialist at **Nova Chemicals**, said that selecting the correct tie-layer formulation is vital for multi-layer flexible packaging applications.

He said there was a long-term trend towards multiple layers in food packaging – with three-layer structures gradually declining, while five- and nine-layer structures were expected to continue growing in importance. Typical applications for these high-barrier co-extrusion films are meat, cheese and liquid packaging.

He pointed to a typical commercial example of a frozen pizza, protected by a seven-layer film with a total thickness of 170 microns, including a total of 94 microns in tie-layers – more than 55% of the structure.

"Optimising the tie-layer formulation would present significant opportunity in this application," he said.

He said that most film manufacturers blend 10-20% tie concentrate with 80-90% LLDPE as the base resin – so the base resin is often the highest volume percentage of the total barrier structure.

As well as giving package integrity, the tie-layer should maintain film optics and appearance and give barrier protection, he said.

Some of the challenges of tie-layers include: balancing tensile, stiffness and impact properties, for strong and consistent adhesion; ensuring that minor viscosity mismatches are not amplified – which will cause poor film optics; realising that some functionalities and additives (such as slip, or alcohols) will react with grafted maleic anhydride, rendering it ineffective; and, knowing when certain resins are immiscible or incompatible with tie concentrates.

"The opportunity is to develop a test protocol to optimise tie-layer formulations for individual film formulation," said Aubee. "After this, use the protocol to generate recommendations for tie-layer design." ›

Below: Nova said that optimising the tie-layer formulation in a seven-layer film for frozen pizza would reduce thickness significantly

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Stable gains

Hayder Zahalka, global technology manager at **Addivant** in the US, revealed details of a liquid phosphite for polyethylene (PE) stabilisation.

The company's Weston 705 claims a number of benefits – including excellent MFI retention, superior colour retention (from exposure to NOx), reduced gel formation in LLDPE cast film and reduced plate out.

"This means higher productivity and less downtime," said Zahalka

Part of the reason for the grade's performance is the steric hindrance and reactivity of the molecule. Because it has less steric hindrance around the phosphorus atom – giving it more exposure – it is more reactive.

"Phospite reactivity is determined by availability of the central phosphorus atom," said Zahalka.

Vivek Kalihari, a research scientist at **Dow Chemical**, presented details of resealable flexible packaging solutions – which are intended as alternatives to zippers and sliders.

"Those solutions work, but there is added weight – which increases shipping costs – as well as additional capital and an additional converting step," said Kalihari.

He said that Dow's Sealution technology – which uses a polyolefin-based, extrudable pressure sensitive adhesive to allow resealing – is approved for indirect food contact, and for direct contact in certain applications.

The sealant is incorporated into a multi-layer film. As the inner layer, it can seal to other substrates – or to itself. It can be applied to different formats, such as pouches and lidding trays.

Dow's Sealution is a resealable technology that is intended to replace zippers and sliders

Kalihari said that the resealing force is generally far higher than for competitive solutions – claiming double the reclose force after a single cycle.

"Choice of sealant in the multi-layer structure determines the failure mode," he said.

The rigidity of the film also helps in Sealution cohesive failure during the first opening of the package, he added.

And Sean Bernhardt, senior lead ADTS engineer at **PolyOne**, said that tailored additive solutions can help to deliver desired packaging attributes such as anti-fogging.

He said that incorporating the company's OnCap anti-fog into the film during extrusion can help to dissipate water vapour droplets on the inner surface – and so increase transparency.

A typical application is in lidded film for meat packaging – which would typically be a multi-layer structure, he said.

■ The next edition of *Multilayer Flexible Packaging* takes place in Vienna, Austria on 19-21 November 2018. For more details, contact Jasmine Coles (**jasmine.coles@ami.international**) on +44 (0)117 314 8111.

CLICK ON THE LINKS FOR MORE INFORMATION:

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Measured response for barrier film

The conference also presented information on the measurement and testing of multi-layer structures.

Michael Kragness, laboratory project scientist at **Ametek Mocon**, said that, while analysis of film properties was sufficient "in a perfect world", the final product was often very different to a piece of flat film – with structures such as seals, seams and spouts all being potential permeation paths.

He pointed to a number of common issues affecting barrier integrity. These included: potential channelling through seams; products having sharp edges; shipping and handling; component interfaces (such as spouts and closures); and delamination.

This, he said, is why it is important to carry out whole package testing – to ensure there is sufficient barrier performance for the required shelf life.

Kragness pointed to a challenging case study – that of switching from a metal can to a flexible pouch for packaging infant formula. The pouch was made from metallised film. And, while the film had a water vapour transmission rate (WVTR) of less than 0.005 g/m2.day, that of the package itself varied according to how it was further processed.

The product had a target shelf life of 300 days – and three finished packages that were tested showed lifetimes of 700 and 333 days (which passed) and 205 days (which failed).

"Testing the finished package is imperative," said Kragness.

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Blockchain for Chemicals 2018

Wednesday 12th December 2018

08.30 Registration and welcome coffee
09.30 Opening announcements

MARKET OVERVIEW

09.40 **Opening remarks**
Mr. Chris Middleton, Technology Journalist, Editor, and Robotics Expert, United Kingdom

SESSION 1 - REAL WORLD BLOCKCHAIN APPLICATIONS

10.00 **How business governments can prosper with Blockchain AI tech**
Mr. Dinis Guarda, CEO and Founder, ZTUDIUM, United Kingdom

10.30 **How Blockchain will disrupt the industry**
Mr. Diamantis Ververis, Distributed Ledger Architect, BOSCH CORPORATE SECTOR INFORMATIONS, Germany

11.30 Morning coffee

12.00 **A non-technical introduction to Blockchain: what is in it for the supply chain of chemicals?**
Mr. Badreddine Tazrouti, Blockchain Specialist and Trainer, WWW.TAZROUTI.COM, Netherlands

12.30 **Real world Blockchain applications**
Mr. Sven Laepple, Founder, ASTRATUM GmbH, Switzerland

13.00 **Opportunities for Blockchain in the circular economy**
Dr. Michelle Lynch, Managing Director, ENABLED FUTURE LIMITED, United Kingdom

13.30 Lunch

SESSION 2 - SUPPLY CHAIN DIGITAL MANAGEMENT

15.00 **Supply chain traceability with Distributed Ledger Technology and Blockchain**
Mr. Viktor Peter, Blockchain Governance Expert, DEUTSCHE GESELLSCHAFT FÜR INTERNATIONALE ZUSAMMENARBEIT (GIZ) GmbH, Germany

15.30 **Token system to track responsible minerals up the supply chain**
Mr Nathan Williams, CEO, MINESPIDER, Germany

16.00 Afternoon tea

SESSION 3 - DIGITAL TRADING

16.40 **TradeLens: How Maersk and IBM are digitizing global trade**
Mr. Nicolas Buhmann, Commercial Manager, MAERSK, Denmark

17.10 **Blockchain at the customer interface**
Dr. Doerte-Katja Laue, Partner, EVOLERATE AG, Switzerland

17.40 Networking Cocktail Reception

Thursday 13th December 2018

08.30 Registration and welcome coffee
09.30 Opening announcements

SESSION 4 - TRACING RAW MATERIALS

09.10 **How Blockchain can help take chemical companies to the next level**
Dr. Stefan Guertzgen, Global Sr. Director Industry Marketing and Communications for Chemicals, SAP SE, Germany

09.40 **Use of Blockchain to track chemicals along the supply chain and comply with emerging regulatory challenges**
Mr. Lorenzo Zullo, Managing Director, CHEMYCAL, Netherlands

10.10 **Case study - Evonik's introduction of smart contracts for supply chain management**
Mr. Heinz Lux, Senior Digital Strategist, EVONIK INDUSTRIES, Germany

10.50 Morning coffee

SESSION 5 - REAL WORLD BLOCKCHAIN APPLICATIONS

11.30 **Understanding Blockchain technologies and markets**
Mr. Rafael Cayuela, Chief Economist DOW EUROPE GmbH, Switzerland

12.00 **Emerging Blockchain applications in the plastics industry**
Mr. Phillip Karig, Managing Director, MATHELIN BAY ASSOCIATES LLC, United States

12.30 Lunch

14.00 **Panel discussion: Blockchain platforms - the tech view point**

Panellists TBA

15.00 Afternoon tea and conference ends

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Carbon black is commonly used as a filler for plastics – and can be produced using an increasing number of alternative methods

Dark matter: new routes to carbon black making

Carbon black is widely used in the polymer industry. While it is often used as a straight filler – such as when used as a colorant for rubbish sacks – it can also have more sophisticated use in plastic film, adding extra properties such as electrical or heat-dissipation.

An increasing focus on sustainability and health and safety issues has led to alternatives to traditional production methods. One way is to use a common application of carbon black – car tyres – as a source for new material, with Netherlands-based Black Bear Carbon claiming a lead in this field.

"We have made great progress towards establishing an environmentally friendly and high-quality alternative for regular furnace carbon blacks," said Rick Leunissen, head of commercial and business development at the company.

In June last year, Black Bear became the first organisation worldwide to obtain "cradle-to-cradle" certification for its carbon black products.

"In addition, we obtained technical product approvals and first commercial orders at multiple plastic compounders including several leaders in the masterbatch industry," he said.

Black Bear says that the certificate – from the Environmental Protection Encouragement Agency (EPEA) in Hamburg, Germany – confirm that the material has very low levels of polycyclic aromatic hydrocarbons (PAH). Achieving low levels of PAH is becoming increasingly important given health concerns and increased scrutiny over hazardous substances through the EU Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) regulation.

Michael Braungart, founder and CEO of EPEA, said: "The Black Bear Carbon upcycled product is a game-changer in the field of carbon black."

Leunissen claims that Black Bear can match the

Main image: Black Bear Carbon CEO Martijn Lopes Cardozo with tyre raw material

PHOTO: CCT STEGELITZ

Above: Internal view of the Pyrolyx tyres-to-carbon black production plant at Stegelitz in Germany

performance of numerous regular furnace carbon blacks – saying that improvements in dispersibility of its pellets allow them to be used across more compounding methods.

Leunissen says that his company is seeing many plastic compounders that use recycled plastics broadening their sight to also use other sustainable raw materials in their processes, particularly pigments.

Extra funding

The company recently raised a further €11m to continue developing its carbonisation technology for converting scrap tyres into carbon black additives.

The investment comes from banking group ING, Netherlands-based investment firms 5square and Social Impact Ventures, and the Thailand-based conglomerate SCG – plus other contributions from original funders Chemelot Ventures and DOEN Participants.

The funding will help the company further develop its industrial scale prototype production unit at Nederweert, in the Netherlands, which it operates with tyre recycler Kergro. It can already handle 1m tyres per year – producing 5,000 tonnes/year of carbon black, as well as steel and electricity.

"This new consortium means more than just fresh capital," said Martin Lopes Cardozo, CEO of Black Bear. "They are strategic partners who will play a key role in the development of our technology – and who will speed up our international roll out."

Recovery plant

Germany's **Pyrolyx** is another developer of technology for the extraction of carbon black from end-of-life tyres and claims to be the market leader. It announced last year that it was building a recovered carbon black (rCB) plant at Terre Haute, Indiana, in the US. When completed, the plant – which Pyrolyx claims will be the most advanced of its kind – will produce close to 13,000 tonnes/y of rCB, as well as pyrolysis oil and steel.

The company already has a plant in production in Germany, which is operated by its CCT Stegelitz subsidiary. The two plants together will consume around four million used tyres each year. Niels Raeder, CEO of the Pyrolyx Group, says that the company has already signed long-term purchase contracts for first carbon black production from the new plant.

Another start-up on the scene is Monolith

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Right: Monolith Materials is running a natural gas to carbon black demonstration facility at Seaport in the US

Materials, which has developed a process to make carbon black using natural gas feedstocks and electric plasma arc technology.

John Reese, VP of sales & marketing, says the company has made great strides in the past 12 months.

"Due to the purity of the natural gas feedstock versus the traditional oil-based furnace process, Monolith will be able to bring to market a unique line of speciality products," he said. "Additionally, the Monolith process has demonstrated a 75-90% improvement in environmental performance in the areas of CO2, NOx and SOx versus the furnace process."

Finer particles

Reese says Monolith plans to construct a production facility in Hallam, Nebraska, in the US, which is intended to be operational in early 2019. Initially, it will be able to provide blacks with particles in the 40 to 100nm size range.

"Over time this range will be expanded to allow for finer particles down to 20nm in size," he said.

Currently, Monolith is operating a demonstration plant near San Francisco, from where it is providing a wide range of samples to compounders.

"One of the advantages Monolith enjoys is the ability to provide high purity carbon blacks across a wide spectrum of particle sizes," Reese said.

For instance, he says that many of the FDA materials on the market today from the furnace process are finer in particle size (20nm) due to the temperatures needed in the furnace process to control the PAH levels. Monolith has made – and received FDA status (US FDA 21 CFR 178.3297) for – a carbon black with a particle size in the 80nm range, equivalent to an ASTM N762 carbon black.

"This will lead to many advantages for the plastics compounder or masterbatch supplier, including less energy intensive mixes and the ability to load the compound at higher carbon


PHOTO: MONOLITH MATERIALS

black levels versus incumbent furnace FDA products," he said.

He added that Monolith believes it will be able to deliver multiple products with unique combinations of particle size, performance and purity that have not previously existed. He also believes that the purity and morphology of the company's materials will provide new opportunities for producers of conductive compounds, including wire and cable.

"We have demonstrated the ability to manufacture carbon blacks with a 40nm particle size and structures (COAN) of up to 180ml/100g at extremely high purity levels," he said.

CLICK ON THE LINKS FOR MORE INFORMATION:

- **www.blackbearcarbon.com**
- **www.pyrolyx.com**
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Sustainability and design

AMI's new Design for Sustainability conference brings together leading experts to discuss design and its role in the circular economy. We preview the event

Main image: Design is expected to play a key role in the development of products that support the creation of a more sustainable circular economy

AMI's Design for Sustainability conference provides an opportunity for professionals from across the entire plastics supply chain to come together to discuss and debate the latest trends and developments within product design and exchange ideas on how business can rethink design processes and product attributes to enable the move to a greener economy.

The two-day international conference will take place on the 11- 12 December in London in the UK. It will bring thought leaders in product and industrial design, technical specialists, R&D professionals and engineers, together with high-profile sustainability experts and brand owners.

Design for Sustainability will open with a presentation by **Dr Chris Sherwin**, Director of the UK-based sustainable and innovation design consultancy **Reboot Innovation**. He will look at the front end of the design process and explain why sustainability means having the full lifecycle in mind from day one. Sherwin will be followed by **Dr Fiona Charnley**, Senior Lecturer in Circular Innovation at **Cranfield University** in the UK, who will focus on how to create value from the circular economy.

Then **Simon Gandy**, Principal Consultant for UK-based consultancy **Ricardo Energy & Environment**, will explore how Life Cycle Assessment can be used to investigate the environmental pros and cons of packaging alternatives.

The conference then turns its attention to the automotive sector. **Dr Irene Colicchio**, Sustainability Engineer at **DSM Engineering Plastics** in the Netherlands, will bring the audience up to date with the latest lightweighting developments. She will be followed by **Jamie Shaw**, Technical Specialist Whole Vehicle Sustainability at **Jaguar Land Rover** in the UK, who will explore the latest developments from an end user perspective.

Packaging sustainability

The conference will then move to address packaging. **Peter Skelton**, Senior Partnerships Manager at waste action group **WRAP** in the UK, will open the session with an explanation of the organisation's plastics pact, detailing its goals and what it has achieved with some of the biggest global names in plastics packaging to date. He will be followed by **Dr Karlheinz Hausmann**, R&D Fellow at **Dow** in Switzerland, who will

Expert speakers sharing their insight at Design for Sustainability 2018 include (from left) Pearlfisher CEO Jonathan Ford, Plastics Recyclers Europe Board Member Paolo Glerean, Interface Innovation Partner Jon Khoo, HP Director of Global Sustainability Operations Dr Kirstie McIntyre, Corbion Market Development Manager Stephan Roest, and WRAP Senior Partnerships Manager Peter Skelton

detail the company's new toolbox for structure simplification. The design agency perspective of packaging will be laid out by **Jonathan Ford**, CEO of UK-based design agency **Pearlfisher**, who will examine the concept of lightweighting and how it is applied in packaging design. Then **Stephan Roest**, Market Development Manager at bio-materials maker **Corbion** in the Netherlands, will discuss how the latest generation of bio-based polymers could improve product sustainability.

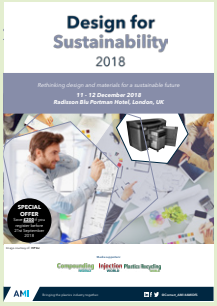
The first day of the conference will close with a discussion on packaging design from a recycler's perspective. **Richard McKinlay**, Head of Circular Economy at UK recycler **Axion,** will detail what he thinks designers need to know about the recycling process. And the day will be brought to a close by **Paolo Glerean**, Board Member of the Belgium-based **Plastic Recyclers Europe** association, who will detail its new product design tool – Recyclass – and explain how it can help designers to keep recycling issues in mind.

Sustainable electronics

Consumer electronics is the topic for the first session of the second day of Design for Sustainability. It will open with a presentation from **Eelco Smit**, Senior Director of Sustainability at consumer electronics giant **Philips** in the Netherlands, who will explore possibilities open to designers to use more recycled plastics. He will be followed by **Karsten Schischke** Group Manager at German technical institute **Fraunhofer IZM**, who will look at current circular design trends within the electronics sector. The session will conclude with an explanation by **Dr Kirstie Mcintyre**, Director Global Sustainabililty Operations at computing giant **HP Inc** in the UK, of how the circular economy model fits into its business model.

The focus of the conference then moves to interiors and furniture. **Jon Khoo**, Innovation Partner at **Interface** in the UK (one of the world's leading carpet tile manufacturers), will talk through the long-standing work the company has been undertaking to minimise climate impact. Then **Arnold Struik**, Marketing & Innovation Director at office furniture firm **Royal Ahrend** in the Netherlands, will present a business case study on the positive benefits that can result from integrating the circular economy approach. He will be followed by **Joe Hale**, CEO of UK-based design agency **Dragon Rouge**, who will discuss how brands can work towards building sustainable homes for the future. **Risto Vapola**, Technical Production Manager at **Neste Corporation** in Finland, will explore the development the company is making in renewable and circular plastics.

The conference will close with two presentations looking at how brands can influence consumer perception of sustainability. **Gillian Garside-Wright**, Packaging Technology Director at **Sun Branding Solutions** in the UK**,** will explore shifting public perception and how that impacts on designing for a sustainable future. Then **Nick Liddell**, Director of Consulting at UK-based branding agency **The Clearing**, will look at how brands can develop within the circular economy framework.



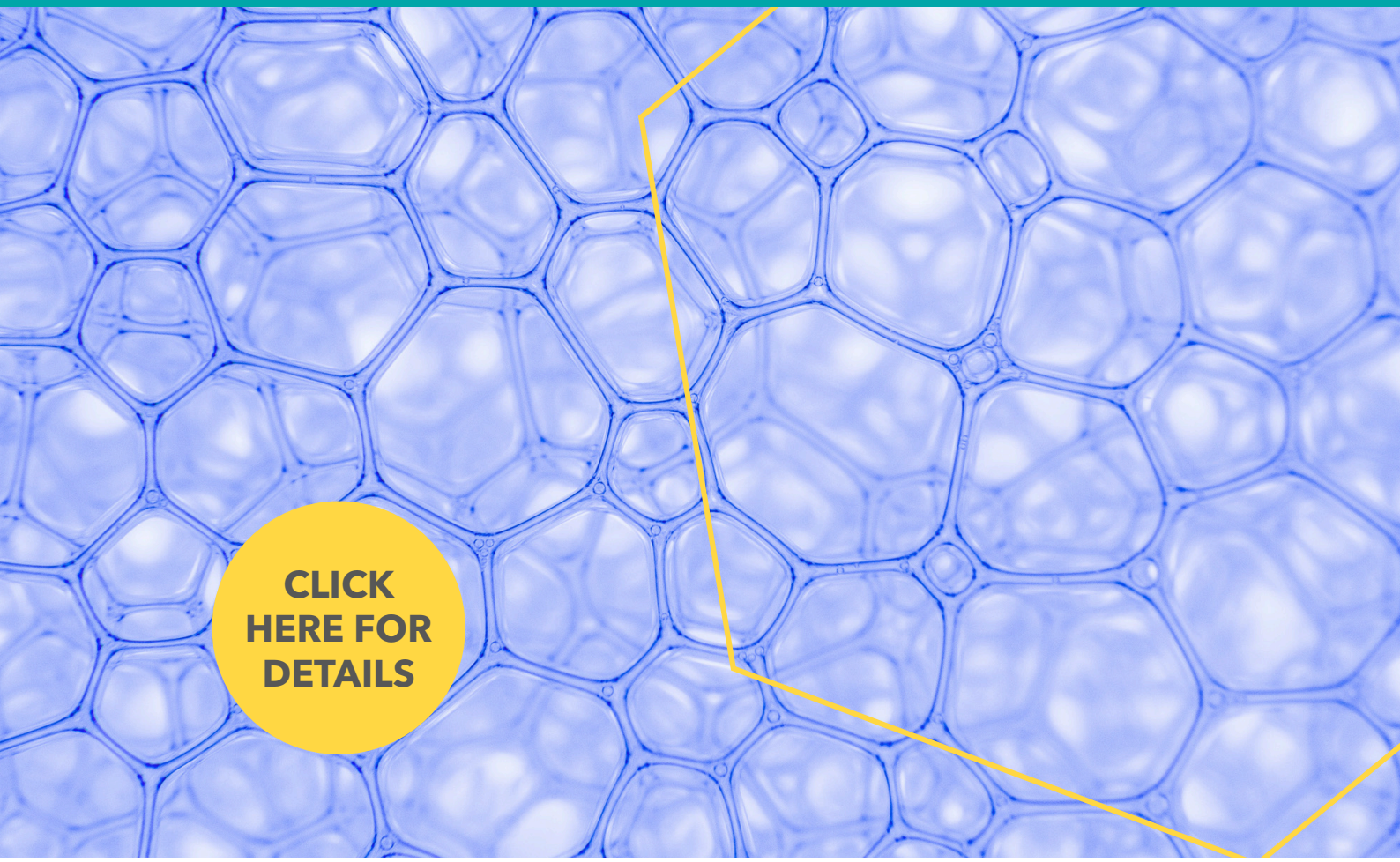
Design for Sustainability 2018 takes place at the Radisson Blu Portman Hotel in London's West End on 11-12 December 2018. This brand-new conference from AMI presents an unmatched opportunity to discuss and debate the latest trends and developments that designers, suppliers and brand owners are advancing to develop a future green economy. The event will cover automotive, packaging, consumer electronics and interior design and features discussions from world-leading experts from across the supply chain. In addition to the formal conference sessions, attendees will benefit from the opportunity to discuss and network during informal refreshment breaks and the complimentary day-one cocktail reception. To find out more, visit the **conference website** or contact Conference Organiser Heidi Lesiw. Tel: +44 (0)117 314 8111; Email: **heidi.lesiw@ami.international**

Polymer Foam

Hamburg / 2018

Making the most of advances in polymer foam materials, processes and applications

28 - 29 November 2018
Marriott Hotel, Hamburg, Germany



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POLYCARBONATE

Makrolon sheet now Tuffak

North American sheet producer Plaskolite has launched its Tuffak range of polycarbonate sheet – which was formerly known as Makrolon.

As part of it acquisition of Covestro's polycarbonate sheet business, Plaskolite secured the Makrolon product line – and use of the Makrolon name for a limited time. Tuffak is the new name for the range. The product itself and all the manufacturing processes to make it will remain the same.

Tuffak polycarbonate sheet is used in interior windows, automotive parts, security glazing, sign and lighting and other applications requiring a combination of strength and light weight.

› **www.plaskolite.com**

RECYCLING

Mondi helps to create 100% recyclable pouch

Mondi has helped Werner & Mertz to develop fully recyclable polyethylene-based pouch.

The design aim was to 'reverse-engineer' the recycling process, said Mondi – to create packaging fit for every stage of the recycling process.

The packaging was made from PE mono-material, which is a prerequisite for recycling.

"Our collaboration with Werner & Mertz shows how challenges can become solutions," said Jens Kösters, manager technical services at Mondi Consumer Goods Packaging, "We worked our way through an 'innovation funnel' – testing different materials until we arrived at a designed-for-recycling concept that convinced everyone at each point of the value chain."

A final touch was to solve the issue of recycling printed plastic materials by giving the pouch two layers.

"We dress the pouch in an eye-catching 'outer garment' that is printed with brand design on the front and consumer info on the back," said Sander.

› **www.mondigroup.com**

SILICONES

Anti-slip shown at Fakuma

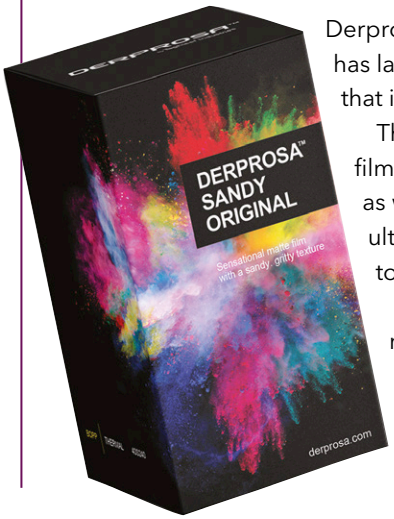
Dow Performance Silicones will launch a new silicone-based slip additive at Fakuma later this month. The grade is for low-density polyethylene (LDPE) film, and that optimises form-fill-seal (FFS) packaging production.

For flexible packaging, the company will also feature a non-migrating slip technology for bi-axially oriented PP (BOPP) and PP cast film, which it says enables superior printing and metallisation.

› **www.dow.com**

PACKAGING FILM

Matte film has granular finish for luxury



Derprosa, a subsidiary of Taghleef Industries, has launched Sandy Original, a matte film that is granular to the touch.

The company earlier introduced tactile film for paper and cardboard lamination, as well as DLSoft Touch, a film with an ultra-matte finish that conveys a silky feel to any laminated graphic product.

Sandy Original is an innovative haptic matt film that evokes feelings of homogeneous roughness to the touch, providing a contrast to the company's DLSoft Touch. Both products produce a unique feeling, encouraging consumers to make purchases or choose a product over other non-laminated or traditionally-finished products, says the company.

Sandy Original is applied as any other conventional lamination film used in the graphic arts and may be used in any project seeking to achieve a matt finish and a specific feeling to the touch. Currently, to achieve a similar quality, one has to resort to serigraphic varnishes – which are far from providing the same level of homogeneity and consistency, says the company.

The product is showcased at all three editions of this year's LuxePack.

› **www.derprosa.com**

ANCILLARIES

Blender takes charge of entire extrusion process

Maguire has developed a new blender with built-in extrusion control which, when combined with a supervisory system, can control the line from start to finish.

The system has been shown to be effective in blown and cast film, sheet and pipe and profile applications.

The WXB Weigh Extrusion Blender incorporates a gain-in-weight (GIW) weigh bin and a loss-in-weight (LIW) mix chamber in a single machine, along with a 4088 controller. While GIW weighs batch ingredients as they are dosed sequentially into the weigh bin, the LIW mix chamber allows accurate metering of the blend into the processing machine and facilitates control of extrusion and haul-off in accordance with process variables.

The 4088 controller, Maguire's most advanced blender control, is designed for communication with other systems in an Industry 4.0 setting. It enables the WXB blender to interface with the Maguire + Syncro supervisory system, which provides control of all segments of the production line from a single touch-screen HMI control. In blown film production, for example, the system controls extruder temperature, raw material metering and consumption data, air ring automation, gauging, internal bubble cooling, web and cage handling, haul-off, and winder.

The Maguire + Syncro control display allows users to easily visualize single-layer and coextrusion processes. Modes of extrusion control available include pounds or kilogrammes per hour; weight per length of extrudate; and product thickness in microns.

The WXB is initially available in three models: WXB 100 for throughputs of 100-220 lbs/hr (50-100 kg/hr); WXB 200 for 220-440 lbs/hr (100-200 kg/hr); and WXB 400 for 440-880 lbs/hr (200-400 kg/hr).

› **www.maguire.com**

WINDERS

BOPP firm orders new winder

Atlas Converting Equipment of the UK is to supply a 10.4m Atlas CW1040 primary slitter rewinder to Fujian Furong Technology Group of China.

Fujian Furong, one of the three largest producers of BOPP film in China, already has six Atlas CW1040 primary slitter rewinders – two at 8.3m and four at 8.7m. The machines are installed at three production sites in China: Fuqing, Fujian Province; Guangzhou, Guangdong province; and Nantong, Jiangsu Province.

It uses a selection criterion based on machine performance, after-sales service, the global installed base of the manufacturer and of course the price.

› **www.atlasconverting.com**

MELT FILTRATION

Filters use automation to add efficiency

ADG Solutions has made improvements to its CFO Line of continuous melt filtration systems, while also adding a new model.

It says that its CFO (Continuous Filter Operation) models can operate automatically during a shift, with minimal operator attention. As extruded material enters the unit, it passes through a stainless-steel screen plate that is micro drilled and hard faced, filtering contaminants that are caught on the screen-plate surface. When waste builds up and back pressure reaches a pre-set level, a rotating blade sweeps the screen and removes the contamination through a discharge port.

CFO models handle a broad range of materials and the filter can cope with up to 10% paper and other foreign objects – including contaminants such as metal, wood, textile fibres and unmelted plastic granules.

Recent refinements include: a new scraper design to handle smaller purges; updated computer program/controls which allows the number of scrapes between purgings to be varied, so the user can maximise contamination collection; and a thicker harder screen plate filter with more uniform hole quality. Before the end of the year, a new diamond hard plate surface will be available for aggressive and abrasive processes. This will make screen life up to three times longer than the existing design.

Its latest model, CFO 25, offers a 10% larger screen surface area, while the cover includes 360 degrees of studs – which fully seals the surface and prevents any leaks.

› **www.adgs.net**

Conductive Plastics

Vienna / 2018

Developing technologies and applications for electrically and thermally conductive plastics

6-7 November 2018
Austria Trend Hotel Savoyen,Vienna, Austria

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SCANFILL: GREENER PACKAGING

Based on a novel polymer/mineral mix, the Scanfill range of packaging resins can minimise environmental impact by reducing polymer consumption, non-renewable energy use and greenhouse gas emissions without sacrificing barrier performance. Find out more in this brochure.

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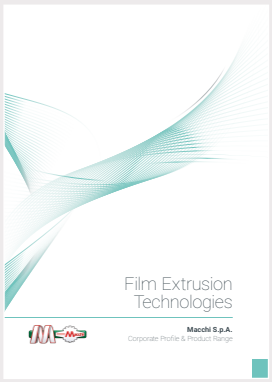
MACCHI: FILM EXTRUSION



This 28-page brochure from Macchi covers the company's wide range of film extrusion technologies including coextrusion lines, wide webs, die heads, take offs, winders, trim recovery and control systems.

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COLINES: BARRIER FILMS

This new brochure from Colines focuses on extrusion lines for the production of barrier films for vacuum and modified atmosphere packaging to preserve foodstuffs and medical products.

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W&H: VAREX II FILM SYSTEMS

Varex II is Windmöller & Hölscher's latest universal system for high output blown film production. This publication details the critical Varex II system features that ensure production of the highest quality films with minimal scrap and highest plant efficiency.

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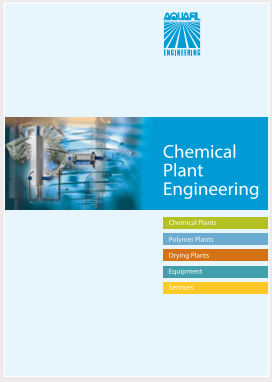
AQUAFIL: PLANT ENGINEERING



This 12-page brochure from Aquafil Engineering details its comprehensive range of chemical plant engineering capabilities, which include polyamide polymerisation, polyester condensation and polymer drying installations.

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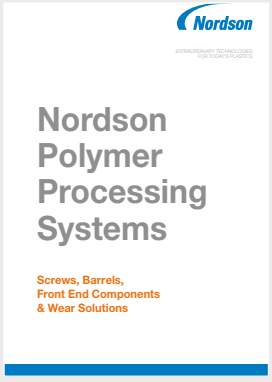
NORDSON: SCREWS & BARRELS



In this Nordson Polymer Processing Systems brochure, find out about Xaloy bimetallic extrusion screws and barrels, designed to meet process requirements, help optimisation, combat wear, boost output, and improve and maintain quality.

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If you would like your brochure to be included on this page, please contact Claire Bishop claire.bishop@ami.international. Tel: +44 (0)1732 682948

Learn more about AMI's upcoming conferences

Click on the relevant brochure cover or link to download a PDF of the full conference programme

STRETCH & SHRINK FILM USA 2018

The 13th Stretch & Shrink Film USA returns to Ft Lauderdale, FL, USA, on November 13-14. The event provides a comprehensive overview of the latest material, technology, and market trends.

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MULTILAYER FLEXIBLE PACKAGING 2018

The 11th edition of AMI's international Multilayer Flexible Packaging conference will take place on 19-21 November in Vienna, Austria. The three-day programme will cover the latest technical developments and market trends in this dynamic sector.

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WATERPROOF MEMBRANES 2018

AMI's 12th edition of Waterproof Membranes will take place in Düsseldorf, Germany on 5-7 November, 2018. The programme covers technical developments and market trends in the roofing, geomembrane and civil engineering waterproofing industry.

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CONDUCTIVE PLASTICS EUROPE 2018

The third European edition of AMI's Conductive Plastics conference takes place on 6-7 November 2018 in Vienna in Austria. It presents a unique opportunity to learn about the latest technologies for achieving electrical and thermal conductivity.

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POLYMERS IN FLOORING 2018

The third edition of AMI's international Polymers in Flooring conference is taking place on 4-5 December 2018 in Berlin, Germany. The event provides a unique forum bringing the polymer flooring industry together to debate technical and market trends.

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PLASTICS REGULATIONS US 2018

Plastics Regulations on 11-12 December 2018 provides expert analysis and guidance on a range of international legislative and regulatory issues that will impact on polymer producers, compounders, processors and end users doing business in the US and beyond.

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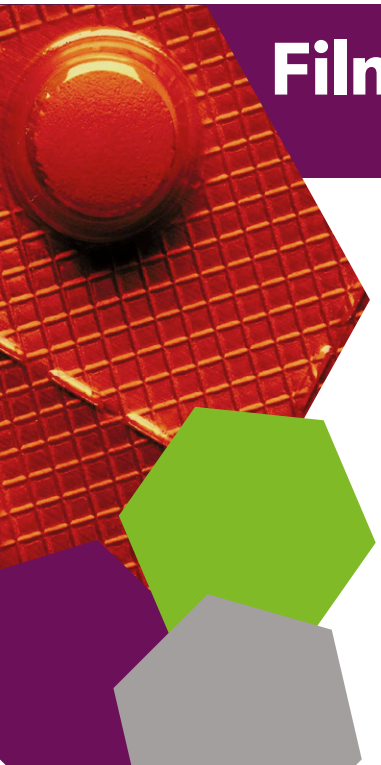
To see our full line-up of more than 50 plastics industry events over the next 12 months, please visit www.ami.international/events

Productive Plastics

Head office:	Mount Laurel, New Jersey, USA
COO:	Evan Gilham
Founded:	1955
Ownership:	Private
Employees:	70
Profile:	Productive Plastics, established in 1955, offers thermoformed plastic components through pressure thermoforming, vacuum forming and twin sheet thermoforming. It is a leading contract manufacturer of heavy gauged thermoformed parts for medical equipment, transportation, kiosk, industrial, and plastic enclosure markets. It became an early adopter of pressure thermoforming in the 1980s.
Product lines:	The company does not have product lines as such, because it provides tailored products for customers, in industries ranging including medical, industrial, transport and retail – as well as making kiosks and plastic enclosures. In this respect, it has developed wide range of products for these various industries. An example of a specific part is a housing for an MRI machine, which consisted of eight different parts – each pressure formed using a cast and machined mould. It has also made similar parts for other medical machinery including PET scanners.
Factory locations:	The company has three manufacturing facilities in North America. It offers a variety of techniques in addition to thermoforming, including design, reverse engineering, assembly, tooling assembly and decoration – which includes spray painting, coating and finishing. As well as offering thermoforming as an alternative to injection moulding, it also specialises in helping to replace existing metal products.

To be considered for 'Extruder of the Month', contact the editor on lou@filmandsheet.com



Film and Sheet EXTRUSION FORTHCOMING FEATURES

The next issues of Film and Sheet Extrusion magazine will have special reports on the following topics:

November 2018
Developments in sheet materials
Thin-wall packaging
Construction applications
Active/intelligent packaging

December 2018
Additives for polyolefins
Extruder developments
Multi-layer packaging
Mineral fillers for films

Editorial submissions should be sent to Lou Reade: lou@filmandsheet.com

For information on advertising in these issues, please contact:
Levent Tounjer: levent.tounjer@ami.international Tel: +44 (0)117 314 8183
Claire Bishop: claire.bishop@ami.international Tel: +44 (0)1732 682948

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Film and Sheet
September 2018
The September 2018 edition of Film and Sheet Extrusion magazine takes a detailed look at the latest developments in the plasticiser sector. It also reviews innovations in biaxial films, laboratory extruders and downstream equipment.

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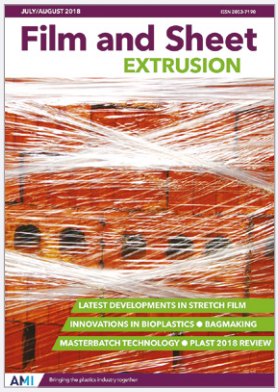

Film and Sheet
July/August 2018
The July/August issue of Film and Sheet Extrusion examines the latest innovations in stretch and shrink films as well as exploring developments in bioplastics, bag-making and masterbatch technologies. It also reviews the Plast 2018 show in Italy.

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Compounding World
September 2018
The September edition of Compounding World looks at developments in the world of colours, where pigment price rises are causing pressure. The issue also covers reactive compounding, new stabilisers and additives for recycling.

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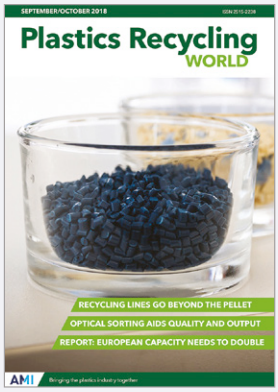

Plastics Recycling World
September/October 2018
The September/October edition of Plastics Recycling World looks at the equipment on offer for direct recycling to sheet. Plus, exclusive analysis of Europe's recycling capacity needs and a review of the latest optical sorting technologies.

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Pipe and Profile
October 2018
The October edition of Pipe and Profile Extrusion magazine has features taking an in-depth look at pipe inspection, oriented PVC, advances in materials handling and new methods for in situ pipe production. The edition also previews AMI's Conductive Plastics conference.

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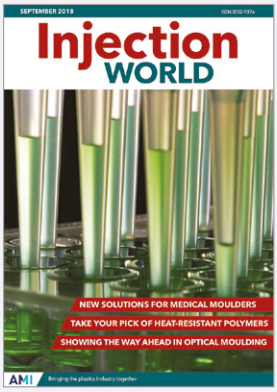

Injection World
September 2018
The September edition of Injection World magazine takes a close up look at the latest medical polymers and processing technologies. It also reviews developments in heat-resistant polymers and moulding of optical parts.

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Film and Sheet EXTRUSION
Pipe and Profile EXTRUSION
Injection WORLD
Plastics Recycling WORLD

GLOBAL EXHIBITION GUIDE

2018	**14-17 October**	Pack Expo, Chicago, USA	www.packexpointernational.com
	16-20 October	Fakuma, Friedrichshafen, Germany	www.fakuma-messe.de
	7-9 November	Expo Plasticos, Guadalajara, Mexico	www.expoplasticos.com.mx
	26-29 November	All4Pack, Paris, France	www.all4pack.com
	5-7 December	Plastic Japan, Chiba, Japan	www.plas.jp/en
	5-8 December	Plast Eurasia, Istanbul, Turkey	www.plasteurasia.com/en
2019	**5-8 January**	ArabPlast, Dubai	https://arabplast.info
	12-15 March	Pro-Pack Africa, Johannesburg, South Africa	www.propakafrica.co.za
	12-16 March	Koplas, Seoul, South Korea	www.koplas.com
	19-21 March	EU Coatings Show, Nuremberg, Germany	www.european-coatings-show.com
	25-29 March	Plástico Brasil, São Paulo, Brazil	www.plasticobrasil.com.br
	8-12 April	Feiplastic, Sao Paulo, Brazil	www.feiplastic.com.br
	8-9 May	Compounding World Expo, Cleveland, USA	www.compoundingworldexpo.com
	8-9 May	Extrusion Expo, Cleveland, USA	www.extrusion-expo.com
	8-9 May	Plastics Recycling World Expo, Cleveland, US	www.plasticsrecyclingworldexpo.com
	21-24 May	Chinaplas, Guangzhou, China	www.chinaplasonline.com
	21-24 May	Moulding Expo, Stuttgart, Germany	www.moulding-expo.com
	18-21 September	T-Plas/Tiprex, Bangkok, Thailand	www.tplas.com
	16-23 October	K2019, Dusseldorf, Germany	www.k-online.com

AMI CONFERENCES

9-10 October 2018	Smart Packaging, Hamburg, Germany
5-7 November 2018	Waterproof Membranes, Dusseldorf, Germany
13-14 November 2018	Stretch & Shrink Film US, Coral Springs, Florida
11-13 December 2018	Thin Wall Packaging, Cologne, Germany
5-7 February 2019	Polyethylene Films, Coral Springs, Florida, USA
27-28 February 2019	Breathable Films, Berlin, Germany
14-15 March 2019	Speciality Packaging Films Asia, Bangkok, Thailand
2-3 April 2019	Plastic Pouches, Vienna, Austria
8-10 April 2019	Stretch & Shrink Film, Barcelona, Spain

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

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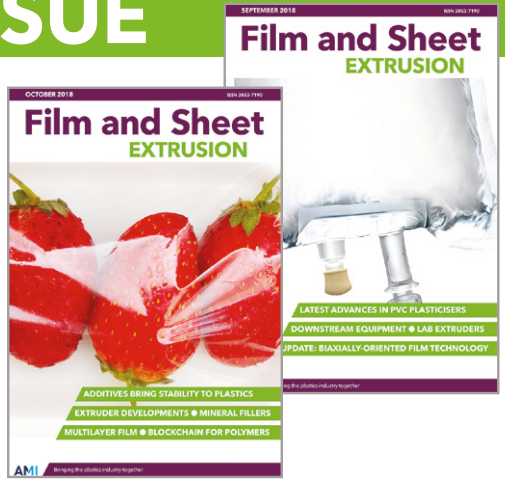

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