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Covestro spends €100m to add film capacity at four global locations

Covestro of Germany is to expand its global film production, with capacity expansions planned at four of its worldwide facilities.

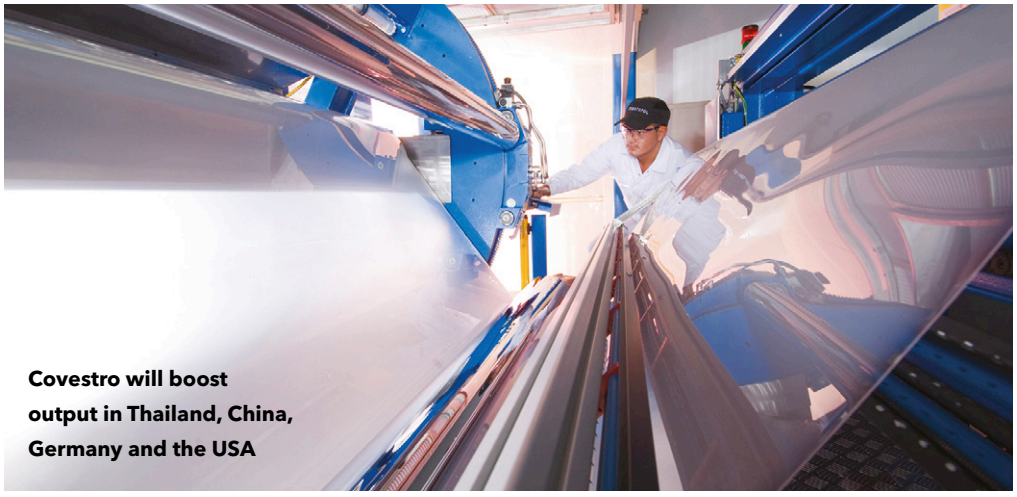
The company is investing more than €100 million to expand production at plants in Thailand, China, Germany and the USA – creating more than 100 jobs in the process. The investment will also be used to expand infrastructure and logistics.

"With this capacity expansion, we are investing in promising technologies and applications," said Markus Steilemann, CEO of Covestro.

The expansion at Map Ta Phut in Thailand is scheduled for completion by the end of 2019. At the Guangzhou site in China, Covestro will initially focus on converting the existing coextrusion line. The first new capacities will be available there as early as mid-2019. In a second phase, capacity will also to be expanded there. In South Deerfield, Massachusetts, USA measures to increase efficiency and quality have already begun. Covestro is also building new coextrusion lines in Dormagen, Germany, which are scheduled for completion in the fourth quarter of 2020.

Michael Friede, global head of Covestro's coatings, adhesives and specialities business, said: "We want to expand our global film production as quickly as possible to meet the growing demand in the regions."

› **www.covestro.com**



Covestro will boost output in Thailand, China, Germany and the USA

Plaskolite takes over Rotuba

US-based sheet extruder Plaskolite has bought the profile lighting business of Rotuba Extruders.

As a part of the transaction, Plaskolite will acquire Rotuba's manufacturing operations in Linden, New Jersey.

Terms of the transaction – which closed at the end of June – have not been disclosed.

The deal will expand Plaskolite's existing profiles business – which it says gives it a clear leadership position in the profile lighting market.

"This further strengthens our offering and allows us to rapidly develop extruded profiles to meet the demands of LED lighting," said Mitchell Grindley, president and CEO of Plaskolite.

Adam Bell, Rotuba's president, will remain with the company to lead the Plaskolite Rotuba profiles business.

› **www.plaskolite.com**
› **www.rotuba.com**

Lactips attracts more money for expansion

France-based Lactips – which is developing water-soluble and biodegradable plastics from milk proteins – has raised €3.7 million (US$4.3m) in a new round of funding.

"This capital increase shows the confidence of our investors in our products and business model," said Marie-Hélène Gramatikoff, , CEO of Lactips.

The investment will allow Lactips to invest in further industrialisation and commercialisation of its technology – such as by adding a 2,500 sq m workshop at its facility. The material is already produced in pellet form in small quantities.

New investors include BASF Venture Capital and BNP Paribas Development.

Markus Solibieda, managing director of BASF Venture Capital, said: "Sustainability is a major pillar of BASF's strategy. With our investment in Lactips we intend to support the market-entry of their innovative products."

■ There are more details on emerging bioplastics in our **feature** that starts on page 13.

› **www.lactips.com**

VinylPlus moves closer to its PVC recycling goal with 12% rise

PVC recycling in Europe rose by 12% last year, to reach almost 640,000 tonnes.

VinylPlus, the PVC industry's programme to boost sustainability, said this puts it 80% of the way towards its target of recycling 800,000 tonnes/year of PVC by 2020. The figures were revealed in the VinylPlus 2018 progress report, which reports on 2017 activities.

The main contributor to the total, with more than 633,000 tonnes, was Recovinyl – the organisation that facilitates PVC recycling under the VinylPlus scheme. Recovinyl recorded increased recycling volumes in France and Italy last year, and steady levels in Germany, said VinylPlus. The rest of the material was collected through sectoral organisations for specific types of product such as roofing and waterproof membranes, and both rigid and flexible films.

Recycling of coated fabrics – collected under the Epcoat project – rose by 10% to exceed 9,000 tonnes in 2017.

At the same time, recycling of rigid and flexible PVC was combined into a single category. Overall, collection in this category rose almost 3% to almost 114,000 tonnes.

Part of the flexible PVC recovered overlapped with efforts to recycle roofing membranes (as part of the RoofCollect programme, run by ESWA). Here, overall collection grew by around 28,000 tonnes to reach almost 118,000 tonnes (an increase of 28%).

One setback to the future recycling of flexible PVC is the recent closure of the VinyLoop Ferrara plant in Italy – which recycles up to 10,000 tonnes/year of PVC (see story below).

A report from German consultancy Conversion, commissioned by VinylPlus, estimated a total of 2.5m tonnes of PVC waste available in Europe in 2016 – meaning that the industry has managed to recycle around 25% of this. Cumulatively, 4.2 million tonnes of PVC have been recycled since 2000, said VinylPlus.

"Our voluntary commitment does more than contribute to the circular economy," said Brigitte Dero, general manager of VinylPlus. "It also tackles other sustainable development themes, including energy and climate change, and responsible use of additives."

› **www.vinylplus.org**

Vinyloop closes PVC recycling plant in Italy

The VinyLoop plant is to close after 16 years of operation

VinyLoop Ferrara, the Italy-based PVC recycling specialist, has closed operations with immediate effect.

The company, a 60/40 joint venture between Inovyn and Texyloop, has seen a collapse in demand for its VinyLoop R- PVC product due mainly to increasing product regulation.

"Despite every effort to sustain the loss-making business over the last 15 years, demand for Vinyloop R-PVC has recently collapsed, and we have concluded that ongoing operation is no longer sustainable," said Francesco Tarantino, VinyLoop general manager. "This has been driven primarily by tighter regulations relating to Vinyloop R-PVC that contains DEHP plasticiser."

The plant at Ferrara, which opened in 2002, used a physical, solvent-based process to handle around 10,000 tonnes/year of PVC products – such as tarpaulins – that are difficult to recycle by traditional means. The recycled material was made into a variety of products including garden hoses, geomembranes and shoe components.

Inovyn said it did not make economic sense "to continue supporting this specialised PVC recycling activity", while Texyloop lacked the industrial knowledge to continue on its own. The company – which employs around 17 people – has now been liquidated, and will begin a process to carry out a "safe closure of the plant".

"A detailed closure plan will now be prepared in discussion with the Trade Unions and employee representatives," said Tarantino.

› **www.vinyloop.com**

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US plastics machine deliveries rise 15% year-on-year in Q1

Deliveries of plastics machinery in North America grew by more than 15% in the first quarter of 2018, compared to the same period last year, but fell compared to the most recent quarter.

An early estimate of deliveries of primary plastics equipment exceeded US$333 million in the first quarter. This was 15.1% higher than the US$290m in Q1 of 2017, but 11.7% lower than Q4 of 2017.

"Shipments of plastics machinery tend to be lower in the first quarter relative to other quarters due to seasonality," said Perc Pineda, chief economist at the association. "Still, the US economy was off to a good start in the first quarter. Plastics equipment shipments data are in sync with healthy corporate profits in the manufacturing sector, including the plastics industry."

The delivery value of injection moulding machinery increased nearly 23% in Q1 compared to the fourth quarter of last year, while that of single-screw extruders fell 14.6% during the same period. Twin-screw extruders – including both co-rotating and counter-rotating machines – fell 27.1%.

The US total export value for plastics machinery in the first quarter was US$404m, a 7.7% decrease from the previous quarter, but 6.9% higher than a year ago.

Plastics machinery imports decreased 12.8% in the first quarter to nearly US$830m. From the first quarter of last year, machinery imports rose 5.7% (to nearly $785m).

The U.S. continues to have a trade deficit in plastics machinery, which was almost $426m in the first quarter – a 17% decrease from the fourth quarter last year, but 4.6% higher than a year ago.

› **www.plasticsindustry.org**

Röchling adds sheet capacity

Röchling Maywo has increased output of thermoplastic vacuum formable sheet and foil at its Bad Grönenbach site.

The company has invested €5 million to expand the site by almost 10,000 sq m – which incorporates a warehouse and production hall covering 5,000 sq m. The move has also created 25 jobs.

The company's thermoformed sheet is used in a number of applications, including ceiling or wall cladding in trains and coaches, and workpiece carriers – made of electrically conductive plastics – in the electronics industry.

› **www.roechling.com**

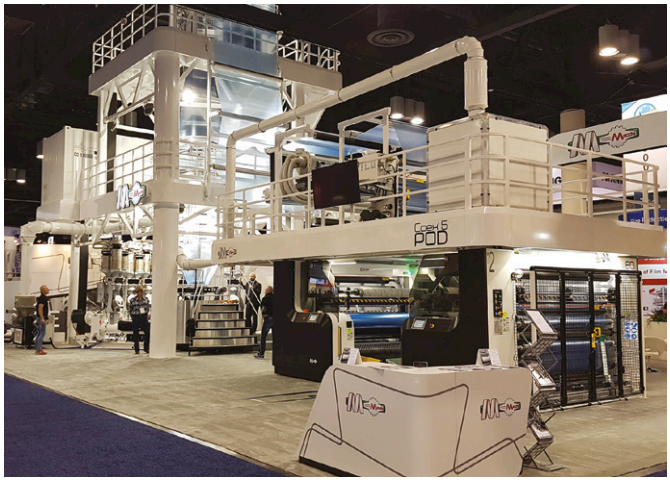
Macchi shows blown film line at NPE – then sells it to customer

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.

During NPE, it produced a five-layer stand-up pouch following close cooperation with 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.



Macchi says no other company showed a blown film line at NPE

"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 customer based in Ohio.

› **www.macchi.it**

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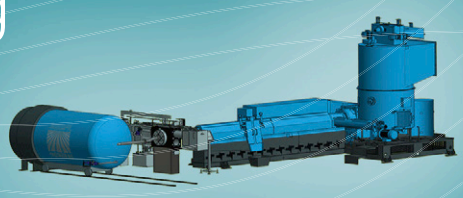

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Italy boosts imports of plastics machines while exports decline

Imports of plastics machinery into Italy made a massive leap in the first quarter of this year – while experts have fallen slightly.

Trade association Amaplast said that the slowdown in exports should not come as a surprise – and could be within "the normal range of variation". It added that the first two months of 2018 saw positive growth – while a fall in March dragged the figures down.

"It is premature to talk about a decline, though the sector has seen growth for the last seven or eight years – and a negative phase would be within the norm in the medium or short term," said Amaplast.

On a more positive note, imports of machinery grew by 26%, indicating recovery in the domestic market.

"It shows that the propensity to invest among Italian converters is back on a positive growth trend, and we can only be happy about this," said Alessandro Grassi, president of Amaplast.

The association also carried out a survey of its 170 members in mid-June, comparing the current half year with the same period in 2017: just over half (51%) of members expect stable turnover this year, while more than two-thirds (38%) expect to increase sales. In terms of orders, 42% expect stability and 41% expect to see increases.

Grassi: "Machinery imports show that Italian converters are investing again"

"After an excellent 2017, it is not unreasonable to expect this year to close with positive performance in both production and foreign trade – albeit at more modest growth rates than in recent years," said the association.

› **www.amaplast.org**

European machines to grow 2%

European manufacturers of plastics and rubber machinery expect to see a 2% growth in production this year.

This equates to a value of around €15.6bn, said Euromap, the umbrella body for machinery trade groups in nine European countries, including Germany and Italy. At the same time, world production is expected to grow by 3%, to €37.4bn.

Euromap added that its members are reporting full order books – though this is causing long delivery times. Other companies are having trouble finding skilled workers, it added.

"A slow-down in economic growth is therefore becoming increasingly likely," it said.

Euromap members accounted for just over half of world exports in 2017 (52%), while China accounted for more than 16%, Japan more than 10% and the USA nearly 6%.

Euromap's members include Amaplast of Italy and VDMA of Germany.

› **http://plastics.vdma.org**

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Natural growth: latest innovations in bioplastics

*Bioplastics production is keeping pace with that of petroleum-based materials – and will continue to find use in everything from food packaging to agricultural film. **Lou Reade** reports*

As long as bio-based plastics can compete with their 'conventional' equivalents, they will find more and more use in industries such as food packaging.

Sometimes, they can be used to overcome shortcomings in conventional designs – such as the difficulty of recycling multi-layer films. Four bioplastics specialists have teamed up to develop a range of transparent, multi-layer bio-based films.

The partners – **Sukano**, **Nippon Gohsei**, **NatureWorks** and **Eurotech Extrusion Machinery** – say the project will allow packaging manufacturers to produce easily recyclable co-extruded film for applications such as dry food packaging.

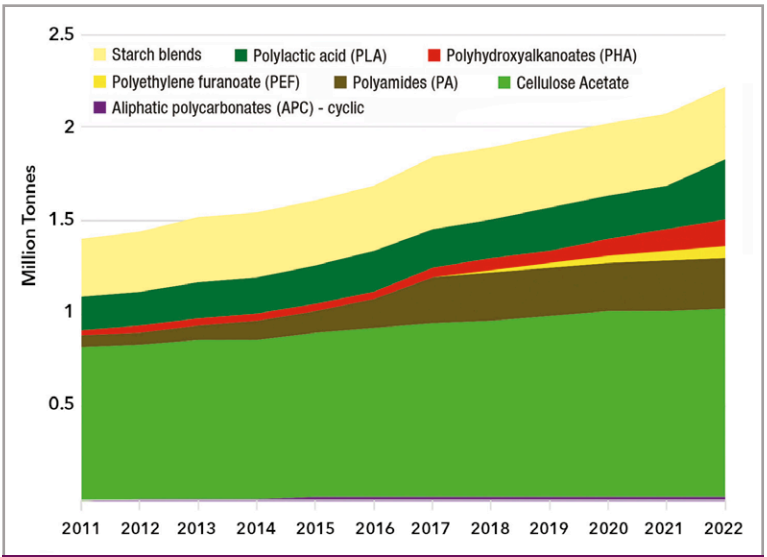
The coex film, processed at Eurotech, used a K5A five-layer blown film lab machine in a configuration using two extruders (each 25mm screw diameter), and three extruders of 20mm diameter – plus a die lip of 100mm diameter and die gap of 1.4mm.

The film, which is 45 microns thick and 280mm wide, uses Ingeo PLA 4043D from NatureWorks for the inner A layer, with an outer bubble layer E including Sukano masterbatches with processing aids. The PLA-based masterbatches were specifically designed for this application. The tie layers use BTR8002P and the barrier layer uses G-polymer – both from Nippon Gohsei. This combination of formulation and process conditions yielded a stable bubble, excellent film transparency, and good roll quality, said the partners.

The barrier layer, which Nippon Gohsei describes as the first extrudable high barrier amorphous vinyl acohol resin, offered high gas and aroma barrier and transparency, while supporting compostability and recyclability properties of the final film. It can replace Alu-foil in many packaging applications.

The partners said that the bio-based barrier film

Main image: The Biovege research project has developed a range of biodegradable films and nets from agricultural waste products



Dedicated bio-polymers, which have no 'petroleum equivalents' are expected to see fast growth, says a report from the Nova Institute

could be used in applications such as dry food packaging – including lidding films for coffee capsules or for cups and trays, flow packs, trays for snacks, and biscuit packages. With refined design, it could also be used for 'wet' foods such as ham, fish, and meat.

Organic waste

There are other examples where bioplastics are used to overcome limitations of more conventional materials.

The pan-European research project **Biovege** – which has recently finished – has developed a range of biodegradable films and nets for horticultural products. The products were made in part using agricultural waste products from Spain.

"In Andalusia, about 500,000 tonnes of fruit and vegetable by-products are landfilled," said research organisation **Aimplas**, one of the project participants. "From these wastes, we have extracted substances of high value for the packaging and food industries."

Several types of biodegradable films with a thickness of 23 microns will be used as shrink film for the packaging of cucumbers and making bags for weighing all kinds of agricultural products. Biodegradable netting will be used to package products such as garlic and green beans.

At the same time, film manufacturer **RKW** has developed a biodegradable star-sealed bag for organic household waste in Germany.

The disposal of organic waste from kitchens has always been a challenge for households, says the company -- as conventional plastic bags cannot be disposed with organic waste, while paper bags tend to soak through over time.

The new bags – which consist mainly of starch and PLA, plus other biodegradable components – are fully compostable and suitable for organic waste. They will be produced at RKW Vietnam in Ho Chi Minh City, and supplied by major retailers in Germany. Certified as fully compostable by DIN Certco, it is also the first T-shirt starseal bag available on the market made of more than 50 percent from renewable materials.

"With the first T-shirt starseal bags that are compostable – and consist of more than 50% renewable materials – RKW is a pioneer on the market," said Manh-Hung Ngo, product manager at RKW Vietnam. "So far, bags with around 40% renewable content have been available in markets such as France and Italy. We were able to design bags with a significant higher proportion."

Growth rate

A report by the **Nova Institute** of Germany says that production capacity of bio-based polymers is growing by 3-4% per year. This is no faster than the growth rate of conventional polymers – meaning that bio-based polymers will continue to account for around 2% of the market.

However, the report says that bio-polymers are growing at different rates: while some are "virtually collapsing" compared to previous forecasts – such as bio-based PET – others are showing constant or slightly increasing capacities, while others (such as PLA) are showing significant growth.

"Additionally, for some bio-based polymers such as PHA, PEF, bio-PE and bio-PP, the prospects for the future are quite positive," said the report. "Overall, the market remains challenging with low crude oil prices, little political support and partially under-utilised capacities. Until now, the biodegradability of some bio-based polymers has not yet been able to generate a real advantage globally."

The report estimates that, in 2017, worldwide capacities for bio-based polymers reached 4.6 million tonnes (which rises to 6.4m tonnes if bio-based PUR – which is hard to quantify – is included). The forecast for 2022 shows 5m tonnes (or 7.5m tonnes including bio-based PUR).

However, growth of 'dedicated' bio-based polymers – which have no direct counterpart in the petrochemical world – is faster, and price pressure from cheap crude oil is lower than for other groups. These materials, such as PLA, PHA and PEF – also offer new properties and functionalities.

"As a consequence, the highest innovation takes place in this group, and a number of new developments are still to be expected," said the report.

While capacities of polymers themselves has

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dropped off, the report says that capacities for bio-based building blocks are rising faster. Between 2017 and 2022, the estimated CAGR of 5-6% is around twice that of bio-based polymers (3 to 4%) as a whole. There are two main reasons for this: bio-based building blocks usually lead to dedicated bio-based polymers, which already show a higher growth rate; and the building blocks can be used in structural polymers, functional polymers and many other applications.

Bioplastic shift

Despite the continuing capacity growth of conventional polymers, there is an increasing focus on replacing them. **UN Environment** has published a report assessing the potential of replacing conventional plastics with alternative materials – such as bioplastics – in certain applications.

While the report says it is "neither possible nor desirable" to remove all plastics from society, consumers and policymakers know that alternative materials could reduce the worst effects of plastics pollution – and help to "reduce our dependence" on them.

"Making the switch from disposable plastic to sustainable alternatives is an investment in the long-term future of our environment," said Erik Solheim, head of UN Environment. "The world needs to embrace solutions other than single-use, throwaway plastic."

The report highlights a range of frequently used plastics products – including plastic food containers – and identifies them as among the 'main culprits' of marine plastic litter. It outlines a range of alternative materials – including plant-based polymers, such as those derived from cellulose – that can replace single-use plastics where possible. However, it says there are situations – especially in the medical field – where plastics provide an "essential use".

"But often, natural materials and alternative technologies can be used to break humanity's addition to disposable plastic," said the report. "This is particularly true for consumer products, as these represent a large amount of the plastic pollution contributing to marine litter."

Peter Kershaw, lead author of the report, said: "The report is intended to encourage society to question our current use of plastics and consider the adoption of alternative approaches – especially for those items which can be characterised as designed for single use, such as packaging."

The report, *Exploring the potential for adopting alternative materials to reduce more plastic litter*, is available **HERE**.

Right: Novamont says its mulch films have helped to improve rooting systems in many plants

Degradable advantage

At last year's *Agricultural Films* conference (organised by AMI), **Novamont** of Italy said that its biodegradable mulch film has helped to boost crop yields while reducing the job of collecting film at the end of the growing season. Agricultural waste accounts for around 5% of all plastic waste, said the company – and mulch films are generally difficult to recycle because of their high level of impurities.

For this reason, degradable films can help to overcome this.

The company says that its Mater-Bi mulch film has helped to boost the growth of a variety of crops, including tomato, asparagus, rice and grapes.

"For some crops, like rice and grapes, mulch film is impossible to remove at the end of the crop cycle," said Novamont's Sara Guerrini.

Tomatoes, for instance, had better-developed root systems and higher yields when using Novamont mulch film, while it cut the need for weed control in asparagus.

In vineyards, the film had the effect of boosting rooting systems compared with conventional PE film (or bare soil), while vines under Mater-Bi mulch were harvested 17 months after planting – around one year faster than those planted on bare soil, said Novamont.

Repsol of Spain has also developed a biodegradable mulch film – in this case, by incorporating an enzyme into the material. Under specific conditions of moisture, bacteria and temperature, the enzyme triggers the break-up of the polymer chains.

"These serve as a source of carbon and energy for bacteria already in the environment," said Roberto Gómez Bernardo, polyolefins advisor at Repsol. ›

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Growth in biopolymer production

Several recent projects are helping bioplastics production to keep pace with that of traditional plastic materials.

A good example of expanding bioplastics production is seen in the new plant from **Total Corbion PLA**, which has begun making PLA plastic and lactide monomers at a 1,000 tonnes/year plant in Rayong, Thailand. The facility makes a range of the company's Luminy PLA resins.

"Our customers have been looking forward to testing and validating our resins" said Francois de Bie, senior marketing director at the company. "Luminy PLA is now available for customer sampling."

On the same site, it is expanding its lactide plant capacity to 100,000 tonnes/year, while a 75,000 tonnes/year PLA polymerisation plant is under construction.

Simon Goldney, plant director, added: "The PLA polymerisation plant is on track to deliver its first commercial quantities of PLA during the second half of 2018."

At the same time, **Bio-On** of Italy has opened its first plant to make its speciality polyhydroxyalkanoate (PHA) bioplastic. The company has invested €20m on a 3,700 sq m plant in Castel San Pietro Terme, near Bologna. The plant will use agricultural waste – including molasses, sugar cane and sugar beet syrups – as feedstocks, and produce up to 1,000 tonnes/year of material.

And **Tecnaro** of Germany has doubled capacity of bioplastics at its Ilsfeld-Auenstein facility, by adding a twin-screw compounding extruder from **KraussMaffei Berstorff**. The line has an output of up to 800 kg/hr. The company's 'liquid wood' products are derived from lignin, and include Arboform, Arboblend and Arbofill.

- **www.total-corbion.com**
- **www.bio-on.it**
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Soil samples

Biodegradable films can be a huge advantage in the agricultural industry. They break down where they are, sidestepping the need for collection. However, some researchers have looked into what chemical species accumulate in the soil during this process.

Sam Deconinck, deputy lab manager at **OWS** in Belgium, told delegates at the same event that not all the carbon in a biodegradable polymer is converted into carbon dioxide – and that intermediate degradation products will enter the soil.

"These cannot be quantified," he said.

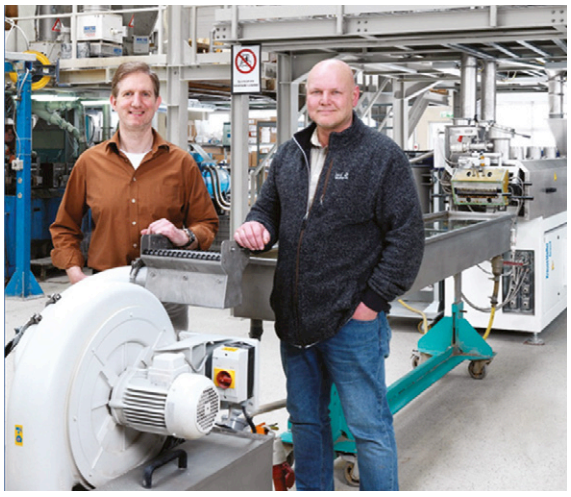
In legislative terms, a biopolymer is classed as being 'totally degradable' if it biodegrades by 90%, he said. Some of the 'unconverted' portions include 'biomass' – which typically varies between 10 and 40%.

"The purpose of lab testing is to show the inherent nature of the material to biodegrade under a given set of conditions," he said.

He also pointed out that 'non-biodegradable' film leaches into the soil: a conventional LDPE mulch film has a maximum accumulation level of 463kg per hectare after 10 years. Downgauging the film actually increases accumulation, he said. In comparison, a biodegradable film would build up a maximum accumulation level of 463kg per hectare, after two years.

BASF, whose biodegradable PLA-based Ecovio is commonly used in agricultural mulch film, has also looked at soil accumulation. The company has used a range of analytical techniques – including Nano-SIMS, to assess the incorporation of polymer carbon into the soil, and Cavity Ring Down Spectroscopy (CRDS) to track 12C and 13C-carbon dioxide.

"There is a strong stakeholder demand to know the fate of materials introduced into the soil," said Andreas Kuenkel, vice president of biopolymers research at BASF in Germany.



Right: Tecnaro has doubled capacity of bioplastics at its facility in Germany

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Tight fit: latest advances in stretch film

PHOTO: EFEKT PLUS

New formulations for stretch film are helping to ensure that pallet loads retain maximum stability in transit. Lou Reade reports

Pallet stretch film has been a revelation in logistics – and plays a key role in maximising pallet stability and minimising damage to goods in transit.

Delegates at AMI's recent Stretch & Shrink Film conference – held in April in Madrid, Spain – discovered some new solutions to existing problems, including boosting cling performance, overcoming film tearing and performing accurate tilt testing.

Braskem presented three potential solutions to pallet wrapping – which balanced cost and performance – while highlighting a new product.

In the first example, its PP DR376.01 – aimed at high performance applications – was used in the middle of a nine-layer pallet stretch film. It showed a high retention force – and performed better in a tilt test than a standard PP grade.

The second test, using its new Flexus 3600 grade – had a lower melt flow rate, and was used in two of the nine inner layers. In particular, it showed superior processability and Elmendorf Tear MD performance than a film using an octene grade. Again, it performed better in tilt tests.

In the third test, it used its LF320 grade for manual application and automatic solutions – and which contains 70% butene – against a 45% butene grade. While the tear resistance was lower, and tilt test results were slightly inferior, Braskem said that the grade was ideal for applications that do not require great tear resistance.

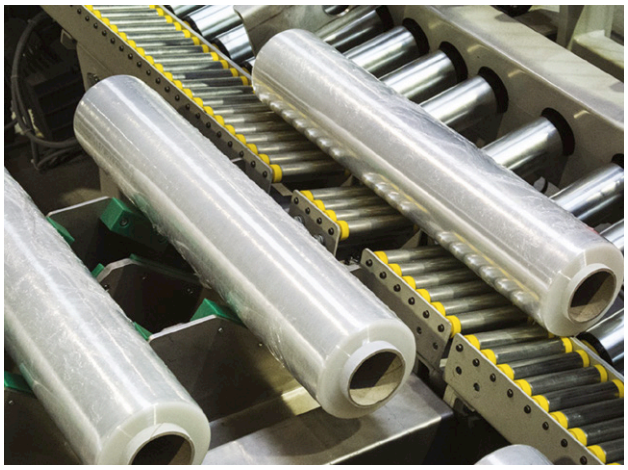
"This formulation is the most competitive in terms of cost, ad presents good performance," said Ana Barbara Maldaner, product engineer at Braskem.

Main image: Stretch film needs to have high mechanical strength

Highly stable

In similar fashion, **Sabic** said that some of its particular grades can help to boost pallet stability through a variety of factors.

In one example, Bart Van Hoof, global marketing manager for flexible packaging at the company, said that adhesion performance of its Cohere grades have helped to boost cling performance when incorporated into the cling layer. In a project run with Efekt Plus – a Polish stretch film manufacturer – it changed the formulation of the outer LLDPE cling layer of a five-layer film, replacing 32% VLDPE with 10% Cohere. This led to a cling layer



Above: Efekt Plus used Sabic's Cohere in stretch film formulations to maintain cling force and cut costs

with similar cling force – despite the lower percentage – as well as a cost advantage, he said.

In a separate project with secondary packaging specialist Maillis, Sabic helped the company create a thin, stiff stretch film using its Supeer 8315 grade. The films were just 10 microns thick, and used Supeer to replace either LLDPE or mLLDPE. The result, said Sabic, was films with higher stretch force, reduced stretching and a constant steep tensile curve.

In its third example – a project with ForumPlast and DuoPlast – it used a combination of Supeer and Cohere to replace EVA in stretch hoods, while improving properties at a competitive price.

In the original structure, a middle EVA layer, sandwiched between two mLLDPE layers, was replaced by a new structure: two outer layers of Supeer/LDPE, sandwiching a middle layer that combined Cohere, Supeer and LDPE.

Some of the advantages of the new design included: higher, more consistent holding force; more stable COF; better protrusion resistance; and higher transparency.

Van Hoof added that Sabic is adding m-C6 LLDPE grades to the Supeer portfolio.

Propagation properties

Many mechanical properties determine the final performance of pallet stretch film – including maximum elongation, holding force, and the tendency to rupture. Many of them can have a negative effect on one another – which can have a huge influence on cost.

"One parameter – tear propagation – if often forgotten, but improving resistance to this has important benefits," said Jelle Dendauw, CEO of **ESTL** in Belgium.

For this reason, he said it is important to measure the mechanical resistance of stretch film after an initial cut or hole has been made in it. This is done in several stages. First, the film is brought to a condition of pre-stretch and second stretch, and the line speed is adjusted to zero. The film is then clamped so that it cannot move. A 20mm vertical incision is then made in the film, and the clamp is released. The film is then pulled at 5mm/s until the film breaks.

The 'conclusion' can be measure in several ways, including: time to breakage (the total time until the film is completely broken); drop time (the time between maximum force and the film breaking); and maximum load factor – which is the film's maximum force divided by the initial force.

Dendauw cited two case studies carried out by ESTL: one on wrapper performance, and one on pallet stability.

In the first instance, ESTL tested three different films (suppled by SML of Austria), each 23 microns thick. Pre-stretch began at 300% and moved up in 20% increments – in each case repeated the test 10 times, and noting the number of film breaks. The test ended when it became impossible to repeat more than seven times out of 10. Under these conditions, the three films failed at pre-stretch values of 360, 380 and 420%.

In the second case, two different 23 micron films were put through similar stress-strain curves, for wrapping a pallet load of carbonated soft drinks. One film offered much less dynamic deflection under acceleration, which simulated transport conditions.

Overall, Dendauw concluded that a higher tear propagation resistance led to: higher load stability; fewer film breaks for a similar ultimate stretch; and, a higher overall equipment efficiency (OEE) of the wrapper – even in extreme conditions.

Two-way stretch

Martin Leinert, of the **Fraunhofer Institute for Process Engineering and Packaging** (IVV) in Germany, told delegates how his organisation has devised machinery for stretching flat, semi-finished

Above: Carbonated soft drinks are a typical load carried on pallets

products. The machinery was originally developed for thermoforming – in order to determine the look of the final product – but has also been applied to operations such as biaxial film stretching.

There are several challenges to determining how a 'stretched' product will end up: tests on 'real' assets are often difficult, because the relationships between the various processing parameters (such as temperature and applied force, for instance) are complex.

Using numerical solutions can help to overcome some of these difficulties, he said. However, they require accurate material characterisation. The results from IVV's experiments can help to determine real material characteristics more accurately – which can then be used to plug into computerised simulation models.

IVV has developed a machine that applies stretching forces more evenly, by improving on previous designs. Existing designs use mechanical clips or grippers to hold the edges of a piece of sheet or film, and then apply a stretching force. The downsides of this method include: damage to the material; non-homogenous application of stretching forces; and insufficient force measurement (only by torque).

The main way that IVV overcome these problem was to clamp the film using silicone tube 'grippers'. Two such grippers are placed either side of the film, and inflated in order to clamp it in place along its length. This makes for a more regular force on the film when it is stretched, and reduces the chance of film damage.

In one example, the researchers stretched a 200 micron PET film using both methods. Using the 'old' technique, the final thickness ranged between 20 microns (in the middle) and 22 microns (at the edge), and generated around 3cm of edge trim. Using the new IVV method, film thickness was consistent at 24 microns, and required an edge trip of less than 1cm.

Model behaviour

At the equivalent event – held late last year in the USA – **Dow** presented details of how pallet stability can be modelled using finite element analysis (FEA).

The technique allows greater understanding of stretch wrap film deformation mechanics, said Pavan Lalavala, associate research scientist at Dow Chemical in the USA.

The modelling attempts to simulate 'real world' tests such as tilt testing, on the performance of films made using Dow's Elite and Elite AT resins.

The FEA model makes certain assumptions, including: the pallet is rigid; corrugated boxes stacked onto its have perfect shape; and the initial stretch film configuration is a tube, with uniform thickness from top to bottom.

Stacked boxes can be modelled in either 'column' form (square boxes) or 'interlocking' (in which oblong boxes are stacked alternately for higher stability).

The FEA model also performs a virtual 'tilt test', in which the pallet is 'tilted' through a typical 15° -- and its maximum displacement measured.

■ AMI's next Stretch & Shrink Film conference takes place in Florida, USA on 13-14 November 2018. For more details, contact Alexandra Fish (**alexandra.fish@ami.international**) on +44 (0) 117 314 8111. A full line-up of the speaker programme is available **here**.

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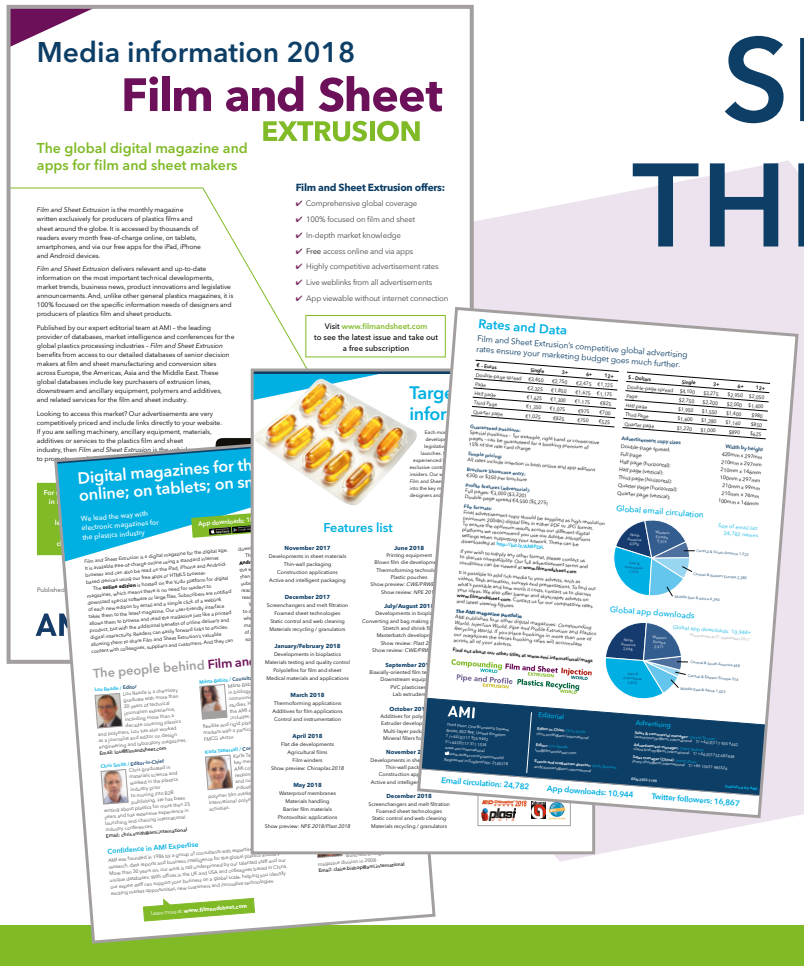
Right: Heavy items – such as concrete blocks – require extra-strong pallet wrap to ensure stability



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Single-Serve Capsules 2018

Capitalising on the growth in the single-serve capsules industry

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Single-Serve Capsules 2018

Wednesday 5th September 2018

08.30 Registration and welcome coffee
09.30 Opening announcements

SESSION 1 - MARKET OVERVIEW AND SEGMENT INNOVATION

09.40 **Global single-serve capsules market overview**
Mrs. Martyna Fong, Unit Manager - Packaging,
AMI CONSULTING, United Kingdom

10.10 **Development of a capsule and system for filtered, chilled, carbonated and flavoured beverages**
Mr. Andrew Cousins, Technical Key Account Manager,
ALUPAK AG, Switzerland

10.40 **A newcomers perspective of the industry: 3 years of experience and expectations**
Mr. Francesco Corsetti, Business Head of Capsules & Beans Division FOOD EMPIRE, Singapore

11.10 Morning coffee sponsored by: cobelPlast Let's Make Things Last

SESSION 2 - EXPLORING SUSTAINABILITY INITIATIVES

11.50 **How to contribute to sustainability: aluminium recycling by Nespresso**
Mr. Veith Behrmann, Group Packaging Manager,
NESTLE NESPRESSO S.A., Switzerland

12.20 **The environmental footprint of single-serve coffee along its full value chain**
Dr. Rainer Zah, Managing Director D-A-CH,
QUANTIS, Switzerland

12.50 **Compostable barrier solutions: a new sustainable way for the single-serve world**
Dr. Gianmaria Pavan, Head of Beverage,
AHLSTROM-MUNKSJÖ, France

13.20 Lunch

SESSION 3 - DEVELOPMENTS IN MATERIALS AND ADDITIVES

14.50 **Printed capsules lidding and the risk for consumer food safety – legislation, industry practice, next frontier**
Mr. Giorgio Dini, Marketing Manager Beverages, AMCOR (AMCOR FLEXIBLES EMEA), Italy and
Manfred Hoffmann, Head of Product Safety, AMCOR (AMCOR FLEXIBLES EMEA)

15.20 **The view of a global industry leader on sustainability**
Mr. Ricardo Calumby, Global Marketing - Thin Wall Packaging, Petrochemicals,
SABIC, Netherlands

15.50 **PLA coffee cups and caps: end-of-life in a circular economy**
Mr. Bert Clymans, Business Development Manager Europe,
TOTAL CORBION PLA BV, Netherlands

16.20 Coffee break sponsored by: KIEFEL TECHNOLOGIES A Member of Brückner Group

17.00 **Certified home compostable beverage capsules**
Mr. Sebastian Meyer, Head of Research & Development,
GOLDEN COMPOUND GmbH, Germany

17.30 **Capsule individualisation through colours - how to find the proper colour within seconds**
Mr. Diego Karpeles, Product Manager,
GABRIEL-CHEMIE GmbH, Austria

18.00-19.30 Networking Cocktail Reception

sponsored by: NatureWorks | FLO

Thursday 6th September 2018

08.30 Registration and welcome coffee
09.00 Opening announcements

SESSION 4 – INNOVATIONS IN CAPSULE DESIGN AND FILLING

09.10 **Single-serve capsules – development and success of a trend**
Mr. Mario Mester, Senior Sales Manager,
RYCHIGER AG, Switzerland

09.40 **Compostable and oxygen barrier: IML technology can be the solution**
Mr. Laurent Lombart, Managing Director,
CAPSUL'IN PRO SA, Luxembourg

10.10 **Machines and Technology – Compatible Capsules for your perfect brew**
Mr. Jean-Paul Roosendaal, Director Global Strategy & Business Development
GEORG MENSHEN GmbH & Co. KG, Germany

10.40 Morning coffee

SESSION 5 – ADVANCES IN CAPSULE MOULDING TECHNOLOGY

11.20 **Optimise your initial capital investments by utilising your existing equipment to co-inject single-serve capsules**
Mr. Rafael Izaguirre, Business Development Manager for Kortec Co-Injection Systems,
MILACRON, United States

11.50 **Multi-layer sheet lines – how to keep the flavour**
Dr. Henning Stieglitz, CTO BC Extrusion Holding,
BATTENFELD-CINCINNATI GERMANY GmbH, Germany

12.20 **Gas, aroma and migration barrier by transparent plasma enhanced - silicon oxide coating**
Dr. Armin Mohr, General Manager,
PLASMA ELECTRONIC GmbH, Germany

12.50 Lunch

14.20 **Thermoformed single-serve capsules – latest developments in metal substitution**
Mr. Sven Engelmann, Director of Packaging Technology,
ILLIG MASCHINENBAU GmbH, Germany

14.50 **Exploring localised injected compression and the research for alternative materials to PP for the realisation of food capsules and packaging, which can raise the barrier to external agents**
Mr. Maurizio Delnevo, CEO / PDG,
ERMO, France

15.20 Coffee break

15.50 **Technical advancements by injection moulding process of capsules – how to gain more benefit**
Mr. Bertram Stern, Sales Manager Packaging,
ARBURG GmbH, Germany

16.20 **Innovative heating technology for best forming and sealing performance of capsules and cups**
Dr. Sascha Bach, Chief Technology Officer,
WATTTRON GmbH, Germany

16.50 Afternoon tea and conference ends

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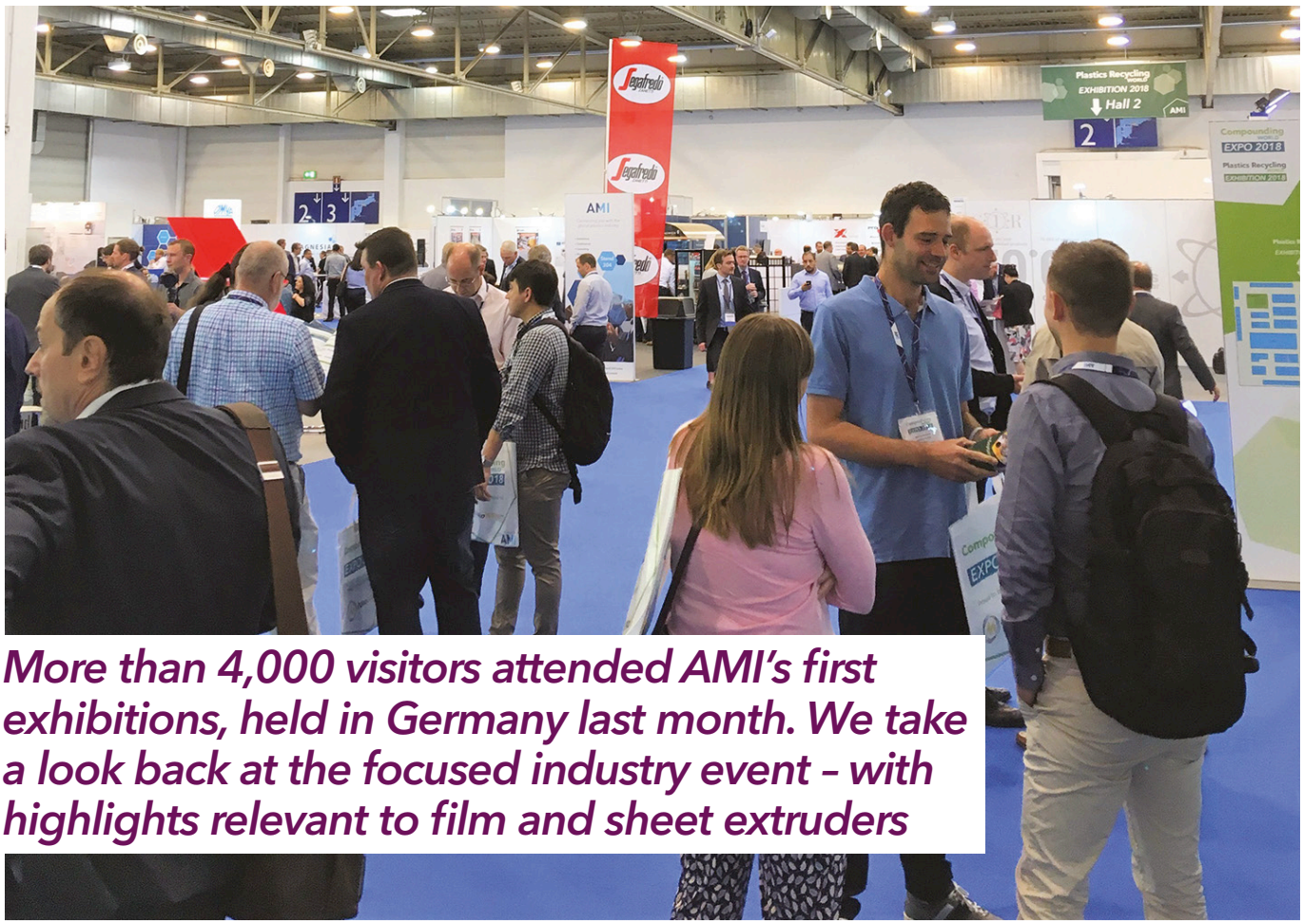

PHOTO: AMI

More than 4,000 visitors attended AMI's first exhibitions, held in Germany last month. We take a look back at the focused industry event – with highlights relevant to film and sheet extruders

Focused industry events get off to a flying start

Compounding World Expo and Plastics Recycling World Exhibition – the co-located, focused plastics industry events organised by **AMI** – made their successful debuts last month, attracting 184 exhibitors and 4,024 visitors to Messe Essen in Germany in late June.

The events boasted a large international audience: 42% of attendees came from Germany, 50% from the rest of Europe, and 8% from outside of Europe – some from as far afield as South Africa, Brazil, China and South Korea.

"We are delighted with the response to our first exhibitions, which were well supported by the plastics recycling and compounding industries," said Rita Andrews, head of exhibitions at AMI.

Exhibitors reported having many meetings with high-quality contacts on both days of the event. More than 60% of exhibitors have already reserved space for the next European versions of the shows, which will return to Messe Essen on 17-18 June 2020. Many have also booked stands at the first US versions of the event – which will take place in Cleveland, Ohio, USA on 8-9 May 2019.

Many exhibitors highlighted the focused nature of the Compounding World Expo, with Dagmar Kirchof, marketing manager at Leistritz Extrusionstechnik, commenting: "The expo is very focused with everything key to the industry in one hall."

The targeted focus also helped deliver high quality visitors. Bernhard Gabauer, segment development manager for plastics at Bühler, said: "I received more quality leads in one day of this event than a whole week at NPE."

The three conference theatres at the Essen shows attracted capacity crowds of up to 250 people each. A series of presentations covered a

Main image: Visitors doing business at the first Compounding World Expo and Plastics Recycling World Exhibition in Essen in Germany last month

PHOTO: AMI/CHRIS SMITH

Above: Polarfin block copolymers from Interface Polymers could double the life of poly-tunnel films

wide range of technologies and market opportunities, while industry leaders took part in a series of informative training seminars and business debates.

"The focused nature of the expos worked very well for visitors from the plastics recycling and compounding sectors," said Andy Beevers, events director at AMI. "

Exhibition highlights

Some aspects of the event were of interest to those in the film and sheet sector. For instance, **AceRetech Machinery** – set up in Zhangjiagang, near Shanghai in China, just three years ago – makes single-screw recycling extrusion lines that can reprocess film, bags, fibres and other flexible plastics. Laye Wong, sales director, said at the show that it uses a 3-in-1 technology approach – with cutting, compacting and extrusion all integrated in the same line.

AceRetech's ACS-H systems are suitable for reprocessing production scrap and post-consumer waste. The ACS-H range starts with an 80mm screw extruder, at 160-220 kg/h throughput rate, and goes up to 180mm screw, at 1,000-1,200 kg/h throughput. The company also makes ACS-Pro systems, with throughputs up to 2,000-2,100 kg/h.

Twin-screw extruder manufacturer **Changzhou Jwell Chemical Machinery** says it is setting up a dedicated export company targeting Europe and North America. Bond Shan, vice president and sales director at the company (part of China's Shanghai Jwell Machinery), said it has been working to grow its export sales in Russia, India, South Korea, Indonesia and countries in the Middle East. However, he said in Essen that executives at the company were surprised how many lines it was starting to sell in Europe and North America without specifically focusing on those markets.

Added value

Dow Performance Silicones said it will launch a new line of additives for PE films combining slip and anti-block performance at the Fakuma show later this year. Christophe Paulo, global segment leader for plastic additives, said the new additive masterbatches use a compatibilisation chemistry that allows silicone slip additives to be compounded with a silica-based anti-block – something that cannot usually be achieved effectively. The new products will also comply with Chinese, as well as EU, FDA and Japanese, regulations.

"In the past, you were OK in China if you had EU and FDA approval but now they are enforcing their own standards," he said.

UK-based **Interface Polymers** presented its Polarfin block copolymer, which is based on technology developed at the University of Warwick and allows compatibilisation and surface modification of polyolefin resins. Polarfin materials have clear application potential in recycling of incompatible polymer blends, such as PE with PS, PA or PET. However, business development manager Simon Waddington said the additives may hold even greater potential in surface modification.

He cited the example of agricultural films for poly-tunnels where effectiveness is often limited by the durability of the anti-fog and anti-drip performance. Traditional additive-based solutions suffer migration issues, which means they have a working lifetime of around 18 months. Polarfin additives are permanently fixed in the polymer so will last as long as the film itself, which can be as long as three years.

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Compounding World Expo and Plastics Recycling World Exhibition will not run in Germany next year – because of the K 2019 show – but will return to Essen on 3-4 June 2020, when they will be joined by two additional focused events: the Extrusion Expo and the Polymer Testing Expo. Next year will see the US debut of the Compounding World, Plastics Recycling World and Extrusion Expos at the Huntington Convention Center in Cleveland, Ohio on 8-9 May 2019. For information on exhibiting at these events, contact Matt Wherlock (matthew.wherlock@ami.international) on +44 (0)117 314 8122 or visit www.ami.international/exhibitions.


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Film and Sheet EXTRUSION

PHOTO: PETER MAPLESTON

While Plast 2018 attracted a number of foreign visitors and hosted numerous international exhibitors, many of the innovations there were home-grown. Peter Mapleston and reports on some of the film and sheet highlights from the show

Made in Italy: film and sheet innovations from Plast 2018

Some of the most impressive spectacles at any major plastics show are the gigantic blown film lines with towers that almost touch the roof. Given how many extrusion equipment makers there are in northern Italy, you might expect the Plast exhibition in Rho, just outside Milan, to excel in this regard.

You would be wrong. Precisely because the showgrounds are so close to where these companies make their machines, they prefer to save costs by putting on open houses and bus people from the show. So this year, in late May and early June, Plast 2018 was graced with just two blown film lines.

Once again, **Macchi** claimed the prize for the most imposing piece of equipment running in the halls, a giant high-output POD (PolyOlefin Dedicated) blown-film line fitted with a new double-lip air ring from German company Kdesign.

"Traditionally, for high-output lines like this, we would use a three-lip design, but this one makes life easier for the operator," said Claudio Grignaschi, international area manager.

Automatic thickness control has been integrated into the system. The line was producing five-layer 45-micron collation shrink film using Dow materials.

"Five-layer extrusion is now spreading all over the world," Grignaschi said. "It can do everything that three-layer can do, but it can make better, thinner film, at lower cost."

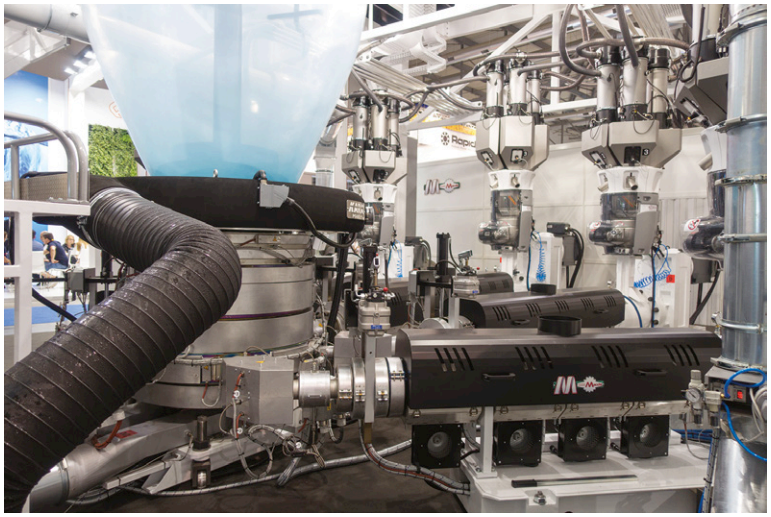
Macchi says that thanks to the close cooperation its technical department has with Dow Chemical on developing the most suitable formulations for multilayer films, the five-layer POD line at the show was able to reach an output of over 1000 kg/h – despite the height of the tower being limited by the hall ceiling.

Nearby, Macchi hosted an information point where visitors could find out about its new line management software – and where its partner Siemens explained how Industry 4.0 systems can lead to smart film extrusion factories.

Only one other blown film line was running at the show – on the **Tecom** stand. This was a three-layer line processing Novamont's Mater-Bi biopolymer. A combination of a clear grade for the external layers and an opaque grade for the core resulted in a highly translucent film rather thicker than Macchi's, at 165 microns; mechanical properties of the biopoly-

Main image: Tecom, which was processing Novamont's Mater-Bi biopolymer, was showing one of only two blown film lines at the show

PHOTO: PETER MAPLESTON



Above Macchi ran a high-output POD blown-film line fitted with a new double-lip air ring

mer still fall short of what is obtainable with today's LLDPEs, although it continues to improve. The Tecom line can also be used for processing LDPE.

Fast cast

Cast film lines, though not as spectacular as blown film lines, can still be highly impressive. **Colines** demonstrated its fastest-ever AllRollEx 1500 cast film line at the show. The equipment has already run at 1000 m/min in the company's laboratories in nearby Nibbia. At the show, it fell just short, achieving 980 m/min of a 12 micron film, with a real energy consumption lower than 0.4 kWh/kg. In any case, this is considerably faster than speeds achieved on previous generations of equipment.

The line, which can produce hand, machine and jumbo rolls on two- and three-inch reels with the Allspeedy automatic winder, had four extruders extruding five-layer film with **ExxonMobil** Exceed, Vistamaxx and LLDPE resins. Colines says it has also carried out improvements to its Bigmouth trim recovery system to accommodate the higher speeds.

Colines also exhibited the Allwrapper LS orbital stretch wrapping unit, engineered by the company and manufactured by Lanfranchi, a specialist in this area. The equipment can be used for bundle-wrapping a wide range of products – such as bottles, jars, cans and boxes – in different materials.

Right: A view from the top of the Colines AllRollEx 1500 cast film line

"The intrinsically money-saving wrapping process (avoiding the need for a shrink tunnel) permits a saving of more than 50% on packaging material and more than 90% in energy consumption," Colines claimed.

Winding power

Amut, meanwhile, was highlighting its Prowind four-shaft winder (not on the stand, but at its open house in Novara), which can be used for machine rolls, hand rolls, and jumbo rolls. Saša Davidovic, sales director of Amut's film division, highlighted various key features of the winder, which accepts two- and three-inch cores and can operate at the same high speeds with both. There is no need for composite roller shafts. There is no direct motorisation on the shafts, with synchronisation being done using a contact-free magnetic system that creates no friction and hence no vibration. Each roll is weighed during the unloading phase, so there is no need for values to be obtained by extrapolation from processing data. Cutting blades are non-oscillating.

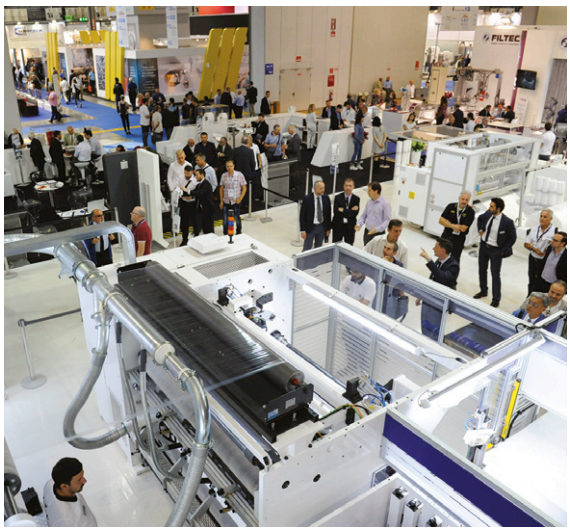
Amut also offers a packaging unit for the finished rolls. Rolls can be loaded into boxes, or in the case of jumbo rolls, a label can be printed on the inside of the core. In any case, all parameters are saved in a central control system. Each finished roll is weighed before being conveyed to the packaging unit.

Notable features of the winder include an indexing cycle time that has been cut to 18 seconds; and an absence of pneumatic and hydraulic components, with contact roll pressure being adjusted electrically adjusted; very high-speed changing between two- and three-inch rolls; and synchronisation of the speed of the incoming air-shaft using a magnetic field and without direct contact with any motor (eliminating friction). All rolls in contact with film are coated with special material that improves the grip of the film and eliminates air entrapment.

Davidovic also highlighted Amut's Roto-Feed trim recycling system, based on a centrifugal pump rated at 4kW, which he said is well below that of rival systems. It is capable of recycling up to an unlikely 50% of total line output.

"This is a zero-fluff solution, which requires less reheating than other solutions, there is no regranulation and it produces fewer gels," he said.

The Roll Pack 4.0 packaging system is available



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in two versions, called Prima and Seconda. On the Roll Pack 4.0 Prima, hand rolls are put in a box which is automatically formed, filled, closed and then stored on a pallet; this model also handles machine and jumbo rolls, which are stored on a pallet. Roll Pack 4.0 Seconda can do everything the Prima does, but it can also take pallets from an accumulator holding up to 10 pallets; it also has an automatic wrapping station to pack the finished pallets ready for shipment.

At its headquarters in Novara, not far from the show, Amut demonstrated production of thermoformable PET sheet suitable for food-contact applications by direct processing of flakes from waste material. A new demonstration line, which pairs an Amut line with a Vacurema recycling system from partner **Erema**, incorporates the latter's PET Laserfilter.

Erema says the Laserfilter is increasingly preferred over piston filters for this type of set-up. Robert Obermayr, head of Erema's Powerfil business unit, attributes this to the higher process stability through constant pressure operation. Whereas the maximum level of contamination which can be handled by a piston filter lies between 0.05 to 0.1%, the Laserfilter processes input material with a degree of contamination of over 1%, he says. Even so, formation of black spots is not an issue. Screen service life of the Laserfilter can in some cases be as long as 12 weeks.

Five-layer film

Throughout the fair, **Bandera** had an open house at its headquarters in Busto Arsizio (also not far from the show), where extrusion lines for flexible packaging and thermoformed rigid packaging running. Bandera said a crucial issue for it at the show was its effort to promote recyclable and/or biodegradable materials.

Below: Bandera prefers to show off its equipment at open houses – not surprising, given how big some lines are

PHOTO: BANDERA

The company showed off a newly-manufactured PO5 five-layer polyolefin blown film line, also capable of outputs over 1000 kg/h and producing packaging film with a useful width of 2600 mm. It also had an FFS (form/fill/seal) line with production output up to 360 kg/h dedicated to heavy duty bags. A third line was capable of extruding rigid PET, PP and PLA film, with a gross output rate of 1200 kg/h and a useful width of 1450mm, in thicknesses from 0.14 up to 1.5mm. A new Pure unit was dedicated to the production of FDA/EFSA approved packaging rigid films using post-consumer PET.

ICMA San Giorgio, best known for its twin-screw compounding extruders, was highlighting technology for production of multi-layer membranes incorporating recyclate. It illustrated a system based on three twin-screw extruders feeding a calender (also produced by the company).

"ICMA was one of the first companies to propose direct extrusion," CEO Giorgio Colombo pointed out.

Incentives recently approved by the Italian government for the recycling of highly contaminated post-consumer waste (what ICMA calls Plasmix) provide for tax credits of up to 50% for purchases of products resulting from Plasmix.

"Our co-rotating twin-screw extruders and extrusion lines, developed through our project called Ecoimpatto, represent the most advanced frontier to transform these extreme materials into commercial artefacts, usable in different areas," said the company.

PET recovery

Melt filtration specialist **Gneuss** was also highlighting its expertise in reprocessing bulky PET waste such as post-consumer bottle flake and various types of industrial waste without pre- drying. A Gneuss Processing Unit consists of a Gneuss MRS extruder for devolatilisation and decontamination in combination with a Gneuss Rotary Filtration System and an online viscometer VIS for intelligent dynamic viscosity control.

Besides producing high quality rigid sheet, Gneuss now also offers the option of producing physically foamed PET sheet from up to 100% post-consumer material with the addition of its new PET foam module. Gneuss says sheet weighing half as much as solid PET sheet can be extruded with a consistent foam structure and mechanical properties.

If you need to dry your PET though, **Plastic Systems** claims to be the largest supplier of dryers for the material – a business the company founded some 25 years ago. It is a specialist in equipment

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PHOTO: PETER MAPLESTON

Right: Omipa's automatic die for solid sheet enables fast regulation of the gap while the lips stay parallel across its entire width

for PET storage, transport, and dehumidification, as well as in dosing systems. The company also does plant engineering for turnkey systems – something for which demand is increasing among compounders, it says.

At the show, the company was also showing off a new plant supervision system that provides real-time control of all auxiliary systems in a processing plant, whether they be from Plastic Systems or from other suppliers. It provides information on energy consumption, enables remote communications with the plant, provides data for preventive and predictive maintenance, and also performance indices.

Automatic die for sheet

Omipa showed a new automatic die concept for solid sheet with thicknesses ranging from 1mm up to around 30 mm. What is remarkable about this die is not only that it enables fast regulation of the gap, but that the lips stay parallel all across the width of the die. There are no bolts, manually adjustable or thermal, to be seen. Sales manager Massimo Maccagnola was tight-lipped (no pun intended) about how the die works, saying no more than it has to do with thermo-regulation and flow.

Omipa's main market is hollow profile PP sheet, a market that it has been in for decades. The company says that over the last couple of years, business has increased considerably. Applications are various, ranging from flooring, through various types of boxes, to pallet interlayers and advertising panels. Maccagnola said business in polycarbonate sheet extrusion systems is also picking up, but is being hindered by polycarbonate supply problems.

Chiller spotlight

Piovan pointed the spotlight at its new Aquatech Easycool+ range of chillers that comply with European Union Ecodesign regulations – which come into force in 2021 – governing energy efficiency of such products.

It was also designed specifically for industrial processing of plastics. Most chillers, it says, are not designed and calibrated specifically for this, but have merely been adapted.

"If they are effective in the process, their costs and energy consumption are high because they were not conceived for this kind of application, and energy outlays push up production costs," said the company. "If they are inefficient, their initial costs are lower, but they have to be run at full capacity: expensive maintenance and imprecise temperature control negatively impact finished product quality and costs."

When processing plastics, the temperature ranges to be maintained for different processes can vary by 50°C or more, demanding different pressures and flow rates from the chiller. Piovan says that Easycool+ is flexible enough to maintain optimal working conditions at all times.

The range employs 'plug and play' technology with integral circuitry in the machine: eight different hydronic versions available for each model, with or without thermal storage, and specific versions for use at extremely high flow and pressure. A system built with Easycool+ is sized to ensure the lowest possible refrigerant load, says Piovan. Power ranges from 60 to 250 kW.

Two different types of evaporators are available: brazed plate, which is normally used when clean water is to be used in the cooling process; and shell and tube, for situations where treated water is not available.

Piovan also emphasises the low maintenance costs. All components are arranged inside the unit for easy access by a technician. The refrigerant circuit is designed for periodic testing in accordance with current European legislation. The control software allows operating parameter monitoring and troubleshooting, even remote. The software can also be connected to Piovan's Winfactory 4.0 supervision software.

And **Frigel Firenze**, fresh from its acquisition of

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fellow refrigeration system supplier Green Box, was on two stands to show the new breadth of its offering. Green Box specialises in the production of systems and equipment for water and fluid temperature control, and has important business with processing equipment OEMs.

"We are delighted that Green Box is now part of our group," said Duccio Dorin, CEO of Frigel. "Green Box harbours considerable technical and innovative potential that – thanks to Frigel's strong international position – will now be able to find its natural outlet."

Moisture metering

Moretto put considerable emphasis on its new Moisture Metering Manager (MMM).

"Before now, there has not been a drying system that measured original humidity in the granules," said business development director Paolo Gasparotto. "The MMM can determine exactly the right amount of dehumidification necessary to obtain the desired ppm levels in the material. This is a form of energy on demand."

The MMM enables product certification, which is particularly important for the automotive industry, Gasparotto noted.

The MMM reads moisture content of the resin itself, rather than the surrounding air, by measuring changes in electromagnetic waves. Two Moisture Meter sensing units, one above the hopper (Moisture Meter Crown) and one below the drying hopper (Moisture Meter Box), read 'before' and 'after' levels. The drying process varies according to these readings.

As standard, the MMM stores data profiles of 15 most commonly used materials, and new material profiles can be added.

The MMM is part of Morettto's Eureka Plus drying system concept, which brings together the MMM with its X Max resin drying system with ultra-low dew point, the Flowmatik airflow management system, and OTX drying hoppers.

PHOTO: PETER MAPLESTON

Above: Moretto's X Cooler is a modular cooling concept for heavy-duty applications

Moretto says that processors using Eureka Plus have on average cut energy consumption by 56%, compared to conventional drying systems.

Still on the theme of energy efficiency, the company also presented its new modular cooling concept for heavy-duty applications, X Cooler. This is equipped with screw compressors with variable-flow, high-efficiency evaporators, centrifugal ducted fans and electronic expansion valves, according to Moretto.

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In the mix: developments in masterbatch technology

The latest masterbatch formulations help processors achieve everything from stabilising greenhouse films to ensuring that black plastic does not overheat in the sun. Lou Reade reports

The range of applications in which masterbatches add value is immense – from adding subtle pigmentation through to important functional effects. Many were covered in the recent Masterbatch Asia conference, organised by Applied Market Information.

Saifudin Abubakar, senior technical advisor at **ExxonMobil Chemical** in China, presented a new range of C3 polymers from the company's Vistamaxx range.

"These are low viscosity grades that can be used as flow modifiers," he told delegates. "This enhances processability, changes MFR and viscosity predictably, and retains physical and property balances."

He used the example of the company's Vistamaxx 8880 grade, which – when added to polypropylene (PP) – lowers both motor torque and die pressure (at equivalent temperature profile and output rate). By increasing screw speed and lowering melt temperature, this allows processors to boost output, cut die build-up and scorching, and reduce energy consumption.

Abubakar added that the grade helps to lower PP viscosity across all shear rates.

Differential scanning calorimetry (DSC) testing showed that adding the Vistamaxx had no significant effect on cooling time: crystallisation half time was similar for all Vistamaxx grades up to 10% addition, while crystallisation temperature was unaffected for one grade (VM8880) and slightly lower for another (VM6502).

VM8880 also improved both melt flow rate and colour retention under multi-pass extrusion, he said.

Black screen

Basic physics tells us that black objects absorb more heat that lighter ones. However, **Ferro Performance Pigments** has developed a range of carbon blacks that incorporate chrome iron hematites – which scatter near infrared (NIR) radiation in order to keep temperatures lower.

Main image: Ferro's range of NIR absorbent pigments help to keep dark products cooler – and so lengthen their service life

These can impart shades with a hint of everything from 'red' (including brown) to 'blue' (in various degrees) by using two specific pigments – known as Pigment Brown 29 (PBr29) and Pigment Green 17 (PG17).

A 1% loading of one of these special grades – rather than a 'standard' carbon black – lowered surface temperature by around 10°C, said the company.

There are grades for thin films that combine these two pigments – and a third, Ultramarine Blue (PB29) – but higher loadings are needed to ensure visible and NIR opacity.

For more moderate performance, manganese ferrite black oxides are a more cost-effective option, said the company.

Palad Sopanakijkosol, a technical services manager at **Birla Carbon** in India, explained the importance of particle size in carbon black masterbatches: while larger particles are relatively easy to disperse, and impart a 'grey' colour to products, smaller particles have a more intense colour effect – but are harder to disperse.

For this reason, the company has studied the factors affecting dispersion – including compounding conditions (such as mixing time and temperature) as well as other factors like polymer properties and the presence of other additives.

"Complete letdown of masterbatch into the final product is essential for the best performance of carbon black," he told delegates.

Different factors that affect letdown include: a viscosity mismatch between masterbatch and letdown resin; inadequate compounding time and shear; and the presence of other fillers in the polymer matrix.

He showed a range of blown film samples – where a good letdown showed a darker film, while poor letdown resulted in black spots caused by undispersed masterbatch.

Size selection

At the other end of the colour spectrum – white rather than black – particle size is also important. Jörg Hocken, global application manager at **Venator Materials** in Germany, said that titanium

Masterbatches can be 'seen' using NIR

UK-based **Colour Tone** has launched a new generation of 'competitively-priced' near-infrared (NIR) detectable masterbatches that meet recyclability concerns for single-use black plastic tubs, trays and films.

Plastics coloured with carbon black cannot be 'seen' by the NIR technology used in commercial waste sorting operations. These new masterbatches overcome this problem. The first two grades are targeted primarily at polypropylene (PP) but can be applied to other polymers. The company said NIR black 958884 meets EU food contact legislation requirements. NIR black 95893 supports applications that meet the US FDA Code of Federal Regulations' criteria at up to 10% dosage.

Colour Tone director Tony Gaukroger said price has been a barrier to wide adoption of NIR-detectable black masterbatches.

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Screening tool cuts regulatory risk

EuMBC – the European sector group for masterbatch makers and compounders – has developed a rapid screening tool to help members identify and prepare for future regulatory change that may affect material availability.

A number of substances that are "critical for the plastics industry" – it cites titanium dioxide as an example – have come under regulatory pressure. Being faced with a sudden restriction would have serious financial implications. In theory, such developments can be anticipated – but EuMBC says it is not feasible for a typical company to review all the necessary information.

The new tool allows a company to screen all its raw materials rapidly, to identify any that could come under scrutiny in the future. It says this will enable EuMBC members to anticipate future changes years in advance.

"Such strategic insight offers a means to anticipate strategic threats, and be used to turn them into opportunities," said EuMBC. "If a company knows, for example, five years in advance that a substance is going to be phased out, this gives valuable time to produce an alternative."

The EuMBC screening tool was shown at the Compounding World Expo in Essen, Germany in July.

› **www.compounders.eu**

dioxide particle size can create 'undertone' effects in products.

"Depending on particle size, blueish of warm undertones can be observed," he said.

Titanium dioxide can also be used to block both UV and IR light – depending on particle size. At the 'ultra fine' end, it can be used as a transparent UV blocker, typically in thin films. Venator offers a number of these grades.

"As in the world of pigments, there is a need for more than one grade in the ultra-fine range – as secondary requirements become essential to the different application options," said Hocken.

At the 'coarse' end, the same additives are used to reflect infrared (IR) radiation.

"Maximising solar reflectance is key to reducing the temperature of coloured exterior systems," he said.

A typical titanium dioxide particle is around 200nm in diameter. Venator's Altiris 800 grade has a diameter of around 1000nm. A typical application of this would be in agricultural film.

However, other additives – including barium sulphate – also have different properties depending on their particle size. Coarse barium sulphate (around 8 microns) gives translucency in applications such as polycarbonate sheet for signage, while fine grades (1 micron) is used for nucleation and anti-blocking – allowing rapid, uniform crystallisation in polymers such as PET and PA.

Below: Sabo's light stabiliser formulations protect greenhouse films under conditions of very high pesticide treatment

Light protection

Arnim Helmboldt, marketing director of **Sabo International** in Switzerland, told delegates about how advanced light stabiliser formulations can be used to protect greenhouse films under conditions of very high pesticide treatment (up to 3,000ppm of sulphur, and up to 200ppm chlorine).

He said that two of the company's advanced additives – UV 0216 and UV 0317 – have very high chemical resistance, and are preferred in this type of application. They were developed and tested over a period of five years, and went through tests included accelerated weathering and simulated sulphur fumigation by weekly immersion in sulphurous acid. Their performance was confirmed through field trials.

Other grades, such as UV 119, are used in greenhouse film under medium to high pesticide exposure – and it outperformed the standard UV 94 grade in both metam sodium and sulphur fumigation. At the same time, UV 40 will give high performance under extreme processing conditions, he said.

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We round up some of the latest developments in bag making machinery – including a servo-driven line, and a new automation concept

Bagging a winner

Some of the most basic products can be surprisingly difficult to pack. Cement, for instance, has a high density and sensitivity to moisture – so requires tough packaging to protect its contents from damage. Increasingly, this has meant a move away from paper towards plastic packaging.

Starlinger of Austria recently sold its 300th Ad Star Kon conversion line, for making Ad Star block bottom valve sacks. Worldwide production of these sacks amounts to around 10 billion units per year, it says.

The 300th line of this type was installed at Philippines-based packaging manufacturer Sakomoto International Packaging, which supplies the local cement industry with Ad Star sacks made of plastic fabric. In Caloocan City, near Manila, Sakomoto operates many systems from Starlinger – including tape extrusion lines, circular looms, and lines for coating, printing, and sack conversion.

Sakomoto produces around 500 million sacks every year – which is due to increase even more, as its installed capacity continues to expand – to supply packaging to the growing cement market. Philippine cement plants are increasingly recognising the advantages of Ad Star sacks over paper sacks, causing their market share to rise.

In early 2018, Sakomoto commissioned two sack conversion lines – including the 300th Ad Star Kon. Both the delivered machines belong to the new generation of Ad Star Kon HX.

Ad Star Kon HX features precise sack conversion at an operating speed of up to 140 sacks per minute. This is about 40% faster than the preceding model, and is mainly achieved with the iMove feature, which dynamically adjusts bag transportation. For the customer, this means higher efficiency, lower energy costs and reduced manpower – as more sacks are made in the same time with the same energy consumption.

Product quality is also important in sack production: This is handled by iShape and iPatch, which ensure that each sack receives a precisely formed bottom and tailored cover and bottom patches. Other advantages of the line are its easily accessible dual stacking unit and the large format range for the production of sacks with a capacity of 4.5 to 100 litres. Both lines at Sakomoto are equipped with the optionally available micro perforation unit MicroStar+ for high air permeability and the quality management system QualiStar II.

Separate to this, Starlinger's PP Star – a pinch bottom bag that can now be made directly from PET bottle flakes – recently won an international industry award. The jury for the WorldStar Award were impressed with the concept of bag manufacturing in a fully closed loop, said Starlinger.

Stéphane Soudais, head of consumer bags at Starlinger, said: "Whereas others only talk about the theoretical recyclability of their product, ours is actually made from recycled material." ›

Main image: Converting Systems says its 1801V bag machine offers faster line speeds, easier maintenance, and HMI access to set-up and troubleshooting

Above: Starlinger's new Ad Star Kon HX features a dual stacking unit, and can make up to 140 sacks per minute

The bag itself is also lightweight: while a typical three-layer paper bag for 50kg fertiliser weighs 140-160 g, the weight of a one-layer rPET PP Star bag is around 117g, said the company.

Vertical style

US-based **Converting Systems** has introduced its new vertical head servo shuttle style bag machine – the sixth (and fastest) addition to its bag machine series. This latest model, the 1801V, features faster line speeds, enhanced safety features, easier maintenance, and HMI touchscreen access for set-up, operation, and troubleshooting resources.

"Our focus is to continually improve our machines to keep up with customers' production requirements," said Bill Engelhardt, general manager of Converting Systems.

The new model uses Lenze's p500 Controller and HMI, as well as its MCS servo motors. The upgraded touch-screen functionality allows easier operation, greater start-up acceleration, and higher bag length accuracy.

Developed with the operator and maintenance mechanic in mind, the 1801V incorporates new, single-operator features to reduce maintenance time and increase productivity, including:

- Tool-free Teflon curtain and platen insert adjustments;
- Pivoting head via hand crank for convenient blade replacement and service;
- Improved, smoother shuttle technology for more consistent film glide;
- Lightweight, short stroking head allowing faster cycle times (up to 225 CPM); and,
- Part compatibility with some older models – including competitor machines.

The HMI touchscreen provides immediate access to information required for set-up, troubleshooting, and maintenance. Plus, all machine functions are controlled through the touchscreen, eliminating the need for operators to go inside any enclosure. Front/rear pull cords and an optional photo eye light curtain prevent injuries by keeping operators safely out of areas with moving parts.

Integrated automation

Windmöller & Hölscher (W&H) has developed an integrated automation and operating concept for its FFS (Form, Fill, Seal) packaging line, called Easy Control, which boosts efficiency.

Until now, operators of FFS lines have had the challenge of individually controlling and monitoring the lines different components and third-party equipment. This can reduce efficiency due to different operating systems, additional interfaces and error sources as well as lack of comprehensive production data. W&H is a full-line supplier of FFS lines – including its Topas FFS machine – and has now developed a modular automation and operating concept that increases uniformity across an entire line.

"Easy Control consists of various modules and can be individually tailored to the needs of the customer," said Rafael Imberg, sales director for FFS bagging systems at W&H.

One new module allows integration of third-party equipment, such as metal detectors or weighing scales, into the line management systems. This means that the operator only has to learn a single system. Another module provides a function that makes status alerts available anywhere via smartphone or tablet PC.

CLICK ON THE LINKS FOR MORE INFORMATION:

- **www.starlinger.com**
- **www.convertingsystems.com**
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Right: W&H's Easy Control concept includes a function to make status alerts available to smartphones or tablet PCs

PHOTO: SHUTTERSTOCK

AMI's second North American Polymers in Flooring conference is set for Atlanta, GA, USA, in September. We take a look at what the event holds in store

In focus – polymer flooring

The second edition of AMI's North American *Polymers in Flooring* conference takes place on September 20-21, 2018 in Atlanta, GA, right at the heart of the US flooring industry. And the timing for the event could hardly be better; the North American polymer flooring market is undergoing a transition and seeing a wave of investment that shows little sign of abating.

Polymers in Flooring Atlanta 2018 will build on last year's successful launch event, bringing together key stakeholders and industry expert speakers to explore market and technical trends driving this business. It will cover applications from residential, commercial and industrial, to healthcare, sports and leisure and will explore how new materials, design innovations and process developments are enabling new, high quality products that are changing customer perceptions and opening up high-value new markets. This preview article takes a look at what the event holds for attendees.

Sustainability matters

Sustainability is a key issue in the flooring market today and sets the theme for the first session, which will be opened by **Dhruv Raina**, Director of Product Sustainability at **Tarkett USA**. His opening presentation explores the value chain for growth and how sustainability creates opportunities for Tarkett and its suppliers.

The opening sustainability theme is then carried on into a panel discussion focusing on next generation trends, challenges and opportunities facing the flooring industry. Raina will take part in the panel, along with **Rochelle Routman**, Chief Sustainability Officer at **Metroflor Corporation** in the US, and **Bernard Merkx**, Project Director for ReVinylFloor at **Polymer Comply Europe** in Belgium.

The second session turns the spotlight to product and design innovations. **Rick Moffatt**, Creative Director at **LSI Floors** in Canada will look at custom printed flooring and integrated virtual reality apps. He will be followed by **Klaas Schneider**, Non-Textile Business Development Manager at **Dover** in Germany, who will discuss whether flooring industry technology is ready for a move from analogue to digital printing applications. The session will be closed by **Daan De Keyzer**, Technology Manager at **Beauflor USA,** who will present details of an innovative sheet vinyl flooring solution for manufactured housing and the RV industry.

The conference will then turn to material and formulation developments that are shaping the

Main image: Key stakeholders in the North American polymer flooring market will be drawn to Atlanta in September for AMI's Polymers in Flooring conference

Expert speakers taking part in Polymers in Flooring Atlanta 2018 include, from left to right, Tarkett Director of Product Sustainability Dhruv Raina, Metroflor Corporation Chief Sustainability Officer Rochelle Routman, Baerlocher USA Flooring Market Manager Kimberly Kern, and Inovyn Belgium Technical Marketing & Development Manager Daniel Martinz

future, and adding value, to polymer flooring. **Timothy Dean**, Vistamaxx Americas Market Developer at **ExxonMobil Chemical Company** in the US, will start the session with a review of current performance polymers for flooring applications. Then **Peter Frenkel**, Vice President of Technology at **Galata Chemicals** in the US, will look at the attributes of PVC stabilisers and plasticisers that are contributing to the sustainability of flooring materials. He will be followed by **Kimberly Kern**, Flooring Market Manager at **Baerlocher USA**, who will give a paper focusing on the challenges and opportunities involved in stabilising rigid LVT in today's evolving and highly competitive landscape.

The final session of the day will be opened by **Daniel Martinz**, Technical Marketing & Development Manager at **Inovyn Belgium SA** in Belgium, who will detail a new generation of blending resins for flooring applications and explain how this can lead to performance enhancements. And the formal content of the day will be completed by **Kyle Posselt**, R&D Chemist at **Emerald Kalama Chemical** in the US, who will explain how new modifiers can be utilised to optimise durability and hardness in highly-filled LVT formulations.

Renew and recycle

The second day will begin with a presentation by **Rich Ruhlin**, Chief Marketing Officer at **Mats** in the US, who will explain the new ASTM standard development in flooring (bio-based categorisation). This will be followed by an update on the ReVinylFloor project and how the end of (first) life of vinyl flooring is being recovered for controlled loop applications, given by **Bernard Merkx** at **Polymer Comply Europe**. The third talk in the session will be delivered by **Ivo Besselsen**, CEO at **Besstrade PVC Recycling** in The Netherlands, who will showcase a number of recycling possibilities for vinyl production scrap including solid, liquid or evaporated plasticiser.

The conference will then go on to examine developments in surface finishing and coating technology. **Jeffrey Best**, Director of Strategic Business Development at **Klockner Pentaplast** in the US, will present the company's developments in LVT films with a focus on polymer types and innovations for the LVT market. Then **Chris Davis**, Head of Sales – Web & Industrial Systems at **IST America**, will present an evaluation of radiation curing options for polymers (UV, LED, Excimer technologies) and explain their role in functional and decorative coatings in vinyl flooring.

The conference will then examine how fast changing market demands are influencing production plant design. This perspective will be presented by **Pascal Maerevoet**, Niche Manager PVC at **J-TEC Material Handling** in the US. Then **Karl Hendrik Schluckebier**, Process Engineer at **Zeppelin Systems** in Germany, will bring the conference to a close with a discussion of the latest mixing and material handling system developments enabling high-quality and high-capacity LVT production.

About Polymers in Flooring Altanta 2018

Polymers in Flooring Atlanta 2018 provides an international forum for all companies involved in the North American polymer flooring sector to learn, network and develop business opportunities. Taking place at The Westin Buckhead in Atlanta, GA, USA, on 20-21 September, the conference will bring together expert speakers and key industry stakeholders from across the entire flooring supply chain. Last year's launch event drew representatives from 15 international flooring producers and 10 countries.

The conference focuses on developments in polymers, additives and compounds aimed specifically at flooring products, as well as advances in product design, production technologies and decoration systems. It will cover the full range of polymers used in flooring systems, including vinyl, polyolefin, polyurethane, acrylic and epoxies, as well as reinforcements, backings and adhesives.

Outside of the formal sessions, Polymers in Flooring 2018 provides plenty of opportunities for networking during the informal refreshment breaks and lunches, in the mini-exhibition, and at the complimentary cocktail reception at the end of the first day. For more information about registering, exhibiting, or sponsoring at Polymers in Flooring Atlanta 2018, contact Conference Coordinator Christa Beveridge. Tel: +1 610 478 0800; Email: **christa.beveridge@ami.international**

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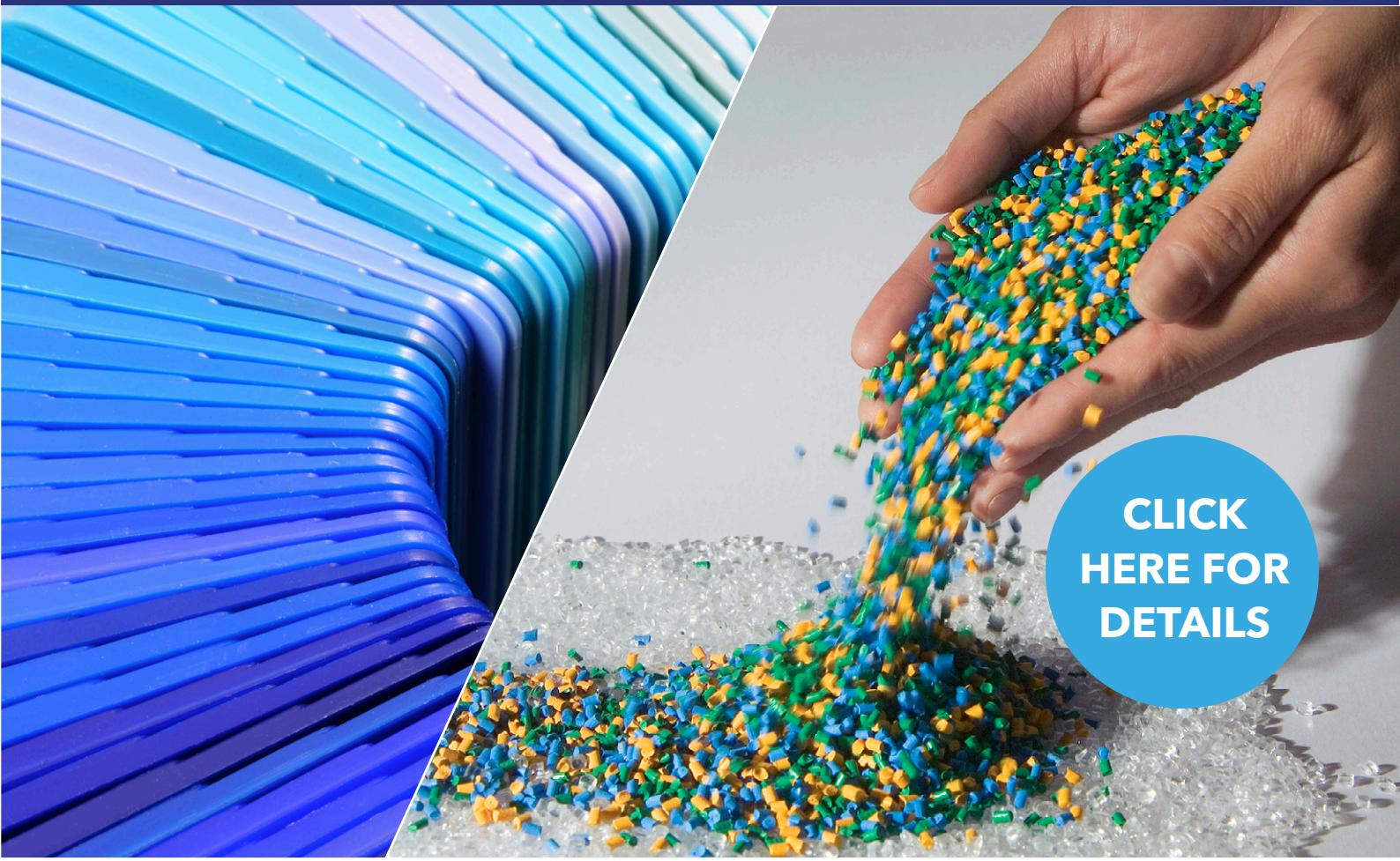

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Compounding WORLD

Ahead of AMI's Smart Packaging 2018 conference taking place in Hamburg, Germany, this October, we preview speakers and topics at this key event

Smarter packaging in a connected world

AMI is holding the third annual Smart Packaging conference on 9-10 October 2018 at the Hamburg Marriott Hotel in Germany.

Smart Packaging 2018 again brings together brand owners, retailers, packaging producers, plastics and additive suppliers, active and intelligent technology developers and processing machinery experts to explore the full range of available and emerging technologies. The conference provides the ideal environment to discuss the packaging needs and expectations of brand owners and consumers, as well as exploring the evolution of the packaging ecosystem and its further development.

In today's competitive environment, packaging must do a great deal more than simply protect the contents during transit. New active and intelligent technologies hold the promise of extended shelf life, improved product traceability and authentification, brand security and far greater customer engagement. Smart Packaging 2018 focuses on the latest technological developments aimed at adding value to flexible and rigid packaging.

This year's dynamic programme features many new elements, including the launch of an interactive technology showcase session and a high-level panel discussion exploring further opportunities, challenges, trends and disruptions for the smart packaging industry.

Here we preview the event, with a closer look at the line-up of expert speakers.

Main image: RFID is one of a number of technologies to be discussed at Smart Packaging 2018

Retail environment

Smart Packaging 2018 kicks off with a keynote presentation delivered by **Robert Witik**, Senior Specialist for Sustainability & Packaging Material Science at **Nestlé** in Switzerland. Witik explores the search for smart packaging applications. **Ville Viopio**, Business Development at **Stora Enso** in Finland, starts session one looking at the new world of retail and how connected packaging is transforming distribution models based on consumer behaviour. Next, **Chris Fesen**, Marketing Director Food, **Amcor Flexibles Europe, Middle East & Africa** in Switzerland, delivers a case study analysing how personalisation is being taken to the next level using innovative smart packaging technology.

Security and differentiation

The second session features **Diego Karpeles**, Product Manager at **Gabriel-Chemie Group** in Austria, who explores the technical and decorative differentiation through laser marking of packaging. This is followed by **Tim Marsden**, Project Manager - Printable Electronics at **The Centre for Process**

Above: Amcor Flexibles will discuss how it is using innovative smart packaging technology

Innovation (CPI) in the UK, who presents CPI's work on the roll-to-roll manufacture of smart labels, incorporating hybrid and printable electronics, for the pharmaceutical sector. Closing this session is **Iacopo Bianconcini**, Marketing Manager and Business Development – Closures & Containers Division at **SACMI** in Italy, who focuses on innovative technologies which are ready to disrupt the status quo of packaging, from anti-counterfeiting and personalised marketing to shelf-life extension.

Gillian Ewers, VP Marketing at **PragmatIC** in the UK, starts the third session looking at affordable smart packaging solutions for mass market goods. **Shoko Yamada**, Specialist Functional Surfaces at **Billerudkorsnäs** in Sweden, then discusses paper based electrodes suitable for disposable packaging. Followed by a presentation on a smart NFC/UHF bottle label for the Internet of Things (IoT) delivered by **Brian Weeks**, Managing Director at **CapTag Solutions** in the UK.

Interactive showcase

Following the afternoon refreshment break, we launch the interactive technology showcase. Six technology hubs each host an innovative concept relating to smart packaging. The audience rotate through each showcase in 8-minute power-sessions. The technology hubs will feature: an innovative liquid packaging system that is designed to be recycled, hosted by **Volker Muche**, Packaging Consultant at **Pacproject** in Germany; smart shelf life sensors enabling last mile traceability, hosted by **Rob Cohen**, Vice President - Marketing at **Freshpoint Quality Assurance** in Israel; a concept bringing IoT to the pharmaceutical packaging industry, hosted by **Frank Jäger**, Managing Director at **Faubel & Co Nachfolger** in Germany; a

circular economy compliant stand-up-pouch, hosted by **Henno Hensen**, Consultant at **Hensen Consult** in Germany; interactive paper for smart packaging applications, hosted by **Anouk Dantuma**, Project Leader End Products at **KCPK Centre of Competence Paper & Board** in Netherlands; and, an intelligent label solution providing a new platform to make products smart, hosted by **Thorsten Weyers**, Key Account Manager at **Hologram Company RAKO** in Germany.

To round off the day, a networking cocktail reception will be held in the exhibition area, where delegates and speakers can discuss and debate the conference so far.

Active and sustainable

Day two of Smart Packaging 2018 is opened by **Roland Schultz**, Global Director Marketing Packaging at **Albis Plastic** in Germany, who discusses innovations in active solutions for packaging and how recyclable pouches are extending shelf life. This is followed by a look at simulation-based developments of active packaging with a focus on oxygen scavengers for food applications given by **Astrid Pant**, Research Associate at **Fraunhofer Institute for Process Engineering and Packaging (IVV)** in Germany. The third talk in the session is delivered by **Marta Klanjšek Gunde**, Associate Professor, Senior Researcher at the **Laboratory for Materials Chemistry / National Institute of Chemistry, Ljubljana** in Slovenia who showcases temperature indicators for mainstream consumer food packaging.

Following the morning refreshment break and networking session, **Edward Kosior**, Managing Director at **Nextek** in the UK, makes a recycling presentation on automatic sorting to EU specifications with intelligent labels and addressing difficult-to-recycle materials. **Grégory Coué**, Technical Manager at **Plásticos Compuestos (Kompuestos)** in Spain then looks towards a green revolution with compostable plastic packaging. **Susana Otero Belmar**, Head of Functional Printing Department at **Aimplas Plastic Technology Centre** in Spain, brings the session to a close by analysing eco-friendly packaging strategies for food shelf life extension.

Expert speakers include, from left to right: Chris Fesen from Amcor Flexibles Europe, Astrid Pant from Fraunhofer IVV, Brian Weeks from CapTag Solutions, Roland Schultz from Albis Plastic, Marta Klanjšek from Gundefrom National Institute of Chemistry, Slovenia, Frank Jäger from Faubel & Co Nachfolger, Grégory Coué from Plásticos Compuestos and Shoko Yamada from Billerudkorsnäs

Industry discussion

The final session of the conference takes the form of a panel discussion that explores the smart packaging industry with a closer look at further opportunities, challenges, trends and disruptions. Members of the panel include **Samuli Manninen**, Co-Founder at **Magic Add** in Finland, **Robert Witik** from **Nestlé** in Switzerland and **Roland Schultz** from **Albis Plastic** in Germany. The panel will be chaired by **Christopher Waterhouse**, Managing Director at **IDI Pac** in the UK.

About Smart Packaging 2018

The third Smart Packaging conference takes place on 9-10 October 2018 at the Hamburg Marriott Hotel in Germany. Smart Packaging 2018 provides an international forum for all companies, through the entire value chain for smart packaging, to come together and engage with each other over two days.

Don't miss this opportunity to learn from the experts who can assist you in understanding the possibilities for smart packaging and to identify the solutions to realise them. In addition to the formal conference sessions, the event provides extensive networking opportunities throughout the informal breaks.

To find out more about attending the conference, taking a table-top exhibition space, or becoming a conference sponsor, visit the **conference website** or contact Conference Organiser Emily Renshaw at **emily.renshaw@ami.international**, Tel +44 117 314 8111.

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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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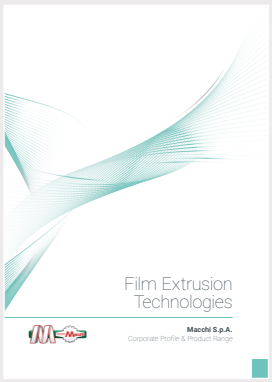
MACCHI: FILM EXTRUSION



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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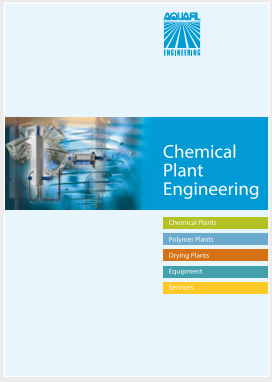
AQUAFIL: PLANT ENGINEERING



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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DAVIS-STANDARD: EXTRUDERS

The Super Blue range of single screw extruders from Davis-Standard is designed for cost effective production of a wide variety of polymer products. This brochure details the key features of the range, which extends from 50.8mm to 114.3mm screw diameter.

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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

POLYMER TESTING & ANALYSIS US

Polymer Testing & Analysis US 2018 takes place on 11-12 September 2018 in Pittsburgh. The event is a great meeting place for laboratory professionals to network and discover the latest advances in polymer testing and characterisation.

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POLYMER TESTING & ANALYSIS EUROPE

AMI's 3rd Polymer Testing & Analysis conference will take place on 11-12 September 2018 in Berlin, Germany, acting as the key meeting place for scientists, laboratory staff and R&D professionals.

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AGRICULTURAL FILM 2018

AMI's well-established Agricultural Film conference series continues on 17-19 September 2018, in Madrid, Spain, bringing together agricultural and horticultural cover specifiers, raw material and film manufacturers and agricultural stakeholders.

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SMART PACKAGING 2018

Taking place in Hamburg in Germany, the third edition of AMI's Smart Packaging conference brings together brand owners, retailers, packaging producers, plastics suppliers and technology providers to explore active and intelligent packaging.

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POLYMERS IN FLOORING USA

The second North American edition of AMI's Polymers in Flooring conference takes place in Atlanta, GA, USA, on 20-21 September 2018. It provides a unique forum in which to explore the latest flooring market, materials and technology trends.

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THIN WALL PACKAGING ASIA

The 3rd edition of AMI's Thin Wall Packaging Asia conference will take place on 25-26 September 2018 in Bangkok, Thailand. The conference has established itself as the must-attend event for the flexible plastic packaging industry in South East Asia.

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Efekt Plus

Head office:	Warsaw, Poland
Chairman:	Sławomir Szeliga
Founded:	2006
Ownership:	Private
Profile:	Efekt Plus, founded in 2006, is a leading Polish producer of cast stretch film. As well as selling in Poland, it exports its products across Europe, and has a total production area of around 10,000 sq m.
Product lines:	The company supplies a range of stretch films, in four product categories: Standard, Power, Super Power and Ultra. Its hand-stretch film includes a standard range that offers stretch of 120-150%. Here, film of 8-12 microns in thickness is used to secure products such as plastic bottles, while thicker film (12-20 microns) is for boxes, and the thickest (20-40 microns) is for heavy duty products such as bricks or metal products. Its machine stretch film – which has higher tear resistance than hand stretch film – includes a 'high slip' variety that has high clarity and overcomes the tendency of pallets to stick together.
Recent projects:	The company recently developed a new product, using Sabic's Cohere grade to improve cling performance. It also developed a stretch film with overlaps – which has reinforced edges and can be used as an alternative to pre-stretch film.
Factory locations:	The company has two production facilities in Poland: one in Rzeszow, and one at the Aeropolis technology park in Rogoznica. Between them, they run five production lines – of which the newest is a 6m wide stretch film production line with an annual output of 40,000 tonnes. This brings the company's total output of around 120,000 tonnes/year of stretch film.

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

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

September 2018
Biaxially oriented film
Downstream equipment
PVC plasticisers
Lab extruders

October 2018
Additives for polyolefins
Thin-wall packaging
Construction applications
Active & intelligent packaging

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
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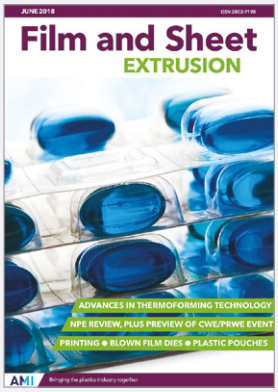

Film and Sheet
June 2018
The June edition of Film and Sheet Extrusion looks at the latest developments in thermoforming. It also explores the latest innovations in blown film dies, printing technology and plastic pouches.

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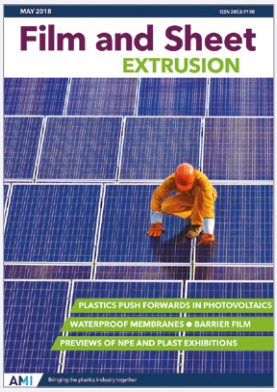

Film and Sheet
May 2018
The May issue of Film and Sheet Extrusion looks at the role of plastics in photovoltaics. It also covers new developments in barrier materials, waterproof membranes and materials handling.

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Compounding World
July 2018
The July issue of Compounding World explores the latest colour management systems to control visual factors and effects. The edition also reports on innovations in antimicrobial additives, melt filters and impact modifiers.

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Plastics Recycling World
May/June 2018
The May-June edition of Plastics Recycling World previews the Plastics Recycling World Exhibition, co-located with the Compounding World Expo in Essen in June. There are also features on PET recycling, shredders and new recyclate additives and compatibilisers.

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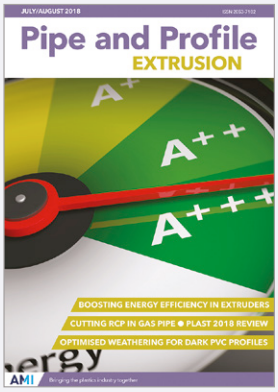

Pipe and Profile
July/August 2018
The July-August issue of Pipe and Profile Extrusion explores ways of boosting energy efficiency in pipe extrusion. The edition also looks at optimising weathering for dark PVC, designing RCP out of PE pipe, and the economies of scale in large diameter pipe.

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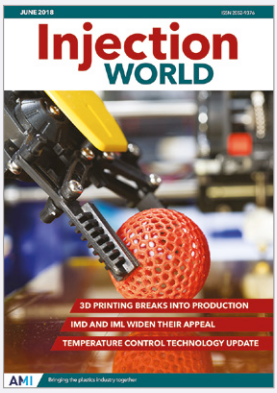

Injection World
June 2018
The June edition of Injection World magazine looks at how 3D print is being used in the injection moulding industry. Plus, the latest developments in in-mould decorating and temperature control technology.

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GLOBAL EXHIBITION GUIDE

2018	**2-4 August**	Plasti & Pack, Lahore, Pakistan	www.plastipacpakistan.com
	15-19 August	Taipei Plas, Tapei, Taiwan	www.taipeiplas.com.tw
	19-22 September	Indoplast, Jakarta, Indonesia	www.indoprintpackplas.com
	24-28 September	ColombiaPlast, Bogota, Colombia	www.colombiaplast.org
	28 September-1 October	Koplas, Seoul, South Korea	www.koplas.com
	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
	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	www.arabplast.info
	12-15 March	Pro-Pack Africa, Johannesburg, South Africa	www.propakafrica.co.za
	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
	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

5-6 September 2018	Single Serve Capsules, Vienna, Austria
17-19 September 2018	Agricultural Film, Madrid, Spain
25-26 September 2018	Thin Wall Packaging Asia, Bangkok, Thailand
4-5 October 2018	Medical Fluid Bags, Woburn, USA
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

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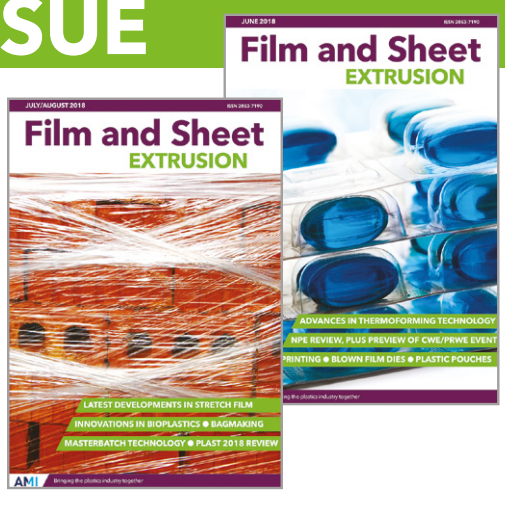

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