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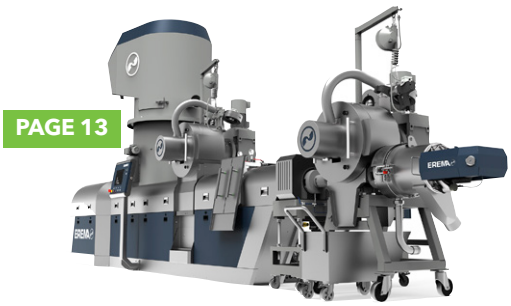
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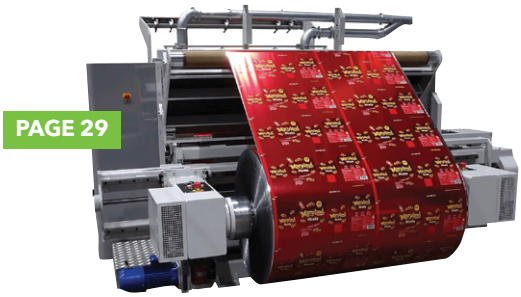
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Renolit spends €130m to merge two film sites

Film producer Renolit is to merge two sites into one in a five-year project.

The company will spend around €130 million to merge its Worms and Frankenthal sites into a single location in Worms. The merger of the two sites is expected to take up to five years. All 370 employees at Frankenthal will be offered jobs at the new Worms site – which is 12km away.

"At a time when more German companies are relocating production abroad, we are investing in Germany as a business location," said Karsten Jänicke, CEO of Renolit. "The merger of the two locations is one of the largest investment projects in our company's history."

The Worms facility, which will make single-layer films, will transfer production volumes – and some existing machinery – from Frankenthal. The existing Worms site has more than five hectares of unused space, where the new production will take place. The merger will raise production volume at Worms from around 24,000 tonnes/year to 38,000 tonnes/year – an increase of more than 50%.

IMAGE: RENOLIT

Renolit will spend €130m upgrading its Worms film plant

The Frankenthal site has been part of Renolit since 1999. It currently produces films in around 1,500 colours, mainly for self-adhesive applications, such as films for vehicle wrapping, lettering or signage systems. Renolit would have had to invest a "high double-digit million" amount in the plant, but its location within a residential area would have made this "practically impossible", said the company.

Michael Bätz, general manager of the Worms site, added: "By merging the two plants, we want to ensure Renolit's competitiveness – and maintain jobs in the region."

› **www.renolit.com**

IN BRIEF...

Oben Group is to acquire Vitopel do Brasil, a manufacturer of biaxially oriented polypropylene (BOPP) films. Vitopel has manufacturing facilities in Mauá and Votorantim, in the state of São Paulo in Brazil. Oben says the acquisition will expand its global footprint.
www.obengroup.com

Sonoco has completed the sale of its thermoformed and flexibles packaging business to **Toppan** for around US$1.8 billion. The deal involves the transfer of around 4,500 employees. The proceeds of the sale are being used to reduce around US$1.5bn in debt.
www.sonoco.com
www.toppan.com

BASF says all its European production sites for plastic pellets – including engineering plastics, polystyrene and polyamides – are now certified by independent third parties according to the Operation Clean Sweep (OCS) standard.
www.basf.com

Speciality film line claims energy efficiency

IMAGE: INNOVIA FILMS

Innovia Films has opened a new line for speciality films at its Schkopau site near Leipzig in Germany. The 8.8m-wide line can produce 15-50 micron film with an annual capacity of 35,000 tonnes.

The new line incorporates Lisim technology from Brueckner, which it says allows extrusion of simultaneously stretched film in faster, more flexible production.

"With this technology we can achieve better film quality, for value added products," said Giuseppe Ronzoni, general manager at Innovia Films in Schkopau. "In addition, it is more energy efficient than other extrusion technologies for BOPP film, leading to a smaller carbon footprint of the finished product."

› **www.innoviafilms.com** › **www.brueckner.com**

Italy machine exports increase though sales fall back in 2024

Amaplast, the trade association for Italian plastics and rubber machinery manufacturers, says sales from its members fell slightly in 2024, despite rising exports.

Although Amaplast and the MECS Statistical Study Centre did not report the exact figure, they said sales were down by about 2% compared to 2023 – putting the final figure at around €4.7 billion.

The dip comes despite a near-2% rise in exports – reaching a total of just over €3.6bn. This is the fourth consecutive year in which exports have increased – helping to offset losses in the domestic market, said Amaplast.

Export highlights included increased deliveries to Mexico, France, China, Turkey, Brazil and India, but reductions to the US, Spain, Poland and Germany.

"Nonetheless, Germany remains the top destination for Italian exports," it said. "This appears even more encouraging when compared to the results of German manufacturers – who saw a 30% collapse in domestic sales and order intake in 2024."

Exports of extruders and injection moulding machines fell by 7%, while flexographic printing machines grew 5%.

Italian manufacturers have already seen encouraging signs this year, though a turnaround – or more pronounced stabilisation of indicators – may not be seen until the second half of the year, it said.

› **www.amaplast.org**

RecyClass revises system

An updated version of the RecyClass Recyclability Methodology in Europe has been published.

The recyclability classification system, originally composed of six classes, will now be streamlined to three, with classes D, E, and F being removed and classified as 'non-recyclable.'

In addition, the recyclable plastic content thresholds have been adapted to the preliminary PPWR thresholds and the revisions incorporated into the RecyClass audit scheme for plastic packaging recyclability.

"With this update, we are ensuring further optimisation in light of the new regulation," said Paolo Glerean, chairman of RecyClass.

› **https://recyclass.eu**

IMAGE: RANI

Rani's new cast film line will allow it to start making hand stretch film

Rani's new cast line lets it make stretch film with more recyclate

Finnish packaging company Rani has installed a new cast film line, allowing it to produce a range of stretch film using recycled materials.

"This is the most advanced technology on the market," said Niklas Storbacka, production manager at Rani's Bjölas plant. "Only a handful of similar machines exist worldwide."

Rani's new line – supplied by Germany's Windmöller & Hölscher – will produce transparent RaniStretch film as thin as eight microns. It allows Rani to incorporate more recycled raw materials into products. The new facility also includes packaging robots and testing apparatus.

The line can produce very thin 'hand stretch' films with reinforced edges, known as 'folded edge' film. Hand stretch film – a new product for Rani – is aimed at companies in the food and beverage industry, and at smaller manufacturing companies. Rani aims to produce increasingly thinner stretch films.

"The new machine is part of our sustainability strategy, and its commitment to producing high-quality PCR stretch film," he said.

› **www.raniplast.com**

› **www.wuh-group.com**

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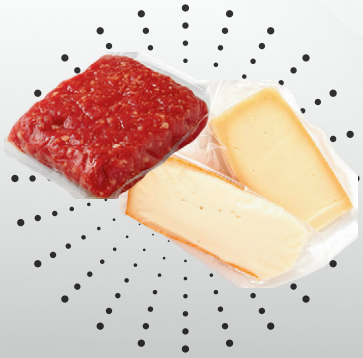

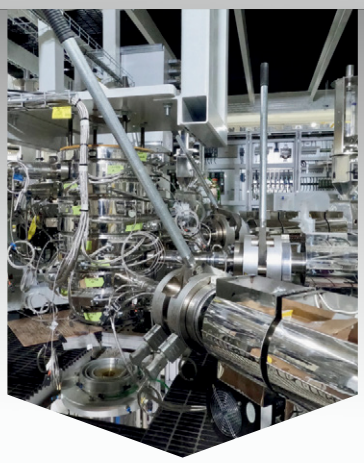

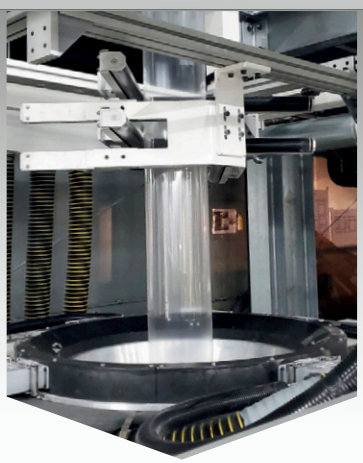

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Cedo to shut Netherlands film recycling operation

Plastics recycler Cedo Recycling is to wind down operations at its Geleen site in the Netherlands this year.

The company, part of the Cedo film and flexible packaging group, says the Geleen plant is Europe's largest plastic film recycling centre with the capacity to process more than 80,000 tonnes/year of plastics waste into recycled granules. Its output is used to make refuse sacks at the group's facilities in Poland and the UK.

It said the closure was due to "ongoing market challenges, rising operational costs, and increasing regulatory pressures", which have affected the site's long-term viability.

"Despite these challenges, Cedo remains dedicated to sustainability and, in any case, will continue its recycling efforts at other locations across Europe," said the company.

Industry body Plastics Recyclers Europe says the move highlights the difficulties faced by plastics recycling companies.

IMAGE: CEDO

Cedo says its Geleen plant is Europe's largest plastic film recycling centre, with a capacity of 80,000 tonnes/year

"The European Union's plastic recycling industry is at a breaking point," it said. "A sharp decline in domestic production, increased imports and rising economic pressures are forcing company closures."

Increasing plastic waste exports from the EU (36% higher in 2024 than 2022) shows "an alarming shift away from in-region recycling efforts", it said.

"The total capacity of facilities that shut down in 2024 doubled compared to 2023, and the situation is intensifying in 2025 – impacting small and large companies alike."

› **www.cedorecycling.nl**

› **www.plasticsrecyclers.eu**

Syensqo: PVDC layer is recyclable

Syensqo says new trials prove that multilayer food packaging structures with its Ixan polyvinylidene chloride (PVDC) can be recycled into feedstock for other applications in a standard polyethylene-based waste stream.

PVDC is used as an oxygen- and water-vapour barrier in food packaging.

Tests were performed with structures for high-barrier meat packaging using PE/EVA/Ixan/EVA/PE multilayer films, and the impact of the structures on the recycling process evaluated in comparison to a reference sample of real flexible packaging waste.

Federico Baruffi, global marketing manager for packaging at Syensqo, said multilayer films can cut food waste. However, due to their composition and structures, they have previously been considered impractical for mechanical recycling.

› **www.syensqo.com**

KAP sales rise in its flexible films division

German industrial holding company KAP reported a decline in 2024 – despite an improvement in its flexible films business.

Sales in the division rose almost 5% last year to nearly €82 million. The company reported a particularly good positioning in high-quality pool liners. The company said that 'normalised EBITDA' rose more than 43% to nearly €12m.

"In flexible films, business was characterised by demand returning to normal," said the company. "While customers had still been reducing their high inventories on account of the Covid-19 pandemic in the previous year, this no longer played a role in the financial year."

Overall, KAP reported a 5% decline in sales to €253m across its three divisions, and a profitability (EBITDA) of nearly €22m, double that of the previous year.

The two main factors in the 2024 financial year were a "challenging" economic situation and the implementation of restructuring and efficiency measures, said Marten Julius, spokesman of the management board of KAP.

"We have optimised our production and administrative processes and adjusted our capacities and cost structures to the challenging market," he said.

› **www.kap.de**

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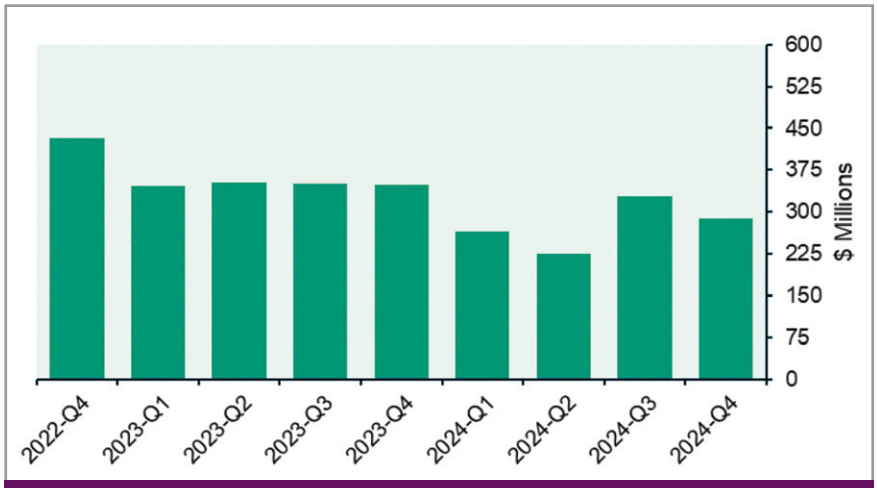
US machine sales dipped again in Q4



Primary plastics machinery shipments
Source: PLASTICS Committee on Equipment Statistics

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

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

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

For comparison, injection moulding sales fell nearly 6% on the previous quarter, and by more than 16% over the full year.

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

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

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

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

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

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

"Lower interest rates and greater clarity on US economic policy – particularly on trade – would help reduce uncertainties across the plastics industry supply chain," said Pineda.

› **www.plasticsindustry.org**

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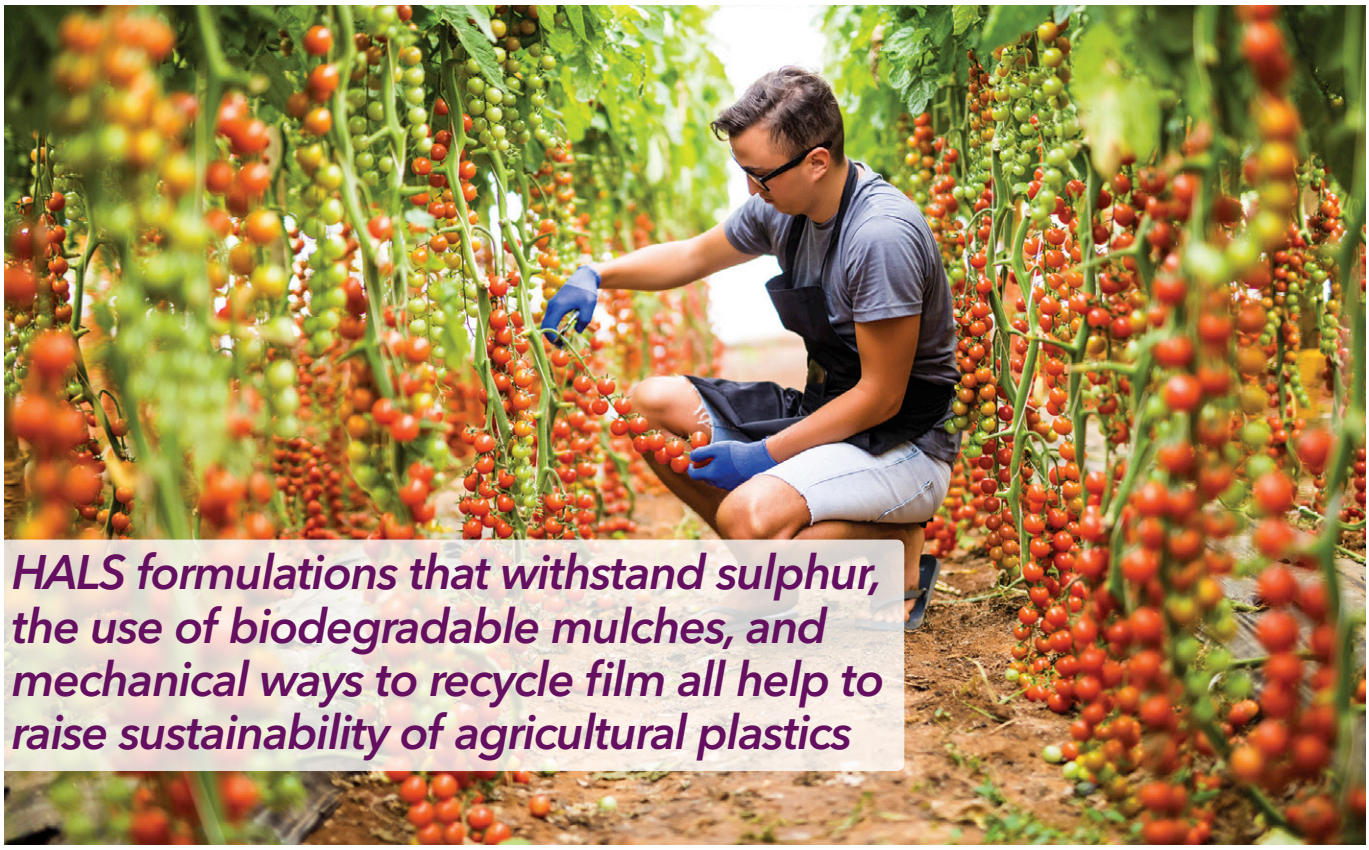

IMAGE: SHUTTERSTOCK

HALS formulations that withstand sulphur, the use of biodegradable mulches, and mechanical ways to recycle film all help to raise sustainability of agricultural plastics

Field goals: latest in agricultural film

Agricultural film takes many forms – including greenhouse, mulch and silage film. Recent changes in agriculture, such as the increasing use of sulphur as a pesticide, has seen the formulation of films change as a result – any this was a key theme at the recent *Agricultural Film* conference, organised by **AMI**.

Greenhouse film is a key product within agriculture and is still on a strong growth path. These films are more economical than glass and can handle temperature and light diffusion. They should also have a service life of 3-4 years, allow high light transmittance – for better crop yield – and be resistant to acidic agrochemicals such as sulphur and chlorine.

MiaoMiao Xiao, research scientist at **Ingenia Polymers** in Canada, told delegates that many hindered-amine light stabilisers (HALS) – which are commonly used in greenhouse film – can be affected by acid-base interactions with pesticides.

"HALS is the best option for UV stabilisation of films, but acidic chemicals deactivate it," she said.

The more basic (alkaline) the HALS, the lower its chemical resistance, she said. For instance, a weakly basic alkoxyamine – after immersion in acid – survived a UVB exposure test for 1240 hours, while a more strongly basic secondary HALS only survived for 330 hours.

"With acidic chemical exposure, alkoxyamine HALS is the best choice," she said.

Selecting the correct UV absorber can have a huge effect on film performance, she said. When the tests were repeated, adding a benzotriazole UV absorber had a 'synergistic' effect with the HALS, she said. This was found to improve film performance.

This is the basis of Ingenia's IP136901 film stabiliser – which helps to maintain light transmittance and extend service to four years or beyond, with pesticide exposure.

In an initial performance evaluation – QUV aging – a 150-micron LLDPE test film with 4000ppm UV additives was immersed for 24 hours in acid then exposed to UVB light. In this case, the failure point was a 50% retention of elongation. Five HALS

Main image: Greenhouse film can be critical to crop yields

blends were tested. The first failed at around 750 hours; the alkoxyamine HALS failed at around 1250 hours, while the IP136901 failed at 2500 hours.

"The accelerated weathering test under UVB light showed IP136901 outperforms the best-performing alkoxyamine on the market," said Xiao.

Film was also tested with Xenon arc and retained its elongation for at least 6000 hours.

The company – in response to greenhouse operators wanting films with even longer lives – is now evaluating two development grades. These both have high UV performance – superior to IP136901 and commercially available grades, she said. One grade retained 80% elongation for more than 2500 hours, at which point others had failed.

Fourier Transfer Infrared (FTIR) testing confirmed reduced degradation of films containing these developmental stabilisers.

"Results suggest the opportunity for reduced loading – for greater cost efficiency – or extended lifetimes," said Xiao.

Maximum growth

Israel-based **Kafrit** has developed additive masterbatches that can help greenhouse films to promote plant growth.

The masterbatches, with UV stabilisers, claim to have superior sulphur resistance. The films have been tested in trials at the Besor Research Station. Here, they were used to construct walk-in tunnels that were subjected to 160 kL/year of sulphur. While typical NOR-based solutions lasted between 24 and 33 months, one proprietary grade lasted 36 months, said Hanna Schwartz, development and technical services manager at Kafrit.


IMAGE: SHUTTERSTOCK

Above: Kafrit has developed 'bee friendly' stabilisers that ensure pollination is not affected

Kafrit has developed two proprietary grades. One, UVA 00701 LD, competes with standard NOR-based grades for sulphur resistance, while the second, UVA 07160 LD, has superior performance. In a 36-month field test, with exposure to 3000 ppm of sulphur, the first grade retained 53% of its tensile strength (comparable to standard grades), while the second retained 68%.

In a separate test, the researchers found that the first grade was still blocking 70% of UV after three years in the field.

Kafrit has also developed 'bee friendly' stabilisers – which 'match' the UV light with those wavelengths that particularly affect bees.

"There is correlation between UV light transmission and pollination activity," said Schwarz.

And, while greenhouse film is generally used to raise interior temperatures, they can also be used to manage this with special 'cooling IR' masterbatches. Kafrit carried out three-year field trials with tomato crops. Using its IR 20575 LD masterbatch, it produced greenhouse film that typically led to the internal temperature being 5°C lower than the external temperature. This led to a 9% higher yield under the cooling film.

Sulphur resistance

The growing use of sulphur as a fungicide and insecticide means that greenhouse films need a higher level of resistance to it. In general, sulphur doses have risen from around 2000ppm to as much as 5000ppm. However, reaction of sulphur with oxygen can create an acidic environment, which can deactivate HALS light stabilisers.

3V Sigma USA said that it develops HALS chemicals that increase the durability of agricultural films that are exposed to acidic species.

Leonardo Martinez, technical director of performance chemicals at 3V Sigma, told delegates that its Uvasorb HA192X has been field-tested in both thin and thick films.

In thin films, 35-micron films were tested against those made with tertiary HALS. They underwent 6,500 hours of accelerated weathering time with exposure to 3200ppm of sulphur and were assessed using stress at break and elongation. Here, the tertiary HALS film lost 50% of its tensile strength after 1500 hours, while the Uvasorb grade failed after 4500. Similar results were seen for retained elongation.

In thick films, 150- and 200-micron Uvasorb HA192X films were tested against tertiary HALS and an amino-ether blend, for the same sulphur exposure. While the Uvasorb grades retained more than 80% of tensile strength for more than 10,000 hours, this compared with the other grades falling to 50% after 7,000-9,000 hours. Similar results were seen for retained elongation.

"Uvasorb HA192X is a better cost/performance solution compared to tertiary HALS, and to tertiary and amino/ether HALS blends," he said.

New generation

BASF is also a leader in HALS for plasticulture. Manuele Vitali, of the plastics additives business at BASF, said the company recently developed a new product in its NOR HALS platform.

"Current technologies, mainly based on Me-HALS, are not enough to meet new plasticulture requirements and trends," he said.

These include increasing integrated pest

IMAGE: BASF

BASF says its Tinuvin NOR 211 AR protects agricultural film against chemicals like sulphur

management, more extreme climates and an increase in organic farming. One key factor is also the higher doses of sulphur that are used in greenhouses.

The latest product, Tinuvin NOR 211 AR, targets broader mid-segment applications exposed to severe conditions, with high stability to light and heat in the presence of acids. It is designed as a replacement for Tinuvin XT 200 FF product – and a five-layer LDPE blown film using the new product retained its mechanical properties around 9% longer than one using the earlier formulation after weathering and sulphur treatment. It was also more resistant to chlorine treatment.

It is supplied in an LDPE carrier and behaves in a similar way to earlier formulations. BASF says it disperses more efficiently, and its optimised physical form makes it safer and easier to dose – as it generates less dust.

Chemical resistance

John Mara, technical director at **Amfine**, told delegates about its new UV stabiliser for agricultural film – LA-811 – which is resistant to agrochemicals.

It is based on very low basicity and prevents possible interactions with acidic substances such as sulphur, chlorine and other chemicals. It has a strong synergistic effect when used with UV absorbers (UVAs), while being easy to handle and feed in the form of a PE-based pellet.

It is aimed at applications including greenhouse, mulch and silage film.

Mechanical properties are retained under weathering, while it resists oxidative deterioration. It also protected thinner films from sulphur treatment.

"Even in thinner films, films with LA-811 retain their molecular weight compared to existing NO-alkyl HALS," he said. "Use of LA-811 may help to reduce film thickness."

The company carried out field trials in areas of strong solar irradiance. One, in North Africa, was with a 150-micron multi-layer film that used a 1.6% loading of LA-811 without

IMAGE: SHUTTERSTOCK

Right: US researchers are using lignin – derived from trees – to make a new type of mulch film

UVA. After two years, the film retained 92% of its elongation and 99% of its total light transmittance.

"Even without UVA formulation, LA-811 maintained the film properties after field trials under severe conditions," he said.

Another trial in the Middle East showed to change in tensile properties after one year of exposure.

Lignin links

Mulch film is another key product used in agriculture. As it is used directly on the soil, there is growing interest in developing biodegradable versions that would not need to be collected at the end of life. Instead, the films would naturally biodegrade in the soil.

"The goal is to supply an alternative to non-soil-biodegradable mulch films," said Aidan Williams, a horticulture student at **Washington State University** (WSU).

End-of-life management of plastic mulch can be a problem, and is typically handled by landfilling, stockpiling, in-field burning, burial or recycling. The growth of organic farming also calls for more organic mulch.

"PE mulch is allowed in organic production, but no commercial biodegradable mulches meet organic requirements," she said.

Williams said that lignocellulosic biomass – from trees and other woody residues – is being used to develop these new types of mulch film. Here, wood chips are ground to a powder, biochar is added and this is mixed with molten salt hydrate – then cast into sheet and dried to produce the film.

Greenhouse trials are currently assessing mulch performance, chemically analysing soil, measuring plant performance and yield potential – and looking at in-soil biodegradation. Physical tests show that it has a higher Young's modulus than typical mulch films, such as those based on PE and Mater-Bi.

Future research includes: in-field burial tests followed by an evaluation of degradation; and testing the material in a roll-to-roll process, as well as assessing its elongation.

Film recycling

As research continues in biodegradable film, recycling remains the main way of ensuring that plastic film does not pollute the environment. Once film has been collected, it must be recycled effectively and efficiently.

The challenge of recycling highly contaminated film – such as soil-covered mulch film – is even higher, says Robert Wahlmueller, CEO of **Erema** North America.

"A quarter of all agricultural film content is already recycled," he said.

While Erema is known as a mechanical recycler, he said the company is also working on chemical recycling methods, including depolymerisation ('solvolysis') and thermal conversion (such as pyrolysis and gasification).

Whatever the source of recylate – and most is still mechanically derived – it must have stable quality, specific properties – such as low polymer stress and few defects – and a reliable supply.

He pointed to several Erema technologies that help to recover used plastics and feed them back into production. For instance, its Intarema TVEplus technology – with counter current concept – helps to widen the operating window.

He said that a higher temperature in the preconditioning unit (PCU) leads to better degassing; better constant screw feeding means less screw stress, due to the absence of over- and under-feeding; and that it produces constantly high throughput and constant high-quality PCR.

"This results in lower maintenance costs and lower downtime on the barrel and screw due to better pre-degassing," he said.

Combining Intarema TVEplus with its DuaFil

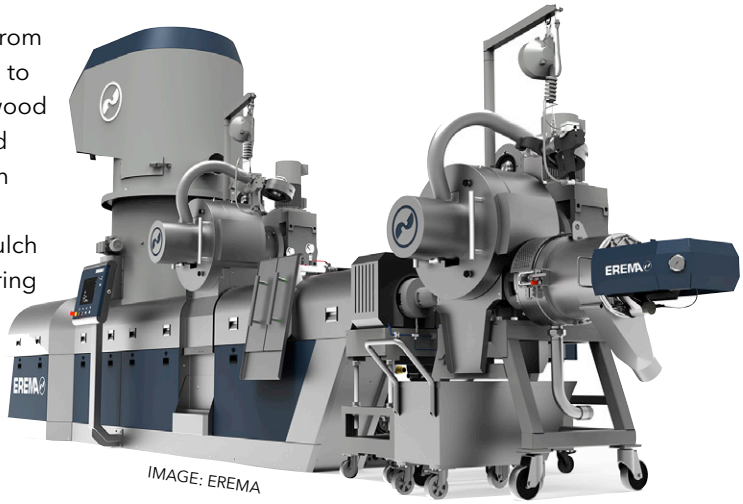

IMAGE: EREMA

Right: Erema says its Intarema TVEplus with DuaFil improve the production of agricultural film

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filtration technology – applied to agricultural film – led to 20°C temperature drops, a 10% rise in throughput and a 10% energy saving, he added.

Mechanical advantage

Andros Engineering is a specialist in machinery used in agriculture, such as drip tape installation – and extraction.

"Mechanisation has made drip tape circularity possible," said Ben Andros, president of Andros Engineering. This also applies to other products such as mulch film, he said.

Drip tape can be installed in the field using special GPS-guided tractors at an exact location and soil depth. At the end of life, it can be extracted from the soil and wound back onto rolls.

"Without effective mechanical densification in the field, drip tape becomes a muddy mess," he added.

With the help of an app, the tape can be collected and transported to a recycler. Andros says that retrieving the tape mechanically is safer and faster than doing it manually.

"Properly densified and clean drip tape is a desirable feedstock," he said. "All parties in the value chain are incentivised to recycle it."

Mulch film can be harder to extract, due to large amounts of "weak and compromised" material, but densification – by winding the film into tight rolls – make it more valuable. These rolls are easy to handle with farm equipment and can be transported to a recycler.

"Extracting mulch mechanically is technically challenging," he said. "Recyclers often need to be convinced of the recyclability of the feed stock."

Recycling streams

Hartmut Bendfeldt, president of **eFactor3**, told delegates there are many different streams of agricultural plastic waste, in various states of contamination – ranging from dirt and sand through to rocks, gravel and dead animals.

"Preparation of the material is key to successful recycling," he said.

Typically, a primary shredder that can deal with heavy contamination is essential – and will break material down to around 300mm in size. This even distribution of material is better for further downstream processes. It can be used to feed complete bales or rolls of film. This kind of equipment is used in the field to prepare material for ongoing recycling.

Extra equipment, such as inline magnets, help to remove ferrous metal contamination such as baling wires. Screening also helps to get rid of contaminants like sand and dirt. One machine offered by the company, called a Windsifter, removes heavy contaminants like root balls, rocks and heavy vegetation.

This leads on to secondary shredding and granulation, cleaning and washing. A secondary shredder reduces material size to around 2in, after which it can be cleaned. The company offers a complete system for 6000-7000 lbs/hour throughput.

Another system, called Plato, is a 'dry cleaning' system that works without water.

■ The next *Agricultural Film* conference takes place in Tampa, USA on 15-16 July. For more details, contact Angelina Ruocco on +1 610 478 0800 (**angelina.ruocco@amiplastics.com**).

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Shining light: innovation in plastic photovoltaics

Recent developments in photovoltaics include improvements to organic solar cells, ways to make them with less harmful solvents and tests that show their value in space

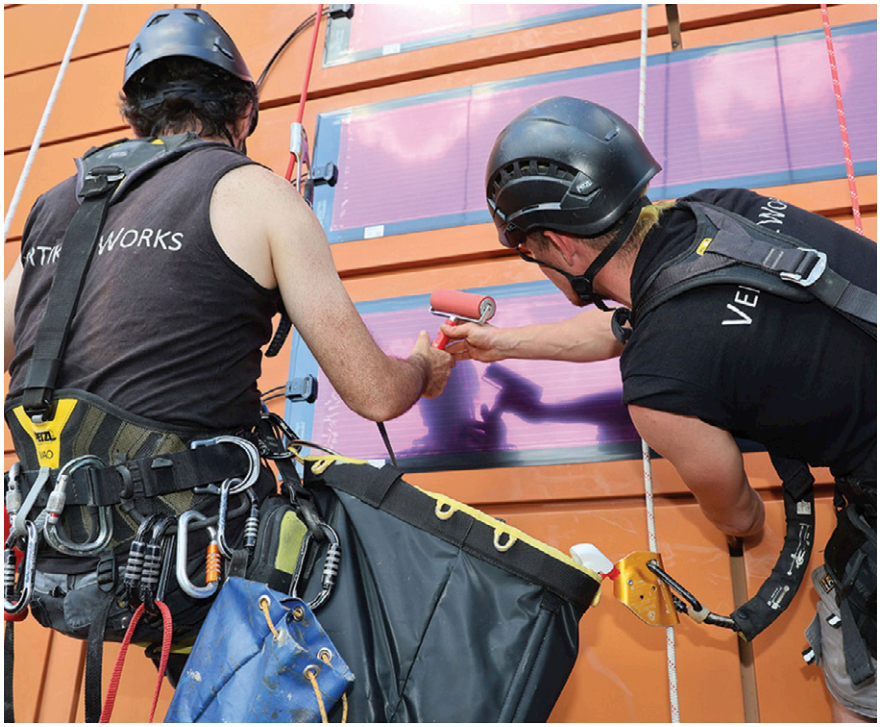

IMAGE: HELIATEK

Main image: Heliatek recently installed 100 HeliaSol solar films onto buildings of the Erlanger Stadtwerke in Germany

Organic solar cells, based on polymers, tend to be less robust but cheaper and more flexible than those based on traditional electronic materials like silicon. They offer great promise as a way of harvesting solar energy from unlikely sources – like clothing.

In general, these materials are still largely developmental, but there are commercial examples. **Heliatek** recently completed a double-façade installation of its HeliaSol solar films on buildings of the Erlanger Stadtwerke (ESTW) in Germany – with two professional high-altitude climbers installing nearly 100 solar films in three days. Thanks to the integrated backside adhesive, the films could be glued directly to the metal building surfaces quickly and efficiently.

"Using every surface of a building skin for clean power generation is central to our vision," said Guido van Tartwijk, CEO of Heliatek. "Façade installations like this are the perfect proof of that idea – transforming surfaces into power generators."

Heliatek is also involved in the Flex16 research project, which aims to increase the efficiency of organic solar cells (OSCs) – and transfer the results into commercial manufacturing processes and marketable products.

As a project partner, Heliatek aims to increase the efficiency of organic solar films by developing new organic semiconductor materials and new cell designs. The current efficiency of its mass-produced HeliaSol solar films is 8-9%. Raising this is an important step in increasing power generation from the same area, making the solution more attractive for users.

In terms of new materials, a core task for researchers will be to develop new absorber materials for various spectral ranges to produce more efficient cells. One challenge is that the materials must be highly thermally stable so they can later be used in mass production. This excludes many known materials – which can achieve high efficiency on a small scale but are not suitable for production. The researchers will also consider new approaches to material combinations

The other key focus is on cell design – specifically how organic solar cells can be built more efficiently. This is crucial for the efficiency of a solar cell and for its lifespan. The goal is to develop new approaches to cell design and to explore how to make efficient and durable solar cells. ›

Right: Making organic solar cells with eco-friendly solvents could propel them into the mainstream

Flex16 started in May 2024 and lasts for three years. There is also a large body of other research dedicated to improving the performance – and commercial potential – of organic solar cells.

Flying high

Organic solar cells are typically seen as less hardy than silicon or gallium arsenide cells, but researchers at **Michigan University** have found one place where they may last longer – in space.

Radiation testing found carbon-based materials could outperform conventional silicon and gallium arsenide for generating electricity in space.

Silicon semiconductors are unstable in space because of proton irradiation coming from the sun, said the researchers, in a study published in the journal *Joule*. Space missions often use gallium arsenide for its high efficiency and resistance to proton damage. However, it is expensive and – like silicon – relatively heavy and inflexible.

Organic solar cells made with small molecules did not seem to have any trouble with protons – and showed no damage after three years of radiation. However, those made with polymers lost around half their efficiency.

"We found that protons cleave some of the side chains, and that leaves an electron trap that degrades solar cell performance," said Stephen Forrest, a professor of engineering at the university, and lead corresponding author of the study. "These grab onto electrons freed by light hitting the cell, preventing them from flowing to the electrodes that harvest the electricity."

He said this could be healed by thermal annealing, or by heating the solar cell.

"But we might find ways to fill the traps with other atoms, eliminating this problem," he added.

It is possible that sun-facing solar cells could 'self-heal' at temperatures of 100°C – as this warmth is enough to repair the bonds in the lab – but it is not certain that repair would take place in the vacuum of space.

Below: Linköping University researchers have devised a new method to make organic solar cells

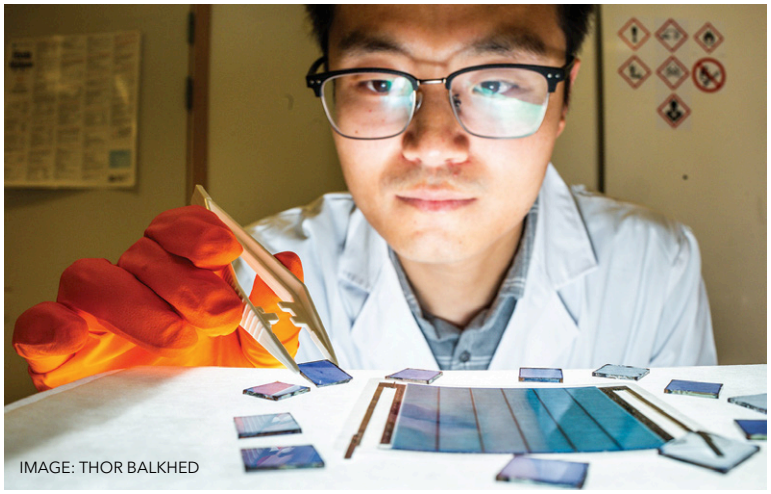

IMAGE: THOR BALKHED

IMAGE: THOR BALKHED

Friendly solvents

Researchers at **Linköping University** in Sweden are also looking into how OSCs could be made at scale with more 'friendly' solvents.

In a study, published in the journal *Nature Energy*, they explain how a detailed study of molecule shape and interaction helped them solve the problem.

Organic solar cells are made in a physical mixture which is then placed on a substrate and the solvent in the mixture evaporates. However, the solution contains toxic and hazardous substances.

"To realise mass production of organic solar cells – with printed technologies, for example, on a large scale – we need to find methods that don't use toxic chemicals," said Feng Gao, professor of optoelectronics at the university.

His team, together with colleagues in China and the US, have managed to produce efficient OSCs using several environmentally friendly solvents.

"To choose the right solvent, it's important to understand the entire solar cell manufacturing process," he said. "This includes knowing the initial structures of the solution, observing the dynamic processes during evaporation and checking the final structure of the solar cell film."

The researchers have mapped the molecular interaction between the materials that transport the electrons and the solvent itself using advanced synchrotron X-ray and neutron techniques. This allowed them to develop a design principle that works for many different harmless solvents. In the long run, they hope that even water could be used as a solvent.

"Thanks to a toxin-free manufacturing method, we have a much greater chance of commercialising

the technology on a larger scale," he said.

Doctor blading

Researchers in China have developed a 'doctor-blading' technique that raises the efficiency of organic solar cells (OSCs) while using eco-friendly solvents.

Doctor blading (also known as 'blade coating') applies a thin layer to a surface by dragging a bead of it out using a thin blade.

The new method claims to address both the environmental and scalability challenges of traditional solvents – such as chloroform – while achieving power conversion efficiencies (PCEs) above 16% using the 'green' solvents o-xylene and toluene.

OSCs are lightweight, flexible and potentially much cheaper than their traditional counterparts, as they can be made using roll-to-roll production. However, the use of halogenated solvents is of environmental concern, and can be a health hazard. This limits scalability, as the solvents need high concentrations and narrow processing windows that complicate large-scale production. Non-halogenated green solvents are considered safer, but their lower solubility and poor film morphology have hindered device performance. These problems are overcome with the new method.

The high-speed doctor-blading method – developed by researchers at **Central South University** – overcomes these challenges. It reduces the solution concentration for OSCs, allowing the use of solvents like o-xylene and toluene without affecting efficiency. The team demonstrated a remarkable module efficiency of 16.07% using o-xylene, showcasing the potential for greener, scalable OSC production.

"This represents a significant leap forward in the field of organic photovoltaics," said Jun-liang Yang, corresponding author of the study. "Our technique, which works with non-halogenated solvents, not only improved the efficiency of organic solar cells but made them more environmentally sustainable and scalable for industrial applications."

The technique could help to cut the carbon footprint of solar cell manufacturing while maintaining efficiency, he added. Cells made this way could be used in applications including flexible, lightweight solar panels for portable electronics, building-integrated photovoltaics, and large-scale solar farms.

Glowing reference

A research team at the **Riken Centre for Sustainable Resource Science** (CSRS) in Japan has developed a self-healing material

that can emit fluorescence when absorbing light. The research, published in the *Journal of the American Chemical Society*, could lead to new materials such as organic solar cells that are more durable than current types.

In 2019, Zhaomin Hou and his team at Riken CSRS copolymerised ethylene and anisylpropylene using a rare-earth catalyst. The resulting copolymer showed remarkable self-healing properties. Its soft components, alternating units of ethylene and anisylpropylene, coupled with hard crystalline units of ethylene-ethylene chains, acted as physical cross-linking points.

Adding to this, they incorporated a luminescent unit, styrylpyrene, into a monomer and formed polymers that included anisylpropylene and ethylene. This process led to the synthesis of a self-healing, fluorescent material.

"Fluorescent materials are useful, as they can be used for organic light emitting diodes (OLEDs), organic field-effect transistors (OFETs), and solar cells," said Masayoshi Nishiura, a researcher in the study.

One of the main problems of these materials is their short lifetime – but the new material can last longer and work with increased reliability, he said.

Self-healing allowed the material to regain its tensile strength within 24 hours. It could even self-heal in water, and both acidic and alkaline solutions. Its network structure, which involves many physical cross-linking points, facilitated the self-repair.

"The material gave us the ability to control its optical and mechanical properties by adjusting the composition of the monomer," said Hou. "We think it could contribute to the development of novel functional materials with high self-healing capabilities."

In the wash

Riken researchers have also developed an organic photovoltaic film that is waterproof and flexible – allowing a solar cell to be put onto clothes and still function after being rained on or washed.

In a study published in *Nature Communications*, Riken scientists have explained how they made the cells waterproof without reducing the flexibility.

Photovoltaic films are typically made of several layers, including an active layer that separates electrons and 'holes' into a cathode and anode. Here, the researchers deposited the anode layer – in this case a silver electrode – directly onto the active layers, creating better adhesion between layers. They then used thermal annealing, exposing the film to air at 85°C for 24 hours.

"In the end we created a film that was 3 microns thick," said Sixing Xiong, lead author of the paper.

The researchers immersed the film in water for four hours and found it retained 89% of its initial performance. They then stretched it by 30% – 300 times – underwater, and found it retained 96% of its performance. Finally, they ran it through a washing machine cycle – and it survived the ordeal.

Kenjiro Fukuda, a corresponding author of the paper, added: "What we have created is a method that can be used more generally. Looking to the future, by improving the stability of devices in other areas – such as exposure to air, strong light and mechanical stress – we plan to further develop our ultrathin organic solar cells so they can be used for practical wearable devices."

At a stretch

Meanwhile, researchers in South Korea have developed high-performance stretchable solar cells.

The researchers, from the **Korea Advanced Institute of Science and Technology** (KAIST), have developed a conductive polymer with high electrical performance and elasticity – which could be used in a stretchable organic solar cell.

Likely uses for such a material would be wearable electric devices, as stretchable solar cells can function under strain. To build such cells, their photoactive layer, which converts light into electricity, should have high electrical performance and mechanical elasticity. This is typically a challenge, making stretchable solar cells difficult to develop.

The researchers, led by Professor Bumjoon Kim of the department of chemical and biomolecular engineering (CBE) conjugated a stretchable polymer to an electrically conductive polymer through chemical bonding. The polymer has a photovoltaic conversion efficiency of 19% and claims to 10 times the stretchability of existing devices. The team has built a solar cell that can be stretched up to 40% during operation.

"Through this research, we developed the world's best-performing stretchable organic solar cell," said Kim. "It is also significant that we developed a new polymer that can be applicable as a base material for various electronic devices that need to be malleable and/or elastic."

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Recent innovations in slitters/rewinders include several model upgrades, a first delivery to Guatemala and how four new machines optimised production at a flexpack specialist

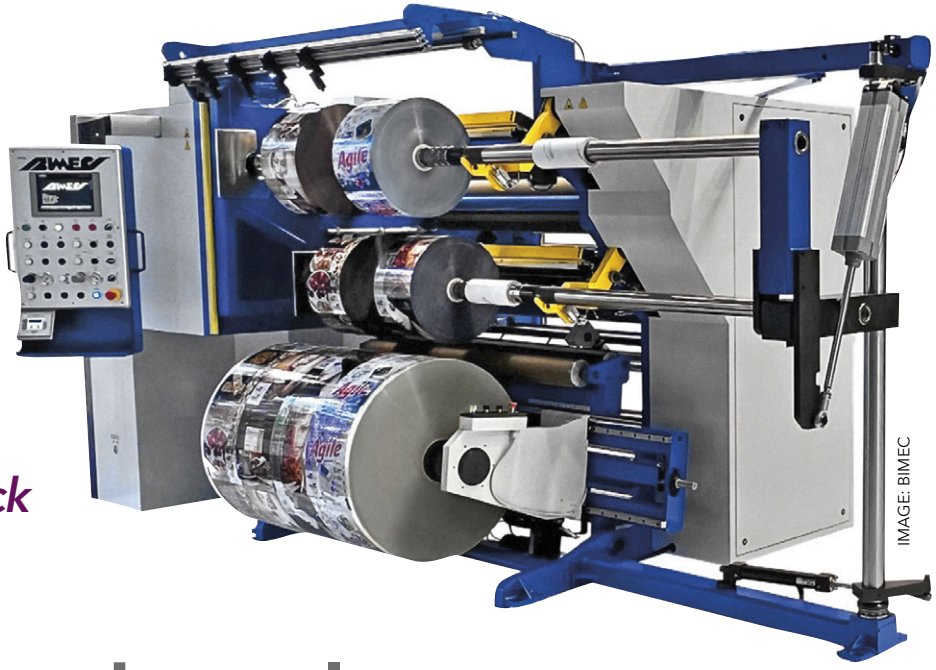

IMAGE: BIMEC

Reel deal: developments in slitters and rewinders

Film extrusion is one thing; but converting it to a usable product – be it tape, labels or film of a specified width – is another. The act of slitting – and rewinding the product onto reels – is critical and must be done as quickly and efficiently as possible. Several suppliers have recently upgraded existing models or extended their offerings.

Italian flexpack producer Gerosa, for instance, recently took delivery of four new TF60 single face slitter rewinders from **Bimec**.

Last year, Gerosa commissioned Bimec to manufacture the new machines, for use at its headquarters and two other production sites. The four slitters add to two purchased in 2021 and intended for materials transformed using both rotogravure and flexography.

The TF60 single face slitter rewinder allows both because its design features unwinding and rewinding on the same side. This can help to reduce start-up times and speed up changeovers between cycles. This is also possible thanks to the automatic positioning systems of the knife holders, the multi-groove female knives and the automatic single laser beam for core positioning, says Bimec.

The system allows simple, intuitive use by the operator. In 2024, it was the subject of a major upgrade and was presented at the Drupa fair in Düsseldorf. It can now process reels up to 1m in diameter in unwinding.

Using the same model of slitter rewinder across three sites also brings added value – not just in the standardisation of the systems, but also by simplifying spare part management.

The four machines were installed and started up in late 2024 and early 2025 and are operating on full cycle.

"Optimising our customers' work cycles and increasing their productivity is our top priority," said Davide Bottoli, general manager at Bimec.

Elena Bottoli, co-owner of the company, added: "Automation and ergonomics are the main trends driving the slitting machinery sector. Converters are looking for increasingly automatic and intuitive machines that simplify operations and reduce downtime. At the same time, there is growing attention to sustainability – meaning material waste reduction."

Integrated unwind

Ashe Converting Equipment displayed its Diamond model duplex slitter rewinder at the recent **ICE** exhibition in Germany.

The 1650mm (65in) wide machine featured an integrated unwind with electric roll lift. Its maximum speed is 500 m/min and it is built in a modular format so the unwind can be separated to allow for other equipment such as perforating systems. The model is suitable for running most web substrates. ❯

Main image: Gerosa is using Bimec TF60 single face slitter rewinders at three of its facilities

IMAGE: ASHE

Above: Ashe displayed its Diamond model duplex slitter rewinder at the recent ICE exhibition

The Diamond cantilevered twin shaft model has been designed to be a modular, cost-effective solution while maximising production output. It is based on the company's earlier Sapphire S2, which can slit most web-based materials.

Ashe says the simple design makes it easy to operate. The unwind can handle a maximum diameter of 1000mm (40in) and is available in widths of 1000-1850mm (40-73in).

As the design is modular, the machines can be configured to meet exact requirements. it is available with an integrated unwind – to make it a one-piece unit – or with a separate unwind to allow ease of access to the slitting station so that other equipment, such as perforation, can be easily accommodated within the machine.

In addition – at last year's Drupa – the company launched its Sapphire S3 Duplex slitter rewinder. Ashe developed the S3 to be a fully automated duplex or duplex turret requiring minimal operator involvement.

The machine has a new unwind loading system for the master rolls which automatically positions the unwind into the correct position when at the correct height. This can be configured with auto knife positioning and auto rewind core positioning, which requires minimal operator input as the machine virtually sets itself, says Ashe.

Another feature of the S3 is a linear lay-on concept, adapted from its earlier Sapphire DB and S2 models.

Ashe says the S3 "gives a true duplex centre winder with linear lay-on". Linear lay-on helps to improve automation. Each lay-on roller sits on its own independent carriage which moves linearly away from the rewind shaft. This allows integration of an automatic cross cutting mechanism and addition of tape applicators that can automatically close the finished rolls and tape the incoming web onto the new cores.

Guatemala debut

Guatemala-based stretch film producer **Epsilon Packaging** has taken delivery of an Allrollex line from **Colines** – which includes an offline machine from **Noel**, allowing rewinding and film pre-stretching.

The Pre 500 Multi from Noel allows rewinding and pre-stretching of stretch film, both core and coreless. In addition, the five-layer, 1500mm 3-up line from Colines allowed the customer to operate at full capacity right after installation.

"We started extruding high quality film very quickly, and extreme flexibility and automation of the line makes it easy for anyone to manage it," said Eduardo Arathoon, CEO and founder of Epsilon Packaging. "Our next step is to further equip the line so we can produce high-quality film with a significant percentage of PCR resins."

The agreement was originally signed at the NPE show in the US in 2024. It is the first sale in Guatemala for both suppliers.

Matteo Collegini, sales manager at Noel, said: "This will give Epsilon the opportunity to offer its customers sustainable packaging options such as pre-stretched and coreless film."

Smart slitting

US-based **Maxcess** has launched the Tidland Smart Slit automated slitting system, aimed at narrow web applications.

The system allows automatic, precise placement of slitting blades, eliminating the need for manual adjustments, and reducing set-up time, it says. This, in turn, can raise productivity and cut operational costs.

"Smart Slit is ideal for tag and label producers and narrow web converters looking to automate manual finishing operations or add finishing operations to their current lines," said Richard Provencher, global product manager for Tidland Slitting and Winding.

Features of the Smart Slit include: use of up to 24 knives – about twice that offered by competitive systems; a maximum web width of 48in (1220mm); the option to run either automated or manual; removable blade cartridges; and the ability to autoscan current slit position.

"Our automatic machinery movement minimises manual hand adjustment and reduces safety concerns and operator errors," said Provencher. "Users get improved ergonomics and greater accuracy compared to manual position alternatives."

Repeat jobs can be stored for later re-use. Provencher claims a two-year payback for the system.

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US merger

Kampf and **Atlas Converting North America** – both part of the **Jagenberg Group** – will now operate under the unified name Kampf Machinery North America in the US.

The move is part of the company's 'One Face to the Customer' strategy and is a way to "enhance internal processes, strengthen market presence, and optimise customer interactions", it said.

The company's two US locations are in Charlotte, North Carolina (Atlas) and Windsor, Connecticut (Kampf). Both locations will remain operational. The company says that by combining the strengths of the two locations – which will remain operational – it can ensure faster response times and more efficient processes.

Combining the expertise and resources of both companies, Kampf Machinery North America says it will "strengthen its position in the North American market and expand its leadership in mechanical engineering and technology solutions".

The two companies have a 4,000 sq ft technology centre – offering both duplex and turret slitter rewinders from the TitanSlitter and ConSlitter series – at the Charlotte site.

Group companies also exhibited at the recent ICE show. Jagenberg Converting Solutions (JCS) and Kampf LSF, for instance, highlighted collaborations in turnkey solutions in the energy and surface market. JCS offers solutions for the energy and decorative surfaces sectors, which are scalable from laboratory to production scale. Kampf LSF provides slitting and winding expertise with its EvoSlitter and TechWinder machines – as well as customised machines for special solutions. These are developed for demanding applications and tailored to the needs of customers.

In addition, Kampf and Atlas focused on their ConSlitter BlueLine and ConSlitter BlackLine at the show. With these machines, Kampf and Atlas demonstrated advanced automation and flexible handling, as well as energy-efficient sustainability. They also presented solutions for packaging applications and labels – known as rigids – with their UniCon and UniSlit II c/s machines.

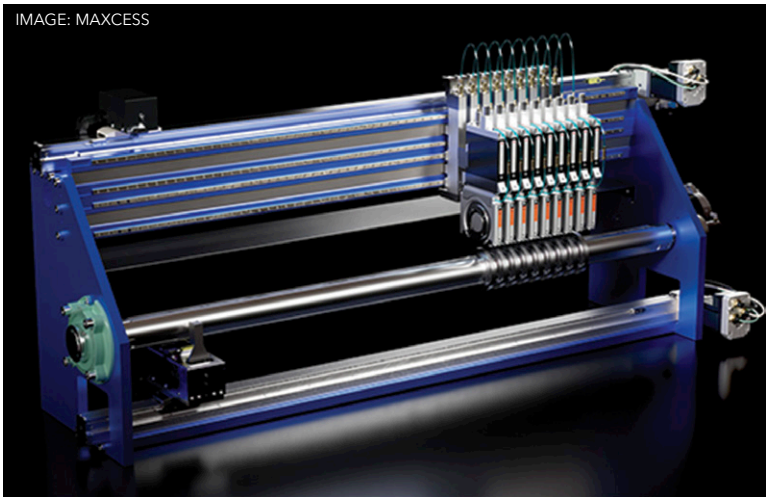
IMAGE: MAXCESS

Above: The Tidland Smart Slit automated slitting system from Maxcess is aimed at narrow web applications

Italy expansion

In June 2024, **IMS Technologies** opened a new production facility at its Calcinate plant in Bergamo, Italy.

This 5,500 sq m extension increases the group's total area to 28,500 sq m. The expansion follows the consolidation of all assembly activities in Italy, marked by the 2021 closure of its Darmstadt plant in Germany.

IMS Technologies now operates its headquarters in Calcinate, with other production sites in Seriate and Casale Monferrato, plus sales and after-sales offices in Germany, the US and China.

The expansion of the Calcinate campus, which lasted about a year, allows for the optimisation of machine assembly and testing activities, which meets the needs of an evolving market, said the company. The project was designed to be modular, allowing for future expansion to support business growth.

Internal logistics have been improved, with new

Right: Goebel has added automatic knife positioning as an option for its Rapid slitter-rewinder

traffic routes separating the flow of goods transport vehicles from the flow of cars, raising safety for employees and visitors. In addition, the new building has a modern underfloor heating system with a heat pump, providing maximum comfort in the factory while being environmentally friendly. A 350kWp photovoltaic panel system was also installed, complementing power from existing panels, for a total of 700kWp.

"The inauguration of the new plant represents a clear and tangible sign of our company's growth," said Stefano Bartolini, CEO of IMS Technologies.

Knife position

Meanwhile, IMS group company **Goebel** has developed an upgrade option for its Rapid slitter-rewinder: an automatic knife positioning system.

Specifically designed by Dienes for the Rapid machine, the system offers high levels of precision, productivity and user convenience.

The Rapid is an established model in slitting and winding applications, known for its precision in processing a variety of materials. Integration of the new system helps Rapid "to raise the bar even higher", meeting the demands of modern production with enhanced performance, says Goebel.

The automated knife positioning system has a stand-alone control system with a dedicated touch panel and 'pick and place' automation that allows for quick, precise upper knife adjustments. It can handle a minimum slitting width of 20mm and maximum web speed of 1,000 m/min. DS4 shear knife holders, equipped with 105mm diameter knives and quick-change heads, include a double vertical stroke guide for added rigidity, ensuring robust and reliable cuts.

The company claims several benefits of the new system. One is easy integration. The system integrates seamlessly into existing equipment, reducing set-up time and allowing a smooth transition to the latest technology. In addition, maintenance is more efficient: the system is designed for cost-effective maintenance without disassembling the top knife shaft, which minimises downtime and ensures a fast switch to new slitting formats.

Other include: enhanced Safety, due 360° hand protection and limited overhead work; increased machine availability, as offline knife replacements with quick-change heads optimise uptime; and stable, error-free operation, thanks to its Easy Set integration and touch-panel control.

Below: Helios slitters integrated into an accumulator at PTI's technology development centre

IMAGE: PTI

French film

Roll-o-Matic has delivered a high-speed multilane winder (HMW) 1250 to Guerin Plastiques in France.

Guerin, part of the Plastica CI group, will use the machine – installed in-line with an extruder – to produce dry-cleaning film in two lanes with high efficiency.

The HMW 1250 has a maximum winding width of 1250mm and a maximum roll diameter of 310mm.

The Roll-o-Matic team oversaw the machine's startup at Guerin and provided training to staff.

Roll-o-Matic has also updated several of its other models. For instance, it has upgraded the HMW750 to boost efficiency and versatility for bag and sheet production. Firstly, it has a larger roll capacity, for diameters up to 508mm (20in). In addition, it now operates at speeds up to 220 m/min (720 ft/min), in widths of 100-750mm (4-29.5in).

The company has also updated its Omega 1250 line – a high-performance solution for high-volume production of bottom-sealed bags in light gauge film, for applications such as fruit and vegetable bags.

Optimised for up to six-lane production, the Omega 1250 now delivers more value, says the company. One key factor is easier set-up – due to

partitions on the HMW 1250 winder now being made from lightweight aluminium, making it easier and faster to change the number of lanes.

Distribution agreement

Last year, **Processing Technologies International** (PTI) became the exclusive distributor for **Helios Slitting**, supplying slitters, parts, service and support to the US and Canada.

The agreement focuses on providing sales, support and services for slitter and related components for plastic sheet. This synergy and local hub for processing components provides a mutually beneficial provision in terms of timely product availability that would otherwise take several weeks to months to fulfill through overseas negotiations, said PTI.

In addition, PTI aftermarket, customer service and process technicians have been trained on the product features, uses, and installation methods, which in turn can be relayed to onsite personnel via training or phone support.

Based in Italy, Helios operates in the cutting sector, specialising in shear, razor and pressure cutting systems and offering solutions for edge trim, central and multiple cut modules. Its areas of application are wide-ranging, mainly in flexible coil and sheet material.

Attilio Cavagna, president of Helios, said the agreement signified a local presence in North America and would result in easier sales and distribution and increased product expertise and customer satisfaction.

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RECYCLING

Handheld plastics identifier

Trinamix has expanded its range for plastics identification with a new handheld NIR spectrometer.

The Trinamix Pal Two uses mobile near-infrared spectroscopy to identify specific plastics for recycling purposes.

It allows for single-handed operation, making it user-friendly and convenient.

In addition, it includes a built-in display that presents measurement results directly on the device, enhancing usability and accessibility for users.

Because many plastics sorting processes rely on near-infrared (NIR) technology, material must be 'NIR detectable'. The design of packaging plays a key role for this parameter. Features like colour, labels and additives can affect a package's ability to be identified.

› **www.trinamix.de**

EXTRUSION

PTI adds to portfolio of dryerless extruders

Processing Technologies International (PTI) has further expanded its portfolio of dryerless twin screw extruders.

The SGTSE MultiRESN model – while not new to the product line – has been gradually improved over time to meet industry demands and processing capabilities. It was originally launched as a 90mm 50/LD, 430 hp oil-cooled, co-rotating twin screw.

Maintaining the premise of intermeshing co-rotating, self-wiping screws, with high-vacuum venting to eliminate the crystallising and drying processes, the SGTSE MultiRESN claims to outperform other twin-screw technology in terms of operating performance, energy efficiency and sustainable use of resources.

Capable of processing a variety of virgin, post-consumer, post-industrial resins and flake – including PET, PLA, PP, PS and PE, without first having to crystallise, dry or change screws – the SGTSE MultiRESN offers significant advantages. Capital equipment needs, floor space, logistics, associated labour and energy usage are minimised or eliminated with dryerless technology.

The added capability to process many resins on one system leads to greater versatility and opportunities for the processor to meet consumer demands, says PTI.

The newest version incorporates PTI's M-Atex technology – which allows free thermal expansion of the equipment – as well as its Titan control system, and RealTime IV monitoring. This allows improvements in several areas, including: targeted sizes that coincide with processor needs; modular components; greater heat retention; higher energy efficiency; and easy screw removal.

› **www.ptiextruders.com**

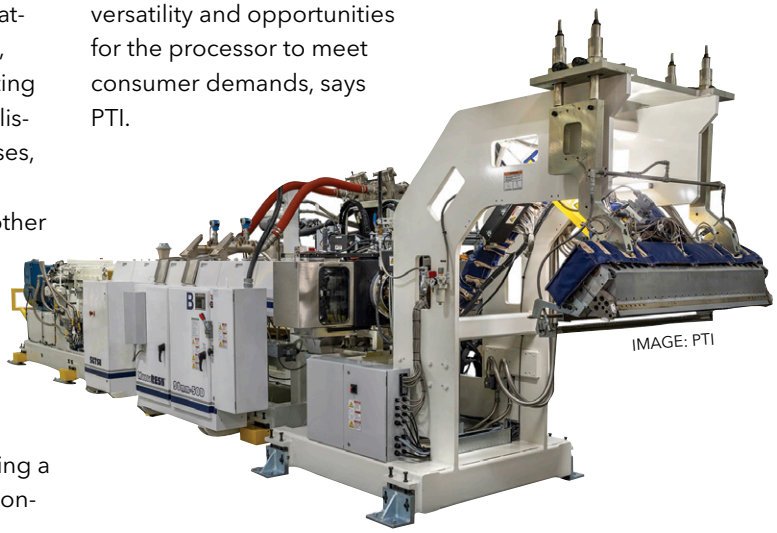

IMAGE: PTI

MELT FILTRATION

Filtration for high contamination

IMAGE: BB ENGINEERING

BB Engineering has developed its Cobra filter, which was specially designed for challenging filtration tasks with high levels of contamination – such as PET recycling.

The new filter combines large-area fine filtration with fast cleaning, so can handle higher contamination rates that would be beyond common candle filters, it says.

It offers a filtration area up to 24 sq m and features an automatic cleaning and changeover process – for which no manual intervention in required. This helps to minimise handling and increase process stability. Output is 500-4,000 kg/hour.

A self-cleaning system, called white filter cleaning, uses only superheated steam. Gentle cleaning temperatures also help to extend service life, it says.

A two-chamber housing ensures continuous operation. The filtration and cleaning form a closed system, so operators do not need to handle toxic substances or hot melt.

› **www.bbeng.de**

RECYCLING

Feeder lines aid with plastic recycling

Coperion will present a number of technologies for processing and recycling plastics at Chinaplas.

With Herbold Meckesheim, it offers plants for a variety of plastics recycling applications, from mechanical processing – shredding, washing, separating, drying and agglomerating plastics – to bulk material handling as well as feeding and extrusion through to compounding and pelletising.

Coperion says that its ProRate Plus continuous gravimetric feeder line is an economical solution and offers a quick return on investment due to its good price-performance ratio and fast delivery times. It features a space-saving trapezoidal shape which allows up to six feeders to be grouped around an extruder inlet within a 1.5m radius. Three single-screw feeder models (Plus-S, Plus-M and Plus-L) along with the PLUS-MT twin screw model cover a range of throughputs and bulk materials.

In addition, it will demonstrate its Coperion K-Tron K2-ML-D5-T35 gravimetric feeder with ActiFlow smart bulk solid activator and EPC (Electronic Pressure Compensation). The feeder is equipped with a 2415 vacuum receiver for refill.

The ActiFlow smart bulk solid activator offers a way to prevent bridging and rat-holing of cohesive bulk materials in stainless steel hoppers without internal hopper agitation. It applies gentle vibrations to the hopper wall, to activate the contained material with the optimal amplitude and frequency. It is designed specifically to work with Coperion K-Tron's line of gravimetric loss-in-weight feeders.

› **www.coperion.com**

DOWNSTREAM EQUIPMENT

MDO stretching helps boost recyclability of packaging film

At Chinaplas, Reifenhäuser will present its latest innovations for producing plastic films – including machine direction orientation (MDO) technologies for making recyclable mono-material films, and other downstream equipment.

IMAGE: REIFENHAUSER

"In flexible packaging, we are seeing a huge trend towards recyclable mono-material composites, both for blown and cast films," said Marcel Perrevort, CSO of Reifenhäuser. "Our MDO stretching units enable enhanced mechanical properties for all-PE or all-PP films, allowing PET films to be replaced."

With the Evo Ultra Stretch MDO unit for its blown film lines, manufacturers can make all-PE mono films for applications such as high- barrier food pouches. Integrating the MDO unit directly into the haul-off, the film is stretched using the 'first heat' of the process, for maximum efficiency and film stability.

In addition, the all-PE film achieves the required barrier effect with a 5% EVOH content, which meets the criteria for recyclability. At the same time, Ultra Stretch enhances the performance of the EVOH barrier layer while reducing material usage, delivering cost and sustainability benefits.

Reifenhäuser's Kdesign subsidiary, a specialist in cooling, measuring, and calibration systems for blown film lines, will showcase its Karat cooling ring. With a claimed output capacity of 50% higher than mid-range products and 25% higher than high-end competitors, it enables an increase in productivity, while maintaining profile tolerances and film quality. Kdesign also offers secondary cooling units. With Centro-Freeze, producers avoid film blocking in the haul-off by cooling the bubble before it enters the flattening process. Output is further increased, while producers save on anti-block additives and improve film properties.

› **www.reifenhauser.com**

CAST FILM

Cast line for mono-materials

In recent months, SML says it has focused on increasing capacity, productivity and efficiency as well as promoting recyclability.

At Chinaplas, it will focus on its new type of multi-functional cast film system for efficient production of easy-to-recycle mono-material film.

Beside standard products, such as CPP, CPE, cast-PET and barrier films, its new cast film line with MDO unit is specially designed to process mono-oriented films for easy recycling. The line can produce a wide functional range – from standard food and non-food packaging to easy-to-recycle stand-up pouches in a thickness range of 15 to 60 microns.

› **www.sml.at**

Download these new product brochures

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DIING KUEN: BLOWN FILM

In this brochure, Taiwan-based Diing Kuen provides all the specifications of its blown film technology to produce mono, two three, five and seven layers.. The film lines are divided into four categories: HTRL horizontal top rotating; EBLR vertical top rotating; BFL fixed; and other types.

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AMUT: FOIL EXTRUSION LINES

Built on more than 50 years of plastics expertise, Amut's range of extrusion lines for production of foil and sheet covers a broad range of applications. They can produce mono or multi-layer sheet as thin as 150 microns and as wide as 3.3m at rates up to 4 tonnes/hr or more.

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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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BRUCKNER: BOPP/BOPE FILMS

Brückner Maschinenbau says its BOPP/BOPE film lines offer benefits including high stiffness and sealing strength, excellent transparent barrier, outstanding puncture resistance and linear tear opening behaviour. Find out more in this brochure.

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HAN KING

Han King, based in Taiwan, has produced this brochure outlining its machines for blown film extrusion, covering five-layer film, three-layer co-extruded film, agricultural film, geomembranes; plus other products in stretch hood, lamination and bags.

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VAN MEEUWEN: ADDITIVES

Van Meeuwen's functional additive range for plastics film and sheet producers includes anti-blocks, anti-statics, anti-fogs and specialty fluids. Suitable for plastic packaging applications, products comply with EU food contact regulations.

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

Gerosa Group

Head office:	Inverigo, Italy
General manager:	Maximiliano Bruno
Founded:	1935
Ownership:	Private
Turnover:	Around €258 million (2022)
Employees:	Around 836 (2022)
Profile:	Gerosa Group has grown into a specialist in flexible packaging and labels. It made its first foreign acquisition in 2004, buying Rieusset of Spain. It now has production in Italy, Spain and Romania and sales offices in Germany and France. Its products, including twist-wrap film, bags, stand-up pouches and a variety of labels are used in industries including food, drink and personal care.
Product lines:	The company offers a wide array of flexible packaging. It recently launched its G4R packaging, which has an invisible code that can be scanned with a mobile device to deliver multimedia content. It also has protective and antibacterial functions to extend shelf-life. The packaging also prevents leakage of mineral oils. The concept has been put into practice in a collaboration with BeeGraphic, to create 'smart coffee'.
Factory locations:	The company has five production sites in Europe. Its main site in Inverigo produces multi-layer laminates and cold seal packaging, while a second Italian facility in Brescia specialises in digital printing. Its Rieusset plant in Spain prints labels, sleeves and plastic film for food, while a second Spanish plant makes metallised film, among other products. Artema Plast, in Romania, uses both flexographic and rotogravure printing.

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

Film and Sheet EXTRUSION FORTHCOMING FEATURES

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

May 2025
Waterproof membranes
Materials handling
Sheet materials

June 2025
Printing equipment
Blown film dies
Stretch/shrink film
Masterbatch

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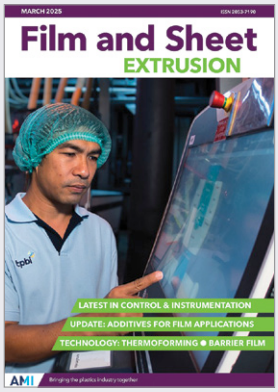

Film and Sheet
March 2025
The March issue of Film and Sheet Extrusion has a cover story looking at the increasing sophistication of control systems for film and sheet companies, while other features cover the latest developments in thermoforming, barrier film and additives for film.

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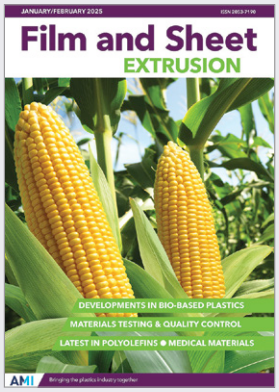

Film and Sheet
January/February 2025
The January/February edition of Film and Sheet Extrusion looks at how bioplastics producers are broadening the appeal of their offerings for film and sheet companies, plus new materials for medical applications, polyolefin-based developments and a testing/ quality control update.

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Compounding World
April 2025
The April issue of Compounding World has features that delve into the strict regime in medical materials, the science behind processing aids, solutions for impact resistance and new additives for polyamide applications.

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Plastics Recycling World
March/April 2025
Plastics Recycling World's March-April edition investigates additives that benefit recycled plastics, and looks at the latest in melt filtration and PET recycling, plus there's a preview of the conference at GreenPlast 2025 in Italy.

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Pipe and Profile
Spring 2025
Features in Pipe and Profile Extrusion's Spring edition find that polyolefin materials are as critical as ever in numerous pipe applications, melt filtration is a hot topic in recycling, and control/ measurement is advancing.

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Injection World
March/April 2025
The March/April issue of Injection World magazine reports on expert opinion in the caps and closures sector, performance polymers in high-temperature operating environments and the use of AI for automation and robotics in injection moulding.

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GLOBAL EXHIBITION GUIDE

2025	**15-18 April**	Chinaplas, Shenzen, China	www.chinaplasonline.com
	7-8 May	PlastTeknik Nordic, Malmö, Sweden	www.plasttekniknordic.com/en/
	8-10 May	RePlast Eurasia, Istanbul, Turkey	www.replasteurasia.com
	13-15 May	Kuteno, Bad Salzuflen, Germany	www.kuteno.de
	14-17 May	Plastics & Rubber Thailand, Bangkok, Thailand	https://www.plasticsrubberthailand.com
	20-23 May	Plastpol, Kielce, Poland	www.targikielce.pl/en/plastpol
	27-30 May	GreenPlast, Milan, Italy	www.greenplast.org
	24-26 June	Foam Expo North America, Novi, MI, USA	www.foam-expo.com
	8-15 October	K2025, Dusseldorf, Germany	www.k-online.com
	12-13 November	Plastics Extrusion World Expo North America, Cleveland, OH, USA	https://na.extrusion-expo.com/
	3-6 December	PlastEurasia, Istanbul, Turkey	https://plasteurasia.com
2026	**20-22 January**	Swiss Plastics Expo, Lucerne, Switzerland	https://swissplastics-expo.ch
	7-13 May	Interpack, Dusseldorf, Germany	www.interpack.com
	2-4 June	Interplas, Birmingham, UK	www.interplasuk.com
	2-5 June	Equiplast, Barcelona, Spain	www.equiplast.com

AMI CONFERENCES

21-22 May 2025	Multilayer Flexible Packaging North America, Chicago, USA
24-26 June 2025	Chemical Recycling Europe, Brussels, Belgium
15-16 July 2025	Agricultural Film North America, Tampa, USA
19-20 August 2025	Rigid Packaging Forum North America, Cincinnati, USA
26-27 August 2025	Bioplastics, Cleveland, USA
16-18 September 2025	Single-Serve Capsules Europe, Malaga, Spain
9-10 December 2025	Recycling Flexible Packaging, Vienna, Austria
9-10 December 2025	Stretch & Shrink Film North America, Tampa, USA
9-10 December 2025	Specialty Packaging Films Europe, Vienna, Austria
2-4 February 2026	Polyethyene Films, Tampa, USA

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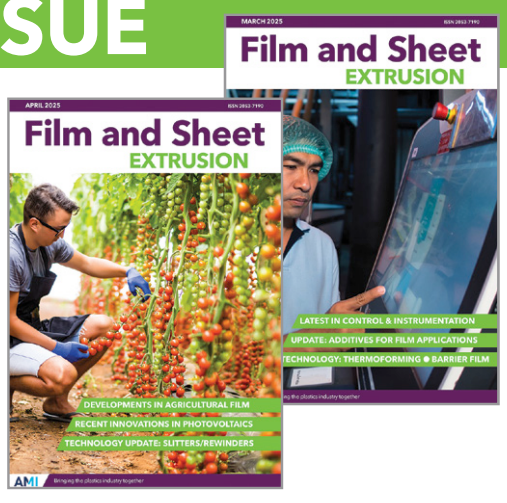

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